FINAL

STORM WATER MANAGEMENT PROGRAM PLAN FOR MARINE CORPS BASE HAWAII

Kaneohe Bay, Oahu, Hawaii

NPDES Permit No. HI S000007

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List of Acronyms and Abbreviations

ADP	Available Demonstrated Practices
ADT	Available Demonstrated Technology
AFFF	Aqueous Film Forming Foam
AMS	Asset Management System
AUL	Authorized Use List
BAT	Best Available Technology Economically Achievable
BCT	Best Conventional Pollutant Control Technology
BMP	Best Management Practice
BOD	Biochemical Oxygen Demand
CERCLA	Comprehensive Environmental Response Compensation and Liability Act
CFR	Code of Federal Regulations
CFS	Cubic Feet per Second
CLB-3	Combat Logistics Battalion
CO	Base Commanding Officer
COD	Chemical Oxygen Demand
CWA	Clean Water Act
DOD	Department of Defense
DOE	Department of Education
DOH	State of Hawaii Department of Health
DOT	Department of Transportation
DWCP	Digging Work Clearance Permit
EA	Environmental Assessment
ECATTS	Environmental Compliance Assessment, Training, and Tracking System
ECC	Environmental Compliance Coordinator
ECPD	Environmental Compliance and Protection Division
EDOP	Effective Date of Permit
EIS	United States Environmental Impact Statement

EISA	Energy Independence and Security Act (2007)
EPA	Environmental Protection Agency
EPCRA	Emergency Planning and Community Right-to-Know Act
EQA	Environmental Quality Assessment
FEAD	Facilities Engineering and Acquisition Division
FWPCA	Federal Water Pollution Control Act
GIS	Geographic Information System
GP	General Permit
GPD	Gallons per Day
GPM	Gallons per Minute
HAR	Hawaii Administrative Rules
HAZMIN	Hazardous Material Minimization
ICDM	Industrial and Commercial Discharge Management
ICP	Integrated Contingency Plan
IDDE	Illicit Discharge and Elimination
IP	Individual Permit
IPMP	Integrated Pest Management Plan
IRP	Installation Restoration Program
ISWM	Integrated Solid Waste Management
ISWMP	Integrated Solid Waste Management Plan
LFPE	Logistics Facilities Public Works Engineering
LID	Low Impact Development
M1R1	Maintenance 1 Repair 1
M2R2	Maintenance 2 Repair 2
MCBH	Marine Corps Base Hawaii
MCCS	Marine Corps Community Services
MCD	Facilities Engineering Maintenance Control Division
MCO	Marine Corps Order

MEP	Maximum Extent Practicable
MGD	Million Gallons per Day
MRO	Facilities Engineering Maintenance Repair Operations
MS4	Municipal Separate Storm Sewer System
MS4 Permit	Marine Corps Base Hawaii's Municipal Separate Storm Sewer System (MS4) NPDES Permit, No. HI S000007
MSDS	Material Safety Data Sheet
NAD 83	North American Datum 83
NAVFAC Hawaii	Naval Facilities Engineering System Command Hawaii
NAVFAC Pacific	Naval Facilities Engineering System Command Pacific
NEPA	National Environmental Policy Act
NEPMU-6	Navy Environmental Preventative Medicine Unit 6
NGPC	Notice of General Permit Coverage
NOI	Notice of Intent
NOPRS	NAVFAC Online Pesticide Reporting System
NPDES	National Pollutant Discharge Elimination System
NSDEPP	Non-Storm Water Discharge Elimination and Prevention Program
O&M	Operation and Maintenance
OMC	Ohana Military Communities
OPA 90	Oil Pollution Act of 1990
OSHA	Occupational Safety and Health Administration
PCB	Polychlorinated Biphenyl
pH	Hydrogen-Ion Activity
PM	Project Manager
POL	Petroleum, Oil, Lubricant
POTW	Publicly Owned Treatment Works
PPM	Parts Per Million
PPMC	Professional Pest Management Consultant
PPV Housing	Public-Private Venture Housing

QA/QC	Quality Assurance/Quality Control
RCRA	Resource Conservation and Recovery Act
SARA	Superfund Amendment and Reauthorization Act
SAS	Satellite Accumulation Site
SIC	Standard Industrial Classification
SOP	Standard Operating Procedures
SPCC	Spill Prevention, Control, and Countermeasures
SWMP	Storm Water Management Program
SWPPP	Storm Water Pollution Prevention Plan
TMDL	Total Maximum Daily Load
TSS	Total Suspended Solids
UIC	Underground Injection Control
U.S.C.	United States Code
USMC	United States Marine Corps
UST	Underground Storage Tank
VOC	Volatile Organic Compound
WLA	Waste Load Allocation
WQC	Water Quality Certification
WRF	Water Reclamation Facility

Definitions

Activity	An independent command performing a specific mission and having its own unit identification code.
Acute Toxicity	Any toxic effect that is produced within a short period of time, generally 96 hours or less. Although the effect most frequently considered is mortality, the end result of an acute effect could be any harmful biological effect.
Adsorption	The collection of a gas, liquid, or dissolved substance in a condensed form on a surface. An example would be the tendency of contaminants to collect on and adhere to sediment particles.
Algae	Aquatic, non-flowering plants that lack roots and use light energy to convert carbon dioxide and inorganic nutrients such as nitrogen and phosphorus into organic matter by photosynthesis. Common algae include dinoflagellates, diatoms, seaweeds, and kelp. An algal bloom can occur when excessive nutrient levels and other physical and chemical conditions enable the algae to reproduce rapidly.
Aquifer	The underground layer of rock or soil in which groundwater resides. Aquifers are replenished or recharged by surface water percolating through soil. Wells are drilled into aquifers to extract water for human use.
Base Flow	The flow contribution to a creek by groundwater. During dry periods, base flow constitutes the majority of stream flow.
Baseline Load	Quantitative estimate of the debris currently being discharged from the Municipal Separate Storm Sewer System (MS4).

Best Available Technology Economically Achievable (BAT)

Defined in Clean Water Act (CWA) Section 304(b)(2). In general, BAT represents the best available economically achievable performance of plants in the industrial subcategory or category. Factors considered in assessing BAT include:

- cost of achieving BAT effluent reductions;
- age of equipment and facilities involved;
- the processes employed by the industry and potential process changes;
- non-water quality environmental impacts, including energy requirements; and
- other factors as the Environmental Protection Agency (EPA) deems appropriate.

Best Conventional Pollutant Control Technology (BCT)

Defined in CWA Section 304(b)(4), addresses conventional pollutants from existing industrial point sources. In addition to considering the other factors specified in Section 304(b)(4)(B), EPA establishes BCT limitations after consideration of a two-part "cost-reasonableness" test. This methodology was published in a Federal Register notice on July 9, 1986 (51 FR 24974).

Best Management Practice (BMP)

Measure that is implemented to protect water quality and reduce the potential for pollution associated with storm water runoff.

Bioaccumulation — The process by which a contaminant accumulates in the tissue of an organism. For example, certain chemicals in food eaten by a fish tend to accumulate in its liver and other tissues.

Bioavailable — Available for biological uptake.

Biodegradation — The conversion of organic compounds into simpler compounds (such as carbon dioxide and water) through biochemical activity. Toxic compounds can be converted into non-toxic compounds through biodegradation. However, in some cases, complex compounds are first converted into intermediate substances that can be more toxic than the original substance.

Biofiltration — Treatment technology that uses microorganisms in the destruction of volatile organic compounds. Waste gases are purified by passage through a biologically active, porous medium. As the waste gases pass through the medium, contaminants are absorbed into a wet/biofilm layer and are aerobically degraded to carbon dioxide, water, and biomass end products.

Biochemical Oxygen Demand (BOD)

The amount of oxygen in water required by bacteria to decompose organic matter under an aerobic condition. BOD is an indicator of water quality: a high BOD value indicates a high level of pollution. Although BOD is not a specific compound, it is defined as a conventional pollutant under the CWA.

Biomagnification — The process by which concentrations of contaminants increase (magnify) as they pass up the food chain such that each animal in the food chain has higher tissue concentrations than did its food. For example, concentrations of certain contaminants can increase as they are passed from plankton to herring to salmon to seals.

Channelization — The process of making a channel or channels. A channel is the bed of a stream or river, or the hollow or course in which a stream flows.

Check Dam — A small dam designed to slow the velocity of water and sediment in a channel, used especially for grade control and channel erosion reduction.

Chemical Oxygen Demand (COD)

A test that measures the amount of oxygen in water required for chemical oxidation of organic matter.

Chronic Toxicity — Any toxic effect on an organism that results after exposure of long duration (often 1/10th of the life span or more). The end result of a chronic effect can be death although the usual effects are sublethal (e.g., inhibited reproduction or growth).

These sublethal effects may be reflected by changes in the productivity and population structure of the community.

Clean Water Act (CWA)

The Federal Water Pollution Control Act (FWPCA) enacted by Public Law 92-500 as amended by Public Laws 95-217, 95-576, 96-483, and 97-117; 33 U.S.C. 1251 et seq. It is the primary federal law in the U.S. governing water pollution.

Coliform Bacteria Organisms residing in the intestinal tracts of human beings and other warm-blooded animals. The presence of coliform bacteria indicates the presence of fecal contamination.

Combined Sewer Overflow (CSO)

A pipe that discharges untreated wastewater during storms from a sewer system that carries both sanitary wastewater and storm water. The overflow occurs because the system does not have the capacity to transport and treat the increased flow caused by storm water runoff.

Combined Sewer System

A wastewater collection and treatment system where domestic and industrial wastewater is combined with storm runoff. Although such a system does provide treatment of storm water, in practice the systems cannot handle major storm flows resulting in untreated discharges from combined sewer overflows.

Critical Area A source area that has a high likelihood for the release of pollutants.

Culvert A drain, usually a concrete or metal pipe, crossing under a road or an embankment.

Detention The process of collecting and holding back storm water for later release to receiving waters.

Dissolved Oxygen Oxygen that is present (dissolved) in water and therefore available for fish and other aquatic animals to use. If the amount of dissolved oxygen in the water is too low, then aquatic animals may die. Wastewater and naturally occurring organic matter contain oxygen-demanding substances that consume dissolved oxygen.

Dry Weather Flow Flow from anything other than a storm event; non-storm runoff (e.g., air conditioning condensate, landscaping overflow, etc.).

Environmental Impact Statement (EIS)

A document that discusses the likely significant impacts of a proposal, methods to lessen the impacts, and alternatives to the proposal, required by the National Environmental Policy Act (NEPA) and the Hawaii Environmental Impact Statement Law, Chapter 343, HRS.

Erosion	Wearing away of rock or soil by the gradual detachment of rock or soil fragments by water, wind, ice, and other mechanical and chemical forces.
Eutrophication	The process by which a body of water becomes enriched with nutrients, especially nitrogen and phosphate, stimulating the growth of aquatic plants. Excessive plant growth tends to have undesirable effects such as closing streams and reducing water clarity. Also, when large numbers of plants decay, they consume disproportionate amounts of dissolved oxygen, reducing the amount of oxygen available for use by other aquatic life.
Facility	An industrial operation created to serve a particular function.
Fecal Coliform	See Coliform Bacteria.
Geometric Mean	An arithmetic average of the logarithmic values; obtained by combining all data points, computing the logarithm (the power to which a number is raised), taking the average (mean), and transferring it back to an arithmetic number.
Grated Inlet	A storm drain inlet structure with a grate framework opening to allow storm water runoff to enter.
Habitat	The specific area or environment in which a particular type of plant or animal lives. An organism's habitat must provide all of the basic requirements for life and should be free of harmful contaminants.
Health Risk	The risk or likelihood that a person's health will be adversely affected.
Herbicide	A chemical agent that destroys or inhibits plant growth.
Illegal Dumping	The illegal act of putting something other than storm water into a storm water system.
Illicit Connection	An unauthorized connection of a pipe carrying something other than storm water to a storm water system.
Illicit Discharge	Any discharge to a separate storm sewer that is not composed entirely of storm water except discharges pursuant to an NPDES permit and discharges resulting from firefighting activities.
Impervious	A surface that cannot be easily penetrated; for instance, rain does not readily penetrate asphalt or concrete surfaces.
Inflow and Infiltration (I/I)	Excess water that enters a sewer system. Since a sewer system can only handle a certain amount of wastewater at one time, excess flows can trigger overflows of raw wastewater. Inflow refers to water that unnecessarily flows into the system, for example, from manhole covers. Infiltration is water that seeps into the system through cracks and gaps in the pipes. Typically, inflow and infiltration are clean water not needing treatment.

Insecticide — A chemical agent that destroys insects.

Land Use — The way land is developed and used in terms of the types of activities allowed (agriculture, residences, industries, etc.) and the size of buildings and structures permitted. Certain types of pollution problems are often associated with particular land use practices, such as sedimentation from construction activities.

Materials Management

Employ proper handling and storage (inventory control and material labeling) procedures to transport and store significant materials according to Federal, state, and local regulations (i.e., (1) use barrel cart or forklift to move drums; and (2) store significant materials in proper containers and in a covered area).

Metals — Metals are elements naturally found in rocks and minerals that are released to the environment by weathering and erosion. This material can also be released as pollutants by human activity, as is the case for (heavy) metals, such as mercury, lead, nickel, zinc, and cadmium. These are of environmental concern because they are generally toxic to life above ‘trace’ concentration. Since metals are elements, they do not break down in the environment over time and can be incorporated into plant and animal tissue.

Monitor — To systematically and repeatedly measure conditions in order to track changes. For example, dissolved oxygen in a bay might be monitored over a period of several years in order to identify any trends in its concentration.

Municipal Separate Storm Sewer System (MS4)

A conveyance or system of conveyances (including roads, drainage systems, municipal streets, grated inlets, curbs, gutters, ditches, man-made channels, or storm drains) owned or operated by a state, city, or other public body, designed or used for collecting or conveying storm water. MS4s are not a combined sewer and are not part of a Publicly Owned Treatment Works (POTW). MS4s discharge directly into receiving waters.

National Pollutant Discharge Elimination System (NPDES)

NPDES is a part of the federal CWA, which requires point source dischargers to obtain permits. These permits are referred to as NPDES permits and are administered in Hawaii by the Clean Water Branch of the State of Hawaii Department of Health.

NPDES States — NPDES States have NPDES permitting authority. The state agency administers and enforces the storm water program within the state. They may issue individual and general permits for industrial dischargers, including those that are developed as a result of the group application process. Having such authority does not, however, oblige a state to issue general permits (either baseline or group). States with general permitting authority may elect to issue only individual permits. Most states with general permitting authority are expected to use it.

Under the CWA, state NPDES programs must be at least as strict as the EPA's programs but may be more stringent. Several states have indicated that their program requirements will exceed the EPA minimums. Moreover, NPDES states may choose to promulgate baseline permits but are not required to do so.

Non-NPDES States NPDES states that currently do not have general permitting authority are particularly hard pressed by the regulation's deadlines. These states administer the NPDES program in the same manner as other NPDES states, except that they do not have the EPA-delegated authority to issue general permits.

Non-Point Source Pollution

Pollution that enters water from dispersed and uncontrolled sources such as surface runoff. Non-point sources (e.g., forest practices, agricultural practices, on-site sewage disposal, street and paved area runoff) may contribute pathogens, suspended solids, and toxicants. While individual sources may seem insignificant, the cumulative effects of non-point source pollution are significant.

Non-Point Sources (NPS)

Diffuse sources from which contaminants originate to accumulate in surface water or groundwater. These sources can add to a cumulative problem with serious health or environmental consequences.

Non-Storm Water Discharge

Any discharge to storm water systems that is not composed entirely of storm water.

Nutrients Essential chemicals needed by plants or animals for growth. If other physical and chemical conditions are optimal, excessive amounts of nutrients can lead to degradation of water quality by promoting excessive growth, accumulation, and subsequent decay of plants, especially algae. Some nutrients can be toxic to animals at high concentrations.

Organics A broad term that includes numerous compound which are derived (naturally or by man-made processes) from animal or vegetation sources or from petroleum. Typical organic matter would include fallen leaves, grasses, pollen, animal wastes, paper, other litter, oil and grease, gasoline, pesticide, and various synthetic products.

Outfall (Industrial) The point of discharge of storm water to adjacent property, to a municipal separate storm water system, or directly to waters of the United States. The outlet can be from a storm water system or drain system.

Outfall (Non-Industrial)

The outlet point of storm water discharges excluded from the NPDES industrial storm water program.

Oxygen-Demanding Materials

Materials such as food waste and dead plant or animal tissue that use up dissolved oxygen in the water when they are degraded through chemical or biological processes. BOD is a measure of how much oxygen demand a substance has.

Parameter

A quantifiable or measurable characteristic. For example, height, weight, sex, and hair color are all parameters that can be determined for humans. Water quality parameters include temperature, pH, salinity, dissolved oxygen concentration, and many others.

Pathogen

An agent such as a virus, bacterium, or fungus that can cause diseases in humans. Pathogens can be present in municipal, industrial, and non-point source discharges.

Percolate

To pass through a permeable substance. For instance, septic effluent percolates through soil.

Permeable Surfaces

Surfaces, such as soil, that allow some percolation or infiltration of water into the ground and ultimately the groundwater system. This is in contrast to impermeable surfaces, such as concrete, that allow water to run off with little or no infiltration.

Pesticide

A general term to describe chemical substances used to destroy or control organisms. Pesticides include insecticides, algicides, fungicides, and others. Many of these substances are manufactured and are not naturally found in the environment. Others, such as pyrethrum, are natural toxins which are extracted from plants and animals.

pH

The degree of alkalinity or acidity of a solution. A pH of 7.0 indicates neutral water, while a pH of 5.5 is acidic. A reading of 8.5 is alkaline or basic. The pH of water influences many of the types of chemical reactions that will occur in it. For instance, a slight decrease in pH may greatly increase the toxicity of substances such as cyanides, sulfides, and most metals. A slight increase may greatly increase the toxicity of pollutants such as ammonia.

Pluvial

Of or having to do with rain; formed by the action of rain.

Point Sources

A source of pollutants from a single point of conveyance such as a pipe. For example, the discharge pipe from a sewage treatment plant or factory is a point source.

Pollutant

A contaminant that adversely alters the physical, chemical, or biological properties of the environment. The term includes pathogens, toxic metals, carcinogens, oxygen-demanding materials, and all other harmful substances. With reference to non-point sources, the term is sometimes used to apply to contaminants released in low concentrations from many activities which collectively degrade water quality. As defined in the federal CWA, pollutant means dredged spoil, solid waste, incinerator residue, sewage, garbage, sewage sludge, munitions, chemical wastes, biological materials, radioactive materials, heat, wrecked or discarded equipment, rock, sand, cellar dirt, and industrial, municipal, and agricultural waste discharged into water.

Primary-Treated Sewage

Sewage that has undergone primary treatment.

Primary Treatment A wastewater treatment method that uses settling, skimming, and (usually) chlorination to remove solids, floating materials, and pathogens, respectively, from wastewater. Primary treatment removes about 35 percent of BOD and less than half of the metals and toxic organic substances.

Priority Pollutants Substances listed by the EPA under the CWA as toxic and having priority for regulatory controls. The list currently includes metals (13), inorganic compounds containing cyanide and arsenic, and a broad range of both natural and artificial organic compounds (111).

Receptors When referring to water quality, receptors are users of the water body, such as fish or humans ingesting fish that are affected by the condition of the water.

Regulatory Framework

A particular set of laws, rules, procedure, and agencies designed to govern a particular type of activity or solve a particular program.

Representative Storm Event

A storm event that results in more than 0.1 inch of total rainfall and occurs more than 72 hours since the last event of more than 0.1 inch of total rainfall.

Retention The process of collecting and holding storm water with no surface outflow.

Riprap A foundation, wall, or revetment made of various sizes of rock placed irregularly in water or on the soft bottom of a water body.

Riparian Pertaining to the banks of streams, lakes, or tidewater.

Secondary Treatment

A wastewater treatment method that usually involves the addition of biological treatment to the settling, skimming, and disinfection provided by primary treatment. Secondary treatment may remove up to 90 percent of BOD and significantly more metals and toxic organics than primary treatment.

Sediment Material suspended in or settling to the bottom of a liquid, such as the sand and mud that make up much of the shorelines and bottom of the ocean. Sediment input to streams and rivers comes from natural sources, such as erosion of soils and weathering of rock; or anthropogenic sources, such as forest or agricultural practices, or construction activities. Certain contaminants tend to collect on and adhere to sediment particles.

Separated Sewer System

A wastewater collection and treatment system where domestic and industrial wastewater is separated from storm water runoff. A separated system consists of independent sanitary wastewater and storm water systems. The storm water is discharged directly into open water and the sanitary wastewater goes to a treatment plant.

Significant Materials

Includes, but is not limited to: raw materials; fuels; materials such as solvents, detergents, and plastic pellets; finished materials such as metallic products; raw materials used in food processing or production; hazardous substances designated under Section 101(14) of CERCLA; any chemical the facility is required to report pursuant to Section 313 of Title III of SARA; fertilizers; pesticides; and waste products such as ashes, slag, and sludge that have the potential to be released with storm water discharges.

Significant Quantities

The volume, concentrations, or mass of a pollutant in storm water discharge that can cause or threaten to cause pollution, contamination, or nuisance; adversely impact human health or the environment; and cause or contribute to a violation of any applicable water quality standards for the receiving water.

Siltation — The process by which a river, lake, or other water body becomes clogged with sediment. Silt can clog gravel beds and prevent successful salmon spawning.

Source Control BMP

An effort to prevent or limit the exposure of significant materials to storm water at the source.

Storm Drain — A system of gutters, pipes, or ditches used to carry storm water from surrounding lands to streams, lakes, or the ocean, which is vulnerable to deliberate dumping or spills, and storm water runoff pollutants that can be generated through a variety of routine human activities. This term also refers to the end of the pipe where the storm water is discharged (i.e., Storm Drain Outlet).

Storm Water — Storm water runoff, snow melt runoff, and surface runoff and drainage.

Storm Water Discharge Associated with Industrial Activity

The discharge from any conveyance which is used for collecting and conveying storm water and which is directly related to manufacturing, processing or raw materials storage areas at an industrial plant. The term includes, but is not limited to, storm water discharges from industrial plant yards; immediate access roads and rail lines used or traveled by carriers of raw materials, manufactured products, waste material, or by-products used or created by the facility; material handling sites; refuse sites; sites used for the application or disposal of process waste waters; sites used for the storage and maintenance of material handling equipment; sites used for residual treatment, storage, or disposal; shipping and receiving areas; manufacturing buildings; storage areas (including tank farms) for raw materials, and intermediate and finished products; and areas where industrial activity has taken place in the past and significant materials remain and are exposed to storm water.

Surcharge — This refers to a condition where the hydraulic capacity of a storm water system is temporarily exceeded (e.g., during a storm event).

Surge — A large mass of moving water, such as a wave or swell. Also, a heavy, violent swelling motion, such as a surge of water through a storm drain during a heavy rain.

Suspended Solids — Organic or inorganic particles that are suspended in and carried by the water. The term includes sand, mud and clay particles as well as solids in wastewater.

Swale — A broad, shallow, vegetated channel. A swale is essentially a vegetated drainage ditch that has been engineered to collect and transport storm water in a way that allows the vegetation to filter sediments and pollutants.

Total Suspended Solids (TSS)

The weight of particles that are suspended in water. Suspended solids in water reduce light penetration in the water column, can clog the gills of fish and invertebrates, and are often associated with toxic contaminants because organics and metals tend to bind to particles.

Toxic — Poisonous, carcinogenic, or otherwise directly harmful to life.

Trash — For the purposes of this plan, “trash” will be considered analogous to “litter” as defined below by the Hawaii Revised Statutes (HRS) §391-1.

> *“Litter” means rubbish, refuse, waste material, garbage, trash, offal, or any debris of whatever kind or description, whether or not it is of value, and includes improperly discarded paper, metal, plastic, glass, or solid waste.*

A distinction is made that trash is not inclusive of natural materials, such as branches, leaves, and other vegetation, that are deposited into waterbodies naturally.

Tributary — A stream that flows into another.

Turbidity — A measure of the amount of material suspended in the water. Increasing the turbidity of the water decreases the amount of light that penetrates the water column. High levels of turbidity are harmful to aquatic life.

Urban Runoff — A substance, such as rain, that runs off of surfaces in a watershed in excess of the amount absorbed by the surfaces (usually the ground). Urban runoff can contain sediments and contaminants (non-point source pollution) that can add to water

	quality degradation in the watershed. Increases in impervious surface usually result in increased urban runoff.
Volatile	Can be readily vaporized at a relatively low temperature.
Watershed	The geographic region from which water drains into a particular river or body of water. A watershed includes hills, lowlands, and the body of water into which the land drains. Watershed boundaries are defined by the ridges of separating watersheds.
Weir	A low dam built across a stream, primarily to control water level or to divert water into another facility. Also used to measure flow.
Wetlands	Wetlands are transitional areas between terrestrial and aquatic systems where the water table is usually at or near the surface or the land is covered by shallow water. Wetlands have one or more of the following three attributes: (1) at least periodically, the land supports predominantly hydrophytes; (2) the substrate is predominantly undrained hydric soil; and (3) the substrate is saturated with water or covered by shallow water at some time during the growing seasons each year.
Zoning	To designate by ordinances areas of land reserved and regulated for different land uses.

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1 Introduction

As of the effective date, September 1, 2021, the United States (U.S.) Marine Corps Base Hawaii (MCBH) Municipal Separate Storm Sewer System (MS4) is required to comply with the conditions of the National Pollutant Discharge Elimination System (NPDES) Permit No. HI S000007 (referred to hereinafter as the "MS4 Permit"). The MS4 Permit was issued by the State of Hawaii Department of Health (DOH). Refer to Appendix 1-1 for the final MS4 Permit and permit rationale. It includes authorized storm water and specified non-storm water discharges from the MS4, and storm water runoff from industrial sites into Kaneohe Bay, Nuupia, Halekou, and Kaluapuhi Ponds, Kailua Bay, and the Mokapu Central Drainage Channel (MCDC).

Per the Permit, Part D.1, MCBH is required to further develop, improve, implement, and enforce its existing Storm Water Management Program (SWMP) Plan. The Permit states:

*"**Part D.1. Development, Improvement, Implementation and Enforcement of SWMP***

> *The Permittee shall further develop and improve, implement, and enforce a SWMP designed to address the requirements of this permit and reduce, to the Maximum Extent Practicable (MEP), the discharge of pollutants to and from its MS4 to protect water quality and to satisfy the appropriate water quality requirements of the Act. The SWMP shall include the following information for each of the SWMP components described in Part D.1.a to Part D.1.g below:*
>
> - *The BMPs, including the underlying rationale that will be implemented for each of the program components.*
> - *The measurable standards and milestones for each of the BMPs, including the underlying rationale and interim measures to aid in determining the level of effort and effectiveness of each program component.*
> - *The name or position title and affiliation of the person or persons responsible for implementation or coordination of each program component.*
> - *A monitoring program to determine effectiveness of the controls and the overall storm water program.*
>
> *Submittal Date - The SWMP shall be: updated and modified per the requirements of this permit; consistent with the format of this permit; submitted to the DOH in accordance with Part A.6. and A.7. within 18 months after the effective date of this permit, or as otherwise specified; and fully implemented upon submittal. The Permittee shall implement the existing SWMP until submittal of the revision. The SWMP and any of its revisions, additions, or modifications are enforceable components of this permit."*

The MS4 Permit requires that MCBH continue to comply with its existing SWMP Plan until a revised plan is submitted to DOH. This revised SWMP is to be implemented upon submittal to DOH, no later than March 1, 2023.

1.1 Objective

Above all, the primary goal of the MCBH SWMP Plan is to protect and restore the water quality of the surface waters affected by its MS4. The SWMP will accomplish this goal using a multi-faceted approach outlined by various program components that have been specified in the MS4 Permit.

For the purpose of this document, the term "tenants" will be used to describe all individuals and organizations present within MCBH. This includes, but is not limited to, military personnel and their dependents, construction and maintenance contractors, civilian employees, commercial businesses, industrial facilities, schools, and recreational facilities.

A summary of the objectives of this SWMP Plan include:

- Promoting awareness of MCBH's SWMP among all of its tenants.
- Education and training of all parties responsible for complying with, or managing the MCBH SWMP;
- Identification of potential sources of pollutant discharges into storm water runoff that are regulated by the MS4 Permit;
- Evaluation and modification, as needed, of existing Best Management Practices (BMPs) to meet changing conditions and MS4 Permit requirements;
- Facilitating implementation of the Base-wide and facility-specific Storm Water Pollution Prevention Plans (SWPPPs);
- Continued monitoring to ensure that the quality of storm water discharges at the facility are in compliance with discharge prohibitions, effluent limitations, and receiving water limitations specified in the MS4 Permit;
- Regular inspection and enforcement of MS4 Permit regulations at all applicable facilities; and
- Measuring the effectiveness of prescribed BMPs in preventing, minimizing, or removing pollutants in storm water discharges, for continued development of the SWMP.

This SWMP Plan is intended to be a user-friendly document to assist and promote the effective implementation of MCBH's SWMP. It is aimed at the development and implementation of comprehensive, cost-effective, Base-wide practices that prevent, reduce, and eliminate pollutants in storm water discharges, generated by MCBH, to the maximum extent practicable (MEP).

1.2 Marine Corps Base Hawaii Background

1.2.1 Location

MCBH is located on the Mokapu Peninsula along the eastern shore of the island of Oahu, Hawaii. The Base encompasses a total land area of approximately 2,951 acres. It is bordered on the north by the Pacific Ocean, on the east by Kailua Bay, and on the west and southwest by Kaneohe Bay. A vicinity map showing the location of the Base and its geographic surroundings is shown in Figure 1-1.

The Base's primary mission is to operate and maintain facilities that provide services and material support for the air and ground units of its tenant organizations.

1.2.2 Drainage and Topography

Approximately 80 percent of the land area of MCBH is relatively flat, with slopes of less than 10 percent. Impervious areas at MCBH include roofed buildings, patios, sheds, roads, aircraft runways, sidewalks, and paved lots. An estimated 35 percent of the area on Base is impervious to storm water infiltration, and an additional 10 percent consists of the Nuupia Ponds.

Storm runoff is transported via surface runoff, protected or earthen ditches, and through a system of catch basins, grated storm drain inlets, storm drain manholes, and culverts.

1.2.3 Historical and Current Land Uses

The Kuwaaohe Military Reservation was established in 1918 on the east side of Mokapu Peninsula. Following a period of inactivity, it was re-established as Kaneohe Naval Air Station on February 15, 1941. The facility consisted of a 5,800-foot airstrip, seaplane runways, hangars, fuel storage facilities, waterfront facilities, and support and administrative buildings. In 1949, the Station was deactivated and placed on caretaker status. In 1952, the facility was re-activated and renamed Kaneohe Marine Corps Air Station. Following its reactivation, a 7,800-foot-long runway, motor vehicle maintenance facilities, exchange, and the majority of bachelor and family housing units were constructed. With the departure of all fixed-wing aircraft squadrons at Kaneohe, the Base was again renamed to Marine Corps Base Hawaii (MCBH), Kaneohe Bay.

The mission of MCBH is to maintain and operate facilities that provide services and material support for air and ground units, and its tenant organizations.

Industrial Facility Descriptions: Industrial facilities currently operating at MCBH, are grouped under the following list of industrial facility categories:

- Operational Buildings;
- Maintenance Buildings;
- Various Utility Facilities;
- Storage Buildings;
- Recycling Facility;
- Water Reclamation Facility/Wastewater Treatment Plant (WWTP); and
- Sanitary Landfill.

Each of the industrial facilities at MCBH are described in more detail in Chapter 11, Industrial Facilities.

1.2.4 SARA Title III, Section 313 Facilities

In accordance with the MS4 Permit, the SWMP Plan shall incorporate special provisions at facilities which are subject to the reporting requirements of Superfund Amendment and Reauthorization Act (SARA), Section 313, pages 1 through 20, for water priority chemicals. This is also known as the Emergency Planning and Community Right-to-Know Act (EPCRA).

MCBH facilities that have been identified by onsite EPCRA personnel, to produce or store chemicals in quantities that meet thresholds subject to regulation under Section 313 of SARA Title III are listed below. The corresponding regulated chemicals have been listed with each facility.

- Water Reclamation Facility (Nitrates)
- Firing Range (Lead/Copper)
- 90-Day Base Hazardous Waste Accumulation Site (Antifreeze)

1.3 Storm Water Program Background

Storm water discharge has long been identified as a significant source of water pollution. In 1972, in an effort to improve the direction of water pollution control in the U.S., Congress passed legislation under the Federal Water Pollution Control Act (FWPCA) to create the NPDES program. The NPDES program established regulations for any persons wishing to discharge pollutants into waters of the U.S. These NPDES permits set limits on the composition, quantity and the mass or concentration of pollutants being discharged.

To more adequately address existing water pollution concerns, the FWPCA was amended by the Clean Water Act (CWA) of 1977 to restore and maintain the chemical, physical and biological integrity of U.S. waters. The CWA provided the U.S. Environmental Protection Agency (EPA) with the authority to control point source discharges, and also required each State to establish water quality standards for its surface waters.

In 1987, the CWA was amended by the Water Quality Act which gave the EPA the authority to regulate storm water discharges associated with discharges from large and medium MS4s, industrial activities, and construction sites that disturb five (5) or more acres. On November 16, 1990, the EPA promulgated regulations under the “Phase I Rule”, which are contained in the Code of Federal Regulations (CFR), Title 40 Parts 122, 123 and 124, establishing permit application requirements for these storm water discharges. Additionally, on December 8, 1999, EPA promulgated the final Phase II storm water regulations for smaller MS4s areas and smaller construction sites, which disturb areas of one (1) to five (5) acres.

The EPA only requires permits for the discharge of storm water for specific types of industrial activities, in accordance with 40 CFR § 122.26(b)(14). Those industries requiring storm water permits are described in one of two ways: by a narrative description or by a Standard Identification Classification (SIC) code.

MCBH, Kaneohe Bay has facilities that engage in EPA defined industrial activities and therefore storm water discharges from Marine Corps properties are subject to regulation under the CWA. Chapter 10 details the Industrial and Commercial Discharge Management Program and Chapter 11 discusses the Industrial Facilities Program.

1.3.1 Hawaii Storm Water Program

The State of Hawaii has been delegated NPDES permitting authority by the EPA. Through such delegation, DOH is responsible for administering the NPDES program throughout Hawaii in the same manner that the EPA's regional offices administer the program in non-NPDES States. DOH revised regulations implementing the storm water program in the Hawaii Administrative Rules (HAR) Title 11; Chapter 54, Water Quality Standards (Chapter 11-54), effective November 15, 2014; and Chapter 55, Water Pollution Control (Chapter 11-55), effective February 9, 2019. NPDES General Permit for Storm Water Discharges Associated with Industrial Activity was adopted in HAR, Chapter 11-55, Appendix B, effective January 15, 2022. NPDES General Permit Authorizing Discharges of Storm Water Associated with Construction Activity was adopted in HAR, Chapter 11-55, Appendix C, effective February 9, 2019.

The DOH storm water regulations present two permit application options for storm water discharges in Hawaiian waters; (1) Individual Permit (IP) application; and (2) Notice of Intent (NOI) for coverage under a General Permit (GP). The IP address design and water quality standards specific to an individual facility, whereas the GP is used to authorize a category of discharges within a specific geographic area. In the case of a GP, the applicant must meet the requirements of the GP such as common storm point sources, operations, wastes generated, disposal practices, etc. The permit requires information regarding existing programs, the means available to the municipality to control pollutants, and a field screening analysis of major outfalls to detect illicit connections. Building on this information, the permit requires a limited amount of representative data and a description of a proposed storm water management plan.

To obtain authorization to discharge storm water from industrial activities, the property owner may acquire storm water permits for the lessees that have industrial activities or have the lessees obtain the permits directly through the DOH. Since MCBH owns all of the industrial facilities within its property, the industrial storm water discharges have been incorporated into Part E of its MS4 Permit.

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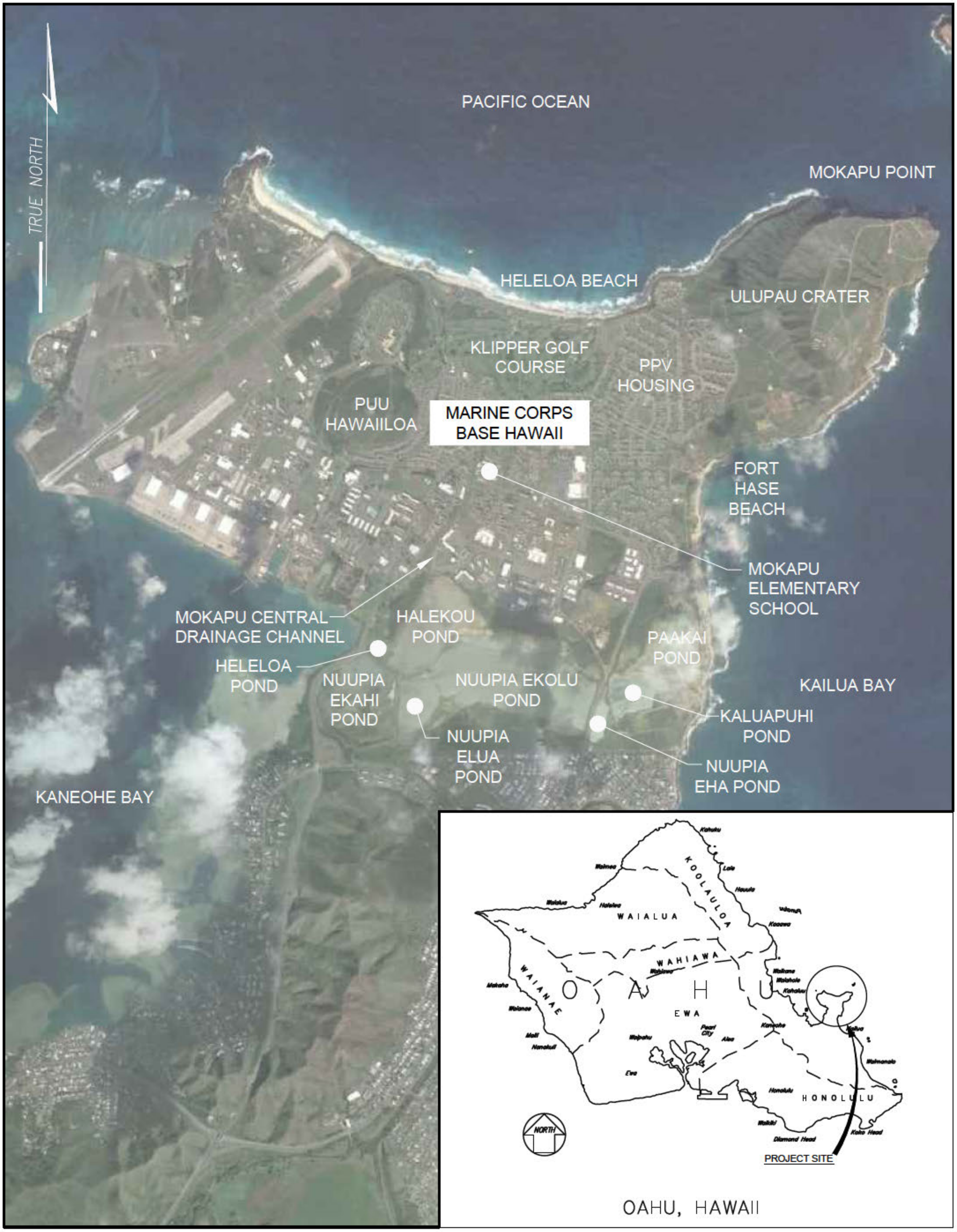

VICINITY & LOCATION MAP

NOT TO SCALE

FIGURE 1-1

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1.3.2 Marine Corps Base Hawaii Storm Water Permit Requirements

The previous permit No. HI 1121423 was originally an industrial storm water permit issued by the DOH to the Commanding General, MCBH, Kaneohe Bay on December 2, 1996. It was reissued on December 31, 2002 to include the MCBH MS4. The reissued permit no. HI 1121423 became effective on January 30, 2003 and expired on January 31, 2007.

MCBH submitted the NPDES permit renewal application on July 26, 2006, whereby the NPDES Permit Number was changed to No. HI S000007. DOH administratively extended the NPDES permit on January 26, 2007. MCBH NPDES Permit No. HI S000007 became effective on October 15, 2014 and expired on September 14, 2019. MCBH submitted the NPDES permit renewal application on December 28, 2018. DOH administratively extended the permit, pending the reapplication process. NPDES Permit No. HI S000007 became effective on September 1, 2021 and will expire at midnight on August 31, 2026.

The MS4 Permit specifies the conditions and requirements that authorize MCBH to discharge storm water associated with industrial activities. These provisions require MCBH to:

- Effectively prohibit non-storm water discharges through its separate storm sewer system into State waters and from its facilities discharging directly to State waters or through a non-MCBH-owned MS4. NPDES permitted discharges and non-storm water discharges, in Section 1.3.2.1, have been identified in the permit and are exempt from the prohibition.
- Reduce the discharge of pollutants from its MS4 to the MEP.
- Reduce the discharge of pollutants, classified as industrial in accordance with 40 CFR §122.26(b)(14), to the applicable limitations subject to the Best Available Technology currently available (BAT)/Best Conventional Pollutant Control Technology (BCT) discharge requirement and other federal/state requirements for such facilities. At MCBH, these are encompassed within the industrial facilities required to have NPDES permit coverage and listed in the Permit.

In the event that the MS4 Permit requirements conflict with any other regulations, MCBH is to comply the more stringent requirement.

1.3.2.1 Allowable Non-Storm Water Discharges

The following non-storm water discharges may be discharged into the MCBH MS4 provided that the discharge is identified below and meets all conditions when specified by MCBH. These conditions can be found in Appendix 3-1, BMPs for Allowable Non-storm Discharge. In the event that any of the non-storm water discharges listed below is determined to be a source of pollution by MCBH, the discharge will no longer be allowed.

- Water line flushing;
- Landscape irrigation;
- Diverted stream flows;
- Rising ground waters;
- Uncontaminated groundwater infiltration (as defined in 40 CFR §35.2005(20));
- Uncontaminated pumped ground water, not including construction related dewatering activities;
- Discharges from potable water sources and foundation drains;
- Air conditioning condensate;
- Irrigation water;

- Springs;
- Water from crawl space pumps, uncontaminated water from utility manholes or boxes, and footing drains;
- Lawn watering runoff;
- Water from individual residential car washing;
- Water from charity car washes;
- Flows from riparian habitats and wetlands;
- Dechlorinated swimming pool discharges;
- Exterior building wash water (water only);
- Residual street wash water (water only), including wash water from sidewalks, plazas, and driveways, but excluding parking lots; and
- Discharges or flows from firefighting activities.

MCBH may also develop a list of other similar occasional incidental non-storm water discharges that will not be addressed as illicit discharges, provided that these discharges are not reasonably expected to be a significant source of pollutants to the MS4. This can be based on either the nature of the discharge or the conditions/controls (such as BMPs) that MCBH has established for allowing it.

MCBH has outlined specific criteria for additional, conditionally allowable, non-storm water discharges associated with boat rinsing, dive gear rinsing, emergency pipe and tank hydrotesting and disinfecting, and emergency trench dewatering. See Section 3.1.1 for detailed information conditionally allowable non-storm water discharges.

1.4 Marines Corps Environmental Policy

The following excerpt is from the Marine Corps environmental policy, Marine Corps Order (MCO) P5090.2, Environmental Compliance and Protection Program, dated June 11, 2018.

<u>MCO P5090.2, Chapter 1:</u>

> *"**<u>010102</u>**. Marine Corps environmental programs ensure compliance with environmental requirements, protect human health and the environment, and sustain and enhance mission readiness. The programs focus on the following elements:*
>
> *A. Compliance with environmental requirements.*
>
> *B. Pollution Prevention (P2).*
>
> *C. Conservation of natural and cultural resources.*
>
> *D. Environmental Restoration (ER)."*

<u>MCO P5090.2, Chapter 3:</u>

> ***<u>"0304. COMPLIANCE</u>***. *All Marine Corps civilian and military personnel, installation tenants, and contractors shall comply with applicable federal, state, and local environmental laws and regulations; DOD, DON, and Marine Corps environmental policies; Presidential E.O.s; and where applicable, overseas environmental requirements.*

> ***<u>0320. POLLUTION PREVENTION (P2)</u>****. The Marine Corps shall minimize resource consumption and eliminate waste generation, where practicable, when planning, designing, manufacturing or constructing, maintaining, sustaining, and disposing of facilities, weapon systems, and equipment. Marine Corps facilities shall also eliminate or minimize the use of hazardous materials and the generation of hazardous waste, where practicable. P2 is a cross-cutting program with relevance to most other program areas."*

1.5 Marine Corps Base Hawaii Storm Water Program

MCBH obtained State of Hawaii Permit No. HI S000007 for individual NPDES Storm Water Permit coverage of specified storm water and non-storm water discharges from the MCBH MS4.

In accordance with the requirements of NPDES Permit HI S000007, this SWMP Plan was prepared to meet the storm water discharge requirements of:

- Title 40 of the CFR, Parts 122, 123, and 124, Subparts A and D, and 125;
- NPDES Permit Program in the HAR, Title 11, Chapter 55, Water Pollution Control;
- HAR, Title 11, Chapter 54, Water Quality Standards; and
- Applicable portions of the CWA, Sections 301, 302, 307 and 402.

The information provided in this SWMP Plan outlines the Base-wide practices in place to meet MS4 Permit requirements, and furthermore to protect and improve the water quality to the MEP of receiving waters surrounding MCBH. It has been broken down into the components described in Figure 1-2. The primary intent of this document is to assist all parties responsible for managing and implementing MCBH's SWMP in doing so. It is also a complete and comprehensive compliance document, developed to meet the state and federal requirements described above.

1.5.1 Implementation of the SWMP Plan

This updated SWMP Plan becomes effective and enforceable upon its submission to the DOH. As a Base-wide program, the policies outlined in this plan are applicable to all tenants located and operating on the MCBH. A more detailed list of these "target groups" is included in Section 2.2.

If the regulations of the MS4 Permit conflict with any other federal, state, or local regulations, the more stringent alternative will apply.

1.5.2 Program Organization & Responsibilities

The MS4 Permit No. HI S000007 and this updated SWMP Plan supersede all previous versions. MCBH is responsible to ensure compliance with the MS4 Permit No. HI S000007 and the conditions established within this plan. All tenants on Base are subject to the rules and regulations of these documents. Primary components of MCBH's SWMP are summarized in Figure 1-2.

Generally, oversight of the policies and development of the Base-wide SWMP Plan is managed by the MCBH Environmental Compliance and Protection Division (ECPD). This includes: plan revisions, as necessary; annual reporting; and ensuring that this document and any subsequent updates are available to affected parties. More detailed information on reporting requirements is provided in Chapter 13, Reporting Requirements.

MCBH currently manages its MS4 system components using a Geographic Information System (GIS) database for mapping in combination with other internal databases and tracking systems. To fully comply with the MS4 Permit, MCBH must implement a GIS-based Asset Management System (AMS). MCBH's strategy to develop and maintain a comprehensive AMS is described in the Mapping, Inventorying, Inspection, and Maintenance Strategy in Appendix 1-2. The strategy outlines the steps MCBH will take to establish an AMS capable of tracking system operations, maintenance, and inspections for all critical components of the MS4.

MCBH is unique from most MS4s in that within its property boundary, it owns the property and almost all of the facilities. MCBH also provides funding for a majority of work completed on Base.

There are several different tenants on Base. MCBH is structured such that the Base Commanding Officer (CO) has ultimate authority to enforce Base-wide compliance with the requirements of the MS4 Permit. In addition to ECPD, there are various levels of authority between the CO and each tenant on Base, through which day-to-day practices are monitored and managed. Some of the primary entities responsible for specific groups of tenants are listed below:

- ECPD Compliance Inspection Team – Overall management of all tenants on base to ensure compliances of all established rules and regulations
- Ohana Military Communities (OMC)/Hunt – Management of the Public-Private Venture (PPV) Housing
- Marine Corps Community Services (MCCS) – Management of commercial facilities
- Department of Education (DOE) – Management of Mokapu Elementary School
- Facilities Engineering Maintenance Control Division (MCD) – Scopes and plans in-house work
- Facilities Engineering Maintenance Repair Operations (MRO) – Conducts work scoped by MCD
- Facilities Engineering and Acquisition Division (FEAD) – Management of Naval Facilities Engineering Systems Command (NAVFAC) construction projects

As appropriate, MCBH will conduct enforcement type action and the necessary corrective action for any "non-compliant" issue. Enforcement procedures have been outlined in the *Enforcement Response Plan* (See Appendix 3-4), as needed, for each storm water program set forth in this document. Typically, all non-compliance issues are handled through escalation of the level of authority, with the CO being the last resort, for issues that have gone unaddressed. This has been found to be an effective mechanism for ensuring rules and regulations are followed. To date there have been no issues that have required escalation to the level of the CO.

The organization of the overall SWMP is shown in Figure 1-3. The entities responsible for ensuring that each SWMP task is completed in compliance with MS4 Permit requirements, are listed below that task.

MCBH Storm Water Management Program

Public Education & Outreach (Chapter 2)

Objective: Raise awareness and effect positive behavioral change throughout the community with respect to the goals and implementation of the base-wide Storm Water Management Program (SWMP) Plan.

Illicit Discharge Detection and Elimination Program (Chapter 3)

Objective: Detect and eliminate all illicit discharges to the MS4, through a program of field screening, compliant investigation, monitoring, tracking of illicit discharges discovered, and approved connections to MS4.

Construction Site Runoff Control (Chapter 4)

Objective: Reduce to the maximum extent practicable (MEP) the discharge of pollutants from all construction sites, through standardized policies, best management practices (BMPs), routine inspections, and tracking.

Post-construction Storm Water Management (Chapter 5)

Objective: Implement permanent controls, in all new development and redevelopment projects, to prevent or minimize water quality impacts to the MEP, using revised construction design and plan review standards, and asset management System (AMS) with a BMP inventory and routine maintenance schedule.

Prevention/Good Housekeeping:

Debris Control BMPs Program (Chapter 6)

Chemical Applications BMPs Program (Chapter 7)

Erosion Control BMPs Program (Chapter 8)

Maintenance Activities BMPs Program (Chapter 9)

Objective: Incorporate BMPs throughout various basewide maintenance programs, to reduce the discharge of pollutants from all MCBH property to the MEP.

Industrial and Commercial Activities

(Chapter 10 & 11)

Objective: Reduce the discharge of pollutants from all industrial and commercial facilities basewide, through requirements to implement BMPs, inventory, inspections, and tracking of these facilities.

Monitoring Program (Chapter 12)

Objective: Provide an ongoing measureable assessment of the progress and effectiveness of the implementation of the MCBH SWMP.

Reporting (Chapter 13)

Objective: To conduct annual evaluations and monitor the progress of MCBH's SWMP. It also supports the continued development of the SWMP Plan by identifying areas for improvement, and tracking monitoring results and all changes and progress made in the program throughout the year.

Figure 1-2 Storm Water Management Program Summary

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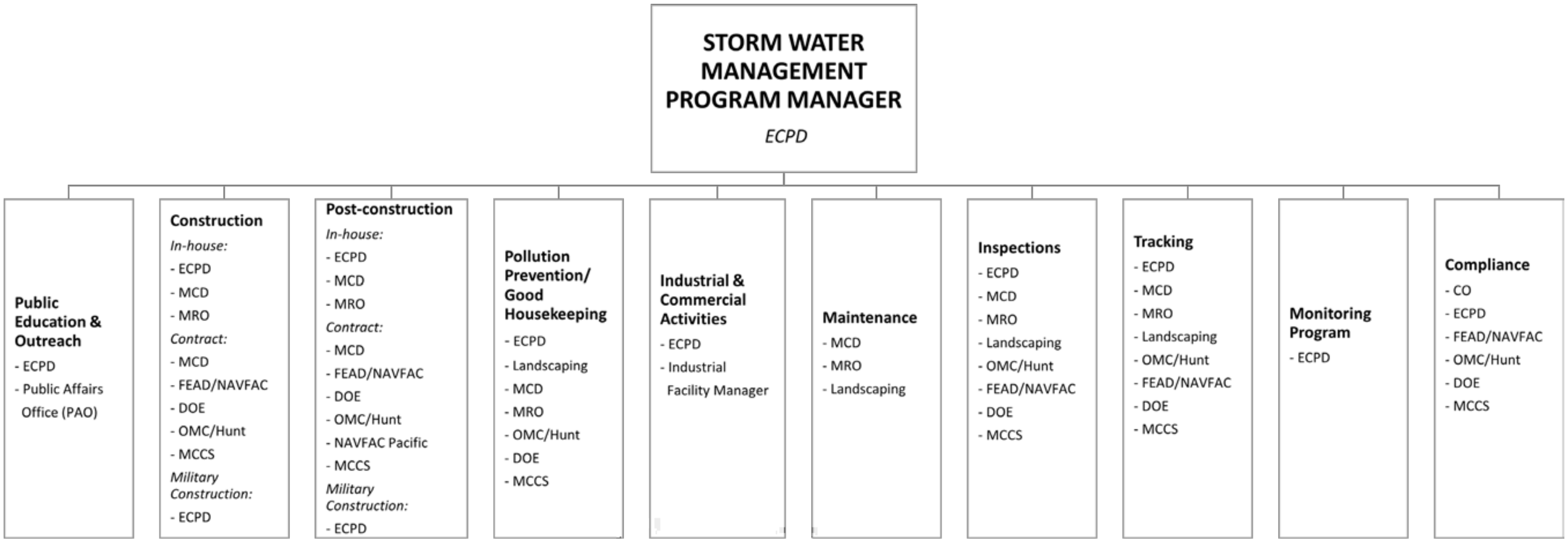

Figure 1-3 Storm Water Management Program Organizational Chart

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1.5.3 SWMP Team

The SWMP Team is responsible for the overall implementation and management of the MCBH SWMP. The SWMP Team's roles pertain to the general oversight and management of the Base-wide storm water program. The SWMP Team member roles and responsibilities are summarized below.

- Team Leader – ECPD is responsible for the implementation of all components of the SWMP and management of the SWMP Team.
- Facilities Maintenance – MCD and MRO are responsible for conducting and tracking routine maintenance of MCBH's storm drain system facilities.
- Mapping – ECPD GIS is responsible for maintaining MCBH's GIS database and updating it with new facilities, specifically storm drain or Low Impact Development (LID) features that are constructed on Base.
- Personnel Trainer – ECPD is responsible for the storm water training program, including preparing training documents and materials as well as scheduling, coordinating, and conducting training sessions.
- Site Inspector – The ECPD Compliance Inspection Team is responsible for conducting site inspections, dry weather visual inspections, and preparing site inspection documentation.
- Storm Water Sampling Coordinator – ECPD is responsible for collection and analysis of storm water samples.
- Recordkeeper – ECPD is responsible for archiving all documents associated with the SWMP, including the site map, inspection reports, maintenance records, and annual reports.

1.6 Revisions and Updates

To promote the continued improvement and efficacy of MCBH's SWMP, this plan is intended to be a living document and will be reviewed and updated at regular intervals.

Per the following excerpt from the MS4 Permit, modifications to the SWMP Plan are triggered by the following criteria.

<u>Permit Requirement (Part D.2):</u>

> *"The Permittee shall modify the SWMP as required when any of the following occur:*
>
> - *Exceedance of any discharge limitation or water quality standard established in HAR Section 11-54-4. The revisions shall include BMPs and/or other measures to reduce the amount of pollutants found to be in exceedance from entering State Waters.*
> - *Change in conditions and incorporation of more effective approaches to pollutant control.*
> - *System modifications, including any planned physical alterations or additions to the permitted MS4 and any existing outfalls newly identified over the term of the permit."*

Generally, revisions or additions to the SWMP Plan may include any of, but not exclusively, the following:

- Changes in program organization, operation, maintenance, or construction of new facilities at MCBH that affect the MS4 and/or storm water pollution control.

- Additional or removal of industrial facilities covered by this MS4 Permit, including changes to the primary activity at an industrial facility.
- Observations or patterns discovered through routine maintenance or monitoring, and any significant spills.
- Program deficiencies and the appropriate mitigation to ensure the protection of storm water runoff quality and compliance with the MS4 Permit.
- Program improvements and justification for the change.

MCBH is required to document any changes made to the SWMP throughout each year, to be included in the Annual Report and as a revision to the SWMP Plan at the end of that year.

All information, reports, and updates related to this SWMP Plan shall be submitted through the CWB Compliance Submittal Form for Individual NPDES Permits and Notice of General Permit Coverages (NGPCs), as outlined in Part A.7 of the Permit. This form is accessible through the e-Permitting Portal website at:

https://eha-cloud.doh.hawaii.gov/epermit/

There is additional information, regarding annual reporting and SWMP Plan revisions, provided in Chapter 13.

1.6.1 Permit Renewal

Renewal of the MCBH NPDES Permit is required after five (5) years from the date of issuance (on August 31, 2026). For the calendar year prior to the expiration date of the permit, the Annual Report and the e-Permitting CWB Individual NPDES Form, or the form approved by DOH shall be submitted to DOH. The Annual Report shall also include a description of the statuses of all items required in the permit. Submittal of the renewal application shall be at least one (1) year prior to the expiration date of the MS4 permit and include a $1,000 filing fee, as specified in Part G.1.a of the Permit.

1.6.2 Accuracy of Information Contained in this Plan

This SWMP Plan is accurate as best as practicable, based on available information, data collected during routine field survey, and updates from previous plans. It is hereby acknowledged that the major provisions of the Plan are accurate, but that there may be changing conditions that occurred after the routine field surveys which need to be identified and reflected in periodic updates.

2 Public Education and Outreach

In accordance with the MS4 permit, Parts D.1.a and D.1.b, MCBH is required to develop and implement a public education and outreach program to educate the community about the impacts of storm water, illicit discharges, and storm water pollution prevention.

The program shall, at a minimum, include the following:

1. Activity-specific educational materials and/or training for various targeted groups on Base.
2. Create positive changes in attitude, knowledge, and awareness.
3. Enable the public to identify and report pollution-causing activities (i.e., illicit discharges and illegal connections to the MS4).
4. Outreach activities, as specified in the MS4 Permit, to promote awareness for the general public.
5. Program evaluation based on an annual survey of tenants, number of brochures distributed, participation in events, volunteer hours, etc.
6. Public involvement in the development of the SWMP Plan including an informational meeting prior to finalizing the plan and other SWMP-related projects that can be used to educate the public about the impacts of storm water.

The MS4 Permit describes the requirements for the Public Education and Outreach Program as follows:

"Part D.1.a. Public Education and Outreach:

The Permittee shall further develop and implement a comprehensive education and involvement program to distribute educational materials to the community or conduct equivalent outreach activities about the impacts of storm water as well as enabling the public to identify and report a pollution-causing activity (i.e., spotting an illicit discharge) and the steps that the public can take to reduce pollutants in storm water runoff. The program should create: positive changes in attitude, knowledge, and awareness; BMP implementation; pollutant load reduction; and an improvement in discharge and receiving water quality. The SWMP shall include a written public education plan for how the Permittee will reach all targeted audiences and implement the permit requirements described below. The Permittee may fulfill portions of this requirement by cooperating with other MS4 storm water public education programs.

Part D.1.a.(1) Targeted Groups *- The Permittee shall address the following targeted groups in the Base-wide Awareness Plan with appropriate messages, and describe outreach activities and anticipated frequencies that each activity will be conducted over the permit term:*

- *Military personnel and dependents that work or live on base;*
- *Civilian personnel that work on base;*
- *Construction and maintenance contractors that work on base;*
- *Consultants;*
- *Landscaping personnel and contractors (e.g., to prevent the use of leaf blowers from blowing material into the drainage structures);*
- *Construction Industry;*

- *Industrial facilities covered by the NPDES permit program;*
- *Commercial businesses (i.e., automobile detailing, automobile repair and maintenance, retail gasoline outlets, and restaurants, including those types of businesses highly ranked, pursuant to Part D.1.g.(4));*
- *Schools, recreational facilities;*
- *Any other source that the Permittee determines may contribute a significant pollutant load to its Small MS4.*

Part D.1.a.(2) Outreach Activities *– The Permittee shall include in the Base-wide Awareness Plan the following activities, with prescribed frequencies that each activity will be conducted over the permit term:*

- *Publicize the telephone numbers for facilities and on-base personnel to report illegal discharges;*
- *Distribution of brochures to the residential community and industrial/commercial facilities;*
- *Participation in special events (e.g., Earth Day Educational Events) and exhibits;*
- *An informative web site, that provides educational materials/information for residents and commercial tenants regarding storm water pollution, storm water pollutant controls and best management practices, and applicable storm water rules and regulations at the Facility. The website shall also provide links to a copy of the SWMP, the most recent storm water annual report, a copy of this permit, and telephone numbers and email address to report illegal storm water activity. Any public meetings regarding storm water policy, regulations, or the SWMP shall also be posted with the applicable date, time, and location;*
- *Pesticides, herbicides, and fertilizer use program;*
- *The promotion of water conservation;*
- *Storm drain stenciling or marker installation;*
- *Proper disposal of grass clippings, leaves, and other green waste;*
- *A hazardous waste information and awareness program to promote awareness of proper disposal and handling of hazardous waste by residents and tenants (i.e., household chemicals, used oil, automotive fluids, paint, pesticides, and other toxics); and*
- *If determined to be necessary by the Permittee, public meetings/resident panels to discuss storm water management policies.*

Information regarding: hazardous waste disposal; the proper disposal of grass clippings, leaves, and other green wastes; a link to the storm water website; and a phone number and email address to report illegal storm water activity shall be provided to all new residents and tenants on the Facility.

Part D.1.a.(3) Evaluation Methods *- The Permittee shall evaluate the progress of the public education program based on the following:*

- *Annual survey of Facility residents and tenants to measure both behavior and knowledge relating to storm water. The surveys can be conducted in person at events, on the phone, or using Web-based survey tools. The results of the survey shall be compared to past surveys.*
- *Number of brochures distributed.*
- *Participation in events.*
- *Volunteer hours.*
- *Any other methods that the Permittee determines to be effective.*

The results of the evaluation shall be summarized in the Annual Report.

Part D.1.b. Public Involvement/Participation

The Permittee shall include base/installation administrators, facility management, and facility occupants in developing, reviewing, and implementing the SWMP. The draft and final SWMP shall be made available to the public (e.g., on Permittee's website) and at local offices. An informational meeting shall be scheduled and announced prior to finalizing the SWMP to solicit comments and answer questions from the public. Other activities to involve the public may include providing volunteer opportunities that improve water quality, organizing a citizen advisory group to solicit ongoing input from the public about changes to the SWMP and specific SWMP-related projects, or organizing clean-up events to educate the public about impacts of storm water."

2.1 Program Goals

The goal of the Public Education and Outreach Program is to raise awareness and effect behavior change by involving the community in the overall goals and implementations of the SWMP. Greater knowledge of the program will garner greater public support for the program, as well as a more willingness to comply with the best management practices (BMPs) put forth in the program. The program should create positive changes in attitude, knowledge, and awareness; BMP implementation; pollutant load reduction; and an improvement in discharge and receiving water quality.

2.2 Targeted Groups

Specific groups have been identified for targeted outreach based on their potential ability to impact storm water runoff quality. The Base-wide awareness efforts will include activity-specific messages and outreach activities. The MS4 Permit identifies the following groups as targeted audiences:

- Military personnel and dependents that work or live on base;
- Civilian personnel that work on base;
- Construction and maintenance contractors that work on base;
- Consultants;
- Landscaping personnel and contractors;
- Construction Industry;
- Industrial facilities covered by the National Pollutant Discharge Elimination System (NPDES) permit program;

- Commercial businesses (i.e., automobile detailing, automobile repair and maintenance, retail gasoline outlets, and restaurants, including those types of businesses that have been ranked as high priority in the Industrial and Commercial Discharge Management Program (See Chapter 10); and
- Schools and recreational facilities.

Additionally, MCBH may identify any other source that they determine to be a potential pollutant concern to its Small MS4. Depending on the results of these activities and feedback from the targeted groups, the outreach efforts may change over time.

2.3 Outreach Activities

2.3.1 MCBH News Stories Webpage

The MCBH News Stories webpage is a publication platform that is available to everyone online. The News Stories webpage includes an Environmental article twice a year. The Environmental articles cover a wide range of environmental issues including the following topics:

- Water quality;
- Pollution prevention;
- Pesticides, herbicides, and fertilizer use;
- Promotion of water conservation;
- Proper disposal of green waste; and
- Hazardous material/waste awareness and disposal.

2.3.2 Orientation for New Arrivals to MCBH

MCBH holds a monthly orientation brief at the MCBH Kaneohe Bay Theatre for all new arrivals on the Base. The orientation brief is mandatory for new military and civilian employees and is also open to military dependents. Attendees receive information regarding Base environmental policies, including storm water pollution prevention, green waste disposal, and hazardous waste disposal and handling.

New MCBH residents are instructed to contact the Resident Service Office to report any illegal storm water activity and the website address where information about the SWMP Plan can be reviewed. Employees are instructed to contact the Complaint Hotline at (808) 257-8852 or the Spill Hotline at (808) 257-9111. The MCBH Environmental Compliance and Protection Division (ECPD) Compliance Inspection Team follows up on complaints received via the complaint hotline.

2.3.3 Household Hazardous Materials

ECPD produces a Household Hazardous Waste Disposal pamphlet for distribution to all housing units at MCBH Kaneohe Bay. These pamphlets are also available at the New Arrivals brief.

The MCBH Housing Department provides residents with information regarding the base household hazardous material reuse center, the Base Reuse Room. The Base Reuse Room, Building 6409, accepts residents’ excess household hazardous materials and reissues the reusable items for free, as needed.

2.3.4 Staff Training

MCBH is developing an annual general storm water awareness training for all MCBH employees, residents, and contractors. The training will be a poster, e-mail, workshop, social media post, or a combination of multiple formats. The general storm water awareness training will include an explanation of MCBH's organizational structure, responsibilities of MCBH personnel, BMPs, a clear definition of an illicit discharge, and procedures for reporting illicit discharges. The list of attendees or a general headcount will be included in the annual report.

MCBH has a dedicated team of Environmental Compliance Coordinators (ECC). ECCs are MCBH personnel designated as environmental liaisons between their activity or facility and ECPD. ECCs act as first responders in the event of an environmental compliance issue, such as accidental release or spill. The ECCs are ECPD's primary points of contact when distributing environmental compliance policy and training information to MCBH tenants and facilities. All units are required to have a designated ECC and alternate ECC. ECPD hosts a monthly ECC training on MCBH's environmental regulations and policy. The ECC training includes a storm water pollution prevention module that covers the MS4 Permit, storm water runoff, outfalls, illicit discharges, SWPPPs, good housekeeping protocol, and reporting violations.

MCBH is developing an annual employee awareness survey. The annual survey will be distributed to the ECCs at least annually to assess their knowledge of general storm water information and awareness of storm water pollution prevention measures. MCBH will ensure that at least 80 percent of the ECCs respond to the survey. The results of the survey will be included in the storm water Annual Report submitted to DOH each year. MCBH will update the update ECC and other storm water training courses based on the results of the annual employee awareness survey.

The Industrial and Commercial Discharge Management (ICDM) Program requires routine facility inspections and quarterly visual assessments of storm water discharge. Inspections are done by at least one member of the Storm Water Pollution Control Team which consists of the MCBH Storm Water Program Manager, ECC, and the Hazardous Material (HAZMAT) and Hazardous Material Minimization (HAZMIN) team. The ICDM Program inspectors are trained at least annually on how to conduct industrial and commercial inspections.

MCBH utilizes the Navy's web-based training system, Environmental Compliance Assessment, Training, and Tracking System (ECATTS), to provide environmental awareness training to contractors working on MCBH. The storm water module in the ECATTS training includes in-depth information on laws and regulations, storm water pollution prevention techniques, erosion and sediment control, construction site BMPs, and storm water plans.

2.3.5 Good Housekeeping Training

Good housekeeping training occurs at the annual general storm water awareness and monthly ECC training sessions. Good housekeeping training includes recycling and reuse, hazardous material and hazardous waste management, solid waste disposal, and storm water pollution prevention. The Base Recycle Center, Building 132, accepts cardboard, paper, wood, metal, plastic, glass, and more.

2.3.6 MCBH Main Entrance Marquee

An informational marquee at the main entrance to the base displays information about upcoming base activities and other programs. ECPD will work with the Base Public Affairs Office to include storm water pollution prevention tips in the semi-annual rotation. The hotline for the base security, which includes reporting of illicit discharges, will also be included in this rotation.

2.3.7 Web based Educational Materials

MCBH has an existing ECPD website (https://www.mcbhawaii.marines.mil/Offices-Staff/S-4-Installations-Logistics/Facilities/Environmental/)) that is available to the general public as well as staff. The ECPD websites provides educational materials aimed at residents and commercial tenants, such as good housekeeping practices, disposal of household hazardous wastes, and Base policies addressing pollution prevention. The site features a Welcome Aboard video that covers MCBH's environmental policy on natural resources, cultural resources, storm water pollution prevention, water conservation, spill response, and recycling.

Information related to storm water pollution prevention, storm water pollutant controls, BMPs, and applicable storm water rules and regulations are posted on the MCBH Storm Water Program website:

https://www.mcbhawaii.marines.mil/Offices-Staff/S-4-Installations-Logistics/Facilities/Environmental/Storm-Water-Program/

The Storm Water Program website provides links to storm water related documents including, the SWMP, the MS4 Permit, the most recent Storm Water Annual Report, and public meeting notices regarding storm water policies, regulations, and/or the SWMP Plan, including locations and time. The site also features the Spill Response Hotline for reporting illicit discharges.

2.4 Public Involvement/Participation

As with Public Education and Outreach, there is great value in allowing the public to play an active role in both the development and implementation of the SWMP. An active and involved community will help develop a large public support base for the program including a broader base of expertise and allow for shorter implementation schedules due to fewer obstacles in the form of public challenges.

2.4.1 Development, Review, and Implementation of the SWMP Plan

In accordance with the MS4 Permit, all plans related to the development of the draft and final SWMP Plan shall be made available to the public for review and comment. The plans shall be posted on the MCBH Storm Water Program website (https://www.mcbhawaii.marines.mil/Offices-Staff/S-4-Installations-Logistics/Facilities/Environmental/Storm-Water-Program/) during the review period. The public review period is a minimum of 30 calendar days, and all comments/responses will be submitted to the State of Hawaii Department of Health (DOH) along with the submittal of each document.

An informational meeting shall be scheduled and announced prior to finalizing the SWMP Plan to solicit further comments. The final SWMP Plan shall incorporate any questions from the public.

Following the completion of the final SWMP Plan, MCBH will make the document available on its website and, upon request, at the ECPD office.

2.4.2 Community Clean-up Events

MCBH conducts annual clean-up events, including trash pick-up or beach clean-ups, to help to raise public awareness about the impacts of trash and illicit discharges on storm water runoff quality.

Additionally, the Natural Resources Program holds the Weed Warrior Service Project event on the second Saturday of even numbered months. There are typically six (6) events per year with approximately 25-30 participants including military and Department of Defense (DOD) civilians. The Weed Warrior Service Project focuses on removal of weeds and trash at various wetland and beach areas.

ECPD is responsible for organizing these community events, including documentation of participation numbers, amount of trash collected, and any observed trends or correlations to the other SWMP activities.

MCBH also distributes information about Base activities via Facebook. ECPD may consider promoting volunteer opportunities through this social media outlet.

https://www.facebook.com/MarineCorpsBaseHawaii/

2.4.3 Storm Drain Placards

In 2012, MCBH implemented a Storm Drain Stenciling Program on the base to increase public awareness about storm water pollution and discourage illicit discharges to the MS4. Per Section D.1.f.(1)(ii) of the current MS4 Permit, MCBH is required to install a minimum of 50 new storm drain placards per year. ECPD may solicit volunteers to assist with this program. Additional information about the placard requirements is included in Chapter 6, Debris Control BMPs Program.

2.4.4 Partnerships

MCBH will investigate the possibility of partnering with other MS4 permit holders (i.e., Department of Education and the City and County of Honolulu), nonprofit organizations, and other interested community organizations to raise awareness, implement BMPs, reduce pollutant loads, and improve storm water runoff quality.

2.4.5 Promoting Public Participation

There are a variety of other methods to involve the public in MCBH’s SWMP, however, success of such programs is largely dependent on community interest. MCBH will continue to offer ideas, guidance, and/or opportunities to public groups that have shown interest in participating in SWMP-related programs.

Additional activities that will be considered include organizing a citizen advisory group to solicit comments from the public on changes to the SWMP Plan or SWMP-related programs, or volunteer projects to improve water quality and educate the public on the impacts of storm water.

2.5 Evaluation Methods

A summary of each year’s efforts toward public and targeted group outreach will be included in the Annual Report. See SWMP Plan Chapter 13, Reporting Requirements, and Appendix 13-1, Program Effectiveness Assessment Plan, for additional information.

2.6 Summary of Public Education, Outreach and Participation

Table 2-1
Summary of Public Education, Outreach and Participation

Outreach Activity	Targeted Group							Frequency/ Measurable Goals
	Military residents and dependents	Military and civilian workers	Construction and maintenance contractors	Landscaping personnel and contractors;	Industrial facilities	Commercial businesses	Schools, recreational facilities	
MCBH News Stories Webpage	X	X	X	X	X	X	X	Environmental articles published semi-annually
New Arrival Orientation	X	X						Monthly brief for new arrivals
Household Hazardous Materials Brochure	X							New arrivals, general storm water awareness (annual)
Staff Training		X			X	X		General storm water awareness (annual), ECC (monthly)
Good Housekeeping Training		X	X	X	X	X	X	General storm water awareness (annual), ECC (monthly)
Main Entrance Marquee	X	X	X	X	X	X	X	Semi-annually
MCBH Storm Water Program Website	X	X	X	X	X	X	X	Post all MS4 documents as they are developed
Community Cleanups	X	X	X	X	X	X	X	Annually
Storm Drain Placard	X	X	X	X	X	X	X	Minimum 50/year
Partnerships	X					X	X	TBD
ECC Meetings		X			X	X	X	Monthly
Earth Day	X	X	X	X	X	X	X	Annually

3 Illicit Discharge Detection and Elimination

In accordance with the MS4 permit and this SWMP Plan, MCBH is required to detect and eliminate illicit connections and illegal discharges into its MS4. The upgraded Illicit Discharge Detection and Elimination (IDDE) program will include:

1. Process for new drain connections,
2. Outfall inspections,
3. Data tracking,
4. Complaint investigation,
5. Enforcement,
6. Spill prevention and response,
7. Hazardous materials/waste handling and disposal, and
8. Training.

The MS4 Permit describes the requirements for IDDE as follows:

<u>Part D.1.c. Illicit Discharge Detection and Elimination (IDDE)</u>

"The Permittee shall implement the ongoing SWMP to detect and eliminate illegal connections and illicit discharges into its MS4 and shall include an improved program in the revised SWMP Plan. The program shall include:

Part D.1.c.(1) Connection Permits for private drain connections *- Within six (6) months after the effective date of this permit, the Permittee shall establish and implement requirements for issuing connection permits, or equivalent, and require obtaining the permit prior to allowing the drain connections. The Permittee shall also establish and implement requirements for issuing permits, or equivalent, for the operation and maintenance of drain connections to the MS4. A database shall be maintained of all permitted connections to its MS4. Prior to issuing a connection permit, the Permittee shall ensure the following are met:*

- *the project has provided proof of filing a Notice of Intent (NOI) or NPDES application, if applicable; and*
- *control measures comply with its requirements to minimize pollutant discharge into its MS4.*

Part D.1.c.(2) Field Screening *- The Permittee shall update and implement an Outfall Field Screening Plan for observing major and minor outfalls to screen for illicit discharges within six (6) months of the effective date of this permit. The plan shall designate priority areas for screening, specify the frequency for screening, and identify the procedures to be followed if a discharge is observed. If any outfall locations are submerged at the time of inspection, the monitoring personnel shall inspect the discharge line (or contributing tributary lines), at the closest location(s) upstream of the discharge location and outside tidal influence. At a minimum, outfalls in priority areas shall be screened once per permit term.*

Part D.1.c.(3) Tracking *- The Permittee shall maintain a database of complaints, illegal connections, illicit discharges, and spills which tracks the location of the discharge by installation name and building number or Tax Map Key (TMK), type of discharge, responsible party, the*

Permittee's investigation and response of the discharge, follow-up activities, and the resolution of each discharge to the MS4.

Part D.1.c.(4) Complaint Investigation *- The Permittee shall promptly investigate observed, suspected, or reported illicit flows and pursue enforcement actions, as appropriate. Complaints made to the CWB for discharges to the Permittee's MS4 will be forwarded to the Permittee for action. The Permittee shall:*

(i) Develop and implement a database to identify illicit discharge activities by installation name and building number or TMK. The database shall include information about each suspected improper discharge, the Permittee's investigation of that discharge, follow-up activities, and the resolution of each discharge as required in Part D.1.c.(3) above;

(ii) Implement a program to facilitate public reporting of illicit discharges (i.e., environmental hotline and/or website for reporting), including providing at least one (1) contact that the public can reach (including phone number and/or email address). This contact information shall be clearly posted on its website; and

(iii) Develop and implement a response plan for the investigation of illicit discharges to be consistent with the requirements in this permit.

Part D.1.c.(5) Enforcement *- Within six (6) months after the effective date of this permit, the Permittee shall:*

(i) Establish and implement the policies for enforcement and penalties for entities found to be in noncompliance with requirements developed in accordance with Part D.1.c.(1), including for persons illegally discharging pollutants to its MS4, and

(ii) Pursue enforcement actions against entities in non-compliance with its requirements, with illegal drain connections, and illegally discharging pollutants to its MS4 without direct connections.

Part D.1.c.(6) Spill Prevention and Response *- The Permittee shall implement its ongoing SWMP to prevent, respond to, contain, and clean up all wastewater and other spills that may enter its MS4 from any source (including private laterals and failing cesspools). This program shall be included in the SWMP. Spill response teams, which may consist of local, state, and/or federal agencies, shall prevent entry of spills into the Permittee's MS4 and contamination of surface water, ground water, and soil to the MEP.*

The Permittee shall coordinate spill prevention, containment, and response activities throughout all appropriate departments, programs, and agencies to ensure maximum water quality protection at all times.

The Permittee shall notify DOH of all wastewater spills or overflows from private laterals and failing septic systems into its MS4. The Permittee shall implement its ongoing SWMP to prevent, respond to, contain, and clean up wastewater from any such notification.

Part D.1.c.(7) Used Oil and Toxic Materials Disposal *- The Permittee shall implement its ongoing SWMP to facilitate the proper management and disposal or recycling of used oil, vehicle* *fluids, toxic materials, and other household hazardous wastes. Such a program shall include educational activities, public information activities, and identification of collection sites or methods.*

Part D.1.c.(8) ***Training*** *- The Permittee shall provide annual training to Environmental Compliance Coordinator (ECC) and all pertinent facility personnel on identifying and eliminating illegal connections, illicit discharges, and spills to its MS4. This training shall be specific to the Permittee's activities, policies, rules, and procedures. The Permittee shall maintain records of the annual training program."*

3.1 Illicit Discharges

The U.S. Environmental Protection Agency (EPA) defines an illicit discharge as "…any discharge to an MS4 that is not composed entirely of stormwater…," with the exception of those that are specifically permitted by a National Pollutant Discharge Elimination System (NPDES) Permit.

3.1.1 Conditionally Allowable Non-storm Water Discharge

Permit Specified Discharge Limitations

Part B.2. of the MS4 Permit includes a list of conditionally allowable non-storm water discharges, provided the discharge is not determined to be a source of pollution by MCBH. In the event that any of the listed discharges is observed or expected to be significant sources of pollutants to the MS4, the discharge will no longer be allowed.

- Water line flushing
  (including steam line condensate and flushing);
- Landscape irrigation;
- Diverted stream flows;
- Rising ground waters;
- Uncontaminated ground water infiltration (as defined in 40 CFR 35.2005(20));
- Uncontaminated pumped ground water, not including construction related dewatering activities;
- Discharges from potable water sources and foundation drains
  (including emergency eye wash basins and showers, and drinking fountains on piers);
- Air conditioning condensate;
- Irrigation water;
- Springs;
- Water from crawl space pumps, uncontaminated water from utility manholes or boxes, and footing drains
  (including discharge from buildings with basements, and crawl space pumps used by utility companies to dewater utility manholes and other maintenance and operations substructure facilities);
- Lawn watering runoff;
- Water from individual residential car washing;
- Water from charity car washes;
- Flows from riparian habitats and wetlands;
- Dechlorinated swimming pool discharges;

- Exterior building wash water (water only)
  (including piers and wharves – water only without detergent);
- Residual street wash water (water only), including wash water from sidewalks, plazas, and driveways, but excluding parking lots; and
- Discharges or flows from firefighting activities
  (including fire hydrant testing, fire sprinkler testing, and firefighter training activities).

Additional Allowable Non-storm Water Discharges

Part B.2. of the MS4 Permit also authorizes MCBH to develop a list of other similar occasional incidental non-storm water discharges that will not be addressed as illicit discharges. These non-storm water discharges must not be reasonably expected (based on the information available to MCBH) to be significant sources of pollutants to the MS4, because of either the nature of the discharges or conditions they have established for allowing these discharges to the MS4. The controls or conditions placed on these discharges must be documented in the SWMP Plan. In the event that any of the listed discharges is observed or expected to be significant sources of pollutants to the MS4, the discharge will no longer be allowed.

Therefore, in addition to the list of non-storm water discharges specified in the MS4 Permit and listed above, MCBH has determined that the following may be considered allowable non-storm water discharges under the specified conditions:

- <u>Boat rinsing</u>
  - The intent of the rinsing activity is salt removal.
  - Washing must be limited to water only.
  - No detergents are allowed.
  - Engine maintenance/degreasing activities must be conducted at designated locations featuring an oil-water separator and cannot be discharged directly to the MS4.
  - No discharge of bilge water to the MS4.
- <u>Dive gear rinsing</u>
  - The intent of the rinsing activity is salt removal.
  - Washing must be limited to water only.
  - No detergents are allowed.
- <u>Emergency pipe and tank hydrotesting and disinfecting</u>
  - Dechlorinate water prior to discharge.
  - Clean pavement surfaces of dust, debris, or other pollutants prior to discharge.
  - Discharge to vegetated, pervious areas.
- <u>Emergency trench dewatering</u>
  - Clean pavement surfaces of dust, debris, or other pollutants prior to discharge.
  - Place sandbags, silt fences, or hay bales around drainage inlets prior to discharge.
  - Discharge to vegetated, pervious areas.

A table of allowable discharges and recommended best management practices (BMPs) is included in Appendix 3-1.

3.2 Review and Approval Process for Drain Connections

In lieu of a separate connection permit form for private drainage connections to the MS4, the Environmental Compliance and Protection Division (ECPD) uses the Digging Work Clearance Permit (DWCP) application for construction projects requiring a new connection to the MS4. Refer to Appendix 3-2 for the DWCP application form.

The DWCP application form is required for any excavation work that may affect utilities, traffic, fire protection systems, or routine MCBH activities. The DWCP application initiates the dig permit process and informs key MCBH departments of digging work. The dig permit process identifies potentially hazardous work conditions and coordinates the work with MCBH activities that may be affected by it. The application requires project information including location, contractor information, description of the work to be performed, site plan, National Environmental Policy Act (NEPA) documentation, Storm Water Pollution Prevention Plan (SWPPP) Content Review Checklist, and a Maintenance Repair and Construction Approval form. Other related documents and plans relating to pollution prevention (i.e., Erosion and Sediment Control, Grading, Post-Construction BMP, Landscaping, Dewatering, and Hydrotesting Plans) are also submitted with the application. See Appendix 4-1 for the SWPPP Content Review Checklist.

The DWCP application form is routed for approval through multiple offices on base, including ECPD and the Facilities Engineering Maintenance Control Division (MCD), for ultimate approval by Logistics Facilities Public Works Engineering (LFPE). A DWCP cannot be issued unless environmental aspects have been reviewed and accepted through the NEPA process. LFPE issues the DWCP and maintains a record of all DWCPs. The DWCP must be approved prior to the start of work.

MCBH has an existing Geographic Information System (GIS) database to inventory and track storm water system elements. MCBH is in the process of developing the database into a comprehensive GIS-based Asset Management System (AMS). When new connections to the MCBH MS4 are established, they are immediately added to the GIS database. MCD is responsible for tracking permitted connections in the AMS and ECPD is responsible for overall storm water management. All base connections to the MS4, including new connections, belong to MCBH. MCBH construction projects are turned over to MCBH upon completion. ECPD and MCD are responsible for the MS4 connection and associated post-construction BMPs.

3.3 Outfall Field Screening Plan

Routine illicit connection inspections are performed to identify storm water discharges that are not identified as allowable in the NPDES Permit. The outfall inventory, priority areas, screening procedures, documentation, and tracking are detailed in the *Outfall Field Screening Plan* (See Appendix 3-6). The *Outfall Field Screening Plan* supports MCBH's overall SWMP as part of the IDDE Program and provides priorities and procedures to monitor all outfalls and the collection system for evidence of illicit discharges during wet and dry weather.

Outfall inspectors will be annually trained to evaluate the quality of storm water from outfalls and conveyance systems to identify and eliminate illicit connections and illegal discharges into the MCBH MS4. The primary objectives of the *Outfall Field Screening Plan* are to designate priority areas and frequency for screening and to identify the procedures to be followed if a discharge is observed.

The Industrial and Commercial Discharge Management (ICDM) Program, as discussed in Chapter 10, establishes priority areas for industrial and commercial facilities and activities based on the relative risk that any discharge might be contaminated with pollutants. ECPD reviews the ICDM Program priority areas at least annually. Outfalls are assigned a screening category of high, medium, or low based on the water use classification of its receiving waters and proximity of ICDM Program prioritized areas. Outfalls in the high screening category are inspected at least annually. Outfalls in the medium screening category are inspected at least twice per MS4 permit term. Outfalls in the low screening category are inspected at least once per permit term.

The ECPD Compliance Inspection Team inspects outfalls for illegal connections and illicit discharges at least once per permit term. Outfall inspections include a visual survey of the physical conditions at each site. Observations are documented using the Outfall Field Screening Inspection Checklist, including photographs. If any outfall location is submerged at the time of inspection, the monitoring personnel inspects the closest upstream storm drain structure or contributing tributary line outside of tidal influence. If dry weather flow is observed, the flow is visually examined for characteristics such as color, odor, sheen, or suds. If such characteristics indicate the presence of non-storm water discharges, the ECPD Compliance Inspection Team will expand the survey to track the flow upstream and determine the location of the discharge and initiate corrective actions. The ECPD Compliance Inspection Team will work with the responsible party to correct the violation as soon as possible using the enforcement procedures outlined in the *Enforcement Response Plan* (See Appendix 3-4).

A list of pollutant indicators that may be observed in the MS4 inlets and outlets are included in Table 3-1 to assist in identifying their possible sources and associated activities.

Results from outfall field screening inspections are used to identify outfalls with erosion issues. Additional outfall field screening may be conducted for further outfall condition assessment or debris removal. Refer to the Appendix 3-3, *Action Plan to Address Erosion at Storm Drain System Outlets* for additional information.

Table 3-1
Possible Sources of Pollutant Indicators

Indicators	Possible Sources
Ammonia	Broken sanitary wastewater lines, lawn/agricultural runoff
Bacteria/algae	Decomposing organic matter
Cloudy/opaque water	Metal fabrication
Cloudy appearance	Erosion
Copper	Pesticides, plating, paint shops, or spills
Discolored sediments	Metal fabrication
Floatable solids	Trash and debris
Gray color, sewage odor	Cross connection between sanitary and storm sewer
High chlorine	Swimming pools
High or low pH	Plastic/fiberglass shops, metal plating, masonry wastes
Inhibited vegetation	Various
Metal/concrete corrosion	Metal plating
Multicolor water	Construction sites
Oil, grease, fuel	Gas stations
Oily sheen	Auto repair shops/salvage yards
Phenols	Wood preservatives, pesticides
Pungent/burning odor	Chemical industry
Sediment deposits	Construction site
Soapy film, detergents	Laundries
Unusual colors/odors	Various
Volatile chemical odor	Painting, vehicle/equipment repair, metal plating

3.4 Tracking Database

ECPD maintains a file-based illicit discharge database with the completed Outfall Field Screening Inspection Checklist, photograph log, inspection reports, maps, notification letters, and corrective action records. A spreadsheet-format IDDE database will be developed and maintained by ECPD to track all illicit discharges, illicit connections, spills, and associated information, including geographic location, type of discharge, responsible party, MCBH response to address the discharge, follow-up activities, and the ultimate resolution of each event. All violations will be tracked in the IDDE database. Ultimately, the IDDE database will be merged into the GIS-based AMS that MCBH is developing.

The ECPD Compliance Inspection Team retains a record of all received complaints, including all storm water quality concerns, in the IDDE database. ECPD will ensure that minor observed discharges that do not require escalated enforcement actions are resolved immediately and entered into the tracking database. ECPD will be directly involved in significant discharges and spills, and those incidents requiring escalated enforcement actions. For significant illicit discharges and illegal connections, ECPD will follow the enforcement procedures established in the *Enforcement Response Plan* (See Appendix 3-4).

The Facilities Department currently maintains the GIS database, which includes the MS4 drainage structures (including inlets and outfalls) and receiving bodies of water. This database will be upgraded to a comprehensive AMS including an additional layer for locations of spills and illegal discharges based on the ECPD records.

3.5 Complaint Investigation

Routine base-wide inspections are carried out by the ECPD Compliance Inspection Team. These sweeps are intended to promote overall compliance with all established rules and regulations. Regular operations and maintenance (O&M) activities in school, commercial, and industrial areas are monitored through routine general base-wide inspections. The Compliance Inspection Team also conducts routine inspections of the Public-Private Venture (PPV) Housing areas to ensure compliance of residents.

The ECPD Compliance Inspection Team is responsible for following up with all written or verbal complaints received via mail, email, or the complaint hotline, as noted below:

Complaint Hotline: (808) 257-8852

Spill Hotline: (808) 257-9111

The Storm Water Program Manager will follow up by on any written or verbal storm water complaints or inquiries.

If the Compliance Inspection Team observes a minor illicit discharge, they will work with the responsible party to correct the violation as soon as possible. Refer to the *Enforcement Response Plan* in Appendix 3-4 for MS4 inspection and reporting procedures. All violations are tracked through the database described in Section 3.4 above. The ECPD Compliance Inspection Team retains a record of all received illicit discharge and storm water quality complaints in the IDDE database.

3.6 Enforcement

To ensure compliance with the MS4 Permit requirements, MCBH has established inspection and enforcement procedures in the *Enforcement Response Plan* (See Appendix 3-4). Compliance with the

IDDE Program and overall SWMP policies is monitored through base-wide inspections and compliance oversight of construction and maintenance projects. ECPD will be notified of MS4 Permit violations detected during routine inspections in the following circumstances:

1. The ECPD Compliance Inspection Team identifies a violation during general base-wide inspections.
2. A MS4 Permit violation is not resolved internally and promptly by processes put in place through construction contracts with the Facilities Engineering and Acquisition Division (FEAD), Marine Corps Community Services (MCCS), Ohana Military Communities (OMC)/Hunt, or Department of Education (DOE).

MCBH is unique from most MS4s in that within its property boundary, it owns the property and almost all of the facilities and provides funding for a majority of work. Due to the nature and internal structure of MCBH, the most effective means for enforcement is escalation of unaddressed violations to the next higher authority.

If an observed deficiency is not addressed within the allotted mitigation period, the issue will be brought to the attention of the ECPD Director. The party in violation will receive a written notice and deadline for compliance. If the issue remains unresolved, it will be escalated to the next higher authority. Refer to the *Enforcement Response Plan* for more information on the departments responsible for oversight, types of deficiencies, reporting procedures, and enforcement procedures.

Regardless of the type of project or violation, the ultimate penalty for non-compliance with the MS4 Permit regulations is eviction or discharge of the responsible party from MCBH. This action is placed at the discretion of the Base Commanding Officer (CO).

3.6.1 Referral of Non-compliance and Non-filers to DOH

In the event that MCBH encounters a situation where continued failure to resolve an observed deficiency has resulted in the CO's determination that the contractor or tenant be evicted, ECPD will notify the State Department of Health (DOH) within one (1) week of the decision. A written notification from ECPD, including all relevant information (such as inspection checklists, photographs, notes, and correspondence) is to follow within two (2) weeks of the CO's determination.

All written notifications submitted via email will be directed to:

cleanwaterbranch@doh.hawaii.gov, Attn: Enforcement Section Supervisor

3.7 Spill Prevention and Response

MCBH has completed a Spill Prevention, Control, and Countermeasures (SPCC) Plan and a Spill Contingency Plan. The purpose of the MCBH SPCC Plan is to establish procedures, methods, equipment, and other criteria to prevent the discharge of oil products into the navigable water of the U.S. or adjoining shorelines. The SPCC Plan helps to ensure that oil storage facilities are equipped with proper spill prevention and spill response tools.

ECPD is responsible for oversight of the Spill Response Program to prevent and respond to releases of oil or hazardous substances originating from any MCBH facility. ECPD ensures that the SPCC Plan is implemented by MCBH tenant activities involved in the handling and storage of oil products. The Spill

Response Program ensures compliance with all federal, state, and local laws and regulations pertaining to Oil Pollution Act of 1990 (OPA 90) Facility Response Planning, Spill Contingency Planning, Resource Conservation and Recovery Act (RCRA) Contingency Planning, and Risk Management Planning.

The Spill Response Program has combined planning, equipment, training, partnering with federal/state/local emergency planning agencies and participation in multi-agency drills to produce a more capable and responsive spill team which is recognized as one of the best in DOD and the primary spill response team on the windward side of Oahu.

The Spill Response Program:

- Manages an Integrated Contingency Plan (ICP) that combines Oil/Hazardous Substance Spill Contingency Planning, RCRA Contingency Planning, OPA 90 Facility Response Planning, and Risk Management Planning.
- Conducts annual Facility Response Team Training and Hazardous Substance Incident Response Training with spill teams utilizing a mobile decontamination unit, a mobile command trailer, command vessel, utility and boom platform boats, rapid response skimmers, vacuum truck, and a spill equipment van.
- Provides spill response training during ECPD's general storm water awareness training.
- Conducts annual Spill Management Team exercises using Incident Command System principles and establishing a Unified Command.
- Provides the Marine Corps representative to the Honolulu Area Planning Committee, the Local Emergency Planning Committee, the State Emergency Response Commission, the Natural Resources Damage Assessment Restoration and Rehabilitation Sub-Committee, the Marine Oil Spill Ephemeral Sampling Work Group, and the Risk Assessment and Nearshore/Shoreline Protection Sub-Committee.
- Protects the marine environment, Wildlife Management Areas, wetlands, base property, surrounding communities and human health by planning, preparing, and exercising response to worst-case discharge scenarios.

The Wastewater Division at MCBH is responsible for spill prevention and response for wastewater spills. The Wastewater Division has developed a Spill Prevention and Response Manual, which is maintained on-site at the base wastewater reclamation facility. Wastewater Division personnel are responsible for spill response and executing notifications and reporting in accordance with the *Wastewater Spill Notification/Response Procedures* (See Appendix 3-5).

3.8 Used Oil and Toxic Materials Disposal

3.8.1 Household Hazardous Materials/Waste

ECPD produces a Household Hazardous Waste Disposal pamphlet for distribution to all housing units at MCBH Kaneohe Bay. These pamphlets are also available at the New Arrivals brief and on the Base website. The pamphlet identifies the various types of household hazardous materials that require proper disposal as household hazardous waste and provides locations where residents may drop these materials off for proper disposal.

The MCBH Housing Department provides residents with information regarding the Base Reuse Room. The Base Reuse Room, Building 6409, accepts residents' excess household hazardous materials and reissues the reusable items for free, as needed. Household hazardous materials that are not reissued are turned into the 90-day Hazardous Waste Accumulation Site for disposal.

3.8.2 Privately Owned Vehicle (POV) Maintenance

Due to environmental and safety concerns, automobile/vehicle maintenance is not permitted in residential areas, including garages, carports, parking spaces, or streets. Vehicle repairs, engine cleaning, and oil changes must be conducted at an approved location, including a commercial business or the Auto Skills Center. These facilities are trained and equipped to deal with the proper management and disposal or recycling of used oil, vehicle fluids, etc. Information regarding vehicle maintenance is distributed by OMC/Hunt to all residents in the Community Handbook. Residents in the bachelors' quarters receive similar information and guidance through their housing office.

3.8.3 Industrial Vehicle Maintenance

Maintenance occurs at most of the industrial facilities on Base, including boats, automobiles/vehicles, and aircraft. Refer to the industrial facility SWPPP in Chapter 11 of this SWMP Plan for additional information about specific hazardous materials and BMPs associated with vehicle maintenance.

3.8.4 Hazardous Waste Accumulation Point

Proper hazardous materials handling and waste management at industrial and commercial locations is the responsibility of all personnel, with oversight by the Unit Environmental Compliance Coordinator (ECC), Command Level Coordinator, and Shop Level Coordinator. Hazardous waste accumulation points have been established at industrial and commercial locations throughout MCBH. Hazardous wastes/materials are picked up from these accumulation points as needed by the Hazardous Material Minimization (HAZMIN) Center for disposal. The Base Hazardous Waste Accumulation Site and Shop Level Coordinators are tasked with proper management, transportation, and disposal of hazardous waste generated by military activities on MCBH.

3.9 Training

3.9.1 IDDE Program Training

MCBH storm water personnel will receive specialized training annually on the following topics:

- Procedures to be used when observing outfalls;
- Procedures to be used to track non-storm water discharges to their source;
- Explanation of MCBH's illicit discharge and illicit connection definitions; and
- Overview and procedures to implement MCBH's current *Enforcement Response Plan*

In accordance with Part D.1.c.(8) of the MS4 Permit, ECCs and all pertinent facility personnel will receive annual training on identifying and eliminating illegal connections, illicit discharges, and spills to the MCBH MS4. ECCs, spill response team members, and Housing Department personnel will be trained on the IDDE Program policies at least annually. The ECCs will be instructed to disseminate the IDDE training to their respective units and facility personnel. The list of attendees or a general headcount for the IDDE training will be included in the annual report.

Personnel that work in Waterfront Operations are trained on the SPCC Plan and the Spill Contingency Plan so that they can promptly respond to any spills.

3.9.2 Hazardous Waste Accumulation Point Management

ECPD conducts a hazardous waste accumulation point management course for all personnel (military, civilians, and contractors) who generate, package, handle, store, transport, and manage hazardous waste and/or supervise those who manage hazardous waste in the performance of their duties at MCBH. The 8-hour initial course and annual refresher are mandatory for designated personnel assigned as the unit ECC, Command Level Coordinator, Shop Level Coordinator, and or Alternate Shop Level Coordinator.

Topics covered are: hazardous waste management; HAZMIN Center services; hazardous material/hazardous waste training requirements; First Responder Awareness Level training for emergency spill response; and oil water separators.

3.9.3 ECPD Compliance Inspection Team

Routine inspections are carried out by the ECPD Compliance Inspection Team. These routine inspections are intended to promote overall compliance on MCBH with established rules and regulations, including those related to environmental protection and pollution prevention. The ECPD Compliance Inspection Team is also responsible for following up on all written or verbal complaints received.

4 Construction Site Runoff Control

Per the MS4 Permit, Part D.1.d, MCBH is required to implement a Construction Site Runoff Control Program (Construction Program) as part of its construction site management.

The primary goal of MCBH's Construction Program is to protect and restore water quality of the surrounding surface waters, by reducing, to the maximum extent practicable (MEP), the discharge of pollutants from construction sites to the MS4. Due to the nature of MCBH, as a military installation that owns all of the property on Base, encroachment-type construction projects are not applicable. This Construction Program applies to all MCBH construction sites, which include both in-house and contract, maintenance and construction projects. The objectives of this Construction Program are to:

1. Standardize best management practice (BMP) implementation, and maintenance in the field.
2. Maintain an inventory of construction sites to facilitate tracking efforts.
3. Standardize the plan review and approval process to promote the incorporation of BMPs as part of the early stages of design and planning and to ensure that BMP measures are implemented to the MEP prior to start of construction.
4. Require written approvals from MCBH for all construction related storm water discharges to MCBH's MS4.
5. Enforce Construction Program policies through routine inspection procedures, tracking, and standard corrective actions per MCBH's *Enforcement Response Plan* (Appendix 3-4).
6. Promote awareness of MCBH's SWMP Plan among all parties involved in any component of the Construction Program through annual training and education programs.
7. Develop a Construction Program that will most efficiently utilize available resources at MCBH.

This Construction Program is outlined in accordance with the MS4 Permit requirements. The MS4 Permit states:

"Part D.1.d. Construction Site Runoff Control

> *The Permittee shall implement a construction site management program to reduce to the MEP the discharge of pollutants from both private and public construction projects (i.e., contract, in-house, maintenance, and encroachment). The construction site management program shall include the following minimum elements:*
>
> ***Part D.1.d.(1) Requirement to develop BMPs Manuals*** *- Within twelve (12) months from the effective date of this permit, the Permittee shall develop and submit to the DOH, the following types of manuals for construction projects:*
>
> - *Construction Best Management Practices Field Manual.*
> - *Maintenance Activities Best Management Practices Field Manual.*
> - *Storm Water Permanent Best Management Practices Manual.*
>
> *The performance of MEP includes addressing projects, regardless of size, that have the potential to impact water quality. The Permittee shall review these standards annually and, as necessary, revise to include descriptions of new or modified BMPs, including permanent BMPs and LID practices. All revisions made during a calendar year shall be discussed in its corresponding*

Annual Reports and all documents included in the SWMP Plan. All documents shall be made available to the Permittee's staff, contractors, and consultants, as appropriate.

Part D.1.d.(2) Requirement to implement BMPs *- Within twelve (12) months from the effective date of this permit, the Permittee shall establish policies to require proposed construction projects to implement BMPs and standards described in the following manuals:*

- *Construction Best Management Practices Field Manual.*
- *Maintenance Activities Best Management Practices Field Manual.*
- *Storm Water Permanent Best Management Practices Manual.*

Part D.1.d.(3) Inventory of construction sites *- Within six (6) months from the effective date of this permit, the Permittee shall implement a system to track both private and public construction projects (i.e., contract, in-house, maintenance, and encroachment). This system shall track information on the project (including permit or file number, if available); status of plan review and approval, inspection dates, and if applicable, enforcement actions; and whether the project has applied for coverage under HAR, Chapter 11-55, Appendix C, NPDES General Permit Authorizing the Discharge of Storm Water Associated with Construction Activity (a.k.a. General Construction Activity Storm Water permit) (unless the project will disturb less than one acre of land) and satisfied any other applicable requirements of the NPDES permit program (i.e., an individual NPDES permit).*

Part D.1.d.(4) Plan Review and Approval *- The Permittee shall:*

(i) *Review the appropriate Storm Water Pollution Prevention Plan (SWPPP) and other pollution prevention measures (e.g., Erosion and Sediment Control, Grading, Post-construction BMP and Landscaping) or similar plans/documents prior to approval of the construction plans and specifications. The Permittee shall verify that the SWPPP meets the following requirements:*

- *HAR, Chapter 11-55, Appendix C, and any other requirements under the NPDES permit program, as applicable;*
- *Construction Best Management Practices Field Manual;*
- *Maintenance Activities Best Management Practices Field Manual;*
- *Storm Water Permanent Best Management Practices Manual; and*
- *Implementation of measures to ensure that the discharge of pollutants from the site will be reduced to the appropriate discharge limitations subject to the BAT/BCT discharge requirement, consistent with the Act and other respective federal and state requirements for such facilities and will not cause or contribute to an exceedance of water quality standards.*

(ii) *Require a permit or written equivalent approval for drainage connections to its MS4, discharge of surface storm water runoff associated with construction (i.e., from both private and public projects) or discharge permit (i.e., hydrotesting and dewatering effluent or other non-storm water, except those allowed under this permit) into their MS4 and maintain a database of the permits/approvals. Prior to issuing a drainage*

connection, discharge of surface runoff permit/approval, discharge permit, or encroachment permit, the Permittee shall ensure that the following are met:

- *The project owner has provided proof of filing an NOI Form C or NPDES application for the discharge of storm water associated with construction activities that disturb one (1) acre or more;*
- *The project owner has provided proof of filing a NOI Form F and/or G or NPDES application for the discharge of hydrotesting effluent or construction dewatering effluent, respectively, if applicable; and*
- *A SWPPP or other documents (e.g., Erosion and Sediment Control, Grading, Post-construction BMP and Landscaping Plans, Dewatering Plan, and Hydrotesting Plan) relating to pollution prevention or similar document(s) have been reviewed and accepted by the Permittee;*

(iii) Prohibit the commencement of construction on any private or public construction project (i.e., contract, in-house, maintenance, and encroachment) unless and until it has verified that the project has received from DOH a Notice of General Permit Coverage (NGPC) under HAR, Chapter 11-55, Appendix C, NPDES General Permit Authorizing the Discharge of Storm Water Associated with Construction Activity (General Construction Activity Storm Water permit) (unless the project will disturb less than one (1) acre of land) and satisfied any other applicable requirements of the NPDES permit program (i.e., an individual NPDES permit);

(iv) Implement a plan review checklist that its reviewers shall use in evaluating the plans and BMPs or other similar document(s) which have been implemented pursuant to this Part [i.e., Part D.1.d] within 90 calendar days from the effective date of this permit. Copies of this plan review checklist shall be provided to applicants for connection, discharge, and encroachment permits; and to consultants and contractors for their use in developing the Plans or other similar document(s) for Permittee-contracted construction projects. The plan review checklist shall include at a minimum, but not be limited to, comments on any deficiencies and the date when comments were addressed to the satisfaction of the Permittee. A system shall be implemented to ensure all comments, identified during the review process has been properly addressed.

***Part D.1.d.(5) Inspections** – The Permittee shall:*

(i) Prior to the initiation of ground-disturbing activities at any site, except for activities associated with the installation of BMPs at a site, an engineer or qualified inspector employed or retained by the Permittee who reviews and becomes familiar with the project's SWPPP and/or other equivalent document(s), shall inspect the site to verify BMPs as required by the BMP Plan and/or other documents have been installed correctly and in the correct locations prior to the commencement of ground-disturbing activity. Inspections shall include a review of site Erosion and Sediment Controls, good housekeeping practices, and compliance with Permittee-accepted erosion and sediment control plans, construction BMPs Plans, or other similar documents and Permittee-approved permits. The inspector shall also identify, document, report, and remedy any

site conditions having the potential for erosion and sediment runoff, including other pollutant discharges which may occur as a result of the project's construction activities.

(ii) In addition to inspections required by the NPDES permit program, all contract, in-house and maintenance construction projects shall be inspected at least monthly by a qualified construction inspector who is independent (i.e., not involved in the day-to-day planning, design, or implementation) of the construction projects to be inspected. The Permittee may use more than one (1) qualified construction inspector for these inspections. Upon three (3) successive monthly inspections that indicate, in total, no critical or major deficiencies or less than six (6) minor deficiencies with no more than three (3) minor deficiencies in one (1) month in a project's BMPs or other storm water management activities, the Permittee may decrease the inspection frequency for such project to quarterly. However, if while under a quarterly inspection frequency, an inspection of a project conducted pursuant to this paragraph indicates at least one (1) critical or major deficiency or a total of three (3) or more minor deficiencies in the project's BMPs or other storm water management activities, the inspections frequency shall immediately return to no less than monthly. This reduced inspection frequencies option is contingent upon the Permittee having defined each type (i.e., critical, major, or minor) of deficiency. The Permittee shall further develop and implement written procedures for appropriate corrective actions and follow-up inspections when deficiencies had been identified at an inspected project. The corrective action procedures shall, at a minimum, require that 1) any critical deficiencies shall be corrected or addressed before the close of business on the day of the inspection at which the deficiency is identified, and 2) any major deficiencies shall be corrected or addressed as soon as possible, but in no event later than five (5) calendar days after the inspection at which the deficiency is identified or before the next forecasted precipitation, whichever is sooner.

(iii) All construction projects with a connection permit, encroachment permit, or discharge of surface runoff permit/approval shall be inspected at least once annually or once during the life of the project, whichever comes first, by a qualified construction inspector who is independent (i.e., not involved in the day-to-day planning, design, or implementation) of the construction projects to be inspected. The Permittee may use more than one (1) qualified construction inspector for these inspections. If the project has a SWPPP or other equivalent document(s), the inspection shall also verify that the BMPs were properly installed and at the locations specified in the Plan.

(iv) The Permittee shall develop and implement a standard inspection form(s); reporting and corrective procedures for inspections, including use of an inspection checklist, or equivalent; and a database or equivalent system to track inspection results within 90 calendar days of the effective date of this permit. The inspection checklist shall include at a minimum, but not be limited to, identifying any deficiencies and the date of the corrective actions. Photos shall accompany the inspection checklist to document the deficiencies.

***Part D.1.d.(6) Enforcement** – The Permittee shall:*

(i) Implement policies for enforcement and penalties for those in non-compliance with Part D.1.d.(1) requiring the implementation of standards, and

(ii) Implement an Enforcement Response Plan to include written procedures for appropriate corrective and enforcement actions, and follow-up inspections when an inspected project is not in full compliance with its requirements, other permits, and any other applicable requirements under the NPDES permit program.

***Part D.1.d.(7) Process to refer noncompliance and non-filers to the DOH** - In the event the Permittee has exhausted its use of sanctions and cannot bring a construction site or construction operator into compliance with its policies, standards, or this permit, or otherwise deems the site poses an immediate and significant threat to water quality, the Permittee shall provide an e-mail notification to cleanwaterbranch@doh.hawaii.gov, Attn: Enforcement Section Supervisor within one (1) week of such determination. E-mail notifications shall be followed by written notification in accordance with Part A.7. and include a copy of all inspection checklists, notes, and related correspondence in pdf format (300 minimum dpi) within two (2) weeks of the determination. In instances where an inspector identifies a site that has not applied for permit coverage under the NPDES permit program, the Permittee shall provide written notification in accordance with Part A.7 to the DOH within two (2) weeks of the discovery.*

***Part D.1.d.(8) Training** - The Permittee shall provide annual training on the Construction BMPs Program Plan to all staff with construction storm water responsibilities, including construction engineers, construction and maintenance inspectors, and plan reviewers. This training shall be specific to the Permittee's activities (including the proper installation and maintenance of accepted BMPs), policies, rules and procedures. The Permittee shall maintain records of the annual training program.*

***Part D.1.d.(9) Education** - The Permittee shall implement an education program as part of its ongoing SWMP to ensure that project applicants, contractors, developers, property owners, and other responsible parties have an understanding of the storm water requirements they need to implement."*

4.1 Program Organization

As a military installation, MCBH has several different types of construction projects and an agency to handle the oversight of each one. The overseeing agency has the most immediate authority over the day-to-day activities at each construction site. As such, the Construction Program is structured to place responsibility for implementation and enforcement of MCBH's SWMP Plan policies at construction sites on each of these corresponding agencies.

The Environmental Compliance and Protection Division (ECPD) is responsible for managing the overall SWMP Construction Program, and updating policies, as needed, to improve the effectiveness of the program. Although it is typical for any issues with implementation of the SWMP Plan or non-compliance with the MS4 Permit to be resolved at a lower level of authority, the Base Commanding Officer (CO) has the ultimate authority to adjust policies or direct enforcement actions for tenants/agencies subject to the Construction Program. This is described in more detail in Section 4.6, Enforcement, and in Appendix 3-4, the *Enforcement Response Plan*.

To address the MS4 Permit requirements for construction site runoff of the various types of construction that occur on base at MCBH, the organizational structure displayed in Figure 4-1 has been established. In Figure 4-1, the grey boxes indicate the agency responsible for oversight of the project. Typically, construction projects at MCBH are categorized as either:

(i) *In-house Maintenance and Construction* – projects are scoped and planned by Facilities Engineering Maintenance Control Division (MCD), and the construction work is completed by Facilities Engineering Maintenance Repair Operations (MRO). Typically, these projects are less than 5,000 square feet (sf) and/or related to emergency repair work.

(ii) *Military Construction* – These are projects that would typically be handled as in-house construction, but due to limited manpower have been contracted out. These projects are managed by Logistics Facilities Public Works Engineering (LFPE), with all storm water management managed by ECPD.

(iii) *Contract Maintenance and Construction* – These projects are conducted by an outside contractor, but are managed as follows:

- *Naval Facilities Engineering Systems Command (NAVFAC) Construction Projects* are managed by the Facilities Engineering and Acquisition Division (FEAD).
- *Mokapu Elementary School Projects* are managed by the Department of Education (DOE).
- *Public-Private Venture (PPV) Housing Projects* are managed by Ohana Military Communities (OMC)/Hunt.
- *Commercial Tenant Projects* are managed by Marine Corps Community Services (MCCS).
- *Various other contract maintenance and construction projects* are managed by MCD.

In-house Maintenance and Construction, Military Construction, and MCD Maintenance and Construction fall into two subcategories, (1) Maintenance 1 Repair 1 (M1R1), or (2) Maintenance 2 Repair 2 (M2R2). M1R1 projects are typically minor in-house construction projects, whereas M2R2 designates major construction projects.

Due to the nature of certain in-house maintenance and construction projects, where the potential risk of storm water pollution is minimal or would compromise public health and safety to uphold, certain projects may be exempt from selected plan review and inspection requirements of the Construction Program. These exceptions will be decided on a case-by-case basis, at the discretion of MCD. Projects that may qualify for exemption include those that involve:

- Routine maintenance to maintain the original hydraulic capacity, or the original purpose of the facility;
- Emergency repair construction activities required to immediately protect public health and safety; and
- Interior remodeling that involves no outside exposure of construction materials/waste to storm water.

These qualifying characteristics are subject to the discretion of the MCD and ECPD, and may be revised as determined necessary and/or justifiable. All projects that do not meet these exemption criteria will be referred to herein as *"non-exempt"* construction projects.

4.2 Best Management Practices (BMP) Manuals

BMP Manuals are used by MCBH to provide guidance and consistency within the Construction Program. To meet the MS4 Permit requirements, MCBH is required to develop the following types of BMP Manuals for all construction projects within twelve (12) months of the effective date of the permit (EDOP), by September 1, 2022:

- *Construction Best Management Practice Field Manual* – The *Construction BMP Field Manual* is intended to provide guidance on BMP installation and maintenance procedures for construction activities and approved construction related non-storm water discharges, including site management, erosion control, and sediment control. See Appendix 4-3.
- *Maintenance Activities Best Management Practice Field Manual* – The *Maintenance Activities BMP Field Manual* is designed to provide guidance on common maintenance procedures and how to prevent storm water pollutants from entering the MS4 via non-storm water management practices, and through proper maintenance of storm drain structures. Some of the maintenance activities include painting, paving, landscaping, street sweeping, and storm drain cleaning. See Appendix 11-3.
- *Post-Construction Best Management Practice Manual* – The *Post-Construction BMP Manual* provides guidance on permanent BMP selection, installation, and maintenance procedures to eliminate or reduce the discharge of pollutants to State waters. The focus of the *Post-Construction BMP Manual* is Low Impact Development (LID) and ensuring that all projects include the suitable use of permanent post-construction BMPs. See Appendix 5-3.

Each BMP manual will be reviewed by MCBH annually for completeness and accuracy, and revisions will be made as necessary. This will include descriptions of all new/modified BMPs, including permanent BMPs and LID practices. ECPD is responsible for ensuring that necessary revisions are made and the BMP Manuals are available for all applicable parties involved in the Construction Program.

4.2.1 BMP Implementation Policy

MCBH is required to implement policies for requiring BMPs for all proposed construction projects within twelve (12) months of the EDOP, by September 1, 2022. This will include all *non-exempt* in-house maintenance and construction, military construction, and contract construction projects. The BMP requirements will be based on the guidance of the three (3) aforementioned BMP Manuals. MCBH staff, contractors, and consultants, are to use the BMP field manuals as guidance for these practices.

The *Construction BMP Field Manual* has been developed to establish BMP policy for construction projects. The manual is a primary tool of MCBH's Construction Program to protect and restore the water quality of the surrounding surface waters. BMPs should be implemented to the MEP for all *non-exempt* projects, regardless of size, that have the potential to impact water quality.

Selection and implementation of construction BMPs is outlined in the *Construction BMP Field Manual*. BMP selection is based on the pollution risks associated with the construction activity. Proper selection and implementation of construction BMPs can reduce or eliminate the impacts of potential pollutants on water quality. The effectiveness of a BMP is typically directly related to the maintenance of the BMP and the area around it. Therefore, BMP maintenance requirements must be considered during BMP selection.

The *Construction BMP Field Manual* organizes BMPs in categories that focus on erosion control, sediment control, or site management. Erosion control BMPs are devices installed or constructed by the contractor on disturbed soil to protect the ground surface from erosion due to wind, rain, or runoff. Sediment control BMPs are measures to intercept and detain sediment-laden runoff prior to discharge off-site or to the storm sewer system. Sediment control devices detain runoff to promote infiltration and/or sedimentation. Site management BMPs include preventative measures implemented during the planning or construction stage of a project to control potential pollutants at their source.

BMP Fact Sheets with detailed implementation, operation and maintenance information are included in Section 7 of the *Construction BMP Field Manual*. Routine inspections and maintenance are essential to maximize the effectiveness of the BMP device, application, or procedure.

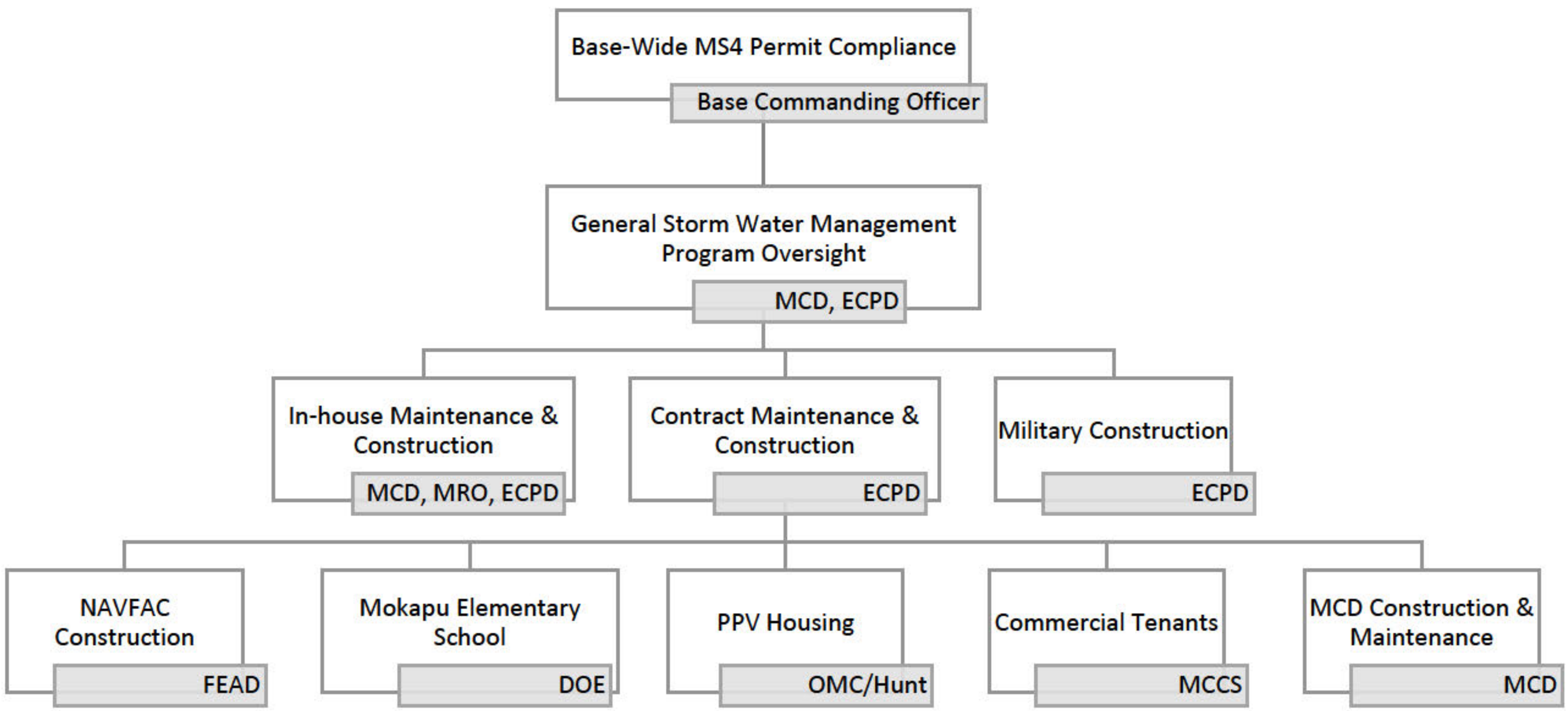

Figure 4-1 Construction Program Organizational Chart

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4.3 Inventory of Construction Sites

There are three general categories of construction projects at MCBH, (1) In-house Maintenance and Construction, (2) Military Construction, and (3) Contract Maintenance and Construction. An inventory of applicable construction sites is maintained by the responsible agencies displayed in Table 4-1. All records are kept at the associated agency's office and will be made available, when necessary, upon request by ECPD or the State of Hawaii Department of Health (DOH).

The goals of the inventory of construction sites include:

- Tracking where pollutants may discharge into system;
- Ensuring that plans have been reviewed, and associated permit(s) obtained;
- Recordkeeping to show that applicable inspections are being conducted, as well as any necessary enforcement actions; and
- Easily attainable points of contact to obtain more information on a project, or to address a problem.

Effectively managing project information will enable MCBH to easily identify and correct compliance issues and recognize recurring issues within the Construction Program or repeat offenders of theMS4 Permit requirements. The ability to easily identify and address problems will further promote the continual improvement of the Construction Program and facilitate its effectiveness in reducing storm water pollution from construction sites.

The inventory of construction sites consists of project records that contain the following information, as applicable:

- Project title, and permit or file number.
- Status of plan review and approval process.
- Inspection dates and enforcement action. If enforcement action is noted, the record shall include reference information for the associated Construction BMP Inspection Checklist forms (See Appendix 4-1), and any follow-up documentation as tracked in the ECPD database.
- If the project has filed a Notice of Intent (NOI) for, or received a Notice of General Permit Coverage (NGPC) for any General Permits under Hawaii Administrative Rules (HAR), Chapter 11-55, including, but not limited to:
    - o Appendices C and A - National Pollutant Discharge Elimination System (NPDES) General Permit Authorizing the Discharge of Storm Water Associated with Construction Activity *(for projects disturbing an area of one (1) acre or more);*
    - o Appendices F and A - NPDES General Permit Authorizing Discharge of Hydrotesting Waters; or
    - o Appendices G and A - NPDES General Permit Authorizing Discharges Associated with Construction Activity Dewatering

or If the project has applied for, or received an individual NPDES permit, or satisfied any other requirement of the NPDES permit program.

In addition to managing the construction project inventory, the specific agency responsible for construction project management is responsible for maintaining the project information and inspection/enforcement data in the MCBH storm water Asset Management System (AMS). This includes data such as general project information, NPDES permit status, status of plan review and approval, and inspection dates with associated reports/photographs, and enforcement actions.

Effective tracking of construction projects from the review stage to project completion ensures that pollutants do not degrade water quality to the MEP. This allows tracking of where pollutants enter the MS4, the schedule and results of inspections, enforcement actions, and the location and maintenance requirements of post-construction BMPs. The purpose of the construction project inventory and the storm water AMS is to ensure projects maintain compliance with the MS4 Permit and the SWMP.

4.3.1 Routine Project Exemption

To prevent overburdening of the tracking systems and procedures in place, MCBH is in the process of developing a list of criteria for routine in-house maintenance and construction projects (*exempt* or *non-exempt*) that follow MCBH's standard BMP procedures and can be reasonably considered to pose a negligible risk for discharging pollutants to its MS4. These criteria will be compiled into a Routine Project Exemption Form.

ECPD is also collaborating with MCD to develop a guidance sheet/booklet to be used by project managers (PMs) and staff to further explain required BMP implementation, procedures for meeting exemption criteria, and the importance of this process. For projects that meet these criteria, this Exemption Form will be filled out and signed by the MCBH PM. By signing the Exemption Form, the PM is certifying that the project will meet all exemption criteria until completion. This means that all applicable BMP measures will be implemented and that there is no reasonably foreseeable risk to storm water quality. For tracking purposes, the signed form will be submitted to and kept on file at MCD.

To distinguish between the aforementioned "*exempt"* maintenance/construction projects (i.e., emergency repair projects, interior remodeling, etc.), projects that meet the Exemption Form criteria will be referred to as "*routine exempt*" maintenance/construction.

Routine exempt projects will not require any further Construction Program tracking or inspection. It will be the responsibility of the signing PM to ensure that the exemption criteria are met until the project is completed. Should any general inspection come across a routine exempt project in noncompliance with any exemption criteria, ECPD and MCD will immediately be notified for further corrective action. If the project scope changes at any time throughout the duration of construction activities, to fall out of the exemption criteria, the PM will immediately notify MCD. The remainder of the project will be subject to the plan review, inspection, and tracking requirements of all other MCBH in-house maintenance and construction projects.

Exempt projects (such as emergency repair projects) will still be considered for tracking if the exemption criteria are not met, because tracking can be instrumental in identifying recurring or resultant issues in the future.

Table 4-1
Location of Inventory of Construction Sites

Type of Construction Project	Agency Responsible for Site Management	Location of Records (Agency/POC, Building/Address)
In-house Maintenance and Construction	MCD	MCD Building 242
	MRO	MRO Building 201
Military Construction	ECPD	Storm Water Program Manager Building 1360
Contract Construction	MCD	MCD Building 242
▪ NAVFAC	FEAD	FEAD Deputy Director Building 566
▪ Mokapu Elementary School	DOE	School Liaison Officer Mokapu Elementary School
▪ PPV Housing	OMC/Hunt	OMC/Hunt Project Manager 5173 Nimitz Road, Honolulu, HI 96818
	NAVFAC Pacific	PPV Program Manager POC 258 Makalapa Drive, Suite 100, JBPHH, HI 96860
▪ Commercial Tenant	MCCS	Logistics Office Building 140
▪ MCD Construction and Maintenance	MCD	MCD Building 242

4.4 Plan Review and Approval

MCBH conducts plan review of all proposed, non-exempt, construction projects as required by the MS4 Permit. All applicable plans, including but not limited to, the Storm Water Pollution Prevention Plans (SWPPPs), Erosion and Sediment Control, Grading, Post-construction BMP, and Landscaping Plans, are reviewed in accordance with the requirements of the following:

- HAR, Chapter 11-55, Appendix C, and any other requirements under the NPDES permit program, as applicable;
- *Construction BMP Field Manual*;
- *Maintenance Activities BMP Field Manual*;
- *Post-Construction BMP Manual*; and
- Implementation of measures to ensure that the discharge of pollutants from the site will be reduced to the appropriate discharge limitations subject to the Best Available Technology

Economically Achievable/Best Conventional Pollutant Control Technology (BAT/BCT) discharge requirement, consistent with the Clean Water Act and other respective federal and state requirements for such facilities and will not cause or contribute to an exceedance of water quality standards.

Review of the SWPPP and other supporting documents will be conducted by the agency responsible for overseeing the project, as outlined in Table 4-1. MCBH's Storm Water Pollution Prevention Plan Content Review Checklist (see Section 4.4.1) will be used to guide the plan review process. Plan review is conducted similarly for in-house maintenance and construction, military construction, and contract maintenance and construction projects.

- *For In-house Maintenance and Construction projects* - The SWPPP Content Review Checklist, as well as the BMP manuals or similar documents, are readily available to all MCBH staff for incorporation into in-house maintenance and construction projects.
- *For Military Construction, and Contract Maintenance and Construction Projects* - MCBH provides copies of the SWPPP Content Review Checklist and supporting documents to all contractors and/or consultants hired for any contract construction projects.

Upon completion and acceptance of a SWPPP review, the reviewing agency will issue a notification to the MCBH PM and contractor. A database of all approvals will be maintained by each respective agency.

If a plan submittal does not meet the requirements outlined by the plan review process, all deficiencies are noted on the project's SWPPP Content Review Checklist. The applicant must resubmit the checklist, with comments describing how each deficiency has been addressed. At a minimum, the reviewing agency will keep a record of deficiencies/comments noted, and the date in which revisions were made to the satisfaction of the reviewer. Other relevant information may be tracked at the discretion of the agency.

Prior to commencement of construction, the MCBH PM or contractor is responsible for ensuring that necessary approvals, including documentation of any revisions made to satisfy reviewer comments, have been received and updated in the project record.

Any pertinent revisions to the SWPPP and supporting documents following review approval, including but not limited to design or concept changes, shall be resubmitted to the appropriate agency for review. As necessary, ECPD will oversee or provide assistance during the plan review process.

4.4.1 SWPPP Content Review Checklist

The SWPPP Content Review Checklist is intended to outline all minimum requirements of a project SWPPP and supporting documents. The SWPPP Content Review Checklist is included in Appendix 4-1. It is the responsibility of ECPD to revise the SWPPP Content Review Checklist, as needed, and to ensure that the updated form is provided to MCBH staff and applicants, including reviewers, MCBH PMs, contractors, and consultants.

4.4.2 Connection Permits

Following the review of the project SWPPP and all other pertinent documents, any project requiring a drainage connection to the MS4, discharge of surface storm water runoff associated with construction activities (private or public), or discharge permit into the MS4 (i.e., hydrotesting, dewatering, etc.) is required to obtain additional approval from MCBH.

In lieu of a separate connection permit approval form, ECPD uses the Digging Work Clearance Permit (DWCP) application for construction projects that require a connection to the MCBH MS4. The DWCP application is included in Appendix 3-2. See Section 3.2, Review and Approval Process for Drain Connections, for details on the dig permit process including DWCP application requirements and the review and approval process.

All DWCPs are issued by LFPE and are routed for approval through multiple offices on base, including ECPD and MCD. Prior to construction, all project owners must submit a completed SWPPP Content Review Checklist, with all other pertinent documents, for review to LFPE. To receive approval in the dig permit process, all documents must demonstrate the following, as applicable:

- All required components of the SWPPP and other planning documents related to pollution prevention, such as Erosion and Sediment Control, Grading, Post-construction BMP and Landscaping Plans, Dewatering Plan, and Hydrotesting Plans are completed.
- Proof of filing an NOI Form C or NPDES application for discharge of storm water associated with construction activities that disturb one (1) acre or more;
- Proof of filing a NOI Form F and/or/ G or NPDES application for the discharge of hydrotesting effluent or construction dewatering effluent; and
- Proof of filing for other NPDES permit coverages, as applicable, for any other non-storm water discharges.

All DWCPs are kept on file at LFPE and reference information will be provided to the agency responsible for keeping inventory of the construction site (as listed in Table 4-1). The project owner is required to ensure that reference information for the approved DWCP has been provided to the overseeing agency to facilitate tracking efforts. The LFPE records will be made available to ECPD, upon request, to facilitate additional annual inspections of construction sites with connection permits. The DWCP must be approved prior to the start of work.

4.4.3 Commencement of Construction

Prior to any construction, a project owner must receive notice of the completion and acceptance of a SWPPP review and revised DWCP, if applicable. All construction activities, for in-house, military or contract projects, will also be prohibited until it is verified that the project has received a NGPC under HAR, Chapter 11-55, Appendix C, from DOH and Notice of Start, if applicable, and has satisfied all other requirements of the NPDES program.

4.5 Construction Site Inspections

To ensure the effectiveness of its Construction Program, the following inspection procedures are in place. These ensure that all non-exempt maintenance and construction sites adhere to the approved SWPPPs and supporting documents for that project, have these documents readily available onsite, and that BMPs are maintained throughout the duration of construction activities.

MCBH has prepared standard inspection forms for all applicable maintenance and construction projects. The Initial BMP Site Inspection Checklist and Construction BMP Inspection Checklist are included in

Appendix 4-1. The Reporting and Corrective Procedures for Construction Storm Water Inspections are in Appendix 4-2.

For further information, see the *Construction BMP Field Manual* in Appendix 4-3. The manual establishes inspection and documentation procedures for construction and maintenance projects including the initial site inspection, dig permit inspection, and monthly/quarterly inspections.

As described in the MS4 Permit, there are three (3) construction inspection requirements that must be met for all applicable maintenance and construction projects. A summary of these requirements is as follows:

- ***Initial Site Inspection***:
  - *Purpose*: To ensure that BMPs are correctly installed, in the right locations, and in accordance with all MCBH approved SWPPP related documents. More detailed information is provided in Section 4.5.1.
  - *Inspector*: An engineer or qualified inspector that is familiar with the project and SWPPP related documents.
  - *Frequency*: One-time, after installation of BMPs but prior to any ground disturbing activities.
  - *Documentation:* Initial BMP Site Inspection Checklist (Appendix 4-1)
- ***Monthly Site Inspections***:
  - *Purpose*: To ensure the continued performance of BMPs throughout the life of the project, that SWPPP related documents are available to workers onsite, and to make sure that appropriate adjustments are made to BMPs that are found to be deficient. Monthly inspections will be conducted for all projects. More detailed information is provided in Section 4.5.2.
  - *Inspector*: A qualified, independent inspector, with no involvement in the day-to-day planning, design, or implementation of the project.
  - *Frequency*: Begins as monthly, however, the frequency can be reduced to quarterly in accordance with criteria detailed in Section 4.5.2.
  - *Documentation:* Construction BMP Inspection Checklist (Appendix 4-1)
- ***Dig Permit Inspection:***
  - *Purpose:* This applies to all projects that have been approved, via DWCP, for connections to the MS4, discharge of surface storm water runoff related to construction activities, or discharge of non-storm water to the MS4. The inspection is intended to ensure that any potential construction related discharges to the MS4 have been accurately reported in the DWCP, and any other applicable NPDES permit coverages, and that BMPs have been installed in accordance with the project SWPPP or related documents, as applicable. More detailed information is provided in Section 4.5.2.
  - *Inspector:* A qualified, independent inspector, with no involvement in the day-to-day planning, design, or implementation of the project.
  - *Frequency:* Annual or at least once during the life cycle of the project, whichever is comes first.
  - *Documentation:* Construction BMP Inspection Checklist (Appendix 4-1)

All inspections, reporting, and corrective procedures will be conducted in compliance with the MS4 Permit. Table 4-2 provides a general summary of the organization of oversight for MS4 Permit compliance with construction site inspections, corrective actions, and recordkeeping/tracking requirements.

Initial site inspections will be conducted by the ECPD Compliance Inspection Team or a qualified inspector contracted by the overseeing agency who is familiar with the plans, the project SWPPP, and related documents. For in-house projects, all monthly inspections and dig permit inspections will be conducted by ECPD or a qualified inspector designated or hired by MCD/ECPD. The inspector will not be involved in the day-to-day activities/progress of the project. Any contracted maintenance or construction projects that require monthly inspections and/or dig permit inspections, will have these requirements included as a component within the contract. Contractors will be responsible for hiring a qualified, third-party inspector, that will report to the overseeing agency and to ECPD, as necessary. This is noted, where applicable, in Table 4-2.

For consistency within the inspection process, MCBH has categorized reportable deficiencies as *(i) critical, (ii) major,* and *(iii) minor*. The deficiency categories are also defined in the *Enforcement Response Plan* (See Appendix 3-4). Each category has been defined, with specific examples, as follows:

Critical Deficiency: A deficiency that poses an immediate risk of discharge of pollutants to a storm drain MS4 system, surface waters or State waters. Critical deficiencies include, but are not limited to, the following examples:

- Any evidence or observed discharge of non-storm water to the storm drain system, surface waters, or State waters generated by construction activity;
- No SWPPP document or NPDES permit;
- Absence of perimeter controls and/or linear barriers required by the SWPPP document;
- There are identified storm drain inlets, surface waters, or State waters within or adjacent to the project site in close proximity to disturbed soil areas without control measures in place that pose an immediate threat of untreated storm water discharges;
- Work in an active stream channel or other surface water body without proper implementation of required BMPs; and
- Any presence of any spilled oil or hazardous materials near to unprotected storm drain inlets, surface waters, or State waters.

***Major Deficiency*:** A deficiency that is a significant issue that could result in the discharge of pollutants to the storm drain system, surface waters or State waters. Major deficiencies include, but are not limited to, the following examples:

- Linear barriers and/or perimeter controls in areas tributary to a water body or drain inlet that are installed as required by the SWPPP document, but are not functional, such as silt fences that are not anchored properly, have collapsed, or are overwhelmed by accumulated sediment;
- Hazardous materials or waste stored within a project without containment or implementation of BMPs;

- Any fluid spills covering more than one (1) square yard and/or are adjacent to protected storm drain inlets, surface waters, or State waters;
- Sediment tracking more than 50 feet from project entrance/exit location(s);
- Expansion of the active disturbed soil area limit without written approval;
- Soil stabilization and sediment controls are not installed in accordance with the current SWPPP document and BMP site map;
- Sediment controls are installed in accordance with the SWPPP document, but there is a large unstabilized disturbed soil area with insufficient controls down gradient to prevent the discharge of untreated storm water to the storm drain system, surface waters, or State waters if a rain event generates runoff; and
- Dust from project site visibly blowing off the site and into storm drain conveyances or adjacent surface water bodies.

***Minor Deficiency*:** A deficiency that does not pose a threat of discharge of untreated storm water or pollutants to the storm drain system, surface waters, or State waters, but are not in direct conformance with the SWPPP document. Minor deficiencies include, but are not limited to, the following examples:

- BMPs are not deficient, but are not consistent with the SWPPP;
- SWPPP does not reflect current operations and an amendment is recommended;
- Linear barriers and/or perimeter controls are properly installed according to the SWPPP document, but require minor maintenance;
- Sediment controls are installed per the SWPPP plan, but not properly maintained;
- Site inspections by project staff are not being conducted at the required frequencies;
- Non-storm water or waste management BMPs that are improperly maintained;
- Any fluid spills covering less than one (1) square yard and not adjacent to storm drain inlets, surface waters, or State waters;
- Evidence of active wind erosion on unstabilized slopes/stockpiles;
- Minor tracking less than 50 feet from project entry/exit locations; and
- Major deficiencies which are corrected prior to the inspector leaving the site.

Table 4-2
Organization of MS4 Compliance Oversight

Source of Storm Water Runoff	Required Permits/ Agreements	Responsible for Inspections	Responsible for Corrective Action	Recordkeeping and Tracking
General Base-Wide Inspections	None	ECPD Compliance Inspection Team	Varies[1]	Varies[1]
In-house Maintenance & Construction	• Project-specific NPDES Permit or connection/discharge approval through dig permit process (if applicable) *None (If no NPDES permit coverage needed)*	MCD, ECPD	MCD	ECPD
Military Construction	• Project-specific NPDES Permit or connection/discharge approval through dig permit process (if applicable) *None (If no NPDES permit coverage needed)*	MCD, ECPD	MCD	MCD
NAVFAC Construction by Outside Contractor	• Contract documents, including plans & specifications • Project-specific NPDES Permit or connection/discharge approval through dig permit process (if applicable)	FEAD, ECPD	Contractor	FEAD
DOE – Mokapu Elementary School	• Lease Agreement • Project-specific NPDES Permit or connection/discharge permit (if applicable)	DOE, ECPD	DOE (State)	DOE
PPV Housing	• Lease Agreement • Project-specific NPDES Permit or connection/discharge approval through dig permit process (if applicable)	OMC/Hunt, ECPD	Resident (Residential Lots) OMC/Hunt (Common Areas)	OMC/Hunt
MCCS – Commercial Areas	• Lease Agreement • Project-specific NPDES Permit or connection/discharge approval through dig permit process (if applicable)	MCCS, ECPD	Commercial Tenant	MCCS
MCD Maintenance & Construction	• Project-specific NPDES Permit or connection/discharge approval through dig permit process (if applicable) *None (If no NPDES permit coverage needed)*	MCD, ECPD	MCD	MCD

[1] Varies depending on the agency responsible for oversight of the project, in accordance with Figure 4-1.

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4.5.1 Initial Site Inspection

Prior to the start of any ground-disturbing activities, except for activities associated with the installation of BMPs at a site, the ECPD Compliance Inspection Team or a qualified inspector will inspect each site to verify BMPs have been installed in accordance with the approved SWPPP and supporting documents. The inspector will be checking that BMPs are installed correctly, in the correct locations, and will document any site conditions that pose a potential risk for erosion and sediment runoff, or any other pollutants as a result of the project's construction activities. The inspector will use the Initial BMP Site Inspection Checklist (See Appendix 4-1) to document the inspection and identify any issues or deficiencies. Part of the inspection also involves ensuring that a copy of the SWPPP and all other applicable documents, such as connection permits, NGPC, and other related documents are readily available onsite at all times during construction activities.

It is the responsibility of the MCBH PM or construction contractor to confirm that the construction site has satisfied all SWPPP requirements prior to construction. The agency responsible for recordkeeping will track all deficiencies, comments, and resultant corrective actions made during the initial inspection to ensure that all issues have been properly resolved prior to the commencement of construction.

4.5.2 Monthly Site Inspections & Dig Permit Inspections

In addition to Initial Site Inspections, MCBH will conduct Monthly Site Inspections and Dig Permit Inspections of all non-exempt in-house maintenance and construction, military construction, and contract construction projects. This will ensure that all BMPs specified in the SWPPP are properly maintained and continue to be sufficient in preventing storm water pollution resulting from construction activities throughout the duration of the project.

All inspections will be conducted by the ECPD Compliance Inspection Team or an independent, qualified inspector. The inspector will not be involved in the day-to-day planning, design, or implementation of the construction project. The inspector will use the Construction BMP Inspection Checklist (See Appendix 4-1) to document any BMP deficiencies and inconsistencies between the approved SWPPP and project site conditions. The inspection form includes the date, inspection observations (with a photographic log to document all minor, major and critical issues observed on site), potential noncompliance issues, and any necessary corrective actions that need to be addressed. All deficiencies will be classified as either critical, major, or minor at the time of inspection. These terms are based on the definitions provided in Section 4.5 and in the *Enforcement Response Plan* (See Appendix 3-4).

4.5.2.1 Inspection Frequency

Initially all applicable construction projects will be inspected at least once monthly, by the ECPD Compliance Inspection Team or a qualified independent construction inspector who is familiar with the project SWPPP.

These routine monthly inspections can be reduced to quarterly upon three (3) successive monthly inspections where each of the following criteria are met:

(i) No critical or major deficiencies reported;
(ii) Less than six (6) minor deficiencies, with no more than three (3) minor deficiencies reported in a single monthly inspection;

The project will immediately be returned to a minimum of monthly inspections, if during any future inspection:

(i) One (1) or more critical or major deficiencies are reported
(ii) Three (3) minor deficiencies are reported

MCBH is responsible for ensuring that a minimum of once annual inspections are conducted for all construction projects that have received approval, through the dig permit process, for a drainage connection to the MS4 or for surface runoff discharge. This requirement can be met in conjunction with the monthly required inspections, if applicable. The dig permit inspections are to continue at a minimum of annual frequency until the project is complete. For in-house projects, the inspections will be conducted by the ECPD Compliance Inspection Team or qualified independent inspector and will be tracked by ECPD. For contracted projects the inspections will be conducted by a qualified independent third-party inspector hired by the contractor and will be tracked internally by the overseeing agency for recordkeeping purposes.

Inspections will also be conducted upon complaints from citizens or concerned groups. Unannounced and follow-up inspections will be conducted as deemed necessary by ECPD. ECPD will coordinate with the overseeing agency if violations are documented. All construction projects are also subject to routine general inspections by the ECPD Compliance Inspection Team. Adjustments to inspection frequency will be made at the discretion of the overseeing agency and ECPD, in accordance with the MS4 Permit requirements.

4.5.2.2 Reporting and Corrective Procedure

MCBH has developed procedures for reporting and corrective actions, based on the severity of any deficiencies observed onsite during any routine site inspection. Detailed reporting and corrective action procedures are documented in more detail in the *Enforcement Response Plan* in Appendix 3-4 and the *Reporting and Corrective Procedures for Construction Storm Water Inspections* in Appendix 4-2. Generally, outside of its own inspections, ECPD will be notified of MS4 Permit violations detected during routine inspections if:

1. The ECPD Compliance Inspection Team identifies a violation during general base-wide inspections.
2. A MS4 Permit violation is not internally, and promptly resolved by processes in place through construction contracts with the FEAD, MCCS, OMC/Hunt, or DOE.

Once ECPD has been notified, the following procedure will come into effect:

> *If any critical deficiency is observed*, ECPD will provide verbal notification to the responsible tenant/manager and ensure all critical deficiencies are addressed and adequately corrected before the close of business day on the day the deficiency is identified. ECPD will document the issue using the inspection checklist and photograph log and send a written notification to the responsible tenant and MCBH PM. ECPD will immediately notify DOH if work is being completed without appropriate permits or if there is a discharge to State waters that exceeds reportable quantities or exceeds water quality standards.

If any major deficiency is observed, ECPD will immediately provide verbal notification to the responsible tenant/manager. ECPD will document the issue using the inspection checklist and send a written notification with an attached inspection checklist containing photographs to the responsible tenant/manager and MCBH PM explaining the site nonconformities. ECPD will ensure all major deficiencies are addressed or corrected as soon as possible, but in no event later than five (5) calendar days after the deficiency is identified or before the next forecasted rain event, whichever is sooner.

If any minor deficiency is observed, ECPD will document the issue using the approved inspection checklist, photograph log and internal project tracking system. The responsible tenant/manager and MCBH PM(s) will be notified verbally of any non-conformities at the end of the inspection and provided an emailed copy of the inspection form (with attached photographs) within 48 hours of the inspection (two (2) business days). A response from the tenant or PM documenting the corrective action taken to address the identified issues is expected within five (5) calendar days from receiving the verbal notification from ECPD.

Per the permit, an independent qualified construction inspector will conduct follow-up inspections, as needed, at least monthly to ensure site deficiencies have been properly addressed and all storm water controls are in proper working order.

For recordkeeping purposes, ECPD will provide the responsible tenant/manager an emailed copy of the inspection form (with attached photographs) within 48 hours of the inspection (two (2) business days). The responsible tenant/manager or MCBH PM is expected to provide a formal written response to ECPD, documenting corrective actions (with photograph verification, maps, etc.), within five (5) calendar days of receiving the inspection form. ECPD will track all inspections using an internal public share drive.

4.6 Enforcement

To ensure compliance with the Construction Program and MS4 Permit requirements, MCBH has developed enforcement procedures for all maintenance and construction projects in the *Enforcement Response Plan* in Appendix 3-4. Refer to the *Enforcement Response Plan* for more detailed information on the enforcement procedures for this Construction Program.

MCBH is unique from most MS4s in that within its property boundary, it owns the property and almost all of the facilities and provides funding for a majority of work. Due to the nature and internal structure of MCBH, the most effective means for enforcement is escalation of unaddressed violations to the next higher authority.

ECPD enforcement procedures vary, depending on whether the job is contracted or in-house. Contracted projects, such as construction projects initiated by NAVFAC, MCCS, or OMC/Hunt, will use contract language to require compliance with the conditions of the Construction Program. ECPD will immediately be notified of any violations that are not addressed promptly and completely. The contracting entity will be given formal notice by the ECPD Director with an appropriate deadline for action. If the problem remains unchanged, the situation will be brought to the attention of the next higher authority.

For in-house work, corrective actions that exceed the allotted mitigation time period be enforced by escalation through the chain of command for the base. Unaddressed issues are initially brought to the attention of the ECPD Director, after which the responsible party will be given formal notice with an appropriate deadline for action. If the problem remains unchanged, the situation will be brought to the attention of the next higher authority.

Regardless of the type of project, the ultimate penalty for non-compliance of this Construction Program and MS4 Permit regulations, is eviction or discharge of the responsible party from MCBH. This is placed at the discretion of the CO. Although unaddressed violations can be escalated as high as the CO, this has not been an issue in the past due to the inherent threat of discharge or eviction from MCBH.

4.6.1 Referral of Non-compliance and Non-filers to DOH

In the event that MCBH encounters a situation where continued failure to resolve an observed deficiency has resulted in the CO's determination that the contractor or tenant be evicted, ECPD will notify DOH within one (1) week of the decision. A written notification from ECPD, including all relevant information (such as inspection checklists, photographs, notes, and correspondence) is to follow within two (2) weeks of the CO's determination.

In the event that an MCBH inspector identifies that a construction site has not applied for permit coverage under the NPDES permit program, ECPD will provide written notification to DOH within two (2) weeks of the discovery.

All written notifications submitted via email will be directed to:

cleanwaterbranch@doh.hawaii.gov, Attn: Enforcement Section Supervisor

4.7 Training

ECPD will conduct annual training for all staff with Construction Program responsibilities. This includes its construction engineers, PMs, plan reviewers, construction and maintenance inspectors (responsible for routine site inspections), qualified inspectors (responsible for initial site inspections, monthly site inspections, and dig permit inspections), and any other staff responsible for managing the Construction Program.

Training sessions will relate specifically to MCBH construction activities and include information on proper installation and maintenance of approved BMPs, Construction Program policies, rules, procedures, and resolution of any issues observed during the previous year. Construction site inspectors are required to take the Air Force Institute of Technology Construction Site Stormwater Seminar training course. The course includes in-depth information on construction site permitting requirements, SWPPP development, and selection of appropriate BMPs.

ECPD will be responsible for ensuring that updated information regarding revisions to BMP field manuals, current inspection forms, and any other updates to the Construction Program policy, procedures, etc. are made available to MCBH staff.

4.8 Education

As part of the effective management of its Construction Program, MCBH will implement an ongoing education program directed at all parties subject to the requirements of the Construction Program, including project applicants, contractors, developers, and property owners.

The program will promote a general understanding of MCBH SWMP Plan, and more specifically of the requirements that they must meet as participants of the Construction Program. Part of this education involves familiarity with MCBH's BMP field manuals, knowledge of the proper procedures/approvals necessary to begin construction, as well as knowledge of how to remain in good standing throughout the construction process, and where to go for additional information and assistance.

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5 Post-construction Storm Water Management

Per the MS4 Permit, Part D.1.e, MCBH is required to implement a Post-construction Storm Water Management Program (Post-construction Program). The Post-construction Program applies to all new development and redevelopment projects that result in a disturbance of one (1) acre or more, or smaller projects that have the potential to discharge pollutants to MCBH's MS4.

MCBH's Post-construction Program is a critical part of the Base-wide SWMP Plan because it defines the permanent measures that will be taken to protect nearby receiving waters from any potential storm water pollution that could be generated onsite in the future. As such, the Post-construction Program has the most lasting impact on the continued effectiveness of MCBH's SWMP Plan. The primary goal of the Post-construction Program is to ensure that permanent controls or post-construction best management practices (BMPs) are incorporated into all applicable construction projects to the maximum extent practicable (MEP), to prevent or minimize water quality impacts. The objectives of this program are to:

1. Develop and implement revised standards, and feasibility criteria for requiring post-construction BMPs and low impact development (LID) measures that will effectively reduce pollutants, including foreseeable potential future pollutants, to MCBH's MS4.
2. Standardize the plan review process to ensure that post-construction BMPs and LID measures are incorporated into projects in the early stages of design and planning efforts.
3. Ensure the continued performance of post-construction BMPs throughout construction and once ownership of a project has been turned over to MCBH, using a routinely updated BMP Database to track inventory, and inspections and maintenance activities.
4. Promote awareness of MCBH's SWMP Plan among all parties involved in any component of the Post-construction Program through annual training, and education and outreach materials.

This Post-construction Program is outlined in accordance with the MS4 Permit requirements. The MS4 Permit states:

Part D.1.e. Post-Construction Storm Water Management in New Development and Redevelopment

> *"The Permittee shall further develop, implement, and enforce a program to address storm water runoff from all (i.e., both private and public) new development and redevelopment projects that result in a land disturbance of one (1) acre or more and smaller projects that have the potential to discharge pollutants to the Permittee's MS4. The Permittee's program must ensure that permanent controls are in place to prevent or minimize water quality impacts to the MEP. Post-construction storm water management in new development and redevelopment requirements shall not be limited to the storm water requirements under the The Energy Independence and Security Act (EISA) of 2007 Section 438 Storm Water Runoff Requirements for Federal Development Projects and the Unified Facilities Criteria (UFC) 3-210-10 but apply to all projects that have the potential to impact water quality to the extent practical.*
>
> *The Permittee shall review and update, as necessary, the criteria defining when and the types of permanent post-construction BMPs, including, among other measures, LID techniques, that must be included in a project design to address storm water impacts and pollutants of concern. For State waters on the State CWA Section 303(d) list or State established and EPA approved Total*

Maximum Daily Loads (TMDLs), the pollutants of concern to be targeted shall include the parameters causing impairment.

The Permittee shall consider trash reduction techniques to comply with short and long term plans as required in Part D.1.f.(1)(v). The program shall include, at a minimum, the following elements:

***Part D.1.e.(1) Standards Revision** – Within six (6) months of the effective date of this permit, the Permittee shall revise its standards for addressing post-construction BMPs to Low Impact Development (LID) requirements. The plan for requiring LID in the standards to the MEP shall include revisions to the plan review and inspection checklist to include LID requirements. Standards for addressing post-construction BMPs to LID requirements shall not be limited to the storm water requirements under the EISA of 2007 Section 438 or the UFC 3-210-10 but apply to all projects that have the potential to impact water quality to the extent practical.*

LID refers to storm water management practices which seek to mimic a site's predevelopment hydrology by minimizing disturbed areas and impervious cover and then infiltrating, storing, detaining, evapotranspiring, and/or biotreating storm water runoff close to its source. The standards shall ensure that the management practices are prioritized to favor infiltration, evapotranspiration, or harvesting/reuse of storm water followed by other practices that treat and release storm water. The standards shall be applicable to all construction projects disturbing at least one (1) acre and smaller projects that have the potential to discharge pollutants to the Permittee's MS4. LID employs principles such as preserving and recreating natural landscape features and minimizing imperviousness to create functional and appealing site drainage that treats storm water as a resource, rather than a waste product. LID treatment measures include harvesting and use, infiltration, evapotranspiration, or biotreatment.

The plan for the implementation of LID provisions shall include at a minimum the following:

- *Criteria for requiring implementation.*
- *Investigation into the development of quantitative criteria for a specific design storm to be managed by LID techniques. Examples of design storm requirements include: 24-hour, 85% storm through infiltration; on-site management of the first inch of rainfall within a 24-hour period; retention of the 100-year, 2-hour storm; or on-site management of the 24-hour, 95% storm.*
- *Feasibility criteria for circumstances in which a waiver could be granted for the LID requirements.*
- *When a LID waiver is granted, alternatives such as offsite mitigation and/or non-LID treatment control BMPs could be required.*

The Permittee shall develop and implement its LID Design Review Checklist.

***Part D.1.e.(2) Review of Plans for Post-Construction BMPs** – For design-bid-build projects, the Permittee shall not advertise any construction project nor award any construction contract until the project design has been reviewed and accepted to ensure that appropriate permanent post-construction BMPs, which include LID practices upon adoption into its standards, have been included in the project design and are included in the bid package to ensure compliance with this* *part of the permit. For design-build projects, the Permittee shall review and approve the project design the same as for design-bid-build projects prior to implementation. No project shall proceed without the inclusion of appropriate permanent post-construction BMPs unless a waiver is granted by the Permittee based on specific documentation demonstrating that such post-construction BMPs are not feasible. Project documents for projects that will include installation of permanent post-construction BMPs shall also include appropriate requirements for their future continued maintenance.*

Part D.1.e.(3) BMP, Operation and Maintenance, and Inspection Database *– Within six (6) months of the effective date of this permit, the Permittee shall develop and implement an Asset Management System to track the frequency of inspections and maintenance of the Permanent BMPs. In addition to the standard information collected for all projects (e.g., project name, owner, location, start/end date, etc.), the database shall also include, at a minimum:*

- *Name and identification of asset or control measures.*
- *Type and number of LID practices.*
- *Type and number of Source Control BMPs.*
- *Type and number of Treatment Control BMPs.*
- *Latitude/Longitude coordinates of controls using Global Positioning Systems and NAD83 or other Datum as long as the datum remains consistent.*
- *Photographs of controls.*
- *Operation and maintenance requirements.*
- *Frequency of inspections.*
- *Frequency of maintenance.*
- *Current performance.*
- *Consequences of failure.*
- *Likelihood of failure.*

All stormwater treatment and LID BMPs shall be inspected at least once a calendar year for proper operation; maintenance shall be performed as necessary to ensure proper operation.

Part D.1.e.(4) Education and Training

(i) Project Proponents - The Permittee shall provide education and outreach material for those parties who are involved in the design process (e.g., consultants and engineers) on the selection, design, installation, operation and maintenance of storm water BMPs, structural controls, post construction BMPs, and LID practices. The outreach material may include LID design examples, requirements of LID installation, and a brief discussion of potential environmental impacts associated with storm water runoff.

(ii) Inspectors - All Permittee staff and contractors responsible for inspecting permanent post-construction BMPs and LID practices shall receive annual training. The Permittee shall maintain records of the annual training program."

5.1 Program Organization

The program organization for the Post-construction Program, is similar to that described in the Construction Program, Chapter 4. The MCBH Environmental Compliance and Protection Division (ECPD) is responsible for the general oversight of the Post-construction Program. Figure 5-1 shows the agencies responsible for overseeing that all Post-construction Program requirements are met for various types of MCBH construction projects, in accordance with the MS4 Permit. The main differences are that Post-construction Program begins in the planning stages and includes a long-term maintenance component which is coordinated by ECPD and Facilities Engineering Maintenance Control Division (MCD) and Maintenance Repair Operations (MRO). As part of this component there is a required management of the maintenance and associated tracking for each construction project.

Figure 5-1 outlines the organization of the Post-construction Program. The grey boxes indicate the agency responsible for general oversight of the project. Typically, construction projects at MCBH are categorized as either:

(i) *In-house Maintenance and Construction* – projects are scoped and planned by MCD, and the construction work is completed by MRO. Typically, these projects are less than 5,000 sf and/or related to emergency repair work.

(ii) *Military Construction* – These are projects that would typically be handled as in-house construction, but due to limited manpower have been contracted out. These projects are managed by Logistics Facilities Public Works Engineering (LFPE), with all storm water management managed by ECPD.

(iii) *Contract Maintenance and Construction* – These projects are conducted by an outside contractor, but are managed as follows:

- *Naval Facilities Engineering Systems Command (NAVFAC) Construction Projects* are managed by the Facilities Engineering and Acquisition Division (FEAD).
- *Mokapu Elementary School Projects* are managed by the Department of Education (DOE).
- *Public-Private Venture (PPV) Housing Projects* are managed by Ohana Military Communities (OMC)/Hunt.
- *Commercial Tenant Projects* are managed by Marine Corps Community Services (MCCS).
- *Various other contract maintenance and construction projects* are managed by MCD.

To address the MS4 Permit requirements, construction projects subject to the requirements of the Post-construction Program are those that disturb one (1) or more acres, or smaller projects that have the potential to discharge pollutants into MCBH's MS4. The Post-construction Program covers all new development and redevelopment projects.

For the purpose of this SWMP Plan and the Post-construction Program, the following construction activities are *not* considered for classification as "redevelopment" projects:

- Routine maintenance to maintain the original hydraulic capacity, line and grade, or the original purpose of the facility;
- Trenching and pavement resurfacing activities, of the same surfacing material, related only to utility work;
- Resurfacing or replacement of damaged pavement, with the same surfacing material;

- Construction of sidewalks, ramps, or related pedestrian/bicyclist features on existing paved roadways;
- Emergency construction activities required to immediately protect public health and safety;
- Interior remodeling that involves no outside exposure of construction materials/waste to storm water; and
- Exterior building renovation that does not disturb ground or increase the footprint of impermeable surfaces.

In projects listed above, where trenching or resurfacing of pavement is needed, the pavement must be replaced with the same ground covering materials (e.g., permeable pavement cannot be replaced with impermeable pavement) so as to not increase the amount of storm water runoff generated onsite. Those projects classified as *exempt* projects are subject to the discretion of the overseeing agency and ECPD.

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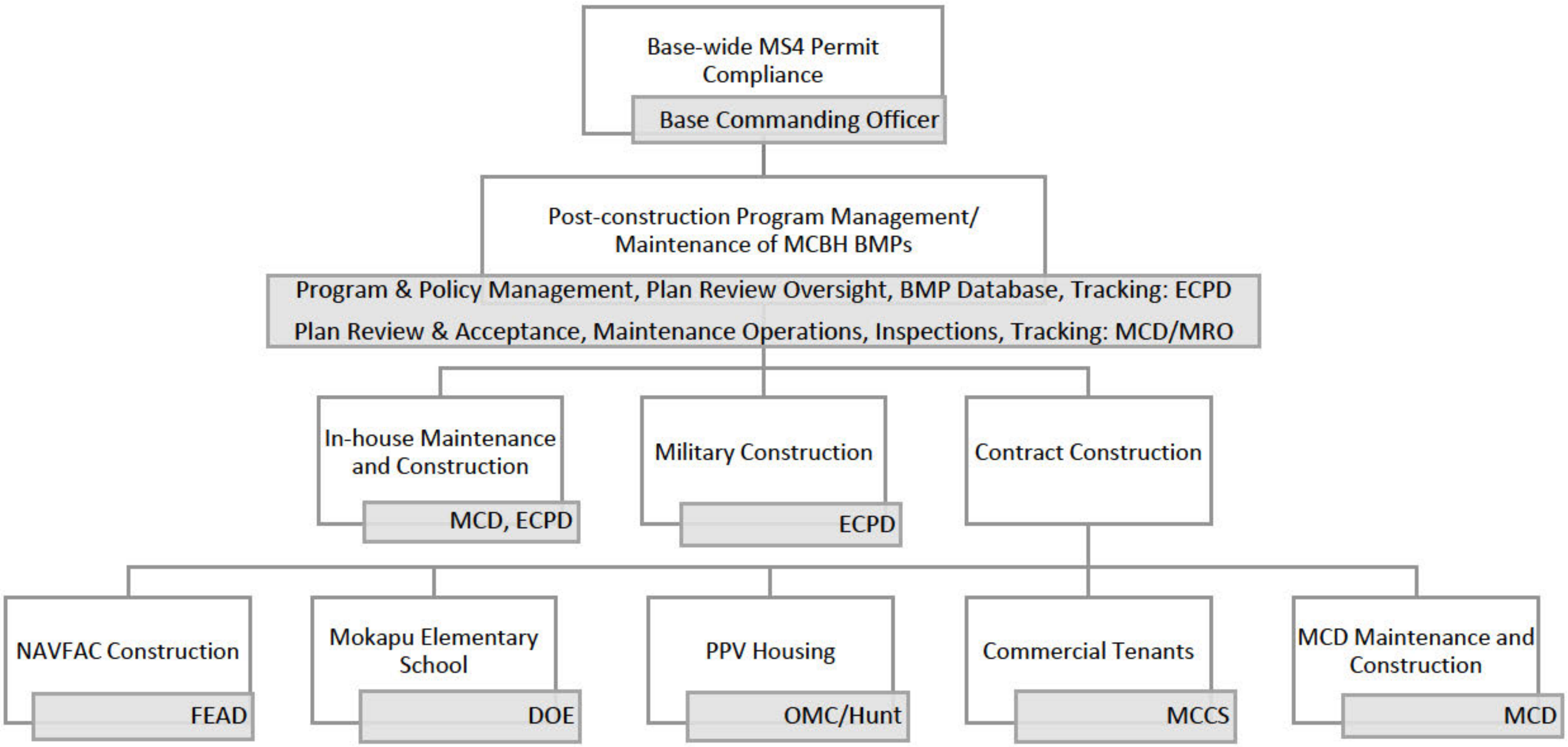

Figure 5-1 Post-construction Program Organizational Chart

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5.2 Standards Revision

In accordance with the MS4 Permit, Part D.1.e(1), MCBH has revised the *Plan for Requiring Low Impact Development in the Standards*. The *Plan for Requiring LID in the Standards* is included in Appendix 5-1. LID aims at preserving or mimicking the sites predevelopment hydrology. This is achieved by minimizing ground disturbance and use of impervious cover, and infiltrating, storing, detaining, evapotranspiration, and/or biotreating storm water runoff close to its source. Ideally LID measures are based on the concept of using storm water to preserve the natural landscape and treating storm water as a resource rather than a waste product. MCBH's LID design standards are intended to prioritize management practices that favor infiltration, evapotranspiration, or harvesting/reuse of storm water, followed by other practices that treat and release storm water.

The *Plan for Requiring LID in the Standards* describes in detail:

- Criteria for requiring implementation of LID;
- Quantitative criteria for a specific design storm to be managed by LID techniques;
- Infeasibility criteria for circumstances in which a waiver could be granted for the LID requirements;
- List of alternatives that may be implemented when an LID waiver is granted; and
- LID planning and design example checklist

MCBH has developed the *Post-Construction BMP Manual* to establish post-construction BMP policy for development and redevelopment projects. The manual is a primary tool of the Post-construction Program to ensure that permanent controls (post-construction BMPs) are incorporated into all applicable projects and protect the MCBH MS4. The *Post-Construction BMP Manual* provides guidance on post-construction BMP selection, installation, and maintenance procedures to eliminate or reduce the discharge of pollutants to State waters. The *Post-Construction BMP Manual* is included in Appendix 5-3. Post-construction BMP inspection example checklists are included in Attachment 1 of the *Post-Construction BMP Manual*.

5.3 Review of Plans for Post-construction BMPs

A primary goal of the Post-construction Program is to ensure that no construction project will proceed without the inclusion of the appropriate post-construction BMPs and documentation outlining future BMP maintenance requirements. To achieve this goal, all projects, design-bid-build and design-build alike, must be reviewed and accepted for suitable use of post-construction BMPs. The review and acceptance process will be conducted by the overseeing agency shown in Figure 5-1 and will incorporate all LID standards that have been developed for the MS4 Permit.

All project owners have access to the criteria for requiring LID, and the Low Impact Development Planning and Design Checklist (LID Design Checklist) provided in the *Plan for Requiring LID in the Standards* (See Appendix 5-1). Applicants are required to submit the LID Design Checklist to facilitate the incorporation of BMPs into the initial stages of design development. The review process is intended to assist with early identification of design conflicts and selection of preferred alternatives. At the time of review, the project owner must also submit documentation of required maintenance activities for post-construction BMPs. The BMPs will be reviewed for long-term feasibility and may require reviewers to collaborate with MCD/MRO.

To guarantee the implementation of adequate post-construction BMPs, no construction shall begin or be awarded until the plans have been appropriately reviewed and accepted by the overseeing agency. If it is determined that it is infeasible for a construction project to meet all of the post-construction BMP requirements, the applicant must submit a completed LID/EISA Constraints and Waiver Request (See Appendix 5-2). The LID/EISA Constraints and Waiver Request is a form to request exemption from post-construction BMP requirements in the infrequent situations when LID is not appropriate given the characteristics of the project site. As part of the *Plan for Requiring LID in the Standards*, the applicant must submit a description of the alternative measures or non-LID BMPs that will be implemented should the LID waiver be granted by MCBH due to technical and site constraints.

For design-bid-build projects, MCBH shall not advertise any construction project nor award any construction contract until the project design has been reviewed and accepted to ensure that appropriate post-construction BMPs. For design-build projects, MCBH shall review and approve the project design just as for design-bid-build projects, prior to implementation. No project shall proceed without the inclusion of appropriate post-construction BMPs unless the LID/EISA Constraints and Waiver Request is granted based on specific documentation demonstrating that post-construction BMPs are not feasible.

MCBH encourages the collaboration of applicants, reviewers, ECPD, and MCD/MRO, as necessary to meet program requirements, and develop successful solutions for post-construction BMP implementation.

ECPD is responsible for the overall Post-construction Program. This includes revising design checklists/criteria or policies, as needed, to meet program requirements and to facilitate program implementation within the various types of construction projects at MCBH.

5.4 Post-construction BMP Selection

The *Post-Construction BMP Manual* provides guidance on post-construction BMP selection and detailed fact sheets on post-construction BMP options (See Appendix 5-3).

The manual organizes post-construction BMPs into three categories: LID site design strategies, source control BMPs, and post-construction treatment control BMPs. LID site design strategies reduce the hydrologic impact of development and maintain or restore the project site’s hydrologic and hydraulic functions. Source control BMPs prevent pollutants from coming into contact with storm water runoff and prevent polluted runoff from discharging into the MS4. Treatment control BMPs retain runoff on-site through infiltration, evapotranspiration, or harvesting and reuse. Treatment control BMPs can also remove pollutants from runoff by filtering storm water through vegetation and soils or through detention, settling, filtration, and vortex separation.

The three categories of BMPs reduce peak runoff and improve water quality by allowing rainwater to infiltrate into the ground, evaporate and transpire, or collect in a storage system for irrigation and other methods of reuse. Rather than moving stormwater off-site through a conveyance system, the goal of LID is to restore the natural ability of a developed site to absorb storm water, resulting in an area more closely resembling pre-development hydrology. LID strategy seeks to control stormwater quality at its source, using a range of small-scale, economical devices such as native landscaping and constructed green spaces, bioretention facilities, vegetated swales, infiltration through permeable pavement, and green roofs to name a few.

Selection of BMPs must be site-specific. No single BMP can be applied to all scenarios. The pollutant removal efficiency, historical data, aesthetics, community acceptance, the lifecycle cost, and maintenance factors of the post-construction BMP must be considered. The *Post-Construction BMP Manual* provides the description, benefits, limitations, and inspection and maintenance requirements of several post-construction BMPs.

5.5 Post-construction BMP Maintenance Program

An important factor in maintaining the long-term effectiveness of post-construction BMPs is adequate maintenance. A successful maintenance program relies on routine inspection and accurate tracking and recordkeeping.

There is a stabilization period over which the contractor is responsible for maintenance of vegetated BMPs. This stabilization period can be helpful in identifying design problems and/or oversights during installation. Unvegetated, structural BMPs are to be clean when ready to turnover to the base. To facilitate the turnover of BMP ownership to MCBH, the contractor may document any observed maintenance baseline or other information that may be useful to MCD/MRO. The process for a contractor to turn a new or redeveloped facility over to ownership of MCBH includes submittal of:

- As-built plans, with clear distinction of all post-construction BMPs (supplemental written documentation may be submitted for additional clarification of any details);
- All relevant documentation outlining post-construction BMP/LID specifications and required future maintenance; and
- Proof of BMP stabilization (photos, prior maintenance records, etc.), if applicable.

These documents are to be submitted to MCD/MRO and LFPE. Before the contractor demobilizes, ECPD or a qualified inspector will conduct a post-construction BMP inspection. Once MCD/MRO has accepted the proof of stabilization, the maintenance of applicable BMPs will fall under the responsibility of MCD/MRO. It is up to the project owner/contractor to ensure that all relevant information is provided to MCBH.

5.5.1 Post-construction BMP Database

Effectively managing project information and post-construction assets will ensure the long-term effectiveness of LID and other post-construction items. This will enable MCBH to easily identify and correct compliance issues and recognize recurring issues within the Stormwater Pollution Prevention Program or repeat offenders of its MS4 Permit requirements. The storm water Asset Management System (AMS) is the primary tool used to determine the current performance, likelihood of failure, and the consequences of failure for a particular asset. The ability to easily identify and address current/potential problems will further promote the continual improvement of the MCBH SWMP and facilitate its effectiveness in reducing storm water pollution across MCBH.

A copy of the as-built plans will also be provided to LFPE to be used to update MCBH’s existing Geographic Information System (GIS) database and the overall storm water AMS for tracking and scheduling of maintenance work. LFPE will incorporate all structural BMP components into GIS, such as inlets, pipes, vaults, etc., within 150 days of the beneficial occupancy date. Notification of MCD/MRO BMP acceptance, along with applicable plans and relevant documentation, showing post-construction BMPs, LID features, and required maintenance, will be directed to ECPD for incorporation into an inventory of post-construction BMPs within the storm water AMS. ECPD is working with LFPE to develop a new layer in the MCBH's GIS database to map vegetated BMPs. This layer will be maintained by ECPD.

The MS4 Permit requires that post-construction assets are well documented in the MCBH AMS. At a minimum, the BMP inventory in the MCBH AMS will include:

- General Information: Project name, owner, general location, start/end date of construction, date of acceptance by MCBH (MCD/MRO);
- Type and number of LID practices;
- Type and number of Source Control BMPs;
- Type and number of Treatment Control BMPs;
- Latitude/Longitude coordinates of controls using Global Positioning Systems and NAD83 or other Datum as long as the datum remains consistent;
- Photographs of controls;
- Operation and maintenance requirements;
- Frequency of inspections;
- Frequency of maintenance and entity responsible for maintenance;
- Current performance;
- Likelihood and consequence of failure; and
- Records of upsets or malfunctioning of the BMPs.

5.5.2 BMP Inspection and Maintenance

Effectively managing MCBH's maintenance program will allocate its resources to prioritize the operation and maintenance of facilities with the maximum potential to affect storm water quality. The post-construction BMP inventory and AMS will be used by ECPD to collaborate with MCD/MRO, to ensure that annual inspection requirements of all post-construction BMPs, and LID features are met. At a minimum, this requires at least one (1) inspection be conducted annually for each post-construction BMP, with maintenance performed as necessary to retain its function. Inspections will be conducted using the guidance of the inspection example checklists as provided in *the Post-Construction BMP Manual* (See Appendix 5-3). Post-Construction BMP Inspection Example Checklists for bioretention, hydrodynamic separator, and underground detention BMPs are included in Attachment 1 of the *Post-Construction BMP Manual*.

Routine maintenance activities will also be conducted to the MEP, but priority will be given to BMPs that have been identified by inspection, or public notification, as malfunctioning. MRO/MCD use an internal database, MAXIMO, to schedule maintenance activities and submit and track work orders. Inspection and maintenance records will be tracked via work orders generated by MAXIMO and MCBH's storm water AMS. All inspection/maintenance records will be maintained by MCD/MRO and made available to ECPD upon request.

5.6 Education and Training

5.6.1 Project Proponents

As part of its Post-construction Program, MCBH will implement an ongoing education program directed at all project proponents, including developers, engineers, architects, consultants, contractors, excavators, and property owners. Education of all participating parties will promote consistency, and efficiency within the Post-construction Program.

The program will also provide outreach materials intended to promote a general understanding of MCBH SWMP Plan and of specific requirements of the Post-construction Program. This includes information on the selection, design, installation, operation and maintenance of storm water BMPs, structural controls, post construction BMPs and LID practices. MCBH will use *its Post-construction BMP Manual* and may develop other materials, as needed, to facilitate learning on:

- Criteria to determine required permits for construction;
- Organizational charts for the permitting and compliance (including local, state, and federal agencies, as well as MCBH's internal management programs);
- Fees or scheduling for permitting;
- Submittal and plan review requirements; and
- New program requirements as MCBH's Storm Water Program evolves.

ECPD is responsible for oversight of MCBH's post-construction education and outreach program, including contents and method of which information is circulated. Outreach material will be developed, revised, and distributed at the discretion of ECPD. These materials will be used to address observed issues or general Post-construction Program policy updates.

5.6.2 Inspectors

MCBH will conduct, at a minimum, annual training for all staff and contractors tasked with Post-construction BMP inspections. Training sessions may be combined with other training material but will cover material related specifically to MCBH Post-construction Program. Information will be based on proper installation and maintenance of approved BMPs, Post-construction Program policies, procedures, and resolution of any issues observed during the previous year.

ECPD will be responsible for updating and ensuring that current resources are available to MCBH staff and contractors tasked with managing any portion of the Post-construction Program. These resources include BMP manuals, inspection forms, LID Design Checklists, Post-construction Program policies, and any other related material.

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6 Debris Control BMPs Program Plan

A crucial component of MCBH's SWMP Plan is its Base-wide Pollution Prevention and Good Housekeeping Program (Pollution Prevention Program). Generally, this is a multi-faceted maintenance program aimed at reducing discharge of pollutants from all MCBH-owned property to the maximum extent practicable (MEP). MCBH-owned property includes facilities, roads, parking lots, maintenance facilities, and its MS4. MCBH's Pollution Prevention Program is separated into four main components including:

1. Debris Control Best Management Practices (BMPs) Program Plan (Chapter 6);
2. Chemical Applications BMP Program Plan (Chapter 7);
3. Erosion Control BMPs Program Plan (Chapter 8); and
4. Maintenance Activities BMPs Program Plan (Chapter 9).

Each of these components is described in detail in the individual chapters as noted above. This chapter focuses on MCBH's Debris Control BMPs Program Plan (Debris Control Program).

Per the MS4 Permit, Part D.1.f.(1), MCBH is required to implement a Debris Control Program. The Debris Control Program applies to all of MCBH's MS4, including structural and vegetated BMPs, and related appurtenances. The main objective of the Debris Control Program is to develop MCBH's existing MS4 operations and maintenance program to minimize the discharge of pollutants, specifically sediment and trash. The *Trash Reduction Plan* is included in Appendix 6-1.

The primary effort of the Debris Control Program is to prevent debris from entering the MS4 and to minimize and manage the debris that is captured within the MS4. This includes, but is not limited to, good housekeeping, street sweeping, catch basin cleaning, green waste, and accumulated soil removal. The objectives of the Debris Control Program are to:

1. Use an Asset Management System (AMS) to schedule and track inspection and maintenance efforts with established priorities in areas where there is the most significant potential to impact storm water quality. This also involves updating system mapping to include identification numbers for all facilities, and developing an inventory of any related appurtenances, including maintenance equipment.
2. Schedule preliminary inspections to prioritize where maintenance efforts are required.
3. Install storm drain placards at drainage inlets and evaluate the effectiveness of doing so, by tracking locations and frequency of required maintenance activities.
4. Develop a Base-wide *Trash Reduction Plan* (See Appendix 6-1).
5. Develop a Base-wide *Action Plan for Retrofitting Structural BMPs* (See Appendix 6-2).

This Debris Control Program is outlined in accordance with the MS4 Permit requirements. The MS4 Permit states:

Part D.1.f. Pollution Prevention/Good Housekeeping

> *"The Permittee shall further develop and implement a system maintenance program to reduce to the MEP the discharge of pollutants from all Permittee-owned facilities, roads, parking lots, maintenance facilities, and the Permittee's MS4. The program shall include:*

Part D.1.f.(1) Debris Control BMPs Program Plan

(i) Asset Management System and Mapping – Within twelve (12) months of the effective date of this permit, the Permittee shall implement a comprehensive asset management system and map of its MS4, including structural and vegetative BMPs and an inventory of related appurtenances, including maintenance equipment, to ensure appropriate debris removal and system maintenance. The asset management system shall, at a minimum, assign an identification number for each drain inlet, outfall, and BMPs, and map their location on the Geographic Information System.

The Permittee shall use this asset management system to establish priorities and to schedule and track efforts of appropriate system maintenance and debris removal program activities such as street sweeping, catch basin cleaning, and green waste and accumulated soil removal. The SWMP shall include justification of its priorities applied to the asset management system on the basis of potential impacts to water quality.

(ii) Inspection/Maintenance Schedule - The Permittee shall include in its SWMP procedures, a schedule for inspections of:

a) All roadways for the purpose of identifying if sweeping of roadways, shoulders, and/or medians is needed; and
b) All storm drainage system catch basins, gutters and open ditches, trenches, and BMPs for the purpose of identifying if maintenance/cleaning of such structures are needed.

In both cases, the need for sweeping and/or maintenance/cleaning shall, at a minimum, be determined based upon material accumulation rates and/or potential threat of discharge to State waters that may have an effect on water quality. The schedule shall provide that each roadway mile, storm drainage feature, and BMP is inspected at least once during the term of this permit (maintenance/cleaning may be conducted in lieu of inspections to satisfy this requirement). The adopted procedures shall provide for the identification of roadway segments and their associated storm drainage features and BMPs that may require more frequent sweeping and/or structure cleaning based upon material accumulation rates and potential threat of discharge to State waters that may have an effect on water quality. The procedures shall establish debris accumulation thresholds above which sweeping and/or structure cleaning must occur. The priority-based schedule shall be annually reviewed; updated as necessary; and the changes, along with explanations of the changes submitted within the Annual Report.

(iii) Storm Drain Placards - The Permittee shall install placards on its drainage inlets and post-construction BMPs; evaluate the effectiveness of the placards; and revise as necessary to meet its purpose. The purpose of the placards shall be discussed within the SWMP. A minimum of 50 new placards shall be installed per year. Priority shall be given to the Permittee's industrial and commercial areas and areas with pedestrian traffic. The Permittee shall implement its system to track placement of placards and procedures for maintenance staff to inspect and replace, as necessary, placards during routine maintenance activities.

(iv) *Action Plan for Retrofitting Structural BMPs – The Permittee shall implement an Action Plan for Retrofitting Structural BMPs within twelve (12) months of the effective date of this permit which shall identify retrofits to be implemented, and include an explanation of the basis for their selection and an implementation schedule. The implementation schedule shall cover a five (5) year period and be updated annually to include additional retrofit projects with water quality protection measures.*

The annual updates to the implementation schedule shall be included in the Annual Report with a description of the project's status. The Action Plan may include, but not be limited to projects in compliance with any TMDL implementation and monitoring plan.

(v) *Trash Reduction Plan - The Permittee shall implement its trash reduction plan which assesses the issue, identifies and implements control measures, and monitors the control measures to reduce trash loads from the MS4. The plan shall include, at a minimum and be formatted consistent with the following:*

- *Quantitative estimate of the debris currently being discharged (baseline load) from the MS4, including methodology used to determine the load.*
- *Description of control measures currently being implemented as well as those needed to reduce debris discharges from the MS4 consistent with short-term and long-term reduction targets.*
- *A short-term plan and proposed compliance deadline for reducing debris discharges from the MS4 by 50% from the baseline load.*
- *A long-term plan and proposed compliance deadline for reducing debris discharges from the MS4 to zero.*
- *Geographical targets for trash reduction activities with priority on waterbodies listed as impaired for trash on the State's CWA Section 303(d) list.*
- *Trash reduction-related education activities as a component of Part D.1.a.*
- *Integration of control measures, education and monitoring to measure progress toward reducing trash discharges.*
- *An implementation schedule.*
- *Monitoring plan to aid with source identification and loading patterns as well as measuring progress in reducing the debris discharges from the MS4.*
- *The Annual Report shall include a summary of its trash load reduction actions (control measures and best management practices) including the types of actions and levels of implementation, the total trash loads and dominant types of trash removed by its actions, and the total trash loads and dominant types of trash for each type of action.*

The plan shall provide for compliance with the above short-term and long-term discharge limits in the shortest practicable timeframe. The Trash Reduction Plan shall be included in the SWMP and any revisions noted in the Annual Report.

6.1 Program Organization

Implementation of the Debris Control Program is achieved through collaboration between the Environmental Compliance and Protection Division (ECPD) and Facilities Engineering Maintenance Control Division (MCD) and Maintenance Repair Operations (MRO). The responsibility falls largely upon MCD and MRO to manage the physical maintenance activities. ECPD provides additional program oversight and scheduling assistance. The organizational structure of the Debris Control Program is shown in Figure 6-1. Maintenance of Public-Private Venture (PPV) Housing is managed by Ohana Military Communities (OMC)/Hunt. Maintenance of all MCBH-owned MS4 system facilities is overseen by MCD, regardless of the tenant. As with all other Base-wide programs, the ultimate authority for policy changes and enforcing compliance with the MS4 Permit, is the MCBH Base Commanding Officer (CO).

To address the MS4 Permit requirements, the Debris Control Program applies Base-wide to all MCBH-owned facilities, including those occupied by its tenants.

6.2 Asset Management System and Mapping

As part of its Debris Control Program, MCBH is required to develop an AMS to track and manage the inspections and maintenance of its entire MS4 system, including permanent BMPs. MCBH has an existing database, MAXIMO, that is managed by MCD/MRO and used to schedule maintenance activities and submit and track work orders. Facilities including components of the MS4 are mapped by Logistics Facilities Public Works Engineering (LFPE) in a Geographic Information System (GIS) database. MCBH is developing a comprehensive GIS-based AMS. ECPD will continue to work with LFPE to update the GIS information to include identification numbers of each storm drain inlet, outfall, or permanent BMP and implement the storm water AMS.

The comprehensive GIS-based AMS will consist of the following elements:

- Inventory of all critical components of the MCBH MS4 including hard assets such as the storm drain system, structural controls, and a schedule for recurring inspection, cleaning, and maintenance;
- Relevant information for each asset class (e.g., material, size, and condition);
- Capability to generate and track work orders for inspection, cleaning, and maintenance and assist with prioritization of capital improvement projects;
- Location and name of all waters of the U.S. receiving discharges from the MCBH outfalls; and
- Identification of all MCBH outfalls that discharge to impaired water.

MCBH is also upgrading the existing GIS storm sewer system map to identify all MCBH assets including inlets, pipes, above ground drainage features, outfalls, post-construction control measures, and the locations of industrial activities that drain storm water to the MS4.

6.2.1 System Maintenance Priorities

MCBH will use the storm water AMS to establish priorities and schedule and track maintenance activities. ECPD will work with MCD/MRO to develop a priority-based schedule for maintenance and debris removal activities including street sweeping, catch basin cleaning, and green waste and accumulated soil removal.

ECPD and MCD/MRO will conduct an initial assessment to determine the locations in which the MS4 is more prone to collection of sediment.

The initial assessment will inspect:

1. All roadways to identify if sweeping of roadways, shoulders, and/or medians is needed to prevent storm water pollution from debris and sediment.
2. All MS4 system features, such as catch basins, storm drain inlets, gutters, open ditches, trenches, and BMPs, to identify if maintenance and cleaning of these structures is needed.

The results of the assessment will be used to delineate and prioritize sections of the MS4 system for routine scheduled maintenance.

The factors that will be used to determine areas prioritized for maintenance efforts will be:

1. Potential to impact water quality of receiving waters, and proximity to receiving waters.
2. Sediment and debris loading observed during the initial assessment.
3. Cost effectiveness. Maintenance and inspections will be grouped into areas that will most effectively utilize available resources at MCBH.
4. Need-based. Priority will be given to address concerns or notifications brought to the attention of ECPD or MCD/MRO from the public or through any other general inspections.

The initial assessment inspections will also be used to approximate the rate of sediment and debris accumulation, which will be factored into long-term routine maintenance. Based on observed trends, MCBH will develop a threshold corresponding to each feature inspected, such as depth of sediment within a storm drain inlet or BMP or amounts of debris observed on a mile of roadway. These thresholds will be used to categorize each feature into a maintenance priority group.

The MS4 system components will be classified into the following maintenance priority groups:

HIGH PRIORITY – Features that exceed the sediment and debris threshold limits.

MEDIUM PRIORITY – Features that have not yet exceeded threshold limits for sediment and debris but can be reasonably expected to reach or exceed the threshold by the time of the next inspection.

LOW PRIORITY – Features where it can be reasonably expected that the effect of observed sediment and debris accumulation has a negligible impact on its function.

Once the prioritization areas and maintenance priority groups have been delineated, ECPD will collaborate with MCD/MRO to highlight any adjustments that should be made to the maintenance schedule or any maintenance issues that have been observed. ECPD will use the GIS-based AMS to focus any permanent BMPs requiring inspection or maintenance efforts.

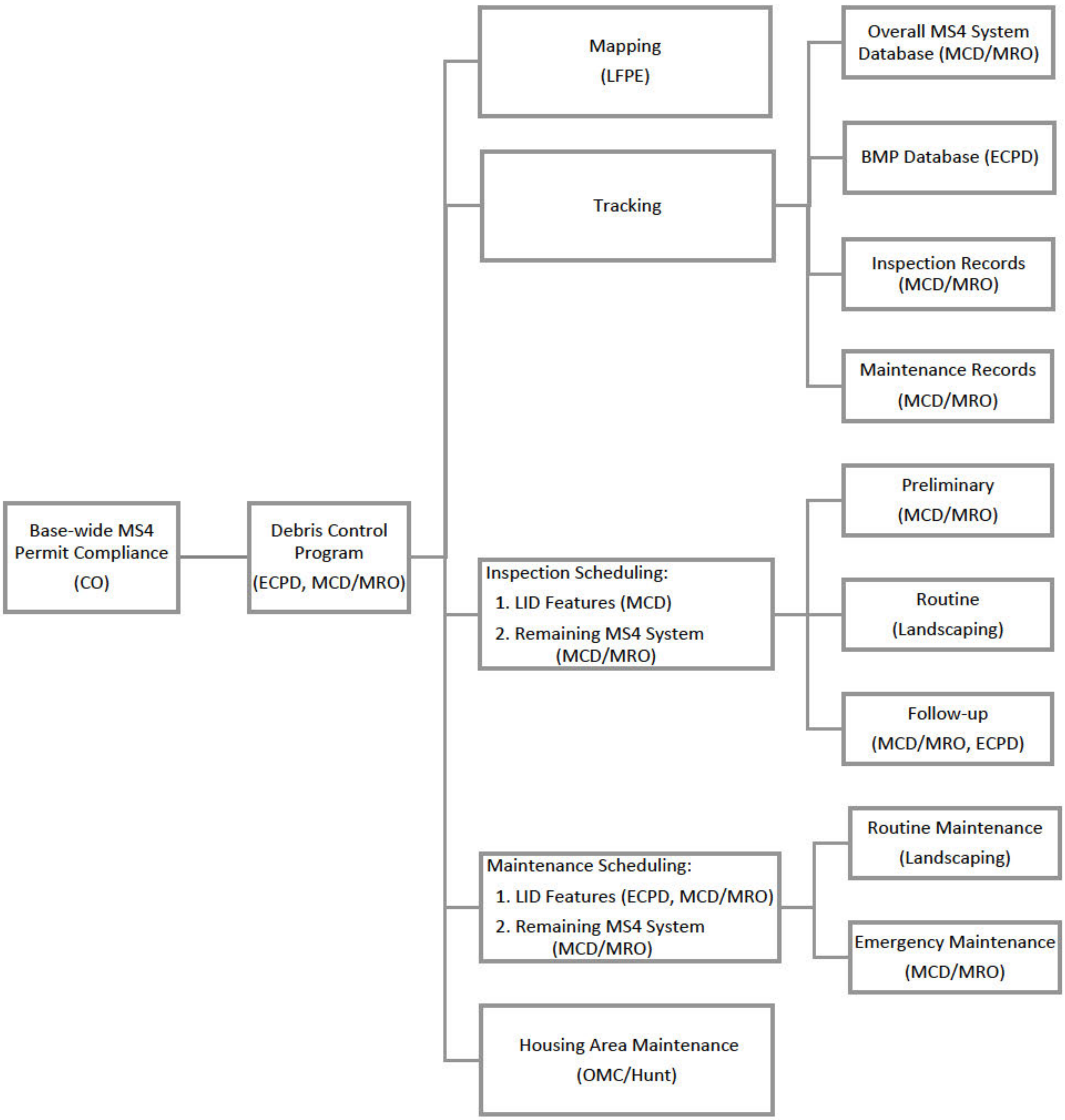

Figure 6-1 Debris Control Program Organizational Chart

6.3 Inspection/Maintenance Schedule

As part of the development of its MS4 Inspections/Maintenance Program, ECPD and MCD/MRO will complete an initial assessment to determine the existing condition of its facilities. As discussed in Section 6.2.1, MCBH will categorize the MS4 system features into maintenance priority groups based on the initial assessment and Base priority areas.

MCBH will inspect each roadway mile, storm drain feature, and BMP at least once during the term of this permit while concurrently inspecting each permanent BMP at least once annually. MCBH may perform maintenance in lieu of these inspections to most effectively meet the Permit requirements.

Currently, MCBH conducts routine Base-wide street sweeping. Although this is typically need-based, industrial and commercial facilities are generally swept at least twice a month. Detailed information about maintenance activities related to trash removal are outlined in the *Trash Reduction Plan* (See Appendix 6-1).

Routine storm drain maintenance and repair is performed annually before the rainy season to ensure function of the system and that accumulated debris will not be washed into receiving waters. These routine maintenance efforts will be reviewed and redistributed as necessary to comply with the MS4 Permit requirements.

The implementation schedule for the Inspection and Maintenance Program is outlined in Table 6-1. The schedule is subject to change, at the discretion of ECPD and MCD/MRO, depending on the outcome of the initial assessment, and as the Debris Control Program develops. The schedule is also subject to the requirements of any observed deficiencies of the MS4 system or complaints received by ECPD or MCD/MRO. These issues will continue to be addressed and given priority of available maintenance resources, as needed. Significant revisions to the Inspection and Maintenance Program Implementation Schedule or overall Debris Control Program will be documented in the Annual Report.

Table 6-1
Inspection and Maintenance Program Implementation Schedule

Task	***Year 1***	***Year 2***	***Year 3***	***Year 4***	***Year 5***
• Conduct required inspection and maintenance of permanent BMPs tracked by ECPD	X	X	X	X	X
• Establish and update AMS, as needed	X	X	X	X	X
• Conduct initial assessment of roadways and storm drain system features	X	X			
• Determine priority areas and establish maintenance priority groups		X	X		
• Appropriation of funding for required inspection and maintenance activities	X	X	X	X	X
• Implementation of Inspection and maintenance activities	X	X	X	X	X
• Evaluation and update of the priority-based scheduling and overall Debris Control Program, as needed (in the Annual Report)	X	X	X	X	X

6.4 Storm Drain Placards

The installation of informational storm drain placards is intended to create public awareness of the connection of the storm drain system to the ocean and other waterbodies. Storm drain placards create a direct connection in the mind of the public, establishing the notion that what goes into the storm drain ends up in the ocean and other waterbodies. The purpose of installing the placards is to discourage intentional or negligible behaviors that result in dumping into or near storm drain inlets. Storm drain placards have already been installed on all inlets in the PPV Housing areas.

As part of the Debris Control Program, MCBH will install a minimum of 50 new placards annually, on storm drain inlets located around the Base. Due to the nature of the Base, there are several restricted areas, or regions that are not exposed to frequent or high pedestrian traffic.

MCD/MRO and ECPD will collaborate to determine and justify the most suitable locations for storm drain placards. Priority will be given to industrial and commercial areas with pedestrian traffic and high priority areas, as determined in the initial assessment.

At the discretion of MCD/MRO and ECPD, the number of installed storm drain placards may be revised to reflect a smaller number if:

(i) There are not enough sites that could be identified where the impact of placards was perceived to produce a significant potential benefit; and
(ii) Where resources could be directed to another component of MCBH's Public Awareness and Outreach program and reasonably expected to create a more positive impact on preserving storm water quality.

During fiscal year 2021, an additional 50 storm drains were stenciled at high traffic, commercial and industrial areas on base. Storm drain marking was also included as part of formal assist visits during industrial and commercial site inspections. New placards or stencils at were installed at key storm drains if the storm drain lacked a placard or the existing placard or stencil was identified as deficient.

MCBH plans to continue installing placards at all drain inlets connected to the MS4. MCBH also plans to install signage at all post-construction BMPs on base to increase awareness of these storm water system components.

To facilitate the replacement of damaged placards and identify unmarked locations, MCD/MRO will track the locations of placards. If needed, placards will be replaced during routine scheduled maintenance. An evaluation of effectiveness and justification for future placement of placards will be described in the Annual Report.

6.5 Action Plan for Retrofitting Structural BMPs

In accordance with the MS4 Permit, MCBH has developed and implemented the *Action Plan for Retrofitting Structural BMPs* (See Appendix 6-2).

The *Action Plan for Retrofitting Structural BMPs* is intended to reduce storm water pollution by designing and constructing or installing appropriate and cost-effective structural BMPs or retrofits in strategic locations and structures within the existing MS4.

Structural BMPs are engineered systems designed to control or store runoff or remove pollutants from storm water runoff via a chemical or physically based treatment system. These systems improve storm water runoff water quality by addressing issues of erosion and trash.

Key elements of the *Action Plan for Retrofitting Structural BMPs* include:

- Outlining a process by which potential locations for BMP retrofits can be identified;
- Identifying areas concern, where retrofit BMPs should be implemented;
- Retrofit projects that have been implemented by MCBH; and
- Proposed program actions and implementation schedule.

ECPD is responsible for annual review of the implementation schedule and project status, as well as providing all relevant information on program/policy updates and revisions in the Annual Report. Updates should also include any additional retrofit projects with water quality protection measures and a description of project status.

6.6 Trash Reduction Plan

In accordance with the MS4 Permit, MCBH has developed and implemented a *Trash Reduction Plan* (See Appendix 6-1). MCBH's short-term goal for trash reduction is to determine the baseline discharge load and reduce overall debris discharges from the MCBH MS4 to receiving waters by 50 percent from the baseline load. The long-term goal is to reduce total debris discharges to zero.

The main objectives of the *Trash Reduction Plan* are to:

- Define the current trash load baseline;
- Identify source and problem areas;
- Pinpoint corresponding preventative measures and corrective actions; and
- Develop an implementation plan and schedule.

Some of the components in the *Trash Reduction Plan* include:

- A definition of "trash" for MCBH;
- Existing MCBH solid waste programs and policies;
- Existing control measures and BMPs;
- A proposed process for estimating the baseline discharge load;
- A plan to reach MCBH's short-term and long-term goals;
- Prioritized target areas;
- Related educational activities;
- Methods for measuring program success; and
- Implementation schedule.

Implementation of MCBH's debris discharge reduction goals were set with timelines based on a reflection of what is anticipated to be the shortest practicable timeframe for the actions required. As with the rest of the SWMP Plan, the *Trash Reduction Plan* is subject to annual review and revision, as necessary, to address program developments and changing Base-wide conditions. ECPD is responsible for making these changes and ensuring that the updated versions of the plan are available to the residents of MCBH and other affected parties.

With respect to trash reduction, the Annual Report shall include a summary of its trash load reduction actions including control measures and BMPs and the total trash loads and dominant types of trash removed by the reduction actions.

6.7 BMPs for Disposal of Waste Materials

Guidelines for disposal of waste material and contaminated water are provided in Appendix 6-3*, BMPs for Disposal of Waste Materials*. The BMPs are listed by type of discharge and activity and are intended for use by all facilities and contractors during maintenance and construction activities. BMPs are provided for wastes generated by maintenance and construction activities including general construction and painting, street and utility maintenance, landscaping, and vehicle maintenance. The guidelines presented in Appendix 6-3 do not represent all options for disposal of waste materials or contaminated water. The guidelines are included for guidance in the event that waste material or contaminated water is found. Disposal alternatives are listed the table in order of priority.

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7 Chemical Applications BMPs Program Plan

A crucial component of MCBH's SWMP Plan is its Base-wide Pollution Prevention and Good Housekeeping Program (Pollution Prevention Program). Generally, this is a multi-faceted maintenance program aimed at reducing pollutants from all MCBH-owned property to the maximum extent practicable (MEP). MCBH-owned property includes facilities, roads, parking lots, maintenance facilities, and its MS4. MCBH's Pollution Prevention Program is separated into four main components including:

1. Debris Control Best Management Practices (BMPs) Program Plan (Chapter 6);
2. Chemical Applications BMPs Program Plan (Chapter 7);
3. Erosion Control BMPs Program Plan (Chapter 8); and
4. Maintenance Activities BMPs Program Plan (Chapter 9).

Each of these components is described in detail in individual chapters as noted above. This chapter focuses on MCBH's Chemical Applications BMPs Program Plan (Chemical Applications Program), most of which has already been implemented as a component of the *MCBH Integrated Pest Management Plan* (IPMP), dated January 2017.

Per the MS4 Permit, Part D.1.f.(2), MCBH is required to implement a Chemical Applications Program. The Chemical Applications Program applies to all of MCBH's MS4, including structural and vegetated BMPs, and related appurtenances. The primary goal of the Chemical Applications Program is to reduce the contribution of pollutants associated with application, storage, and disposal of pesticides, herbicides, and fertilizers to the MS4. The potential areas of chemical application include facilities, right-of-ways, and landscaped areas, including areas leased to tenants.

The main elements of the Chemical Applications Program are:

1. Training requirements for all appliers of chemicals;
2. Development of an Authorized Use List (AUL) of chemicals; and
3. Implementation of appropriate requirements for chemical applications.

This Chemical Applications Program is outlined in accordance with the MS4 Permit requirements. The MS4 Permit states:

<u>Part D.1.f. Pollution Prevention/Good Housekeeping</u>

"The Permittee shall further develop and implement a system maintenance program to reduce to the MEP the discharge of pollutants from all Permittee-owned facilities, roads, parking lots, maintenance facilities, and the Permittee's MS4. The program shall include:

Part D.1.f.(2) Chemical Applications BMPs Program Plan

(i) Training - All employees or contractors or employees of contractors applying pesticides, herbicides, and fertilizers shall possess a current commercial certification by the State of Hawaii, Department of Agriculture or Department of Defense Certificate of Competency in the appropriate EPA-approved state categories. The Permittee shall develop an Authorized Use List of chemicals used and implement a specific training program for all potential appliers (bulk and hand-held) of the chemicals (e.g., fertilizers, pesticides, and herbicides) on

the proper application of the chemicals. The Permittee shall not permit the application of fertilizers, pesticides, or herbicides unless the handler and applier has first received this training and has provided proper certification.

(ii) *Implement appropriate requirements for pesticide, herbicide, and fertilizer applications - The Permittee shall implement BMPs to reduce the contribution of pollutants associated with the application, storage, and disposal of pesticides, herbicides, and fertilizers from Permittee-owned areas and activities to its MS4. Permittee-owned areas and activities include, at a minimum, federal facilities, right-of-ways, and landscaped areas.*

Such BMPs shall include, at a minimum: 1) educational activities, permits, certifications and other measures for applicators; 2) integrated pest management measures that rely on non-chemical solutions; 3) the use of native vegetation; 4) chemical application, as needed; and 5) the collection and proper disposal of unused pesticides, herbicides, and fertilizers.

(iii) *Records and Reports - The Permittee shall ensure that all employees or contractors or employees of contractors prepare, submit, and maintain daily pest management activities for each pest management service. Records shall include all surveillance, non-chemical controls and chemical applications.*

The Permittee shall ensure that their employees or contractors or employees of contractors applying registered pesticides, herbicides, and fertilizers work under the direction of a certified applicator, follow the pesticide label, and comply with any other State, City, or Federal regulations for pesticides, herbicides, and fertilizers. All Permittee employees or contractors applying pesticides, herbicides or fertilizers shall receive training on the BMPs annually. The Permittee shall maintain records of the annual training program."

7.1 Program Organization

Implementation of the Chemical Applications Program is predominantly the responsibility of the Facilities Engineering Maintenance Control Division (MCD) and Maintenance Repair Operations (MRO) and the Marine Corps Community Services (MCCS) Klipper Golf Course Maintenance. These three departments are the main applicators of chemicals on MCBH. General pest control services for MCBH are provided through these in-house pest control shops. The Environmental Compliance and Protection Division (ECPD) is responsible for general oversight and program management, led by the Installation Pest Management Coordinator.

Additional support for the MCBH pest management program is available from Naval Facilities Engineering Systems Command (NAVFAC) Pacific and Navy Environmental Preventative Medicine Unit Six (NEPMU-6). The NAVFAC Pacific Terrestrial Natural Resources Branch has two Department of Defense (DOD)-certified Professional Pest Management Consultants (PPMCs). NEPMU-6 is based at JBPHH and acts as Navy Medicine's professional pest management consultants.

Similar to all other programs in this SWMP Plan, the Base Commanding Officer (CO) has the ultimate authority to change policies or direct enforcement actions for non-compliance. The *Enforcement Response Plan* in Appendix 3-4 outlines the enforcement procedures of the MCBH SWMP. The organizational structure of the Chemical Applications Program is outlined in Figure 7-1. For additional roles and responsibilities, refer to the Section 2 of the IPMP.

To address the MS4 Permit requirements, the Chemical Applications Program applies Base-wide to all areas of potential chemical application, including but not limited to facilities, right-of-ways, landscaped areas, and areas leased to tenants. In accordance with their tenant agreements, tenants themselves are not permitted to apply chemicals and must contact MCD/MRO with pest control-related requests. Ohana Military Communities (OMC)/Hunt hires licensed contractors for chemical applications within the Public-Private Venture (PPV) Housing areas.

7.2 Training

The MS4 Permit requires that all MCBH employees, contractors, and employees of contractors applying pesticides, herbicides, and fertilizers possess a commercial certification by the State of Hawaii, Department of Agriculture or DOD Certificate of Competency in the appropriate U.S. Environmental Protection Agency (EPA) approved state categories.

The Permit additionally requires that any MCBH employee, contractor, or employee of contractors applying registered pesticides, herbicides, and fertilizers, (i) work under the direction of a certified applicator, (ii) follow the pesticide label information, (iii) comply with all other State, City, or Federal regulations for pesticides, herbicides, and fertilizers.

All MCBH employees or contractors applying pesticides, herbicides, or fertilizers must receive training on BMPs annually. All pesticide applicators from the facilities pest control shop and the golf course are required to attend pesticide applicator training for pesticide applicator certification or recertification training to ensure that pesticides are applied properly and safely in accordance with Department of Defense Instruction (DODINST) 4150.7.

Any personnel who have not been trained and do not possess a valid Certificate of Competency (DD Form 1826) must have “line of sight” supervision by a certified applicator. Uncertified personnel hired as pesticide applicator trainees must receive certification training within two (2) years of employment. On-the-job training can range from six (6) to twelve (12) months depending on the proficiency of the new employee, based on written and/or practical exams. Certification training courses are offered locally and on the mainland. Personnel who fail to obtain a passing grade on the examination must achieve passing grade on the follow-up exam or they will be considered unqualified, and action will be taken to remove them from performing pest management functions.

Each pesticide applicator possessing a Certificate of Competency must be recertified every three (3) years through NAVFAC Pacific. Personnel who do not receive a passing grade must retake the exam within 120 days of the original recertification examination but will be allowed to continue their on-the-job training. Pesticide applicators that fail to pass the follow-up examination will be subject to personnel reassignment within the command. No individual is permitted to apply any chemicals on base at MCBH prior to completion of the applicable training requirements.

The MCBH pest management program and BMPs related to chemical application are discussed in the general storm water awareness training conducted by ECPD. OMC/Hunt hires licensed contractors for chemical applications within the housing areas. Tenant activities and units on MCBH are not permitted to apply chemicals and must contact MCD/MRO for assistance.

Additional information regarding training and certification can be found in Section 7.7 of the IPMP.

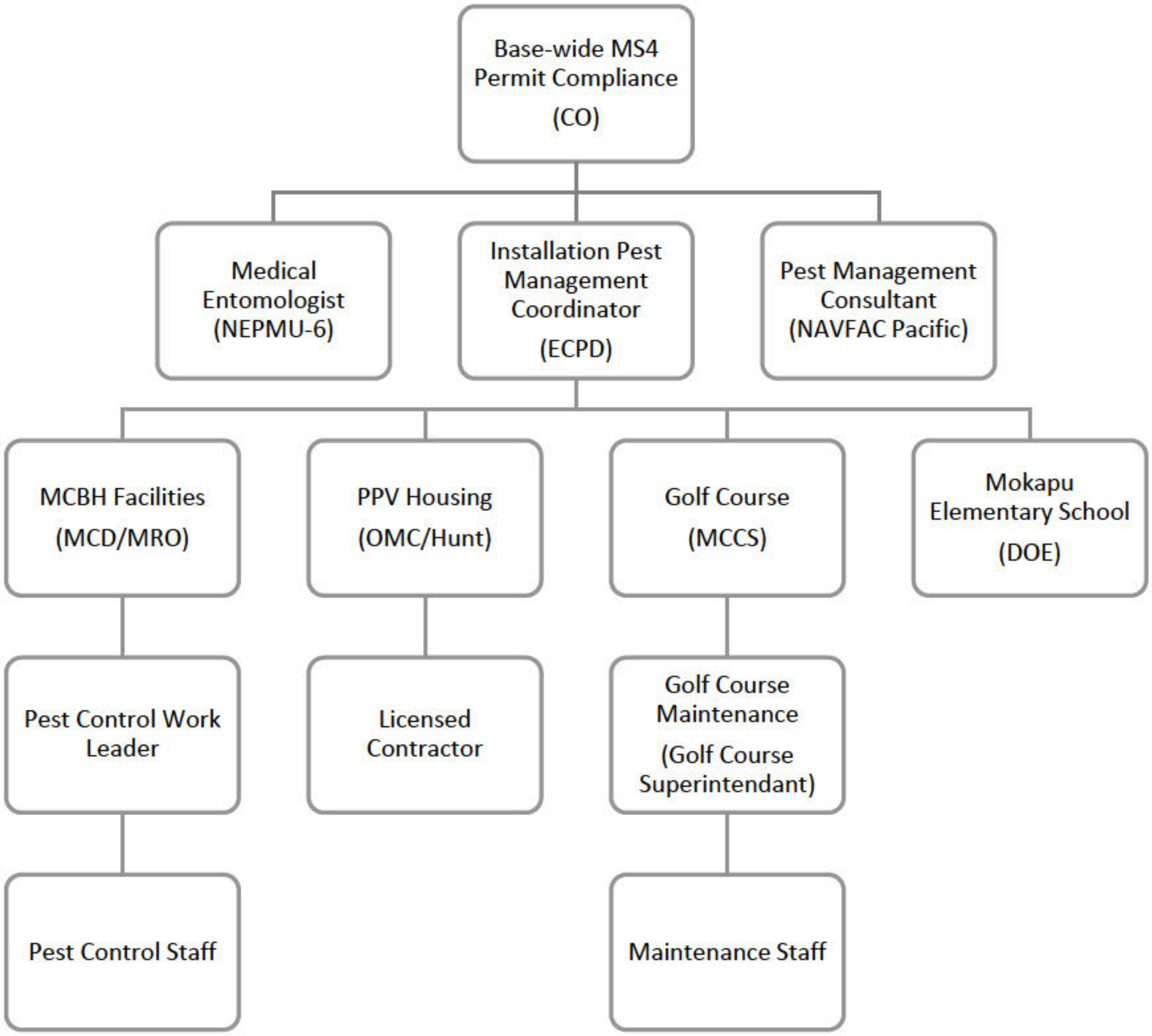

Figure 7-1 Chemical Applications Program Organizational Chart

7.3 Authorized Use List

Chemicals used by MCBH pest control shops and contractors must be on the authorized use list (AUL). The pesticide AUL is included in Appendix D of the MCBH IPMP and on the NAVFAC Online Pesticide Reporting System (NOPRS). NOPRS is an online database used to request pesticide approval, report pesticide use, and manage pest management records.

Pesticides must be approved by the NAVFAC PPMC to be added to the AUL and prior to use at MCBH. The purpose of this approval process is to ensure that only registered pesticides which are safe, effective, and appropriate for the site are used. Only pesticides listed on the AUL in NOPRS may be purchased.

All potential appliers of chemicals on the AUL are trained on the proper application in accordance with DODINST 4150.7. The IPMP is reviewed and updated annually, and any modifications to the plan will be included in the storm water Annual Report.

7.4 Implement Appropriate Requirements for Pesticide, Herbicide, and Fertilizer Applications

BMPs associated with chemical application are discussed during the various aspects of the training program discussed in Section 7.2 above. Training BMPs ensure that only properly trained personnel apply chemicals and help reduce the contribution of pollutants to the MS4. IPMP Chapter 3, Operations, contains detailed information regarding various BMPs specific to the selection, application, storage and disposal of pesticides, herbicides, and fertilizer.

Chapter 5 of the IPMP addresses environmental considerations of the MCBH pest management program. IPMP Section 5.3.1.3 includes the following pollution prevention BMPs:

- Apply pesticides and clean equipment away from storm drains to prevent storm water contamination.
- Do not pour pesticide container rinsate into drains.
- Use less-toxic and target-specific pesticides.
- When applying Permethrin repellent to uniforms outdoors, do not mix or apply near storm drains or where water run-off will result in storm water contamination, and avoid overspray of pesticide onto the ground.
- Minimize outdoor applications of pyrethroids.
- Use spot spraying and crack and crevice applications rather than broadcast or baseboard spraying.
- Minimize pesticide storage on the installation through proper inventory management and not allowing contractors to store pesticides on the installation.

7.5 Reports and Records

7.5.1 Records

Daily records of pest management operations are required. Marine Corps Order (MCO) 5090.2A, Volume 14, Chapter 3 requires MCBH to maintain complete daily pesticide application and pest management operations records. These records are kept with the organization responsible for applying pesticides or involved in oversight management of pesticide application.

- Facilities and golf course shops shall report pesticides applied by their applicators.
- The Facilities Engineering and Acquisition Division (FEAD) shall report pesticides applied by persons on all MCBH construction projects for which they provide oversight management.
- OMC/Hunt will report pesticides applied by persons under PPV Housing contracts.

Monthly summaries of all pest management operations at MCBH shall be submitted to the Installation Pest Management Coordinator, who will compile and submit the reports to NAVFAC via NOPRS.

Additional information regarding record keeping forms and procedures can be found in Section 2.3 of the IPMP.

Data from pest control operations should be used to assess the efficacy of the installation's pest control methods.

8 Erosion Control BMPs Program Plan

A crucial component of MCBH's SWMP Plan is its Base-wide Pollution Prevention and Good Housekeeping Program (Pollution Prevention Program). Generally, this is a multi-faceted maintenance program aimed at reducing pollutants from all MCBH-owned property to the maximum extent practicable (MEP). MCBH-owned property includes facilities, roads, parking lots, maintenance facilities, and its MS4. MCBH's Pollution Prevention Program is separated into four main components including:

1. Debris Control Best Management Practices (BMPs) Program Plan (Chapter 6);
2. Chemical Applications BMPs Program Plan (Chapter 7);
3. Erosion Control BMPs Program Plan (Chapter 8); and
4. Maintenance Activities BMPs Program Plan (Chapter 9).

Each of these components is described in detail in individual chapters as noted above. This chapter focuses on MCBH's Erosion Control BMPs Program Plan (Erosion Control Program).

Per the MS4 Permit, Part D.1.f.(3), MCBH is required to implement an Erosion Control Program. The Erosion Control Program applies Base-wide, and focuses on erosion-prone areas, vegetated portions of the storm drain system, and low impact development (LID) features. The primary goal of the Erosion Control Program is to reduce the impact of erosion and sediment on the quality of storm water generated at MCBH. The objectives of the Erosion Control Program are to:

1. Implement procedures to identify and construct permanent erosion control improvements at prioritized erosion-prone areas observed on base.
2. Implement temporary erosion control measures for erosion-prone areas with significant potential to affect water quality of receiving waters where a permanent solution is not immediately available.
3. Implement a maintenance plan for vegetated features of the storm drain system.
4. Implement an *Action Plan to Address Erosion at Storm Drain System Outlets* (See Appendix 3-3).
5. Submit a list and implementation schedule for permanent erosion control improvements within one (1) year of the effective date of permit (EDOP).

This Erosion Control Program is outlined in accordance with the MS4 Permit requirements. The MS4 Permit states:

<u>Part D.1.f. Pollution Prevention/Good Housekeeping</u>

"The Permittee shall further develop and implement a system maintenance program to reduce to the MEP the discharge of pollutants from all Permittee-owned facilities, roads, parking lots, maintenance facilities, and the Permittee's MS4. The program shall include:

Part D.1.f.(3) Erosion Control BMPs Program Plan - The Permittee shall:

(i) Implement permanent erosion control improvements, ensuring that erosion-prone areas with the potential for significant water quality impact, but with limited public safety concerns, are also considered a high priority for remediation. Identification of erosion-prone areas with the potential for significant water quality impact shall include areas where there

is evidence of rilling, gullying, and/or other evidence of significant sediment transport, and areas in close proximity to receiving waters listed as impaired by either sediment, siltation and/or turbidity. The Permittee shall include procedures to identify and implement erosion control projects based on water quality concerns while continuing to address high profile public safety projects.

(ii) Require the implementation of temporary erosion control measures (e.g., erosion control blankets and/or fabrics, gravel bag placement and silt fencing/fiber rolls) on erosion-prone areas with the potential for significant water quality impact if a permanent solution is not immediately possible. Notwithstanding any other implementation provisions, the SWMP shall require the implementation of such temporary erosion control measures on all applicable areas. For projects which require a CWA Section 401 Water Quality Certification (WQC), the WQC application shall be submitted to the DOH within one (1) year from the effective date of this permit and be implemented with six (6) months of the WQC or other regulatory permit(s) issuance date.

(iii) Implement a maintenance plan for vegetated portions of the drainage system used for erosion and sediment control, and LID features; including controlling any excessive clearing/removal, cutting of vegetation, and application of herbicide which affects its usefulness.

(iv) Implement an Action Plan to address erosion at its storm drain system outlets with significant potential for water quality impacts, which shall identify outfalls to be addressed, explanation on the basis of their selection and an implementation schedule. The implementation schedule shall cover a five (5) year period. A status report on implementation of the plan shall be included in the Annual Report. The Permittee shall install velocity dissipators or other BMPs to reduce erosion at locations identified by periodic required inspections.

(v) Submit a list of projects and an implementation schedule for permanent erosion control improvements as described in Part D.1.f.(3)(i) of this permit to the DOH within one (1) year from the effective date of this permit.

8.1 Program Organization

The program organization for the Erosion Control Program is shown in Figure 8-1. The MCBH Environmental Compliance and Protection Division (ECPD) is responsible for identifying and prioritizing areas of erosional concern based on inspections, or complaints/notifications from the ECPD Compliance Inspection Team or the public.

Facilities Engineering Maintenance Control Division (MCD) and Maintenance Repair Operations (MRO) are responsible for implementing temporary and permanent erosion control measures for MCBH facilities, in-house maintenance and construction, and maintenance and construction projects contracted by MCD. Logistics Facilities Public Works Engineering (LFPE) and ECPD are responsible for erosional control measures associated with military construction projects. Ohana Military Communities (OMC)/Hunt manages the Public-Private Venture Housing areas and will oversee erosion control projects in PPV Housing. Erosion control measures associated with Naval Facilities Engineering Systems

Command (NAVFAC) projects will be overseen by the Facilities Engineering and Acquisition Division (FEAD). Different components of the program are also outlined in Figure 8-1, along with the agencies responsible for each component.

ECPD is responsible for general oversight of the Erosion Control Program. This includes revising erosion control BMPs or policies, as needed, to meet program requirements and to facilitate program implementation. ECPD is also responsible for including a status report of any such revisions and program updates in the storm water Annual Report.

Construction and maintenance of erosion-related projects identified on base will be evaluated on a case-by-case basis and will fall under the responsibility of MCBH or OMC/Hunt. This will depend on the location of work and the specifications lease agreement. MCBH maintenance and construction projects will fall under the responsibility of agencies listed in Chapter 4, excluding the Department of Education (DOE) and Marine Corps Community Services (MCCS) tenant categories. Erosion control projects located on properties leased to DOE and MCCS will be considered MCBH’s responsibility.

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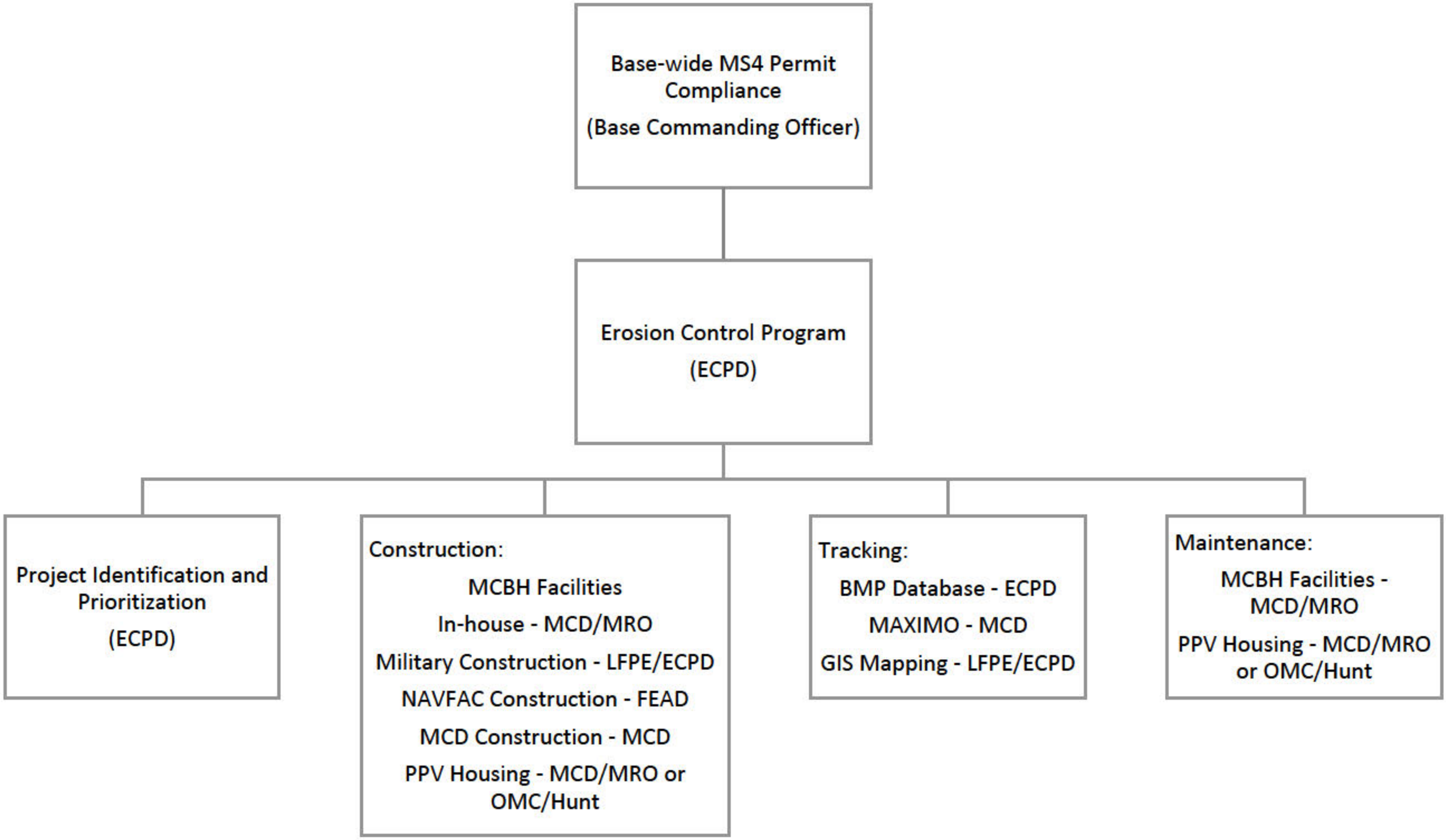

Figure 8-1 Erosion Control Program Organizational Chart

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8.2 Implement Permanent Erosion Control Improvements

As part of the MS4 Permit requirements, MCBH has developed a procedure for identifying and implementing construction of permanent erosion control improvements. The process for identifying and prioritizing erosional areas of concern is described in detail in the *Action Plan to Address Erosion at Storm Drain System Outlets* (See Appendix 3-3), and in the *Action Plan for Retrofitting Structural BMPs* (See Appendix 6-2).

ECPD plans to carry out inspections to assess past erosion control efforts and follow-up on potential areas of concern. Although public health and safety will take highest precedent when ranking erosional sites identified for remediation efforts, MCBH is also committed to exercising a sense of urgency to secure resources that will be used to permanently address erosional areas posing a significant threat to the water quality of surrounding receiving waters.

The plans referenced above also outline efforts that ECPD has made to identify erosional areas of concern, and projects that have already been completed.

8.3 Implementation of Temporary Erosion Control Measures

Temporary erosion control measures will be implemented, as soon as possible, to address any erosional areas identified as posing a significant risk to water quality. During the utilization of temporary BMPs, ECPD will be responsible for ensuring that adequate maintenance is performed to maintain the function of these BMPs and protect the receiving waters, until permanent measures can be constructed.

There are currently no projects that have been identified by MCBH that require a Water Quality Certification (WQC). ECPD will evaluate any newly identified maintenance and/or construction projects to ensure that, through its Construction Program, a WQC and any other National Pollutant Discharge Elimination System (NPDES) requirements are submitted to the State of Hawaii Department of Health (DOH) when applicable.

Although temporary erosion control measures will be in place, MCBH will continue to work toward constructing a permanent erosion control to address the situation as soon as possible.

8.4 Maintenance for Vegetated Best Management Practices

MCBH has developed the *Maintenance Activities BMP Field Manual* (See Appendix 11-3). The field manual provides guidance on common maintenance procedures and selection of BMPs to reduce or eliminated the discharge of pollutants to State waters to the MEP. The *Maintenance Activities BMP Field Manual* covers maintenance activities routinely performed by MCD and MRO including street sweeping, vehicle maintenance, painting operations, and material handling and storage.

A selected BMP in the *Maintenance Activities BMPs Field Manual* is maintenance of vegetated MS4 features and LID features. Section 6 of the *Maintenance Activities BMP Field* Manual includes selected BMP Fact Sheets*.* Of these BMPs, BMP #121, covers maintenance and preservation of vegetated MS4 features and LID features. Preserving natural vegetation helps to control erosion and protect water quality by minimizing the amount of bare soil exposed to erosive forces. BMP #121 is employed for maintenance activities of erosion and sediment control measures, such as discouraging practices of excessive clearing/removal/cutting of vegetation, limiting the use of herbicide, and using native plant species.

The *Action Plan to Address Erosion at Storm Drain System Outlets* (See Appendix 3-3) is discussed in Section 8.5 below. The action plan contains the Erosional Area Inspection Checklist which is used to document erosion-prone areas and indicate whether there is deteriorating or unmaintained vegetation. The results of erosional area inspections will be documented in the storm water Asset Management System (AMS) and used to determine maintenance priorities.

8.5 Action Plan to Address Erosion at Storm Drain System Outlets

MCBH has established the *Action Plan to Address Erosion at Storm Drain System Outlets* (Appendix 3-3). The purpose of this plan is to identify erosional outfalls that pose a significant risk of impacting receiving water quality. The *Action Plan to Address Erosion at Storm Drain System Outlets* contains the following components:

- Overview of past efforts to mitigate storm water pollution caused by erosion and sediment;
- Inspection process for identifying areas of concern;
- Proposed actions to address erosion-prone areas; and
- Five (5) year implementation schedule for action.

Per the MS4 Permit Part D.1.f.(1)(v), an annual update will be provided on progress and changes made to the implementation schedule in the storm water Annual Report.

8.6 Projects and Implementation Schedule for Permanent Erosion Control Improvements

As described in Section 8.1, MCBH has consistently made efforts to address erosional areas of concern. MCBH has a list of potential erosional areas based on previous studies that it plans to investigate and remediate as part of the implementation of its Erosion Control Program. Section 2.1 of the *Action Plan to Address Erosion at Storm Drain System Outlets* highlights four high priority areas for erosion control improvements. See the *Action Plan to Address Erosion at Storm Drain System Outlets* in Appendix 3-3 and the *Action Plan for Retrofitting Structural BMPs* in Appendix 6-2 for proposed actions and corresponding implementation schedules.

9 Maintenance Activities BMPs Program Plan

A crucial component of MCBH's SWMP Plan is its Base-wide Pollution Prevention and Good Housekeeping Program (Pollution Prevention Program). Generally, this is a multi-faceted maintenance program aimed at reducing pollutants from all MCBH-owned property to the maximum extent practicable (MEP). MCBH-owned property includes facilities, roads, parking lots, maintenance facilities, and its MS4. MCBH's Pollution Prevention Program is separated into four main components including:

1. Debris Control Best Management Practices (BMPs) Program Plan (Chapter 6);
2. Chemical Applications BMPs Program Plan (Chapter 7);
3. Erosion Control BMPs Program Plan (Chapter 8); and
4. Maintenance Activities BMPs Program Plan (Chapter 9).

Each of these components is described in detail in individual chapters as noted above. This chapter focuses on MCBH's Maintenance Activities BMPs Program Plan (Maintenance Activities Program).

Per the MS4 Permit, Part D.1.f.(4), MCBH is required to implement a Maintenance Activities Program. The Maintenance Activities Program establishes pollution prevention strategies for maintenance activities, including routine maintenance projects. Ensuring the implementation of proper source control measures and spill response procedures can effectively reduce the discharge of pollutants associated with maintenance activities. Appropriate implementation of BMPs is required for all maintenance activities.

The objectives of this program are to:

1. Maintain and implement a *Maintenance Activities BMPs Field Manual*.
2. Implement and enforce the requirements of the Storm Water Pollution Prevention Plans (SWPPPs) as presented in Chapter 11.
3. Train staff on proper BMP implementation and pollution prevention strategies.

This Maintenance Activities Program is outlined in accordance with the MS4 Permit requirements. The MS4 Permit states:

Part D.1.f.(4) Maintenance Activities BMPs Program Plan

"(i) Maintenance Activities Best Management Practices Field Manual - The Permittee shall maintain and implement a BMPs Field Manual for Maintenance Activities for all Marine Corps Base Hawaii maintenance activities. Examples of such activities include, but are not limited to: paving and road repairs, street cleaning, saw cutting, concrete work, curb and gutter replacement, buried utility repairs and installation, vegetation removal, painting and paving, debris and trash removal, spill cleanup, etc. The Field Manual shall be updated as necessary or at least once per permit term and include written procedures to minimize pollutant discharge for maintenance activities which have the potential to discharge pollutants to its MS4. The procedures shall ensure that appropriate BMPs are verifiable through field inspections (i.e., field inspectors can quickly determine if the appropriate BMPs have been implemented).

(ii) Storm Water Pollution Prevention Plan or SWPPP (formerly known as the Storm Water Pollution Control Plan or SWPCP). The Permittee shall implement and enforce the requirements of the SWPPP, as discussed in Appendix 1 of this Permit.

(iii) Training - The Permittee shall further develop and provide annual training to staff on proper maintenance activities to prevent storm water pollution. The training shall cover the Field Manual, identify potential sources of pollution, general BMPs that can be used to reduce and/or eliminate such sources, and specific BMPs for their activities. The training shall incorporate components of the public education campaign and educate staff that they serve a role in protecting water quality. Staff shall be made aware of the NPDES permit, the overall SWMP, and the applicable BMPs Program(s). The Permittee shall maintain records of the annual training program."

9.1 Program Organization

The program organization for the Maintenance Activities Program, is shown on Figure 9-1. The Facilities Engineering Maintenance Control Division (MCD) and Maintenance Repair Operations (MRO) are responsible for the general maintenance projects for all facilities within MCBH with the exception of Mokapu Elementary School, Public-Private Venture (PPV) Housing, and commercial tenants managed by Marine Corps Community Services (MCCS).

Figure 9-1 shows the agencies responsible for overseeing that all Maintenance Activities Program requirements are met. The grey boxes indicate the agency responsible for implementation of BMPs at the facilities. The Department of Education (DOE) is responsible for maintenance at the Mokapu Elementary School. Ohana Military Communities (OMC)/Hunt manages maintenance for PPV Housing areas.

The MCBH Environmental Compliance and Protection Division (ECPD) is responsible for general oversight of the Maintenance Activities Program. This includes revising maintenance activity BMPs or policies, as needed, to meet program requirements and to facilitate program implementation.

9.2 Maintenance Activities Best Management Practices Field Manual

A field manual with BMPs for maintenance activities has been developed in accordance with the requirements of the MS4 Permit. The *Maintenance Activities BMP Field Manual* is included in Appendix 11-3 of this plan.

The field manual is a handbook that provides direction, guidance, and procedures for maintenance activities performed by MCD/MRO personnel to reduce, to the MEP, pollutants from being discharged to the MS4 or receiving waters. Through use of proper management techniques and practices, it is possible to improve control of the identified potential sources of pollutants and reduce the number of releases to the storm water system.

Routine maintenance projects are scheduled or cyclical projects performed to preserve the life of a system; to restore the original function or delay the deterioration of an existing asset without substantially increasing is structural capacity; or to maintain the original line and grade, hydraulic capacity or original purpose of a facility, system or asset, in which land disturbance does not go beyond the original footprint of the previous structure.

The *Maintenance Activities BMP Field Manual* contains BMPs for the most common activities performed in the field which include:

- Pavement and maintenance and cleaning
- Drainage system and utility maintenance
- Street cleaning
- Debris and trash removal
- Landscape maintenance
- Exterior maintenance on buildings
- Painting
- Spill clean up

Common maintenance activities have the potential to impact the water quality of the MCBH MS4. Oil, detergent, paints, lubricants, fertilizers, and other materials involved in maintenance activities are considered pollutants when found in the MS4 system. Use of appropriate BMPs can reduce the potential of routine maintenance activities to impact water quality. The procedures outlined in the *Maintenance Activities BMP Field Manual* will ensure that appropriate BMPs are verifiable through field inspections.

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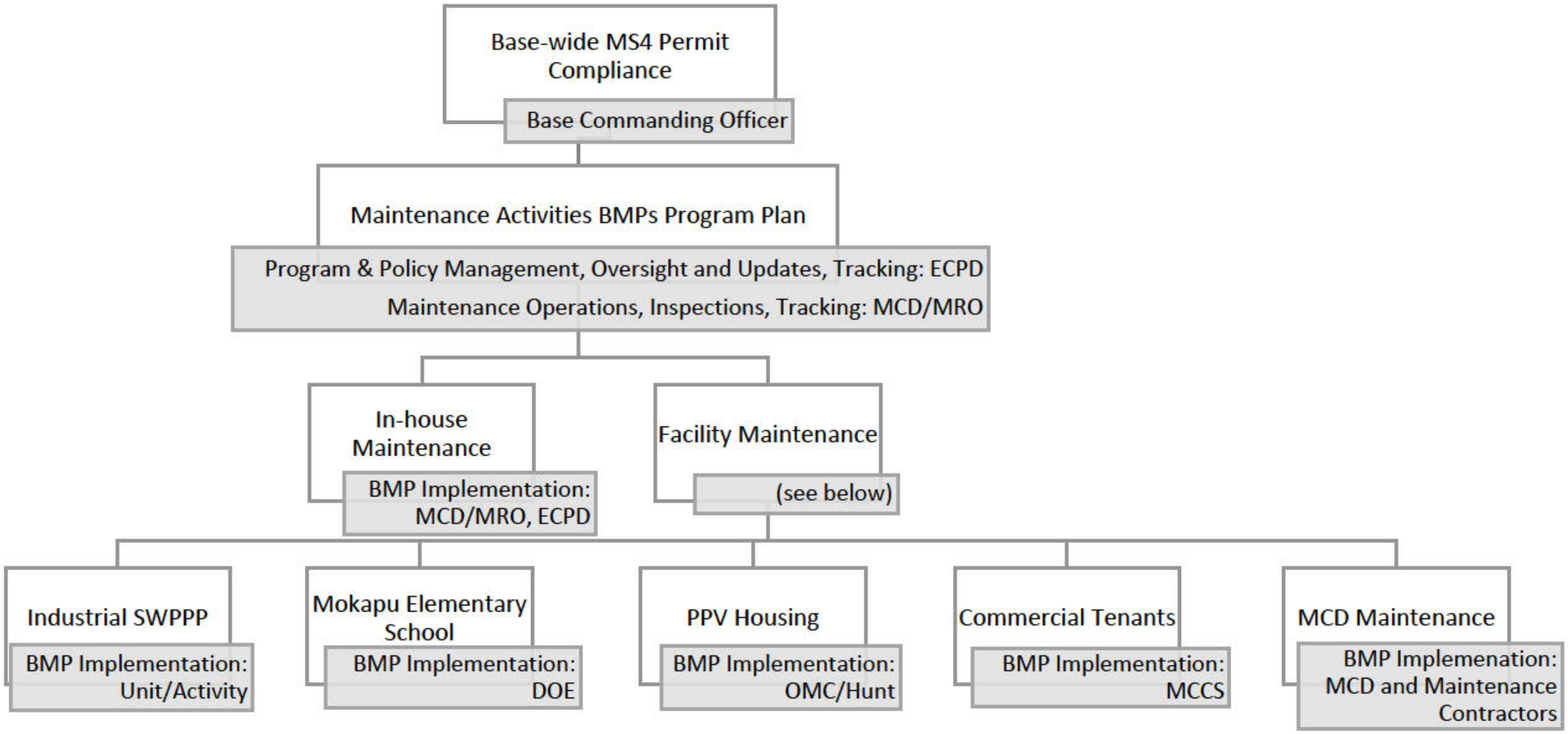

Figure 9-1 Maintenance Activities Program Organizational Chart

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9.3 Storm Water Pollution Prevention Plan (SWPPP)

MCBH has developed SWPPPs for industrial activities identified in the permit. The SWPPP components are described in detail in Chapter 11, and facility SWPPPs are contained in Appendix 11-2. Copies of the SWPPPs for each of the industrial facilities are available from ECPD and maintained at each facility.

The SWPPP for each facility contains applicable BMPs designed to reduce the potential for pollutant discharge to the MS4 or receiving water to the MEP using the Best Available Technology currently available (BAT)/ best Conventional Pollution Control Technology (BCT).

To ensure that the requirements of the SWPPP are properly implemented and maintained, the ECPD Compliance Inspection Team or designated facility Environmental Compliance Coordinator (ECC) will conduct and document inspections of these facilities. The site inspection is an overall evaluation of the effectiveness of the BMPs implemented at that facility. The MS4 Permit requires a routine quarterly site inspection by a qualified person with at least one member of the Storm Water Pollution Control Team participating. The inspections will be documented on the Routine Facility Inspection Checklist included in the facility SWPPP.

The MS4 Permit also requires that a quarterly visual assessment of storm water discharge is conducted for all industrial facilities. For the visual assessment, storm water samples are collected in such a manner that the samples are representative of the storm water discharge from the facility. Storm water samples are collected at monitoring points designated in the facility SWPPP and assessed for evidence of storm water pollution.

Based on the results of quarterly site inspections and visual assessments, updates to the SWPPPs and employed BMPs will be made, as necessary.

9.4 Training

As part of its Maintenance Activities Program, ECPD will implement annual training for maintenance staff on proper maintenance activities BMPs to prevent storm water pollution. The training will focus on the *Maintenance Activities BMP Field Manual*, identification of potential sources of pollution, general BMPs that can be used to reduce or eliminate such sources, and appropriate BMPs for their specific maintenance activities.

ECPD is responsible for oversight of MCBH’s maintenance activities education and outreach program, including contents and method of which information is circulated. Outreach material for tenants and facilities will be developed, revised, and distributed at the discretion of ECPD. These materials will be used to address observed issues or general program policy updates.

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10 Industrial and Commercial Activities

In accordance with the MS4 permit and this SWMP Plan, MCBH is required to develop and implement an Industrial and Commercial Discharge Management Program (ICDM Program) to reduce to the maximum extent practicable (MEP) the discharge of pollutants from all industrial and commercial activities that discharge into the MS4.

The ICDM Program will administer the following activities:

1. Issue and track connection and discharge permits/approvals.
2. Maintain an inventory and map of industrial and commercial facilities and activities that initially discharge into the MS4.
3. Inspect industrial and commercial facilities and activities and identify potential sources of pollution to the MS4.
4. Designate priority areas for inspections.
5. Review Storm Water Pollution Prevention Plans (SWPPPs) and associated best management practices (BMPs) for applicable industrial facilities.
6. Provide training for ICDM Program staff.
7. Establish and implement an enforcement policy for industrial and commercial facilities and activities.

The MS4 Permit describes the requirements for the ICDM Program as follows:

Part D.1.g. Industrial and Commercial Activities Discharge Management Program:

> *"The Permittee shall implement an industrial and commercial discharge management program to reduce to the MEP the discharge of pollutants from all industrial and commercial facilities and activities which initially discharge into the Permittee's MS4. At a minimum, the program shall include:*
>
> ***Part D.1.g.(1) Requirement to Implement BMPs*** *- Require a permit or written equivalent approval for drainage connections and discharge of surface runoff into the MS4 and maintain a database of the permits/approvals. The permit/approval shall obligate the facility to implement BMPs from their BMP Plan or SWPPP and prevent water quality violations to the Permittee's storm drain system.*
>
> ***Part D.1.g.(2) Inventory and Map of Industrial Facilities and Activities*** *- The Permittee shall annually update and submit in the Annual Report, in portable document format (pdf - minimum 300 dpi), the industrial facilities and activities inventory (industrial inventory), sorted by priority areas, and map of such facilities and activities discharging, directly or indirectly, to its MS4.*
>
> *The industrial inventory shall include, by priority area, the installation or facility name, street address, building number, nature of business or activity, Standard Industrial Classification (SIC) code(s) that best reflect the facility product or service, principal storm water contact, receiving State water, and whether an NGPC under HAR, Chapter 11-55, Appendix B, NPDES General Permit Authorizing the Discharge of Storm Water Associated with Industrial Activities (General*

Industrial Storm Water permit) or any other applicable NPDES permit has been obtained, including a permit or file number and issuance date.

At a minimum, the industrial inventory shall include facilities and activities such as:

- *Municipal Landfills (open and closed).*
- *Hazardous waste recovery, treatment, storage and disposal facilities.*
- *Facilities subject to Section 313 of the Emergency Planning and Community Right-to-Know Act, 42 U.S.C. 11023.*
- *Findings from follow-up investigations of the industrial facilities identified in the Questionnaire Survey.*
- *Facilities subject to NPDES permit coverage which are adjacent to the Permittee's facilities or discharge to the MS4.*
- *And any other industrial facility that either the Permittee or the DOH determines is contributing a substantial pollutant loading to the MS4.*

Part D.1.g.(3) Inventory and Map of Commercial Facilities and Activities *– The Permittee shall annually update and submit in the Annual Report, in pdf format (minimum 300 dpi), the commercial facilities and activities inventory (commercial inventory), sorted by priority areas, and map of such facilities and activities discharging, directly or indirectly, to its MS4 within its Annual Report. The commercial inventory update may be based on the collection of new information obtained during field activities or through other readily available intra-agency informational databases (e.g., business licenses, pretreatment permits, sanitary sewer hook-up permits).*

The commercial inventory shall include, by priority area, the installation or facility name, street address, building number, nature of business or activity, SIC code(s) that best reflect the facility product(s) or service(s), principal storm water contact, and receiving State water.

At a minimum, the commercial inventory shall include facilities and activities such as:

- *Findings from investigations of the commercial facilities identified in the Questionnaire Survey.*
- *Retail Gasoline Outlets.*
- *Retail Automotive Services, including Repair Facilities.*
- *Restaurants.*
- *Any other commercial facility that either the Permittee or the DOH determines is contributing pollutants to the MS4 that may cause or contribute to an exceedance of State water quality standards.*

***Part D.1.g.(4) Prioritized Areas for Industrial and Commercial Facility and Activity Inspections - ****The Permittee shall implement the Prioritized Areas for Industrial and Commercial Facility and Activity Plan. Under the Plan, the Permittee is to designate priority areas for industrial and commercial facility and activity inspections, based on the relative risk that any discharge might be contaminated with pollutants.*

Within 60 calendar days from the effective date of this permit, the Permittee shall submit a status report to the DOH. The status report shall identify the numbers of industrial and *commercial facilities discharging into the Permittee's MS4 and the number of inspections that have been completed during the prior permit term. The status report shall be organized by priority area.*

On an annual basis, the Permittee shall modify the Plan based on updated information from its industrial and commercial inventory, findings from previous inspections, the number of industrial and commercial facilities in the area, the density of these facilities, previous storm water violations in the area, and water quality impairments in the area. The modified Plan shall set a schedule that ensures inspections will be completed in accordance with the schedule in Part D.1.g.(5). This Plan shall be submitted with the Permittee's Annual Report.

Part D.1.g.(5) Inspection of Industrial and Commercial Facilities and Activities - *The industrial/commercial inspection program shall be implemented and updated as appropriate to reflect the outcomes of the investigations.*

The Permittee shall ensure industrial and commercial facilities and activities identified in the industrial and commercial inventories required under Parts D.1.g.(2) and D.1.g.(3) are inspected and re-inspected as often as necessary based on its findings to ensure corrective action was taken and the deficiency was resolved. At a minimum, the Permittee shall inspect each industrial facility that does not have NPDES permit coverage under the NPDES permit program at least twice every five (5) years, and each industrial facility that does have such NPDES permit coverage at least once every five (5) years. Any industrial facility discharging Industrial Storm Water (as defined by 40 CFR Part 122.26(b)(14)) that does not have NPDES Permit coverage shall be reported to the DOH within 30 calendar days of the inspection. Commercial dischargers are to be ranked according to relative risk of discharge of contaminated runoff to the MS4. The highly ranked commercial facilities shall be inspected at least once every five (5) years.

All inspections shall be in accordance with the applicable portions (e.g., Chapter 11 – Storm Water) of the "NPDES Compliance Inspection Manual" (EPA 305-X-04-001), dated July 2004. Inspectors shall be trained to identify deficiencies, assess potential impacts to receiving waters, evaluate the appropriateness and effectiveness of deployed BMPs, and require controls to minimize the discharge of pollutants to the MS4. The inspectors shall use an inspection checklist, or equivalent, and photographs to document site conditions and BMP conditions. Records of all inspections shall be maintained for a minimum of five (5) years, or as otherwise indicated. The Permittee shall submit semi-annual inspection report(s) to the DOH by October 31st and April 30th for inspections done within the previous period.

Part D.1.g.(6) Storm Water Pollution Prevention Plan or SWPPP (formerly known as the Storm Water Pollution Control Plan or SWPCP) Review and Acceptance for Industrial Facilities - *The Permittee shall:*

(i) Verify that all industrial and commercial facilities that initially discharge storm water associated with industrial activities into MCBH's Small MS4 are incorporated into the SWPPP to ensure the discharge of pollutants will be minimized to the maximum extent practicable, and

(ii) Update and implement the SWPPP to ensure the discharge of pollutants will be minimized to meet MCBH standards and the requirements in Appendix 1.

Part D.1.g.(7) Enforcement Policy for Industrial and Commercial Facilities and Activities *- The Permittee shall implement its own polices for enforcement and penalties for industrial and commercial facilities which have failed to comply. The policy shall be part of an overall escalating enforcement policy and must consist of the following:*

- *Conducting inspections.*
- *Issuance of written documentation to a facility representative within 30 calendar days of storm water deficiencies identified during inspection. Documentation must include copies of all field notes, correspondence, photographs, and sampling results, if applicable.*
- *A timeline for correction of the deficiencies.*
- *Provisions for re-inspection and pursuing enforcement actions, if necessary.*

In the event the Permittee has exhausted all available sanctions and cannot bring a facility or activity into compliance with its policies and this permit, or otherwise deems the facility or activity an immediate and significant threat to water quality, the Permittee shall provide e-mail notification to cleanwaterbranch@doh.hawaii.gov, Attn: Enforcement Section Supervisor within one (1) week of such determination. E-mail notification shall be followed by written notification and include a copy of all inspection checklists, notes, photographs, and related correspondence in pdf format (300 minimum dpi) in accordance with Part A.7 within two (2) weeks of the determination. In instances where an inspector identifies a facility that has not applied for the General Industrial Storm Water permit coverage or any other applicable NPDES permit, the Permittee shall provide email notification to the DOH within one (1) week of such determination.

Part D.1.g.(8) Training *- The Permittee shall provide training to staff on how to conduct industrial and commercial inspections, the types of facilities requiring NPDES permit coverage for storm water permit associated with industrial activity or any other applicable NPDES permit, components in a SWPPP for industrial facilities, BMPs and source control measures for industrial and commercial facilities, and inspection and enforcement techniques. This training shall be specific to the Permittee's activities, policies, rules, and procedures. Any updates to the training shall be included in the Annual Report. Permittee inspectors shall receive annual training. The Permittee shall maintain records of the annual training program onsite.*

10.1 Requirement to Implement BMPs

In accordance with the Hawaii Administrative Rules (HAR) Chapter 11-55, all industrial facilities with Standard Industrial Classification (SIC) Codes regulated in 40 CFR §122.26(b)(14)(i) through 122.26(b)(14)(ix) and 122.26(b)(14)(xi) are required to obtain National Pollutant Discharge Elimination System (NPDES) permit coverage for discharges of storm water runoff associated with an industrial activity. Typically, two types of permits may be obtained: (1) an individual NPDES permit and (2) general NDPES permit coverage under HAR 11-55 Appendix B.

Since MCBH is the owner of the industrial facilities and MS4, storm water discharges are not covered under the State's general permit in accordance with HAR 11-55 Appendix B.2.(a).(4). Therefore, industrial facilities at MCBH are covered under the MS4 Permit HI S000007.

In accordance with Section 3.2 of this SWMP Plan, all drainage connections, including connections from industrial and commercial facilities, will require review and approval of a Digging Work Clearance Permit

(DWCP). The DWCP application form is routed through the Environmental Compliance and Protection Division (ECPD), Facilities Engineering Maintenance Control Division (MCD) and other MCBH departments for review before final approval and issuance by Logistics Facilities Public Works Engineering (LFPE). The drainage connection approval requires industrial and commercial facilities and activities to implement site-specific BMPs from the facility SWPPP to prevent water quality violations to the MCBH MS4 system. Projects and facilities with approved DWCPs are subject to inspection and enforcement as described in the following sections.

MCBH has a dedicated team of Environmental Compliance Coordinators (ECC). ECCs are MCBH personnel designated as environmental liaisons between their activity or facility and ECPD. ECCs act as first responders in the event of an environmental compliance issue, such as accidental release or spill. ECCs are the primary points of contact for distributing environmental compliance policy and training information to MCBH tenants and facilities. All units are required to have a designated ECC and alternate ECC. ECCs are responsible for implementing BMPs at their facilities as well as BMP maintenance, inspections, storm water assessments and sampling, and corrective actions.

10.2 Inventory and Map of Industrial Facilities and Activities

ECPD has developed an inventory of industrial facilities and activities that is maintained in an industrial inventory database. The database is continually updated and is used to track the following information:

- Facility name and number;
- Street address;
- Priority Area
- Nature of business or activity;
- SIC code(s); and
- Principal storm water contact and State receiving water.

In accordance with the permit, the industrial database includes as a minimum the following types of facilities and activities:

- Municipal landfills (open and closed);
- Hazardous waste recovery, treatment, storage and disposal facilities;
- Facilities subject to Section 313 of the Emergency Planning and Community Right-to-Know Act, 42 U.S.C. 11023;
- Facilities subject to NPDES permit coverage which are adjacent to the Permittee’s facilities or discharge to the MS4; and
- Any other industrial facility that either MCBH or the State of Hawaii Department of Health (DOH) determines is contributing a substantial pollutant loading to the MS4.

Rather than conducting a Questionnaire Survey, ECPD conducted a comprehensive review of the facilities database to identify industrial activities for inclusion in the industrial inventory database.

The MCBH inventory of industrial facilities with priority rankings is included in the *Prioritized Area Plan for Industrial and Commercial Facilities* in Appendix 10-2. The industrial facilities with qualifying SIC codes identified in the MS4 Permit are included in Table 10-1. See Chapter 11, Industrial Facilities, for more information on the MCBH Industrial Facilities Program including the program organization, industrial activity categories, and SWPPPs.

ECPD is responsible for maintaining and updating the database and associated maps. An updated inventory and maps will be submitted to DOH each year in the storm water Annual Report.

10.3 Inventory and Map of Commercial Facilities and Activities

ECPD has developed an inventory of commercial facilities and activities that is maintained in a commercial inventory database. The database is continually updated and is used to track the following information:

- Facility Name and Number;
- Street Address;
- Priority Area;
- Nature of business or activity;
- Standard Industrial Classification (SIC) code(s); and
- Principal storm water contact and State receiving water.

The inventory will be sorted by priority areas (see Section 10.4). In accordance with the permit, the commercial inventory database includes, at a minimum, the following types of facilities and activities:

- Retail Gasoline Outlets;
- Retail Automotive Services, including Repair Facilities;
- Restaurants; and
- Any other commercial facility that either MCBH or DOH determines is contributing pollutants to the MS4 that may cause or contribute to an exceedance of State water quality standards.

Rather than conducting a Questionnaire Survey, ECPD conducted a comprehensive review of the facilities database to identify commercial activities for inclusion in the commercial inventory database.

The MCBH inventory of commercial facilities with priority rankings is included in the *Prioritized Area Plan for Industrial and Commercial Facilities* in Appendix 10-2. ECPD is responsible for maintaining and updating the database and associated maps. An updated inventory and maps will be submitted to DOH in the Annual Report.

10.4 Inspections of Industrial and Commercial Facilities and Activities

Inspections of industrial and commercial facilities and activities are conducted for the purpose of reducing, to the MEP, pollutants from entering the MS4. Industrial and commercial facilities are typically inspected by the designated ECC or the ECPD Compliance Inspection Team. Inspections of industrial facilities with SWPPPs are conducted by at least one member of the Storm Water Pollution Control Team which consists of the MCBH Storm Water Program Manager, designated ECC, and the Hazardous Material (HAZMAT) and Hazardous Material Minimization (HAZMIN) team.

The inspections will include:

- Assessment of the appropriateness and effectiveness of the BMPs implemented at a facility;

- Identification of illegal connections and illicit discharges into the MS4, potential sources of pollution, and deficiencies in BMP and/or SWPPP implementation;
- Education of facility owners about storm water-related issues and proper source control measures; and
- Identification of required corrective actions when deficiencies are identified.

ICDM Program inspectors are trained on a variety of topics, including sources of pollution, inspection and enforcement techniques, the types of industrial facilities requiring SWPPP implementation, and the general components of a SWPPP. Training is provided as necessary in support of the above and is discussed in Section 10.7 of this SWMP Plan.

ICDM Program inspectors use the Industrial and Commercial Facility Inspection Checklist (See Appendix 10-1) to document findings during inspections. Inspection results are documented in the industrial and commercial database. Additionally, inspection reports, with accompanying photographs, are kept on ECPD's share drive. Deficiencies are documented on an ICDM deficiency database. Records of inspections are maintained for a minimum of five (5) years. MCBH submits semi-annual inspection reports to DOH for industrial and commercial inspections conducted during the previous term by October 31st and April 30th of each year. The inspection terms span from January 1st to June 30th and July 1st to December 31st, respectively. All inspections are conducted in accordance with the applicable portions of the *NPDES Compliance Inspection Manual* (USEPA 305-X-04-001).

If an ICDM Program inspector identifies a facility with a qualifying SIC code discharging industrial storm water that is not included in the inventory of industrial facilities, ECPD will provide e-mail notification to DOH within 30 days of such determination. ECPD will add the facility to the inventory of industrial facilities and activities and develop a SWPPP for the facility.

10.4.1 Prioritized Areas

ECPD has designated priority areas for industrial and commercial facility and activity inspections, based on the relative risk that any discharge might be contaminated with pollutants. Specific priority areas and inspection schedules are designated under the *Prioritized Area Plan for Industrial and Commercial Facilities* (See Appendix 10-2). On an annual basis, ECPD modifies the *Prioritized Area Plan for Industrial and Commercial Facilities* based on updated information from its industrial and commercial inventory, findings from previous inspections, the number of industrial and commercial facilities in the area, the density of these facilities, previous storm water violations in the area, and water quality impairments in the area. The updated *Prioritized Area Plan for Industrial and Commercial Facilities* will be submitted with the storm water Annual Report, if necessary.

Industrial and commercial facilities and activities identified in the industrial and commercial inventories are inspected and re-inspected as often as necessary based on previous findings to ensure corrective action was taken and the deficiency was resolved.

Each industrial facility that is not included in the industrial facility list in Table 10-1 is inspected at least twice every five (5) years. Industrial facilities in Table 10-1, that have NPDES permit coverage, are inspected at least once every five (5) years.

Any industrial facility discharging Industrial Storm Water as defined by 40 CFR Part 122.26(b)(14) that is not included in Table 10-1 shall be reported to the DOH within 30 calendar days of the inspection.

Commercial dischargers are ranked according to relative risk of discharge of contaminated runoff to the MCBH MS4. Highly ranked commercial facilities are inspected at least once every five (5) years. The *Prioritized Area Plan for Industrial and Commercial Facilities* contains the priority ranking of the industrial and commercial facilities and corresponding inspection frequency and schedule.

An inspection status report will be submitted to DOH as part of the storm water Annual Report. The status report identifies the numbers of industrial and commercial facilities discharging into the MS4 and the number of inspections that have been completed during the prior permit term.

10.5 SWPPP Review and Acceptance for Industrial Facilities

As presented in Section 10.1 above, industrial facilities at MCBH are covered under the MS4 Permit HI S000007. Industrial facilities that fall under qualifying SIC codes were identified in Part E.1 of the Permit.

Four additional facilities have been identified by MCBH for additional coverage under the MS4 Permit. Facilities 3073, 6892, 4050, and 1295 are vehicle and aircraft maintenance facilities. Facility-specific SWPPPs for the additional maintenance facilities have been developed and are included in Appendix 11-2. The list of qualifying industrial facilities is presented in Table 10-1 below.

SWPPPs for industrial facilities with qualifying SIC codes have been developed and are presented in Appendix 11-2. To develop the SWPPPs, inspections of the facilities were conducted, and the facility managers were interviewed regarding activities and existing BMPs. Facility SWPPPs have been created for all industrial facilities identified in the MS4 Permit that discharge storm water associated with specific industrial activities into MCBH's Small MS4.

The SWPPPs contain site-specific BMPs to minimize the discharge of pollutants to the MEP. The SWPPPs contain control measures, routine inspections, storm water discharge visual assessments, required monitoring, corrective actions, and recordkeeping procedures in accordance with the SWPPP requirements in Appendix 1 of the MS4 Permit.

Table 10-1
Industrial Facilities Covered Under MS4 Permit HI S000007

Building No.	General Category	Description
P-3 Apron	Maintenance	Aircraft Wash Facility
132	Utility	Recycle Center
1698	Maintenance	Small Boat Repair Shop
351	Maintenance	Vehicle Maintenance Shop
6874	Maintenance	3rd Radio Battalion
1170, 1171	POL Storage	Aircraft Fuel Islands
1252, 1253	Storage	Fuel Division Supply Department
6801	Maintenance	Lab/Boat Shop
1619	Maintenance	Ground Support Equipment Shop
1631	Maintenance	Aircraft Wash & Rinse Facility
6107	Maintenance	Aircraft Rinse Facility
6182	Storage	Fuel Delivery Branch & Refueler Truck Parking
6183	Maintenance	Engine Test Facility
6479	Storage	Aircraft Ready Fuel Storage
Sanitary Landfill	Sanitary Landfill	Sanitary Landfill
Water Reclamation Facility (WRF)	Utility	Water Reclamation Facility
3014	Maintenance	Combat Logistics Battalion (CLB-3) Support Company Transportation services
5011	Maintenance	12th Marine Motor T
3073	Maintenance	Helicopter Wash Facility
6892	Maintenance	Aircraft Wash Facility
4050	Maintenance	Golf Cart Barn
1295	Maintenance	Golf Course Maintenance Shop

10.6 Enforcement

MCBH has established an enforcement policy for the overall SWMP including industrial and commercial activities and facilities. Types of deficiencies, enforcement actions, and reporting procedures are presented in the *Enforcement Response Plan* in Appendix 3-4.

Due to the organizational structure of MCBH, the most effective means for enforcement is escalation of unaddressed violations to the next higher authority. Regardless of the type of violation, the ultimate penalty for non-compliance with the MS4 Permit regulations is eviction or discharge of the responsible party from MCBH. This action is placed at the discretion of the Base Commanding Officer.

10.7 Training

ICDM Program inspections are performed by at least one member of the Storm Water Pollution Control Team which consists of the MCBH Storm Water Program Manager, designated ECC, and the HAZMAT and HAZMIN team. In addition to ECC training, ICDM Program inspectors are trained to conduct industrial and commercial inspections.

The ICDM Program inspection training is provided to ICDM Program staff including ECCs on an as-needed basis or at least annually. The training includes a review of applicable sections of the *NPDES Compliance Inspection Manual* (EPA 305-X-04-001), dated July 2004. The content of the training includes:

- Inspection and enforcement techniques;
- Identifying deficiencies during inspections of industrial and commercial facilities and activities;
- Assessing potential impacts to receiving waters;
- BMPs and source control measures for industrial and commercial facilities to reduce storm water pollution;
- Evaluating the appropriateness and effectiveness of BMPs;
- Types of industrial facilities covered by the Permit or any other applicable NPDES Permit;
- Components of a SWPPP for industrial facilities; and
- Forms and/or processes for documenting inspections of industrial and commercial facilities and activities.

The training is specific to MCBH’s activities, policies, rules, and procedures. Any updates to the training program will be submitted to in the storm water Annual Report.

11 Industrial Facilities

Per Part E of the MS4 Permit, MCBH is required to ensure that the industrial facilities covered under the MS4 Permit are in compliance with its requirements, and those in the Hawaii Administrative Rules (HAR), Chapter 11-55, Appendix B. The overall objective of this Industrial Facilities Program is to reduce pollutants from MCBH facilities, classified as industrial in accordance with 40 CFR §122.26(b)(14), to the maximum extent practicable (MEP).

At a minimum, pollutants are to be reduced to the appropriate discharge limitations subject to the Best Available Technology Economically Achievable/Best Conventional Pollutant Control Technology (BAT/BCT) discharge requirement, consistent with the Clean Water Act (CWA) and other applicable federal and state requirements.

The specific objectives of the Industrial Facilities Program are to:

1. Ensure that the industrial facilities covered by the MS4 Permit are in compliance with its requirements.
2. Provide a facility-specific Storm Water Pollution Prevention Plan (SWPPP) for each industrial facility covered by the MS4 Permit.
3. Designate an individual from each industrial facility to receive appropriate training and be accountable for ensuring implementation of the facility specific SWPPP.
4. Inform the State of Hawaii Department of Health (DOH) of any changes to the list of industrial facilities (i.e., either adding or removing a facility).

As described in Section 10.1 of this SWMP Plan, the U.S. Environmental Protection Agency (EPA) only requires permits for the discharge of storm water for specific types of industrial activities, in accordance with 40 CFR §122.26(b)(14). Per HAR Chapter 11-55, all industrial facilities with Standard Industrial Classification (SIC) Codes regulated in 40 CFR §122.26(b)(14)(i) through 122.26(b)(14)(ix) and 122.26(b)(14)(xi) are required to obtain National Pollutant Discharge Elimination System (NPDES) permit coverage for discharges of storm water runoff associated with an industrial activity. Those industries requiring storm water permits are described in one of two ways: by a narrative description or by a SIC code.

Requirement to obtain permit is based on SIC code for primary site activity. This means that, if the listed activity is not the primary site activity, it does not need a permit. A “primary site activity” is considered to be the principal industrial activity in which a facility or plant engages in. The “site” is considered to be the area or areas immediately surrounding the plant or facility where the industrial activity takes place. Excluded from the term “site” are areas located on facility or plant lands separate from the facility or plant’s industrial activities, such as office buildings and accompanying parking lots, as long as drainage from the excluded area is not mixed with storm water drained from the facility or plant defined as the primary site activity. Permit requirements for activities described by a narrative definition are considerably more stringent because any of the described activity occurring on site would require regulation.

For purposes of this SWMP Plan, five broad categories of industrial activity are described by the narrative definition as an industrial activity and are subject to permit for discharges of storm water associated with the facility and need for SWPPPs:

- 40 CFR Subchapter N Industries;
- Landfills;
- Steam Power Generation Facilities;
- Sewage Treatment Plants; and
- Hazardous Waste Treatment, Storage, and Disposal Facilities.

Five general categories of industrial activity are described by SIC codes:

- Heavy Manufacturing;
- Light Manufacturing;
- Mining;
- Recyclers; and
- Industrial Transportation.

HAR Chapter 11-55, Appendix B authorizes storm water discharges associated with industrial activities from the following facilities:

1. *Facilities Subject to Storm Water Effluent Limitations Guidelines*: Facilities subject to storm water effluent limitations guidelines, new source performance standards, or toxic pollutant effluent standards under 40 CFR Subchapter N (except facilities with toxic pollutant effluent standards that are exempted under categories (i) to (ix) and (xi) of this definition). The categories of facilities specified in 40 CFR Subchapter N currently are: Cement Manufacturing (40 CFR 411), Feedlots (40 CFR 412), Fertilizer Manufacturing (40 CFR 418), Petroleum Refining (40 CFR 419), Phosphate Manufacturing (40 CFR 422), Steam Electric (40 CFR 423), Coal Mining (40 CFR 434), Mineral Mining and Processing (40 CFR 436), Ore Mining and Dressing (40 CFR 440), and Asphalt Emulation (40 CFR 443).

2. *Manufacturing Facilities*: SICs 24 (except 2434), 26 (except 265 and 267), 28 (except 283 and 285), 29, 311, 32 (except 323), 33, 3441, and 373.

3. *Oil and Gas/Mining Facilities:* SICs 10 through 14 including active or inactive mining operations and oil and gas exploration, production, processing, or treatment operations, or transmission facilities that discharge storm water contaminated by contact with or that has come into contact with any overburden, raw material, intermediate products, finished products, by-products or waste products.

4. *Hazardous Waste Treatment, Storage, or Disposal Facilities:* Includes those operating under interim status or a permit under Subtitle C of the Resource Conservation and Recovery Act (RCRA).

5. *Landfills, Land Application Sites, and Open Dumps*: Sites that receive or have received industrial waste from any of the facilities described in this subsection, sites subject to regulation under Subtitle D of RCRA.

6. *Recycling Facilities:* SICs 5015 and 5093. These codes include metal scrapyards, battery reclaimers, salvage yards, and automobile junkyards, including but limited to those classified as:

    SIC 5015 - Motor Vehicle Parts, Used

    SIC 5093 - Scrap and Waste Materials

7. *Steam Electric Power Generating Facilities*: Includes coal handling sites.
8. *Transportation Facilities:* SICs 40, 41, 42 (except 4221-25), 43, 44, 45, and 5171 which have vehicle maintenance shops, equipment cleaning operations, or airport deicing operations. Only those portions of the facility involved in vehicle maintenance (including vehicle rehabilitation, mechanical repairs, painting, fueling, and lubrication), equipment cleaning operations, airport deicing operations, or other operations identified herein that are associated with industrial activity.
9. *Sewage or Wastewater Treatment Works:* Treatment works treating domestic sewage or any other sewage sludge; or wastewater treatment device or system used in the storage, treatment, recycling, and reclamation of municipal or domestic sewage, including land dedicated to the disposal of sewage sludge that are located within the confines of the facility, with a design flow of one million gallons per day or more, or required to have an approved pretreatment program under 40 CFR Part 403. Not included are farmlands, domestic gardens, or lands used for sludge management where sludge is beneficially reused and which are not physically located in the confines of the facility, or areas that are in compliance with Section 405 of the CWA.
10. *Manufacturing Facilities Where Materials are Exposed to Storm Water:* SICs 20, 21, 22, 23, 2434, 25, 265, 267, 27, 283, 285, 30, 31, (except 311), 323, 34 (except 3441), 35, 36, 37 (except 373), 38, 39, and 4221-25.

A quick reference guide with the SIC codes for industrial facilities that require inclusion in the MS4 Permit in accordance with HAR Chapter 11-55, Appendix B and 40 CFR §122.26(b)(14) is provided in Appendix 11-1.

The Industrial Facilities Program is outlined in accordance with the MS4 Permit requirements. The MS4 Permit states:

Part E. Industrial Facilities

> ***"Part E.1. -*** *The industrial facilities covered under this permit shall comply with the requirements in Appendix 1 – Storm Water Associated with Industrial Activities.*

Building No.	**General Category**	**Description**
P-3 Apron	Maintenance	Aircraft Wash Facility
132	Utility	Recycle Center
1698	Maintenance	Small Boat Repair Shop
351	Maintenance	Vehicle Maintenance Shop
6874	Maintenance	3rd Radio Battalion

Building No.	General Category	Description
1170, 1171	POL Storage	Aircraft Fuel Islands
1252, 1253	Storage	Fuel Division Supply Department
6801	Maintenance	Lab/Boat Shop
1619	Maintenance	Ground Support Equipment Shop
1631	Maintenance	Aircraft Wash & Rinse Facility
6107	Maintenance	Aircraft Rinse Facility
6182	Storage	Fuel Delivery Branch & Refueler Truck Parking
6183	Maintenance	Engine Test Facility
6479	Storage	Aircraft Ready Fuel Storage
Sanitary Landfill	Sanitary Landfill	Sanitary Landfill
Water Reclamation Facility	Utility	Water Reclamation Facility
3014	Maintenance	Combat Logistics Battalion (CLB-3) Support Company Transportation Services
5011	Maintenance	12th Marine Motor T

Part E.2. - *An individual at each facility (e.g., yard foreman) shall be charged with ensuring implementation of the Storm Water Pollution Prevention Plan (SWPPP). This individual shall be trained to implement the SWPPP, including but not limited to, collecting storm water samples and analyzing samples for temperature and pH, conducting inspections, identifying deficiencies and performing corrective actions.*

Part E.3. - *The Permittee shall implement SWPPPs for facilities listed in Part E.1. of this permit. The SWPPPs shall identify site-specific BMPs and be user-friendly for facility personnel. The SWPPP shall contain all information required under Appendix 1, Part 5.2.*

Part E.4. - *The Permittee shall retain the SWPPP, and all subsequent revisions, on-site or at a nearby office.*

Part E.5. - *The Permittee shall conduct facility inspections as specified in Federal Register, Vol. 73, No. 189, pages 56572-56578, dated September 29, 2008; to ensure that the storm water pollution prevention plan remains effective. Otherwise, the Permittee shall conduct facility inspections at least quarterly. The Permittee shall maintain a record of the following:*

(1) Dates on which inspections were conducted;
(2) Inspection findings; and
(3) Corrective actions taken.

Part E.6. - *The Permittee shall continue regular coordination and storm water quality data sharing between Departments with facilities having SWPPPs and with the Environmental Compliance and Protection Department.*

11.1 Program Organization

Implementation of facility specific SWPPPs is primarily the responsibility of the facility manager. The MCBH Environmental Compliance and Protection Division (ECPD) is responsible for general program oversight, and for identifying facilities that should be added or removed from MS4 Permit coverage.

The Industrial and Commercial Discharge Management (ICDM) Program is discussed in Chapter 10. The Industrial Facilities Program is part of the overarching ICDM Program policies on new connections, priority area designation, staff training, and enforcement procedures. Refer to Chapter 10 for details on the overall ICDM Program components.

Oversight of the Industrial Facilities Program also involves oversight of the Monitoring Program described in Chapter 12. ECPD prepares the storm water Annual Report and Annual Monitoring Report to provide annual updates of SWMP activities including monitoring data, SWPPP revisions, as required, and status of inspections. The Base Commanding Officer (CO) maintains ultimate authority to revise program policies or to direct enforcement actions.

11.2 Facility-specific Storm Water Pollution Control Plans

MCBH has conducted site visits of all industrial facilities covered by the MS4 Permit. SWPPPs have been developed and implemented accordingly to meet the requirements specified in HAR Chapter 11-55, Appendix B, Section 6 and Appendix 1 of the MS4 Permit. Table 11-1 is the list of industrial facilities at MCBH. This list includes the 18 industrial facilities identified by the MS4 Permit and four additional facilities identified by MCBH for coverage under the Permit.

Appendix 11-2 of this SWMP Plan contains the SWPPPS for all industrial facilities covered by the MS4 Permit. The SWPPS are ordered as shown in the list of industrial facilities provided in Table 11-2-1. Figure 11-2-1 in Appendix 11-2 is a map showing the locations of all facilities covered by the MS4 Permit.

To develop the SWPPPs, inspections of all of facilities were conducted and the facility managers were interviewed regarding activities and existing best management practices (BMPs). Each facility SWPPP contains the following elements:

- Storm water pollution control team;
- Site description;
- Summary of potential pollutant sources;
- Description of control measures;
- Schedules and procedures;
- Documentation to support eligibility considerations under other federal laws; and
- Signature requirements.

BMPs specific to the facility’s activities and detailed BMP fact sheets in Appendix A of the SWPPP. The Routine Facility Inspection Checklist and Quarterly Visual Assessment Checklist are included in SWPPP Appendix B and Appendix C. A Corrective Action Log is contained in the SWPPP’s Appendix D.

Copies of the updated SWPPPs have been provided to each industrial facility. The facility manager has reviewed the SWPPP and accepted the changes. ECPD has verified that facility managers have received the required training and have been given the responsibility of implementing all practices indicated within the SWPPP. Each updated SWPPP has been implemented upon submittal of this SWMP Plan to DOH. The facility manager will ensure that a copy of the SWPPP is available onsite at all times.

Environmental Compliance Coordinators (ECCs) are MCBH personnel designated as environmental liaisons between their activity or facility and ECPD. All units are required to have a designated ECC and alternate ECC. The ECC is the primary point of contact for storm water related items and the day-to-day environmental matters at a specific facility. ECCs are responsible for SWPPP implementation including BMP and facility inspections, storm water assessments and sampling, BMP maintenance, and corrective actions.

SWPPPs will be reviewed as needed, at a minimum of once annually, and will be updated accordingly by ECPD. Any changes will be provided to the corresponding facility manager for review and acceptance before it is submitted to DOH.

11.2.1 Inspections, Assessments, and Monitoring

ECPD has developed a *Prioritized Area Plan for Industrial and Commercial Facilities* designating the priority areas for industrial and commercial facility and activity inspections. The priority areas are based on the relative risk that any discharge might be contaminated with pollutants. The *Prioritized Area Plan for Industrial and Commercial Facilities* is included in Appendix 10-2 and details the priority areas and corresponding inspection frequencies and schedules.

The MS4 Permit requires routine quarterly site inspections of industrial facilities identified in the Permit. Inspections of industrial facilities are conducted by at least one member of the Storm Water Pollution Control Team which consists of the MCBH Storm Water Program Manager, designated ECC, and the Hazardous Material (HAZMAT) and Hazardous Material Minimization (HAZMIN) team. Industrial facilities are typically inspected by the designated ECC or the ECPD Compliance Inspection Team.

The routine quarterly inspection evaluates the effectiveness of the BMPs implemented at that facility. The inspector documents observations and corrective actions using the Routine Facility Inspection Checklist included in the SWPPP for each inspection.

The MS4 Permit also requires a quarterly visual assessment of storm water discharge for all industrial facilities identified in the Permit. The quarterly visual assessment is usually performed by the facility ECC. Storm water samples are collected from sampling points designated in the SWPPP to ensure that the samples are representative of the storm water discharge from the facility. Observations and an evaluation of the discharge is documented on the Quarterly Visual Assessment Checklist included in the SWPPP. If there is evidence of storm water pollution, corrective action procedures to remedy the pollutants must be taken.

Refer to Chapter 12, Monitoring Program, for more information on storm water sampling and analysis including quarterly visual assessments, annual effluent monitoring, and quarterly benchmark monitoring. Annual effluent monitoring sampling is conducted at one industrial location, the Sanitary Landfill. Sector-specific quarterly benchmark sampling is conducted at four industrial facilities: the Sanitary Landfill, Recycle Center, Small Boat Repair Shop, and Building 6802.

Chapter 12 details the procedures for performing wet weather sampling and analysis and describes sampling locations, analytical parameters, sampling methods, protocols, and the sampling schedule.

11.3 Changes to Industrial Facilities Covered by the MS4 Permit

Four additional facilities have been identified by MCBH for additional coverage under the MS4 Permit. Facilities 3073, 6892, 4050, and 1295 are vehicle and aircraft maintenance facilities. Facility-specific SWPPPs for the additional maintenance facilities have been developed and are included in Appendix 11-2. See Table 11-1 for a complete list of industrial facilities at MCBH covered by the MS4 Permit.

There have been no facilities identified as qualifying for a Conditional “No Exposure” Exclusion from NPDES Storm Water Associated with Industrial Activity permitting.

If a change to the industrial facility coverage is observed in the future, ECPD will follow the applicable procedures outlined in the MS4 Permit, Parts E.3 and E.5. In accordance with Appendix 1, Section 7.7 of the Permit, ECPD will notify DOH no fewer than 30 days prior to making any planned physical alterations or additions to the permitted facility that qualify the facility as a new source or that could significantly change the nature or significantly increase the quantity of pollutants discharged. In addition, if a listed facility changes use (i.e., SIC code change that does not require permit coverage) or is no longer in use, ECPD will notify DOH via the Annual Report of the facility to be removed from the inventory of industrial facilities.

Table 11-1
Industrial Facilities at MCBH

No.	Building No.	General Category	Description
1	P-3 Apron	Maintenance	Aircraft Wash Facility
2	132	Utility	Recycle Center
3	1698	Maintenance	Small Boat Repair Shop
4	351	Maintenance	Vehicle Maintenance Shop
5	6874	Maintenance	3rd Radio Battalion
6	1170, 1171	POL Storage	Aircraft Fuel Islands
7	1252, 1253	Storage	Fuel Division Supply Department
8	6801	Maintenance	Lab/Boat Shop
9	1619	Maintenance	Ground Support Equipment Shop
10	1631	Maintenance	Aircraft Wash & Rinse Facility
11	6107	Maintenance	Aircraft Rinse Facility
12	6182	Storage	Fuel Delivery Branch & Refueler Truck Parking
13	6183	Maintenance	Engine Test Facility
14	6479	Storage	Aircraft Ready Fuel Storage
15	Sanitary Landfill	Sanitary Landfill	Sanitary Landfill
16	Water Reclamation Facility	Utility	Water Reclamation Facility
17	3014	Maintenance	Combat Logistics Battalion (CLB-3) Support Company Transportation Services
18	5011	Maintenance	12th Marine Motor T
19	3073	Maintenance	Helicopter Wash Facility
20	6892	Maintenance	Aircraft Wash Facility
21	4050	Maintenance	Golf Cart Barn
22	1295	Maintenance	Golf Course Maintenance Shop

12 Monitoring Program

12.1 Introduction

In accordance with its MS4 Permit No. HI S00007, which covers all storm water discharges to its MS4 and specified discharges associated with industrial activities, MCBH is required to conduct annual monitoring. Annual monitoring will be used to evaluate the effectiveness of MCBH's SWMP and compliance with its MS4 Permit. As detailed further in this section, the MS4 Permit requires that MCBH submit an Annual Monitoring Plan (Monitoring Plan) to the State of Hawaii Department of Health (DOH), by June 1st of each year, and an Annual Monitoring Report, by January 30th of each year to describe events of the past fiscal year.

This Monitoring Program outlines the technical and management procedures that MCBH will implement to meet its annual monitoring requirements. All monitoring described in this program are required by the National Pollutant Discharge Elimination System (NPDES) storm water permit and/or state and federal storm water regulations. The MS4 Permit requires regulated entities to monitor storm water discharges associated with industrial activities. Storm water samples must be collected and monitoring activities documented consistent with the procedures described in Part 6, Hawaii Administrative Rules (HAR) Chapter 11-55, Appendix A, Subsections 14 and 16, must be sufficiently sensitive as defined at 40 CFR 122.21(e)(3) and 122.44(i)(1)(iv) and any additional sector-specific requirements in Appendix 1, Part 8 of the Permit. Sector specific requirements include annual effluent limitations guidelines monitoring and quarterly benchmark monitoring. All other permitted industrial locations require quarterly visual assessments. The objective of this Monitoring Program is to guide the implementation of MCBH's annual monitoring requirements.

A brief summary of the types of information contained in this Monitoring Program includes:

- Representative Monitoring Locations and Outfall Selection Criteria;
- Quarterly benchmark screening criteria;
- Quarterly visual assessment procedures;
- Storm Event Selection Criteria;
- Wet Weather Sampling and Analysis;
- Prioritized Monitoring Schedule;
- Methods and Procedures;
- Inspections and Observations;
- Quality Assurance/Quality Control Plan;
- Methods to Document Best Management Practice (BMP) Effectiveness;
- Training MCBH Staff in Sampling;
- Monitoring Program Evaluation; and
- Annual Reporting and Recordkeeping.

MCBH's Monitoring Plan and Annual Monitoring Report will be prepared in accordance with the MS4 Permit requirements. This Monitoring Program outlines how these documents will be used to meet these requirements. The MS4 Permit states:

<u>"Part F.1 Annual Monitoring Plan</u>

Part F.1.a *The Permittee shall submit the Annual Monitoring Plan to the DOH by June 1st of each year for review and acceptance. The Annual Monitoring Plan shall be implemented over the coming fiscal year.*
The monitoring program must be designed and implemented to meet the following objectives:

Part F.1.a.(1) *Assess compliance with this permit (including TMDL Implementation & Management (I&M) Plans and demonstrating consistency with wasteload allocations (WLAs), if required);*

Part F.1.a.(2) *Measure the effectiveness of the Permittee's SWMP;*

Part F.1.a.(3) *Assess the overall health based on the chemical, physical, and biological impacts to receiving waters resulting from storm water discharges and an evaluation of the long term trends;*

Part F.1.a.(4) *Characterize storm water discharges;*

Part F.1.a.(5) *Identify sources of specific pollutants;*

Part F.1.a.(6) *Detect and eliminate illicit discharges and illegal connections to the MS4; and*

Part F.1.a.(7) *Assess the water quality issues in watershed resulting from storm water discharges to receiving waters.*

Part F.1.b *The plan shall, at a minimum, include the following items:*

Part F.1.b.(1) *Written narrative of the proposed monitoring plan's objectives, including but not limited to the objectives identified in Part F.1.a, and description of activities;*

Part F.1.b.(2) *The monitoring locations on a sampling location map with an explanation of why the location was selected and the identification of the pollutants of concern for each of the sampling locations.*

Part F.1.b.(3) *The Permittee shall develop a priority based monitoring schedule for each type of industrial area or facility consistent with Part D.1.g.(4) of this permit. The monitoring schedule will prioritize facilities or areas with the greatest potential of pollutant discharge. The facilities or areas ranked first within each type shall be monitored annually. Industrial facilities not ranked first shall be monitored on a rotational basis (at least two facilities monitored per year per type). The Plan shall provide the rationale for the priority rankings, identify the types of industry and the priority facilities within each industry, and provide a monitoring schedule for the rotational monitoring of industrial facilities. Industrial and commercial facilities shall comply with the monitoring requirements in Appendix 1, Part 6.*

Part F.1.b.(4) *For each activity, a description of how the results will be used to determine compliance with this permit.*

Part F.1.b.(5) *Identification of management measures proven to be effective and/or ineffective at reducing pollutants and flow.*

Part F.1.b.(6) *Written documentation of the following:*

(i) Characteristics (timing, duration, intensity, total rainfall) of the storm event(s);
(ii) Parameters for measured pollutant loads; and
(iii) Range of discharge volumes to be monitored, as well as the timing, frequency, and duration at which they are identified;

Part F.1.b.(7) *Written documentation of the analytical methods to be used;*

Part F.1.b.(8) *Written documentation of the Quality Assurance/Quality Control procedures to be used; and*

Part F.1.b.(9) *Estimated budget to be implemented over the coming fiscal year.*

Part F.2. *Storm Water Associated with Industrial Activities*

Part F.2.a*. Industrial and commercial facilities shall be inspected in accordance with Appendix 1, Part 3 and the industry sector-specific requirements in Appendix 1, Part 8.*

Part F.2.b. *Effluent Limitations*
The Permittee shall monitor the storm water runoff at the facilities listed in Part E.1. in accordance with Appendix 1, Part 6 and the industry sector specific requirements in Appendix 1, Part 8. All pollutant parameters shall be analyzed according to test procedures described in Appendix 1, Part 6.

Part F.2.b.(1) *Effluent Limitations Monitoring: Sector L – Landfills, Land Application Sites, and Open Dumps. Effluent limitations for storm water associated with industrial activity from Sector L – Landfills, Land Application Sites, and Open Dumps are listed in Appendix 1, Part 8.L.10 and are shown in Table F-1. An exceedance of the effluent limitation is a permit violation.*

Part F.2.c. *Sector-Specific Benchmarks*
The Permittee shall monitor the storm water runoff at the facilities listed in Part E.1. in accordance with Appendix 1, Part 6 and the industry sector-specific requirements in Part 8. Benchmark monitoring data are primarily for your use to determine the overall effectiveness of your control measures and to assist you in determining when additional corrective action(s) may be necessary. A benchmark exceedance is not a permit violation, however, if corrective action is required as a result of a benchmark exceedance, failure to conduct required corrective action is a permit violation.

Part F.2.c.(1) *Benchmark Monitoring: Sector L – Landfills, Land Application Sites, and Open Dumps. Benchmark monitoring for storm water associated with industrial activity from Sector L – Landfills, Land Application Sites, and Open Dumps are listed in Appendix 1, Part 8.L.9 and are shown in section 12.3.3.*

Part F.2.c.(2) *Benchmark Monitoring: Sector N – Scrap Recycling and Waste Recycling Facilities.*

Benchmark monitoring for storm water associated with industrial activity from Sector N – Scrap Recycling and Waste Recycling Facilities are listed in Appendix 1, Part 8.N.6 and are shown in section 12.3.3

Part F.2.c.(3) *Benchmark Monitoring: Sector Q – Water Transportation. Benchmark monitoring for storm water associated with industrial activity from Sector Q – Water Transportation are listed in Appendix 1, Part 8.Q.6 and are shown in section 12.3.3*

12.1.1 Monitoring Plan Background

MCBH's Monitoring Program consists of two types of monitoring: (1) sampling and laboratory analysis for sector specific sites and (2) quarterly wet weather visual observations. The Annual Monitoring Plan describes in detail the sampling procedures, laboratory analysis and required documentation. Detailed information on wet and dry weather visual observations is contained in Chapter 3, Illicit Discharge Detection and Elimination.

The Annual Monitoring Plan includes:

- Monitoring Plan objectives and description of activities for that year.
- Representative monitoring locations, pollutants of concerns, and justification of each site.
- Priority based monitoring schedule.
- Description of how monitoring results will be used to determine compliance with the MS4 Permit.
- Evaluation of BMPs that have been implemented.
- Detailed documentation of sampling events including:
  - Storm event selection;
  - Parameters for measured pollutant loads;
  - Discharge volumes, as well as timing, frequency, and duration identified;
  - Analytical methods used;
  - Quality Assurance/Quality Control procedures; and
  - Estimated budget for the coming fiscal year.

The MS4 Permit establishes narrative effluent limitations for the effective prohibition, to the maximum extent practicable (MEP), of non-storm water discharges through the permitted storm drain system throughout the entire MS4. Additionally, the MS4 Permit establishes narrative and numerical receiving water limitations for specific industrial facilities. These discharge limitations constitute the use of best conventional pollutant control technology (BCT) or best available technology economically achievable (BAT) to manage storm water to the MEP associated with industrial activity and must be satisfied to comply with MS4 Permit No. HI S000007.

Although Total Maximum Daily Loads (TMDLs) and waste load allocations (WLAs) are not currently part of the MS4 Permit, each subsequent Monitoring Plan must incorporate any such limits that may be developed during the permit period.

MCBH's Monitoring Program includes storm water discharge monitoring locations associated with all industrial activities specified in the MS4 Permit. These sampling locations are representative of the most significant routine activities that occur on base.

As required by the MS4 Permit, these monitoring locations shall be designated using a priority based ranking system per industrial type. Industrial types are defined by Standard Industrial Classification (SIC) codes that have been assigned to each industrial facility in accordance with its primary industrial activity. SIC codes are described in further detail in Chapter 11 "Industrial Facilities." Only one site, the Sanitary Landfill is required by the Permit to conduct sector specific effluent limitations monitoring and quarterly benchmark monitoring. Three other sites, the Scrap Metal Recycling Facility (Building 132), Waterfront Operations (WFO) Lab/Boat Shop (Building 6802) and the Small Boat Repair Shop (Building 1698), are required to conduct quarterly benchmark monitoring only. All industrial sites require quarterly visual assessments.

Monitoring will be conducted by the permit required testing frequency as discussed in the previous paragraph and in Appendix 1, Part 6 of the Permit. The MS4 Permit also requires facility prioritization and describes how monitoring should be conducted based on that prioritization. According to the Permit, sites ranked first shall be monitored annually and the remaining shall be monitored on a rotational basis. Since there is only one site identified in Part F.2 which requires annual monitoring, MCBH will not be required to rotate lower priority sites. However, prioritization and ranking of sites are presented in this plan as per the Permit, Part F.1.b.(3).

Highest priority ranked sites, with rationale for selection as primary sampling location, include:

- LF-1 Sanitary Landfill – DOH defined priority Sector L
- 132 Recycling Center – DOH defined priority Sector N
- 6802 Waterfront Operations (WFO) Lab/Boat Shop DOH defined priority Sector Q
- 1698 Small Boat Repair Shop DOH defined priority Sector Q

Secondary permitted locations:

- Aircraft Wash and Rinse Facility, Building 1631
- Vehicle Maintenance Shop, Building 351
- 3rd Radio Battalion, Building 6874
- Aircraft Fuel Islands, Buildings 1170 and 1171
- Storage Fuel Division Supply Department, Building 1252, 1253
- Ground Support Equipment Shop, Building 1619
- Maintenance Aircraft Rinse Facility, Building 6107
- Fuel Delivery Branch and Refueler Truck Parking, Building 6182
- Engine Test Facility, Building 6183
- Aircraft Ready Fuel Storage, Building 6479
- Water Reclamation Facility, WRF
- Combat Logistics Battalion (CLB-3) Support Company Transportation Services, 3014
- 12th Marine Motor T, Building 5011
- Helicopter Wash Facility, Building 3073
- Aircraft Wash Facility, Building 6892

- Golf Course Maintenance Shed, Building 1295
- Sanitary Landfill Tire Wash Area

The Monitoring Program also has reporting and recordkeeping requirements, which are described in Section 12.7. Section 12.7 includes guidance for collecting and maintaining records of MCBH's Monitoring Program information. It also includes specific information on Annual Monitoring Report requirements, and duration in which all Monitoring Program data and information must be kept at the MCBH Environmental Compliance and Protection Division (ECPD).

12.1.2 Annual Monitoring Plan Objectives

MCBH's monitoring under the MS4 Permit provides a consistent ongoing assessment of the progress and results of the overall storm water program. Much of the SWMP Plan stresses the implementation of qualitative BMPs, while the Monitoring Program is intended to quantify the results of storm water management efforts. The DOH's NPDES Storm Water Permit program is intended to establish and achieve a baseline level of monitoring and a basis for consistent comparison: (1) among sites in the same industry but in different locations and (2) at a given site in one location over time. The monitoring approach allows the use of visual observations to supplement resource-intensive sampling and analytical monitoring. Visual requirements are discussed in Sections 12.3 and 12.4 and Chapter 3 of the SWMP Plan.

Sampling and analyses are defined for specific sectors in accordance with the MS4 Permit No. HI S000007. These are intended to provide a baseline level of pollutant data in a cost-effective manner. Because pollutant concentrations in storm water samples have been found to vary substantially within and between storm events, it is not clear that trends will be seen in monitoring data until years of data have been gathered. The process of evaluating the "effectiveness" of BMPs in controlling storm water pollutants, and of the overall monitoring program itself, will be more of a recordkeeping exercise than a true numerical comparison of results obtained prior to and following implementation of BMPs. As described in the Program Effectiveness Assessment Plan (Appendix 13-1), MCBH may also utilize water quality monitoring analysis results conducted by other county or state agencies to evaluate effectiveness of its BMPs and SWMP Plan.

The intent of the monitoring program is to determine the quality of the storm water runoff from the MS4, including identified industrial areas. The determination for measured pollutant loads for a single rainfall event is not a true representation of the pollutant loading from the monitored area since the quantity, or volume, of rainfall in the area would vary tremendously throughout the year and every year. DOH has stated, "The volume of discharge is dependent upon rainfall-induced runoff and is highly variable," (**Permit No. HI S000001**).

Each Monitoring Plan has several specific objectives to be achieved through the monitoring program. These objectives are listed below, followed by a detailed discussion.

- ***Assess compliance with this permit (including TMDL Implementation & Management (I&M) Plans and demonstrating consistency with waste load allocations (WLAs), if required).***

  The monitoring provisions of the MS4 Permit are intended to conform to existing discharge prohibitions, numeric and narrative effluent limitations, and any applicable water quality standards for the receiving waters. Compliance will be assessed in the Monitoring Program by comparing numerical water quality chemistry values and visual assessments to the allowable limits designated in the Permit.

- ***Ensure that practices to control pollutants in storm water discharges are evaluated and revised, as necessary, to meet changing conditions at MCBH.***

  The monitoring program is intended to provide information that can be used to reflect changes in facilities, operational procedures, or materials handled that could lead to changes in the quality of storm water discharges.

- ***Measure the effectiveness of the Permittee's SWMP.***

  Effectiveness will be measured by reviewing and identifying improvements in water quality chemistry values, where improvements are needed to meet compliance, and by other factors specified in the Program Effectiveness Assessment Plan (Appendix 13-1).

- ***Qualitatively measure the effectiveness of BMPs in preventing, minimizing, or removing pollutants in storm water discharges.***

  The SWMP Plan requires implementation of BMPs that are selected on a site-by-site basis to reduce storm water pollutants from certain identified sources. The process of evaluating sources and selecting BMPs is usually done prior to wet weather. Thus, certain decisions are made without the benefit of visual observations and analytical results. In addition, storm water quality BMPs may not result in a predictable reduction in pollutant concentrations. Analytical and visual monitoring should eventually provide a means for evaluating the effectiveness of selected BMPs.

- ***Assess the overall health based on the chemical, physical, and biological impacts to receiving waters resulting from storm water discharges and an evaluation of the long-term trends.***

  As described in the Program Effectiveness Assessment Plan (Appendix 13-1), MCBH may also utilize water quality monitoring analysis results conducted by other county or state agencies to evaluate effectiveness of its BMPs and SWMP Plan.

- ***Characterize storm water discharges.***

  Flow, physical appearance, and color will be recorded as noted in Section 12.3 and consistent with Appendix 1, Part 6 of the Permit.

- ***Identify sources of specific pollutants.***

  Sampling locations have been identified to represent industrial facilities in accordance with the MS4 Permit. Detections of water chemistry parameters will be unique to operations at or around the facility closest to the monitoring point. An additional part of MCBH’s Base-wide monitoring includes outfall screening and general Base-wide inspections, which will help to identify other sources of pollution on Base. Data/observations shall be used to determine which specific activities may cause presence of a specific pollutant.

- ***Detect and eliminate illicit discharges and illegal connections to the MS4.***

  Detections of chemical pollutants not related to the operations of a facility will be evaluated as potential illicit discharges or illegal connections. This will also be supplemented by outfall screening exercises and routine base-wide inspections, by the ECPD Compliance Inspection Team, as specified in Chapter 3.

- ***Assess the water quality issues in watershed resulting from storm water discharges to receiving waters.***

  Receiving water quality will be assessed in the Monitoring Plan by comparing numerical water quality chemistry values to the allowable limits from the Permit and through visual assessments.

- ***Aid in the implementation of facility-specific Storm Water Pollution Prevention Plans (SWPPPs) and SWMP Plan required by the MS4 Permit.***

  The monitoring program has three major components that are intended to aid in the implementation of the SWPPPs and the SWMP Plan: (1) site inspections; (2) visual observations; and (3) sampling and analysis. Section 12.4 describes these inspection requirements. The site inspection is intended to assess how well BMPs are being implemented and whether additional pollutant control measures are needed. Visual observations and storm water sampling and analysis are intended to provide a comprehensive assessment of storm water quality. As storm water quality data are accumulated and assessed, the SWPPP will be modified to reflect these data.

12.1.3 Outfall Selection Criteria

The storm water regulations require that samples be collected from all representative outfalls where storm water is discharged from an industrial site. Outfalls that drain only non-industrial areas, such as personnel parking lots or administrative buildings, need not be sampled, as long as there is no potential for contact of storm water with industrial processes or significant materials. The MS4 Permit states that where two or more outfalls are expected to convey substantially similar storm water effluent, the facility may choose to monitor as few as one of those outfalls, provided that the outfalls monitored are representative of the overall storm water discharges from the facility.

In 2012, initial site visits were conducted at the MCBH industrial sites to identify outfalls and associated portions of the MS4. Each outfall was inspected, photographed, and assigned a unique identification number. Each outfall's drainage area and associated industrial facilities were described in detail. Based on this survey and the surveys conducted in 2015, outfalls were selected for possible sampling. A site visit was conducted in 2022 to confirm existing industrial locations and to identify new outfalls for industrial sites added to the permit in 2021. Additional information regarding the outfalls selected for sampling at MCBH is presented in Section 12.3.

12.1.4 Information Sources

Information sources used in the selection of outfalls and preparation of the sampling and analysis plan include:

- MCAS Kaneohe Bay Hawaii Master Plan, October 1983;

- Marine Corps Base Hawaii, Kaneohe Bay, Storm Drain System Location Plan, January 1995;
- Marine Corps Base Hawaii Overall Base Map;
- Marine Corps Base Hawaii GIS Map, 2021;
- Field Observations;
- Correspondence and telephone conversations with various MCBH personnel; and
- Site characterization.

12.2 Storm Event Selection Criteria

MCBH's MS4 Permit No. HI S000007 requires dischargers to collect and analyze grab and composite samples by manual or automatic monitoring methods, from a measurable storm event. The MS4 Permit states that a measurable storm event is defined as *a storm event that produces actual discharge from your site and that occurs at least 72 hours after any previous measurable events.* Sampling schedules for the various parameters are discussed in Section 12.3.3. Sampling methods are described in Section 12.3.5 of this report.

12.3 Storm Water Sampling and Analysis

This section provides detailed information for performing wet weather sampling and analysis. The information provided describes sampling locations, pertinent analytical parameters, sampling methods, protocols and describes the sampling schedule.

Any site found to have an analyte that fails to meet permitted receiving water limits, must be evaluated and management practices improved. The evaluation will be conducted to identify any potential pollutant source(s) and appropriate mitigation measures will be implemented immediately.

12.3.1 Sites Ranked Highest Priority Based on Their SIC Category

Table 12-1 presents data gathered during field investigations of outfalls, catch basins, storm drains or other areas that receive storm water drainage from MCBH industrial facilities. The industrial facilities have been organized by general category/SIC code and given a priority ranking within that general category/SIC code. This priority ranking is based on the perceived potential risk that the facility poses to storm water quality due to the nature of its industrial activities, or proximity to receiving waters if BMPs are not correctly followed. Included in Table 12-1 are the priority ranking of each facility within its general category/SIC code, the industrial facility and building number, general category and SIC code, outfall type and identification numbers (where applicable), a description of the outfall or sampling location, and justification for the priority ranking.

The following list details the outfalls that have been determined to be the highest priority in their respective SIC:

- The Sanitary Landfill is the only facility within the industrial activity sector L. The sampling point is identified as sampling point LF-1 and the monitoring location for the sediment tire wash-off area is on the other side of the vegetated berm. Parameters for Multi-Sector monitoring are given in Section 12.3.5. The location of Outfall LF-1 and the sediment tire wash-off monitoring area is shown in Figure 12-14.

- The Recycling Center, Building 132 is the only facility within the industrial activity sector N. The sampling location is a designated catch basin on the northern side of the facility. See Figure 12-2 for details.

- The Small Boat Repair Shop, Building 1698 is identified in the Permit as priority with the industrial activity sector Q requirements. The Small Boat Repair Shop is a facility that conducts minor repairs on recreational boats docked in the small boat harbor. The sampling location is a sheet flow location along a seam in the concrete where a puddle forms prior to running into the harbor. See Figure 12-3.

- Building 6802 (1388) is a complex with a former lab and a boat shop and is also identified with the industrial activity sector Q requirements. The sampling location is a trench drain on the southeast side of the facility. See Figure 12-8.

The priority ranking and outfall locations are based industrial activity sector definitions and on field reconnaissance and available information. All ranking, outfall locations, and sampling methods are subject to change, at the discretion of ECPD, in order to most effectively represent current conditions at each site and to facilitate monitoring program efforts.

Although the ranking the priority ranking process was completed as required in the Permit. Actual monitoring will follow the permitted, sector based monitoring requirements.

Table 12-1
Summary of Outfalls and Associated Industrial Facilities, MCBH

Priority Rank	Bldg. No.	Associated Industrial Facility	General Category	Outfall Type & ID	Receiving Waters	Location of Sampling	Justification for Priority Within Category of Facility
1	SLF	Sanitary Landfill	Sanitary Landfill	Outlet Pipe –Outfall LF-1	Kailua Bay (Marine Waters) via Outfall LF-1	Inside concrete drainage structure. Westernmost outlet located along Middaugh Street.	This area intercepts storm water for a large area that has been historically prone to erosion and is in close proximity to Kailua Bay. Industrial activity sector L.
2	WRF	Water Reclamation Facility	Utility	Sheet Flow to Low Point	Kaneohe Bay (Marine Waters) via sheet flow	Designated sampling point for sheet flow.	Greater potential for pollutants to leave the site at this low point, via sheet flow to the adjacent Kaneohe Bay (approximately 300 feet south).
3	132	Recycling Center	Recycling	Catch Basin	Kaneohe Bay (Marine Waters) via Outfall 017	CBMH just outside facility pedestrian gate at the north side of facility on 'D' Street.	Only facility within the industrial activity sector N.
4	1698	Small Boat Repair Shop	Maintenance	Surface sheet flow	Kaneohe Bay (Marine Waters) (Marine Waters) via Outfalls 017 & 021	Along east side of Building 1698.	Facility comprised of several buildings, spread apart. Diverse number of potential pollutants situated close to Kaneohe Bay. Industrial activity sector Q.
5	6802	WFO Lab/Boat Shop	Maintenance	Trench Drain to Outfall 027	Kaneohe Bay (Marine Waters) via Outfall 027	Sample at end of trench drain located north of Bldg. 1623, at southeast side of the facility.	Diverse number of potential pollutants situated close to Kaneohe Bay. Industrial activity sector Q.

Priority Rank	Bldg. No.	Associated Industrial Facility	General Category	Outfall Type & ID	Receiving Waters	Location of Sampling	Justification for Priority Within Category of Facility
6	1170, 1171	Aircraft Fuel Islands	POL Storage	Grated Inlet	Kaneohe Bay (Marine Waters) via Outfall 024	Sample at inlet closest to 1170. Near sign PIT A.	Active fueling area has potential for spills.
7	6183	Engine Test Facility	Maintenance	Sheet Flow	Kaneohe Bay (Marine Waters) via sheet flow	Near front gate by Bldg. 6183 for sheet flow.	Drain inlets and OWS on site should route contaminants to sanitary sewer.
8	1631	Aircraft Wash and Rinse Facility	Maintenance	Sheet Flow	Kaneohe Bay (Marine Waters) via Outfall 018	Along curb (in-line with OWS) at 'B' Street for sheet flow.	Secondary containment surrounds the washdown areas and conveys wash water to the OWS to route contaminants to sanitary sewer. In the unlikely event that this system were to overflow pollutants may entire the MS4 via the curbside inlet.
9	6107	Aircraft Rinse Facility	Maintenance	Sheet Flow	Pacific Ocean	Lowest point, near west corner of concrete rinse pad.	Low priority. In the unlikely event that the OWS and adjacent grassy sump areas overflow, pollutants may enter storm water via surface runoff. There are no storm drain system inlets in the near vicinity, and the nearest receiving water is the Pacific Ocean (approximately 1,500-ft east).
10	351	Vehicle Maintenance Shop	Maintenance	Trench Drain (351-3)	Kaneohe Bay	Trench drain east of Bldg. 322 at the west corner of the facility.	Relatively high possibility of activities producing potential pollutants in runoff.

Priority Rank	Bldg. No.	Associated Industrial Facility	General Category	Outfall Type & ID	Receiving Waters	Location of Sampling	Justification for Priority Within Category of Facility
11	1252 & 1253	Fuel Division Supply Department	Storage	Sheet Flow	Kaneohe Bay (Marine Waters) via Outfall 021	Sheet flow along east side of asphalt driveway.	In the unlikely event that the secondary containment berms overflow, contaminated storm water runoff may potentially move toward the grated inlet near Bldg. 370 or to catch basins in 3rd Street.
12	6182	Fuel Delivery Branch and Refueler Truck Parking	Storage	Sheet Flow	Kaneohe Bay (Marine Waters) via Outfall 021	Near front gate for sheet flow.	Fuel leaks may impact storm water runoff if valves for bermed containment area are not closed, or in the unlikely event that the containment area overflows.
13	6479	Aircraft Ready Fuel Storage	Storage	Grated Inlet	Kaneohe Bay (Marine Waters) via Outfall 021	Access road south of Bldg. 349 (not within the secondary containment) for sheet flow to grated inlet, east of Bldg. 370.	Lower priority as good practices noted in SWPPP.
14	3014	Combat Logistics Battalion (CLB-3) Support	Maintenance	Grated Inlet	Nu`upia Ponds	Sheet flow just north of the grated inlet in the center of the facility on the north side of the building.	Several activities occur outdoors.

Priority Rank	Bldg. No.	Associated Industrial Facility	General Category	Outfall Type & ID	Receiving Waters	Location of Sampling	Justification for Priority Within Category of Facility
15	1619	Ground Support Equipment Shop	Maintenance	SDMH	Kaneohe Bay (Marine Waters) via Outfall 017	SDMH near southwest corner of Bldg. 4036.	SDMH receives storm water runoff from trench drain located adjacent to Bldg. 4036. An OWS, connected to the sanitary sewer, is located at the South side of Bldg. 4036. There is a potential of pollutant runoff to this trench drain if BMPs are not correctly implemented for facility washdown and rinsing activities.
16	5011	12th Marine Motor T	Maintenance	Sheet Flow	Nu`upia Ponds	Sheet flow on the south side of the building in front of Building 6734R.	Good BMPs and practices. Most work conducted indoors.
17	6874	Third Radio Battalion	Maintenance	Grated Inlet	Nu`upia Ponds	Grated inlet inside compound on the southern end of the parking area.	Good BMPs and practices. Most work conducted indoors.
18	1295	Golf Course Maintenance Shed	Maintenance	Sheet Flow	Mokapu Central Drainage Channel (MCDC)	Cushman Avenue curb.	Activities occur mostly under cover.
19	6892	Aircraft Wash Facility,	Maintenance	Grated Inlet	Kaneohe Bay (Marine Waters)	Storm Drain Inlet located to the southeast of the site may catch overspray from trade winds.	Facility is self contained and bermed.
20	3073	Helicopter Wash Facility,	Maintenance	Sheet Flow	Kaneohe Bay (Marine Waters)	Sheet flow off the southwest corner of the facility	Facility is self contained and bermed.

12.3.2 Additional Sampling Locations

In addition to the sector specific industrial site sampling requirements, all other sites will be visually monitored quarterly. The current permit schedule only includes one sector specific site for annual monitoring and three others for benchmark monitoring. The following locations have been selected with lower priority ranking:

- Building 351, vehicle maintenance, has a trench drain terminating at inlet 351-3 where samples are to be taken. Inlet 351-3 is located on the west corner of the facility as seen in Figure 12-4.
- Building 1619 is a ground support equipment maintenance facility. Samples can be taken from the storm drain manhole closest to the entrance gate on the south side of the facility as seen in Figure 12-9.
- The motor vehicle maintenance 3rd Radio Battalion, Building 373 has been moved to Building 6874. The sampling point has been moved to a storm drain inlet at the new site (Figure 12-5).
- The aircraft wash and rinse at Building 1631 has secondary containment and does not have a storm water collection point on site. In a situation where storm water overflowed out of the secondary containment area, it would flow off the site along ‘B’ Street. Samples are to be collected using a sheet flow sampler along ‘B’ Street from the curb in line with the oil water separator on site as seen in Figure 12-1.
- Buildings 1170 and 1171, aircraft fueling operations sampling location is a grated inlet near the sign “PIT-A” as seen in Figure 12-6.
- The engine test facility, Building 6183 does not have a storm water sampling point. Sheet flow samples are to be collected from the street near the front gate of the building. See Figure 12-12 for the location.
- The aircraft rinse facility, Building 6107, has secondary containment and does not have a storm water inlet in close proximity. If storm water were to overflow out of the adjacent grassy swales, storm water would flow toward the Pacific Ocean from the west corner of the concrete rinse pad, as shown in Figure 12-10.
- The fuel delivery branch and refueler truck parking at Building 6182 does not have a storm drain inlet to sample. Sheet flow is to be sampled near the front gate as seen in Figure 12-11.
- The aircraft ready fuel storage facility at Building 6479 includes a containment berm and an oil water separator on site. Most storm water is managed though these BMPs but some runoff of support activities may be sampled from a grated storm drain inlet at the east side of Building 370. See Figure 12-13 for details.
- The fuel division supply department has two tanks, Buildings 1252 and 1253, surrounded by a concrete berm. There is also secondary containment around the fueling pad. If these waters

were to be released via overflow, the runoff would flow toward 3rd Street along a long asphalt paved driveway. The sheet flow will be manually collected along this driveway. See Figure 12-7.

- The Water Reclamation Facility outfall is approximately 300 feet from Kaneohe Bay. A location for collected sheet flow has been designated as a sheet flow sampling location on the southwest corner of the site. See Figure 12-15.

- The Helicopter Wash Facility, Building 3073 is a self-contained automated wash system with a trench drain with surfaces that slope to the center and bordered by concrete curbs. The spray from the wash jets is subject to drifting off the wash pad with trade winds. The sample location is located to the southeast of the pad as seen in Figure 12-18.

- The Combat Logistics Battalion (CLB-3) support company transportation services, Building 3014 sampling point is a storm drain inlet on the north side of the building (Figure 12-16).

- The 12th Marine Motor T, Building 5011 sampling point is a sheet flow location in front of the temporary Building 6734R as seen in Figure 12-17.

- The Aircraft Wash Facility at Building 6892 is a contained facility with surfaces that slope to a center drain and is surrounded with concrete curbs. A storm drain inlet located just to the southeast of the site may receive overspray during trade wind conditions. See Figure 12-19.

- The Golf Course Maintenance Shed, Building 1295 has a gravel parking lot. Stormwater runs off to a southeast direction to the adjacent Cushman Road as seen in Figure 12-20.

The following sites were formerly monitored and have been determined to be “No Exposure Sites”

- The liquid oxygen and nitrogen facility at Building 6025 does not have a storm water inlet. Samples are to be collected from sheet flow manually from the grass swale fronting the facility.

- The Building 1304 sampling point is a catch basin on the southwest side of the building.

- Inlet 105-2 is located off the southwest corner of Maintenance Hangar 105 near the aircraft taxiway. The sampling site is a stainless-steel pan underneath the grate, and storm water is sampled as it flows into the pan.

- Aircraft Maintenance Building 375 has a drain inlet 375-2. Samples can be taken from the inlet.

- The corrosion control facility, Building 5069, has a grated inlet for sampling storm water 5069-2. The location is the most eastern inlet at the facility.

12.3.3 Sample Schedule

This section details the sampling schedule for industrial sites covered by the MS4 Permit. Sampling will be conducted according to the sector specific requirements described in Part F.2.b of the Permit as follows:

Annual effluent monitoring sampling shall be conducted at the Sanitary Landfill effluent discharge location.

Quarterly benchmark sampling shall be conducted at the Sanitary Landfill and at Buildings 132, 6802 and 1698.

Quarterly visual assessments shall be conducted at all permitted locations listed in Table 12-1.

12.3.4 Annual Monitoring Effluent Limitations and Analytical Requirements for Monitoring

An annual storm water discharge from the representative outfall at the Sanitary Landfill will be monitored in accordance with Table 12-2.

Table 12-2 Effluent Limitations for Storm Water Associated with the Sanitary Landfill

Parameter	Units	Daily Maximum	Monthly Average
Biochemical Oxygen Demand (BOD5)	mg/L	140	37
Total Suspended Solids (TSS)	mg/L	88	27
Ammonia	mg/L	10	4.9
Alpha Terpineol	mg/L	0.033	0.016
Benzoic Acid	mg/L	0.12	0.071
p-Cresol	mg/L	0.025	0.014
Phenol	mg/L	0.026	0.015
Total Zinc	mg/L	0.2	0.11
pH	s.u.	Within the range of 6-9 standard pH units	

In the case any analyte fails to meet the daily maximum limits, the site must be evaluated, BMPs corrected, and the site shall be re-sampled to determine compliance.

12.3.5 Quarterly Benchmark Monitoring Requirements

Quarterly benchmark storm water discharge from the representative outfall at the Sanitary Landfill will be monitored in accordance with Table 12-3.

Table 12-3 Sanitary Landfill Quarterly Benchmark Monitoring Requirements

Parameter	Units	Daily Maximum
Total Suspended Solids	mg/L	100
Total Iron	mg/L	1.0

Benchmark monitoring data are primarily for MCBH's use to determine the overall effectiveness of control measures and to assist in determining when additional corrective action(s) may be necessary. A benchmark exceedance is not a permit violation, however, if corrective action is required as a result of a benchmark exceedance, failure to conduct required corrective action is a permit violation.

Quarterly benchmark storm water discharge from the representative outfall at the Recycling Center, Building 132 will be monitored in accordance with Table 12-4.

Table 12-4 Recycling Center Quarterly Benchmark Monitoring Requirements

Parameter	Units	Daily Maximum
Chemical Oxygen Demand (COD)	mg/L	120
Total Suspended Solids (TSS)	mg/L	100
Aluminum Total Recoverable	mg/L	0.75
Copper Total Recoverable	mg/L	0.0048
Iron Total Recoverable	mg/L	1
Lead Total Recoverable	mg/L	0.21
Zinc Total Recoverable	mg/L	0.09

Quarterly benchmark storm water discharge from the representative outfall at the Small Boat Repair Shop, Building 1698 and the WFO Lab/Boat Shop, Building 6802 will be monitored in accordance with Table 12-5.

Table 12-5 Water Transportation Quarterly Benchmark Monitoring Requirements

Parameter	Units	Daily Maximum
Aluminum Total Recoverable	mg/L	0.75
Iron Total Recoverable	mg/L	1
Lead Total Recoverable	mg/L	0.21
Zinc Total Recoverable	mg/L	0.09

Data not exceeding benchmarks: After collection of four quarterly samples, if the average of the four monitoring values for any parameter does not exceed the benchmark, MCBH has fulfilled monitoring requirements for that parameter for the permit term.

Data exceeding benchmarks: After collection of four quarterly samples, if the average of the four monitoring values for any parameter exceeds the benchmark, review the selection, design, installation, and implementation of control measures to determine if modifications are necessary to meet the effluent limits in this permit, and either:

• Make the necessary modifications and continue quarterly monitoring until four additional quarters of monitoring are completed for which the average does not exceed the benchmark; or

• Make a determination that no further pollutant reductions are technologically available and economically practicable and achievable in light of best industry practice to meet the technology-based effluent limits or are necessary to meet the water-quality-based effluent limitations,

in which case monitoring must continue once per year. Furthermore, documentation of the rationale for concluding that no further pollutant reductions are achievable must be completed and all records related to this documentation shall be retained with the site SWPPP.

Control measures must be reviewed, and any required corrective action performed immediately (or document why no corrective action is required), without waiting for the full four quarters of monitoring data, when an exceedance of the four-quarter average is mathematically certain. If after modifying control measures and conducting four additional quarters of monitoring, the average still exceeds the benchmark (or if an exceedance of the benchmark by the four-quarter average is mathematically certain prior to conducting the full four additional quarters of monitoring), review of control measures must be conducted and take one of the two actions above.

***Natural background pollutant levels*:** Following the first four quarters of benchmark monitoring (or sooner if the exceedance is triggered by less than four quarters of data; see above), if the average concentration of a pollutant exceeds a benchmark value, and a determination has been made that exceedance of the benchmark is attributable solely to the presence of that pollutant in the natural background, MCBH is not required to perform corrective action or additional benchmark monitoring provided that:

- The average concentration of your benchmark monitoring results is less than or equal to the concentration of that pollutant in the natural background; and
- Supporting documentation is produced with rationale for concluding that benchmark exceedances are in fact attributable solely to natural background pollutant levels. The supporting rationale must include any data previously collected (including literature studies) that describe the levels of natural background pollutants in the storm water discharge. Natural background pollutants are those substances that are naturally occurring in soils or ground water. Natural background pollutants do not include legacy pollutants from earlier activity on the site, or pollutants in run-on from neighboring sources which are not naturally occurring, such as other industrial sites or roadways. However, the DOH may determine that MCBH is eligible to discontinue monitoring for pollutants that occur solely from run-on sources.

12.3.6 Sampling Methods and Protocol

A minimum of one grab sample shall be collected from a discharge resulting from a measurable storm event. Samples must be collected within the first 30 minutes of a discharge associated with a measurable storm event. If it is not possible to collect the sample within the first 30 minutes of a measurable storm event, the sample must be collected as soon as practicable after the first 30 minutes and documentation must be kept with the SWPPP explaining why it was not possible to take samples within the first 30 minutes.

When adverse weather conditions prevent the collection of samples according to the relevant monitoring schedule, a substitute sample must be taken during the next qualifying storm event. Adverse weather does not exempt filing a benchmark monitoring report in accordance with the sampling schedule. NetDMR shall be used to report any failure to monitor using a “no data” or “NODI” code during the regular reporting period.

If limited rainfall occurs during parts of the year (e.g., arid or semi-arid climates) that prevent runoff from occurring for extended periods, required monitoring events may be distributed during seasons when precipitation occurs. The required number of samples must still be collected. NetDMR shall be used to report a “no data” or “NODI” code for any of the regular reporting periods that there was no monitoring.

Monitoring requirements in this permit begin in the first full quarter following either 90 days after permit issuance or the date of discharge authorization, whichever date comes later. If the monitoring is required on a quarterly basis (e.g., benchmark monitoring), monitoring must occur at least once in each of the following 3-month intervals:

- January 1 – March 31;
- April 1 – June 30;
- July 1 – September 30;
- October 1 – December 31.

Samples may be collected using automatic sampling devices, as described in Section 12.6, or manually. For manual sampling, the sample bottles will be filled using a peristaltic pump or other appropriate sample collection device.

Specific analytical parameters and their associated sampling methods, such as container type, sample holding time and analytical methodology, are listed in Table 12-7.

12.4 Quarterly Site Inspections and Visual Assessment of Storm Water Discharges

The MS4 Permit requires a quarterly site inspection for the facilities requiring SWPPP and outfall screening as described in Chapter 3. The site inspection is an overall evaluation of the effectiveness of the BMPs implemented at that facility. A Quarterly Facility Inspection Checklist (Table 12-6) shall be completed during each site inspection.

Additionally, once each quarter for the entire permit term, a storm water sample shall be collected from each permitted site (Table 12-1) outfall and a visual assessment shall be conducted. These samples are not required to be collected consistent with 40 CFR Part 136 procedures but must be collected in such a manner that the samples are representative of the storm water discharge. A Quarterly Visual Inspection Checklist (Table 12-8) shall be completed by each facility’s Environmental Compliance Coordinator (ECC) once per quarter.

The visual assessment must be made:

- Of a sample in a clean, colorless glass or plastic container, and examined in a well-lit area;

- On samples collected within the first 30 minutes of an actual discharge from a storm event. If it is not possible to collect the sample within the first 30 minutes of discharge, the sample must be collected as soon as practicable after the first 30 minutes and documented why it was not possible to take the sample within the first 30 minutes; and
- For storm events, on discharges that occur at least 72 hours (three days) from the previous discharge. The 72-hour (three-day) storm interval does not apply if documented that less than a 72-hour (three-day) interval is representative for local storm events during the sampling period.

Personnel shall visually inspect or observe the sample for the following water quality characteristics:

- Color;
- Odor;
- Clarity (diminished);
- Floating solids;
- Settled solids;
- Suspended solids;
- Foam;
- Oil sheen; and
- Other obvious indicators of storm water pollution.

The results of the visual assessments shall be documented onsite with the SWPPP. Documentation is not required to be submitted to the DOH, unless specifically requested to do so. However, MCBH shall summarize the findings in the annual report. Documentation of the visual assessment must include, but not be limited to:

- Sample location(s);
- Sample collection date and time, and visual assessment date and time for each sample;
- Personnel collecting the sample and performing visual assessment, and their signatures;
- Nature of the discharge (i.e., runoff);
- Results of observations of the storm water discharge;
- Probable sources of any observed storm water contamination;
- If applicable, why it was not possible to take samples within the first 30 minutes; and
- A statement, signed and certified in accordance with HAR Chapter 11-55, Appendix A, Subsection 15.

Whenever the visual assessment shows evidence of storm water pollution, corrective action procedures to remedy the pollutants must be taken and documented.

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Table 12-6
Quarterly Site Inspection Checklist

Activity Name: ____________________ **Date of Inspection:** ____________________

Inspector(s): ____________________ **Facility Name/Number:** ____________________

Column 1	Column 2	Column 3	Column 4	Column 5	
Source Area	BMP Number and Title	Status: FI, PI, NI, NA[1]	Briefly Describe Effectiveness (Good or Other [describe])	Corrective Measures	
				What	By When

Note: FI = Fully Implemented; PI = Partially Implemented; NI = Not Implemented; NA = No longer applicable to this source area (remove from source area master list)

Table 12-7
Quality Assurance / Quality Control Objectives

Parameter Name	Analytical Method	Units	Methodology	Maximum Holding Time	Preservation	Container Type/ Size
Metals	EPA 200.7, 200.8	µg/L	ICP	6 months	pH<2, HNO3	500 mL plastic
BOD5	SM 5210B	mg/L	Electrode	48 hours	4ºC	1000 mL plastic
COD	SM 5220D	mg/L	Photo Spectroscopy	28 days	4ºC, pH<2, H2SO4	50 mL plastic
pH	EPA 150.1	units	Electrode	ASAP	4ºC	100 mL plastic
NH4+	SM 4500 NH3 D	mg/L	Colorimetric	14 days	4ºC, pH<2, H2SO4	500 mL plastic
Semi volatile Organics	EPA 625.1	µg/L	GC/MS	7 days	4ºC	1000ml amber glass
TSS	SM 2540D	mg/L	Gravimetric	7 days	4ºC	100 mL plastic

Table 12-8 Quarterly Visual Inspection Checklist

MCBH Stormwater Quarterly Visual Inpection Checklist

Facility ID and Location: ______________________

Date: ____________________

Sampler Name (Printed): ______________________________ Signature: ______________________________

Time of Rainfall Begin: ______________ Time of Rainfall End: ______________

Time of Flow Begin: ______________ Time of Flow End: ______________

Rainfall event more than 72 hours since last event? Yes / No

Rainfall Event Total: ______________

Sample: sample in a clean, colorless glass or plastic container, and examined in a well-lit area

On samples collected within the first 30 minutes of an actual discharge from a storm event

Sample Characteristics:

Color: ______________ Floating Solids: ______________

Odor: ______________ Settled Solids: ______________

Clarity: ______________ Suspended Solids: ______________

Oil Sheen: ______________ Foam: ______________

Other Obvious Indicators of Storm Water Pollution

(describe): ____

Nature of the discharge (i.e., runoff):

Results of observations of the storm water discharge:

Probable sources of any observed storm water contamination:

If applicable, why it was not possible to take samples within the first 30 minutes:

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

12.5 Quality Assurance/Quality Control

A thorough Quality Assurance/Quality Control (QA/QC) plan is an essential component of a monitoring program, involving extensive field sampling and laboratory analyses. Because of the inherent variability in storm water samples, it is important to minimize additional uncertainties that may be introduced by sample handling and analytical techniques. This section describes the major elements of the QA/QC plan as related to sampling procedures and to methods of chemical analyses performed in the monitoring program. The plan fulfills the QA/QC requirements of the NPDES storm water permit.

The objectives of the QA/QC plan are to assure that: (1) all elements of the monitoring program are conducted, and (2) all monitoring is conducted by trained personnel. Implementation of a sound QA/QC plan ensures that the data collected are of high quality and defensible in court. QA/QC procedures will be followed in all phases of the monitoring program including sampling, laboratory analysis, and data reporting/validation. This plan includes elements to address both sampling and analytical concerns including sample contamination, variability, accuracy, and precision.

12.5.1 Field Sample Procedures

Adherence to proper sampling preparation, sample handling, and laboratory procedures is essential to maintaining data quality and integrity. This section details the required standard operating procedures for sampling and sample handling as set forth by the United States Environmental Protection Agency (EPA).

12.5.1.1 Reconnaissance and Preparation

Representative sampling sites have been selected in accordance with feasibility, accessibility, and safety constraints. Communication with laboratories will be established and a Sampling Field Notebook will be prepared, as described in Section 12.5.1.2 noted below. Field teams will be trained by experienced personnel following guidelines described in Section 12.5.1.2. Supervisors will be responsible for coordination of sampling efforts and for preparedness of teams.

12.5.1.2 Sampling Field Notebook

A specific Sampling Field Notebook will be prepared and kept on file in the MCBH, Kaneohe Bay ECPD office. The Sampling Field Notebook will contain the following items and procedures:

- List of equipment
- Location (map and description) of sampling point(s)
- Field Data Sheets
- Field sampling instructions
- Sample packing, transfer, and tracking (chain-of-custody) instructions and forms

These procedures will be followed by the field personnel in all phases of the field monitoring program. Personnel with field experience in storm water sampling will be responsible for training field sampling personnel.

12.5.2 Chain-of-Custody Procedures

All sample custody and transfer procedures will follow EPA-recommended procedures and emphasize careful documentation of sample collection and handling processes, including transfer of sample and chain-of-custody details such as sample date and time, number of sample containers and sampling method required. Field teams will adhere to proper chain-of-custody and documentation procedures for all sampling operations. Preformatted sample and chain-of-custody forms will be used to document the relevant information for each sample bottle and the transfer of bottles to the laboratory. An example of a completed chain-of-custody form is shown in Table 12-9.

12.5.3 Laboratory Procedures

Analysis for the routine parameters will be performed by a qualified laboratory. Table 12-7 presents a list of QA/QC objectives associated with each analytical method. The laboratory must make every effort to meet target detection limits, holding times, and sample preservation techniques. The laboratory shall provide a written QA/QC report addressing any deviations from the QA/QC requirements.

12.5.3.1 Accuracy

Laboratory accuracy can be assessed through performance and evaluation programs, and/or a certification of performance. As an alternative, the use of "blind" standard reference samples supplied by Environmental Resource Associates (ERA) and through the analysis of laboratory-prepared matrix spike samples, or "internal standards", can be used. Blind ERA reference samples would be analyzed once every quarter in which samples are analyzed. A goal of five percent of the samples shall be analyzed as matrix spike duplicates. For the matrix spike duplicate, a known standard analyte concentration is first spiked, or added, to an original sample and then duplicated. The accuracy of the analytical methods is evaluated from the results of the analytical recoveries of the first, or matrix spike, and second, or matrix spike duplicate spikes.

12.5.3.2 Precision

Laboratory precision must be assessed through the analysis of laboratory duplicates, for example analysis of two portions derived from the same sample, at the frequency of ten percent of the samples. In addition, five percent of the samples will be analyzed for matrix spike duplicates as described above.

12.5.3.3 Laboratory Blanks

Sample contamination resulting from laboratory analysis procedures or sample storage methods will be assessed through the use and analysis of laboratory blanks and equipment blanks. Laboratory blanks, including reagent and/or method, shall be reported for each day samples are analyzed.

12.5.3.4 Completeness

All reported analyses will be evaluated against the requested analyses to assess the completeness of the analytical characterization of the water samples. Any missing data will be accounted for by the laboratory or field programs, with an overall goal of 95 percent completeness.

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Table 12-9
Example Chain of Custody

AECOS, Inc.
45-939 Kamehameha Highway Suite 104
Kaneohe, Oahu, HI 96744
Tel: (808) 234-7770 Fax: 234-7775

CHAIN OF CUSTODY FORM

PROJECT FILE No.	
LOG NUMBER	[ ]

CLIENT:
ADDRESS:
CONTACT:
PHONE No.: ☎
Purchase Order No.:

☐ RUSH
☐ SEE REVERSE
SPECIAL INSTRUCTIONS

	☑	SAMPLE ID	SAMPLED DATE	SAMPLED TIME	SAMPLE TYPE	CONTAINER(S)		REQUESTED ANALYSES	PRESERVATION
1									
2									
3									
4									
5									
6									
7									
8									
9									
10									

CLIENTS PROVIDING SAMPLES TO THE LABORATORY SHOULD COMPLETE AS MUCH OF THE ABOVE FORM AS POSSIBLE. NOTE: NAME AND DATED SIGNATURE OF PERSON COLLECTING THE SAMPLE MUST BE ENTERED BELOW ↓. INFORMATION REQUESTED IN SHADED BOXES ABOVE TO BE FILLED IN BY THE LABORATORY.

SAMPLED BY: DATE 20___	RECEIVED BY: DATE 20___	RECEIVED FOR LABORATORY: DATE 20___
PRINT NAME	SIGNATURE TIME	SIGNATURE TIME
RELINQUISHED: DATE 20___	RELINQUISHED: DATE 20___	RELINQUISHED: DATE 20___
SIGNATURE TIME	SIGNATURE OR INITIALS TIME	SIGNATURE OR INITIALS TIME
COMMENTS:	PRECAUTIONS:	DISPOSAL:

RETURN SAMPLE TO CLIENT ☐

USE (BLACK) INK

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12.5.4 Data Reduction, Validation, and Reporting

Overall data quality will be assessed by MCBH ECPD personnel. Laboratory personnel will review analytical conditions, adherence to internal QC procedures, and results of accuracy and precision checks. Detection limits will be reported in the final analytical report summary along with the results of the external QA samples, laboratory duplicates, laboratory control spikes and matrix spike duplicates. Corrective action will be identified by the QA/QC leader, if necessary.

12.6 Automatic Sampling

The use of automatic vs. manual sampling will be at the discretion of ECPD, depending on access restrictions, feasibility, and any other condition that may facilitate monitoring efforts. Battery operated automatic samplers, designed specifically for storm water sampling, may be used to obtain the required samples. These will be installed at sampling locations where deemed appropriate by ECPD. The samplers are ISCO series 700 model sampling units with remote data retrieval modules that allow direct download of the collected storm water data for transfer to a remote computer. The units are operated using a high-output 12-volt battery and are housed in an enclosure when deployed to collect samples. A rain gauge is connected to the sampler and is used as one of the determining trigger points for when the sampler begins to collect the storm water sample.

Prior to deployment, the units are checked for operation and repaired or serviced as required. During deployment general maintenance of the sampling sites includes checking the condition of the weirs, the sample uptake line, the flow meter bubbler line, the rain gauge, and the removal of any debris which may hamper the acquisition of a sample.

Sample collection from LF-1 is typically more difficult to achieve due to the configuration of the collection basin at the Sanitary Landfill. The storm event must be significant enough to produce more storm water flow than can be collected and treated within the sedimentation basin. When that occurs, storm water will discharge out of the basin through the outlet, and a sample can be collected. Prior conversation with DOH determined that sampling at the landfill is only required when discharge off-site is observed from LF-1, due to the sedimentation basin.

12.7 Records Management and Reporting Formats

Well maintained records management and clear reporting formats are necessary for regulatory compliance. They are also useful for the assessment of the effectiveness of the SWMP.

12.7.1 Records Management

The SWMP Plan and supporting records are considered public documents under Section 308(b) of the Clean Water Act (CWA). Therefore, any member of the public may request to review MCBH's storm water permit documentation. Additionally, the SWMP Plan and supporting data will need to be made available upon request of a representative of the EPA and DOH.

Copies of the SWMP Plan, annual reports, monitoring information, and data pertaining to the MS4 Permit must be retained at the MCBH ECPD office for a minimum period of five years from the date of measurement, observation, report, or application. The above must also be made available to the public upon request.

12.7.2 Reporting Requirements

An Annual Report, which will include a Monitoring Report, shall be submitted to DOH by January 30th of each year. The Annual Report shall cover the past Marine Corps fiscal year. The Annual Report will be reviewed by the ECPD Director, who will then submit it to the DOH Clean Water Branch (CWB) through the CWB Compliance Submittal Form, as outlined in the MS4 Permit requirements (Part A.7). Monitoring reporting will be completed in accordance with the MS4 Permit. Storm water monitoring results shall be submitted on a DOH discharge monitoring report. Monitoring results exceeding the effluent limitations shall be reported to the DOH CWB as soon as the results become available, but in no case later than 30 days after the samples were taken. Reporting requirements are discussed in greater detail in Chapter 13 of the SWMP Plan.

12.8 Monitoring Program Evaluation

In general, a monitoring program can be evaluated quantitatively, based on its effect on water quality through long-term trends in chemical concentrations or other measurements, or qualitatively, by keeping track of the extent to which inspections and analytical monitoring are implemented.

The monitoring program will be evaluated and revised at least once a year for consistency with the evolving goals of the storm water monitoring program. As discussed in Section 12.7, the MS4 Permit requires submittal of an annual report to DOH CWB. The annual monitoring report will describe the monitoring tasks performed over the course of the year, as well as any analytical results obtained therein. The annual report will also present MCBH's overall assessment of its monitoring program effectiveness.

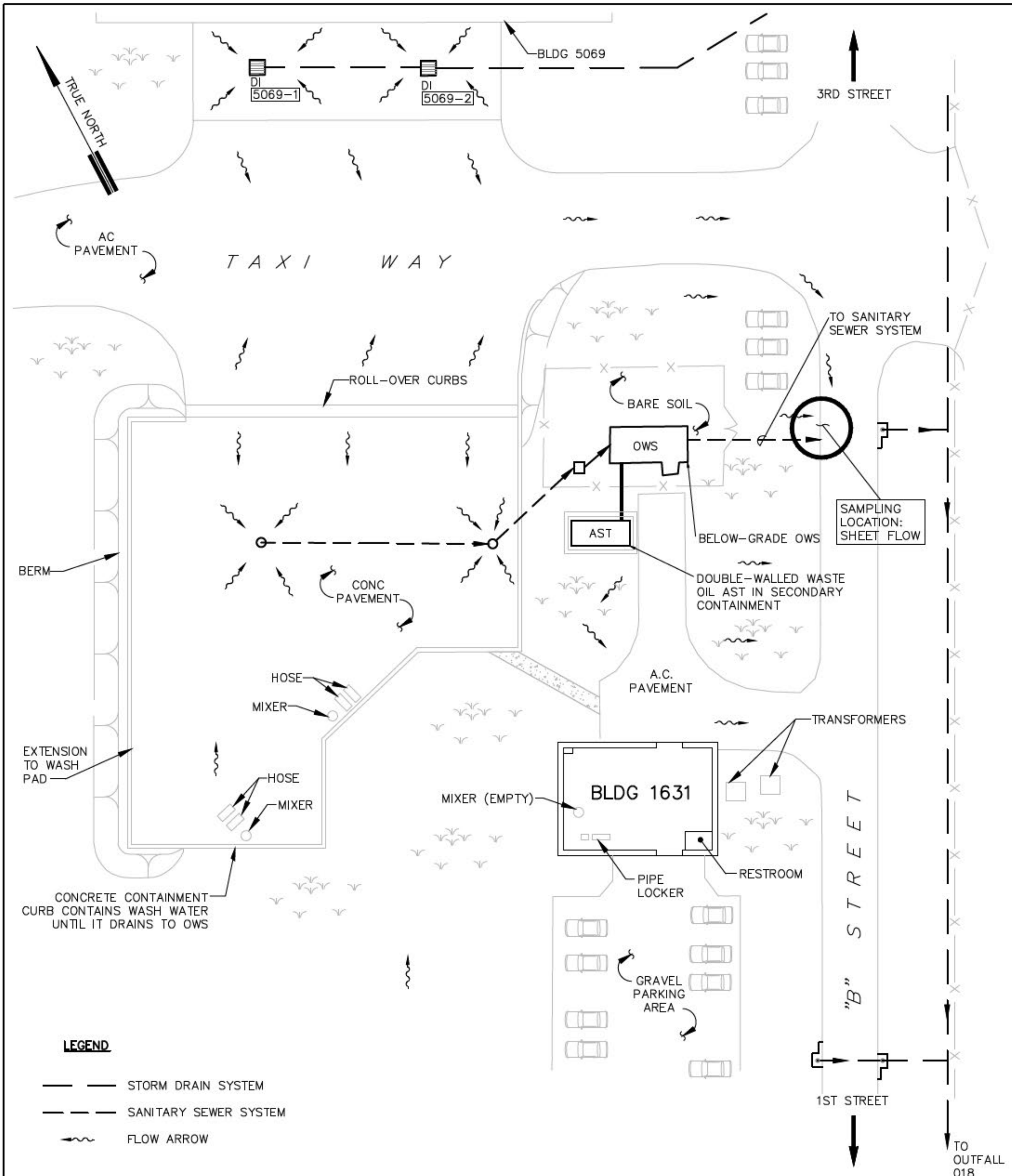
Basic recordkeeping is another method of evaluating the effectiveness of the monitoring program. MCBH will carefully track all visual observations and analytical monitoring activities to document compliance with the requirements listed in the Individual Permit. Types of records that should be kept and reviewed may include:

- Dates when visual and analytical monitoring is performed;
- Observations during visual observations and analytical monitoring;
- Site inspections; and
- Incidents such as spills or other releases.

By documenting activities and incidents in this way, MCBH may be able to identify problem areas and take action by selecting or modifying BMPs to mitigate the problems. The "measure of effectiveness" will include a description of actions that MCBH takes in response to the visual observations or trends identified in its records. These are outlined further in the Program Effectiveness Assessment Plan (Appendix 13-1).

12.9 Estimated Monitoring Budget

For the upcoming Fiscal Year 2023, there will be one full-time Government employee for this program; with an estimated budget of $350k for contractual work.



AIRCRAFT WASH & RINSE FACILITY (BUILDING 1631)

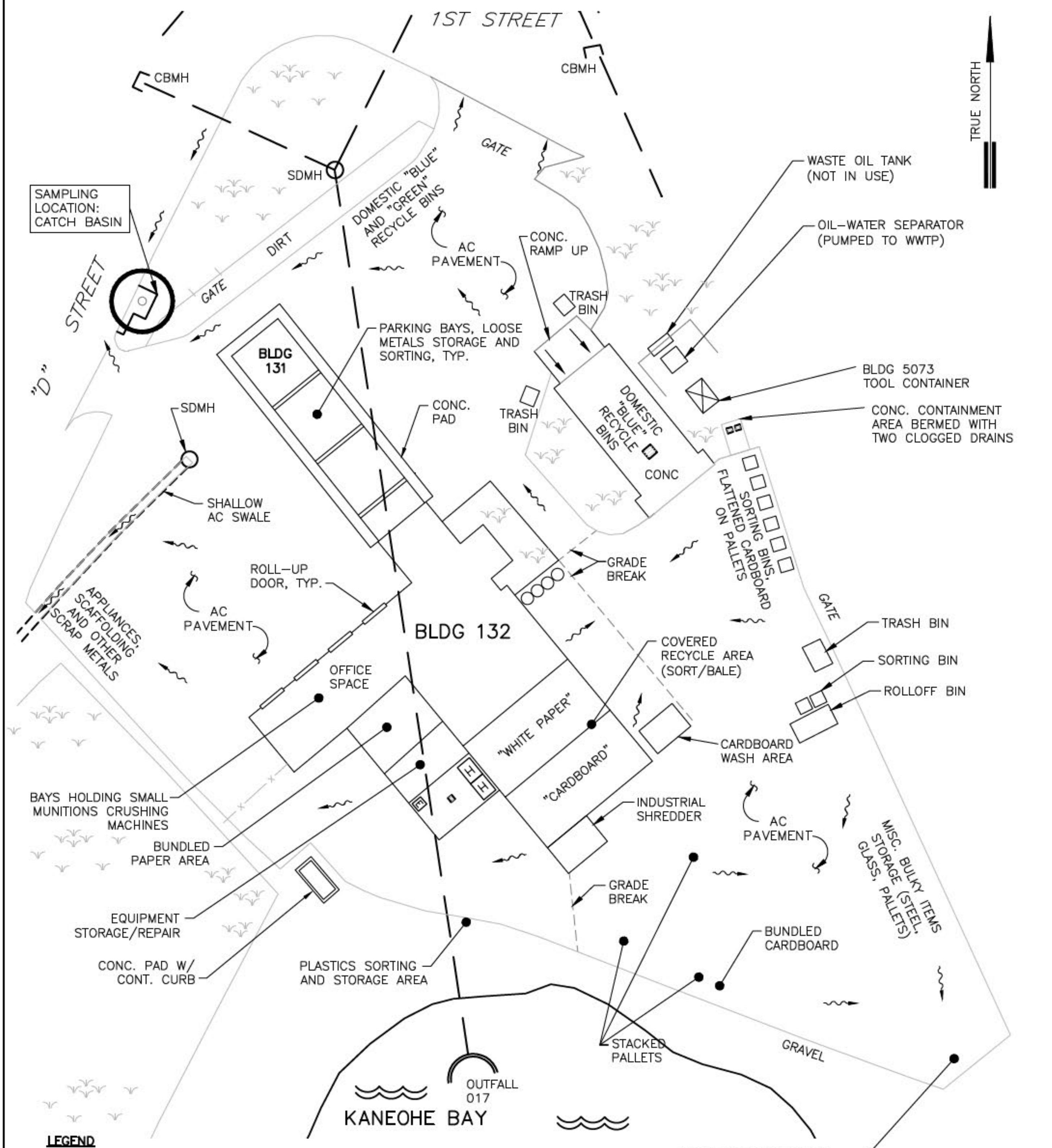
NOT TO SCALE

NOTES:

1. STORM WATER, FROM APPROXIMATELY 1.6 ACRES ASSOCIATED WITH BUILDING 1631, DISCHARGE TO THE SANITARY. IN THE UNLIKELY EVENT THAT THE SECONDARY CONTAINMENT OVERFLOWS, STORM WATER WOULD FLOW TO OUTFALL 018 AN BE DISCHARGED TO KANEOHE BAY.
2. CONCRETE FLOORS IN BUILDINGS UNLESS OTHERWISE NOTED.

DATE:	PROJECT TITLE:	
MAY 2022	STORM WATER MONITORING PLAN MCBH, KANEOHE BAY, OAHU, HAWAII	
FIGURE TITLE:		FIGURE NO.:
AIRCRAFT WASH & RINSE FACILITY (BUILDING 1631)		12-1

MHESKETT 5/27/2022 1:50:43 PM FIG 12-1 Bldg 1631 - Aircraft Wash & Rinse Facility.dwg



LEGEND

H	HAZARDOUS MATERIALS LOCKER
E	EYEWASH STATION
— —	STORM DRAIN SYSTEM
~~►	FLOW ARROW

RECYCLING CENTER (BUILDING 132)

NOT TO SCALE

NOTES:

1. STORM WATER, FROM APPROXIMATELY 2.0 ACRES ASSOCIATED WITH BUILDING 132, DISCHARGES TO KANEOHE BAY VIA SURFACE RUNOFF AND OUTFALL 017.
2. NO BATTERIES ARE STORED ONSITE.

DATE:	PROJECT TITLE:	
MAY 2022	STORM WATER MONITORING PLAN MCBH, KANEOHE BAY, OAHU, HAWAII	
FIGURE TITLE:		FIGURE NO.:
RECYCLING CENTER (BUILDING 132)		12-2

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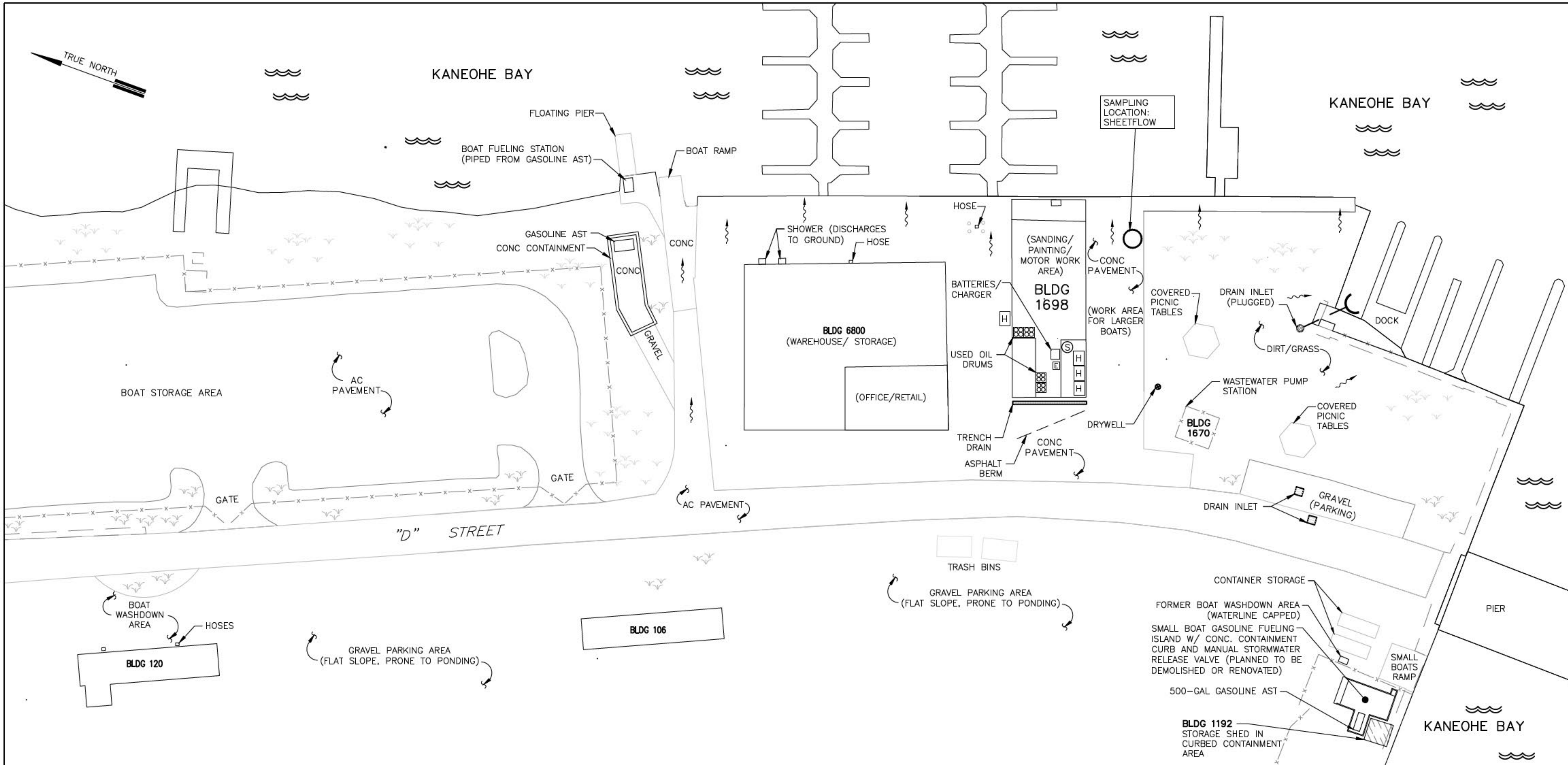
FIG 12-2 Bldg 132 – Recycling Center.dwg



SMALL BOAT REPAIR SHOP (BUILDING 129)

NOT TO SCALE

LEGEND

- H — HAZARDOUS MATERIALS LOCKER
- SPILL PALLET W/DRUMS
- W — WASTE ACCUMULATION SITE
- S — SPILL KIT
- E — EYEWASH STATION
- STORM DRAIN SYSTEM
- FLOW ARROW

NOTE:

STORM WATER, FROM APPROXIMATELY 3.4 ACRES, ASSOCIATED WITH BUILDING 1698 (FORMERLY BUILDING 129), DISCHARGES TO KANEOHE BAY VIA SURFACE RUNOFF

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PROJECT TITLE:
STORM WATER MONITOR NG PLAN
MCBH, KANEOHE BAY, OAHU, HAWAII

FIGURE TITLE:
SMALL BOAT REPAIR SHOP (BUILDING 1698)

DATE: MAY 2022

FIGURE NO.: 12-3

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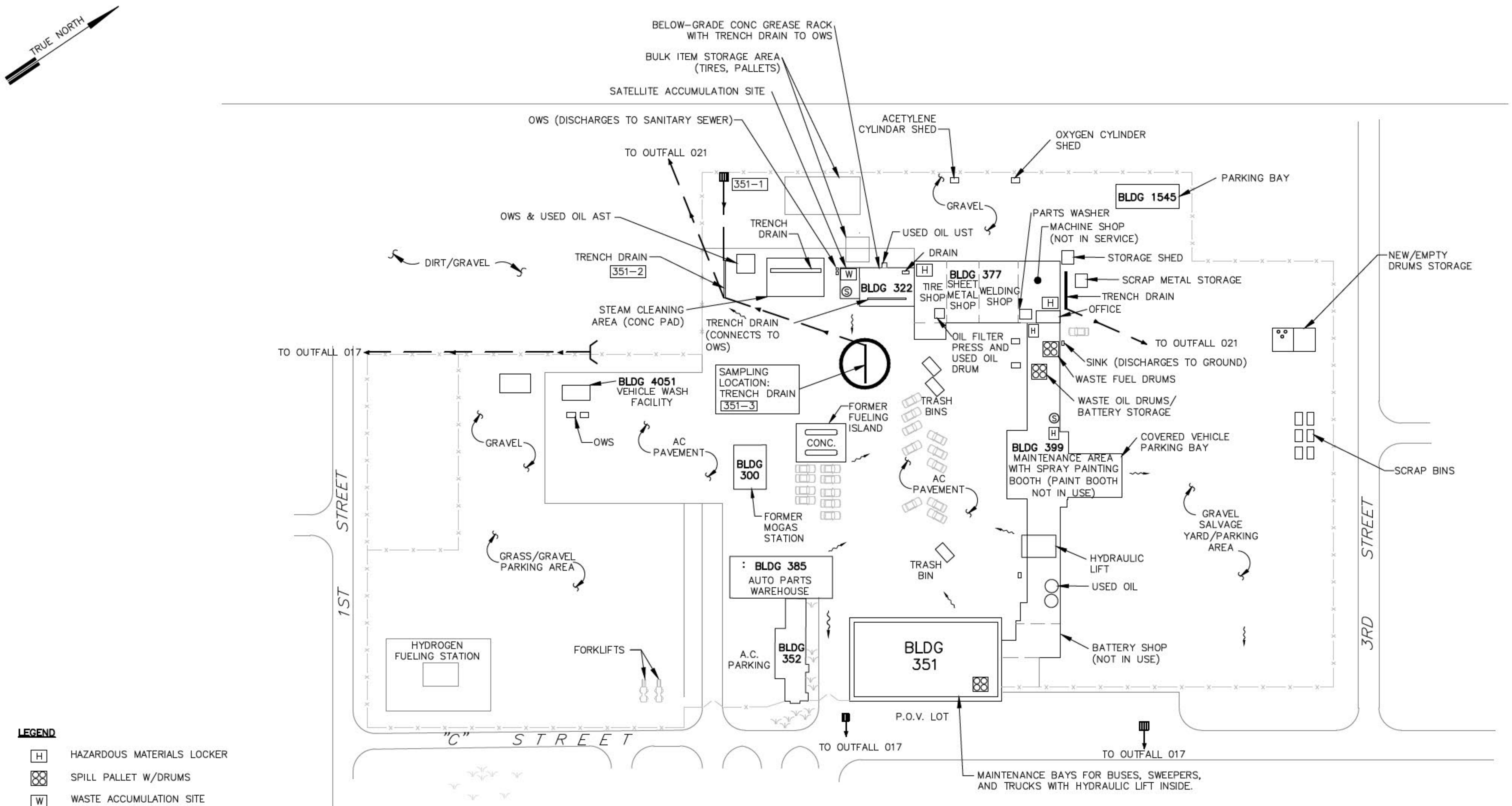
FIG 12-3 Bldg 1698 – Small Boat Repair Shop.dwg



LEGEND

- H — HAZARDOUS MATERIALS LOCKER
- SPILL PALLET W/DRUMS
- W — WASTE ACCUMULATION SITE
- S — SPILL KIT
- — — — STORM DRAIN SYSTEM
- FLOW ARROW

NOTES:

1. STORM WATER, FROM APPROXIMATELY 7.9 ACRES ASSOCIATED WITH BUILDING 351, DISCHARGES TO KANEOHE BAY VIA OUTFALLS 017 AND 021.
2. FLUIDS DRAINED FROM VEHICLES KEPT AT BAYS UNTIL FULL, THEN TRANSFERRED TO SAS ONSITE.
3. ABSORBENT PADS AND DRIP PANS TO BE PLACED UNDER ENTERING VEHICLES.
4. ALL INTERIOR FLOORS ARE CONCRETE UNLESS OTHERWISE NOTED.

VEHICLE MAINTENANCE SHOP (BUILDING 351)

NOT TO SCALE

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PROJECT TITLE:
STORM WATER MONITORING PLAN
MCBH, KANEOHE BAY, OAHU, HAWAII

FIGURE TITLE:
VEHICLE MAINTENANCE SHOP (BUILDING 351)

DATE: MAY 2022

FIGURE NO.: 12-4

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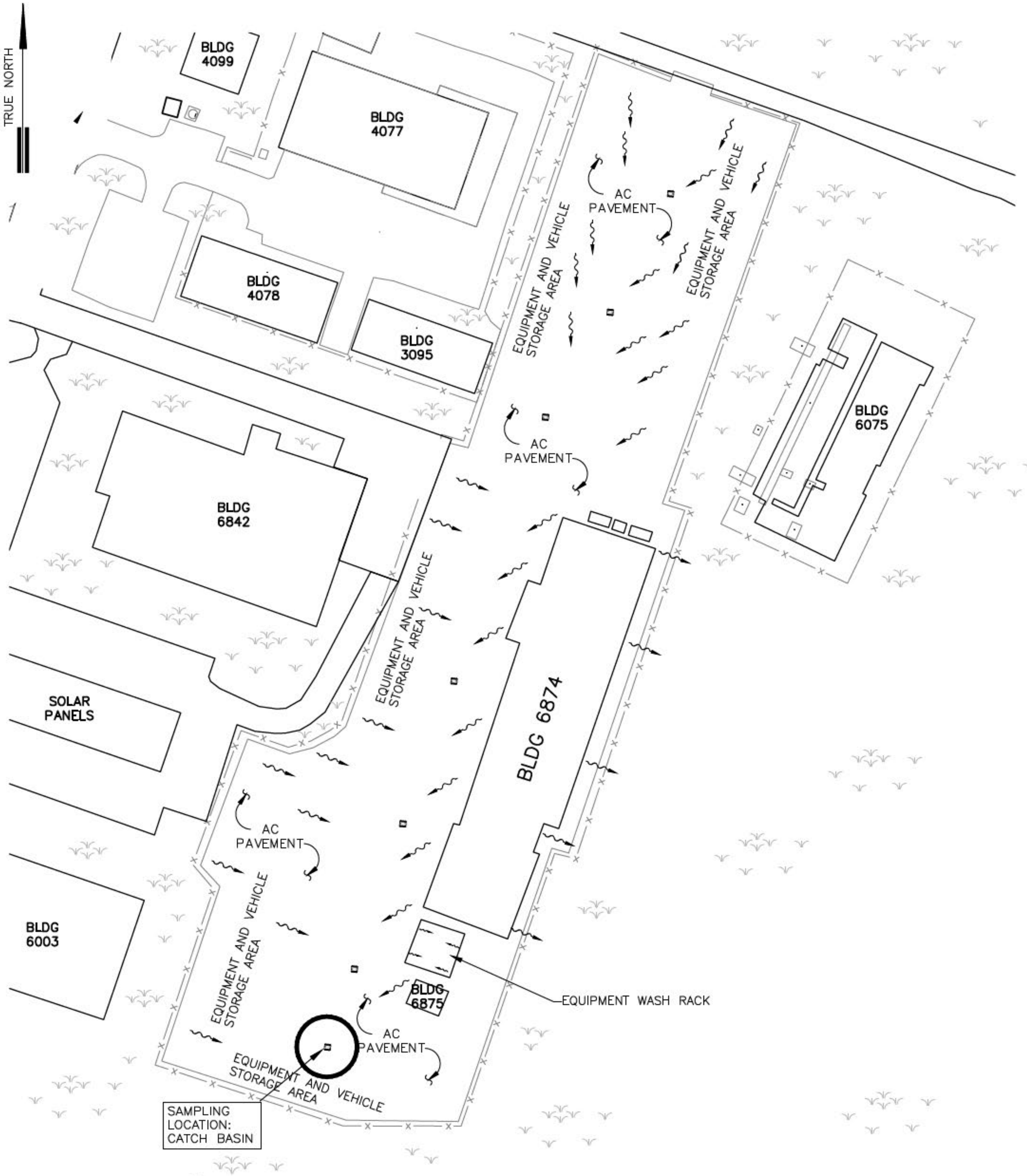
FIG 12-4 Bldg 351 – Vehicle Maintenance Shop.dwg



3RD RADIO BATTALION (BUILDING 6874)

NOT TO SCALE

LEGEND

FLOW ARROW

DATE:	PROJECT TITLE:	
MAY 2022	STORM WATER MONITORING PLAN MCBH, KANEOHE BAY, OAHU, HAWAII	
FIGURE TITLE: 3RD RADIO BATTALION (BUILDING 6874)		FIGURE NO.: 12-5

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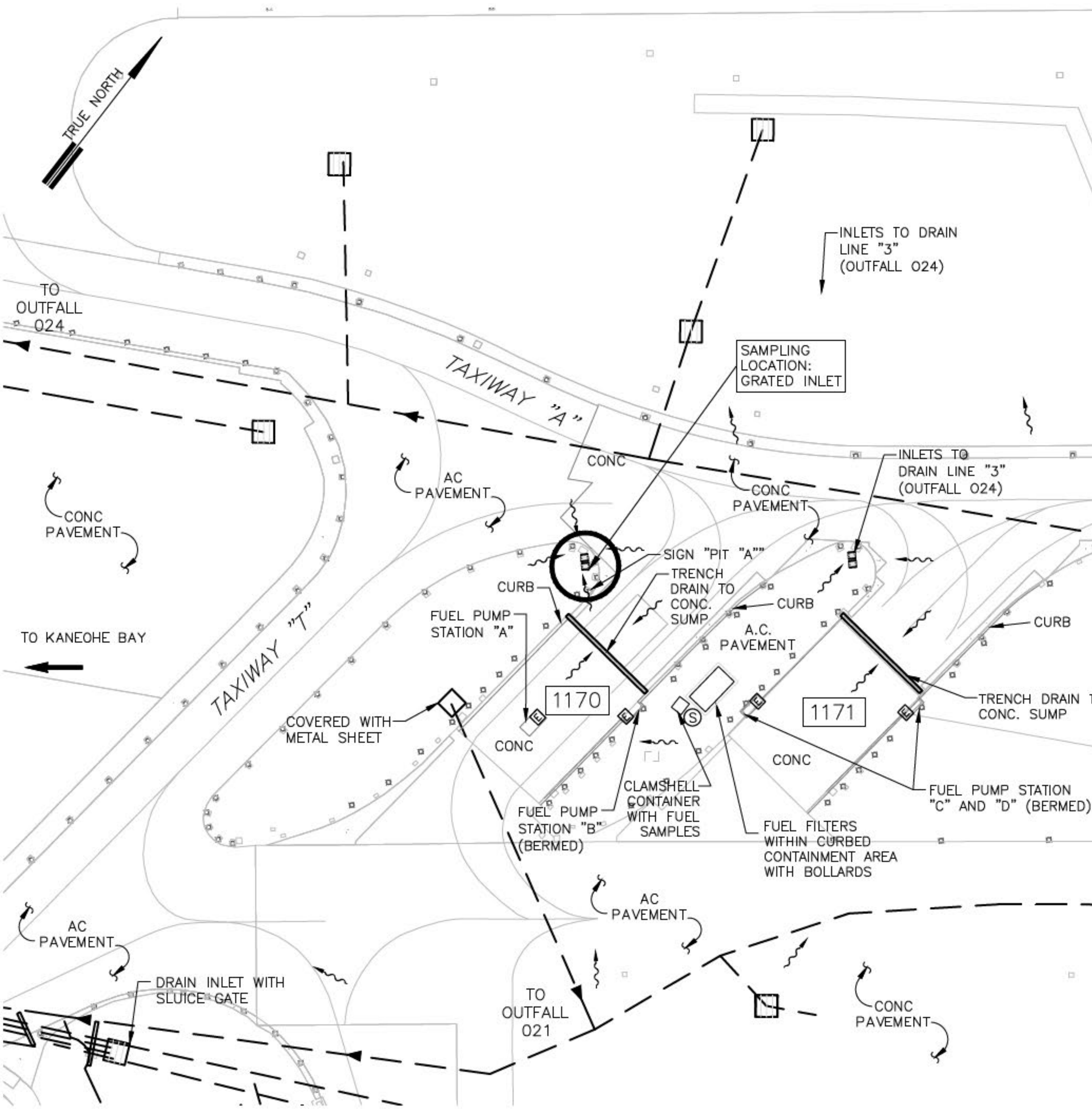
FIG 12-5 Bldg 6874 - 3rd Radio Battalion.dwg



AIRCRAFT FUEL ISLANDS (FACILITIES 1170 & 1171)

NOT TO SCALE

LEGEND

- E EYEWASH STATION
- S SPILL KIT
- STORM DRAIN SYSTEM
- STORM DRAIN INLET
- FLOW ARROW

NOTE:

STORM WATER, FROM APPROXIMATELY 3.3 ACRES ASSOCIATED WITH FACILITIES 1170 & 1171, DISCHARGES TO KANEOHE BAY VIA OUTFALL 024 AND SHEET FLOWS TO SURROUNDING GRASS.

DATE: MAY 2022	PROJECT TITLE: STORM WATER MONITORING PLAN MCBH, KANEOHE BAY, OAHU, HAWAII	
FIGURE TITLE: AIRCRAFT FUEL ISLANDS (FACILITIES 1170 & 1171)		FIGURE NO.: 12-6

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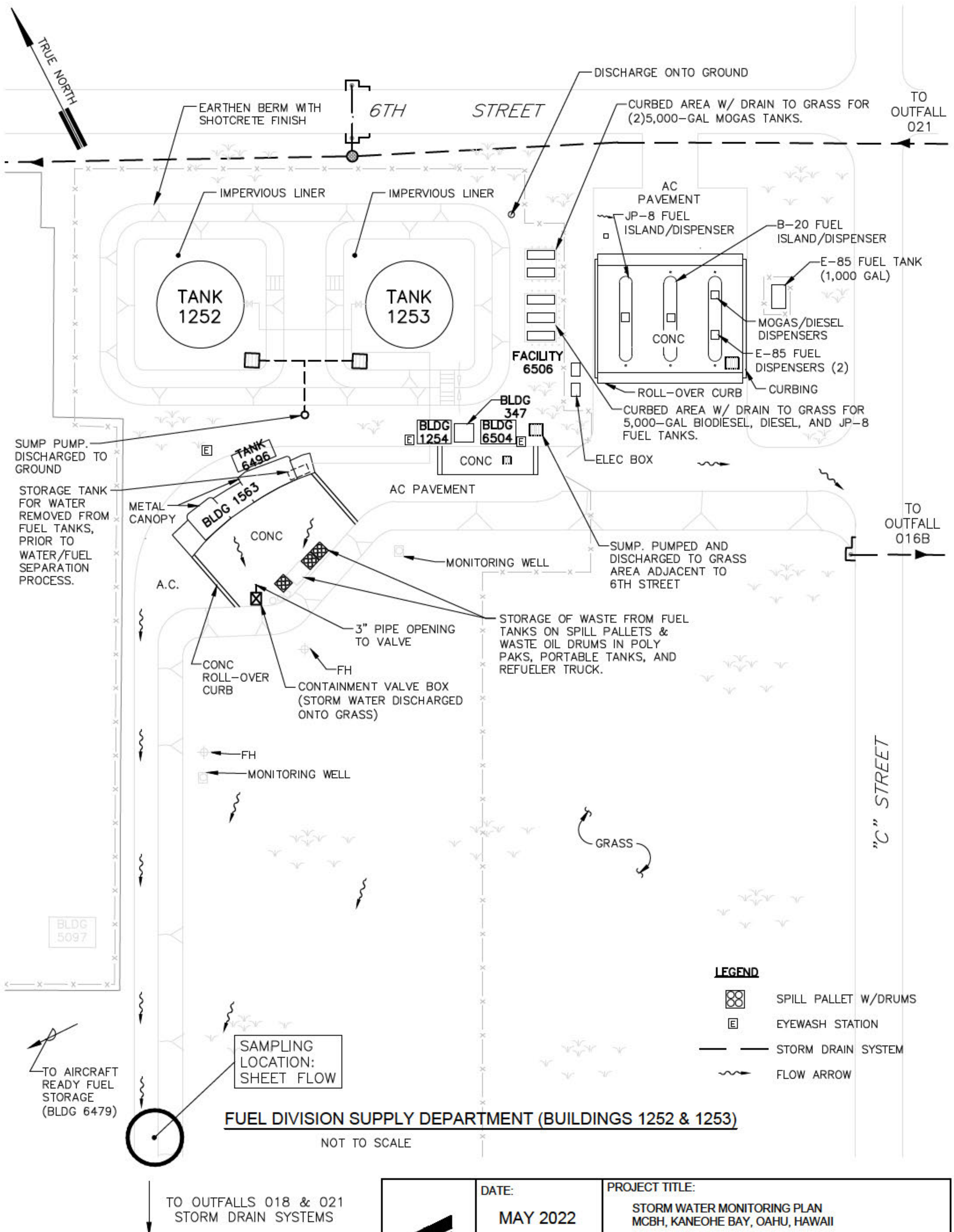
FIG 12-6 Bldg 1170, 1171 - Aircraft Fueling Islands.dwg



FUEL DIVISION SUPPLY DEPARTMENT (BUILDINGS 1252 & 1253)

NOT TO SCALE

NOTE:

STORM WATER, FROM APPROXIMATELY 9.5 ACRES ASSOCIATED WITH BUILDINGS 1252 & 1253, IS DISCHARGED TO KANEOHE BAY VIA OUTFALLS 016B, 018 AND 021.

DATE:	PROJECT TITLE:	
MAY 2022	STORM WATER MONITORING PLAN MCBH, KANEOHE BAY, OAHU, HAWAII	
FIGURE TITLE:		FIGURE NO.:
FUEL DIVISION SUPPLY DEPARTMENT (BUILDINGS 1252 & 1253)		12-7

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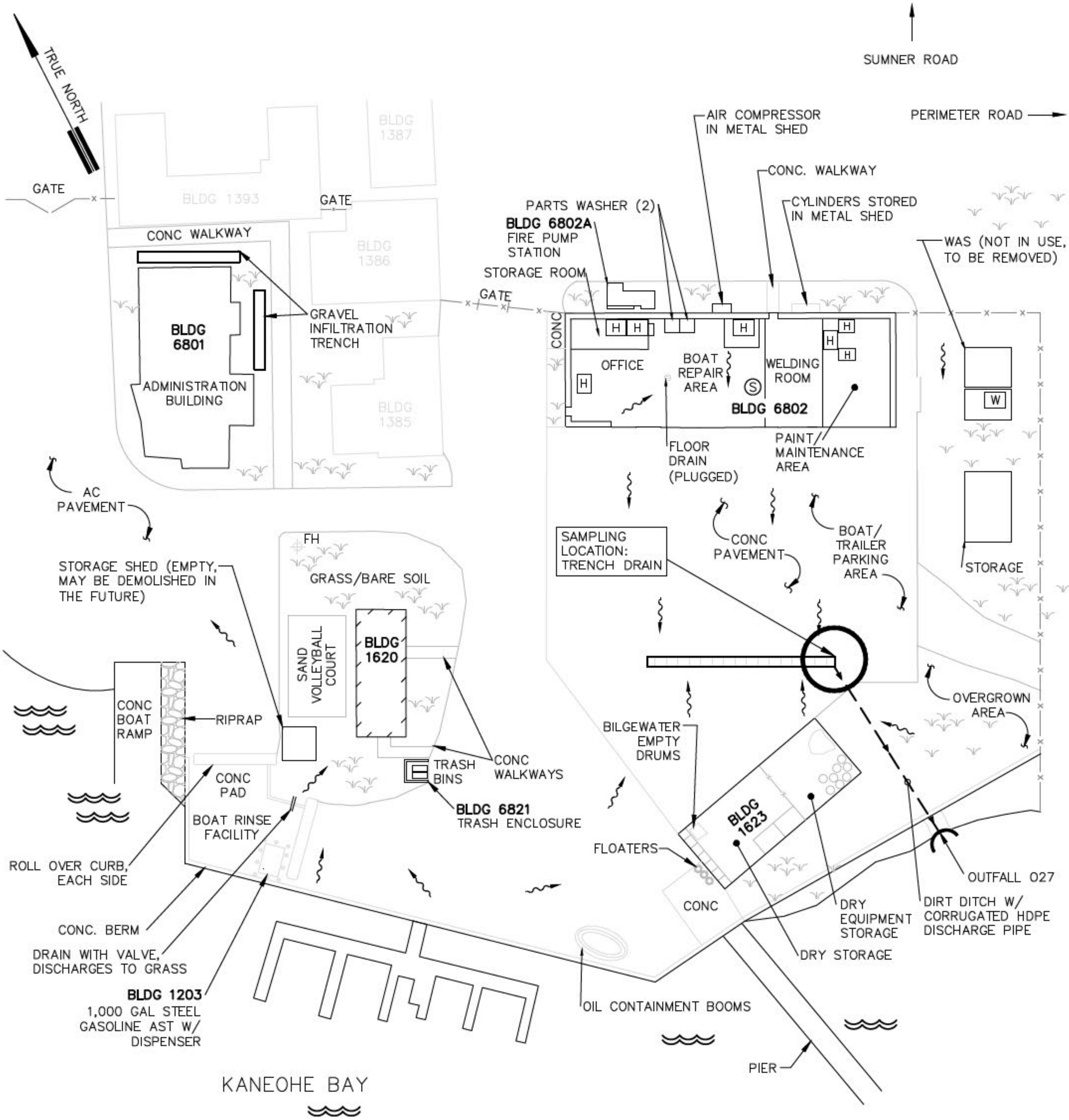
FIG 12-7 Bldg 1252, 1253 – Fuel Division Supply Deportment.dwg



LEGEND

H	HAZARDOUS MATERIALS LOCKER
W	WASTE ACCUMULATION SITE
S	SPILL KIT
	STORM DRAIN SYSTEM
	STORM DRAIN INLET
	FLOW ARROW

LAB/BOAT SHOP (BUILDING 1388)

NOT TO SCALE

NOTES:

1. STORM WATER, FROM APPROXIMATELY 3.2 ACRES ASSOCIATED WITH BUILDING 6802 (FORMERLY BUILDING 1388) IS DISCHARGED TO KANEOHE BAY VIA OUTFALL 027.
2. CONCRETE FLOORS IN BUILDINGS UNLESS OTHERWISE NOTED.

DATE:	PROJECT TITLE:	
MAY 2022	STORM WATER MONITORING PLAN MCBH, KANEOHE BAY, OAHU, HAWAII	
FIGURE TITLE:		FIGURE NO.:
LAB/BOAT SHOP (BUILDING 6801)		12-8

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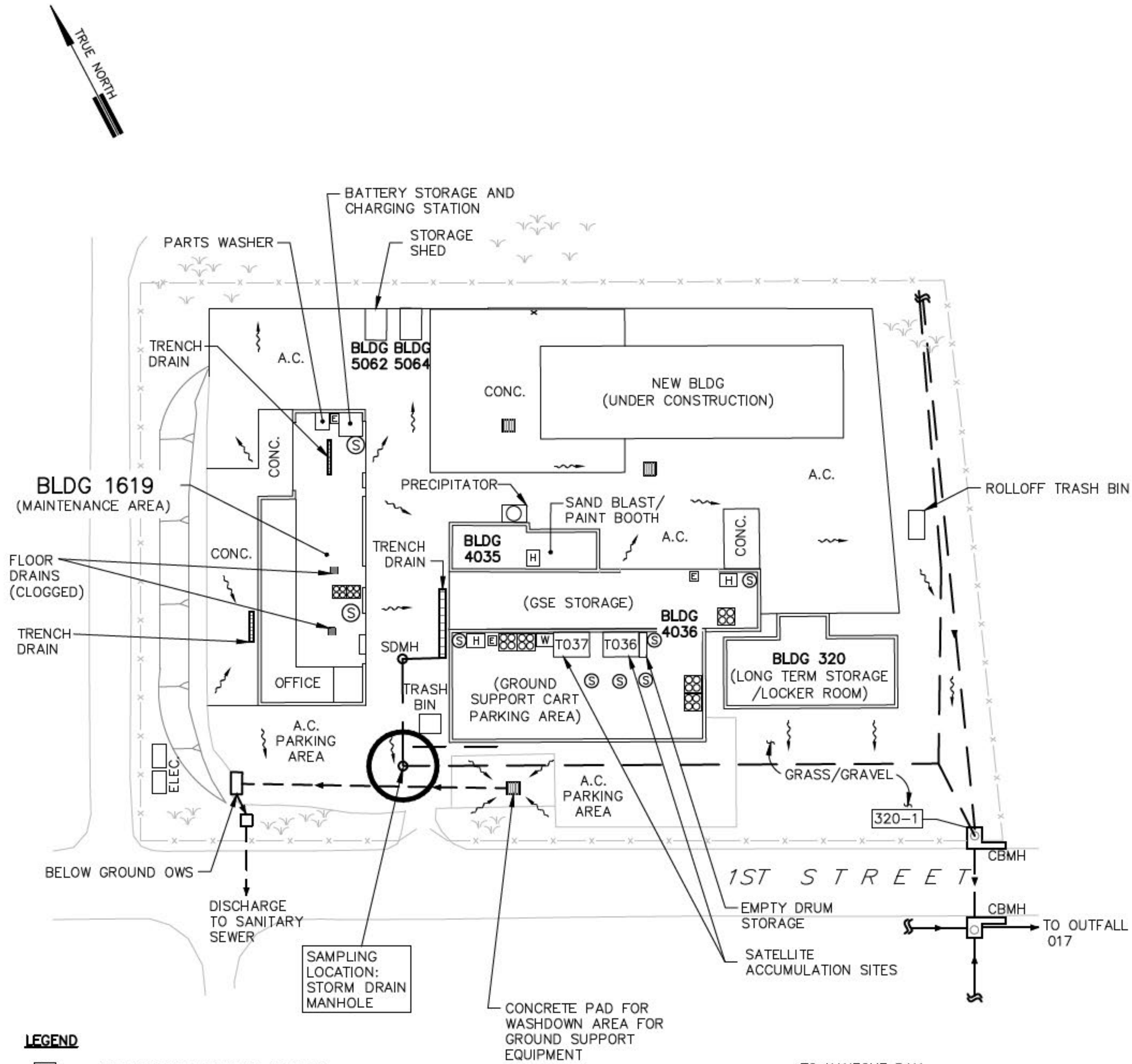
FIG 12-8 Bldg 6802 - Lab_Boot Shop.dwg



LEGEND

- H HAZARDOUS MATERIALS LOCKER
- SPILL PALLET W/DRUMS
- W WASTE ACCUMULATION SITE
- S SPILL KIT
- E EYEWASH STATION
- STORM DRAIN SYSTEM
- STORM DRAIN INLET
- SANITARY SEWER SYSTEM
- FLOW ARROW

GROUND SUPPORT EQUIPMENT SHOP (BUILDING 1619)

NOT TO SCALE

NOTES:

1. STORM WATER, FROM APPROXIMATELY 3.8 ACRES ASSOCIATED WITH BUILDING 1619, DISCHARGES TO KANEOHE BAY VIA OUTFALL 017.
2. ALL BUILDINGS HAVE CONCRETE FLOORS UNLESS NOTED OTHERWISE.
3. FLOOR DRAINS IN BUILDING 1619 DRAIN TO OWS.

DATE: MAY 2022	PROJECT TITLE: STORM WATER MONITORING PLAN MCBH, KANEOHE BAY, OAHU, HAWAII	
FIGURE TITLE: GROUND SUPPORT EQUIPMENT SHOP (BUILDING 1619)		FIGURE NO.: 12-9

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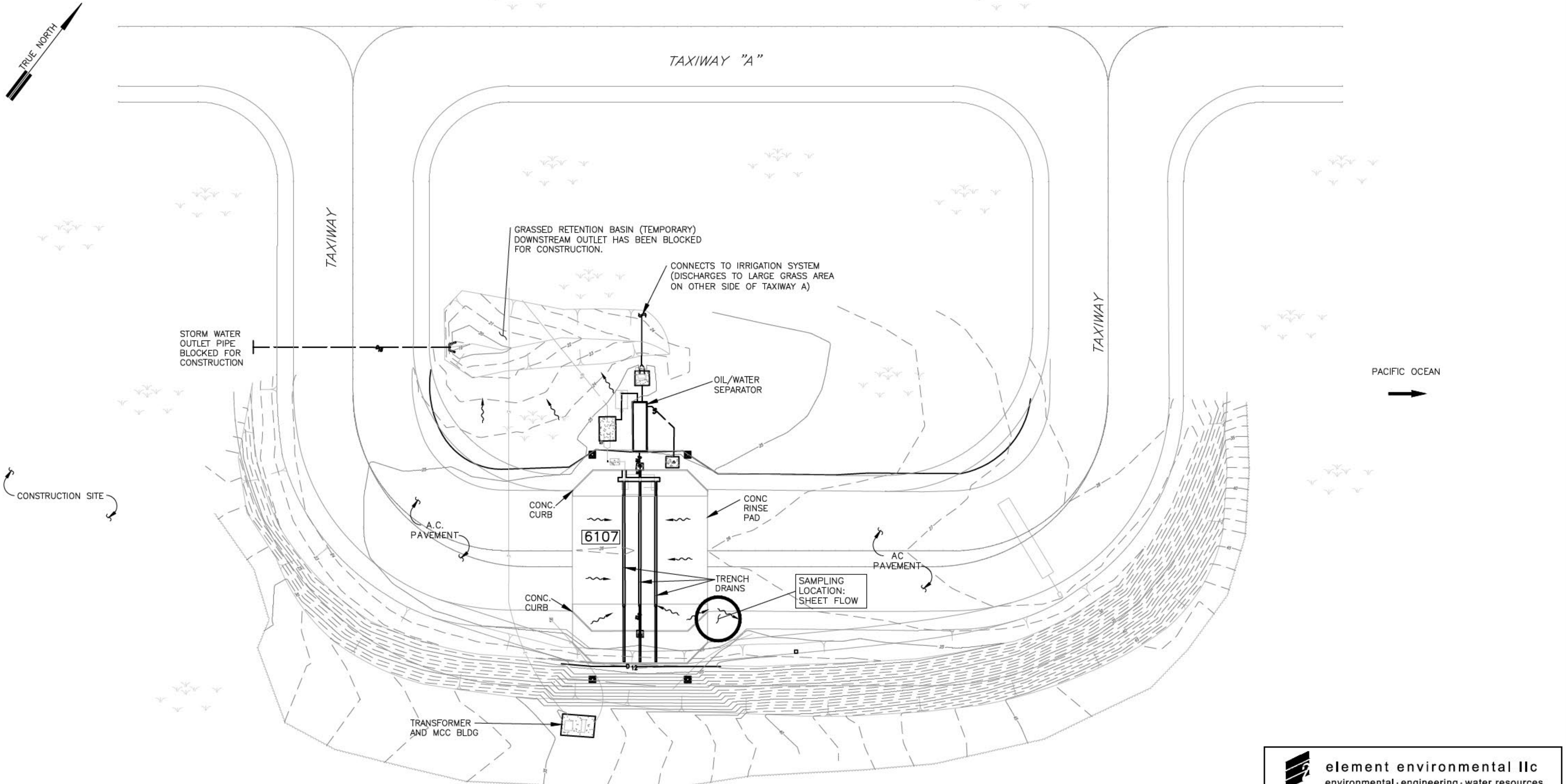
FIG 12-9 Bldg 1619 — Ground Support Equipment Shop.dwg



AIRCRAFT RINSE FACILITY (BUILDING 6107)

NOT TO SCALE

LEGEND

STORM DRAIN SYSTEM

FLOW ARROW

NOTES:

STORM WATER, FROM APPROXIMATELY 1.4 ACRES ASSOCIATED WITH FACILITY 6107. PRIMARILY DISCHARGES TO AN OIL/WATE SEPARATOR AND ADJACENT GRASSY AREAS. THE NEAREST RECEIVING WATER BODY IS THE PACIFIC OCEAN.

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PROJECT TITLE:
STORM WATER MONITORING PLAN
MCBH, KANEOHE BAY, OAHU, HAWAII

FIGURE TITLE:
AIRCRAFT RINSE FACILITY (BUILDING 6107)

DATE: MAY 2022

FIGURE NO.: 12-10

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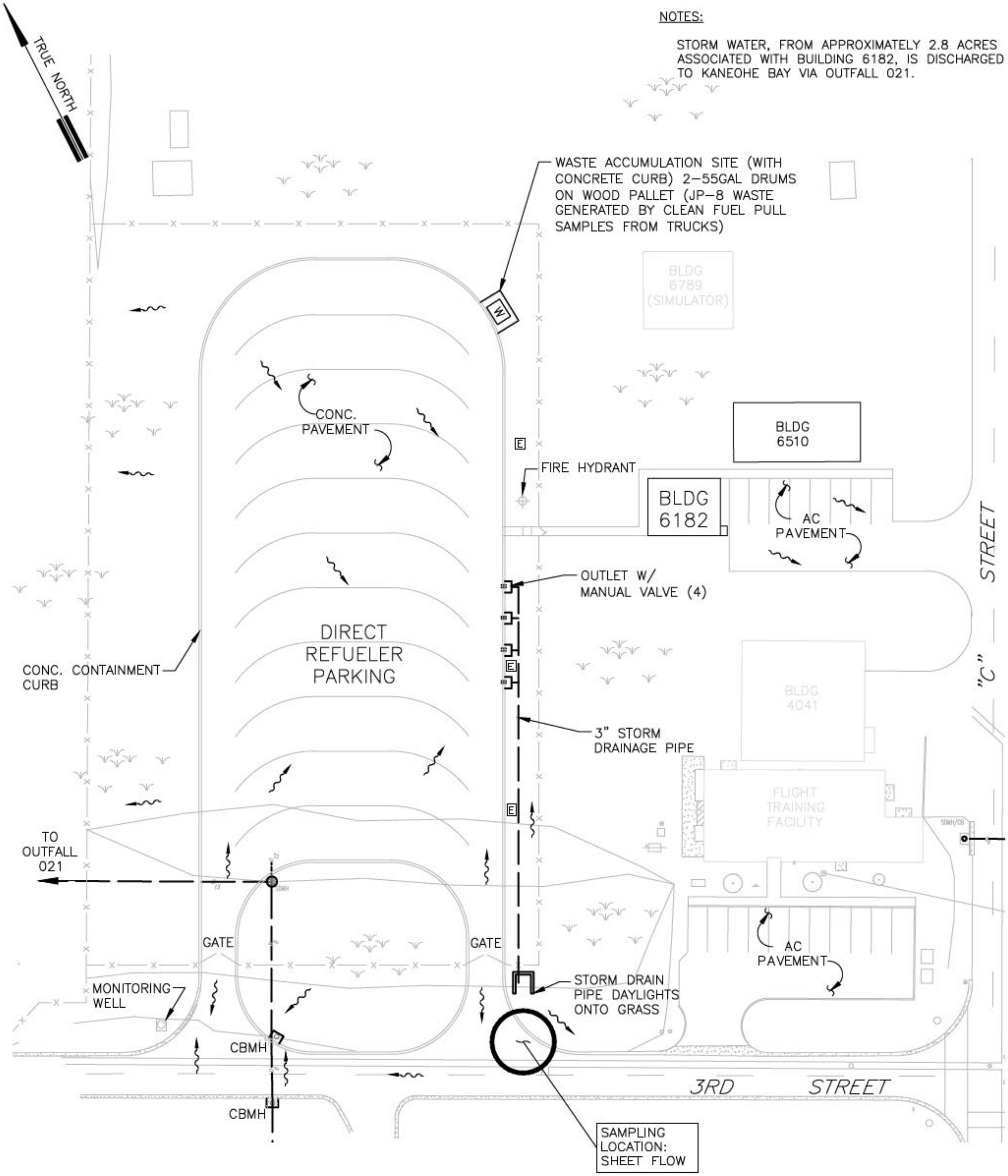
FIG 12-10 Bldg 6107 – Aircraft Rinse Facility.dwg

NOTES:

STORM WATER, FROM APPROXIMATELY 2.8 ACRES ASSOCIATED WITH BUILDING 6182, IS DISCHARGED TO KANEOHE BAY VIA OUTFALL 021.



FUEL DELIVERY BRANCH/REFUELER TRUCK PARKING (BUILDING 6182)

NOT TO SCALE

LEGEND

W	WASTE ACCUMULATION SITE
S	SPILL KIT
E	EYEWASH STATION
— —	STORM DRAIN SYSTEM
~→	FLOW ARROW

DATE: MAY 2022	PROJECT TITLE: STORM WATER MONITORING PLAN MCBH, KANEOHE BAY, OAHU, HAWAII
FIGURE TITLE: FUEL DELIVERY BRANCH/REFUELER TRUCK PARKING (BUILDING 6182)	FIGURE NO.: 12-11

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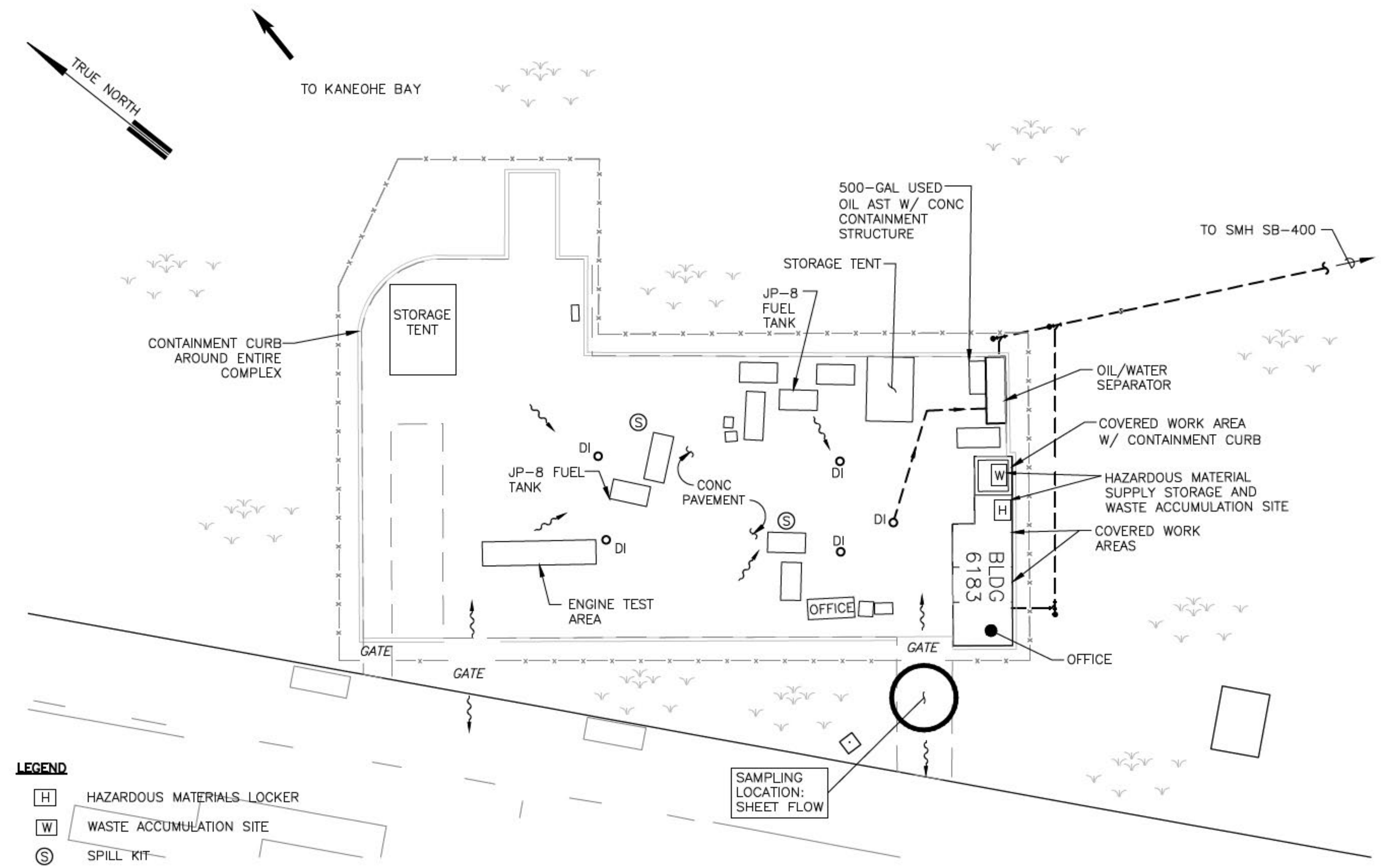
FIG 12-11 Bldg 6182 – Fuel Delivery Branch and Refueler Truck Parking.dwg



LEGEND

H	HAZARDOUS MATERIALS LOCKER
W	WASTE ACCUMULATION SITE
S	SPILL KIT
— — —	SANITARY SEWER SYSTEM
~~>	FLOW ARROW

ENGINE TEST FACILITY (BUILDING 6183)

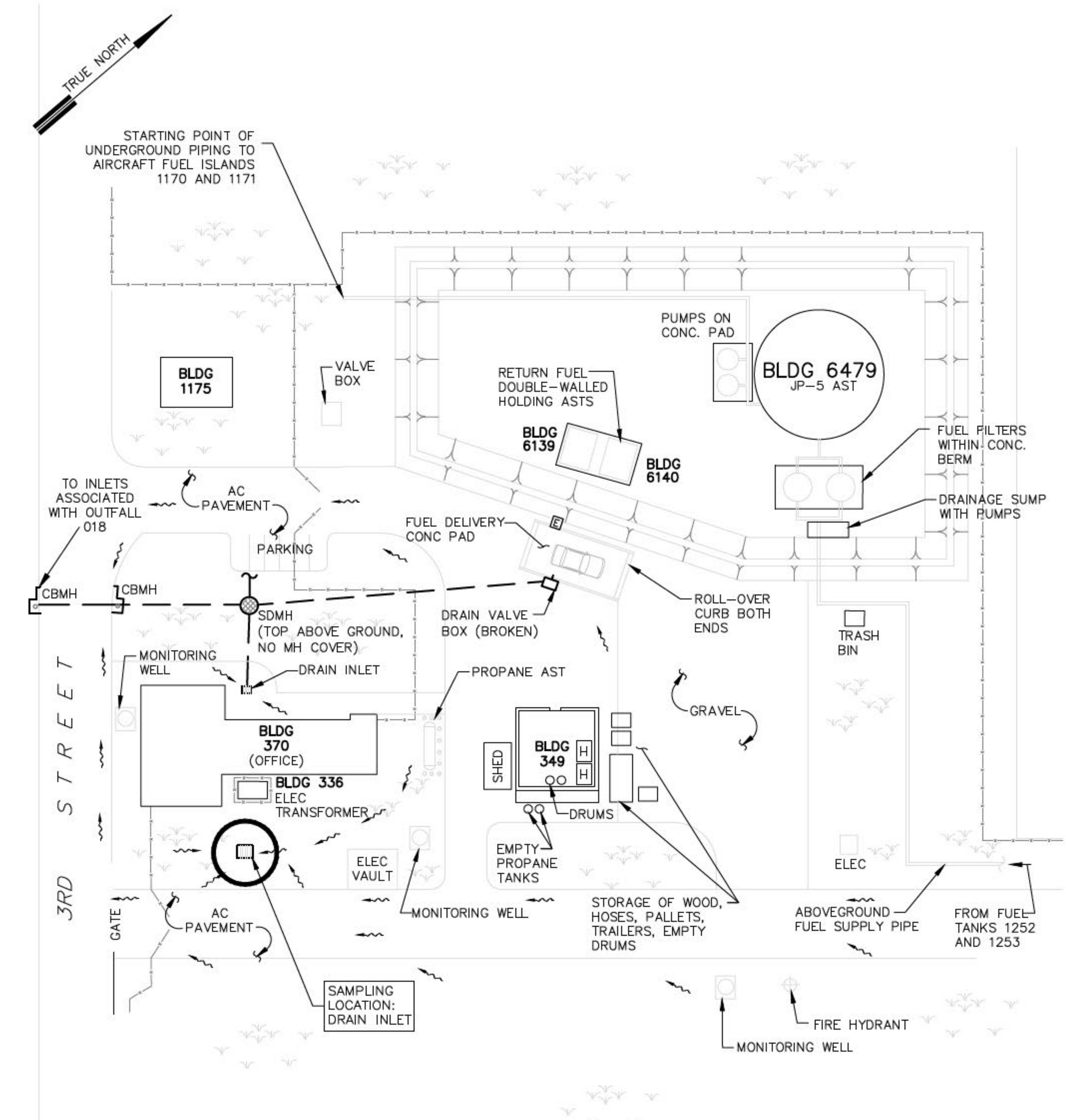
NOT TO SCALE

NOTES:

STORM WATER COLLECTED BY FLOOR DRAINS IS DISHCARGED TO THE OIL/WATER SEPARATOR. ANY OVERFLOW OF STORM WATER, FROM APPROXIMATELY 1.1 ACRES ASSOCIATED WITH BUILDING 6183 IS DISCHARGED AS SHEET FLOW TO ADJACENT GRASS AND PAVEMENT. THE NEAREST RECEIVING WATER IS KANEOHE BAY.

DATE: MAY 2022	PROJECT TITLE: STORM WATER MONITORING PLAN MCBH, KANEOHE BAY, OAHU, HAWAII	
FIGURE TITLE: ENGINE TEST FACILITY (BUILDING 6183)		FIGURE NO.: 12-12

MHESKETT 5/27/2022 2:36:20 PM FIG 12-12 Bldg 6183 – Engine Test Facility.dwg



AIRCRAFT READY FUEL STORAGE (BUILDING 6479)

NOT TO SCALE

LEGEND

H	HAZARDOUS MATERIALS LOCKER
E	EYEWASH STATION
— —	STORM DRAIN SYSTEM
~~>	FLOW ARROW

NOTES:
STORM WATER, FROM APPROXIMATELY 1.4 ACRES ASSOCIATED WITH BUILDING 6479, DISCHARGES TO KANEOHE BAY VIA OUTFALLS 018 & 021.

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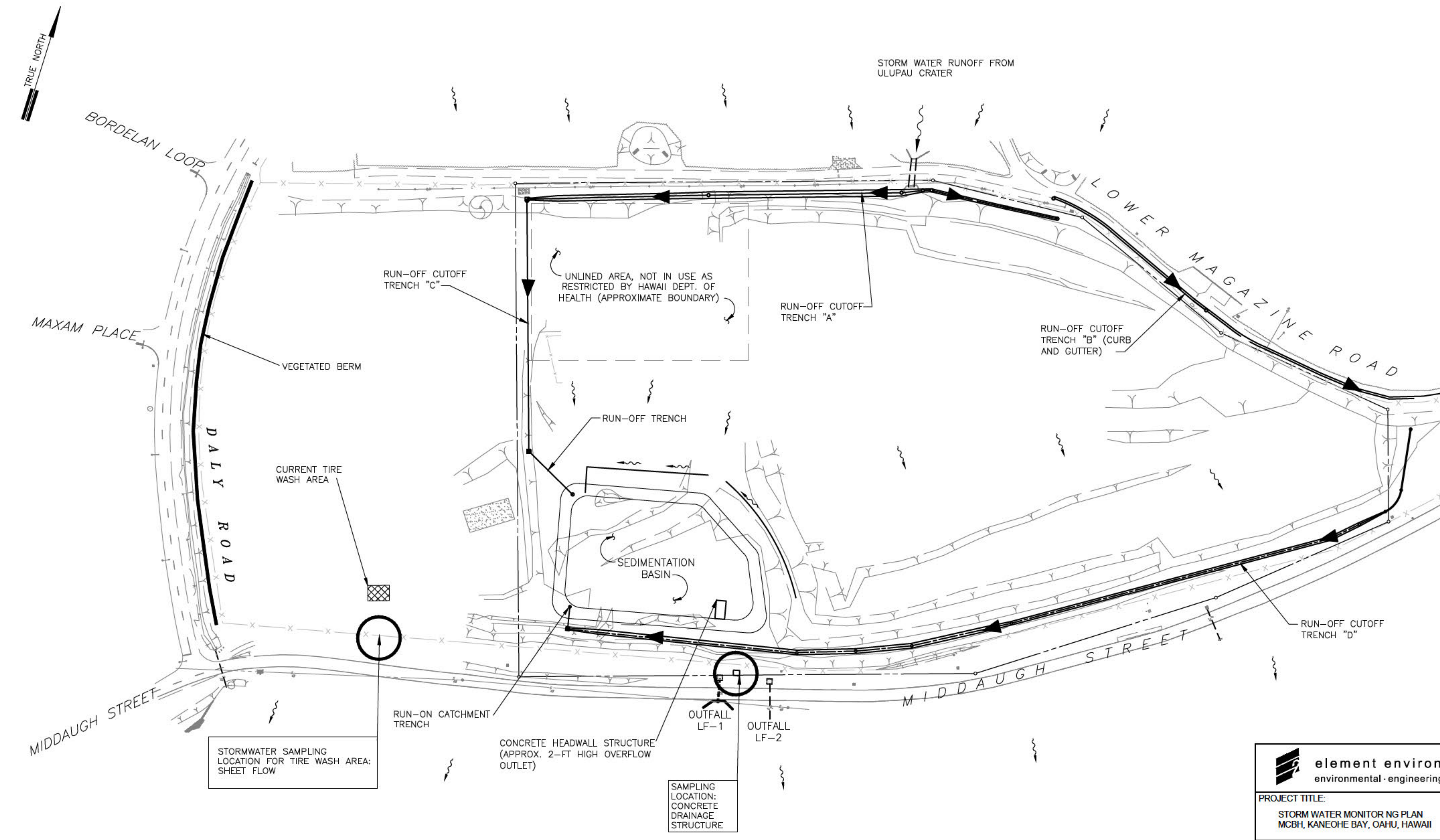
FIG 12-13 Bldg 6479 – Aircraft Ready Fuel Storage.dwg

DATE: MAY 2022

PROJECT TITLE: STORM WATER MONITORING PLAN MCBH, KANEOHE BAY, OAHU, HAWAII

FIGURE TITLE: AIRCRAFT READY FUEL STORAGE (BUILDING 6479)

FIGURE NO.: 12-13



SANITARY LANDFILL

NOT TO SCALE

NOTE:

STORM WATER, FROM APPROXIMATELY 34.1 ACRES ASSOCIATED WITH THE SANITARY LANDFILL, IS DISCHARGED TO KAILUA BAY VIA OUTFALLS LF–1 AND LF–2.

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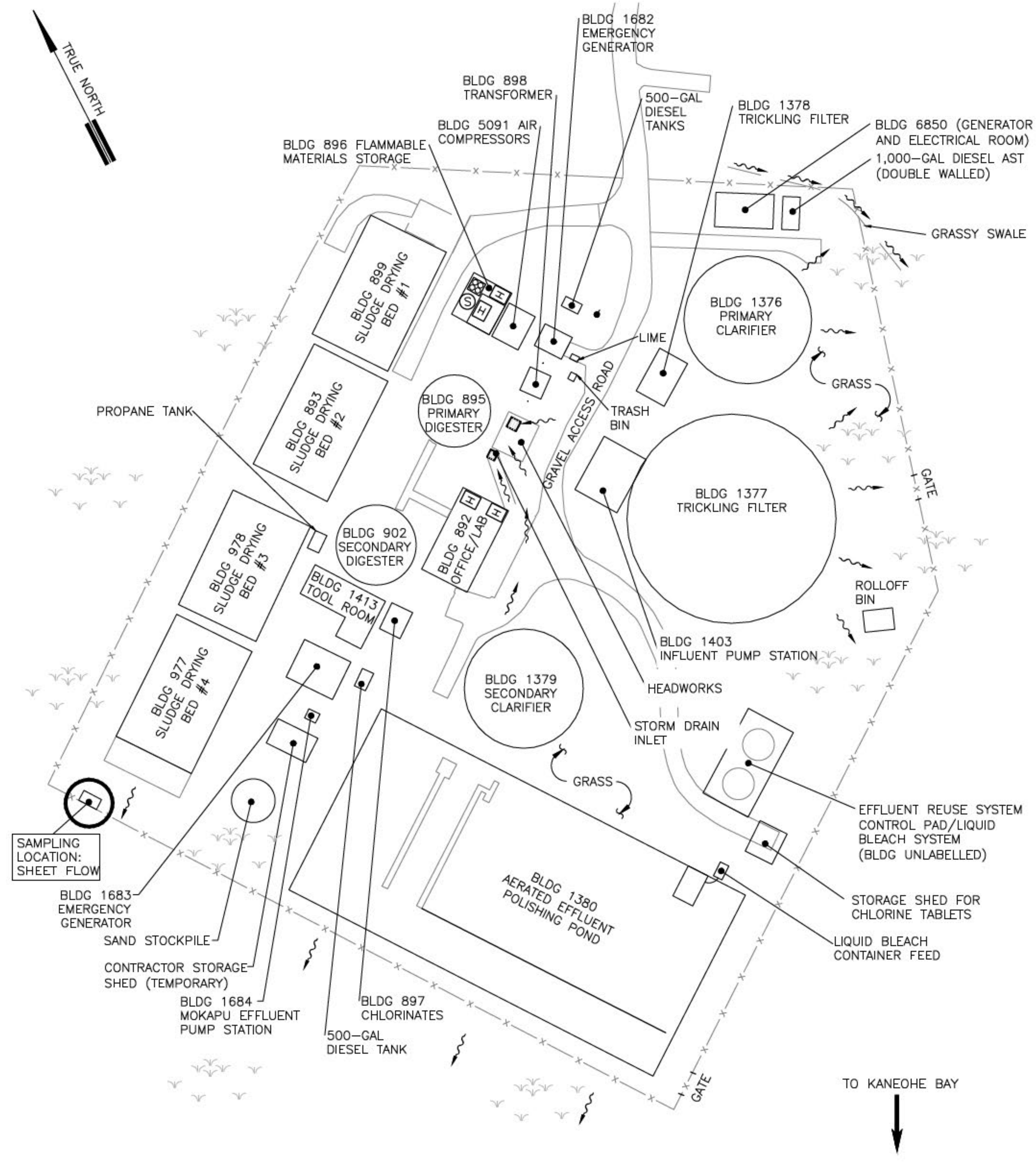
PROJECT TITLE:
STORM WATER MONITOR NG PLAN
MCBH, KANEOHE BAY, OAHU, HAWAII

FIGURE TITLE:
SANITARY LANDFILL

DATE:
MAY 2022

FIGURE NO.:
12-14



LEGEND

H HAZARDOUS MATERIALS LOCKER

SPILL PALLET W/DRUMS

S SPILL KIT

WATER RECLAMATION FACILITY

NOT TO SCALE

NOTES:

1. STORM WATER, FROM APPROXIMATELY 4.6 ACRES, ASSOCIATED WITH THE WATER RECLAMATION FACILITY, DISCHARGES TO KANEOHE BAY VIA SURFACE RUNOFF.

DATE:	PROJECT TITLE:	
MAY 2022	STORM WATER MONITORING PLAN MCBH, KANEOHE BAY, OAHU, HAWAII	
FIGURE TITLE:		FIGURE NO.:
WATER RECLAMATION FACILITY		12-15

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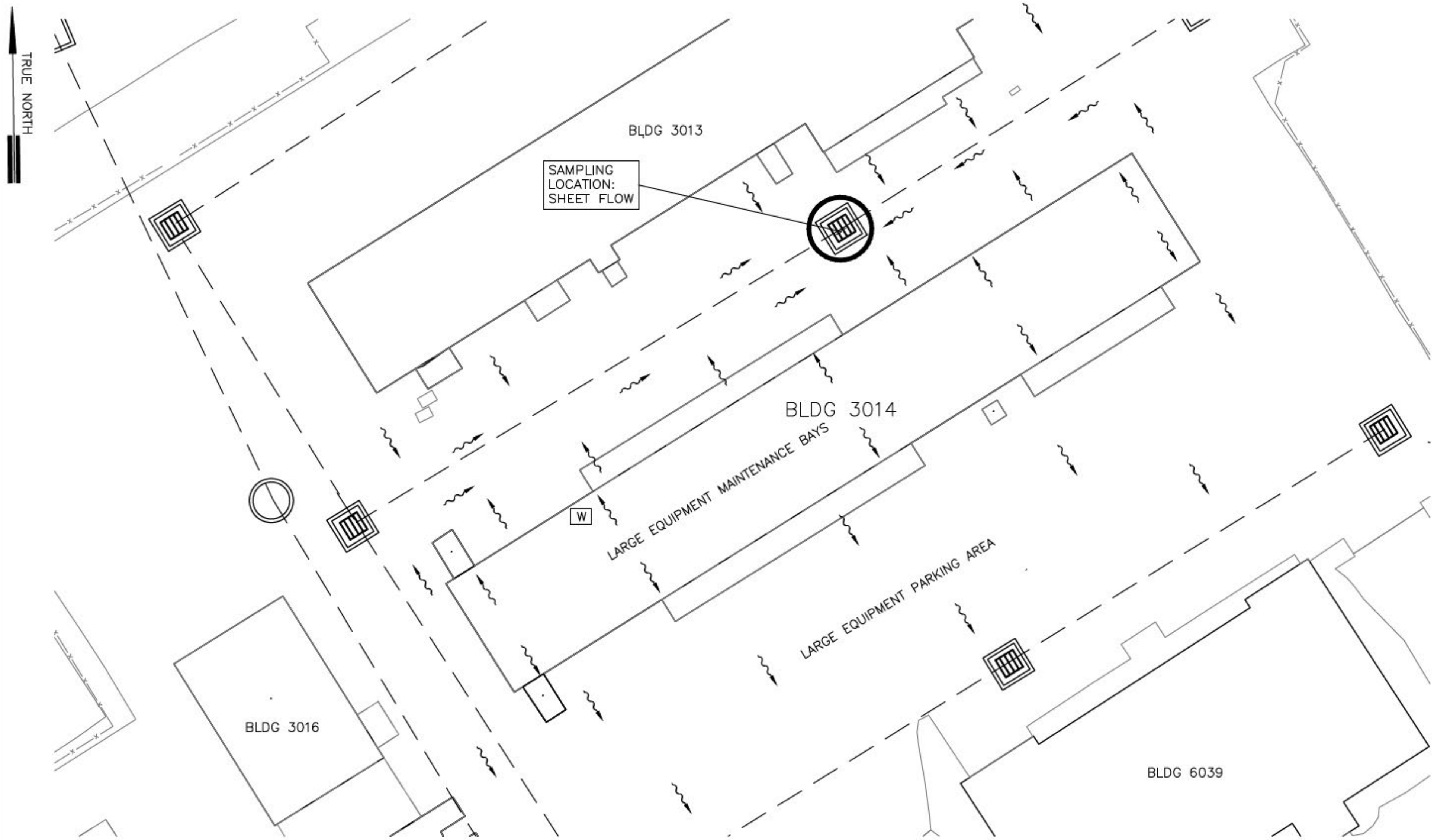
FIG 12-15 Water Reclamation Facility.dwg



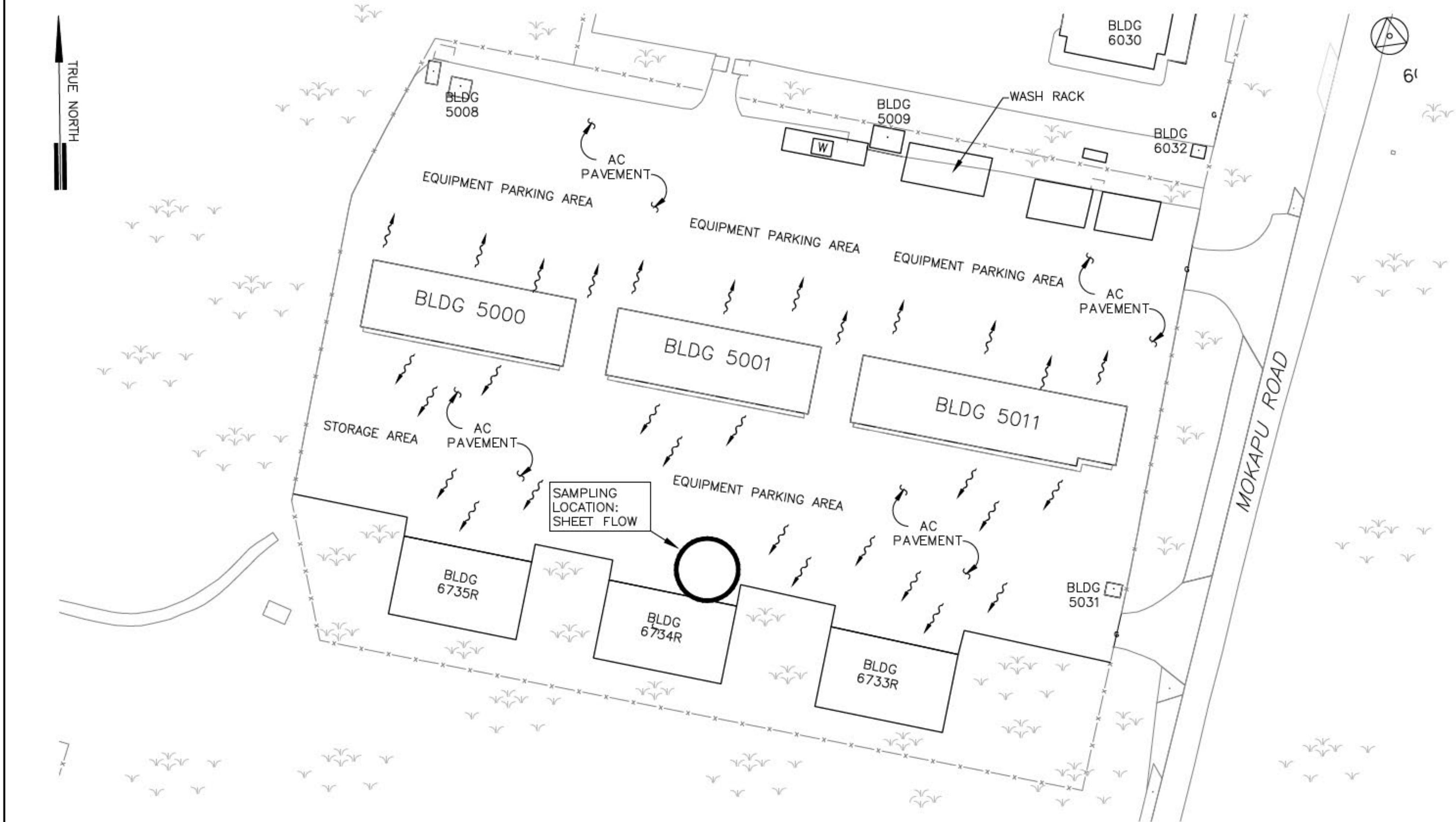
COMBAT LOGISTICS BATTALION (CLB-3) SUPPORT COMPANY TRANSPORTATION SERVICES (BUILDING 3014)

NOT TO SCALE

LEGEND

W	SATELLITE ACCUMULATION SITE
	FLOW ARROW
	STORMWATER UTILITY

DATE:	PROJECT TITLE:	
MAY 2022	STORM WATER MONITORING PLAN MCBH, KANEOHE BAY, OAHU, HAWAII	
FIGURE TITLE:		FIGURE NO.:
COMBAT LOGISTICS BATTALION (CLB-3) SUPPORT COMPANY (BUILDING 3014)		12-16



12th MOTOR T (BUILDINGS 5000, 5001, 5011)

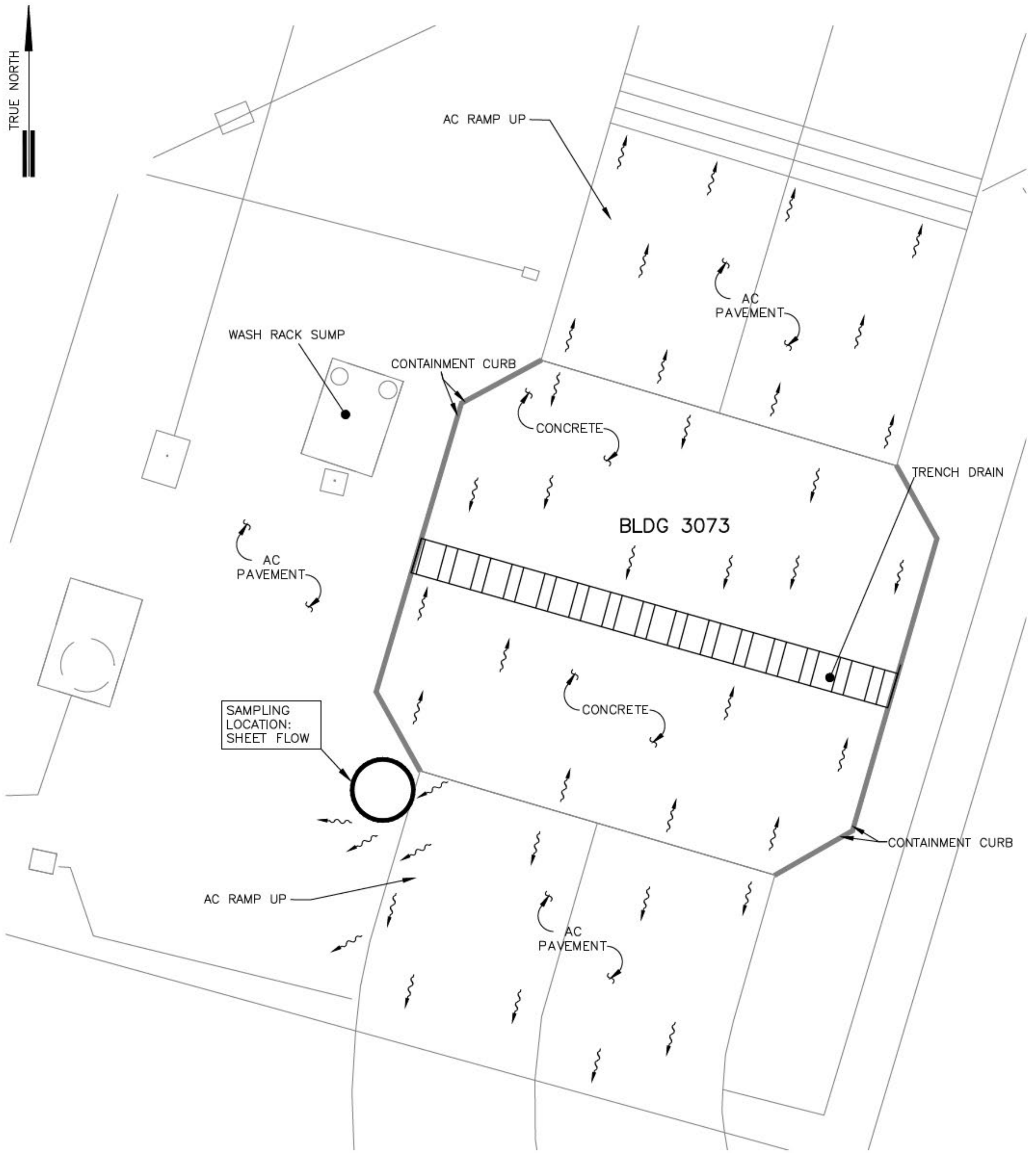
NOT TO SCALE

LEGEND

W SATELLITE ACCUMULATION SITE

FLOW ARROW

DATE:	PROJECT TITLE:	
MAY 2022	STORM WATER MONITORING PLAN MCBH, KANEOHE BAY, OAHU, HAWAII	
FIGURE TITLE:		FIGURE NO.:
12th MOTOR T (BUILDINGS 5000, 5001, 5011)		12-17



HELICOPTER WASH (FACILITY 3073)

NOT TO SCALE

LEGEND

FLOW ARROW

DATE: MAY 2022	PROJECT TITLE: STORM WATER MONITORING PLAN MCBH, KANEOHE BAY, OAHU, HAWAII	
FIGURE TITLE: HELICOPTER WASH (FACILITY 3073)		FIGURE NO.: 12-18

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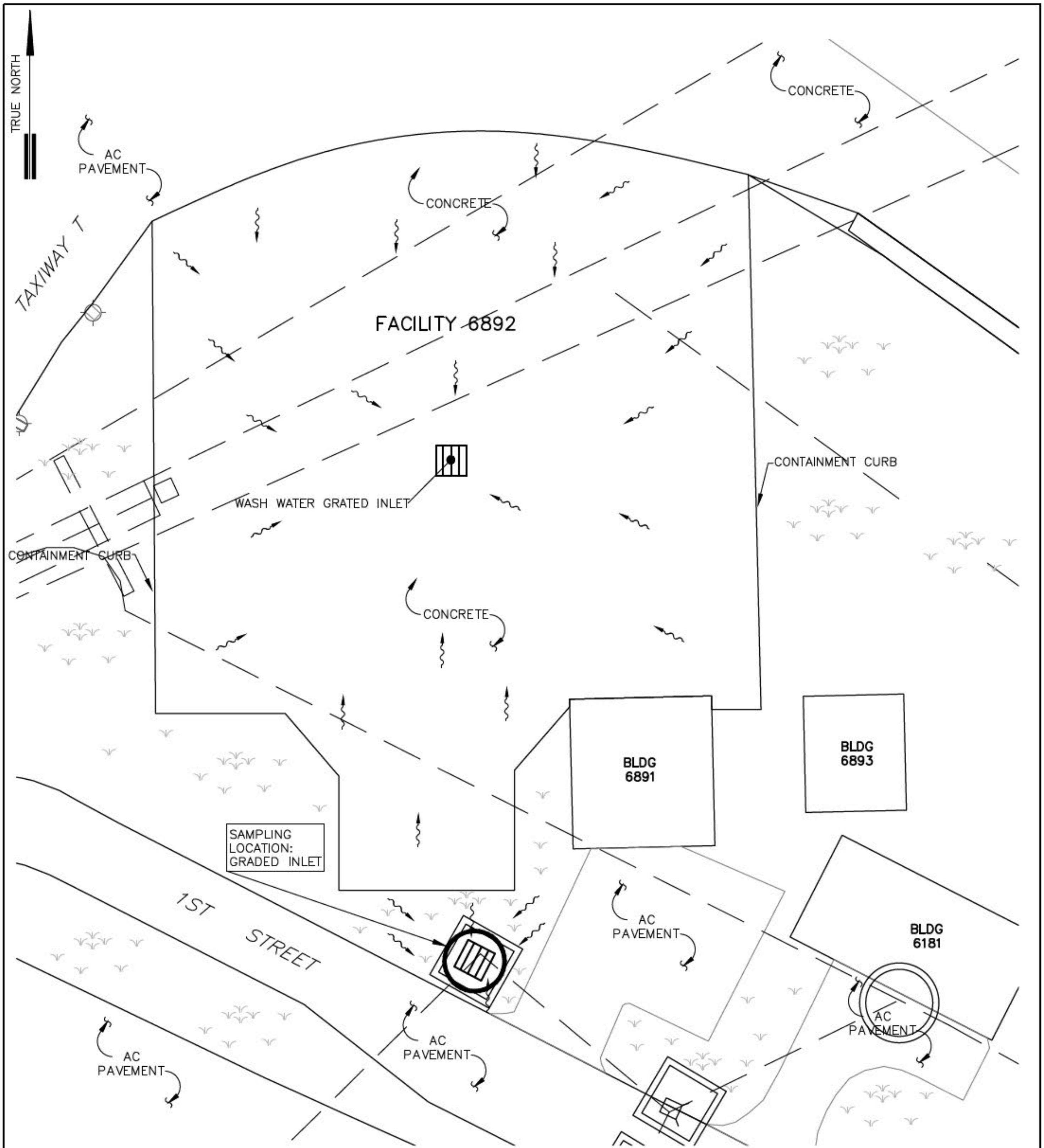
FIG 12-18 Bldg 3073 – Helicopter Wash Facility.dwg



AIRCRAFT WASH (FACILITY 6892)

NOT TO SCALE

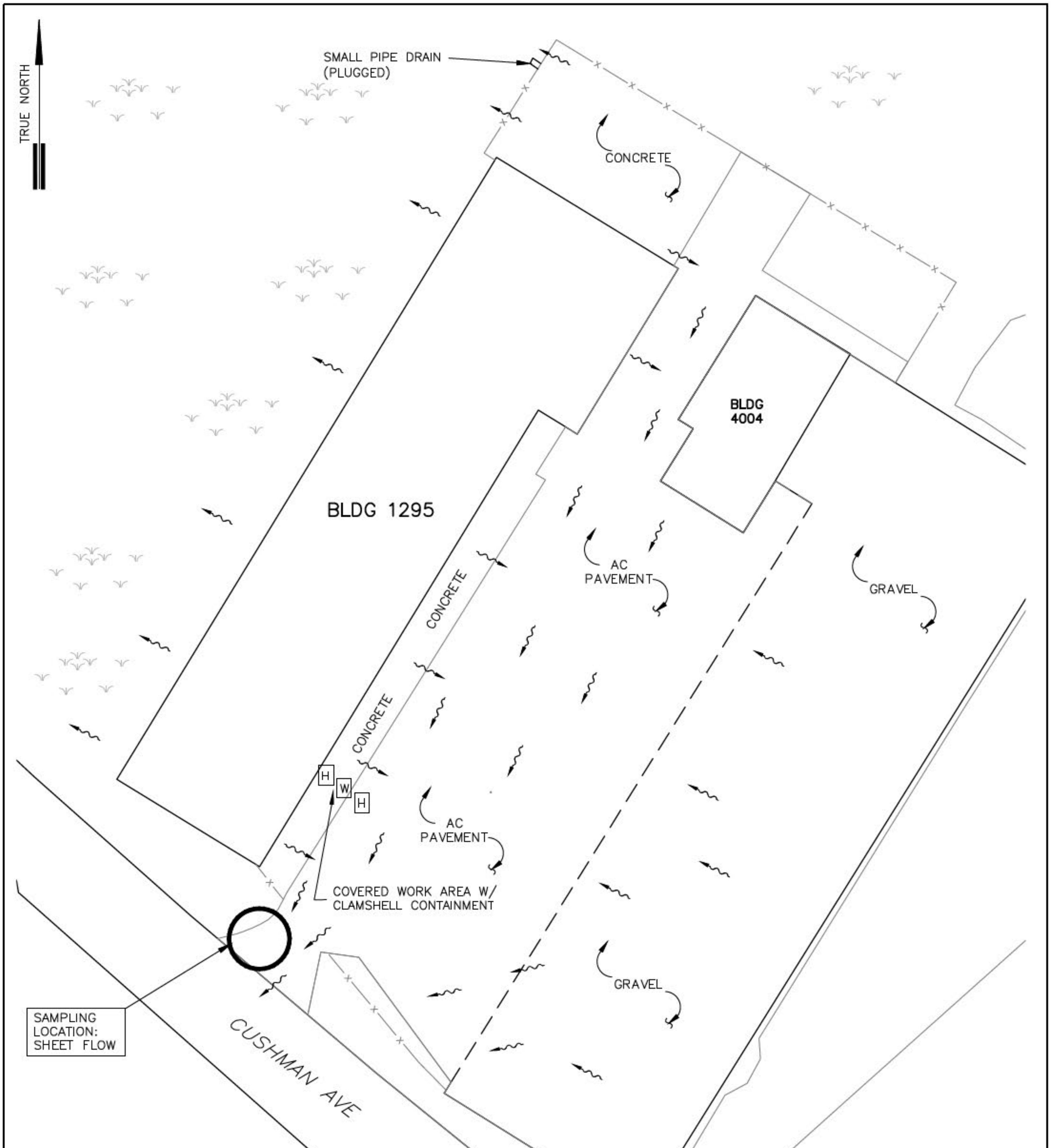
LEGEND

FLOW ARROW

STORMWATER UTILITY

DATE: MAY 2022	PROJECT TITLE: STORM WATER MONITORING PLAN MCBH, KANEOHE BAY, OAHU, HAWAII	
FIGURE TITLE: AIRCRAFT WASH (FACILITY 6892)		FIGURE NO.: 12-19

DAMATO
5/27/2022 12:21:30 PM
Fg 12-19 Bldg 6892 – Aircraft Wash Facility.dwg



GOLF COURSE MAINTENANCE SHED (BUILDING 1295)

NOT TO SCALE

LEGEND

- W — SATELLITE ACCUMULATION SITE
- H — HAZARDOUS MATERIALS STORAGE
- FLOW ARROW

DATE:	PROJECT TITLE:	
MAY 2022	STORM WATER MONITORING PLAN MCBH, KANEOHE BAY, OAHU, HAWAII	
FIGURE TITLE: GOLF COURSE MAINTENANCE SHED (FACILITY 1295)		FIGURE NO.: 12-20

MHESKETT
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FIG 12-20 Bldg 1295 – Golf Course Maintenance.dwg

13 Reporting Requirements

In accordance with the MS4 Permit, 40 CFR §122.42(c), and this SWMP Plan, MCBH is required to submit two annual reports to the State of Hawaii Department of Health (DOH) by January 30th of each year. These reports include the following:

1. An Annual Report, which includes documentation of all SWMP Plan activities during the reporting period (i.e., fiscal year) and demonstrates compliance with the MS4 permit with respect to various activities and milestones.
2. An Annual Monitoring Report, which documents the sampling events, data collection and water quality assessments described in Chapter 12, Monitoring Requirements.

The storm water Annual Report documents all updates and revisions to the SWMP Plan, along with explanations of the changes. The Annual Report also contains a status update on all of the SWMP elements required by the MS4 Permit as well as an assessment of the SWMP's effectiveness.

The Annual Monitoring Report summarizes the past year's monitoring efforts including Discharge Monitoring Reports documenting the storm water sampling and analysis results. The Annual Monitoring Report also includes an assessment of the effectiveness of the SWMP monitoring program.

Well-maintained records and clear reporting formats are necessary for regulatory compliance. Thorough records management is also useful for the assessment of the effectiveness of the storm water management program.

In addition to the annual reporting requirements, certain updates to the SWMP Plan may occur at any time during the permit period. As stated in Part D.2. of the Permit, MCBH is also required to modify the SWMP Plan when any of the following occur:

1. An exceedance of any discharge limitation or water quality standard established in Hawaii Administrative Rules (HAR), Section 11-54-4. The revisions shall include best management practices (BMPs) and/or measures to reduce the amount of pollutants found to be in exceedance from entering State waters.
2. Change in conditions and incorporation of more effective approaches to pollutant control.
3. System modifications, including any planned physical alterations or additions to the permitted MS4 and any existing outfalls newly identified over the term of the permit.

Part D.2, SWMP Modifications, of the MS4 Permit states:

> *"The Permittee shall properly address all modifications, concerns, requests, and/or comments to the satisfaction of the DOH and/or EPA. Minor changes may be proposed by the Permittee or requested by DOH or the EPA. Proposed changes that imply a major reduction in the overall scope and/or level of effort of the SWMP must be made for cause and in compliance with 40 CFR 122.62 and Part 124. A written report shall be submitted to the DOH for acceptance at least 30 calendar days prior to the initiation date of the major modification. The Permittee shall report and justify all other modifications made to the SWMP in its Annual Report for the year in which the modification was made."*

The MS4 Permit describes the requirements for the Annual Report and Annual Monitoring Report as follows:

*"**Part G.1. Annual Report***

> ***Part G.1.a.*** *The Permittee shall submit the Annual Report by January 30th of each year in pdf format (minimum 300 dpi) in accordance with Part A.7. The Annual Report shall cover the past fiscal year. For the calendar year prior to the expiration date of the permit, the Annual Report and the e- Permitting CWB Individual NPDES Form, or other form approved by the DOH, shall be submitted to the DOH. The Annual Report shall also include a description of the statuses of all items required in the permit. Submittal of the renewal application shall be at least one (1) year prior to the expiration date of this permit and include a $1,000 filing fee.*
>
> ***Part G.1.b.*** *The Permittee shall revise its SWMP to include a description of reporting procedures and activities, including schedules and proposed content of the Annual Reports such that, at a minimum, the following is reported for each storm water program component in each Annual Report:*
>
> > ***Part G.1.b.(1) Requirements*** *- Describe what the Permittee was required to do (describe status of compliance with conditions of this permit and other commitments set forth in the SWMP).*
> >
> > ***Part G.1.b.(2) Past Year Activities*** *- Describe activities over the reporting period in comparison to the requirements, including, where applicable, progress accomplished toward meeting specific measurable goals, standards and milestones or other specific performance requirements. When requirements were not fully met, include a detailed explanation as to why the Permittee did not meet its commitments for the reporting period. Also describe an assessment of the SWMP, including progress towards implementing each of the SWMP program components.*
> >
> > ***Part G.1.b.(3) Future Activities*** *- Describe planned activities, including, where applicable, specific activities to be undertaken during the next reporting period toward accomplishing specific measurable goals, standards and milestones or other specific performance requirements.*
> >
> > ***Part G.1.b.(4) Resources*** *- Report on the status of the Permittee's resource base for implementing this NPDES permit during the applicable reporting period and an estimate of the resources over and above those required in the current reporting period that will be required in the next reporting period.*
>
> ***Part G.1.c. Modifications*** *- In each Annual Report, the Permittee shall describe any modifications made to the SWMP and implementation schedule during the past year, including justifications. The Permittee shall also describe major modifications made to the Permittee's MS4, including, but not limited to, addition and removal of outfalls, drainage lines, and facilities.*
>
> ***Part G.1.d. Program Effectiveness Reporting*** *- Within six (6) months from the effective date of the permit, the Permittee shall submit to the DOH and implement their written strategy for determining effectiveness of its SWMP. The strategy shall include water quality monitoring*

efforts as well as program implementation information and other indicators. The Permittee shall include an assessment of program effectiveness and identification of water quality improvements or degradation in its Annual Report."

"Part G.2. Annual Monitoring Report

Part G.2.a. *The Permittee shall submit the Annual Monitoring Report by January 30thDecember 31st of each year in pdf format (minimum 300 dpi) in accordance with Part A.76. The Annual Monitoring Report shall cover the past fiscal year.*

Part G.2.b. *The monitoring report shall at a minimum, include the following items:*

Part G.2.b.(1) *Discussion on the activities/work implemented to meet each objective, as outlined in Part F.1.a, including any additional objectives identified by the Permittee, and the results [e.g., assessment of the water quality issues in each watershed resulting from storm water discharges, refer to Part F.1.a.(7)] and conclusions.*

Part G.2.b.(2) *Written narrative of the past fiscal year's activities, including those coordinated with other agencies, objectives of activities, results and conclusions.*

Part G.2.b.(3) *Data gathered on levels of pollutants in non-storm water discharges to the Permittee's MS4.; and*

Part G.2.b.(4) *Using rainfall data collected by the Permittee and other agencies, the Permittee shall relate rainfall events, measured pollutant loads, and discharge volumes from the watershed and other watersheds that may be identified from time to time by the DOH or Permittee.*

Part G.2.b.(5) *Dates when monitoring occurred for each industrial facility covered under this permit. The monitoring event shall be of a representative storm event, where results were available for all required parameters following the QA/QC measures as described in the Annual Monitoring Plan.*

Part G.2.b.(6) *Discharge Monitoring Reports (DMRs) for industrial facilities shall be included in the Annual Monitoring Report and be submitted via NetDMR once established by the DOH. NetDMR is a Web-based tool that allows NPDES permittees to electronically sign and submit their DMRs to EPA's Integrated Compliance Information System (ICIS-NPDES) via the Environmental Information Exchange Network. NetDMR is accessed from http://www.epa.gov/netdmr. A DMR must be submitted for the facility which is scheduled to be monitored even if sampling was not conducted. An explanation as to why sampling was not conducted shall be explained with the submittal."*

Part G.2.c. Reporting of Noncompliance
In case of conflict between the conditions stated here and those in the "Standard NPDES Permit Conditions", the more stringent conditions shall apply.

Part G.2.c.(1) Twenty-Four Hour Reporting

The Permittee or its duly authorized representative (40 CFR 122.22) shall report any noncompliance which may endanger health or the environment. Any information shall be provided orally within 24 hours from the time the Permittee becomes aware of the circumstances. A written report shall also be provided within five (5) days of the time the Permittee becomes aware of the circumstances. A written report shall contain the information required under Part G.2.c.(4)(i). The following shall be included as information which must be reported within 24 hours.

- i. *Any unanticipated bypass which exceeds any benchmark value or effluent limitation (if applicable), in the permit.*
- ii. *Any upset which exceeds any benchmark value or effluent limitation (if applicable), in the permit.*
- iii. *Violations of a maximum daily discharge limitation in this permit.*

Part G.2.c.(2) Contacts for Oral Reports

- i. *The Permittee shall make oral reports during regular office hours (7:45 a.m. to 4:30 p.m.) to DOH, Clean Water Branch (CWB) at (808) 586-4309.*
- ii. *The Permittee shall make oral reports outside of regular office hours to the State Hospital Operator at (808) 247-2191.*

Part G.2.c.(3) Other Noncompliance
The Permittee shall report all instances of noncompliance not reported under Part F.2.c.(1) at the time DMR are submitted. The permittee shall provide information required under Part F.2.c.(4).

Part G.2.c.(4) Written Noncompliance Reports

- i. *Written noncompliance reports shall contain a description of the noncompliance and its cause; the period of noncompliance, including exact dates and times; if the noncompliance has not been corrected, the anticipated time it is expected to continue; public notice efforts, if any; clean-up efforts, if any; and steps taken or planned to reduce, eliminate and prevent reoccurrence of the noncompliance.*
- ii. *The DOH may waive the written report or the five-working day deadline on a case-by-case basis for spills, bypasses, upsets, and violations of daily maximum discharge limitations if the oral report has been received within 24 hours of the noncompliance or when the Permittee's authorized personnel becomes aware of the noncompliance.*
- iii. *The written report shall be submitted through the CWB Compliance Submittal Form for Individual NPDES Permits and Notice of General Permit Coverages (NGPCs) or as otherwise instructed by the DOH. This form is accessible through the e-Permitting Portal website at: https://eha-cloud.doh.hawaii.gov/epermit.*

Part G.2.d. Types of Sample

Part G.2.d.(1) *"Grab sample" means an individual sample collected within the first 30 minutes of a discharge associated with a measurable storm event. See Appendix 1, Part 6.1.4. for more information regarding grab samples.*

> ***Part G.2.d.(2)*** *"Composite sample" means a combination of at least eight (8) sample aliquots, collected at periodic intervals during the operating hours of the facility over a 24-hour period. The composite must be flow proportional; either the time interval between each aliquot or the volume of each aliquot must be proportional to either the stream flow at the time of sampling or the total stream flow since the collection of the previous aliquot. Aliquots may be collected manually or automatically."*

13.1 Annual Reports

The structure of the annual report will be consistent with the structure of this SWMP Plan.

The Annual Report chapters are organized by program element, as follows:

- Public Education and Outreach;
- Illicit Discharge Detection and Elimination (IDDE);
- Construction Site Runoff Control;
- Post-Construction Storm Water Management;
- Pollution Prevention/Good Housekeeping;
- Industrial and Commercial Activities Discharge Management; and
- Monitoring.

Each chapter in the Annual Report contains the following information:

- Requirements - Status of compliance with permit requirements and commitments set forth in this SWMP Plan,
- Past year's activities,
- Future activities,
- Resources – resource base for the current and future reporting period,
- Modifications – any changes to the SWMP Plan, schedule, and/or the MS4, and
- Program effectiveness reporting – evaluation of activities and collected information to assess the effectiveness of past SWMP Plan activities and to refine future decision making regarding resource allocation and program implementation.

The Annual Report will also include a summary of training conducted during the previous year including the results of the annual Environmental Compliance Coordinator (ECC) awareness survey and specific IDDE Program training.

After conducting a physical inspection of the MS4, including all outfalls, MCBH will identify high priority components at a greater risk of impact to receiving waters from discharge of pollutants, based on the types of activities and proximity to impaired waters. Newly identified high priority components of the MCBH MS4 will be identified in the Annual Report.

13.2 Annual Monitoring Reports

The Annual Monitoring Report will be completed in accordance with the MS4 Permit and the Monitoring Plan, as described in Chapter 12 of this SWMP Plan. The Annual Monitoring Report will include a narrative of the past year's monitoring activities, summary of collected data and an assessment of the results.

MCBH conducts quarterly visual assessments of storm water discharge at all of its permitted industrial facilities. A storm water sample is collected, visually inspected for water quality characteristics, and assessed for evidence of storm water pollution. Sector-specific quarterly benchmark sampling is conducted at four industrial facilities. Annual effluent monitoring sampling is conducted at one industrial location. Sampling and analysis results are documented on Discharge Monitoring Report and submitted to DOH via NetDMR as well as in the Annual Monitoring Report.

Monitoring results exceeding the effluent limitations shall be reported to DOH Clean Water Branch (CWB) as soon as the results become available.

13.3 Records Management

The SWMP Plan and supporting records are considered public documents under Section 308(b) of the Clean Water Act (CWA). Therefore, any member of the public may request to review MCBH's storm water permit documentation. Additionally, the SWMP Plan and supporting data will need to be made available upon request of a representative of the U.S. Environmental Protection Agency (EPA) and DOH.

Copies of the SWMP Plan, annual reports, monitoring information, and data pertaining to the MS4 Permit must be retained at the ECPD office for a minimum period of five (5) years from the date of measurement, observation, report, or application. The above must also be made available to the public upon request.

ECPD is the designated recordkeeper of the MCBH SWMP Team. As noted in Chapter 1, the recordkeeper is responsible for archiving all documents associated with the SWMP Plan, including the site map, inspection reports, maintenance records, and annual reports.

13.4 Program Effectiveness Assessment Plan

The *Program Effectiveness Assessment Plan* is included in Appendix 13-1. The *Program Effectiveness Assessment Plan* presents the strategy for:

(1) Measuring progress of permit compliance and implementation of BMPs;
(2) Tracking program component effectiveness over the permit period; and
(3) Setting the framework to be able to link program implementation with environmental improvements over time.

APPENDIX 1-1

Final Permit and Rationale

Marine Corps Base Hawaii Permit No. HI S000007

Effective Date of Permit: September 1, 2021

AUTHORIZATION TO DISCHARGE UNDER THE NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM

In compliance with the provisions of the Clean Water Act, as amended, (33 U.S.C. §1251 et. seq.; the "Act"); Hawaii Revised Statutes, Chapter 342D; Hawaii Administrative Rules (HAR) Chapters 11-54 and 11-55, and the Department of Health (DOH), State of Hawaii,

MARINE CORPS BASE HAWAII (MCBH), KANEOHE BAY

(hereinafter PERMITTEE),

is authorized to discharge storm water runoff and certain non-storm water discharges as identified in Part B.2. of this permit from the MCBH, Kaneohe Bay Municipal Separate Storm Sewer System (MS4); storm water runoff from industrial sites; and additional storm sewer outfalls that may be identified from time to time by the Permittee,

into Kaneohe Bay (class AA); Nuupia, Halekou, and Kaluapuhi Ponds (class 1); Kailua Bay (class A); and Mokapu Central Drainage Channel (class AA/2); Island of Oahu, Hawaii,

in accordance with the general requirements, discharge monitoring requirements, and other conditions set forth herein, and in the attached DOH "Standard NPDES Permit Conditions," (Version 15) that is available on the DOH, Clean Water Branch (CWB) website at
http://health.hawaii.gov/cwb/site-map/home/standard-npdes-permit-conditions.

All references to Title 40 of the Code of Federal Regulations (CFR) are to regulations that are in effect on July 1, 2020, except as otherwise specified. Unless otherwise specified herein, all terms are defined as provided in the applicable regulations in Title 40 of the CFR.

Failure to comply with any condition, requirement, and/or limitation in this permit is an enforceable violation and your National Pollutant Discharge Elimination System (NPDES) permit may be terminated. Examples of enforceable violations include, but are not limited to: Unauthorized discharges where a pollutant was not disclosed in the NPDES application, but was detected by monitoring only requirements in the NPDES permit or by other means determined by the DOH; failure to sample, analyze, or submit water quality results as required in the NPDES permit; and discharging pollutants in locations that were not authorized in the NPDES permit. If you violate Hawaii Revised Statutes (HRS) Chapter 342D, you may be subject to penalties of up to $25,000 per violation per day and up to two (2) years in jail.

Falsification of information, including providing information in the NPDES application that does not match what is actually occurring at the project site/facility, may result in criminal penalties for the Permittee and their authorized representative as provided in Clean Water Act, Section 309 and HRS Section 342D-35.

This permit will become effective on **September 1, 2021**.

This permit and the authorization to discharge will expire at midnight, **August 31, 2026**. The Permittee shall submit a renewal application at least one (1) year prior to the expiration date of this permit.

Signed this 12th day of August, 2021.

____
(For) Director of Health

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ATTACHMENT: STANDARD NPDES PERMIT CONDITIONS (VERSION 15). In case of conflict between the conditions stated in this permit and those specified in the Standard NPDES Permit Conditions, the more stringent conditions shall apply.

Part A. GENERAL REQUIREMENTS

The Permittee shall:

Part A.1. Comply with the existing Marine Corps Base Hawaii's (MCBH) Storm Water Management Program (SWMP) Plan until submittal of the revised SWMP to the DOH; and future activities as identified in its last submitted Annual Report. The revised SWMP shall be implemented upon submittal to the DOH.

Part A.2. Comply with all requirements in this permit, until its termination. In case of conflict with any requirements, the more stringent requirement shall apply.

Part A.3. Retain a copy of this permit and all other related materials and the SWMP, with all subsequent revisions, at the designated location as identified in the SWMP.

Part A.4. Ensure that anyone working under this permit complies with the terms and conditions of this permit.

Part A.5. Include the permit number, **HI S000007**, and the following certification with all information required under this permit:

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

Part A.6. All "Plans" (e.g., SWMP Plan, Enforcement Response Plan, Trash Reduction Plan, Plan for Requiring Low Impact Development (LID) in its Standards; etc.) shall be available (e.g., on Permittee's website or other means) for a minimum of 30 calendar days for public review and comment. The Permittee shall notify DOH by email at cleanwaterbranch@doh.hawaii.gov of the availability of the plan within five (5) calendar days of the plan being available. The Permittee shall address all comments received within the 30-calendar-day period and provide both comments and responses to the DOH with its submittal of the Plan in accordance with the deadline as specified in Part H. All Plans shall be implemented upon submittal regardless of DOH's review and acceptance. If any deficiencies are found by the DOH after submittal, the Permittee shall correct the deficiencies to the DOH's satisfaction within 30 calendar days or such other time as agreed to in writing and resubmit the plan. In addition to the Plans being available for public comment, the current/existing plans shall also be accessible for public viewing.

Part A.7. All information and reports required under this permit and updates to information on file shall be submitted through the "CWB Compliance Submittal Form for Individual NPDES Permits and Notice of General Permit Coverages (NGPCs)" or other form approved by the DOH. This form is accessible through the e-Permitting Portal website at: https://eha-cloud.doh.hawaii.gov/epermit/. If not already registered, you will be asked to do a one-time registration to obtain your login and password. After you register, click on the Application Finder tool to locate the form. Follow the instructions to complete and submit this form. All submissions shall include a CD or DVD containing the downloaded e-Permitting submission and a completed "Transmittal Requirements and Certification Statement for e-Permitting NPDES/NGPC Compliance Submissions" form, with original signature and date.

Part B. DISCHARGE LIMITATIONS

Part B.1. The Permittee shall effectively prohibit non-storm water discharges through its separate storm sewer system into State Waters and from its facilities discharging directly to State Waters or through a non-Permittee-owned MS4. National Pollutant Discharge Elimination System (NPDES) permitted discharges and non-storm water discharges identified in Part B.2 of this permit are exempt from this prohibition.

Part B.2. The following non-storm water discharges may be discharged into the Permittee's MS4 provided that the discharge is identified below, and meets all conditions when specified by the Permittee. In the event that any of the non-storm water discharges listed below is determined to be a source of pollution by the Permittee, the discharge will no longer be allowed. The source of the non-storm water discharges listed below shall not be reuse water or recycled process wastewater (i.e. construction dewater effluent, hydrotesting water, etc.).

- Water line flushing;
- Landscape irrigation;
- Diverted stream flows;
- Rising ground waters;
- Uncontaminated ground water infiltration (as defined in 40 CFR 35.2005(20));
- Uncontaminated pumped ground water, not including construction related dewatering activities;
- Discharges from potable water sources and foundation drains;
- Air conditioning condensate;
- Irrigation water;
- Springs;
- Water from crawl space pumps, uncontaminated water from utility manholes or boxes, and footing drains;
- Lawn watering runoff;
- Water from individual residential car washing;
- Water from charity car washes;
- Flows from riparian habitats and wetlands;
- Dechlorinated swimming pool discharges;
- Exterior building wash water (water only);
- Residual street wash water (water only), including wash water from sidewalks, plazas, and driveways, but excluding parking lots; and
- Discharges or flows from firefighting activities.

The Permittee may also develop a list of other similar occasional incidental non-storm water discharges (e.g., non-commercial car washes, etc.) that will not be addressed as illicit discharges. These non-storm water discharges must not be reasonably expected (based on the information available to the Permittee) to be significant sources of pollutants to the MS4, because of either the nature of the discharges or conditions the Permittee has established for allowing these discharges to the MS4 (e.g., non-commercial car wash with appropriate controls on frequency, proximity to sensitive water bodies, Best Management Practices (BMPs) for the wash water, etc.). The Permittee shall document in the SWMP any local controls or conditions placed on the discharges, and include a provision prohibiting any individual non-storm water discharge that is determined to be contributing pollutants to the MS4.

Part B.3. The discharge of pollutants from the Permittee's MS4 shall be reduced to the Maximum Extent Practicable (MEP), consistent with Section 402(p)(3)(B) of the Act. The intent of this permit, and the provisions herein, is for the Permittee to develop, achieve, and implement a timely, comprehensive, cost-effective SWMP to reduce the discharge of pollutants to the MEP from the Permittee’s MS4 to waters of the State. MEP is a dynamic performance standard and evolves as knowledge of urban runoff control measures increases.

Part B.4. The discharge of pollutants from the Permittee's facilities classified as Industrial in accordance with 40 CFR 122.26(b)(14) shall be reduced to the appropriate discharge limitations subject to the Best Available Technology currently available (BAT)/ Best Conventional Pollutant Control Technology (BCT) discharge requirement, consistent with the Act and other respective federal and state requirements for such facilities.

Part C. RECEIVING WATER LIMITATIONS, INSPECTIONS, AND CORRECTIVE ACTIONS

Part C.1. The discharge shall comply with the basic water quality criteria which states:

"All waters shall be free of substances attributable to domestic, industrial, or other controllable sources of pollutants, including:

Part C.1.a. Materials that will settle to form objectionable sludge or bottom deposits;

Part C.1.b. Floating debris, oil, grease, scum, or other floating materials;

Part C.1.c. Substances in amounts sufficient to produce taste in the water or detectable off-flavor in the flesh of fish, or in amounts sufficient to produce objectionable color, turbidity or other conditions in receiving waters;

Part C.1.d. High or low temperatures; biocides; pathogenic organisms; toxic, radioactive, corrosive, or other deleterious substances at levels or in combinations sufficient to be toxic or harmful to human, animal, plant, or aquatic life, or in amounts sufficient to interfere with any beneficial use of the water;

Part C.1.e. Substances or conditions or combinations thereof in concentrations which produce undesirable aquatic life; and

Part C.1.f. Soil particles resulting from erosion on land involved in earthwork, such as the construction of public works; highways; subdivisions; recreational, commercial, or industrial developments; or the cultivation and management of agricultural lands."

Part C.2. The discharge shall not cause or contribute to a violation of any of the applicable beneficial uses or water quality objectives contained in HAR Chapter 11-54, titled "Water Quality Standards."

Part C.3. During inspections/screenings as required by this permit, the Permittee shall also visually inspect the receiving state waters, effluent, and control measures and BMPs to detect violations of, and conditions which may cause violations of, the basic water quality criteria as specified in HAR Section 11-54-4 (e.g., the Permittee shall look at effluent and receiving state waters for turbidity, color, floating oil and grease, floating debris and scum, materials that will settle, substances that will produce taste in the water or detectable off-flavor in fish, and inspect for items that may be toxic or harmful to human or other life). If the discharge enters the Permittee's MS4 prior to the receiving state water, then the Permittee may inspect their discharge where it enters the drainage system rather than at the receiving water. The Permittee is not required to inspect areas that, at the time of the inspection, are considered unsafe to inspection personnel, if the unsafe conditions have been documented.

Part C.4. The Permittee shall immediately take action to stop, reduce, or modify the discharge of pollutants as needed to stop or prevent a violation of the basic water quality criteria as specified in HAR Section 11-54-4.

Part C.5. For TMDLs adopted by DOH and approved by the EPA, the Permittee shall demonstrate consistency with the effluent limitations associated with TMDL WLAs consistent with the assumption of the associated TMDL document within the timeframe as specified in its Implementation and Monitoring (I&M) Plan.

Part D. STORM WATER MANAGEMENT PROGRAM (SWMP) PLAN

Part D.1. Development, Improvement, Implementation and Enforcement of SWMP

The Permittee shall further develop and improve, implement, and enforce a SWMP designed to address the requirements of this permit and reduce, to the Maximum Extent Practicable (MEP), the discharge of pollutants to and from its MS4 to protect water quality and to satisfy the appropriate water quality requirements of the Act. The SWMP shall include the following information for each of the SWMP components described in Part D.1.a to Part D.1.g below:

- The BMPs, including the underlying rationale that will be implemented for each of the program components.
- The measurable standards and milestones for each of the BMPs, including the underlying rationale and interim measures to aid in determining the level of effort and effectiveness of each program component.
- The name or position title and affiliation of the person or persons responsible for implementation or coordination of each program component.
- A monitoring program to determine effectiveness of the controls and the overall storm water program.

Submittal Date - The SWMP shall be: updated and modified per the requirements of this permit; consistent with the format of this permit; submitted to the DOH in accordance with Part A.6. and A.7. within 18 months after the effective date of this permit, or as otherwise specified; and fully implemented upon submittal. The Permittee shall implement the existing SWMP until submittal of the revision. The SWMP and any of its revisions, additions, or modifications are enforceable components of this permit.

Part D.1.a. Public Education and Outreach

The Permittee shall further develop and implement a comprehensive education and involvement program to distribute educational materials to the community or conduct equivalent outreach activities about the impacts of storm water as well as enabling the public to identify and report a pollution-causing activity (i.e., spotting an illicit discharge) and the steps that the public can take to reduce pollutants in storm water runoff. The program should create: positive changes in attitude, knowledge, and awareness; BMP implementation; pollutant load reduction; and an improvement in discharge and receiving water quality. The SWMP shall include a written public education plan for how the Permittee will reach all targeted audiences and implement the permit requirements described below. The Permittee may fulfill portions of this requirement by cooperating with other MS4 storm water public education programs.

Part D.1.a.(1) *Targeted Groups* - The Permittee shall address the following targeted groups in the Base-wide Awareness Plan with appropriate messages, and describe outreach activities and anticipated frequencies that each activity will be conducted over the permit term:

- Military personnel and dependents that work or live on base;
- Civilian personnel that work on base;
- Construction and maintenance contractors that work on base;
- Consultants;
- Landscaping personnel and contractors (e.g., to prevent the use of leaf blowers from blowing material into the drainage structures);
- Construction Industry;
- Industrial facilities covered by the NPDES permit program;
- Commercial businesses (i.e., automobile detailing, automobile repair and maintenance, retail gasoline outlets, and restaurants, including those types of businesses highly ranked, pursuant to Part D.1.g.(4));
- Schools, recreational facilities;
- Any other source that the Permittee determines may contribute a significant pollutant load to its Small MS4.

Part D.1.a.(2) *Outreach Activities – The Permittee shall include in the Base-wide Awareness Plan the following activities, with prescribed frequencies that each activity will be conducted over the permit term:*

- Publicize the telephone numbers for facilities and on-base personnel to report illegal discharges;
- Distribution of brochures to the residential community and industrial/commercial facilities;
- Participation in special events (e.g., Earth Day Educational Events) and exhibits;
- An informative web site, that provides educational materials/information for residents and commercial tenants regarding storm water pollution, storm water pollutant controls and best management practices, and applicable storm water rules and regulations at the Facility. The website shall also provide links to a copy of the SWMP, the most recent storm water annual report, a copy of this permit, and telephone numbers and email address to report illegal storm water activity. Any public meetings regarding storm water policy, regulations, or the SWMP shall also be posted with the applicable date, time, and location;
- Pesticides, herbicides, and fertilizer use program;
- The promotion of water conservation;
- Storm drain stenciling or marker installation;
- Proper disposal of grass clippings, leaves, and other green waste;
- A hazardous waste information and awareness program to promote awareness of proper disposal and handling of hazardous waste by residents and tenants (i.e., household chemicals, used oil, automotive fluids, paint, pesticides, and other toxics); and
- If determined to be necessary by the Permittee, public meetings/resident panels to discuss storm water management policies.

Information regarding: hazardous waste disposal; the proper disposal of grass clippings, leaves, and other green wastes; a link to the storm water website; and a phone number and email address to report illegal storm water activity shall be provided to all new residents and tenants on the Facility.

Part D.1.a.(3) *Evaluation Methods* - The Permittee shall evaluate the progress of the public education program based on the following:

- Annual survey of Facility residents and tenants to measure both behavior and knowledge relating to storm water. The surveys can be conducted in person at events, on the phone, or using Web-based survey tools. The results of the survey shall be compared to past surveys.

- Number of brochures distributed.
- Participation in events.
- Volunteer hours.
- Any other methods that the Permittee determines to be effective.

The results of the evaluation shall be summarized in the Annual Report.

Part D.1.b. Public Involvement/Participation

The Permittee shall include base/installation administrators, facility management, and facility occupants in developing, reviewing, and implementing the SWMP. The draft and final SWMP shall be made available to the public (e.g., on Permittee's website) and at local offices. An informational meeting shall be scheduled and announced prior to finalizing the SWMP to solicit comments and answer questions from the public. Other activities to involve the public may include providing volunteer opportunities that improve water quality, organizing a citizen advisory group to solicit ongoing input from the public about changes to the SWMP and specific SWMP-related projects, or organizing clean-up events to educate the public about impacts of storm water.

Part D.1.c. Illicit Discharge Detection and Elimination (IDDE)

The Permittee shall implement the ongoing SWMP to detect and eliminate illegal connections and illicit discharges into its MS4 and shall include an improved program in the revised SWMP Plan. The program shall include:

Part D.1.c.(1) *Connection Permits for private drain connections* – Within six (6) months after the effective date of this permit, the Permittee shall establish and implement requirements for issuing connection permits, or equivalent, and require obtaining the permit prior to allowing the drain connections. The Permittee shall also establish and implement requirements for issuing permits, or equivalent, for the operation and maintenance of drain connections to the MS4. A database shall be maintained of all permitted connections to its MS4. Prior to issuing a connection permit, the Permittee shall ensure the following are met:

- the project has provided proof of filing a Notice of Intent (NOI) or NPDES application, if applicable; and
- control measures comply with its requirements to minimize pollutant discharge into its MS4.

Part D.1.c.(2) *Field Screening* – The Permittee shall update and implement an Outfall Field Screening Plan for observing major and minor outfalls to screen for illicit discharges within six (6) months of the effective date of this permit. The plan shall designate priority areas for screening, specify the frequency for screening, and identify the procedures to be followed if a discharge is observed. If any outfall locations are submerged at the time of inspection, the monitoring personnel shall inspect the discharge line (or contributing tributary lines), at the closest location(s) upstream of the discharge location and outside tidal influence. At a minimum, outfalls in priority areas shall be screened once per permit term.

Part D.1.c.(3) *Tracking* – The Permittee shall maintain a database of complaints, illegal connections, illicit discharges, and spills which tracks the location of the discharge by installation name and building number or Tax Map Key (TMK), type of discharge, responsible party, the Permittee's investigation and response of the discharge, follow-up activities, and the resolution of each discharge to the MS4.

Part D.1.c.(4) *Complaint Investigation* – The Permittee shall promptly investigate observed, suspected, or reported illicit flows and pursue enforcement actions, as appropriate. Complaints made to the CWB for discharges to the Permittee's MS4 will be forwarded to the Permittee for action. The Permittee shall:

(i) Develop and implement a database to identify illicit discharge activities by installation name and building number or TMK. The database shall include information about each suspected improper discharge, the Permittee's investigation of that discharge, follow-up activities, and the resolution of each discharge as required in Part D.1.c.(3) above;

(ii) Implement a program to facilitate public reporting of illicit discharges (i.e., environmental hotline and/or website for reporting), including providing at least one (1) contact that the public can reach (including phone number and/or email address). This contact information shall be clearly posted on its website; and

(iii) Develop and implement a response plan for the investigation of illicit discharges to be consistent with the requirements in this permit.

Part D.1.c.(5) *Enforcement* – Within six (6) months after the effective date of this permit, the Permittee shall:

(i) Establish and implement the policies for enforcement and penalties for entities found to be in noncompliance with requirements developed in accordance with Part D.1.c.(1), including for persons illegally discharging pollutants to its MS4, and

(ii) Pursue enforcement actions against entities in non-compliance with its requirements, with illegal drain connections, and illegally discharging pollutants to its MS4 without direct connections.

Part D.1.c.(6) *Spill Prevention and Response* – The Permittee shall implement its ongoing SWMP to prevent, respond to, contain, and clean up all wastewater and other spills that may enter its MS4 from any source (including private laterals and failing cesspools). This program shall be included in the SWMP. Spill response teams, which may consist of local, state, and/or federal agencies, shall prevent entry of spills into the Permittee’s MS4 and contamination of surface water, ground water, and soil to the MEP.

The Permittee shall coordinate spill prevention, containment, and response activities throughout all appropriate departments, programs, and agencies to ensure maximum water quality protection at all times.

The Permittee shall notify DOH of all wastewater spills or overflows from private laterals and failing septic systems into its MS4. The Permittee shall implement its ongoing SWMP to prevent, respond to, contain, and clean up wastewater from any such notification.

Part D.1.c.(7) *Used Oil and Toxic Materials Disposal* – The Permittee shall implement its ongoing SWMP to facilitate the proper management and disposal or recycling of used oil, vehicle fluids, toxic materials, and other household hazardous wastes. Such a program shall include educational activities, public information activities, and identification of collection sites or methods.

Part D.1.c.(8) *Training* – The Permittee shall provide annual training to Environmental Compliance Coordinator (ECC) and all pertinent facility personnel on identifying and eliminating illegal connections, illicit discharges, and spills to its MS4. This training shall be specific to the Permittee's activities, policies, rules, and procedures. The Permittee shall maintain records of the annual training program.

Part D.1.d. Construction Site Runoff Control

The Permittee shall implement a construction site management program to reduce to the MEP the discharge of pollutants from both private and public construction projects (i.e., contract, in-house, maintenance, and encroachment). The construction site management program shall include the following minimum elements:

Part D.1.d.(1) *Requirement to develop BMPs Manuals* – Within twelve (12) months from the effective date of this permit, the Permittee shall develop and submit to the DOH, the following types of manuals for construction projects:

- Construction Best Management Practices Field Manual.
- Maintenance Activities Best Management Practices Field Manual.
- Storm Water Permanent Best Management Practices Manual.

The performance of MEP includes addressing projects, regardless of size, that have the potential to impact water quality. The Permittee shall review these standards annually and, as necessary, revise to include descriptions of new or modified BMPs, including permanent BMPs and LID practices. All revisions made during a calendar year shall be discussed in its corresponding Annual Reports and all documents included in the SWMP Plan. All documents shall be made available to the Permittee's staff, contractors, and consultants, as appropriate.

Part D.1.d.(2) *Requirement to implement BMPs* – Within twelve (12) months from the effective date of this permit, the Permittee shall establish policies to require proposed construction projects to implement BMPs and standards described in the following manuals:

- Construction Best Management Practices Field Manual.
- Maintenance Activities Best Management Practices Field Manual.
- Storm Water Permanent Best Management Practices Manual.

Part D.1.d.(3) *Inventory of construction sites* – Within six (6) months from the effective date of this permit, the Permittee shall implement a system to track both private and public construction projects (i.e., contract, in-house, maintenance, and encroachment). This system shall track information on the project (including permit or file number, if available); status of plan review and approval, inspection dates, and if applicable, enforcement actions; and whether the project has applied for coverage under HAR Chapter 11-55, Appendix C, NPDES General Permit Authorizing the Discharge of Storm Water Associated with Construction Activity (a.k.a. General Construction Activity Storm Water permit) (unless the project will disturb less than one acre of land) and satisfied any other applicable requirements of the NPDES permit program (i.e., an individual NPDES permit).

Part D.1.d.(4) *Plan Review and Approval* – The Permittee shall:

(i) Review the appropriate Storm Water Pollution Prevention Plan (SWPPP) and other pollution prevention measures (e.g., Erosion and Sediment Control, Grading, Post-construction BMP and Landscaping) or similar plans/documents prior to approval of the construction plans and specifications. The Permittee shall verify that the SWPPP meets the following requirements:

- HAR Chapter 11-55, Appendix C, and any other requirements under the NPDES permit program, as applicable;
- Construction Best Management Practices Field Manual;
- Maintenance Activities Best Management Practices Field Manual;
- Storm Water Permanent Best Management Practices Manual; and
- Implementation of measures to ensure that the discharge of pollutants from the site will be reduced to the appropriate discharge limitations subject to the BAT/BCT discharge requirement, consistent with the Act and other respective federal and state requirements for such facilities and will not cause or contribute to an exceedance of water quality standards.

(ii) Require a permit or written equivalent approval for drainage connections to its MS4, discharge of surface storm water runoff associated with construction (i.e., from both private and public projects) or discharge permit (i.e., hydrotesting and dewatering effluent or other non-storm water, except those allowed under this permit) into their MS4 and maintain a database of the permits/approvals. Prior to issuing a drainage connection, discharge of surface runoff permit/approval, discharge permit, or encroachment permit, the Permittee shall ensure that the following are met:

- The project owner has provided proof of filing an NOI Form C or NPDES application for the discharge of storm water associated with construction activities that disturb one (1) acre or more;
- The project owner has provided proof of filing a NOI Form F and/or G or NPDES application for the discharge of hydrotesting effluent or construction dewatering effluent, respectively, if applicable; and
- A SWPPP or other documents (e.g., Erosion and Sediment Control, Grading, Post-construction BMP and Landscaping Plans, Dewatering Plan, and Hydrotesting Plan) relating to pollution prevention or similar document(s) have been reviewed and accepted by the Permittee;

(iii) Prohibit the commencement of construction on any private or public construction project (i.e., contract, in-house, maintenance, and encroachment) unless and until it has verified that the project has received from DOH a Notice of General Permit Coverage (NGPC) under HAR Chapter 11-55, Appendix C, NPDES General Permit Authorizing the Discharge of Storm Water Associated with Construction Activity (General Construction Activity Storm Water permit) (unless the project will disturb less than one (1) acre of land) and satisfied any other applicable requirements of the NPDES permit program (i.e., an individual NPDES permit);

(iv) Implement a plan review checklist that its reviewers shall use in evaluating the plans and BMPs or other similar document(s) which have been implemented pursuant to this Part [i.e., Part D.1.d] within 90 calendar days from the effective date of this permit. Copies of this plan review checklist shall be provided to applicants for connection, discharge, and encroachment permits; and to consultants and contractors for their use in developing the Plans or other similar document(s) for Permittee-contracted construction projects. The plan review checklist shall include at a minimum, but not be limited to, comments on any deficiencies and the date when comments were addressed to the satisfaction of the Permittee. A system shall be implemented to ensure all comments, identified during the review process has been properly addressed.

Part D.1.d.(5) *Inspections* – The Permittee shall:

(i) Prior to the initiation of ground-disturbing activities at any site, except for activities associated with the installation of BMPs at a site, an engineer or qualified inspector employed or retained by the Permittee who reviews and becomes familiar with the project's SWPPP and/or other equivalent document(s), shall inspect the site to verify BMPs as required by the BMP Plan and/or other documents have been installed correctly and in the correct locations prior to the commencement of ground-disturbing activity. Inspections shall include a review of site Erosion and Sediment Controls, good housekeeping practices, and compliance with Permittee-accepted erosion and sediment control plans, construction BMPs Plans, or other similar documents and Permittee-approved permits. The inspector shall also identify, document, report, and remedy any site conditions having the potential for erosion and sediment runoff, including other pollutant discharges which may occur as a result of the project's construction activities.

(ii) In addition to inspections required by the NPDES permit program, all contract, in-house and maintenance construction projects shall be inspected at least monthly by a qualified construction inspector who is independent (i.e., not involved in the day-to-day planning, design, or implementation) of the construction projects to be inspected. The Permittee may use more than one (1) qualified construction inspector for these inspections.

Upon three (3) successive monthly inspections that indicate, in total, no critical or major deficiencies or less than six (6) minor deficiencies with no more than three (3) minor deficiencies in one (1) month in a project's BMPs or other storm water management activities, the Permittee may decrease the inspection frequency for such project to quarterly. However, if while under a quarterly inspection frequency, an inspection of a project conducted pursuant to this paragraph indicates at least one (1) critical or major deficiency or a total of three (3) or more minor deficiencies in the project's BMPs or other storm water management activities, the inspections frequency shall immediately return to no less than monthly. This reduced inspection frequencies option is contingent upon the Permittee having defined each type (i.e., critical, major, or minor) of deficiency. The Permittee shall further develop and implement written procedures for appropriate corrective actions and follow-up inspections when deficiencies had been identified at an inspected project. The corrective action procedures shall, at a minimum, require that 1) any critical deficiencies shall be corrected or addressed before the close of business on the day of the inspection at which the deficiency is identified, and 2) any major deficiencies shall be corrected or addressed as soon as possible, but in no event later than five (5) calendar days after the inspection at which the deficiency is identified or before the next forecasted precipitation, whichever is sooner.

(iii) All construction projects with a connection permit, encroachment permit, or discharge of surface runoff permit/approval shall be inspected at least once annually or once during the life of the project, whichever comes first, by a qualified construction inspector who is independent (i.e., not involved in the day-to-day planning, design, or implementation) of the construction projects to be inspected. The Permittee may use more than one (1) qualified construction inspector for these inspections. If the project has a SWPPP or other equivalent document(s), the inspection shall also verify that the BMPs were properly installed and at the locations specified in the Plan.

(iv) The Permittee shall develop and implement a standard inspection form(s); reporting and corrective procedures for inspections, including use of an inspection checklist, or equivalent; and a database or equivalent system to track inspection results within 90 calendar days of the effective date of this permit. The inspection checklist shall include at a minimum, but not be limited to, identifying any deficiencies and the date of the corrective actions. Photos shall accompany the inspection checklist to document the deficiencies.

Part D.1.d.(6) *Enforcement* – The Permittee shall:

(i) Implement policies for enforcement and penalties for those in non-compliance with Part D.1.d.(1) requiring the implementation of standards, and

(ii) Implement an Enforcement Response Plan to include written procedures for appropriate corrective and enforcement actions, and follow-up inspections when an inspected project is not in full compliance with its requirements, other permits, and any other applicable requirements under the NPDES permit program.

Part D.1.d.(7) *Process to refer noncompliance and non-filers to the DOH* – In the event the Permittee has exhausted its use of sanctions and cannot bring a construction site or construction operator into compliance with its policies, standards, or this permit, or otherwise deems the site poses an immediate and significant threat to water quality, the Permittee shall provide an e-mail notification to cleanwaterbranch@doh.hawaii.gov, Attn: Enforcement Section Supervisor within one (1) week of such determination. E-mail notifications shall be followed by written notification in accordance with Part A.7. and include a copy of all inspection checklists, notes, and related correspondence in pdf format (300 minimum dpi) within two (2) weeks of the determination. In instances where an inspector identifies a site that has not applied for permit coverage under the NPDES permit program, the Permittee shall provide written notification in accordance with Part A.7. to the DOH within two (2) weeks of the discovery.

Part D.1.d.(8) *Training* – The Permittee shall provide annual training on the Construction BMPs Program Plan to all staff with construction storm water responsibilities, including construction engineers, construction and maintenance inspectors, and plan reviewers. This training shall be specific to the Permittee's activities (including the proper installation and maintenance of accepted BMPs), policies, rules and procedures. The Permittee shall maintain records of the annual training program.

Part D.1.d.(9) *Education* – The Permittee shall implement an education program as part of its ongoing SWMP to ensure that project applicants, contractors, developers, property owners, and other responsible parties have an understanding of the storm water requirements they need to implement.

Part D.1.e. Post-Construction Storm Water Management in New Development and Redevelopment

The Permittee shall further develop, implement, and enforce a program to address storm water runoff from all (i.e., both private and public) new development and redevelopment projects that result in a land disturbance of one (1) acre or more and smaller projects that have the potential to discharge pollutants to the Permittee's MS4. The Permittee's program must ensure that permanent controls are in place to prevent or minimize water quality impacts to the MEP. Post-construction storm water management in new development and redevelopment requirements shall not be limited to the storm water requirements under the The Energy Independence and Security Act (EISA) of 2007 Section 438 Storm Water Runoff Requirements for Federal Development Projects and the Unified Facilities Criteria (UFC) 3-210-10 but apply to all projects that have the potential to impact water quality to the extent practical.

The Permittee shall review and update, as necessary, the criteria defining when and the types of permanent post-construction BMPs, including, among other measures, LID techniques, that must be included in a project design to address storm water impacts and pollutants of concern. For State waters on the State CWA Section 303(d) list or State established and EPA approved Total Maximum Daily Loads (TMDLs), the pollutants of concern to be targeted shall include the parameters causing impairment.

The Permittee shall consider trash reduction techniques to comply with short and long term plans as required in Part D.1.f.(1)(v). The program shall include, at a minimum, the following elements:

Part D.1.e.(1) *Standards Revision* – Within six (6) months of the effective date of this permit, the Permittee shall revise its standards for addressing post-construction BMPs to Low Impact Development (LID) requirements. The plan for requiring LID in the standards to the MEP shall include revisions to the plan review and inspection checklist to include LID requirements. Standards for addressing post-construction BMPs to LID requirements shall not be limited to the storm water requirements under the EISA of 2007 Section 438 or the UFC 3-210-10 but apply to all projects that have the potential to impact water quality to the extent practical.

LID refers to storm water management practices which seek to mimic a site's predevelopment hydrology by minimizing disturbed areas and impervious cover and then infiltrating, storing, detaining, evapotranspiring, and/or biotreating storm water runoff close to its source. The standards shall ensure that the management practices are prioritized to favor infiltration, evapotranspiration, or harvesting/reuse of storm water followed by other practices that treat and release storm water. The standards shall be applicable to all construction projects disturbing at least one (1) acre and smaller projects that have the potential to discharge pollutants to the Permittee's MS4. LID employs principles such as preserving and recreating natural landscape features and minimizing imperviousness to create functional and appealing site drainage that treats storm water as a resource, rather than a waste product. LID treatment measures include harvesting and use, infiltration, evapotranspiration, or biotreatment.

The plan for the implementation of LID provisions shall include at a minimum the following:

- Criteria for requiring implementation.
- Investigation into the development of quantitative criteria for a specific design storm to be managed by LID techniques. Examples of design storm requirements include: 24-hour, 85% storm through infiltration; on-site management of the first inch of rainfall within a 24-hour period; retention of the 100-year, 2-hour storm; or on-site management of the 24-hour, 95% storm.

- Feasibility criteria for circumstances in which a waiver could be granted for the LID requirements.
- When a LID waiver is granted, alternatives such as offsite mitigation and/or non-LID treatment control BMPs could be required.

The Permittee shall develop and implement its LID Design Review Checklist.

Part D.1.e.(2) *Review of Plans for Post-Construction BMPs* – For design-bid-build projects, the Permittee shall not advertise any construction project nor award any construction contract until the project design has been reviewed and accepted to ensure that appropriate permanent post-construction BMPs, which include LID practices upon adoption into its standards, have been included in the project design and are included in the bid package to ensure compliance with this part of the permit. For design-build projects, the Permittee shall review and approve the project design the same as for design-bid-build projects prior to implementation. No project shall proceed without the inclusion of appropriate permanent post-construction BMPs unless a waiver is granted by the Permittee based on specific documentation demonstrating that such post-construction BMPs are not feasible. Project documents for projects that will include installation of permanent post-construction BMPs shall also include appropriate requirements for their future continued maintenance.

Part D.1.e.(3) *BMP, Operation and Maintenance, and Inspection Database* – Within six (6) months of the effective date of this permit, the Permittee shall develop and implement an Asset Management System to track the frequency of inspections and maintenance of the Permanent BMPs. In addition to the standard information collected for all projects (e.g., project name, owner, location, start/end date, etc.), the database shall also include, at a minimum:

- Name and identification of asset or control measures.
- Type and number of LID practices.
- Type and number of Source Control BMPs.
- Type and number of Treatment Control BMPs.
- Latitude/Longitude coordinates of controls using Global Positioning Systems and NAD83 or other Datum as long as the datum remains consistent.
- Photographs of controls.

- Operation and maintenance requirements.
- Frequency of inspections.
- Frequency of maintenance.
- Current performance.
- Consequences of failure.
- Likelihood of failure.

All stormwater treatment and LID BMPs shall be inspected at least once a calendar year for proper operation; maintenance shall be performed as necessary to ensure proper operation.

Part D.1.e.(4) *Education* and *Training*

(i) *Project Proponents -* The Permittee shall provide education and outreach material for those parties who are involved in the design process (e.g., consultants and engineers) on the selection, design, installation, operation and maintenance of storm water BMPs, structural controls, post construction BMPs, and LID practices. The outreach material may include LID design examples, requirements of LID installation, and a brief discussion of potential environmental impacts associated with storm water runoff.

(ii) *Inspectors* - All Permittee staff and contractors responsible for inspecting permanent post-construction BMPs and LID practices shall receive annual training. The Permittee shall maintain records of the annual training program.

Part D.1.f. Pollution Prevention/Good Housekeeping

The Permittee shall further develop and implement a system maintenance program to reduce to the MEP the discharge of pollutants from all Permittee-owned facilities, roads, parking lots, maintenance facilities, and the Permittee's MS4. The program shall include:

Part D.1.f.(1) *Debris Control BMPs Program Plan*

(i) *Asset Management System and Mapping* – Within twelve (12) months of the effective date of this permit, the Permittee shall implement a comprehensive asset management system and map of its MS4, including structural and vegetative BMPs and an inventory of related appurtenances, including maintenance equipment, to ensure appropriate debris removal and system maintenance. The asset management system shall, at a minimum, assign an identification number for each drain inlet, outfall, and BMPs, and map their location on the Geographic Information System.

The Permittee shall use this asset management system to establish priorities and to schedule and track efforts of appropriate system maintenance and debris removal program activities such as street sweeping, catch basin cleaning, and green waste and accumulated soil removal. The SWMP shall include justification of its priorities applied to the asset management system on the basis of potential impacts to water quality.

(ii) *Inspection/Maintenance Schedule* – The Permittee shall include in its SWMP procedures, a schedule for inspections of:

a) All roadways for the purpose of identifying if sweeping of roadways, shoulders, and/or medians is needed; and

b) All storm drainage system catch basins, gutters and open ditches, trenches, and BMPs for the purpose of identifying if maintenance/cleaning of such structures are needed.

In both cases, the need for sweeping and/or maintenance/cleaning shall, at a minimum, be determined based upon material accumulation rates and/or potential threat of discharge to State waters that may have an effect on water quality. The schedule shall provide that each roadway mile, storm drainage feature, and BMP is inspected at least once during the term of this permit (maintenance/cleaning may be conducted in lieu of inspections to satisfy this requirement).

The adopted procedures shall provide for the identification of roadway segments and their associated storm drainage features and BMPs that may require more frequent sweeping and/or structure cleaning based upon material accumulation rates and potential threat of discharge to State waters that may have an effect on water quality. The procedures shall establish debris accumulation thresholds above which sweeping and/or structure cleaning must occur. The priority-based schedule shall be annually reviewed; updated as necessary; and the changes, along with explanations of the changes submitted within the Annual Report.

(iii) *Storm Drain Placards* – The Permittee shall install placards on its drainage inlets and post-construction BMPs; evaluate the effectiveness of the placards; and revise as necessary to meet its purpose. The purpose of the placards shall be discussed within the SWMP. A minimum of 50 new placards shall be installed per year. Priority shall be given to the Permittee's industrial and commercial areas and areas with pedestrian traffic. The Permittee shall implement its system to track placement of placards and procedures for maintenance staff to inspect and replace, as necessary, placards during routine maintenance activities.

(iv) *Action Plan for Retrofitting Structural BMPs* – The Permittee shall implement an Action Plan for Retrofitting Structural BMPs within twelve (12) months of the effective date of this permit which shall identify retrofits to be implemented, and include an explanation of the basis for their selection and an implementation schedule. The implementation schedule shall cover a five (5) year period and be updated annually to include additional retrofit projects with water quality protection measures.

The annual updates to the implementation schedule shall be included in the Annual Report with a description of the project's status. The Action Plan may include, but not be limited to projects in compliance with any TMDL implementation and monitoring plan.

(v) *Trash Reduction Plan* – The Permittee shall implement its trash reduction plan which assesses the issues, identifies and implements control measures, and monitors the control measures to reduce trash loads from the MS4. The plan shall include, at a minimum and be formatted consistent with the following:

- Quantitative estimate of the debris currently being discharged (baseline load) from the MS4, including methodology used to determine the load.
- Description of control measures currently being implemented as well as those needed to reduce debris discharges from the MS4 consistent with short-term and long-term reduction targets.
- A short-term plan and proposed compliance deadline for reducing debris discharges from the MS4 by 50% from the baseline load.
- A long-term plan and proposed compliance deadline for reducing debris discharges from the MS4 to zero.
- Geographical targets for trash reduction activities with priority on waterbodies listed as impaired for trash on the State's CWA Section 303(d) list.
- Trash reduction-related education activities as a component of Part D.1.a.
- Integration of control measures, education and monitoring to measure progress toward reducing trash discharges.
- An implementation schedule.
- Monitoring plan to aid with source identification and loading patterns as well as measuring progress in reducing the debris discharges from the MS4.
- The Annual Report shall include a summary of its trash load reduction actions (control measures and best management practices) including the types of actions and levels of implementation, the total trash loads and dominant types of trash removed by its actions, and the total trash loads and dominant types of trash for each type of action.

The plan shall provide for compliance with the above short-term and long-term discharge limits in the shortest practicable timeframe. The Trash Reduction Plan shall be included in the SWMP and any revisions noted in the Annual Report.

Part D.1.f.(2) *Chemical Applications BMPs Program Plan*

(i) *Training* – All employees or contractors or employees of contractors applying pesticides, herbicides, and fertilizers shall possess a current commercial certification by the State of Hawaii, Department of Agriculture or Department of Defense Certificate of Competency in the appropriate EPA-approved state categories. The Permittee shall develop an Authorized Use List of chemicals used and implement a specific training program for all potential appliers (bulk and hand-held) of the chemicals (e.g., fertilizers, pesticides, and herbicides) on the proper application of the chemicals. The Permittee shall not permit the application of fertilizers, pesticides, or herbicides unless the handler and applier has first received this training and has provided proper certification.

(ii) *Implement appropriate requirements for pesticide, herbicide, and fertilizer applications* - The Permittee shall implement BMPs to reduce the contribution of pollutants associated with the application, storage, and disposal of pesticides, herbicides, and fertilizers from Permittee-owned areas and activities to its MS4. Permittee-owned areas and activities include, at a minimum, federal facilities, right-of-ways, and landscaped areas.

Such BMPs shall include, at a minimum: 1) educational activities, permits, certifications and other measures for applicators; 2) integrated pest management measures that rely on non-chemical solutions; 3) the use of native vegetation; 4) chemical application, as needed; and 5) the collection and proper disposal of unused pesticides, herbicides, and fertilizers.

(iii) Records and Reports – The Permittee shall ensure that all employees or contractors or employees of contractors prepare, submit, and maintain daily pest management activities for each pest management service. Records shall include all surveillance, non-chemical controls and chemical applications.

The Permittee shall ensure that their employees or contractors or employees of contractors applying registered pesticides, herbicides, and fertilizers work under the direction of a certified applicator, follow the pesticide label, and comply with any other State, City, or Federal regulations for pesticides, herbicides, and fertilizers. All Permittee employees or contractors applying pesticides, herbicides or fertilizers shall receive training on the BMPs annually. The Permittee shall maintain records of the annual training program.

Part D.1.f.(3) *Erosion Control BMPs Program Plan* – The Permittee shall:

(i) Implement permanent erosion control improvements, ensuring that erosion-prone areas with the potential for significant water quality impact, but with limited public safety concerns, are also considered a high priority for remediation. Identification of erosion-prone areas with the potential for significant water quality impact shall include areas where there is evidence of rilling, gullying, and/or other evidence of significant sediment transport, and areas in close proximity to receiving waters listed as impaired by either sediment, siltation and/or turbidity. The Permittee shall include procedures to identify and implement erosion control projects based on water quality concerns while continuing to address high profile public safety projects.

(ii) Require the implementation of temporary erosion control measures (e.g., erosion control blankets and/or fabrics, gravel bag placement and silt fencing/fiber rolls) on erosion-prone areas with the potential for significant water quality impact if a permanent solution is not immediately possible. Notwithstanding any other implementation provisions, the SWMP shall require the implementation of such temporary erosion control measures on all applicable areas. For projects which require a CWA Section 401 Water Quality Certification (WQC), the WQC application shall be submitted to the DOH within one (1) year from the effective date of this permit and be implemented with six (6) months of the WQC or other regulatory permit(s) issuance date.

(iii) Implement a maintenance plan for vegetated portions of the drainage system used for erosion and sediment control, and LID features; including controlling any excessive clearing/removal, cutting of vegetation, and application of herbicide which affects its usefulness.

(iv) Implement an Action Plan to address erosion at its storm drain system outlets with significant potential for water quality impacts, which shall identify outfalls to be addressed, explanation on the basis of their selection and an implementation schedule. The implementation schedule shall cover a five (5) year period. A status report on implementation of the plan shall be included in the Annual Report. The Permittee shall install velocity dissipators or other BMPs to reduce erosion at locations identified by periodic required inspections.

(v) Submit a list of projects and an implementation schedule for permanent erosion control improvements as described in Part D.1.f.(3)(i) of this permit to the DOH within one (1) year from the effective date of this permit.

Part D.1.f.(4) *Maintenance Activities BMPs Program Plan*

(i) *Maintenance Activities Best Management Practices Field Manual* – The Permittee shall maintain and implement a BMPs Field Manual for Maintenance Activities for all Marine Corps Base Hawaii maintenance activities. Examples of such activities include, but are not limited to: paving and road repairs, street cleaning, saw cutting, concrete work, curb and gutter replacement, buried utility repairs and installation, vegetation removal, painting and paving, debris and trash removal, spill cleanup, etc. The Field Manual shall be updated as necessary or at least once per permit term and include written procedures to minimize pollutant discharge for maintenance activities which have the potential to discharge pollutants to its MS4. The procedures shall ensure that appropriate BMPs are verifiable through field inspections (i.e., field inspectors can quickly determine if the appropriate BMPs have been implemented).

(ii) *Storm Water Pollution Prevention Plan or SWPPP (formerly known as the Storm Water Pollution Control Plan or SWPCP)*. The Permittee shall implement and enforce the requirements of the SWPPP, as discussed in Appendix 1 of this Permit.

(iii) *Training* – The Permittee shall further develop and provide annual training to staff on proper maintenance activities to prevent storm water pollution. The training shall cover the Field Manual, identify potential sources of pollution, general BMPs that can be used to reduce and/or eliminate such sources, and specific BMPs for their activities. The training shall incorporate components of the public education campaign and educate staff that they serve a role in protecting water quality. Staff shall be made aware of the NPDES permit, the overall SWMP, and the applicable BMPs Program(s). The Permittee shall maintain records of the annual training program.

Part D.1.g. Industrial and Commercial Activities Discharge Management Program

The Permittee shall implement an industrial and commercial discharge management program to reduce to the MEP the discharge of pollutants from all industrial and commercial facilities and activities which initially discharge into the Permittee's MS4. At a minimum, the program shall include:

Part D.1.g.(1) *Requirement to Implement BMPs* – Require a permit or written equivalent approval for drainage connections and discharge of surface runoff into the MS4 and maintain a database of the permits/approvals. The permit/approval shall obligate the facility to implement BMPs from their BMP Plan or SWPPP and prevent water quality violations to the Permittee's storm drain system.

Part D.1.g.(2) *Inventory and Map of Industrial Facilities and Activities* – The Permittee shall annually update and submit in the Annual Report, in portable document format (pdf - minimum 300 dpi), the industrial facilities and activities inventory (industrial inventory), sorted by priority areas, and map of such facilities and activities discharging, directly or indirectly, to its MS4.

The industrial inventory shall include, by priority area, the installation or facility name, street address, building number, nature of business or activity, Standard Industrial Classification (SIC) code(s) that best reflect the facility product or service, principal storm water contact, receiving State water, and whether an NGPC under HAR Chapter 11-55, Appendix B, NPDES General Permit Authorizing the Discharge of Storm Water Associated with Industrial Activities (General Industrial Storm Water permit) or any other applicable NPDES permit has been obtained, including a permit or file number and issuance date.

At a minimum, the industrial inventory shall include facilities and activities such as:

- Municipal Landfills (open and closed).
- Hazardous waste recovery, treatment, storage and disposal facilities.
- Facilities subject to Section 313 of the Emergency Planning and Community Right-to-Know Act, 42 U.S.C. 11023.
- Findings from follow-up investigations of the industrial facilities identified in the Questionnaire Survey.
- Facilities subject to NPDES permit coverage which are adjacent to the Permittee's facilities or discharge to the MS4.
- And any other industrial facility that either the Permittee or the DOH determines is contributing a substantial pollutant loading to the MS4.

Part D.1.g.(3) *Inventory and Map of Commercial Facilities and Activities* – The Permittee shall annually update and submit in the Annual Report, in pdf format (minimum 300 dpi), the commercial facilities and activities inventory (commercial inventory), sorted by priority areas, and map of such facilities and activities discharging, directly or indirectly, to its MS4 within its Annual Report. The commercial inventory update may be based on the collection of new information obtained during field activities or through other readily available intra-agency informational databases (e.g., business licenses, pretreatment permits, sanitary sewer hook-up permits).

The commercial inventory shall include, by priority area, the installation or facility name, street address, building number, nature of business or activity, SIC code(s) that best reflect the facility product(s) or service(s), principal storm water contact, and receiving State water.

At a minimum, the commercial inventory shall include facilities and activities such as:

- Findings from investigations of the commercial facilities identified in the Questionnaire Survey.
- Retail Gasoline Outlets.
- Retail Automotive Services, including Repair Facilities.
- Restaurants.
- Any other commercial facility that either the Permittee or the DOH determines is contributing pollutants to the MS4 that may cause or contribute to an exceedance of State water quality standards.

Part D.1.g.(4) *Prioritized Areas for Industrial and Commercial Facility and Activity Inspections* – The Permittee shall implement the Prioritized Areas for Industrial and Commercial Facility and Activity Plan. Under the Plan, the Permittee is to designate priority areas for industrial and commercial facility and activity inspections, based on the relative risk that any discharge might be contaminated with pollutants.

Within 60 calendar days from the effective date of this permit, the Permittee shall submit a status report to the DOH. The status report shall identify the numbers of industrial and commercial facilities discharging into the Permittee's MS4 and the number of inspections that have been completed during the prior permit term. The status report shall be organized by priority area.

On an annual basis, the Permittee shall modify the Plan based on updated information from its industrial and commercial inventory, findings from previous inspections, the number of industrial and commercial facilities in the area, the density of these facilities, previous storm water violations in the area, and water quality impairments in the area. The modified Plan shall set a schedule that ensures inspections will be completed in accordance with the schedule in Part D.1.g.(5). This Plan shall be submitted with the Permittee's Annual Report.

Part D.1.g.(5) *Inspection of Industrial and Commercial Facilities and Activities* – The industrial/commercial inspection program shall be implemented and updated as appropriate to reflect the outcomes of the investigations.

The Permittee shall ensure industrial and commercial facilities and activities identified in the industrial and commercial inventories required under Parts D.1.g.(2) and D.1.g.(3) are inspected and re-inspected as often as necessary based on its findings to ensure corrective action was taken and the deficiency was resolved. At a minimum, the Permittee shall inspect each industrial facility that does not have NPDES permit coverage under the NPDES permit program at least twice every five (5) years, and each industrial facility that does have such NPDES permit coverage at least once every five (5) years. Any industrial facility discharging Industrial Storm Water (as defined by 40 CFR Part 122.26(b)(14)) that does not have NPDES Permit coverage shall be reported to the DOH within 30 calendar days of the inspection. Commercial dischargers are to be ranked according to relative risk of discharge of contaminated runoff to the MS4. The highly ranked commercial facilities shall be inspected at least once every five (5) years.

All inspections shall be in accordance with the applicable portions (e.g., Chapter 11 – Storm Water) of the "NPDES Compliance Inspection Manual" (EPA 305-X-04-001), dated July 2004. Inspectors shall be trained to identify deficiencies, assess potential impacts to receiving waters, evaluate the appropriateness and effectiveness of deployed BMPs, and require controls to minimize the discharge of pollutants to the MS4. The inspectors shall use an inspection checklist, or equivalent, and photographs to document site conditions and BMP conditions. Records of all inspections shall be maintained for a minimum of five (5) years, or as otherwise indicated. The Permittee shall submit semi-annual inspection report(s) to the DOH by October 31st and April 30th for inspections done within the previous period.

Part D.1.g.(6) *Storm Water Pollution Prevention Plan or SWPPP (formerly known as the Storm Water Pollution Control Plan or SWPCP) Review and Acceptance for Industrial Facilities* – The Permittee shall:

(i) Verify that all industrial and commercial facilities that initially discharge storm water associated with industrial activities into MCBH's Small MS4 are incorporated into the SWPPP to ensure the discharge of pollutants will be minimized to the maximum extent practicable, and

(ii) Update and implement the SWPPP to ensure the discharge of pollutants will be minimized to meet MCBH standards and the requirements in Appendix 1.

Part D.1.g.(7) *Enforcement Policy for Industrial and Commercial Facilities and Activities* – The Permittee shall implement its own polices for enforcement and penalties for industrial and commercial facilities which have failed to comply. The policy shall be part of an overall escalating enforcement policy and must consist of the following:

- Conducting inspections.
- Issuance of written documentation to a facility representative within 30 calendar days of storm water deficiencies identified during inspection. Documentation must include copies of all field notes, correspondence, photographs, and sampling results, if applicable.
- A timeline for correction of the deficiencies.
- Provisions for re-inspection and pursuing enforcement actions, if necessary.

In the event the Permittee has exhausted all available sanctions and cannot bring a facility or activity into compliance with its policies and this permit, or otherwise deems the facility or activity an immediate and significant threat to water quality, the Permittee shall provide e-mail notification to cleanwaterbranch@doh.hawaii.gov, Attn: Enforcement Section Supervisor within one (1) week of such determination. E-mail notification shall be followed by written notification and include a copy of all inspection checklists, notes, photographs, and related correspondence in pdf format (300 minimum dpi) in accordance with Part A.7 within two (2) weeks of the determination. In instances where an inspector identifies a facility that has not applied for the General Industrial Storm Water permit coverage or any other applicable NPDES permit, the Permittee shall provide email notification to the DOH within one (1) week of such determination.

Part D.1.g.(8) *Training* – The Permittee shall provide training to staff on how to conduct industrial and commercial inspections, the types of facilities requiring NPDES permit coverage for storm water permit associated with industrial activity or any other applicable NPDES permit, components in a SWPPP for industrial facilities, BMPs and source control measures for industrial and commercial facilities, and inspection and enforcement techniques. This training shall be specific to the Permittee's activities, policies, rules, and procedures. Any updates to the training shall be included in the Annual Report. Permittee inspectors shall receive annual training. The Permittee shall maintain records of the annual training program onsite.

Part D.2. SWMP Modifications

The Permittee shall modify the SWMP as required when any of the following occur:

- Exceedance of any discharge limitation or water quality standard established in HAR Section 11-54-4. The revisions shall include BMPs and/or other measures to reduce the amount of pollutants found to be in exceedance from entering State Waters.
- Change in conditions and incorporation of more effective approaches to pollutant control.
- System modifications, including any planned physical alterations or additions to the permitted MS4 and any existing outfalls newly identified over the term of the permit.

The Permittee shall properly address all modifications, concerns, requests, and/or comments to the satisfaction of the DOH and/or EPA. Minor changes may be proposed by the Permittee or requested by DOH or the EPA. Proposed changes that imply a major reduction in the overall scope and/or level of effort of the SWMP must be made for cause and in compliance with 40 CFR 122.62 and Part 124. A written report shall be submitted to the DOH for acceptance at least 30 calendar days prior to the initiation date of the major modification. The Permittee shall report and justify all other modifications made to the SWMP in its Annual Report for the year in which the modification was made.

Part E. INDUSTRIAL FACILITIES

Part E.1. The industrial facilities covered under this permit shall comply with the requirements in Appendix 1 – Storm Water Associated with Industrial Activites.

Building No.	General Category	Description
P-3 Apron		Aircraft Wash Facility
132		Recycle Center
1698	Maintenance	Small Boat Repair Shop
351	Maintenance	Vehicle Maintenance Shop
6874		3rd Radio Battalion
1170, 1171	POL Storage	Aircraft Fuel Islands
1252, 1253	Storage	Fuel Division Supply Department
6801	Maintenance	Lab/Boat Shop
1619	Maintenance	Ground Support Equipment Shop
1631	Maintenance	Aircraft Wash & Rinse Facility
6107	Maintenance	Aircraft Rinse Facility
6182	Storage	Fuel Delivery Branch & Refueler Truck Parking
6183	Maintenance	Engine Test Facility
6479	Storage	Aircraft Ready Fuel Storage
Sanitary Landfill	Sanitary Landfill	Sanitary Landfill
Water Reclamation Facility (WRF)	Utility	Water Reclamation Facility
3014		Combat Logistics Battalion (CLB-3) Support Company Transportation Services
5011		12th Marine Motor T

Part E.2. An individual at each facility (e.g., yard foreman) shall be charged with ensuring implementation of the Storm Water Pollution Prevention Plan (SWPPP). This individual shall be trained to implement the SWPPP, including but not limited to, collecting storm water samples and analyzing samples for temperature and pH, conducting inspections, identifying deficiencies and performing corrective actions.

Part E.3. The Permittee shall implement SWPPPs for facilities listed in Part E.1. of this permit. The SWPPPs shall identify site-specific BMPs and be user-friendly for facility personnel. The SWPPP shall contain all information required under Appendix 1, Part 5.2.

Part E.4. The Permittee shall retain the SWPPP, and all subsequent revisions, on-site or at a nearby office.

Part E.5. The Permittee shall conduct facility inspections as specified in Federal Register, Vol. 73, No. 189, pages 56572-56578, dated September 29, 2008; to ensure that the storm water pollution prevention plan remains effective. Otherwise, the Permittee shall conduct facility inspections at least quarterly. The Permittee shall maintain a record of the following:

(1) Dates on which inspections were conducted;
(2) Inspection findings; and
(3) Corrective actions taken.

Part E.6. The Permittee shall continue regular coordination and storm water quality data sharing between Departments with facilities having SWPPPs and with the Environmental Compliance and Protection Department.

Part F. MONITORING REQUIREMENTS

Part F.1. Annual Monitoring Plan

Part F.1.a. The Permittee shall submit the Annual Monitoring Plan to the DOH by June 1st of each year for review and acceptance. The Annual Monitoring Plan shall be implemented over the coming fiscal year.

The monitoring program must be designed and implemented to meet the following objectives:

Part F.1.a.(1) Assess compliance with this permit (including TMDL Implementation & Management (I&M) Plans and demonstrating consistency with wasteload allocations (WLAs), if required);

Part F.1.a.(2) Measure the effectiveness of the Permittee's SWMP;

Part F.1.a.(3) Assess the overall health based on the chemical, physical, and biological impacts to receiving waters resulting from storm water discharges and an evaluation of the long term trends;

Part F.1.a.(4) Characterize storm water discharges;

Part F.1.a.(5) Identify sources of specific pollutants;

Part F.1.a.(6) Detect and eliminate illicit discharges and illegal connections to the MS4; and

Part F.1.a.(7) Assess the water quality issues in watershed resulting from storm water discharges to receiving waters.

Part F.1.b. The plan shall, at a minimum, include the following items:

Part F.1.b.(1) Written narrative of the proposed monitoring plan's objectives, including but not limited to the objectives identified in Part F.1.a, and description of activities;

Part F.1.b.(2) The monitoring locations on a sampling location map with an explanation of why the location was selected and the identification of the pollutants of concern for each of the sampling locations.

Part F.1.b.(3) The Permittee shall develop a priority based monitoring schedule for each type of industrial area or facility consistent with Part D.1.g.(4) of this permit. The monitoring schedule will prioritize facilities or areas with the greatest potential of pollutant discharge. The facilities or areas ranked first within each type shall be monitored annually. Industrial facilities not ranked first shall be monitored on a rotational basis (at least two facilities monitored per year per type). The Plan shall provide the rationale for the priority rankings, identify the types of industry and the priority facilities within each industry, and provide a monitoring schedule for the rotational monitoring of industrial facilities. Industrial and commercial facilities shall comply with the monitoring requirements in Appendix 1, Part 6.

Part F.1.b.(4) For each activity, a description of how the results will be used to determine compliance with this permit.

Part F.1.b.(5) Identification of management measures proven to be effective and/or ineffective at reducing pollutants and flow.

Part F.1.b.(6) Written documentation of the following:

(i) Characteristics (timing, duration, intensity, total rainfall) of the storm event(s);

(ii) Parameters for measured pollutant loads; and

(iii) Range of discharge volumes to be monitored, as well as the timing, frequency, and duration at which they are identified;

Part F.1.b.(7) Written documentation of the analytical methods to be used;

Part F.1.b.(8) Written documentation of the Quality Assurance/Quality Control procedures to be used; and

Part F.1.b.(9) Estimated budget to be implemented over the coming fiscal year.

Part F.2. Storm Water Associated with Industrial Activities

Part F.2.a. Industrial and commercial facilities shall be inspected in accordance with Appendix 1, Part 3 and the industry sector-specific requirements in Appendix 1, Part 8.

Part F.2.b. Effluent Limitations

The Permittee shall monitor the storm water runoff at the facilities listed in Part E.1. in accordance with Appendix 1, Part 6 and the industry sector-specific requirements in Appendix 1, Part 8. All pollutant parameters shall be analyzed according to test procedures described in Appendix 1, Part 6.

Part F.2.b.(1) Effluent Limitations Monitoring: Sector L – Landfills, Land Application Sites, and Open Dumps.

Effluent limitations for storm water associated with industrial activity from Sector L – Landfills, Land Application Sites, and Open Dumps are listed in Appendix 1, Part 8.L.10 and are shown in Table F-1. An exceedance of the effluent limitation is a permit violation.

Table F-1 Effluent Limitations for Storm Water Associated with Industrial Activity from Sector L (Discharges from non-hazardous waste landfills subject to effluent limitations in 40 CFR Part 445 Subpart B).

Parameter	Units	Daily Maximum	Monthly Average
Biochemical Oxygen Demand (BOD_5)	mg/L	140	37
Total Suspended Solids (TSS)	mg/L	88	27
Ammonia	mg/L	10	4.9
Alpha Terpineol	mg/L	0.033	0.016
Benzoic Acid	mg/L	0.12	0.071
p-Cresol	mg/L	0.025	0.014
Phenol	mg/L	0.026	0.015
Total Zinc	mg/L	0.20	0.11
pH	s.u.	Within the range of 6 – 9 standard pH units	

Part F.2.c. Sector-Specific Benchmarks

The Permittee shall monitor the storm water runoff at the facilities listed in Part E.1. in accordance with Appendix 1, Part 6 and the industry sector-specific requirements in Part 8. Benchmark monitoring data are primarily for your use to determine the overall effectiveness of your control measures and to assist you in determining when additional corrective action(s) may be necessary. A benchmark exceedance is not a permit violation, however, if corrective action is required as a result of a benchmark exceedance, failure to conduct required corrective action is a permit violation.

Part F.2.c.(1) Benchmark Monitoring: Sector L – Landfills, Land Application Sites, and Open Dumps.

Benchmark monitoring for storm water associated with industrial activity from Sector L – Landfills, Land Application Sites, and Open Dumps are listed in Appendix 1, Part 8.L.9 and are shown in Table F-3 below.

Table F-3 Benchmarks for Storm Water Associated with Industrial Activity from Sector L.

Subsector (You may be subject to requirements for more than one sector/subsector)	Parameter	Units	Benchmark Monitoring Concentration[1]
Subsector L1. All Landfill, Land Application Sites and Open Dumps (Industrial Activity Code “LF”)	Total Suspended Solids (TSS)	mg/L	100
Subsector L2. All Landfill, Land Application Sites and Open Dumps, except Municipal Solid Waste Landfill (MSWLF) Areas Closed in Accordance with 40 CFR 258.60 (Industrial Activity Code “LF”)	Total Iron	mg/L	1.0

[1]Benchmark monitoring required only for discharges not subject to effluent limitations in 40 CFR Part 445 Subpart B (see Table L-2 in Appendix 1, Part 8.L.10.).

Part F.2.c.(2) Benchmark Monitoring: Sector N – Scrap Recycling and Waste Recycling Facilities.

Benchmark monitoring for storm water associated with industrial activity from Sector N – Scrap Recycling and Waste Recycling Facilities are listed in Appendix 1, Part 8.N.6 and are shown in Table F-4 below.

Table F-4 Benchmarks for Storm Water Associated with Industrial Activity from Sector N.

Subsector (You may be subject to requirements for more than one sector/subsector)	Parameter	Units	Benchmark Monitoring Concentration[1]
Subsector N1. Scrap Recycling and Waste Recycling Facilities except those only receiving source-separated recyclable materials primarily from non-industrial and residential sources (SIC 5093)	Chemical Oxygen Demand (COD)	mg/L	120
	Total Suspended Solids (TSS)	mg/L	100
	Aluminum Total Recoverable	mg/L	0.75
	Total Copper (freshwater)[2] Total Copper (saltwater)[1]	mg/L	Hardness Dependent 0.0048
	Total Recoverable Iron	mg/L	1.0
	Total Lead (freshwater)[2] Total Lead (saltwater)[1]	mg/L	Hardness Dependent 0.21
	Total Zinc (freshwater)[2] Total Zinc (saltwater)[1]	mg/L	Hardness Dependent 0.09

[1]Saltwater benchmark values apply to storm water discharges into saline waters where indicated.

[2]The freshwater benchmark values of some metals are dependent on water hardness. For these parameters, permittees must determine the hardness of the receiving water (see Appendix 1, Part 11, “Calculating Hardness in Receiving Waters for Hardness Dependent Metals,” for methodology), in accordance with Appendix 1, Part 6.2.1.1. to identify the applicable ‘hardness range’ for determining their benchmark value applicable to their facility.

Part F.2.c.(3) Benchmark Monitoring: Sector Q – Water Transportation.

Benchmark monitoring for storm water associated with industrial activity from Sector Q – Water Transportation are listed in Appendix 1, Part 8.Q.6 and are shown in Table F-5 below.

Table F-5 Benchmarks for Storm Water Associated with Industrial Activity from Sector Q.

Subsector (You may be subject to requirements for more than one sector/subsector)	Parameter	Units	Benchmark Monitoring Concentration[1]
Subsector Q1. Water Transportation Facilities	Total Aluminum	mg/L	0.75
	Total Iron	mg/L	1.0
	Total Lead (freshwater)[2] Total Lead (saltwater)[1]	mg/L	Hardness Dependent 0.21
	Total Zinc (freshwater)[2] Total Zinc (saltwater)[1]	mg/L	Hardness Dependent 0.09

[1]Saltwater benchmark values apply to storm water discharges into saline waters where indicated.

[2]The freshwater benchmark values of some metals are dependent on water hardness. For these parameters, permittees must determine the hardness of the receiving water (see Part 11, “Calculating Hardness in Receiving Waters for Hardness Dependent Metals,” for methodology), in accordance with Appendix 1, Part 6.2.1.1. to identify the applicable ‘hardness range’ for determining their benchmark value applicable to their facility.

Part F.3. TMDLs

As TMDLs are adopted by DOH and approved by the EPA that identify the Permittee as a source, the Permittee shall develop I&M Plans for each and all applicable TMDLs within one (1) year of the approval date. The Permittee shall include within each I&M Plan a compliance schedule with a final deadline to demonstrate consistency with the WLAs consistent with the assumption of the associated TMDL document. The schedule shall provide for the implementation of the BMPs, monitoring to evaluate its performance, and time to make adjustments necessary to demonstrate consistency with the WLAs consistent with the assumption of the associated TMDL document at the earliest possible time. If the schedule extends beyond a year, interim dates and milestones shall be included in the schedule with the time between interim dates not to exceed one (1) year. The I&M Plans shall include, at a minimum, the following:

Part F.3.a. Detailed information on the activities proposed to be implemented.

Part F.3.b. Actual or literature documentation of the estimated effectiveness of the activities targeted to reduce the pollutants of concern such as total nitrogen, and total suspended solids in the watershed, as applicable, to demonstrate consistency with the annual or seasonal WLA reductions consistent with the assumption of the associated TMDL document.

Part F.3.c. A detailed and quantitative analysis which demonstrates that the proposed activities would ensure consistency with the annual or seasonal WLA reductions consistent with the assumption of the associated TMDL document.

Part F.3.d. Information from pre- and post-monitoring activities to quantitatively demonstrate consistency with the annual or seasonal WLA reductions consistent with the assumption of the associated TMDL document.

Part F.3.e. A monitoring plan which shall identify activities to demonstrate consistency with the annual or seasonal WLA reductions consistent with the assumption of the associated TMDL document.

Part F.3.f. A compliance schedule with a final deadline to demonstrate consistency with the WLAs consistent with the assumption of the associated TMDL document. The schedule shall provide for the implementation of the BMPs, monitoring to evaluate its performance, and time to make adjustments necessary to demonstrate consistency with the WLAs consistent with the assumption of the associated TMDL document at the earliest possible time. If the schedule extends beyond a year, interim dates and milestones shall be included in the schedule with the time between interim dates not to exceed one (1) year.

Part F.4. Re-opener

In accordance with 40 CFR Parts 122 and 124, this permit may be modified (i.e., to include compliance schedules, permit conditions, etc.) to address additional or revised TMDLs as adopted by DOH and approved by the EPA.

Part G. REPORTING REQUIREMENTS

All submittals to the DOH shall be in a format consistent with first satisfying the requirements of this permit.

Part G.1. Annual Report

Part G.1.a. The Permittee shall submit the Annual Report by January 30th of each year in pdf format (minimum 300 dpi) in accordance with Part A.7. The Annual Report shall cover the past fiscal year. For the calendar year prior to the expiration date of the permit, the Annual Report and the e-Permitting CWB Individual NPDES Form, or other form approved by the DOH, shall be submitted to the DOH. The Annual Report shall also include a description of the statuses of all items required in the permit. Submittal of the renewal application shall be at least one (1) year prior to the expiration date of this permit and include a $1,000 filing fee.

Part G.1.b. The Permittee shall revise its SWMP to include a description of reporting procedures and activities, including schedules and proposed content of the Annual Reports such that, at a minimum, the following is reported for each storm water program component in each Annual Report:

Part G.1.b.(1) *Requirements* – Describe what the Permittee was required to do (describe status of compliance with conditions of this permit and other commitments set forth in the SWMP).

Part G.1.b.(2) *Past Year Activities* – Describe activities over the reporting period in comparison to the requirements, including, where applicable, progress accomplished toward meeting specific measurable goals, standards and milestones or other specific performance requirements. When requirements were not fully met, include a detailed explanation as to why the Permittee did not meet its commitments for the reporting period. Also describe an assessment of the SWMP, including progress towards implementing each of the SWMP program components.

Part G.1.b.(3) *Future Activities* – Describe planned activities, including, *where* applicable, specific activities to be undertaken during the next reporting period toward accomplishing specific measurable goals, standards and milestones or other specific performance requirements.

Part G.1.b.(4) *Resources* – Report on the status of the Permittee's resource base for implementing this NPDES permit during the applicable reporting period and an estimate of the resources over and above those required in the current reporting period that will be required in the next reporting period.

Part G.1.c. *Modifications* – In each Annual Report, the Permittee shall describe any modifications made to the SWMP and implementation schedule during the past year, including justifications. The Permittee shall also describe major modifications made to the Permittee's MS4, including, but not limited to, addition and removal of outfalls, drainage lines, and facilities.

Part G.1.d. *Program Effectiveness Reporting* – Within six (6) months from the effective date of the permit, the Permittee shall submit to the DOH and implement their written strategy for determining effectiveness of its SWMP. The strategy shall include water quality monitoring efforts as well as program implementation information and other indicators. The Permittee shall include an assessment of program effectiveness and identification of water quality improvements or degradation in its Annual Report.

Part G.2. Annual Monitoring Report

Part G.2.a. The Permittee shall submit the Annual Monitoring Report by January 30th of each year in pdf format (minimum 300 dpi) in accordance with Part A.7. The Annual Monitoring Report shall cover the past fiscal year.

Part G.2.b. The monitoring report shall at a minimum, include the following items:

Part G.2.b.(1) Discussion on the activities/work implemented to meet each objective, as outlined in Part F.1.a, including any additional objectives identified by the Permittee, and the results [e.g., assessment of the water quality issues in each watershed resulting from storm water discharges, refer to Part F.1.a.(7)] and conclusions.

Part G.2.b.(2) Written narrative of the past fiscal year's activities, including those coordinated with other agencies, objectives of activities, results and conclusions.

Part G.2.b.(3) Data gathered on levels of pollutants in non-storm water discharges to the Permittee’s MS4.

Part G.2.b.(4) Using rainfall data collected by the Permittee and other agencies, the Permittee shall relate rainfall events, measured pollutant loads, and discharge volumes from the watershed and other watersheds that may be identified from time to time by the DOH or Permittee.

Part G.2.b.(5) Dates when monitoring occurred for each industrial facility covered under this permit. The monitoring event shall be of a representative storm event, where results were available for all required parameters following the QA/QC measures as described in the Annual Monitoring Plan.

Part G.2.b.(6) Discharge Monitoring Reports (DMRs) for industrial facilities shall be included in the Annual Monitoring Report and be submitted via NetDMR. NetDMR is a Web-based tool that allows NPDES permittees to electronically sign and submit their DMRs to EPA's Integrated Compliance Information System (ICIS-NPDES) via the Environmental Information Exchange Network. NetDMR is accessed from http://www.epa.gov/netdmr. A DMR must be submitted for the facility which is scheduled to be monitored even if sampling was not conducted. An explanation as to why sampling was not conducted shall be explained with the submittal.

Part G.2.c. Reporting of Noncompliance

In case of conflict between the conditions stated here and those in the **"Standard NPDES Permit Conditions"**, the more stringent conditions shall apply.

Part G.2.c.(1) Twenty-Four Hour Reporting

The Permittee or its duly authorized representative (40 CFR 122.22) shall report any noncompliance which may endanger health or the environment. Any information shall be provided orally within 24 hours from the time the Permittee becomes aware of the circumstances. A written report shall also be provided within five (5) days of the time the Permittee becomes aware of the circumstances. A written report shall contain the information required under Part G.2.c.(4)(i). The following shall be included as information which must be reported within 24 hours.

i. Any unanticipated bypass which exceeds any benchmark value or effluent limitation (if applicable), in the permit.

ii. Any upset which exceeds any benchmark value or effluent limitation (if applicable), in the permit.

iii. Violations of a maximum daily discharge limitation in this permit.

Part G.2.c.(2) Contacts for Oral Reports

i. The Permittee shall make oral reports during regular office hours (7:45 a.m. to 4:30 p.m.) to DOH, Clean Water Branch (CWB) at (808) 586-4309.

ii. The Permittee shall make oral reports outside of regular office hours to the State Hospital Operator at (808) 247-2191.

Part G.2.c.(3) Other Noncompliance

The Permittee shall report all instances of noncompliance not reported under Part F.2.c.(1) at the time DMR are submitted. The permittee shall provide information required under Part F.2.c.(4).

Part G.2.c.(4) Written Noncompliance Reports

i. Written noncompliance reports shall contain a description of the noncompliance and its cause; the period of noncompliance, including exact dates and times; if the noncompliance has not been corrected, the anticipated time it is expected to continue; public notice efforts, if any; clean-up efforts, if any; and steps taken or planned to reduce, eliminate and prevent reoccurrence of the noncompliance.

ii. The DOH may waive the written report or the five-working day deadline on a case-by-case basis for spills, bypasses, upsets, and violations of daily maximum discharge limitations if the oral report has been received within 24 hours of the noncompliance or when the Permittee’s authorized personnel becomes aware of the noncompliance.

iii. The written report shall be submitted through the CWB Compliance Submittal Form for Individual NPDES Permits and Notice of General Permit Coverages (NGPCs) or as otherwise instructed by the DOH. This form is accessible through the e-Permitting Portal website at: https://eha-cloud.doh.hawaii.gov/epermit.

Part G.2.d. Types of Sample

Part G.2.d.(1) "Grab sample" means an individual sample collected within the first 30 minutes of a discharge associated with a measurable storm event. See Appendix 1, Part 6.1.4. for more information regarding grab samples.

Part G.2.d.(2) "Composite sample" means a combination of at least eight (8) sample aliquots, collected at periodic intervals during the operating hours of the facility over a 24-hour period. The composite must be flow proportional; either the time interval between each aliquot or the volume of each aliquot must be proportional to either the stream flow at the time of sampling or the total stream flow since the collection of the previous aliquot. Aliquots may be collected manually or automatically.

Part H. SUMMARY OF DEADLINES

The Permittee shall implement existing plans until plans are revised/updated in accordance with the deadlines below.

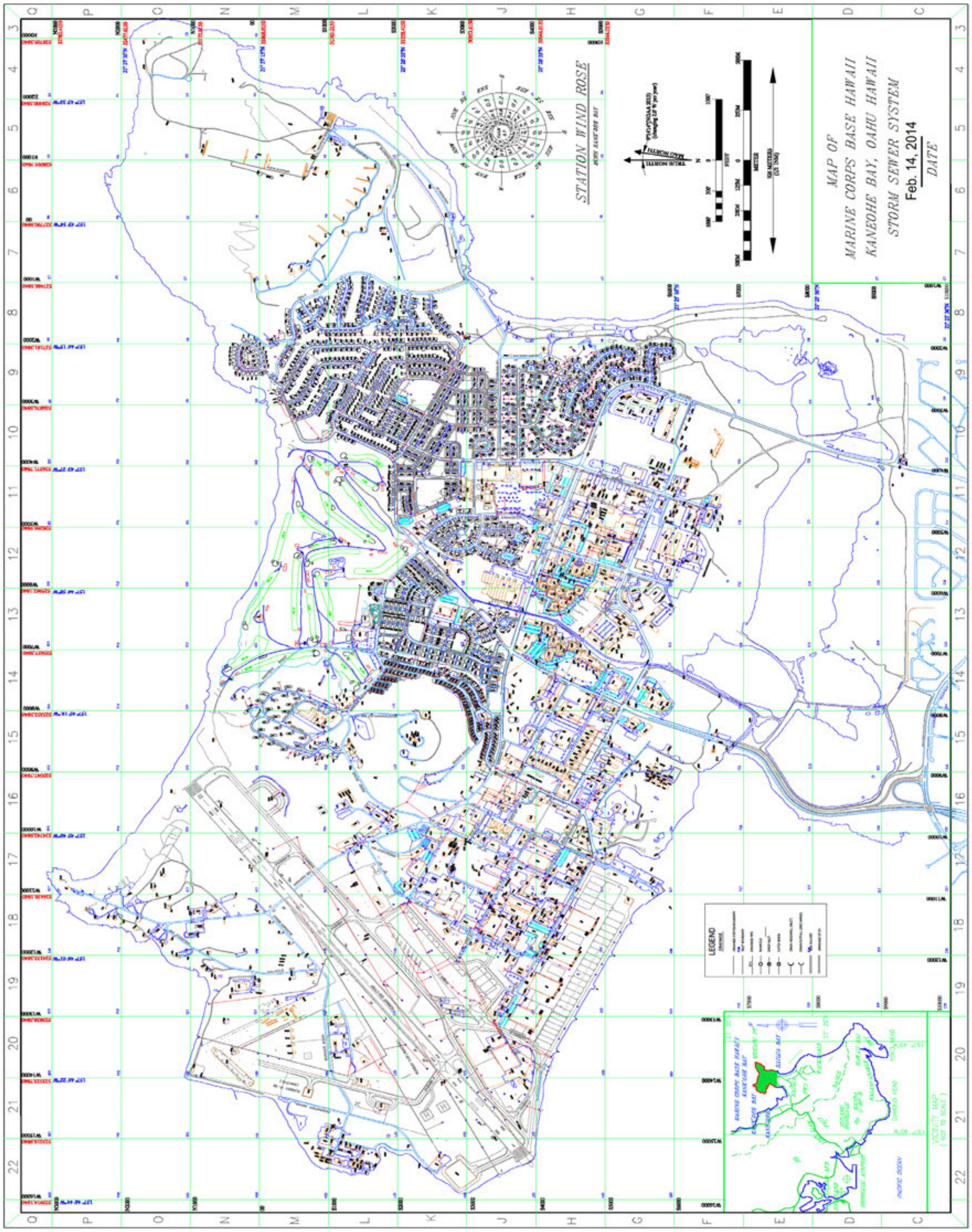
Deadline	Description	Part	Submit to the DOH
18 months after the Effective Date of Permit (EDOP)	Revised SWMP Plan.	D.1.	Yes
6 months after EDOP	Establish and implement requirements for issuing connection permits, or equivalent, and require obtaining the permit prior to allowing the drain connection. Also establish and implement requirements for issuing permits, or equivalent, for the operation and maintenance of drain connections to the MS4.	D.1.c.(1)	No
6 months after EDOP	Implement an Outfall Field Screening Plan.	D.1.c.(2)	No
6 months after EDOP	Establish and implement the policies for enforcement and penalties for non-compliance with Part D.1.c.(1) and for persons illegally discharging pollutants to its MS4; and pursue enforcement actions.	D.1.c.(5)	No
12 months after EDOP	Establish BMP Manuals.	D.1.d.(1)	Yes
12 months after EDOP	Establish policies to require construction projects to implement BMPs and standards described in the Construction, Maintenance Activities, and Storm Water Permanent BMPS Manuals..	D.1.d.(2)	No

Deadline	Description	Part	Submit to the DOH
6 months after EDOP	Implement a system to track both private and public construction projects.	D.1.d.(3)	No
90 calendar days after EDOP	Implement the Plan Review Checklist that reviewers use in evaluating the plans and BMPs or other similar documents which have been implemented pursuant to Part D.1.d.	D.1.d.(4)(iv)	No
90 calendar days after EDOP	Implement a standard inspection form(s), inspection checklist, and reporting and corrective procedures.	D.1.d.(5)(iv)	No
6 months after EDOP	Implement the revised plan for requiring LID in its Standards.	D.1.e.(1)	No
6 months after EDOP	Develop and implement Asset Management System to track frequency of inspections and maintenance of the Permanent BMPs.	D.1.e.(3)	No
12 months after EDOP	Implement Asset Management System and map of its MS4.	D.1.f.(1)(i)	No
12 months after EDOP	Implement an Action Plan for Retrofitting Structural BMPs.	D.1.f.(1)(iv)	No
Annual Report	Trash Reduction Plan	D.1.f.(1)(v)	Yes
1 year after EDOP	List of projects and implementation schedule for permanent erosion control improvements.	D.1.f.(3)(v)	Yes
Annual Report	Industrial facilities and activities inventory information.	D.1.g.(2)	Yes

Deadline	Description	Part	Submit to the DOH
Annual Report	Commercial facilities and activities inventory information	D.1.g.(3)	Yes
60 calendar days after EDOP	Prioritized areas for industrial and commercial facility and activity inspection status report.	D.1.g.(4)	Yes
October 31st and April 30th of each year	Semi-Annual Industrial and Commercial Inspection Reports.	D.1.g.(5)	Yes
Annual Report	Updates to the industrial and commercial inspection training shall be included in the Annual Report.	D.1.g.(8)	Yes
30 calendar days prior to the initiation date of the major modification	SWMP Modification Report	D.2.	Yes
June 1st of each year	Annual Monitoring Plan	F.1.a	Yes
Various	TMDL Compliance, refer to Schedules of Compliance if applicable.	F.3	Yes
January 30th of each year	Annual Report, to include but not limited to: • Progress evaluation results of the public education program [Part D.1.a.(3)], • Description and reason for any revision to its Standards and copy of the revised Standards [Part D.1.d.(1)],	G.1	Yes

Deadline	Description	Part	Submit to the DOH
	• Updates to its inspection/maintenance schedule, including explanation of the changes [Part D.1.f.(1)(ii)], • Updates to its implementation schedule for retrofitting structural BMPs [Part D.1.f.(1)(iv)], • Summary of its trash load reduction actions [Part D.1.f.(1)(v)], • Status report on implementation of erosion control measures at its storm drain system outlets [Part D.1.f.(3)(iv)], • Updated industrial inventory information (4th Annual Report) [Part D.1.g.(2)] • Updated commercial inventory information (4th Annual Report) [Part D.1.g.(3)] • Modified Prioritized Areas for Industrial and Commercial Facility and Activity Plan [Part D.1.g.(4)], • SWMP Modifications [Part D.2] • System Modifications [Part D.2], and • Annual Report requirements [Part G.1]		
6 months after EDOP	Written strategy for determining effectiveness of its SWMP	G.1.d	Yes
January 30th of each year	Annual Monitoring Report with Discharge Monitoring Reports	G.2	Yes

Part I. MAP


MAP OF
MARINE CORPS BASE HAWAII
KANEOHE BAY, OAHU HAWAII
STORM SEWER SYSTEM
Feb. 14, 2014
DATE
STATION WIND ROSE
LEGEND

APPENDIX 1 – Storm Water Associated with Industrial Activities.

The industrial facilities covered under this permit shall comply with the requirements in this Appendix.

1. Coverage Under This Permit.

1.1. Eligibility.

1.1.1. Facilities Covered.

To be eligible to discharge under this permit, you must have an allowable storm water discharge or an allowable non-storm water discharge associated with industrial activity from your primary industrial activity, as defined below.

Primary Industrial Activity – includes any activities performed on-site which are (1) identified by the facility's primary SIC code and included in the descriptions of 122.26(b)(14)(ii), (iii), (vi), or (viii); or (2) included in the narrative descriptions of 122.26(b)(14)(i), (iv), (v), (vii), or (ix). (For co-located activities covered by multiple SIC codes, it is recommended that the primary industrial determination be based on the value of receipts or revenues or, if such information is not available for a particular facility, the number of employees or production rate for each process may be compared. The operation that generates the most revenue or employs the most personnel is the operation in which the facility is primarily engaged. In situations where the vast majority of on-site activity falls within one SIC code, that activity may be the primary industrial activity.) Narrative descriptions in 40 CFR 122.26(b)(14) identified above include: (i) activities subject to storm water effluent limitations guidelines, new source performance standards, or toxic pollutant effluent standards; (iv) hazardous waste treatment storage, or disposal facilities including those that are operating under interim status or a permit under subtitle C of the Resource Conservation and Recovery Act (RCRA); (v) landfills, land application sites and open dumps that receive or have received industrial wastes; (vii) steam electric power generating facilities; and (ix) sewage treatment works with a design flow of 1.0 mgd or more.

Effluent Limitations Guideline (ELG) – defined in 40 CFR 122.2 as a regulation published by the EPA Administrator under section 304(b) of CWA to adopt or revise effluent limitations.

New Source Performance Standards (NSPS) – technology-based standards for facilities that qualify as new sources under 40 CFR 122.2 and 40 CFR 122.29.

1.1.2. Reserved.

1.1.3. Allowable Non-Storm Water Discharges.

Below in Part 1.1.3.1 are the only non-storm water discharges authorized under this permit for all sectors provided that all discharges comply with the effluent limits set forth in Parts 2 and 8. In addition to the authorized non-storm water discharges in Part 1.1.3.1 applicable to all sectors, for Sector A, there is an additional non-storm water discharge in Part 1.1.3.2 below, and for the mining sectors (Sectors G, H, and J), there are additional authorized non-storm water discharges in Part 1.1.3.3 below. The additional allowable non-storm water discharges for Sectors G, H, and J apply only to discharges from earth-disturbing activities conducted prior to active mining activities as defined in Part 8.G.3.2, 8.H.3.2, and 8.J.3.2 provided that, with the exception of water used to control dust and to irrigate areas to be vegetatively stabilized, these discharges are not routed to areas of exposed soil and all discharges comply with the permit's effluent limits.

Non-storm water discharges requiring NPDES permit coverage except those specifically listed in Part 1.1.3 are not authorized by this permit. If non-storm water discharges requiring NPDES permit coverage other than those specifically authorized in Part 1.1.3, including sector-specific non-storm water discharges that are listed in Part 8 as prohibited (a non-exclusive list provided to raise awareness of contaminants or sources of contaminants characteristic of certain sectors), will be discharged, such non-storm water discharges are not authorized by this permit and must either be eliminated or covered under another NPDES permit.

1.1.3.1. Allowable Non-Storm Water Discharges for all Sectors of Industrial Activity:

- Discharges from emergency/unplanned fire-fighting activities;
- Fire hydrant flushing;
- Potable water, including water line flushing;
- Uncontaminated condensate from air conditioners, coolers/chillers, and other compressors and from the outside storage of refrigerated gases or liquids;
- Irrigation drainage;
- Landscape watering provided all pesticides, herbicides, and fertilizers have been applied in accordance with the approved labeling;

- Pavement wash waters where no detergents or hazardous cleaning products are used (e.g., bleach, hydrofluoric acid, muriatic acid, sodium hydroxide, nonylphenols), and the wash waters do not come into contact with oil and grease deposits, sources of pollutants associated with industrial activities (see Part 5.2.3), or any other toxic or hazardous materials, unless residues are first cleaned up using dry clean-up methods (e.g., applying absorbent materials and sweeping, using hydrophobic mops/rags) and you have implemented appropriate control measures to minimize discharges of mobilized solids and other pollutants (e.g., filtration, detention; settlement);

  Hazardous Materials or Hazardous Substances or Toxic Materials – for the purposes of this permit, any liquid, solid, or contained gas that contain properties that are dangerous or potentially harmful to human health or the environment. See also 40 CFR 261.2.

  Control Measures – refers to any storm water control or other method (including narrative effluent limitations) used to prevent or reduce the discharge of pollutants to state waters.

  Minimize – for the purposes of this permit, minimize means to reduce and/or eliminate to the extent achievable using control measures that are technologically available and economically practicable and achievable in light of best industry practices.

- Routine external building washdown/power wash water that does not use detergents or hazardous cleaning products (e.g., those containing bleach, hydrofluoric acid, muriatic acid, sodium hydroxide, nonylphenols);
- Uncontaminated ground water or spring water;
- Foundation or footing drains where flows are not contaminated with process materials; and
- Incidental windblown mist from cooling towers that collects on rooftops or adjacent portions of your facility, but not intentional discharges from the cooling tower (e.g., “piped” cooling tower blowdown; drains).

1.1.4. Limitation on Coverage

Any discharges not expressly authorized in this permit cannot become authorized or shielded from liability under Clean Water Act (CWA) section 402(k) by disclosure to the DOH-CWB after issuance of this permit via any means, including the NPDES Individual Application, the SWPPP, or during an inspection.

1.1.4.1. For Discharges Mixed with Non-Storm Water. Storm water discharges that are mixed with non-storm water discharges, other than those mixed with allowable non-storm water discharges listed in Part 1.1.3 and/or those mixed with a discharge authorized by a different NPDES permit and/or a discharge that does not require NPDES authorization, are not eligible for coverage under this permit.

1.1.4.2. For Storm Water Discharges Associated with Construction Activity. Storm water discharges associated with construction activity disturbing one acre or more, or that are part of a larger common plan of development or sale if the larger common plan will ultimately disturb one acre or more, are not eligible for coverage under this permit.

1.2. Reserved.

1.3. Reserved.

1.4. Reserved.

1.5. Permit Compliance.

Any non-compliance with any of the requirements of this permit constitutes a violation of this permit, and thus is a violation of the CWA. As detailed in Part 4 (Corrective Actions) of this permit, failure to take any required corrective actions constitutes an independent, additional violation of this permit, in addition to any original violation that triggered the need for corrective action. As such, any actions and time periods specified for remedying non-compliance do not absolve parties of the initial underlying non-compliance.

Corrective Action – for the purposes of the permit, any action taken, or required to be taken, to (1) repair, modify, or replace any storm water control used at the site; (2) clean up and dispose of spills, releases, or other deposits found on the site; and (3) remedy a permit violation.

Spill – for the purpose of this permit, the release of a hazardous or toxic substance from its container or containment.

Where corrective action is triggered by an event that does not itself constitute permit non-compliance, such as an exceedance of an applicable benchmark, there is no permit violation provided you take the required corrective action within the relevant deadlines established in Part 4.3.

2. Control Measures and Effluent Limits.

In the technology-based limits included in Parts 2.1 and 8, the term "minimize" means reduce and/or eliminate to the extent achievable using control measures (including best management practices) that are technologically available and economically practicable and achievable in light of best industry practice. The term "infeasible" means not technologically possible or not economically practicable and achievable in light of best industry practices.

2.1. Control Measures.

You must select, design, install, and implement control measures (including best management practices) to minimize pollutant discharges that address the selection and design considerations in Part 2.1.1, meet the non-numeric effluent limits in Part 2.1.2, meet limits contained in applicable effluent limitations guidelines in Part 2.1.3, and meet the water quality-based effluent limitations in Part 2.2. The selection, design, installation, and implementation of these control measures must be in accordance with good engineering practices and manufacturer's specifications. Note that you may deviate from such manufacturer's specifications where you provide justification for such deviation and include documentation of your rationale in the part of your SWPPP that describes your control measures, consistent with Part 5.2.4. If you find that your control measures are not achieving their intended effect of minimizing pollutant discharges to meet applicable water quality standards or any of the other non-numeric effluent limits in this permit, you must modify these control measures per the corrective action requirements in Part 4. Regulated storm water discharges from your facility include storm water run-on that commingles with storm water discharges associated with industrial activity at your facility.

Effluent limit requirements in Part 2.1.2 that do not involve the site-specific selection of a control measure or are specific activity requirements (e.g., "Cleaning catch basins when the depth of debris reaches two-thirds (2/3) of the sump depth and keeping the debris surface at least six inches below the lowest outlet pipe") are marked with an asterisk (*). When documenting in your SWPPP, per Part 5, how you will comply with the requirements marked with an asterisk, you have the option of including additional information or you may just "cut-and-paste" those effluent limits verbatim into your SWPPP without providing additional documentation (see Part 5.2.4).

2.1.1. Control Measure Selection and Design Considerations.

You must consider the following when selecting and designing control measures:

- Preventing storm water from coming into contact with polluting materials is generally more effective, and less costly, than trying to remove pollutants from storm water;

- Using control measures in combination may be more effective than using control measures in isolation for minimizing pollutants in your storm water discharge;
- Assessing the type and quantity of pollutants, including their potential to impact receiving water quality, is critical to designing effective control measures that will achieve the limits in this permit;
- Minimizing impervious areas at your facility and infiltrating runoff onsite (including bioretention cells, green roofs, and pervious pavement, among other approaches) can reduce runoff and improve ground water recharge and stream base flows in local streams, although care must be taken to avoid ground water contamination;
- Attenuating flow using open vegetated swales and natural depressions can reduce in-stream impacts of erosive flows;
- Conserving and/or restoring riparian buffers will help protect streams from storm water runoff and improve water quality; and
- Using treatment interceptors (e.g., swirl separators and sand filters) may be appropriate in some instances to minimize the discharge of pollutants.

2.1.2. Non-Numeric Technology-Based Effluent Limits (BPT/BAT/BCT).

You must comply with the following non-numeric effluent limits (except where otherwise specified in Part 8) as well as any sector-specific non-numeric effluent limits in Part 8:

2.1.2.1. Minimize Exposure. You must minimize the exposure of manufacturing, processing, and material storage areas (including loading and unloading, storage, disposal, cleaning, maintenance, and fueling operations) to rain and runoff in order to minimize pollutant discharges by either locating these industrial materials and activities inside or protecting them with storm resistant coverings. Unless infeasible, you must also:

- Use grading, berming or curbing to prevent runoff of contaminated flows and divert run-on away from these areas;
- Locate materials, equipment, and activities so that potential leaks and spills are contained or able to be contained or diverted before discharge;
- Clean up spills and leaks promptly using dry methods (e.g., absorbents) to prevent the discharge of pollutants;
- Store leaky vehicles and equipment indoors or, if stored outdoors, use drip pans and absorbents;
- Use spill/overflow protection equipment;
- Perform all vehicle and/or equipment cleaning operations indoors, under cover, or in berm areas that prevent runoff and run-on and also that capture any overspray; and

- Drain fluids from equipment and vehicles that will be decommissioned, and, for any equipment and vehicles that will remain unused for extended periods of time, inspect at least monthly for leaks.

2.1.2.2. **Good Housekeeping.** You must keep clean all exposed areas that are potential sources of pollutants. You must perform good housekeeping measures in order to minimize pollutant discharges, including but not limited to, the following:

- Sweep or vacuum at regular intervals or, alternatively, wash down the area and collect and/or treat, and properly dispose of the washdown water;
- Store materials in appropriate containers;
- Keep all dumpster lids closed when not in use. For dumpsters and roll off boxes that do not have lids and could leak, ensure that discharges have a control (e.g., secondary containment, treatment). Consistent with Part 1.1.3 above, this permit does not authorize dry weather discharges from dumpsters or roll off boxes; *
- Minimize the potential for waste, garbage and floatable debris to be discharged by keeping exposed areas free of such materials, or by intercepting them before they are discharged.

  Plastic Materials Requirements: Facilities that handle pre-production plastic must implement best management practices to eliminate discharges of plastic in storm water. Examples of plastic material required to be addressed as storm water pollutants include plastic resin pellets, powders, flakes, additives, regrind, scrap, waste and recycling.

2.1.2.3. **Maintenance.** You must maintain all control measures that are used to achieve the effluent limits in this permit in effective operating condition, as well as all industrial equipment and systems, in order to minimize pollutant discharges.

Effective Operating Condition – for the purposes of this permit, a storm water control is kept in effective operating condition if it has been implemented and maintained in such a manner that it is working as designed to minimize pollutant discharges.

This includes:

- Performing inspections and preventive maintenance of storm water drainage, source controls, treatment systems, and plant equipment and systems that could fail and result in contamination of storm water.
- Diligently maintaining non-structural control measures (e.g., keep spill response supplies available, personnel appropriately trained).
- Inspecting and maintaining baghouses at least quarterly to prevent the escape of dust from the system and immediately removing any accumulated dust at the base of the exterior baghouse. *

- Cleaning catch basins when the depth of debris reaches two-thirds (2/3) of the sump depth and keeping the debris surface at least six inches below the lowest outlet pipe. *

If you find that your control measures are in need of routine maintenance, you must conduct the necessary maintenance immediately in order to minimize pollutant discharges. If you find that your control measures need to be repaired or replaced, you must immediately take all reasonable steps to prevent or minimize the discharge of pollutants until the final repair or replacement is implemented, including cleaning up any contaminated surfaces so that the material will not be discharged during subsequent storm events. Final repairs/replacement of storm water controls should be completed as soon as feasible but must be no later than the timeframe established in Part 4.3 for corrective actions, i.e., within 14 days or, if that is infeasible, within 45 days. If the completion of storm water control repairs/replacement will exceed the 45-day timeframe, you may take the minimum additional time necessary to complete the maintenance, provided that you notify the DOH of your intention to exceed 45 days, and document in your SWPPP your rationale for your modified maintenance timeframe. If a control measure was never installed, was installed incorrectly or not in accordance with Parts 2 and/or 8, or is not being properly operated or maintained, you must conduct corrective action as specified in Part 4.

Note: In this context, the term "immediately" requires you to, on the same day you identify that a control measure needs to be maintained, take all reasonable steps to minimize or prevent the discharge of pollutants until a permanent solution is installed and made operational. However, if a problem is identified at a time in the workday when it is too late to take action, the initiation of action must begin no later than the following workday. "All reasonable steps" means that the permittee has undertaken initial actions to assess and address the condition causing the corrective action, including, for example, cleaning up any exposed materials that may be discharged in a storm event (e.g., through sweeping, vacuuming) or making arrangements (i.e., scheduling) for a new best management practice (BMP) to be installed at a later date. "All reasonable steps" for purposes of complying with Part 4.2 Conditions Requiring SWPPP Review to Determine if Modifications Are Necessary, when you conclude a corrective action is, in fact, not necessary, could include documenting why a corrective action is unnecessary.

2.1.2.4. Spill Prevention and Response. You must minimize the potential for leaks, spills and other releases that may be exposed to storm water and develop plans for effective response to such spills if or when they occur in order to minimize pollutant discharges. You must conduct spill prevention and response measures, including but not limited to, the following:

- Plainly label containers (e.g., "Used Oil," "Spent Solvents," "Fertilizers and Pesticides") that could be susceptible to spillage or leakage to encourage proper handling and facilitate rapid response if spills or leaks occur; *
- Implement procedures for material storage and handling, including the use of secondary containment and barriers between material storage and traffic areas, or a similarly effective means designed to prevent the discharge of pollutants from these areas;
- Develop training on the procedures for expeditiously stopping, containing, and cleaning up leaks, spills, and other releases. As appropriate, execute such procedures as soon as possible;
- Keep spill kits on-site, located near areas where spills may occur or where a rapid response can be made; and
- Notify appropriate facility personnel when a leak, spill, or other release occurs.

Where a leak, spill or other release containing a hazardous substance or oil in an amount equal to or in excess of a reportable quantity established under either 40 CFR Part 110, 40 CFR Part 117, or 40 CFR Part 302, occurs during a 24-hour period, you must notify the Clean Water Branch at (808) 586-4309 during regular office hours which are Monday through Friday (excluding holidays) from 7:45 a.m. until 4:15 p.m. or the Hawaii State Hospital Operator at (808) 247-2191 outside of regular office hours. Contact information must be in locations that are readily accessible and available.

2.1.2.5. **Erosion and Sediment Controls.** You must minimize erosion by stabilizing exposed soils at your facility in order to minimize pollutant discharges and placing flow velocity dissipation devices at discharge locations to minimize channel and streambank erosion and scour in the immediate vicinity of discharge points. You must also use structural and non-structural control measures to minimize the discharge of sediment. The use of polymers and/or other chemical treatments as part of your controls is not covered under this general permit. There are many resources available to help you select appropriate BMPs for erosion and sediment control, including from the EPA.

2.1.2.6. **Management of Runoff.** You must divert, infiltrate, reuse, contain, or otherwise reduce storm water runoff to minimize pollutants in your discharges. In selecting, designing, installing, and implementing appropriate control measures, you are encouraged to consult with EPA's Internet-based resources relating to runoff management, including the sector-specific *Industrial Storm Water Fact Sheet Series*, *National Menu of Storm water BMPs*, and *National Management Measures to Control Nonpoint Source Pollution from Urban Areas*, and any similar resources.

2.1.2.7. **Reserved.**

2.1.2.8. **Employee Training.** You must train all employees who work in areas where industrial materials or activities are exposed to storm water, or who are responsible for implementing activities necessary to meet the conditions of this permit (e.g., inspectors, maintenance personnel), including all members of your storm water pollution control team. You must ensure the following personnel understand the requirements of this permit and their specific responsibilities with respect to those requirements:

- Personnel who are responsible for the design, installation, maintenance, and/or repair of controls (including pollution control measures);
- Personnel responsible for the storage and handling of chemicals and materials that could become contaminants in storm water discharges;
- Personnel who are responsible for conducting and documenting monitoring and inspections as required in Parts 3 and 6; and
- Personnel who are responsible for taking and documenting corrective actions as required in Part 4.

Personnel must be trained in at least the following if related to the scope of their job duties (e.g., only personnel responsible for conducting inspections need to understand how to conduct inspections):

- An overview of what is in the SWPPP;
- Spill response procedures, good housekeeping, maintenance requirements, and material management practices;
- The location of all controls on the site required by this permit, and how they are to be maintained;
- The proper procedures to follow with respect to the permit’s pollution control requirements; and
- When and how to conduct inspections, record applicable findings, and take corrective actions.

2.1.2.9. **Non-Storm Water Discharges.** You must evaluate for the presence of non-storm water discharges. Any non-storm water discharges not explicitly authorized in Part 1.1.3 or covered by another NPDES permit must be eliminated. This includes vehicle and equipment/tank wash water (except for those authorized in Part 1.1.3.3 for Sectors G, H, and J). If not covered under a separate NPDES permit, wastewater, wash water and any other unauthorized non-storm water must be discharged to a sanitary sewer in accordance with applicable industrial pretreatment requirements, or otherwise disposed of appropriately.

2.1.2.10. **Dust Generation and Vehicle Tracking of Industrial Materials.** You must minimize generation of dust and off-site tracking of raw, final, or waste materials in order to minimize pollutant discharges.

2.1.3. Numeric Effluent Limitations Based on Effluent Limitations Guidelines.

If you are in an industrial category subject to one of the effluent limitations guidelines identified in Table 6-1 (see Part 6.2.2.1), you must meet the effluent limits referenced in Table 2-1 below:

Table 2-1. Applicable Effluent Limitations Guidelines

Regulated Activity	40 CFR Part/Subpart	Effluent Limit
Discharges resulting from spray down or intentional wetting of logs at wet deck storage areas	Part 429, Subpart I	See Part 8.A.7
Runoff from phosphate fertilizer manufacturing facilities that comes into contact with any raw materials, finished product, by-products or waste products (SIC 2874)	Part 418, Subpart A	See Part 8.C.4
Runoff from asphalt emulsion facilities	Part 443, Subpart A	See Part 8.D.4
Runoff from material storage piles at cement manufacturing facilities	Part 411, Subpart C	See Part 8.E.5
Mine dewatering discharges at crushed stone, construction sand and gravel, or industrial sand mining facilities	Part 436, Subparts B, C, or D	See Part 8.J.9
Runoff from hazardous waste landfills	Part 445, Subpart A	See Part 8.K.6
Runoff from non-hazardous waste landfills	Part 445, Subpart B	See Part 8.L.10
Runoff from coal storage piles at steam electric generating facilities	Part 423	See Part 8.O.8
Runoff containing urea from airfield pavement deicing at existing and new primary airports with 1,000 or more annual non-propeller aircraft departures	Part 449	See Part 8.S.8

2.2. Water Quality-Based Effluent Limitations.

2.2.1. Water Quality Standards.

Your discharge must be controlled as necessary to meet applicable water quality standards (i.e., your discharge must not cause or contribute to an exceedance of applicable water quality standards).

The DOH expects that compliance with the conditions in this permit will control discharges as necessary to meet applicable water quality standards as described in HAR Chapter 11-55, Appendix A, Section 1. If at any time you become aware, or DOH determines, that your discharge does not meet applicable water quality standards, you must take corrective action(s) as required in Part 4.1 and document the corrective actions as required in Part 4.4.

The DOH may also require that you undertake additional control measures (to meet the narrative water quality-based effluent limit above) on a site-specific basis if information in your Individual NPDES Application, required reports, or from other sources indicates that your discharges are not controlled as necessary to meet applicable water quality standards. You must implement all measures necessary to be consistent with an applicable waste load allocation in a DOH established and EPA approved TMDL.

2.2.2. Discharges to Water Quality-Impaired Waters.

You are considered to discharge to an impaired water if the first state water to which you discharge is identified by the DOH as not meeting an applicable water quality standard, and:

- Requires development of a TMDL [pursuant to section 303(d) of the CWA];
- Is addressed by a DOH established and EPA-approved TMDL; or
- Is not in either of the above categories but the waterbody is covered by a pollution control program that meets the requirements of 40 CFR 130.7(b)(1).

Note: For discharges that enter a separate storm sewer system[1] prior to discharge, the first state water to which you discharge is the waterbody that receives the water from the storm sewer system.

2.2.2.1. Existing Discharge to an Impaired Water with a DOH Established and EPA Approved TMDL. If you discharge to an impaired water with a DOH established and EPA-approved TMDL, DOH will inform you whether any additional measures are necessary for your discharge to be consistent with the assumptions and requirements of the applicable TMDL and its waste load allocation, or if coverage under an individual permit is necessary per Part 1.2.3.

2.2.2.2. Existing Discharger to an Impaired Water without a DOH established and EPA-Approved TMDL. If you discharge to an impaired water without a DOH established and EPA-approved TMDL, you are still required to comply with Part 2.2.1, and you must comply with the monitoring requirements of Part 6.2.4.1.

1 Separate storm systems do not include combined sewer systems or sanitary sewer systems. Separate storm systems include both municipal storm sewer systems (MS4s) and non-municipal separate storm sewers.

Note that the impaired waters monitoring requirements of Part 6.2.4.1 also apply where DOH determines that your discharge is not controlled as necessary to meet applicable water quality standards in an impaired downstream water segment, even if your discharge is to a receiving water that is not identified as impaired according to Part 2.2.2.

2.2.2.3. **New Discharger or New Source to an Impaired Water.** If your authorization to discharge under this permit relied on Part 1.1.4.8 for a new discharger or a new source to an impaired water, you must implement and maintain any measures that enabled you to become eligible under Part 1.1.4.8, and modify such measures as necessary pursuant to any Part 4 corrective actions. You also must comply with Part 2.2.1 and the monitoring requirements of Parts 6.2.4.1.

2.3. **Reserved.**

3. Inspections.

3.1. Routine Facility Inspections.

During normal facility operating hours, you must conduct inspections of areas of the facility covered by the requirements in this permit, including, but not limited to, the following:

- Areas where industrial materials or activities are exposed to storm water;
- Areas identified in the SWPPP and those that are potential pollutant sources (see Part 5.2.3);
- Areas where spills and leaks have occurred in the past three years;
- Discharge points; and
- Control measures used to comply with the effluent limits contained in this permit.

Inspections must be conducted at least quarterly (i.e., once each calendar quarter), or in some instances more frequently (e.g., monthly). Increased frequency may be appropriate for some types of equipment, processes and storm water control measures, or areas of the facility with significant activities and materials exposed to storm water. At least once each calendar year, the routine inspection must be conducted during a period when a storm water discharge is occurring.

Inspections must be performed by qualified personnel, as defined in below, with at least one member of your storm water pollution control team participating. Inspectors must consider the results of visual and analytical monitoring (if any) for the past year when planning and conducting inspections.

Qualified Personnel – qualified personnel are those who are knowledgeable in the principles and practices of industrial storm water controls and pollution prevention, and who possess the education and ability to assess conditions at the industrial facility that could impact storm water quality, and the education and ability to assess the effectiveness of storm water controls selected and installed to meet the requirements of the permit.

During the inspection you must examine or look out for the following:

- Industrial materials, residue or trash that may have or could come into contact with storm water;
- Leaks or spills from industrial equipment, drums, tanks and other containers;
- Offsite tracking of industrial or waste materials, or sediment where vehicles enter or exit the site;
- Tracking or blowing of raw, final or waste materials from areas of no exposure to exposed areas;

- Control measures needing replacement, maintenance or repair.

During an inspection occurring during a storm water event or discharge, control measures implemented to comply with effluent limits must be observed to ensure they are functioning correctly. Discharge points, as defined below, must also be observed during this inspection. If such discharge locations are inaccessible, nearby downstream locations must be inspected.

Discharge Point – for the purposes of this permit, the location where collected and concentrated storm water flows are discharged from the facility such that the first receiving waterbody into which the discharge flows, either directly or through a separate storm sewer system, is a state water.

3.1.1. Routine Facility Inspection Documentation.

You must document the findings of your facility inspections and maintain this report with your SWPPP as required in Part 5.5. Do not submit your routine facility inspection report to the DOH, unless specifically requested to do so. However, you must summarize your findings in the annual report per Part 7.5. Document all findings, including but not limited to, the following information:

- The inspection date and time;
- The name(s) and signature(s) of the inspector(s);
- Weather information;
- All observations relating to the implementation of control measures at the facility, including:
  - A description of any discharges occurring at the time of the inspection;
  - Any previously unidentified discharges from and/or pollutants at the site;
  - Any evidence of, or the potential for, pollutants entering the drainage system;
  - Observations regarding the physical condition of and around all outfalls, including any flow dissipation devices, and evidence of pollutants in discharges and/or the receiving water;
  - Any control measures needing maintenance, repairs, or replacement;
- Any additional control measures needed to comply with the permit requirements;
- Any incidents of non-compliance; and
- A statement, signed and certified in accordance with HAR Chapter 11-55, Appendix A, Subsection 15.

Any corrective action required as a result of a routine facility inspection must be performed consistent with Part 4 of this permit.

If you performed a discharge visual assessment required in Part 3.2 during your facility inspection, you may include the results of the assessment with the report required in Part 3.1.1, as long as all components of both types of inspections are included in the report.

3.2. Quarterly Visual Assessment of Storm Water Discharges.

3.2.1. Quarterly Visual Assessment Procedures.

Once each quarter for the entire permit term, you must collect a storm water sample from each outfall (except as noted in Part 3.2.3) and conduct a visual assessment of each of these samples. These samples are not required to be collected consistent with 40 CFR Part 136 procedures but must be collected in such a manner that the samples are representative of the storm water discharge.

The visual assessment must be made:

- Of a sample in a clean, colorless glass or plastic container, and examined in a well-lit area;
- On samples collected within the first 30 minutes of an actual discharge from a storm event. If it is not possible to collect the sample within the first 30 minutes of discharge, the sample must be collected as soon as practicable after the first 30 minutes and you must document why it was not possible to take the sample within the first 30 minutes; and
- For storm events, on discharges that occur at least 72 hours (three days) from the previous discharge. The 72-hour (three-day) storm interval does not apply if you document that less than a 72-hour (three-day) interval is representative for local storm events during the sampling period.

You must visually inspect or observe the sample for the following water quality characteristics:

- Color;
- Odor;
- Clarity (diminished);
- Floating solids;
- Settled solids;
- Suspended solids;
- Foam;
- Oil sheen; and
- Other obvious indicators of storm water pollution.

Whenever the visual assessment shows evidence of storm water pollution, you must initiate the corrective action procedures in Part 4.

3.2.2. Quarterly Visual Assessment Documentation.

You must document the results of your visual assessments and maintain this documentation onsite with your SWPPP as required in Part 5.5. You are not required to submit your visual assessment findings to the DOH, unless specifically requested to do so. However, you must summarize your findings in the annual report per Part 7.5. Your documentation of the visual assessment must include, but not be limited to:

- Sample location(s);
- Sample collection date and time, and visual assessment date and time for each sample;
- Personnel collecting the sample and performing visual assessment, and their signatures;
- Nature of the discharge (i.e., runoff or snowmelt);
- Results of observations of the storm water discharge;
- Probable sources of any observed storm water contamination;
- If applicable, why it was not possible to take samples within the first 30 minutes; and
- A statement, signed and certified in accordance with HAR Chapter 11-55, Appendix A, Subsection 15.

Any corrective action required as a result of a quarterly visual assessment must be performed consistent with Part 4 of this permit.

3.2.3. Exceptions to Quarterly Visual Assessments.

Adverse Weather Conditions: When adverse weather conditions prevent the collection of samples during the quarter, you must take a substitute sample during the next qualifying storm event. Documentation of the rationale for no visual assessment for the quarter must be included with your SWPPP records as described in Part 5.5. Adverse conditions are those that are dangerous or create inaccessibility for personnel, such as local flooding, high winds, or situations that otherwise make sampling impractical.

Climates with Irregular Storm Water Runoff: If your facility is located in an area where limited rainfall occurs during many parts of the year (e.g., arid or semi-arid climate) that prevent runoff from occurring for extended periods, then your samples for the quarterly visual assessments may be distributed during seasons when precipitation runoff occurs.

Semi-Arid Areas – areas where annual rainfall averages from 10 to 20 inches.

Substantially Identical Outfalls: If your facility has two or more outfalls that discharge substantially identical effluents, as documented in Part 5.2.5.3, you may conduct quarterly visual assessments of the discharge at just one of the outfalls and report that the results also apply to the substantially identical outfall(s) provided that you perform visual assessments on a rotating basis of each substantially identical outfall throughout the period of your coverage under this permit.

If storm water contamination is identified through visual assessment performed at a substantially identical outfall, you must assess and modify your control measures as appropriate for each outfall represented by the monitored outfall.

3.3. Authorization to Inspect.

The DOH may conduct an inspection of any facility covered by this permit to ensure compliance with state requirements, including state water quality standards.

4. Corrective Actions.

4.1. Conditions Requiring SWPPP Review and Revision to Ensure Effluent Limits Are Met.

When any of the following conditions occur or are detected during an inspection, monitoring or other means, or the DOH or the operator of the MS4 through which you discharge informs you that any of the following conditions have occurred, you must review and revise, as appropriate, your SWPPP (e.g., sources of pollution; spill and leak procedures; non-storm water discharges; the selection, design, installation and implementation of your control measures) so that this permit's effluent limits are met and pollutant discharges are minimized:

- An unauthorized release or discharge (e.g., spill, leak, or discharge of non-storm water not authorized by this or another NPDES permit to a state water) occurs at your facility.
- A discharge violates a numeric effluent limit listed in Table 2-1 and in your Part 8 sector-specific requirements.
- Your control measures are not stringent enough for the discharge to meet applicable water quality standards or the non-numeric effluent limits in this permit.
- A required control measure was never installed, was installed incorrectly, or not in accordance with Parts 2 and/or 8 or is not being properly operated or maintained.
- Whenever a visual assessment shows evidence of storm water pollution (e.g., color, odor, floating solids, settled solids, suspended solids, foam).

4.2. Conditions Requiring SWPPP Review to Determine if Modifications Are Necessary.

If any of the following conditions occur, you must review your SWPPP (e.g., sources of pollution, spill and leak procedures, non-storm water discharges, selection, design, installation and implementation of your control measures) to determine if modifications are necessary to meet the effluent limits in this permit:

- Construction or a change in design, operation, or maintenance at your facility that significantly changes the nature of pollutants discharged in storm water from your facility, or significantly increases the quantity of pollutants discharged.
- The average of four quarterly sampling results exceeds an applicable benchmark (see Part 6.2.1.2). If less than four benchmark samples have been taken, but the results are such that an exceedance of the four-quarter average is mathematically certain (i.e., if the sum of quarterly).

- Sample results to date is more than four times the benchmark level) this is considered a benchmark exceedance, triggering this review.

Note: A benchmark exceedance does not trigger a corrective action if you determine that the exceedance is solely attributable to natural background sources, or if you make a finding that no further pollutant reductions are technologically available and economically practicable and achievable in light of best industry practice (see Part 6.2.1.2).

Note: When run-on to your facility causes a benchmark exceedance, in addition to reviewing and revising, as appropriate, your SWPPP, you should notify the other operators contributing run-on to your discharges to abate their pollutant contribution. Where the other operators fail to take action to address the storm water run-on, you should contact the DOH.

4.3. Corrective Actions and Deadlines.

4.3.1. Immediate Actions.

If corrective action is needed, you must immediately take all reasonable steps necessary to minimize or prevent the discharge of pollutants until a permanent solution is installed and made operational, including cleaning up any contaminated surfaces so that the material will not discharge in subsequent storm events.

Note: In this context, the term "immediately" requires you to, on the same day a condition requiring corrective action is found, take all reasonable steps to minimize or prevent the discharge of pollutants until a permanent solution is installed and made operational. However, if a problem is identified at a time in the workday when it is too late to initiate corrective action, the initiation of corrective action must begin no later than the following workday. "All reasonable steps" means that the permittee has undertaken initial actions to assess and address the condition causing the corrective action, including, for example, cleaning up any exposed materials that may be discharged in a storm event (e.g., through sweeping, vacuuming) or making arrangements (i.e., scheduling) for a new BMP to be installed at a later date. "All reasonable steps" for purposes of complying with Part 4.2 Conditions Requiring SWPPP Review to Determine if Modifications Are Necessary, when you conclude a corrective action is, in fact, not necessary, could include documenting why a corrective action is unnecessary.

4.3.2. Subsequent Actions.

If you determine that additional actions are necessary beyond those implemented pursuant to Part 4.3.1, you must complete the corrective actions (e.g., install a new or modified control and make it operational, complete the repair) before the next storm event if possible, and within 14 calendar days from the time of discovery of the corrective action condition. If it is infeasible to complete the corrective action within 14 calendar days, you must document why it is infeasible to complete the corrective action within the 14-day timeframe. You must also identify your schedule for completing the work, which must be done as soon as practicable after the 14-day timeframe but no longer than 45 days after discovery. If the completion of corrective action will exceed the 45-day timeframe, you may take the minimum additional time necessary to complete the corrective action, provided that you notify the DOH of your intention to exceed 45 days, your rationale for an extension, and a completion date, which you must also include in your corrective action documentation (see Part 4.4). Where your corrective actions result in changes to any of the controls or procedures documented in your SWPPP, you must modify your SWPPP accordingly within 14 calendar days of completing corrective action work.

These time intervals are not grace periods, but are schedules considered reasonable for documenting your findings and for making repairs and improvements. They are included in this permit to ensure that the conditions prompting the need for these repairs and improvements do not persist indefinitely.

4.4. Corrective Action Documentation.

You must document the existence of any of the conditions listed in Parts 4.1 or 4.2 within 24 hours of becoming aware of such condition. You are not required to submit your corrective action documentation to the DOH, unless specifically requested to do so. However, you must summarize your findings in the annual report per Part 7.5. Include the following information in your documentation:

- Description of the condition triggering the need for corrective action review. For any spills or leaks, include the following information: a description of the incident including material, date/time, amount, location, and reason for spill, and any leaks, spills or other releases that resulted in discharges of pollutants to state waters, through storm water or otherwise;
- Date the condition was identified;
- Description of immediate actions taken pursuant to Part 4.3.1 to minimize or prevent the discharge of pollutants. For any spills or leaks, include response actions, the date/time clean-up completed, notifications made, and staff involved. Also include any measures taken to prevent the reoccurrence of such releases (see Part 2.1.2.4); and

- A statement signed and certified in accordance with HAR Chapter 11-55, Appendix A, Subsection 15.

You must also document the corrective actions taken or to be taken as a result of the conditions listed in Part 4.1 or 4.2 (or, for triggering events in Part 4.2 where you determine that corrective action is not necessary, the basis for this determination) within 14 days from the time of discovery of any of those conditions. Provide the dates when each corrective action was initiated and completed (or is expected to be completed). If applicable, document why it is infeasible to complete the necessary installations or repairs within the 14-day timeframe and document your schedule for installing the controls and making them operational as soon as practicable after the 14-day timeframe. If you notified the DOH regarding an extension of the 45-day timeframe, you must document your rationale for an extension.

4.5. Effect of Corrective Action.

If the event triggering the review is a permit violation (e.g., non-compliance with an effluent limit), correcting it does not remove the original violation. Additionally, failing to take corrective action in accordance with this section is an additional permit violation. The DOH will consider the appropriateness and promptness of corrective action in determining enforcement responses to permit violations.

4.6. Substantially Identical Outfalls.

If the event triggering corrective action is associated with an outfall that had been identified as a “substantially identical outfall” (see Parts 3.2.3 and 6.1.1), your review must assess the need for corrective action for all related substantially identical outfalls. Any necessary changes to control measures that affect these other outfalls must also be made before the next storm event if possible, or as soon as practicable following that storm event. Any corrective actions must be conducted within the timeframes set forth in Part 4.3.

5. Storm Water Pollution Prevention Plan (SWPPP).

You must update the SWPPP for your facility within 12 months of the date of NPDES Permit issuance. The SWPPP will be implemented within 180 days after submittal. If you prepared a SWPPP for coverage under a previous version of this NPDES permit, you must review and update the SWPPP to implement all provisions of this permit prior to submitting your SWPPP. The SWPPP does not contain effluent limitations; such limitations are contained in Parts 2 and 8 of the permit. The SWPPP is intended to document the selection, design, and installation of control measures to meet the permit's effluent limits. As distinct from the SWPPP, the additional documentation requirements (see Part 5.5) are intended to document the implementation (including inspection, maintenance, monitoring, and corrective action) of the permit requirements.

Note: Any discharges not expressly authorized in this permit cannot become authorized or shielded from liability under CWA section 402(k) by disclosure to the DOH after issuance of this permit via any means, including the Individual NPDES Application to be covered by the permit, the SWPPP, during an inspection, etc.

5.1. Person(s) Responsible for SWPPP Preparation.

The SWPPP shall be prepared in accordance with good engineering practices and to industry standards. The SWPPP may be developed by either a person on your staff or a third party you hire, but it must be developed by a “qualified person” and must be certified per the signature requirements in Part 5.2.7. If DOH concludes that the SWPPP is not in compliance with Part 5.2 of this permit, DOH may require the SWPPP to be reviewed, amended as necessary, and certified by a Professional Engineer, or for Sector G, H or J, by a Professional Geologist, with the education and experience necessary to prepare an adequate SWPPP.

Note: A “qualified person” is a person knowledgeable in the principles and practices of industrial storm water controls and pollution prevention, and possesses the education and ability to assess conditions at the industrial facility that could impact storm water quality, and the education and ability to assess the effectiveness of storm water controls selected and installed to meet the requirements of the permit.

5.2. Contents of Your SWPPP.

For coverage under this permit, your SWPPP must contain all of the following elements:

- Storm water pollution control team (see Part 5.2.1);
- *Site* description (see Part 5.2.2);
- *Summary* of potential pollutant sources (see Part 5.2.3);

- Description of control measures (see Part 5.2.4);
- *Schedules* and procedures (see Part 5.2.5);
- *Documentation* to support eligibility considerations under other federal laws (see Part 5.2.6); and
- *Signature* requirements (see Part 5.2.7).

Where your SWPPP refers to procedures in other facility documents, such as a Spill Prevention, Control and Countermeasure (SPCC) Plan, copies of the relevant portions of those documents must be kept with your SWPPP.

5.2.1. Storm water Pollution Control Team.

You must identify the staff members (by name or title) that comprise the facility's storm water pollution control team as well as their individual responsibilities (e.g., monitoring, inspections, maintenance, etc.). Your storm water pollution control team is responsible for, but not limited to overseeing development of the SWPPP, any modifications to it, and for implementing and maintaining control measures and taking corrective actions when required. Each member of the storm water pollution control team must have ready access to either an electronic or paper copy of applicable portions of this permit, the most updated copy of your SWPPP, and other relevant documents or information that must be kept with the SWPPP.

5.2.2. Site Description.

Your SWPPP must include the following:

- *Activities at the Facility*. Provide a description of the nature of the industrial activities at your facility.
- *General location map*. Provide a general location map [e.g., U.S. Geological Survey (USGS) quadrangle map] with enough detail to identify the location of your facility and all receiving waters for your storm water discharges.
- *Site map*. Provide a map showing:
    - Boundaries of the property and the size of the property in acres;
    - Location and extent of significant structures and impervious surfaces;
    - Directions of storm water flow (use arrows);
    - Locations of all storm water control measures;
    - Locations of all receiving waters, including wetlands, in the immediate vicinity of your facility. Indicate which waterbodies are listed as impaired;
    - Locations of all storm water conveyances including ditches, pipes, and swales;
    - Locations of potential pollutant sources identified under Part 5.2.3.2;

- Locations where significant spills or leaks identified under Part 5.2.3.3 have occurred;
- Locations of all storm water monitoring points;
- Locations of storm water inlets and outfalls, with a unique identification code for each outfall (e.g., Outfall 001, 002), indicating if you are treating one or more outfalls as "substantially identical" under Parts 3.2.3, 5.2.5.3, and 6.1.1, and an approximate outline of the areas draining to each outfall;
- If applicable, MS4s and where your storm water discharges to them;
- Locations of the following activities where such activities are exposed to precipitation:
    - fueling stations;
    - vehicle and equipment maintenance and/or cleaning areas;
    - loading/unloading areas;
    - locations used for the treatment, storage, or disposal of wastes;
    - liquid storage tanks;
    - processing and storage areas;
    - immediate access roads used or traveled by carriers of raw materials, manufactured products, waste material, or by-products used or created by the facility;
    - transfer areas for substances in bulk;
    - machinery; and
    - locations and sources of run-on to your site from adjacent property that contains significant quantities of pollutants.

5.2.3. Summary of Potential Pollutant Sources.

You must describe areas at your facility where industrial materials or activities are exposed to storm water or from which allowable non-storm water discharges originate. Industrial materials or activities include, but are not limited to: material handling equipment or activities; industrial machinery; raw materials; industrial production and processes; and intermediate products, by-products, final products, and waste products. Material handling activities include, but are not limited to: the storage, loading and unloading, transportation, disposal, or conveyance of any raw material, intermediate product, final product or waste product.

For structures located in areas of industrial activity, you must be aware that the structures themselves are potential sources of pollutants. This could occur, for example, when metals such as aluminum or copper are leached from the structures as a result of acid rain.

For each area identified, the description must include:

5.2.3.1. **Activities in the Area**. A list of the industrial activities exposed to storm water (e.g., material storage; equipment fueling, maintenance, and cleaning; cutting steel beams).

5.2.3.2 **Pollutants.** A list of the pollutant(s) or pollutant constituents (e.g., crankcase oil, zinc, sulfuric acid, cleaning solvents) associated with each identified activity, which could be exposed to rainfall and could be discharged from your facility. The pollutant list must include all significant materials that have been handled, treated, stored or disposed, and that have been exposed to storm water in the three years prior to the date you prepare or amend your SWPPP.

Significant Materials – includes, but is not limited to: raw materials; fuels; materials such as solvents, detergents, and plastic pellets; finished materials such as metallic products; raw materials used in food processing or production; hazardous substances designated under section 101(14) of CERCLA; any chemical the facility is required to report pursuant to Section 313 of Title III of SARA; fertilizers; pesticides; and waste products such as ashes, slag and sludge that have the potential to be released with storm water discharges. See 40 CFR 122.26(b)(12).

5.2.3.3. **Spills and Leaks.** You must document where potential spills and leaks could occur that could contribute pollutants to storm water discharges, and the corresponding outfall(s) that would be affected by such spills and leaks. You must document all significant spills and leaks of oil or toxic or hazardous substances that actually occurred at exposed areas, or that drained to a storm water conveyance, in the three years prior to the date you prepare or amend your SWPPP.

Note: Significant spills and leaks include, but are not limited to, releases of oil or hazardous substances in excess of quantities that are reportable under CWA section 311 (see 40 CFR 110.6 and 40 CFR 117.21) or Section 102 of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), 42 USC §9602. This permit does not relieve you of the reporting requirements of 40 CFR 110, 40 CFR 117, and 40 CFR 302 relating to spills or other releases of oils or hazardous substances.

5.2.3.4. **Unauthorized Non-Storm Water Discharges.** You must document that you have evaluated for the presence of unauthorized non-storm water discharges (see Part 1.1.3 for the exclusive list of authorized non-storm water discharges under this permit).

Documentation of your evaluation must include:

- The date of the evaluation;
- A description of the evaluation criteria used;

- A list of the outfalls or onsite drainage points that were directly observed during the evaluation; and
- The action(s) taken, such as a list of control measures used to eliminate unauthorized discharge(s), or documentation that a separate NPDES permit was obtained. For example, a floor drain was sealed, a sink drain was re-routed to sanitary, or an NPDES permit application was submitted for an unauthorized cooling water discharge.

5.2.4. Description of Control Measures to Meet Technology-Based and Water Quality-Based Effluent Limits. You must document the location and type of control measures you have specifically chosen and/or designed to comply with:

- Non-numeric technology-based effluent limits in Part 2.1.2;
- Applicable numeric effluent limitations guidelines-based limits in Part 2.1.3 and Part 8;
- Water quality-based effluent limits in Part 2.2; and
- Applicable effluent limits in Part 8.
- Regarding your control measures, you must also document, as appropriate:
  - How you addressed the selection and design considerations in Part 2.1.1; and
  - How they address the pollutant sources identified in Part 5.2.3.

Effluent limit requirements in Part 2.1.2 that do not involve the site-specific selection of a control measure or are specific activity requirements (e.g., “cleaning catch basins when the depth of debris reaches two-thirds (2/3) of the sump depth and keeping the debris surface at least six inches below the lowest outlet pipe”) are marked with an asterisk (*). For the requirements marked with an asterisk, you may include extra information, or you may just “cut-and-paste” these effluent limits verbatim into your SWPPP without providing additional documentation.

5.2.5. Schedules and Procedures.

5.2.5.1. Pertaining to Control Measures Used to Comply with the Effluent Limits in Part 2. The following must be documented in your SWPPP:

- Good Housekeeping (See Part 2.1.2.2) – A schedule or the convention used for determining when pickup and disposal of waste materials occurs. Also provide a schedule for routine inspections for leaks and conditions of drums; tanks and containers.

- Maintenance (See Part 2.1.2.3) – Preventative maintenance procedures; including regular inspections, testing, maintenance and repair of all control measures to avoid situations that may result in leaks, spills, and other releases, and any back-up practices in place should a runoff event occur while a control measure is off-line. The SWPPP shall include the schedule or frequency for maintaining all control measures used to comply with the effluent limits in Part 2;
- Spill Prevention and Response Procedures (See Part 2.1.2.4) – Procedures for preventing and responding to spills and leaks, including notification procedures. For preventing spills, include in your SWPPP the control measures for material handling and storage, and the procedures for preventing spills that can contaminate storm water. Also specify cleanup equipment, procedures and spill logs, as appropriate, in the event of spills. You may reference the existence of other plans for Spill Prevention Control and Countermeasure (SPCC) developed for the facility under Section 311 of the CWA or BMP programs otherwise required by an NPDES permit for the facility, provided that you keep a copy of that other plan onsite and make it available for review consistent with Part 5.4; and
- Employee Training (Part 2.1.2.8) – The elements of your employee training plan shall include all, but not be limited to, the requirements set forth in Part 2.1.2.8, and also the following:
  - The content of the training;
  - The frequency/schedule of training for employees who work in areas where industrial materials or activities are exposed to storm water, or who are responsible for implementing activities necessary to meet the conditions of this permit; and
  - A log of the dates on which specific employees received training.

5.2.5.2. **Pertaining to Inspections and Assessments.** You must document in your SWPPP your procedures for performing, as appropriate, the types of inspections specified by this permit, including:

- Routine facility inspections (see Part 3.1); and
- Quarterly visual assessment of storm water discharges (see Part 3.2).

For each type of inspection performed, your SWPPP must identify:

- Person(s) or positions of person(s) responsible for inspection; facilities in climates with irregular storm water runoff discharges (see Schedules for conducting inspections, including tentative schedule for Part 3.2.3); and
- Specific items to be covered by the inspection, including schedules for specific outfalls.

5.2.5.3. Pertaining to Monitoring. You must document in your SWPPP procedures for conducting the four types of analytical monitoring specified by this permit, where applicable to your facility, including:

- Benchmark monitoring (see Part 6.2.1);
- Effluent limitations guidelines monitoring (see Part 6.2.2);
- Impaired waters monitoring (see Part 6.2.4); and
- Other monitoring as required by DOH (see Part 6.2.5).

For each type of monitoring, your SWPPP must document:

- Locations where samples are collected, including any determination that two or more outfalls are substantially identical;
- Parameters for sampling and the frequency of sampling for each parameter;
- Schedules for monitoring at your facility, including schedule for alternate monitoring periods for climates with irregular storm water runoff (see Part 6.1.6);
- Any numeric control values (benchmarks, effluent limitations guidelines, TMDL-related requirements, or other requirements) applicable to discharges from each outfall; and
- Procedures (e.g., responsible staff, logistics, laboratory to be used) for gathering storm event data, as specified in Part 6.1.

You must document the following in your SWPPP if you plan to use the substantially identical outfall exception for your quarterly visual assessment requirements in Part 3.2.3 or your benchmark or impaired waters monitoring requirements in Parts 6.2.1 and 6.2.4.1 (see also Part 6.1.1):

- Location of each of the substantially identical outfalls;
- Description of the general industrial activities conducted in the drainage area of each outfall;
- Description of the control measures implemented in the drainage area of each outfall;
- Description of the exposed materials located in the drainage area of each outfall that are likely to be significant contributors of pollutants to storm water discharges;
- An estimate of the runoff coefficient of the drainage areas (low = under 40%; medium = 40 to 65%; high = above 65%); and
- Why the outfalls are expected to discharge substantially identical effluents.

5.2.6. Reserved.

5.2.7. Signature Requirements.

You must sign and date your SWPPP in accordance with HAR Chapter 11-55, Appendix A, Subsection 15.

5.3. Required SWPPP Modifications.

You must modify your SWPPP based on the corrective actions and deadlines required under Part 4.3 and that you documented under Part 4.4. SWPPP modifications must be signed and dated in accordance with HAR Chapter 11-55, Appendix A, Subsection 15.

5.4. SWPPP Availability.

You must retain a complete copy of your current SWPPP required by this permit at the facility in any accessible format. A complete SWPPP includes any documents incorporated by reference and all documentation supporting your permit eligibility pursuant to Part 1.1 of this permit, as well as your signed and dated certification page. Regardless of the format, the SWPPP must be immediately available to facility employees, EPA, DOH, the operator of an MS4 into which you discharge, and representatives of the U.S. Fish and Wildlife Service (USFWS) or the National Marine Fisheries Service (NMFS) at the time of an onsite inspection. The DOH may request a copy of the SWPPP and the permittee is required to submit the SWPPP to the DOH within 14 days of the request. Your current SWPPP or certain information from your current SWPPP described below must also be made available to the public [except any confidential business information (CBI) or restricted information, as defined in below], but you must clearly identify those portions of the SWPPP that are being withheld from public access; to do so, you must comply with one of the following two options:

5.4.1. SWPPP Posting on the Internet.

If you provide a URL in your Individual NPDES Application where your SWPPP can be found, and maintain your current SWPPP at this URL, you will have complied with the public availability requirements for the SWPPP. To remain current, you must post any SWPPP modifications, records and other reporting elements required for the previous year at the same URL as the main body of the SWPPP. The SWPPP update shall be no later than 45 days after conducting the final routine facility inspection for the year required in Part 3.1.

If you did not provide a SWPPP URL in your Individual NPDES Application, you may submit to the DOH the URL using the "CWB Compliance Submittal Form for Individual NPDES and NGPCs" in the e-permitting portal where your current SWPPP can be found at any time subsequent to your original Individual NPDES Application submittal. You are not required to post any CBI or restricted information (as defined below) (such information may be redacted), but you must clearly identify those portions of the SWPPP that are being withheld from public access. CBI may not be withheld from those staff cleared for CBI review within DOH, EPA, USFWS or NMFS.

5.4.2. SWPPP Information Provided on Individual NPDES Application Form.

If you did not provide a SWPPP URL in your Individual NPDES Application, your SWPPP must include the information required by Part 7.3. Irrespective of this requirement, DOH may provide access to portions of your SWPPP to a member of the public upon request (except any CBI or restricted information (as defined below)). To remain current, you must report any modifications to the SWPPP information required by Part 7.3 through submittal of a "CWB Compliance Submittal Form for Individual NPDES and NGPCs" in the e-permitting portal. The SWPPP update shall be no later than 45 days after conducting the final routine facility inspection for the year required in Part 3.1.

Confidential Business Information (CBI) – see 40 CFR Part 2 for relevant definitions of CBI:

http://www.gpo.gov/fdsys/pkg/CFR-2013-title40-vol1/pdf/CFR-2013-title40-vol1-part2-subpartB.pdf.

Restricted Information – for the purposes of this permit, information that is privileged or that is otherwise protected from disclosure pursuant to applicable statutes, Executive Orders, or regulations. Such information includes but is not limited to: classified national security information, protected critical infrastructure information, sensitive security information, and proprietary business information.

5.5. Additional Documentation Requirements.

You are required to keep the following inspection, monitoring, and certification records with your SWPPP that together keep your records complete and up-to-date, and demonstrate your full compliance with the conditions of this permit:

- A copy of the Individual NPDES Application submitted to DOH along with any correspondence exchanged between you and DOH specific to coverage under this permit, including a copy of the Notice of General Permit Coverage;
- A copy of the acknowledgment you receive from the DOH assigning your NPDES File No.;

- A copy of this permit (an electronic copy easily available to SWPPP personnel is also acceptable);
- Documentation of maintenance and repairs of control measures, including the date(s) of regular maintenance, date(s) of discovery of areas in need of repair/replacement, and for repairs, date(s) that the control measure(s) returned to full function, and the justification for any extended maintenance/repair schedules (see Part 2.1.2.3);
- All inspection reports, including the Routine Facility Inspection Reports (see Part 3.1.1) and Quarterly Visual Assessment Reports (see Part 3.2.2); and
- Description of any deviations from the schedule for visual assessments and/or monitoring, and the reason for the deviations (e.g., adverse weather or it was impracticable to collect samples within the first 30 minutes of a measurable storm event) (see Parts 3.2.3 and 6.1.5).

Measurable Storm Event – a precipitation event that results in a measurable amount of precipitation (i.e., a storm event that results in an actual discharge) and that follows the preceding storm event by at least 72 hours (3-days). The 72-hour storm interval does not apply if you document that less than a 72-hour interval is representative for local storm events.

- Corrective action documentation required per Part 4.4;
- Documentation of any benchmark exceedances and the type of response to the exceedance you employed, including:
  - the corrective action taken;
  - a finding that the exceedance was due to natural background pollutant levels;
  - a determination from the DOH that benchmark monitoring can be discontinued because the exceedance was due to run-on; or
  - a finding that no further pollutant reductions were technologically available and economically practicable and achievable in light of best industry practice consistent with Part 6.2.1.2.; and
- Documentation to support any determination that pollutants of concern are not expected to be present above natural background levels if you discharge directly to impaired waters, and that such pollutants were not detected in your discharge or were solely attributable to natural background sources (see Part 6.2.4.1).

6. Monitoring.

You must collect and analyze storm water samples and document monitoring activities consistent with the procedures described in Part 6, HAR Chapter 11-55, Appendix A, Subsections 14 and 16, must be sufficiently sensitive as defined at 40 CFR 122.21(e)(3) and 122.44(i)(1)(iv) and any additional sector-specific requirements in Parts 8. Refer to Part 7 for reporting and recordkeeping requirements.

6.1. Monitoring Procedures.

6.1.1. Monitored Outfalls.

Applicable monitoring requirements apply to each outfall authorized by this permit, except as otherwise exempt from monitoring as a “substantially identical outfall.” If your facility has two or more outfalls that you believe discharge substantially identical effluents, based on the similarities of the general industrial activities and control measures, exposed materials that may significantly contribute pollutants to storm water, and runoff coefficients of their drainage areas, you may monitor the effluent of just one of the outfalls and report that the results also apply to the substantially identical outfall(s). As required in Part 5.2.5.3, your SWPPP must identify each outfall authorized by this permit and describe the rationale for any substantially identical outfall determinations. The allowance for monitoring only one of the substantially identical outfalls is not applicable to any outfalls with numeric effluent limitations. You are required to monitor each outfall covered by a numeric effluent limit as identified in Part 6.2.2.

6.1.2. Commingled Discharges.

If discharges authorized by this permit commingle with discharges not authorized under this permit, any required sampling of the authorized discharges must be performed at a point before they mix with other waste streams, to the extent practicable.

6.1.3. Measurable Storm Events.

All required monitoring must be performed on a storm event that results in an actual discharge from your site (“measurable storm event”) that follows the preceding measurable storm event by at least 72 hours (three days). The 72-hour (3-day) storm interval does not apply if you are able to document that less than a 72-hour (3-day) interval is representative for local storm events during the sampling period.

For each monitoring event, you must identify the date and duration (in hours) of the rainfall event, rainfall total (in inches) for that rainfall event, and time (in days) since the previous measurable storm event.

6.1.4. Sample Type.

You must take a minimum of one grab sample from a discharge resulting from a measurable storm event as described in Part 6.1.3. Samples must be collected within the first 30 minutes of a discharge associated with a measurable storm event. If it is not possible to collect the sample within the first 30 minutes of a measurable storm event, the sample must be collected as soon as practicable after the first 30 minutes and documentation must be kept with the SWPPP explaining why it was not possible to take samples within the first 30 minutes.

6.1.5. Adverse Weather Conditions.

When adverse weather conditions as described in Part 3.2.3 prevent the collection of samples according to the relevant monitoring schedule, you must take a substitute sample during the next qualifying storm event. Adverse weather does not exempt you from having to file a benchmark monitoring report in accordance with your sampling schedule. As specified in Part 7.4, you must use NetDMR to report any failure to monitor using a “no data” or “NODI” code during the regular reporting period.

6.1.6. Climates with Irregular Storm Water Runoff.

If your facility is located in areas where limited rainfall occurs during parts of the year (e.g., arid or semi-arid climates) that prevent runoff from occurring for extended periods, required monitoring events may be distributed during seasons when precipitation occurs. You must still collect the required number of samples. As specified in Part 7.4, you must also use NetDMR to report using a “no data” or “NODI” code for any of the regular reporting periods that there was no monitoring.

6.1.7. Monitoring Periods.

Monitoring requirements in this permit begin in the first full quarter following either 90 days after permit issuance or your date of discharge authorization, whichever date comes later. If your monitoring is required on a quarterly basis (e.g., benchmark monitoring), you must monitor at least once in each of the following 3-month intervals:

- January 1 – March 31;
- April 1 – June 30;
- July 1 – September 30;
- October 1 – December 31.

For example, if you obtain permit coverage on July 2, 2018, then your first monitoring quarter is October 1 – December 31, 2018.

This monitoring schedule may be modified in accordance with Part 6.1.6 if the revised schedule is documented with your SWPPP. However, using NetDMR you must report using a “no data” or “NODI” code for any 3-month interval that you did not take a sample.

6.1.8. Monitoring for Allowable Non-Storm water Discharges.

You are only required to monitor allowable non-storm water discharges (as delineated in Part 1.1.3) when they are commingled with storm water discharges associated with industrial activity.

6.1.9. Monitoring Reports.

DMRs shall be submitted in compliance with Federal eReporting Rule requirements and monitoring data must be reported using EPA’s electronic NetDMR tool at: www.epa.gov/netdmr, as described in Part 7.4.

6.2. Required Monitoring.

This permit includes four types of required analytical monitoring, one or more of which may apply to your discharge:

- Quarterly benchmark monitoring (see Part 6.2.1);
- Annual effluent limitations guidelines monitoring (see Part 6.2.2);
- Impaired waters monitoring (see Part 6.2.4); and
- Other monitoring as required by the DOH (see Part 6.2.5).

When more than one type of monitoring for the same pollutant at the same outfall applies (e.g., total suspended solids once per year for an effluent limitation and once per quarter for benchmark monitoring at a given outfall), you may use a single sample to satisfy both monitoring requirements (i.e., one sample satisfying both the annual effluent limitation sample and one of the four quarterly benchmark monitoring samples). When the effluent limitation is lower than the benchmark concentration for the same pollutant, your corrective action trigger is based on an exceedance of the effluent limitation, which would subject you to the corrective action requirements of Part 4.1.

Note: Exceedance of an effluent limitation associated with the results of any analytical monitoring type required by this Part subjects you to the corrective action requirements of Part 4.1.

All required monitoring must be conducted in accordance with the procedures described in HAR Chapter 11-55, Appendix A, Subsection 14.

6.2.1. Benchmark Monitoring.

This permit specifies pollutant benchmark concentrations that are applicable to certain sectors / subsectors. Benchmark monitoring data are primarily for your use to determine the overall effectiveness of your control measures and to assist you in determining when additional corrective action(s) may be necessary to comply with the effluent limitations in Part 2.

The benchmark concentrations are not effluent limitations; a benchmark exceedance, therefore, is not a permit violation. However, if corrective action is required as a result of a benchmark exceedance, failure to conduct required corrective action is a permit violation.

At your discretion, more than four samples may be taken during separate runoff events and used to determine the average benchmark parameter concentration for facility discharges.

6.2.1.1. Applicability of Benchmark Monitoring.

You must monitor for any benchmark parameters specified for the industrial sector(s), both primary industrial activity and any co-located industrial activities, applicable to your discharge. Your industry-specific benchmark concentrations are listed in the sector-specific sections of Part 8. If your facility is in one of the industrial sectors subject to benchmark concentrations that are hardness-dependent, you are required to submit to the DOH with your SWPPP a hardness value, established consistent with the procedures in Part 9, which is representative of your receiving water.

Samples must be analyzed consistent with 40 CFR Part 136 analytical methods and using test procedures with quantitation limits at or below benchmark values and must be sufficiently sensitive as defined at 40 CFR 122.21(e)(3) and 122.44(i)(1)(iv) for all benchmark parameters for which you are required to sample.

6.2.1.2. Benchmark Monitoring Schedule.

Benchmark monitoring must be conducted quarterly, as identified in Part 6.1.7, for your first four full quarters of permit coverage commencing no earlier than 90 days after permit issuance.

Facilities in climates with irregular storm water runoff, as described in Part 6.1.6, may modify this quarterly schedule provided that this revised schedule is reported directly to the DOH by the due date of the first benchmark sample, and that this revised schedule is kept with the facility's SWPPP as specified in Part 5.5. When conditions prevent you from obtaining four samples in four consecutive quarters, you must continue monitoring until you have the four samples required for calculating your benchmark monitoring average. As noted in Part 6.1.7, you must use NetDMR to report using a "no data" or "NODI" code for any 3-month interval that you did not take a sample.

Data not exceeding benchmarks: After collection of four quarterly samples, if the average of the four monitoring values for any parameter does not exceed the benchmark, you have fulfilled your monitoring requirements for that parameter for the permit term.

Data exceeding benchmarks: After collection of four quarterly samples, if the average of the four monitoring values for any parameter exceeds the benchmark, you must, in accordance with Part 4, review the selection, design, installation, and implementation of your control measures to determine if modifications are necessary to meet the effluent limits in this permit, and either:

- Make the necessary modifications and continue quarterly monitoring until you have completed four additional quarters of monitoring for which the average does not exceed the benchmark; or
- Make a determination that no further pollutant reductions are technologically available and economically practicable and achievable in light of best industry practice to meet the technology-based effluent limits or are necessary to meet the water-quality-based effluent limitations in Parts 2.1 and 2.2 of this permit, in which case you must continue monitoring once per year. You must also document your rationale for concluding that no further pollutant reductions are achievable, and retain all records related to this documentation with your SWPPP.

You must review your control measures and perform any required corrective action immediately (or document why no corrective action is required), per Part 4, without waiting for the full four quarters of monitoring data, when an exceedance of the four-quarter average is mathematically certain.

If after modifying your control measures and conducting four additional quarters of monitoring, your average still exceeds the benchmark (or if an exceedance of the benchmark by the four-quarter average is mathematically certain prior to conducting the full four additional quarters of monitoring), you must again review your control measures and take one of the two actions above.

***Natural background pollutant levels*:** Following the first four quarters of benchmark monitoring (or sooner if the exceedance is triggered by less than four quarters of data; see above), if the average concentration of a pollutant exceeds a benchmark value, and you determine that exceedance of the benchmark is attributable solely to the presence of that pollutant in the natural background, you are not required to perform corrective action or additional benchmark monitoring provided that:

- The average concentration of your benchmark monitoring results is less than or equal to the concentration of that pollutant in the natural background; and

- You document and maintain with your SWPPP, as required in Part 5.5, your supporting rationale for concluding that benchmark exceedances are in fact attributable solely to natural background pollutant levels. You must include in your supporting rationale any data previously collected by you or others (including literature studies) that describe the levels of natural background pollutants in your storm water discharge.

Natural background pollutants are those substances that are naturally occurring in soils or ground water. Natural background pollutants do not include legacy pollutants from earlier activity on your site, or pollutants in run-on from neighboring sources which are not naturally occurring, such as other industrial sites or roadways. However, the DOH may determine that you are eligible to discontinue monitoring for pollutants that occur solely from run-on sources.

6.2.2. Effluent Limitations Monitoring.

6.2.2.1. Monitoring Based on Effluent Limitations Guidelines. Table 6-1 identifies the storm water discharges subject to effluent limitation guidelines that are authorized for coverage under this permit. An exceedance of the effluent limitation is a permit violation. Beginning in the first full quarter following 90 days after permit issuance or your date of discharge authorization, whichever date comes later, you must monitor once per year at each outfall containing the discharges identified in Table 6-1 for the parameters specified in the sector-specific section of Part 8.

Table 6-1. Required Monitoring for Effluent Limits Based on Effluent Limitations Guidelines

Regulated Activity	Effluent Limit	Monitoring Frequency	Sample Type
Discharges resulting from spray down or intentional wetting of logs at wet deck storage areas	See Part 8.A.7.	1/year	Grab
Runoff from phosphate fertilizer manufacturing facilities that comes into contact with any raw materials, finished product, by-products or waste products (SIC 2874)	See Part 8.C.4.	1/year	Grab
Runoff from asphalt emulsion facilities	See Part 8.D.4.	1/year	Grab
Runoff from material storage piles at cement manufacturing facilities	See Part 8.E.5.	1/year	Grab
Mine dewatering discharges at crushed stone, construction sand and gravel, or industrial sand mining facilities	See Part 8.J.9.	1/year	Grab
Runoff from hazardous waste landfills	See Part 8.K.6.	1/year	Grab
Runoff from non-hazardous waste landfills	See Part 8.L.10.	1/year	Grab
Runoff from coal storage piles at steam electric generating facilities	See Part 8.O.8.	1/year	Grab
Runoff containing urea from airfield pavement deicing at existing and new primary airports with 1,000 or more annual non-propeller aircraft departures.	See Part 8.S.8.	1/year	Grab

6.2.2.2. **Substantially Identical Outfalls.** You must monitor each outfall discharging runoff from any regulated activity identified in Table 6-1. The substantially identical outfall monitoring provisions are not available for numeric effluent limits monitoring.

6.2.2.3. **Follow-up Actions if Discharge Exceeds Numeric Effluent Limitation.** If any monitoring value exceeds a numeric effluent limitation contained in this permit, you must indicate the exceedance on a “CWB Compliance Submittal Form for Individual NPDES and NGPCs” in the e-permitting portal, and you must conduct follow-up monitoring within 30 calendar days (or during the next qualifying runoff event, should none occur within 30 days) of implementing corrective action(s) taken per Part 4. When your follow-up monitoring exceeds the applicable effluent limitation, you must:

- ***Submit an Exceedance Report:*** You must submit an Exceedance Report no later than 30 days after you have received your laboratory result consistent with Part 7.6; and
- ***Continue to Monitor:*** You must monitor, at least quarterly, until your discharge is in compliance with the effluent limit or until DOH waives the requirement for additional monitoring. Once your discharge is back in compliance with the effluent limitation you must indicate this on a "CWB Compliance Submittal Form for Individual NPDES and NGPCs" in the e-permitting portal.

6.2.3. Reserved.

6.2.4. Discharges to Impaired Waters Monitoring.

Note: For the purposes of this permit, your project is considered to discharge to an impaired water if the first state water to which you discharge is identified by the DOH pursuant to section 303(d) of the CWA as not meeting an applicable water quality standard, or has been removed from the 303(d) list either because the impairments are addressed by a DOH-approved or established TMDL or is covered by pollution control requirements that meet the requirements of 40 CFR 130.7(b)(1). For discharges that enter a separate storm sewer system[2] *prior to discharge, the first state water to which you discharge is the waterbody that receives the storm water discharge from the storm sewer system.*

6.2.4.1. Permittees Required to Monitor Discharges to Impaired Waters.

Discharges to impaired waters without a DOH established and EPA-approved TMDL: Beginning in the first full quarter following 90 days after permit issuance or your date of discharge authorization, whichever date comes later, you must monitor all pollutants for which the waterbody is impaired and for which a standard analytical method exists (see 40 CFR Part 136) once per year at each outfall (except substantially identical outfalls) discharging storm water to impaired waters without a DOH established and EPA-approved TMDL.

If the pollutant of concern for the impaired waterbody is suspended solids, turbidity or sediment/sedimentation, you must monitor for Total Suspended Solids (TSS). If a pollutant of concern is expressed in the form of an indicator or surrogate pollutant, you must monitor for that indicator or surrogate pollutant. No monitoring is required when a waterbody's biological communities are impaired but no pollutant, including indicator or surrogate pollutants, is specified as causing the impairment, or when a waterbody's impairment is related to hydrologic modifications, impaired hydrology, or other non-pollutant.

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2 Separate storm systems do not include combined sewer systems or sanitary sewer systems. Separate storm systems include both municipal storm sewer systems (MS4s) and non-municipal separate storm sewers.

If the pollutant of concern is not detected and not expected to be present in your discharge, or it is detected but you have determined that its presence is caused solely by natural background sources, you may discontinue monitoring for that pollutant. To support a determination that the pollutant's presence is caused solely by natural background sources, you must document and maintain with your SWPPP, as required by Part 5.5:

- An explanation of why you believe that the presence of the pollutant of concern in your discharge is not related to the activities or materials at your facility; and
- Data and/or studies that tie the presence of the pollutant of concern in your discharge to natural background sources in the watershed.

Natural background pollutants include those that occur naturally as a result of native soils, and vegetation, wildlife, or ground water. Natural background pollutants do not include legacy pollutants from earlier activity on your site, or pollutants in run-on from neighboring sources that are not naturally occurring. However, you may be eligible to discontinue annual monitoring for pollutants that occur solely from these sources and should consult with DOH for guidance.

Discharges to impaired waters with a DOH established and EPA-approved TMDL: For storm water discharges to waters for which there is a DOH established and EPA-approved TMDL, you are not required to monitor for the pollutant(s) for which the TMDL was written unless the DOH informs you, upon examination of the applicable TMDL and its waste load allocation, that you are subject to such a requirement consistent with the assumptions and requirements of the applicable TMDL and its waste load allocation. The DOH's notice will include specifications on monitoring parameters and frequency. Permittees must consult with the DOH for guidance regarding required monitoring under this Part.

6.2.5. Additional Monitoring Required by the DOH. The DOH may also notify you of additional discharge monitoring requirements that the DOH determines are necessary to meet the permit's effluent limitations. Any such notice will briefly state the reasons for the monitoring, locations, and parameters to be monitored, frequency and period of monitoring, sample types, and reporting requirements.

7. Reporting and Recordkeeping.

7.1. Electronic Reporting Requirement.

You must submit all NOCs, Annual Reports, DMRs, and other reporting information as appropriate electronically via the e-Permitting Portal and in compliance with Federal eReporting Rule requirements.

7.2. Submitting Information to DOH.

Most information required to be submitted by this permit shall be submitted via DOH's e-permitting portal. To access the e-permitting portal, go to: https://eha-cloud.doh.hawaii.gov/epermit/.

Information required to be submitted to the DOH via the e-permitting portal:

- Individual NPDES Application;
- No Exposure Certification;
- Notice of Cessation; and
- Annual Report (Part 7.5).

Note: Discharge Monitoring Reports (see Part 7.4) are required to be submitted using EPA's NetDMR system, available at: www.epa.gov/netdmr*.*

7.3. Additional SWPPP Information Required in Your Individual NPDES Application.

If you did not provide a SWPPP URL in your Individual NPDES Application per Part 5.4.1, you must include the additional SWPPP information as follows:

- Onsite industrial activities exposed to storm water, including potential spill and leak areas (see Parts 5.2.3.1 and 5.2.3.3);
- Pollutants or pollutant constituents associated with each industrial activity exposed to storm water that could be discharged in storm water and/or any authorized non-storm water discharges listed in Part 1.1.3 (see Part 5.2.3.2);
- Storm water control measures you employ to comply with the non-numeric technology-based effluent limits required in Part 2.1.2 and Part 8, and any other measures taken to comply with the requirements in Part 2.2 Water Quality -Based Effluent Limitations (see Part 5.2.4); and
- Schedule for good housekeeping and maintenance (see Part 5.2.5.1) and schedule for all inspections required in Part 3 (see Part 5.2.5.2).

7.4. Reporting Monitoring Data to DOH.

Reports shall be submitted in compliance with Federal eReporting Rule requirements. All monitoring data collected pursuant to Part 6.2 must be submitted to DOH via the e-Permitting Portal and also using EPA's NetDMR system (available at: www.epa.gov/netdmr) no later than 28 days after the completed monitoring period. Your monitoring requirements (i.e., parameters required to be monitored and sample frequency) will be prepopulated on your electronic DMR form based on the information you reported on your Individual NPDES Application. Accordingly, the following changes to your monitoring frequency must be reported to DOH through the submittal of a "CWB Compliance Submittal Form for Individual NPDES and NGPCs" in the e-permitting portal, which will trigger changes to your monitoring requirements in NetDMR:

- All benchmark monitoring requirements have been fulfilled for the permit term;
- All impaired waters monitoring requirements have been fulfilled for the permit term;
- For Sector G2 only: Discharges from waste rock and overburden piles have exceeded benchmark values;
- A numeric effluent limitation guideline has been exceeded; and
- A numeric effluent limitation guideline exceedance is back in compliance.

Once monitoring requirements have been completely fulfilled, you are no longer required to report monitoring results using NetDMR. If you have only partially fulfilled your benchmark monitoring and/or impaired waters monitoring requirements (e.g., your four quarterly average is below the benchmark for some, but not all, parameters; you did not detect some, but not all, impairment pollutants), you must continue to use NetDMR to report your results, but you must report a "no data" or "NODI" code for any monitoring parameters that have been fulfilled.

For benchmark monitoring, note that you are required to submit sampling results to DOH no later than 30 days after receiving your complete laboratory results for all monitored outfalls for each quarter that you are required to collect benchmark samples, per Part 6.2.1.2. If you collect samples during multiple storm events in a single quarter (e.g., due to adverse weather conditions or climates with irregular storm water runoff), you are required to submit all sampling results for each storm event to DOH within 30 days of receiving all laboratory results for the event. Or, for any of your monitored outfalls that did not have a discharge within the reporting period, using NetDMR you must report using a "no data" or "NODI" code for that outfall no later than 30 days after the end of the reporting period.

7.5. **Annual Report.** You must submit an Annual Report to DOH electronically, per Part 7.2, by January 30th for each year of permit coverage containing information generated from the past calendar year. Also, reports shall be submitted in compliance with Federal eReporting Rule requirements. You must include the following information:

- A summary of your past year's routine facility inspection documentation required (Part 3.1.1). A summary of your past year's quarterly visual assessment documentation (see Part 3.2.2 of the permit);
- For any four-sample (minimum) average benchmark monitoring exceedance, if after reviewing the selection, design, installation, and implementation of your control measures and considering whether any modifications are necessary to meet the effluent limits in the permit, you determine that no further pollutant reductions are technologically available and economically practicable and achievable in light of best industry practice, your rationale for why you believe no further reductions are achievable (see Part 6.2.1.2 of the permit); and
- A summary of your past year's corrective action documentation (see Part 4.4). If corrective action is not yet completed at the time of submission of your annual report, you must describe the status of any outstanding corrective action(s). Also describe any incidents of non-compliance in the past year or currently ongoing, or if none, provide a statement that you are in compliance with the permit.

Your Annual Report must also include a statement, signed and certified in accordance with HAR Chapter 11-55, Appendix A, Subsection 15.

7.6. **Exceedance Report for Numeric Effluent Limitations.** If follow-up monitoring per Part 6.2.2.3. exceeds a numeric effluent limit, you must submit an Exceedance Report to the DOH no later than 30 days after you have received your laboratory results. Your report must include the following:

- NPDES File No;
- Facility name, physical address and location;
- Name of receiving water;
- Monitoring data from this and the preceding monitoring event(s);
- An explanation of the situation, including what you have done and intend to do (should your corrective actions not yet be complete) to correct the violation; and
- An appropriate contact name and phone number.

Send the Exceedance Report to DOH using the "CWB Compliance Submittal Form for Individual NPDES and NGPCs" form via the e-Permitting Portal and report the monitoring data through NetDMR.

7.7. Additional Reporting.

In addition to the reporting requirements stipulated in Part 7, you are also subject to the standard permit reporting provisions of HAR Chapter 11-55, Appendix A, Subsection 16. Reports shall be submitted to the DOH using the "CWB Compliance Submittal Form for Individual NPDES and NGPCs" form via the e-Permitting Portal and in compliance with Federal eReporting Rule requirements.

You must submit the following reports to the DOH. If you discharge through an MS4, you must also submit these reports to the MS4 operator (identified pursuant to Part 5.2.2):

- 24-hour reporting – You must report any non-compliance which may endanger health or the environment. Any information must be provided orally within 24 hours from the time you become aware of the circumstances;
- 5-day follow-up reporting to the 24-hour reporting – A written submission must also be provided within five days of the time you become aware of the circumstances;
- Reportable quantity spills – You must provide notification, as required under Part 2.1.2.4, as soon as you have knowledge of a leak, spill, or other release containing a hazardous substance or oil in an amount equal to or in excess of a reportable quantity;
- Planned changes – You must give notice to DOH promptly, no fewer than 30 days prior to making any planned physical alterations or additions to the permitted facility that qualify the facility as a new source or that could significantly change the nature or significantly increase the quantity of pollutants discharged;
- Anticipated non-compliance – You must give advance notice to DOH of any planned changes in the permitted facility or activity which you anticipate will result in noncompliance with permit requirements;
- Compliance schedules – Reports of compliance or non-compliance with, or any progress reports on, interim and final requirements contained in any compliance schedule of this permit must be submitted no later than 14 days following each schedule date;
- Other non-compliance – You must report all instances of non-compliance not reported in your monitoring report (pursuant to Part 7.1), compliance schedule report, or 24-hour report at the time monitoring reports are submitted; and
- Other information – You must promptly submit facts or information if you become aware that you failed to submit relevant facts in your Individual NPDES Application, or that you submitted incorrect information in your Individual NPDES Application or in any report.

7.8. Recordkeeping.

You must retain copies of your SWPPP (including any modifications made during the term of this permit), additional documentation requirements pursuant to Part 5.5 (including documentation related to corrective actions taken pursuant to Part 4), all reports and certifications required by this permit, monitoring data, and records of all data used to complete the Individual NPDES Application to be covered by this permit, for a period of at least three years from the date that your coverage under this permit expires or is terminated.

Part 8 – Sector-Specific Requirements for Industrial Activity

Subpart L – Sector L – Landfills, Land Application Sites, and Open Dumps.

You must comply with Part 8 sector-specific requirements associated with your primary industrial activity and any co-located industrial activities, as defined in Part 1.1.2.1. The sector-specific requirements apply to those areas of your facility where those sector-specific activities occur. These sector-specific requirements are in addition to any requirements specified elsewhere in this permit.

8.L.1 Covered Storm Water Discharges.

The requirements in Subpart L apply to storm water discharges associated with industrial activity from Landfills and Land Application Sites as identified by the Activity Code specified under Sector L in Table 9 of Part 9 of the permit.

8.L.2 Industrial Activities Covered by Sector L.

This permit may authorize storm water discharges for Sector L facilities associated with waste disposal at landfills, land application sites that receive or have received industrial waste, including sites subject to regulation under Subtitle D of RCRA. This permit does not cover discharges from landfills that receive only municipal wastes.

8.L.3 Limitations on Coverage.

8.L.3.1 **Prohibition of Non-Storm water Discharges.** (See also Part 1.1.4) The following discharges are not authorized by this permit: leachate, gas collection condensate, drained free liquids, contaminated ground water, laboratory wastewater, and contact wash water from washing truck and railcar exteriors and surface areas that have come in direct contact with solid waste at the landfill facility. (DOH includes these prohibited non-storm water discharges here solely as a helpful reminder to the operator that the only non-storm water discharges authorized by this permit are at Part 1.1.3.)

8.L.3.2 **Prohibition Storm water Discharges from Open Dumps.** Discharges from open dumps as defined under RCRA are also not authorized under this permit.

8.L.4 Definitions.

8.L.4.1 **Contaminated storm water** – storm water that comes into direct contact with landfill wastes, the waste handling and treatment areas, or landfill wastewater. Some areas of a landfill that may produce contaminated storm water include (but are not limited to) the open face of an active landfill with exposed waste (no cover added); the areas around wastewater treatment operations; trucks, equipment, or machinery that has been in direct contact with the waste; and waste dumping areas.

8.L.4.2 **Drained free liquids** – aqueous wastes drained from waste containers (e.g., drums) prior to landfilling.

8.L.4.3 **Landfill wastewater** – as defined in 40 CFR Part 445 (Landfills Point Source Category) all wastewater associated with, or produced by, landfilling activities except for sanitary wastewater, non-contaminated storm water, contaminated ground water, and wastewater from recovery pumping wells. Landfill process wastewater includes, but is not limited to, leachate; gas collection condensate; drained free liquids; laboratory-derived wastewater; contaminated storm water; and contact wash water from washing truck, equipment, and railcar exteriors and surface areas that have come in direct contact with solid waste at the landfill facility.

8.L.4.4 **Leachate** – liquid that has passed through or emerged from solid waste and contains soluble, suspended, or miscible materials removed from such waste.

8.L.4.5 **Non-contaminated storm water** – storm water that does not come into direct contact with landfill wastes, the waste handling and treatment areas, or landfill wastewater. Non-contaminated storm water includes storm water that flows off the cap, cover, intermediate cover, daily cover, and/or final cover of the landfill.

8.L.5 Additional Technology-Based Effluent Limits.

8.L.5.1 **Preventive Maintenance Program.** (See also Part 2.1.2.3) As part of your preventive maintenance program, maintain the following: all elements of leachate collection and treatment systems, to prevent commingling of leachate with storm water; the integrity and effectiveness of any intermediate or final cover (including repairing the cover as necessary), to minimize the effects of settlement, sinking, and erosion.

8.L.5.2 **Erosion and Sedimentation Control.** (See also Part 2.1.2.5) Provide temporary stabilization (e.g., temporary seeding, mulching, and placing geotextiles on the inactive portions of stockpiles) for the following in order to minimize discharges of pollutants in storm water: materials stockpiled for daily, intermediate, and final cover; inactive areas of the landfill or open dump; landfills or open dump areas that have gotten final covers but where vegetation has yet to establish itself; and land application sites where waste application has been completed but final vegetation has not yet been established.

8.L.6 Additional SWPPP Requirements.

8.L.6.1 **Drainage Area Site Map.** (See also Part 5.2.2) Document in your SWPPP where any of the following may be exposed to precipitation or surface runoff: active and closed landfill cells or trenches, active and closed land application areas, locations where open dumping is occurring or has occurred, locations of any known leachate springs or other areas where uncontrolled leachate may commingle with runoff, and leachate collection and handling systems.

8.L.6.2 **Summary of Potential Pollutant Sources.** (See also Part 5.2.3) Document in your SWPPP the following sources and activities that have potential pollutants associated with them: fertilizer, herbicide, and pesticide application; earth and soil moving; waste hauling and loading or unloading; outdoor storage of significant materials, including daily, interim, and final cover material stockpiles as well as temporary waste storage areas; exposure of active and inactive landfill and land application areas; uncontrolled leachate flows; and failure or leaks from leachate collection and treatment systems.

8.L.7 Additional Inspection Requirements. (See also Part 3)

8.L.7.1 **Inspections of Active Sites.** Except in arid and semi-arid climates, inspect operating landfills, open dumps, and land application sites at least once every 7 days. Focus on areas of landfills that have not yet been finally stabilized; active land application areas, areas used for storage of material and wastes that are exposed to precipitation, stabilization, and structural control measures; leachate collection and treatment systems; and locations where equipment and waste trucks enter and exit the site. Ensure that sediment and erosion control measures are operating properly. For stabilized sites and areas where land application has been completed, or where the climate is arid or semi-arid, conduct inspections at least once every month.

8.L.7.2 **Inspections of Inactive Sites.** Inspect inactive landfills, open dumps, and land application sites at least quarterly. Qualified personnel must inspect landfill (or open dump) stabilization and structural erosion control measures, leachate collection and treatment systems, and all closed land application areas.

8.L.8 Additional Post-Authorization Documentation Requirements.

8.L.8.1 **Recordkeeping and Internal Reporting.** Keep records with your SWPPP of the types of wastes disposed of in each cell or trench of a landfill or open dump. For land application sites, track the types and quantities of wastes applied in specific areas.

8.L.9 Sector-Specific Benchmarks. (See also Part 6)

Table 8.L-1 identifies benchmarks that apply to the specific subsectors of Sector L. These benchmarks apply to both your primary industrial activity and any co-located industrial activities.

Table 8.L-1.

Subsector (You may be subject to requirements for more than one sector/subsector)	Parameter	Benchmark Monitoring Concentration[1]
Subsector L1. All Landfill, Land Application Sites and Open Dumps (Industrial Activity Code "LF")	Total Suspended Solids (TSS)	100 mg/L
Subsector L2. All Landfill, Land Application Sites and Open Dumps, except Municipal Solid Waste Landfill (MSWLF) Areas Closed in Accordance with 40 CFR 258.60 (Industrial Activity Code "LF")	Total Iron	1.0 mg/L

[1]Benchmark monitoring required only for discharges not subject to effluent limitations in 40 CFR Part 445 Subpart B (see Table L-2 below).

8.L.10. Effluent Limitations Based on Effluent Limitations Guidelines. (See also Part 6.2.2.1)

Table 8.L-2 identifies effluent limitations that apply to the industrial activities described below. Compliance with these effluent limitations is to be determined based on discharges from these industrial activities independent of commingling with any other waste streams that may be covered under this permit.

Table 8.L-2[1]

Industrial Activity	Parameter	Effluent Limitation
Discharges from non-hazardous waste landfills subject to effluent limitations in 40 CFR Part 445 Subpart B.	Biochemical Oxygen Demand (BOD_5)	140 mg/L, daily maximum
		37 mg/L, monthly avg. maximum
	Total Suspended Solids (TSS)	88 mg/L, daily maximum
		27 mg/L, monthly avg. maximum
	Ammonia	10 mg/L, daily maximum
		4.9 mg/L, monthly avg. maximum
	Alpha Terpineol	0.033 mg/L, daily maximum
		0.016 mg/L monthly avg. maximum
	Benzoic Acid	0.12 mg/L, daily maximum
		0.071 mg/L, monthly avg. maximum
	p-Cresol	0.025 mg/L, daily maximum
		0.014 mg/L, monthly avg. maximum
	Phenol	0.026 mg/L, daily maximum
		0.015 mg/L, monthly avg. maximum
	Total Zinc	0.20 mg/L, daily maximum
		0.11 mg/L, monthly avg. maximum
	pH	Within the range of 6-9 standard pH units (s.u.)

Subpart N – Sector N – Scrap Recycling and Waste Recycling Facilities.

You must comply with Part 8 sector-specific requirements associated with your primary industrial activity and any co-located industrial activities, as defined in Part 1.1.2.1. The sector-specific requirements apply to those areas of your facility where those sector-specific activities occur. These sector-specific requirements are in addition to any requirements specified elsewhere in this permit.

8.N.1 Covered Storm water Discharges.

The requirements in Subpart N apply to storm water discharges associated with industrial activity from Scrap Recycling and Waste Recycling facilities as identified by the SIC Code specified under Sector N in Table 9 of Part 9 of the permit.

8.N.2 Limitations on Coverage.

Separate permit requirements have been established for recycling facilities that receive, process, and do wholesale distribution of only source-separated recyclable materials primarily from non-industrial and residential sources (i.e., common consumer products including paper, newspaper, glass, cardboard, plastic containers, and aluminum and tin cans). This includes recycling facilities commonly referred to as material recovery facilities (MRF). See Part 8.N.3.3.

8.N.2.1 Prohibition of Non-Storm water Discharges. (See also Part 1.1.4) Non-storm water discharges from turnings containment areas are not covered by this permit (see also Part 8.N.3.1.3). Discharges from containment areas in the absence of a storm event are prohibited unless covered by a separate NPDES permit. (DOH includes these prohibited non-storm water discharges here solely as a helpful reminder to the operator that the only non-storm water discharges authorized by this permit are at Part 1.1.3.)

8.N.3 Additional Technology-Based Effluent Limits.

8.N.3.1 Scrap and Waste Recycling Facilities (Non-Source Separated, Nonliquid Recyclable Materials). The following requirements are for facilities that receive, process, and do wholesale distribution of non-source separated, nonliquid recyclable wastes (e.g., ferrous and nonferrous metals, plastics, glass, cardboard, and paper). These facilities may receive both nonrecyclable and recyclable materials. This section is not intended for those facilities that accept recyclables only from primarily non-industrial and residential sources.

8.N.3.1.1 **Inbound Recyclable and Waste Material Control Program.** Minimize the chance of accepting materials that could be significant sources of pollutants by conducting inspections of inbound recyclables and waste materials and through implementation of control measures such as the following, where determined to be feasible (list not exclusive): providing information and education to suppliers of scrap and recyclable waste materials on draining and properly disposing of residual fluids (e.g., from vehicles and equipment engines, radiators and transmissions, oil filled transformers, and individual containers or drums) and removal of mercury switches from vehicles before delivery to your facility; establishing procedures to minimize the potential of any residual fluids from coming into contact with precipitation or runoff; establishing procedures for accepting scrap lead-acid batteries (additional requirements for the handling, storage, and disposal or recycling of batteries are contained in the scrap lead-acid battery program provisions in Part 8.N.3.1.6); providing training targeted for those personnel engaged in the inspection and acceptance of inbound recyclable materials; and establishing procedures to ensure that liquid wastes, including used oil, are stored in materially compatible and non-leaking containers and are disposed of or recycled in accordance with the Resource Conservation and Recovery Act (RCRA).

8.N.3.1.2 **Scrap and Waste Material Stockpiles and Storage (Outdoor).** Minimize contact of storm water runoff with stockpiled materials, processed materials, and nonrecyclable wastes through implementation of control measures such as the following, where determined to be feasible (list not exclusive): permanent or semi-permanent covers; sediment traps, vegetated swales and strips, catch basin filters, and sand filters to facilitate settling or filtering of pollutants; dikes, berms, containment trenches, culverts, and surface grading to divert runoff from storage areas; silt fencing; and oil and water separators, sumps, and dry absorbents for areas where potential sources of residual fluids are stockpiled (e.g., automobile engine storage areas).

8.N.3.1.3 **Stockpiling of Turnings Exposed to Cutting Fluids (Outdoor Storage).** Minimize contact of surface runoff with residual cutting fluids by storing all turnings exposed to cutting fluids under some form of permanent or semi-permanent cover, or establishing dedicated containment areas for all turnings that have been exposed to cutting fluids. Any containment areas must be constructed of concrete, asphalt, or other equivalent types of impermeable material and include a barrier (e.g., berms, curbing, elevated pads) to prevent contact with storm water run-on. Storm water runoff from these areas can be discharged, provided that any runoff is first collected and treated by an oil and water separator or its equivalent. You must regularly maintain the oil and water separator (or its equivalent) and properly dispose of or recycle collected residual fluids.

8.N.3.1.4 **Scrap and Waste Material Stockpiles and Storage (Covered or Indoor Storage).** Minimize contact of residual liquids and particulate matter from materials stored indoors or under cover with surface runoff through implementation of control measures such as the following, where determined to be feasible (list not exclusive): good housekeeping measures, including the use of dry absorbents or wet vacuuming to contain, dispose of, or recycle residual liquids originating from recyclable containers, and mercury spill kits for spills from storage of mercury switches; not allowing wash water from tipping floors or other processing areas to discharge to the storm sewer system; and disconnecting or sealing off all floor drains connected to the storm sewer system.

8.N.3.1.5 **Scrap and Recyclable Waste Processing Areas.** Minimize surface runoff from coming in contact with scrap processing equipment. Pay attention to operations that generate visible amounts of particulate residue (e.g., shredding) to minimize the contact of accumulated particulate matter and residual fluids with runoff (i.e., through good housekeeping, preventive maintenance).

To minimize discharges of pollutants in storm water from scrap and recyclable waste processing areas, implement control measures such as the following, where determined to be feasible (list not exclusive): at least once per month inspecting equipment for spills or leaks and malfunctioning, worn, or corroded parts or equipment; establishing a preventive maintenance program for processing equipment; using dry-absorbents or other cleanup practices to collect and dispose of or recycle spilled or leaking fluids or use mercury spill kits for spills from storage of mercury switches; on unattended hydraulic reservoirs over 150 gallons in capacity, installing protection devices such as low-level alarms or equivalent devices, or secondary containment that can hold the entire volume of the reservoir; implementing containment or diversion structures such as dikes, berms, culverts, trenches, elevated concrete pads, and grading to minimize contact of storm water runoff with outdoor processing equipment or stored materials; using oil and water separators or sumps; installing permanent or semi-permanent covers in processing areas where there are residual fluids and grease; and using retention or detention ponds or basins, sediment traps, vegetated swales or strips, and/or catch basin filters or sand filters for pollutant settling and filtration.

8.N.3.1.6 **Scrap Lead-Acid Battery Program.** To minimize the discharge of pollutants in storm water from lead-acid batteries, properly handle, store, and dispose of scrap lead-acid batteries, and implement control measures such as the following, where determined to be feasible (list not exclusive): segregating scrap lead-acid batteries from other scrap materials; properly handling, storing, and disposing of cracked or broken batteries; collecting and disposing of leaking lead-acid battery fluid; minimizing or eliminating (if possible) exposure of scrap lead-acid batteries to precipitation or runoff; and providing employee training for the management of scrap batteries.

8.N.3.1.7 **Spill Prevention and Response Procedures.** (See also Part 2.1.2.4) Install alarms and/or pump shutoff systems on outdoor equipment with hydraulic reservoirs exceeding 150 gallons in the event of a line break. Alternatively, a secondary containment system capable of holding the entire contents of the reservoir plus room for precipitation can be used. Use a mercury spill kit for any release of mercury from switches, anti-lock brake systems, and switch storage areas.

8.N.3.1.8 **Supplier Notification Program.** As appropriate, notify major suppliers which scrap materials will not be accepted at the facility or will be accepted only under certain conditions.

8.N.3.2 Waste Recycling Facilities (Liquid Recyclable Materials).

8.N.3.2.1 **Waste Material Storage (Indoor).** Minimize or eliminate contact between residual liquids from waste materials stored indoors and from surface runoff. The plan may refer to applicable portions of other existing plans, such as Spill Prevention, Control, and Countermeasure (SPCC) plans required under 40 CFR Part 112. To minimize discharges of pollutants in storm water from indoor waste material storage areas, implement control measures such as the following, where determined to be feasible (list not exclusive): implementing procedures for material handling (including labeling and marking); cleaning up spills and leaks with dry absorbent materials and/or a wet vacuum system; installing appropriate containment structures (e.g., trenching, curbing, gutters, etc.); and installing a drainage system, including appurtenances (e.g., pumps or ejectors, manually operated valves), to handle discharges from diked or bermed areas. Drainage should be discharged to an appropriate treatment facility or sanitary sewer system, or otherwise disposed of properly. These discharges may require coverage under a separate NPDES wastewater permit or industrial user permit under the pretreatment program.

8.N.3.2.2 **Waste Material Storage (Outdoor).** Minimize contact between stored residual liquids and precipitation or runoff. The plan may refer to applicable portions of other existing plans, such as SPCC plans required under 40 CFR Part 112. Discharges of storm water from containment areas containing used oil must also be in accordance with applicable sections of 40 CFR Part 112. To minimize discharges of pollutants in storm water from outdoor waste material storage areas, implement control measures such as the following, where determined to be feasible (list not exclusive): appropriate containment structures (e.g., dikes, berms, curbing, pits) to store the volume of the largest tank, with sufficient extra capacity for precipitation; drainage control and other diversionary structures; corrosion protection and/or leak detection systems for storage tanks; and dry-absorbent materials or a wet vacuum system to collect spills.

8.N.3.2.3 **Trucks and Rail Car Waste Transfer Areas.** Minimize pollutants in storm water discharges from truck and rail car loading and unloading areas. Include measures to clean up minor spills and leaks resulting from the transfer of liquid wastes. To minimize discharges of pollutants in storm water from truck and rail car waste transfer areas, implement control measures such as the following, where determined to be feasible (list not exclusive): containment and diversionary structures to minimize contact with precipitation or runoff; and dry clean-up methods, wet vacuuming, roof coverings, and/or runoff controls.

8.N.3.3 **Recycling Facilities (Source-Separated Materials).** The following requirements are for facilities that receive only source-separated recyclables, primarily from non-industrial and residential sources.

8.N.3.3.1 **Inbound Recyclable Material Control.** Minimize the chance of accepting nonrecyclables (e.g., hazardous materials) that could be a significant source of pollutants by conducting inspections of inbound materials and through the implementation of control measures such as the following, where determined to be feasible (list not exclusive): providing information and education measures to inform suppliers of recyclables about acceptable and non-acceptable materials; training drivers responsible for pickup of recycled material; clearly marking public drop-off containers regarding which materials can be accepted; rejecting nonrecyclable wastes or household hazardous wastes at the source; and establishing procedures for handling and disposal of nonrecyclable material.

8.N.3.3.2 **Outdoor Storage.** Minimize exposure of recyclables to precipitation and runoff by using good housekeeping measures to prevent accumulation of particulate matter and fluids, particularly in high traffic areas and through implementation of control measure such as the following, where determined to be feasible (list not exclusive): providing totally enclosed drop-off containers for the public; installing a sump and pump with each container pit and treat or discharge collected fluids to a sanitary sewer system; providing dikes and curbs for secondary containment (e.g., around bales of recyclable waste paper); diverting surface water runoff away from outside material storage areas; providing covers over containment bins, dumpsters, and roll-off boxes; and storing the equivalent of one day's volume of recyclable material indoors.

8.N.3.3.3 **Indoor Storage and Material Processing.** Minimize the release of pollutants from indoor storage and processing areas through implementation of control measures such as the following, where determined to be feasible (list not exclusive): scheduling routine good housekeeping measures for all storage and processing areas; prohibiting tipping floor wash water from draining to the storm sewer system; and providing employee training on pollution prevention practices.

8.N.3.3.4 **Vehicle and Equipment Maintenance.** Minimize the discharge of pollutants in storm water from areas where vehicle and equipment maintenance occur outdoors through implementation of control measures such as the following, where determined to be feasible (list not exclusive): minimizing or eliminating outdoor maintenance areas; establishing spill prevention and clean-up procedures in fueling areas; avoiding topping off fuel tanks; diverting runoff from fueling areas; storing lubricants and hydraulic fluids indoors; and providing employee training on proper handling and storage of hydraulic fluids and lubricants.

8.N.4 Additional SWPPP Requirements.

8.N.4.1 **Drainage Area Site Map.** (See also Part 5.2.2) Document in your SWPPP the locations of any of the following activities or sources that may be exposed to precipitation or surface runoff: scrap and waste material storage; outdoor scrap and waste processing equipment; and containment areas for turnings exposed to cutting fluids.

8**.N.4.2** **Maintenance Schedules/Procedures for Collection, Handling, and Disposal or Recycling of Residual Fluids at Scrap and Waste Recycling Facilities.** If you are subject to Part 8.N.3.1.3, your SWPPP must identify any applicable maintenance schedule and the procedures to collect, handle, and dispose of or recycle residual fluids.

8.N.5 Additional Inspection Requirements.

8.N.5.1 **Inspections for Waste Recycling Facilities.** The inspections must be performed quarterly, per Part 3.1, and include, at a minimum, all areas where waste is generated, received, stored, treated, or disposed of and that are exposed to either precipitation or storm water runoff.

8.N.6 Sector-Specific Benchmarks. (See also Part 6)

Table 8.N-1 identifies benchmarks that apply to Sector N. These benchmarks apply to both your primary industrial activity and any co-located industrial activities.

Table 8.N-1.

Subsector (You may be subject to requirements for more than one sector/subsector)	Parameter	Benchmark Monitoring Concentration
Subsector N1. Scrap Recycling and Waste Recycling Facilities except those only receiving source-separate recyclable materials primarily from non-industrial and residential sources (SIC 5093)	Chemical Oxygen Demand (COD)	120 mg/L
	Total Suspended Solids (TSS)	100 mg/L
	Aluminum Total Recoverable	0.75 mg/L
	Total Copper (freshwater)[2] Total Copper (saltwater)[1]	Hardness Dependent 0.0048 mg/L
	Total Recoverable Iron	1.0 mg/L
	Total Lead (freshwater)[2] Total Lead (saltwater)[1]	Hardness Dependent 0.21 mg/L
	Total Zinc (freshwater)[2] Total Zinc (saltwater)[1]	Hardness Dependent 0.09 mg/L

[1]Saltwater benchmark values apply to storm water discharges into saline waters where indicated.

[2]The freshwater benchmark values of some metals are dependent on water hardness. For these parameters, permittees must determine the hardness of the receiving water (see Part 11, “Calculating Hardness in Receiving Waters for Hardness Dependent Metals,” for methodology), in accordance with Part 6.2.1.1, to identify the applicable ‘hardness range’ for determining their benchmark value applicable to their facility.

Hardness Dependent Benchmarks follow in the table below:

Freshwater Hardness Range	Copper (mg/L)	Lead (mg/L)	Zinc (mg/L)
0-24.99 mg/L	0.0038	0.014	0.04
25-49.99 mg/L	0.0056	0.023	0.05
50-74.99 mg/L	0.0090	0.045	0.08
75-99.99 mg/L	0.0123	0.069	0.11
100-124.99 mg/L	0.0156	0.095	0.13
125-149.99 mg/L	0.0189	0.122	0.16
150-174.99 mg/L	0.0221	0.151	0.18
175-199.99 mg/L	0.0253	0.182	0.20
200-224.99 mg/L	0.0285	0.213	0.23
225-249.99 mg/L	0.0316	0.246	0.25
250+ mg/L	0.0332	0.262	0.26

Subpart P – Sector P – Land Transportation and Warehousing

You must comply with Part 8 sector-specific requirements associated with your primary industrial activity and any co-located industrial activities, as defined in Part 1.1.2.1. The sector-specific requirements apply to those areas of your facility where those sector-specific activities occur. These sector-specific requirements are in addition to any requirements specified elsewhere in this permit.

8.P.1 Covered Storm water Discharges.

The requirements in Subpart P apply to storm water discharges associated with industrial activity from Land Transportation and Warehousing facilities as identified by the SIC Codes specified under Sector P in Table 9 of Part 9 of the permit.

8.P.2 Limitation on Coverage.

8.P.2.1 **Prohibited Discharges.** (See also Parts 1.1.4 and 8.P.3.1.4) This permit does not authorize the discharge of vehicle/equipment/surface wash water, including tank cleaning operations. Such discharges must be authorized under a separate NPDES permit, discharged to a sanitary sewer in accordance with applicable industrial pretreatment requirements, or recycled on-site.

8.P.3 Additional Technology-Based Effluent Limits.

8.P.3.1 **Good Housekeeping Measures.** (See also Part 2.1.2.2) In addition to the Good Housekeeping requirements in Part 2.1.2.2, you must do the following.

8.P.3.1.1 **Vehicle and Equipment Storage Areas.** Minimize the potential for storm water exposure to leaky or leak-prone vehicles/equipment awaiting maintenance through implementation of control measures such as the following, where determined to be feasible (list not exclusive): using of drip pans under vehicles/equipment; storing vehicles and equipment indoors; installing berms or dikes; using of absorbents; roofing or covering storage areas; and cleaning pavement surfaces to remove oil and grease.

8.P.3.1.2 **Fueling Areas.** Minimize contamination of storm water runoff from fueling areas through implementation of control measures such as the following, where determined to be feasible: covering the fueling area; using spill/overflow protection and cleanup equipment; minimizing storm water run-on/runoff to the fueling area; using dry cleanup methods; and treating and/or recycling collected storm water runoff.

8.P.3.1.3 **Material Storage Areas.** Maintain all material storage vessels (e.g., for used oil/oil filters, spent solvents, paint wastes, hydraulic fluids) to prevent contamination of storm water and plainly label them (e.g., “Used Oil,” “Spent Solvents”). To minimize discharges of pollutants in storm water from material storage areas, implement control measures such as the following, where determined to be feasible (list not exclusive): storing the materials indoors; installing berms/dikes around the areas; minimizing runoff of storm water to the areas; using dry cleanup methods; and treating and/or recycling collected storm water runoff.

8.P.3.1.4 **Vehicle and Equipment Cleaning Areas.** Minimize contamination of storm water runoff from all areas used for vehicle/equipment cleaning through implementation of control measures such as the following, where determined to be feasible (list not exclusive): performing all cleaning operations indoors; covering the cleaning operation, ensuring that all wash water drains to a proper collection system (i.e., not the storm water drainage system); treating and/or recycling collected wash water; or other equivalent measures. Discharges of vehicle and equipment wash water, including tank cleaning operations, are not authorized by this permit for this sector.

8.P.3.1.5 **Vehicle and Equipment Maintenance Areas.** Minimize contamination of storm water runoff from all areas used for vehicle/equipment maintenance through implementation of control measures such as the following, where determined to be feasible (list not exclusive): performing maintenance activities indoors; using drip pans; keeping an organized inventory of materials used in the shop; draining all parts of fluid prior to disposal; prohibiting wet clean up practices if these practices would result in the discharge of pollutants to storm water drainage systems; using dry cleanup methods; treating and/or recycling collected storm water runoff; and minimizing run on/runoff of storm water to maintenance areas.

8.P.3.1.6 **Locomotive Sanding (Loading Sand for Traction) Areas.** Minimize discharges of pollutants in storm water from locomotive sanding areas through implementation of control measures such as the following, where determined to be feasible (list not exclusive): covering sanding areas; minimizing storm water run on/runoff; or appropriate sediment removal practices to minimize the offsite transport of sanding material by storm water.

8.P.3.2 **Employee Training.** (See also Part 2.1.2.8) Train personnel at least once a year and address the following activities, as applicable: used oil and spent solvent management; fueling procedures; general good housekeeping practices; proper painting procedures; and used battery management.

8.P.4 Additional SWPPP Requirements.

8.P.4.1 **Drainage Area Site Map.** (See also Part 5.2.2) Identify in the SWPPP the following areas of the facility and indicate whether activities occurring there may be exposed to precipitation/surface runoff: fueling stations; vehicle/equipment maintenance or cleaning areas; storage areas for vehicle/equipment with actual or potential fluid leaks; loading/unloading areas; areas where treatment, storage or disposal of wastes occur; liquid storage tanks; processing areas; and storage areas.

8.P.4.2 **Potential Pollutant Sources.** (See also Part 5.2.3) Assess the potential for the following activities and facility areas to contribute pollutants to storm water discharges: onsite waste storage or disposal; dirt/gravel parking areas for vehicles awaiting maintenance; illicit plumbing connections between shop floor drains and the storm water conveyance system(s); and fueling areas. Describe these activities in the SWPPP.

8.P.4.3 **Description of Good Housekeeping Measures.** You must document in your SWPPP the good housekeeping measures you implement consistent with Part 8.P.3.

8.P.4.4 **Vehicle and Equipment Wash Water Requirements.** If wash water is handled in a manner that does not involve separate NPDES permitting (e.g., hauled offsite), describe the disposal method and include all pertinent information (e.g., frequency, volume, destination, etc.) in your SWPPP. Discharges of vehicle and equipment wash water, including tank cleaning operations, are not authorized by this permit for this sector.

8.P.5 Additional Inspection Requirements. (See also Part 3.1)

Inspect all the following areas/activities: storage areas for vehicles/equipment awaiting maintenance, fueling areas, indoor and outdoor vehicle/equipment maintenance areas, material storage areas, vehicle/equipment cleaning areas and loading/unloading areas.

Subpart Q – Sector Q – Water Transportation.

You must comply with Part 8 sector-specific requirements associated with your primary industrial activity and any co-located industrial activities, as defined in Part 1.1.2.1. The sector-specific requirements apply to those areas of your facility where those sector-specific activities occur. These sector-specific requirements are in addition to any requirements specified elsewhere in this permit.

8.Q.1 Covered Storm water Discharges.

The requirements in Subpart Q apply to storm water discharges associated with industrial activity from Water Transportation facilities as identified by the SIC Codes specified under Sector Q in Table 9 of Part 9 of the permit.

8.Q.2 Limitations on Coverage.

8.Q.2.1 **Prohibition of Non-Storm water Discharges.** (See also Part 1.1.4) Not covered by this permit: discharges from vessels including bilge and ballast water, sanitary wastes, pressure wash water, and cooling water. Any discharge of pollutants from a point source to a water of the U.S. requires coverage under an NPDES permit. (DOH includes these prohibited non-storm water discharges here solely as a helpful reminder to the operator that the only non-storm water discharges authorized by this permit are at Part 1.1.3.)

8.Q.3 Additional Technology-Based Effluent Limits.

8.Q.3.1 **Good Housekeeping Measures.** You must implement the following good housekeeping measures in addition to the requirements of Part 2.1.2.2:

8.Q.3.1.1 **Pressure Washing Area.** If pressure washing is used to remove marine growth from vessels, the discharge water must be permitted by a separate NPDES permit. Collect or contain the discharges from the pressure washing area so that they are not commingled with storm water discharges authorized by this permit.

8.Q.3.1.2 **Blasting and Painting Area.** Minimize the potential for spent abrasives, paint chips, and overspray to be discharged into receiving waters or the storm sewer system. Contain all blasting and painting activities, or use other measures, to minimize the discharge of contaminants (e.g., hanging plastic barriers or tarpaulins during blasting or painting operations to contain debris). At least once per month, you must clean storm water conveyances of deposits of abrasive blasting debris and paint chips.

8.Q.3.1.3 **Material Storage Areas.** Store and plainly label all containerized materials (e.g., fuels, paints, solvents, waste oil, antifreeze, batteries) in a protected, secure location away from drains. Minimize the contamination of precipitation or surface runoff from the storage areas. Specify which materials are stored indoors, and contain or enclose or use other measures for those stored outdoors. If abrasive blasting is performed, discuss the storage and disposal of spent abrasive materials generated at the facility. Implement an inventory control plan to limit the presence of potentially hazardous materials onsite.

8.Q.3.1.4 **Engine Maintenance and Repair Areas.** Minimize the contamination of precipitation or surface runoff from all areas used for engine maintenance and repair through implementation of control measures such as the following, where determined to be feasible (list not exclusive): performing all maintenance activities indoors; maintaining an organized inventory of materials used in the shop; draining all parts of fluid prior to disposal; prohibiting the practice of hosing down the shop floor; using dry cleanup methods; and treating and/or recycling storm water runoff collected from the maintenance area.

8.Q.3.1.5 **Material Handling Area.** Minimize the contamination of precipitation or surface runoff from material handling operations and areas (e.g., fueling, paint and solvent mixing, disposal of process wastewater streams from vessels) through implementation of control measures such as the following, where determined to be feasible (list not exclusive): covering fueling areas; using spill and overflow protection; mixing paints and solvents in a designated area (preferably indoors or under a shed); and minimizing runoff of storm water to material handling areas.

8.Q.3.1.6 **Drydock Activities.** Routinely maintain and clean the drydock to minimize dischrges of pollutants in storm water. Address the cleaning of accessible areas of the drydock prior to flooding, and final cleanup following removal of the vessel and raising the dock. Include procedures for cleaning up oil, grease, and fuel spills occurring on the drydock. To minimize discharges of pollutants in storm water from drydock activities, implement control measures such as the following, where determined to be feasible (list not exclusive): sweeping rather than hosing off debris and spent blasting material from accessible areas of the drydock prior to flooding; and making absorbent materials and oil containment booms readily available to clean up or contain any spills.

8.Q.3.2 **Employee Training.** (See also Part 2.1.2.8) As part of your employee training program, address, at a minimum, the following activities (as applicable): used oil management; spent solvent management; disposal of spent abrasives; disposal of vessel wastewaters; spill prevention and control; fueling procedures; general good housekeeping practices; painting and blasting procedures; and used battery management.

8.Q.3.3 **Preventive Maintenance.** (See also Part 2.1.2.3) As part of your preventive maintenance program, perform timely inspection and maintenance of storm water management devices (e.g., cleaning oil and water separators and sediment traps to ensure that spent abrasives, paint chips, and solids will be intercepted and retained prior to entering the storm drainage system), as well as inspecting and testing facility equipment and systems to uncover conditions that could cause breakdowns or failures resulting in discharges of pollutants to surface waters.

8.Q.4 Additional SWPPP Requirements.

8.Q.4.1 **Drainage Area Site Map.** (See also Part 5.2.2) Document in your SWPPP where any of the following may be exposed to precipitation or surface runoff: fueling; engine maintenance and repair; vessel maintenance and repair; pressure washing; painting; sanding; blasting; welding; metal fabrication; loading and unloading areas; locations used for the treatment, storage, or disposal of wastes; liquid storage tanks; liquid storage areas (e.g., paint, solvents, resins); and material storage areas (e.g., blasting media, aluminum, steel, scrap iron).

8.Q.4.2 **Summary of Potential Pollutant Sources.** (See also Part 5.2.3) Document in the SWPPP the following additional sources and activities that have potential pollutants associated with them: outdoor manufacturing or processing activities (e.g., welding, metal fabricating) and significant dust or particulate generating processes (e.g., abrasive blasting, sanding, and painting).

8.Q.5 Additional Inspection Requirements. (See also Part 3.1)

Include the following in all quarterly routine facility inspections: pressure washing areas; blasting, sanding, and painting areas; material storage areas; engine maintenance and repair areas; material handling areas; drydock area; and general yard area.

8.Q.6 Sector-Specific Benchmarks. (See also Part 6)

Table 8.Q-1 identifies benchmarks that apply to Sector Q. These benchmarks apply to both your primary industrial activity and any co-located industrial activities.

Table 8.Q-1.

Subsector (You may be subject to requirements for more than one sector/subsector)	Parameter	Benchmark Monitoring Concentration
Subsector Q1. Water Transportation Facilities (SIC 4412-4499)	Total Aluminum	0.75 mg/L
	Total Iron	1.0 mg/L
	Total Lead (freshwater)2	Hardness Dependent
	Total Lead (saltwater)1	0.21 mg/L
	Total Zinc (freshwater)2	Hardness Dependent
	Total Zinc (saltwater)1	0.09 mg/L

[1]Saltwater benchmark values apply to storm water discharges into saline waters where indicated.

[2]The freshwater benchmark values of some metals are dependent on water hardness. For these parameters, permittees must determine the hardness of the receiving water (see Part 11, “Calculating Hardness in Receiving Waters for Hardness Dependent Metals,” for methodology), in accordance with Part 6.2.1.1, to identify the applicable ‘hardness range’ for determining their benchmark value applicable to their facility.

Hardness Dependent Benchmarks follow in the table below:

Freshwater Hardness Range	Lead (mg/L)	Zinc (mg/L)
0-24.99 mg/L	0.014	0.04
25-49.99 mg/L	0.023	0.05
50-74.99 mg/L	0.045	0.08
75-99.99 mg/L	0.069	0.11
100-124.99 mg/L	0.095	0.13
125-149.99 mg/L	0.122	0.16
150-174.99 mg/L	0.151	0.18
175-199.99 mg/L	0.182	0.20
200-224.99 mg/L	0.213	0.23
225-249.99 mg/L	0.246	0.25
250+ mg/L	0.262	0.26

Subpart S – Sector S – Air Transportation.

You must comply with Part 8 sector-specific requirements associated with your primary industrial activity and any co-located industrial activities, as defined in Part 1.1.2.1. The sector-specific requirements apply to those areas of your facility where those sector-specific activities occur. These sector-specific requirements are in addition to any requirements specified elsewhere in this permit.

8.S.1 Covered Storm water Discharges.

The requirements in Subpart S apply to storm water discharges associated with industrial activity from Air Transportation facilities identified by the SIC Codes specified under Sector S in Table 9 of Part 9 of the permit.

8.S.2 Limitation on Coverage.

8.S.2.1 **Limitations on Coverage.** This permit authorizes storm water discharges from only those portions of the air transportation facility that are involved in vehicle maintenance (including vehicle rehabilitation, mechanical repairs, painting, fueling and lubrication), or equipment cleaning operations.

8.S.2.2 **Prohibition of Non-Storm water Discharges.** (See also Part 1.1.4 and Part 8.S.5.3) This permit does not authorize the discharge of aircraft, ground vehicle, runway and equipment wash waters. Such discharges must be covered by separate NPDES permit(s). Note that a discharge resulting from snowmelt is not a dry weather discharge. (DOH includes these prohibited non-storm water discharges here solely as a helpful reminder to the operator that the only non-storm water discharges authorized by this permit are at Part 1.1.3.)

8.S.3 Multiple Operators at Air Transportation Facilities.

Air transportation facilities often have more than one operator who could discharge storm water associated with industrial activity. Operators include the airport authority and airport tenants, including air passenger or cargo companies, fixed based operators, and other parties who routinely perform industrial activities on airport property.

8.S.3.1 **Permit Coverage/Submittal of NOIs.** Where an airport transportation facility has multiple industrial operators that discharge storm water, each individual operator must obtain coverage under an NPDES storm water permit. To obtain coverage under the MSGP, all such operators must meet the eligibility requirements in Part 1 and must submit an NOI, per Part 1.2.1.1 (or, if appropriate, a no exposure certification).

8.S.3.2 **MSGP Implementation Responsibilities for Airport Authority and Tenants.** The airport authority, in collaboration with its tenants, may choose to implement certain MSGP requirements on behalf of its tenants in order to increase efficiency and eliminate redundancy or duplication of effort. Options available to the airport authority and its tenants for implementation of MSGP requirements include:

- The airport authority performs certain activities on behalf of itself and its tenants and reports on its activities;
- Tenants provide the airport authority with relevant inputs about tenants' activities and the airport authority compiles and reports on tenants' and its own activities;
- Tenants independently perform, document and submit required information on their activities.

8.S.3.3 **SWPPP Requirements.** A single comprehensive SWPPP must be developed for all storm water discharges associated with industrial activity at the airport before submittal of any NOIs. The comprehensive SWPPP should be developed collaboratively by the airport authority and tenants. If any operator develops a SWPPP for discharges from its own areas of the airport, that SWPPP must be coordinated and integrated with the comprehensive SWPPP. All operators and their separate SWPPP contributions and compliance responsibilities must be clearly identified in the comprehensive SWPPP, which all operators must sign and certify per Part 5.2.7. As applicable, the SWPPP must clearly specify the MSGP requirements to be complied with by:

- The airport authority for itself;
- The airport authority on behalf of its tenants;
- Tenants for themselves.

For each activity that an operator (e.g., the airport authority) conducts on behalf of another operator (e.g., a tenant), the SWPPP must describe a process for reporting results to the latter operator and for ensuring appropriate follow-up, if necessary, by all affected operators. This is to ensure all actions are taken to correct any potential deficiencies or permit violations. For example, where the airport authority is conducting monitoring for itself and its tenants, the SWPPP must identify how the airport authority will share the monitoring results with its tenants, and then follow-up with its tenants where there are any exceedances of benchmarks, effluent limits, or water quality standards. In turn, the SWPPP must describe how the tenants will also follow-up to ensure permit compliance.

8.S.3.4 **Duty to Comply.** All individual operators are responsible for implementing their assigned portion of the comprehensive SWPPP, and operators must ensure that their individual activities do not render another operator's storm water controls ineffective. In addition, the standard permit conditions apply to each individual operator, including B.1 Duty to Comply (which states, in part, "You [each individual operator] must comply with all conditions of this permit.").

For multiple operators at an airport this means that each individual operator remains responsible for ensuring all requirements of its own MSGP coverage are met regardless of whether the comprehensive SWPPP allocates the actual implementation of any of those responsibilities to another entity. That is, the failure of the entity allocated responsibility in the SWPPP to implement an MSGP requirement on behalf of other operators does not negate the other operators' ultimate liability.

8.S.4 Additional Technology-Based Effluent Limits.

8.S.4.1 Good Housekeeping Measures. (See also Part 2.1.2.2)

8.S.4.1.1 Aircraft, Ground Vehicle and Equipment Maintenance Areas. Minimize the contamination of storm water runoff from all areas used for aircraft, ground vehicle and equipment maintenance (including the maintenance conducted on the terminal apron and in dedicated hangers) through implementation of control measures such as the following, where determined to be feasible and that accommodate considerations of safety, space, operational constraints, and flight considerations (list not exclusive): performing maintenance activities indoors; maintaining an organized inventory of material used in the maintenance areas; draining all parts of fluids prior to disposal; prohibiting the practice of hosing down the apron or hanger floor; using dry cleanup methods; and collecting the storm water runoff from the maintenance area and providing treatment or recycling.

8.S.4.1.2 Aircraft, Ground Vehicle and Equipment Cleaning Areas. Clearly demarcate these areas on the ground using signage or other appropriate means. Minimize the contamination of storm water runoff from cleaning areas.

8.S.4.1.3 Aircraft, Ground Vehicle and Equipment Storage Areas. Store all aircraft, ground vehicles and equipment awaiting maintenance in designated areas only and implement control measures to minimize the discharge of pollutants in storm water from these storage areas such as the following, where determined to be feasible and that accommodate considerations of safety, space, operational constraints, and flight considerations (list not exclusive): storing aircraft and ground vehicles indoors; using drip pans for the collection of fluid leaks; and perimeter drains, dikes or berms surrounding the storage areas.

8.S.4.1.4 **Material Storage Areas.** Maintain the vessels of stored materials (e.g., used oils, hydraulic fluids, spent solvents, and waste aircraft fuel) in good condition to prevent or minimize contamination of storm water. Also plainly label the vessels (e.g., "used oil," "Contaminated Jet A"). To minimize contamination of precipitation/runoff from these areas, implement control measures such as the following, where determined to be feasible and that accommodate considerations of safety, space, operational constraints, and flight considerations (list not exclusive): storing materials indoors; storing waste materials in a centralized location; and installing berms/dikes around storage areas.

8.S.4.1.5 **Airport Fuel System and Fueling Areas.** Minimize the discharge of pollutants in storm water from airport fuel system and fueling areas through implementation of control measures such as the following, where determined to be feasible and that accommodate considerations of safety, space, operational constraints, and flight considerations (list not exclusive): implementing spill and overflow practices (e.g., placing absorptive materials beneath aircraft during fueling operations); using only dry cleanup methods; and collecting storm water runoff. If you have implemented a SPCC plan developed in accordance with the 2006 amendments to the SPCC rule, you may cite the relevant aspects from your SPCC plan that comply with the requirements of this section in your SWPPP.

8.S.5 Additional SWPPP Requirements.

8.S.5.1 **Drainage Area Site Map.** (See also Part 5.2.2) Document in the SWPPP the following areas of the facility and indicate whether activities occurring there may be exposed to precipitation/surface runoff: fueling stations; aircraft, ground vehicle and equipment maintenance/cleaning areas; and storage areas for aircraft, ground vehicles and equipment awaiting maintenance.

8.S.5.2 **Potential Pollutant Sources.** (See also Part 5.2.3) In the inventory of exposed materials, describe in the SWPPP the potential for the following activities and facility areas to contribute pollutants to storm water discharges: aircraft, runway, ground vehicle and equipment maintenance and cleaning.

8.S.5.3 **Vehicle and Equipment Wash Water Requirements.** If wash water is handled in a manner that does not involve separate NPDES permitting or local pretreatment requirements (e.g., hauled offsite, retained onsite), describe the disposal method and include all pertinent information (e.g., frequency, volume, destination) in your SWPPP. Discharges of vehicle and equipment wash water are not authorized by this permit for this sector.

8.S.5.4 Documentation of Control Measures Used for Management of Runoff. Document in your SWPPP the control measures used for collecting or containing contaminated melt water from collection areas used for disposal of contaminated snow.

Subpart T – Sector T – Treatment Works.

You must comply with Part 8 sector-specific requirements associated with your primary industrial activity and any co-located industrial activities, as defined in Part 1.1.2.1. The sector-specific requirements apply to those areas of your facility where those sector-specific activities occur. These sector-specific requirements are in addition to any requirements specified elsewhere in this permit.

8.T.1 Covered Storm water Discharges.

The requirements in Subpart T apply to storm water discharges associated with industrial activity from Treatment Works as identified by the Activity Code specified under Sector T in Table 9 of Part 9 of the permit.

8.T.2 Industrial Activities Covered by Sector T.

The requirements listed under this part apply to all existing point source storm water discharges associated with the following activities:

8.T.2.1 Treatment works treating domestic sewage, or any other sewage sludge or wastewater treatment device or system used in the storage, treatment, recycling, and reclamation of municipal or domestic sewage, including land dedicated to the disposal of sewage sludge; that are located within the confines of a facility with a design flow of 1.0 million gallons per day (MGD) or more; or are required to have an approved pretreatment program under 40 CFR Part 403.

8.T.2.2 The following are not required to have permit coverage: farm lands, domestic gardens or lands used for sludge management where sludge is beneficially reused and which are not physically located within the facility, or areas that are in compliance with Section 405 of the CWA.

8.T.3 Limitations on Coverage.

8.T.3.1 **Prohibition of Non-Storm water Discharges.** (See also Part 1.1.4) Sanitary and industrial wastewater and equipment and vehicle wash water are not authorized by this permit. (DOH includes these prohibited non-storm water discharges here solely as a helpful reminder to the operator that the only non-storm water discharges authorized by this permit are at Part 1.1.3.)

8.T.4 Additional Technology-Based Effluent Limits.

8.T.4.1 **Control Measures.** (See also Part 2.1.2) To minimize the discharge of pollutants in storm water, implement control measures such as the following, where determined to be feasible (list not exclusive): routing storm water to the treatment works; or covering exposed materials (i.e., from the following areas: grit, screenings and other solids handling, storage or disposal areas; sludge drying beds; dried sludge piles; compost piles; and septage or hauled waste receiving station).

8.T.4.2 **Employee Training.** (See also Part 2.1.2.8) At a minimum, training must address the following areas when applicable to a facility: petroleum product management; process chemical management; spill prevention and controls; fueling procedures; general good housekeeping practices; and proper procedures for using fertilizer, herbicides, and pesticides.

8.T.5 Additional SWPPP Requirements.

8.T.5.1 **Site Map.** (See also Part 5.2.2) Document in your SWPPP where any of the following may be exposed to precipitation or surface runoff: grit, screenings, and other solids handling, storage, or disposal areas; sludge drying beds; dried sludge piles; compost piles; septage or hauled waste receiving station; and storage areas for process chemicals, petroleum products, solvents, fertilizers, herbicides, and pesticides.

8.T.5.2 **Potential Pollutant Sources.** (See also Part 5.2.3) Document in your SWPPP the following additional sources and activities that have potential pollutants associated with them, as applicable: grit, screenings, and other solids handling, storage, or disposal areas; sludge drying beds; dried sludge piles; compost piles; septage or hauled waste receiving station; and access roads and rail lines.

8.T.5.3 **Wastewater and Wash Water Requirements.** If wastewater and/or vehicle and equipment wash water is not covered by another NPDES permit but is handled in another manner (e.g., hauled offsite, retained onsite), the disposal method must be described and all pertinent information (e.g., frequency, volume, destination) must be included in your SWPPP. Discharges of vehicle and equipment wash water, including tank cleaning operations, are not authorized by this permit for this sector.

8.T.6 Additional Inspection Requirements. (See also Part 3.1)

Include the following areas in all inspections: access roads and rail lines; grit, screenings, and other solids handling, storage, or disposal areas; sludge drying beds; dried sludge piles; compost piles; and septage or hauled waste receiving station.

Part 9 – Calculating Hardness in Freshwater Receiving Waters for Hardness Dependent Metals.

Overview

For any sectors required to conduct benchmark samples for a hardness-dependent metal, EPA includes 'hardness ranges' from which benchmark values are determined. To determine which hardness range to use, you must collect data on the hardness of your receiving water(s). Once the site-specific hardness data have been collected, the corresponding benchmark value for each metal is determined by comparing where the hardness data fall within hardness ranges, as shown in Table 9-1. You only need to determine hardness for your discharges into freshwater as the benchmark values for metals do not vary for discharges to saline waters.

Table 9-1. ***Hardness Ranges to Be Used to Determine Benchmark Values for Cadmium, Copper, Lead, Nickel, Silver, and Zinc.***

All Units mg/L	Benchmark Values (mg/L, total)					
	Cadmium	Copper	Lead	Nickel	Silver	Zinc
0-24.99 mg/L	0.0005	0.0038	0.014	0.15	0.0007	0.04
25-49.99 mg/L	0.0008	0.0056	0.023	0.20	0.0007	0.05
50-74.99 mg/L	0.0013	0.0090	0.045	0.32	0.0017	0.08
75-99.99 mg/L	0.0018	0.0123	0.069	0.42	0.0030	0.11
100-124.99 mg/L	0.0023	0.0156	0.095	0.52	0.0046	0.13
125-149.99 mg/L	0.0029	0.0189	0.122	0.61	0.0065	0.16
150-174.99 mg/L	0.0034	0.0221	0.151	0.71	0.0087	0.18
175-199.99 mg/L	0.0039	0.0253	0.182	0.80	0.0112	0.20
200-224.99 mg/L	0.0045	0.0285	0.213	0.89	0.0138	0.23
225-249.99 mg/L	0.0050	0.0316	0.246	0.98	0.0168	0.25
250+ mg/L	0.0053	0.0332	0.262	1.02	0.0183	0.26

How to Determine Hardness for Hardness-Dependent Parameters in Freshwater.

You may select one of three methods to determine hardness, including: individual grab sampling, grab sampling by a group of operators which discharge to the same receiving water, or using third-party data. Regardless of the method used, you are responsible for documenting the procedures used for determining hardness values. The hardness value is required to be submitted to the DOH with your SWPPP so that your electronic DMR which you will submit through NetDMR will include the appropriate limits. You must retain all report and monitoring data in accordance with Part 7.5 of the permit. The three method options for determining hardness are detailed in the following sections.

(1) Permittee Samples for Receiving Stream Hardness

This method involves collecting samples in the receiving water and submitting these to a laboratory for analysis. If you elect to sample your receiving water(s) and submit samples for analysis, hardness must be determined from the closest intermittent or perennial stream downstream of your point of discharge. The sample can be collected during either dry or wet weather. Collection of the sample during wet weather is more representative of conditions during storm water discharges; however, collection of in-stream samples during wet weather events may be impracticable or present safety issues.

Hardness must be sampled and analyzed using approved methods as described in 40 CFR Part 136 (Guidelines Establishing Test Procedures for the Analysis of Pollutants).

(2) Group Monitoring for Receiving Stream Hardness

You can be part of a group of permittees discharging to the same receiving waters and collect samples that are representative of the hardness values for all members of the group. In this scenario, hardness of the receiving water must be determined using 40 CFR Part 136 procedures and the results shared by group members. To use the same results, hardness measurements must be taken on a stream reach within a reasonable distance of the discharge points of each of the group members.

(3) Collection of Third-Party Hardness Data

You can submit receiving stream hardness data collected by a third party provided the results are collected consistent with the approved 40 CFR Part 136 methods. These data may come from a local water utility, previously conducted stream reports, TMDLs, peer reviewed literature, other government publications, or data previously collected by the permittee. Data should be less than 10 years old.

DAVID Y. IGE
GOVERNOR OF HAWAII

ELIZABETH A. CHAR, M.D.
DIRECTOR OF HEALTH

STATE OF HAWAII
DEPARTMENT OF HEALTH
P. O. BOX 3378
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In reply, please refer to:
File:

08004PMHK.21b
DATE: August 12, 2021
NPDES PERMIT NO. HI S000007 (fka HI 1121423)

RATIONALE: **APPLICATION FOR RENEWAL OF NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) PERMIT TO DISCHARGE TO VARIOUS WATERS OF THE UNITED STATES**

PERMITTEE: **U.S. MARINE CORPS, MARINE COPRS BASE HAWAII (MCBH)**

FACILITY: **U.S. MARINE CORPS BASE HAWAII MUNICIPAL SEPARATE STORM SEWER SYSTEM (MS4)**

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Table of Contents

This Rationale includes the legal requirements and technical rationale that serve as the basis for the requirements of this permit. Revisions to the previous permit are documented in Appendix 1 of this Rationale.

A. Permit Information

The following table summarizes administrative information related to the U.S. Marine Corps (Permittee) Municipal Separate Storm Sewer System (MS4) at the Marine Corps Base Hawaii (hereinafter facility).

Table 1. Facility Information

Permittee	U.S. Marine Corps Base Hawaii	
Name of Facility	U.S. Marine Corps Base Hawaii, Kaneohe Bay, Municipal Separate Storm Sewer System (MS4)	
Facility Address	U.S. Marine Corps Base Hawaii MCBH Kaneohe Bay, HI 96863	
Facility Contact, Title, and Phone	Ms. Tessa Schaffer Environmental Compliance & Protection Division Telephone: 808-257-4358 Email: tessa.schaffer@usmc.mil	
Authorized Person to Sign and Submit Reports	Major Jeffry Hart Director Telephone: 808-257-5640 Email: jeffry.hart@usmc.mil	
Mailing Address	U.S. Marine Corps Base Hawaii Box 63002, Building 1360 MCBH Kaneohe Bay, Hawaii 96863-3002	
Billing Address	Same	
Type of Facility	Municipal Separate Storm Sewer System	
Pretreatment Program	NA	
Reclamation Requirements	NA	
Facility Permitted Flow	Outfall Serial No.	Discharge
	Various Outfalls, as identified in permit application	Storm Water Runoff* Storm Water Associated with Industrial Activity
Receiving Waters	Kaneohe Bay; Nuupia, Halekou, and Kaluapuhi Ponds; & Kailua Bay; as identified in the permit application & Mokapu Central Drainage Channel	
Receiving Water Types	Kaneohe Bay – Embayment; Nuupia, Halekou, and Kaluapuhi Ponds - Inland Waters; Kailua Bay – Open Coastal; Mokapu Central Drainage Channel – Inland/ Embayment.	
Receiving Water Classification	Kaneohe Bay – Class AA; Nuupia, Halekou, and Kaluapuhi Ponds – Class 1; Kailua Bay – Class A; & Mokapu Central Drainage Channel – Class AA/2.	

* including certain specified non storm water discharges

1. NPDES Permit No. HI 1121423 became effective on January 30, 2003 and expired on January 31, 2007. The Permittee submitted renewal NPDES permit application on July 26, 2006, whereby the NPDES Permit No. was changed to HI S000007. The Hawaii Department of Health (hereinafter DOH) administratively extended the NPDES permit on January 26, 2007, pending the reapplication processing. NPDES Permit No. HI S000007 was issued on September 15, 2014, became effective on October 15, 2014 ("2014 Permit"), and expired at midnight, September 14, 2019. DOH received the "2018 Annual Storm Water Report for Marine Corps Base Hawaii (MCBH)", which also serves as MCBH's renewal application for MS4 NPDES Permit No. HI S000007, on December 28, 2018. DOH administratively extended the NPDES permit on September 23, 2019, pending the reapplication process.

2. The DOH proposes to issue a permit to discharge to the waters of the State until five (5) years after the date of issuance, and has included in the proposed permit those terms and conditions which the DOH has determined are necessary to carry out the provisions of the Federal Water Pollution Control Act (P.L. 92-500), Federal Clean Water Act (CWA) (P.L. 95-217) and Chapter 342D, Hawaii Revised Statutes.

B. Facility Setting

1. Facility Operation and Location

This MS4 permit shall cover the Marine Corps Base Hawaii (MCBH) – Kaneohe Bay facility on the Island of Oahu. MCBH is located on the Mokapu Peninsula of windward Oahu in Kaneohe and is home to the Marine Aircraft Group 24, 3d Marine Regiment, Patrol and Reconnaissance Wing Two, Marine Forces Pacific Headquarters, Pacific Command Headquarters, government agencies and many other commands. MCBH provides high quality training support, housing and recreation activities for the Marines, Sailors and their families (roughly 11,000 military personnel).

The storm sewers are systems of conveyances, including storm drains, catch basins, curbs, gutters, canals, and ditches designed to collect and convey storm water runoff. Storm water discharges from the MS4 enters Kaneohe Bay; Nuupia, Halekou, and Kaluapuhi Ponds; Kailua Bay; and Mokapu Central Drainage Channel from various outfalls. Per NPDES Storm Water Permit Application for Marine Corps Base Hawaii, July 28, 1994, outfalls were grouped according to the types of industrial activities occurring within the drainage basins.

The four groupings are:

a. Active runway and possible burn pit runoff (outfall nos. 001 & 002);
b. Active runway and helipad/wash rack (outfall no. 025);
c. Active runway/hangar operations/light industrial activities (outfall nos. 003-007 & 009-024); and
d. Sanitary landfill (outfall no. 008).

Representative outfalls for the 4 groupings were noted as 001, 025, 019, and 008. Note: 1) light industrial operations consisted primarily of vehicle and AmTrack maintenance activities; 2) in 2001, a sedimentation basin was constructed in the sanitary landfill and has not discharged since.

More recently the outfalls were identified starting with an “O” and the old Landfill outfall no. 008 was redesignated as nos. LF-1 & LF-2. As such, the outfall numbering is designated as follows: Nuupia Ponds outfalls - O10, O11, & O12; Kaneohe Bay outfalls - O16, O16A, O16B, O17, O17A, O18, O19, O20, O21, O22, O24, O25, O26, O27, & O28; and Kailua Bay outfalls - LF-1, & LF-2.

Starting from the “2017 Annual Storm Water Monitoring Report for Marine Corps Base Hawaii”, outfalls identified for storm water sampling have been referred to as “EPA ID”, “NetDMR Site Code”, or “Outfall ID” and are listed in “Table 2. Industrial Activities” in the next section.

A map of the sanitary landfill has been submitted to correct the previous landfill boundaries. The sanitary landfill perimeter includes a truck wash area to prevent tracking sediment out of the sanitary landfill area. Appendix 1, Part 8.L.3.1. of the proposed permit prohibits discharges of contact wash water from washing truck exterior and surface areas that have come in direct contact with solid waste at the landfill facility. The sanitary landfill sampling point has been relocated to be more representative of storm water discharges from the sanitary landfill and prevent commingling with storm water runoff from the adjacent roadway.

2. Industrial Activities

The following industrial facilities were identified in the permit application (list to be updated in the next annual report after permit issuance and to include SIC codes):

Table 2. Industrial Facilities

Outfall ID	Building No.	General Category	Description	SIC Code
None (same as 105)	101	Maintenance	Maintenance Hangar HMLA 367	45
	102	Maintenance	Maintenance Hangar HMH 463	45
	103	Maintenance	Maintenance Hangar HSL	45

Outfall ID	Building No.	General Category	Description	SIC Code
			37	
	104	Maintenance	Maintenance Hangar VP4 VP47	45
001-Y	105	Maintenance	Maintenance Hangar VPU2 VR-52 (DYNCORP)	45
None	106	Maintenance	Maintenance Hangar	
None	107	Maintenance	Maintenance Hangar	
None	P-3 Apron		Aircraft Wash Facility	
007-Y	132		Recycle Center	50
009-P	1698	Maintenance	Small Boat Repair Shop	44
010-P	351	Maintenance	Vehicle Maintenance Shop	41
011-P	373	Maintenance	Motor Vehicle Maintenance Shop	42
None	6874		3rd Radio Battalion	
012-P	375	Maintenance	Aircraft Maintenance	45
004-Y	1170, 1171	POL Storage	Aircraft Fuel Islands	45
021-P	1252, 1253	Storage	Fuel Division Supply Department	51
003-Y	1304	Operations	Ordnance Operations	45
008-P	6801	Maintenance	Lab/Boat Shop	44
015-P	1619	Maintenance	Ground Support Equipment Shop	42
013-P	1631	Maintenance	Aircraft Wash & Rinse Facility	45
016-P	5069	Maintenance	Corrosion Control Facility	45
019-P	6025	Storage	Liquid Oxygen/Nitrogen Facility	45
014-P	6107	Maintenance	Aircraft Rinse Facility	45
018-P	6182	Storage	Fuel Delivery Branch and Refueler Truck Parking	51
017-P	6183	Maintenance	Engine Test Facility	45
020-P	6479	Storage	Aircraft Ready Fuel Storage	51
LF-1 002-Y	Sanitary Landfill	Sanitary Landfill	Sanitary Landfill	49
WRF-1 006-Y	WRF-1	Utility	Water Reclamation Facility	49
005-Y	P-3 Aircraft Parking Apron	Storage	Aircraft Parking Apron	
Alternate	6030		3rd Marine Motor Transportation (MT)	
Alternate	3014		Combat Logistics Battalion	

Outfall ID	Building No.	General Category	Description	SIC Code
			(CLB-3) Support Company Transportation Services	
Alternate	1284		Combat Assault Command (CAC)	
Alternate	5011		12th Marine Motor T	

The current permit covers the industrial facilities and requires each facility to have a Storm Water Pollution Prevention Plan (SWPPP) and perform monitoring.

In the Annual Monitoring Plan submitted on May 31, 2019, MCBH proposed to remove eight (8) sampling locations from the previous Monitoring Plan:

a. Small Boat Repair Shop, Building (Bldg) 129: No discharge to a storm water drain. There is no storm drain system in this area. Area is surrounded by a grassy and gravel field.

b. Aircraft Wash & Rinse Facility, Bldg 1631: No discharge to a storm water drain. All runoff flow was captured by an onsite Oil/Water Separator (O/W) and discharged directly to a Wastewater Treatment Plant (WWTP).

c. Engine Test Facility, Bldg 6183: No discharge to a storm water drain. All runoff flow is captured by an onsite O/W and surrounding grassy area. O/W is connected directly to the WWTP.

d. Aircraft Rinse Facility, Bldg 6107: No discharge to a storm water drain. New construction installed Low Impact Development (LID) features. LID features changed the nature of this area and no offsite discharge occurs.

e. P-3 Aircraft Parking Apron: No discharge to a storm water drain. New construction installed LID features. LID features changed the nature of this area and no offsite discharge occurs.

f. Liquid Oxygen/Nitrogen Facility, Bldg 6025: No flow location. This location is surrounded by a grassy field. Contractor confirmed there was no flow during previous storm events.

g. Fuel Division Supply Department, Bldg 1252 & 1253: No flow location. This location is surrounded by a grassy field. Contractor confirmed there was no flow during previous storm events.

h. Wastewater Treatment Plant: No flow location. This location is surrounded by a grassy field. Contractor confirmed there was no flow during previous storm events.

Permit coverage to discharge industrial storm water only is not required for industrial facilities which satisfy the no exposure condition under 40 CFR 122.26(g) and HAR 11-55. The table below lists industrial facilities that are under the conditional "no exposure" exclusion.

Building No.	General Category	Description
101	Maintenance	Maintenance Hangar
102	Maintenance	Maintenance Hangar
103	Maintenance	Maintenance Hangar
104	Maintenance	Maintenance Hangar
105	Maintenance	Maintenance Hangar
6814	Maintenance	Maintenance Hangar
6886	Maintenance	Maintenance Hangar
373	Maintenance	Motor Vehicle Maintenance Shop
375	Maintenance	Aircraft Maintenance
1304	Operations	Ordnance Operations
5069	Maintenance	Corrosion Control Facility
6025	Storage	Liquid Oxygen/Nitrogen Facility
P-3 Parking Apron	Storage	Aircraft Parking Apron
6030		3rd Marine Motor Transportation (MT)
6082		Other household goods, repairs, and maintenance
1284		Combat Assault Command (CAC)

No exposure is defined as all industrial materials and activities that are protected by storm resistant shelter to prevent exposure to rain, snow, snowmelt, and/or runoff. Industrial materials or activities include, but are not limited to, material handling equipment or activities, industrial machinery, raw materials, intermediate products, by-products, final products, or waste products. Failure to maintain the condition of no exposure can lead to the unauthorized discharge of pollutants to State surface receiving waters resulting in penalties under the Clean Water Act. A copy of this permit indicating facilities covered under the CNEE must be retained on-site or at a nearby office or field office.

3. Commercial Facilities

The following commercial facilities were identified in the permit application (list to be updated in the next annual report after permit issuance and to include SIC codes):

Table 3. Commercial Facilities

Building No.	Description
3071	K-Bay Marine Mart/Smokey Joes/Gas Lanes
1667	MCX Gas & More (Wash & Co., Firestone)
3097	Five-O Motors (Auto Hobby Shop)
1307	Old Auto Hobby Shop (Demolished)
6882	New Addition
6883	New Covered Structure
1267	Paint Booth

4. Receiving Water Classification

The MCBH separate storm sewer system discharges into receiving waters Kailua Bay; Kaneohe Bay; Nuupia, Halekou, and Kaluapuhi Ponds; and the Mokapu Central Drainage Channel.

The receiving water Kailua Bay (Dry Criteria) is classified by the Department of Health as a Class A, Open Coastal, Marine Water under Hawaii Administrative Rules (HAR) Section 11-54-6. The objective of Class A waters is to protect their use for recreational purposes and aesthetic enjoyment. Any other use shall be permitted as long as it is compatible with the protection and propagation of fish, shellfish, and wildlife, and with recreation in and on these waters. These waters shall not act as receiving waters for any discharge which has not received the best degree of treatment or control compatible with the criteria established for this class.

The receiving waters Nuupia, Halekou, and Kaluapuhi Ponds and Mokapu Central Drainage Channel are classified by the Department of Health as a Class 1, Inland Water under HAR Section 11-54-5. It is the objective of Class 1 waters that these waters remain in their natural state as nearly as possible with an absolute minimum of pollution from any human-caused source. To the extent possible, the wilderness character of these areas shall be protected.

The receiving water Kaneohe Bay (Wet Criteria) and Mokapu Central Drainage Channel (portion of the channel that is tidally influenced by Kaneohe Bay) are classified by the Department of Health as Class AA, Embayment, Marine Water under HAR Section 11-54-6. While the uses of Class AA Marine Water is essentially identical to those described for Class A Marine Water, Class AA has the additional objective that these waters remain in their natural pristine state as nearly as possible with an absolute minimum of pollution or alteration of water quality from any human-caused source or actions. To the extent practicable, the wilderness character of these areas shall be protected.

5. Impaired Water Bodies on CWA 303(d) List

CWA Section 303(d) requires states to identify specific water bodies where water quality standards (WQS) are not expected to be met after implementation of technology-based effluent limitations on point sources.

The 2018 State of Hawaii Water Quality Monitoring and Assessment Report, which includes the 2018 303(d) List of Impaired Water Bodies in the State of Hawaii, was approved by the EPA on August 16, 2018. The report is pursuant to Sections 303(d) and 305(b) of the Clean Water Act.

According to the report, the receiving waters are classified as follows:

Table 4. Receiving Water Assessments from the 303(d) List/305(b) Report

Receiving Water	Wet/Dry Criteria	Pollutant Decisions								Category Codes[1]
		Enterococci	Total Nitrogen	Nitrate+ Nitrite Nitrogen	Total Phosphorus	Turbidity	Chlorophyll a	Ammonia Nitrogen	Other	
Kaneohe Bay	Wet	Not Attained	Not Attained	Not Attained	Insufficient Data	Not Attained	Insufficient Data	Not Attained	---	3, 5
Kailua Bay (Southern Region)	Dry	Attained	Attained	Attained	Attained	Attained	Attained	Not Attained	---	2, 5

Receiving Water	Season	Pollutant Decisions							Category Codes[1]
		Enterococci	Total Nitrogen	Nitrate+ Nitrite Nitrogen	Total Phosphorus	Turbidity	Total Suspended Solids	Other	
Nuupia Pond	Not Listed								
Halekou Pond	Not Listed								
Kaluapuhi Pond	Not Listed								
Mokapu Central Drainage Channel	Not Listed								

[1] Category Codes: 2 – Data show some uses attained
3 – Not enough data to evaluate
5 – Data show at least one use not attained, TMDL needed.

At present, no Total Maximum Daily Loads (TMDLs) have been established for these water bodies.

6. Summary of Existing Effluent Limitations and Monitoring Data

a. Effluent limitations contained in the 2014 permit for storm water discharges from associated with industrial activities are presented in Table 5. The 2014 permit requires MCBH to collect and analyze grab and composite samples by manual or automatic monitoring methods, from a representative storm event. A representative storm event is defined as a storm event that is greater than 0.1 inch in magnitude and that occurs at least 72 hours after any previous storm events of 0.1 inch or greater. The sampling locations shall be representative of storm water discharging from the industrial facility and consist of storm water runoff from industrial activities.

Table 5. Effluent Limitations – Storm Water Associated with Industrial Activities

Effluent Parameter	Units	Effluent Limitation {1}	Type of Sample {2}
Flow	gallons	{3}	Calculated or Estimated
Biochemical Oxygen Demand (5-day)	mg/l	{3}	Composite {4}
Chemical Oxygen Demand	mg/l	{3}	Composite {4}
Total Suspended Solids	mg/l	{3}	Composite {4}
Total Phosphorus	mg/l	{3}	Composite {4}
Total Nitrogen {5}	mg/l	{3}	Composite {4}
Nitrate + Nitrite Nitrogen	mg/l	{3}	Composite {4}
Oil and Grease	mg/l	15	Grab {6}
pH Range	SU	5.5-8.0 {7} 7.6-8.6 {8}	Grab {9}

Effluent Parameter	Units	Effluent Limitation {1}	Type of Sample {2}
Ammonia Nitrogen	mg/l	{3}	Composite
Turbidity	0.1 NTU	{3}	Grab
Dissolved Oxygen	0.1 mg/l	{3}	Grab
Oxygen Saturation	1%	{3}	Grab
Temperature	0.1 ºC	{3}	Grab
Salinity	0.1 ppt	{3}	Grab
Arsenic {10}{11}	µg/l	360 {7} 69 {8}	Composite {4}
Cadmium {10}{11}	µg/l	3+ {7} 43 {8}	Composite {4}
Chromium (VI) {10}{11}	µg/l	16 {7} 1100 {8}	Composite {4}
Copper {10}{11}	µg/l	6+ {7} 2.9 {8}	Composite {4}
Lead {10}{11}	µg/l	29+ {7} 140 {8}	Composite {4}
Nickel {10}{11}	µg/l	5+ {7} 75 {8}	Composite {4}
Selenium {10}{11}	µg/l	20 {7} 300 {8}	Composite {4}
Silver {10}{11}	µg/l	1+ {7} 2.3 {8}	Composite {4}
Zinc {10}{11}	µg/l	22+ {7} 95 {8}	Composite {4}
Additional Toxic Pollutants {11}	µg/l	{12}	{13}

mg/l = milligrams per liter = 1000 micrograms per liter (µg/l)
+ = The value listed is the minimum standard. Depending upon the receiving water $CaCO_3$ hardness, higher standards may be calculated using the respective formula in the U.S. Environmental Protection Agency publication Quality Criteria for Water (EPA 440/5-86-001, Revised May 1, 1987).

NOTES:

{1} Pollutant concentration levels shall not exceed the storm water discharge limits or be outside the ranges indicated in the table. Actual or measured levels which exceed those storm water discharge limits or are outside those ranges shall be reported to the CWB required in HAR Chapter 11-55, Appendix B, Section 10(c). In the event any of these limitations are exceeded, the PERMITTEE shall continue to monitor and report every representative storm event until limitations are met, unless as otherwise informed by the DOH-CWB.

{2} The Permittee shall collect samples for analysis from a discharge resulting from a representative storm. A representative storm means a rainfall that accumulates more than 0.1 inch of rain and occurs at least 72 hours after the previous measurable (greater than 0.1 inch) rainfall event.
"Grab sample" means a sample collected during the first 15 minutes of the discharge.

"Composite sample" means a combination of at least two (2) sample aliquots, collected at periodic intervals. The composite shall be flow proportional; either the time interval between each aliquot or the volume of each aliquot must be proportional to the total flow of storm water discharge flow since the collection of the previous aliquot. The Permittee may collect aliquots manually or automatically.

Samples for analysis shall be collected during the first 15 minutes of the discharge and at 15-minute intervals thereafter for the duration of the discharge, as applicable. If the discharge lasts for over an hour, sample collection may cease.

{3} The value shall not exceed the applicable limit as specified in Chapter 11-54 for the applicable classification of the receiving state waters. If no limitation is specified in HAR Chapter 11-54, then the Permittee shall monitor and report the analytical result. The Department may include discharge limitations specified in HAR Section 11-55-19 and discharge limitations based on Federal Register, Vol. 73, No. 189, Pages 56572–56578, dated September 29, 2008.

{4} If the duration of the discharge event is less than 30 minutes, the sample collected during the first 15 minutes of the discharge shall be analyzed as a grab sample and reported toward the fulfillment of this composite sample specification. If the duration of the discharge event is greater than 30 minutes, the Permittee shall analyze two (2) or more sample aliquots as a composite sample.

{5} The Total Nitrogen parameter is a measure of all nitrogen compounds in the sample (nitrate, nitrite, ammonia, dissolved organic nitrogen, and organic matter present as particulates).

{6} The Permittee shall measure Oil and Grease using EPA Method 1664, Revision A.

{7} This limitation applies to discharge into state waters classified as inland streams.

{8} This limitation applies to discharge into state waters classified as marine open coastal waters.

{9} The Permittee shall measure pH within 15 minutes of obtaining the grab sample.

{10} The Permittee shall test for the total recoverable portion of all metals.

{11} Toxic pollutants, as identified in Appendix D of 40 CFR Part 122 or in HAR Chapter 11-54, Section 11-54-4, need only be analyzed if they are identified as potential pollutants requiring monitoring in the SWPCP. The Permittee shall test for the total recoverable portion of all metals. If monitoring results indicate that the discharge limitation was equaled or exceeded, the SWPCP shall be amended to include additional BMPs targeted to reduce the parameter which was in excess of the discharge limitation.

{12} Effluent limitations are the acute water quality standards established in HAR Chapter 11-54, Section 11-54-4. For pollutants which do not have established acute water quality standards, any detected concentration greater than 0.01 mg/l shall be reported.

{13} Cyanide and the volatile fraction of the toxic organic compounds shall be sampled by grab sample. All other pollutants, as identified in Appendix D of the 40 CFR Part 122 or in HAR Chapter 11-54, Section 11-54-4, shall be sampled by composite sample.

The sampling locations shall be representative of storm water discharging from industrial facility and consist of storm water runoff from industrial activities.

b. MCBH industrial facilities are given a priority ranking based on the perceived potential risk that the facility poses to storm water quality due to the nature of its industrial activities or proximity to receiving waters if BMPs are not correctly followed. For example, Inlet 105-2 located off the southwest corner of Maintenance Hangar 105 near the aircraft taxiway, was chosen as the representative inlet for storm water discharges from all Maintenance Hangar facilities (Buildings 101 through 105). The inlet is subject to tidal flow from Kaneohe Bay. High priority sampling locations are collected on an annual basis whereas low priority sampling locations are rotated in so that all sites are eventually sampled by the end of the compliance period.

Storm water samples are annually collected at the following high priority locations:

Table 6. MCBH High Priority Storm Water Sampling Locations

Outfall ID	Building Name	Building No. (Sampling Method)
001-Y	Hangar 105	Hangar 105 (Grated Inlet 105-2)
004-Y	Aircraft Fuel Islands	Bldg. 1170 & 1171 (Grated Inlet)
003-Y	Ordnance Operations	Bldg. 1304 (Catch Basin)
006-Y	Water Reclamation Facility	WRF-1 (Sheet Flow)
002-Y	Sanitary Landfill	LF-1 (Outfall LF-1)
007-Y	Recycling Center	Bldg. 132 (Catch Basin)

Storm water samples are collected on a rotational schedule for the following lower priority sampling locations.

Table 7. MCBH Lower Priority Storm Water Sampling Locations

Outfall ID	Building Name	Building No. (Sampling Method)
008-P	Lab/Boat Shop	Bldg. 1388 (Trench Drain)
009-P	Small Boat/Repair Shop (Marina)	Bldg. 129 (Outfall 017A)
010-P	Vehicle Maintenance Shop	Bldg. 351 (Trench Drain 351-3)
015-P	Ground Support Equipment Shop	Bldg. 1619 (SDMH)
011-P	Motor Vehicle Maintenance	Bldg. 373 (Sheet Flow)
012-P	Aircraft Maintenance	Bldg. 375 (SDMH 375-2)
013-P	Aircraft Wash & Rinse	Bldg. 1631 (Sheet Flow)
016-P	Corrosion Control Facility	Bldg. 5069 (Grated Inlet 5069-2)
017-P	Engine Test Facility	Bldg. 6183 (Sheet Flow)
014-P	Aircraft Rinse Facility	Bldg. 6107 (Sheet Flow)
005-Y	P-3 Parking Apron	Bldg. 6188 (Sluice Gate)
018-P	Fuel Delivery & Truck Parking	Bldg. 6182 (Sheet Flow)
020-P	Aircraft Ready Fuel Storage	Bldg. 6479 (Sheet Flow)
019-P	Liquid O_2/N_2 Facility	Bldg. 6025 (Grass Swale)
021-P	Fuel Division Supply Dept.	Bldg. 1252 & 1253 (Sheet Flow)

Storm water discharges associated with industrial activities monitoring data from the 2018 annual monitoring report are presented in Tables 8 – 14.

Table 8. Facilities 1170 and 1171 Aircraft Fuel Islands Monitoring Results

Parameter (Units)	Water Quality Standard (Chronic, Salt Water)	Maximum Reported Value
Flow (MGD)	{1}	0.0155
Biochemical Oxygen Demand (5-day) (mg/l)	{1}	2
Chemical Oxygen Demand (mg/l)	{1}	Non-Detect
Total Suspended Solids (mg/l)	{1}	1.6
Total Phosphorus (mg/l)	0.05	Non-Detect
Total Nitrogen (mg/l)	0.35	0.11
Nitrate+Nitrite Nitrogen (mg/l)	0.02	Non-Detect
Oil and Grease (mg/l)	15	Non-Detect
pH (SU)	7.6 – 8.6	7.79
Turbidity (NTU)	**3**	**6.2**
Ammonia Nitrogen (mg/l)	0.013	Non-Detect
Dissolved Oxygen (mg/l)	{1}	7.59
Oxygen Saturation (1%)	**≥75%**	**78.6**
Temperature (°C)	{2}	22.88
Salinity (ppt)	{3}	Not Measured
Arsenic (µg/l)	69	Non-Detect
Arsenic, Dissolved (µg/l)	69	Non-Detect
Cadmium (µg/l)	43	Non-Detect
Cadmium, Dissolved (µg/l)	43	Non-Detect
Chromium VI (µg/l)	1100	Non-Detect
Chromium VI, Dissolved (µg/l)	1100	Non-Detect
Copper (µg/l)	**2.9**	**4.7**
Copper, Dissolved (µg/l)	**2.9**	**4.0**
Lead (µg/l)	140	Non-Detect
Lead, Dissolved (µg/l)	140	Non-Detect
Nickel (µg/l)	75	0.86
Nickel, Dissolved (µg/l)	75	0.76
Selenium (µg/l)	300	0.78
Selenium, Dissolved (µg/l)	300	Non-Detect
Silver (µg/l)	2.3	Non-Detect
Silver, Dissolved (µg/l)	2.3	Non-Detect
Zinc (µg/l)	95	9.6
Zinc, Dissolved (µg/l)	95	17
Mercury (µg/l)	2.1	Non-Detect
Mercury, Dissolved (µg/l)	2.1	Non-Detect
Acenaphthene (µg/l)	320	Non-Detect
Benzo[a]pyrene (µg/l)	{1}	Non-Detect
Fluoranthene (µg/l)	13	Non-Detect
Naphthalene (µg/l)	780	Non-Detect
DRO C9-C25	{1}	Non-Detect

Bold indicates exceedance of the water quality standard.
{1} Monitor and report only.
{2} Temperature shall not vary more than one degree Celsius from ambient conditions.
{3} Salinity shall not vary more than ten percent from natural or seasonal changes considering hydrologic input and oceanographic factors.

Table 9. Building 1304, Ordnance Operations Monitoring Results

Parameter (Units)	Water Quality Standard (Chronic, Salt Water)	Maximum Reported Value
Flow (MGD)	{1}	0.0116
Biochemical Oxygen Demand (5-day) (mg/l)	{1}	7
Chemical Oxygen Demand (mg/l)	{1}	0.14
Total Suspended Solids (mg/l)	{1}	22
Total Phosphorus (mg/l)	**0.05**	**0.17**
Total Nitrogen (mg/l)	**0.35**	**1.2**
Nitrate+Nitrite Nitrogen (mg/l)	**0.02**	**0.22**
Oil and Grease (mg/l)	15	Non-Detect
pH (SU)	7.6 – 8.6	8.16
Turbidity (NTU)	**3**	**47.4**
Ammonia Nitrogen (mg/l)	0.013	Non-Detect
Dissolved Oxygen (mg/l)	{1}	6.76
Oxygen Saturation (1%)	**≥75%**	**69.9**
Temperature (°C)	{2}	22.36
Salinity (ppt)	{3}	Not Measured
Arsenic (µg/l)	69	Non-Detect
Arsenic, Dissolved (µg/l)	69	Non-Detect
Cadmium (µg/l)	43	Non-Detect
Cadmium, Dissolved (µg/l)	43	Non-Detect
Chromium VI (µg/l)	1100	1.4
Chromium VI, Dissolved (µg/l)	1100	2.4
Copper (µg/l)	**2.9**	**4.3**
Copper, Dissolved (µg/l)	**2.9**	**3.0**
Lead (µg/l)	140	2.7
Lead, Dissolved (µg/l)	140	Non-Detect
Nickel (µg/l)	75	1.8
Nickel, Dissolved (µg/l)	75	1.4
Selenium (µg/l)	300	Non-Detect
Selenium, Dissolved (µg/l)	300	Non-Detect
Silver (µg/l)	2.3	Non-Detect
Silver, Dissolved (µg/l)	2.3	Non-Detect
Zinc (µg/l)	95	14
Zinc, Dissolved (µg/l)	95	9
Mercury (µg/l)	2.1	Not Measured
Mercury, Dissolved (µg/l)	2.1	Not Measured
Acenaphthene (µg/l)	320	Not Measured
Benzo[a]pyrene (µg/l)	{1}	Not Measured
Fluoranthene (µg/l)	13	Not Measured
Naphthalene (µg/l)	780	Not Measured
DRO C9-C25	{1}	Not Measured

Bold indicates exceedance of the water quality standard.
{1} Monitor and report only.
{2} Temperature shall not vary more than one degree Celsius from ambient conditions.
{3} Salinity shall not vary more than ten percent from natural or seasonal changes considering hydrologic input and oceanographic factors.

Table 10. Building 132, Recycling Center Monitoring Results

Parameter (Units)	Water Quality Standard (Chronic, Salt Water)	Maximum Reported Value
Flow (MGD)	{1}	0.031
Biochemical Oxygen Demand (5-day) (mg/l)	{1}	17
Chemical Oxygen Demand (mg/l)	{1}	110
Total Suspended Solids (mg/l)	{1}	464
Total Phosphorus (mg/l)	**0.05**	**1.5**
Total Nitrogen (mg/l)	**0.35**	**2.1**
Nitrate+Nitrite Nitrogen (mg/l)	**0.02**	**0.20**
Oil and Grease (mg/l)	15	Non-Detect
pH (SU)	**7.6 – 8.6**	**7.12**
Turbidity (NTU)	**3**	**533**
Ammonia Nitrogen (mg/l)	**0.013**	**0.19**
Dissolved Oxygen (mg/l)	{2}	4.02
Oxygen Saturation (1%)	**$\geq$75%**	**59.2**
Temperature (°C)	{2}	27.04
Salinity (ppt)	{3}	Not Measured
Arsenic (µg/l)	69	5.5
Arsenic, Dissolved (µg/l)	69	1.4
Cadmium (µg/l)	43	1.3
Cadmium, Dissolved (µg/l)	43	Non-Detect
Chromium VI (µg/l)	1100	46
Chromium VI, Dissolved (µg/l)	1100	3.6
Copper (µg/l)	**2.9**	**120**
Copper, Dissolved (µg/l)	**2.9**	**18**
Lead (µg/l)	140	76
Lead, Dissolved (µg/l)	140	1.6
Nickel (µg/l)	75	66
Nickel, Dissolved (µg/l)	75	3.9
Selenium (µg/l)	300	1.1
Selenium, Dissolved (µg/l)	300	Non-Detect
Silver (µg/l)	2.3	Non-Detect
Silver, Dissolved (µg/l)	2.3	2.3
Zinc (µg/l)	95	410
Zinc, Dissolved (µg/l)	95	13
Mercury (µg/l)	2.1	Non-Detect
Mercury, Dissolved (µg/l)	2.1	Non-Detect
Benzene (µg/l)	1700	Non-Detect
Toluene (µg/l)	2100	Non-Detect
Ethylbenzene (µg/l)	140	Non-Detect
m-Xylene & p-Xylene (µg/l)	{1}	Non-Detect
o-Xylene	{1}	Non-Detect
Xylenes, Total	{1}	Non-Detect
GRO (C6-C12)	{1}	Non-Detect

Bold indicates exceedance of the water quality standard.
{1} Monitor and report only.
{2} Temperature shall not vary more than one degree Celsius from ambient conditions.
{3} Salinity shall not vary more than ten percent from natural or seasonal changes considering hydrologic input and oceanographic factors.

Table 11. Building 105, Maintenance Hangar Monitoring Results

Parameter (Units)	Water Quality Standard (Chronic, Salt Water)	Maximum Reported Value
Flow (MGD)	{1}	0.090
Biochemical Oxygen Demand (5-day) (mg/l)	{1}	2
Chemical Oxygen Demand (mg/l)	{1}	93
Total Suspended Solids (mg/l)	{1}	15
Total Phosphorus (mg/l)	**0.025**	**0.1**
Total Nitrogen (mg/l)	**0.2**	**0.79**
Nitrate+Nitrite Nitrogen (mg/l)	**0.02**	**0.29**
Oil and Grease (mg/l)	15	Non-Detect
pH (SU)	7.6 – 8.6	7.68
Turbidity (NTU)	**1.5**	**137**
Ammonia Nitrogen (mg/l)	**0.006**	**0.39**
Dissolved Oxygen (mg/l)	{1}	7.05
Oxygen Saturation (1%)	**≥75%**	**62.9**
Temperature (°C)	{2}	26
Salinity (ppt)	{3}	Not Measured
Arsenic (µg/l)	69	Non-Detect
Arsenic, Dissolved (µg/l)	69	Non-Detect
Cadmium (µg/l)	43	0.44
Cadmium, Dissolved (µg/l)	43	Non-Detect
Chromium VI (µg/l)	1100	9.4
Chromium VI, Dissolved (µg/l)	1100	0.57
Copper (µg/l)	**2.9**	**22**
Copper, Dissolved (µg/l)	**2.9**	**7.2**
Lead (µg/l)	140	13
Lead, Dissolved (µg/l)	140	Non-Detect
Nickel (µg/l)	75	12
Nickel, Dissolved (µg/l)	75	1.1
Selenium (µg/l)	300	Non-Detect
Selenium, Dissolved (µg/l)	300	Non-Detect
Silver (µg/l)	2.3	Non-Detect
Silver, Dissolved (µg/l)	2.3	Non-Detect
Zinc (µg/l)	95	120
Zinc, Dissolved (µg/l)	95	32
Mercury (µg/l)	2.1	Non-Detect
Mercury, Dissolved (µg/l)	2.1	Non-Detect
Benzene (µg/l)	1700	Non-Detect
Toluene (µg/l)	2100	Non-Detect
Ethylbenzene (µg/l)	140	Non-Detect
m-Xylene & p-Xylene (µg/l)	{1}	Non-Detect
o-Xylene	{1}	Non-Detect
Xylenes, Total	{1}	Non-Detect
GRO (C6-C12)	{1}	Non-Detect
DRO C9-C25	{1}	0.32

Bold indicates exceedance of the water quality standard.
{1} Monitor and report only.
{2} Temperature shall not vary more than one degree Celsius from ambient conditions.
{3} Salinity shall not vary more than ten percent from natural or seasonal changes considering hydrologic input and oceanographic factors.

Table 12. Building 375, Aircraft Mainenance Monitoring Results

Parameter (Units)	Water Quality Standard (Chronic, Salt Water)	Maximum Reported Value
Flow (MGD)	{1}	0.019
Biochemical Oxygen Demand (5-day) (mg/l)	{1}	6
Chemical Oxygen Demand (mg/l)	{1}	67
Total Suspended Solids (mg/l)	{1}	1340
Total Phosphorus (mg/l)	**0.05**	**0.1**
Total Nitrogen (mg/l)	**0.35**	**5.9**
Nitrate+Nitrite Nitrogen (mg/l)	**0.02**	**0.061**
Oil and Grease (mg/l)	15	Non-Detect
pH (SU)	**7.6 – 8.6**	**7.24**
Turbidity (NTU)	**1.5**	**1339**
Ammonia Nitrogen (mg/l)	0.006	Non-Detect
Dissolved Oxygen (mg/l)	{1}	5.89
Oxygen Saturation (1%)	**≥75%**	**66.6**
Temperature (°C)	{2}	22.16
Salinity (ppt)	{3}	Not Measured
Arsenic (µg/l)	69	1.7
Arsenic, Dissolved (µg/l)	69	Non-Detect
Cadmium (µg/l)	43	0.91
Cadmium, Dissolved (µg/l)	43	Non-Detect
Chromium VI (µg/l)	1100	59
Chromium VI, Dissolved (µg/l)	1100	8.1
Copper (µg/l)	**2.9**	**45**
Copper, Dissolved (µg/l)	**2.9**	**2.1**
Lead (µg/l)	140	23
Lead, Dissolved (µg/l)	140	Non-Detect
Nickel (µg/l)	75	52
Nickel, Dissolved (µg/l)	75	1.3
Selenium (µg/l)	300	1.8
Selenium, Dissolved (µg/l)	300	Non-Detect
Silver (µg/l)	2.3	Non-Detect
Silver, Dissolved (µg/l)	2.3	Non-Detect
Zinc (µg/l)	95	220
Zinc, Dissolved (µg/l)	95	9.1
Mercury (µg/l)	2.1	Non-Detect
Mercury, Dissolved (µg/l)	2.1	Non-Detect
Acenaphthene (µg/l)	320	Non-Detect
Benzo[a]pyrene (µg/l)	{1}	Non-Detect
Fluoranthene (µg/l)	13	Non-Detect
Naphthalene (µg/l)	780	Non-Detect
DRO C9-C25	{1}	0.26

Bold indicates exceedance of the water quality standard.
{1} Monitor and report only.
{2} Temperature shall not vary more than one degree Celsius from ambient conditions.
{3} Salinity shall not vary more than ten percent from natural or seasonal changes considering hydrologic input and oceanographic factors.

Table 13. Sanitary Landfill Monitoring Results

Parameter (Units)	Water Quality Standard (Chronic, Salt Water)	Maximum Reported Value
Flow (MGD)	{1}	0.0019
Biochemical Oxygen Demand (5-day) (mg/l)	{1}	6
Chemical Oxygen Demand (mg/l)	{1}	Non-Detect
Total Suspended Solids (mg/l)	{1}	155
Total Phosphorus (mg/l)	**0.06**	**0.87**
Total Nitrogen (mg/l)	**0.3**	**1.3**
Nitrate+Nitrite Nitrogen (mg/l)	0.015	Non-Detect
Oil and Grease (mg/l)	15	Non-Detect
pH (SU)	**7.6 – 8.6**	**7.5**
Turbidity (NTU)	**1.5**	**486**
Ammonia Nitrogen (mg/l)	**0.03**	**0.12**
Dissolved Oxygen (mg/l)	{1}	6.98
Oxygen Saturation (1%)	**≥75%**	**48.5**
Temperature (°C)	{2}	22.1
Salinity (ppt)	{3}	Not Measured
Arsenic (µg/l)	69	0.86
Arsenic, Dissolved (µg/l)	69	0.79
Cadmium (µg/l)	43	Non-Detect
Cadmium, Dissolved (µg/l)	43	Non-Detect
Chromium VI (µg/l)	1100	2.1
Chromium VI, Dissolved (µg/l)	1100	8.3
Copper (µg/l)	**2.9**	**7.1**
Copper, Dissolved (µg/l)	**2.9**	**6.4**
Iron (µg/l)	{1}	1600
Iron, Dissolved (µg/l)	{1}	1700
Lead (µg/l)	140	Non-Detect
Lead, Dissolved (µg/l)	140	Non-Detect
Nickel (µg/l)	75	12
Nickel, Dissolved (µg/l)	75	14
Selenium (µg/l)	300	Non-Detect
Selenium, Dissolved (µg/l)	300	Non-Detect
Silver (µg/l)	2.3	Non-Detect
Silver, Dissolved (µg/l)	2.3	Non-Detect
Zinc (µg/l)	95	13
Zinc, Dissolved (µg/l)	95	8.3
Mercury (µg/l)	2.1	Non-Detect
Mercury, Dissolved (µg/l)	2.1	Non-Detect

Bold indicates exceedance of the water quality standard.
{1} Monitor and report only.
{2} Temperature shall not vary more than one degree Celsius from ambient conditions.
{3} Salinity shall not vary more than ten percent from natural or seasonal changes considering hydrologic input and oceanographic factors.

Table 14. Wastewater Reclamation Facility Monitoring Results

Parameter (Units)	Water Quality Standard (Chronic, Salt Water)	Maximum Reported Value
Flow (MGD)	{1}	3.23
Biochemical Oxygen Demand (5-day) (mg/l)	{1}	5
Chemical Oxygen Demand (mg/l)	{1}	17
Total Suspended Solids (mg/l)	{1}	268
Total Phosphorus (mg/l)	**0.05**	**0.63**
Total Nitrogen (mg/l)	**0.35**	**1.8**
Nitrate+Nitrite Nitrogen (mg/l)	**0.02**	**0.12**
Oil and Grease (mg/l)	15	Non-Detect
pH (SU)	7.6 – 8.6	8.38
Turbidity (NTU)	**3**	**621**
Ammonia Nitrogen (mg/l)	**0.013**	**0.15**
Dissolved Oxygen (mg/l)	{1}	5.36
Oxygen Saturation (1%)	**≥75%**	**49.9**
Temperature (°C)	{2}	23.21
Salinity (ppt)	{3}	Not Measured
Arsenic (µg/l)	69	5
Arsenic, Dissolved (µg/l)	69	1.2
Cadmium (µg/l)	43	1
Cadmium, Dissolved (µg/l)	43	Non-Detect
Chromium VI (µg/l)	1100	31
Chromium VI, Dissolved (µg/l)	1100	0.96
Copper (µg/l)	**2.9**	**34**
Copper, Dissolved (µg/l)	**2.9**	**3.8**
Lead (µg/l)	140	30
Lead, Dissolved (µg/l)	140	0.71
Nickel (µg/l)	75	67
Nickel, Dissolved (µg/l)	75	3.1
Selenium (µg/l)	300	1.3
Selenium, Dissolved (µg/l)	300	0.53
Silver (µg/l)	**2.3**	**4.4**
Silver, Dissolved (µg/l)	2.3	Non-Detect
Zinc (µg/l)	95	310
Zinc, Dissolved (µg/l)	95	17
Mercury (µg/l)	2.1	0.35
Mercury, Dissolved (µg/l)	2.1	Non-Detect
Alkalinity as CaCO3 (mg/l)	{1}	94
Bicarbonate Alkalinity as CaCO3 (mg/l)	{1}	94
Carbonate Alkalinity as CaCO3 (mg/l)	{1}	Non-Detect
Hydroxide Alkalinity as CaCO3 (mg/l)	{1}	Non-Detect
Residual Chlorine (mg/L)	<0.10	Non-Detect

Bold indicates exceedance of the water quality standard.
{1} Monitor and report only.
{2} Temperature shall not vary more than one degree Celsius from ambient conditions.
{3} Salinity shall not vary more than ten percent from natural or seasonal changes considering hydrologic input and oceanographic factors.

7. Compliance History

MCBH Kaneohe Bay's compliance with the NPDES permit was audited January 11-12, 2012. The audit report found several elements of MCBH's program particularly notable:

a. There was strong programmatic support for the storm water program and the management structure effectively conveyed widespread implementation, thus contributing to a sustainable program.
    - Delegation of multiple roles for various stakeholders within the installation, each having responsibilities contributing to storm water pollution prevention,
    - Multiple levels of oversight within the MCBH organization contributing to an overall strong awareness among staff and personnel to implement storm water controls and practices as part of routine duties, and
    - Frequent and effective staff training regarding storm water pollution prevention.

b. MCBH's Integrated Natural Resource Management Plan ensures the inclusion of watershed protection and storm water pollution prevention efforts in both the planning and construction stages of development. Particularly notable examples of these efforts were the installation-wide erosion assessment and subsequent crater slope and roadside ditch improvement projects.

c. The overall organization and structure of the Facilities program was particularly notable as MCBH operated facilities displayed a high level of storm water pollutions prevention and hazardous materials and waste minimization efforts were apparent throughout the facilities operated by the military.

d. The inclusion of Low Impact Development (LID) and Leadership in Energy and Environmental Design (LEED) practices implemented on the Bachelor Enlisted Quarters project and other projects demonstrates MCBH's commitment to sustainable development.

e. There was strong awareness for storm water pollutions prevention on active construction projects throughout MCBH. The contractors working on the installation effectively demonstrated their knowledge of erosion and sediment control practices.

The audit also noted the following potential permit violations and program deficiencies:

a. The Storm Water Pollution Control Plan was out of date and needed to be updated to reflect current conditions and MCBH's current Storm Water Management Program. However, it was noted in the audit report that the Permittee was waiting for issuance of a reissued permit prior to commencement of the updates to ensure all applicable requirements are included in the SWPCP.

b. The maintenance of the separate storm sewer system is deficient due to inadequate resources (i.e., limitations of the availability of staff to conduct required maintenance).

c. Additional oversight may be needed by MCBH to ensure all Tenants and Facilities operating at MCBH are complying with the requirements of the Permit.

d. The illicit discharge prevention program should be improved to ensure illicit discharges are identified and eliminated, including washing activities conducted by various Tenants throughout the installation. Specifically, three active/potential illicit discharges were observed during the audit.

e. MCBH may need to provide additional oversight and inspection of construction activities performed by the public-private venture contractor, Forest City.

On April 15, 2016, MCBH submitted an updated Storm Water Management Program Plan which included separate SWPCPs for each industrial facility. MCBH has submitted annual monitoring plans, annual storm water reports, annual monitoring reports, and semi-annual industrial and commercial facility inspection reports in accordance with the current permit. MCBH has also submitted the following:

- Plan Review Checklist for Construction Storm Water Pollution Prevention Plans (SWPPPs),
- Construction Site Inspection procedures and checklists,
- Plan for Requiring Low Impact Development (LID) in Standards,
- Trash Reduction Plan,
- Enforcement Response Plan,
- Program Effectiveness Assessment Plan,
- Action Plan for Retrofitting Structural Best Management Practices,
- Action Plan to Address Erosion at Storm Drain System Outlets,
- Construction BMP Field Manual,
- Maintenance BMP Field Manual, and
- Storm Water Permanent BMP Field Manual.

MCBH also reported various exceedances and incidents during the permit term:

- September 29, 2016 – Exceedances reported for samples taken at the Recycling Center, Bldg 132 for pH, zinc, and copper. Temporary BMPS were immediately installed to reduce sediment accumulation.

- November 16, 2016 – Exceedances reported for samples taken at the Aircraft Fuel Islands, Bldgs 1170 & 1171 for copper, zinc, turbidity, and pH. Exceedances reported for samples taken at the Aircraft Maintenance facility, Bldg 375 for copper, ammonia, nitirate+nitrite nitrogen, phosphorus, and turbidity. Exceedances reported for samples taken at the Maintenance Hangar VPU2 VR-52 (DYNCORP), Bldg 105 for copper, zinc, turbidity, and pH.

- February 6, 2017 – Exceedances reported for samples taken at the Lab/Boat Shop, Bldg 1388 for copper, pH, turbidity, total nitrogen, ammonia, nitirate+nitrite nitrogen, and phosphorus. Exceedances reported for samples taken at the Vehicle Maintenance Shop, Bldg 351 for copper, pH, turbidity, total nitrogen, nitrate+nitrite nitrogen, phosphorus alone with a visible sheen. Exceedances reported for samples taken at the Recycling Center, Bldg 132 for copper and pH.

- February 15, 2017 – Exceedances reported for samples taken at the Fuel Delivery Branch, Bldg 6182 for copper, pH, turbidity, total nitrogen, nitrate+nitrite nitrogen, and phosphorus.

- April 14, 2017 – Exceedances reported for samples taken at the Aircraft Fuel Islands, Bldgs 1170 & 1171 for copper and pH.

- August 29, 2017 – Exceedances reported for samples taken at the Aircraft Ready Fuel Storage, Bldg 6479 for copper, zinc, nickel, nitrate+nitrite nitrogen, phosphorus, and total nitrogen.

- April 2018 – An unconfirmed illicit discharge (plume of sediment in the Marina cove) occurred during a period of dry weather. The discharge ceased as the inspection team moved upstream of the outfall. Although the source could not be confirmed, the suspected construction site contractor was notified regarding dewatering activities at their site.

- May 2018 – MCBH Environmental Compliance and Protection Department (LFE) received a report than an above ground construction dewatering basin had collapsed. Because the basin was located near a wastewater lift station, there was concern that the spill contained sewage. LFE contacted the construction site personnel and verified that no sewage was involved.

- July 2018 – LFE and MCHB Facilities Department (LF) were notified about a sewage leak in the Base housing area. This was associated with a clogged line upstream of a Lift Station. The minor amount was cleaned up onsite and did not reach the Mokapu Central Drainage Channel (MCDC).

- July 2018 – LFE personnel observed a minor sewage spill near the MCBH Chapel. The spill was contained in a grassy area which was decontaminated (via chlorination) by Water Utility personnel.

- October 12, 2018 – A sewage spill occurred at a manhole in the MCBH industrial area. Water Utilities responded by temporarily bypassing the clogged sewer line and pumping the wastewater downstream. The spillage that was confined to land was disinfected and monitored by LFE personnel on scene. No sewage reached inlets or MS4 channels.

- In FY 2018, there was one significant water main break, involving an eight (8) inch main. No sediment entered the MS4 from this incident. In September, a service line break was observed by LFE in the housing area. Although no impact to the MS4 from the break was observed, LFE personnel directed repair personnel to employ BMPs for storm inlet protection.

- During FY 2018, there were three (3) fuel related spill incidents which entailed quantities of 10, 35, and 800 gallons, respectively. All three were reported to the HDOH Hazard Evaluation and Emergency Response (HEER) Office. There were also ten (10) spills classified as minor which were internally reported and recorded. The quantities involved ranged from 0 to 3 gallons. With the exception of the 800 gallon diesel spill (which did reach Mokapu Central Drainage Channel and Nuupia Ponds), all spills were immediately contained using absorbent booms, adsorbent pillows, adsorbant pads and adsorbent clay. The oil spills were cleaned up prior to migration of any product offsite. Details of all spills are maintained with MCBH LFE.

- March 25, 2019 – Exceedances reported for samples taken at the Recycling Center, Bldg 132 for ammonia, phosphorus, copper, zinc, total nitrogen, and turbidity.

- April 4, 2019 – Exceedances reported for samples taken at Maintenance Hangar VPU2 VR-52 (DYNCORP), Bldg 105 for phosphorus, copper, zinc, and turbidity.

- September 4, 2019 – Exceedances reported for samples taken at the Liquid Oxygen/Nitrogen facility, Building 6025 for copper, ammonia, nitrate+nitrite nitrogen, phosphorus, total nitrogen, and turbidity at the Liquid Oxygen/Nitrogen.

- October 11, 2019 – Storm water runoff containing fine sediment discharged into MCBH North Beach Cove after an intense rainfall event occurred at the Ulupau Hunt Ohana Military Housing construction site HI R10F566). Post incident investigation observed some BMPs overwhelmed by fast elevated water depth. Corrective actions included reinforcement of existing BMPs, construction of another rock check dam upgradient of existing one to further reduce runoff velocity and allow sediment tapping, and placement of filter socks on top of the soil berm.

- January 6, 2020 – Exceedances reported for samples taken at MCBH sanitary landfill (002-Y) for pH, turbidity, copper, mercury, nickel, ammonia, nitrate+nitrite nitrogen, phosphorus, and total nitrogen.

- February 24, 2020 – Fire suppression water main break on First Street carrying sediments into the storm drain system and eventually reaching Kaneohe Bay. Water main was shut off and dewatering tanks employed. Subsequent investigation determined water main break was caused by pipeline corrosion.

- July 10, 2020 – Exceedances reported for samples taken at the Motor Vehicle Maintenance facility, Building 373 for ammonia, nitrate+nitrite nitrogen, phosphorus, copper, and turbidity.

A recent audit (a.k.a. FY20 EPA Audit) of MCBH focusing on compliance with the Illicit Discharge Detection and Elimination (IDDE), Construction Site Runoff Control, and Post-Construction Storm Water Management in New Development and Redevelopment programs required by the MS4 NPDES permit was conducted on September 17 – October 9, 2020 by the U.S. Environmental Protection Agency (EPA) and the Hawaii Department of Health Clean Water Branch (DOH-CWB). The audit report found several elements of MCBH's program particularly notable:

- MCBH appears to have appropriate oversight of construction projects within the Permittee's inventory. Inspection findings appear to be well documented and communicated via a standardized checklist. (*Parts D.1.d.(4), D.1.d.(6), and D.1.d.(7)*)

- MCBH maintains an effective hotline and web forum that allow individuals on base to report illicit discharge tips and/or complaints. (*Part D.1.c.(4)*)

- Bi-monthly "Environmental Standard Operating Procedure" training to individuals who live and/or work on base (people not involved in the implementation of MCBH environmental programs) is a highlight of the Permittees storm water training programs. (*Parts D.1.c.(8), D.1.d.(8), and D.1.d.(9)*)

EPA identified several deficiencies during the audit, most notably:

- Prior to groundbreaking for construction projects, MCBH has a process to approve connection to the MS4 system. However, no additional "connection permit" is issued to the operator upon completion of the construction project. This scenario could result in an operator being unaware of on-site storm water discharge pathways, including whether a specific drain is part of the MS4 or a nearby post-construction BMP. (*Part D.1.c.(1)*)

- MCBH does not have an Outfall Field Screening plan. The Permittee was not able to demonstrate that they have designated priority areas for screening, specified the frequency of outfall inspections, or identified procedures to be used if a discharge is observed. (*Part D.1.c.(2)*)

- MCBH reported 168 effluent violations and 370 failures to submit parameter specific data during the Permit term. (*Part D.1.c.(2)*)

- Tracking and follow-up to reported illicit discharges is not centrally managed by an Asset Management System. (*Part D.1.c.(3)*)

- Illicit Discharge Detection and Elimination training does not sufficiently provide relevant information to staff and base personnel. (*Part D.1.c.(8)*)

- The BMP field guides required by the Permit have either not been developed or there is conflicting information regarding when a manual is applied. None of the BMP field manuals, submitted prior to the interviews, were designed specifically for the Marine Corps Base. (*Parts D.1.d.(1) and D.1.d.(2)*)

- MCBH design criteria for post-construction BMPs is not inclusive of all construction projects that have the potential for impact to water quality. (*Parts D.1.e.(1) and D.1.e.(2)*)

- Post-construction BMPs in existence are not being properly inspected or maintained. (*Part D.1.e.(3)*)

MCBH's response to the FY20 EPA Audit is included as an attachment to this rationale.

8. Planned Changes

No planned changes have been declared in the renewal application. Per the 2018 Annual Storm Water Report for MCBH, it is anticipated that implementation of temporary erosion control measures at high priority sites will be performed and that design appropriation of funding to put permanent erosion control improvements will take place at prioritized erosion-prone areas.

C. Applicable Plans, Policies, Regulations, and Guidance

1. Hawaii Administrative Rules Chapter 11-54

On November 12, 1982, the Hawaii Administrative Rules, Title 11, Department of Health, Chapter 54 became effective (hereinafter HAR Chapter 11-54). HAR Chapter 11-54 was amended and compiled on October 6, 1984; April 14, 1988; January 18, 1990; October 29, 1992; April 17, 2000; October 2, 2004; June 15, 2009; October 21, 2012; December 6, 2013; and the most recent amendment was on November 15, 2014. HAR Chapter 11-54 establishes beneficial uses and classifications of State waters, the State antidegradation policy, zones of mixing standards, and water quality criteria that are applicable to Kaneohe Bay; Nuupia, Halekou, and Kaluapuhi Ponds; Kailua Bay; and Mokapu Drainage Channel.

Requirements of the proposed permit implement HAR Chapter 11-54.

2. Hawaii Administrative Rules Chapter 11-55

On November 27, 1981 Hawaii Administrative Rules, Title 11, Department of Health, Chapter 55 became effective (hereinafter HAR Chapter 11-55). HAR Chapter 11-55 was amended and compiled on October 29, 1992, September 22, 1997, January 6, 2001, November 7, 2002, August 1, 2005, October 22, 2007, June 15, 2009, October 21, 2012, December 6, 2013, November 15, 2014, July 13, 2018, with the most recent amendment was on February 9, 2019. HAR Chapter 11-55, establishes standard permit conditions and requirements for NPDES permits issued in Hawaii.

Requirements of the proposed permit implement HAR Chapter 11-55.

3. Storm Water Discharges Associated with Industrial Activity

The storm water discharges from this facility are subject to the *Storm Water Discharges Associated with Industrial Activity* NPDES requirements under 40 CFR Section 122.26(b)(14)(v), (vi), (viii), and (ix).

40 CFR 122.26(b)(14)(v) considers landfills, land application sites, and open dumps that receive or have received any industrial wastes (waste that is received from any of the facilities described under this subsection) including those that are subject to regulation under subtitle D of RCRA as engaging in “industrial activity” for the purposes of 40 CFR 122.26(b)(14).

40 CFR 122.26(b)(14)(vi) considers facilities involved in the recycling of materials, including metal scrapyards, battery reclaimers, salvage yards, and automobile junkyards, including but limited to those classified as Standard Industrial Classification (SIC) 5015 and 5093 as engaging in “industrial activity”.

40 CFR 122.26(b)(14)(viii) considers transportation facilities classified as SIC 40, 41, 42 (except 4221-25), 43, 44, 45, and 5171 which have vehicle maintenance shops, equipment cleaning operations, or airport deicing operations as engaging in “industrial activity”. Only those portions of the facility that are either involved in vehicle maintenance (including vehicle rehabilitation, mechanical repairs, painting, fueling, and lubrication), equipment cleaning operations, airport deicing operations, or which are otherwise identified under paragraphs (b)(14) (i)-(vii) or (ix)-(xi) of 40 CFR 122.26 are associated with industrial activity.

40 CFR 122.25(b)(14)(ix) considers treatment works treating domestic sewage or any other sewage sludge or wastewater treatment device or system, used in the storage treatment, recycling, and reclamation of municipal or domestic sewage, including land dedicated to the disposal of sewage sludge that are located within the confines of the facility, with a design flow of 1.0 mgd or more, or required to have an approved pretreatment program under 40 CFR part 403 as engaging in “industrial activity”. Not included are farm lands, domestic gardens or lands used for sludge management where sludge is beneficially reused and which are not physically located within the confines of the facility, or areas that are in compliance with section 405 of the CWB.

The Storm Water Discharges Associated with Industrial Activity NPDES requirements follow the objectives of the EPA’s 2015 MSGP by establishing requirements based on a facility’s industrial sector. The industrial storm water requirements include general requirements applicable to all facilities, additional sector-specific control measures and monitoring requirements, and additional monitoring for storm water discharges into impaired water bodies, as listed in the 2018 303(d) List of Impaired Water Bodies in the State of Hawaii.

The draft permit includes the general requirements for all facilities and sector-specific requirements. The sector-specific requirements for Sector L – Landfills, Land Application Sites, and Open Dumps; Sector N – Scrap Recycling and Waste Recycling Facilities; Sector P – Land Transportation and Warehousing; Sector Q – Water Transportation; and Sector S – Air Transportation; and Sector T – Treatment Works (as defined in Appendix 1 of the proposed permit) include sector-specific effluent limitations and benchmark monitoring. Additional technology-based effluent limits in the form of good housekeeping measures and additional Storm Water Pollution Prevention Plan (SWPPP) requirements are also included.

Industrial storm water requirements are incorporated in Appendix 1 of the draft permit.

4. State Toxics Control Program

NPDES Regulations at 40 CFR 122.44(d) require permits to include water quality-based effluent limitations (WQBELs) for pollutants, including toxicity, that are or may be discharged at levels that cause, have reasonable potential to cause, or contribute to an exceedance of a Water Quality Standard (WQS). The *State Toxics Control Program: Derivation of Water Quality-Based Discharge Toxicity Limits for Biomonitoring and Specific Pollutants* (hereinafter, STCP) was finalized in April 1989, and provides guidance for the development of water quality-based toxicity control in NPDES permits by developing the procedures for translating WQS in HAR Chapter 11-54 into enforceable NPDES permit limits. The STCP identifies procedures for calculating permit limits for specific toxic pollutants for the protection of aquatic life and human health.

5. Hawaii Implementation Plan for Toxic Pollutants and Nutrients

The Hawaii Implementation Plan for Toxics Pollutants and Nutrients in National Pollutant Discharge Elimination System Permit Process (HIP) is a draft DOH document that establishes procedures for DOH staff in the implementation of the water quality standards and procedures found in HAR Chapters 11-54 and 11-55 related to the NPDES permit process.

D. Proposed Determinations

The CWA specifies that a revised permit may not include effluent limitations that are less stringent than the previous permit unless the less stringent limitations are justified based on exceptions to the anti-backsliding provisions contained in CWA Sections 402(o) or 303(d)(4), or, where applicable, 40 CFR 122.44(l). In general, the draft permit contains same goals as the 2014 permit with the exception of storm water associated with industrial activities. Industrial storm water permit conditions were revised from the previous version to allow discharges to all classifications of State waters and implement Benchmark monitoring (if applicable), control measures, inspections, corrective actions, etc. in lieu of previously required compliance with numeric effluent limitations. Most of the industrial storm water discharge requirements are the same as in the EPA's 2015 MSGP, however, only sector specific requirements for industrial activity applicable to MCBH's industrial facilities were retained in this permit. Satisfaction of anti-backsliding requirements are discussed in Part E of this rationale.

1. General Requirements

The general requirements, specified in Part A., set the framework for Permittee compliance with the draft permit. The Permittee shall comply with its existing Storm Water Management Program (SWMP) Plan until submittal of the revised plan. The purpose of this requirement is to clarify DOH's expectations during which the SWMP Plan is being revised per the requirement of the draft permit and to prevent any gaps in time where an SWMP Plan is not being implemented.

Part A also contains other basic requirements, including requiring a copy of the SWMP Plan be retained at a location designated in its SWMP and the inclusion of the certification statement with all submittals. This part further requires that the Permittee allows the public an opportunity to review and comment on the different plans required by the SWMP and clarifies the DOH's expectations for the Permittee to address all of DOH's comments on required submittals.

2. Discharge Limitations

Discharge Limitations listed in Part B of the draft permit specify that the Permittee shall effectively prohibit non-storm water discharges through its MS4 into State waters (per Section 402(p) of the Act). "Effectively prohibit" means that a non-storm water discharge shall be specifically regulated by an NPDES permit, or that the discharge is not considered a waste, or that the discharge does not contain constituents of concern which would necessitate an NPDES permit. NPDES permitted discharges and certain non-storm water discharges identified in Part B.2. of this permit may be allowed into the MS4 provided that such discharges will not contain pollutants in amounts that will result in a violation of an applicable water quality standard.

As required by Section 402(p) of the Act and 40 CFR 122.26(d)(2)(iv), the discharge of pollutants must be reduced to the "maximum extent practicable (MEP)." The activities described in the SWMP shall meet this MEP control standard.

The discharge of pollutants from the Permittee's industrial facilities shall be consistent with the Best Available Technology (BAT) / Best Conventional Pollutant Control Technology (BCT) discharge requirement of the Act.

3. Receiving Water Limitations

Receiving Water Limitations listed in Part C of the permit are restated from HAR Section 11-54-4(a). In accordance with HAR Section 11-54-3(a), existing storm water discharges into State Waters are allowed provided such discharges meet the basic water quality criteria listed in HAR Section 11-54-4 (refer to Part C.1. of the permit). The discharge shall not cause or contribute to a violation of any of the applicable beneficial uses or water quality objectives contained in HAR Chapter 11-54, titled "Water Quality Standards." This part sets a minimum frequency for visual inspections of State waters to provide guidance to the Permittee for development of their inspection program, and also to create an enforceable requirement.

4. Storm Water Management Program Plan

Storm Water Management Program (SWMP) Plan listed in Part D of the permit contains six (6) minimum control measures as listed below.

a. Targeted Groups Education and Outreach.

b. Public Involvement/Participation.

c. Illicit Discharge Detection and Elimination.

d. Construction Site Runoff Control.

   Requirements within this section apply to all public construction projects and private projects which discharge storm water to the Permittee's MS4.

e. Post-Construction Storm Water Management in New Development and Redevelopment.

   This section includes Low Impact Development (LID) requirements for addressing post-construction BMPs. The Permittee is required to revise its standards for addressing post-construction BMPs to LID requirements to the Maximum Extent Practicable (MEP). The performance to the MEP includes addressing projects not limited to the storm water requirements under the Energy Independence and Security Act (EISA) of 2007 Section 438 or the Unified Facilities Criteria (UFC) 3-210-10 but to all projects that have the potential to impact water quality to the extent practical.

   Although the UFC 3-210-10 LID criteria is applicable to projects with footprint greater than 5,000 gross square feet, revision to the post-construction BMPs standards should consider all projects that have the potential to impact water quality. UFC 3-210-10 Part 1.4 includes the following statement for projects whose footprint is less than 5,000 square feet:

   > "For projects in the United States, United States Territories, and Possessions of the United States that do not meet the applicability requirements above, LID techniques apply to the extent practical."

   UFC 3-210-10 Part 3-6 includes the following statement that complements the States requirement to consider LID techniques in post-construction BMPs storm water requirements:

   > "EISA Section 438 requirements are independent of stormwater requirements under the Clean Water Act and should not be included in permits for stormwater unless a state (or EPA) has promulgated regulations for certain EISA Section 438 requirements (i.e., temperature or heat criteria) that are applicable to all regulated entities under its Clean Water Act authority."

f. Pollution Prevention/Good Housekeeping.

Under this section, the draft permit requires the Permittee to develop and submit to DOH a trash control plan with an implementation schedule to reduce trash discharges from the MS4 to zero. Numerous waterbodies on Oahu are currently listed on the State's CWA section 303(d) as impaired due to trash, and the proposed requirement is intended to address this problem. Similar requirements have recently been adopted for trash control in the City and County of Honolulu's MS4 Permit, State DOT's MS4 Permit, and in the State of California. The DOH recommends that the Permittee review these requirements in developing a practicable plan and implementation schedule.

Also, under this section, the draft permit requires the implementation of a maintenance plan for vegetated portions of the drainage system used for erosion and sediment control and LID features and the implementation of an Action Plan to address erosion at outlets.

g. Industrial and Commercial Activities Discharge Management Program

Under this section, the draft permit requires implementation of BMPs for industrial and commercial facilities through the issuance of a permit or written equivalent approval process for drainage connections and discharge of surface storm water runoff into the MS4. This section also specifies inspection frequencies for industrial and commercial facilities.

The Permittee is also required to annually update an inventory of industrial and commercial facilities and activities. This section also specifies inspection frequencies for industrial and commercial facilities. Training must be provided to staff on how to conduct industrial and commercial inspections.

The Permittee is required to review and approve Storm Water Pollution Prevention Plans (formerly known as Storm Water Pollution Control Plans) for industrial activities, similar to the Plan review and approval process for construction activities

The Permittee must also establish and implement enforcement policies for facilities which have failed to comply with its requirement and rules for penalties.

h. Modifications

This section requires the Permittee to revise the SWMP, as necessary, if any discharge limitation or water quality standard is exceeded. All modifications to this permit shall be made pursuant to any applicable requirements in the DOH's Standard NPDES Permit Conditions.

5. Industrial Facilities

The storm water runoff from industrial facilities within the installations covered by this individual NPDES MS4 permit are subject to the Storm Water Discharges Associated with Industrial Activities NPDES requirements under 40 CFR Part 122.26(b)(14)(v), (vi), (viii), and (ix). The storm water discharge from the facility can be covered under DOH's NPDES general permit for storm water associated with industrial activities, however, as in the current permit, it is included in this individual MS4 permit in Part E. MCBH contains eighteen (18) industrial facilities and seven (7) commercial facilities.

Industrial facilities whose industrial materials and activities are protected by storm resistant shelter to prevent exposure to rain, snow, snowmelt, and/or runoff may be eligible for a conditional "no exposure" exclusion (CNEE). MCBH has identified sixteen (16) industrial facilities under a No Exposure Certification (NOE) and are listed in Part B.2. of this rationale. To maintain coverage under the CNEE, these industrial facilities must comply with the requirements under 40 CFR 122.26(g) and HAR 11-55.

The 2014 permit includes storm water runoff discharge conditions and requirements for storm water associated with industrial activity based on Appendix B of HAR Chapter 11-55. The Permittee is also required to prepare and implement a SWPCP. However, the industrial storm water runoff discharge requirements in this draft permit follow EPA's Multi-Sector General Permit (MSGP) approach and the permit conditions are found in Appendix 1. In the draft permit, industrial storm water permit conditions were revised from the 2014 permit to implement Benchmark monitoring (if applicable), control measures, inspections, corrective actions, etc. in lieu of previously required compliance with numeric effluent limitations. Most of the industrial storm water discharge requirements are the same as in the EPA's 2015 MSGP, however, only sector specific requirements for industrial activity applicable to MCBH's industrial facilities were retained in this permit. The Permittee is also required to prepare and implement a Storm Water Pollution Prevention Plan (SWPPP), formerly known as the Storm Water Pollution Control Plan (SWPCP).

Because operations on military bases are dynamic, this permit requires the Permittee to develop a priority-based monitoring schedule for each type of industrial facility with the greatest potential for pollutant discharge, and a rotational monitoring schedule for other industrial facilities (at least two facilities monitored per year per type). For facilities to be of the same type, the activities and pollutant sources must be the same.

Priority based monitoring provides the greatest certainty that representative samples of the discharges most likely to impact water quality are collected and assessed for compliance with applicable effluent limitations and water quality standards.

6. Monitoring Requirements

40 CFR 122.41(j) specify monitoring requirements applicable to all NPDES permits. HAR Section 11-55-28 establishes monitoring requirements applicable to NPDES permits within the State of Hawaii. 40 CFR 122.48 and HAR Section 11-55-28 require that all NPDES permits specify requirements for recording and reporting monitoring results.

a. The draft permit includes the following monitoring program objectives:

Part F.1.a.(1) Assess compliance with this permit (including TMDL Implementation & Management (I&M) Plans and demonstrating consistency with WLAs, if required);

Part F.1.a.(2) Measure the effectiveness of the Permittee's SWMP;

Part F.1.a.(3) Assess the overall health based on the chemical, physical, and biological impacts to receiving waters resulting from storm water discharges and an evaluation of the long term trends;

Part F.1.a.(4) Characterize storm water discharges;

Part F.1.a.(5) Identify sources of specific pollutants;

Part F.1.a.(6) Detect and eliminate illicit discharges and illegal connections to the MS4; and

Part F.1.a.(7) Assess the water quality issues in watershed resulting from storm water discharges to receiving waters.

Annual Monitoring Plan is due on June 1st. Part F.1.b. lists the Plan’s minimum requirements.

b. Industrial Facilities

The monitoring requirements for storm water have been revised in accordance with requirements in Appendix 1 of the draft permit.

c. Total Maximum Daily Load (TMDL)

   Implement any additional measures that are necessary to be consistent with the assumptions and requirements of the applicable TMDL adopted by DOH and approved by the EPA. Storm water discharges from MCBH's MS4 enters Kaneohe Bay; Nuupia, Halekou, and Kaluapuhi Ponds; Kailua Bay; and Mokapu Central Drainage Channel from various outfalls. At present, no TMDLs have been established for these waterbodies.

d. The permit includes a re-opener provision in Part F.4. to address TMDLs adopted by DOH and approved by the EPA, while the Permit is in effect.

7. Reporting Requirements

a. Annual Report

   Most of the information specified in the end-of-year report is required by 40 CFR 122.42(c). The Annual Report is due on January 30th.

b. Annual Monitoring Report

   The Annual Monitoring Report is due on January 30th and shall be included in the Annual Report.

   Discharge Monitoring Reports (DMRs) for Municipal Industrial Facilities shall be included in the Annual Monitoring Report. A DMR must be submitted for the facility which is scheduled to be monitored even if sampling was not conducted. An explanation as to why sampling was not conducted shall be explained with the submittal.

8. Summary of Deadlines

The Permit includes a Summary of Deadlines in Part H of the permit.

E. Anti-Backsliding

The CWA specifies that a renewed permit may not include effluent limitations that are less stringent than the current permit unless the less stringent limitations are justified based on exceptions to the anti-backsliding provisions contained in CWA 402(o) or 303(d)(4), or, where applicable under 40 CFR 122.44(l). Effluent limitations and requirements for all pollutants contained in this draft permit are retained from those contained in the current permit except for storm water associated with industrial activities. In accordance with HAR 11-55-02(c), 11-55-19(a)(4)(B), and 40 CFR 123.25(a), the proposed industrial storm water revisions are consistent with the EPA's 2015 MSGP, which the DOH Clean Water Branch also believes is appropriate for Hawaii. Permit conditions specific to industrial storm water discharges are in Appendix 1 of the draft permit.

Most of the industrial storm water discharge requirements are the same as in the EPA's 2015 MSGP, however, only sector specific requirements for industrial activity applicable to MCBH's industrial facilities were retained in this permit. Industrial storm water permit conditions were revised from the previous version to allow discharges to all classifications of State waters and implement Benchmark monitoring (if applicable), control measures, inspections, corrective actions, etc. in lieu of previously required compliance with numeric effluent limitations. If a sector has both Benchmark and Effluent Limitation Guidelines (ELGs), both shall apply, however only the exceedance of the ELG would be violation of the permit.

For an exceedance of a Benchmark, a violation would occur upon the failure to implement corrective actions, which includes escalating levels of corrective actions. These escalating requirements provide additional incentive for Permittees to be more attentive, thoughtful, and complete in their initial responses/actions to reduce storm water pollutants from discharging and entering receiving water bodies and degrading water quality. The proposed revision aims to require Permittees to implement corrective actions by making the failure to implement corrective actions a violation of the permit instead of numeric effluent limitations, unless a sector specific ELG has already been promulgated. For the development of ELGs, please refer to the Federal Notice and Fact Sheets for EPA's previous versions at the website https://www.epa.gov/npdes/previous-versions-epas-msgp-documents.

In the 2014 permit, exceedance of a numeric effluent limitation was a violation of the permit. However, the permit wasn't clear if a failure to implement corrective actions to address the exceedance was also a violation (which made enforcement difficult). The DOH believes that the implementation of corrective actions to be more important than the exceedance and therefore has adopted the EPA's approach (i.e., EPA's 2015 MSGP). The intent is to place greater emphasis on taking corrective actions to minimize further pollutant discharges than on exceeding a numeric limit. Since the implementation of corrective actions serves as the mechanism for the reduction of the pollutant, the violation occurs upon the failure to take corrective actions and not on the exceedance.

Placing the violation on the failure to take corrective action seeks to address the contentious topic of whether it is unreasonable to assign numeric water quality-based effluent limits for industrial stormwater discharge based on the State's Water Quality Standards. The DOH-CWB has held multiple stakeholder meetings with Permittees, including Federal, State, and County government agencies, who have all expressed concerns about the practicality of numeric WQBELs for industrial storm water dischargers. After considering the concerns of the Permittees and evaluating the previous permit, the DOH-CWB has determined that it is not feasible currently to establish numeric WQBELs for industrial stormwater dischargers; BMPs shall be utilized when numeric effluent limits are infeasible per 40 CFR 122.44(k); and the benchmark monitoring and BMPs in the proposed renewal permit are appropriate WQBELs. Below are the reasons why the DOH-CWB believes the numeric WQBELs from the previous permit are not practicable currently:

- Storm events are variable in nature and the pollutants in the stormwater that may or may not originate from the discharger.

- It is extremely difficult, if not impossible to objectively determine if a facility is in compliance with its permit requirements. The DOH-CWB acknowledges that requiring industrial storm water Permittees to comply with numeric WQBELs is viewed as an easier way to measure compliance, but it is not as simple as selecting a number directly from our WQS due to the unique nature of storm events and stormwater discharges. Any numeric limit that is placed in an industrial stormwater permit must take into consideration the episodic nature of storm events, be truly representative of stormwater discharges, and reflect the fact that pollutants in the stormwater discharges may not originate from the Permittee, who may not have a means to control them.

- There are pollutants in stormwater discharges that did not originate from the facility (run on, atmospheric deposition, etc.) or the discharger may not have the means to control the pollutant, and therefore, must be given special consideration.

  Monitoring for enforcement of numeric effluent limits is challenging. While spot checks can be made at some of the outfalls, there is a wide variation in stormwater quality form place to place, facility to facility, and storm to storm. Geographical location and land use are important factors affecting stormwater quality for most constituents. Since the storm-to-storm variation at any outfall can be high, it is unreasonable to expect all events to be below a numeric value. Also, there could be a number of storm events each year that are large in volume and/or intensity that can exceed the design capacity volume or flow rates of most BMPs. Assessing compliance during these larger events represents another challenge to DOH and the discharger.

- There are no protocols that enable an engineer to design with certainty a BMP that will produce a desired outflow concentration for a constituent of concern. Even if we use % removal, it will vary directly with the inflow concentration. It will take substantial research to develop design criteria for the removal of pollutants with confidence intervals that enable DOH to make reliable estimates of the median and variance of the effluent concentrations to be expected from the various types of BMPs. Until this is done, it is impossible to assign legally enforceable numerical effluent limitation to any particular BMP.

- Many facilities rely on non-structural control measures, making it impossible to set numeric effluent limits because little is known about the quantity and quality performance of non-structural controls.

- DOH, in determining the public interest for permitting, considers the optimum balance between economic development and environmental quality regarding Hawaii businesses subject to industrial stormwater permitting.

The State has adopted its own WQS in HAR Chapter 11-54, Water Quality Standards. The proposed industrial storm water permit conditions in Appendix 1 include water quality-based effluent limits (WQBELs) to ensure the authorized discharges will be controlled as necessary to meet applicable water quality standards. The provisions of Part 2.2 constitute the WQBELs of the proposed Appendix 1 and supplement the permit's technology-based effluent limits in Part 2.1.

The WQBELS ensure that sector-authorized discharges will be controlled as necessary to meet applicable water quality standards, pursuant to CWA section 301(b)(1)(C) and 40 CFR 122.44(d)(1). The provisions of Part 2.2 constitute the WQBELs and supplement the permit's technology-based effluent limits in Part 2.1. The following is a list of the permits' WQBEL requirements:

- Control discharges as necessary to meet applicable water quality standards (i.e., discharges must not cause or contribute to a violation of applicable water quality standards) (See Part 2.2.1);

- Implement any additional measures that are necessary to be consistent with the assumptions and requirements of the applicable Total Maximum Daily Load (TMDL) and its wasteload allocation (See Part 2.2.2.1). For discharges to impaired waters without a TMDL, conduct impaired waters monitoring (See Part 2.2.2.2). Additionally, new discharges to impaired waters must implement any measures required per the Part 1.1.4.8 eligibility requirements;

Prior to or after initial discharge authorization, DOH may require operators to implement additional measures on a facility-specific basis, or require permittees to obtain coverage under an individual permit, if information in the permit renewal application, required reports, or other sources indicates that, after complying with the technology-based limits in Part 2.1 and the WQBELs in Part 2.2, discharges will not be controlled as necessary to meet water quality standards.

Facilities that achieve the permit's technology-based limits through the careful selection, design, installation, and implementation of effective control measures are likely to be controlling their stormwater discharges to a degree that would make additional water quality-based measures unnecessary. However, to ensure that this is so, the permit contains additional provisions in Part 2.2, which, along with the BAT/BPT/BCT limits in the permit, are as stringent as necessary to achieve water quality standards.

The WQBELs included in the permit are non-numeric. DOH, consistent with the EPA's 2015 MSGP, relies on a narrative limit to ensure discharges are controlled as necessary to meet applicable water quality standards, and to ensure that additional measures are employed where necessary to meet the narrative WQBELs, or to be consistent with the assumptions and requirements of an applicable TMDL and its WLAs. This is a reasonable approach for the proposed renewal permit, based on the following considerations:

- Receiving waterbody information is not available for individual dischargers. Receiving water information is necessary for DOH to determine what, if any, special protections apply to that water.

- The EPA, along with the DOH, realizes there are greater cost burdens associated with analytical monitoring in comparison to visual examinations.

- If the operator is unwilling or unable to implement the required control measures, the facility is not eligible for coverage under this proposed renewal permit and must instead apply for an individual permit.

The proposed renewal permit maintains its regulatory authority under the Clean Water Act even as it shifts from numeric to narrative based water quality requirements. Importantly, the permittee shall not cause or contribute to a violation of the basic water quality criteria specified in Sections 11-54-4(a) and (b), refer to HAR 11-55, Appendix A, Department of Health Standard General Permit Conditions.

DOH has removed requirements for monitoring the parameters listed in the current permit Part F.2., unless a parameter has been identified as having a benchmark or effluent limitation in Appendix 1 of the permit. In its place, the proposed permit has added detailed language to better describe the requirements necessary to meet the DOH expectations and thereby comply with the water quality-based permit conditions. Specifically, the language has been expanded within the Control Measures (Part 2), Inspections (Part 3), and Corrective Action (Part 4) parts of the proposed renewal permit Appendix 1 and as a result, expects that compliance with the conditions in this permit will control discharges as necessary to meet applicable water quality standards in all receiving water classifications.

In addition, the proposed Appendix 1 follows the EPA's 2015 MSGP in covering certain allowable sources of non-stormwater which have been both the EPA's and DOH's long standing practice of allowing those discharges from Municipal Separate Storm Sewer Systems (MS4s).

Currently in the 2014 permit Part F.2., monitoring is required for Biochemical Oxygen Demand (BOD), Chemical Oxygen Demand (COD), Total Suspended Solids (TSS), Total Phosphorus (TP), Total Nitrogen (TN), Nitrate+Nitrite Nitrogen, Oil and Grease, pH, Ammonia Nitrogen (NH4), Turbidity, Dissolved Oxygen, Oxygen Saturation, Temperature, Salinity, and toxic parameters. DOH has determined that since WQBELs do not exist for BOD and COD, this requirement would be removed, unless a benchmark or effluent limit exists in Appendix 1, as it only increased the cost for permittees to comply without any reported direct benefit to water quality or enforcement action. For TSS, TP, Nitrate+Nitrite Nitrogen, Oil and Grease, pH, NH4, Turbidity, DO, Oxygen Saturation, Temperature, and Salinity, monitoring was also removed because if a sector didn't already require that pollutant to be monitored in Appendix 1, then the EPA had already ruled out that pollutant to be a pollutant of concern. For TN, the DOH has in its Hawaii Implementation Plan decided to no longer require monitoring for TN.

Toxic monitoring has been removed in the proposed renewal permit because, as discussed in the 2015 EPA's MSGP Fact Sheet, page 21 of 80: "EPA has determined that the technology-based numeric and non-numeric effluent limits in the 2015 MSGP, taken as a whole, constitute BPT for all pollutants, BCT for conventional pollutants, and BAT for toxic and nonconventional pollutants that may be discharged in industrial stormwater." The DOH has incorporated the same technology-based numeric and non-numeric effluent limits in its proposed renewal permit.

Besides those modifications to the EPA's 2015 MSGP required to make the permit appropriate for the State (e.g., formatting, revising references to the EPA/Agency, workflow, etc.), the only substantive changes to the EPA's 2015 MSGP were:

1) Deleting coverage to those facilities that use polymers and/or chemical treatments as part of their controls. Consistent with DOH's HAR Chapter 11-55, Appendix C, coverage is not eligible if polymers are used, and

2) Deleting those requirements found in Appendix 1 that were not currently applicable. Those not applicable to the State included requirements for: Endangered and Threatened Species and Critical Habitat as part of the Endangered Species Act Consultation or ESA Section 10 permit as required for the Federal Government; Historical Properties Preservation; Tribal areas; rail lines, salt storage piles or piles containing salt; areas subject to snow, snowmelt, and other requirement intended for other States/Regions.

3) The replacement of industrial storm water requirements is in accordance with the new information exception to anti-backsliding in CWA 402(o)(2)(B)(i).

F. Anti-degradation

The proposed permit meets Hawaii's anti-degradation policy because it requires the Permittee to apply the best degree of treatment or control to the discharge that will result in pollutants reaching the receiving body of water from the facility to be of an acceptable level, as provided under HAR Chapter 11-54-4(c).

G. Public Participation

A public notice of the proposed permit was published in the ***Honolulu Star-Advertiser*** on July 1, 2021, soliciting public comment on the proposed action for a 30-day period. The permit application, applicable documents, proposed permit, and rationale were available for public review at the CWB office. Persons wishing to comment upon or object to the proposed NPDES permit in accordance with HAR Chapter 11-55-09(b) and 11-55-09(d), had the opportunity to submit their comments through email at: cleanwaterbranch@doh.hawaii.gov, or in writing either in person or by mail to:

Department of Health, Clean Water Branch
P.O. Box 3378
Honolulu, Hawaii 96801-3378

Appendix 1

Marine Corps Base Hawaii Municipal Separate Storm Sewer System (MS4)

Permit No. HI S000007

Proposed Draft Permit Revisions from the Previous September 15, 2014 Permit (2014 Permit)

Marine Corps Base Hawaii (MCBH) Municipal Separate Storm Sewer System (MS4) HI S000007	
Authorization to Discharge Under the National Pollutant Discharge Elimination System	
Previous 2014 MCBH MS4 Permit	**Draft 2020 MCBH MS4 Permit Revisions**
In compliance with the provisions of the Clean Water Act, as amended, (33 U.S.C. §1251 et. seq.; the "Act"); Hawaii Revised Statutes, Chapter 342D; and Hawaii Administrative Rules (HAR), Department of Health (DOH), State of Hawaii, Chapters 11-54 and 11-55; **MARINE CORPS BASE HAWAII (MCBH), KANEOHE BAY** (PERMITTEE) is authorized to discharge storm water runoff and certain non-storm water discharges as identified in Part B.2. of this permit from the MCBH, Kaneohe Bay Municipal Separate Storm Sewer System (MS4); storm water runoff from industrial sites; and additional storm sewer outfalls that may be identified from time to time by the Permittee, into Kaneohe Bay (class AA), Nuupia Ponds (class 1), Kailua Bay (class A), and Mokapu Central Drainage Channel (class AA/2), Island of Oahu, Hawaii, in accordance with the general requirements, discharge monitoring requirements, and other conditions set forth herein, and in the attached DOH "Standard NPDES Permit Conditions," that is available on the DOH, Clean Water Branch (CWB) website at http://health.hawaii.gov/cwb/files/2013/05/StandardNpdesPermitConditions.pdf. All references to Title 40 of the Code of Federal Regulations (CFR) are to regulations that are in effect on July 1, 2014, except as otherwise specified. Unless otherwise specified herein, all terms are defined as provided in the applicable regulations in Title 40 of the CFR.	In compliance with the provisions of the Clean Water Act, as amended, (33 U.S.C. §1251 et. seq.; the "Act"); Hawaii Revised Statutes, Chapter 342D; and Hawaii Administrative Rules (HAR)~~,~~ Chapters 11-54 and 11-55, Department of Health (DOH), State of Hawaii~~, Chapters 11-54 and 11-55~~; **MARINE CORPS BASE HAWAII (MCBH), KANEOHE BAY** (hereinafter PERMITTEE), is authorized to discharge storm water runoff and certain non-storm water discharges as identified in Part B.2. of this permit from the MCBH, Kaneohe Bay Municipal Separate Storm Sewer System (MS4); storm water runoff from industrial sites; and additional storm sewer outfalls that may be identified from time to time by the Permittee, into Kaneohe Bay (class AA)~~,~~; Nuupia, Halekou, and Kaluapuhi Ponds (class 1)~~,~~; Kailua Bay (class A)~~,~~; and Mokapu Central Drainage Channel (class AA/2)~~,~~; Island of Oahu, Hawaii, in accordance with the general requirements, discharge monitoring requirements, and other conditions set forth herein, and in the attached DOH "Standard NPDES Permit Conditions," (Version 15) that is available on the DOH, Clean Water Branch (CWB) website at ~~http://health.hawaii.gov/cwb/files/2013/05/StandardNpdesPermitConditions.pdf~~ http://health.hawaii.gov/cwb/site-map/home/standard-npdes-permit-conditions. All references to Title 40 of the Code of Federal Regulations (CFR) are to regulations that are in effect on ~~July 1, 2014~~ July 1, 2020, except as otherwise specified. Unless otherwise specified herein, all terms are defined as provided in the applicable regulations in Title 40 of the CFR. *Rationale*: 1. Updated citations to applicable Acts, Statutes, and Rules to the current boilerplate. 2. Added Halekou and Kaluapuhi Ponds to the list of receiving waters based on the "2018 Annual Stormwater Report for Marine Corps Base Hawaii (MCBH)" (renewal application). 3. Added Standard NPDES Permit Conditions

Marine Corps Base Hawaii (MCBH) Municipal Separate Storm Sewer System (MS4) HI S000007 — Authorization to Discharge Under the National Pollutant Discharge Elimination System	
Previous 2014 MCBH MS4 Permit	**Draft 2020 MCBH MS4 Permit Revisions**
	version number for future reference. 4. Updated link to the Standard NPDES Permit Conditions. 5. Updated Title 40 of the CFR publication date.
	Failure to comply with any condition, requirement, and/or limitation in this permit is an enforceable violation and your National Pollutant Discharge Elimination System (NPDES) permit may be terminated. Examples of enforceable violations include, but are not limited to: Unauthorized discharges where a pollutant was not disclosed in the NPDES application, but was detected by monitoring only requirements in the NPDES permit or by other means determined by the DOH; failure to sample, analyze, or submit water quality results as required in the NPDES permit; and discharging pollutants in locations that were not authorized in the NPDES permit. If you violate Hawaii Revised Statutes (HRS) Chapter 342D, you may be subject to penalties of up to $25,000 per violation per day and up to two (2) years in jail. Falsification of information, including providing information in the NPDES application that does not match what is actually occurring at the project site/facility, may result in criminal penalties for the Permittee and their authorized representative as provided in Clean Water Act, Section 309 and HRS Section 342D-35. *Rationale*: Added this section as part of the standard permit language.
This permit will become effective on **October 15, 2014**. This permit and the authorization to discharge will expire at midnight, **September 14, 2019**. Signed this 15th day of September, 2014. ______________________________ (For) Director of Health	This permit will become effective on **~~October 15, 2014.~~September 1, 2021**. This permit and the authorization to discharge will expire at midnight, **~~September 14, 2019.~~ August 31, 2026**. The Permittee shall submit a renewal application at least one (1) year prior to the expiration date of this permit. Signed this ~~15th~~11th day of ~~September, 2014~~ August, 2021. ______________________________ (For) Director of Health *Rationale*: 1. Updated proposed draft permit reissuance, effective, and expiration dates. 2. Added renewal application deadline.

Marine Corps Base Hawaii (MCBH) Municipal Separate Storm Sewer System (MS4) HI S000007

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Previous 2014 MCBH MS4 Permit	**Draft 2020 MCBH MS4 Permit Revisions**
  ATTACHMENT: STANDARD NPDES PERMIT CONDITIONS (VERSION 14). In case of conflict between the conditions stated in this permit and those specified in the Standard NPDES Permit Conditions, the more stringent conditions shall apply.	 ATTACHMENT: STANDARD NPDES PERMIT CONDITIONS (~~VERSION 14~~ VERSION 15). In case of conflict between the conditions stated in this permit and those specified in the Standard NPDES Permit Conditions, the more stringent conditions shall apply. *Rationale*: 1. Corrected SWMP acronym. EPA's NPDES website "SWMP" refers to a "Storm Water Management Program". 2. Added APPENDIX 1 Storm Water Associated with Industrial Activities permit requirements. 3. Updated version of the Standard NPDES Permit Conditions.

Marine Corps Base Hawaii (MCBH) Municipal Separate Storm Sewer System (MS4) HI S000007	
Part A. GENERAL REQUIREMENTS	
Previous 2014 MCBH MS4 Permit	**Draft 2020 MCBH MS4 Permit Revisions**
Part A.1. Comply with the existing Storm Water Management Plan (SWMP) until submittal of the revised SWMP to the DOH; and future activities as identified in its last submitted Annual Report. The revised SWMP shall be implemented upon submittal to the DOH.	**Part A.1.** Comply with the existing Marine Corps Base Hawaii's (MCBH) Storm Water Management ~~Plan~~ Program (SWMP) Plan until submittal of the revised SWMP to the DOH; and future activities as identified in its last submitted Annual Report. The revised SWMP shall be implemented upon submittal to the DOH. *Rationale*: 1. Explicitly specified the MCBH's SWMP Plan. 2. Corrected SWMP acronym.
Part A.3. Retain a copy of this permit and all other related materials and the SWMP, with all subsequent revisions, at designated location as identified in the SWMP.	**Part A.3.** Retain a copy of this permit and all other related materials and the SWMP, with all subsequent revisions, at the designated location as identified in the SWMP. *Rationale*: Grammatical correction.
Part A.7. All information and reports required under this permit and updates to information on file shall be submitted through the CWB Compliance Submittal Form for Individual NPDES Permits and Notice of General Permit Coverages (NGPCs). This form is accessible through the e-Permitting Portal website at: https://eha-cloud.doh.hawaii.gov/epermit/View/home.aspx. If not already registered, you will be asked to do a one-time registration to obtain your login and password. After you register, click on the Application Finder tool to locate the form. Follow the instructions to complete and submit this form. All submissions shall include a CD or DVD containing the downloaded e-Permitting submission and a completed Transmittal Requirements and Certification Statement for e-Permitting NPDES/NGPC Compliance Submissions Form, with original signature and date.	**Part A.7.** All information and reports required under this permit and updates to information on file shall be submitted through the "CWB Compliance Submittal Form for Individual NPDES Permits and Notice of General Permit Coverages (NGPCs)" or other form approved by the DOH. This form is accessible through the e-Permitting Portal website at: ~~https://eha-cloud.doh.hawaii.gov/epermit/View/home.aspx~~ https://eha-cloud.doh.hawaii.gov/epermit/. If not already registered, you will be asked to do a one-time registration to obtain your login and password. After you register, click on the Application Finder tool to locate the form. Follow the instructions to complete and submit this form. All submissions shall include a CD or DVD containing the downloaded e-Permitting submission and a completed "Transmittal Requirements and Certification Statement for e-Permitting NPDES/NGPC Compliance Submissions" ~~F~~form, with original signature and date. *Rationale*: 1. Added DOH approved form contingency. 2. Updated e-Permitting Portal URL.

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Part B. DISCHARGE LIMITATIONS	
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Part B.2. The following non-storm water discharges may be discharged into the Permittee's MS4 provided that the discharge is identified below, and meets all conditions when specified by the Permittee. In the event that any of the non-storm water discharges listed below is determined to be a source of pollution by the Permittee, the discharge will no longer be allowed.	**Part B.2.** The following non-storm water discharges may be discharged into the Permittee's MS4 provided that the discharge is identified below, and meets all conditions when specified by the Permittee. In the event that any of the non-storm water discharges listed below is determined to be a source of pollution by the Permittee, the discharge will no longer be allowed. The source of the non-storm water discharges listed below shall not be reuse water or recycled process wastewater (i.e. construction dewater effluent, hydrotesting water, etc.). *Rationale*: Clarified reuse or recycled process wastewater would not be allowed as a source of non-storm water discharge.

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Part C. RECEIVING WATER LIMITATIONS, INSPECTIONS, AND CORRECTIVE ACTIONS	
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Part C.2. The discharge shall not cause or contribute to a violation of any of the applicable beneficial uses or water quality objectives contained HAR, Chapter 11-54, titled "Water Quality Standards."	**Part C.2.** The discharge shall not cause or contribute to a violation of any of the applicable beneficial uses or water quality objectives contained in HAR~~,~~ Chapter 11-54, titled "Water Quality Standards." *Rationale*: Grammatical correction.
Part C.3. During inspections/screenings as required by this permit, the Permittee shall also visually inspect the receiving state waters, effluent, and control measures and BMPs to detect violations of, and conditions which may cause violations of, the basic water quality criteria as specified in HAR, Section 11-54-4. (e.g., the Permittee shall look at effluent and receiving state waters for turbidity, color, floating oil and grease, floating debris and scum, materials that will settle, substances that will produce taste in the water or detectable off-flavor in fish, and inspect for items that may be toxic or harmful to human or other life).	**Part C.3.** During inspections/screenings as required by this permit, the Permittee shall also visually inspect the receiving state waters, effluent, and control measures and BMPs to detect violations of, and conditions which may cause violations of, the basic water quality criteria as specified in HAR~~,~~ Section 11-54-4~~.~~ (e.g., the Permittee shall look at effluent and receiving state waters for turbidity, color, floating oil and grease, floating debris and scum, materials that will settle, substances that will produce taste in the water or detectable off-flavor in fish, and inspect for items that may be toxic or harmful to human or other life). If the discharge enters the Permittee's MS4 prior to the receiving state water, then the Permittee may inspect their discharge where it enters the drainage system rather than at the receiving water. The Permittee is not required to inspect areas that, at the time of the inspection, are considered unsafe to inspection personnel, if the unsafe conditions have been documented. *Rationale*: Included a provision to ensure inspection personnel safety.
Part C.5. For TMDLs adopted by DOH and approved by the EPA, the Permittee shall demonstrate consistency with the WLAs consistent with the assumption of the associated TMDL document within the timeframe as specified in its Implementation and Monitoring (I&M) Plan.	**Part C.5.** For TMDLs adopted by DOH and approved by the EPA, the Permittee shall demonstrate consistency with the effluent limitations associated with TMDL WLAs consistent with the assumption of the associated TMDL document within the timeframe as specified in its Implementation and Monitoring (I&M) Plan. *Rationale*: WLAs are translated into the permit as effluent limits.

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Part D. STORMWATER MANAGEMENT ~~PLAN~~ PROGRAM (SWMP) PLAN	
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Part D.1. Development, Improvement, Implementation and Enforcement of SWMP The Permittee shall further develop and improve, implement, and enforce a SWMP designed to address the requirements of this permit and reduce, to the MEP, the discharge of pollutants to and from its MS4 to protect water quality and to satisfy the appropriate water quality requirements of the Act. The SWMP shall include the following information for each of the SWMP components described in Part D.1.a to Part D.1.g below: • The BMPs, including the underlying rationale that will be implemented for each of the program components. • The measurable standards and milestones for each of the BMPs, including the underlying rationale and interim measures to aid in determining the level of effort and effectiveness of each program component. • The name or position title and of the person or persons responsible for implementation or coordination of each program component. • A monitoring program to determine effectiveness of the controls and the overall storm water program. Submittal Date - The SWMP shall be: updated and modified per the requirements of this permit; consistent with the format of this permit; submitted to the DOH in accordance with Part A.6 within 18 months after the effective date of this permit, or as otherwise specified; and fully implemented upon submittal. The Permittee shall implement the existing SWMP until submittal of the revision. The SWMP and any of its revisions, additions, or modifications are enforceable components of this permit.	**Part D.1.** Development, Improvement, Implementation and Enforcement of SWMP The Permittee shall further develop and improve, implement, and enforce a SWMP designed to address the requirements of this permit and reduce, to the Maximum Extent Practicable (MEP), the discharge of pollutants to and from its MS4 to protect water quality and to satisfy the appropriate water quality requirements of the Act. The SWMP shall include the following information for each of the SWMP components described in Part D.1.a to Part D.1.g below: • The BMPs, including the underlying rationale that will be implemented for each of the program components. • The measurable standards and milestones for each of the BMPs, including the underlying rationale and interim measures to aid in determining the level of effort and effectiveness of each program component. • The name or position title and affiliation of the person or persons responsible for implementation or coordination of each program component. • A monitoring program to determine effectiveness of the controls and the overall storm water program. Submittal Date - The SWMP shall be: updated and modified per the requirements of this permit; consistent with the format of this permit; submitted to the DOH in accordance with Part A.6. and A.7. within 18 months after the effective date of this permit, or as otherwise specified; and fully implemented upon submittal. The Permittee shall implement the existing SWMP until submittal of the revision. The SWMP and any of its revisions, additions, or modifications are enforceable components of this permit. *Rationale*: 1. Corrected SWMP acronym from Storm Water Management Plan to Storm Water Management Program. 2. Included affiliation of person(s) responsible for

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	the implementation of each SWMP program component. 3. Submissions are made using CWB compliance forms specified in Part A.7.
Part D.1.a.(1) *Targeted Groups* – The Permittee shall address the following targeted groups in the Base-wide Awareness Plan with appropriate messages, and describe outreach activities and anticipated frequencies that each activity will be conducted over the permit term: • Military personnel and dependents that work or live on base; • Civilian personnel that work on base; • Construction and maintenance contractors that work on base; • Landscaping personnel and contractors; • Construction Industry; • Industrial facilities covered by the NPDES permit program; • Commercial businesses (i.e., automobile detailing, automobile repair and maintenance, retail gasoline outlets, and restaurants, including those types of businesses highly ranked, pursuant to Part D.1.g.(4); • Schools, recreational facilities; • Any other source that the Permittee determines may contribute a significant pollutant load to its Small MS4.	**Part D.1.a.(1)** *Targeted Groups* – The Permittee shall address the following targeted groups in the Base-wide Awareness Plan with appropriate messages, and describe outreach activities and anticipated frequencies that each activity will be conducted over the permit term: • Military personnel and dependents that work or live on base; • Civilian personnel that work on base; • Construction and maintenance contractors that work on base; • Consultants • Landscaping personnel and contractors (e.g., to prevent the use of leaf blowers from blowing material into the drainage structures); • Construction Industry; • Industrial facilities covered by the NPDES permit program; • Commercial businesses (i.e., automobile detailing, automobile repair and maintenance, retail gasoline outlets, and restaurants, including those types of businesses highly ranked, pursuant to Part D.1.g.(4)); • Schools, recreational facilities; • Any other source that the Permittee determines may contribute a significant pollutant load to its Small MS4. *Rationale*: 1. Included consultants within the targeted groups. 2. Explicitly prohibited blowing materials into the drainage structures.

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Part D.1.b. Public Involvement/Participation The Permittee shall include the public in developing, reviewing, and implementing the SWMP. The draft and final SWMP shall be made available to the public (e.g., on Permittee's website) and at local offices. An informational meeting shall be scheduled and announced prior to finalizing the SWMP to solicit comments and answer questions from the public. Other activities to involve the public may include providing volunteer opportunities that improve water quality, organizing a citizen advisory group to solicit ongoing input from the public about changes to the SWMP and specific SWMP-related projects, or organizing clean-up events to educate the public about impacts of storm water.	**Part D.1.b.** Public Involvement/Participation The Permittee shall include ~~the public~~ base/installation administrators, facility management, and facility occupants in developing, reviewing, and implementing the SWMP. The draft and final SWMP shall be made available to the public (e.g., on Permittee's website) and at local offices. An informational meeting shall be scheduled and announced prior to finalizing the SWMP to solicit comments and answer questions from the public. Other activities to involve the public may include providing volunteer opportunities that improve water quality, organizing a citizen advisory group to solicit ongoing input from the public about changes to the SWMP and specific SWMP-related projects, or organizing clean-up events to educate the public about impacts of storm water. *Rationale*: Revised to target MCBH personnel.
Part D.1.c. Illicit Discharge Detection and Elimination (IDDE) The Permittee shall implement the ongoing SWMP to detect and eliminate illicit connections and illegal discharges into its MS4 and shall include an improved program in the revised SWMP Plan. The program shall include:	**Part D.1.c.** Illicit Discharge Detection and Elimination (IDDE) The Permittee shall implement the ongoing SWMP to detect and eliminate ~~illicit~~ illegal connections and ~~illegal~~ illicit discharges into its MS4 and shall include an improved program in the revised SWMP Plan. The program shall include: *Rationale*: Revised to use consistent terminology throughout the proposed permit.
Part D.1.c.(1) *Connection Permits for private drain* connections – Within one (1) year after the effective date of this permit the Permittee shall establish requirements for issuing connection permits and require obtaining the permit prior to allowing the drain connections. A database shall be maintained of all permitted connections to its MS4. Prior to issuing a connection permit, the Permittee shall ensure the following are met:	**Part D.1.c.(1)** *Connection Permits for private drain connections* – Within ~~one (1) year~~ six (6) months after the effective date of this permit, the Permittee shall establish and implement requirements for issuing connection permits, or equivalent, and require obtaining the permit prior to allowing the drain connections. The Permittee shall also establish and implement requirements for issuing permits for the operation of drain connections to the MS4. A database shall be maintained of all permitted connections to its MS4. Prior to issuing a connection permit, the Permittee shall ensure the following are met: *Rationale*: Based on the MCBH MS4 audit, the Permittee is still required to establish and implement requirements for issuing connection permits prior to connection and for issuing permits to operate drain connections to the MS4.

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Part D.1.c.(2) *Field Screening* – The Permittee shall implement an Outfall Field Screening Plan for observing major and minor outfalls to screen for improper discharges. The plan shall designate priority areas for screening, specify the frequency for screening, and identify the procedures to be followed if a discharge is observed. If any outfall locations are submerged at the time of inspection, the monitoring personnel shall inspect the discharge line (or contributing tributary lines), at the closest location(s) upstream of the discharge location and outside tidal influence. At a minimum, outfalls in priority areas shall be screened once per permit term.	**Part D.1.c.(2)** *Field Screening* – The Permittee shall update and implement an Outfall Field Screening Plan for observing major and minor outfalls to screen for ~~improper~~ illicit discharges within six (6) months of the effective date of this permit. The plan shall designate priority areas for screening, specify the frequency for screening, and identify the procedures to be followed if a discharge is observed. If any outfall locations are submerged at the time of inspection, the monitoring personnel shall inspect the discharge line (or contributing tributary lines), at the closest location(s) upstream of the discharge location and outside tidal influence. At a minimum, outfalls in priority areas shall be screened once per permit term. *Rationale*: 1. Revised Outfall Field Screening Plan implementation to within six months of the EDOP. 2. Revise to "illicit discharge" for consistent terminology throughout the permit.
Part D.1.c.(3) *Tracking* – The Permittee shall maintain a database of complaints, illicit connections, illegal discharges, and spills which tracks the location of the discharge by Tax Map Key (TMK), type of discharge, responsible party, the Permittee's investigation and response of the discharge, follow-up activities, and the resolution of each discharge to the MS4.	**Part D.1.c.(3)** *Tracking* – The Permittee shall maintain a database of complaints, ~~illicit~~ illegal connections, ~~illegal~~ illicit discharges, and spills which tracks the location of the discharge by installation name and building number or Tax Map Key (TMK), type of discharge, responsible party, the Permittee's investigation and response of the discharge, follow-up activities, and the resolution of each discharge to the MS4. *Rationale*: 1. Revise to "illicit discharge" and "illegal connection" for consistent terminology throughout the permit. 2. Adjust tracking requirement to appropriately cover the MCBH military installation (i.e., use facility names or building numbers instead of TMK).
Part D.1.c.(4) *Complaint Investigation* – The Permittee shall promptly investigate observed, suspected, or reported illicit flows and pursue enforcement actions, as appropriate. Complaints made to the CWB, which discharge to the Permittee's MS4 will be forwarded to the Permittee for action. The Permittee shall: (i) Develop and implement a database to identify illicit discharge activities by TMK. The database shall include information about each suspected improper discharge, the Permittee's investigation	**Part D.1.c.(4)** *Complaint Investigation* – The Permittee shall promptly investigate observed, suspected, or reported illicit flows and pursue enforcement actions, as appropriate. Complaints made to the CWB~~, which~~ for discharges to the Permittee's MS4 will be forwarded to the Permittee for action. The Permittee shall: (i) Develop and implement a database to identify illicit discharge activities by installation name and building number or TMK. The database shall include information about each suspected

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of that discharge, follow-up activities, and the resolution of each discharge as required in Part D.1.c.(3) above;	improper discharge, the Permittee's investigation of that discharge, follow-up activities, and the resolution of each discharge as required in Part D.1.c.(3) above; *Rationale*: Adjust complaint investigation requirement to more appropriately cover the MCBH military installation.
Part D.1.c.(5) *Enforcement* – Within one (1) year after the effective date of this permit, the Permittee shall: (i) Establish policies for enforcement and penalties for entities found to be in noncompliance with requirements developed in accordance with Part D.1.c.(1), including for persons illegally discharging pollutants to its MS4, and	**Part D.1.c.(5)** *Enforcement* – Within ~~one (1) year~~ six (6) months after the effective date of this permit, the Permittee shall: (i) Establish and implement the policies for enforcement and penalties for entities found to be in noncompliance with requirements developed in accordance with Part D.1.c.(1), including for persons illegally discharging pollutants to its MS4, and *Rationale*: The requirement to establish enforcement policies was contained in the previous permit and is being included in this draft permit.
Part D.1.c.(6) *Spill Prevention and Response* - The Permittee shall implement its ongoing SWMP to prevent, respond to, contain, and clean up all wastewater and other spills that may enter its MS4 from any source (including private laterals and failing cesspools). This program shall be included in the SWMP. Spill response teams, which may consist of local, state, and/or federal agencies, shall prevent entry of spills into the Permittee's MS4 and contamination of surface water, ground water, and soil to the MEP. The Permittee shall coordinate spill prevention, containment, and response activities throughout all appropriate departments, programs, and agencies to ensure maximum water quality protection at all times. The Permittee shall notify DOH of all wastewater spills or overflows from private laterals and failing septic systems into its MS4. The Permittee shall prevent, respond to, contain, and clean up wastewater from any such notification.	**Part D.1.c.(6)** *Spill Prevention and Response* - The Permittee shall implement its ongoing SWMP to prevent, respond to, contain, and clean up all wastewater and other spills that may enter its MS4 from any source (including private laterals and failing cesspools). This program shall be included in the SWMP. Spill response teams, which may consist of local, state, and/or federal agencies, shall prevent entry of spills into the Permittee's MS4 and contamination of surface water, ground water, and soil to the MEP. The Permittee shall coordinate spill prevention, containment, and response activities throughout all appropriate departments, programs, and agencies to ensure maximum water quality protection at all times. The Permittee shall notify DOH of all wastewater spills or overflows from private laterals and failing septic systems into its MS4. The Permittee shall implement its ongoing SWMP to prevent, respond to, contain, and clean up wastewater from any such notification. *Rationale*: Revision in third paragraph is self-consistent with the first paragraph in this part.

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Part D.1.c.(8) *Training* – The Permittee shall provide annual training to staff on identifying and eliminating illicit connections, illegal discharges, and spills to its MS4. This training shall be specific to the Permittee's activities, policies, rules, and procedures.	**Part D.1.c.(8)** *Training* – The Permittee shall provide annual training to ~~staff~~ Environmental Compliance Officers (ECOs) and all pertinent facility personnel on identifying and eliminating ~~illicit~~ illegal connections, ~~illegal~~ illicit discharges, and spills to its MS4. This training shall be specific to the Permittee's activities, policies, rules, and procedures. The Permittee shall maintain records of the annual training program. *Rationale*: 1. Adjusted training requirement to more appropriately cover the MCBH. 2. Revised to "illicit discharge" and "illegal connection" for consistent terminology throughout the permit. 3. Added recordkeeping requirement.
Part D.1.d.(1) *Requirement to develop BMPs Manuals* – Within two (2) years from the effective date of this permit, the Permittee shall develop and submit to the DOH, the following types of manuals for construction projects: • Construction Best Management Practices Field Manual. • Maintenance Activities Best Management Practices Field Manual. • Storm Water Permanent Best Management Practices Manual. The Permittee shall review these standards annually and, as necessary, revise to include descriptions of new or modified BMPs, including permanent BMPs and LID practices. All revisions made during a calendar year shall be discussed in its corresponding Annual Reports and all documents included in the SWMP Plan. All documents shall be made available to the Permittee's staff, contractors, and consultants, as appropriate.	**Part D.1.d.(1)** *Requirement to develop BMPs Manuals* – Within ~~two (2) years~~ twelve (12) months from the effective date of this permit, the Permittee shall develop and submit to the DOH, the following types of manuals for construction projects: • Construction Best Management Practices Field Manual. • Maintenance Activities Best Management Practices Field Manual. • Storm Water Permanent Best Management Practices Manual. The performance of MEP includes addressing projects, regardless of size, that have the potential to impact water quality. The Permittee shall review these standards annually and, as necessary, revise to include descriptions of new or modified BMPs, including permanent BMPs and LID practices. All revisions made during a calendar year shall be discussed in its corresponding Annual Reports and all documents included in the SWMP Plan. All documents shall be made available to the Permittee's staff, contractors, and consultants, as appropriate. *Rationale*: MCBH MS4 audit identified deficiencies with the BMP field manuals. The permit requirement shall remain but given a reduced compliance time as this was required in the previous permit.

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Part D.1.d.(2) *Requirement to implement BMPs* – Within three (3) years from the effective date of this permit, the Permittee shall establish policies to require proposed construction projects to implement BMPs and standards described in the following: • Construction Best Management Practices Field Manual. • Maintenance Activities Best Management Practices Field Manual. • Storm Water Permanent Best Management Practices Manual.	**Part D.1.d.(2)** *Requirement to implement BMPs* – Within ~~three (3) years~~ twelve (12) months from the effective date of this permit, the Permittee shall establish policies to require construction projects to implement BMPs and standards described in the following manuals: • Construction Best Management Practices Field Manual. • Maintenance Activities Best Management Practices Field Manual. • Storm Water Permanent Best Management Practices Manual. *Rationale*: MCBH MS4 audit identified deficiencies with establishing policies to require proposed construction projects to implement BMPs and standards. The permit requirement to establish policies shall remain in the permit but given a reduced compliance time.
Part D.1.d.(3) *Inventory of construction sites* – Within six (6) months from the effective date of this permit, the Permittee shall implement a system to track both private and public construction projects (i.e., contract, in-house, maintenance, and encroachment). This system shall track information on the project (including permit or file number, if available); status of plan review and approval, inspection dates, and if applicable, enforcement actions; and whether the project has applied for coverage under HAR, Chapter 11-55, Appendix C, NPDES General Permit Authorizing the Discharge of Storm Water Associated with Construction Activity (a.k.a. General Construction Activity Storm Water permit) (unless the project will disturb less than one acre of land) and satisfied any other applicable requirements of the NPDES permit program (i.e., an individual NPDES permit).	**Part D.1.d.(3)** *Inventory of construction sites* – Within six (6) months from the effective date of this permit, the Permittee shall implement a system to track both private and public construction projects (i.e., contract, in-house, maintenance, and encroachment). This system shall track information on the project (including permit or file number, if available); status of plan review and approval, inspection dates, and if applicable, enforcement actions; and whether the project has applied for coverage under HAR, Chapter 11-55, Appendix C, NPDES General Permit Authorizing the Discharge of Storm Water Associated with Construction Activity (a.k.a. General Construction Activity Storm Water permit) (unless the project will disturb less than one acre of land) and satisfied any other applicable requirements of the NPDES permit program (i.e., an individual NPDES permit). *Rationale*: MCBH ECPD developed a construction site database to track current construction site activities in the previous permit. The permit condition is being continued in draft permit. The MCHB MS4 audit found that the Permittee provided a list of NPDES-permitted construction projects. The Permittee subsequently provided a "Construction Site Inventory and Inspection" datasheet that differed from the previous list and did not include all of the NPDES-permitted projects. Neither lists captured construction projects less than one acre in

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	size that may have the potential to impact water quality. Therefore, this requirement shall remain in the permit.
Part D.1.d.(4) *Plan Review and Approval* – The Permittee shall: (i) Review the appropriate Storm Water Pollution Prevention Plan (SWPPP) and other pollution prevention measures (e.g., for Erosion and Sediment Control, Grading, Post-construction BMP and Landscaping) or similar plans/documents prior to approval of the construction plans and specifications. The Permittee shall verify that the SWPPP meets the following requirements: • HAR, Chapter 11-55, Appendix C, and any other requirements under the NPDES permit program, as applicable; • Construction Best Management Practices Field Manual (after developed); • Maintenance Activities Best Management Practices Field Manual (after developed); • Storm Water Permanent Best Management Practices Manual (after developed); and • Implementation of measures to ensure that the discharge of pollutants from the site will be reduced to the appropriate discharge limitations subject to the BAT/BCT discharge requirement, consistent with the Act and other respective federal and state requirements for such facilities and will not cause or contribute to an exceedance of water quality standards.	**Part D.1.d.(4)** *Plan Review and Approval* – The Permittee shall: (i) Review the appropriate Storm Water Pollution Prevention Plan (SWPPP) and other pollution prevention measures (e.g., ~~for~~ Erosion and Sediment Control, Grading, Post-construction BMP and Landscaping) or similar plans/documents prior to approval of the construction plans and specifications. The Permittee shall verify that the SWPPP meets the following requirements: • HAR~~,~~ Chapter 11-55, Appendix C, and any other requirements under the NPDES permit program, as applicable; • Construction Best Management Practices Field Manual ~~(after developed);~~ • Maintenance Activities Best Management Practices Field Manual ~~(after developed);~~ • Storm Water Permanent Best Management Practices Manual ~~(after developed);~~ and • Implementation of measures to ensure that the discharge of pollutants from the site will be reduced to the appropriate discharge limitations subject to the BAT/BCT discharge requirement, consistent with the Act and other respective federal and state requirements for such facilities and will not cause or contribute to an exceedance of water quality standards. *Rationale*: MCBH will verify that the SWPPP meets the requirements under the NPDES permit program, “Construction BMP Field Manual”, “Maintenance Activities BMP Field Manual”, and “Storm Water Permanent BMP Field Manual” in this permit term.
Part D.1.d.(4) *Plan Review and Approval* – The Permittee shall: (ii) Require a permit or written equivalent approval for drainage connections to its MS4, discharge of surface storm water runoff of storm water associated with construction (i.e., from both private and public projects) or discharge permit (i.e., hydrotesting and dewatering effluent or other non-storm water, except those allowed	**Part D.1.d.(4)** *Plan Review and Approval* – The Permittee shall: (ii) Require a permit or written equivalent approval for drainage connections to its MS4, discharge of surface storm water runoff ~~of storm water~~ associated with construction (i.e., from both private and public projects) or discharge permit (i.e., hydrotesting and dewatering effluent or other non-storm water, except those allowed

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under this permit) into their MS4 and maintain a database of the permits/approvals. Prior to issuing a drainage connection, discharge of surface runoff permit/approval, discharge permit, or encroachment permit, the Permittee shall ensure that the following are met:	under this permit) into their MS4 and maintain a database of the permits/approvals. Prior to issuing a drainage connection, discharge of surface runoff permit/approval, discharge permit, or encroachment permit, the Permittee shall ensure that the following are met: *Rationale*: Remove redundant phrase.
Part D.1.d.(4) *Plan Review and Approval* – The Permittee shall: (iv) Update and submit for review and acceptance to the DOH, a plan review checklist that its reviewers shall use in evaluating the plans and BMPs or other similar document(s) which have been implemented pursuant to this Part [i.e., Part D.1.d] within 90 calendar days from the effective date of this permit. Copies of this plan review checklist shall be provided to applicants for connection, discharge, and encroachment permits; and to consultants and contractors for their use in developing the Plans or other similar document(s) for Permittee-contracted construction projects. The plan review checklist shall include at a minimum, but not be limited to, comments on any deficiencies and the date when comments were addressed to the satisfaction of the Permittee. A system shall be implemented to ensure all comments, identified during the review process has been properly addressed.	**Part D.1.d.(4)** *Plan Review and Approval* – The Permittee shall: (iv) ~~Update and submit for review and acceptance to the DOH,~~ Implement a plan review checklist that its reviewers shall use in evaluating the plans and BMPs or other similar document(s) which have been implemented pursuant to this Part [i.e., Part D.1.d] within 90 calendar days from the effective date of this permit. Copies of this plan review checklist shall be provided to applicants for connection, discharge, and encroachment permits; and to consultants and contractors for their use in developing the Plans or other similar document(s) for Permittee-contracted construction projects. The plan review checklist shall include at a minimum, but not be limited to, comments on any deficiencies and the date when comments were addressed to the satisfaction of the Permittee. A system shall be implemented to ensure all comments, identified during the review process has been properly addressed. *Rationale*: Implement the Plan Review Checklist.
Part D.1.d.(5) *Inspections* – The Permittee shall: (i) Prior to the initiation of ground-disturbing activities at any site, except for activities associated with the installation of BMPs at a site, an engineer or qualified inspector employed or retained by the Permittee who reviews and becomes familiar with the project's SWPPP and/or other equivalent document(s), shall inspect the site to verify BMPs as required by the BMP Plan and/or other documents have been installed correctly and in the correct locations prior to the commencement of ground-disturbing activity. Inspections shall include a review of site Erosion and Sediment Controls, good housekeeping practices, and compliance	**Part D.1.d.(5)** *Inspections* – The Permittee shall: (i) Prior to the initiation of ground-disturbing activities at any site, except for activities associated with the installation of BMPs at a site, an engineer or qualified inspector employed or retained by the Permittee who reviews and becomes familiar with the project's SWPPP and/or other equivalent document(s), shall inspect the site to verify BMPs as required by the BMP Plan and/or other documents have been installed correctly and in the correct locations prior to the commencement of ground-disturbing activity. Inspections shall include a review of site Erosion and Sediment Controls, good housekeeping practices, and compliance

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with Permittee-accepted erosion and sediment control plans, construction BMPs Plans, or other similar documents and Permittee-approved permits. The inspector shall also identify and remedy any site conditions having the potential for erosion and sediment runoff, including other pollutant discharges which may occur as a result of the project's construction activities.	with Permittee-accepted erosion and sediment control plans, construction BMPs Plans, or other similar documents and Permittee-approved permits. The inspector shall also identify, document, report, and remedy any site conditions having the potential for erosion and sediment runoff, including other pollutant discharges which may occur as a result of the project's construction activities. *Rationale*: Included documentation and reporting requirements in the construction site inspection.
Part D.1.d.(5) *Inspections* – The Permittee shall: (ii) In addition to inspections required by the NPDES permit program, all contract, in-house and maintenance construction projects shall be inspected at least monthly by a qualified construction inspector who is independent (i.e., not involved in the day-to-day planning, design, or implementation) of the construction projects to be inspected. The Permittee may use more than one (1) qualified construction inspector for these inspections. The reporting procedures shall include, at a minimum, notification of any critical deficiencies to the DOH. Upon three (3) successive monthly inspections that indicate, in total, no critical or major deficiencies or less than six (6) minor deficiencies with no more than three (3) minor deficiencies in one (1) month in a project's BMPs or other storm water management activities, the Permittee may decrease the inspection frequency for such project to quarterly. However, if while under a quarterly inspection frequency, an inspection of a project conducted pursuant to this paragraph indicates at least one (1) critical or major deficiency or a total of three (3) or more minor deficiencies in the project's BMPs or other storm water management activities, the inspections frequency shall immediately return to no less than monthly. This reduced inspection frequencies option is contingent upon the Permittee having defined each type (i.e., critical, major, or minor) of deficiency. The Permittee shall further develop and implement written procedures for appropriate corrective actions and follow-up inspections when deficiencies had been identified at an inspected project. The corrective action procedures shall, at a minimum, require	**Part D.1.d.(5)** *Inspections* – The Permittee shall: (ii) In addition to inspections required by the NPDES permit program, all contract, in-house and maintenance construction projects shall be inspected at least monthly by a qualified construction inspector who is independent (i.e., not involved in the day-to-day planning, design, or implementation) of the construction projects to be inspected. The Permittee may use more than one (1) qualified construction inspector for these inspections. ~~The reporting procedures shall include, at a minimum, notification of any critical deficiencies to the DOH.~~ Upon three (3) successive monthly inspections that indicate, in total, no critical or major deficiencies or less than six (6) minor deficiencies with no more than three (3) minor deficiencies in one (1) month in a project's BMPs or other storm water management activities, the Permittee may decrease the inspection frequency for such project to quarterly. However, if while under a quarterly inspection frequency, an inspection of a project conducted pursuant to this paragraph indicates at least one (1) critical or major deficiency or a total of three (3) or more minor deficiencies in the project's BMPs or other storm water management activities, the inspections frequency shall immediately return to no less than monthly. This reduced inspection frequencies option is contingent upon the Permittee having defined each type (i.e., critical, major, or minor) of deficiency. The Permittee shall further develop and implement written procedures for appropriate corrective actions and follow-up inspections when deficiencies had been identified at an inspected project. The corrective action procedures shall, at a minimum, require

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that 1) any critical deficiencies shall be corrected or addressed before the close of business on the day of the inspection at which the deficiency is identified, and 2) any major deficiencies shall be corrected or addressed as soon as possible, but in no event later than five (5) calendar days after the inspection at which the deficiency is identified or before the next forecasted precipitation, whichever is sooner.	that 1) any critical deficiencies shall be corrected or addressed before the close of business on the day of the inspection at which the deficiency is identified, and 2) any major deficiencies shall be corrected or addressed as soon as possible, but in no event later than five (5) calendar days after the inspection at which the deficiency is identified or before the next forecasted precipitation, whichever is sooner. *Rationale*: 1. Critical deficiencies are expected to be addressed by the Permittee's corrective action procedures.
Part D.1.d.(5) *Inspections* – The Permittee shall: (iii) All construction projects with a connection permit, encroachment permit, or discharge of surface runoff permit/approval shall be inspected at least once annually or once during the life of the project, whichever comes first, by a qualified construction inspector who is independent (i.e., not involved in the day-to-day planning, design, or implementation) of the construction projects to be inspected. The Permittee may use more than one (1) qualified construction inspector for these inspections. If the project has a SWPPP or other equivalent document(s), the inspection shall also verify that the BMPs were properly installed and at the locations specified in the Plan. The reporting procedures shall include, at a minimum, notification of any critical deficiencies to the DOH.	**Part D.1.d.(5)** *Inspections* – The Permittee shall: (iii) All construction projects with a connection permit, encroachment permit, or discharge of surface runoff permit/approval shall be inspected at least once annually or once during the life of the project, whichever comes first, by a qualified construction inspector who is independent (i.e., not involved in the day-to-day planning, design, or implementation) of the construction projects to be inspected. The Permittee may use more than one (1) qualified construction inspector for these inspections. If the project has a SWPPP or other equivalent document(s), the inspection shall also verify that the BMPs were properly installed and at the locations specified in the Plan. ~~The reporting procedures shall include, at a minimum, notification of any critical deficiencies to the DOH.~~ *Rationale*: Critical deficiencies are expected to be addressed by the Permittee's corrective action procedures.
Part D.1.d.(5) *Inspections* – The Permittee shall: (iv) The Permittee shall develop and implement a standard inspection form(s); reporting and corrective procedures for inspections, including use of an inspection checklist, or equivalent; and a database or equivalent system to track inspection results. The inspection checklist shall include at a minimum, but not be limited to, identifying any deficiencies and the date of the corrective actions. Photos shall accompany the inspection checklist to document the deficiencies. The inspection form(s), inspection	**Part D.1.d.(5)** *Inspections* – The Permittee shall: (iv) The Permittee shall develop and implement a standard inspection form(s); reporting and corrective procedures for inspections, including use of an inspection checklist, or equivalent; and a database or equivalent system to track inspection results within 90 calendar days of the effective date of this permit. The inspection checklist shall include at a minimum, but not be limited to, identifying any deficiencies and the date of the corrective actions. Photos shall accompany the inspection checklist to document

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checklist, and reporting and corrective procedures shall be submitted to the DOH for review and acceptance within 90 calendar days of the effective date of this permit.	the deficiencies. ~~The inspection form(s), inspection checklist, and reporting and corrective procedures shall be submitted to the DOH for review and acceptance within 90 calendar days of the effective date of this permit.~~ *Rationale*: Develop and implement the Plan Review Checklist and Construction Site Inspection Procedures and Checklist during this permit term. The permit requirement to develop and implement a database to track inspection results shall remain in this permit but given a reduced compliance time as this was required in the previous permit.
Part D.1.d.(6) *Enforcement* – Within one (1) year from the effective date of this permit, the Permittee shall: (i) Establish policies for enforcement and penalties for those in non-compliance with Part D.1.d.(1) requiring the implementation of standards, and (ii) Develop and implement an Enforcement Response Plan to include written procedures for appropriate corrective and enforcement actions, and follow-up inspections when an inspected project is not in full compliance with its requirements, other permits, and any other applicable requirements under the NPDES permit program.	**Part D.1.d.(6)** *Enforcement* – ~~Within one (1) year from the effective date of this permit, the~~ The Permittee shall: (i) ~~Establish~~ Implement policies for enforcement and penalties for those in non-compliance with Part D.1.d.(1) requiring the implementation of standards, and (ii) ~~Develop and i~~Implement an Enforcement Response Plan to include written procedures for appropriate corrective and enforcement actions, and follow-up inspections when an inspected project is not in full compliance with its requirements, other permits, and any other applicable requirements under the NPDES permit program. *Rationale*: The Enforcement Response Plan was submitted in the previous permit term and is to be implemented in draft permit.
Part D.1.d.(7) *Process to refer noncompliance and non-filers to the DOH* – In the event the Permittee has exhausted its use of sanctions and cannot bring a construction site or construction operator into compliance with its policies, standards, or this permit, or otherwise deems the site poses an immediate and significant threat to water quality, the Permittee shall provide an e-mail notification to cleanwaterbranch@doh.hawaii.gov, Attn: Enforcement Section Supervisor within one (1) week of such determination. E-mail notifications shall be followed by written notification in accordance with Part A.6. and include a copy of all inspection checklists, notes, and related correspondence in pdf format (300 minimum dpi) within two (2) weeks of the determination. In instances where an inspector	**Part D.1.d.(7)** *Process to refer noncompliance and non-filers to the DOH* – In the event the Permittee has exhausted its use of sanctions and cannot bring a construction site or construction operator into compliance with its policies, standards, or this permit, or otherwise deems the site poses an immediate and significant threat to water quality, the Permittee shall provide an e-mail notification to cleanwaterbranch@doh.hawaii.gov, Attn: Enforcement Section Supervisor within one (1) week of such determination. E-mail notifications shall be followed by written notification in accordance with Part ~~A.6.~~A.7. and include a copy of all inspection checklists, notes, and related correspondence in pdf format (300 minimum dpi) within two (2) weeks of the determination. In instances where an inspector

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identifies a site that has not applied for permit coverage under the NPDES permit program, the Permittee shall provide written notification in accordance with Part A.6 to the DOH within two (2) weeks of the discovery.	identifies a site that has not applied for permit coverage under the NPDES permit program, the Permittee shall provide written notification in accordance with Part ~~A.6.~~A.7. to the DOH within two (2) weeks of the discovery. *Rationale*: Revised to appropriate Part A.7. reference.
Part D.1.d.(8) *Training* – The Permittee shall provide annual training on the Construction BMPs Program Plan to all staff with construction storm water responsibilities, including construction engineers, construction and maintenance inspectors, and plan reviewers. This training shall be specific to the Permittee's activities (including the proper installation and maintenance of accepted BMPs), policies, rules and procedures.	**Part D.1.d.(8)** *Training* – The Permittee shall provide annual training on the Construction BMPs Program Plan to all staff with construction storm water responsibilities, including construction engineers, construction and maintenance inspectors, and plan reviewers. This training shall be specific to the Permittee's activities (including the proper installation and maintenance of accepted BMPs), policies, rules and procedures. The Permittee shall maintain records of the annual training program. *Rationale*: Added recordkeeping requirement.
Part D.1.e. Post-Construction Storm Water Management in New Development and Redevelopment The Permittee shall further develop, implement, and enforce a program to address storm water runoff from all (i.e., both private and public) new development and redevelopment projects that result in a land disturbance of one (1) acre or more and smaller projects that have the potential to discharge pollutants to the Permittee's MS4. The Permittee's program must ensure that permanent controls are in place to prevent or minimize water quality impacts to the MEP. The Permittee shall review and update, as necessary, the criteria defining when and the types of permanent post-construction BMPs, including, among other measures, LID techniques, that must be included in a project design to address storm water impacts and pollutants of concern. For State waters on the State CWA Section 303(d) list or State established and EPA approved Total Maximum Daily Loads (TMDLs), the pollutants of concern to be targeted shall include the parameters causing impairment. The Permittee shall consider trash reduction techniques to comply with short and long term plans as required in Part D.1.f.(1)(v). The program shall include, at a minimum, the following elements:	**Part D.1.e.** Post-Construction Storm Water Management in New Development and Redevelopment The Permittee shall further develop, implement, and enforce a program to address storm water runoff from all (i.e., both private and public) new development and redevelopment projects that result in a land disturbance of one (1) acre or more and smaller projects that have the potential to discharge pollutants to the Permittee's MS4. The Permittee's program must ensure that permanent controls are in place to prevent or minimize water quality impacts to the MEP. Post construction storm water management in new development and redevelopment requirements shall not be limited to the storm water requirements under The Energy Independence and Security Act (EISA) of 2007 Section 438 Storm Water Runoff Requirements for Federal Development Projects and the Unified Facilities Criteria (UFC) 3-210-10 but apply to all projects that have the potential to impact water quality to the extent practical. The Permittee shall review and update, as necessary, the criteria defining when and the types of permanent post-construction BMPs, including, among other measures, LID techniques, that must be included in a project design to address storm

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	water impacts and pollutants of concern. For State waters on the State CWA Section 303(d) list or State established and EPA approved Total Maximum Daily Loads (TMDLs), the pollutants of concern to be targeted shall include the parameters causing impairment. The Permittee shall consider trash reduction techniques to comply with short and long term plans as required in Part D.1.f.(1)(v). The program shall include, at a minimum, the following elements: *Rationale*: Added sentence to set the expectation that MEP applies to all new development and redevelopment projects and that all projects are addressed in the post-construction storm water management program.
Part D.1.e.(1) *Standards Revision* – The Permittee shall revise its standards for addressing post-construction BMPs to LID requirements. Within six (6) months of the effective date of this permit, the Permittee shall submit to the DOH for review and acceptance, a plan for requiring LID in the standards to the MEP, including revisions to the plan review and inspection checklist to include LID. LID refers to storm water management practices which seek to mimic a site's predevelopment hydrology by minimizing disturbed areas and impervious cover and then infiltrating, storing, detaining, evapotranspiring, and/or biotreating storm water runoff close to its source. The standards shall ensure that the management practices are prioritized to favor infiltration, evapotranspiration, or harvesting/reuse of stormwater followed by other practices that treat and release stormwater. The standards shall be applicable to all construction projects disturbing at least one (1) acre and smaller projects that have the potential to discharge pollutants to the Permittee's MS4. LID employs principles such as preserving and recreating natural landscape features and minimizing imperviousness to create functional and appealing site drainage that treats storm water as a resource, rather than a waste product. LID treatment measures include harvesting and use, infiltration, evapotranspiration, or biotreatment. The plan for the implementation of LID provisions shall include at a minimum the following:	**Part D.1.e.(1)** *Standards Revision* – Within six (6) months of the effective date of this permit, ~~The~~ the Permittee shall revise its standards for addressing post-construction BMPs, to Low Impact Development (LID) requirements. ~~Within six (6) months of the effective date of this permit, the Permittee shall submit to the DOH for review and acceptance, a the~~ The plan for requiring LID in the standards to the MEP~~,~~ shall includ~~ing~~e revisions to the plan review and inspection checklist to include LID requirements. Standards for addressing post-construction BMPs to LID requirements shall not be limited to storm water requirements under EISA of 2007 or the UFC 3-210-10 but apply to all projects that have the potential to impact water quality to the extent practical. LID refers to storm water management practices which seek to mimic a site's predevelopment hydrology by minimizing disturbed areas and impervious cover and then infiltrating, storing, detaining, evapotranspiring, and/or biotreating storm water runoff close to its source. The standards shall ensure that the management practices are prioritized to favor infiltration, evapotranspiration, or harvesting/reuse of storm water followed by other practices that treat and release stormwater. The standards shall be applicable to all construction projects disturbing at least one (1) acre and smaller projects that have the potential to discharge pollutants to the Permittee's MS4. LID employs principles such as preserving and recreating natural

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• Criteria for requiring implementation. • Investigation into the development of quantitative criteria for a specific design storm to be managed by LID techniques. Examples of design storm requirements include: 24-hour, 85% storm through infiltration; on-site management of the first inch of rainfall within a 24-hour period; retention of the 100-year, 2-hour storm; or on-site management of the 24-hour, 95% storm. • Feasibility criteria for circumstances in which a waiver could be granted for the LID requirements. • When a LID waiver is granted, alternatives such as offsite mitigation and/or non-LID treatment control BMPs could be required. A draft of the revised standards shall be submitted to the DOH in accordance with Part A.6 for review and acceptance within 12 months from the effective date of this permit and include, at a minimum, the above. Within 18 months after the effective date of this permit, subject to adoption by rulemaking or other equivalent process, the revised standards shall be submitted to the DOH in accordance with Part A.6. To the extent that the revised standards have not been adopted, the Permittee shall submit a compliance schedule for adoption, which shall not exceed 24 months after the effective date of this permit.	landscape features and minimizing imperviousness to create functional and appealing site drainage that treats storm water as a resource, rather than a waste product. LID treatment measures include harvesting and use, infiltration, evapotranspiration, or biotreatment. The plan for the implementation of LID provisions shall include at a minimum the following: • Criteria for requiring implementation. • Investigation into the development of quantitative criteria for a specific design storm to be managed by LID techniques. Examples of design storm requirements include: 24-hour, 85% storm through infiltration; on-site management of the first inch of rainfall within a 24-hour period; retention of the 100-year, 2-hour storm; or on-site management of the 24-hour, 95% storm. • Feasibility criteria for circumstances in which a waiver could be granted for the LID requirements. • When a LID waiver is granted, alternatives such as offsite mitigation and/or non-LID treatment control BMPs could be required. ~~A draft of the revised standards shall be submitted to the DOH in accordance with Part A.6. and A.7. for review and acceptance within 12 months from the effective date of this permit and include, at a minimum, the above. Within 18 months after the effective date of this permit, subject to adoption by rulemaking or other equivalent process, the revised standards shall be submitted to the DOH in accordance with Part A.6. To the extent that the revised standards have not been adopted, the Permittee shall submit a compliance schedule for adoption, which shall not exceed 24 months after the effective date of this permit.~~ The permittee shall develop and implement its LID Design Review Checklist. The Permittee shall develop and implement its LID Design Review Checklist. *Rationale*: The requirement to revise MCBH's post-construction standards to address LID requirements was included in the previous permit and shall remain in this permit but given a reduced compliance time as this was required in the previous permit.

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Part D.1.e.(3) *BMP, Operation and Maintenance, and Inspection Database* – The Permittee shall implement its Asset Management System to track the frequency of inspections and maintenance of the Permanent BMPs. In addition to the standard information collected for all projects (e.g., project name, owner, location, start/end date, etc.), the database shall also include, at a minimum: • Type and number of LID practices. • Type and number of Source Control BMPs. • Type and number of Treatment Control BMPs. • Latitude/Longitude coordinates of controls using Global Positioning Systems and NAD83 or other Datum as long as the datum remains consistent. • Photographs of controls. • Operation and maintenance requirements. • Frequency of inspections. • Frequency of maintenance.	**Part D.1.e.(3)** *BMP, Operation and Maintenance, and Inspection Database* – Within six (6) months of the effective date of this permit, ~~The~~ the Permittee shall implement its Asset Management System to track the frequency of inspections and maintenance of the Permanent BMPs. In addition to the standard information collected for all projects (e.g., project name, owner, location, start/end date, etc.), the database shall also include, at a minimum: • Name and identification of asset or control measures. • Type and number of LID practices. • Type and number of Source Control BMPs. • Type and number of Treatment Control BMPs. • Latitude/Longitude coordinates of controls using Global Positioning Systems and NAD83 or other Datum as long as the datum remains consistent. • Photographs of controls. • Operation and maintenance requirements. • Frequency of inspections. • Frequency of maintenance. • Current performance. • Consequences of failure. • Likelihood of failure. *Rationale*: The requirement to implement its Asset Management System was included in the previous permit but is now given a reduced compliance time as this was required in the previous permit.
Part D.1.e.(4) *Education and Training* (i) *Project Proponents* – The Permittee shall provide education and outreach material for those parties who apply for permits (i.e., developers, engineers, architects, consultants, construction contractors, excavators, and property owners) on the selection, design, installation, operation and maintenance of storm water BMPs, structural controls, post construction BMPs, and LID practices. The outreach material may include a simplified flowchart for thresholds triggering permits and requirements, a list of required permits, implementing agencies, fees, overviews, timelines and a brief discussion of potential environmental impacts associated with storm water runoff. (ii) *Inspectors* – All Permittee staff and contractors	**Part D.1.e.(4)** *Education and Training* (i) *Project Proponents* – The Permittee shall provide education and outreach material for those parties who ~~apply for permits~~ are involved in the design process (~~i.e., developers, engineers, architects, consultants, construction contractors, excavators, and property owners~~ e.g., consultants and engineers) on the selection, design, installation, operation and maintenance of storm water BMPs, structural controls, post construction BMPs, and LID practices. The outreach material may include ~~a simplified flowchart for thresholds triggering permits and requirements, a list of required permits, implementing agencies, fees, overviews, timelines~~ LID design examples, requirements of LID installation, and a brief discussion of potential environmental impacts associated with storm water runoff.

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responsible for inspecting permanent post-construction BMPs and LID practices shall receive annual training.	(ii) *Inspectors* – All Permittee staff and contractors responsible for inspecting permanent post-construction BMPs and LID practices shall receive annual training. The Permittee shall maintain records of the annual training program. *Rationale*: Added LID and recordkeeping requirements.
Part D.1.f.(1) *Debris Control BMPs Program Plan* (i) *Asset Management System and Mapping* – The Permittee shall implement a comprehensive asset management system and map of its MS4, including structural and vegetative BMPs and an inventory of related appurtenances, including maintenance equipment, to ensure appropriate debris removal and system maintenance. The asset management system shall, at a minimum, assign an identification number for each drain inlet, outfall, and BMPs, and map their location on the Geographic Information System. The Permittee shall use this asset management system to establish priorities and to schedule and track efforts of appropriate system maintenance and debris removal program activities such as street sweeping, catch basin, cleaning, and green waste and accumulated soil removal. The SWMP shall include justification of its priorities applied to the asset management system on the basis of potential impacts to water quality.	**Part D.1.f.(1)** *Debris Control BMPs Program Plan* (i) *Asset Management System and Mapping* – Within twelve (12) months of the effective date of this permit, the ~~The~~ Permittee shall implement a comprehensive asset management system and map of its MS4, including structural and vegetative BMPs and an inventory of related appurtenances, including maintenance equipment, to ensure appropriate debris removal and system maintenance. The asset management system shall, at a minimum, assign an identification number for each drain inlet, outfall, and BMPs, and map their location on the Geographic Information System. The Permittee shall use this asset management system to establish priorities and to schedule and track efforts of appropriate system maintenance and debris removal program activities such as street sweeping, catch basin, cleaning, and green waste and accumulated soil removal. The SWMP shall include justification of its priorities applied to the asset management system on the basis of potential impacts to water quality. *Rationale*: The requirement to implement its Asset Management System was included in the previous permit but is now given a reduced compliance time as this was required in the previous permit.
Part D.1.f.(1) *Debris Control BMPs Program Plan* (iii) *Storm Drain Placards* – The Permittee shall install placards on its drainage inlets; evaluate the effectiveness of the placards; and revise as necessary to meet its purpose. The purpose of the placards shall be discussed within the SWMP. A minimum of 50 new placards shall be installed per year. Priority shall be given to the Permittee's industrial and commercial areas and	**Part D.1.f.(1)** *Debris Control BMPs Program Plan* (iii) *Storm Drain Placards* – The Permittee shall install placards on its drainage inlets and post-construction BMPs; evaluate the effectiveness of the placards; and revise as necessary to meet its purpose. The purpose of the placards shall be discussed within the SWMP. A minimum of 50 new placards shall be installed per year. Priority shall be given to the Permittee's

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areas with pedestrian traffic. The Permittee shall implement its system to track placement of placards and procedures for maintenance staff to inspect and replace, as necessary, placards during routine maintenance activities.	industrial and commercial areas and areas with pedestrian traffic. The Permittee shall implement its system to track placement of placards and procedures for maintenance staff to inspect and replace, as necessary, placards during routine maintenance activities. *Rationale*: Added requirement to install placards on post-construction BMPs, consistent with the HIARNG and Army Garrison MS4 permits.
Part D.1.f.(1) *Debris Control BMPs Program Plan* *(iv) Action Plan for Retrofitting Structural BMPs* – The Permittee shall provide the DOH with an Action Plan for Retrofitting Structural BMPs within one (1) year from the effective date of this permit, which shall identify retrofits to be implemented, and include an explanation of the basis for their selection and an implementation schedule. The implementation schedule shall cover a five (5) year period and be updated annually to include additional retrofit projects with water quality protection measures. The annual updates to the implementation schedule shall be included in the Annual Report with a description of the projects status. The Action Plan may include, but not be limited to projects in compliance with any TMDL implementation and monitoring plan.	**Part D.1.f.(1)** *Debris Control BMPs Program Plan* *(iv) Action Plan for Retrofitting Structural BMPs* – The Permittee shall ~~provide the DOH with an~~ implement an Action Plan for Retrofitting Structural BMPs within ~~one (1) year~~ twelve (12) months ~~from~~ of the effective date of this permit, which shall identify retrofits to be implemented, and include an explanation of the basis for their selection and an implementation schedule. The implementation schedule shall cover a five (5) year period and be updated annually to include additional retrofit projects with water quality protection measures. The annual updates to the implementation schedule shall be included in the Annual Report with a description of the project's status. The Action Plan may include, but not be limited to projects in compliance with any TMDL implementation and monitoring plan. *Rationale*: An action plan for retrofitting structural BMPs was included in the previous permit and shall remain in this permit but given a reduced compliance time as this was required in the previous permit.
Part D.1.f.(1) *Debris Control BMPs Program Plan* *(v) Trash Reduction Plan* – Within three (3) years from the effective date of this permit, the Permittee shall develop and submit to the DOH for review and acceptance, a trash reduction plan which assesses the issue, identifies and implements control measures, and monitors the control measures to reduce trash loads from the MS4. The plan shall include, at a minimum and be formatted consistent with the following: • Quantitative estimate of the debris currently being discharged (baseline load) from the MS4, including methodology used to	**Part D.1.f.(1)** *Debris Control BMPs Program Plan* *(v) Trash Reduction Plan* – ~~Within three (3) years from the effective date of this permit, the~~ The Permittee shall ~~develop and submit to the DOH for review and acceptance, a~~ implement its trash reduction plan which assesses the issues, identifies and implements control measures, and monitors the control measures to reduce trash loads from the MS4. The plan shall include, at a minimum and be formatted consistent with the following: • Quantitative estimate of the debris currently being discharged (baseline load) from the

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determine the load. • Description of control measures currently being implemented as well as those needed to reduce debris discharges from the MS4 consistent with short-term and long-term reduction targets. • A short-term plan and proposed compliance deadline for reducing debris discharges from the MS4 by 50% from the baseline load. • A long-term plan and proposed compliance deadline for reducing debris discharges from the MS4 to zero. • Geographical targets for trash reduction activities with priority on waterbodies listed as impaired for trash on the State's CWA Section 303(d) list. • Trash reduction-related education activities as a component of Part D.1.a. • Integration of control measures, education and monitoring to measure progress toward reducing trash discharges. • An implementation schedule. • Monitoring plan to aid with source identification and loading patterns as well as measuring progress in reducing the debris discharges from the MS4. • The Annual Report shall include a summary of its trash load reduction actions (control measures and best management practices) including the types of actions and levels of implementation, the total trash loads and dominant types of trash removed by its actions, and the total trash loads and dominant types of trash for each type of action. The plan shall provide for compliance with the above short-term and long-term discharge limits in the shortest practicable timeframe.	MS4, including methodology used to determine the load. • Description of control measures currently being implemented as well as those needed to reduce debris discharges from the MS4 consistent with short-term and long-term reduction targets. • A short-term plan and proposed compliance deadline for reducing debris discharges from the MS4 by 50% from the baseline load. • A long-term plan and proposed compliance deadline for reducing debris discharges from the MS4 to zero. • Geographical targets for trash reduction activities with priority on waterbodies listed as impaired for trash on the State's CWA Section 303(d) list. • Trash reduction-related education activities as a component of Part D.1.a. • Integration of control measures, education and monitoring to measure progress toward reducing trash discharges. • An implementation schedule. • Monitoring plan to aid with source identification and loading patterns as well as measuring progress in reducing the debris discharges from the MS4. • The Annual Report shall include a summary of its trash load reduction actions (control measures and best management practices) including the types of actions and levels of implementation, the total trash loads and dominant types of trash removed by its actions, and the total trash loads and dominant types of trash for each type of action. The plan shall provide for compliance with the above short-term and long-term discharge limits in the shortest practicable timeframe. The Trash Reduction Plan shall be included in the SWMP and any revisions noted in the Annual Report. *Rationale*: 1. A final trash reduction plan was submitted in the previous permit term and is being continued in draft permit. 2. Added Trash Reduction Plan revisions to be noted in the Annual Report.

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Part D.1.f.(2) *Chemical Applications BMPs Program Plan* (i) *Training* – Permittee shall develop an Authorized Use List of chemicals used and implement a specific training program for all potential appliers (bulk and hand-held) of the chemicals (e.g., fertilizers, pesticides, and herbicides) on the proper application of the chemicals. The Permittee shall not permit the application of fertilizers, pesticides, or herbicides unless the applier has first received this training and has provided proper certification.	**Part D.1.f.(2)** *Chemical Applications BMPs Program Plan* (i) *Training* – All employees or contractors or employees of contractors applying pesticides, herbicides, and fertilizers shall possess a current commercial certification by the State of Hawaii, Department of Agriculture or Department of Defense Certificate of Competency in the appropriate EPA-approved state categories. The Permittee shall develop an Authorized Use List of chemicals used and implement a specific training program for all potential appliers (bulk and hand-held) of the chemicals (e.g., fertilizers, pesticides, and herbicides) on the proper application of the chemicals. The Permittee shall not permit the application of fertilizers, pesticides, or herbicides unless the handler and applier has first received this training and has provided proper certification. *Rationale*: Added permit condition consistent with the HIARNG MS4 and Army Garrison MS4 permits.
Part D.1.f.(2) *Chemical Applications BMPs Program Plan* (iii) The Permittee shall ensure that their employees or contractors or employees of contractors applying registered pesticides, herbicides, and fertilizers work under the direction of a certified applicator, follow the pesticide label, and comply with any other State, City, or Federal regulations for pesticides, herbicides, and fertilizers. All Permittee employees or contractors applying pesticides, herbicides or fertilizers shall receive training on the BMPs annually.	**Part D.1.f.(2)** *Chemical Applications BMPs Program Plan* (iii) Records and Reports – The Permittee shall ensure that all employees or contractors or employees of contractors prepare, submit, and maintain daily pest management activities for each pest management service. Records shall include all surveillance, non-chemical controls and chemical applications. The Permittee shall ensure that their employees or contractors or employees of contractors applying registered pesticides, herbicides, and fertilizers work under the direction of a certified applicator, follow the pesticide label, and comply with any other State, City, or Federal regulations for pesticides, herbicides, and fertilizers. All Permittee employees or contractors applying pesticides, herbicides or fertilizers shall receive training on the BMPs annually. The Permittee shall maintain records of the annual training program. *Rationale*: Added recordkeeping requirement.

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Part D.1.f.(3) *Erosion Control BMPs Program Plan* – The Permittee shall: (ii) Require the implementation of temporary erosion control measures (e.g., erosion control blankets and/or fabrics, gravel bag placement and silt fencing/fiber rolls) on erosion-prone areas with the potential for significant water quality impact if a permanent solution is not immediately possible. Notwithstanding any other implementation provisions, the SWMP shall require the implementation of such temporary erosion control measures on all applicable areas within 18 months from the effective date of this permit. For projects which require a CWA Section 401 Water Quality Certification (WQC), the WQC application shall be submitted to the DOH within one (1) year from the effective date of this permit and be implemented with six (6) months of the WQC or other regulatory permit(s) issuance date.	**Part D.1.f.(3)** *Erosion Control BMPs Program Plan* – The Permittee shall: (ii) Require the implementation of temporary erosion control measures (e.g., erosion control blankets and/or fabrics, gravel bag placement and silt fencing/fiber rolls) on erosion-prone areas with the potential for significant water quality impact if a permanent solution is not immediately possible. Notwithstanding any other implementation provisions, the SWMP shall require the implementation of such temporary erosion control measures on all applicable areas ~~within 18 months from the effective date of this permit~~. For projects which require a CWA Section 401 Water Quality Certification (WQC), the WQC application shall be submitted to the DOH within one (1) year from the effective date of this permit and be implemented with six (6) months of the WQC or other regulatory permit(s) issuance date. *Rationale*: The revised SWMP submitted during the previous permit term included implementing temporary erosion control measures.
Part D.1.f.(3) *Erosion Control BMPs Program Plan* – The Permittee shall: (iii) Develop a maintenance plan for vegetated portions of the drainage system used for erosion and sediment control, and LID features; including controlling any excessive clearing/removal, cutting of vegetation, and application of herbicide which affects its usefulness.	**Part D.1.f.(3)** *Erosion Control BMPs Program Plan* – The Permittee shall: (iii) ~~Develop~~ Implement a maintenance plan for vegetated portions of the drainage system used for erosion and sediment control, and LID features; including controlling any excessive clearing/removal, cutting of vegetation, and application of herbicide which affects its usefulness. *Rationale*: Revised SWMP submitted during the previous permit term refers to the Maintenance Activities BMPs Field Manual for maintenance of vegetated BMPs.

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Part D.1.f.(3) *Erosion Control BMPs Program Plan* – The Permittee shall: (iv) Provide the DOH with an Action Plan to address erosion at its storm drain system outlets with significant potential for water quality impacts to be completed within one (1) year from the effective date of this permit, which shall identify outfalls to be addressed, explanation on the basis of their selection and an implementation schedule. The implementation schedule shall cover a five (5) year period. A status report on implementation of the plan shall be included in the Annual Report. The Permittee shall install velocity dissipators or other BMPs to reduce erosion at locations identified by periodic required inspections.	**Part D.1.f.(3)** *Erosion Control BMPs Program Plan* – The Permittee shall: (iv) ~~Provide the DOH with~~ Implement an Action Plan to address erosion at its storm drain system outlets with significant potential for water quality impacts ~~to be completed within one (1) year from the effective date of this permit~~, which shall identify outfalls to be addressed, explanation on the basis of their selection and an implementation schedule. The implementation schedule shall cover a five (5) year period. A status report on implementation of the plan shall be included in the Annual Report. The Permittee shall install velocity dissipators or other BMPs to reduce erosion at locations identified by periodic required inspections. *Rationale*: Action Plan to Address Erosion at Storm Drain Outlets was submitted during the previous permit term and is being continued in draft permit.
Part D.1.f.(4) *Maintenance Activities BMPs Program Plan* (i) *Maintenance Activities Best Management Practices Field Manual* - The Permittee shall develop and implement a BMPs Field Manual for Maintenance Activities for all Marine Corps Base Hawaii maintenance activities within three (3) years from the effective date of this permit. Examples of such activities include, but are not limited to: paving and road repairs, street cleaning, saw cutting, concrete work, curb and gutter replacement, buried utility repairs and installation, vegetation removal, painting and paving, debris and trash removal, spill cleanup, etc. The Field Manual shall be updated as necessary or at least once per permit term and include written procedures to minimize pollutant discharge for maintenance activities which have the potential to discharge pollutants to its MS4. The procedures shall ensure that appropriate BMPs are verifiable through field inspections (i.e., field inspectors can quickly determine if the appropriate BMPs have been implemented.	**Part D.1.f.(4)** *Maintenance Activities BMPs Program Plan* (i) *Maintenance Activities Best Management Practices Field Manual* - The Permittee shall ~~develop~~ maintain and implement a BMPs Field Manual for Maintenance Activities for all Marine Corps Base Hawaii maintenance activities ~~within three (3) years from the effective date of this permit~~. Examples of such activities include, but are not limited to: paving and road repairs, street cleaning, saw cutting, concrete work, curb and gutter replacement, buried utility repairs and installation, vegetation removal, painting and paving, debris and trash removal, spill cleanup, etc. The Field Manual shall be updated as necessary or at least once per permit term and include written procedures to minimize pollutant discharge for maintenance activities which have the potential to discharge pollutants to its MS4. The procedures shall ensure that appropriate BMPs are verifiable through field inspections (i.e., field inspectors can quickly determine if the appropriate BMPs have been implemented. *Rationale*: Maintenance Activities BMP Program Plan was submitted during the previous permit term and is being continued in draft permit.

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Part D.1.f.(4) *Maintenance Activities BMPs Program Plan* (ii) *Storm Water Pollution Control Plan (SWPCP).* The Permittee shall implement and enforce the requirements of the SWPCP, as discussed in Part E.1. of this Permit.	**Part D.1.f.(4)** *Maintenance Activities BMPs Program Plan* (ii) *Storm Water Pollution ~~Control~~ Prevention Plan or SWPPP (formerly known as the Storm Water Pollution Control Plan or SWPCP).* The Permittee shall implement and enforce the requirements of the ~~SWPCP~~ SWPPP, as discussed in ~~Part E.1.~~ Appendix 1 of this Permit. *Rationale*: Revised to Storm Water Pollution Prevention Plan (formerly known as SWPCP), consistent with Appendix 1.
Part D.1.f.(4) *Maintenance Activities BMPs Program Plan* (iii) *Training* – The Permittee shall further develop and provide annual training to staff on proper maintenance activities to prevent storm water pollution. The training shall cover the Field Manual, identify potential sources of pollution, general BMPs that can be used to reduce and/or eliminate such sources, and specific BMPs for their activities. The training shall incorporate components of the public education campaign and educate staff that they serve a role in protecting water quality. Staff shall be made aware of the NPDES permit, the overall SWMP, and the applicable BMPs Program(s).	**Part D.1.f.(4)** *Maintenance Activities BMPs Program Plan* (iii) *Training* – The Permittee shall further develop and provide annual training to staff on proper maintenance activities to prevent storm water pollution. The training shall cover the Field Manual, identify potential sources of pollution, general BMPs that can be used to reduce and/or eliminate such sources, and specific BMPs for their activities. The training shall incorporate components of the public education campaign and educate staff that they serve a role in protecting water quality. Staff shall be made aware of the NPDES permit, the overall SWMP, and the applicable BMPs Program(s). The Permittee shall maintain records of the annual training program. *Rationale*: Added recordkeeping requirement.
Part D.1.g. Industrial and Commercial Activities Discharge Management Program The Permittee shall develop an industrial and commercial discharge management program to reduce to the MEP the discharge of pollutants from all industrial and commercial facilities and activities which initially discharge into the Permittee's MS4. At a minimum, the program shall include:	**Part D.1.g.** Industrial and Commercial Activities Discharge Management Program The Permittee shall ~~develop and~~ implement an industrial and commercial discharge management program to reduce to the MEP the discharge of pollutants from all industrial and commercial facilities and activities which initially discharge into the Permittee's MS4. At a minimum, the program shall include: *Rationale*: Industrial and commercial activities program were incorporated into revised SWMP submitted during the previous permit term.
Part D.1.g.(1) *Requirement to Implement BMPs* – Require a permit or written equivalent approval for drainage connections and discharge of surface runoff into the MS4 and maintain a database of the	**Part D.1.g.(1)** *Requirement to Implement BMPs* – Require a permit or written equivalent approval for drainage connections and discharge of surface runoff into the MS4 and maintain a database of the

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permits/approvals. The permit/approval shall obligate the facility to implement BMPs	permits/approvals. The permit/approval shall obligate the facility to implement BMPs from their BMP Plan or SWPPP and prevent water quality violations to the Permittee's storm drain system. *Rationale*: Added specific implementation of BMPs from the BMP Plan or SWPPP.
Part D.1.g.(2) *Inventory and Map of Industrial Facilities and Activities* – The Permittee shall update and submit to the DOH, in electronic portable document format (pdf - minimum 300 dpi), the industrial facilities and activities inventory (industrial inventory), sorted by TMK, and map of such facilities and activities discharging, directly or indirectly, to its MS4. The industrial inventory shall include the facility name, street address, TMK, nature of business or activity, Standard Industrial Classification (SIC) code(s) that best reflect the facility product or service, principal storm water contact, receiving State water, and whether an NGPC under HAR, Chapter 11-55, Appendix B, NPDES General Permit Authorizing the Discharge of Storm Water Associated with Industrial Activities (General Industrial Storm Water permit) or any other applicable NPDES permit has been obtained, including a permit or file number and issuance date.	**Part D.1.g.(2)** *Inventory and Map of Industrial Facilities and Activities* – The Permittee shall annually update and submit ~~to the DOH,~~ in the Annual Report, in ~~electronic~~ portable document format (pdf - minimum 300 dpi), the industrial facilities and activities inventory (industrial inventory), sorted by ~~TMK~~ priority areas, and map of such facilities and activities discharging, directly or indirectly, to its MS4. The industrial inventory shall include, by priority area, the installation or facility name, street address, ~~TMK~~ building number, nature of business or activity, Standard Industrial Classification (SIC) code(s) that best reflect the facility product or service, principal storm water contact, receiving State water, and whether an NGPC under HAR~~,~~ Chapter 11-55, Appendix B, NPDES General Permit Authorizing the Discharge of Storm Water Associated with Industrial Activities (General Industrial Storm Water permit) or any other applicable NPDES permit has been obtained, including a permit or file number and issuance date. *Rationale*: 1. Industrial facilities inventory to be included in the annual report. 2. Adjust facility location requirement to more appropriately cover the MCBH military installation.
Part D.1.g.(3) *Inventory and Map of Commercial Facilities and Activities* – The Permittee shall update and submit to the DOH, in pdf format (minimum 300 dpi), the commercial facilities and activities inventory (commercial inventory), sorted by priority areas, and map of such facilities and activities discharging, directly or indirectly, to its MS4 within its Annual Report. The commercial inventory update may be based on the collection of new information obtained during field activities or through other readily available intra-agency informational databases (e.g., business licenses, pretreatment permits, sanitary sewer hook-up permits).	**Part D.1.g.(3)** *Inventory and Map of Commercial Facilities and Activities* – The Permittee shall annually update and submit ~~to the DOH,~~ in the Annual Report, in pdf format (minimum 300 dpi), the commercial facilities and activities inventory (commercial inventory), sorted by priority areas, and map of such facilities and activities discharging, directly or indirectly, to its MS4 within its Annual Report. The commercial inventory update may be based on the collection of new information obtained during field activities or through other readily available intra-agency informational databases (e.g., business licenses, pretreatment permits, sanitary

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The commercial inventory shall include, by priority area, the facility name, street address, TMK, nature of business or activity, SIC code(s) that best reflect the facility product(s) or services(s), principal storm water contact, and receiving State water.	sewer hook-up permits). The commercial inventory shall include, by priority area, the installation or facility name, street address, ~~TMK~~ building number, nature of business or activity, SIC code(s) that best reflect the facility product(s) or services(s), principal storm water contact, and receiving State water. *Rationale*: 1. Commercial facilities inventory to be included in the annual report. 2. Adjust facility location requirement to more appropriately cover the MCBH military installation.
Part D.1.g.(6) *Storm Water Pollution Control Plan (SWPCP) Review and Acceptance for Industrial Facilities* – The Permittee shall: (i) Require Industrial Activities that initially discharge storm water into MCBH's Small MS4 to develop, implement, and update, as necessary, a SWPCP that meets MCBH's Standards and HAR Chapter 11-55, Appendix B, SWPCP requirements, which includes storm water monitoring; (ii) Verify the facility owner has received NPDES permit coverage for the discharge of storm water associated with industrial activity or provided proof of filing a NOI, NPDES application, or NPDES "No Exposure;" and (iii) Review for acceptance, the SWPCP and any revisions or updates or other plans relating to pollution prevention or similar document(s) to ensure the discharge of pollutants will be minimized to the maximum extent practicable.	**Part D.1.g.(6)** *Storm Water Pollution ~~Control~~ Prevention Plan or SWPPP (formerly known as the Storm Water Pollution Control Plan or SWPCP) Review and Acceptance for Industrial Facilities* – The Permittee shall: (i) ~~Require Industrial Activities that initially discharge storm water into MCBH's Small MS4 to develop, implement, and update, as necessary, a SWPCP that meets MCBH's Standards and HAR Chapter 11-55, Appendix B SWPCP requirements, which includes storm water monitoring;~~ Verify that all industrial and commercial facilities that initially discharge storm water associated with industrial activities into MCBH's Small MS4 are incorporated into the SWPPP to ensure the discharge of pollutants will be minimized to the maximum extent practicable, and (ii) ~~Verify the facility owner has received NPDES permit coverage for the discharge of storm water associated with industrial activity or provided proof of filing a NOI, NPDES application, or NPDES "No Exposure;" and~~ Update and implement the SWPPP to ensure the discharge of pollutants will be minimized to meet MCBH standards and the requirements of Appendix 1. ~~(iii) Review for acceptance, the SWPCP and any revisions or updates or other plans relating to pollution prevention or similar document(s) to ensure the discharge of pollutants will be minimized to the maximum extent practicable.~~

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	Rationale: Revised to Storm Water Pollution Prevention Plan (formerly known as SWPCP), consistent with Appendix 1.
Part D.1.g.(7) *Enforcement Policy for Industrial and Commercial Facilities and Activities* – Within one (1) year of the effective date of this permit, the Permittee shall establish and implement its own polices for enforcement and penalties for industrial and commercial facilities which have failed to comply. The policy shall be part of an overall escalating enforcement policy and must consist of the following: • Conducting inspections. • Issuance of written documentation to a facility representative within 30 calendar days of storm water deficiencies identified during inspection. Documentation must include copies of all field notes, correspondence, photographs, and sampling results, if applicable. • A timeline for correction of the deficiencies. • Provisions for re-inspection and pursuing enforcement actions, if necessary. In the event the Permittee has exhausted all available sanctions and cannot bring a facility or activity into compliance with its policies and this permit, or otherwise deems the facility or activity an immediate and significant threat to water quality, the Permittee shall provide e-mail notification to cleanwaterbranch@doh.hawaii.gov, Attn: Enforcement Section Supervisor within one (1) week of such determination. E-mail notification shall be followed by written notification and include a copy of all inspection checklists, notes, photographs, and related correspondence in pdf format (300 minimum dpi) in accordance with Part A.6 within two (2) weeks of the determination. In instances where an inspector identifies a facility that has not applied for the General Industrial Storm Water permit coverage or any other applicable NPDES permit, the Permittee shall provide email notification to the DOH within one (1) week of such determination.	**Part D.1.g.(7)** *Enforcement Policy for Industrial and Commercial Facilities and Activities* – ~~Within one (1) year of the effective date of this permit, the~~ The Permittee shall ~~establish and~~ implement its own polices for enforcement and penalties for industrial and commercial facilities which have failed to comply. The policy shall be part of an overall escalating enforcement policy and must consist of the following: • Conducting inspections. • Issuance of written documentation to a facility representative within 30 calendar days of storm water deficiencies identified during inspection. Documentation must include copies of all field notes, correspondence, photographs, and sampling results, if applicable. • A timeline for correction of the deficiencies. • Provisions for re-inspection and pursuing enforcement actions, if necessary. In the event the Permittee has exhausted all available sanctions and cannot bring a facility or activity into compliance with its policies and this permit, or otherwise deems the facility or activity an immediate and significant threat to water quality, the Permittee shall provide e-mail notification to cleanwaterbranch@doh.hawaii.gov, Attn: Enforcement Section Supervisor within one (1) week of such determination. E-mail notification shall be followed by written notification and include a copy of all inspection checklists, notes, photographs, and related correspondence in pdf format (300 minimum dpi) in accordance with Part ~~A.6~~A.7. within two (2) weeks of the determination. In instances where an inspector identifies a facility that has not applied for the General Industrial Storm Water permit coverage or any other applicable NPDES permit, the Permittee shall provide email notification to the DOH within one (1) week of such determination. *Rationale*: 1. Enforcement policies included in the ERP submitted during the previous permit term and continued in the draft permit. 2. Update reference to Part A.7.
Part D.1.g.(8) *Training* – The Permittee shall	**Part D.1.g.(8)** *Training* – The Permittee shall

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provide training to staff on how to conduct industrial and commercial inspections, the types of facilities requiring NPDES permit coverage for storm water permit associated with industrial activity or any other applicable NPDES permit, components in a SWPCP for industrial facilities, BMPs and source control measures for industrial and commercial facilities, and inspection and enforcement techniques. This training shall be specific to the Permittee's activities, policies, rules, and procedures. Any updates to the training shall be submitted to the DOH for review and acceptance within 90 calendar days of the change. Permittee inspectors shall receive annual training.	provide training to staff on how to conduct industrial and commercial inspections, the types of facilities requiring NPDES permit coverage for storm water permit associated with industrial activity or any other applicable NPDES permit, components in a ~~SWPCP~~ SWPPP for industrial facilities, BMPs and source control measures for industrial and commercial facilities, and inspection and enforcement techniques. This training shall be specific to the Permittee's activities, policies, rules, and procedures. Any updates to the training shall be ~~submitted to the DOH for review and acceptance within 90 calendar days of the change~~ included in the Annual Report. Permittee inspectors shall receive annual training. The Permittee shall maintain records of the annual training program onsite. *Rationale*: Added recordkeeping requirement.

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Part E. INDUSTRIAL FACILITIES

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Part E.1. The industrial facilities covered under this permit shall comply with the requirements in HAR, Chapter 11-55, Appendix B.	**Part E.1.** The industrial facilities covered under this permit shall comply with the requirements in ~~HAR, Chapter 11-55, Appendix B~~ Appendix 1 – Storm Water Associated with Industrial Activities. *Rationale*: Industrial storm water requirements are specified in Appendix 1 and are based on EPA's MSGP approach.

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Building No.	General Category	Description
101	Maintenance	Maintenance Hangar
102	Maintenance	Maintenance Hangar
103	Maintenance	Maintenance Hangar
104	Maintenance	Maintenance Hangar
105	Maintenance	Maintenance Hangar
		Recycle Center
129	Maintenance	Small Boat Repair Shop
351	Maintenance	Vehicle Maintenance Shop
373	Maintenance	Motor Vehicle Maintenance Shop
375	Maintenance	Aircraft Maintenance
1170, 1171	POL Storage	Aircraft Fuel Islands
1252, 1253	Storage	Fuel Division Supply Department
1304	Operations	Ordnance Operations
1388	Maintenance	Lab/Boat Shop
1619	Maintenance	Ground Support Equipment Shop
1631	Maintenance	Aircraft Wash & Rinse Facility
5069	Maintenance	Corrosion Control Facility
6025	Storage	Liquid Oxygen/Nitrogen Facility
6107	Maintenance	Aircraft Rinse Facility
6182	Storage	Fuel Delivery Branch and Refueler Truck Parking
6183	Maintenance	Engine Test Facility
6479	Storage	Aircraft Ready Fuel Storage
Sanitary Landfill	Sanitary Landfill	Sanitary Landfill
WWTP	Utility	Water Reclamation Facility
Parking Apron	Storage	Aircraft Parking Apron

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Building No.	General Category	Description
~~101~~	~~Maintenance~~	~~Maintenance Hangar~~
~~102~~	~~Maintenance~~	~~Maintenance Hangar~~
~~103~~	~~Maintenance~~	~~Maintenance Hangar~~
~~104~~	~~Maintenance~~	~~Maintenance Hangar~~
~~105~~	~~Maintenance~~	~~Maintenance Hangar~~
P-3 Apron		Aircraft Wash Facility
132		Recycle Center
~~129~~ 1698	Maintenance	Small Boat Repair Shop
351	Maintenance	Vehicle Maintenance Shop
~~373~~	~~Maintenance~~	~~Motor Vehicle Maintenance Shop~~
6874		3rd Radio Battalion
~~375~~	~~Maintenance~~	~~Aircraft Maintenance~~
1170, 1171	POL Storage	Aircraft Fuel Islands
1252, 1253	Storage	Fuel Division Supply Department
~~1304~~	~~Operations~~	~~Ordnance Operations~~
~~1388~~ 6801	Maintenance	Lab/Boat Shop
1619	Maintenance	Ground Support Equipment Shop
1631	Maintenance	Aircraft Wash & Rinse Facility
~~5069~~	~~Maintenance~~	~~Corrosion Control Facility~~
~~6025~~	~~Storage~~	~~Liquid Oxygen/Nitrogen Facility~~
6107	Maintenance	Aircraft Rinse Facility
6182	Storage	Fuel Delivery Branch and Refueler Truck Parking
6183	Maintenance	Engine Test Facility
6479	Storage	Aircraft Ready Fuel Storage
Sanitary Landfill	Sanitary Landfill	Sanitary Landfill
~~WWTP~~ Water Reclamation Facility (WRF)	Utility	Water Reclamation Facility
~~P-3 Parking Apron~~	~~Storage~~	~~Aircraft Parking Apron~~
~~6030~~		~~3rd Marine Motor Transportation (MT)~~
3014		Combat Logistics Battalion (CLB-3) Support Company Transportation Services
5011		12th Marine Motor T

Rationale: Inventory of industrial facilities updated

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	from the 2018 Annual Report. Removed industrial facilities under the conditional "No Exposure" exclusion.
Part E.2. An individual at each facility (e.g., yard foreman) shall be charged with ensuring implementation of the SWPCP. This individual shall be trained to implement the SWPCP, including but not limited to, collecting storm water samples and analyzing samples for temperature and pH, conducting inspections, identifying deficiencies and performing corrective actions.	**Part E.2.** An individual at each facility (e.g., yard foreman) shall be charged with ensuring implementation of the ~~SWPCP~~ Storm Water Pollution Prevention Plan (SWPPP). This individual shall be trained to implement the ~~SWPCP~~ SWPPP, including but not limited to, collecting storm water samples and analyzing samples for temperature and pH, conducting inspections, identifying deficiencies and performing corrective actions. *Rationale*: Revised to Storm Water Pollution Prevention Plan (formerly known as SWPCP), consistent with Appendix 1.
Part E.3. This permit may cover new or currently existing industrial facilities not currently identified in the Permittee's application upon submission of the "MS4 NPDES Individual Permit - Industrial Storm Water Discharge Notification Form" by the Permittee using the "CWB Compliance Submittal Form for Individual NPDES Permits and NGPCs" through the DOH's e-Permitting Portal. Along with the submission of the form, the Permittee shall submit a SWPCP for the industrial facility, and other attachments to the DOH for review and comment, including updating its SWMP Plan. Upon acceptance of the information, the DOH will acknowledge by letter NPDES permit coverage under this permit for the added facility. The SWPCP must be implemented upon the start-up of the facility or for an existing industrial facility; the SWPCP must be implemented upon submittal of the written request. To request coverage of a facility's industrial storm water discharges under this NPDES permit: • Open the e-Permitting Portal website at: https://eha-cloud.doh.hawaii.gov/epermit. Enter your login and password. If you do not have a login and password you will be asked to do a one-time registration. • Click on the e-Permitting Application Finder tool and locate the "CWB Compliance Submittal Form for Individual NPDES Permits and NGPCs." • Under Additional Links, download the "MS4 NPDES Individual Permit – Industrial Storm Water Discharge Notification Form."	~~**Part E.3.** This permit may cover new or currently existing industrial facilities not currently identified in the Permittee's application upon submission of the "MS4 NPDES Individual Permit - Industrial Storm Water Discharge Notification Form" by the Permittee using the "CWB Compliance Submittal Form for Individual NPDES Permits and NGPCs" through the DOH's e-Permitting Portal. Along with the submission of the form, the Permittee shall submit a SWPCP for the industrial facility, and other attachments to the DOH for review and comment, including updating its SWMP Plan. Upon acceptance of the information, the DOH will acknowledge by letter NPDES permit coverage under this permit for the added facility. The SWPCP must be implemented upon the start-up of the facility or for an existing industrial facility; the SWPCP must be implemented upon submittal of the written request.~~ ~~To request coverage of a facility's industrial storm water discharges under this NPDES permit:~~ • ~~Open the e-Permitting Portal website at: https://eha-cloud.doh.hawaii.gov/epermit. Enter your login and password. If you do not have a login and password you will be asked to do a one-time registration.~~ • ~~Click on the e-Permitting Application Finder tool and locate the "CWB Compliance Submittal Form for Individual NPDES Permits and NGPCs."~~ • ~~Under Additional Links, download the "MS4 NPDES Individual Permit – Industrial Storm Water Discharge Notification Form."~~

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• You are required to complete the "MS4 NPDES Individual Permit -Industrial Storm Water Discharge Notification Form" for each facility that discharges industrial storm water. All sections of this form MUST be completed for NPDES Permit compliance. • Follow the instructions to complete and submit this form. • Attach the completed "MS4 NPDES Individual Permit – Industrial Storm Water Discharge Notification Form" in Section 7 of the "CWB Compliance Submittal Form for Individual NPDES Permits and NGPCs."	• ~~You are required to complete the "MS4 NPDES Individual Permit -Industrial Storm Water Discharge Notification Form" for each facility that discharges industrial storm water. All sections of this form MUST be completed for NPDES Permit compliance.~~ • ~~Follow the instructions to complete and submit this form.~~ • ~~Attach the completed "MS4 NPDES Individual Permit – Industrial Storm Water Discharge Notification Form" in Section 7 of the "CWB Compliance Submittal Form for Individual NPDES Permits and NGPCs."~~ _Rationale_: Industrial and commercial facilities seeking industrial storm water coverage shall submit an applicable Notice of Intent (NOI) or individual NPDES permit application forms.
Part E.4. The SWPCP shall contain all information required under HAR, Chapter 11-55, Appendix B, Section 6.	**Part E.3.** ~~The SWPCP shall contain all information required under HAR, Chapter 11-55, Appendix B, Section 6.~~ The Permittee shall implement SWPPPs for facilities listed in Part E.1. of this permit. The SWPPPs shall identify site-specific BMPs and be user-friendly for facility personnel. The SWPPP shall contain all information required under Appendix 1, Part 5.2. _Rationale_: Industrial storm water requirements are specified in Appendix 1 and are based on EPA's MSGP approach.
Part E.5. If the industrial facilities listed in Part E.1 above qualify for Conditional "No Exposure" Exclusion from NPDES Storm Water Associated with Industrial Activity permitting, the Permittee may submit the "MS4 NPDES Individual Permit – Industrial Storm Water No Exposure Notification Form," following the procedure listed in Part E.3 above. The Permittee will not be required to sample storm water runoff according to Part F.2 of this permit upon submittal of the "MS4 NPDES Individual Permit – Industrial Storm Water No Exposure Notification Form."	~~**Part E.5.** If the industrial facilities listed in Part E.1 above qualify for Conditional "No Exposure" Exclusion from NPDES Storm Water Associated with Industrial Activity permitting, the Permittee may submit the "MS4 NPDES Individual Permit – Industrial Storm Water No Exposure Notification Form," following the procedure listed in Part E.3 above.~~ ~~The Permittee will not be required to sample storm water runoff according to Part F.2 of this permit upon submittal of the "MS4 NPDES Individual Permit – Industrial Storm Water No Exposure Notification Form."~~ _Rationale_: Industrial storm water requirements are specified in Appendix 1 and are based on EPA's MSGP approach.

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	Part E.4. The Permittee shall retain the SWPPP, and all subsequent revisions, on-site or at a nearby office. *Rationale*: Added SWPPP document accessibility requirement.
	Part E.5. The Permittee shall conduct facility inspections as specified in Federal Register, Vol. 73, No. 189, pages 56572-56578, dated September 29, 2008; to ensure that the storm water pollution prevention plan remains effective. Otherwise, the Permittee shall conduct facility inspections at least quarterly. The Permittee shall maintain a record of the following: (1) Dates on which inspections were conducted; (2) Inspection findings; and (3) Corrective actions taken. *Rationale*: Added facility inspection requirements.
	Part E.6. The Permittee continue regular coordination and storm water quality data sharing between Departments with facilities having SWPPPs and with the Environmental Compliance and Protection Department. *Rationale*: Added facility coordination requirements.

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Part F. MONITORING REQUIREMENTS	
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Part F.1.b.(3) The Permittee shall develop a priority based monitoring schedule for each type of industrial area or facility consistent with part 1 of this permit. The monitoring schedule will prioritize facilities or areas with the greatest potential of pollutant discharge. The facilities or areas ranked first within each type shall be monitored annually. Industrial facilities not ranked first shall be monitored on a rotational basis (at least two facilities monitored per year per type). The Plan shall provide the rationale for the priority rankings, identify the types of industry and the priority facilities within each industry, and provide a monitoring schedule for the rotational monitoring of industrial facilities. Facilities which exceed any of the limitations are required to be monitored during the next representative storm event for all parameters until none of the limitations are exceeded.	**Part F.1.b.(3)** The Permittee shall develop a priority based monitoring schedule for each type of industrial area or facility consistent with ~~part 1~~ Part D.1.g.(4) of this permit. The monitoring schedule will prioritize facilities or areas with the greatest potential of pollutant discharge. The facilities or areas ranked first within each type shall be monitored annually. Industrial facilities not ranked first shall be monitored on a rotational basis (at least two facilities monitored per year per type). The Plan shall provide the rationale for the priority rankings, identify the types of industry and the priority facilities within each industry, and provide a monitoring schedule for the rotational monitoring of industrial facilities. ~~Facilities which exceed any of the limitations are required to be monitored during the next representative storm event for all parameters until none of the limitations are exceeded.~~ Industrial and commercial facilities shall comply with the monitoring requirements in Appendix 1, Part 6. *Rationale*: 1. Corrected reference to appropriate section of the draft permit. 2. Included reference to Appendix 1 for industrial storm water monitoring requirements.
Part F.2. Storm Water Associated with Industrial Activities	**Part F.2.** Storm Water Associated with Industrial Activities **Part F.2.a.** Industrial and commercial facilities shall be inspected in accordance with Appendix 1, Part 3 and the industry sector-specific requirements in Appendix 1, Part 8. *Rationale*: Included reference to industrial storm water inspection requirements from Appendix 1.
Part F.2. Storm Water Associated with Industrial Activities The Permittee shall annually monitor the storm water runoff for the parameters specified below, for each of the Permittee's industrial facilities, including any additional parameters which the Permittee also believes to be present in the storm water runoff.	**Part F.2.** Storm Water Associated with Industrial Activities **Part F.2.b.** Effluent Limitations The Permittee shall ~~annually~~ monitor the storm water runoff ~~for the parameters specified below, for each of the Permittee's industrial facilities, including any additional parameters which the Permittee also believes to be present in the storm water runoff~~ at the facilities listed in Part E.1. in accordance with Appendix 1, Part 6 and the industry sector-specific requirements in Part 8. All pollutant parameters shall be analyzed according to test procedures described in Appendix 1, Part 6.

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	Rationale: Industrial storm water requirements are specified in Appendix 1 and are based on EPA's MSGP approach.
	Part F.2.b.(1) Effluent Limitations Monitoring: Sector L – Landfills, Land Application Sites, and Open Dumps Effluent limitations for storm water associated with industrial activity from Sector L – Landfills, Land Application Sites, and Open Dumps are listed in Appendix 1, Part 8.L.10 and are shown in Table F-1 below. An exceedance of the effluent limitation is a permit violation. Table F-1 Effluent Limitations for Storm Water Associated with Industrial Activity from Sector L (Discharges from non-hazardous waste landfills subject to effluent limitations in 40 CFR Part 445 Subpart B).

Parameter	Units	Daily Maximum	Monthly Average
Biochemical Oxygen Demand (BOD_5)	mg/L	140	37
Total Suspended Solids (TSS)	mg/L	88	27
Ammonia	mg/L	10	4.9
Alpha Terpineol	mg/L	0.033	0.016
Benzoic Acid	mg/L	0.12	0.071
p-Cresol	mg/L	0.025	0.014
Phenol	mg/L	0.026	0.015
Total Zinc	mg/L	0.20	0.11
pH	s.u.	Within the range of 6 – 9 standard pH units	

Rationale: Provided reference to Sector L industrial storm water effluent limitations in Appendix 1.

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	Part F.2.c. Sector-Specific Benchmarks The Permittee shall monitor the storm water runoff at the facilities listed in Part E.1 in accordance with Appendix 1, Part 6 and the industry sector-specific requirements in Part 8. Benchmark monitoring data are primarily for your use to determine the overall effectiveness of your control measures and to assist you in determining when additional corrective action(s) may be necessary. A benchmark exceedance is not a permit violation, however, if corrective action is required as a result of a benchmark exceedance, failure to conduct required corrective action is a permit violation. *Rationale*: Provided reference to industrial storm water benchmarks in Appendix 1.

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	Part F.2.c.(1) Benchmark Monitoring: Sector L – Landfills, Land Application Sites, and Open Dumps Benchmark monitoring for storm water associated with industrial activity from Sector L – Landfills, Land Application Sites, and Open Dumps are listed in Appendix 1, Part 8.L.9 and are shown in Table F-3 below. Table F-3 Benchmarks for Storm Water Associated with Industrial Activity from Sector L.

Subsector (You may be subject to requirements for more than one sector/subsector)	Parameter	Units	Benchmark Monitoring Concentration[1]
Subsector L1. All Landfill, Land Application Sites and Open Dumps (Industrial Activity Code "LF")	Total Suspended Solids (TSS)	mg/L	100
Subsector L2. All Landfill, Land Application Sites and Open Dumps, except Municipal Solid Waste Landfill (MSWLF) Areas Closed in Accordance with 40 CFR 258.60 (Industrial Activity Code "LF")	Total Iron	mg/L	1.0

[1]Benchmark monitoring required only for discharges not subject to effluent limitations in 40 CFR Part 445 Subpart B (see Table L-2 in Appendix 1, Part 8.L.10.).

Rationale: Provided reference to Sector L industrial storm water benchmarks in Appendix 1.

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Part F.2.c.(2) Benchmark Monitoring: Sector N – Scrap Recycling and Waste Recycling Facilities

Benchmark monitoring for storm water associated with industrial activity from Sector N – Scrap Recycling and Waste Recycling Facilities are listed in Appendix 1, Part 8.N.6 and are shown in Table F-4 below.

Table F-4 Benchmarks for Storm Water Associated with Industrial Activity from Sector N.

Subsector (You may be subject to requirements for more than one sector/subsector)	Parameter	Units	Benchmark Monitoring Concentration[1]
Subsector N1. Scrap Recycling and Waste Recycling Facilities except those only receiving source-separated recyclable materials primarily from non-industrial and residential sources (SIC 5093)	Chemical Oxygen Demand (COD)	mg/L	120
	Total Suspended Solids (TSS)	mg/L	100
	Aluminum Total Recoverable	mg/L	0.75
	Total Copper (freshwater)[2] Total Copper (saltwater)[1]	mg/L	Hardness Dependent 0.0048
	Total Recoverable Iron	mg/L	1.0
	Total Lead (freshwater)[2] Total Lead (saltwater)[1]	mg/L	Hardness Dependent 0.21
	Total Zinc (freshwater)[2] Total Zinc (saltwater)[1]	mg/L	Hardness Dependent 0.09

[1]Saltwater benchmark values apply to storm water discharges into saline waters where indicated.
[2]The freshwater benchmark values of some metals are dependent on water hardness. For these parameters, permittees must determine the hardness of the receiving water (see Appendix 1, Part 11, "Calculating Hardness in Receiving Waters for Hardness Dependent Metals," for methodology), in

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	accordance with Appendix 1, Part 6.2.1.1. to identify the applicable 'hardness range' for determining their benchmark value applicable to their facility. *Rationale*: Provided reference to Sector N industrial storm water benchmarks in Appendix 1.

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	Part F.2.c.(3) Benchmark Monitoring: Sector Q – Water Transportation

Benchmark monitoring for storm water associated with industrial activity from Sector Q – Water Transportation are listed in Appendix 1, Part 8.Q.6 and are shown in Table F-5 below.

Table F-5 Benchmarks for Storm Water Associated with Industrial Activity from Sector Q.

Subsector (You may be subject to requirements for more than one sector/subsector)	Parameter	Units	Benchmark Monitoring Concentration[1]
Subsector Q1. Water Transportation Facilities	Total Aluminum	mg/L	0.75
	Total Iron	mg/L	1.0
	Total Lead (freshwater)[2] Total Lead (saltwater)[1]	mg/L	Hardness Dependent 0.21
	Total Zinc (freshwater)[2] Total Zinc (saltwater)[1]	mg/L	Hardness Dependent 0.09

[1]Saltwater benchmark values apply to storm water discharges into saline waters where indicated.

[2]The freshwater benchmark values of some metals are dependent on water hardness. For these parameters, permittees must determine the hardness of the receiving water (see Part 11, "Calculating Hardness in Receiving Waters for Hardness Dependent Metals," for methodology), in accordance with Appendix 1, Part 6.2.1.1. to identify the applicable 'hardness range' for determining their benchmark value applicable to their facility.

Rationale: Provided reference to Sector Q industrial storm water benchmarks in Appendix 1.

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Part F.2. Storm Water Associated with Industrial Activities

Effluent Parameter (units)	Effluent Limitation {1}	
Flow (gallons)	{3}	
Biochemical Oxygen Demand (5-Day) (mg/l)	{3}	
Chemical Oxygen Demand (mg/l)	{3}	
Total Suspended Solids (mg/l)	{3}	
Total Phosphorus (mg/l)	{3}	
Total Nitrogen (mg/l) {5}	{3}	
Nitrate + Nitrite Nitrogen (mg/l)	{3}	
Oil and Grease (mg/l)	15	
pH Range (Standard Units)	5.5-8.0 {7} 7.6-8.6 {8}	
Ammonia Nitrogen (mg/l)	{3}	
Turbidity (0.1 NTU)	{3}	
Dissolved Oxygen (0.1 mg/l)	{3}	
Oxygen Saturation (1%)	{3}	
Temperature (0.1 °C)	{3}	
Salinity (0.1 ppt)	{3}	
Arsenic (µg/l) {10}{11}	360 {7} 69 {8}	

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~~**Part F.2. Storm Water Associated with Industrial Activities**~~

~~Effluent Parameter (units)~~	~~Effluent Limitation {1}~~	~~Type of Sample {2}~~
~~Flow (gallons)~~	~~{3}~~	~~Calculated or Estimated~~
~~Biochemical Oxygen Demand (5-Day) (mg/l)~~	~~{3}~~	~~Composite {4}~~
~~Chemical Oxygen Demand (mg/l)~~	~~{3}~~	~~Composite {4}~~
~~Total Suspended Solids (mg/l)~~	~~{3}~~	~~Composite {4}~~
~~Total Phosphorus (mg/l)~~	~~{3}~~	~~Composite {4}~~
~~Total Nitrogen (mg/l) {5}~~	~~{3}~~	~~Composite {4}~~
~~Nitrate + Nitrite Nitrogen (mg/l)~~	~~{3}~~	~~Composite {4}~~
~~Oil and Grease (mg/l)~~	~~15~~	~~Grab {6}~~
~~pH Range (Standard Units)~~	~~5.5-8.0 {7}~~ ~~7.6-8.6 {8}~~	~~Grab {9}~~
~~Ammonia Nitrogen (mg/l)~~	~~{3}~~	~~Composite~~
~~Turbidity (0.1 NTU)~~	~~{3}~~	~~Grab~~
~~Dissolved Oxygen (0.1 mg/l)~~	~~{3}~~	~~Grab~~
~~Oxygen Saturation (1%)~~	~~{3}~~	~~Grab~~
~~Temperature (0.1 °C)~~	~~{3}~~	~~Grab~~
~~Salinity (0.1 ppt)~~	~~{3}~~	~~Grab~~
~~Arsenic (µg/l) {10}{11}~~	~~360 {7}~~ ~~69 {8}~~	~~Composite {4}~~

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Cadmium (µg/l) {10}{11}	3+ {7} 43 {8}		Composite {4}
Chromium (VI) (µg/l) {10}{11}	16 {7} 1100 {8}		Composite {4}
Copper (µg/l) {10}{11}	6+ {7} 2.9 {8}		Composite {4}
Lead (µg/l) {10}{11}	29+ {7} 140 {8}		Composite {4}
Nickel (µg/l) {10}{11}	5+ {7} 75 {8}		Composite {4}
Selenium (µg/l) {10}{11}	20 {7} 300 [8]		Composite {4}
Silver (µg/l) {10}{11}	1+ {7} 2.3 {8}		Composite {4}
Zinc (µg/l) {10}{11}	22+ {7} 95 {8}		Composite {4}
Additional Toxic Pollutants {11}	{12}		{13}

mg/l = milligrams per liter = 1000 micrograms per liter (µg/l)
+ = The value listed is the minimum standard. Depending upon the receiving water $CaCO_3$ hardness, higher standards may be calculated using the respective formula in the U.S. Environmental Protection Agency publication Quality Criteria for Water (EPA 440/5-86-001, Revised May 1, 1987).

NOTES:

{1} Pollutant concentration levels shall not exceed the storm water discharge limits or be outside the ranges indicated in the table. Actual or measured levels which exceed those storm water discharge limits or are outside those ranges shall be reported to the CWB required in HAR, Chapter 11-55, Appendix B, Section 10(c). In the event any of these limitations are exceeded, the PERMITTEE, shall continue to monitor and report every representative storm event until limitations are met, unless as otherwise informed by the DOH-CWB.

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~~Cadmium (µg/l) {10}{11}~~	~~3+ {7}~~ ~~43 {8}~~	~~Composite {4}~~
~~Chromium (VI) (µg/l) {10}{11}~~	~~16 {7}~~ ~~1100 {8}~~	~~Composite {4}~~
~~Copper (µg/l) {10}{11}~~	~~6+ {7}~~ ~~2.9 {8}~~	~~Composite {4}~~
~~Lead (µg/l) {10}{11}~~	~~29+ {7}~~ ~~140 {8}~~	~~Composite {4}~~
~~Nickel (µg/l) {10}{11}~~	~~5+ {7}~~ ~~75 {8}~~	~~Composite {4}~~
~~Selenium (µg/l) {10}{11}~~	~~20 {7}~~ ~~300 [8]~~	~~Composite {4}~~
~~Silver (µg/l) {10}{11}~~	~~1+ {7}~~ ~~2.3 {8}~~	~~Composite {4}~~
~~Zinc (µg/l) {10}{11}~~	~~22+ {7}~~ ~~95 {8}~~	~~Composite {4}~~
~~Additional Toxic Pollutants {11}~~	~~{12}~~	~~{13}~~

~~mg/l = milligrams per liter = 1000 micrograms per liter (µg/l)~~
~~+ = The value listed is the minimum standard. Depending upon the receiving water $CaCO_3$ hardness, higher standards may be calculated using the respective formula in the U.S. Environmental Protection Agency publication Quality Criteria for Water (EPA 440/5-86-001, Revised May 1, 1987).~~

~~NOTES:~~

~~{1} Pollutant concentration levels shall not exceed the storm water discharge limits or be outside the ranges indicated in the table. Actual or measured levels which exceed those storm water discharge limits or are outside those ranges shall be reported to the CWB required in HAR, Chapter 11-55, Appendix B, Section 10(c). In the event any of these limitations are exceeded, the PERMITTEE, shall continue to monitor and report every representative storm event until limitations are met, unless as otherwise informed by the DOH-CWB.~~

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{2} The Permittee shall collect samples for analysis from a discharge resulting from a representative storm. A representative storm means a rainfall that accumulates more than 0.1 inch of rain and occurs at least 72 hours after the previous measurable (greater than 0.1 inch) rainfall event. "Grab sample" means a sample collected during the first 15 minutes of the discharge. "Composite sample" means a combination of at least two (2) sample aliquots, collected at periodic intervals. The composite shall be flow proportional; either the time interval between each aliquot or the volume of each aliquot must be proportional to the total flow of storm water discharge flow since the collection of the previous aliquot. The Permittee may collect aliquots manually or automatically. Samples for analysis shall be collected during the first 15 minutes of the discharge and at 15-minute intervals thereafter for the duration of the discharge, as applicable. If the discharge lasts for over an hour, sample collection may cease.	~~{2} The Permittee shall collect samples for analysis from a discharge resulting from a representative storm. A representative storm means a rainfall that accumulates more than 0.1 inch of rain and occurs at least 72 hours after the previous measurable (greater than 0.1 inch) rainfall event.~~ ~~"Grab sample" means a sample collected during the first 15 minutes of the discharge.~~ ~~"Composite sample" means a combination of at least two (2) sample aliquots, collected at periodic intervals. The composite shall be flow proportional; either the time interval between each aliquot or the volume of each aliquot must be proportional to the total flow of storm water discharge flow since the collection of the previous aliquot. The Permittee may collect aliquots manually or automatically.~~ ~~Samples for analysis shall be collected during the first 15 minutes of the discharge and at 15-minute intervals thereafter for the duration of the discharge, as applicable. If the discharge lasts for over an hour, sample collection may cease.~~
{3} The value shall not exceed the applicable limit as specified in Chapter 11-54 for the applicable classification of the receiving state waters. If no limitation is specified in HAR, Chapter 11-54, then the Permittee shall monitor and report the analytical result. The Department may include discharge limitations specified in HAR, Section 11-55-19 and discharge limitations based on Federal Register, Vol. 73, No. 189, Pages 56572–56578, dated September 29, 2008.	~~{3} The value shall not exceed the applicable limit as specified in Chapter 11-54 for the applicable classification of the receiving state waters. If no limitation is specified in HAR, Chapter 11-54, then the Permittee shall monitor and report the analytical result. The Department may include discharge limitations specified in HAR, Section 11-55-19 and discharge limitations based on Federal Register, Vol. 73, No. 189, Pages 56572–56578, dated September 29, 2008.~~
{4} If the duration of the discharge event is less than 30 minutes, the sample collected during the first 15 minutes of the discharge shall be analyzed as a grab sample and reported toward the fulfillment of this composite sample specification. If the duration of the discharge event is greater than 30 minutes, the Permittee shall analyze two (2) or more sample aliquots as a	~~{4} If the duration of the discharge event is less than 30 minutes, the sample collected during the first 15 minutes of the discharge shall be analyzed as a grab sample and reported toward the fulfillment of this composite sample specification. If the duration of the discharge event is greater than 30 minutes, the Permittee shall analyze two (2) or more sample aliquots as a composite sample.~~

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composite sample.	
{5} The Total Nitrogen parameter is a measure of all nitrogen compounds in the sample (nitrate, nitrite, ammonia, dissolved organic nitrogen, and organic matter present as particulates).	~~{5} The Total Nitrogen parameter is a measure of all nitrogen compounds in the sample (nitrate, nitrite, ammonia, dissolved organic nitrogen, and organic matter present as particulates).~~
{6} The Permittee shall measure Oil and Grease using EPA Method 1664, Revision A.	~~{6} The Permittee shall measure Oil and Grease using EPA Method 1664, Revision A.~~
{7} This limitation applies to discharge into state waters classified as inland streams.	~~{7} This limitation applies to discharge into state waters classified as inland streams.~~
{8} This limitation applies to discharge into state waters classified as marine open coastal waters.	~~{8} This limitation applies to discharge into state waters classified as marine open coastal waters.~~
{9} The Permittee shall measure pH within 15 minutes of obtaining the grab sample.	~~{9} The Permittee shall measure pH within 15 minutes of obtaining the grab sample.~~
{10} The Permittee shall test for the total recoverable portion of all metals.	~~{10} The Permittee shall test for the total recoverable portion of all metals.~~
{11} Toxic pollutants, as identified in Appendix D or 40 CFR Part 122 or in HAR, Chapter 11-54, Section 11-54-4, need only be analyzed if they are identified as potential pollutants requiring monitoring in the SWPCP. The Permittee shall test for the total recoverable portion of all metals. If monitoring results indicate that the discharge limitation was equaled or exceeded, the SWPCP shall be amended to include additional BMPs targeted to reduce the parameter which was in excess of the discharge limitation.	~~{11} Toxic pollutants, as identified in Appendix D or 40 CFR Part 122 or in HAR, Chapter 11-54, Section 11-54-4, need only be analyzed if they are identified as potential pollutants requiring monitoring in the SWPCP. The Permittee shall test for the total recoverable portion of all metals. If monitoring results indicate that the discharge limitation was equaled or exceeded, the SWPCP shall be amended to include additional BMPs targeted to reduce the parameter which was in excess of the discharge limitation.~~
{12} Effluent limitations are the acute water quality standards established in HAR, Chapter 11-54, Section 11-54-4. For pollutants which do not have established acute water quality standards, any detection concentration greater than 0.01 mg/l shall be reported.	~~{12} Effluent limitations are the acute water quality standards established in HAR, Chapter 11-54, Section 11-54-4. For pollutants which do not have established acute water quality standards, any detection concentration greater than 0.01 mg/l shall be reported.~~
{13} Cyanide and the volatile fraction of the toxic organic compounds shall be sampled by grab sample. All other pollutants, as identified in Appendix D of the 40 CFR Part 122 or in HAR Chapter 11-54, Section 11-	~~{13} Cyanide and the volatile fraction of the toxic organic compounds shall be sampled by grab sample. All other pollutants, as identified in Appendix D of the 40 CFR Part 122 or in HAR Chapter 11-54, Section 11-54-4 shall be sampled by composite sample.~~

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54-4 shall be sampled by composite sample. The sampling locations shall be representative of storm water discharging from the industrial facility and consist of storm water runoff from industrial activities.	~~The sampling locations shall be representative of storm water discharging from the industrial facility and consist of storm water runoff from industrial activities.~~ *Rationale*: Industrial storm water requirements are specified in Appendix 1 and are based on EPA's MSGP approach.

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Part F.3. TMDLs As TMDLs are adopted by DOH and approved by the EPA that identify the Permittee as a source, the Permittee shall develop I&M Plans for a minimum of one (1) additional TMDL per year within one (1) year of the approval date. The Permittee shall include within each I&M Plan a compliance schedule with a final deadline to demonstrate consistency with the WLAs consistent with the assumption of the associated TMDL document. The schedule shall provide for the implementation of the BMPs, monitoring to evaluate its performance, and time to make adjustments necessary to demonstrate consistency with the WLAs consistent with the assumption of the associated TMDL document at the earliest possible time. If the schedule extends beyond a year, interim dates and milestones shall be included in the schedule with the time between interim dates not to exceed one (1) year.	**Part F.3.** TMDLs As TMDLs are adopted by DOH and approved by the EPA that identify the Permittee as a source, the Permittee shall develop I&M Plans for ~~a minimum of one (1) additional TMDL per year~~ each and all applicable TMDLs within one (1) year of the approval date. The Permittee shall include within each I&M Plan a compliance schedule with a final deadline to demonstrate consistency with the WLAs consistent with the assumption of the associated TMDL document. The schedule shall provide for the implementation of the BMPs, monitoring to evaluate its performance, and time to make adjustments necessary to demonstrate consistency with the WLAs consistent with the assumption of the associated TMDL document at the earliest possible time. If the schedule extends beyond a year, interim dates and milestones shall be included in the schedule with the time between interim dates not to exceed one (1) year. The I&M Plans shall include, at a minimum, the following: Part F.3.a. Detailed information on the activities proposed to be implemented. Part F.3.b. Actual or literature documentation of the estimated effectiveness of the activities targeted to reduce the pollutants of concern such as total nitrogen, and total suspended solids in the watershed, as applicable, to demonstrate consistency with the annual or seasonal WLA reductions consistent with the assumption of the associated TMDL document. Part F.3.c. A detailed and quantitative analysis which demonstrates that the proposed activities would ensure consistency with the annual or seasonal WLA reductions consistent with the assumption of the associated TMDL document. Part F.3.d. Information from pre- and post-monitoring activities to quantitatively demonstrate consistency with the annual or seasonal WLA reductions consistent with the assumption of the associated TMDL document. Part F.3.e. A monitoring plan which shall identify

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	activities to demonstrate consistency with the annual or seasonal WLA reductions consistent with the assumption of the associated TMDL document. Part F.3.f. A compliance schedule with a final deadline to demonstrate consistency with the WLAs consistent with the assumption of the associated TMDL document. The schedule shall provide for the implementation of the BMPs, monitoring to evaluate its performance, and time to make adjustments necessary to demonstrate consistency with the WLAs consistent with the assumption of the associated TMDL document at the earliest possible time. If the schedule extends beyond a year, interim dates and milestones shall be included in the schedule with the time between interim dates not to exceed one (1) year. *Rationale*: 1. Revised to require an I&M Plan for each TMDL. 2. Added the Implementation and Monitoring Plan requirements.

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Part G. REPORTING REQUIREMENTS	
Previous 2014 MCBH MS4 Permit	**Draft 2020 MCBH MS4 Permit Revisions**
Part G.1.a. The Permittee shall submit the Annual Report by December 31st of each year in pdf format (minimum 300 dpi) in accordance with Part A.6. The Annual Report shall cover the past fiscal year. The Annual Report for the fiscal year prior to the expiration date of the permit shall serve as the permit's renewal application. Submittal of the renewal application shall include a $1,000 filing fee.	**Part G.1.a.** The Permittee shall submit the Annual Report by ~~December 31st~~ January 30th of each year in pdf format (minimum 300 dpi) in accordance with Part ~~A.6.~~A.7. The Annual Report shall cover the past fiscal year. ~~The~~ For the calendar year prior to the expiration date of the permit, the Annual Report for the fiscal year ~~prior to the expiration date of the permit~~ and the e-Permitting CWB Individual NPDES Form, or other form approved by the DOH, shall be submitted to the DOH. The Annual Report shall also include a description of the statuses of all items required in the permit. Submittal of the renewal application shall be at least one (1) year prior to the expiration date of this permit and include a $1,000 filing fee. ~~shall serve as the permit's renewal application. Submittal of the renewal application shall include a $1,000 filing fee.~~ *Rationale*: Annual Report due January 30th. Renewal application to include submission of the individual NPDES application one year prior to the permit expiration date.
Part G.1.d. *Program Effectiveness Reporting* – Within one (1) year from the effective date of the permit, the Permittee shall submit to the DOH a written strategy for determining effectiveness of its SWMP. The strategy shall include water quality monitoring efforts as well as program implementation information and other indicators. The Permittee shall include an assessment of program effectiveness and identification of water quality improvements or degradation beginning with the 2nd Annual Report.	**Part G.1.d.** *Program Effectiveness Reporting* – Within ~~one (1) year~~ six (6) months from the effective date of the permit, the Permittee shall submit to the DOH and implement their written strategy for determining effectiveness of its SWMP. The strategy shall include water quality monitoring efforts as well as program implementation information and other indicators. The Permittee shall include an assessment of program effectiveness and identification of water quality improvements or degradation ~~beginning with the 2nd~~ in its Annual Report. *Rationale*: The Program Effectiveness Reporting requirement was contained in the previous permit and are being continued in this draft permit.
Part G.2.a. The Permittee shall submit the Annual Monitoring Report by December 31st of each year in pdf format (minimum 300 dpi) in accordance with Part A.6. The Annual Monitoring Report shall cover the past fiscal year.	**Part G.2.a.** The Permittee shall submit the Annual Monitoring Report by ~~December 31st~~ January 30th of each year in pdf format (minimum 300 dpi) in accordance with Part ~~A.6~~ A.7. The Annual Monitoring Report shall cover the past fiscal year. *Rationale*: Annual Monitoring Report due January 30th. Revised to appropriate reference.

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Part G. REPORTING REQUIREMENTS	
Previous 2014 MCBH MS4 Permit	**Draft 2020 MCBH MS4 Permit Revisions**
Part G.2.b.(6) Discharge Monitoring Reports (DMRs) for industrial facilities shall be included in the Annual Monitoring Report and be submitted via NetDMR once established by the DOH. NetDMR is a Web-based tool that allows NPDES permittees to electronically sign and submit their DMRs to EPA's Integrated Compliance Information System (ICIS-NPDES) via the Environmental Information Exchange Network. A DMR must be submitted for the facility which is scheduled to be monitored even if sampling was not conducted. An explanation as to why sampling was not conducted shall be explained with the submittal.	**Part G.2.b.(6)** Discharge Monitoring Reports (DMRs) for industrial facilities shall be included in the Annual Monitoring Report and be submitted via NetDMR ~~once established by the DOH~~. NetDMR is a Web-based tool that allows NPDES permittees to electronically sign and submit their DMRs to EPA's Integrated Compliance Information System (ICIS-NPDES) via the Environmental Information Exchange Network. NetDMR is accessed from http://www.epa.gov/netdmr. A DMR must be submitted for the facility which is scheduled to be monitored even if sampling was not conducted. An explanation as to why sampling was not conducted shall be explained with the submittal. *Rationale*: NetDMR has already been established for MCBH.
	Part G.2.c. Reporting of Noncompliance In case of conflict between the conditions stated here and those in the **"Standard NPDES Permit Conditions"**, the more stringent conditions shall apply. Part G.2.c.(1) Twenty-Four Hour Reporting The Permittee or its duly authorized representative (40 CFR 122.22) shall report any noncompliance which may endanger health or the environment. Any information shall be provided orally within 24 hours from the time the Permittee becomes aware of the circumstances. A written report shall also be provided within five (5) days of the time the Permittee becomes aware of the circumstances. A written report shall contain the information required under Part G.2.c.(4)(i). The following shall be included as information which must be reported within 24 hours. i. Any unanticipated bypass which exceeds any benchmark value or effluent limitation (if applicable), in the permit. ii. Any upset which exceeds any benchmark value or effluent limitation (if applicable), in the permit. iii. Violations of a maximum daily discharge limitation in this permit.

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Part G. REPORTING REQUIREMENTS	
Previous 2014 MCBH MS4 Permit	Draft 2020 MCBH MS4 Permit Revisions
	Part G.2.c.(2) Contacts for Oral Reports i. The Permittee shall make oral reports during regular office hours (7:45 a.m. to 4:30 p.m.) to DOH, Clean Water Branch (CWB) at (808) 586-4309. ii. The Permittee shall make oral reports outside of regular office hours to the State Hospital Operator at (808) 247-2191. Part G.2.c.(3) Other Noncompliance The Permittee shall report all instances of noncompliance not reported under Part F.2.c.(1) at the time DMR are submitted. The permittee shall provide information required under Part F.2.c.(4). Part G.2.c.(4) Written Noncompliance Reports i. Written noncompliance reports shall contain a description of the noncompliance and its cause; the period of noncompliance, including exact dates and times; if the noncompliance has not been corrected, the anticipated time it is expected to continue; public notice efforts, if any; clean-up efforts, if any; and steps taken or planned to reduce, eliminate and prevent reoccurrence of the noncompliance. ii. The DOH may waive the written report or the five-working day deadline on a case-by-case basis for spills, bypasses, upsets, and violations of daily maximum discharge limitations if the oral report has been received within 24 hours of the noncompliance or when the Permittee's authorized personnel becomes aware of the noncompliance. iii. The written report shall be submitted through the CWB Compliance Submittal Form for Individual NPDES Permits and Notice of General Permit Coverages (NGPCs) or as otherwise instructed by the DOH. This form is accessible through the e-Permitting Portal website at: https://eha-cloud.doh.hawaii.gov/epermit .

Marine Corps Base Hawaii (MCBH) Municipal Separate Storm Sewer System (MS4) HI S000007	
Part G. REPORTING REQUIREMENTS	
Previous 2014 MCBH MS4 Permit	**Draft 2020 MCBH MS4 Permit Revisions**
	Rationale: Added standard noncompliance protocols.
	Part G.2.d. Types of Sample Part G.2.d.(1) "Grab sample" means an individual sample collected within the first 30 minutes of a discharge associated with a measurable storm event. See Appendix 1, Part 6.1.4. for more information regarding gab samples. Part G.2.d.(2) "Composite sample" means a combination of at least eight (8) sample aliquots, collected at periodic intervals during the operating hours of the facility over a 24-hour period. The composite must be flow proportional; either the time interval between each aliquot or the volume of each aliquot must be proportional to either the stream flow at the time of sampling or the total stream flow since the collection of the previous aliquot. Aliquots may be collected manually or automatically. *Rationale*: Added definitions of grab and composite samples that were removed from the Effluent Limitation table in Part F.

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Part H. SUMMARY OF DEADLINES	
Previous 2014 MCBH MS4 Permit	**Draft 2020 MCBH MS4 Permit Revisions**
Part H.	**Part H.** The Permittee shall implement existing plans until plans are revised/updated in accordance with the deadlines below. *Rationale*: Revised/updated deadlines in table.

Deadline	**Description**	**Part**	**Submit to the DOH**
18 months after the Effective Date of Permit (EDOP)	Revised SWMP Plan.	D.1.	Yes
~~1 year~~ 6 months after EDOP	Establish and implement requirements for issuing connection permits, or equivalent, and require obtaining the permit prior to allowing the drain connection. Also establish and implement requirements for issuing permits, or equivalent, for the operation and maintenance of drain connections to the MS4.	D.1.c.(1)	No
6 months after EDOP	Implement an Outfall Field Screening Plan.	D.1.c.(2)	No
~~1 year~~ 6 months after EDOP	Establish and implement the policies for enforcement and penalties for non-compliance with Part D.1.c.(1) and for persons illegally discharging pollutants to its MS4; and pursue enforcement actions.	D.1.c.(5)	No
~~2 year~~ 12 months after EDOP	Establish BMP Manuals.	D.1.d.(1)	Yes
~~3 year~~ 12 months after EDOP	Establish policies to require construction projects to implement BMPs and standards described in the Construction, Maintenance Activities, and Storm Water Permanent BMPs Manuals.	D.1.d.(2)	No

Deadline	Description	Part	Submit to the DOH
6 months after EDOP	Implement a system to track both private and public construction projects.	D.1.d.(3)	No
90 calendar days after EDOP	Implement the Plan Review Checklist that reviewers use in evaluating the plans and BMPs or other similar documents which have been implemented pursuant to Part D.1.d.	D.1.d.(4)(iv)	~~Yes~~ No
90 calendar days after EDOP	Implement a standard ~~I~~inspection form(s), inspection checklist, and reporting and corrective procedures.	D.1.d.(5)(iv)	~~Yes~~ No
~~1 year after EDOP~~	~~Establish policies for enforcement and penalties for non-compliance with Part D.1.d.(2); and develop and implement an Enforcement Response Plan.~~	~~D.1.d.(6)~~	~~No~~
6 months after EDOP	Implement the revised ~~P~~plan for requiring LID in its Standards.	D.1.e.(1)	~~Yes~~ No
~~12 months after EDOP~~	~~Draft of the revised Standards.~~	~~D.1.e.(1)~~	~~Yes~~
~~18 to 24 months after EDOP dependent on adoption by rulemaking~~	~~Final of the revised Standards.~~	~~D.1.e.(1)~~	~~Yes~~
6 months after EDOP	Develop and implement Asset Management System to track frequency of inspections and maintenance of the Permanent BMPs.	D.1.e.(3)	No
12 months after EDOP	Implement Asset Management System and map of its MS4.	D.1.f.(1)(i)	No
~~1 year~~ 12 months after EDOP	Implement an Action Plan for Retrofitting Structural BMPs	D.1.f.(1)(iv)	~~Yes~~ No
~~1 year after EDOP~~ Annual	Trash Reduction Plan	D.1.f.(1)(v)	Yes

Deadline	Description	Part	Submit to the DOH
Report			
~~18 months after EDOP~~	~~Require the implementation of temporary erosion control measures on erosional areas within the right of ways.~~	~~D.1.f.(3)(ii)~~	~~Yes~~
~~1 year after EDOP~~	~~WQC application(s) for temporary erosion control measures.~~	~~D.1.f.(3)(ii)~~	~~Yes~~
~~1 year after EDOP~~	~~Action Plan to address erosion at its storm drain system outlets.~~	~~D.1.f.(3)(iv)~~	~~Yes~~
1 year after EDOP	List of projects and implementation schedule for permanent erosion control improvements.	D.1.f.(3)(v)	Yes
4th ~~Year~~ Annual Report	Industrial facilities and activities inventory information.	D.1.g.(2)	Yes
4th ~~Year~~ Annual Report	Commercial facilities and activities inventory information	D.1.g.(3)	Yes
60 calendar days after EDOP	Prioritized areas for industrial and commercial facility and activity inspection status report.	D.1.g.(4)	Yes
October 31st and April 30th of each year	Semi-Annual Industrial and Commercial Inspection Reports.	D.1.g.(5)	Yes
~~1 year after EDOP~~	~~For Industrial and Commercial Facilities,establish and implement policies for enforcement and penalties.~~	~~D.1.g.(7)~~	~~No~~
~~90 calendar days of the change~~ Annual Report	Updates to the industrial and commercial inspection training shall be included in the Annual Report.	D.1.g.(8)	Yes
30 calendar days prior to the initiation date of the major	SWMP Modification Report	~~D.3.a.~~ D.2.	Yes

Deadline	Description	Part	Submit to the DOH
modification			
~~As needed~~	~~MS4 NPDES Individual Permit - Industrial Storm Water Discharge Notification Form and SWPCP for each industrial activity. (For those that have not yet been submitted.)~~	~~E.3~~	~~Yes~~
June 1st of each year	Annual Monitoring Plan	F.1.a	Yes
Various	TMDL Compliance, refer to Schedules of Compliance if applicable.	F.3	Yes
~~December 31st~~ January 30th of each year	Annual Report, to include but not limited to: • Progress evaluation results of the public education program [Part D.1.a.(3)], • Description and reason for any revision to its Standards and copy of the revised Standards [Part D.1.d.(1)], • Updates to its inspection/maintenance schedule, including explanation of the changes [Part D.1.f.(1)(ii)], • Updates to its implementation schedule for retrofitting structural BMPs [Part D.1.f.(1)(iv)], • Summary of its trash load reduction actions [Part D.1.f.(1)(v)], • Status report on implementation of erosion control measures at its storm drain system outlets [Part D.1.f.(3)(iv)], • Updated industrial inventory information (4th Annual Report) [Part D.1.g.(2)] • Updated commercial inventory information (4th Annual Report)	G.1	Yes

Deadline	Description	Part	Submit to the DOH
	[Part D.1.g.(3)] • Modified Prioritized Areas for Industrial and Commercial Facility and Activity Plan [Part D.1.g.(4)], • SWMP Modifications [Part D.2] • System Modifications [Part D.2], and • Annual Report requirements [Part G.1]		
~~1 year after EDOP~~ 6 months after EDOP	Written strategy for determining effectiveness of its SWMP	G.1.d	Yes
~~December 31st~~ January 30th of each year	Annual Monitoring Report with Discharge Monitoring Reports	G.2	Yes

APPENDIX 1 – Storm Water Associated with Industrial Activities

ATTACHMENT 1 – MCBH Response to EPA Audit Report

APPENDIX 1-2

Mapping, Inventorying, Inspection, and Maintenance Strategy

FINAL

Mapping, Inventorying, Inspection, and Maintenance Strategy

Storm Water Management Program Plan

Marine Corps Base Hawaii

NPDES Permit No. HI 000007

Prepared by:

Marine Corps Base Hawaii

March 2023

Table of Contents

List of Acronyms and Abbreviations

AMS	Asset Management System
BMP	Best Management Practice
DOH	State of Hawaii Department of Health
ECPD	Environmental Compliance and Protection Division
EDOP	Effective Date of Permit
EPA	United States Environmental Protection Agency
GIS	Geographic Information System
GPS	Geographic Position System
IDDE	Illicit Discharge Detection and Elimination
LFPE	Logistics Facilities Public Works Engineering
LID	Low Impact Development
MCBH	Marine Corps Base Hawaii
MCCS	Marine Corps Community Services
MCD	Facilities Engineering Maintenance Control Division
MRO	Facilities Engineering Maintenance Repair Operations
MS4	Municipal Separate Storm Sewer System
MS4 Permit	Marine Corps Base Hawaii’s MS4 NPDES Permit No. HI S000007
NPDES	National Pollutant Discharge Elimination System
O&M	Operation and Maintenance
SWMP	Storm Water Management Program
SWPPP	Storm Water Pollution Prevention Plan
U.S.	United States

1 Introduction

As of the effective date, September 1, 2021, the Marine Corps Base Hawaii (MCBH) is required to comply with the conditions of the National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4) Permit No. HIS000007 (referred to hereinafter as the "MS4 Permit"). The MS4 Permit includes authorized storm water and specified non-storm water discharges into Kaneohe Bay, Nuupia, Halekou, and Kaluapuhi Ponds, Kailua Bay, and the Mokapu Central Drainage Channel.

Per the MS4 Permit, Parts D.1.e.(3) and D.1.f.(1), MCBH is required to develop and implement an Asset Management System (AMS). The storm water AMS is an integral part of MCBH's Storm Water Management Program (SWMP). The MS4 Permit states:

Post-Construction Storm Water Management in New Development and Redevelopment, Part D.1.e.(3)

"BMP, Operation and Maintenance, and Inspection Database – Within six (6) months of the effective date of this permit, the Permittee shall develop and implement an Asset Management System to track the frequency of inspections and maintenance of the Permanent BMPs. In addition to the standard information collected for all projects (e.g., project name, owner, location, start/end date, etc.), the database shall also include, at a minimum:

- *Name and identification of asset or control measures.*
- *Type and number of LID practices.*
- *Type and number of Source Control BMPs.*
- *Type and number of Treatment Control BMPs.*
- *Latitude/Longitude coordinates of controls using Global Positioning Systems and NAD83 or other Datum as long as the datum remains consistent.*
- *Photographs of controls.*
- *Operation and maintenance requirements.*
- *Frequency of inspections.*
- *Frequency of maintenance.*
- *Current performance.*
- *Consequences of failure.*
- *Likelihood of failure.*

All stormwater treatment and LID BMPs shall be inspected at least once a calendar year for proper operation; maintenance shall be performed as necessary to ensure proper operation."

Debris Control BMPs Program Plan, Part D.1.f.(1)

"(i) Asset Management System and Mapping – Within twelve (12) months of the effective date of this permit, the Permittee shall implement a comprehensive asset management system and map of its MS4, including structural and vegetative BMPs and an inventory of related appurtenances, including maintenance equipment, to ensure appropriate debris removal and system maintenance. The asset management system shall, at a minimum, assign an identification number for each drain inlet, outfall, and BMPs, and map their location on the Geographic Information System.

The Permittee shall use this asset management system to establish priorities and to schedule and track efforts of appropriate system maintenance and debris removal program activities such as street *sweeping, catch basin cleaning, and green waste and accumulated soil removal. The SWMP shall include justification of its priorities applied to the asset management system on the basis of potential impacts to water quality."*

MCBH currently manages its MS4 system components using a Geographic Information System (GIS) database for mapping in combination with other internal databases and tracking systems. To fully comply with the MS4 Permit, MCBH must implement a GIS-based Asset Management System (AMS). This plan contains MCBH's strategy to develop and maintain a comprehensive AMS capable of tracking system operations, maintenance, and inspections for all critical components of the MS4. The MCBH Environmental Compliance and Protection Division (ECPD) and Facilities Department are responsible for oversight of the development of the AMS.

The primary objectives of this Mapping, Inventorying, Inspection, and Maintenance Strategy are to:

1. Describe the existing systems used to manage the operations, maintenance, and inspection of the MCBH MS4.
2. Establish a schedule with detailed tasks to develop and implement a comprehensive GIS-based AMS.

2 Existing Tracking and Maintenance Systems

MCBH has several internal systems for tracking elements of the SWMP including permitted connections, illicit discharges, scheduled maintenance, work orders for repair or replacement, and mapping of MS4 components.

The Facilities Department maintains the GIS database for the base. The current GIS database includes MS4 drainage structures (including inlets and outfalls) and receiving bodies of water.

In lieu of a separate connection permit form for private drainage connections to the MS4, MCBH uses the Digging Work Clearance Permit (DWCP) application for construction projects requiring a new connection to the MS4. The DWCP application form is routed through several MCBH including ECPD and the Facilities Engineering Maintenance Control Division (MCD) for approval by Logistics Facilities Public Works Engineering (LFPE). LFPE issues the DWCP and maintains a record of all DWCPs. MCD is responsible for tracking all permitted connections and ECPD is responsible for overall storm water management.

The Illicit Discharge Detection and Elimination (IDDE) Program includes routine inspections to identify illicit storm water discharges and illegal connections to the MCBH MS4. ECPD maintains a file-based illicit discharge database with inspection reports, photographs, maps, notification letters, and corrective action records. ECPD also retains a record of all received complaints, including all storm water quality concerns, in the IDDE database.

The Industrial and Commercial Discharge Management (ICDM) Program and Industrial Facilities Program maintain industrial and commercial facility databases. The databases include an inventory and map of the facilities and are used to track location, nature of activity, priority area, priority ranking, receiving water, and inspection schedule. A Storm Water Pollution Prevention Plan (SWPPP) has been developed for each industrial facility identified in the MS4 Permit. The SWPPPs detail the routine facility inspections, quarterly visual assessments, and storm water monitoring required by Appendix 1 of the MS4 Permit.

MCD and Facilities Engineering Maintenance Repair Operations (MRO) manage the maintenance database, MAXIMO. MAXIMO is used to schedule maintenance activities and submit and track work orders.

3 MCBH AMS Development Strategy

MCBH will integrate the existing GIS mapping database and internal tracking systems into a comprehensive storm water AMS. MCBH will develop and maintain a GIS-based AMS that will:

- Include an inventory of all critical components of the MS4 including hard assets such as the storm drain system, structural controls, and a schedule for recurring inspection, cleaning, and maintenance.
- Include relevant information for each asset class, (e.g., material, size, and condition), as relevant.
- Be capable of generating and tracking work orders for inspection, cleaning, and maintenance and shall be capable of assisting MCBH with prioritization of capital improvement projects.
- Include the location and name of all waters of the United States receiving discharges from the outfalls. Each mapped outfall must be given an individual alphanumeric identifier, which must be noted on the map. The outfalls must be located using GPS and photographs should be taken to provide baseline information and track operation and maintenance needs over time.
- Identify MCBH outfalls that discharge to impaired waters.

The four elements of MCBH's strategy to develop and implement the storm water AMS are mapping, inventorying, inspection, and maintenance. See Table 1 below for a description of the main AMS elements and the department responsible for each element.

MCBH will be divided into four distinct quadrants based on area of coverage, size, and number and type of facilities. The Mapping, Inventorying, Inspection and Maintenance Strategy will proceed quadrant by quadrant. The following steps will be completed for each quadrant:

1. Mapping: Identify and locate all MS4 assets including inlets, pipes, above ground drainage features, outfalls, post-construction BMPs, and locations of industrial activities that drain water to the MCBH MS4 using a geographic position system (GPS).
2. Inventorying: Create an inventory of all identified assets in a GIS-based AMS database with the GPS coordinates and real property information.
3. Inspection: Initial inspection of all MS4 assets using standardized checklists:
    a. Erosional Area Inspection Checklist (SWMP Plan Appendix 3-3)
    b. Outfall Field Screening Inspection Checklist (SWMP Plan Appendix 3-6)
    c. Post-Construction BMP Checklists in *MCBH Post-Construction BMP Manual* (SWMP Plan Appendix 5-3) for bioretention, hydrodynamic separator, and underground detention
    d. Trash Survey Inspection Checklist (SWMP Plan Appendix 6-1)
    e. Routine Facility Inspection Checklist (SWMP Plan Appendix 11-2, SWPPP Appendix B)

4. **Maintenance: ECPD will work with MCD/MRO to develop a priority-based maintenance and inspection schedule for each MS4 asset.**

All steps shall be addressed for one quadrant before proceeding to the next. The estimated time for completing the mapping, inventorying, inspection, and maintenance steps for each quadrant is 10 business days. The Mapping, Inventorying, Inspection, and Maintenance Strategy will commence in the first quarter of fiscal year 2023.

Table 1 MCBH AMS Elements

AMS Element	Responsible Department	Description	Rationale
Mapping	ECPD and Facilities GIS Team	Identify and mark coordinates for all storm water system components.	MCBH does not have an up-to-date map or AMS for storm water components, as required by the MS4 Permit.
Inventorying	ECPD and Facilities GIS Team	Integrate coordinates and real property characteristics into GIS-based AMS and create an inventory of all storm water components.	A comprehensive AMS is required by the MS4 Permit.
Inspection	ECPD, initial Facilities, periodic	Initial inspection shall take place at time of mapping using standardized checklists. Photos must also be taken for records. Coordinate inspection schedule with Outfall Screening Plan.	Necessary to maintain visual oversight of storm water features and ensure MS4 Permit compliance.
Maintenance	Facilities	A maintenance and inspection schedule shall be developed for the storm water components.	Necessary to ensure integrity of all storm water components. Required per MS4 Permit.

APPENDIX 3-1

BMPs for Allowable Non-storm Water Discharge

NOTE: In the event that any of the listed discharges is observed or expected to be a significant source of pollutants to the MS4, the discharge will no longer be allowed.

BMPs FOR ALLOWABLE NON-STORM DISCHARGE

Allowable Discharge	BMP Description
Water line flushing *(including steam line condensate and flushing)*	If applicable, clean pavement surfaces of dust, debris, or other pollutants prior to discharge to the paved surface, street gutter, or drainage ditch. If possible, discharge to vegetated, pervious areas that do not have high erosion potential.
Landscape irrigation	Reduce watering demand by watering during the cool part of the day. Follow manufacturer's application instructions to prevent excessive herbicide and/or pesticide use.
Diverted stream flows	BMPs not applicable
Rising ground waters	BMPs not applicable
Uncontaminated ground water infiltration (as defined in 40 CFR 35.2005(20))	Install temporary pollution prevention measures (sandbags, plastic sheets, hay bales, silt fences, sediment traps/basins, etc.) at drainage inlets or conveyances, where possible, prior to discharge. If possible, place sandbags, silt fences, or hay bales around drainage inlets prior to discharge and/or discharge to vegetated, pervious areas that do not have high erosion potential.
Uncontaminated pumped ground water, not including construction related dewatering activities	Clean pavement surfaces of dust, debris, or other pollutants, and remove any oil sheen or slick prior to discharge to paved surface, street gutter, or drainage ditch. If possible, place sandbags, silt fences, or hay bales around drainage inlets prior to discharge and/or discharge to vegetated, pervious areas that do not have high erosion potential.
Discharges from potable water sources and foundation drains *(including emergency eye wash basins and showers, and drinking fountains on piers)*	Waterline Flushing: Clean pavement surfaces of dust, debris, or other pollutants prior to discharge to the paved surface, street gutter, or drainage ditch. If possible, discharge to vegetated, pervious areas that do not have high erosion potential. Emergency Eye Wash and Shower and Drinking Fountains: Quantity of discharge will be very small. Pollution potential negligible for MCBH.

NOTE: In the event that any of the listed discharges is observed or expected to be a significant source of pollutants to the MS4, the discharge will no longer be allowed.

BMPs FOR ALLOWABLE NON-STORM DISCHARGE

Allowable Discharge	BMP Description
Air conditioning condensate	Quantity of discharge will be very small. Pollution potential negligible for MCBH, Kaneohe Bay
Irrigation water	Reduce watering demand by watering during the cool part of the day. Follow manufacturer's application instructions to prevent excessive herbicide and/or pesticide use.
Springs	BMPs not applicable
Water from crawl space pumps, uncontaminated water from utility manholes or boxes, and footing drains *(including discharge from buildings with basements, and crawl space pumps used by utility companies to dewater utility manholes and other maintenance and operations substructure facilities)*	Clean pavement surfaces of dust, debris, or other pollutants, and remove any oil sheen or slick prior to discharge to paved surface, street gutter, or drainage ditch. If possible, place sandbags, silt fences, or hay bales around drainage inlets prior to discharge and/or discharge to vegetated, pervious areas that do not have high erosion potential.
Lawn watering runoff	Reduce watering demand by watering during the cool part of the day. Follow manufacturer's application instructions to prevent excessive herbicide and/or pesticide use.
Water from individual residential car washing	Wash cars at designated wash areas. Minimize detergent use and do not wash engine components. Pavement surfaces where cars are being washed shall be cleaned by sweeping and removing debris and other pollutants prior to the car wash activity. For charity car washes, BMPs have been developed and will be implemented during these events.
Water from charity car washes	Wash cars at designated wash areas. Minimize detergent use and do not wash engine components. Pavement surfaces where cars are being washed shall be cleaned by sweeping and removing debris and other pollutants prior to the car wash activity. For charity car washes, BMPs have been developed and will be implemented during these events.
Flows from riparian habitats and wetlands	BMPs not applicable

NOTE: In the event that any of the listed discharges is observed or expected to be a significant source of pollutants to the MS4, the discharge will no longer be allowed.

BMPs FOR ALLOWABLE NON-STORM DISCHARGE

Allowable Discharge	BMP Description
Dechlorinated swimming pool discharges	Dechlorinate water prior to discharge. Clean pavement surfaces of dust, debris, or other pollutants prior to discharge to paved surface, street gutter, or drainage ditch. If possible, discharge to vegetated, pervious areas that do not have high erosion potential.
Exterior building wash water (water only) *(including piers and wharves – water only without detergent)*	Clean surfaces by sweeping and remove debris and other pollutants prior to washdown.
Residual street wash water (water only), including wash water from sidewalks, plazas, and driveways, but excluding parking lots	Clean surfaces by sweeping and remove debris and other pollutants prior to washdown.
Discharges or flows from firefighting activities *(including fire hydrant testing, fire sprinkler testing, and firefighter training activities)*	BMPs not applicable for emergency situations. For training and testing activities, clean pavement surfaces of dust, debris, or other pollutants prior to discharge to the paved surface, street gutter, or drainage ditch. If possible, discharge to vegetated, pervious areas that do not have high erosion potential.
Boat rinsing	The intent of the rinsing activity is salt removal. Washing must be limited to water only. No detergents are allowed. Engine maintenance/degreasing activities must be conducted at designated locations featuring an oil-water separator and cannot be discharged directly to the MS4. No discharge of bilge water to the MS4.
Dive gear rinsing	The intent of the rinsing activity is salt removal. Washing must be limited to water only. No detergents are allowed.
Emergency pipe and tank hydrotesting and disinfecting	Dechlorinate water prior to discharge. Clean pavement surfaces of dust, debris, or other pollutants prior to discharge to paved surface, street gutter, or drainage ditch. If possible, discharge to vegetated, pervious areas that do not have high erosion potential.

NOTE: In the event that any of the listed discharges is observed or expected to be a significant source of pollutants to the MS4, the discharge will no longer be allowed.

BMPs FOR ALLOWABLE NON-STORM DISCHARGE

Allowable Discharge	BMP Description
Emergency trench dewatering	Clean pavement surfaces of dust, debris, or other pollutants, and remove any oil sheen or slick prior to discharge to paved surface, street gutter, or drainage ditch. If possible, place sandbags, silt fences, or hay bales around drainage inlets prior to discharge and/or discharge to vegetated, pervious areas that do not have high erosion potential.

APPENDIX 3-2

MCBH Digging Work Clearance Permit

DIGGING WORK CLEARANCE PERMIT

MCBH Kaneohe Bay, Facilities Department

Project Title:	FOR FACILITIES USE ONLY **DWCP NO:**

The Digging Work Clearance Permit ***(DWCP)*** is required for any excavation work that may disrupt utility services, vehicular or aircraft traffic flow, protection provided by fire and intrusion alarm systems, or routine activities of Marine Corps Base Hawaii, Kaneohe Bay. The clearance process tries to identify, as much as practicable, any known, potentially hazardous work condition and is to help prevent accidents. It also informs key Base activities of the digging work and coordinates the required work with these activities to keep customer inconvenience to a minimum. ***The DWCP and CATEX must be approved prior to the start of work.***

1. INSTRUCTIONS:

The contractor/excavating activity shall complete blocks 2-12 *and* 23-25 below. Re-Submit this ORIGINAL MS Word Document with plans and/or drawings showing the location, width, and depth of excavation in an *Electronic Format* to MCBH Kaneohe Bay, Facilities Department via the Contracting Officer and/or Project Manager. Allow at least **20 Working Days** before commencement of work for clearance review by Facilities Department. Upon receipt of the approved and signed DWCP, the contractor/excavating activity may proceed with the excavation and shall follow all precautionary notes and directions as provided.

2. Documents prior to APPROVING this Dig Permit. (*Required*)

(A) An Environmental Category Exclusion (*CATEX*) has been submitted...?? ☐ **yes** ☐ **no** ***(Please Include)***

If No, explain why:

(B) MRACA (Maintenance Repair and Construction Approval Form) or SOP for FMMS (Appendix C) ☐ **yes** ☐ **no**

(*Note: MRACA is not required for projects that aregenerated by MCBH FacilitiesDepartment***)** ***(Please Include)***

This DWCP will Not be approved without an Approved CATEX or Waiver from LFPE

3. SITE LOCATION: *(Required)*	**4. TARGET START DATE:**
5. MCBH PROJECT MANAGER: (*Required DoD*) **POC:**	**6. PHONE NO:**
7. CONTRACTOR: **POC:**	**8. COMPANY PH.#:** **FAX #:** **ADDRESS:**
9. CONTRACT NO.:	**10. WORK ORDER/JOB NO.:**

11. TYPE OF WORK (*check all that apply*)

TYPE OF WORK PLANNED:

☐ CONSTRUCTION ☐ DEMOLITION ☐ MAINTENANCE/REPAIR

UNDERGROUND UTILITIES:

☐ WATER ☐ SEWER ☐ DRAIN ☐ ELECTRICAL ☐ TELEPHONE ☐ FIBEROPTIC

EXCAVATION

☐ TRENCHING ☐ FOUNDATION/SLAB ☐ DE-WATERING ☐ SOIL BORING/TEST PIT ☐ OTHER:

12. DESCRIPTION OF WORK: ***(Required)***

* **Provide a work description including the method of excavation** *(use of hand tools or type of heavy/powered equipment)*
* **Provide description of any precautionary measures to be followed and safety devices to be used such as shoring.**
* **Provide drawings or sketch showing the depth, width and length of the excavation and any known utilities that may interfere with the work.** ***(continue on additional sheet if required)***

Attached Sketch: ☐ **Yes** ☐ **No** ***(if no, explain)***

DIGGING WORK CLEARANCE PERMIT

MCBH Kaneohe Bay, Facilities Department

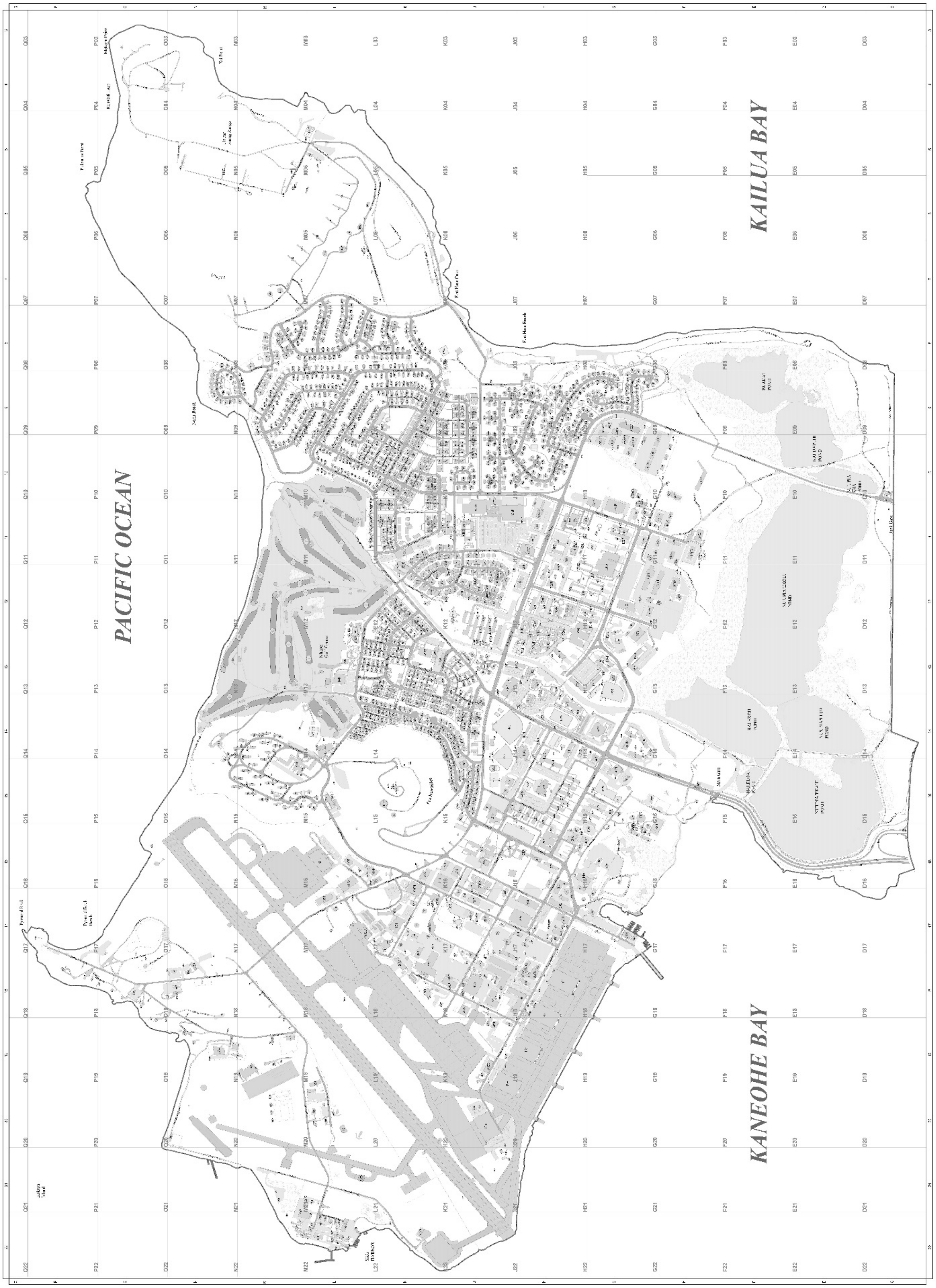
Project Title:	FOR FACILITIES USE ONLY **DWCP NO:**

Continuation:

12a. DESCRIPTION OF WORK:

SITE PLAN
Approximate Locations

*Please Circle the Area where the work is to be accomplished, you may include more Maps as needed to help identify areas.



CLEARANCE REVIEW
(MCBH DEPARTMENTS)

Project Title:		**FOR FACILITIES USE ONLY** **DWCP NO:**
ORGANIZATION	**SPECIAL INSTRUCTIONS**	**SIGNATURE / DATE**
13. FACILITIES DEPT **A. * WATER LINES** WATER DRAINAGE LINES ***Brett Chambers***, 257-6900		
B. * SEWER DRAINAGE LINES ***Brett Chambers***, 257-6900		
C. * ELECTRICAL LINES ***Gary Ishiii***, 257-4128		
14. PHYSICAL SECURITY *** LAN/FIBER SYSTEM** ***Jerry Hines***, 257-8559 Office: 257-8558 (or current POC)		
15. MILITARY POLICE **TRAFFIC CONTROL** ***Domonic Sumailo***, 257-6987 (or current POC)		
16. * FUELS DIVISION ***Jantzen Fernandez,*** 257-2234 (or current POC)	Fuel Lines: ☐ Active ☐ Non Active ☐ N/A	
17. * S6, BASE COMMUNICATIONS ***Benefield, Dillon,*** 257-1419 (or current POC)		
18. * CABLE TELEVISION **OCEANIC** ***L. Iha***, 625-8443 Fax : 625-5888 Email: haw.engineering research@charter .com		
19. ENVIRONMENTAL ***Jacquelyn Bomar,*** 257-0484	Approved: ☐ E.A. ☐ CATEX ☐ Other **Comments:**	
20. SAFETY ***Peter Evans***, 257-5719 (or current POC)		
21. EXPLOSIVE SAFETY ***Scott Ebert***, 257-2096 (or current POC) 216-6256		

***NOTE: YOU ARE REQUIRED TO TONE AREA !**

DIGGING WORK CLEARANCE PERMIT

MCBH Kaneohe Bay, Facilities Department

Project Title:	FOR FACILITIES USE ONLY **DWCP NO:**

23. The contractor/excavating activity shall perform a general site survey prior to any excavation. You are ***Required*** to ***Tone Area***; The activity will make every effort to locate unknown utilities posing a conflict with their work insofar as these utilities fall with the proposed excavation limits and are detectable by industry-standard underground utility locating equipment. If water valves; sewer, drain, or electrical manholes; recent trenching scars; or pavement trench patches are found where no utility line is shown on the drawings/sketches provided, the contractor/unit shall contact the undersigned prior to any excavation.______________. **Initial/Date**

24. There are known existing primary utilities shown for the area in question ☐ **yes**

______________. **Initial/Date**

25. The equipment operator shall closely monitor the excavated material for significant changes in color, size (gradation) and type of material. Such changes may indicate the presence of an unmarked utility. If such changes are noted, the contractor/unit shall cease all excavation by equipment and probe by hand. If any questions arise, contact the undersigned. ______________. **Initial/Date**

The contractor/excavating activity shall have an approved Digging Work Clearance Permit at the work site at all times during excavation.

The Digging Work Clearance Permit does NOT relieve the contractor/excavating activity from responsibility for any damage to underground utilities encountered during excavation.

All known existing primary utilities are shown on the attached sketches/drawings. Those not shown in the original sketches/drawings were added. The contractor/excavating activity shall locate each intersecting line and all other lines in the general vicinity of the excavation prior to any excavation. The utility lines shown on the drawings/sketches represents approximate locations only.

In case of emergency, contact **Emergency Shop**, Facilities Department, Maintenance Division, phone **257-2380**.

NOTE:

If the actual work differs from the written Description of Work (Item No. 12 above)., this DWCP will be voided and MUST be Resubmitted.

This Dig Permit shall be TERMINATED 180 days after the signed approval date below if work has not started unless otherwise noted.

Digging Work Clearance Permit No.# *XXX-XXXXXX* is hereby: ☐ **Approved.**
☐ **Disapproved**

______________________________________.

LFPE Lyle Fong, **LFP / Date**
FACILITIES DEPARTMENT, 257-6899

APPENDIX 3-3

Action Plan to Address Erosion at Storm Drain System Outlets

FINAL

ACTION PLAN TO ADDRESS EROSION AT STORM DRAIN SYSTEM OUTLETS

Storm Water Management Program Plan

Marine Corps Base Hawaii

NPDES Permit No. HI 000007

Prepared by:

Marine Corps Base Hawaii

March 2023

Table of Contents

Tables

Figures

List of Acronyms and Abbreviations

AMS	Asset Management System
BMP	Best Management Practice
CFR	Code of Federal Regulations
CWA	Clean Water Act
DOH	State of Hawaii Department of Health
ECE	Environmental Compliance Evaluation
ECPD	MCBH Environmental Compliance and Protection Division
EPA	United States Environmental Protection Agency
FY	Fiscal Year
GIS	Geographic Information System
HDPE	High Density Polyethylene
ID	Identification
IDDE	Illicit Discharge Detection and Elimination
INRMP	Integrated Natural Resources Management Plan
MCBH	Marine Corps Base Hawaii
MCDC	Mokapu Central Drainage Channel
MS4	Municipal Separate Storm Sewer System
MS4 Permit	Marine Corps Base Hawaii’s NPDES Permit No. HI S000007
NAVFAC	Naval Facilities Engineering Systems Command
NPDES	National Pollutant Discharge Elimination System
SWMP	Storm Water Management Program

1 Introduction

As of the effective date, September 1, 2021, the Marine Corps Base Hawaii (MCBH) is required to comply with the conditions of the National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4) Permit No. HIS000007 (referred to hereinafter as the "MS4 Permit"). The MS4 Permit includes authorized storm water and specified non-storm water discharges into Kaneohe Bay, Nuupia, Halekou, and Kaluapuhi Ponds, Kailua Bay, and the Mokapu Central Drainage Channel (MCDC). Per the MS4 Permit, Part D.1.f.(3).(iv), MCBH is required to provide an Action Plan to Address Erosion at Storm Drain System Outlets.. The MS4 Permit states:

> *Permit Requirements, Part D.1.f.(3)(iv):*
>
> *"Implement an Action Plan to address erosion at its storm drain system outlets with significant potential for water quality impacts, which shall identify outfalls to be addressed, explanation on the basis of their selection and an implementation schedule. The implementation schedule shall cover a five (5) year period. A status report on implementation of the plan shall be included in the Annual Report. The Permittee shall install velocity dissipators or other BMPs to reduce erosion at locations identified by periodic required inspections."*

This Action Plan to Address Erosion at Storm Drain Outlets has been prepared to identify MCBH outfalls with significant potential for water quality impact. The goal of this Action Plan is to continue to reduce erosion at MCBH outfalls posing a significant risk for impacting the water quality of receiving waters through monitoring and implementation of effective and feasible Best Management Practices (BMPs).

2 Identification of Erosional Outfalls

2.1 Completed Erosion Control Studies and Projects

The MCBH Environmental Compliance and Protection Division (ECPD) has conducted several ongoing studies and projects to identify and address its highest priority erosion issues on a watershed level. A continued focal point for erosion concerns within MCBH has been the landfill and Ulupau Crater area. The following three studies are useful references for measures that have been taken to address erosion at prioritized outfalls within these areas and others throughout MCBH:

1. *Final Marine Corps Base Hawaii Integrated Natural Resources Management Plan (INRMP), Update, 2012-2016* .
2. *Erosion Assessment with Recommendations: Outer Slopes and Southeast Shoreline, Ulupau Crater, Marine Corps Base Hawaii* (2007).
3. *Landfill and Northeast Crater Catchment Erosion Assessment Report with Recommendations* (2004).

The INRMP provides an extensive look at base wide ecosystem conservation plans. This goal-driven and active document is reviewed annually and necessary revisions/updates are made at least once every five years. The two erosion assessment studies conducted for the landfill and Ulupau contain detailed information and recommendations for MCBH's erosion project focus areas, which have since been addressed, and are also referred to in the INRMP.

Permanent erosion control improvements were designed, funded, and implemented in the residential area near North Beach in fiscal year (FY) 2020. The project included the installation of a smart ditch and vegetation surrounding the North Beach residential area to prevent erosion runoff.

The ECPD Compliance Inspection Team conducts routine inspections of all outfalls at MCBH. The Outfall Field Screening Plan (See Appendix 3-6) establishes the inventory of outfalls, priority areas, screening frequency, and tracking procedures for outfall inspections. The outfall inspections consist of a visual survey of the physical conditions at each outfall. The inspection results including checklist, photographs, maps, notification letters, and corrective action records are tracked in the Illicit Discharge Detection and Elimination (IDDE) database. The results of the outfall inspections are used to identify outfalls with erosional issues or prone to erosion.

MCBH has identified the following sites that require erosion control improvements:

- Pond Road Crater Slope
- Officer's Club Overflow Parking Lot
- Hillside along Puu Hawaiiloa Road
- North Beach Outfall Cliff (Outfall 042)

ECPD and the Facility Planning Division have coordinated to initiate erosion control projects at the four areas. A project to repair the erosion issues at Pond Road and upper North Beach parking lot was completed in 2018.

Improvement projects to address the erosion issues at the remaining areas have not been initiated due to lack of available funding. Permanent erosion control improvements were installed in the residential area near North Beach in 2020. However, repair of the North Beach outfall (Outfall 042) has not been carried out due to inadequate funding.

MCBH is committed to securing resources to permanently address areas prone to erosion. ECPD will initiate the request for funding for projects to install BMPs at the remaining sites of concern. Completed projects related to erosion control are summarized in Table 1.

Table 1: Completed Erosion Related Projects

Project Name/Description	Project Status
Install Erosion BMPs – North Beach Residential Area. The project addressed the erosion runoff from the residential area near North Beach. BMPs including a smart ditch and vegetation were installed to prevent erosion runoff.	Completed 2020
Repave Pond Road, Repair Utilities and Headwall – The project addressed the major erosion issues in the area by the upper North Beach parking lot and Pond Road. The road, headwall, and drainage culvert were repaired.	Completed 2018
Install Erosion BMPs - Southeast Crater Shoreline: The project addressed recommendations made in the erosion assessment for outer slope and southeast shoreline of Ulupau Crater. An unlined dirt ditch was lined with corrugated high density polyethylene (HDPE), and eroding slopes along southern shoreline cliffs were stabilized with waddles. Drainage features at the Weapons Range Parking Lot were also improved.	Completed
Install Erosion BMPs - North-Facing Crater Slopes: The project addressed recommendations made in the erosion assessment for the outer slope and southeast shoreline of Ulupau Crater. An unlined dirt ditch was lined with corrugated HDPE, and eroding slopes along the north-facing side of Ulupau Crater cliffs were stabilized with waddles.	Completed

Featured structural erosion and sediment control measures that are in place at MCBH to improve water quality at priority outfalls are summarized below:

Debris/Sediment Collection

- Wetlands:
  1. Nuupia Pond Complex (Sediment Basin/Storm Water Storage)
  2. Hale Koa (Sediment Basin/Storm Water Storage)
  3. Temporary Lodging Facility Wetland (Sediment Basin/Storm Water Storage)
  4. Salvage Yard Wetland (Sediment Basin/Storm Water Storage)
  5. Motor Pool (Filter Runoff)
  6. Percolation Ditch (Sediment Basin/Storm Water Storage)
- Concrete debris collector & sediment basin installed at inlet to sediment basin installed along the restored portion of MCDC
- Two debris/sediment collectors have been installed at inlets to the lined drainage channel starting at Uli Street along Daly Road
- Sediment trap (near Buildings 6002 & 6003) and retention basin located before discharge point to Nuupia Ponds

Erosion Controls

- To address erosion at the residential area near North Beach, a smart ditch and vegetation were installed to prevent erosion runoff.
- To address erosion on the southeast shoreline, the earthen drainage channel ending at Middaugh Street, adjacent to Daly Road has been lined with corrugated HDPE to act as a velocity dissipator and prevent erosion.
- To address erosion on the north–facing Ulupau Crater slopes, the earthen drainage channel starting at Uli Street along Daly Road has been lined with corrugated HDPE to act as a velocity dissipator and prevent erosion.
- Golf Course drainage channel perpendicular to Manning St. has been flattened enough to allow access for maintenance, allowing vegetation to grow back.

2.2 Active/Planned Erosion Control Projects

Projects that were active or planned during the INRMP (2012-2016) Five Year Implementation Plan, related to erosion control at MCBH, are listed in Table 2.

Table 2: Active or Planned Erosion Related Projects in the INRMP Update 2012-2016

INRMP Objective No.	Project Description
7.2.1	Maintain current wetland Geographic Information System (GIS) boundary layers.
7.2.4	• Ensure assigned personnel obtain appropriate training on wetland delineation, regulations, and/or monitoring protocols. • Explore interagency cooperative projects to implement regional wetland enhancement and monitoring opportunities.
7.3.1	• Initiate systematic monitoring of ambient erosion conditions and implement appropriate follow-on actions. • Conduct follow-on monitoring of erosion control project results and adaptive management. • HI0920013M Install Erosion BMPs: Southeast Crater Shoreline (Post-Project Evaluation Study). • HI0920014M Install Erosion BMPs: North-Facing Crater Slopes (Post-Project Evaluation Study)
7.3.2	HI20010 Watershed Repair/Restore, MCDC (Post-Project Evaluation Study)
7.3.3	• Review and update all relevant plans and projects to integrate watershed BMPs. • Identify and assist appropriate personnel to incorporate BMPs into operational guidelines and SOPs.
7.3.4	• Ensure relevant personnel obtain appropriate training on watershed BMPs. • Display/distribute *available* presentation materials on watershed health, assessment and BMPs. • Develop/distribute *additional* presentation materials on watershed health, assessment and BMPs.

2.3 Action Plan for Identification of Erosion Areas

As part of its continued commitment to reduce erosion at priority outfalls, MCBH's on-going identification and selection of erosional hot spots will be based on:

- Verification of existing priority erosional outfalls.
- Follow-up evaluations, included as part of active or planned erosion related projects, during which any new potential erosional hot spots will be identified.
    - The *Erosion Assessment with Recommendations: Outer Slopes and Southeast Shoreline, Ulupau Crater, Marine Corps Base Hawaii (2007)* identified potential areas of concern that were located outside of the completed corrective action project focus areas (see Figure 1). General site inspections for erosion will be conducted at these locations during the first year of inspections to be completed.
- Potential erosional hot spots brought to the attention of ECPD by the ECPD Compliance Inspection Team or MCBH residents.

All MCBH outfalls are routinely inspected for erosion issues. The results of the outfall inspections will be used to identify outfalls with significant potential for water quality impact due to erosion. For outfalls and other with erosion issues, field inspections will be conducted using the attached Erosional Area Inspection Checklist and will be used to prioritize sites for erosional control improvements.

New high priority erosional hot spots will be prioritized based on the following criteria:

- Immediate threat to public safety or risk of property damage;
- Proximity to and potential impact on receiving surface water;
- Level of onsite usage; and
- Constructability of the recommended erosion control measure.

ECPD and the Facilities Department have discussed the need for a base-wide erosion control study to identify areas of concern and recommend corrective actions. ECPD will request appropriate funding to initiate a base-wide erosion control study for MCBH.

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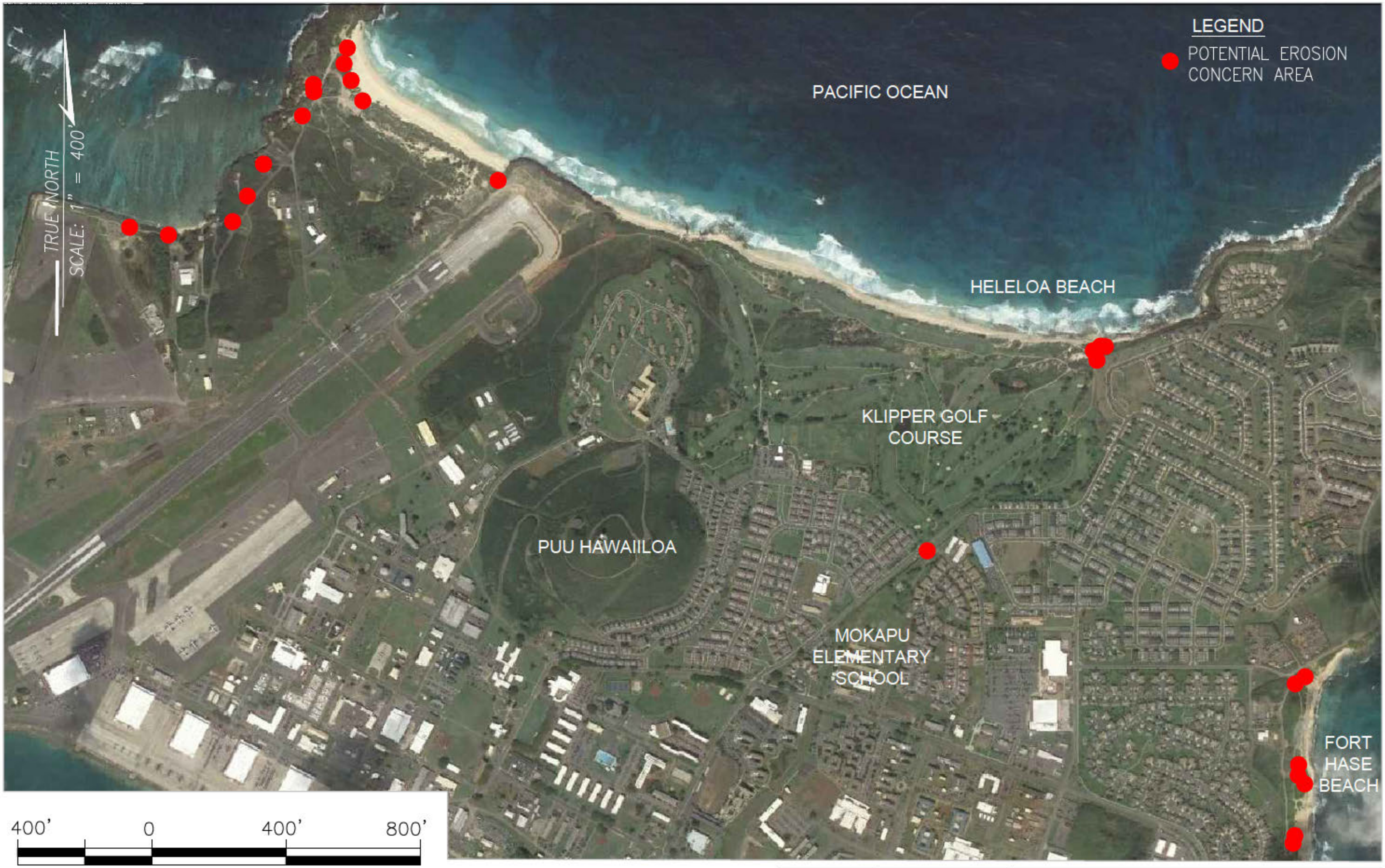

SCALE: 1"=400'

SOURCE: SUSTAINABLE RESOURCES GROUP INTERNATIONAL, INC. ,2007. FIGURE 13 MCBH–KB: EROSION AND RUNOFF AREAS OF CONCERN. EROSION ASSESSMENT WITH RECOMMENDATIONS FOR OUTER SLOPES AND SOUTHEAST SHORELINE OF ULUPAU CRATER, MARINE CORPS BASE HAWAII, FINAL REPORT, MAY 2007.

DATE:	PROJECT TITLE:	
SEP 2022	MCBH STORM WATER MANAGEMENT PROGRAM PLAN - ACTION PLAN TO ADDRESS EROSION AT STORM DRA N SYSTEM OUTLETS	
FIGURE TITLE:		FIGURE NO.:
POTENTIAL EROSIONAL AREAS		1

3 Proposed Actions

Moving forward, MCBH's program for erosion control at storm water outfalls will be based on the following activities:

- Inspection results from the MCBH Outfall Field Screening Program. All MCBH outfalls are inspected at least once per permit term. High priority outfalls are inspected annually, at a minimum. See the Outfall Field Screening Plan in Appendix 3-6 for more information on outfall screening priority and frequency. The inspection checklists, observations, photographs, notification documents, and corrective action records will be tracked in the IDDE database.
- The MCBH Facilities Department will upgrade the GIS database to a comprehensive GIS-based asset management system (AMS) with an inventory of existing erosional outfalls and erosion control BMPs. In the meantime, the existing GIS database will be used to track outfall inspection and maintenance frequency.
- MCBH will request funding and design and implement permanent erosion control measures for high priority sites, to address both sediment accumulation and velocity of flow.
- If a permanent solution for a high priority erosion hot spot cannot be constructed immediately, the site will be addressed with temporary erosion controls such as silt fences, bio-filter socks, or geotextiles.
- Following preliminary investigations, inspection frequency will be based on the outcome of previous inspections. If appropriate BMPs have been installed to address erosion concerns or if there are no reported high priority erosion concerns after two consecutive rainfall events, a site will be downgraded to a reduced inspection frequency:
  - Low priority sites shall be inspected at least once every five (5) years.
  - Medium priority sites shall be inspected at least twice every five (5) years.
  - High priority sites shall be inspected at least annually.
- Training will be provided to designers, contractors, and maintenance staff on optimizing use of BMPs, and to ensure the use of appropriate BMPs during all stages of the implementation of temporary and permanent BMPs.
- All applicable documents and field manuals, provided with MCBH's SWMP Plan update, will be used to guide implementation, inspection, and maintenance of new and existing erosion control measures.

Annual status reports will be used to evaluate and revise the Action Plan to Address Erosion at Storm Drain System Outlets, as needed.

4 Proposed Implementation Schedule

Based on the outcome of preliminary verification inspections and the number of high priority sites identified, if any, the following implementation schedule is proposed. The implementation year is the year in which the proposed repair is scheduled to be completed; however, this schedule is subject to change due to funding availability, permitting delays, or other unforeseen circumstances. Changes to the implementation schedule will be provided in the storm water Annual Report. The Annual Report is submitted to the State of Hawaii Department of Health (DOH) by January 30th each year.

Table 3: Implementation Schedule

Task	*Year 1*	*Year 2*	*Year 3*	*Year 4*	*Year 5*
• Implement outfall inspection schedule outlined Outfall Field Screening Plan	X	X	X	X	X
• Request funding for base-wide erosion control study	X	X			
• Conduct base-wide erosion control study and develop list erosion control improvement projects.		X	X	X	X
• Update GIS database and AMS	X	X	X	X	X
• Implementation and maintenance of temporary erosion control measures at high priority sites, as needed	X	X	X	X	X
• Design and appropriation of funding for permanent erosion controls	X	X	X	X	X
• Implementation of permanent erosion controls	X	X	X	X	X
• Update database for tracking of maintenance and inspections, as needed		X	X	X	X
• Erosion Control BMP Program status updates (in Annual Report) – Evaluation	X	X	X	X	X

5 References

1. *Final Marine Corps Base Hawaii Integrated Natural Resources Management Plan (INRMP), Update 2012-2016* (2011). Prepared for MCBH, by the Environmental Compliance and Protection Department MCBH and Sustainable Resources Group Int'l Inc. November 2011.
2. *Erosion Assessment with Recommendations: Outer Slopes and Southeast Shoreline, Ulupau Crater, Marine Corps Base Hawaii* (2007). Prepared for the ENV, by Sustainable Resource Group Int'l Inc. May 2007.
3. *Landfill and Northeast Crater Catchment Erosion Assessment Report with Recommendations* (2004). Prepared for the ENV, by Sustainable Resource Group Int'l Inc. June 2004.

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Attachment

Erosional Area Inspection Checklist

Erosional Area Inspection Checklist	
Inspector Name:	**Date/Time:**
Outfall ID/Location (if applicable):	

Site Information	
Site Name:	**Location/Watershed:**
Facility Description: Point of Contact Name/Position: ______________________ Phone Number: ______________________ Email: ______________________	
Inspection: ☐ Announced ☐ Unannounced	Approximate size of site (acres)?
Type of Inspection: ☐ Preliminary Investigation ☐ Construction Site ☐ Post-project Monitoring	
Weather during inspection:	Amount of Rainfall in past 24 hrs (inches): ___________
Site Drainage Description:	
General Discharge Observation *(if inspection performed during a rain event)* and Location(s):	
(For Follow-up Inspections) Deficiencies Noted in Last Inspection:	Date of last inspection: ______________________

Erosion Controls/Concerns

(*Identify existing measures observed on site and provide general comment/deficiencies where applicable*)

Are potential sources of sediment protected? Yes ☐ No ☐

Is there storm water discharge to unprotected areas? Yes ☐ No ☐

Deteriorating or unmaintained vegetation? Yes ☐ No ☐

Steep/unprotected slopes? Yes ☐ No ☐

Are appropriate BMPs in place to prevent erosion due to activities associated with construction (such as wash-down areas, silt fences, bio-filter socks, inlet protection, etc.)? Yes ☐ No ☐

Are structural BMPs installed correctly and in good condition? Yes ☐ No ☐

Is there evidence of deficiencies in the storm drain system? *(such as overflow of inlets, basins, etc.)* Yes ☐ No ☐

Do existing structures appear to have adequate maintenance? Yes ☐ No ☐
(Less than ½ full of sediment and debris, vegetated channels/basins are not overgrown, etc.)

Is there evidence of erosion onsite? *(gullies, rills, exposed soil, steep/eroded slopes, etc.)* Yes ☐ No ☐	**Is there evidence of sediment leaving the site?** *(sediment accumulation/plumes, stained pavement, etc.)* Yes ☐ No ☐

If any of the above questions are answered 'yes', describe below:

____

____

Have past deficiencies been addressed: Yes ☐ No ☐ *(if no, describe below)*

____

____

Describe structural BMPs in place? Permanent ☐ Temporary ☐ Both ☐ N/A ☐

☐ Inlet Protection
☐ Sediment Basin
☐ Bio-filter Sock
☐ Silt Fence
☐ Vegetated Swale
☐ Sediment/Debris Collecting Inlet
☐ Energy Dissipator
☐ Erosion Control Mats/Geotextiles
☐ Mechanical Separator
☐ Filter berm
☐ Slope Stabilization

☐ Lined Drainage Channel
☐ Outlet Protection(Headwall)
☐ Removable Inlet Filter
☐ Other *(describe)*: ______________________________

Describe Condition and Observed Structural/Maintenance Deficiencies *(if any)*:

____

____

____

____

____

(If there is no observed erosion and no deficiencies noted in existing BMPs)

Are existing BMPs consistent with applicable plans, field manuals, SWPPP, and SWMP Plan requirements?

Yes ☐ No ☐

If no, describe:

Photos Taken: Yes ☐ No ☐
Photo Reference IDs:

Erosional Area Priority Level

Does any deficiency pose a potential risk to public safety or of property damage? Yes ☐ No ☐
(if yes, site is high priority)

Do deficiencies impair current usage of the site? Yes ☐ No ☐

Does runoff from this site impact other areas? Yes ☐ No ☐

What is the name and proximity to receiving surface water? ______________________________

Is there an observable impact on the receiving water quality? Yes ☐ No ☐

Based on findings, this site is:

☐ Does not pose an erosion concern

☐ LOW PRIORITY – No observable erosion concerns. Condition of vegetation or structural BMPs poses a potential for an erosion concern to develop.

☐ MEDIUM PRIORITY – Observed erosion concerns and evidence of sediment leaving the site or affecting locations downstream.

☐ HIGH PRIORITY – Immediate risk for impacts to water quality, nearby/downstream property, and/or public safety.

Recommendations/Additional Notes:

Photographic Log:

Photo 1:	Photo 2:
Photo 3:	Photo 4:

APPENDIX 3-4

Enforcement Response Plan

Final

ENFORCEMENT RESPONSE PLAN

Storm Water Management Program Plan

Marine Corps Base Hawaii

NPDES Permit No. HI 000007

Prepared by:

Marine Corps Base Hawaii

May 2022

Table of Contents

Tables

Appendices

List of Acronyms and Abbreviations

BMP	Best Management Practice
DOE	State of Hawaii Department of Education
DOH	State of Hawaii Department of Health
ECC	Environmental Compliance Coordinator
ECPD	MCBH Environmental Compliance and Protection Division
EPA	United States Environmental Protection Agency
ERP	Enforcement Response Plan
FEAD	Facilities Engineering and Acquisition Division
MCBH	U.S. Marine Corps Base Hawaii
MCCS	Marine Corps Community Services
MCD	Facilities Maintenance Control Division
MS4	Municipal Separate Storm Sewer System
MS4 Permit	MCBH’s NPDES Permit No. HI S000007
NAVFAC	Naval Facilities Engineering Systems Command
NPDES	National Pollutant Discharge Elimination System
O&M	Operation and Maintenance
OMC	Ohana Military Communities
PPV	Public-Private Venture (Housing)
SWMP	Storm Water Management Program
SWPPP	Storm Water Pollution Prevention Plan
U.S.	United States

1 Introduction

As of the effective date, September 1, 2021, the Marine Corps Base Hawaii (MCBH) is required to comply with the conditions of the National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4) Permit No. HIS000007 (referred to hereinafter as the "MS4 Permit"). The MS4 Permit includes authorized storm water and specified non-storm water discharges into Kaneohe Bay, Nuupia, Halekou, and Kaluapuhi Ponds, Kailua Bay, and the Mokapu Central Drainage Channel. Per the MS4 Permit, Part D.1.d.(6), MCBH is required to implement an Enforcement Response Plan (ERP). The MS4 Permit states:

<u>Construction Site Runoff Control, Part D.1.d.(6)</u>

"Enforcement –The Permittee shall:

(i) Implement policies for enforcement and penalties for those in non-compliance with Part D.1.d.(1) requiring the implementation of standards, and

(ii) Implement an Enforcement Response Plan to include written procedures for appropriate corrective and enforcement actions, and follow-up inspections when an inspected project is not in full compliance with its requirements, other permits, and any other applicable requirements under the NPDES permit program."

Enforcement is also required within other parts of the MS4 Permit as follows:

<u>Illicit Discharge Detection and Elimination (IDDE), Part D.1.c.(5)</u>

"Enforcement – Within six (6) months after the effective date of this permit, the Permittee shall:

(i) Establish and implement the policies for enforcement and penalties for entities found to be in noncompliance with requirements developed in accordance with Part D.1.c.(1), including for persons illegally discharging pollutants to its MS4, and

(ii) Pursue enforcement actions against entities in non-compliance with its requirements, with illegal drain connections, and illegally discharging pollutants to its MS4 without direct connections."

<u>Industrial and Commercial Activities Discharge Management Program, Part D.1.g.(7)</u>

"Enforcement Policy for Industrial and Commercial Facilities and Activities - The Permittee shall implement its own polices for enforcement and penalties for industrial and commercial facilities which have failed to comply. The policy shall be part of an overall escalating enforcement policy and must consist of the following:

- *Conducting inspections.*
- *Issuance of written documentation to a facility representative within 30 calendar days of storm water deficiencies identified during inspection. Documentation must include copies of all field notes, correspondence, photographs, and sampling results, if applicable.*
- *A timeline for correction of the deficiencies.*
- *Provisions for re-inspection and pursuing enforcement actions, if necessary.*

In the event the Permittee has exhausted all available sanctions and cannot bring a facility or activity into compliance with its policies and this permit, or otherwise deems the facility or activity an immediate and significant threat to water quality, the Permittee shall provide e-mail notification to cleanwaterbranch@doh.hawaii.gov, Attn: Enforcement Section Supervisor within one (1) week of such determination. E-mail notification shall be followed by written notification and include a copy of all inspection checklists, notes, photographs, and related correspondence in pdf format (300 minimum dpi) in accordance with Part A.7 within two (2) weeks of the determination. In instances where an inspector identifies a facility that has not applied for the General Industrial Storm Water permit coverage or any other applicable NPDES permit, the Permittee shall provide email notification to the DOH within one (1) week of such determination."

The primary objectives of the ERP are to:

1. Ensure base-wide compliance with the MS4 Permit and updated Storm Water Management Program (SWMP) Plan.
2. Improve documentation to create and maintain an up-to-date inventory of construction projects on MCBH.
3. Facilitate routine and follow-up inspections to help prevent illicit runoff from reaching receiving surface waters.

2 Existing Policy and Standards

MCBH is unique from most MS4s in that within its property boundary, it owns the property and almost all of the facilities and provides funding for a majority of work. For the purpose of this document, the term “tenants” will be used to describe all individuals and organizations present within MCBH. This includes but is not limited to military personnel and their dependents, construction and maintenance contractors, civilian employees, commercial businesses, industrial facilities, schools, and recreational facilities.

All tenants on base are subject to the rules and regulations of the MS4 Permit and the SWMP Plan. The revised permit and plans supersede previous versions of these documents.

Due to the nature and internal structure of MCBH, the most effective means for enforcement is escalation of unaddressed violations to the next higher authority. Although unaddressed violations can be escalated as high as the Base Commander, this has not been an issue in the past due to the inherent threat of discharge or eviction from MCBH.

2.1 Management of MS4 Compliance at MCBH

MS4 Permit violations can be reported through various inspection procedures or through formal complaints by tenants. The entity responsible for standard inspection procedures is dependent on the type of facility or project, organized as follows:

- General Base-wide Inspections: Routine inspections are carried out by the MCBH Environmental Compliance and Protection Division (ECPD) Compliance Inspection Team. These are intended to promote overall compliance with all established rules and regulations. The Compliance Inspection Team is also responsible for following up with all written or verbal complaints received via mail, email, or the complaint hotline.

- Construction/Post-Construction Sites: Oversight for MS4 compliance of construction projects will comply with the “Reporting and Corrective Procedures for Construction Storm Water Inspections, May 2022,” to meet the requirements in Section D.1.d.(5)(iv) of the MS4 Permit (see attached). Construction projects are split into two main categories at MCBH, contracted projects and in-house and maintenance construction.

    1. Contract Projects:

       Projects contracted by the Navy Facilities Engineering Systems Command (NAVFAC) are managed through the Facilities Engineering and Acquisition Division (FEAD), MCBH. In these situations, the FEAD manages required inspections for safety issues and environmental compliance. Inspection records are tracked internally at the FEAD and are available to ECPD.

       The Department of Education (DOE), Marine Corps Community Services (MCCS), and Housing Public-Private Venture (PPV) Ohana Military Communities (OMC)/Hunt also contract construction projects and are responsible for ensuring communication and enforcement of contractor compliance with MS4 Permit regulations. Inspection records are tracked internally by the entity involved and are available to ECPD. In accordance with the MS4 Permit requirements, ECPD will conduct monthly inspections of construction projects completed by these tenants.

2. In-house and Maintenance Construction Projects:

   These projects are managed by the Facilities Maintenance Control Division (MCD) and are typically less than 5,000 square feet and/or related to emergency repairs. ECPD will conduct monthly inspections and tracking as required by the MS4 Permit. At ECPD's discretion, special consideration will be given to emergency projects to account for the urgent nature of these projects.

- Housing PPV: OMC/Hunt is responsible for communicating and enforcing MS4 Permit requirements with all tenants of the PPV Housing. The ECPD Compliance Inspection Team conducts regular inspections of the PPV Housing areas, as part of the general base-wide inspections, to ensure compliance of residents.
- Commercial: Commercial sites within MCBH are managed by MCCS. The ECPD Compliance Inspection Team conducts regular inspection of these facilities as part of the general base-wide inspections.
- Industrial: ECPD conducts annual inspections of industrial areas listed in Part E of the MS4 Permit. Environmental Compliance Coordinators (ECCs) conduct quarterly inspections of industrial sites.
- Schools: Mokapu Elementary's storm water program is managed and funded by the DOE. The ECPD Compliance Inspection Team conducts regular inspection of school facilities as part of the general base-wide inspections.
- Formal Complaints: Written or verbal complaints received via mail or the complaint hotline are followed-up by the Storm Water Program Manager.

At the discretion of ECPD, all facilities are subject to additional periodic inspection by an ECPD qualified inspector(s). See Table 1 for the Organization of MCBH's Oversight for MS4 Compliance.

Table 1: **Organization of MS4 Compliance Oversight**

Source of Storm Water Runoff	Responsible for Corrective Action	Responsible for Inspections	Required Permits/ Agreements	Recordkeeping & Tracking
General Base-wide Storm Water Issues	Varies	Compliance Inspection Team, ECPD	None	Varies
NAVFAC Construction by Outside Contractor	Contractor	FEAD	Contract documents, including plans and specifications Project-specific NPDES Permit or connection/discharge permit (if applicable)	FEAD
Construction & Maintenance – In-house	MCD	MCD, ECPD	Project-specific NPDES Permit or connection/discharge permit (if applicable) None (If no permits needed)	ECPD
DOE – Mokapu Elementary School	DOE (State)	DOE, ECPD	Lease Agreement Project-specific NPDES Permit or connection/discharge permit (if applicable)	DOE
PPV Housing	Resident (Residential Lots) OMC/Hunt (Common Areas)	Compliance Inspection Team, ECPD	Lease Agreement Project-specific NPDES Permit or connection/discharge permit (if applicable)	OMC/Hunt
MCCS – Commercial Areas	Commercial Tenant	ECPD	Lease Agreement Project-specific NPDES Permit or connection/discharge permit (if applicable)	MCCS
Industrial Areas	Facility Manager	ECPD	Industrial Storm Water Pollution Prevention Plan (SWPPP)	ECPD
Written/Verbal Complaints	Varies	Compliance Inspection Team, ECPD	Varies	Varies

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3 Tenant Agreements

The DOE, commercial, and PPV Housing tenants are required to follow updated MCBH SWMP Plan requirements through primary lease agreements with MCBH. Secondary tenants, that have leases with any of these three entities, are responsible for complying with the more stringent requirements of either the MCBH SWMP Plan or their secondary lease, as applicable. In all cases, the primary lease holder is accountable for all communications and enforcement of MCBH MS4 Permit regulations among its tenants. Commercial businesses are overseen by MCCS. The PPV Housing area is managed by OMC/Hunt, which signs secondary lease agreements with all residents. The DOE manages and funds MS4 compliance for Mokapu Elementary School. It is noted that the Mokapu Elementary School is not part of the DOE MS4 and is subject only to the MCBH MS4 permit.

With regard to MCCS and DOE tenant agreements, compliance with MS4 permit requirements is an enforceable environmental requirement. Per the Termination Clause in the Base / Entity Agreement inclusive of environmental, the Base Commander has the authority to evict a tenant and/or take other suitable enforcement action. This authority is granted under the Supported Agreement Directive DODI 4000.19. The standard period of notification of noncompliance is 180 days during which time the CO may consult ECPD for any clarifications.

MCBH ECPD will coordinate with MCBH Real Estate to receive an inventory of the existing properties and the points of contact for any observed MS4 Permit violations.

Regular operations and maintenance (O&M) activities in school, commercial, and residential areas will continue to be monitored through routine general base-wide inspections. For contracted construction projects, it is the primary lease holder's responsibility to ensure communication and enforcement of MCBH MS4 Permit regulations with contractors. These construction projects are also subject to the "Reporting and Corrective Procedures for Construction Storm Water Inspections, May 2022"and applicable contract requirements; in the event of a discrepancy, the more stringent requirement will apply. Periodic site inspections will be conducted by an ECPD-qualified inspector, at the discretion of ECPD. ECPD will work directly with DOE, MCCS, OMC/Hunt, or a corresponding representative, where applicable.

If needed in the future, MCBH may work with the Navy legal department to develop contract language for new and renewing tenants that will facilitate inspection procedure tracking and overall SWMP Plan compliance.

4 Inspections and Reporting Procedures

Outside of its own inspections, ECPD will be notified of MS4 Permit violations detected during routine inspections if:

1. The ECPD Compliance Inspection Team identifies a violation during general base-wide inspections.
2. A MS4 Permit violation is not resolved internally and promptly by processes put in place through construction contracts with the FEAD, MCCS, OMC/Hunt, or DOE.

Upon ECPD notification, the violation will be classified according to severity of the offense, as follows:

Critical Deficiency: A deficiency that poses an immediate risk of discharge of pollutants to a storm drain MS4 system, surface waters or State waters. Critical deficiencies include, but are not limited to, the following examples:

- Any evidence or observed discharge of non-storm water to the storm drain system, surface waters, or State waters generated by construction activity;
- No Storm Water Pollution Prevention Plan (SWPPP) document or NPDES permit;
- Absence of perimeter controls and/or linear barriers required by the SWPPP document;
- There are identified storm drain inlets, surface waters, or State waters within or adjacent to the project site in close proximity to disturbed soil areas without control measures in place that pose an immediate threat of untreated storm water discharges;
- Work in an active stream channel or other surface water body without proper implementation of required best management practices (BMPs); and
- Any presence of any spilled oil or hazardous materials near to unprotected storm drain inlets, surface waters, or State waters.

Major Deficiency: A deficiency that is a significant issue that could result in the discharge of pollutants to the storm drain system, surface waters or State waters. Major deficiencies include, but are not limited to, the following examples:

- Linear barriers and/or perimeter controls in areas tributary to a water body or drain inlet that are installed as required by the SWPPP document, but are not functional, such as silt fences that are not anchored properly, have collapsed, or are overwhelmed by accumulated sediment;
- Hazardous materials or waste stored within a project without containment or implementation of BMPs;
- Any fluid spills covering more than one (1) square yard and/or are adjacent to protected storm drain inlets, surface waters, or State waters;
- Sediment tracking more than 50 feet from project entrance/exit location(s);
- Expansion of the active disturbed soil area limit without written approval;

- Soil stabilization and sediment controls are not installed in accordance with the current SWPPP document/ BMP site map;
- Sediment controls are installed in accordance with the SWPPP document, but there is a large unstabilized disturbed soil area with insufficient controls down gradient to prevent the discharge of untreated storm water to the storm drain system, surface waters, or State waters if a rain event generates runoff; and
- Dust from project site visibly blowing off the site and into storm drain conveyances or adjacent surface water bodies.

Minor Deficiency: A deficiency that does not pose a threat of discharge of untreated storm water or pollutants to the storm drain system, surface waters, or State waters, but are not in direct conformance with the SWPPP document. Minor deficiencies include, but are not limited to, the following examples:

- BMPs are not deficient, but are not consistent with the SWPPP;
- SWPPP does not reflect current operations and an amendment is recommended;
- Linear barriers and/ or perimeter controls are properly installed according to the SWPPP document, but require minor maintenance;
- Sediment controls are installed per the SWPPP, but are not properly maintained;
- Site inspections by project staff are not being conducted at the required frequencies;
- Non-storm water or waste management BMPs that are improperly maintained;
- Any fluid spills covering less than one (1) square yard and not adjacent to storm drain inlets, surface waters, or State waters;
- Evidence of active wind erosion on unstabilized slopes/stockpiles;
- Minor tracking less than 50 feet from project entry/exit locations; and
- Major deficiencies which are corrected prior to the inspector leaving the site.

ECPD will evaluate the reported violation and classify it is a critical, major, or minor deficiency. At this time, ECPD will provide a recommendation and deadline for corrective action, as well as required follow-up activities/inspections. Deadlines and follow-up procedures are dependent on the severity of the offense, as follows:

- Critical Deficiencies: ECPD will immediately provide verbal notification to the responsible tenant/manager. ECPD will document the issue using the approved inspection checklist, photograph log and internal project tracking system, and send a written notification with an attached inspection checklist containing photographs to the responsible tenant and MCBH project manager(s), if applicable, to explain the site nonconformities. ECPD will ensure that corrective actions for all critical deficiencies are initiated immediately and completed as soon as possible. Deficiencies that result in discharge to receiving waters will be adequately corrected by close of business on the day the deficiency is identified. The tenant and project manager(s), if applicable, will provide ECPD daily updates and submit daily progress reports documenting the corrective actions taken and the progress made until completion. ECPD will complete a final inspection to verify that the corrective actions have been completed and adequately address the deficiencies.

ECPD will immediately notify the State of Hawaii Department of Health (DOH) if work is being completed without appropriate permits or if there is a discharge to State waters that exceeds reportable quantities or exceeds water quality standards.

- Major Deficiencies: ECPD will immediately provide verbal notification to the responsible tenant/manager. ECPD will document the issue using the approved inspection checklist, photograph log and internal project tracking system and send a written notification with an attached inspection checklist containing photographs to the responsible tenant and MCBH project manager(s), if applicable, to explain the site nonconformities. ECPD will follow up to ensure all major deficiencies are addressed or corrected as soon as possible, but in no event later than five (5) calendar days after the deficiency is identified or before the next forecasted rain event, whichever is sooner. The tenant and project manager(s), if applicable, will document the corrective actions taken and submit a response report to the ECPD within five (5) calendar days of completion. ECPD will complete a final inspection to verify that the corrective actions have been completed and adequately address the deficiencies.
- Minor Deficiencies: ECPD will document the issue using the approved inspection checklist, photograph log and internal project tracking system. The responsible tenant and MCBH project manager(s), if applicable, will be notified verbally of any non-conformities at the end of the inspection and provided an emailed copy of the inspection form (with attached photographs) within 48 hours of the inspection (normal business days). A response from the tenant and project manager(s), if applicable, documenting the corrective action taken to address the identified issues is expected within five (5) calendar days from receiving the completed inspection form.

The inspection form will also detail enforcement procedures if the violation is not adequately addressed. All inspection forms will be tracked internally by ECPD for monitoring of follow-up activities. Problems that have not been sufficiently addressed within the specified time period will become subject to MCBH's enforcement policy.

After deficiencies have been properly addressed, follow-on inspections will be completed at least monthly to ensure that all deficiencies will continue to be addressed. Inspections will also be conducted based on public complaints. Upon three (3) successive monthly site inspections that indicate, in total, no critical or major project BMP and storm water control deficiencies or less than six (6) minor deficiencies with no more than three (3) minor deficiencies in one month, ECPD may decrease inspection frequency to quarterly, at the discretion of ECPD. However, if under quarterly inspection frequency, a critical deficiency is observed or three (3) or more minor deficiencies are detected, inspection frequency shall return to no less than monthly.

5 Enforcement Procedure

Observed MS4 Permit violations that are not adequately addressed within the specified time period, will be subject to the base enforcement procedure. The ECPD enforcement procedures vary, depending on whether the job is contracted or in-house.

<u>Contracted Work:</u> Contracted projects, such as construction projects initiated by NAVFAC, MCCS, or OMC/Hunt, will use contract language to require compliance with the conditions of MCBH's Construction Program and MS4 Permit. In these cases, the contract will be written to meet the intent of the MS4 regulations. ECPD will immediately be notified of any violations that are not addressed promptly, as required by MCBH's SWMP Plan and/or the contract. The contracting entity will be given formal notice by the ECPD Director with an appropriate deadline for action. If the problem remains unchanged, the situation will be brought to the attention of the next higher authority.

<u>In-house Work:</u> Violations related to in-house work, that exceed the allotted mitigation time period will fall under enforcement by escalation through the chain of command for the base. Unaddressed issues are initially brought to the attention of the ECPD Director, after which the responsible party will be given formal notice with an appropriate deadline for action. If the problem remains unchanged, the situation will be brought to the attention of the next higher authority.

Regardless of the type of project, the ultimate penalty for non-compliance of MS4 Permit regulations is eviction or discharge of the responsible party from MCBH. This is placed at the discretion of the Base Commander.

Table 2 displays a summary of the enforcement action procedure for MCBH.

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Table 2: Enforcement Action Procedure Summary

OBSERVED DEFICIENCY	CRITICAL		MAJOR	MINOR
Immediate Response by ECPD	Notify DOH (written and verbal) if there is a discharge to State waters that exceeds reportable quantities or exceeds water quality standards	Notify Responsible Party (verbal notice)	Notify Responsible Party (verbal notice at time of inspection, and written notice incl. photo documentation)	Notify Responsible Party (verbal notice at time of inspection; followed by written notice incl. photo documentation within 2 business days)
Maximum Allotted Time for Corrective Action[2]		Same day (close of business)	5 calendar days from inspection date -OR- prior to storm event (whichever comes first)	5 calendar days from written notice
Follow up Inspection Frequency		Minimum once a month for 3 months	Minimum once a month for 3 months	Minimum once a month for 3 months
Reduced Inspection Frequency[3]		Quarterly	Quarterly	Quarterly

Notes:

1. ECPD will document all issues using the approved inspection checklist, photograph log and internal project tracking system.
2. Insufficient action from the responsible party during the specified time will be elevated to the ECPD Director. This will be escalated as needed until either the deficiency has been mitigated or the Base Commander is involved.
3. If no critical or major deficiencies or less than 6 minor deficiencies (no more than three in one month), inspections can be reduced from monthly to quarterly at the discretion of ECPD.

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6 References

Reporting and Corrective Procedures for Construction Storm Water Inspections (2022). Prepared for the Marine Corps Base Hawaii by the Environmental Compliance and Protection Division, Marine Corps Base Hawaii. May 2022.

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APPENDIX A

Reporting and Corrective Procedures for Construction Storm Water Inspection

May 2022

REQUIREMENT

In accordance with the Marine Corps Base Hawaii (MCBH) Municipal Separate Storm Sewer System (MS4) Permit Number HI S000007, effective September 1, 2021, Part D.1.d.(5)(iv), MCBH is required to submit reporting and corrective procedures for construction site inspections. This document establishes construction site inspection, corrective actions, tracking and reporting procedures to ensure compliance with the MS4 permit requirements.

DEFINITIONS

The terms minor, major and critical when relating to deficiencies in this document are defined as the following:

Critical Deficiency: A deficiency that poses an immediate risk of discharge of pollutants to a storm drain MS4 system, surface waters or State waters. Critical deficiencies include, but are not limited to, the following examples:

- Any evidence or observed discharge of non-storm water to the storm drain system, surface waters, or State waters generated by construction activity
- No Storm Water Pollution Prevention Plan (SWPPP) document or National Pollutant Discharge Elimination System (NPDES) permit
- Absence of perimeter controls and/or linear barriers required by the SWPPP document
- There are identified storm drain inlets, surface waters, or State waters within or adjacent to the project site in close proximity to disturbed soil areas without control measures in place that pose an immediate threat of untreated storm water discharges;
- Work in an active stream channel or other surface water body without proper implementation of required best management practices (BMPs); and
- Any presence of any spilled oil or hazardous materials near to unprotected storm drain inlets, surface waters, or State waters

Major Deficiency: A deficiency that is a significant issue that could result in the discharge of pollutants to the storm drain system, surface waters or State waters. Major deficiencies include, but are not limited to, the following examples:

- Linear barriers and/or perimeter controls in areas tributary to a water body or drain inlet that are installed as required by the SWPPP document, but are not functional, such as silt fences that are not anchored properly, have collapsed, or are overwhelmed by accumulated sediment;
- Hazardous materials or waste stored within a project without containment or implementation of BMPs;
- Any hazardous fluid spills covering more than one (1) square yard and/or are adjacent to protected storm drain inlets, surface waters, or State waters;
- Sediment tracking more than 50 feet from project entrance/exit location(s);

- Expansion of the active disturbed soil area limit without written approval;
- Soil stabilization and sediment controls are not installed in accordance with the current SWPPP document/BMP site map;
- Sediment controls are installed in accordance with the SWPPP document, but there is a large unstabilized disturbed soil area with insufficient controls down gradient to prevent the discharge of untreated storm water to the storm drain system, surface waters, or State waters if a rain event generates runoff; and
- Dust from project site visibly blowing off the site and into storm drain conveyances or adjacent surface water bodies.

Minor Deficiency: A deficiency that does not pose a threat of discharge of untreated storm water or pollutants to the storm drain system, surface waters, or State waters, but are not in direct conformance with the SWPPP document. Minor deficiencies include, but are not limited to, the following examples:

- BMPs are not deficient, but are not consistent with the SWPPP plan;
- SWPPP does not reflect current operations and an amendment is recommended;
- Linear barriers and/or perimeter controls are properly installed according to the SWPPP document, but require minor maintenance;
- Sediment controls are installed per the SWPPP plan, but not properly maintained;
- Site inspections by project staff are not being conducted at the required frequencies;
- Non-storm water or waste management BMPs that are improperly maintained;
- Any fluid spills covering less than one (1) square yard and not adjacent to storm drain inlets, surface waters, or State waters;
- Evidence of active wind erosion on unstabilized slopes/stockpiles;
- Minor tracking less than 50 feet from project entry/exit locations; and
- Major deficiencies which are corrected prior to the inspector leaving the site

PROCEDURES

Permit Citation	Permit Requirement	MCBH Procedure
Part D.1.d(4)	Plan review and approval	MCBH Environmental Compliance and Protection Division (ECPD) will review all project SWPPP's and supporting documents. ECPD will verify that all documents meet Hawaii Administrative Rules (HAR), Chapter 11-55, Appendix C, Section 7 and approved BMP manual requirements by using an approved SWPPP document checklist. Comments and notes will be made to the document preparer if any SWPPP elements are omitted or any portion is believed insufficient. Deficiencies will be noted with the date comments were addressed by the document preparer to the satisfaction of ECPD.
Part D.1.d(5)i	Inspections	Prior to the start of any ground-disturbing activities, except for activities associated with the installation of BMPs at a site, the qualified ECPD inspector will inspect the site to verify BMPs have been properly installed to the SWPPP specifications. The inspector will document and report any site conditions having the potential for erosion and sediment runoff as a result of the project's construction activities. A spreadsheet will be used to verify and document all comments made by ECPD during the review process have been properly resolved.
Part D.1.d.(5)ii	Inspection frequency	All contract, in-house and maintenance construction projects will be inspected at least monthly by an independent qualified construction inspector(s), who is familiar with the project SWPPP. Initial inspections will verify BMPs have been properly installed prior to the start of earth disturbing activities. The inspector(s) will use the attached "Construction Inspection Checklist" that will document any BMP deficiencies and inconsistencies between the approved SWPPP and project site conditions. The inspection form will include the date, inspection observations with photographs, potential noncompliance issue(s) and any necessary corrective actions needed to be addressed. Inspection forms will be sent (via email) to the construction contractor and the MCBH project manager(s) within 48 hours of the inspection (working business days). A photographic log will be kept to document all minor, major and critical issues observed on site. A response (via email) from the contracting project manager to ECPD verifying (with photographs, maps, etc.) appropriate corrective action was taken to address the identified deficiencies is expected within five (5) calendar days of receiving the inspection form. ECPD will track all inspections using an internal public share drive. Upon three successive monthly site inspections that indicate, in total,

		no critical or major project BMP and storm water control deficiencies or less than six (6) minor deficiencies with no more than three (3) minor deficiencies in one (1) month, ECPD may decrease inspection frequency to quarterly per the permit. This will be at the discretion of the ECPD qualified inspector(s). However, If under quarterly inspection frequency, a critical deficiency is observed or three (3) or more minor deficiencies are detected, inspection frequency shall return to no less than monthly.
Part D.1.d(5)ii	Corrective actions and reporting	If any critical deficiencies are observed, ECPD will verbally notify the responsible construction contractor and ensure all critical deficiencies are addressed and adequately corrected before the close of business day on the day the deficiency is identified. In the event a major deficiency is detected, ECPD will immediately send a written notification with an attached inspection checklist containing photographs to the responsible construction contractor and MCBH project manager(s) explaining the site nonconformities. ECPD will ensure all major deficiencies are addressed or corrected as soon as possible, but in no event later than five (5) calendar days after the deficiency is identified or before the next forecasted rain event, whichever is sooner. In the event a minor deficiency is detected, ECPD will document the issue using the approved inspection checklist, photograph log and internal project tracking system. The responsible construction contractor and MCBH project manager(s) will be notified verbally of any non-conformities at the end of the inspection and provided an emailed copy of the inspection form (with attached photographs) within 48 hours of the inspection (normal business days). A response from the contractor documenting the corrective action taken to address the identified issues is expected within five (5) calendar days from receiving the completed inspection form. Per the permit, ECPD qualified construction inspector(s) will conduct follow-up inspections as needed, at least monthly to ensure site deficiencies have been properly addressed and all storm water controls are in proper working order. Inspections will also be conducted upon complaints from citizens or concerned groups. Unannounced and follow-up inspections will be conducted as necessary. For all projects, if the corrective measures are not completed, then the deficiency will be elevated to the ECPD Director.
	Record keeping	Electronic inspection reports, spreadsheets and supporting photographic logs will be kept on file with ECPD. Records shall be kept for five (5) years in accordance with the NPDES permit.

BMP Construction Inspection Monthly/Quarterly MCBH Checklist	
Construction Project Name:	
Inspection Date:	**Location:**
Inspection Time:	**Total Disturbance Area**: > 1 acre ☐ < 1 acre ☐ Exempt ☐
Weather:	**Inspection Type:** Monthly ☐ Quarterly ☐ Follow-up ☐ Complaint ☐
NPDES Permit #:	**On-site POC** **Name:**
Name of Inspector:	**Email:**

Inspection Items

Item	YES	NO	N/A	Comments
Drain inlets, waterways, and site perimeter are adequately protected	☐	☐	☐	
Drain inlets, waterways, and site perimeter are adequately free of signs of illicit discharge	☐	☐	☐	
Stabilized construction ingress/egress prevents significant tracking of sediment	☐	☐	☐	
Spill kits are available and sufficiently stocked	☐	☐	☐	
Site surfaces are free of spills and stains	☐	☐	☐	
Washout facilities are sufficient to prevent non-storm water discharges	☐	☐	☐	
Trash and construction debris are placed in covered dumpsters	☐	☐	☐	
General housekeeping is sufficient	☐	☐	☐	
Materials that are potential storm water contaminants are properly stored	☐	☐	☐	
Slopes and disturbed areas not actively being worked are properly stabilized	☐	☐	☐	
SWPPP/SSCBMP/BMP maps on site and reflect current BMP status	☐	☐	☐	
Contractor self-inspections performed in accordance with HAR 11-55 APP C	☐	☐	☐	
Contractor personnel training records are available onsite or in an approved offsite location	☐	☐	☐	
Project has NPDES permit if applicable	☐	☐	☐	

3 or less minor deficiencies noted Inspectors initial :__________________ Onsite POC initial:____________________				
#	**Deficiency Description**	**Minor Deficiency Deadline 5 days from receipt of report**	**Major Deficiency Deadline 5 days from inspection date**	**Critical Deficiency Deadline close of business same day**
1				
2				
3				
4				
5				
6				
NOTE: Deficiency types are described in the Storm Water Management Plan (SWMP) for Marine Corps Base Hawaii, Chapter 4.5, April 2016. Use additional comments section below if more than 10 deficiencies are identified or illicit discharge is suspected or identified.				
Additional Comments:				

Sign below if more than 3 minor deficiencies were identified today

Inspectors Signature: ____

Onsite POC acceptance: ____ Date: ____________

Photographic Log:

Photo 1:	Photo 2:
Photo 3:	Photo 4:

APPENDIX 3-5

Wastewater Spill Notification/Response Procedures

Wastewater Spill Notification/Response Procedures

Wastewater Spill Notification Responsibility

1. Jeff Larson	Work: (808) 257-6999	Home: (808) 262-7419	
2. Randall Hu	Work: (808) 257-7142	Home: (808) 247-8114	
3. Lee Yamamoto	Work: (808) 257-0800	Home: (808) 945-0872	Cell: (808) 368-2633

Bypass, Upset, or Wastewater Spill Resulting in a Discharge to State Waters (including storm drains)

1. Immediate notification (no later than 24 hours after spill) to State of Hawaii Department of Health (DOH) Clean Water Branch at (808) 586-4309. When DOH is notified, request waiver of the 5-day written reporting requirement and ask if a press release will be required. A press release can be required for spills greater than 1,000 gallons.

If spill notification is needed outside of DOH working hours, make notification to one of the following:

a) Hawaii State Hospital Operator: (808) 247-2191

b) State on Scene Coordinator: (808) 226-3799 or (808) 251-1057

2. Warning signs shall be posted near waters likely to be affected by the discharge and where public access is possible. Warning signs are stored in Building 5091 at the Wastewater Treatment Plant (WWTP).

3. If public health is threatened, the Naval Health Clinic Hawaii, Preventive Medicine shall be contacted to conduct water quality testing. The point of contact (POC) is Lt. Palm (471-2212 x552). If Lt. Palm cannot be reached, call the Quarterdeck at 473-1880 x2210.

4. In the case of a bypass or upset at the WWTP, make sure that influent and effluent Biochemical Oxygen Demand (BOD) and Total Suspended Solids (TSS) samples are taken during bypass or upset.

Wastewater Spill Resulting in a Discharge to Ground Only

1. If spill is less than 1,000 gallons, immediate reporting is not required. A tabulated summary of discharges less than 1,000 gallons shall be submitted quarterly to DOH.

2. If spill is greater than 1,000 gallons, immediately notify the DOH Wastewater Branch at (808) 586-4294. Make sure to report that the spill was to ground only. When DOH is notified, request waiver of 5-day written reporting requirement.

If spill notification is done outside of DOH working hours, make notification to one of the following:

a) Hawaii State Hospital Operator: (808) 247-2191

b) State on Scene Coordinator: (808) 226-3799 or (808) 251-1057

3. Contaminated grounds shall be cleared of all debris and standing wastewater and disinfected.

APPENDIX 3-6

Outfall Field Screening Plan

FINAL

OUTFALL FIELD SCREENING PLAN

Storm Water Management Program Plan

Marine Corps Base Hawaii

NPDES Permit No. HI 000007

Prepared by:

Marine Corps Base Hawaii

September 2022

Table of Contents

Tables

Appendices

List of Acronyms and Abbreviations

AMS	Asset Management System
BMP	Best Management Practice
DOH	State of Hawaii Department of Health
ECC	Environmental Compliance Coordinator
ECPD	MCBH Environmental Compliance and Protection Division
EPA	United States Environmental Protection Agency
GIS	Geographic Information System
ICDM	Industrial and Commercial Discharge Management
ID	Identification Number
IDDE	Illicit Discharge Detection and Elimination
MCBH	U.S. Marine Corps Base Hawaii
MCDC	Mokapu Central Drainage Channel
MS4	Municipal Separate Storm Sewer System
MS4 Permit	MCBH’s NPDES Permit No. HI S000007
NPDES	National Pollutant Discharge Elimination System
POL	Petroleum, Oil, and Lubricants
SWMP	Storm Water Management Program
SWPPP	Storm Water Pollution Prevention Plan
TMDL	Total Maximum Daily Load
U.S.	United States

1 Introduction

As of the effective date, September 1, 2021, the Marine Corps Base Hawaii (MCBH) is required to comply with the conditions of the National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4) Permit No. HIS000007 (referred to hereinafter as the "MS4 Permit"). The MS4 Permit includes authorized storm water and specified non-storm water discharges into Kaneohe Bay, Nuupia, Halekou, and Kaluapuhi Ponds, Kailua Bay, and the Mokapu Central Drainage Channel (MCDC).

Per the MS4 Permit, Part D.1.c.(2), MCBH is required to update and implement an Outfall Field Screening Plan to observe outfalls to screen for illicit discharges. The MS4 Permit states:

Part D.1 Illicit Discharge Detection and Elimination (IDDE)

"The Permittee shall implement the ongoing SWMP to detect and eliminate illegal connections and illicit discharges into its MS4 and shall include an improved program in the revised SWMP Plan. The program shall include:

> ***Part D.1.c.(2) Field Screening*** *- The Permittee shall update and implement an Outfall Field Screening Plan for observing major and minor outfalls to screen for illicit discharges within six (6) months of the effective date of this permit. The plan shall designate priority areas for screening, specify the frequency for screening, and identify the procedures to be followed if a discharge is observed. If any outfall locations are submerged at the time of inspection, the monitoring personnel shall inspect the discharge line (or contributing tributary lines), at the closest location(s) upstream of the discharge location and outside tidal influence. At a minimum, outfalls in priority areas shall be screened once per permit term."*

1.1 Purpose and Scope

The Outfall Field Screening Plan supports MCBH's overall Storm Water Management Program (SWMP) as part of the Illicit Discharge Detection and Elimination (IDDE) Program. The purpose of the IDDE program is to detect and eliminate illicit connections and illegal discharges into the MS4.

The U.S. Environmental Protection Agency (EPA) defines an illicit discharge as "…any discharge to an MS4 that is not composed entirely of stormwater…," with the exception of those discharges that are specifically permitted by a NPDES Permit. Routine illicit connection and illicit discharge inspections are performed to identify storm water discharges that are not identified as allowable in the NPDES Permit.

The Outfall Field Screening Plan provides guidance for the IDDE Program to screen outfalls for illicit discharges into the MS4 and protect state water quality. This plan identifies the outfalls that discharge into a receiving water, priority areas for field screening, frequency for screening outfalls based on priority type, and the procedures to follow if a discharge is observed. Using the priorities and procedures specified in this plan, MCBH has implemented a storm water collection system surveillance program to monitor all outfalls and the collection system for evidence of illicit discharges during wet and dry weather. Outfall inspectors will be annually trained to evaluate the quality of storm water from outfalls and conveyance systems to identify and eliminate illicit connections and illegal discharges into the MCBH MS4.

The primary objectives of the Outfall Field Screening Plan are to:

1. Designate priority areas and frequency for screening.
2. Identify the procedures to be followed if a discharge is observed.

2 Outfall Inventory and GIS Database

MCBH maintains the outfall inventory as part of the IDDE program using a file-based illicit discharge database. MCBH is developing a Geographic Information System (GIS) database and overall asset management system (AMS) with an inventory of all MS4 components, IDDE database, and inspection and maintenance schedule.

An outfall is defined as a point source at the point where an MS4 discharges to waters of the United States. The GIS contains the MCBH MS4 assets and identifies each outfall as a discharge point. Each outfall has a unique Outfall Identification Number (Outfall ID). The outfalls are located using a geographic position system and the coordinates are logged in the GIS database.

The MCBH Environmental Compliance and Protection Division (ECPD) maintains the outfall inventory and tracks a total of 74 outfalls. The AMS currently supports the IDDE program and outfall field screening program by providing a comprehensive map of the MS4 system and outfall locations. The AMS is under further development to integrate MAXIMO, the system MCBH uses for tracking and scheduling maintenance work. Once complete, the AMS database will maintain the outfall maintenance and cleaning work orders, field screening inspection forms and reports, and enforcement responses.

Appendix A contains the outfall inventory and location map. The inventory contains the outfall ID, receiving waters, map grid location, connected industrial facilities, and inspection frequency. As discussed in Section 3, the inspection frequency is based on the screening category assigned to the outfall.

3 Outfall Screening Category and Inspection Frequency

Outfall field screening is a key element of MCBH's IDDE program. The purpose of outfall field screening is to identify potential polluted runoff discharging into the MCBH MS4. MCBH is in the process of conducting an overall physical inspection of all outfalls to identify high priority components of the MS4 that require annual inspection and cleaning. Observations and photographs will be documented using the Outfall Field Screening Inspection Checklist. The photographs of the outfalls provide baseline information for future outfall field screening inspections. After conducting the initial physical inspection of all outfalls, MCBH will update the priority ranking and screening category of outfalls at a greater risk of impact to receiving waters from discharge of pollutants, based on the types of activities and proximity to impaired waters.

Each outfall on MCBH property is assigned a screening category that correlates to an inspection frequency. The outfall field screening category and inspection frequency are based on the relative risk that a discharge might be contaminated with pollutants into high quality waters. The criteria used to determine the outfall screening category include the Industrial and Commercial Discharge Management Program (ICDM Program) prioritized areas and the water use classification of the outfall's receiving waters.

MCBH administers the IDDE program in conjunction with the ICDM Program to reduce, to the maximum extent practicable (MEP), the discharge of pollutants into the MS4. The ICDM Program has designated priority areas for industrial and commercial facility and activity inspections based on the relative risk that any discharge might be contaminated with pollutants. ECPD reviews the ICDM Program prioritized areas, at least annually, based on updated industrial and commercial inventories, inspection findings, and storm water violations.

The ICDM program priority ranking of the industrial facilities is based on the Storm Water Monitoring Plan's prioritization of monitoring locations. The ranking, from 1 to 20, is based on Standard Industrial Classification (SIC) code, potential risk that the facility poses to storm water quality due to the nature of the industrial activity, and proximity to the receiving waters. Higher priority industrial facilities include facilities with activities in Sectors L (Landfills, Land Application Sites, and Open Dumps), N (Scrap Recycling and Waste Recycling Facilities), T (Treatment Works), and Q (Water Transportation) followed by facilities with activities in Sectors S (Air Transportation) and P (Land Transportation and Warehousing). The highest priority sites are required by the MS4 Permit to conduct sector specific effluent limitations monitoring and quarterly benchmark monitoring or only quarterly benchmark monitoring. Table 1 shows the industrial facilities included in the MS4 Permit and their assigned priority ranking. Industrial facilities with rankings 1 to 5 are high priority, 6 to15 are medium priority and 16 to 20 are low priority. The three commercial facilities listed in the MS4 Permit are assigned high priority for the commercial facility ranking. See Table 2 for the commercial facilities included in the ICDM Program.

In Hawaii, state waters are classified as either inland or marine waters. Hawaii Administrative Rules Chapter 11-54, Water Quality Standards establishes standards for both inland and marine waters. Inland waters are classified as either Class 1, waters to remain in their natural state as nearly as possible with an absolute minimum of pollution from any human-caused source, or Class 2, waters to be protected for recreational purposes, the support and propagation of aquatic life, agricultural and industrial water supplies, shipping, and navigation. Marine waters are classified as either Class AA, waters to remain in

their natural pristine state as nearly as possible with an absolute minimum of pollution from any human-caused source, or Class A, waters to be protected for recreational purposes and aesthetic enjoyment.

Table 1: ICDM Program Industrial Facilities Priority Ranking

Priority Ranking	Building No.	Description	General Category	Receiving Waters and Discharge Point
		High		
1	Sanitary Landfill	Sanitary Landfill	Sanitary Landfill	Kailua Bay via Outfall LF-1
2	WRF	Water Reclamation Facility	Utility	Kaneohe Bay via sheet flow
3	132	Recycle Center	Recycling Center	Kaneohe Bay via Outfall 017
4	1698	Small Boat Repair Shop	Maintenance	Kaneohe Bay via Outfalls 017 & 021
5	6802	Waterfront Operations Lab/Boat Shop	Maintenance	Kaneohe Bay via Outfall 027
		Medium		
6	1170, 1171	Aircraft Fuel Islands	POL Storage	Kaneohe Bay via Outfall 024
7	6183	Engine Test Facility	Maintenance	Kaneohe Bay via sheet flow
8	1631	Aircraft Wash & Rinse Facility	Maintenance	Kaneohe Bay via Outfall 018
9	6107	Aircraft Rinse Facility	Maintenance	Pacific Ocean via sheet flow
10	351	Vehicle Maintenance Shop	Maintenance	Kaneohe Bay via Trench Drain (351-3)
11	1252, 1253	Fuel Division Supply Department	Storage	Kaneohe Bay via Outfall 021
12	6182	Fuel Delivery Branch & Refueler Truck Parking	Storage	Kaneohe Bay via Outfall 021
13	6479	Aircraft Ready Fuel Storage	Storage	Kaneohe Bay via Outfall 021
14	3014	Combat Logistics Battalion Support Company Transportation Services	Maintenance	Nuupia, Halekou, and Kaluapuhi Ponds via grated inlet
15	1619	Ground Support Equipment Shop	Maintenance	Kaneohe Bay via Outfall 017

Priority Ranking	Building No.	Description	General Category	Receiving Waters and Discharge Point
Low				
16	5011	12th Marine Motor T	Maintenance	Nuupia, Halekou, and Kaluapuhi Ponds
17	6874	3rd Radio Battalion	Maintenance	Nuupia, Halekou, and Kaluapuhi Ponds via sheet flow
18	1295	Golf Course Maintenance Shed	Maintenance	Mokapu Central Drainage Channel via sheet flow
19	6892	Aircraft Wash Facility	Maintenance	Kaneohe Bay via grated inlet
20	3073	Helicopter Wash Facility	Maintenance	Kaneohe Bay via sheet flow

Table 2: ICDM Program Commercial Facilities Priority Ranking

Priority Ranking	Building No.	Description	Receiving Waters and Discharge Point
High			
1	1667	MCX Gas & More (Wash & Co., Firestone)	Nuupia, Halekou, and Kaluapuhi Ponds via Outfall 011
1	3071	K-Bay Marine Mart/Subway/Gas Lanes	MCDC via Outfall G14
1	1267, 3097, 6882, 6883	Five-O Motors (Auto Hobby Shop)	Kaneohe Bay via Outfall 016

MCBH's outfalls discharge to both marine waters (Kaneohe Bay, Kailua Bay, and the Pacific Ocean) and inland waters (Nuupia, Halekou, and Kaluapuhi Ponds and the MCDC). Kaneohe Bay is classified as Class AA marine waters. The Pacific Ocean and Kailua Bay are Class A waters. Nuupia, Halekou, and Kaluapuhi Ponds are classified as Class 1 inland waters. The MCDC is a man-made channel that stretches from the southern end of the Klipper Golf Course to the Nuupia Ponds. The MCDC facilitates flow of storm water runoff from the inland areas of the Mokapu Peninsula to the ponds and ultimately to Kaneohe Bay. The MCDC is classified as both Class AA/Class 2 because it is a Class 2 inland water that discharges to Class AA marine waters.

Each outfall is assigned a screening category of high, medium, or low based on the water use classification of its receiving waters and proximity of ICDM Program prioritized areas. Outfalls in the high screening category are inspected at least annually. Outfalls in the medium screening category are inspected at least twice per MS4 permit term. Low screening category outfalls are inspected at least once per permit term. Table 3 shows the outfall screening category and inspection frequency based on receiving water and ICDM Program priority criteria.

Table 3: Outfall Screening Categories and Inspection Frequency

Outfall Receiving Waters	Industrial Priority Ranking	Commercial Priority Ranking	Outfall Screening Category	Inspection Frequency
Kaneohe Bay or Nuupia, Halekou, and Kaluapuhi Ponds	High	High or N/A	High	Annually
Kaneohe Bay or Nuupia, Halekou, and Kaluapuhi Ponds	Medium	High or N/A	High	Annually
Kaneohe Bay or Nuupia, Halekou, and Kaluapuhi Ponds	Low or N/A	High	Medium	At least twice per permit term
Kaneohe Bay or Nuupia, Halekou, and Kaluapuhi Ponds	Low or N/A	N/A	Low	At least once per permit term
Kailua Bay, Pacific Ocean, or MCDC	High	High or N/A	High	Annually
Kailua Bay, Pacific Ocean, or MCDC	Medium	High or N/A	Medium	At least twice per permit term
Kailua Bay, Pacific Ocean, or MCDC	Low or N/A	High or N/A	Low	At least once per permit term

The outfalls in the high and medium screening categories are presented in Table 4. Outfalls LF-1, LF-2, 017 and 027 will be screened at least annually. Outfalls 011, 016, 018, 021, and 024 will be screened at least twice per permit term. The remaining outfalls will be screened at least once during the permit term. The outfall screening categories and inspection frequency may be modified, if necessary, to account for changes to water use classifications, ICDM Program prioritized areas modifications, and inspection findings. Any changes to the outfall field screening plan will be documented in the SWMP Annual Report.

Table 4: Priority Outfalls

Outfall ID	Outfall Receiving Waters	Industrial Priority Ranking	Commercial Priority Ranking	Outfall Screening Category	Inspection Frequency
			High		
017	Kaneohe Bay	High	N/A	High	Annually
027	Kaneohe Bay	High	N/A	High	Annually
LF-1	Kailua Bay	High	N/A	High	Annually
LF-2	Kailua Bay	High	N/A	High	Annually
			Medium		
011	Nuupia, Halekou, and Kaluapuhi Ponds	N/A	High	Medium	At least twice per permit term
016	Kaneohe Bay	N/A	High	Medium	At least twice per permit term
018	Kaneohe Bay	Medium	N/A	Medium	At least twice per permit term
021	Kaneohe Bay	Medium	N/A	Medium	At least twice per permit term
024	Kaneohe Bay	Medium	N/A	Medium	At least twice per permit term

4 Outfall Screening Procedures

The ECPD Compliance Inspection Team inspects outfalls for illegal connections and illicit discharges in accordance with the frequency in Table 3. The inspectors are trained, at least annually, to identify indicators of storm water pollution and evidence of non-storm water discharges.

4.1 Field Inspection

Outfall inspections include a visual survey of the physical conditions at each site. The ECPD Compliance Inspection Teams conduct outfall field screening during dry weather periods to determine the presence of any non-storm water flows, stains, sediment, odors, and other conditions. If any outfall location is submerged at the time of inspection, the monitoring personnel inspect the closest upstream storm drain structure or contributing tributary line outside of tidal influence.

The ECPD Compliance Inspection Team screen each outfall site for illegal connections and illicit discharges. Appendix B contains the Outfall Field Screening Inspection Checklist used by the inspectors to input observations including structural condition, presence of flow, and pollution condition. Photographs are documented along with observations on the checklist. The photographs of the outfalls are used to track operation and maintenance needs over time. The team inspects the outfall area for signs of any discharge not composed entirely of storm water except for the allowable non-storm water discharges discussed in Section 4.3. All discharges other than storm water and the allowable exceptions are not permitted. Inspectors will note any trash, debris or vegetation obstructing the outfall on the Outfall Field Screening Inspection Checklist. The inspection results will be utilized to identify outfalls that require maintenance and cleaning.

In-depth investigations shall occur at each priority area outfall at least once per permit term. If illicit discharges are observed at the outfall, the ECPD Compliance Inspection Team is responsible for the investigation of the contributing drainage basin, including industrial inventory and activities within the area. The ECPD Compliance Inspection Team shall conduct additional inspections during dry weather conditions and walkthrough inspections at industrial and commercial facilities to review existing best management practices (BMPs) and compliance with Storm Water Pollution Prevention Plans (SWPPPs).

Additional outfall field screening may be conducted to support the SWMP, including outfall condition assessments or outfall debris removal. Refer to the Appendix 3-3 of the SWMP Plan, Action Plan to Address Erosion at Storm Drain System Outlets for more information.

4.2 Potential Illicit Discharge

The signs for an illicit discharge may include pollutants, the presence of flowing water in dry weather conditions, or illegal connections to the MCBH MS4. Physical indicators of storm water pollution may include odor, color, turbidity, floating materials, debris, sediment, staining, damage, or vegetation. If dry weather flow is observed, the flow is visually examined for characteristics such as color, odor, sheen or suds. A list of pollutant indicators that may be observed in the MS4 inlets and outlets are included in

Table 5 to assist in identifying their possible sources and associated activities. If such characteristics indicate the presence of non-storm water discharges, the inspection team will expand the survey to investigate receiving waters and track the flow upstream to determine the location of the discharge. Once the source is located, the inspector will notify the tenant and initiate corrective actions. The inspector will complete the Outfall Field Screening Inspection Checklist and take photographs of site conditions. If a discharge is observed during dry weather, the outfall will be placed in the highest screening category and will be inspected annually, at a minimum.

The ECPD Compliance Inspection Team will work with the responsible party to correct the violation as soon as possible. The inspector will initiate the IDDE program enforcement procedures outlined in the Enforcement Response Plan (See Appendix 3-4 of the SWMP Plan). The Enforcement Response Plan establishes violation levels and associated enforcement actions. A critical deficiency is defined as a deficiency that poses an immediate risk of discharge of pollutants to the MS4. A major deficiency is a significant issue that could result in the discharge of pollutants to the MS4. A minor deficiency does not pose a threat of discharge of untreated storm water or pollutants to the MS4 but is not in conformance with the SWPPP document.

Any evidence or observed discharge of non-storm water to the MS4 generated by construction activity is an example of a critical deficiency. If an observed deficiency is not addressed within the allotted mitigation period, the issue will be brought to the attention of the ECPD Director. The party in violation will receive a written notice and deadline for compliance. If the issue remains unresolved, it will be escalated to the next higher authority.

Table 5: Possible Sources of Pollutant Indicators

Pollutant Indicator	Possible Sources
Ammonia	Broken sanitary wastewater lines, lawn/agricultural runoff
Bacteria/algae	Decomposing organic matter
Cloudy/opaque water	Metal fabrication
Cloudy appearance	Erosion
Copper	Pesticides, plating, paint shops, or spills
Discolored sediments	Metal fabrication
Floatable solids	Trash and debris
Gray color, sewage odor	Cross connection between sanitary and storm sewer
High chlorine	Swimming pools
High or low pH	Plastic/fiberglass shops, metal plating, masonry wastes
Inhibited vegetation	Various
Metal/concrete corrosion	Metal plating
Multicolor water	Construction sites
Oil, grease, fuel	Gas stations
Oily sheen	Auto repair shops/salvage yards
Phenols	Wood preservatives, pesticides
Pungent/burning odor	Chemical industry
Sediment deposits	Construction site
Soapy film, detergents	Laundries
Unusual colors/odors	Various
Volatile chemical odor	Painting, vehicle/equipment repair, metal plating

4.3 Allowable Non-Storm Water Discharge

Part B.2. of the MS4 Permit includes a list of conditionally allowable non-storm water discharges, provided the discharge is not determined to be a source of pollution by MCBH. The MS4 Permit also authorizes MCBH to develop a list of other similar occasional incidental non-storm water discharges that will not be addressed as illicit discharges. These non-storm water discharges must not be reasonably expected to be significant sources of pollutants to the MS4, because of either the nature of the discharges or conditions they have established for allowing these discharges to the MS4. The controls or conditions placed on these discharges is documented in the SWMP Plan. A table of allowable discharges and recommended BMPs is included in Appendix 3-1 of the SWMP.

In the event that any of the listed discharges is observed or expected to be significant sources of pollutants to the MS4, the discharge will no longer be allowed. Allowable non-storm water discharges under the specified conditions include the following:

- Water line flushing *(including steam line condensate and flushing)*;
- Landscape irrigation;
- Diverted stream flows;
- Rising ground waters;
- Uncontaminated ground water infiltration (as defined in 40 CFR §35.2005(20));
- Uncontaminated pumped ground water, not including construction related dewatering activities;
- Discharges from potable water sources and foundation drains *(including emergency eye wash basins and showers, and drinking fountains on piers)*;
- Air conditioning condensate;
- Irrigation water;
- Springs;
- Water from crawl space pumps, uncontaminated water from utility manholes or boxes, and footing drains *(including discharge from buildings with basements, and crawl space pumps used by utility companies to dewater utility manholes and other maintenance and operations substructure facilities);*
- Lawn watering runoff;
- Water from individual residential car washing;
- Water from charity car washes;
- Flows from riparian habitats and wetlands;
- Dechlorinated swimming pool discharges;
- Exterior building wash water (water only) *(including piers and wharves – water only without detergent);*
- Residual street wash water (water only), including wash water from sidewalks, plazas, and driveways, but excluding parking lots;
- Discharges or flows from firefighting activities *(including fire hydrant testing, fire sprinkler testing, and firefighter training activities);*
- Boat Rinsing
    - *The intent of the rinsing activity is salt removal.*

  - *Washing must be limited to water only.*
  - *No detergents are allowed.*
  - *Engine maintenance/degreasing activities must be conducted at designated locations featuring an oil-water separator and cannot be discharged directly to the MS4.*
  - *No discharge of bilge water to the MS4.*
- Dive Gear Rinsing
  - *The intent of the rinsing activity is salt removal.*
  - *Washing must be limited to water only.*
  - *No detergents are allowed.*

5 Documentation and Tracking

The results of the outfall field inspections are documented by ECPD and the Facilities Department. ECPD maintains a file-based illicit discharge database with the completed Outfall Field Screening Inspection Checklist, photograph log, inspection reports, maps, notification letters, and corrective action records. MCBH is in the process of developing a comprehensive GIS-based asset management system (AMS). A spreadsheet-format tracking database will be developed and maintained by ECPD to track all illicit discharges, illicit connections, spills, and associated information, including geographic location, type of discharge, responsible party, MCBH response to address the discharge, follow-up activities, and the ultimate resolution of each event. All violations will be tracked in the IDDE database.

The Facilities Department currently maintains the GIS database of the MS4 storm water system including inlets and outfalls and receiving bodies of water. This database will be upgraded to a comprehensive GIS-based AMS including an additional layer for locations of spills and illegal discharges based on the ECPD records. The Facilities Department uses the results of the outfall inspections to schedule maintenance and cleaning of outfalls.

In addition to conducting scheduled outfall field screening, inspectors may investigate potential illegal connections and illicit discharges at outfalls in response to public complaints. The ECPD Compliance Inspection Team retains a record of all received complaints, including all storm water quality concerns, in the IDDE database.

As discussed in Section 3, MCBH identifies high priority components at a greater risk of impact to receiving waters from discharge of pollutants based on the types of activities and proximity to impaired waters. MCBH will include any changes to the list of high priority outfalls in the storm water Annual Report submitted to the State of Hawaii Department of Health (DOH) by January 30th of each year.

6 References

Enforcement Response Plan (2022). Prepared for the Marine Corps Base Hawaii by Environmental Compliance & Protection Department, Marine Corps Base Hawaii. May 2022.

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APPENDIX A

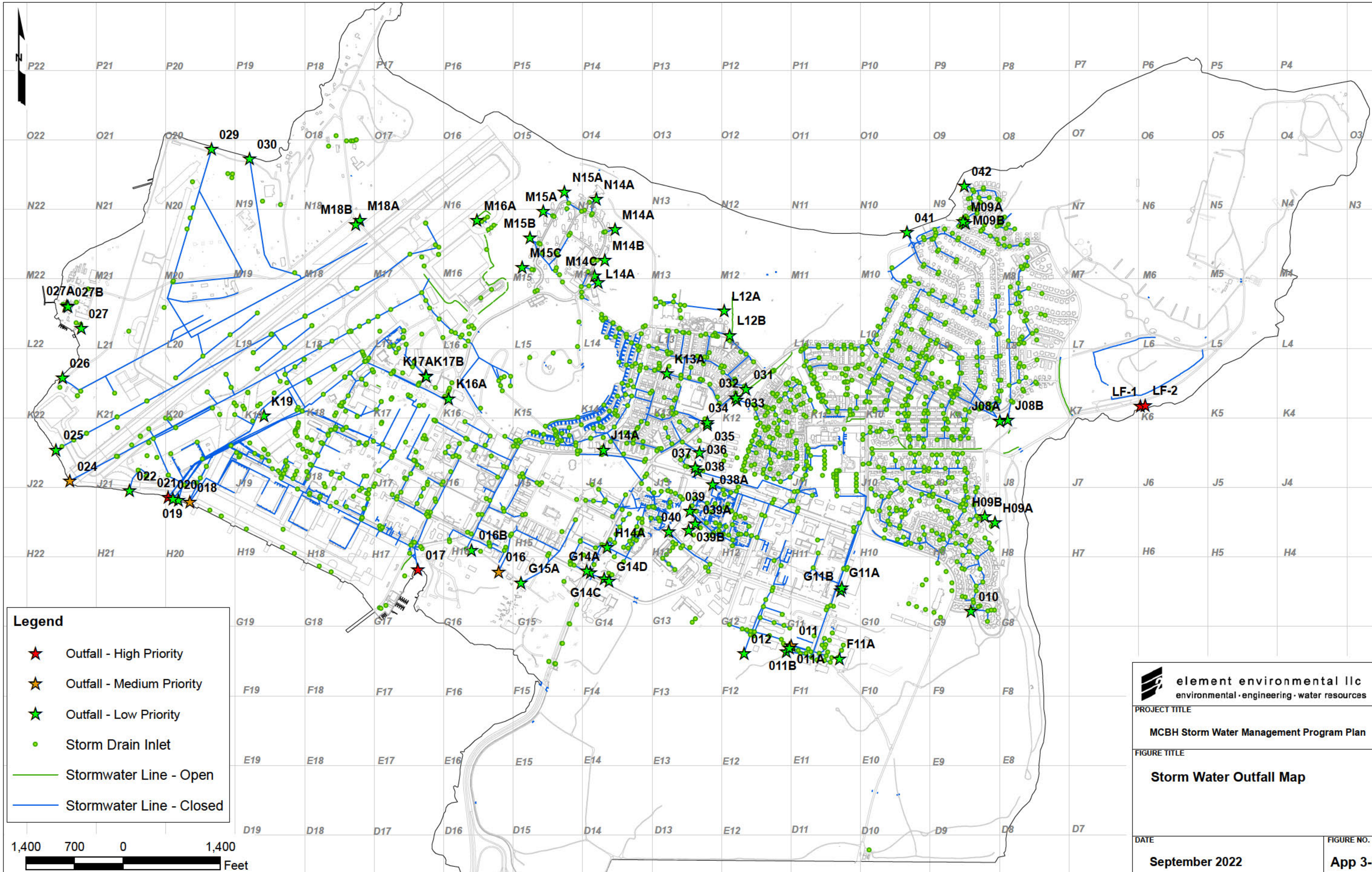
Outfall Inventory and Location Maps

Outfall ID	Watershed	GIS featureName	Rev featureName	Outfall Screening Category	Comments
017	Kaneohe Bay	N/A	G17DO01	High	Discharge point with no label on GIS map.
021	Kaneohe Bay	I20DO01	H20DO01	High	Located in grid H20 not I20.
027	Kaneohe Bay	N/A	L22DO03, L22DO04, L22DO05, L22DO06	High	No outfall or leader shown on SPCC map. Two pairs of discharges shown on GIS map labeled headwall corners.
LF-1	Kailua Bay	N/A	K6DO01	High	Outfall not shown but labeled on SPCC map. Not shown or labeled on GIS map.
LF-2	Kailua Bay	N/A	K6DO02	High	Outfall not shown but labeled on SPCC map. Not shown or labeled on GIS map.
011	Nuupia, Helekou, Kaluapuhi Ponds	F12DO02	F12DO02	Medium	011 label on SPCC map for three discharges shown on GIS map. Added 011A and 011B.
016	Kaneohe Bay	G16DO01	G16DO01	Medium	
018	Kaneohe Bay	I20DO04	H20DO04	Medium	Located in grid H20 not I20.
024	Kaneohe Bay	J22DO02	J22DO02, J22DO03	Medium	Two discharge points in GIS labeled drain discharge and 16" pipe?. Second point does not have a featureName.
010	Kailua Bay	G9DO01	G9DO01	Low	
011A	Nuupia, Helekou, Kaluapuhi Ponds	F12DO03	F12DO03	Low	011 label on SPCC map for three discharges shown on GIS map. Added 011A and 011B.
011B	Nuupia, Helekou, Kaluapuhi Ponds	F12DO04	F12DO04	Low	011 label on SPCC map for three discharges shown on GIS map. Added 011A and 011B.
012	Nuupia, Helekou, Kaluapuhi Ponds	F12DO01	F12DO01	Low	
016B	Kaneohe Bay	H16DO01	H16DO01	Low	
019	Kaneohe Bay	I20DO03	H20DO03	Low	Located in grid H20 not I20.
020	Kaneohe Bay	I20DO02	H20DO02	Low	Located in grid H20 not I20.
022	Kaneohe Bay	I21DO01	H21DO01, H21DO02	Low	Located in grid H21 not I21. Two discharge points labeled drainage discharge and 16" pipe?.
025	Kaneohe Bay	J22DO01	J22DO01	Low	
026	Kaneohe Bay	K22DO01	K22DO01	Low	
027A	Kaneohe Bay	N/A	L22DO01	Low	Discharge point labeled pipe outlet into swale on GIS map.
027B	Kaneohe Bay	N/A	L22DO02	Low	Discharge point labeled pipe outlet into swale on GIS map.
028?	Kaneohe Bay	not in GIS	not in GIS		Labeled on SPCC map but no outfall shown. Not shown or labeled on GIS map.
029	Kaneohe Bay	N20DO01	N20DO01	Low	
030	Kaneohe Bay	N19DO01	N19DO01	Low	
031	Mokapu Central Drainage Channel	K12DO01	K12DO01	Low	
032	Mokapu Central Drainage Channel	K12DO02	K12DO02	Low	
033	Mokapu Central Drainage Channel	K12DO03	K12DO03	Low	

Outfall ID	Watershed	GIS featureName	Rev featureName	Outfall Screening Category	Comments
034	Mokapu Central Drainage Channel	J13DO01	J13DO01	Low	
035	Mokapu Central Drainage Channel	J13DO02	J13DO02	Low	
036	Mokapu Central Drainage Channel	J13DO03	J13DO03	Low	
037	Mokapu Central Drainage Channel	J13DO04	J13DO04	Low	
038	Mokapu Central Drainage Channel	J13DO05	J13DO05	Low	
038A	Mokapu Central Drainage Channel	J13DO06	J13DO06	Low	Shown but not labeled on SPCC map.
039	Mokapu Central Drainage Channel	N/A	H13DO01	Low	Discharge point with no label on GIS map.
039A	Mokapu Central Drainage Channel	N/A	H13DO02	Low	Not shown or labeled on SPCC map. Discharge point with no label on GIS map.
039B	Mokapu Central Drainage Channel	N/A	H13DO03	Low	Not shown or labeled on SPCC map. Discharge point with no label on GIS map.
040	Mokapu Central Drainage Channel	N/A	H13DO04	Low	Discharge point with no label on GIS map.
041	Pacific Ocean	M10DO01	M10DO01	Low	
042	Pacific Ocean	N9DO01	N9DO01	Low	
F11A	Nuupia, Helekou, Kaluapuhi Ponds	N/A	F11DO01	Low	No label or outfall shown on SPCC map. Disharge point with no label shown on GIS map.
G11A	Nuupia, Helekou, Kaluapuhi Ponds	L11DO01	G11DO01	Low	No label on SPCC map. Located in grid G11 not L11.
G11B	Nuupia, Helekou, Kaluapuhi Ponds	L11DO02	G11DO02	Low	No label on SPCC map. Located in grid G11 not L11.
G14A	Mokapu Central Drainage Channel	G14DO01	G14DO01	Low	Three discharges shown but not labeled on SPCC map. Four discharges shown on GIS map, only three labeled.
G14B	Mokapu Central Drainage Channel	G14DO02	G14DO02	Low	Three discharges shown but not labeled on SPCC map. Four discharges shown on GIS map, only three labeled.
G14C	Mokapu Central Drainage Channel	G14DO03	G14DO03	Low	Three discharges shown but not labeled on SPCC map. Four discharges shown on GIS map, only three labeled.
G14D	Mokapu Central Drainage Channel	N/A	G14DO04	Low	Three discharges shown but not labeled on SPCC map. Four discharges shown on GIS map, only three labeled.
G15A	Kaneohe Bay	G15DO01	G15DO01	Low	No label on SPCC map.
H09A	Kailua Bay	H9DO01	H9DO01	Low	Shown but not labeled on SPCC map.
H09B	Kailua Bay	H9DO02	H9DO02	Low	Shown but not labeled on SPCC map.
H14A	Mokapu Central Drainage Channel	H14DO02	H14DO01	Low	Shown but not labeled on SPCC map.
J08A	Kailua Bay	J8DO01	J8DO01	Low	Shown but not labeled on SPCC map.
J08B	Kailua Bay	J8DO02	J8DO02	Low	Shown but not labeled on SPCC map.
J14A	Mokapu Central Drainage Channel	N/A	J14DO01	Low	Not shown or labeled on SPCC map. Discharge point with no label on GIS map.
K13A	Mokapu Central Drainage Channel	N/A	K13DO01	Low	Not shown or labeled on SPCC map. Discharge point with no label on GIS map.
K16A	Kaneohe Bay	N/A	K16DO01	Low	No label on SPCC or GIS maps
K17A	Kaneohe Bay	N/A	K17DO01	Low	No label on SPCC or GIS maps. Only one inlet shown at this location but two discharges in GIS.
K17B	Kaneohe Bay	N/A	K17DO02	Low	No label on SPCC or GIS maps. Only one inlet shown at this location but two discharges in GIS.
K19	Kaneohe Bay	K19DO01	K19DO01	Low	No label on SPCC map.

Outfall ID	Watershed	GIS featureName	Rev featureName	Outfall Screening Category	Comments
L12A	Pacific Ocean	L12DO01	L12DO01	Low	Shown but not labeled on SPCC map.
L12B	Pacific Ocean	L12DO02	L12DO02	Low	Shown but not labeled on SPCC map.
L14A	Pacific Ocean	L14DO01	L14DO01	Low	Shown but not labeled on SPCC map.
M09A	Pacific Ocean	M9DO01	M9DO01	Low	Shown but not labeled on SPCC map.
M09B	Pacific Ocean	M9DO02	M9DO02	Low	Shown but not labeled on SPCC map.
M14A	Pacific Ocean	M14DO01	M14DO01	Low	Shown but not labeled on SPCC map.
M14B	Pacific Ocean	M14DO02	M14DO02	Low	Shown but not labeled on SPCC map.
M14C	Pacific Ocean	M14DO03	M14DO03	Low	Shown but not labeled on SPCC map.
M15A	Pacific Ocean	M15DO01	M15DO01	Low	Shown but not labeled on SPCC map.
M15B	Pacific Ocean	M15DO02	M15DO02	Low	Shown but not labeled on SPCC map.
M15C	Pacific Ocean	M15DO03	M15DO03	Low	Shown but not labeled on SPCC map.
M16A	Pacific Ocean	N/A	M16DO01	Low	No label or outfall shown on SPCC map. Disharge point with no label shown on GIS map.
M18A	Kaneohe Bay	M18DO01	M18DO01	Low	No label on SPCC map.
M18B	Kaneohe Bay	M18DO02	M18DO02	Low	No label on SPCC map.
N14A	Pacific Ocean	N14DO01	N14DO01	Low	Shown but not labeled on SPCC map.
N15A	Pacific Ocean	N15DO01	N15DO01	Low	Shown but not labeled on SPCC map.

Outfall ID	Watershed	GIS featureName	Rev featureName	Outfall Screening Category	Comments	Industrial Facility Discharging to Outfall / ICDM Program Priority Ranking *Annual/Quarterly Sampling Site*	Industrial Priority Ranking	Commercial Priority Ranking
017	Kaneohe Bay	N/A	G17DO01	High	Discharge point with no label on GIS map.	Recycling Center (132)* / 3 Small Boat Repair Shop (1698)* / 4 Vehicle Maintenance Shop (351) / 10 Ground Support Equipment Shop (1619) / 15	High	
021	Kaneohe Bay	I20DO01	H20DO01	High	Located in grid H20 not I20.	Small Boat Repair Shop (1698)* / 4 Vehicle Maintenance Shop (351) / 10 Fuel Division Supply Department (1252, 1253) / 11 Fuel Delivery Branch & Refueler Truck Parking (6182) / 12 Aircraft Ready Fuel Storage (6479) / 13	High	
027	Kaneohe Bay	N/A	L22DO03, L22DO04, L22DO05, L22DO06	High	No outfall or leader shown on SPCC map. Two pairs of discharges shown on GIS map labeled headwall corners.	Waterfront Operations Lab/Boat Shop (6802)* / 5	High	
LF-1	Kailua Bay	N/A	K6DO01	High	Outfall not shown but labeled on SPCC map. Not shown or labeled on GIS map.	Sanitary Landfill* / 1	High	
LF-2	Kailua Bay	N/A	K6DO02	High	Outfall not shown but labeled on SPCC map. Not shown or labeled on GIS map.	Sanitary Landfill / 1	High	
011	Nuupia, Helekou, Kaluapuhi Ponds	F12DO02	F12DO02	Medium	011 label on SPCC map for three discharges shown on GIS map. Added 011A and 011B.	MCX Gas & More, Wash & Co., Firestone (1667) / 1		High
016	Kaneohe Bay	G16DO01	G16DO01	Medium		Five-O Motors, Auto Hobby Shop (1267, 3097, 6882, 6883)		High
018	Kaneohe Bay	I20DO04	H20DO04	Medium	Located in grid H20 not I20.	Aircraft Wash and Rinse Facility (1631) / 8	Medium	
024	Kaneohe Bay	J22DO02	J22DO02, J22DO03	Medium	Two discharge points in GIS labeled drain discharge and 16" pipe?. Second point does not have a featureName.	Aircraft Fuel Islands (1170, 1171) / 6	Medium	



element environmental llc
environmental · engineering · water resources

PROJECT TITLE
MCBH Storm Water Management Program Plan

FIGURE TITLE
Storm Water Outfall Map

DATE
September 2022

FIGURE NO.
App 3-6

APPENDIX B

Outfall Field Screening Inspection Checklist

Outfall Field Screening Inspection Checklist

Inspector Name:	**Date/Time:**
Outfall ID:	**Outfall Location:**

Recent Rain Event? None ☐ Last 24 Hrs ☐ Last 48 Hrs ☐

Tides times immediately before and after this inspection: High: __________ Low: ___________

If structure is submerged or inaccessible, Inspect upstream inlet and check this box ☐

Outfall Type:
Closed Pipe ☐ Open Drainage ☐ Sheet Flow ☐ Inlet ☐ Other ☐_________________________

Material:
Concrete ☐ Steel ☐ Earthen ☐ Rip-rap ☐ Vegetated ☐ PVC ☐ Other ☐________________

Shape:
Circular ☐ Elliptical ☐ Box ☐ Trapezoid ☐ Parabolic ☐ Semi-circular ☐

Dimensions: __________ in. diameter ** OR ** Height __________ in. X Width __________ in.

Observations

	YES	NO	N/A	Comments
Appears to function properly?	☐	☐	☐	
Submerged? Indicate estimated depth (in.)	☐	☐	☐	
Filled with Sediment? Indicate estimated depth (in.)	☐	☐	☐	
Erosion? If Yes, Provide a brief description.	☐	☐	☐	
Flow Observed? Indicate type of flow: slight, moderate, or substantial	☐	☐	☐	
Odor?	☐	☐	☐	
Sheen?	☐	☐	☐	

Damage/Failure (Check all that apply):
Cracking ☐ Spalling ☐ Chipping ☐ Corrosion ☐ Collapse ☐ Other ☐____________________

Trash/Debris: Description: ____
Outside ☐ Inside ☐ %Obstructed __________

Vegetation: Outside ☐ Inside ☐ %Obstructed __________

Additional Comments:

Photographic Log:

Photo 1:	Photo 2:
Photo 3:	Photo 4:

APPENDIX 4-1

Construction Checklists:

- Storm Water Pollution Prevention Plan Content Review Checklist
- Initial BMP Site Inspection Checklist
- Construction BMP Inspection Checklist

Storm Water Pollution Prevention Plan (SWPPP) Content Review Checklist

Project Name: ________________ Location: ______________ Date: _____________

NPDES Tracking No: ___________ Reviewed By: ____________ Contractor Name______________

Permit Citation	Are the required SWPPP elements included?	Yes	No	N/A	Comments/ Notes
	Project Activity and Description				
7.2.1	SWPPP identifies a "storm water team" including personnel name and individual responsibilities				
7.2.2	Defines the nature of construction activities, total site area (in acres) that is expected to be disturbed by construction activities (including any off-site areas)				
7.2.2	Indicates the maximum area expected to be disturbed at one time				
7.2.3	If applicable, an explanation is given if the project is in response to a public emergency or natural disaster				
7.2.4	Provides the name of all contractors and indicates the areas of the project each contractor controls				
	Project Scheduling				
7.2.5	Contains a sequence of scheduled construction activities and approximate start and end dates				
7.2.5.1	Includes a schedule of the approximate dates storm water control measures will be installed and made operational				
7.2.5.2	Maintains a schedule of the initiation and duration of earth-disturbing activities including when grading, excavating and filling activities will occur				
7.2.5.3	If applicable, the work schedule indicates when construction activity will be temporarily or permanently ceased				
7.2.5.4 & 5.2.1	The dates of temporary and final site stabilization are included, including when ground disturbance will occur, which is consistent to stabilizing soil immediately after earth-disturbing activities have ceased on all portions of the site				

7.2.5.5	The schedule includes approximate dates of when temporary storm water control measures, construction equipment, and vehicles will be removed from the project site				
	The schedule outlines the estimated start and end dates of pollutant-generating activities				
	Site Maps and Work Boundaries				
7.2.6	Contains a legible site map showing property boundaries and locations where construction activities will occur				
7.2.6.1.	Map includes approximate slopes <u>before</u> and <u>after</u> grading and drainage patterns with flow patterns				
7.2.6.1.c & 7.2.6.1.d	Map includes locations where sediment, soil and other materials will be stockpiled, including contaminated spoils				
7.2.6.1.e & 7.2.6.1.f	Crossings of any state waters and vehicle exit points (to paved roads) are included				
7.2.6.1.g	All impervious surfaces are identified including built structures (upon completion of construction)				
7.2.6.1.h	Construction support area locations are included				
7.2.6.2	Site maps include locations of all state waters and listed impaired water bodies within or in the immediate vicinity of the project site				
7.2.6.3	If state waters are identified within 50 feet of earth disturbances, the map provides boundary lines of natural buffers (50-foot undisturbed) or buffers with double sediment control				
7.2.6.4	Map includes topography of the site, existing vegetation cover and drainage patterns of storm water onto, over and from the site property before and after major grading activities				
	Storm Water Discharge Locations				
7.2.6.5	Storm drain inlets have been located on and near the immediate vicinity of the sites that receive project storm water discharge				
7.2.6.7& 7.2.6.8	Includes the locations of storm water control measures and the locations where chemicals will be used and stored				
	Construction Site Pollutants				
7.2.7.a	A list and description of all pollutant-generating activities are included				

7.2.7.b	Inventory of pollutants or pollutant constituents for each pollutant-generating activity that could be discharged from the construction site are listed				
7.2.8	All sources of non-storm water are identified, including control measures to prevent discharges				
7.2.9	If state waters are located within 50 feet of project earth disturbances, natural buffers and additional sediment control measures are described				
	Erosion and Sediment Control				
7.2.10.1	All storm water control measures that will be installed and maintained on the project site are described				
7.2.10.1.a	Information is included on the type and design of all storm water control measures to be implemented and maintained				
7.2.10.1.b	Site specific sediment controls will be made operational prior to the initiation of earth disturbing activities				
7.2.10.1.c	If applicable, control measures are enacted to prevent the contact of any contaminated soil to storm water				
7.2.10.1.d	Stabilization techniques are used for vehicle exit points				
7.2.10.1.e	If applicable, linear project's BMPs are documented to the extent practicable				
7.2.10.2	Specific vegetative and/or non-vegetative stabilization measures are outlined				
	Post Construction and Spill Prevention Management				
7.2.10.3	Post construction BMP measures are described				
7.2.11.1	A spill prevention plan is included with spill response procedures for stopping, containing and cleaning up spills				
7.2.11.1.b	Procedures are defined for notifying appropriate facility personnel in the case of a hazardous substance spill				
7.2.11.2	Measures for handling and disposing of waste (including hazardous, sanitary) generated onsite are outlined				
	Staff Training Documentation and Inspections				
7.2.12	Procedures for maintaining storm water control measures, conducting inspections and taking corrective actions are outlined				

7.2.12.a, 7.2.12.b & 7.2.12.c	Personnel responsible for conducting inspections, an inspection schedule and any implemented inspection forms are included				
7.2.13	Documentation included shows personnel have been trained on their specific responsibilities				
7.2.14	If applicable, documentation of compliance with the Safe Drinking Water Act Underground Injection Control (UIC) is included				
7.2.15	The contactors information is listed (name, position title, address, phone, email)				
7.2.15.2.a	If applicable, the following are included: a copy of the drainage system owner's approval, county-approved grading permit, section 401 water quality certification and a copy of the department of the army permit				
	SWPPP Certifications and Amendments				
7.2.17	The SWPPP has been certified, signed and dated				
7.2.18.a & 7.2.18.b	After the issuance of the NGPC the SWPPP includes a copy of the NOI (with any correspondence with the department) and a copy of the NGPC including attachments				
7.4.1.4.	If applicable, where the department requires additional discharge requirements, a copy of any correspondence is included with a description of additional storm water control measures				
7.4.4	If applicable, modifications made to the SWPPP are certified, signed and dated by the Certifying Person				
	Is a hydrotesting or other non-storm water permit required?				

Additional Comments:
Date Corrections Received by MCBH ECPD:

MCBH Environmental Compliance and Protection Division (ECPD), Clean Water Program will not allow construction to commence on any contract or in-house project until a Clean Water Program employee has reviewed the SWPPP to verify that it meets the requirements of Hawaii Administrative Rules (HAR), Chapter 11-55, Appendix C and any other requirements under the National Pollutant Discharge Elimination System (NPDES) permit program.

The SWPPP document has been reviewed according to the above criteria.

____ __________________

Reviewed By (MCBH ECPD Clean Water Program Signature) Date

INITIAL BMP SITE INSPECTION CHECKLIST

Site Name: ___________________ Installation: _______________ Location: __________________

Date: ___________________ Permit Number:___________ Inspector: ________________

Inspection Criteria	Yes	No	N/A	Comments
Is the inspection occurring before the initiation of ground-disturbing activities?	☐	☐	☐	
Is the SWPPP/ BMP plan complete including all site maps?	☐	☐	☐	
Are BMPs installed in the locations specified in the plan?	☐	☐	☐	
Are all site BMPs and erosion/sediment controls installed correctly?	☐	☐	☐	
Are good housekeeping practices used?	☐	☐	☐	
Is the site in compliance with all Permittee-accepted permits, plans?	☐	☐	☐	
Will other pollutant discharges occur as a result of the project's construction activity?	☐	☐	☐	
Will any part of the site have the potential for erosion and sediment runoff?	☐	☐	☐	

Additional Comments:

Construction BMP Inspection Checklist (Monthly/Quarterly)					
Construction Project Name:					
Inspection Date:	**Location:**				
Inspection Time:	**Total Disturbance Area:** > 1 acre ☐ < 1 acre ☐ Exempt ☐				
Weather:	**Inspection Type:** Monthly ☐ Quarterly ☐ Follow-up ☐ Complaint ☐				
NPDES Permit #:	**On-site POC**	**Name:**			
Name of Inspector:		**Email:**			

Inspection Items

Item	YES	NO	N/A	Comments
Drain inlets, waterways, and site perimeter are adequately protected	☐	☐	☐	
Drain inlets, waterways, and site perimeter are adequately free of signs of illicit discharge	☐	☐	☐	
Stabilized construction ingress/egress prevents significant tracking of sediment	☐	☐	☐	
Spill kits are available and sufficiently stocked	☐	☐	☐	
Site surfaces are free of spills and stains	☐	☐	☐	
Washout facilities are sufficient to prevent non-storm water discharges	☐	☐	☐	
Trash and construction debris are placed in covered dumpsters	☐	☐	☐	
General housekeeping is sufficient	☐	☐	☐	
Materials that are potential storm water contaminants are properly stored	☐	☐	☐	
Slopes and disturbed areas not actively being worked are properly stabilized	☐	☐	☐	
SWPPP/SSCBMP/BMP maps on site and reflect current BMP status	☐	☐	☐	
Contractor self-inspections performed in accordance with HAR 11-55, Appendix C	☐	☐	☐	
Contractor personnel training records are available onsite or in an approved offsite location	☐	☐	☐	
Project has NPDES permit if applicable	☐	☒	☐	

3 or less minor deficiencies noted, Initial below: Inspector's Initials: __________ Onsite POC Initials: ___________				
		Deficiency Type		
#	**Deficiency Description**	**Minor Deficiency** **Deadline: 5 days from receipt of report**	**Major Deficiency** **Deadline: 5 days from inspection date**	**Critical Deficiency** **Deadline: Close of business same day**
1				
2				
3				
4				
5				
6				
NOTE: Deficiency types are described in the MCBH Storm Water Management Program (SWMP) Plan (See Chapter 4.5 & Appendix 3-4). Use additional comments section below if more than 10 deficiencies are identified or an illicit discharge is suspected or identified.				
Additional Comments:				

Sign below if more than 3 minor deficiencies were identified today:

Inspectors Signature: ____

Onsite POC Acceptance: ____ Date: ___________

Photographic Log:

Photo 1:	Photo 2:
Photo 3:	Photo 4:

APPENDIX 4-2

Reporting and Corrective Procedures for Construction Storm Water Inspections

REQUIREMENT

In accordance with the Marine Corps Base Hawaii (MCBH) Municipal Separate Storm Sewer System (MS4) Permit Number HI S000007, effective September 1, 2021, Part D.1.d.(5)(iv), MCBH is required to submit reporting and corrective procedures for construction site inspections. This document establishes construction site inspection, corrective actions, tracking and reporting procedures to ensure compliance with the MS4 permit requirements.

DEFINITIONS

The terms minor, major and critical when relating to deficiencies in this document are defined as the following:

Critical Deficiency: A deficiency that poses an immediate risk of discharge of pollutants to a storm drain MS4 system, surface waters or State waters. Critical deficiencies include, but are not limited to, the following examples:

- Any evidence or observed discharge of non-storm water to the storm drain system, surface waters, or State waters generated by construction activity
- No Storm Water Pollution Prevention Plan (SWPPP) document or National Pollutant Discharge Elimination System (NPDES) permit
- Absence of perimeter controls and/or linear barriers required by the SWPPP document
- There are identified storm drain inlets, surface waters, or State waters within or adjacent to the project site in close proximity to disturbed soil areas without control measures in place that pose an immediate threat of untreated storm water discharges;
- Work in an active stream channel or other surface water body without proper implementation of required best management practices (BMPs); and
- Any presence of any spilled oil or hazardous materials near to unprotected storm drain inlets, surface waters, or State waters

Major Deficiency: A deficiency that is a significant issue that could result in the discharge of pollutants to the storm drain system, surface waters or State waters. Major deficiencies include, but are not limited to, the following examples:

- Linear barriers and/or perimeter controls in areas tributary to a water body or drain inlet that are installed as required by the SWPPP document, but are not functional, such as silt fences that are not anchored properly, have collapsed, or are overwhelmed by accumulated sediment;
- Hazardous materials or waste stored within a project without containment or implementation of BMPs;
- Any hazardous fluid spills covering more than one (1) square yard and/or are adjacent to protected storm drain inlets, surface waters, or State waters;
- Sediment tracking more than 50 feet from project entrance/exit location(s);

- Expansion of the active disturbed soil area limit without written approval;
- Soil stabilization and sediment controls are not installed in accordance with the current SWPPP document/BMP site map;
- Sediment controls are installed in accordance with the SWPPP document, but there is a large unstabilized disturbed soil area with insufficient controls down gradient to prevent the discharge of untreated storm water to the storm drain system, surface waters, or State waters if a rain event generates runoff; and
- Dust from project site visibly blowing off the site and into storm drain conveyances or adjacent surface water bodies.

Minor Deficiency: A deficiency that does not pose a threat of discharge of untreated storm water or pollutants to the storm drain system, surface waters, or State waters, but are not in direct conformance with the SWPPP document. Minor deficiencies include, but are not limited to, the following examples:

- BMPs are not deficient, but are not consistent with the SWPPP plan;
- SWPPP does not reflect current operations and an amendment is recommended;
- Linear barriers and/or perimeter controls are properly installed according to the SWPPP document, but require minor maintenance;
- Sediment controls are installed per the SWPPP plan, but not properly maintained;
- Site inspections by project staff are not being conducted at the required frequencies;
- Non-storm water or waste management BMPs that are improperly maintained;
- Any fluid spills covering less than one (1) square yard and not adjacent to storm drain inlets, surface waters, or State waters;
- Evidence of active wind erosion on unstabilized slopes/stockpiles;
- Minor tracking less than 50 feet from project entry/exit locations; and
- Major deficiencies which are corrected prior to the inspector leaving the site

PROCEDURES

Permit Citation	Permit Requirement	MCBH Procedure
Part D.1.d(4)	Plan review and approval	MCBH Environmental Compliance and Protection Division (ECPD) will review all project SWPPP's and supporting documents. ECPD will verify that all documents meet Hawaii Administrative Rules (HAR), Chapter 11-55, Appendix C, Section 7 and approved BMP manual requirements by using an approved SWPPP document checklist. Comments and notes will be made to the document preparer if any SWPPP elements are omitted or any portion is believed insufficient. Deficiencies will be noted with the date comments were addressed by the document preparer to the satisfaction of ECPD.
Part D.1.d(5)i	Inspections	Prior to the start of any ground-disturbing activities, except for activities associated with the installation of BMPs at a site, the qualified ECPD inspector will inspect the site to verify BMPs have been properly installed to the SWPPP specifications. The inspector will document and report any site conditions having the potential for erosion and sediment runoff as a result of the project's construction activities. A spreadsheet will be used to verify and document all comments made by ECPD during the review process have been properly resolved.
Part D.1.d.(5)ii	Inspection frequency	All contract, in-house and maintenance construction projects will be inspected at least monthly by an independent qualified construction inspector(s), who is familiar with the project SWPPP. Initial inspections will verify BMPs have been properly installed prior to the start of earth disturbing activities. The inspector(s) will use the attached "Construction Inspection Checklist" that will document any BMP deficiencies and inconsistencies between the approved SWPPP and project site conditions. The inspection form will include the date, inspection observations with photographs, potential noncompliance issue(s) and any necessary corrective actions needed to be addressed. Inspection forms will be sent (via email) to the construction contractor and the MCBH project manager(s) within 48 hours of the inspection (working business days). A photographic log will be kept to document all minor, major and critical issues observed on site. A response (via email) from the contracting project manager to ECPD verifying (with photographs, maps, etc.) appropriate corrective action was taken to address the identified deficiencies is expected within five (5) calendar days of receiving the inspection form. ECPD will track all inspections using an internal public share drive. Upon three successive monthly site inspections that indicate, in total,

		no critical or major project BMP and storm water control deficiencies or less than six (6) minor deficiencies with no more than three (3) minor deficiencies in one (1) month, ECPD may decrease inspection frequency to quarterly per the permit. This will be at the discretion of the ECPD qualified inspector(s). However, If under quarterly inspection frequency, a critical deficiency is observed or three (3) or more minor deficiencies are detected, inspection frequency shall return to no less than monthly.
Part D.1.d(5)ii	Corrective actions and reporting	If any critical deficiencies are observed, ECPD will verbally notify the responsible construction contractor and ensure all critical deficiencies are addressed and adequately corrected before the close of business day on the day the deficiency is identified. In the event a major deficiency is detected, ECPD will immediately send a written notification with an attached inspection checklist containing photographs to the responsible construction contractor and MCBH project manager(s) explaining the site nonconformities. ECPD will ensure all major deficiencies are addressed or corrected as soon as possible, but in no event later than five (5) calendar days after the deficiency is identified or before the next forecasted rain event, whichever is sooner. In the event a minor deficiency is detected, ECPD will document the issue using the approved inspection checklist, photograph log and internal project tracking system. The responsible construction contractor and MCBH project manager(s) will be notified verbally of any non-conformities at the end of the inspection and provided an emailed copy of the inspection form (with attached photographs) within 48 hours of the inspection (normal business days). A response from the contractor documenting the corrective action taken to address the identified issues is expected within five (5) calendar days from receiving the completed inspection form. Per the permit, ECPD qualified construction inspector(s) will conduct follow-up inspections as needed, at least monthly to ensure site deficiencies have been properly addressed and all storm water controls are in proper working order. Inspections will also be conducted upon complaints from citizens or concerned groups. Unannounced and follow-up inspections will be conducted as necessary. For all projects, if the corrective measures are not completed, then the deficiency will be elevated to the ECPD Director.
	Record keeping	Electronic inspection reports, spreadsheets and supporting photographic logs will be kept on file with ECPD. Records shall be kept for five (5) years in accordance with the NPDES permit.

APPENDIX 4-3

Construction Best Management Practice Field Manual

FINAL

MCBH CONSTRUCTION BMP FIELD MANUAL

Storm Water Management Program Plan

Marine Corps Base Hawaii, Oahu, Hawaii

NPDES Permit No. HI S000007

Prepared by:

Marine Corps Base Hawaii

July 2022

Table of Contents

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List of Acronyms and Abbreviations

AMS	Asset Management System
BAT	Best Available Technology
BCT	Best Conventional Technology
BFM	Bonded Fiber Matrix
BMP	Best Management Practice
C&D	Construction and Demolition
CO	Commanding Officer
CFR	Code of Federal Regulations
CFS	Cubic Feet per Second
CTB	Cement-Treated Base
CWA	Clean Water Act
CWB	State of Hawaii Department of Health, Clean Water Branch
CWRM	State of Hawaii Department of Land and Natural Resources, Commission on Water Resource Management
DLNR	State of Hawaii Department of Land and Natural Resources
DOE	Department of Education
DOH	State of Hawaii Department of Health
EAL	Environmental Action Level
EC	Erosion Control
ECPD	Environmental Compliance and Protection Division
FEAD	Facilities Engineering and Acquisition Division
GDI	Grated Drop Inlet
GHS	Globally Harmonized System
H:V	Horizontal to Vertical Slope
HAR	Hawaii Administrative Rules
HDOA	State of Hawaii Department of Agriculture
HEER	State of Hawaii Department of Health, Hazard Evaluation and Emergency Response
LBP	Lead-Based Paint
LID	Low Impact Development
L/SD	Length to Settling Depth

LFPE	Logistics Facilities Public Works Engineering
MCBH	Marine Corps Base Hawaii
MCCS	Marine Corps Community Services
MCD	Facilities Engineering Maintenance Control Division
MEP	Maximum Extent Practicable
MRO	Facilities Engineering Maintenance Repair Operations
MS4	Municipal Separate Storm Sewer System
NRCS	United States Department of Agriculture, Natural Resource Conservation Service
NGPC	Notice of General Permit Coverage
NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System
NRC	U.S. Coast Guard National Response Center
OMC	Ohana Military Communities
OSHA	Occupational Safety and Health Administration
PCBs	Polychlorinated Biphenyls
PCC	Portland Cement Concrete
PM	Project Manager
PPE	Personal Protective Equipment
PPV	Public-Private Venture
RCRA	Resource Conservation and Recovery Act
SC	Sediment Control
SDS	Safety Data Sheet
SHWB	State of Hawaii Department of Health, Solid and Hazardous Waste Branch
SM	Site Management
SPCC	Spill Prevention Control Countermeasures
SSBMP	Site-Specific Best Management Practice
SWPPP	Storm Water Pollution Prevention Plan
USACE	United States Army Corps of Engineers

1 Introduction

1.1 Purpose and Scope

The purpose of this *Marine Corps Base Hawaii (MCBH) Construction Best Management Practice (BMP) Field Manual* is to provide guidance on BMP selection, installation, and maintenance procedures for construction activities to reduce or eliminate the discharge of pollutants from construction sites to State waters to the Maximum Extent Practicable (MEP).

While this manual does not constitute an exhaustive list of all BMPs available, it does provide guidance suitable for use by a wide range of individuals involved in construction site water pollution control. Each user of the manual is responsible for working within their capabilities obtained through training and experience, and for seeking the advice and consultation of appropriate experts at all times. The target audience for this manual includes MCBH personnel, consultants, contractors, and other agencies involved in the planning, design, construction, and maintenance of construction projects at MCBH.

As of the effective date, September 1, 2021, MCBH is required to comply with the conditions of the National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4) Permit No. HIS000007. In accordance with Part D.1.d.(1) of the MS4 Permit, MCBH is required to develop and implement a Construction BMP Field Manual to establish BMP policy for construction projects. The Construction BMP Field Manual is a key element of the MCBH’s Construction Site Runoff Control Program (Construction Program) to protect and restore the water quality of the surrounding surface waters. Refer to Chapter 4 of the Storm Water Management Program (SWMP) Plan for additional information on the objectives of MCBH’s Construction Program Plan.

1.2 Water Quality Impacts Related to Construction Activities

Excessive erosion and sedimentation have perhaps the most visible impacts to water quality from construction activities. Erosion is the process by which the soil and rock are removed from the earth’s surface by the action of water, wind, and gravity. Most natural erosion occurs at slow rates; however, the rate of erosion increases when land is cleared or altered and left unprotected. Construction sites, if unprotected, can erode at rates more than one hundred times the natural background rate of erosion.

Sedimentation is the movement and settling out of suspended soil particles. Sediment resulting from excessive erosion is a pollutant. Sedimentation occurs when the velocity of water is slowed sufficiently to allow suspended soil particles to settle. Larger particles, such as gravel and sand, settle more rapidly than fine particles such as silt and clay. Other less visible impacts are associated with off-site discharge of pollutants such as metals, nutrients, soil additives, pesticides, construction chemicals, and other construction waste. Proper selection and implementation can reduce or eliminate the impacts of potential pollutants on water quality.

1.3 BMP Selection

Selection and implementation of BMPs is based on the pollution risks associated with the construction activity. BMPs should be implemented to the MEP which includes addressing projects, regardless of size, that have the potential to impact water quality. The effectiveness of a BMP is typically directly related to the maintenance of the BMP and the area around it. BMP maintenance requirements should be considered during BMP selection.

The BMPs included in this manual (Section 7 – Construction BMP Fact Sheets) are organized into BMP categories that focus on the areas of erosion control, sediment control, and site management. Erosion Control (EC) BMPs are devices installed or constructed by the contractor on disturbed soil to protect the ground surface from erosion due to wind, rain, or runoff. Sediment Control (SC) BMPs are measures to intercept and detain sediment-laden runoff prior to discharge off-site or to the storm sewer system. These devices detain runoff to promote infiltration and/or sedimentation. Site Management (SM) BMPs include preventative measures implemented during the planning or construction stage of a project to control potential pollutants at their source.

Table 7-1 lists the commonly used BMPs covered in this manual. BMP Fact Sheets with detailed implementation, operation and maintenance information are included in Section 7 for all BMPs listed in Table 7-1. Continued inspections and maintenance of BMPs are essential to maximize the effectiveness of the device, application, or procedure.

2 Construction Program Organization and Project Review Process Summary

2.1 Construction Program Organization

As a military installation, MCBH has several different types of construction projects and an agency to handle the oversight of each one. The overseeing agency has the most immediate authority over the day-to-day activities at each construction site. As such, the Construction Program is structured to place responsibility for implementation and enforcement of MCBH's SWMP Plan policies at construction sites on each of these corresponding agencies. The Environmental Compliance and Protection Division (ECPD) is responsible for managing the overall Construction Program, and updating policies as deemed necessary to improve the effectiveness of the program. Although it is typical for any SWMP Plan implementation or non-compliance with the MS4 Permit issues to be resolved at a lower level of authority, the Base Commanding Officer (CO) has the ultimate authority to adjust policies or direct enforcement actions for tenants/agencies subject to the Construction Program.

There are three general categories of construction projects at MCBH: (1) In-house Maintenance and Construction, (2) Military Construction, and (3) Contract Maintenance and Construction. To address the MS4 Permit requirements for construction site runoff of the various types of construction that occur on base at MCBH, the organizational structure displayed in Table 3-1 has been outlined. In Figure 2-1

Construction Program Organizational Chart, the grey boxes indicate the agency responsible for oversight of the project. As indicated above, construction projects at MCBH are categorized as either:

(i) *In-house Maintenance and Construction* – projects are scoped and planned by Facilities Engineering Maintenance Control Division (MCD), and the construction work is completed by Facilities Engineering Maintenance Repair Operations (MRO). Typically, these projects are less than 5,000 sf and/or related to emergency repair work.

(ii) *Military Construction* – These are projects that would typically be handled as in-house construction, but due to limited manpower have been contracted out. These projects are managed by Logistics Facilities Public Works Engineering (LFPE), with all storm water management managed by ECPD.

(iii) *Contract Maintenance and Construction* – These projects are conducted by an outside contractor, but are managed as follows:

- *Naval Facilities Engineering Systems Command (NAVFAC) Construction Projects* are managed by the Facilities Engineering and Acquisition Division (FEAD).
- *Mokapu Elementary School Projects* are managed by the Department of Education (DOE).
- *Public-Private Venture (PPV) Housing Projects* are managed by Ohana Military Communities (OMC)/Hunt Military Communities.
- *Commercial Tenant Projects* are managed by Marine Corps Community Services (MCCS).
- *Various other contract maintenance and construction projects* are managed by MCD.

In-house Maintenance and Construction, Military Construction, and MCD Maintenance and Construction fall into two subcategories, (1) Maintenance 1 Repair 1 (M1R1), or (2) Maintenance 2 Repair 2 (M2R2). M1R1 projects are typically minor in-house construction projects, whereas M2R2 designates major construction projects.

Due to the nature of certain in-house maintenance and construction projects, where the potential risk of storm water pollution is minimal or would compromise public health and safety to uphold, certain projects may be exempt from selected plan review and inspection requirements of the Construction Program. These exceptions will be decided on a case-by-case basis, at the discretion of MCD. Projects that may qualify for exemption include those that involve:

- Routine maintenance to maintain the original hydraulic capacity, or the original purpose of the facility;
- Emergency repair construction activities required to immediately protect public health and safety; and
- Interior remodeling that involves no outside exposure of construction materials/waste to storm water.

These qualifying characteristics are subject to the discretion of the MCD and ECPD and may be revised as determined necessary and/or justifiable. All projects that do not meet these exemption criteria will be referred to herein as *"non-exempt"* construction projects.

2.2 Plan Review and Approval Process

MCBH conducts plan review of all proposed, *non-exempt*, construction projects as required by the MS4 Permit. All applicable plans, including but not limited to, the Storm Water Pollution Prevention Plans (SWPPPs), Erosion and Sediment Control, Grading, Post-construction BMP, and Landscaping Plans, are reviewed in accordance with the requirements of the following:

- Hawaii Administrative Rules (HAR), Chapter 11-55, Appendix C, and any other requirements under the NPDES permit program, as applicable;
- Construction BMP Field Manual;
- Maintenance Activities BMP Field Manual;
- Storm Water Permanent BMP Manual; and
- Implementation of measures to ensure that the discharge of pollutants from the site will be reduced to the appropriate discharge limitations subject to the Best Available Technology Economically Achievable/Best Conventional Pollutant Control Technology (BAT/BCT) discharge requirement, consistent with the Clean Water Act (CWA) and other respective federal and state requirements for such facilities and will not cause or contribute to an exceedance of water quality standards.

2.2.1 Plan Review Checklist

Review of the SWPPP and other supporting documents will be conducted by the agency responsible for overseeing the project, as outlined in Table 3-1. MCBH's "Storm Water Pollution Prevention Plan Content Review Checklist" (see SWMP Plan Appendix 4-1) will be used to guide the plan review process. Plan review is conducted similarly for in-house maintenance and construction, military construction, and contract maintenance and construction projects.

Upon completion and acceptance of a SWPPP review, the reviewing agency will issue a notification to the MCBH project manager (PM) and contractor. If a plan submittal does not meet the requirements outlined by the plan review process, all deficiencies are noted on the project's Plan Review Checklist. The applicant must resubmit the checklist, with comments describing how each deficiency has been addressed. Prior to commencement of construction, the MCBH PM or contractor is responsible for ensuring that necessary approvals, including documentation of any revisions made to satisfy reviewer comments, have been received and updated in the project record.

Any pertinent revisions to the SWPPP and supporting documents following review approval, including but not limited to design or concept changes, shall be resubmitted to the appropriate agency for review. As necessary, ECPD will oversee or provide assistance during the plan review process.

2.2.2 Dig and Connection Permits

Following the review of the project SWPPP and all other pertinent documents, any project requiring a drainage connection to the MS4, discharge of surface storm water runoff associated with construction activities (private or public), or discharge permit into the MS4 (i.e., hydrotesting, dewatering, etc.) is required to obtain additional approval from MCBH. A dig/connection permit application form is found in Appendix 3-2 of the SWMP Plan. All dig permits are issued by LFPE and are routed for approval through multiple offices on base, including ECPD and MCD. Prior to construction, all project owners must submit a completed Plan Review Checklist, with all other pertinent documents, for review to LFPE. To receive approval in the dig permit process, all documents must demonstrate the following, as applicable:

- All required components of the SWPPP and other planning documents related to pollution prevention, such as Erosion and Sediment Control, Grading, Post-construction BMP and Landscaping Plans, Dewatering Plan, and Hydrotesting Plans are completed.
- Proof of filing a Notice of Intent (NOI) Form C or NPDES application for discharge of storm water associated with construction activities that disturb one (1) acre or more;
- Proof of filing a NOI Form F and/or/ G or NPDES application for the discharge of hydrotesting effluent or construction dewatering effluent; and
- Proof of filing for other NPDES permit coverages, as applicable, for any other non-storm water discharges.

All dig permits are kept on file at LFPE and reference information will be provided to the agency responsible for keeping inventory of the construction site (as listed in Table 4-1). The project owner is required to ensure that reference information for the approved dig permit has been provided to the overseeing agency to facilitate tracking efforts. The LFPE records will be made available to ECPD, upon request, to facilitate additional annual inspections of construction sites with connection permits.

2.2.3 Commencement of Construction

Prior to any construction, a project owner must receive notice of the completion and acceptance of a SWPPP review and revised dig permit, if applicable. All construction activities, for in-house, military or contract projects, will also be prohibited until it is verified that the project has received Notice of General Permit Coverage (NGPC) under HAR, Chapter 11-55, Appendix C, from the State of Hawaii Department of Health (DOH) and Notice of Start, if applicable, and has satisfied all other requirements of the NPDES program.

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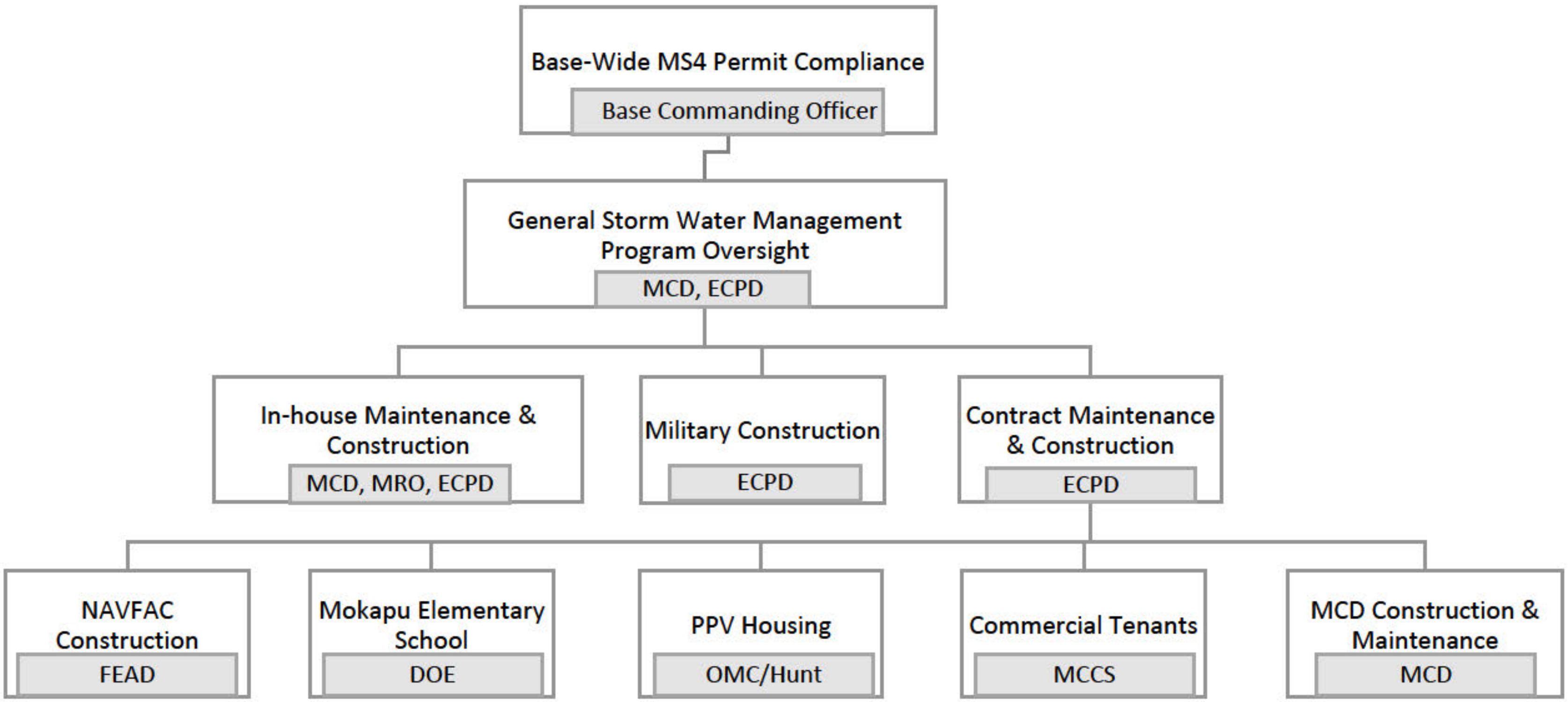

Figure 2-1 Construction Program Organizational Chart

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3 Construction Site Inspections and Documentation Requirements

To ensure the effectiveness of the Construction Program, the following inspection procedures are in place. These ensure that all non-exempt maintenance and construction sites adhere to the approved SWPPPs and supporting documents for that project, have these documents readily available onsite, and that BMPs are maintained throughout the duration of construction activities. MCBH has prepared standard forms for all applicable maintenance and construction projects (SWMP Plan Appendix 4-1) for required inspections, reporting, and corrective action procedures (SWMP Plan Appendix 4-2).

3.1 Construction Site Inspections:

There are three (3) construction inspection requirements that must be met for all applicable maintenance and construction projects. A summary of these requirements is as follows:

- ***Initial Site Inspection**:*
  - *Purpose*: To ensure that BMPs are correctly installed, in the right locations, and in accordance with all MCBH approved SWPPP related documents.
  - *Inspector*: An engineer or qualified inspector that is familiar with the project and SWPPP related documents.
  - *Frequency*: One-time, after installation of BMPs but prior to any ground disturbing activities.
  - *Documentation*: Initial BMP Site Inspection Checklist (SWMP Plan Appendix 4-1)

- ***Monthly Site Inspections*:**
  - *Purpose*: To ensure the continued performance of BMPs throughout the life of the project, that SWPPP related documents are available to workers onsite, and to make sure that appropriate adjustments are made to BMPs that are found to be deficient. Monthly inspections will be conducted for all projects.
  - *Inspector*: A qualified, independent inspector, with no involvement in the day-to-day planning, design, or implementation of the project.
  - *Frequency*: Begins as monthly, however, the frequency can be reduced to quarterly in accordance with criteria detailed in the SWMP Plan Section 4.5.2.
  - *Documentation*: Construction BMP Inspection Checklist” (SWMP Plan Appendix 4-1)

- ***Dig Permit Inspection:***
    - *Purpose:* This applies to all projects that have been approved, via dig permit, for connections to the MS4, discharge of surface storm water runoff related to construction activities, or discharge of non-storm water to the MS4. The inspection is intended to ensure that any potential construction related discharges to the MS4 have been accurately reported in the dig permit, and any other applicable NPDES permit coverages, and that BMPs have been installed in accordance with the project SWPPP or related documents, as applicable.
    - *Inspector:* A qualified, independent inspector, with no involvement in the day-to-day planning, design, or implementation of the project.
    - *Frequency:* Annual or at least once during the life cycle of the project, whichever is comes first.
    - *Documentation*: Construction BMP Inspection Checklist" (SWMP Plan Appendix 4-1)

All inspections, reporting, and corrective procedures will be conducted in compliance with the MS4 Permit. Table 3-1 provides a general summary of the organization of oversight for MS4 Permit compliance with construction site inspections, corrective actions, and recordkeeping/tracking requirements. Initial site inspections will be conducted by the ECPD Compliance Inspection Team or a qualified inspector contracted by the overseeing agency who is familiar with the plans, the project SWPPP, and related documents. For in-house projects, all monthly inspections and dig permit inspections will be conducted by ECPD or a qualified inspector designated or hired by MCD/ECPD. The inspector will not be involved in the day-to-day activities/progress of the project. Any contracted maintenance or construction projects that require monthly inspections and/or dig permit inspections, will have these requirements included as a component within the contract. Contractors will be responsible for hiring a qualified, third-party inspector, who will report to the overseeing agency and to ECPD, as necessary. Additional information regarding inspections is available in the SWMP Plan Section 4.5.

Inspections will also be conducted upon complaints from citizens or concerned groups. Unannounced and follow-up inspections will be conducted as deemed necessary by ECPD. ECPD will coordinate with the overseeing agency if violations/deficiencies are documented. All construction projects are also subject to routine general inspections by the ECPD Compliance Inspection Team. If violations/deficiencies are observed during general inspections, either the tenant or ECPD will be notified. ECPD will direct the issue accordingly. Adjustments to inspection frequency will be made at the discretion of the overseeing agency and ECPD, in accordance with the MS4 Permit requirements.

3.1.1 Deficiency Definitions:

For consistency within the inspection process, MCBH has categorized reportable deficiencies as *(i) critical, (ii) major,* and *(iii) minor*. Refer to the "Enforcement Response Plan" in Appendix 3-4 of the MCBH SWMP Plan for specific examples of deficiencies in these categories.

Critical Deficiency: A deficiency that poses an immediate risk of discharge of pollutants to a storm drain MS4 system, surface waters or State waters.

***<u>Major Deficiency</u>*:** A deficiency that is a significant issue that could result in the discharge of pollutants to the storm drain system, surface waters or State waters.

***<u>Minor Deficiency</u>*:** A deficiency that does not pose a threat of discharge of untreated storm water or pollutants to the storm drain system, surface waters, or State waters, but are not in direct conformance with the SWPPP document.

3.1.2 Reporting and Corrective Action Procedure

MCBH has developed procedures for reporting and corrective actions, based on the severity of any deficiencies observed onsite during any routine site inspection. This procedure is also documented in more detail in the "Enforcement Response Plan" (SWMP Plan Appendix 3-4), and the "Reporting and Corrective Procedures for Construction Storm Water Inspections" (SWMP Plan Appendix 4-2). Generally, outside of its own inspections, ECPD will be notified of MS4 Permit violations detected during routine inspections if:

1. The ECPD Compliance Inspection Team identifies a violation during general base-wide inspections.
2. A MS4 Permit violation is not internally, and promptly resolved by processes in place through construction contracts with the FEAD, MCCS, OMC/Hunt, or DOE.

Once ECPD has been notified, the following procedure will come into effect:

If any critical deficiency is observed, ECPD will immediately provide verbal notification to the responsible tenant/manager and ensure all critical deficiencies are addressed and adequately corrected before the close of business day on the day the deficiency is identified. ECPD will document the issue using the inspection checklist and photograph log and send a written notification to the responsible tenant and MCBH PM. ECPD will immediately notify DOH if work is being completed without appropriate permits or if there is a discharge to State waters that exceeds reportable quantities or exceeds water quality standards.

If any major deficiency is observed, ECPD will immediately provide verbal notification to the responsible tenant/manager. ECPD will document the issue using the inspection checklist and send a written notification with an attached inspection checklist containing photographs to the responsible tenant/manager and MCBH PM explaining the site nonconformities. ECPD will ensure all major deficiencies are addressed or corrected as soon as possible, but in no event later than five (5) calendar days after the deficiency is identified or before the next forecasted rain event, whichever is sooner.

If any minor deficiency is observed, ECPD will document the issue using the approved inspection checklist, photograph log and internal project tracking system. The responsible tenant/manager and MCBH PM will be notified verbally of any non-conformities at the end of the inspection and provided an emailed copy of the inspection form (with attached photographs) within 48 hours of the inspection (two (2) business days). A response from the tenant or PM documenting the corrective action taken to address the identified issues is expected within five (5) calendar days from receiving the verbal notification from ECPD.

Per the permit, an independent qualified construction inspector will conduct follow-up inspections, as needed, at least monthly to ensure site deficiencies have been properly addressed and all storm water controls are in proper working order.

For recordkeeping purposes, ECPD will provide the responsible tenant/manager an emailed copy of the inspection form (with attached photographs) within 48 hours of the inspection (two (2) business days). The responsible tenant/manager or MCBH PM is expected to provide a formal written response to ECPD, documenting corrective actions (with photograph verification, maps, etc.), within five (5) calendar days of receiving the inspection form. ECPD will track all inspections using an internal public share drive.

3.2 Enforcement

To ensure compliance with the Construction Program and MS4 Permit requirements, MCBH has developed enforcement procedures for all maintenance and construction projects in its “Enforcement Response Plan,” (SWMP Plan Appendix 3-4). Refer to the Enforcement Response Plan for more detailed information on the enforcement procedures for this Construction Program.

MCBH is unique from most MS4s in that within its property boundary, it owns the property and almost all of the facilities and provides funding for a majority of work. Due to the nature and internal structure of MCBH, the most effective means for enforcement is escalation of unaddressed violations to the next higher authority.

If an observed deficiency is not addressed by the tenant or contractor within the allotted mitigation period, the issue will be brought to the attention of the ECPD Director. The party in violation will receive a written notice and deadline for compliance. If the issue remains unresolved, it will be escalated to the next higher authority.

Regardless of the type of project, the ultimate penalty for non-compliance of this Construction Program and MS4 Permit regulations, is eviction or discharge of the responsible party from MCBH. This is placed at the discretion of the CO. Although unaddressed violations can be escalated as high as the CO, this has not been an issue in the past due to the inherent threat of discharge or eviction from MCBH.

3.2.1 Referral of Non-compliance and Non-filers to DOH

In the event that MCBH encounters a situation where continued failure to resolve an observed deficiency has resulted in the CO’s determination that the contractor or tenant be evicted, ECPD will notify DOH within one (1) week of the decision. A written notification from ECPD, including all relevant information (such as inspection checklists, photographs, notes, and correspondence) is to follow within two (2) weeks of the CO’s determination.

In the event that an MCBH inspector identifies that a construction site has not applied for permit coverage under the NPDES permit program, ECPD will provide written notification to DOH within two (2) weeks of the discovery.

All written notifications submitted via email will be directed to:

cleanwaterbranch@doh.hawaii.gov, Attn: Enforcement Section Supervisor

Table 3-1
Organization of MS4 Compliance Oversight

Source of Storm Water Runoff	Required Permits/ Agreements	Responsible for Inspections	Responsible for Corrective Action	Recordkeeping and Tracking
General Base-Wide Inspections	None	ECPD Compliance Inspection Team	Varies[1]	Varies[1]
In-house Maintenance & Construction	• Project-specific NPDES Permit or connection/discharge approval through dig permit process (if applicable) *None (If no NPDES permit coverage needed)*	MCD, ECPD	MCD	ECPD
Military Construction	• Project-specific NPDES Permit or connection/discharge approval through dig permit process (if applicable) *None (If no NPDES permit coverage needed)*	MCD, ECPD	MCD	MCD
NAVFAC Construction by Outside Contractor	• Contract documents, including plans & specifications • Project-specific NPDES Permit or connection/discharge approval through dig permit process (if applicable)	FEAD, ECPD	Contractor	FEAD
DOE – Mokapu Elementary School	• Lease Agreement • Project-specific NPDES Permit or connection/discharge permit (if applicable)	DOE, ECPD	DOE (State)	DOE
PPV Housing	• Lease Agreement • Project-specific NPDES Permit or connection/discharge approval through dig permit process (if applicable)	OMC/Hunt, ECPD	Resident (Residential Lots) OMC/Hunt (Common Areas)	OMC/Hunt
MCCS – Commercial Areas	• Lease Agreement • Project-specific NPDES Permit or connection/discharge approval through dig permit process (if applicable)	MCCS, ECPD	Commercial Tenant	MCCS
MCD Contract Maintenance & Construction	• Project-specific NPDES Permit or connection/discharge approval through dig permit process (if applicable) *None (If no NPDES permit coverage needed)*	MCD, ECPD	MCD	MCD

[1] Varies depending on the agency responsible for oversight of the project, in accordance with Figure 2-1.

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4 Construction Project Inventory and the Asset Management System

Effective tracking of construction projects from the review stage to project completion ensures that pollutants do not degrade water quality to the MEP. This allows tracking of where pollutants enter the MS4, the schedule and results of inspections, enforcement actions, and the location and maintenance requirement of permanent (post-construction) BMPs. The purpose of the construction project inventory and the Asset Management System (AMS) is to ensure projects maintain compliance with the MCBH MS4 Permit and the Storm Water Pollution Prevention Program as outlined in the MCBH SWMP Plan.

4.1 Project Inventory

Effectively managing project information will enable MCBH to be able to easily identify and correct compliance issues and recognize recurring issues within the Construction Program or repeat offenders of its MS4 Permit requirements. The ability to easily identify and address problems will further promote the continual improvement of the Construction Program and facilitate its effectiveness in reducing storm water pollution related to construction sites.

An inventory of applicable construction sites is maintained by the responsible agencies displayed in Table 4-1. All records are kept at the associated agency's office and will be made available, when necessary, upon request by ECPD or DOH.

The inventory of construction sites is made up of project records that contain the following information, as applicable:

- Project title, and permit or file number (*if applicable).*
- Status of plan review and approval process.
- Inspection dates and enforcement action *(if applicable)*. If enforcement action is noted, the record shall include reference information for the associated MCBH BMP Construction Inspection Checklist forms (see Appendix 4-1 of the SWMP Plan), and any follow-up documentation (*if applicable*) as tracked in the ECPD database.
- If the project has filed a NOI for, or received a NGPC for any General Permits under HAR, Chapter 11-55, including, but not limited to:
    - Appendices C and A - NPDES General Permit Authorizing the Discharge of Storm Water Associated with Construction Activity *(for projects disturbing an area of one (1) acre or more);*
    - Appendices F and A - NPDES General Permit Authorizing Discharge of Hydrotesting Waters; or
    - Appendices G and A - NPDES General Permit Authorizing Discharges Associated with Construction Activity Dewatering

or If the project has applied for, or received an individual NPDES permit, or satisfied any other requirement of the NPDES permit program.

In addition to managing the construction project inventory, the specific agency responsible for construction project management (Table 4-1) is responsible for maintaining the project information and inspection/enforcement data in the MCBH Stormwater AMS.

4.1.1 Routine Project Exemption

To prevent overburdening the tracking systems and procedures in place, MCBH is in the process of developing a list of criteria for routine in-house maintenance and construction projects (*exempt* or *non-exempt*) that follow MCBH's standard BMP procedures, and can be reasonably considered to pose a negligible risk for discharging pollutants, via storm water, to its MS4. These criteria will be compiled into a Routine Project Exemption Form, which will be incorporated into Appendix 4-1 of the SWMP Plan once developed.

ECPD is also collaborating with MCD to develop a guidance sheet/booklet to be used by PMs, and staff to further explain required BMP implementation, procedures for meeting exemption criteria, and the importance of this process. For projects that meet these criteria, this Exemption Form will be filled out and signed by the MCBH PM. By signing the Exemption Form, the PM is certifying that the project will meet all exemption criteria until completion. This means that all applicable BMP measures will be implemented and that there is no reasonably foreseeable risk to storm water quality. For tracking purposes, the signed form will be submitted to and kept on file at MCD.

To distinguish between the aforementioned "*exempt"* maintenance/construction projects (i.e., emergency repair projects, interior remodeling, etc.), projects that meet the Exemption Form criteria will be referred to as "*routine exempt*" maintenance/construction.

Routine exempt projects will not require any further Construction Program tracking, asset management, or inspection. It will be the responsibility of the signing PM to ensure that the exemption criteria are met until the project is completed. *Exempt* projects (such as emergency repair projects) will still be considered for tracking if the exemption criteria are not met, because tracking can be instrumental in identifying recurring or resultant issues in the future.

4.2 Asset Management System

In addition to managing the construction project inventory, the specific agency responsible for construction project management (Table 4-1) is responsible for maintaining the project information and inspection/enforcement data in the MCBH Stormwater AMS. This includes data such as:

1. General Project information (including permit or file number, if available);
2. Chapter 11-55, Appendix C NPDES permit status (if applicable);
3. Status of plan review and approval;
4. Inspection dates, reports/photologs; enforcement actions (if applicable).

Table 4-1
Location of Inventory of Construction Sites

Type of Construction Project	Agency Responsible for Site Management	Location of Records (Agency/POC, Building/Address)
In-house Maintenance and Construction	MCD	MCD Building 242
	MRO	MRO Building 201
Military Construction	ECPD	Storm Water Program Manager Building 1360
Contract Construction	MCD	MCD Building 242
▪ NAVFAC	FEAD	FEAD Deputy Director Building 566
▪ Mokapu Elementary School	DOE	School Liaison Officer Mokapu Elementary School
▪ PPV Housing	OMC/Hunt	OMC/Hunt Project Manager 5173 Nimitz Road, Honolulu, HI 96818
	NAVFAC Pacific	PPV Program POC 258 Makalapa Drive, Suite 100, JBPHH, HI 96860
▪ Commercial Tenant	MCCS	Logistics Office Building 140
▪ MCD Construction and Maintenance	MCD	MCD Building 242

BMPs that are intended to provide protection for waterbodies and the MS4 system beyond the scope of a construction project are considered assets that must be properly tracked within the MCBH Stormwater AMS. These BMPs generally include intentionally installed LID assets and proprietary BMP devices but the asset management could also be extended to temporary BMPs that are required to remain intact after construction is complete or in-between working phases of larger scale projects. Refer to SWMP Plan Chapter 5 and the “MCBH Post-Construction BMP Manual” in Appendix 5-3 for more information.

5 References

City and County of Honolulu, Department of Environmental Services, *City and County of Honolulu Storm Water Best Management Practice Manual, New and Redevelopment*, July 2014.

City and County of Honolulu, Department of Planning and Permitting, *Rules Relating to Water Quality*, December 2018.

Department of Environmental Services, City and County of Honolulu in cooperation with The General Contractors Association of Hawaii, *City and County of Honolulu, Storm Water Best Management Practice Manual, Construction*, November 2011.

Marine Corps Base Hawaii Small Municipal Separate Storm Sewer System (Small MS4) and Industrial Facilities, *NPDES Permit No. HIS000007*

State of Hawaii, Department of Health, *Hawaii Administrative Rules (HAR), Title 11, Chapter 55, Appendix A, C, F, and G*, 2019.

State of Hawaii, Department of Transportation, *Hawaii Standard Specifications for Road and Bridge Construction, and Special Provisions*, 2005.

State of Hawaii Department of Transportation, Airports Division, *Construction Activities BMP Field Manual*, 2019.

State of Hawaii Department of Transportation, Highways Division, Oahu District, *Storm Water Permanent Best Management Practices Manual,* 2015.

State of Hawaii Department of Transportation, Highways Division, *Construction Best Management Practices Field Manual,* 2021.

6 Disclaimer

The information presented in this Construction BMP Field Manual was adopted from available and most recent sources that have locally acceptable BMPs and stormwater runoff control measures. This manual has been prepared as a reference guideline, however, due to site-specific conditions, the selection of the BMPs must be used in conjunction with the best professional judgment and sound engineering principles to assure proper function and performance of the BMPs contained herein. The author does not guarantee the accuracy or completeness of this document and will not assume any liability or responsibility for the use of, or for any damages resulting from the use of any information contained herein. The detail and the wording in this manual will not necessarily result in compliance with NPDES permit requirements or other requirements specific to the user's site or construction contract. Application of BMPs should comply with applicable federal, state, and county regulations.

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7 Construction BMP Fact Sheets

Table 7-1. Construction BMP Fact Sheets

Section	BMP CATEGORY	BMP NAME	MCBH BMP ID
1	SM	Construction BMP Training	MCBH-SM-01
2	SM	Material Storage and Handling	MCBH-SM-02
3	SM	Stockpile management	MCBH-SM-03
4	SM	Concrete Wash and Waste Management	MCBH-SM-04
5	SM	Asphalt Cement Waste Management	MCBH-SM-05
6	SM	Solid Waste Management	MCBH-SM-06
7	SM	Sanitary Waste Management	MCBH-SM-07
8	SM	Contaminated Soil Management	MCBH-SM-08
9	SM	Hazardous Materials and Waste Management	MCBH-SM-09
10	SM	Spill Prevention and Control	MCBH-SM-10
11	SM	Vehicle and Equipment Cleaning	MCBH-SM-11
12	SM	Vehicle and Equipment Maintenance	MCBH-SM-12
13	SM	Vehicle and Equipment Refueling	MCBH-SM-13
14	SM	Scheduling	MCBH-SM-14
15	SM	Location of Potential Sources of Sediment	MCBH-SM-15
16	SM	Staging Area	MCBH-SM-16
17	SM	Preservation of Existing Vegetation	MCBH-SM-17
18	SM	Dewatering Operations	MCBH-SM-18
19	SM	Dust Control	MCBH-SM-19
20	SM	Paving Operations	MCBH-SM-20
21	SM	Structure Construction and Painting	MCBH-SM-21
22	SM	Topsoil Management	MCBH-SM-22
23	EC	Temporary Stream Crossing	MCBH-EC-01
24	EC	Flared Culvert End Sections	MCBH-EC-02
25	EC	Run-on Diversion	MCBH-EC-03
26	EC	Slope Roughening, Terracing, and Rounding	MCBH-EC-04
27	EC	Earth Dike, Swales, and Ditches	MCBH-EC-05
28	EC	Level Spreader	MCBH-EC-06
29	EC	Slope Drains and Subsurface Drains	MCBH-EC-07
30	EC	Outlet Protection and Velocity Dissipation Devices	MCBH-EC-08
31	EC	Slope Interceptor or Diversion Ditches/Berms	MCBH-EC-09
32	EC	Rip-Rap and Gabion Inflow Protection	MCBH-EC-10
33	EC	Geotextiles and Mats	MCBH-EC-11

Section	BMP CATEGORY	BMP NAME	MCBH BMP ID
34	EC	Seeding and Planting	MCBH-EC-12
35	EC	Hydroseeding	MCBH-EC-13
36	EC	Mulching	MCBH-EC-14
37	EC	Hydromulching	MCBH-EC-15
38	EC	Soil Binders	MCBH-EC-16
39	SC	Storm Drain Inlet Protection	MCBH-SC-01
40	SC	Vegetated Filter Strips and Buffers	MCBH-SC-02
41	SC	Check Dams	MCBH-SC-03
42	SC	Sediment Trap	MCBH-SC-04
43	SC	Sediment Basin	MCBH-SC-05
44	SC	Compost Filter Berm/Sock	MCBH-SC-06
45	SC	Silt Fence or Filter Fabric Fence	MCBH-SC-07
46	SC	Sandbag Barrier	MCBH-SC-08
47	SC	Brush or Rock Filter	MCBH-SC-09
48	SC	Construction Road and Parking Lot Stabilization	MCBH-SC-10
49	SC	Stabilized Construction Entrance/Exit	MCBH-SC-11

Notes:
SM = Site Management
EC = Erosion Control
SC = Sediment Control

1 Construction BMP Training

Image Source: State of Hawaii Department of Transportation, Highways Division, *Construction Best Management Practices Field Manual,* 2021.

1.1 Description

Training programs that address the proper installation and maintenance of construction best management practices (BMPs)

1.2 Training Objectives

Provide the necessary information for personnel to identify potential pollutant sources on construction projects and implement practicable solutions.

1.3 Applications

Personnel with construction storm water responsibilities, including but not limited to designers, construction engineers, construction and maintenance inspectors, plan reviewers, contractors, and sub-contractors are responsible, as applicable, for the following:

- Designing, installing, maintaining, and/or repairing storm water controls/BMPs (including pollution prevention measures).
- Applying and storing chemicals.
- Vehicle/equipment storage, maintenance, and refueling.
- Conducting inspections.
- Taking and documenting corrective actions.

1.4 Implementation

- Provide training with construction storm water responsibilities, including construction engineers, construction and maintenance inspectors, and plan reviewers.
- Provide relevant educational materials to project applicants, contractors, developers, property owners, and other responsible parties.
- Provide construction BMP training to contractors and sub-contractors responsible for development of the Storm Water Pollution Prevention Plan (SWPPP) and implementation of site-specific BMPs.
- The contractor shall keep training logs updated and readily available.
- Prior to commencement of earth-disturbing activities or pollutant-generating activities, whichever occurs first, at a minimum, personnel must be trained to understand the scope of their job duties, as applicable, as follows:
- Location of all storm water controls on the site, and how they are to be maintained.
- Proper procedures to follow with respect to the project’s pollution prevention requirements.
- When and how to conduct inspections, record applicable findings, and take corrective actions.
- Provide storm water training through field office trainings, product demonstrations, an annual storm water conference, videos, newsletters, and/or field demonstrations.

1.5 Training Frequency

- Annual training to staff with construction storm water responsibilities.
- When needed, as new technology, permits, and regulations are created.
- Prior to the commencement of earth-disturbing activities or pollutant-generating activities.
- Provide training to new hires prior to them performing responsibilities related to compliance with applicable permits.
- Site-specific training may be necessary for new construction project

2 Material Storage and Handling

2.1 Description

Practices and procedures to promote proper handling, storage, and use of construction materials in a manner that minimizes or eliminates storm water pollution, groundwater pollution, soil contamination, and injury to workers or visitors.

2.2 Applications

Properly store and handle materials on construction sites based on the general requirements for the materials

- Designate a material storage area.
- Locate stored materials away from inlets, concentrated flows and open waterbodies.
- Provide a cover for stored material.

Table 2-1 Proper storage and handling of materials commonly found on construction sites

Materials Commonly Found on Construction Sites	Proper Storage and Material Handling
• Soil • Fill • Aggregate	• Designate a material storage area. • Locate stored materials away from inlets, concentrated flows and open waterbodies. • Cover stored materials containing fines with an impermeable material to prevent erosion caused by storm water and wind. • Place a compost filter sock, silt fence, or similar sediment barrier device at the base of material stockpiles. • See section 3 Stockpile Management
• Soil stabilizers and binders • Fertilizers • Pesticides and herbicides • Detergents • Plasters	• Designate a material storage area. • Locate stored materials away from inlets, concentrated flows and open waterbodies. • Store materials on proper dunnage, pallet, or similar materials to elevate off the ground. • Cover stored materials with an impermeable material to prevent contact with storm water. • Cover stored materials with an impermeable material to prevent contact with storm water. • Tightly seal container lids when not in use. Do not apply fertilizer or herbicides during or just before a rain event. • Materials shall be in sealed and properly labeled bags or containers. • All liquid materials shall be stored with an appropriately sized secondary containment.
• All metals, including galvanized metal • Rebar	• Rack materials off the ground on proper dunnage, pallet, or similar materials to elevate off the ground. • Cover all metal materials, including galvanized metals and rebar, with an impermeable material to prevent contact with storm water.
• Asphalt • Asphalt products (i.e. cold-patch, tack coat, etc.) • Concrete products (i.e. cold curing compound, form release agents, etc.)	• Designate a material storage area • Locate stored materials away from inlets, concentrated flows and open waterbodies. • Store materials on proper dunnage, pallet, or similar materials to elevate off the ground. • Cover asphalt and concrete • Hazardous materials shall be labeled and stored in their original containers.

Materials Commonly Found on Construction Sites	Proper Storage and Material Handling
	• Provide appropriately sized secondary containment. • Properly dispose of containers only after I the product has been used. • See section 9 Hazardous Materials and Waste Management

2.3 Installation and Implementation

Ensure proper material storage and handling practices are implemented on construction sites.

2.4 Material Storage

- Materials with the potential to contaminate runoff must be stored under some type of impermeable cover and racked off of the ground to prevent contact with storm water. This BMP will greatly decrease the potential of pollutants originating from storage areas.
- Designate an on-site material storage area. This area shall be located away from concentrated flows, inlets, and open waterbodies.
- Maintain accurate and up-to-date records of materials delivered and stored on-site.
- Minimize on-site inventory.
- Retain a complete set of Safety Data Sheets (SDS) on-site.
- Do not store chemicals, drums, and bagged materials directly on the ground. Metal drums or containers must be covered with 10 mil plastic sheeting to prevent contact with rainwater if stored in an uncovered area.
- Secondary containment must be designed, installed, and operated to prevent any migration of wastes or accumulated liquid out of the containment system to the soil, groundwater, or surface water.
- Secondary containment must be able to retain 100% of the volume of the largest container or 10% of the aggregate total of all the containers being stored within the secondary containment, whichever is greater.
- Hazardous chemicals shall be stored in their original containers with manufacturer's labels and placed in secondary containment.
- All product containers should have Globally Harmonized System (GHS) Labels.
- All containers should be labeled as to their contents.
- Do not stack more than 2 containers on top of each other to avoid tipping over. Containers may be stacked higher (no more than 3) provided they are secured from tipping over through such methods of shrink wrap or other supportive means. There must be enough room in the containment area to contain any tipped containers.
- Fuel containers shall have secondary containment for nozzles/hoses.
- Store soaps, detergents, and solvents under cover or other means to prevent contact with rainwater.
- Materials should not be stored in locations that hinder the effectiveness of other BMPs.
- Do not store materials on erosion and sediment control devices.
- Comply with building and fire code requirements when storing materials.

- Provide appropriate training to all new employees responsible for material storage and handling prior to the commencement of work.

2.4.1 Material Handling

- Use the appropriate amount of materials necessary to complete the construction activity.
- All personnel shall be trained in accordance with hazardous communication standards. Refer to the Occupational Safety and Health Administration (OSHA), Occupational Safety and Health Standards 29 CFR Section 1910.1200 for more information.
- Minimize the use of hazardous materials. See section EC-9 Hazardous Materials and Waste Management for more information.
- Do not remove the original label. Comply with manufacturer's labels, which include product information regarding uses, protective equipment, flammability, ventilation, mixing of chemicals, and proper disposal.
- Use the entire product before disposing of the container in accordance with all federal, state, and local regulations.
- Restrict amount of herbicide prepared to the quantity necessary for the current application. Comply with the recommended usage instructions. Do not apply fertilizers or herbicides during or just before a rain event.
- Comply with building and fire code requirements when storing materials.
- Maintain an ample supply of cleanup materials that are readily accessible for spills.

2.5 What to Inspect

- Are storage areas clean, organized, and equipped with an adequate supply of cleanup materials?
- Are secondary containment measures being used and are they appropriately sized?
- Do containers have proper labeling?
- Do containers show signs of corrosion and/or evidence of leaks?
- Are materials properly stored and disposed of?
- Are storage areas located away from drainage structures, concentrated flows and open waterbodies?

2.6 Maintenance

- Storage areas shall be clean and well organized.
- Maintain an adequate supply of spill cleanup materials on-site and readily available.
- Any significant residual materials remaining on the ground shall be removed and properly disposed of immediately. If the residual materials contaminate the soil, then the contaminated soil shall also be removed and disposed of properly.
- Maintain covers on any materials that should not come into contact with storm water. All containers must have proper GHS Labels and, if practicable, be in secondary containment.
- Provide periodic training to all employees responsible for material storage and handling.

3 Stockpile Management

3.1 Description

Stockpile protection measures to reduce the potential for air and water pollution originating from stockpiles of construction materials and spoil piles. Stockpiled materials may include soil, Portland cement concrete (PCC), asphalt concrete, cold mix asphalt, and aggregate. Spoil piles may include materials excavated from a trench, tunnel, shaft or other excavation activity.

3.2 Applications

Provide proper protection of stockpiles on construction sites. Table 3-1 provides a list of materials commonly stockpiled on construction sites and examples of BMPs for stockpile protection, depending on what material is being stored and the associated risk it poses.

Table 3-1 Common Stockpiled materials and example BMPs

Common Stockpile Material	Examples of BMPs
• Soil • Topsoil • Excavated material • Imported material • Spoil piles	• Cover stockpile with either: • 10 mil plastic sheeting or comparable impermeable material. • soil stabilization measures (i.e., hydromulch, tackifier). • Protect stockpile with a temporary perimeter sediment barrier.
• PCC • Rubble • Crushed • Hardened • Saw cut	• Cover with 10 mil plastic sheeting or comparable impermeable material (applicable if fines are present). • Protect stockpile with a temporary perimeter sediment barrier.
• Asphalt • Hot mix asphalt • Asphalt cement (cold mix) • Rubble • Reclaimed asphalt pavement	• Cover with 10 mil plastic sheeting or comparable impermeable material. • Protect stockpile with a temporary perimeter sediment barrier. • Asphalt (cold mix and hot mix) must be stored on an impervious material.
• Aggregate • Base • Sub-base etc.)	• Cover with 10 mil plastic sheeting or comparable impermeable material. • Protect stockpile with a temporary perimeter sediment barrier.
• Treated wood • Creosote telephone poles	• Cover with 10 mil plastic sheeting or comparable impermeable material at all times. • Rack materials off the ground or place on top of impermeable material.

3.3 Installation and Implementation

- Locate stockpiles a minimum of 50 feet, or as far as practicable, from concentrated runoff, waterbodies, and inlets. If impracticable, additional precautions should be taken to protect storm drain inlets, open drainage facilities, and waterbodies.
- Place bagged materials on pallets and under cover.
- Provide physical diversion to protect stockpiles from concentrated runoff.
- Cover stockpiles with 10 mil plastic sheeting or comparable impermeable material.
- Cover may be removed while adding to or removing from the stockpile. Replace the cover when not in use.
- Cover should be weighted down to prevent it from blowing off.
- Geotextile filter fabric is an acceptable cover for mulch stockpiles or other heat producing materials.
- Stockpiles of paving materials must not be placed directly on the ground. Place on 10 mil plastic sheeting or similar impermeable material or dispose of it properly off-site at the end of the day.
- Soil stabilization measures may be used if soil stockpiles will be inactive for an extended amount of time. Hydroseeding, hydromulching, and tackifiers may be accepted as adequate soil stabilization measures. See sections EC-13 Hydroseeding, EC-15 Hydromulching, and EC-16 Soil Binders for more information. Place silt fence, compost filter socks, or other accepted perimeter controls approximately 1 to 2 feet from the base of the stockpile.
- Stockpiles consisting of aggregate may need to be covered depending on the amount of fines present.
- Stockpiling topsoil for extended periods of time can reduce the biotic benefits of the existing soil. Topsoil stockpiles should be stored for as little time as possible.
- Stockpiles must be covered at the end of each work day and before each anticipated rain event.
- Minimize compaction of soil stockpiles.
- Ensure stockpile heights can be managed and should be no taller than surrounding structures.

3.4 Considerations

- Stockpiles are only applicable for temporary storage of material.
- Perimeter controls for the project limits are not considered stockpile protection.
- Stockpiles cannot be located in any natural buffer area.

3.5 What to Inspect

- Are stockpiles completely covered?
- Is perimeter control installed at the base of the stockpile?
- Are there tears/rips in the stockpile cover?
- Is there evidence of water or wind erosion?
- Are stockpiles located away from concentrated flows, open waterbodies, and inlets?
- Does the stockpiled material have fines and need to be covered?
- Is the stockpile taller than surrounding structures?

3.6 Maintenance

- Replace/repair damaged stockpile cover, as needed.
- Ensure the plastic cover is in contact with the ground around the entire pile and properly anchored.
- Replace/repair damaged temporary perimeter sediment barrier.
- Stockpiles removed from the project site shall be disposed of at an approved solid waste permitted facility. Stockpiles shall not be taken to an intermediary site such as a contractor's baseyard unless the contractor's baseyard has been issued the appropriate permit from the Department of Health.
- Revegetate any disturbed areas under removed stockpiles, if applicable.
- Reapply temporary stabilization (i.e., hydromulch, tackifier, etc.), if needed.

4 Concrete Wash and Waste Management

4.1 Description

Practices and procedures to manage concrete/cementitious products, washout, and waste to prevent discharges to the ground, the drainage system, or adjacent waterbodies.

4.2 Applications

- Projects involving the use of concrete/cementitious products as construction materials.
- Demolition activities generating dust and debris.
- On-site wash areas used for concrete-coated vehicles or equipment.
- Activities such as sawcutting and grinding which result in the formation of slurries containing Portland cement.
- Activities generating fines from sawcutting, grinding, and demolition.
- Commonly Used Cementitious Products
- Concrete
- Mortar
- Plaster
- Stucco
- Grout
- Cement-Treated Base (CTB)

4.3 Installation and Implementation

- Properly store cement-based materials under cover to prevent contact with storm water. The materials can be classified as waste if improperly stored.
- Designate areas for concrete waste and washout a minimum of 50 feet away, if practicable, from storm drain inlets, open drainage facilities, and waterbodies. If impracticable, per Hawaii Administrative Rules (HAR) Title 11, Chapter 55, Appendix C, 5.1.2.1.1.2, other measures, such as double sediment control (e.g., double perimeter control), must be employed to prevent wash water/waste concrete from reaching the storm drain inlets, open drainage facilities, and waterbodies.
- Avoid mixing excess concrete, if possible. Discard excess concrete in the designated area.
- Disposal of concrete washout via percolation is prohibited. Wash concrete-coated vehicles or equipment in the designated wash area or off-site.
- The designated concrete washout area shall be a temporary pit (below grade), a level bermed area (above grade), or a commercially available system approved to capture concrete wash water.
- The washout should be sufficiently sized so that no overflow can occur due to inadequate sizing or precipitation.
- The washout area shall be lined with an impermeable material (i.e., plastic sheeting, Visqueen, polypropylene, etc.) to prevent seepage of washout into the ground. If plastic is used, it must be a minimum of 10 mil thick. The lining shall be seamless.
- Allow wash water to evaporate or contain the washout in an approved concrete washout system. Provide a minimum freeboard (height above the water mark) of 4 inches for concrete washouts to account for rain events. Washouts must be changed or not used after reaching 75% capacity or 4-inch freeboard, whichever is more stringent.
- If secondary containment is placed under the washout (recommended), it should be bermed under the plastic sheeting to create a secondary pooling area to catch any leaks or splashes.
- Waste concrete shall not be allowed to harden on the bare ground and shall be removed while wet.
- Materials from the contractor’s spill kit can be used to clean up waste concrete.
- Break up and store hardened concrete in the designated area.
- Saw cut slurry shall be removed from the site by vacuuming.
- Provide storm drain inlet protection during sawcutting operations.
- When placing concrete in water environments or tremie pours and drill shafts, any water which is displaced or in contact with wet concrete, mortar, or grout is considered contaminated/concrete impacted.
- Remove concrete impacted water to a sealed containment area where it cannot contact or percolate into the ground. Holding tanks can be used where water is treated pending release/removal and concrete waste collected for disposal. If a pit is used, it must be sealed against possible leaks to the ground until the water evaporates. Overlapped plastic sheeting in the pit is not permitted.
- Concrete placement in drill shafts often result in water displacement and requires an over pour of concrete in the shaft. Displaced water must be considered contaminated/concrete impacted and treated as you would above. Any over pour of concrete in contact with the ground must be cleaned up while wet and placed in containment. Plastic sheeting lined pit areas at the drill shaft may also be constructed to catch over pour if adhered to the drill shaft.

- Do not allow concrete liquid wastes onto the ground, into the storm drainage systems, or into waterbodies.
- Collect and properly dispose of all concrete waste material at an approved solid waste permitted facility. Dispose of liquid and solid concrete wastes in accordance with solid waste regulations as well as other applicable federal, state, and local regulations.
- Provide concrete waste management training for employees and contractors.

4.4 Considerations

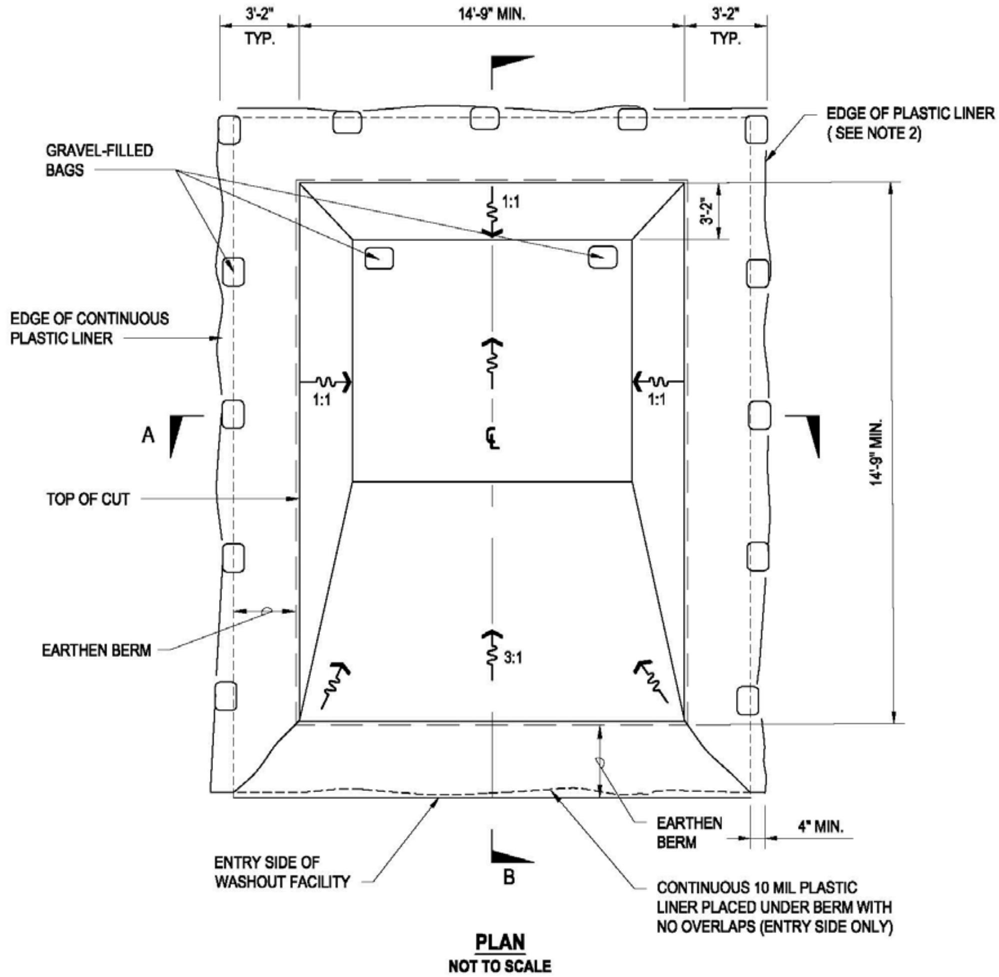
- Off-site concrete wash areas may be impracticable.
- Locating concrete washout areas a minimum of 50 feet away from drainage systems and open waterbodies may not be practicable.
- May need to allow washout to evaporate.
- Constructing washout areas may not be practicable. Manufactured concrete washout bins may be the only option.
- Rainwater can cause uncovered washout pits and containers to overflow.

4.5 What to Inspect

- Has the concrete washout been damaged?
- Is liner a continuous and seamless piece?
- Is the concrete washout area exceeding 75% capacity limits or minimum freeboard of 4 inches?
- Are leaks observed from the designated concrete washout area?
- Is there evidence of concrete waste on ground?
- Are contractors implementing proper concrete waste management measures?

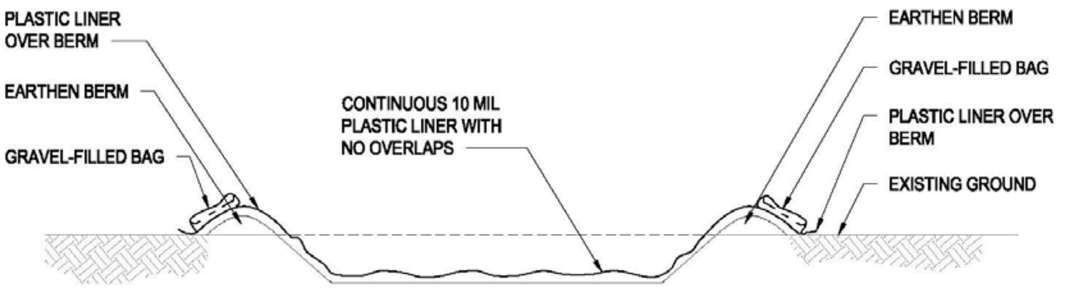
4.6 Maintenance

- Regularly remove and dispose of hardened concrete in accordance with solid waste regulations.
- Remove accumulated concrete washout materials when it reaches 75% capacity or exceeds the minimum 4-inch freeboard requirement.
- Cover temporary concrete washout, when not in use and at the end of the work day, to avoid overflow.
- Inspect concrete washout facilities daily and after heavy rains. Replace lining if damaged (i.e., torn, brittle, UV-degraded) before use.
- Immediately clean up concrete waste on bare ground or paved areas before it hardens.
- Vacuum concrete dust and slurry during and immediately after sawcutting activities with proper equipment to prevent/minimize concrete stains. Hosing or washing the area is not allowed.
- Sweep up debris when concrete work is completed for the day.

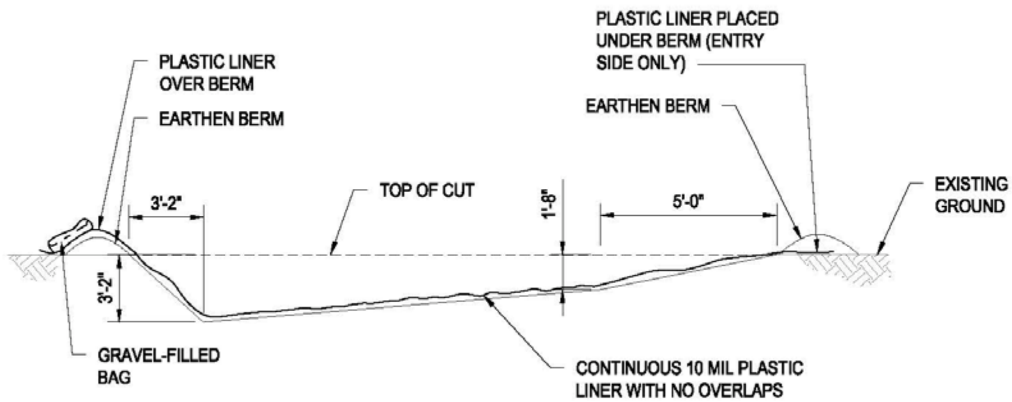


CONCRETE WASHOUT FACILITY (BELOW GRADE)

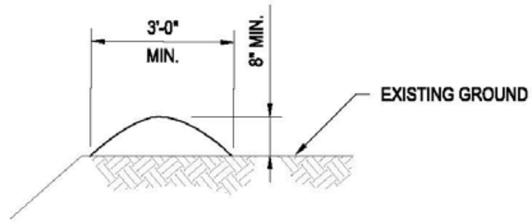
Figure 4-1. Example of a Below Grade Concrete Washout



SECTION A
NOT TO SCALE

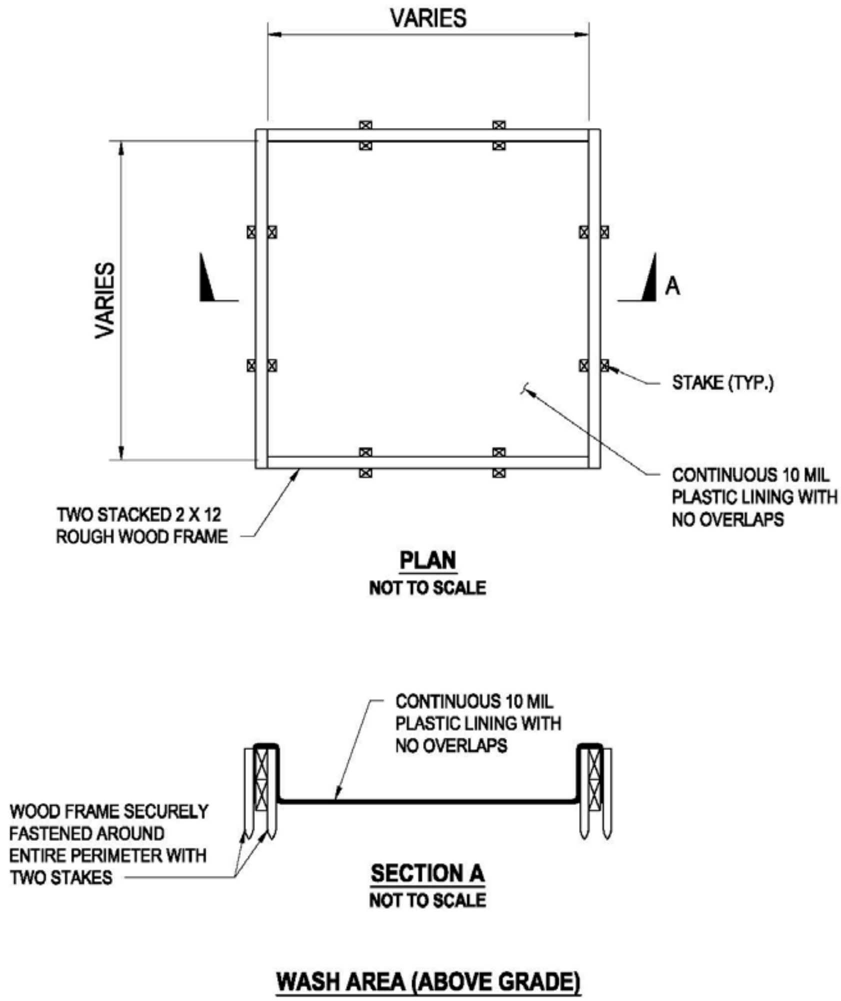


SECTION B
NOT TO SCALE



EARTHEN BERM TYPICAL SECTION
NOT TO SCALE

Figure 4-2. Example of an Earthen Berm Section



NOTES:
1. ACTUAL LAYOUT DETERMINED IN FIELD.
2. THE SIZE OF THE CONCRETE WASHOUT SHALL BE DETERMINED BY THE ANTICIPATED AMOUNT OF CONCRETE WASTE TO BE STORED.
3. THE PLASTIC LINING MUST BE A CONTINUOUS SHEET WITH NO OVERLAPS.

Figure 4-3. Example of an Above Grade Concrete Washout

5 Asphalt Cement Waste Management

5.1 Description

Practices and procedures to prevent asphalt cement millings and waste from discharging into the drainage system or adjacent waterbodies.

5.2 Applications

- Paving operations.
- Milling road and highway surfaces that generate dust and debris.
- Asphalt cement pavement patching and repair.

5.3 Installation and Implementation

- Ensure all inlets at risk of receiving pollutants are protected with inlet protection during milling operations. See section 39 Storm Drain Inlet Protection for more information.
- Place temporary cold patch spoil piles or waste asphalt piles on impervious material, cover with impermeable material, and surround with full perimeter control.
- Store paving vehicles and equipment in an approved staging area and fully park on a layer of geotextile filter fabric on top of 10 mil plastic sheeting. See section 16 Staging Area for more information.
- Seed pervious areas disturbed by paving operations within 14 days (7 days if runoff drains to impaired waters) of completing paving to initiate stabilization per Hawaii Administrative Rules (HAR) Title 11, Chapter 55, Appendix C, section 5.2 or per project specifications.
- Clean roads of loose debris by the end of the work day by sweeping or vacuuming.

- Remove waste asphalt from site, including contaminated soil that may be mixed in material, and dispose of properly based on applicable federal, state, and local regulations. See section 8 Contaminated Soil Management for more information.

5.4 Considerations

- Staging area may have limited amount of space to store milling and paving vehicles/equipment.
- Contractors may need to implement dust control measures during milling operations.
- Storm water can cause fines from milling to enter into storm drains and open bodies of water.

5.5 Maintenance

- Storage areas shall be clean and well organized.
- Remove any significant residual materials remaining on the ground and properly dispose of immediately. If the residual materials contaminate the soil, then the contaminated soil shall also be removed and disposed of properly.
- Maintain an adequate supply of spill cleanup materials on-site and readily available.
- Maintain covers on any materials that should not come into contact with storm water. All containers must have proper Globally Harmonized System (GHS) Labels, including secondary containers.
- Provide periodic training to all employees responsible for material storage and handling.

6 Solid Waste Management

6.1 Description

Practices and procedures to reduce the discharge of pollutants from construction and demolition (C&D) waste from entering the drainage system or adjacent waterbodies.

6.2 Applications

- Construction projects generating non-hazardous solid wastes from C&D activities. These wastes include C&D waste, inert fill material, litter and recycle/reuse material.
- C&D wastes include materials originating from the construction, demolition, and repair of roads, buildings, or other structures.
- Inert fill materials are defined as earth, soils, rocks, rock-like material, such as cured asphalt, brick, and clean concrete less than 8 inches in diameter, except as specified by a licensed Engineer with no exposed steel reinforced rod. The inert fill material shall not contain vegetation, organic material, or other solid waste. It shall not be contaminated with asbestos or lead-based paint. In addition, inert fill materials do not decompose or produce leachate or products harmful to the environment.

6.3 Installation and Implementation

- Separate contaminated cleanup materials from C&D wastes. Contamination may be from hazardous substances, friable asbestos, waste paint, solvents, sealers, or adhesives.
- Dispose of waste in designated waste containers.
- Solid waste bins must be watertight and placed away from drainage facilities and open bodies of water.

- Most C&D wastes can be reused or salvaged for recycling. Inert fill materials shall not be mixed with other C&D waste.
- Solid waste is generally any material that leaves a project that is no longer usable on the project. If any material is intended to be characterized as inert fill or soil for reuse, the material shall be tested and determined clean.
- Ensure inert fill material does not contain vegetation, organic material, or other solid waste.
- The Department of Health, Hazard Evaluation and Emergency Response Office (HEER) refers to Guidance for Soil Stockpile Characterization and Evaluation of Imported and Exported Fill Material, to define “acceptable fill material” as:
- Natural materials consisting of soil, clay, sand, volcanic cinder and ash, and rock; or a mixture/combination of such materials.
- C&D materials exclusive of soil that are known or tested to be free of hazardous substances.
- The fill determination process, defined by HEER, is to determine if proposed fill material meets the definition of acceptable fill material. Options to complete the fill determination process include:
- An environmental due diligence review of the fill source property that concludes there is no evidence of past releases that could pose an environmental hazard or contain chemical contaminants above applicable State of Hawaii Department of Health (DOH) Tier 1 Environmental Action Levels (EALs).
- A fill material characterization report that summarizes representative analytical data for the proposed fill material from the fill source operator, fill importer, or fill exporter.
- Provide waste containers of sufficient size and number to contain construction and domestic waste. Dumpsters must be watertight and securely lidded. Roll off containers must be watertight and have a cover to keep rain out and prevent loss of waste during windy conditions.
- It is highly recommended to cover waste containers with 10 mil plastic sheeting, tarpaulin, manufactured lid, or other impermeable material.
- Waste containers shall meet all local and state solid waste management regulations.
- Littering on-site is prohibited.
- Ensure construction waste is collected, removed, and disposed of only at authorized disposal areas.
- Any site not contiguous with the project site may need a permit to receive solid waste. This includes any site or facility that receives solid waste, landowners who want to accept and process solid waste, and contractors who have to take solid waste to their baseyard.
- The contractor’s supervisory personnel shall be instructed regarding the correct practices for waste disposal. Post notices detailing these practices in the office trailer. The contractor shall ensure that these practices are followed.
- Follow all contract requirements regarding handling and disposal of solid waste.
- Do not allow containers to overflow. Plan for waste and recyclable materials to be collected weekly or when containers are two-thirds full, whichever is sooner.
- Minimize production of solid waste materials wherever possible.
- It is highly recommended to reuse C&D waste when possible. For criteria for reuse, refer to DOH Tier 1 EALs for unrestricted land use. Refer to DOH Evaluation of Environmental Hazards at Sites with Contaminated Soil and Groundwater for more information on EALs.
- Consideration of soil that exceeds Tier 1 EALs for unrestricted land use, but meets the DOH environmental action levels for commercial use (Refer to DOH Evaluation of Environmental Hazards at Sites with Contaminated Soil and Groundwater, Appendix 1, Table I-2) for off-site

reuse at such sites must be approved by HEER in consultation with the State of Hawaii Department of Health, Solid and Hazardous Waste Branch (SHWB).

- Notify the Resident/Construction Engineer of any illegal connections, illicit discharges, or illegal dumping not generated by the contractor.

6.4 Considerations

- Must sort waste material accordingly.
- Some types of solid waste can easily be washed away by storm water if not properly disposed.
- The Engineer may reject imported fill from sources known to contain hazardous material.
- The import of fill material from a source that has not been evaluated could inadvertently recontaminate a remediated property, and may be considered illegal dumping. Contaminated fill material can also pose direct exposure hazards to workers and the public.
- Understanding the source of the fill material and the potential for contamination is very important.
- Construction vehicles may be necessary to put C&D waste in the correct bin.
- Construction personnel should not hose out containers on-site. Leave dumpster cleaning to the trash hauling contractor.

6.5 What to Inspect

- Are waste containers properly covered?
- Do waste containers exceed two-thirds capacity?
- Is there evidence of leaks or spills around waste containers?
- Is site neat and free of litter?
- Is waste being separated and placed in the appropriate bin?
- Are waste bins located away from drainage facilities, inlets, and open bodies of water?
- Is there evidence of illegal dumping on-site?
- Is trash removed regularly?

6.6 Maintenance

- Schedule solid waste collection regularly.
- Empty waste containers when they are two-thirds full.
- Schedule recycling activities based on construction/demolition phases.
- Do not allow containers to overflow.
- Repair/replace leaking or damaged dumpsters.
- Clean up site and dispose of waste in designated waste containers by the end of each work day.

7 Sanitary Waste Management

7.1 Description

Practices and procedures to reduce or prevent the discharge of sanitary wastes from construction sites into the storm drain system or adjacent waterbodies.

7.2 Applications

Construction sites containing temporary or portable sanitary waste systems.

7.3 Installation and Implementation

- Locate sanitary facilities in a convenient place away from drainage facilities.
- Wastewater shall not be discharged to the ground and open waterbodies, or buried.
- Position sanitary facilities where they are secured and will not be tipped over or knocked down.
- Straps, rebar stakes, or similar devices should be used to secure sanitary facilities.
- Sanitary systems discharging to the sanitary sewer shall comply with the local wastewater treatment plant requirements.
- A licensed service provider shall maintain sanitary facilities in good working order.
- Schedule regular waste collection by a licensed transporter at least once a week or as required.
- If a spill occurs, immediately contain and determine if contents have reached an inlet or open waterbody. The area shall be properly disinfected after cleanup of the spill has been completed.
- All spills regardless of size must be reported to the Emergency Spill Response Coordinator. See section 10 Spill Prevention and Control for more information.

7.4 What to Inspect

- Are portable toilets secured from tipping over? Place portable toilets on a dry, level surface against a sturdy structure (i.e., brick wall or building).
- Are contents leaking from septic facility?
- Are portable toilets located away from the drainage systems, concentrated flows and waterbodies?

7.5 Maintenance

- Maintain facilities regularly.
- Schedule regular waste collection by a licensed transporter at least once a week or as required.
- Prevent illicit discharges.
- Resecure portable toilets, if needed.

8 Contaminated Soil Management

Image Source: State of Hawaii Department of Transportation, Highways Division, *Construction Best Management Practices Field Manual,* 2021.

8.1 Description

Practices and procedures to identify and prevent the discharge of pollutants from contaminated soil to the drainage system and adjacent waterbodies.

8.2 Applications

Projects in urbanized or industrial areas where previous site usage, undetected spills or leaks, illicit discharges, or underground storage tank leaks may have contributed to soil contamination.

8.3 Installation and Implementation

- Abide by all federal, state, and local regulations when dealing with contaminated soil.
- A site assessment should be conducted prior to ground-disturbing activity to identify contaminated soil or other hazardous pollutants.
- Research records of previous site uses and activities.
- Identify soil discoloration, odors, soil property differences, abandoned underground tanks or pipes, or buried debris to determine possible soil contamination.
- If contaminated soil or other hazardous pollutants are found on-site, stop work in the area immediately and notify the State of Hawaii Department of Health, Hazard Evaluation & Emergency Response (HEER) office (808-586-4249), as well as the Project Engineer.
- Contaminated soil shall be placed on an impermeable liner or device, such as 20-mil plastic sheeting, surrounded with impermeable lined berms and covered with impermeable sheeting.
- Soil suspected of being contaminated should be isolated from other stockpiles until test results return. If the suspected contaminated soil has evidence of contamination (odor, sheen, color, etc.), then it should be handled and stored as contaminated until testing determines otherwise. Known contaminated soil must be segregated from uncontaminated soil.
- Soil testing is the only option to know if soil is contaminated. Sampling of the soil shall follow DOH guidelines and requirements. Test soil at a certified laboratory if soil is suspected of

contamination. Multi Increment testing should be conducted if soil is contaminated with lead because it is commonly unevenly distributed.

- The contractor shall propose the testing protocols for the Engineer's approval.
- Contaminated soil stockpiles must remain on-site and cannot be transported or stored off-site without prior authorization.
- Temporary stockpiles of contaminated material must have signage designating material as contaminated.
- Identify area to temporarily store contaminated soil away from drainage facilities, waterbodies and conveyance systems.
- Construction vehicles leaving the excavation area must be clean of contaminated soil. All contaminated soil and wash water from vehicle cleaning must be properly contained, collected, and disposed of.
- Contaminated soil disposal options:
- Re-use on-site (not grossly contaminated)
- Off-site reuse (Refer to DOH Guidance for Soil Stockpile Characterization and Evaluation of Imported and Exported Fill Material)
- Landfill disposal (check with landfill)

8.4 Considerations

- Dispose of contaminated soils at DOH-permitted facilities. Transfer contaminated soils via DOH-approved transporter.
- This manual does not explain environmental laws and regulations. Therefore, a contracting firm that is experienced in handling contaminated and hazardous materials should be consulted when dealing with contaminated soil.
- Site-specific conditions may require the use of additional personal protective equipment (PPE). Gloves and safety glasses must be worn when dealing with contaminated soil.
- A removal action may be conducted either as a stand-alone response action, or as an interim response action to be followed by further removal or remedial action at a later date. In addition, a removal action may result in long-term management of contamination on site. Each of these different types of removal actions has implications for site closure.

8.5 What to Inspect

- Are stockpiles of contaminated soil stored on an impermeable liner or device, surrounded by an impermeable lined berm, and completely covered with impermeable material?
- Are the BMP measures installed properly and maintained?
- Has the contaminated soil been properly tested, per DOH guidelines and requirements?
- Is the contaminated soil in contact with non-contaminated bare soil?
- Has the contaminated soil come into contact with rainwater?
- Is the contaminated soil stockpile isolated from other stockpiles?
- How long has the contaminated stockpile remained onsite?

8.6 Maintenance

- Prevent leaks and spills by implementing spill prevention and control practices and procedures. See section 10 Spill Prevention and Control for more information.
- Repair tears and rips to the impermeable berm and cover to ensure erosion is prevented.
- Damaged perimeter control devices must be repaired/replaced when the device is not functioning as designed.
- Repair/replace barriers that no longer prevent contaminated soil from coming into contact with bare soils.

9 Hazardous Materials and Waste Management

Image Source: State of Hawaii Department of Transportation, Highways Division, *Construction Best Management Practices Field Manual,* 2021.

9.1 Description

Practices and procedures to prevent hazardous material and waste from discharging into the storm drain system or adjacent waterbodies.

9.2 Applications

Handling and storing procedures on construction sites involving the following hazardous materials and waste:

9.3 Installation and Implementation

- It is preferred to store hazardous material under a covered facility. If a covered facility is not applicable, materials must be placed in secondary containment and covered with impermeable material to prevent storm water from coming in contact with materials.
- Secondary containment must be able to retain 100% of the volume of the largest container or 10% of the aggregate total of all the containers being stored within the secondary containment, whichever is greater.
- Metal containers shall be covered by an impermeable material so they are not exposed to rainwater, which can cause rusting and potential leaks.
- Secondary containment is required for storing hazardous materials and must be impervious to the materials stored.
- All spills, free products, or storm water captured in a secondary containment shall be immediately removed and properly disposed of.
- Incompatible materials, such as chlorine and ammonia, shall not be stored in the same temporary containment facility.
- Immediately clean up hazardous waste that spills or leaks on the ground. Do not hose down or bury spills.

- Maintain an ample supply of cleanup materials that are readily accessible for spills. All employees shall be informed of the location of the cleanup material and trained in their proper use.
- Hazardous waste must not accumulate on the ground.
- A licensed hazardous waste transporter shall dispose of hazardous waste at an authorized disposal facility. For more information regarding licensed transporters, refer to the State of Hawaii Department of Health (DOH) Hazardous Waste Section at website – http://health.hawaii.gov/shwb/hazwaste/.

9.4 Typical Hazardous Materials and Wastes

Typical hazardous materials and wastes from commercial construction and demolition (C&D) sites include:

- Oil-based paint, stains, and varnishes
- Acids and bases (e.g., muriatic acid, etc.)
- Ignitable waste (gasoline and diesel)
- Used batteries
- Waste vehicle lubricants (e.g., used motor oil, etc.)
- Latex paint with mercury
- Thinners and painting solvents
- Spent sand blast material from paint removal operations
- Weatherproofing/insulation solvents
- Finishing and flooring adhesives and sealants
- Mechanical/electrical waste
- Absorbent materials used to clean up spills
- All petroleum-based products
- Concrete curing/repair compounds and related concrete work products
- Contaminated rags
- Waste mercury or acrylic mercury paint
- Non-empty aerosol cans

9.5 Typical Hazardous Materials and Waste from Existing Structures

- Sandblasted material such as grit or chips containing lead, cadmium, or chromium- based paints
- Asbestos
- Polychlorinated Biphenyls (PCBs)
- Older transformers are a common source of PCBs.

9.6 Potentially Hazardous Waste Recognition

- Review product label and shipping papers.
- Identify key words such as flammable or ignitable (able to catch fire); carcinogenic (causes cancer); toxic or poisonous (injures or harms people or animals); and hazardous, danger, caustic or corrosive (burns through chemical action). Hawaii Administrative Rules (HAR) Title 11, Chapter 261 includes a list of hazardous waste and criteria. Review Safety Data Sheets (SDS) from the manufacturer and supplier of the product.

9.7 Hazardous Materials Handling and Storage

- Hazardous material should remain in the original container. Do not transfer material into another storing device unless it is considered waste.
- Keep the original product label on the container because it includes important safety and disposal information. Keep all SDS at a designated location. Inform all personnel of the location of the SDS.
- Restrict amount of herbicide and fertilizer prepared to the quantity necessary for the current application. Comply with the recommended usage instructions. Do not apply herbicides and fertilizers during or just before a rain event.
- The MCBH Hazardous Material Minimization (HAZMIN) Center was established to consolidate hazardous material base-wide and improve inventory control. Unused or excess reusable hazardous material can be turned into the HAZMIN Center and reissued to other MCBH work centers. The HAZMIN Center is located in Building 6407.

9.7.1 Disposal of Hazardous Waste from Construction Activities

- Ensure the site has adequate space for hazardous waste storage volume.
- Waste storage areas must be located away from drain inlets, watercourses, and moving vehicles.
- Minimize hazardous waste stored on-site.
- Waste shall not be mixed and drums used for waste shall not be overfilled.
- Label all waste containers with the type of waste being stored and the date of accumulation.
- Store hazardous waste separate from non- hazardous waste to prevent mixing in case of a spill. Do not mix wastes.
- Remove as much paint from brushes on painted surface. Do not clean or rinse water-based paint brushes in soil, streets, gutters, storm drains, or streams. Rinse from water-based paints shall be discharged into the sanitary sewer system. Filter and reuse solvents and thinners.
- Dispose of oil-based paints and residue as a hazardous waste.
- Place hazardous waste in a sealable container suitable for the material.
- Rainwater that mixes with hazardous waste due to spills or leaks shall be treated as hazardous waste and must be placed in drums.
- Dispose of container only after all of the product has been used in accordance with federal, state, and local regulations.
- Hazardous waste that will not be recycled/reused must be disposed of off-site within 90 days of being generated, or as directed by the Resident/Construction Engineer.

9.7.2 Waste Recycling and Disposal of Hazardous Waste

- Designate areas for collection of hazardous wastes.
- Store hazardous materials and wastes in covered containers and label according to applicable Resource Conservation and Recovery Act (RCRA) requirements.
- Provide secondary containment for hazardous waste containers to prevent contact with storm water runoff.
- Keep wastes separate to prevent chemical reactions which make recycling and disposal difficult.
- Recycle useful materials such as oil- or water-based paint.
- Do not dispose of toxic liquid wastes (solvents, used oils, and paints) or chemicals (additives, acids, and curing compounds) in dumpsters allocated for construction debris.
- Schedule periodic waste collection to prevent overflow of containers.
- Ensure collection, removal, and disposal of hazardous waste complies with regulations.
- Clean up spills immediately. Do not clean spills or surfaces by hosing the area down. Use the appropriate tools in the spill prevention kit to mitigate spills from leaching into the receiving waters or entering a storm drainage system.
- Eliminate the source of the spill to prevent a discharge or a continuation of an ongoing discharge.

9.8 Considerations

- Hazardous waste that cannot be reused or recycled shall be disposed of by a licensed hazardous waste hauler.
- Nothing in this section relieves the contractor’s responsibility of compliance with federal and state laws.

9.9 What to Inspect

- Is hazardous material in secondary containment and covered with an impermeable material?
- Are containers completely empty before being thrown into the waste bin?
- Is plastic cover ripped or torn?
- Are metal containers containing hazardous material rusting or leaking?
- Are original labels on all containers containing hazardous material.
- Are containers completely sealed?
- Is hazardous material in its original container?
- Is there evidence of leaks or spills on ground?
- Is hazardous waste being stored properly and regularly disposed of by a licensed transporter?
- Is there an ample supply of cleanup material readily accessible?
- Is hazardous waste being mixed?

9.10 Maintenance

- Schedule regular hazardous waste collection.
- Replace/repair secondary containment if there are signs of leaking.
- Replace plastic cover that has rips and tears.
- Immediately clean up spills of hazardous material and dispose of waste properly.
- Maintain areas where hazardous material and waste must be kept clean and well organized.

10 Spill Prevention and Control

10.1 Description

Proper spill prevention practices and procedures to aid in preventing spills and leaks from discharging into the storm drain system or adjacent waterbodies.

10.2 Applications

Construction projects involving the storage and use of chemicals or hazardous substances.

10.3 Installation And Implementation

- Maintain an ample supply of cleanup materials that are readily accessible for spills.
- Train employees on proper spill prevention and cleanup.
- Review spill response requirements at all applicable work sites.
- Install perimeter control, such as a dike or berm, around areas of concern to prevent spills or leaks from exiting the contained area.
- Eliminate the source of the spill to prevent a discharge or a furtherance of an ongoing discharge.

10.4 Cleanup Requirements and Procedures

- Immediately clean up leaks and spills.
- Use minimal water to clean up spills on paved surfaces. For small spills, use a rag. For general cleanup, use a damp mop. For larger spills, use absorbent materials.
- Properly dispose of materials used to clean up hazardous materials.
- Do not hose down or bury dry material spills.
- Ensure all personnel who are affected by the spill or will be responsible for its cleanup have all appropriate personal protective equipment (PPE).
- If possible, prevent or minimize the amount of the spill that may discharge into the drainage system.

10.4.1 Small Spills

- Small spills must be taken care of immediately by the first responder.
- Use a rag or any type of absorbent material to soak up the chemical spill. Do not hose down or bury the spill.
- Use a broom or shovel to clean up dry chemical spills.
- Prompt and effective response is the best way to prevent pollutants from coming into contact with storm water.
- Notify the Engineer.

10.4.2 Medium-Sized Spills

- Semi-significant/medium-sized spills can be cleaned up by the first responder with help from construction personnel on-site, but the spill will be too large to soak up with a rag.
- Isolate and contain the chemical spill with the appropriate BMPs and use materials in the spill prevention kit to immediately clean up the spill. Do not let the chemical liquid spread into drainage systems or state waterways.
- Immediately notify the Resident/Construction Engineer.

10.4.3 Significant Hazardous Spill Occurrence

Should a spill occur that cannot be cleaned up/handled by on site personnel see the following guide:

- Immediately notify the Resident/Construction Engineer followed by completing a written report of the incident.
- Immediately stop work in the vicinity of the spill. Remove and keep all non-essential employees away from the spill. Never subject yourself or other personnel to unreasonable risk of illness or injury.
- Call 911 immediately for spills that pose an immediate threat or danger to the public or property.

10.5 Reporting On-Site Spill Occurrence

- Where a leak, spill, or other release containing a hazardous substance or oil in an amount equal to or in excess of a reportable quantity established under either 40 CFR Part 110, 40 CFR Part 117, or 40 CFR Part 302 occurs during a 24-hour period, the permittee shall notify:
- U.S. Coast Guard National Response Center (NRC) at 800-424-8802,
- The State of Hawaii Department of Health, Clean Water Branch (CWB) during regular business hours,
- The Hawaii State Hospital Operator during non-business hours at 247-2191, and
- The CWB via email at cleanwaterbranch@doh.hawaii.gov during non-business hours as soon as the permittee has knowledge of the discharge.
- To report a spill to the State of Hawaii Department of Health Hazard Evaluation and Emergency Response (HEER) office outside of normal business hours, call (808) 236- 8200.
- It is expected that HEER is notified via telephone or in-person within 20 minutes of discovery of the release. A follow-up written notification form will also need to be completed and post-marked to HEER no later than 30 days after the initial discovery of a release. (The notification form can be found at https://health.hawaii.gov/heer/how-to-report-a-release-spill/).
- Immediately report spills that are 25 gallons or more of petroleum product, such as oil and gasoline, or any spill of any volume that is not contained and remediated within 72 hours to HEER.
- The contractor shall provide to the Engineer, within 7 calendar days of knowledge of the release, the circumstances leading to the release, and the date of the release. The Engineer shall provide this information the CWB.
- For any spills that discharge into the drain system or receiving state waters, immediately notify the CWB. Within 7 calendar days of discovering the occurrence of discharge into the drain system or receiving state waters, submit a discharge report of the following to the CWB:
- Any follow-up actions taken to review the design, installation, and maintenance of storm water controls, including the dates such actions occurred.
- A summary of storm water control modifications taken or to be taken, including a schedule of activities necessary to implement changes, and the date the modifications are completed or expected to be completed.
- Notice of whether Storm Water Pollution Prevention Plan (SWPPP) modifications are required as a result of the condition identified or corrective action.

10.6 Vehicle and Equipment Maintenance Activities

- Use off-site repair and maintenance shops as much as possible. These repair and maintenance shops are better equipped to handle vehicle fluids and spills properly.
- If on-site repair is necessary, use a designated area and/or secondary containment for on-site repair or maintenance activities. These areas shall be located away from drainage courses, inlets, and open waterbodies.
- Conduct regular inspections of on-site vehicles and equipment, including delivery trucks and employee vehicles, for leaks. Do not allow vehicles or equipment with leaks on-site.
- Secondary containment devices such as drop cloths and drain pans shall be used to catch leaks or spills while staging or changing fluids from vehicles or equipment.
- Drip pans can be used to catch potential leaks from idle vehicles and equipment.
- Place drip protection/pads with absorbent and impermeable materials under all vehicles and equipment with the potential to leak/spill when not in use.

- Use absorbent materials on small spills. Do not hose down or bury spills. Remove and properly dispose of cleanup materials.
- Minimize the movement of drums and containers filled with hazardous material.
- Immediately transfer used fluids to the appropriate waste or recycling containers. Avoid leaving drip pans and open containers with hazardous material on-site. Large- diameter funnels must be used to transfer liquids into drums.
- Drain excess oil from oil filters prior to disposal by placing filter in a funnel over a waste oil recycling drum. Recycle oil filters if this service is available.
- Store all cracked batteries in a non-leaking secondary container even if the acid appears to have drained out. Handle dropped batteries as cracked batteries until assured it is not leaking.

10.7 Vehicle and Equipment Fueling Activities

- Use off-site fueling stations as much as possible.
- If on-site fueling is necessary, use designated areas for required on-site fueling. Fueling areas shall be located away from drainage courses, inlets, and waterbodies.
- Avoid “topping off” of fuel tanks.
- Use secondary containment devices such as drain pans to catch spills or leaks while fueling.

10.8 Considerations

- Use of a private spill cleanup company may be necessary.
- This BMP only applies to spills caused on-site by the contractor, sub-contractors, and their vendors.
- Only respond to spills if you can do so safely.

10.9 What to Inspect

- Are drip pans and/or absorbent material placed under construction vehicles and equipment?
- Is there an ample amount of spill cleanup material on-site and easily accessible?
- Are spills/leaks evident around construction vehicles, equipment, stored materials, drain inlets or open bodies of water?
- Are there tears/rips in plastic sheeting or geotextile covers?
- Is plastic cover or other impermeable material overlapped and secured.
- Are perimeter controls in good condition and able to operate properly, in case of a spill?
- Are facilities away from waterbodies and drainage systems?
- Do facilities have sufficient spill containment areas?
- Are facilities located on impervious surfaces?
- Does sufficient containment volume exist?
- Do locations for storing hazardous materials and chemicals exist?
- Are hazardous material drums/containers properly labeled?
- Are hazardous and chemical materials/waste stored in secondary containment?
- Are hazardous and chemical materials/waste covered by an impermeable material?

10.10 Maintenance

- Update spill prevention and control plans and stock necessary cleanup materials as the chemicals used or stored on-site change.

- Locate an ample supply of materials for spill control and cleanup on-site near maintenance and material storage or unloading areas.
- Replace/repair impermeable material/plastic covers that have rips or tears.
- Realign perimeter control devices, when necessary, to ensure proper function.
- Immediately clean up spills.

Table 10-1 Emergency Spill Contacts

Emergency Spill Contacts	Phone Numbers
Federal Fire Department (FedFire) *Honolulu Fire Department; Honolulu Police Departments (call will be transferred to FedFire)*	(808) 471-7117 911
State of Hawaii Department of Health, Hazard Evaluation and Emergency Response Office	(808) 586-4249 or (808) 236-8200 during non-business hours
State of Hawaii Department of Health, Clean Water Branch – Oahu	(808) 586-4309 or (808) 247-2191 during non-business hours
Honolulu Local Emergency Planning Committee	(808) 723-8960
U.S. Coast Guard	(808) 842-2970
Hawaii National Guard	(808) 733-4228
State of Hawaii Department of Health, Solid Waste & Hazardous Waste Branch	(808) 586-4226
U.S. Coast Guard National Response Center	(800) 424-8802

11 Vehicle and Equipment Cleaning

Image Source: State of Hawaii Department of Transportation, Highways Division, *Construction Best Management Practices Field Manual,* 2021.

11.1 Description

Practices and procedures to prevent the discharge of pollutants from equipment and vehicle cleaning activities from entering the drainage system or adjacent waterbodies.

11.2 Applications

Construction or maintenance activities involving cleaning of vehicles and equipment.

11.3 Installation and Implementation

- Use off-site vehicle wash racks or commercial washing facilities when practical. Off-site cleaning facilities may be better equipped to properly handle and dispose of wash waters. Use of MCBH wash racks and oil/water separators is prohibited unless permission is granted.
- If on-site cleaning is necessary, designate a paved surface and bermed wash area for cleaning activities. The wash area may be sloped to facilitate collection of wash water and evaporative drying.
- Water must be contained in the bermed wash area.
- Use a positive shutoff valve when cleaning vehicles and equipment to minimize water usage.
- Removal of sediment or soil from vehicles and equipment, except for contaminated media, can be done on pervious areas as long as they are cleaned through dry cleanup measures (e.g., tire sweeping, vacuuming, etc.) only.
- Do not allow wash water to enter the storm drainage system or open waterbodies.
- Minimize the amount of water being used to clean vehicles and equipment.
- Vehicle and equipment cleaning using soaps, solvents, or detergents are only allowed in an impervious area where water can be captured and either treated (i.e., oil/water separator) or disposed of properly (off-site).

- Properly store soaps, detergents, and solvents. See section 2 Material Storage and Handling for more information.
- Only use phosphate-free, biodegradable soaps.
- Do not discharge wash water directly into the storm drainage system or open waterbodies.
- Minimize water use to avoid the need for erosion and sediment controls for the wash area.
- If vehicles and equipment are cleaned off in the field, ensure waste is collected and disposed of properly.
- Do not store hazardous material in the wash area.
- Cover the wash area when it is not in use to prevent contact with storm water.
- Train employees on pollution prevention measures.
- Do not wash personal vehicles on-site.
- Steam cleaning shall not occur in uncontained areas. Significant pollutant concentrations may be generated from steam cleaning.
- Remove the wash area and stabilize disturbed areas once the project is complete.

11.4 What to Inspect

- Are pollution prevention controls (i.e., berms, sumps, oil/water separators, etc.) properly functioning?
- Are soaps, detergents, and solvents properly stored?
- Are there traces of soap and solvents in pervious wash areas?
- Is there a presence of pollutants (i.e., concrete, oils, etc.) observed in the wash area?
- Are all wash areas located in impervious areas?
- Is wash water being captured?
- Is there evidence of prohibited discharge?

11.5 Maintenance

- Is there evidence of prohibited discharge?
- Any sediment or other potential pollutants removed from vehicles and equipment during cleaning activities should be managed and/or disposed of appropriately.
- Any sediment or other potential pollutants removed from vehicles and equipment during cleaning activities should be managed and/or disposed of appropriately.
- Repair/replace pollution prevention controls (i.e., berm, sump, etc.) if not operating per design.
- Wash water containing soaps, detergents, and solvents should be routinely disposed of.

12 Vehicle and Equipment Maintenance

Image Source: State of Hawaii Department of Transportation, Highways Division, *Construction Best Management Practices Field Manual,* 2021.

12.1 Description

Practices and procedures to prevent or reduce the discharge of pollutants from vehicle and equipment maintenance. When vehicles and equipment need maintenance, the best option is to perform these activities off-site to avoid spills and leaks on-site. If on-site maintenance activities are necessary, they should be conducted in an approved designated area.

12.2 Applications

- Construction sites with vehicle and equipment maintenance areas.
- Construction sites where vehicle and equipment are stored when not in use.
- Construction sites where vehicle and equipment are idle, but intermittent use is occurring.

12.3 Installation and Implementation

- Prevent excessive accumulation of oil and grease by keeping vehicles and equipment clean.
- Use off-site repair and maintenance facilities where practical.
- Repair oil and fluid leaks immediately.
- Place a drip pan or drip pad under the vehicle in the most probable location of a spill while necessary repairs are being conducted.
- Designate a leveled maintenance area away from drainage courses and inlets to prevent pollutants from entering the drainage system.
- Store vehicles and equipment that need maintenance on a layer of geotextile filter fabric on top of 10 mil plastic sheeting before conducting maintenance activities. Perimeter controls must be placed along the perimeter of the maintenance area and underneath the impermeable material, to create a berm able to contain any possible spills and/or leaks.
- Have an ample supply of readily accessible spill cleanup materials on-site, at all times.

- Use absorbent materials on small spills. Promptly remove and properly dispose of absorbent materials. Do not hose down or bury small spills. See section 10 Spill Prevention and Control for more information.
- Check vehicles and equipment regularly for leaks. Leaking vehicles and equipment shall not be allowed on-site.
- Keep maintenance areas clean and orderly to minimize oil and grease buildup.
- Segregate and recycle wastes from vehicle/equipment Maintenance activities such as used oil, oil filters, greases, hydraulic and transmission fluids, cleaning solutions, antifreeze, and automotive batteries.
- Oil, fuels, fluids and lubricants should be recycled whenever possible. Do not dump on the ground or pour into storm drains.
- Properly dispose of wastes generated by vehicle/equipment maintenance activities.
- Provide employee training on proper maintenance and spill cleanup practices and procedures.

12.4 Considerations

- Off-site Maintenance facility may not be easily accessible.
- Vehicle and equipment Maintenance should only be used when off-site maintenance is impractical.

12.5 What to Inspect

- Are leaks and/or spills coming from vehicles and/or equipment?
- Is there evidence of oil, grease, fluids, lubricants, etc. on the ground?
- Are spill cleanup materials available on-site?
- Are vehicles and equipment properly stored on a layer of geotextile filter fabric on top of 10 mil plastic sheeting?
- Are berms properly aligned along the perimeter of the maintenance area?
- Is the maintenance area on leveled ground away from drainage courses?
- Are maintenance areas kept clean and orderly?
- Are vehicles being taken off-site for maintenance?

12.6 Maintenance

- Maintain an adequate supply of spill cleanup materials on-site.
- Remove used oils, antifreeze, grease, lubricants, etc. routinely.
- Do not allow used oils to accumulate on-site.
- Maintain adequate supplies of spill cleanup materials on-site.
- Leaking vehicles and equipment shall be repaired promptly.
- Leaks and spills shall be cleaned up immediately.
- Maintain impermeable material/plastic sheeting, geotextile filter fabric, and perimeter control to ensure proper effectiveness.

13 Vehicle and Equipment Refueling

Image Source: State of Hawaii Department of Transportation, Highways Division, *Construction Best Management Practices Field Manual,* 2021.

13.1 Description

Practices and procedures to prevent or reduce the discharge of pollutants to storm water from vehicle and equipment fuel leaks or spills.

13.2 Applications

Construction or Maintenance activities involving fueling of vehicles or equipment.

13.3 Installation and Implementation

- Use off-site fueling sites when practical. Off-site fueling sites may be better equipped to service and handle spills due to multiple vehicles or pieces of equipment.
- If on-site fueling is necessary, locate designated fuel areas away from storm water run-on and runoff, and locate fueling areas at least 50 feet, or as far as practicable, from downstream drainage facilities and watercourses to prevent contamination of storm water. If impracticable, consider implementing additional BMPs or secondary containment when fueling.
- Avoid “topping-off” of fuel tanks.
- Drip pans or absorbent pads shall be used to absorb leaks or spills during fueling.
- Fueling must be performed on a leveled area.
- Protect fueling areas with berms and dikes to prevent run-on, runoff, and to contain spills.
- Have absorbent spill cleanup materials located in fueling areas.
- Use absorbent materials on small spills. Do not hose down or bury the spill. Promptly remove and properly dispose the absorbent materials. See section 10 Spill Prevention and Control for more information.

- Clean up spills or contaminated surfaces immediately, using dry cleanup measures where possible, and eliminate the source of the spill to prevent a discharge or a furtherance of an ongoing discharge. Store hazardous materials and fluids under cover and in secondary containment. See section 9 Hazardous Materials and Waste Management for more information.
- Minimize mobile fueling of construction equipment by transporting equipment to designated areas for fueling.
- Train employees on proper fueling and cleanup procedures.
- Put fuel pods and hoses in secondary containment to prevent hoses/nozzles from leaking.
- Store diesel fuel, oil, hydraulic fluid, or other petroleum products or other chemicals in watertight containers and provide cover or secondary containment. If container is metal, cover is required.
- Containers shall be properly labeled.
- Comply with federal and state requirements regarding stationary, above ground storage tanks.
- Comply with the Spill Prevention Control Countermeasures (SPCC) requirements in 40 CFR 112 and section 311 of the Clean Water Act (CWA).

13.4 What to Inspect

- Is there evidence of fuel spills or leaks on the ground?
- Are any vehicles and/or equipment leaking fuel?
- Are hoses/nozzles in secondary containment?
- Are berms and absorbent pads well-maintained and effective?
- Is there an ample amount of spill cleanup materials on-site?
- Are hazardous fluids properly stored?

13.5 Maintenance

- Keep an ample supply of materials for fuel spill control and cleanup located on-site near fueling areas available at all times.
- Properly dispose of absorbent pads, hazardous material and contaminated soil.

14 Scheduling

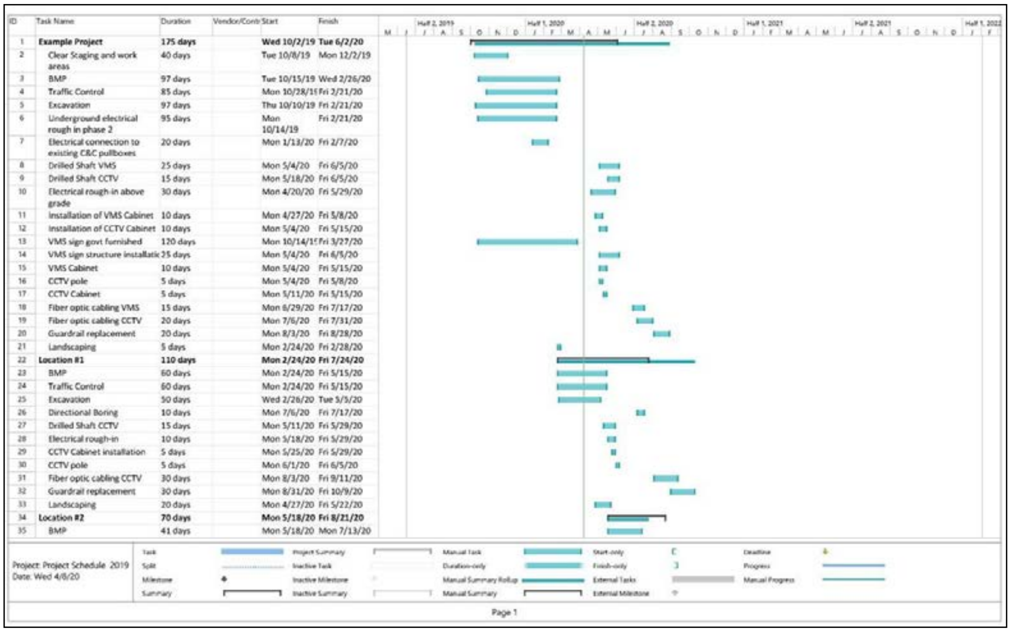


Image Source: State of Hawaii Department of Transportation, Highways Division, *Construction Best Management Practices Field Manual,* 2021.

14.1 Description

Developing a schedule that includes sequencing of construction activities with the implementation of construction site BMPs to reduce the amount and duration of soil exposed to erosion by wind, rain, runoff, and vehicle tracking as well as ensure construction activities and control practices are performed in accordance with the planned schedule.

14.2 Applications

The Storm Water Pollution Prevention Plan (SWPPP) must include a description of the intended sequence of construction activities, including a schedule of the estimated start dates and the duration of the activity, for the following activities:

14.3 Installation and Implementation

- Installation of storm water control measures, and when they will be operational, including an explanation of the sequence and schedule for installation of storm water control measures.
- Commencement and duration of earth-disturbing activities, including clearing and grubbing, mass grading, site preparation (i.e., excavating, cutting, and filling), final grading, and creation of soil and vegetation stockpiles requiring stabilization.
- Cessation, temporarily or permanently, of construction activities on-site, or in designated portions of the site.
- The dates for final or temporary stabilization of areas of exposed soil.

- Removal of temporary storm water conveyances/channels and other storm water control measures, removal of construction equipment and vehicles, and cessation of any pollutant generating activities.
- Minimize the area of active construction. Limit maximum surface area of earth material exposed at any time to 300,000 square feet. Do not expose or disturb surface area of earth material until BMP measures are installed and accepted in writing by the Engineer.
- Inspect the site prior to initiation of ground-disturbing activities to verify BMPs, as required by the approved BMP Plan and/or other documents, have been installed correctly per the manufacturer's specifications and in the correct location.
- Date and sign the Site-Specific BMP Plan (SSBMP) or SWPPP, keeping an approved copy of the plan on-site or at an accessible location so that it can be made available at the time of an on-site inspection or upon request by the Engineer, per 2005 Hawaii Standard Specifications for Road and Bridge Construction, Special Provisions Section 209.03(A)(h).
- After the SSBMP Plan or SWPPP is accepted in writing, schedule a water pollution, dust, and erosion control meeting with the Engineer a minimum of 7 calendar days prior to the start work date.
- Minimize work involving soil-disturbing activities during rain and forecasted events.
- Schedule disturbed areas to be stabilized prior to additional grading of other areas.
- Minimize duration of time trenches remain open. Schedule trenching activities to ensure trenches are closed prior to excavating new trenches.
- Periodically review the schedule for upcoming tasks. Prior to any new activity or new area opened for work, review the SWPPP to ensure BMP measures are appropriate to the site and/or means and methods of work. If not, a SWPPP amendment should be proposed by the Contractor and certified by MCBH prior to any change to the SWPPP. An approved/signed amendment must be in place prior to the start of work.
- Immediately initiate stabilization of exposed soil areas upon completion of earth- disturbing activities for areas permanently or temporarily ceased on any portion of the site. Stabilization must be completed no later than 14 calendar days after the initiation of stabilization measures.
- All BMPs must be in place at the start of construction unless stipulated otherwise in the SWPPP.
- Refer to Hawaii Administrative Rules (HAR) Title 11, Chapter 55, Appendix C or project specifications for information on inspection and maintenance scheduling requirements.

14.4 Considerations

- Adherence to schedule.

14.5 What to Inspect

- Does the schedule reflect actual construction activities?
- Is there new work starting on-site?
- Does the SWPPP need to be amended?
- Are amendments approved prior to the start of work?

14.6 Maintenance

- Monitor progress of construction activities relative to construction schedule. Implement remedial measures if progress deviates from schedule.
- Revise the schedule, as necessary.

15 Location of Potential Sources of Sediment

15.1 Description

Practices and procedures to identify potential sources of sediment to reduce sediment discharge from construction sites.

15.2 Applications

Any potential source of sediment on all projects.

15.3 Installation and Implementation

- Configure construction site to ensure vegetated areas buffer haul roads, stockpiles, and adjacent waterbodies. Vegetation provides an effective means of reducing sediment and pollutants discharged off-site.
- Place stockpiles away from waterways, drains and low spots.
- Direct off-site runoff away from bare ground.
- Maintain vegetation in swales and natural drainage ways.
- Designate naturally level areas for parking and equipment staging during construction.
- Inspect the construction site during or immediately following a rain event to identify the storm water's natural path to locate where sediment leaves the site. This will assist in Storm Water Pollution Prevention Plan (SWPPP) design and BMP placement.

15.4 What to Inspect

- Where are the exposed areas on the construction site?
- Is there evidence of run-on and/or runoff?

15.5 Maintenance

- Install, repair, or replace BMPs to cover exposed areas or redirect off-site runoff.

16 Staging Area

16.1 Description

An approved location, designated in the Storm Water Pollution Prevention Plan (SWPPP), where construction equipment, vehicles, materials, and other construction-related materials are stored. Staging areas can be a significant point source for pollution, so BMPs are necessary to ensure no contaminated storm water exits the site.

16.2 Applications

Sites that include flat areas with ample space for equipment and materials to be stored, paved areas, and/or land already disturbed within project boundaries.

16.3 Installation and Implementation

- Staging areas must be defined in the plans of the project's SWPPP and approved prior to using the area. The approved locations and layout/detailing of the staging area must be included in the SWPPP or included by amendment process. In the case of roadside staging areas for paving equipment, a generic layout may be provided for multiple roadsides identified locations. The approved staging area plan shall designate the locations of the equipment/material to be stored within the staging area, as well as, any BMPs to be implemented for the staging area.
- BMPs must be in place prior to using the staging area.
- Drip pans can be used to catch potential leaks from idle vehicles and equipment.
- Place drip protection/pads with absorbent and impermeable materials under all vehicles and equipment with the potential to leak/spill when not in use.
- Perimeter controls must be placed along the perimeter of the staging area and underneath the impermeable material, to create a berm able to contain any possible spills and/or leaks.

- Perimeter control devices installed along the perimeter of the staging area diverts storm water run-on and runoff. For sloping areas where storm water can run onto the project site, consider installing a diversion to prevent off-site storm water from entering the project site.
- Do not store materials or equipment on perimeter controls. Material and equipment must be stored away from the perimeter controls to allow access for inspection and maintenance of the controls.
- Consider phasing construction staging areas to minimize the duration of exposed soil. Dust control must be used on all exposed soils or any construction activity generating soil. See section 19 Dust Control for more information.
- When a phase of the project is complete and the staging area for the site is no longer required, immediately initiate stabilization at the disturbed areas. Once the area is deemed stabilized, the BMP devices can be removed. See section EC-12 Seeding and Planting for more information.
- Install a stabilized construction entrance/exit at the entrance of the staging area to prevent tracking onto adjacent paved roads and sidewalks. See section 49 Stabilized Construction Entrance/Exit for more information.
- All storm drain inlets that may intercept sediment-laden runoff from staging areas must be protected. See section 39 Storm Drain Inlet Protection for more information.
- Place drip pans or drop cloths under vehicles and equipment to absorb spills or leaks. See sections 10 Spill Prevention and Control and 12 Vehicle and Equipment Maintenance for more information.
- Store paving equipment and vehicles that are idle in a designated staging area on a layer of geotextile filter fabric on top of 10 mil plastic sheeting. Place drip pads/pans under paving equipment to contain leaks and spills. Use drip protection under asphalt hopper and roller assembly. See section 20 Paving Operations for more information.
- Ensure that construction vehicles and equipment are not stored under tree drip lines or on top of existing tree roots. See section 17 Preservation of Existing Vegetation for more information.
- Metal (galvanized and ungalvanized) and rebar must be stored off of the ground on proper dunnage, pallet, or similar material and covered with 10 mil plastic sheeting to prevent material from coming into contact with storm water. See section 2 Material Storage and Handling for more information.
- Locate stockpiles a minimum of 50 feet, or as far as practicable, from concentrated runoff, drainage systems, or open waterbodies. Stockpiles must be entirely covered with an impermeable material and surrounded by a perimeter control device installed around the base of the pile. Staging area perimeter protection cannot be used as perimeter protection for stock/spoil piles. See section 3 Stockpile Management for more information.
- Sanitary facilities must be secured and located away from drainage systems and open waterbodies. See section 7 Sanitary Waste Management for more information.
- Waste bins must be covered by the end of each work day and emptied when they reach two-thirds capacity. See section 6 Solid Waste Management for more information.
- Hazardous materials and waste such as: creosote pipes, waste asphalt, contaminated soil and transite pipes must be properly stored and covered. See section 9 Hazardous Materials and Waste Management for more information.
- Concrete wash areas must be lined with an impervious material and disposed of in compliance with federal, state, and local standards. See section4 Concrete Wash and Waste Management for more information.
- For shared staging areas, responsibilities must be clearly defined. If the staging area is divided by well-defined boundaries for each project, each area can be covered under its respective Notice

of General Permit Coverage (NGPC)/National Pollutant Discharge Elimination System (NPDES) permit. If a staging area is share in its entirety, a separate NGPC/NPDES permit may be obtained for the staging area.

- All areas within a shared staging area must be accounted for and there should be no overlapping areas for which responsibilities are shared by more than 1 contractor. Consult with the Engineer for review/approval.
- Off-site staging areas need to be included in the project's SWPPP and are subject to NPDES requirements.

16.4 Considerations

- Staging area may have a limited amount of space to store vehicles and equipment due to local traffic and existing vegetation.
- Storm water run-on from a point source upgradient becomes the contractor's responsibility to manage if it enters the staging area.
- Contractor may need to implement dust control measures if staging area is not stabilized.
- Runoff flows increase on paved and graded areas. Special attention will be needed during heavier rain events. Staging areas need to be secured prior to a severe storm event.
- Staging areas must be approved before storing materials and equipment in the area.
- Additional staging areas added to the project, outside of the project limits, may require a separate NPDES permit.

Commonly used BMPs which include:

- Silt fences
- Compost filter socks or berms
- Berms

16.5 What to Inspect

- Are approved staging areas identified in the project's SWPPP?
- Are BMPs installed prior to vehicles and equipment being stored in the staging area?
- Are there leaks and/or spills evident around construction vehicles, equipment or materials?
- Is the correct size aggregate being used in staging area for construction roads and entrances?
- Are waste bins covered when not in use?
- Area portable toilets secured to prevent tipping or knocking over?
- Is rebar and steel under cover/covered with 10 mil plastic sheeting and properly stored on dunnage, pallet, or similar material?
- Are construction vehicles stored under existing tree drip lines or on top of tree roots?
- Are vehicles tracking sediment onto public roads?
- Are there traces of run-on or runoff around the perimeter of the staging area?
- Has the contractor-initiated stabilization in disturbed areas no longer required for staging?

16.6 Maintenance

- Immediately clean up spills using dry cleanup methods where possible, and dispose of used materials properly.
- Clean up leaks and spills with an absorbent material. Do not clean surfaces or spills by hosing the area down.
- Provide an ample supply of readily available spill cleanup materials.
- Repair/replace plastic sheeting and/or geotextile filter fabric when torn or ripped.

- Replenish surface and construction entrance aggregate periodically.
- Repair/replace perimeter control devices that are tampered with and not functioning as designed.
- Place drip pans under idle construction vehicles.
- Adjust, repair, and/or reinstall inlet protection devices that are damaged, out of position, or not fully functional according to manufacturer's specifications.
- Regularly dispose of garbage and waste material.
- Amend the project's SWPPP when additional staging areas are needed or existing staging areas are no longer required.

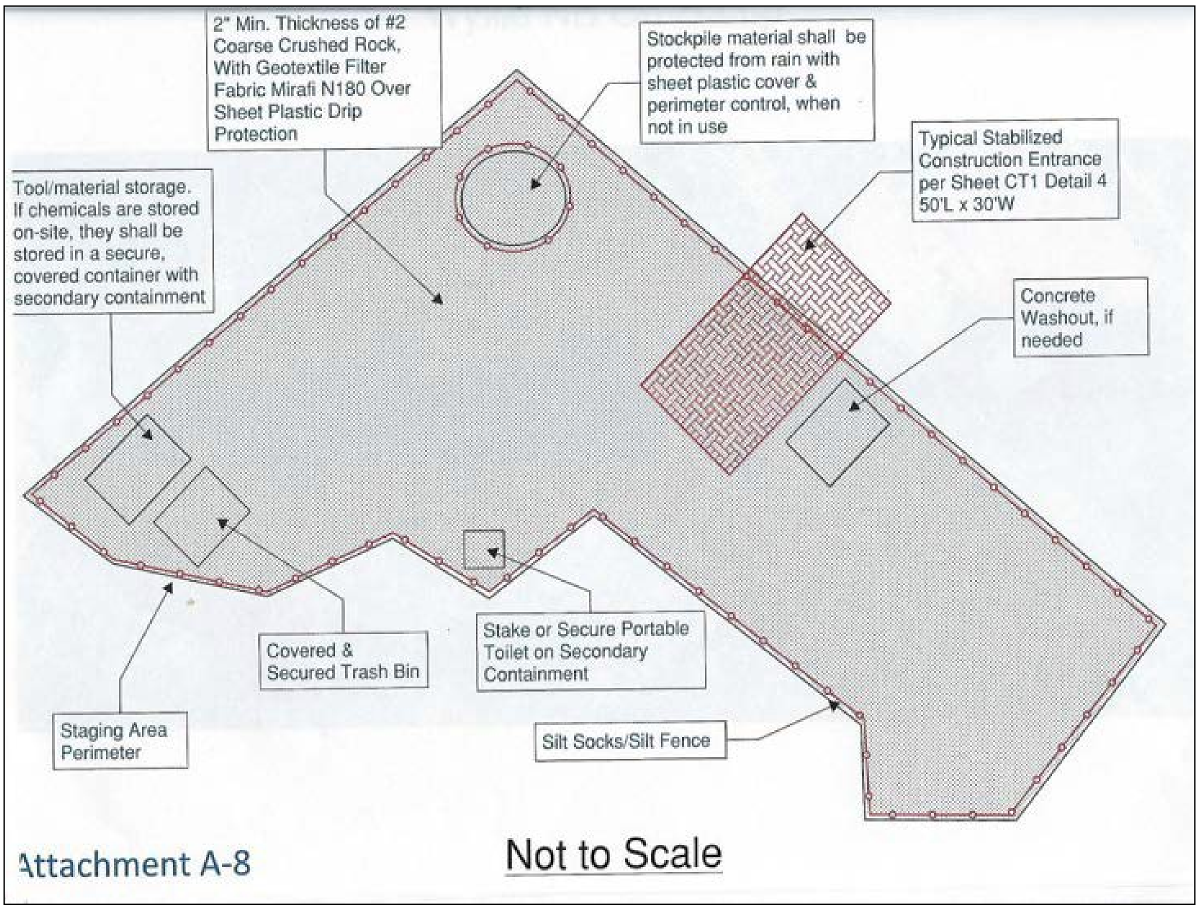


Figure 16-1. Example of a typical staging area

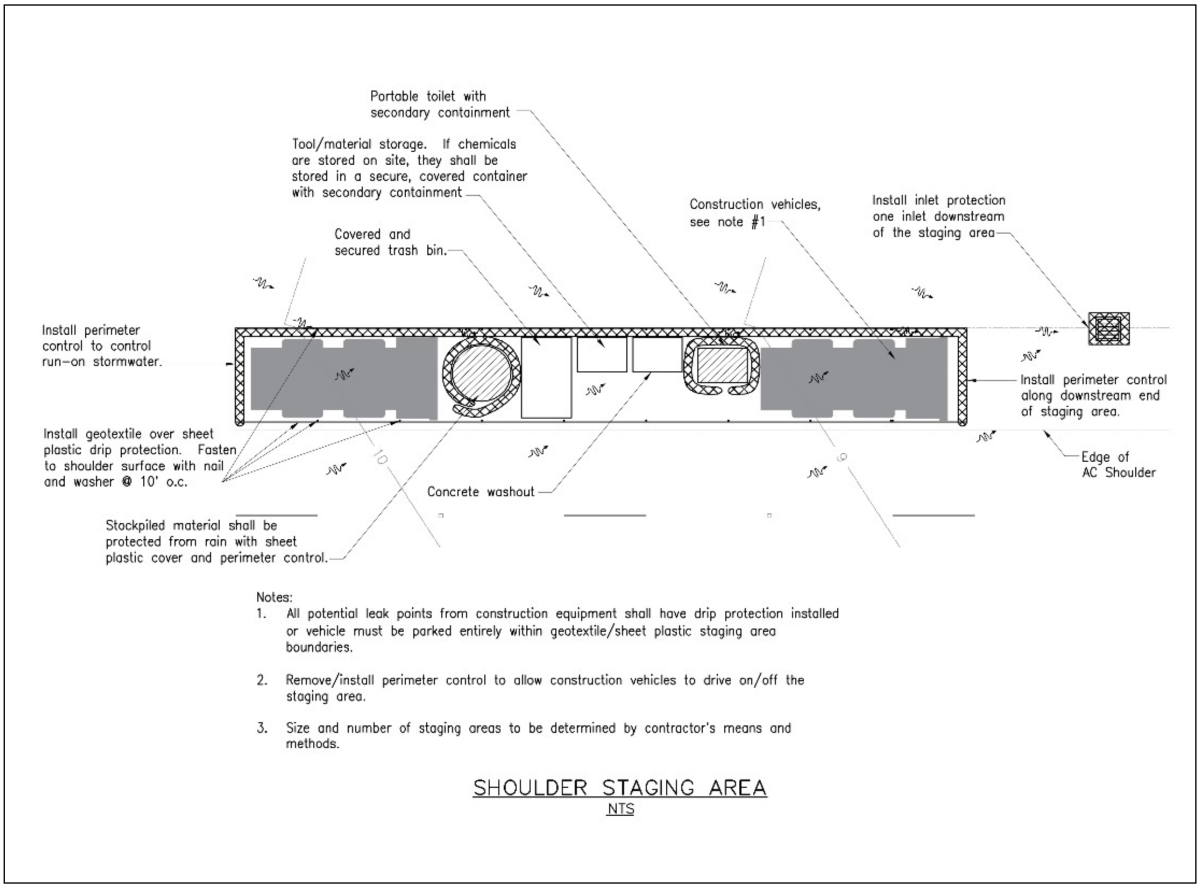


Figure 16-2. Example of a typical shoulder staging area

17 Preservation of Existing Vegetation

Image Source: State of Hawaii Department of Transportation, Highways Division, *Construction Best Management Practices Field Manual,* 2021.

17.1 Description

Practices and procedures to provide erosion and sediment control to preserve existing vegetation on a site with future land-disturbing activities.

17.2 Applications

- Areas on-site where no construction activity occurs or will occur at a later date.
- Areas where the existing vegetation should be preserved such as steep slopes, watercourses, and building sites in wooded areas.
- Natural resources or environmental protection areas requiring preservation by federal, state, and local governments such as wetlands and marshes.

17.3 Installation and Implementation

- Incorporate existing vegetation into landscaping plans when possible. Proper care of this vegetation before and after construction is required.
- Consider aesthetic and environmental values, tree/plant health, life span, sun exposure limitations, and space requirements when determining which vegetation to preserve.
- Avoid using vegetation which competes with the existing vegetation when preparing the landscaping plans
- Phase construction activity to minimize the total amount of disturbed area to preserve existing vegetation.
- Clearly identify land to be disturbed to avoid damaging existing vegetation that is not meant to be disturbed.
- Establish setback distances defined by devices such as berms, fencing, or signs. Setback distances are based on vegetation species, location, size, and age. Consider the type of

construction activity in the vicinity of the vegetation. Construction activities are not permitted within the setback.
- Consult with a licensed arborist to develop a plan if it is not possible, due to construction requirements, to provide a setback to the limits of the root system (tree drip line). This plan should include setback limits and other mitigation methods to provide protection for the subject tree or other vegetation.
- Do not park equipment on tree roots or near endangered species of vegetation.
- Consult with the appropriate agencies to approve any setbacks established if endangered species of vegetation are found within or adjacent to the project limits.

17.3.1 Methods for Protecting Existing Vegetation

Methods include but are not limited to the following:

- Mark, flag, or fence areas of vegetation to be preserved.
- Designate limits of root system (tree drip line).
- Identify tree wells and retaining walls which are large enough to protect the root system.
- Limit grading to within 1 foot of the tree drip lines, if grading under the tree is necessary.
- Locate construction traffic routes, spoil piles, etc. away from existing vegetation.

17.4 Considerations

- Requires advanced planning and coordination among the owner/developer, contractor, and designer.
- Limited use if final site design does not incorporate existing vegetation.
- Diverse site topography may result in additional expenses to satisfy vegetation preservation and the grading required for the site improvements.
- Limited space for construction activity makes it difficult to preserve existing vegetation.

17.5 What to Inspect

- Are any endangered species identified within the projects limits and protected prior to the start of construction?
- Is there construction equipment, materials, personal vehicles or spoil piles stored on a tree's root system?
- Is construction activity occurring within vegetation setback limits?

17.6 Maintenance

- Immediately repair or replace damaged protection measures.
- Damage to existing trees should be examined and attended to by an arborist.

18 Dewatering Operations

18.1 Description

Practices and procedures to prevent or reduce the discharge of pollutants in non-storm water and accumulated precipitation from areas requiring dewatering activities so construction activity may proceed.

18.2 Applications

Construction sites requiring the removal of non-storm water to create a dry work area or to remove the accumulation of non-storm water from a work area.

18.3 Installation and Implementation

- Dewatering non-storm water into storm drains and open bodies of water is prohibited without approval from the State of Hawaii Department of Health, Clean Water Branch (CWB).
- The Engineer must submit a complete Notice of Intent for Hawaii Administrative Rules (HAR) Title 11, Chapter 55, Appendix G, NPDES General Permit Coverage Authorizing Discharges Associated with Construction Activity Dewatering, no later than 30 days before the proposed starting date of the discharge or 30 days before the expiration date of the applicable notice of general permit coverage.
- The permittee shall comply with all requirements from HAR Title 11, Chapter 55, Appendix G and Appendix A, Standard General Permit Conditions. In case of conflict between the conditions listed in Appendix G and Appendix A, the more stringent conditions shall apply.

18.4 Types of Pollutants from Dewatering Discharges

Due to the nature of dewatering operations, high sediment content is common. Toxics and petroleum products, however, are not prevalent unless heavy industrial activities or groundwater contamination occurred in the surrounding area.

- Sediment
- Toxics and petroleum products

18.4.1 Sediment Removal

- Use sediment controls such as a sediment trap to remove sediment from dewatering discharges. See section 42 Sediment Trap for more information.
- Apply filtration methods to remove sediment from the sediment trap. These include:
- Sump pit combined with a perforated/slit standpipe, which is wrapped in geotextile filter fabric. As water collects in the pit, stones placed around the standpipe filter the water, which collects in the pit prior to being pumped out. Due to the wrapped standpipe, an increased suction inlet area may be required to prevent clogging and unacceptable pump operation.
- Floating suction hose, which allows cleaner surface water to be pumped out.

18.4.2 Toxics and Petroleum Products Removal

- Areas of known or suspected groundwater contamination shall be tested by a certified laboratory for known or suspected pollutants using methods detailed in 40 CFR Part 136. The laboratory shall enforce a quality assurance/quality control measures program. Comply with the dewatering requirements in subsection 209.03 (D) of the 2005 Hawaii Standard Specifications for Road and Bridge Construction, Standard Specifications & Special Provisions Section, as in effect.
- Discharges to the sanitary sewer system shall receive approval from the State of Hawaii Department of Health (DOH) and the owner of the wastewater system. Additional testing and disposal requirements may be necessary.
- Testing of the dewatering effluent should be completed and the results identified prior to discharging to a receiving waterbody or storm drainage system.

18.5 Considerations

- Contaminated water may be an indication of contaminated soil. See section 8 Contaminated Soil Management for more information.

18.6 What to Inspect

- Is contaminated water evident in excavated areas?
- Is discoloration, oily sheen, or odor observed?

18.7 Maintenance

- Remove and properly dispose of sediment collected in sediment control devices.

19 Dust Control

Image Source: State of Hawaii Department of Transportation, Highways Division, *Construction Best Management Practices Field Manual,* 2021.

19.1 Description

Measures to minimize erosion and reduce the amount of dust generated by construction activities.

19.2 Applications

Dust control shall be used on all exposed soils or any construction activity generating dust. Dust control shall apply to the following:

- Clearing, grubbing, and grading
- Construction vehicular travel on unpaved roads
- Drilling and blasting
- Soil and debris stockpiles
- Excavation and handling of soil or aggregate from excavators, loaders, and backhoes
- Unstable soil areas
- Sawcutting, jack hammering and grinding
- Sifting operations

19.3 Installation and Implementation

- Minimize exposed areas through the schedule of construction activities.
- Anticipate the prevailing wind direction to determine BMP placement in order to minimize the amount of dust generated.
- Identify and stabilize primary entrances/exits prior to commencement of construction to prevent tracking and dust generation.
- Direct construction vehicular traffic to stabilized roadways.
- Maintain dust screens until permanent ground cover has been established.

- Use methods to mitigate or eliminate the amount of dust produced, such as spraying water from water truck, using misters, chemical dust controlling agents, or combination thereof; hydromulching, keeping soil moist, and grassing.
- Light spray of water or use of vacuum can minimize dust when drilling, sawcutting, jack hammering or grinding.
- Do not overspray water for dust control purposes, which will result in runoff from the area.
- Prevent water from wetting vehicles, pedestrians, and existing pavements.
- Washing down of debris or dirt into drainage, sewage systems, or state waters is not allowed.
- Chemicals used as soil stabilizers for dust control must be approved by the Engineer before use.
- Large areas and stockpiles can be hydromulched with a tackifier (with or without seed) to prevent wind erosion/dust. See section 3 Stockpile Management for more information.
- Geobinders with surfactants may be used to minimize water consumption.
- Cover exposed surface of materials completely with tarpaulin or similar device when transporting aggregate, soil, excavated material or material that may be sources of fugitive dust.
- Utilize vegetation, mulching, sprinkling, and stone/gravel layering to quickly stabilize exposed soil.
- Comply with the 2005 Hawaii Standard Specifications for Road and Bridge Construction, Standard Specifications & Special Provisions Sections 209 and 619, as in effect.

19.4 Considerations

- Daily or more frequent **APPLICATIONS** of water may be necessary since water is a short- term dust preventative.
- Erosion may result from overwatering.
- Oil may not be used for dust control since the oil may discharge into a drainageway or seep into soil.
- Some dust suppression chemicals may cause soil to become water repellent resulting in increased runoff.

19.5 What to Inspect

- Is there evidence of off-site runoff?
- Is dust being suppressed during construction activity?
- Are dust screens properly maintained?
- Is dust from the construction site impeding public safety or health?
- Is water being over-sprayed?

19.6 Maintenance

- Install, repair, or replace BMPs to cover bare ground or redirect off-site runoff.
- Apply water as conditions require.
- Repair water truck leaks immediately.

20 Paving Operations

Image Source: State of Hawaii Department of Transportation, Highways Division, *Construction Best Management Practices Field Manual,* 2021.

20.1 Description

Practices and procedures to prevent or reduce the discharge of pollutants into the storm drain system or adjacent waterbodies from paving, sawcutting, or grinding activities.

20.2 Applications

- Paving operations and activities including the following:
- Paving equipment storage
- Asphalt cleaning
- Removal of existing asphalt or concrete
- Concrete, asphalt, seal coat, tack coat, or slurry applications
- Recycling of pavement

20.3 Installation and Implementation

- Limit paving operations during wet weather when possible.
- Store materials for paving activities away from concentrated runoff.
- Place drip pans/drip pads under paving equipment to contain leaks and spills. Clean up spills with absorbent materials immediately.
- Drip protection must be placed under entire asphalt hopper, roller assemblies and spray arms that are not being used. Place a layer of geotextile filter fabric on top of 10 mil plastic sheeting to create a berm able to contain any possible spills and/or leaks.
- Ensure full inlet and scupper protection per the Storm Water Pollution Prevention Plan (SWPPP) during application of tack coat, seal coat, slurry seal, and fog seal.
- Do not remove inlet protection until paving and striping operations are complete.
- Clean any asphalt from inlet protection immediately following paving to allow water to drain.

- Remove saw cuts or boring slurry from site by vacuuming.
- Provide storm drain inlet protection during sawcutting to prevent slurry from entering the storm drains. See section 39 Storm Drain Inlet Protection for more information.
- Use asphalt emulsions as prime coat when possible.
- Clean asphalt-coated equipment off-site.
- Clean up asphalt millings by the end of the working day and properly dispose of or recycle, as necessary.
- See section 4 Concrete Wash and Waste Management for activities involving Portland cement concrete (PCC).
- Keep an ample supply of cleanup material in case of a spill or leak. See section 10 Spill Prevention and Control for more information.

20.4 Asphalt Concrete Paving

- Properly dispose of old or spilled asphalt. Collect and remove broken asphalt. Recycle asphalt when possible.
- If waste asphalt (new) must be stored, rather than removed, it must be stored on an impervious material, covered with impervious material such as 10 mil plastic sheeting and have full perimeter control. It cannot be stored in dirt or rubble spoil piles.
- Sweep excess sand and gravel to prevent discharge into the storm drainage system or adjacent water bodies.
- Comply with storm water permitting requirements for industrial activities if paving requires an on-site mixing plant.

20.5 Considerations

- Restrict paving operations during wet weather to prevent contact between storm water and paving materials.
- Limited space to stage paving equipment.

20.6 What to Inspect

- Is there drip protection under paving equipment?
- Is inlet protection installed and well-maintained?
- Is there drip protection under paving equipment not being used?
- Are asphalt millings cleaned up at the end of the work day?
- Is paving equipment properly staged within project limits?
- Is there evidence of saw cut slurry entering the storm drain?

20.7 Maintenance

- Keep an ample supply of drip pans and absorbent materials on-site.
- Regularly maintain paving equipment to minimize potential leaks or drips.

21 Structure Construction and Painting

Image Source: State of Hawaii Department of Transportation, Highways Division, *Construction Best Management Practices Field Manual,* 2021.

21.1 Description

Practices and procedures to reduce or prevent the discharge of pollutants from structure construction and painting activities into the storm drain system or adjacent waterbodies. Pollutants include solvents, paints, paint and varnish removers, finishing residues, spent thinners, soap cleaners, kerosene, asphalt and concrete materials, epoxy compounds, adhesive residues, and old asbestos insulation.

21.2 Applications

Construction or maintenance activities involving painting or structure repair and construction.

21.3 Installation and Implementation

- Maintain a clean and orderly work site.
- Use recycled or less hazardous products if practical.
- Comply with local air quality and Occupational Safety and Health Administration (OSHA) regulations during painting activities.
- Properly store paints, solvents, and epoxy compounds in appropriate secondary containment and under impermeable cover.
- Properly store and dispose waste materials generated from painting and structure repair and construction activities.
- Avoid drift by enclosing or covering painting operations.
- Collect residue from sand blasting or scraping operations on a drop cloth. Dispose of this residue properly.
- Use appropriate application equipment to minimize overspray.
- Minimize inadvertent disposal of residual paints and other liquids by ensuring nearby storm drains are clearly marked.

- Inspect the storm drain system in the immediate work area and remove dirt or debris upon completion of the activity.
- Clean painting equipment used with water-based paints in a sink connected to the sanitary sewer system.
- Mix paints in a covered and contained area, when possible, to minimize adverse impacts from spills.
- Immediately clean up spills.
- Testing of waste generated from painting may be required to determine if any hazardous waste are present per the contract documents. See section 6 Solid Waste Management and 9 Hazardous Materials and Waste Management for more information on proper disposal of solid and hazardous waste.
- Comply with applicable laws and regulations for recycling/disposal of residual paints, solvents, lumber, and other materials.
- Treat paint chips containing lead or tributyl tin as hazardous waste. See section 9 Hazardous Materials and Waste Management for more information.
- Properly dispose of material from sand blasting activities. Consider chips and dust from marine paints or paints containing lead as hazardous waste. Sweep paint chips and dust from non-hazardous dry stripping and sand blasting and dispose of as solid waste. See sections 6 Solid Waste Management and 9 Hazardous Materials and Waste Management for more information on proper disposal of solid and hazardous waste.

21.4 Considerations

- Availability of recycled or less hazardous products may be limited.
- Hazardous waste which may not be recycled or reused shall be disposed of by a licensed hazardous waste transporter.
- Storm water quality protection measures shall comply with OSHA and air quality regulations

21.5 What to Inspect

- Is there evidence of paint entering the storm drain system or adjacent waterbodies?
- Are paints and solvents properly stored?
- Is paint and construction repair waste disposed of properly?
- Are inlet protection devices installed at inlets in the direct vicinity of structure construction and painting?
- Are inlet protection devices properly installed and maintained?
- Are any leaks or spills evident where painting materials are being stored?

21.6 Maintenance

- Keep materials and equipment for proper housekeeping and disposal practices readily available.

22 Topsoil Management

22.1 Description

Practices and procedures to manage the reuse of native topsoil and other selected materials during revegetation activities. Salvaging, stockpiling, and reapplication of native topsoil is integral to successful revegetation efforts, especially for the reestablishment of native vegetation.

22.2 Applications

Reestablishment of areas where vegetation with native plant species is desirable. Appropriate for sensitive habitat areas, floodplains, wetlands, and stream banks.

22.3 Installation and Implementation

- Preserve native topsoil where practicable.
- Conduct a site-specific soil survey of the area prior to soil-disturbing activities to assess the location, depth, and amount of soils suitable for salvaging.
- Salvage and stockpile all suitable topsoil and other material for future use during revegetation of the area. See section 3 Stockpile Management for more information.
- Carefully remove shrubs suitable for revegetation and store with the roots covered with mulch or loose soil.
- Apply topsoil or growth medium directly to disturbed areas and seed once construction activity is complete. Water area daily until the area is stabilized. However, avoid over water which can create runoff and erosion.
- Restrict vehicle/equipment use in areas where vegetative stabilization will occur to avoid soil compaction.

- Soil replacement depths are determined by factors such as soil depth prior to disturbance, type of vegetation, and physical and/or chemical properties of the material to be covered. A deeper soil layer is required for soils with poor physical and chemical properties. Testing (nutrients, pH, and toxicity factors) of replacement soils and material to be covered shall be completed prior to reapplication.

22.4 Topsoil Management Considerations

- Quality and amount of native topsoil or growth medium.
- Area of surface disturbance to which topsoil or growth medium will be applied and the required depth of application.
- Methodology for salvaging topsoil or growth medium.
- Stockpile location, duration of storage, and required erosion control measures to protect stockpile.
- Feasibility of direct application of salvaged soils.
- Availability of other growth media to supplement topsoil reclamation.

22.5 Considerations

- Stockpiles may limit the area available for construction activity.
- Runoff from stockpiles may adversely impact water quality.
- Topsoil is contaminated prior to the start of construction activity.
- Avoid placement of topsoil prior to expected rain events.

22.6 What to Inspect

- Is topsoil effectively stockpiled?
- Are BMPs maintained to effectively prevent contact with storm water?
- Is dust originating from stockpiles?

22.7 Maintenance

- Adequately water plantings until they are established.
- Replace/repair damaged stockpile cover, as needed.
- Ensure that the plastic cover is in contact with the ground around the entire pile and properly anchored.
- Replace/repair damaged temporary perimeter sediment barrier.
- After the stockpile has been removed, revegetate the disturbed area, if applicable. Reapply temporary stabilization (i.e., hydromulch, tackifier, etc.), if needed.

23 Temporary Stream Crossing

Image Source: State of Hawaii Department of Transportation, Highways Division, *Construction Best Management Practices Field Manual,* 2021.

23.1 Description

Temporary structures placed across a waterway to provide vehicular access while minimizing or reducing erosion and sedimentation.

23.2 Applications

- Streams or dry channels subject to frequent vehicular crossings.
- Detour roads on bridge replacement projects.

23.3 Installation and Implementation

- Design should be by a registered civil and/or structural engineer knowledgeable in stream flows, soil strength, and hydraulic and construction loading requirements.
- Provide stability in crossing and adjacent areas to withstand design flow. Choose a crossing site where erosion potential is low.
- Consider construction during dry periods to minimize disturbance and flow levels.
- Install means to trap sediment downstream of crossing.
- All materials used in construction should be clean, washed material with a cellular confinement system to prevent downstream contamination.
- Stabilize construction roadways (See section Construction Road and Parking Lot Stabilization Stabilization), adjacent work areas, and stream bottoms against erosion.

- Any temporary artificial obstruction within flowing water should be built with material that does not introduce sediment or silt into the watercourse.
- Temporary waterbody crossing should be built to minimize scour.
- Minimize disturbance to existing vegetation and immediately restabilize the waterway once construction activity is completed.
- Equipment operations that will encroach on the waterbody within the project must be free of grease, oil, fuel, and residues.
- Construction in waterbodies may require temporary stream diversion and dewatering.
- Restrain from excavating in waterways or embedding crossings.
- Minimize or eliminate the need to cross streams by using alternative routes, as applicable.
- Vehicle and equipment maintenance, fueling, storage and cleaning should not be conducted on temporary bridges.

23.3.1 Culverts

- Applicable to perennial or intermittent streams.
- Effective in controlling erosion.

23.3.2 Fords

- Applicable to arid areas during the dry season.
- Low maintenance.
- Provides minimal erosion and sediment control.

23.3.3 Bridges

- Applicable to high velocity, steep gradient conditions.
- Where temporary restrictions in the channel are not allowed.

23.4 Considerations

- Duration of construction projects shall not exceed 1 year.
- Not applicable for general traffic use.
- Additional BMPs will be necessary during installation and removal to minimize soil disturbance.
- Stream Channel Alteration Permit (Refer to Hawaii Administrative Rules (HAR) Title 13, Chapter 169-50, Protection of Instream Users).
- Waterways will be disturbed during installation and removal.
- For construction traffic only. Not intended for public use.
- Bridges generally cost more than alternative methods, but cause the least amount of disturbance to existing conditions.

Subject to permit requirements of the U.S. Army Corps of Engineers (USACE) and State of Hawaii Department of Land and Natural Resources (DLNR):

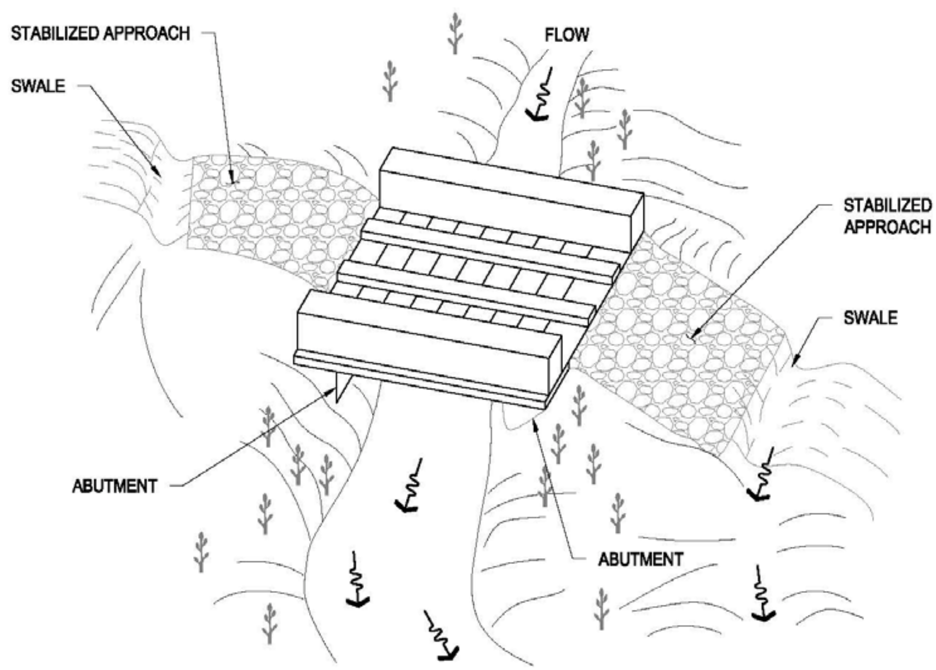
- USACE 404 Permits
- State of Hawaii Department of Health, Clean Water Branch (CWB) 401 Certifications
- DLNR, Commission on Water Resource Management (CWRM)

23.5 What to Inspect

- Are channels blocked from stream crossing during rain events?
- Is there debris accumulated in culverts, behind fords, or under bridges?
- Is there evidence of abutment erosion, rip-rap displacement, channel scour, piping in soil and/or structural degradation?
- What is the turbidity of water downstream?

23.6 Maintenance

- Remove silt and debris periodically.
- Replenish aggregate from culvert inlets and outlets as necessary.
- Remove temporary crossings once no longer needed.



SURFACE FLOW OF ROAD DIVERTED BY SWALE AND/OR DIKE.

TYPICAL BRIDGE CROSSING
NOT TO SCALE

NOTE:
1. IF THE BRIDGE DECK CONTAINS OPENINGS, A CATCHMENT SYSTEM SHALL BE UTILIZED TO PREVENT SEDIMENT FROM FALLING TO THE SURFACE BELOW.

Figure 23-1. Example of a typical bridge crossing

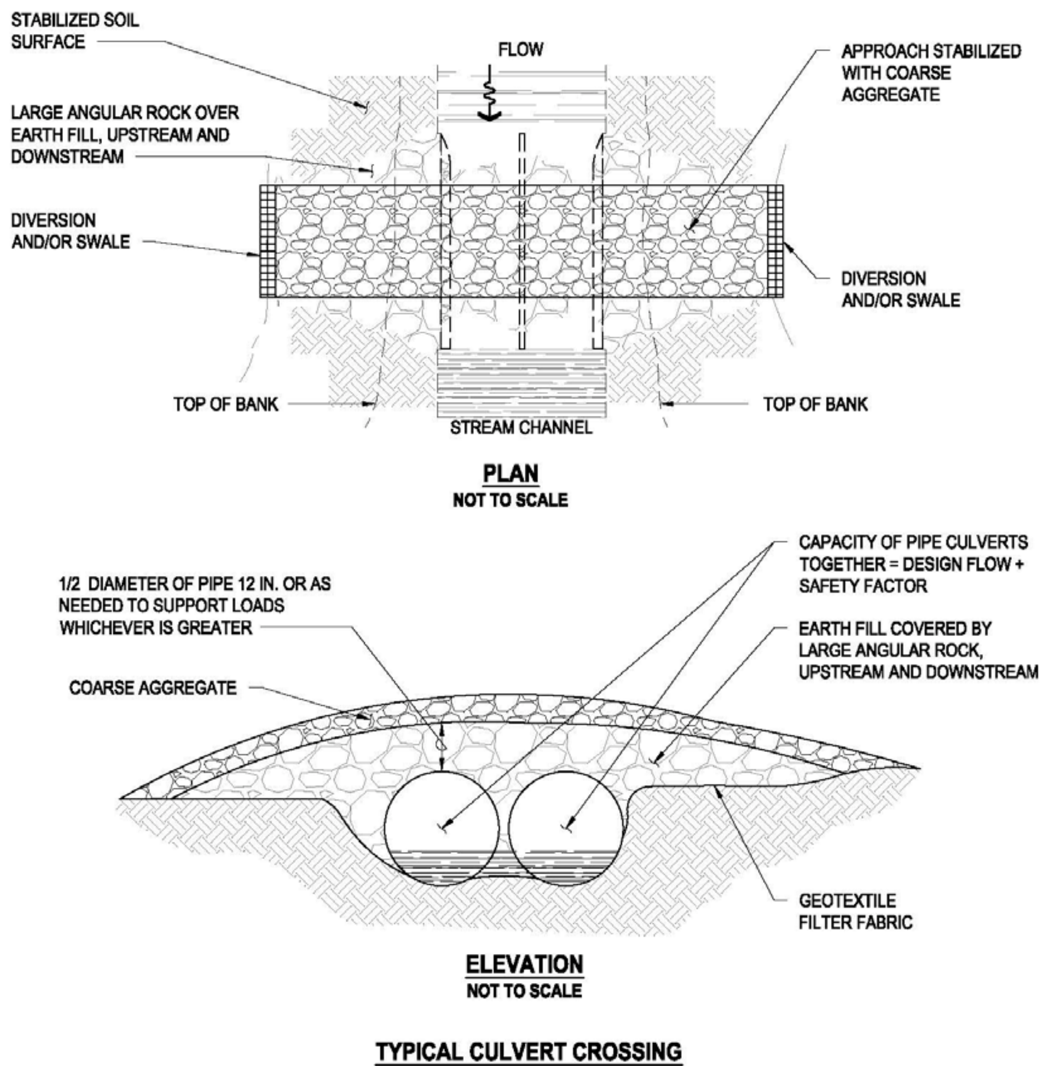


Figure 23-2. Example of a typical culvert crossing

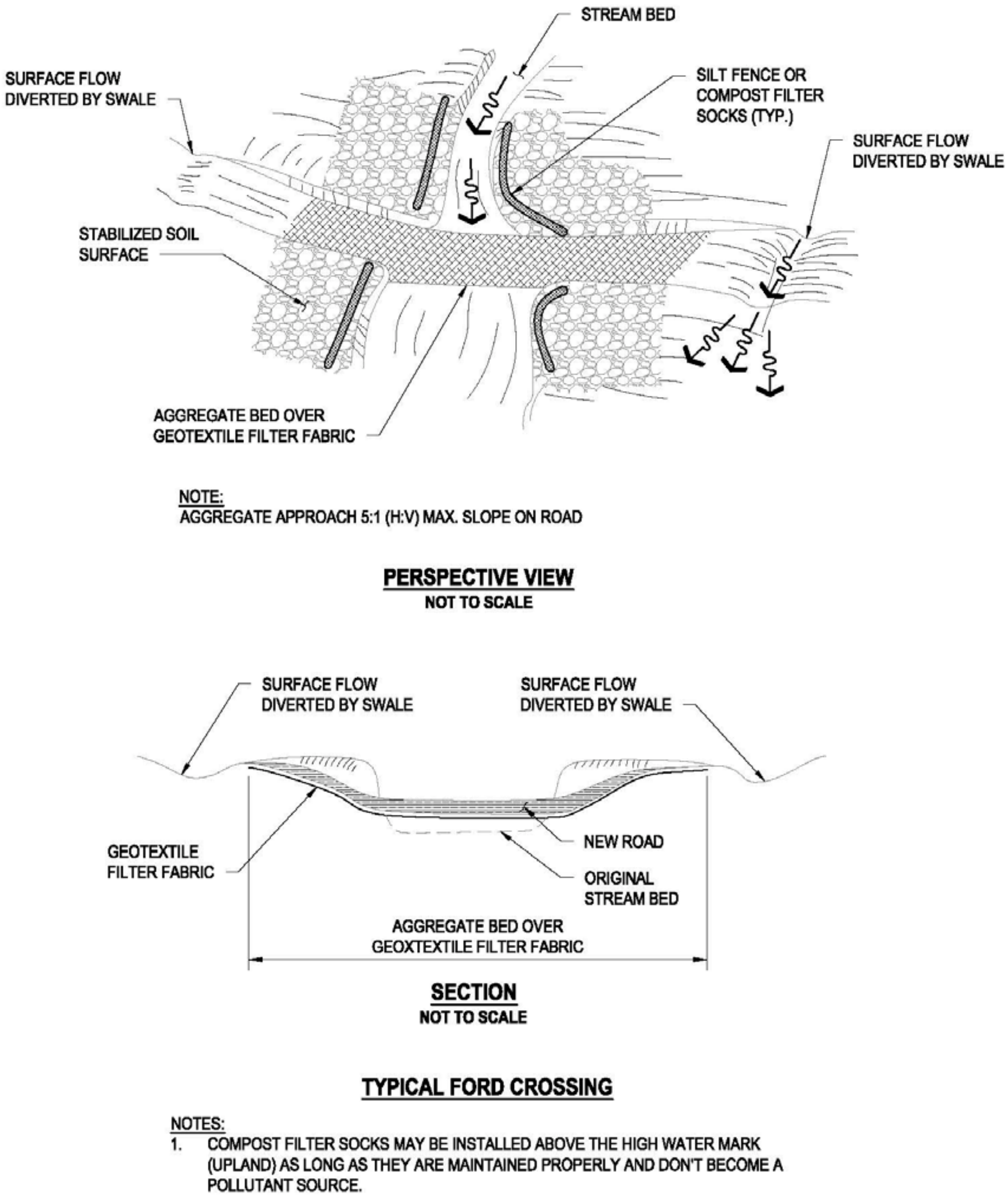


Figure 23-3. Example of a typical ford crossing

24 Flared Culvert End Section

Image Source: State of Hawaii Department of Transportation, Highways Division, *Construction Best Management Practices Field Manual,* 2021.

24.1 Description

Devices placed at the inlet or outlet of pipes and channels to enhance hydraulic operation while minimizing scour and erosion.

24.2 Applications

Flared culvert end sections may be placed at inlets and outlets of slope drains and culverts.

24.3 Installation and Implementation

- Construct on level ground where possible. Flatter slopes reduce the potential of erosion and scour.
- Supplement with additional outlet protection devices.
- Protect the transition to the flared end section at inlets to prevent scouring.
- Extend additional rip-rap downstream of outlet to reach stable conditions and minimize scouring.
- Ensure geotextile filter fabric is installed under rip-rap.
- All disturbed areas must be immediately stabilized with native vegetation once construction is complete.
- Monitor accumulation of debris and sediment and remove within 60 days of notification. Immediately clean culverts located where Class AA or Class 1 waters or highway safety may be adversely affected. Refer to Hawaii Administrative Rules (HAR) Title 11, Chapter 54 for state waters classification.

24.4 Considerations

- Limited use as an erosion control measure. Primarily used to increase hydraulic efficiency.
- Improperly designed culverts could result in erosion, scouring, or ponding.
- Pipes can clog if they are not adequately protected from litter.
- Pipe outlets may cause critical levels of erosion if devices are not installed to dissipate the velocity of storm water flow.
- Additional erosion control BMPs will need to be added to slope drains on slopes greater than 10%, due to highly erosive velocities.
- The contractor may need to temporarily remove rip-rap to repair/replace geotextile filter fabric under rip-rap.

24.5 What to Inspect

- Is flared culvert end section installed correctly, per manufacturer's specifications?
- Is there evidence of scour around and beneath flared culvert end sections?
- Is there a non-storm water discharge observed from pipes?
- Is ponding occurring in traffic lanes or private property?
- Is geotextile filter fabric installed under rip-rap?

24.6 Maintenance

- Remove accumulated sediment from inlets, outlets, and rip-rap.
- Refresh rip-rap that has been dislodged.
- Add additional BMPs if erosion and scouring are observed.
- Repair geotextile filter fabric that has rips and/or tears.
- Remove temporary BMPs when drainage area is stabilized and construction is complete.

25 Run-on Diversion

Image Source: State of Hawaii Department of Transportation, Highways Division, *Construction Best Management Practices Field Manual,* 2021.

25.1 Description

Devices that intercept, divert, and convey off-site surface run-on around or through the project site to prevent site erosion. Run-on (storm water entering the site) diversion devices include dikes, swales, compost filter berms, sandbags, check dams and slope drains.

25.2 Applications

- Along paved surfaces to intercept runoff.
- Upslope from project site to prevent erosion of disturbed areas located on-site.
- Downslope of project site to convey runoff to a sediment control device such as a sediment trap or sediment basin.
- Around material storage areas, maintenance and fueling areas, or areas with runoff containing contaminants or pollutants.
- Below steep grades to intercept concentrated runoff.
- Diversion devices can provide protection from storm water runoff when located around adjacent property and buildings.
- Devices can be used to divert run-on storm water through the construction site without eroding disturbed areas.

25.3 Installation and Implementation

- A designer should provide flow rate calculations to the Engineer for approval before installation to ensure the size of the diversion device is effective.
- Use a layered approach to divert storm water run-on and minimize sediment from leaving the site.
- Select flow velocity based on evaluation of potential risks due to erosion, overtopping, flow backup, washout, and drainage flow patterns of the project.

- Immediately stabilize earth dikes and swales.
- See section 27 Earth Dikes, Swales, and Ditches for more information. See section 29 Slope Drains and Subsurface Drains for more information.

25.4 Considerations

- Run-on diversion devices do not remove sediment from runoff.
- If run-on cannot be diverted around the construction site it will need to be directed through the project without causing erosion.
- Ditches and swales may require check dams or lining to prevent erosion.
- All diversions shall have stabilized outlets that will convey concentrated runoff without erosion.
- Once storm water run-on enters a construction site, it becomes the contractor's responsibility to effectively manage.
- Not all devices are effective individually. A layered approach is more appropriate.

25.5 What to Inspect

- Is there evidence of sediment buildup at inlets?
- Is there erosion at channel embankments, washouts, or ditch beds?
- Is there evidence of erosion or scour at outlets and/or perimeter of site?
- Are there signs of storm water run-on entering the construction site?
- Is sediment accumulating at perimeter control devices?
- Are additional BMPs needed to prevent run-on?

25.6 Maintenance

- Remove accumulated sediment and debris and repair damages as necessary.
- Temporary diversions shall be completely removed and area stabilized at the completion of construction.
- Repair/replace BMP devices that are not properly performing.

26 Slope Roughening, Terracing, and Rounding

Image Source: State of Hawaii Department of Transportation, Highways Division, *Construction Best Management Practices Field Manual,* 2021.

26.1 Description

Methods of slope grading to reduce potential erosion by decreasing runoff velocities, trapping sediment, shortening slope length, and increasing infiltration into the soil.

26.2 Applications

- Areas where seeding, planting, and mulching erosion control measures may be enhanced by roughening of the soil surface. Graded areas with smooth, hard surfaces.
- Areas requiring terracing to shorten the slope length.
- Locations where vegetation is not adequate erosion protection and is affecting construction activity.

26.2.1 Cut Slope Roughening

- Cut slopes steeper than 3:1 (H:V) shall use stair-step grading or furrows.
- Use stair-step grading on soft soils that may be ripped by a bulldozer. Stair-step grading is particularly suitable for slopes consisting of soft rock with some subsoil.
- The vertical cut shall not exceed 2 feet in soft materials and 3 feet in rocky material.
- The vertical cut must be shorter than the horizontal cut. The typical stair width is 1 to 2 feet.
- Slope the horizontal cut towards the face of the slope, so storm water drains towards the slope and allows time for sediment to settle.
- Create ridges and depressions along the slope contours using machinery.

26.2.2 Fill Slope Roughening

- Fill slopes steeper than 3:1 (H:V) shall be placed in lifts not exceeding 9 inches. Each lift shall be properly compacted.
- Slope faces shall consist of 4 to 6 inches of loose and uncompacted soil.
- Grooving or tracking shall be used to roughen slope faces as necessary.
- Apply seed, fertilizer, and mulch. Track or punch in the mulch. See section 36 Mulching 34 Seeding and Planting for additional information.
- The final slope face shall not be bladed or scraped.

26.2.3 Cuts, Fills, and Graded Areas

- Slopes that will be maintained by mowing shall be no steeper than 3:1 (H:V).
- Create shallow grooves by normal tilling, disking, harrowing, or use of a cultivator- seeder. Final pass of tillage shall be along the contour. Spacing between grooves shall be 10 inches or less. Groove depth shall be a minimum of 1 inch.

26.2.4 Roughening with Tracked Machinery

- Roughening with tracked machinery is only applicable to soils with a sandy texture. Other types of soil may be over-compacted by tracked machinery.
- Application is best for slope grades 3:1 (H:V) or flatter.
- Leave horizontal depressions in the soil by operating tracked machinery up and down the slope. During the final grading operation, do not back blade.
- Minimize the number of passes the tracked machinery makes to avoid over-compaction.
- Roughened areas shall be seeded and mulched for optimum seed germination and growth.

26.2.5 Terracing

- Slope grades of 5:1 (H:V) shall include terraces or benches when slope heights exceed 30 feet. Steeper slope or highly erosive soil conditions may warrant terraces or benches for slope heights of 15 feet or higher.
- Runoff collected along terraces and benches shall be routed to lined diversion ditches. Install lined diversion ditches at the intersection of the terrace and slope.
- Vertical cut shall be between 1 and 2 feet. Horizontal cut must be longer than the vertical cut and slope inward towards the face of the slope. Benching width is usually made wide enough for mowing equipment.

26.2.6 ROUNDING

- All slopes shall be rounded with no sharp breaks in plan or profile.

26.3 Considerations

- Since terracing is permanent, design and approval shall be under the direction of a licensed, qualified engineer.
- Design of terraces shall provide adequate drainage and stabilized outlets.
- Roughening may result in increased grading costs and sloughing in soil.
- Stair-step grading are for cut slopes only and may not be applicable to sandy, steep, or shallow soils.

- During intense rainfall events, roughening may not be an effective temporary erosion control measure.
- Surface roughening must not be used to keep an area under the qualification of “actively working” to prolong the stabilization deadline.
- Slopes need to be regraded and reseeded if rills and gullies form, creating channels for runoff.
- Excessive compaction with tracking machinery can inhibit vegetation growth and cause higher runoff rates.
- What to Inspect
- Is there evidence of rills and gullies on seeded and planted slopes?
- Does the slope have adequate vegetation coverage?
- Are proper cuts and methods being used to reduce erosion?

26.4 Maintenance

- Regrade and reseed areas where rills or gullies have formed.
- Revegetate bare areas on slope.

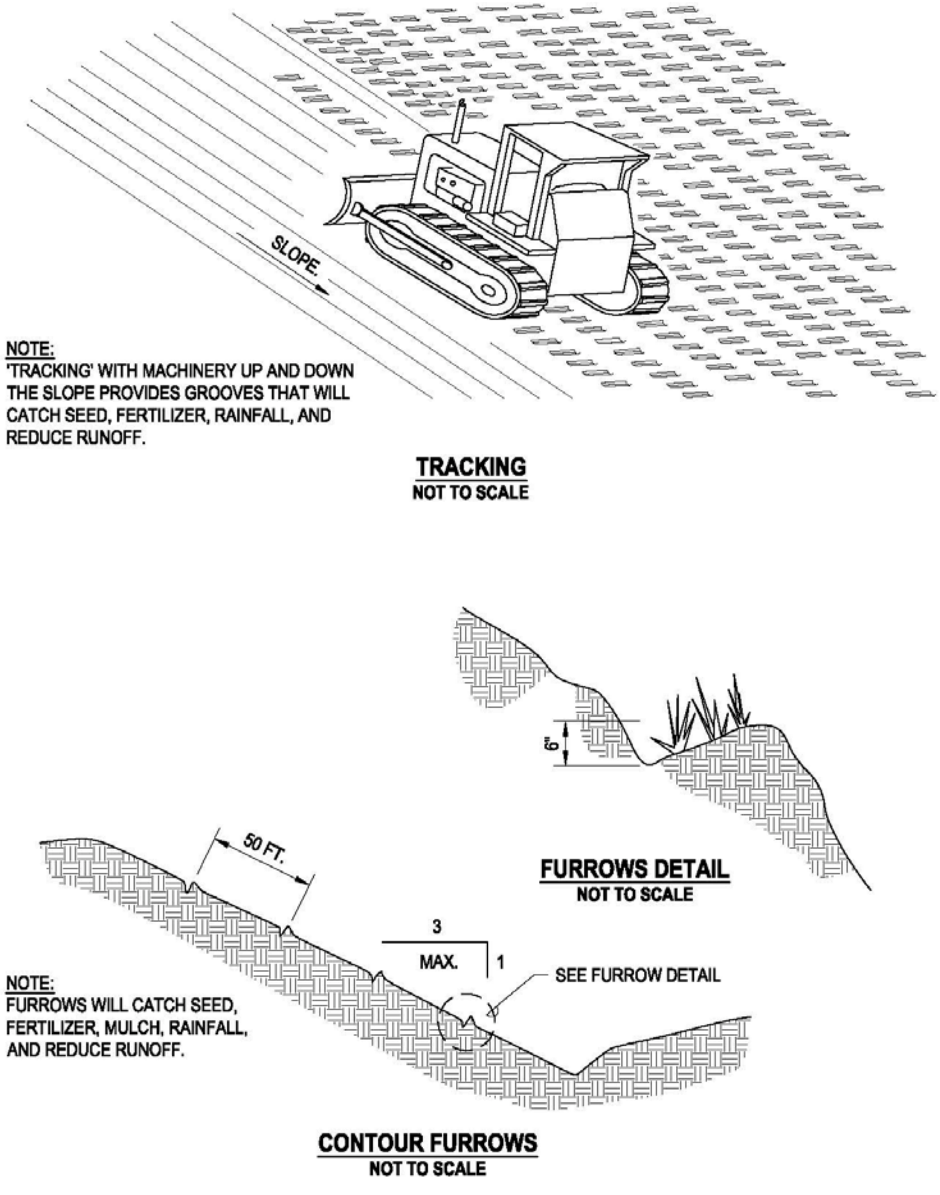


Figure 26-1. Example of contour furrows

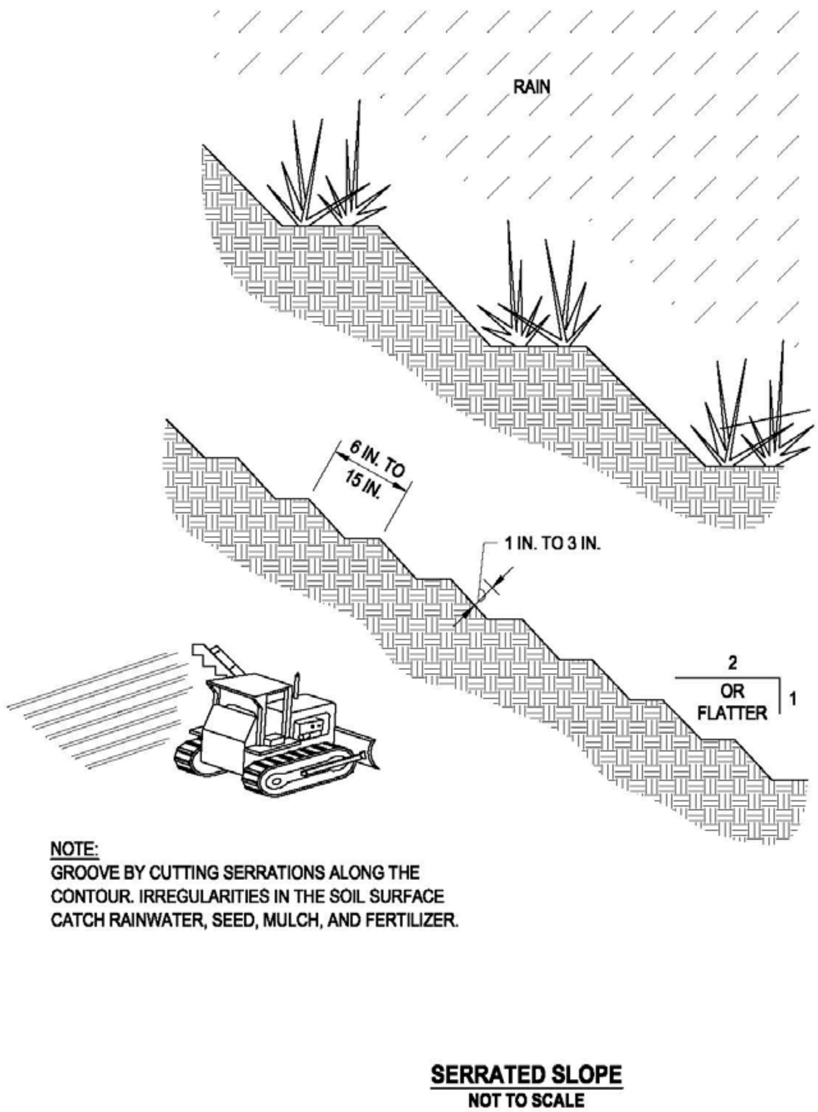


Figure26-2. Example of Serrated Slope

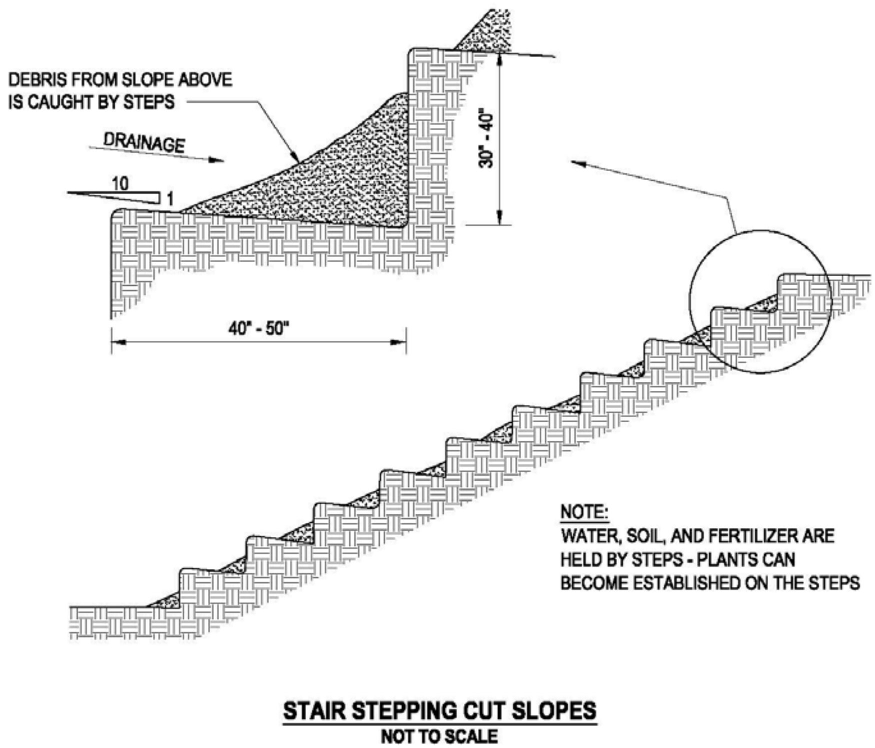


Figure 26-3. Example of stair stepping cut slopes

27 Earth Dikes, Swales, and Ditches

Image Source: State of Hawaii Department of Transportation, Highways Division, *Construction Best Management Practices Field Manual,* 2021.

27.1 Description

Structures that prevent erosion by intercepting, diverting, and conveying surface run-on to a stabilized area or other sediment trapping device.

27.2 Applications

- Use earth dikes for drainage areas smaller than 10 acres.
- Use swales and ditches for drainage areas smaller than 5 acres.
- Direct runoff around unstable or disturbed areas to a stabilized water course, drainage pipe, or channel.
- Divert runoff to sediment basins or sediment traps.
- Along perimeter of the site or disturbed area to divert storm water run-on and runoff.
- Intercept runoff at the point of concentration.
- Supplement other sediment control measures.
- Intercept and divert runoff to prevent sheet flow over sloped surfaces.
- Convey surface runoff down sloping land.
- Provide containment for a specified and limited area including stockpiling or material storage areas within the project limits.

27.2.1 Earth Dikes

- Firmly compact to minimize erosion and prevent unequal settling.
- Drain to a stabilized outlet.
- Divert sediment-laden runoff to a sediment trapping device.
- Ensure continuous, positive grade along dike to prevent ponding of runoff.
- Stabilize earth dikes with vegetation, chemicals, or other physical devices.

- Conform to predevelopment drainage patterns and capacities.
- Berm size is determined by factors including slope length and grade, soil characteristics, climate, and presence of existing vegetation.
- Berms may be vegetated or unvegetated.
- Use velocity dissipation devices within and at the outlet of temporary drains and swales to minimize erosive flow velocities. See section 30 Outlet Protection and Velocity Dissipation Devices for more information.
- Determine design flow and safety factor by an evaluation of risks associated with overtopping, flow backups, or washout of structures.
- Evaluate potential run-on from off-site properties. Install before earth-disturbing activity on slopes.
- Determine flow velocity limit by on-site soil type and drainage flow patterns.
- Establish minimum flow velocity requiring lining (rip-rap, geotextile filter fabric, vegetation, concrete) for earthen diversion devices.
- Incorporate an emergency overflow section or bypass area into the design for storms exceeding the design storm.

27.2.2 Swales and Ditches

- If rip-rap is used, use 4- to 12-inch rock depending on the grade.
- Stabilize earth dikes, drains, and swales with vegetation, chemicals, or other physical devices.

27.3 Considerations

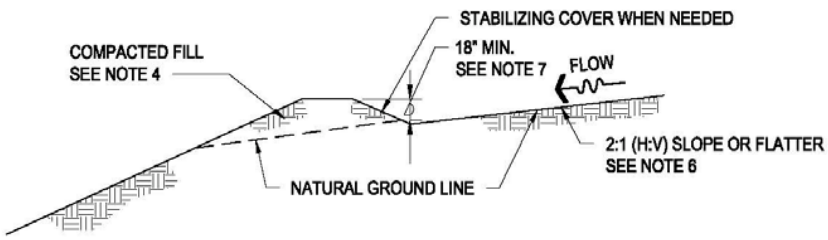
- Access and space can prohibit or limit the installation of a dike.
- Despite simplicity of installation, improper design can limit effectiveness.
- Use of additional sediment and erosion control devices may be required to prevent scour and erosion in recently graded dikes, swales, and ditches.
- Select size and location to prevent unintended consequences such as erosion along steep and unlined ditches and ponding within the travelway or material storage areas.
- Alteration of existing waterways and clearing of existing vegetation are subject to permit requirements of the U.S. Army Corps of Engineers (USACE) and state or local agencies.
- Unsuitable for use as a sediment trapping device.

27.4 What to Inspect

- Is there erosion along berms, channel linings, embankments, beds of ditches and downgradient?
- Is there excess sediment/debris evident in the swale?
- Is there sediment accumulation along dike?
- Is proper size rip-rap used?
- Will runoff remain within diversion channel?
- Are embankments stabilized?
- Is there evidence of potential signs of failure for dike walls, embankments, compacted fills, and earthen channel sidewalls?

27.5 Maintenance

- Restore all bare areas with the appropriate lining material.
- Remove accumulated sediment and debris once it reaches one-half the height of the dike.
- As needed, reseed/stabilize the dike as needed to maintain stability.
- Remove dikes, swales, and ditches after stabilization of the surrounding drainage area or completion of construction.
- Restore any cracks, washouts, animal habitation, exposed materials, or other signs of potential failure. Coordinate restoration with Maintenance Engineer or Material Testing and Research Section as necessary. The Hydraulic Section shall also be consulted for problems associated with structural design or runoff flow patterns.



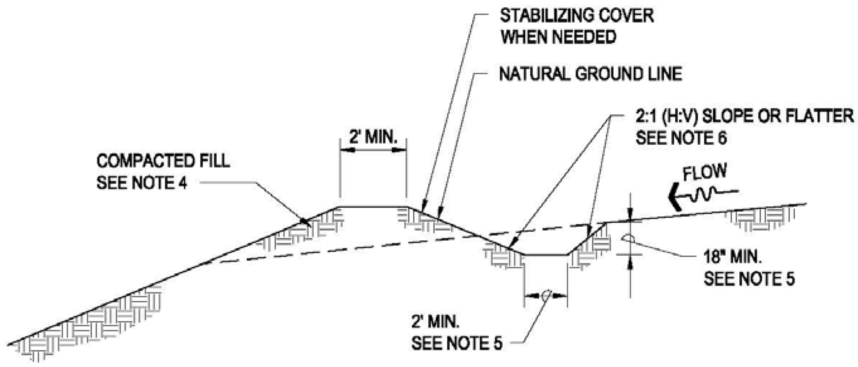
SECTION
NOT TO SCALE

NOTES:
1. ALL DIKES SHOULD BE COMPACTED BY EARTH MOVING EQUIPMENT.
2. ALL DIKES SHOULD HAVE POSITIVE DRAINAGE TO AN OUTLET.
3. ALL DIKES SHOULD HAVE 2:1 OR FLATTER SIDE SLOPES, 18 INCH MINIMUM HEIGHT, AND A MINIMUM TOP WIDTH OF 24 INCHES. WIDE TOP WIDTHS AND FLAT SLOPES ARE USUALLY NEEDED AT CROSSINGS FOR CONSTRUCTION TRAFFIC.
4. THE OUTLET FROM THE EARTH DIKE SHOULD FUNCTION WITH A MINIMUM AMOUNT OF EROSION. RUNOFF SHOULD BE CONVEYED TO A SEDIMENT TRAPPING DEVICE SUCH AS SEDIMENT TRAP OR SEDIMENT BASIN WHEN EITHER THE DIKE CHANNEL OR DRAINAGE AREA ABOVE THE DIKE ARE NOT ADEQUATELY STABILIZED.
5. TEMPORARY STABILIZATION MAY BE ACHIEVED USING SEED AND MULCHING FOR SLOPES LESS THAN 5% AND EITHER RIP-RAP OR SOD FOR SLOPES IN EXCESS OF 5%. IN EITHER CASE, STABILIZATION OF THE EARTH DIKE SHOULD BE COMPLETED IMMEDIATELY AFTER CONSTRUCTION OR PRIOR TO THE FIRST RAIN.
6. IF RIP-RAP IS USED TO STABILIZE THE CHANNEL FORMED ALONG THE TOE OF THE DIKE, THE FOLLOWING TYPICAL SPECIFICATIONS APPLY:

CHANNEL GRADE	RIP-RAP STABILIZATION
0.5-1.0%	4 IN. ROCK
1.1-2.0%	6 IN. ROCK
2.1-4.0%	8 IN. ROCK
4.1-5.0%	8 IN. - 12 IN. ROCK

EARTH DIKE

Figure 27-1.Example of an Earth Dike



SECTION
NOT TO SCALE

NOTES:
1. PLACE DRAINAGE SWALES ABOVE OR BELOW, NOT ON, A CUT OR FILL SLOPE.
2. DRAINAGE OR SWALES SHOULD BE LAID AT A GRADE OF AT LEAST 1 PERCENT, BUT NOT MORE THAN 15 PERCENT.
3. REMOVE ALL TREES, STUMPS, OBSTRUCTIONS, AND OTHER OBJECTIONABLE MATERIAL FROM THE SWALE.
4. FILL MATERIAL ALONG THE PATH OF THE SWALE SHOULD BE COMPACTED TO AT LEAST 90% COMPACTION.
5. SWALE TOP AND BOTTOM WIDTH SHOULD BE AT LEAST 2 FT.
6. SIDE SLOPES SHOULD BE 2:1 OR FLATTER.
7. DEPTH OF THE SWALE SHOULD BE AT LEAST 18 IN.
8. CONSTRUCT THE DRAINAGE SWALE WITH A POSITIVE GRADE TO A STABILIZED OUTLET.
9. USE A LINED DITCH FOR HIGH FLOW VELOCITIES.
10. TEMPORARY STABILIZATION MAY BE ACHIEVED USING SEED AND MULCHING FOR SLOPES LESS THAN 5% AND EITHER RIP-RAP OR SOD FOR SLOPES IN EXCESS OF 5%.
11. IF RIP-RAP IS USED TO STABILIZE THE CHANNEL FORMED ALONG THE TOE OF THE DIKE, THE FOLLOWING TYPICAL SPECIFICATIONS APPLY:

CHANNEL GRADE	RIP-RAP STABILIZATION
0.5-1.0%	4 IN. ROCK
1.1-2.0%	6 IN. ROCK
2.1-4.0%	8 IN. ROCK
4.1-5.0%	8 IN. - 12 IN. ROCK

TEMPORARY DRAINAGE SWALE

Figure 27-2.Example of a temporary drainage swale

28 Level Spreader

Image Source: State of Hawaii Department of Transportation, Highways Division, *Construction Best Management Practices Field Manual,* 2021.

28.1 Description

Device used at outlets to convert concentrated flow to sheet flow, preventing erosion of the receiving area. Tops of channels, earthen berms, or rigid weir-like structures may function as level spreaders.

28.2 Applications

- Flat or gentle sloping areas.
- Outlets for dikes and diversions.
- Where concentrated flows are discharged.

28.3 Installation and Implementation

- Construct on undisturbed soil.
- Do not construct on fill material.
- Locate where reconcentration of water will not occur.
- A stabilized and well vegetated slope of less than 10% shall be located below the level spreader.
- Filter runoff containing high sediment loads through a sediment-trapping device prior to release to the level spreader.
- Incorporate a rigid outlet lip design for high discharge flows.
- 0% grade on the spreader lip is necessary for uniform sheet flow.
- Avoid operating vehicles and heavy equipment on the level spreader to maintain a smooth level surface for the overflow weir.

28.4 Considerations

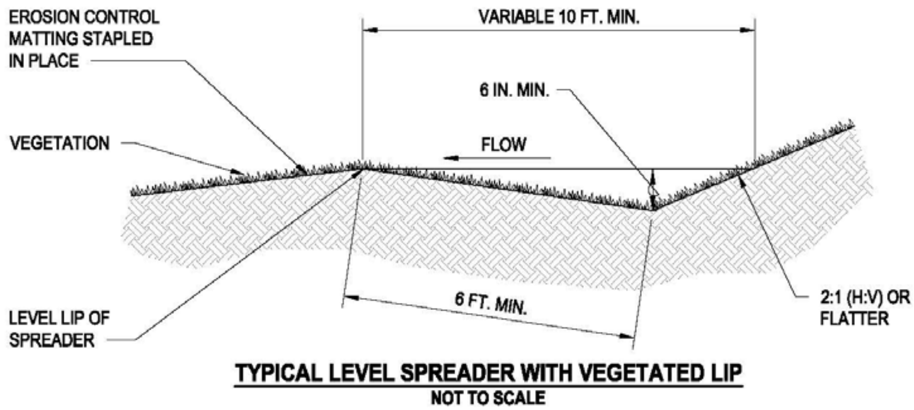
- Not applicable to sediment-laden runoff.
- The level spreader lip needs to be at a 0% grade to confirm no erosion or concentration of flows occur.
- Not recognized as a pollutant reduction BMP when by itself, but is necessary for other BMP devices to function properly. It will also remove some pollutants due to some suspended sediment that settles out.
- Storm water approaching the BMP should not be high energy.

28.5 What to Inspect

- Is there accumulated debris or sediment in the level spreader?
- Does the level spreader have a slope of 0% along the spreader lip?
- Is there evidence of erosion, channelization, or concentrated flow at the discharge area?
- Are there low spots in spreader?

28.6 Maintenance

- Keep level spreader at 0% grade.
- Remove any accumulated debris and sediment and properly dispose off-site.
- Mow grass to assure the level spreader is properly functioning.



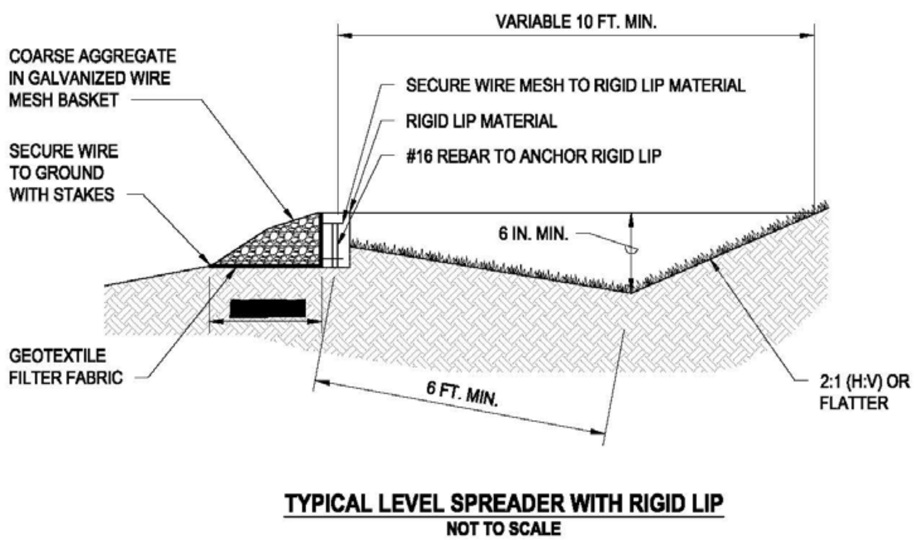


Figure 28-1. Examples of level spreaders

29 Slope Drains and Subsurface Drains

Image Source: State of Hawaii Department of Transportation, Highways Division, *Construction Best Management Practices Field Manual,* 2021.

29.1 Description

Pipes to prevent erosion along slopes by intercepting and conveying runoff or groundwater from the top of the slope to a stabilized discharge point located at the bottom of the slope. Slope drains are primarily used to convey runoff down cut or fill slopes. Subsurface drains are primarily used to remove water from the soil in sloped areas.

29.2 Applications

- Use of slope drains is applicable to the following:
- Drainage of concentrated runoff from within swales or behind dikes located at the top of slopes.
- Drainage of surface runoff to prevent erosion along the slope.
- Emergency spillways for sediment basins.
- Use of subsurface drains is applicable to areas where water must be removed from the soil to lower the groundwater table or to prevent excessive soil saturation.

29.2.1 SLOPE DRAIN DESIGN CONSIDERATIONS

- Consult with a hydrogeologist or qualified engineer regarding design flows.
- Limit drainage area discharging to slope drain to 5 acres.
- Direct surface runoff into slope drain using interceptor dikes at the top of slope. See section 27 Earth Dikes, Swales, and Ditches for more information.
- Pipe slope drains exceeding 12 inches in diameter require a standard flared end section or headwall constructed at the inlet and outlet.
- Common materials used for slope drains is plastic lining, fiber matting, flexible plastic pipe, metal pipe, rigid pipe, and half round pipe.

- Install lining such as vegetation or geotextile filter fabric to protect area around inlet.
- Install rip-rap or other energy dissipation device at outlets.
- Place rip-rap so it extends to the maximum flow depth, or to a point where vegetation will be satisfactory to control erosion.
- Compact soil under and around inlet, outlet, and along the pipe.
- Slope drain must be installed on a slope gradient of 3% or greater.
- Slope drains may be installed above-ground or buried beneath the slope surface.
- Drains that are buried beneath the slope surface must have an earth dike, a minimum of 12 inches, on top of the pipe at the top of slope.
- Above-ground installation shall utilize pipe anchors to secure pipe to ground and be spaced a maximum of 10 feet apart.
- Align slope drain perpendicular to contours of slope. Generally, limit maximum slope to 2:1 (H:V). For slopes exceeding 2:1 (H:V), velocity dissipation is required at the pipe outlet.
- A half round pipe, fiber matting or plastic lining can be installed for shorter slopes that have a gradient flatter than 2:1 (H:V).
- Berms must remain relatively low and vegetated. Limit berm height to no more than 24 inches in height.
- The pipe should have a minimum diameter of 12 inches and should be equal over the entire length. Maximum pipe diameter is 24 inches due to height limitations of berms.
- Direct sediment-laden storm water to a sediment trap or sediment basin.

29.3 Considerations

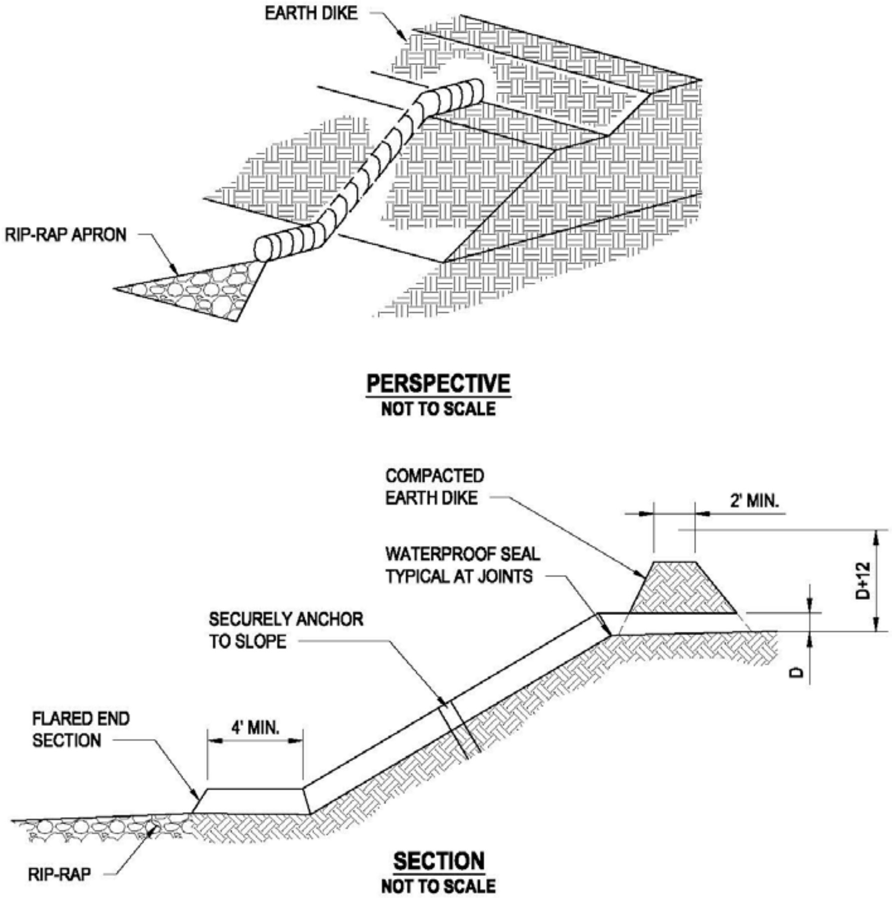
- Drainage area discharging to slope drains shall not exceed 5 acres. For larger areas, use multiple pipes, paved chute, or rock lined channel.
- Clogged slope drains direct runoff around pipe which may result in erosion along the slope.
- High flow velocities at the pipe outlet require implementation of velocity dissipation devices to prevent downstream erosion. See section 30 Outlet Protection and Velocity Dissipation Devices for more information.
- High flows may wash away velocity dissipation devices at the outlet, which leaves the area susceptible to erosion.
- Severe flooding and erosion may result from failure of slope drains and storm water overtopping the berm.

29.4 What to Inspect

- Are slope drains accumulating debris and sediment?
- Is there evidence of scour or erosion at the outlet?
- Is the pipe damaged or leaking?
- Are the pipe connections watertight?
- Is the pipe anchored to the slope?
- Is ponding occurring in active traffic lanes or material storage areas?

29.5 Maintenance

- Repair damage caused by erosion and scour, and install energy dissipation devices as necessary.
- Remove sediment and debris from entrances, outlet, and within drains to maintain flows.
- Repair/replace pipe if it is leaking or damaged.



NOTES:

1. INSTALL SLOPE DRAINS PERPENDICULAR TO SLOPE CONTOURS.
2. SLOPE DRAINS CAN BE PLACED ON OR BURIED UNDERNEATH THE SLOPE SURFACE.
3. COMPACT SOIL AROUND AND UNDER ENTRANCE, OUTLET, AND ALONG LENGTH OF PIPE.
4. SECURELY ANCHOR AND STABILIZE PIPE AND APPURTENANCES INTO SOIL.
5. CHECK TO ENSURE THAT PIPE CONNECTIONS ARE WATERTIGHT.
6. PROTECT AREA AROUND INLET WITH FILTER CLOTH.
7. TOP OF INTERCEPTOR DIKES SHOULD BE LIMITED TO 12" HIGHER THAN THE TOP OF THE SLOPE DRAIN.
8. MAXIMUM SLOPE IS GENERALLY LIMITED TO 2:1 (H:V).
9. DIRECT SURFACE RUNOFF TO SLOPE DRAINS WITH INTERCEPTOR DIKES.
10. PROTECT OUTLET OF SLOPE DRAINS USING FLARED END SECTION WHEN OUTLET DISCHARGES TO A FLEXIBLE ENERGY DISSIPATION DEVICE. THE FLARED SECTION SHOULD SLOPE TOWARDS THE PIPE INLET.

PIPE SLOPE DRAIN (RIGID)

Figure 29-1. Example of a rigid pipe slope drain

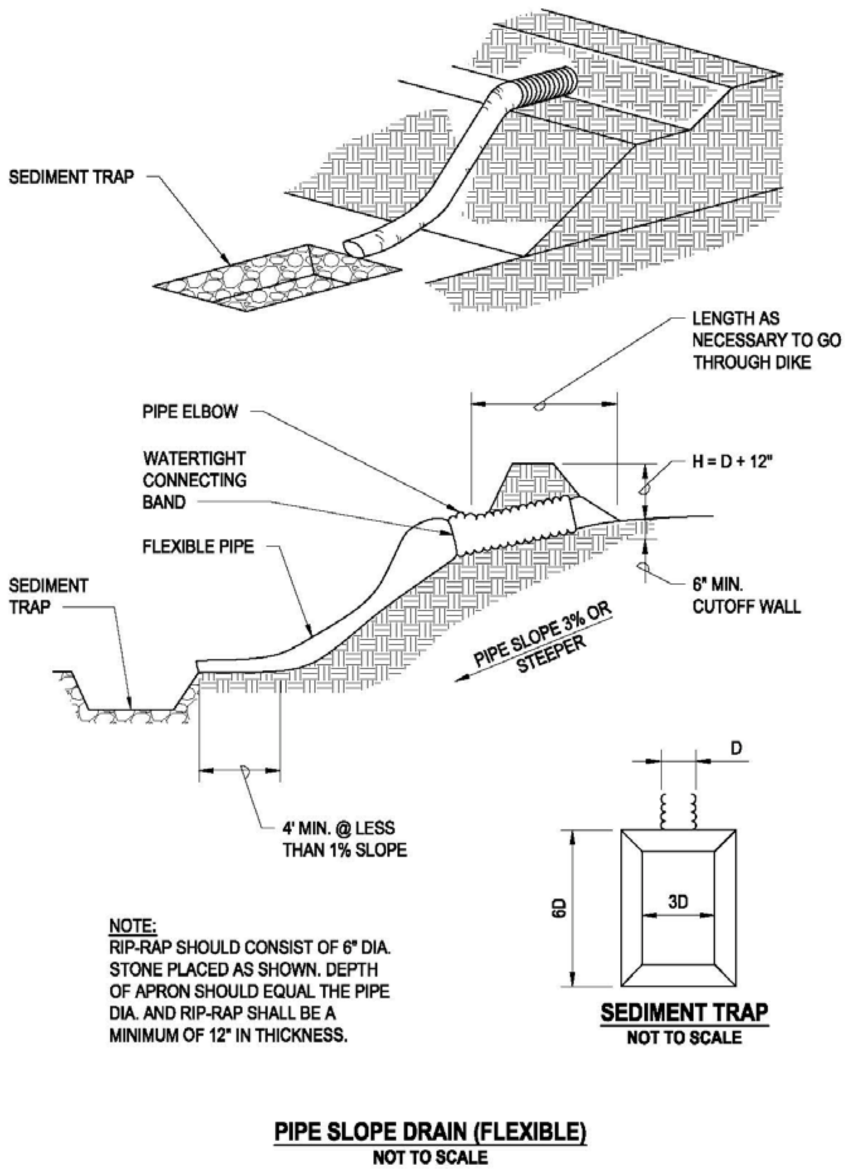


Figure 29-2. Example of a flexible pipe slope drain

30 Outlet Protection and Velocity Dissipation Devices

Image Source: State of Hawaii Department of Transportation, Highways Division, *Construction Best Management Practices Field Manual,* 2021.

30.1 Description

Devices placed at outlets of pipes and channels to prevent or minimize scouring and erosion by reducing the velocity of storm water flow.

30.2 Applications

- Outlets with continuous flows.
- Outlets located at the bottom of slopes.
- Outlets subject to short, intense flows.
- Discharge points from lined conveyances to unlined conveyances.
- Inflow protection.
- Outlet protection that diverts runoff to a natural or manmade drainage element.
- In-stream/channel designed to prevent banks from erosion.

30.3 Installation and Implementation

- Apron length shall be determined by outlet flow rate and tailwater level.
- Align apron with direction of flow and avoid curves in apron. If a curve is necessary, place it in the upper section of the apron.
- Protect the underlying geotextile filter fabric with a 4-inch minimum rock blanket if the rip-rap is 12 inches or larger.
- Increase rock size to counteract high flow velocities.
- Place geotextile filter fabric between aggregate and the underlying soil to prevent soil movement.
- Outlets on slopes steeper than 10% must have additional protection.
- Place and extend rip-rap downstream until stable conditions are met.

30.4 Considerations

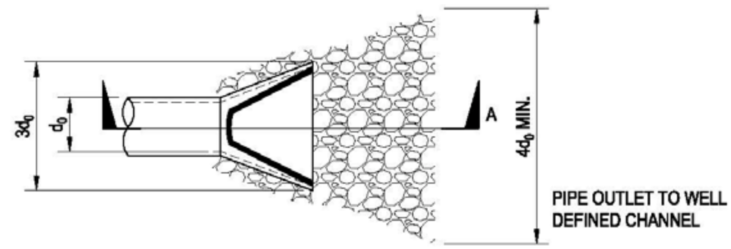
- Potential for stones to wash away during high velocity flows.
- Break up of grouted rip-rap can result from hydrostatic pressure caused by water accumulation.
- It is difficult to repair underlying geotextile filter fabric without removing rip-rap.
- Larger stones are prone to damaging the geotextile filter fabric during installation when installing with a machine and may require installing by hand.

30.5 What to Inspect

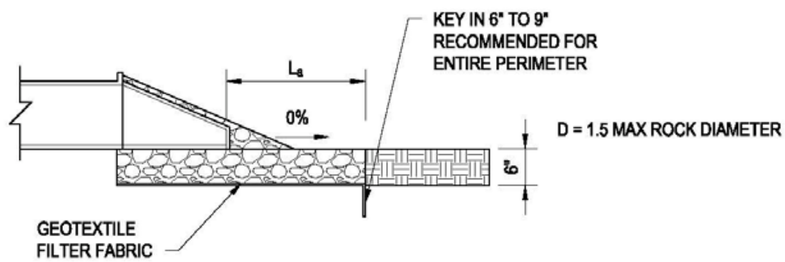
- Is there scour evident beneath the rip-rap and around the outlet?
- Is accumulated sediment wedged in-between rip-rap?
- Can illicit discharge be found in the outlet?
- Is the proper size rock being used?
- Is there damage to underlying geotextile filter fabric?
- Is outlet free of obstructions?

30.6 Maintenance

- Immediately repair damaged slopes or underlying geotextile filter fabric with priorities based on highway safety and protection of Class AA and Class 1 waters, followed by erosion potential and possible damage to downslope areas.
- Replace displaced rip-rap.
- Remove accumulated sediment in aggregate.
- Remove obstruction and repair damage as necessary.



PLAN
NOT TO SCALE



SECTION A
NOT TO SCALE

NOTES:

1. THE APRON LENGTH AND ROCK SIZE GRADATION ARE DETERMINED USING THE TABLE.

2. INSTALL RIP-RAP, GROUTED RIP-RAP, OR CONCRETE APRON AT SELECTED OUTLET. RIP-RAP APRONS ARE BEST SUITED FOR TEMPORARY USE DURING CONSTRUCTION. GROUTED OR WIRED TIED ROCK RIP-RAP CAN MINIMIZE MAINTENANCE REQUIREMENTS.

3. CAREFULLY PLACE RIP-RAP TO AVOID DAMAGING THE FILTER FABRIC.

   a. STONE 4 IN. TO 6 IN. MAY BE CAREFULLY DUMPED ONTO FILTER FABRIC FROM A HEIGHT NOT TO EXCEED 12 IN.

   b. STONE 8 IN. TO 12 IN. SHOULD BE HAND PLACED ONTO FILTER FABRIC, OR THE FILTER FABRIC MAY BE COVERED WITH 4 IN. OF GRAVEL AND THE 8 IN. TO 12 IN. ROCK MAY BE DUMPED FROM A HEIGHT NOT TO EXCEED 16 IN.

   c. STONE GREATER THAN 12 IN. SHOULD ONLY BE DUMPED ONTO FILTER FABRIC PROTECTED WITH A LAYER OF GRAVEL WITH A THICKNESS EQUAL TO ONE HALF THE D50 ROCK SIZE, AND THE DUMP HEIGHT LIMITED TO TWICE THE DEPTH OF THE GRAVEL PROTECTION LAYER THICKNESS.

4. OUTLETS ON SLOPES STEEPER THAN 10 PERCENT SHOULD HAVE ADDITIONAL PROTECTION.

PIPE DIAMETER, (inches)	DISCHARGE (ft^3/s)	APRON LENGTH, La (ft)	RIP-RAP D50 DIAMETER, MIN (inches)
12	5 10	10 13	4 6
18	10 20 30 40	10 16 23 26	6 8 12 16
24	30 40 50 60	16 26 26 30	8 8 12

FOR LARGER OR HIGHER FLOWS CONSULT A LICENSED CIVIL ENGINEER.
SOURCE: USDA-SCS

PIPE OUTLET CONDITIONS

Figure 30-1. Example of a pipe outlet

31 Slope Interceptor or Diversion Ditches/Berms

Image Source: State of Hawaii Department of Transportation, Highways Division, *Construction Best Management Practices Field Manual,* 2021.

31.1 Description

Methods to minimize sheet flow over slopes and reduce erosion by intercepting and conveying runoff to sediment removing structures or a protected drainage system.

31.2 Applications

- Protecting slopes from sheet flow runoff.
- Areas which must be protected from runoff flowing down slopes.
- Installed horizontally across disturbed slopes to reduce runoff velocity.
- Slopes where runoff must be intercepted at bottom of slope.
- Terraced areas on large/long slopes.
- Remove runoff to treatment area.
- A built-in ditch/swale at the base or top of the disturbed slope to divert storm water to an area where erosion control is prevalent.

31.3 Installation and Implementation

- Design flows and safety factors shall be determined by an evaluation of risks associated with erosion and overtopping, flow backups, or structure washouts. Consult with the District maintenance Engineer or Highways Division’s Hydraulic Section to determine these values.
- Ditches with high flow velocities shall be lined or stabilized. Consider use of rock check dams to slow flow.
- Direct flows at top of slopes to slope drains or a sediment trap. See sections 29 Slope Drains and Subsurface Drains and 42 Sediment Trap for more information.
- A BMP device (dike, berm, compost filter sock) should be installed at the top of disturbed slopes until the slope is revegetated or temporary erosion control is installed on the face of the slope.
- Protect outlets from erosion.

- Place slope interceptors as follows:
- Slope inclination of 4:1 (H:V) or flatter: Fiber rolls should be placed at a maximum interval of 20 feet.
- Slope inclination between 4:1 and 2:1 (H:V): Fiber rolls should be placed at a maximum interval of 15 feet.
- Slope inclination 2:1 (H:V) or greater: Fiber rolls should be placed at a maximum interval of 10 feet; a closer spacing is more effective.
- Stakes should be installed to secure compost filter berms. Drive stakes at least 12 inches into the ground. See section 44 Compost Filter Berm/Sock for more information.

31.4 Considerations

- Additional sediment trapping BMP devices may be necessary for sediment-laden runoff.
- Slope interceptors on steeper slopes will need to be spaced closer due to faster flows.
- Slopes made up of a higher percentage of clay will increase the velocity of sheet flow.

31.5 What to Inspect

- Are washouts evident in ditches or berms?
- Are structures accumulating sediment and/or debris?
- Is there evidence of rill or gully erosion?
- Is sediment discharging into outlets?
- Are berms correctly trenched and staked?
- Are berms properly spaced on slope?
- Is a BMP device installed at the top of the disturbed slope?
- Are additional BMPs required to prevent erosion and undermining?

31.6 Maintenance

- Repair or replace rip-rap as needed.
- Repair damaged lining as needed.
- Use soil stabilizers.
- Compact fill berms and revegetate.
- Compact and revegetate ditches as needed.
- Remove accumulated sediment when it reaches one-half the height of the berm.
- Repair/replace compost filter berms that have rips and tears.

32 Rip-rap and Gabion Inflow Protection

Image Source: State of Hawaii Department of Transportation, Highways Division, *Construction Best Management Practices Field Manual,* 2021.

32.1 Description

Devices to protect soil surfaces from erosion by stabilizing slopes, and slowing the velocity of concentrated runoff. Rip-rap consist of large, irregular shaped rocks that fit into place to provide erosion control and slow the velocity of concentrated runoff. Gabions are wire baskets filled with rock, concrete, or other materials that lines drainageways to stabilize the flow channel along steep slopes, shorelines, and stream banks against erosion.

32.2 Applications

32.2.1 Rip-Rap

- Use of rip-rap inflow protection applies to slopes between 10:1 and 4:1 (H:V)
- Erosion-resistant ground cover
- Pipe outlet protection
- Channel lining
- Stabilized slopes
- Shoreline stabilization
- Dissipates high velocities or concentrations of storm water

32.2.2 Gabions

- Use of gabion inflow protection applies to slopes exceeding 4:1 (H:V)
- Retaining structures
- Foundation construction e.g., dams
- Aesthetic purposes
- Rip-rap and gabions are relatively maintenance free and long lasting
- These devices can be used as a temporary or permanent BMP
- Temporary flood walls
- Shoreline stabilization
- Change direction of source water
- Energy dissipation device in channels

32.3 Installation and Implementation

32.3.1 Rip-Rap

- A licensed civil Engineer must provide a design and calculations for approval prior to installation.
- 2:1 (H:V) side slopes, 3-foot minimum bottom width, and 1-foot minimum depth.
- Line channel with 4- to 12-inch rip-rap at a depth of 18 inches. The larger stones must be predominant, while the smaller stones fill the voids.
- Install geotextile filter fabric under all rip-rap to separate rocks with underlying soil. Prior to placing geotextile filter fabric, provide a 3-day notice to the Engineer for inspection of foundation.
- Blend rip-rap into existing ground at uniform thickness so the stream width is not radically narrowed.
- Stones shall be clean, sound, durable, and angular in shape, resistant to weathering and water action, and free from organic material. Stones shall be shaped so that neither their breadth nor thickness are less than one-third their length, not rounded, and have minimum unit weight of 155 pounds per cubic foot. Refer to 2005 Hawaii Standard Specifications for Road and Bridge Construction, Standard Specifications & Special Provisions Section 655.

32.3.2 Gabions

- A licensed Civil Engineer must provide a design and calculations prior to installation.
- Gabion inflow may be used in lieu of rip-rap inflow protection.
- Gabions are prefabricated wire baskets filled with a well-graded mixture of aggregate. The larger stone must be predominant, while the smaller stones fill the voids.
- Baskets must be made of hexagonal triple twist mesh with heavily galvanized steel wire.
- Construct 2:1 (H:V) side slopes, 3-foot bottom width, and 1-foot deep from 9-foot × 3- foot × 1-foot gabion baskets. Install geotextile filter fabric under all gabion baskets.
- A bedding layer of aggregate can be placed before the gabion baskets are installed to level the surface and maximize stability.
- Fill gabion baskets with 4- to 7-inch clean (no fines) stone.
- Hand place rocks in gabion baskets to minimize voids and/or bulges. Rock edges must not poke through the gabion basket. Install gabions in accordance with manufacturer’s recommendations.

- The wire mesh of the gabion basket will eventually fail due to corrosion. The designer must consider this and plan for overall stability when the basket fails.

32.4 Considerations

- Gabion installation is labor intensive (hand installation).
- Costly compared to vegetative devices.
- Not always aesthetically pleasing.
- Scour tends to occur at toe and end of rip-rap.
- If gabions or rip-rap is used within a U.S. Army Corps of Engineers (USACE) jurisdictional waterbody that coordination with the USACE is required.

32.5 What to Inspect

- Is there evidence of scour around rip-rap or gabions?
- Has debris and/or sediment accumulated around or in rip-rap?
- Has an underlying filter fabric/geotextile been installed?
- Has the BMP device been installed correctly?
- Are rocks displaced?
- Does the gabion structure show signs of bulging or gaps?
- Is there damage to the gabion basket?
- Is there evidence of rock failure?
- Does the BMP need to be cleaned out or replaced?

32.6 Maintenance

- Remove accumulated sediment lodged between rip- rap that is affecting filtration purposes.
- Replace/refresh rocks that have been displaced.
- Repair damage to filter fabric/geotextile under rip- rap.
- Any evident damage or abnormalities to the gabion must be repaired.

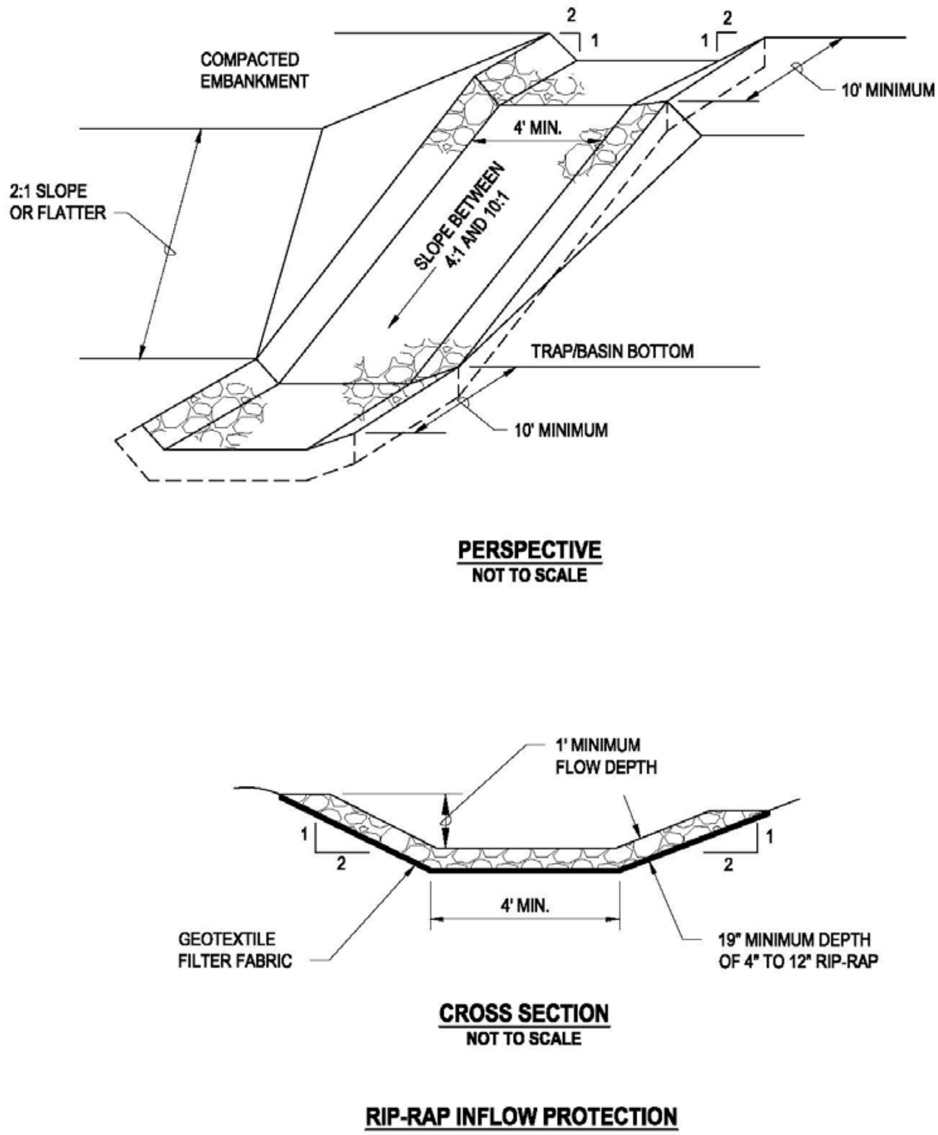


Figure 32-1. Example of rip-rap inflow protection

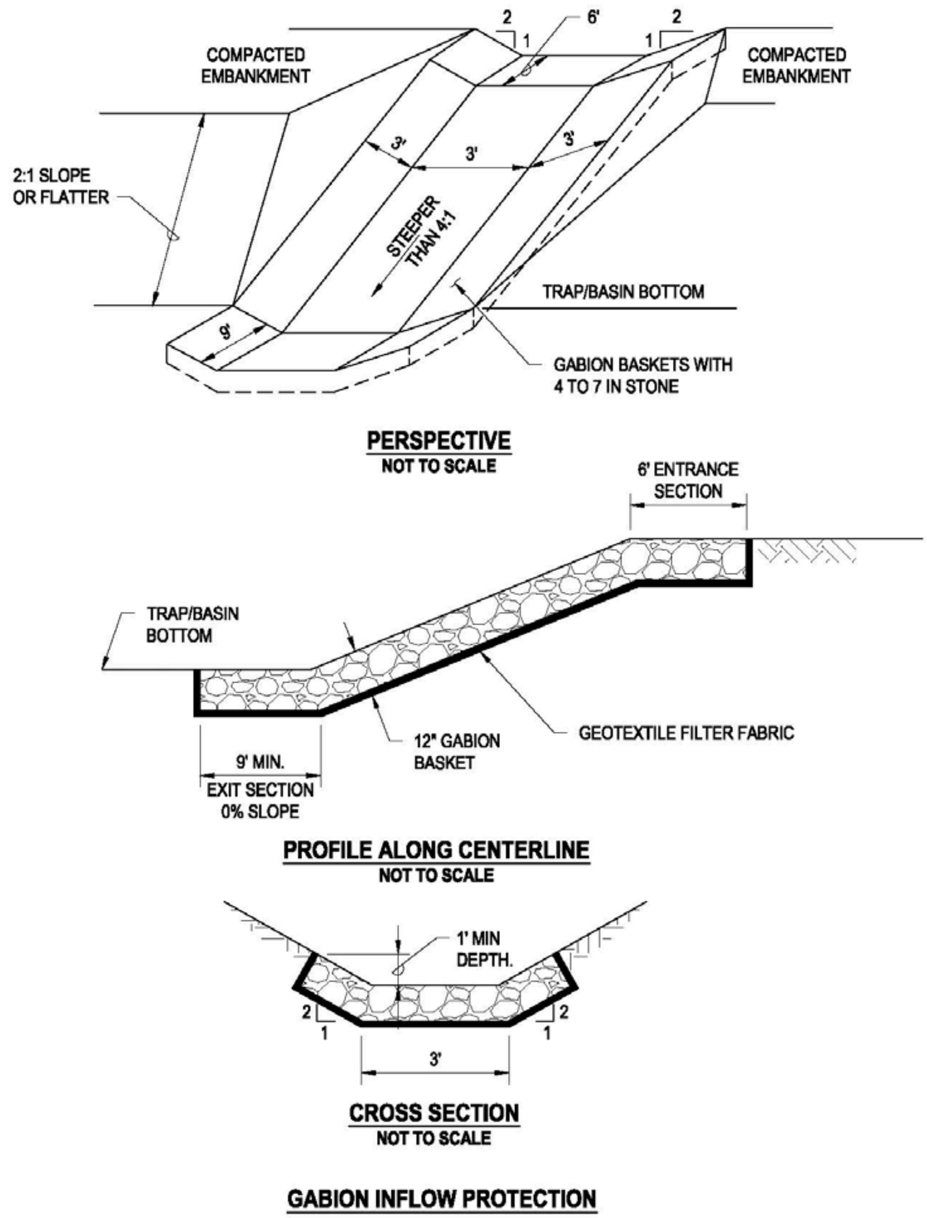


Figure 32-2. Example of gabion inflow protection

33 Geotextiles and Mats

Image Source: State of Hawaii Department of Transportation, Highways Division, *Construction Best Management Practices Field Manual*, 2021.

33.1 Description

Natural or synthetic mats are roll-type materials used for temporary or permanent soil stabilization and protection from rain/wind erosion.

33.2 Applications

- Stabilize drainage ditches, channels, and stream banks.
- Stabilize steep slopes with high potential for erosion.
- Stabilize slope until vegetation is established.
- Hold water near surface to assist in vegetation growth.
- Protect stockpiles from wind erosion.
- Suppress weed growth.
- Provide temporary cover for bare areas that are idle.

33.3 Installation and Implementation

- Apply matting to disturbed soils and areas where vegetation has been removed.
- Install matting immediately after the area is seeded and fertilized.
- Minimize disturbance of slopes greater than 15% in grade.
- Phase disturbances and use stabilization techniques designed for steep grades if disturbance of steep slopes is unavoidable.
- Grade and shape disturbed slopes prior to installing geotextiles and/or erosion control matting.
- Prepare area by removing rocks, vegetation and other obstructions that will inhibit direct contact with soil.
- Entrench or anchor material at the top and bottom of the slope in a 6-inch × 6-inch trench or per manufacturer's specifications, whichever is more stringent. The trench should be placed a minimum of 12 inches from the top of the slope.

- • Intermittent check slots can also be installed for large or long lengths of matted areas to increase stability of the area.
- Do not stretch matting. Maximize mat contact with soil by loosely laying blankets and securing to slope with stakes.
- Ensure matting maintains direct contact with soil to prevent rills, gullies, and undermining.
- Follow manufacturer’s specifications on overlapping and stake spacing requirements. Steep slopes may require additional staking requirements.
- If geotextile matting is to be installed on steep slopes greater than 15%, space stakes every 2 feet.
- Organic matting provides temporary protection until permanent vegetation has been established or construction activities recommence. Organic matting materials include the following:
- Jute matting
- Straw matting
- Synthetic matting provides temporary or post- construction soil stabilization in both vegetated and non-vegetated areas. Synthetic matting materials include the following:
- Excelsior™ matting
- Glass fiber matting
- Stakes
- Mulch netting
- Plastic sheeting/covering
- Key in temporary plastic sheeting at top of slope and weigh down by gravel bags no more than 6 feet apart.
- Install erosion control measures or devices at the top and toe of the slope to filter sediment-laden runoff and decrease storm water velocity.
- Other proprietary devices may be used and shall be installed per manufacturer’s recommendations.
- The contractor shall immediately initiate soil stabilization measures when earth- disturbing construction activities on exposed areas have been completed or will be temporarily inactive for 14 or more calendar days.

33.4 Considerations

- Minimize use of matting to areas where other erosion control measures are not applicable such as channels or steep slopes since matting is costly compared to other erosion control measures.
- Seed germination may be delayed due to decreased soil temperature.
- Extensive soil preparation is needed before installation for adequate contact with slope.
- Mats made of natural material have a limited life and low shear strength.
- High material cost and extensive manpower needed.
- Generally, the slope needs to be smooth and free of large rocks.
- Plastic sheeting results in 100% runoff and is easily torn/damaged.

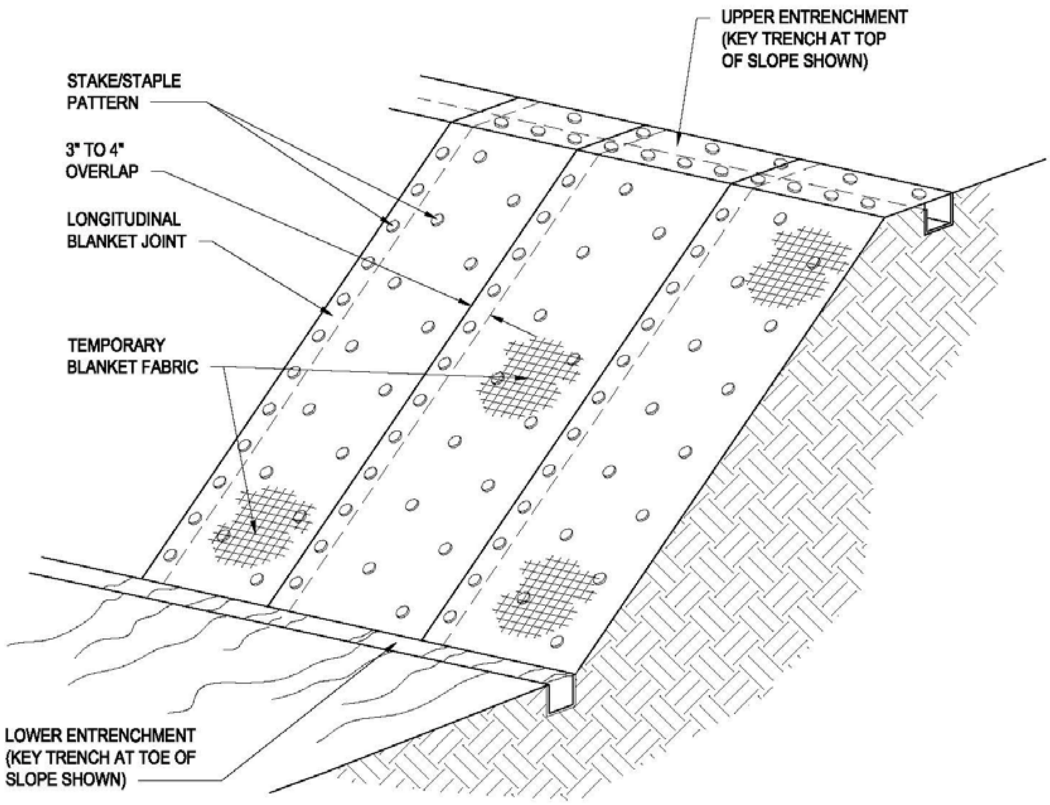
33.5 What to Inspect

- Is there evidence of undercutting at the top of slope?
- Is the slope eroding beneath the blanket?
- Are blankets firmly anchored and trenched in at top and bottom of slope?
- Are blanket segments properly overlapped?

- Are stakes properly spaced and driven into the soil to prevent the blanket from lifting away from soil?
- Is matting free from any defects or tears?
- Are there areas not adequately growing vegetation?

33.6 Maintenance

- Repair undermining or erosion.
- Repair/replace damaged blankets.
- Replace stakes and sandbags as needed.
- Reseed and fertilize areas not adequately growing vegetation.



TEMPORARY EROSION CONTROL BLANKET ON SLOPE
NOT TO SCALE

NOTES:
1. SLOPE SURFACE SHALL BE FREE OF ROCKS, CLODS, STICKS, AND GRASS. SOIL CONTACT SHALL BE MAXIMIZED.
2. LAY BLANKETS LOOSELY AND STAKE TO MAINTAIN DIRECT CONTACT WITH THE SOIL. DO NOT STRETCH.
3. INSTALLATION MAY VARY ACCORDING TO MANUFACTURER'S RECOMMENDATIONS. APPLY THE MORE STRINGENT REQUIREMENT.

Figure 33-1.Example of a temporary erosion control blanket on a slope

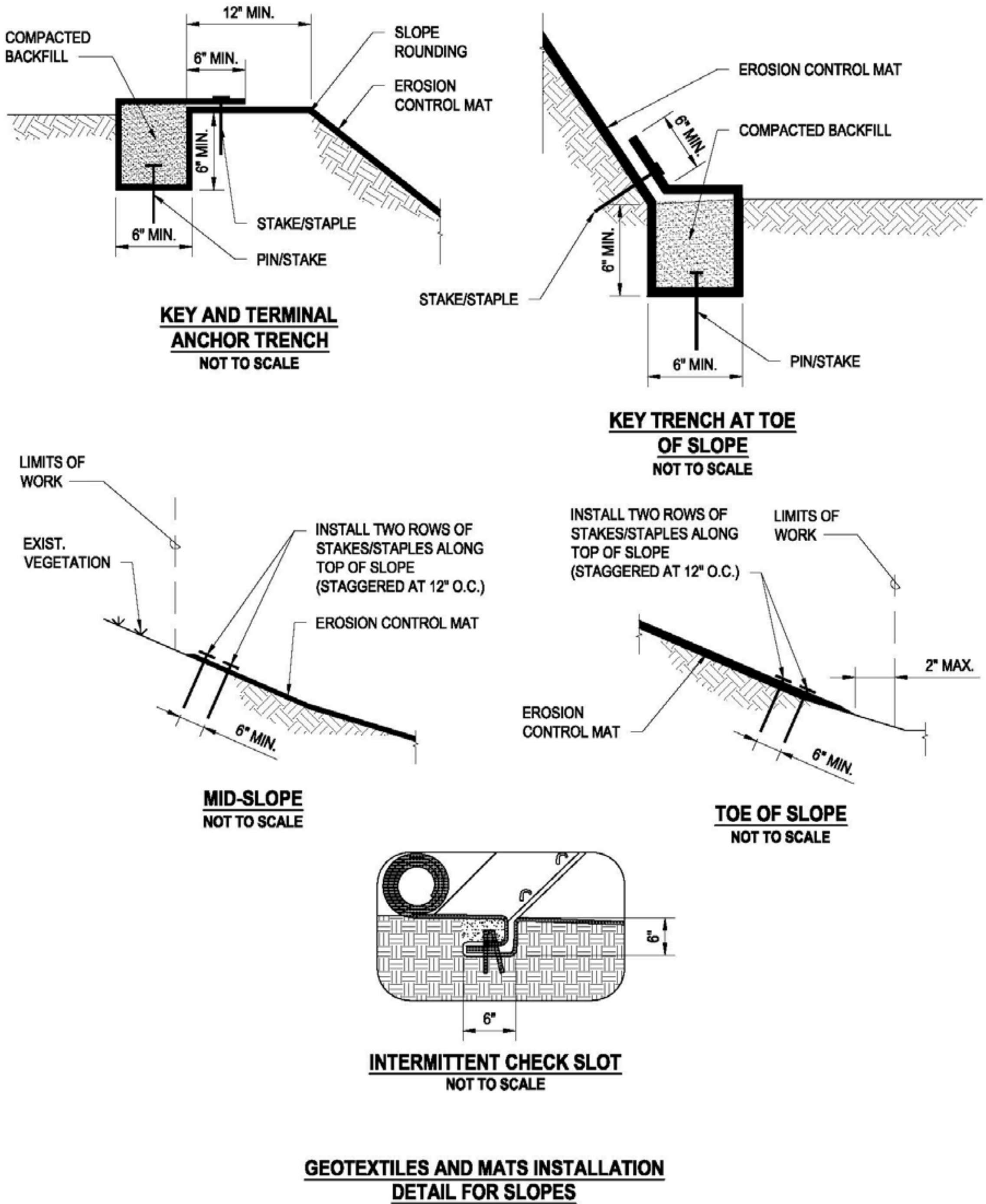


Figure 33-2. Example of the installation of geotextiles and mats

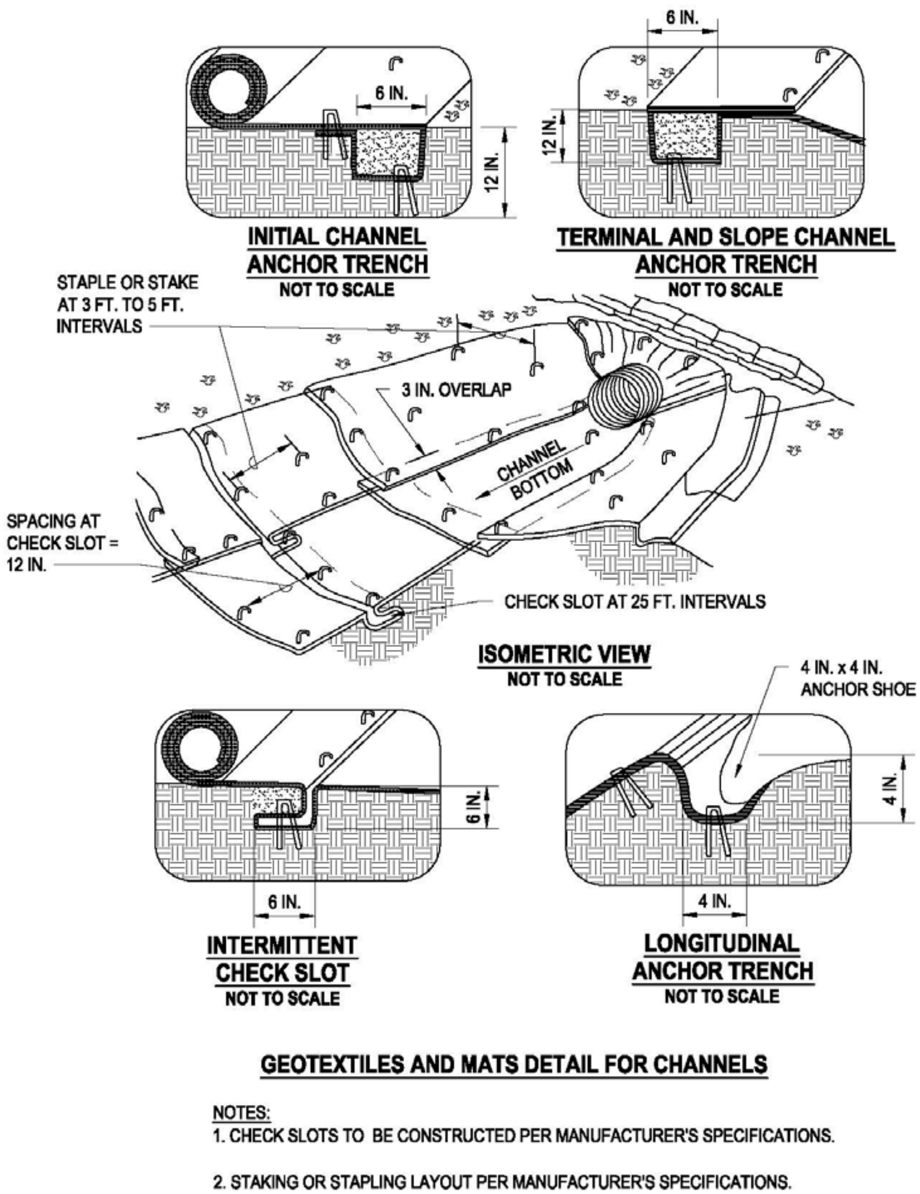


Figure 33-3. Example of installation of geotextiles and mats in channels

34 Seeding and Planting

Image Source: State of Hawaii Department of Transportation, Highways Division, *Construction Best Management Practices Field Manual,* 2021.

34.1 Description

Practices and procedures to provide ground cover for temporary or permanent stabilization of soil.

34.2 Applications

Soil stabilization during or after the construction phase applies to the following site conditions:

- Graded/cleared areas upon temporary or permanent cessation of earth-disturbing activities
- Open space and fill areas
- Steep slopes
- Spoil piles or temporary stockpile of fill material
- Vegetated swales
- Landscape corridors
- Stream banks

34.3 Installation and Implementation

- Coordinate temporary vegetative stabilization with permanent vegetative stabilization.
- Restrict vehicle/equipment use in areas where vegetative stabilization will be used to avoid soil compaction.
- A licensed landscape architect should review the proposed vegetation to be used for the project.
- Condition the soil to promote vegetative growth prior to planting in areas where vehicle/equipment use cannot be avoided.
- Contractor shall keep records of application dates, type(s), amount of fertilizer used, and the areas covered.
- Minimize the amount of exposed soil during construction activity by phasing disturbances.
- Preserve native topsoil and vegetation where practicable.

- Use of invasive species is prohibited.
- Types of activities that constitute initiation of stabilization include the following:
- Prepping the soil for vegetative or non-vegetative stabilization.
- Applying mulch or other non-vegetative product to the exposed area.
- Seeding or planting the exposed area.
- Starting any activities listed above on a portion of the area to be stabilized, but not on the entire area.
- Finalizing arrangements to have stabilization product fully installed in compliance with the deadline for completing initial stabilization activities.
- Stabilization activities must be completed as soon as practicable, but no later than 14 days after the initiation of soil stabilization measures. If area drains to impaired waters, stabilization activities must be completed as soon as practicable, but no later than 7 days after the initiation of soil stabilization measures. Refer to the Hawaii Administrative Rules (HAR) Title 11, Chapter 55, Appendix C for more information.
- Types of activities that constitute completion of initial stabilization activities include the following:
- For vegetative stabilization, all activities necessary to initially seed or plant the area to be stabilized.
- For non-vegetative stabilization, the installation or application of all such non- vegetative measures.
- Vegetative coverage must be perennial.
- Establish uniform vegetation, which provides 70% of coverage that was provided by vegetation prior to commencing earth-disturbing activities.
- The contractor should take pictures of the area being used prior to installing BMPs. This will provide evidence of the amount of vegetation in the area prior to commencing earth- disturbing activities.
- Immediately after seeding the area the contractor shall install non-vegetative erosion controls, to the extent necessary, to provide cover to the area while vegetation is becoming established.
- Install perimeter controls around exposed areas where vegetation is becoming established to prevent sediment-laden runoff from entering storm drain systems and open waterbodies.
- Remove non-vegetative erosion controls once the area is deemed stabilized by the Engineer.

34.3.1 Seeding and Planting Application Considerations

- Type of vegetation
- Site and seedbed preparation
- Seasonal planting times
- Fertilizers
- Water

34.3.2 Grasses

- Plant vegetation immediately after Engineer approval.
- Ground preparation requires fertilization, scarification, and mechanical stabilization of the soil.
- Can tolerate short-term temperature extremes and waterlogged soil conditions.
- Appropriate soil conditions include a shallow soil base, good drainage, and 2:1 (H:V) or flatter slope.
- Quickly develops from seeds.

- Vigorous grass growth depended on mowing, irrigating, and fertilizing.
- Immediately after seeding or planting the area to be vegetatively stabilized, to the extent necessary to prevent erosion on the seeded or planted area, install non- vegetative erosion controls that provide cover (e.g., mulch, rolled erosion control products) to the area while vegetation is becoming established.

34.3.3 Trees and Shrubs

- Selection dependent on vigor, species, size, shape, and potential wildlife food source.
- Consider wind/exposure and irrigation requirements.
- Plant indigenous species where possible.

34.3.4 Vines and Ground Cover

- Lime and fertilizer required for ground preparation.
- Use appropriate seeding rates.
- Consider requirements for drainage, acidity, and ground slope.
- Plant indigenous species where possible.
- Avoid species that require irrigation.

34.3.5 Fertilizer Use

- Do not apply fertilizers or pesticides during or just before a rain event.
- Do not apply to storm water conveyance channels with flowing water.
- Comply with fertilizer and pesticide manufacturer's recommended usage and disposal instructions. Do not over apply.
- Apply fertilizers at the appropriate time of year for the location, and preferably as closely as possible to the period of maximum vegetation uptake and growth.
- Where possible, till fertilizer into soil rather than surface spreading or spraying on steep slopes.
- Minimize discharges of fertilizers containing nitrogen or phosphorus.
- Store fertilizer in original container with proper labeling, sealed, and under cover or covered with secondary containment.
- Follow federal, state, and local laws regarding fertilizer application.

34.3.6 Watering

- Quantity and frequency of watering may vary depending on type of vegetation, type of soil, location, frequency of rainfall, and slope.
- Regulate quantity of water to prevent erosion and formation of gullies.
- Temporary irrigation may be required for initial establishment of vegetation and sustained growth.
- Permanent water supply source may be required for certain types of vegetation.

34.3.7 Stabilization

- Initiate soil stabilization measures immediately whenever earth-disturbing activities have permanently or will/has temporarily ceased for 14 or more calendar days on any portion of the site to prevent erosion.

34.4 Considerations

- During dry periods without irrigation, permanent and temporary vegetation may not grow.
- Improper application of fertilizer may contribute to storm water pollution.
- Vegetative coverage must be perennial for final stabilization.
- Lack of dedicated water supply may require a temporary water source.
- Rainwater can wash away seeds and fertilizer from areas being restabilized.
- It is common for topsoil to be lost from grading, which causes the soil to lack nutrients for seeds to germinate.
- Disturbed areas may be difficult to stabilize if soil has been compacted.

34.5 What to Inspect

- Is vegetation growing?
- Is there evidence of erosion?
- Are fertilizers being properly stored and handled?
- Are fertilizers being over applied or applied in an improper area?
- Is there at least 70% vegetative coverage?
- Are temporary non-vegetative stabilization devices installed?
- Has soil been conditioned?
- Are native plants being used?
- Has the contractor initiated vegetative stabilization within the required timeframe?

34.6 Maintenance

- Water, fertilize, mow, weed, and/or prune the grasses/plants as needed.
- Repair broken or leaking water lines, sprinklers, or valves used for irrigation.
- Mow temporary plantings as needed to prevent signage/site obstructions, fire hazards, or nuisances to the public.
- Replace plants that fail to develop healthy growth, become injured, or die.
- Remove invasive species.
- Reseed areas where the grass did not grow and/or any areas affected by erosion.

35 Hydroseeding

Image Source: State of Hawaii Department of Transportation, Highways Division, *Construction Best Management Practices Field Manual,* 2021.

35.1 Description

Application of a mixture of wood fiber, seed, fertilizer, and stabilizing emulsion with hydromulch equipment to temporarily protect exposed soils from wind and water erosion.

35.2 Applications

- Temporary ground cover until permanent vegetation has been established.
- Suitable for disturbed areas that will be redisturbed following an extended period of inactivity.

35.3 Installation and Implementation

- Seed type must be carefully selected based upon anticipated soil type and future irrigation. All seeds must be in conformance with the State of Hawaii Department of Agriculture (HDOA). For information on appropriate seed mixes, visit the Hawaii office of the United States Department of Agriculture, Natural Resources Conservation Service (NRCS) website.
- Avoid use of hydroseeding in areas where future earthwork activities will commence.
- Roughen the slope, fill area, or area to be seeded with the furrow trending along the contours prior to application of hydroseed. Rolling with a crimping or punching type roller or track walking is required on all slopes prior to hydroseeding. See 26 Slope Roughening, Terracing, and Rounding for more information.
- Apply mulch to keep seeds in place and to moderate soil moisture and temperature until the seeds germinate and grow.
- Avoid spraying hydroseed onto sidewalks, lined drainage channels, roads, and existing vegetation.

35.4 Evaluation of Site Conditions Considerations

The following items should be considered to select the appropriate hydroseeding mixtures.

- Soil conditions
- Site topography
- Season and climate
- Vegetation types
- Maintenance requirements
- Sensitive adjacent areas
- Water availability
- Plans for permanent vegetation

35.5 Considerations

- Steep slopes are difficult to protect with temporary seeding.
- Hydroseeding shall only be used when there is sufficient time to ensure adequate vegetation establishment and provide adequate erosion control.
- Temporary seeding may not be appropriate without supplemental irrigation.
- Temporary vegetation may have to be removed before permanent vegetation is applied.
- Hydroseeding shall not be used in areas subject to heavy traffic.
- To ensure complete coverage over roughen terrain, hydroseeding may have to be applied from multiple angles and sides.

35.6 What to Inspect

- Is there evidence of erosion?
- Are there bare areas that need to be reseeded?
- Is an irrigation system installed?
- Does the irrigation system apply complete coverage to the desired areas?
- Is the irrigation system working?
- Are there any areas of exposed soil showing?

35.7 Maintenance

- Are there any areas of exposed soil showing?
- Mulches applied to seeded areas may be disturbed due to wind or runoff. Recover exposed areas until permanent vegetation has been established.
- Replace ornamental and landscape mulches of bark or wood chips if soil is visible in more than 75% of the designated area.
- Follow-up applications must be made as needed to cover weak spots and to maintain adequate soil protection.
- If erosion has occurred, additional mulch may be required. Eroded areas need to be repaired prior to additional mulch being added.

36 Mulching

Image Source: State of Hawaii Department of Transportation, Highways Division, *Construction Best Management Practices Field Manual,* 2021.

36.1 Description

Application of loose bulk material to stabilize disturbed soil by protecting bare soil, increasing infiltration, and reducing runoff. Materials suitable for mulching include green material, vegetable fibers (hay or straw), and wood/bark chips.

36.2 Applications

- Temporary ground cover until permanent vegetation has been established.
- Method may be used in combination with temporary or permanent seeding to enhance plant growth.
- Areas requiring soil moisture retention to prevent cracking of the soil.
- Ground cover for exposed soil between trees or shrubs.
- Mulch should be used in conjunction with other BMPs for optimal erosion control, especially on slopes.

36.3 Installation and Implementation

36.3.1 Vegetable Fibers (Hay or Straw)

- Loose hay or straw which may be used in combination with seeding. Mulching usually follows seeding and the process is described in the following:
- Apply seed and fertilizer to bare soil.
- Apply loose hay or straw over top of seed and fertilizer prior to seed germination.
- Apply at a rate of 2,000 pounds per acre by machine or hand distribution.
- Evenly distribute mulch on the soil surface to cover 80% to 90% of the ground.
- Maintain maximum fiber length. Average fiber length shall be greater than 6 inches.

- Use a tackifier, netting, or mechanical “punching” method to anchor mulch. “Punching” refers to the act of crimping or compressing to anchor to the ground. Methods depends on slope steepness, accessibility, soil conditions, and longevity.
- Punching straw or hay to anchor the mulch to the ground is the preferred method of anchoring mulch for the following conditions:
- Use a spade or shovel on small areas.
- Use a knife-blade roller or straight bladed coulter (“crimper”) on slopes with soil, which can support construction equipment without undesirable compaction or instability.
- Use plastic netting or jute on small areas and/or steep slopes. Geotextile pins, wooden stakes, or 11-gauge wire staples shall secure netting in place. This condition warrants consideration of the use of matting rather than mulch.
- Use tackifiers on steep slopes unable to support construction equipment or large application areas where use of nettings, straw, or hay is not cost- effective. Tackifiers glue vegetable fibers together and to the soil surface until the establishment of permanent vegetation.

36.3.2 Green Material

- Consists of recycled vegetation trimming such as grass and shredded shrubs and trees.
- Generally applied manually.
- Temporary ground cover with or without seedings.
- Evenly distribute green material on soil surface. Depth shall not exceed 4 inches.
- Anchor with a tackifier or netting on steep slopes or for areas with anticipated overland sheet flow. The condition warrants consideration of the use of matting rather than mulch.

36.3.3 Wood/Bark Chips

- Suitable for areas which will not be mowed such as around trees, shrubs, and landscape plantings.
- Test soils prior to application. Add a minimum of 12 pounds of nitrogen per ton of mulch to counteract the effect of decomposing wood-based materials, which extract nitrogen from soil. Use a balanced, slow-release fertilizer or an organic source such as compost.
- Apply mulch manually.
- Evenly distribute wood/bark chips on soil surface and maintain a 2-inch mulch depth to tree basins and a 4-inch mulch depth to shrub beds.

36.4 Considerations

36.4.1 Vegetable Fibers (Hay or Straw)

- Requires 3-step machinery.
- Labor intensive installation.
- For applications using straw blowers, the applicable area must be located within 150 feet of a road or surface capable of supporting loads from large vehicles. Use of straw is preferred, in lieu of hay, if available.
- Avoid applying fibers prior to an anticipated rain event.

- **Green Material**

- Limited commercial availability.
- Variable quality.
- Application primarily uses manual labor.
- Unpredictable effectiveness as an erosion control measure. Requires overspray with a tackifying agent to increase effectiveness.
- Application of fertilizer may be required.
- Limit use to non-critical steep slopes and areas where alternative erosion control measures may be readily applied. A critical slope surface exists when a combination of soil and slope factors create a high potential for slope face failure and subsequent erosion, such as a slope greater than 2:1 (H:V) on freshly graded or disturbed slopes. Refer to Slope Face Stabilization for Critical Slope Surfaces at website – www.ccriindia.org/pdf/Object335PDFEnglish.pdf for more information on critical slopes.

36.4.2 Wood/Bark Chips

- Poor erosion control effectiveness.
- Anchoring of chips onto sleep slopes is difficult due to potential movement from high winds.
- Subject to displacement from concentrated flows.
- Use of fertilizer with a high nitrogen content is required. This is to prevent nutrient deficiency in plants due to the decomposing wood-based materials, which extract nitrogen from soil. Improper fertilizer use may contribute to water quality pollution.
- Limit use to non-critical steep slopes and areas where alternative erosion control measures may be readily applied.

36.5 What to Inspect

- Is mulch applied to areas which will be regraded and/or revegetated?
- Is there uniform coverage of mulch?
- Was the application rate sufficient for the area?
- Is there evidence of rills or gullies?

36.6 Maintenance

- Mulches applied to seeded areas may be disturbed due to wind or runoff. Recover exposed areas until permanent vegetation has been established.
- Replace ornamental and landscape mulches of bark or wood chips if soil is visible in more than 75% of the designated area.
- If erosion has occurred, additional mulch may be required.

37 Hydromulching

Image Source: State of Hawaii Department of Transportation, Highways Division, *Construction Best Management Practices Field Manual,* 2021.

37.1 Description

Application of loose bulk material to stabilize disturbed soil by protecting bare soil, increasing infiltration, and reducing runoff. Materials used for mulching include hydraulic matrices, hydraulic mulches of recycled paper or wood fiber.

37.2 Applications

- Temporary ground cover until permanent vegetation has been established.
- Method used in combination with temporary or permanent seeding to enhance plant growth.
- Areas requiring soil moisture retention to prevent cracking of the soil.
- Ground cover for exposed soil between trees or shrubs.
- Mulch should be used in conjunction with other BMPs for optimal erosion control, especially on slopes.

37.3 Installation and Implementation

37.3.1 Hydraulic Mulches of Recycled Paper

- Consists of recycled newsprint, magazines, and other wastepaper sources.
- May be applied with or without tackifiers.
- Hydraulic mulch materials shall conform to 2005 Hawaii Standard Specifications for Road and Bridge Construction, Standard Specifications & Special Provisions Sections 209, 619 & 641, as in effect.

- Mix mulch in a hydraulic application machine (hydroseeder) and apply as a liquid slurry.
- May be sprayed from a cannon up to 200 feet or from a hose up to 1,500 feet away from the application area.
- Mix mulch with seed and fertilizer as specified by the manufacturer. Apply mulch at the manufacturer's recommended rate to ensure uniform and effective coverage.
- Mulch used as temporary ground cover shall be reapplied to bare areas until permanent vegetation has been established.
- Avoid spraying mulch onto sidewalks, lined drainage channels (i.e., concrete swales and concrete culverts), travelway areas, and existing vegetation.

37.3.2 Hydraulic Mulches of Wood Fiber:

- Consists of wood waste from lumber mills or urban sources.
- May be manufactured with or without a tackifier.
- Hydraulic mulch shall conform to 2005 Hawaii Standard Specifications for Road and Bridge Construction, Standard Specifications & Special Provisions Sections 209, 619, & 641, as in effect. Mix mulch in a hydraulic application machine (hydroseeder) and apply as a liquid slurry.
- Mix mulch with seed and fertilizer as specified by the manufacturer.
- Apply mulch at the manufacturer's recommended rate to ensure uniform and complete coverage.

37.3.3 Hydraulic Matrices

- Hydraulic slurries consisting of wood fiber, paper fiber, or a combination of wood and paper fiber mixed with a binder system.
- Exceeds erosion control performance of blankets due to close contact with soil.
- Apply as an aqueous slurry (with seed) using standard hydroseeding equipment.
- Application rates vary for different combinations of conditions and products.

37.3.4 Bonded Fiber Matrix (BFM) Consisting Of Premixed Fiber And Binders

- After application and upon drying, BFM shall adhere to soil and form a 100% cover. The cover shall be biodegradable, promote vegetation, and prevent soil erosion.
- Are composed of long strand, thermally produced wood fibers (>88% of total volume by weight), held together by organic tackifiers (10%) and mineral bonding agents (<2%), which become insoluble and non-dispersible upon drying. Composition of BFM varies based on supplier.
- Perform a free liquid quality control test on the liquid slurry.
- Binder shall not dissolve or disperse upon watering.
- Upon applications to the soil, holes in the matrix shall not exceed 0.04 inches in size.
- There shall not be any gaps between the matrix and the soil.
- Minimum water holding capacity of the matrix shall be 1.2 gallons per pound matrix.
- The matrix shall be free of germination of growth inhibiting factors and shall not form a water-resistant crust.
- Materials used for the matrix shall be 100% biodegradable and 100% beneficial to plant growth.
- Testing and evaluation of the matrix by an independent research laboratory shall have been conducted to verify reported erosion control performance.
- A trained and manufacturer certified applicator with knowledge of proper mixing and product application shall install the BFM.

- Typical BFM application rates range from 3,000 to 8,000 pounds per acre per recommendations from various manufacturers.
- BFM shall not be applied 24 hours before an anticipated rain event, during a rainfall event, or immediately after a rainfall event to ensure a drying time of 24 hours after installation.

37.4 Considerations

37.4.1 Hydraulic Mulches of Recycled Paper

- Limited erosion control effectiveness due to short fiber length and absence of a tackifier.
- Limited moisture and soil temperature moderation.
- Residual inks within mulches may be undesirable in environmentally sensitive areas.
- Significant decrease in longevity compared with wood fiber mulch.
- Difficulty budgeting for this product due to volatile prices for recycled paper products.

37.4.2 Hydraulic Mulches of Wood Fiber

- Limited erosion control effectiveness.
- Short-term use of 1 growing season.

37.4.3 Hydraulic Matrices

- Avoid applying mulch 24 hours before an anticipated rainfall event, during a rainfall event, or immediately after a rainfall event.
- Hydromulch requires a drying time of 24 hours.
- To ensure complete coverage over roughen terrain, hydromulch may have to be applied from multiple angles and sides.

37.5 What to Inspect

- Is mulch applied to areas which will be regraded and/or revegetated?
- Is there uniform and complete coverage?
- Was the application rate sufficient for the disturbed area?
- Is there evidence of rill or gullies?

37.6 Maintenance

- Mulches applied to seeded areas may be disturbed due to wind or runoff. Recover exposed areas until permanent vegetation has been established.
- Replace ornamental and landscape mulches of bark or wood chips if soil is visible in more than 75% of the designated area.
- If erosion has occurred, additional mulch may be required.

38 Soil Binders

Image Source: State of Hawaii Department of Transportation, Highways Division, *Construction Best Management Practices Field Manual,* 2021.

38.1 Description

Application of soil binders to exposed soil to temporarily prevent water- and wind- induced erosion.

38.2 Applications

- Disturbed areas requiring short-term temporary protection.
- Good alternative to mulches in areas where grading activities will soon resume.
- Suitable for use on stockpiles.
- Applied in conjunction with mulching or seeding applications.

38.3 Installation and Implementation

- Soil types will dictate appropriate soil binders to be used.
- A soil binder must be environmentally benign (non-toxic to plant and animal life), easy to apply, easy to maintain, economical, and must not stain paved or painted surfaces. Soil binders must not pollute storm water. Prior to application, submit the manufacturer's material product data sheets to the Engineer for review and approval.
- Performance of soil binders depends on temperature, humidity, and traffic across treated areas.
- Avoid overspray onto roads, sidewalks, lined drainage channels (i.e., concrete swales and concrete culverts), existing vegetation, etc.

38.3.1 Selecting A Soil Binder

- Properties of common soil binders used for erosion control are provided in Table 38-3. Use the Table to select an appropriate soil binder.
- Consult with the Engineer if soil binders are an appropriate option for temporary stabilization.

Factors to consider when selecting a soil binder include the following:

- Suitability to situation
- Consider where the soil binder will be applied, if it needs a high resistance to leaching or abrasion, and whether it needs to be compatible with any existing vegetation. Determine the length of time soil stabilization will be needed, and if the soil binder will be placed in an area where it will degrade rapidly. In general, slope steepness is not a discriminating factor for the listed soil binders.
- Soil types and surface materials
- Fines and moisture content are key properties of surface materials. Consider a soil binder's ability to penetrate, likelihood of leaching, and ability to form a surface crust on the surface materials.
- Frequency of application
- The frequency of application can be affected by subgrade conditions, surface type, climate, and maintenance schedule. Frequent applications could lead to high costs. Application frequency may be minimized if the soil binder has good penetration, low evaporation, and good longevity. Consider also that frequent application will require frequent equipment cleanup.

38.3.2 Plant-Material Based (Short-Lived) Binders

- Guar: Guar is a non-toxic, biodegradable, natural galactomannan (or plant carbohydrates/sugars) based hydrocolloid treated with dispersant agents for easy field mixing. It must be mixed with water at the rate of 11 to 15 pounds per 1,000 gallons. Recommended minimum application rates are as provided in Table 38-1.
- Psyllium: Psyllium is composed of the finely ground mucilloid coating of seeds (from Plantago plant) that is applied as a dry powder or in a wet slurry to the surface of the soil. It dries to form a firm but rewettable membrane that binds soil particles together but permits germination and growth of seed. Psyllium requires 12- to 18-hours drying time. Application rates must be 80 to 200 pounds/acre, with enough water in solution to allow for a uniform slurry flow.
- Starch: Starch is non-ionic, cold water soluble (pre-gelatinized) granular cornstarch. The material is mixed with water and applied at the rate of 150 pounds/acre. Approximate drying time is 9 to 12 hours.

Table 38-1 Application rates for Guar soil stabilization

Slope Gradient (H:V)	Pounds/Acre
Flat	40
4:1	45
3:1	50
2:1	60
1:1	70

38.3.3 Plant-Material Based (Long-Lived) Binders

- Pitch and Rosin Emulsion: Generally, a non-ionic pitch and rosin emulsion has a minimum solids content of 48%. The rosin must be a minimum of 26% of the total solids content. The soil stabilizer must be non-corrosive, water dilutable emulsion that upon application cures to a water insoluble binding and cementing agent. For soil erosion control applications, the emulsion is diluted and must be applied as follows:
- For clayey soil: 5-parts water to 1-part emulsion.
- For sandy soil: 1-part water to 1-part emulsion.
- Application can be by water truck or hydraulic seeder with the emulsion and product mixture applied at the rate specified by the manufacturer.

38.3.4 Polymeric Emulsion Blend Binders

- Liquid Polymers of Methacrylates and Acrylates: This material consists of a tackifier/sealer that is a liquid polymer of methacrylates and acrylates. It is an aqueous 100% acrylic emulsion blend of 40% solids by volume that is free from styrene, acetate, vinyl, ethoxylated surfactants, or silicates. For soil stabilization applications, it is diluted with water in accordance with manufacturer's recommendations and applied with a hydraulic seeder at the rate of 20 gallons/acre. Drying time is 12 to 18 hours after applications.
- Copolymers of Sodium Acrylates and Acrylamides: These materials are non-toxic, dry powders that are copolymers of sodium acrylate and acrylamide. They are mixed with water and applied to the soil surface for erosion control at rates that are determined by slope gradient, as described in Table 38-2.
- Polyacrylamide and Copolymer of Acrylamide: Linear copolymer polyacrylamide is packaged as a dry flowable solid. When used as a standalone stabilizer, it is diluted at a rate of 11 pounds/1,000 gallons of water and applied at the rate of 5 pounds/acre.
- Hydro-Colloid Polymers: Hydro-Colloid Polymers are various combinations of dry flowable polyacrylamides, copolymers and hydro-colloid polymers that are mixed with water and applied to the soil surface at rates of 55 to 60 pounds/acre. Drying time is 0 to 4 hours.

Table 38-2 Application rates for copolymers of sodium acrylates and acrylamides

Slope Gradient (H:V)	Pounds/Acre
Flat to 5:1	3 – 5
5:1 to 3:1	5 – 10
2:1 to 1:1	10 – 20

38.3.5 Cementitious-Based Binders

- Gypsum: This is a formulated gypsum-based product that readily mixes with water and mulch to form a thin protective crust on the soil surface. It is composed of high purity gypsum that is ground, calcined and processed into calcium sulfate hemihydrate with a minimum purity of 86%. It is mixed in a hydraulic seeder and applied at rates of 4,000 to 12,000 pounds/acre. Drying time is 4 to 8 hours.

38.3.6 Applying Soil Binders

- After selecting an appropriate soil binder, the untreated soil surface must be prepared before applying the soil binder. The untreated soil surface must contain sufficient moisture to assist the agent in achieving uniform distribution. The following steps shall be followed:
- Follow manufacturer’s specifications for application rates, pre-wetting of application area, and cleaning of equipment after use.
- Prior to application, roughen embankment and fill areas.
- Consider the drying time for the selected soil binder and apply with sufficient time before anticipated rainfall. Soil binders shall not be applied during or immediately before rainfall.
- Avoid overspray onto roads, sidewalks, drainage channels (i.e., concrete swales and concrete culverts), sound walls, existing vegetation, etc. Soil binders shall not be applied to areas with standing water, under rainy conditions, or when the temperature is below 40° Fahrenheit during the curing period.
- More than 1 treatment is often necessary, although the second treatment may be diluted or have a lower application rate.
- Generally, soil binders require a minimum curing time of 24 hours before they are fully effective. Refer to manufacturer’s instructions for specific cure time.
- For liquid agents:
- Crown or slope ground to avoid ponding.
- Uniformly pre-wet ground at 0.03 to 0.3 gallons/yard^2 or according to manufacturer’s recommendations.
- Apply solution under pressure. Overlap solution 6 to 12 inches.
- All treated area to cure for the time recommended by the manufacturer; typically, at least 24 hours.
- Apply second treatment before first treatment becomes ineffective, using 50% application rate.
- In low humidity, reactivate chemicals by rewetting with water at 0.1 to 0.2 gallons/yard^2.

38.4 Considerations

- Soil binders are temporary in nature and may need reapplication.
- Some soil binders may not be compatible with existing vegetation.
- Soil binders require a minimum curing time until fully effective, as prescribed by the manufacturer.
- Soil binders may need reapplication after a rain event.
- Soil binders will generally experience spot failures during heavy rainfall events. If runoff penetrates the soil at the top of a slope treated with a soil binder, it is likely that the runoff will undercut the stabilized soil layer and discharge at a point further down slope.

- Soil binders do not hold up to pedestrian or vehicular traffic across treated areas.
- Soil binders may not penetrate soil surfaces made up primarily of silt and clay, particularly when compacted.
- Some soil binders may not perform well with low relative humidity. Under rainy conditions, some agents may become slippery or leach out of the soil.
- Soil binders may not cure if low temperatures occur within 24 hours of application.
- A sampling and analysis plan should be incorporated into the Storm Water Pollution Prevention Plan (SWPPP), as soil binders could be a source of non-visible pollutants.

38.5 What to Inspect

- Has soil binder broken down due to natural elements?
- Is there evidence of erosion?
- Does the soil binder need to be reapplied?
- Are the soil binders an effective BMP for the area?

38.6 Maintenance

- Repair areas where erosion is evident and reapply BMPs as soon as possible. Care must be exercised to minimize the damage to protected areas while making repairs, as any area damaged will require reapplication of BMPs.
- Reapply the selected soil binder as needed to maintain effectiveness.

Table 38-3 Properties of soil binders used for erosion control

Evaluation Criteria	Binder Type			
	Plant Material Based (Short-lived)	Plant Material Based (Long-lived)	Polymeric Emulsion Blends	Cementitious-Based Binders
Relative Cost	Low	Low	Low	Low
Resistance to Leaching	High	High	Low to Moderate	Moderate
Resistance to Abrasion	Moderate	Low	Moderate to High	Moderate to High
Longevity	Short to Medium	Medium	Medium to Long	Medium
Minimum Curing Time Before Rain	9 to 18 hours	19 to 24 hours	0 to 24 hours	4 to 8 hours
Compatibility with Existing Vegetation	Good	Poor	Poor	Poor
Mode of Degradation	Biodegradable	Biodegradable	Photodegradable/ Chemically Degradable	Photodegradable/ Chemically Degradable
Labor Intensive	No	No	No	No
Specialized Application Equipment	Water Truck or Hydraulic Mulcher	Water Truck or Hydraulic Mulcher	Water Truck or Hydraulic Mulcher	Water Truck or Hydraulic Mulcher
Liquid/ Powder	Powder	Liquid	Liquid/powder	Powder
Surface Crusting	Yes, but dissolves on rewetting	Yes	Yes, but dissolves on rewetting	Yes
Clean Up	Water	Water	Water	Water
Erosion Control Application Rate	Varies	Varies	Varies	4,000 to 12,000 pounds/acre

39 Storm Drain Inlet Protection

39.1 Description

Devices installed at storm drain inlets that detain large objects and sediment-laden runoff prior to entering the storm drain system. These devices are often the last treatment measure, so a layered BMP approach is crucial to mitigating sediment-laden runoff from entering the MS4 or storm drainage system, including surface waters.

39.2 Applications

- All storm drain inlets, both within the project limits and beyond the project limits, that may intercept sediment-laden runoff from the construction site shall be protected prior to commencing land-disturbing activity.
- Where disturbed areas have not been stabilized.

39.3 Installation and Implementation

- Install inlet protection devices prior to upgradient land-disturbing activity.
- Inlet protection causes ponding, which is necessary to allow the sediment to settle. The storm drain inlet must not be completely blocked when public safety is of concern.
- The contractor shall monitor the weather for rainfall events and coordinate with the Engineer to adjust inlet protection to prevent hazardous conditions and flooding.
- For maximum effectiveness, minimize the demand on inlet protection devices by installing and maintaining erosion and sediment control devices upslope of the inlet.

- Immediately stabilize slopes and disturbed areas that are no longer active to reduce potential runoff. Inlet protection shall only be removed once disturbed areas upgradient of the catch basin has been stabilized.
- Grated drop inlets and curb inlets/catch basins are the 2 types of inlets most present on construction sites. There are various types of BMP devices that are applicable in protecting these inlets from accepting sediment-laden runoff.

39.3.1 Grated Drop Inlet (GDI)

- Installing a geotextile filter fabric under the grate to cover the insert is a common inexpensive practice to prevent sediment from entering the GDI. The fabric should be placed fully under the grate to completely shield the inlet. Allow 6 inches, minimum, of excess fabric to extend past the grate on all sides. The fabric is easily clogged by sediment. Other methods are preferred such as a witch's hat, which will facilitate drainage while filtering sediment.
- Compost filter socks or sand bags can be placed around the perimeter of the GDI, to divert and/or detain storm water before it enters the inlet. See section 44 Compost Filter Berm/Sock and section 46 Sandbag Barrier for more information.

The following list below are applicable devices for GDI's:

- Geotextile filter fabric fence.
- Geotextile filter fabric under grate.
- Witch's hat
- Inbox protection.
- Fiber roll with additional in box protection.
- Sand bag, rock bag, or snake bag.

39.3.2 Curb Inlet/Catch Basin

- Devices installed at curb inlets are in place to prevent sediment-laden runoff from entering the storm drain. An ample amount of space must be provided to allow water to pond around the inlet. This allows the sediment to settle, as the storm water slowly enters the MS4.
- Devices must extend at least 1 foot past the inlet insert on both sides, unless manufacturer's specifications differ.
- Non-destructive supporting brackets may be used to prevent inlet protection devices from falling into the curb inlet/catch basin.
- Ensure flooding of nearby properties or impeding traffic is avoided.
- Use check dams to reduce the demand of sediment-laden runoff flowing towards a curb inlet. See section 41 Check Dams for more information.
- In addition to the methods of inlet protection described above, there are other effective methods and proprietary devices, which may also be used. These are limited to drainage areas that are less than 1 acre, unless a sediment trap intercepts the runoff prior to reaching the inlet protection device.
- Other proprietary devices may be used and shall be installed per manufacturer's recommendations.

39.4 Considerations

- Short-term flooding at a protected inlet will occur but must not become a traffic or pedestrian hazard.
- Drainage area is limited to 1 acre or less.
- Straw bales shall not be used for inlet protection.
- Runoff on slopes may bypass protected inlets.
- In the event of a severe storm event where flooding conditions will likely be an issue; the contractor may be directed by the Engineer to remove inlet protection. The inlet protection must be reinstalled immediately following the event.
- Geotextile filter fabric used to protect GDI inserts must be cleaned or replaced often due to the limited capacity of sediment the device can hold.
- Inlet protection devices can be tedious to maintain and become ineffective when sediment accumulates. Regular maintenance is required.
- Inlet protection is the last line of defense, which requires proper erosion and sediment controls in place upgradient.
- Inlet protection BMPs that completely block the insert will cause ponding that could create a traffic and pedestrian hazard or cause damage to nearby properties.
- Some GDI grates require heavy machinery to remove the grate to install geotextile filter fabric.

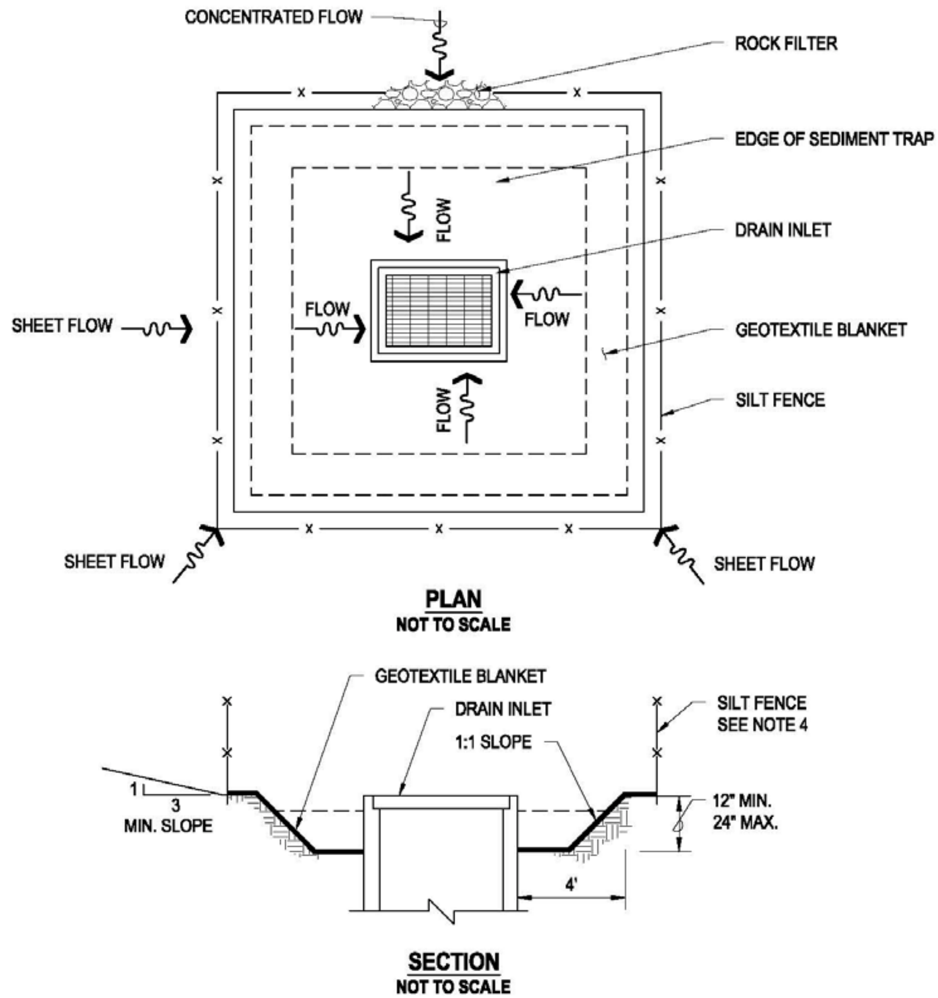
39.5 What to Inspect

- Is proper contact made against curb and gutter to prevent water from undercutting or bypassing inlet protection?
- Can sediment enter catch basin from the top or backside of the structure?
- Is sediment accumulated in front or inside of the inlet protection?
- Is the catch basin insert installed properly and being maintained per manufacturers guidelines?
- Is BMP falling into the inlet?
- Does sediment need to be removed?
- Are there rips/tears in BMP that will allow sediment to bypass it?
- Are compost filter socks damaged with rips/tears that expose the compost media?
- Is there evidence of sediment settling in front of the storm drain following a rain event?

39.6 Maintenance

- Routine maintenance should be initiated the same day the deficiency is identified and completed by the end of the same business day.
- Installation of a new erosion or sediment control device or a significant repair to a device shall be completed within 7 calendar days.
- Immediately replace clogged geotextile filter fabric or stone filters.
- Devices must be inspected, and all accumulated sediment removed before and after each rainfall event.
- During prolonged rainfall events, remove accumulated sediment when depth reaches one-half of the filter height or one-half of the sediment trap depth.
- Remove inlet protection only after stabilization of upstream soils and sweeping of streets is completed. Properly dispose of trapped sediment.
- Clean, remove, or replace protection measures as sediment accumulates, filter becomes clogged, and/or performance is compromised.

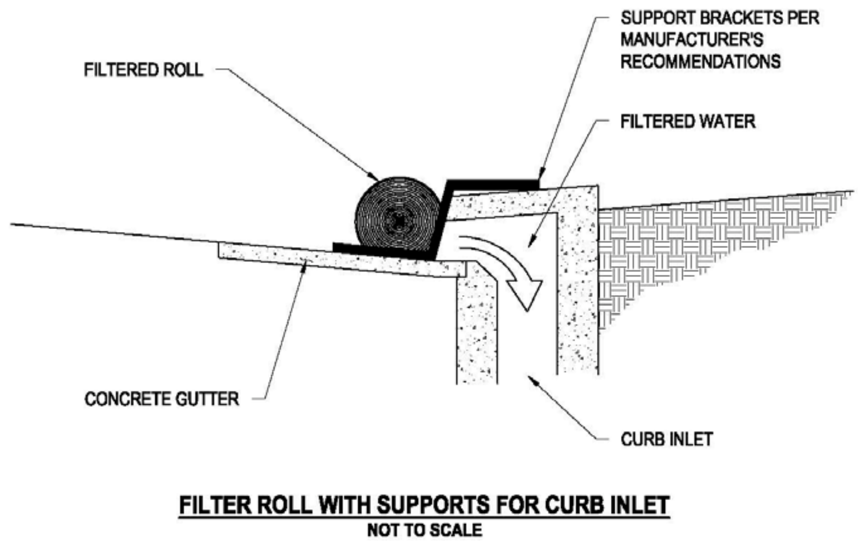
- When there is evidence of sediment accumulation adjacent to the inlet protection measures, remove deposited sediment by the end of the same day in which it is found or by the end of the following work day if removal by the same day is not possible.
- Devices that fall into inlets must be pulled out and repositioned. Devices must be installed per the manufacturer's specifications and procedures for proper effectiveness.
- Address devices experiencing flow bypasses over, underneath, or around the sides of the BMP.
- Regularly maintain inlet protection devices to abide by manufacturer's specifications.



NOTE:
1. FOR USE IN CLEARED AND GRUBBED AND IN GRADED AREAS.
2. FOR CONCENTRATED FLOWS, SHAPE BASIN IN 2:1 (L:W) RATIO WITH LENGTH ORIENTED TOWARDS DIRECTION OF FLOW.
3. SIZE EXCAVATED TRAP TO PROVIDE A MINIMUM STORAGE CAPACITY CALCULATED AT THE RATE 67 YD^3/ACRE OF DRAINAGE AREA.
4. REFER TO BMP SC-7, SILT FENCE OR FILTER FABRIC FENCE.

EXCAVATED DROP INLET SEDIMENT TRAP

Figure 39-1. Example of an excavated drop inlet sediment trap



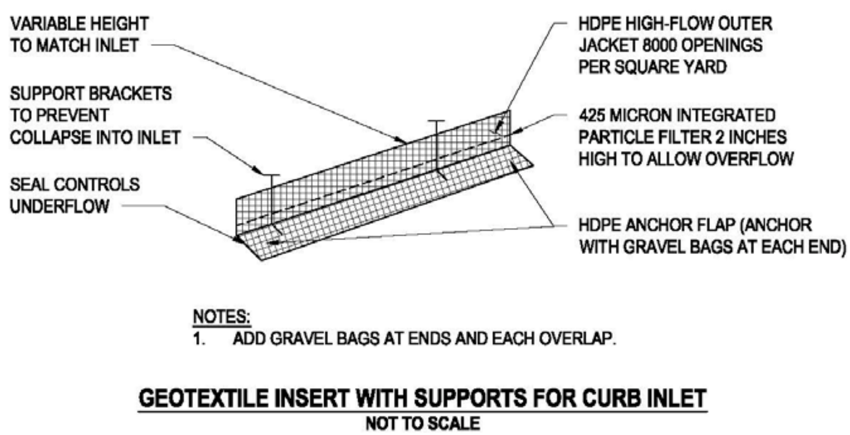


Figure 39-2. Example of a geotextile insert with supports

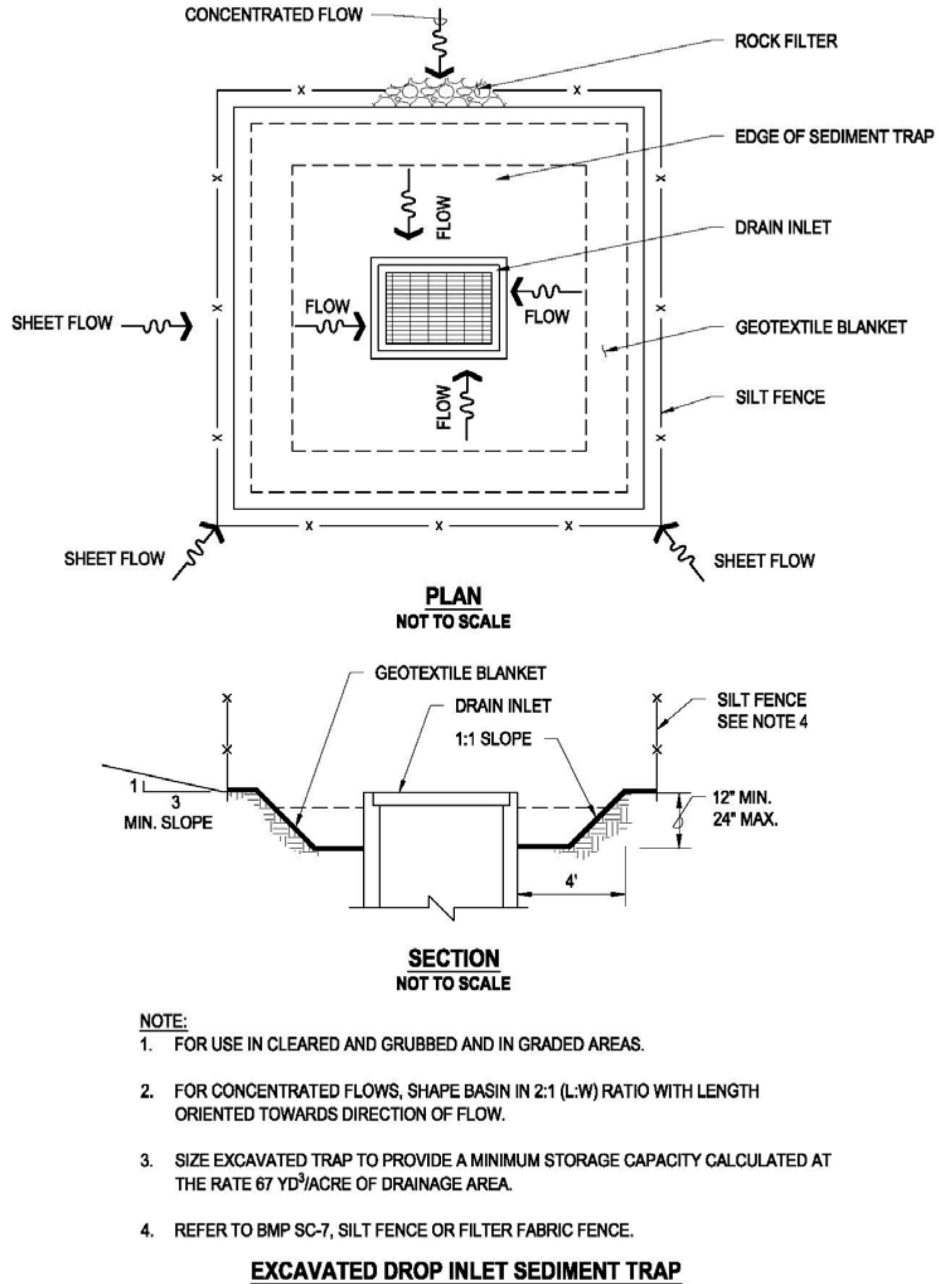


Figure 39-3. Example of an excavated drop inlet sediment trap

40 Vegetated Filter Strips and Buffers

Image Source: State of Hawaii Department of Transportation, Highways Division, *Construction Best Management Practices Field Manual,* 2021.

40.1 Description

Vegetative buffer strips and channels help to protect ditches and banks from erosion, increase infiltration, and remove pollutants from surface runoff providing protection to downstream receiving inlets and waterbodies.

40.2 Applications

- Any site suitable for establishment of vegetation.
- Vegetated buffer strips are appropriate for uncurbed, paved areas; steep slopes; potentially unstable slopes; and areas adjacent to sensitive waterbodies and state waters.
- Vegetated channels are appropriate for surface runoff conveyed by channels to downstream inlets or receiving waters.

40.3 Installation and Implementation

- Minimize the disturbance to existing vegetation at the site when installing a filter strip. Proper care of existing vegetation before and after construction is required. See section 17 Preservation of Existing Vegetation for more information.
- If a boundary of the disturbed area is within 50 feet of state waters, comply with 1 of the following:
- Provide and maintain a 50-foot undisturbed natural buffer and sediment control.
- Provide and maintain an undisturbed natural buffer that is less than 50 feet and double sediment control (e.g., double perimeter control) spaced a minimum of 5 feet apart.
- If it is infeasible to provide and maintain an undisturbed natural buffer of any size, provide and maintain double sediment control (e.g., perimeter control) spaced a minimum of 5 feet apart and complete stabilization within 7 calendar days of the temporary or permanent cessation of earth-disturbing activities.

- Hawaii Revised Statutes Title 13. Planning and Economic Development 205A. Coastal Zone Management defines "shoreline" as "the upper reaches of the wash of the waves at high tide during the season of the year in which the highest wash of the waves occurs, excluding storm surge or seismic action”. The shoreline is considered the starting point for any buffer/filter strips employed during construction. Perimeter control BMPs must be placed according to where the shoreline has been defined.
- Vegetation must be fully established before storm water flows through the buffer. Vegetation used should be competitive with common weed species in area.
- Installation of a buffer strip with new vegetation shall comply with the following:
- Prior to cultivation of the designated buffer strip area, remove and dispose of all weeds and debris in accordance with the following:
- During construction, strip and stockpile good topsoil for surface preparation purposes prior to planting activities.
- Plant the area upon completion of grading in the area.
- Do not remove trees to create an area for vegetated filter strips.
- Vegetated filter strips shall be sloped 5% or less. This allows the storm water to be pulled down the slope by gravity, while moving slow enough to allow sediment and pollution removal.
- Fine grade and roll areas to be planted after cultivating soil and, if applicable, installing the irrigation system.
- Provide additional watering or irrigation of vegetation to supplement rainfall until vegetation has been established.
- Fertilize vegetation in accordance with manufacturer’s instructions and grass/soil requirements determined by testing of the soil.
- Soil should not be compacted. Loosen soil and add top soil as needed before seeding.
- Vehicular traffic passing through vegetated buffer strips or channels shall be avoided to protect vegetation from damage and maximize its effectiveness.
- Comply with applicable regulations and manufacturer’s instructions when applying fertilizers, pesticides, soil amendments, or chemicals
- Wider filter strips will be more effective and remove finer sediments.
- Vegetated filter strips should be a minimum width of 5 feet.
- Buffer strip edges should have dense growth to breakup concentrated flow.
- Seeding activities shall comply with the following:
- Add soil amendments such as fertilizer when preparing seedbed. Apply mulch after seeding to protect vegetation during establishment. Select an appropriate seed mixture based on site conditions.
- Seed mixture should receive approval in writing prior to installation.
- Native plants should be prioritized, but non-native plants can be used if accepted by the Engineer.
- Dense grasses are more effective in reducing flow velocities and removing sediment. Thick root structures are necessary for erosion control.

- Use proper equipment and methods to ensure uniform distribution and appropriate seed placement.
- Overseed, repair bare spots, and apply additional mulch as necessary.
- Sodding activities shall comply with the following:
- Protect sod with tarps or other types of protective covering during delivery and do not allow sod to dry between harvesting and placement.
- Restore any irregular or uneven areas observed prior to or during the plant establishment period to a smooth and even appearance.
- Ensure ground surface is smooth and uniform prior to placing sod.
- Areas which will be planted with sod and are adjacent to paved surfaces such as sidewalks and concrete headers, shall be 1.5 ± 0.25 inches below the top grade of the paved surface after fine grading, rolling, and settlement of the soil.
- Stagger the ends of adjacent strips of sod a minimum of 24 inches apart.
- Place edges and ends of sod firmly against paved borders.
- Lightly roll sodded area to eliminate air pockets and ensure close contact with the soil after placement of the sod.
- Water the sodded area to moisten the soil to a depth of 4 inches after rolling.
- Do not allow sod to dry.
- Avoid planting sod during extremely hot or wet weather.
- Sod shall not be placed on slopes steeper than 3:1 (H:V) if the area will be mowed.

40.4 Considerations

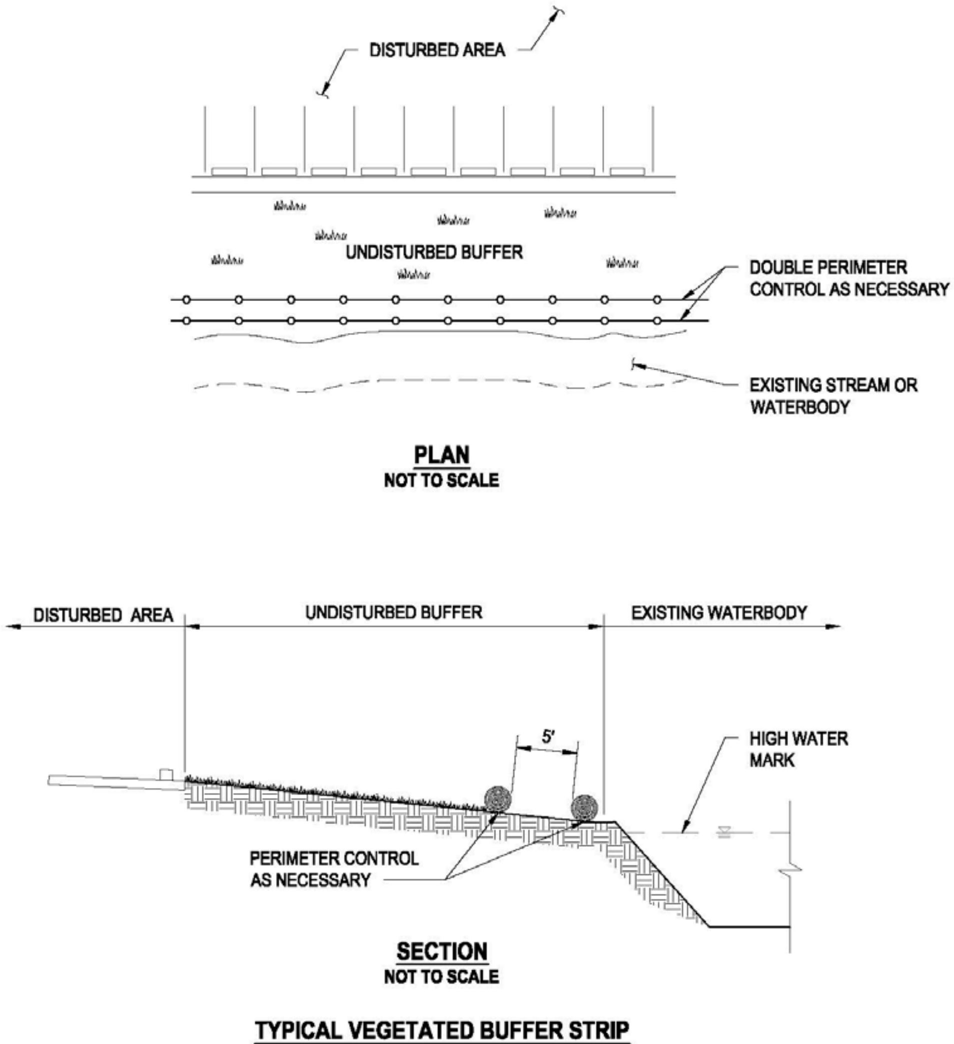
- Site conditions such as availability of land.
- Flow depth and vegetative condition determine BMP effectiveness.
- May require irrigation to maintain vegetation.
- High maintenance requirements may exist depending on the design condition of the vegetation.
- Unless existing vegetation is used as a buffer strip, an area will need to be provided specifically for a buffer strip and vegetation will need to be established.
- Maintaining sheet flow in buffer strips may be difficult.
- Vegetated channels require a larger area than lined channels.
- Vegetated channels require gradual slopes since runoff with high flow velocity may flow over grass rather than through it. Buffer zones do not replace the requirement for site sediment control.
- BMP performance depends on topography and climate conditions for the specific site.

40.5 What to Inspect

- Is there an excess amount of sediment buildup in buffer strips?
- Are buffer strips wide enough to be effective?
- Are rills and gullies formed from runoff?
- Is unwanted vegetation growth observed?
- Are vegetated filter strips fully established prior to receiving flow?
- Have native grasses/plants been planted?

40.6 Maintenance

- Maintenance activities include mowing, weeding, and verification of properly operating irrigation system, if applicable.
- Properly remove and dispose of clippings from mowing and trimming.
- When installed correctly, filter strips require minimal maintenance.
- Unwanted growth should be removed without disrupting existing vegetation.
- Maintain vegetated filter strips so it remains dense and healthy.
- If check dams are installed, repair/replace as necessary.



NOTES:
1. PROVIDE AND MAINTAIN A 50-FOOT UNDISTURBED BUFFER AND SEDIMENT CONTROL FROM STATE WATERS.
2. IF THE EARTH DISTURBANCES ARE LOCATED LESS THAN 50 FEET FROM STATE WATERS, MAINTAIN AN UNDISTURBED NATURAL BUFFER AND INSTALL DOUBLE SEDIMENT CONTROL (E.G. DOUBLE PERIMETER CONTROL) SPACED A MINIMUM OF 5 FEET APART.
3. THE DEPARTMENT DOES NOT CONSIDER ALL STORM WATER CONTROL FEATURES (E.G. STORM WATER CONVEYANCE CHANNELS, STORM DRAIN INLETS, SEDIMENT BASINS) TO BE STATE WATERS.

Figure 40-1. Example of a typical vegetated buffer strip

41 Check Dams

41.1 Description

Temporary devices placed across channels, ditches or swales to reduce scour and erosion by reducing flow velocity and promoting sedimentation.

41.2 Applications

- Appropriate for small open channels conveying runoff from 10 acres or less.
- Steep channels with runoff velocities exceeding 2 feet/second.
- Temporary ditches which do not require installation of erosion-resistant linings due to expected short-term use.
- May be used in a curb and gutter scenario.

41.3 Installation and Implementation

- Distance between check dams and height of each device shall promote the formation of small pools between adjacent devices.
- Backwater from the downstream check dam shall reach the toe of the upstream check dam.
- Major flows shall flow over the check dam without increasing upstream flooding or damaging the check dam.
- Remove check dams and accumulated sediment upon establishment of vegetative lining. Stone check dams shall consist of stones ranging from approximately 8 to 12 inches in size.
- Stones shall be placed by hand or by other mechanical means, not dumped.
- Stone material shall completely span the channel or ditch to prevent washout of the check dam.
- Geotextile should be installed under stone check dams. Check dams should be 6 inches lower in the center than at the ends to allow flow over the center.

- Log check dams shall consist of logs ranging from 4 to 6 inches in diameter. Logs shall be embedded a minimum of 18 inches into the soil.
- Remove check dams upon establishment of grass used for stabilization of the ditch or channel, unless the slope of the swale exceeds 4%.

41.3.1 APPLICABLE CHECK DAM DEVICES

- Rocks
- Sandbags/gravel bags wrapped in geotextile
- Logs
- Snake bags
- Compost filter berms/socks

41.4 What to Inspect

- Is height of check dam effective?
- Is there evidence of sediment bypassing the check dam?
- Does the rock check dam have dislodged stones?
- Are check dams adequately spaced to slow the velocity of flow?
- Is there traces of undercutting?
- Has accumulated sediment reached one-half the height of the check dam?
- Are check dams the required diameter?
- Are check dams properly oriented?

41.5 Maintenance

- Remove accumulated sediment when depth reaches one-half the sump depth.
- Replace/repair damaged gravel bags or sandbags.
- Replace dislodged stones from rock check dams to sustain initial design.
- Reposition and clean compost filter sock check dams that get pushed out of position by a heavy flow.

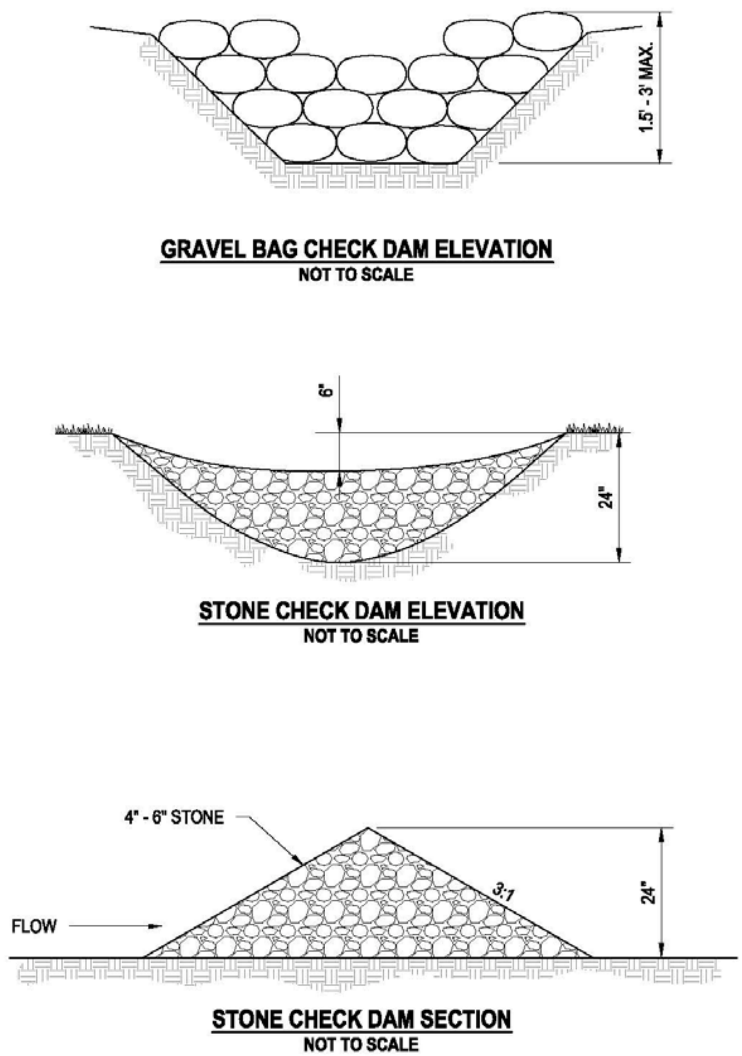


Figure 41-1. Examples of check dams

42 Sediment Trap

Image Source: State of Hawaii Department of Transportation, Highways Division, *Construction Best Management Practices Field Manual,* 2021.

42.1 Description

A temporary runoff containment area to promote sedimentation prior to discharge of the runoff through a stabilized spillway.

42.2 Applications

- Drainage areas less than 5 acres.
- Areas along the perimeter of the site where sediment-laden runoff is discharged off- site.
- Areas requiring additional sediment containment measures such as bodies of water or discharge points to a drainage system.
- On-site discharge points to a stabilized or natural area or waterway.

42.3 Installation and Implementation

- Construct sediment trap prior to engaging in clearing, grubbing, or grading activities.

42.3.1 Location of Sediment Trap

- Area where a low embankment may be constructed across a swale.
- Area where failure of sediment trap will not cause property damage or loss of life.
- Area where maintenance crew may easily access sediment trap.

42.3.2 Sediment Trap Sizing

- Minimum trap settling volume of 133 cubic yards per acre.
- Minimum trap sediment storage volume of 33 cubic yards per acre.

- Trap width shall be less than one-half of the trap length.
- Flood volume.
- Construct sediment trap by excavating ground or constructing an earthen embankment to create a containment area.
- Area under embankment shall be cleared, grubbed, and stripped of vegetation and root mat.
- Fill material for embankment shall be free of roots, woody vegetation, oversized stones, rocks, organic material, or other objectionable material. Compact embankment by traversing with construction equipment.
- Stabilize trap outlet with stone or vegetation.
- Install fencing to prevent unauthorized entry and for safety purposes.
- All pipe joints shall be watertight when a riser is used.
- The top two-thirds of the riser shall be perforated with holes 1 to 4 inches in diameter. The holes shall be vertically spaced at 8-inch intervals and horizontally spaced at 10- to 12-inch intervals.
- Outlet crest elevation of an earth or stone outlet shall be a minimum of 1 foot below the top of the embankment.
- If the sediment trap is to remain in place for 14 calendar days or more, the embankments, berms, and other areas of exposed soil must be temporarily stabilized.

42.4 Considerations

- Applies to maximum drainage area of 5 acres. Drainage areas exceeding 5 acres shall implement Sediment Basins. See section 43 Sediment Basin for more information.
- Only removes large and medium size particles.
- Requires protective fencing.
- Do not install in live streams.
- Availability of right-of-way may limit size of sediment trap.

42.5 What to Inspect

- Are spillways or outlets obstructed or damaged?
- Is there evidence of erosion at the outlets?
- Are the areas stabilized around outlets?
- Is fencing damaged?

42.6 Maintenance

- Remove obstruction and repair damage as necessary.
- Remove sediment which has accumulated to within 1 foot of the maximum storage elevation.
- Properly dispose of sediment and debris removed from sediment trap.

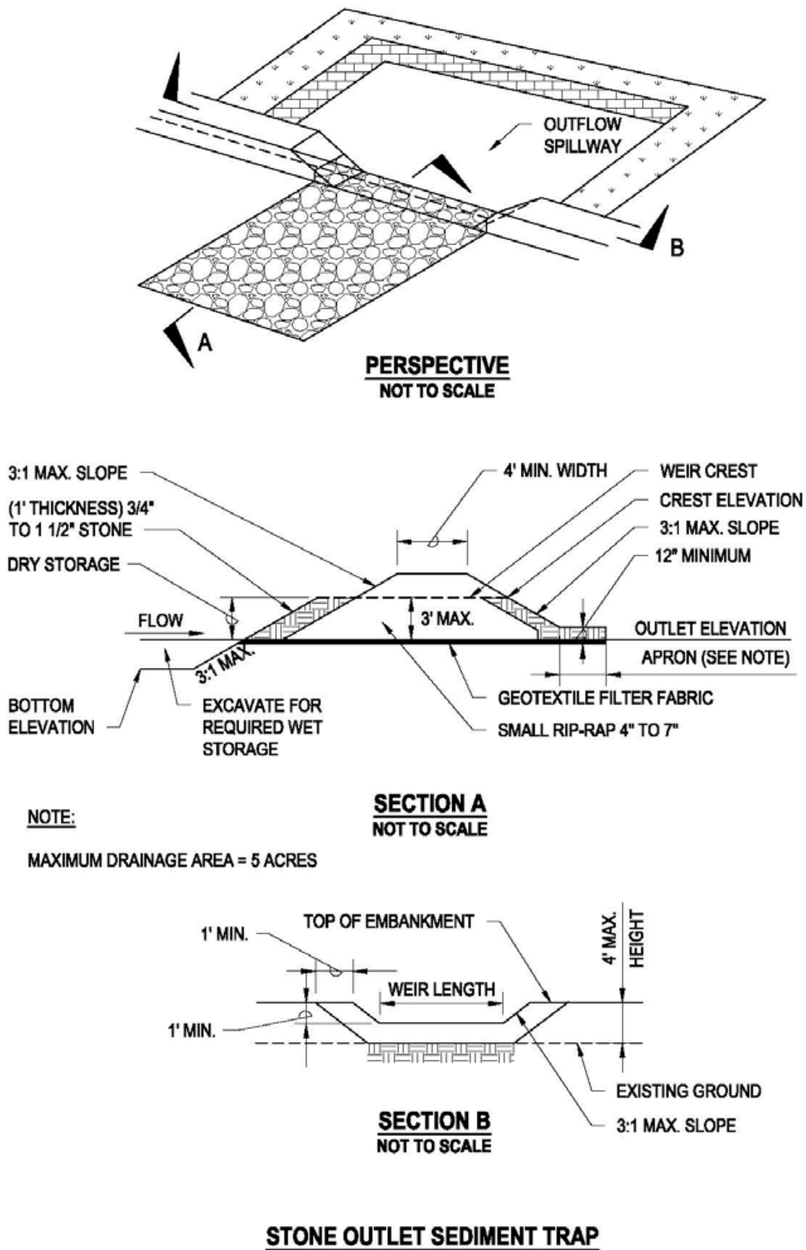


Figure 42-1. Example of a stone outlet sediment trap

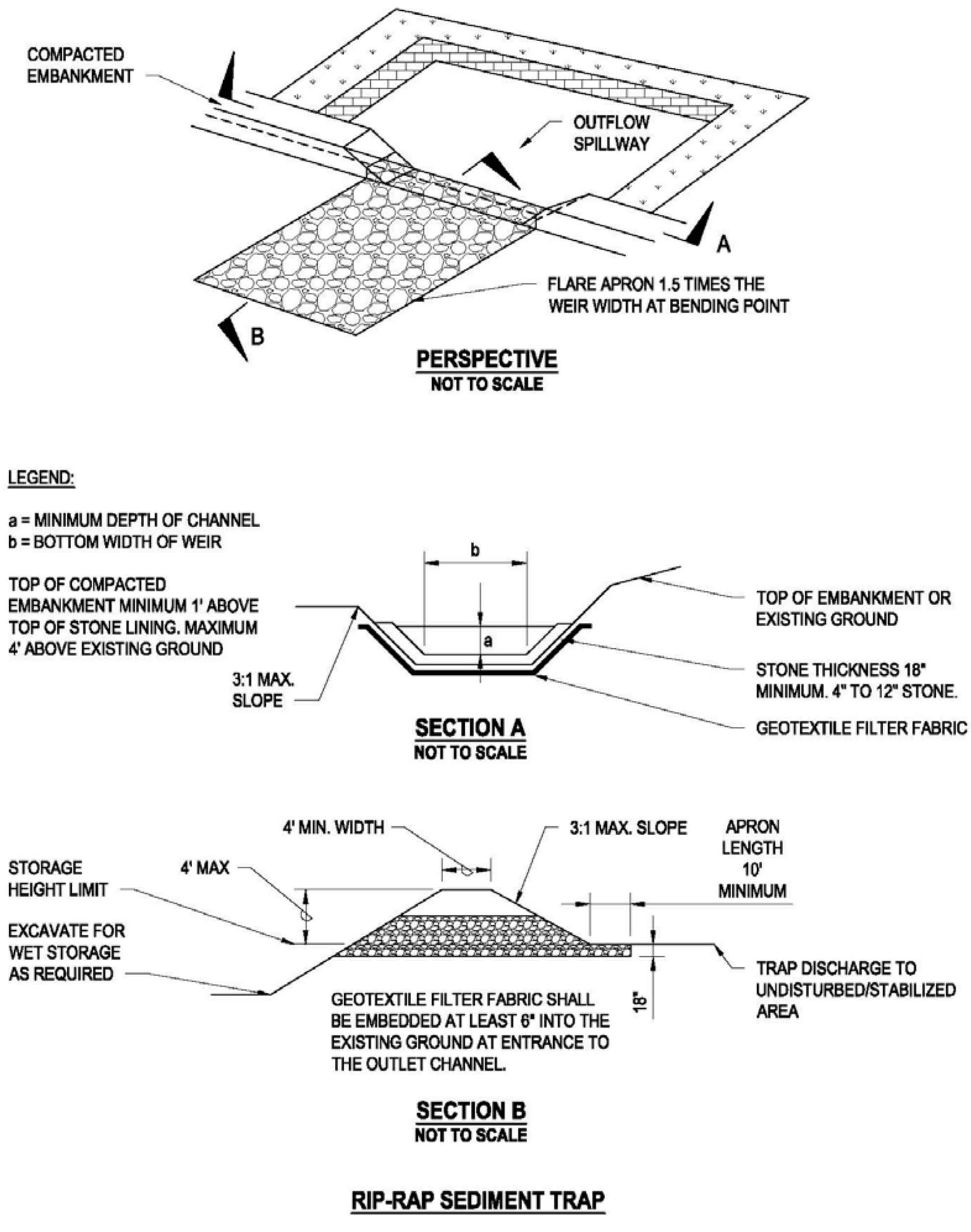


Figure 42-2. Example of a rip-rap sediment trap

43 Sediment Basin

43.1 Description

Temporary basin that intercepts sediment-laden runoff and allows sediment to settle prior to discharge of runoff from the site.

43.2 Applications

- Drainage areas larger than 5 acres.
- Areas where sediment-laden runoff is discharged to the drainage system or watercourses.

43.3 Installation and Implementation

- Construct sediment basins prior to clearing, grubbing, or grading activities.

Location shall be based on the following:

- Area where terrain forms a natural basin.
- Area which minimizes construction interference.
- Area where maximum benefit may be achieved from the existing terrain to minimize excavation or construction effort to install sediment basin.
- Area where failure of sediment basin will not cause property damage or loss of life.
- Area where maintenance crew may easily access sediment basin.
- Area where permanent detention basin will be constructed.
- Sediment basin shall be designed to allow 70% to 80% of the sediment to settle during a 24- to 40-hour detention time.
- The sediment basin is divided into 2 zones:
- Sediment storage zone with a minimum of 1 foot in depth.
- Settling zone with a minimum of 2 feet in depth.

43.3.1 Sediment Basis of Design

Settling zone volume shall be determined by the following equation: V = 1.2(SD)Q/VSED where:

- V = Settling zone volume.
- SD = Settling depth, which shall be a minimum of 2 feet and greater than the average distance from inlet to outlet of the basin divided by 200.
- VSED = Settling velocity of the design soil particle (medium silt). The settling velocity of a medium silt soil particle is 0.00096 feet per second.
- The discharge rate measured shall be determined by the following equation: Q = CIA where:
- Q = Discharge rate measured in cubic feet per second. C = Runoff coefficient.
- I = Precipitation intensity for the 10-year, 1-hour rain event.
- A = Area draining into the sediment basin in acres.

- Basin geometry for the sediment storage zone shall be determined by a minimum depth of 1 foot and 3:1 (H:V) or flatter side slopes extending from the bottom of the basin. Basin bottom shall be level.
- Provide an emergency spillway with the top of the riser pipe 1 foot below the crest elevation.
- Sediment basin length to settling depth ratio (L/SD) shall not exceed 200.
- Sediment basin length to width ratio shall not be less than 6:1 or baffles shall be installed.
- Install and securely anchor anti-seep collar on the outlet pipe/riser.
- Construct sediment basin by excavating ground or constructing an embankment of compacted soil. Embankments should be stabilized.
- Sediment basin may have more than 1 inflow point.
- Stabilize inlet, outlet, and slopes of basin with rock or vegetation.
- Install fencing to prevent unauthorized entry and for safety purposes.
- Refer to the Storm Water Permanent Best Management Practices Manual for more information.

43.4 Considerations

- Limited design life of 12 to 18 months.
- Sediment basin removes medium size particles.
- Additional BMPs such as seeding, mulching, and diversion dikes may be used to reduce the amount of sediment intercepted by the basin.
- Requires protective fencing.
- Inappropriate for installation in live streams.
- Availability of right-of-way may limit size of sediment basin.
- Large basins may be subject to state and local requirements for dam safety.

43.5 What to Inspect

- Is there evidence of obstructions or damage to inlets and outlets?
- Is there erosion around outlets?
- Is fencing damaged?

43.6 Maintenance

- Remove obstructions from inlets and outlets and repair damage as necessary.
- Stabilize outlets and repair fencing as necessary.
- Remove sediment when the sediment storage volume is one-half full.

- Properly dispose of sediment and debris removed from sediment basin.

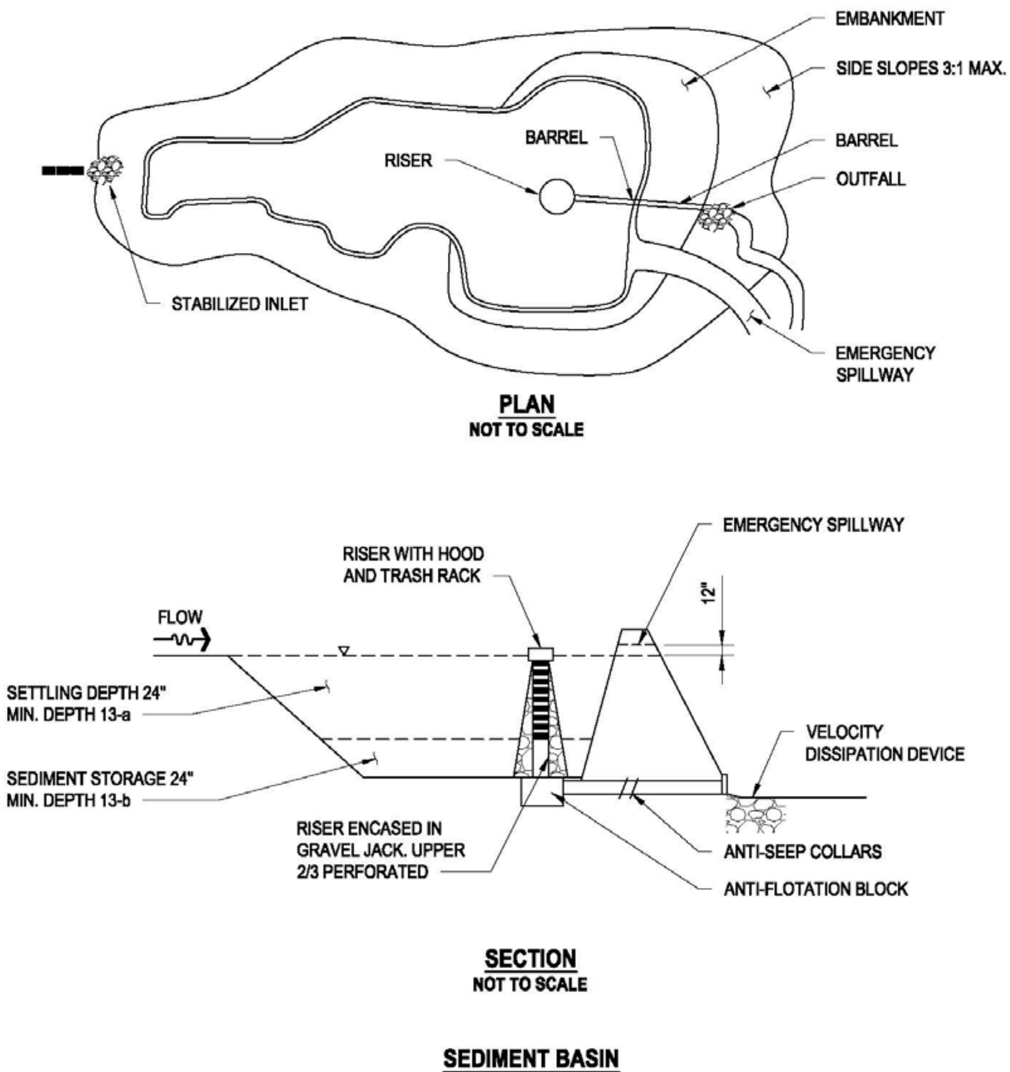


Figure 43-1. Example of a sediment basin

44 Compost Filter Berm/Sock

44.1 Description

Berms consisting of compost material placed perpendicular to runoff to reduce flow velocity and retain sediment and other pollutants. A fiber roll may consist of straw, flax, mulch, or other similar materials bound into a tight tubular roll.

44.2 Applications

- Along the site perimeter.
- Along the slope face and toe of slope (See section 27Earth Dikes, Swales, and Ditches).
- Check dam in small drainage ditches (See section 41Check Dams).
- Inlet protection for storm drains (See section 39 Storm Drain Inlet Protection).
- Surrounding base of temporary stockpiles (See section 3 Stockpile Management).
- Appropriate for small drainage areas and low surface velocity flows (less than 1 cubic feet per second (cfs)).
- Vegetative filtering system.
- Applied as a comprehensive system to storm water management.
- Used as perimeter control for disturbed/bare areas.

44.3 Installation and Implementation

- Usually located at the base of slopes, however, additional berms may be used for velocity dissipation devices mid-slope to increase erosion protection. See section 31 Slope Interceptor or Diversion Ditches/Berms for more information.

- Compost quality shall comply with all local, state, and federal requirements. Installation of a compost filter sock, which consists of a mesh tube filled with composted material, as a type of compost filter berm shall comply with the following:
- Assemble by tying a knot at the end of the mesh sock, filling the sock with compost, and knotting the other end of the sock. A pneumatic blower may be used to fill the sock with compost.
- Socks shall be 8 inches in diameter, minimum.
- If more than 1 compost filter sock is placed in a row, the compost filter socks must be overlapped, not abutted. The overlap shall be 6 inches, minimum (or in accordance with the manufacturer's recommendations), and shall be horizontal, side-by-side. The overlap shall not be vertical, top-to-bottom.
- Compost filter socks used on concrete or other hard surfaces that make staking non-applicable should be weighed down so it does not become displaced during heavy rain/runoff.
- Turn ends of filter sock up slope, a minimum of 3 feet, to prevent flow around ends.
- Compost filter socks must be in continuous contact with the ground. There should be no gaps between the sock and the ground beneath it.
- Compost filter socks may also be used for areas of concentrated flow such as near, but not at or in, streams or shorelines. Compost filter socks cannot be used in-water and must be installed above the high-water mark for streams/shorelines.
- Material and equipment must not be stored on top of the compost filter socks while in place. The compost filter sock must always be accessible for inspection and maintenance.
- When used as velocity dissipation devices on steep slopes, stake compost filter socks into a 2- to 4-inch-deep trench with a width equal to the diameter of the compost filter sock. Stakes must be driven at least 12 inches into the ground, while leaving a minimum stake height of 2 inches above the compost filter sock. Drive stakes through the center at the end of each compost filter sock and space apart 4 feet maximum on center.
- Follow manufacturer's specifications on proper use.
- At the completion of project, filter sock material, including the compost, shall be removed from the site and disposed of/reused properly. Fill and compact trenches once compost filter socks are removed.
- Material for compost berm/filter sock may be left at the site and used as a soil amendment, if approved by the Engineer. Material should be spread, not left in a clump or pile. The geotextile netting must be disposed of properly.

44.4 Considerations

- Do not install below the high-water mark of streams/shorelines or in-water.
- Unsuitable for areas with concentrated runoff unless a low flow rate and small drainage area warrants use of a filter berm/sock. Compost filter socks should be installed per manufacturer's recommendations
- Heavy vegetation must be removed to ensure close contact of compost with the ground surface.
- Difficult to move once saturated.
- Uneven terrain may restrict use of BMP.
- Heavy construction equipment and/or vehicles that run over compost filter socks can easily damage or impair the performance of the device.
- Soil may harden on the geotextile filter fabric, which will inhibit infiltration and proper effectiveness.
- Efficiency quickly decreases as sediment accumulates. Frequent maintenance is needed.

- Berms/socks cannot be staked or trenched when used on concrete and rocky surfaces.

44.5 What to Inspect

- Does the filter sock have rips or tears exposing the filter media?
- Does the filter sock need to be trenched and staked?
- Has sediment accumulated to one-half the height of the berm? Are compost filter socks positioned in the correct orientation to effectively manage storm water? Is there evidence of rills or gullies forming under the compost berm?
- Is there vehicles or equipment stored on top of the berm?
- Are compost filter socks properly installed according to manufacturer's specifications?

44.6 Maintenance

- Remove sediment which has accumulated to within one-half of the berm height.
- Replace disturbed or damaged areas of the berm.
- Repair/replace split, torn or slumping compost filter socks.
- Repairs to damaged compost filter socks must preserve filtration capabilities. Do not use duct tape, glue, or any material that will diminish the effectiveness of the compost filter sock.
- Maintain BMP until the disturbed area above the device is permanently stabilized.
- Reorient compost filter socks that have been disturbed.
- Clean hardened soil on geotextile filter fabric to ensure proper filtration can occur.
- Fix berms/socks that have been driven over and flattened.

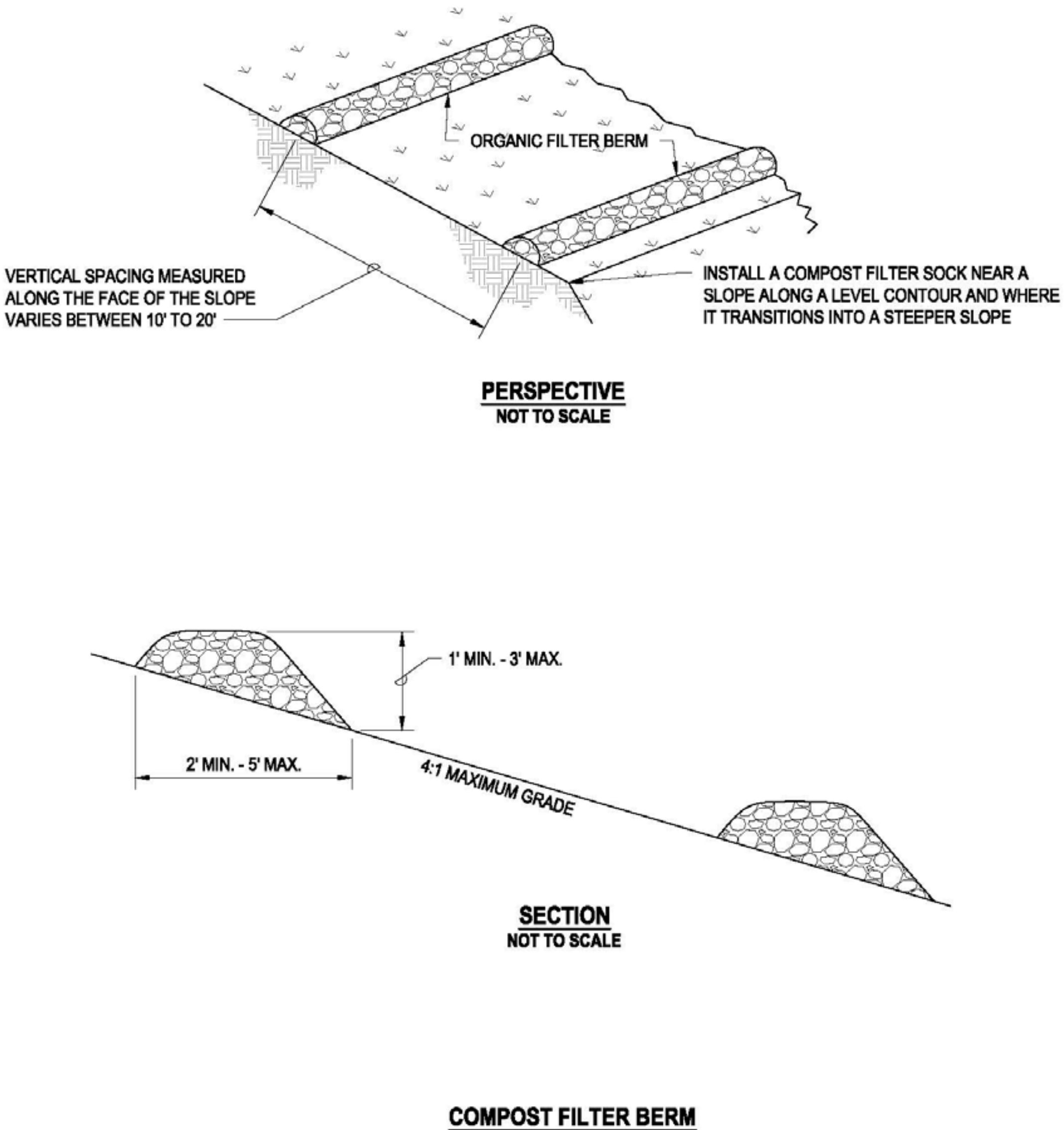
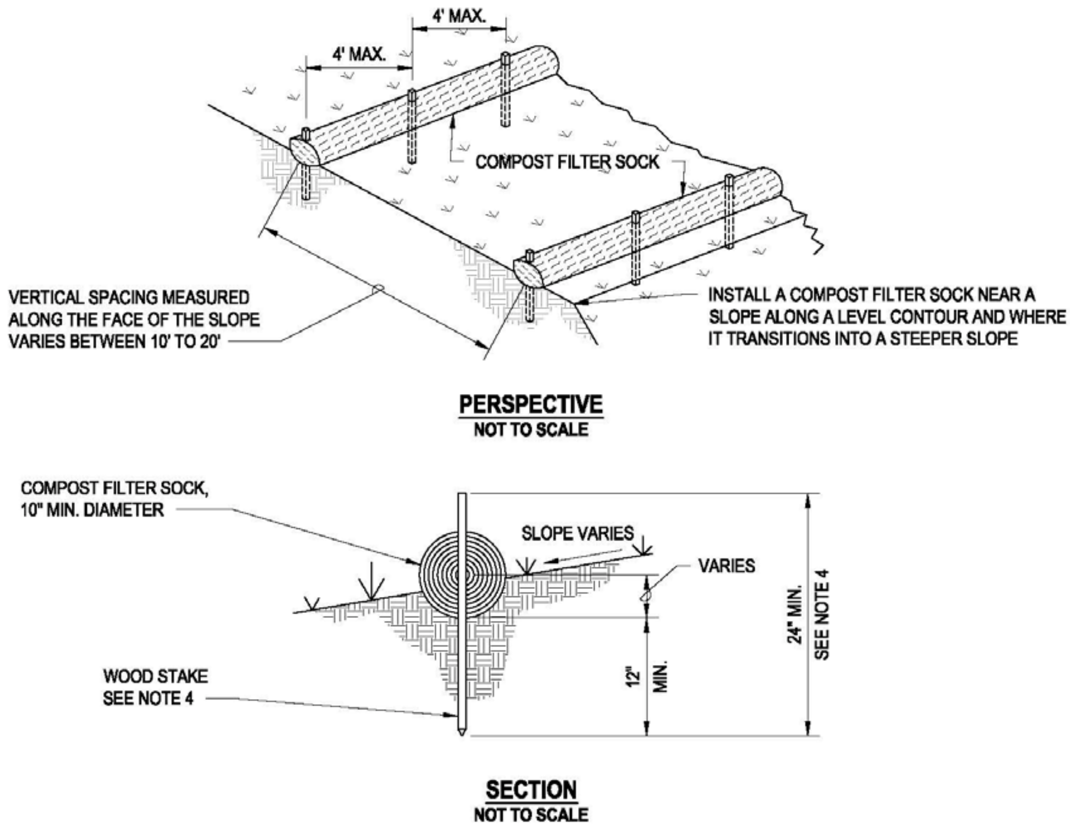


Figure 44-1. Example of a compost filter berm



NOTES:

1. COMPOST FILTER SOCKS SHOULD BE EITHER PREFABRICATED OR ASSEMBLED AT SITE.
2. LOCATE COMPOST FILTER SOCKS ON LEVEL CONTOURS SPACED AS FOLLOWS:
   a. SLOPE INCLINATION OF 4:1 (H:V) OR FLATTER: COMPOST FILTER SOCKS AND/OR BERMS SHOULD BE PLACED AT A MAXIMUM INTERVAL OF 20 FT.
   b. SLOPE INCLINATION BETWEEN 4:1 AND 2:1 (H:V): COMPOST FILTER SOCKS (USE OF BERMS NOT RECOMMENDED) SHOULD BE PLACED AT A MAXIMUM INTERVAL OF 15 FT. (A CLOSER SPACING IS MORE EFFECTIVE).
   c. SLOPE INCLINATION OF 2:1 (H:V) OR GREATER: COMPOST FILTER SOCKS SHOULD BE PLACED AT MAXIMUM INTERVAL OF 10 FT.
3. TURN THE ENDS OF THE COMPOST FILTER SOCKS UP SLOPE TO PREVENT RUNOFF FROM GOING AROUND THE ROLL.
4. STAKE COMPOST FILTER SOCKS WITH STAKES WITH A MINIMUM LENGTH OF 14 IN. AND SPACED 4 FT. ON CENTER, OR AS RECOMMENDED BY THE MANUFACTURER, WHICHEVER IS GREATER.
5. IF MORE THAN ONE COMPOST FILTER SOCKS IS PLACED IN A ROW, THE ROLLS SHOULD BE OVERLAPPED, NOT ABUTTED.

COMPOST FILTER BERM (FILTER SOCK)

Figure 44-2. Example of a compost filter berm with filter sock

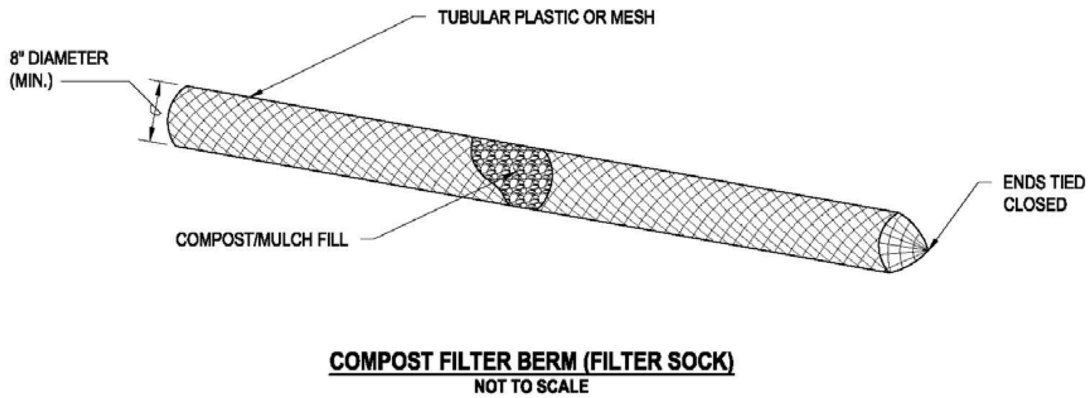


Figure 44-3. Example of a compost filter sock

45 Silt Fence or Filter Fabric Fence

45.1 Description

Temporary linear sediment barrier composed of permeable fabric designed to intercept and slow sediment-laden storm water.

45.2 Applications

- Install along the site perimeter.
- Install around temporary spoil or stockpiles.
- Install along streams and channels.
- Position below the toe of cleared or erodible slopes.
- Protect downslope of exposed soil areas.
- Place along the top of slope or other areas to reduce effects of sheet flow.

45.3 Installation and Implementation

- Install silt fence along or parallel to contours.
- Excavate a trench 6 inches wide and 6 inches deep along the line of the silt fence (soil slicing may be considered).
- Place the bottom of the silt fence in the trench.
- Backfill the trench and compact the soil by hand or mechanically.

- Silt fence posts shall be wooden, 1.25-inch × 1.25-inch × 48-inch, and be driven a minimum of 14 inches into the trench (see silt fence detail). Posts shall be installed on the down slope side of the silt fence. Silt fence posts may be attached to the fabric on- site or silt fence with pre-attached posts may also be used.
- Silt fence products using steel rebars in lieu of wood posts must use #4 or larger rebar and must include a safety cap on all exposed edges.
- Silt fence must be overlapped 6 inches between adjoining segments or may be overlapped, wrapped, and rolled.
- Ends of silt fence shall be turned uphill.
- Primarily used where sheet flow occurs.
- When using 2 rows of silt fence, install far enough apart to prevent the collapse of 1 fence from impacting the other.
- Install silt fence according to the specifications listed above or per manufacturer’s specifications, whichever is more stringent.

45.4 Considerations

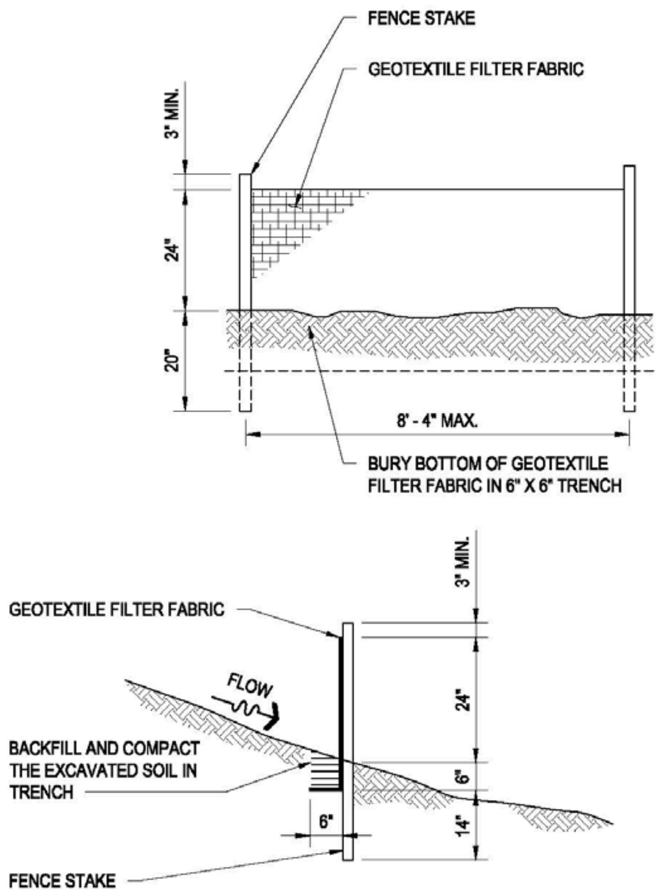
- Avoid installing silt fence on slope. However, if silt fence is placed on a slope, fence posts may need additional embedment.
- Do not install in streams, channels, or areas of concentrated flow.
- Do not use to divert flow.

45.5 What to Inspect

- Is there sediment accumulating behind the silt fence?
- Is the silt fence properly installed?
- Is there evidence of undermining or undercutting?
- Are adjoining segments seamless?
- Does silt fence have rips, tears, or degradation of fabric?
- Are stakes on downgradient side?
- Is the fabric securely attached to the stakes?

45.6 Maintenance

- Repair or replace damaged fence or posts.
- Repair or replace split, torn, slumping, or weathering silt fence.
- Repair or reinstall silt fence where undercutting has occurred.
- Remove all accumulated sediment when depth reaches one-third the barrier height.
- Maintain vegetative ground cover upstream of the silt fence. Bare soil upstream of the silt fence can increase frequency and possibility of silt fence failure.

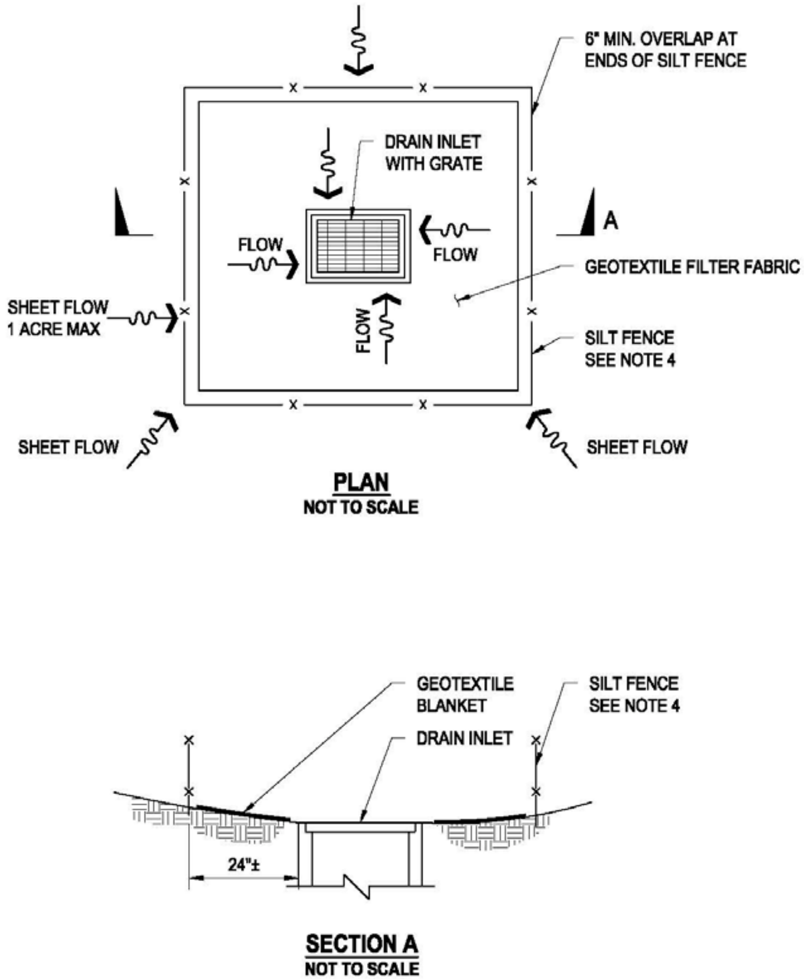


NOTES:

1. THE FILTER FABRIC SHALL BE A MINIMUM OF 36 INCHES WIDE.
2. IF SILT FENCE IS OBTAINED FROM MANUFACTURER AS A PACKAGE (I.E. FABRIC ATTACHED TO POST) THE MANUFACTURER'S INSTALLATION INSTRUCTION SHALL BE ADHERED TO.
3. FENCE STAKE MAY BE WOOD OR METAL, MUST BE CAPABLE OF SUPPORTING ANTICIPATED LOADS.
4. SILT FENCE MUST BE OVERLAPPED 6" BETWEEN ADJOINING SEGMENTS OR MAY BE OVERLAPPED, WRAPPED, AND ROLLED.

SILT FENCE
NOT TO SCALE

Figure 45-1. Example of silt fence



NOTE:

1. FOR USE IN AREAS WHERE GRADING HAS BEEN COMPLETED AND FINAL SOIL STABILIZATION AND SEEDING ARE PENDING.
2. NOT APPLICABLE IN PAVED AREAS.
3. NOT APPLICABLE IN CONCENTRATED FLOWS.
4. REFER TO BMP SC-7, SILT FENCE OR FILTER FABRIC FENCE.

GEOTEXTILE FILTER FABRIC FENCE FOR DROP INLET FILTER

Figure 45-2. Example of a geotextile filter fabric fence for drop inlet filter

46 Sandbag Barrier

Image Source: State of Hawaii Department of Transportation, Highways Division, *Construction Best Management Practices Field Manual,* 2021.

46.1 Description

Device used to intercept sediment-laden sheet flow, and allow sediment to settle prior to discharging off-site.

46.2 Applications

- Along the site perimeter.
- Along streams and channels.
- Utility trench barriers in channels.
- Across swales and small catchments.
- Diversion dike or berm.
- Below toe of exposed slopes.
- Temporary sediment trap.
- Around stockpiles.
- Weigh down inlet protection devices

46.3 Installation and Implementation

- Install bags end-to-end along a level contour.
- Turn ends of sandbag barrier up slope to prevent flow around ends.
- May be used in combination with soil stabilization controls up slope.
- Stack sandbags cross-sectionally in a pyramid formation if bags are to be stacked higher than 2 bags. If additional reinforcement is used, then stack sandbags in a brick wall formation.
- Materials for sandbag barrier shall comply with the following:
- Sandbag shall be woven polypropylene or polyamide fabric with ultraviolet protection to avoid rapid deterioration of fabric.
- Bag dimensions can vary but must be able to withstand anticipated flows.

- Fill material shall consist of non-cohesive, permeable material free of fines from clay and deleterious material.
- Sandbag barriers are allowed to be used in-stream provided that they will not become flood hazards, sandbag contents do not leak into the stream bottom, and they are removed once the project is completed.

46.4 Considerations

- Drainage area shall not exceed 5 acres.
- Avoid installing at locations which may compromise traffic safety.
- Burlap material shall not be used for sandbags.
- Does not filter sediment.
- Bags degrade when exposed to sunlight.
- Not adequate for long-term projects.
- Depending on application, installation may require an adequate amount of manpower.
- Not ideal for concentrated flows.

46.5 What to Inspect

- Has sediment accumulated?
- Does the sandbag have tears or rips?
- Are sandbags evenly spaced to weigh down inlet protection?
- Does the sandbag need to be replaced or reoriented?
- Is there evidence of erosion undermining the sandbag barrier?
- Is water bypassing the sandbag barrier?

46.6 Maintenance

- Reshape or replace sandbags as necessary.
- Remove and properly dispose of sediment, which has accumulated to a depth of 6 inches.
- Remove sandbags if they are no longer in use. If the area needs to be stabilized, do so immediately after removal.

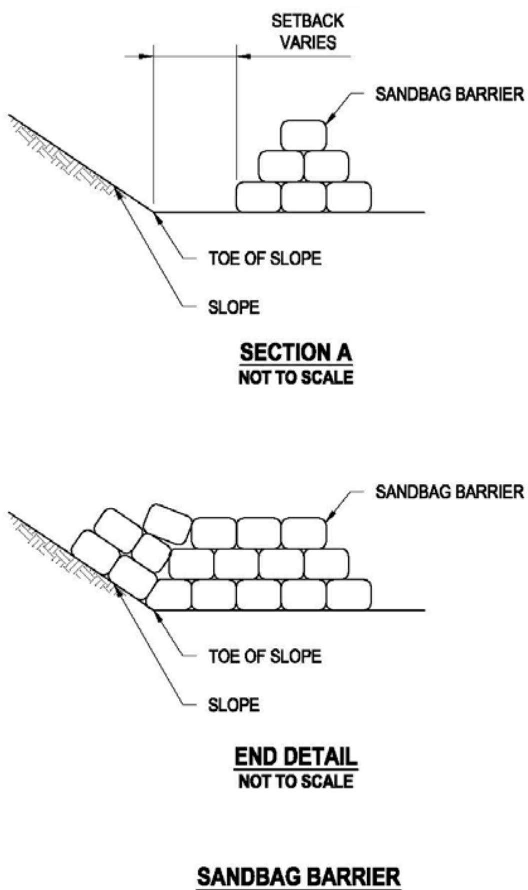
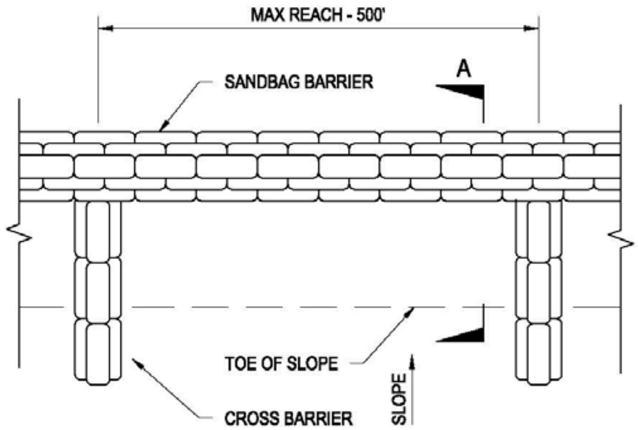


Figure 46-1. Example of a sandbag barrier



PLAN
NOT TO SCALE

NOTES:
1. CONSTRUCT THE LENGTH OF EACH REACH SO THAT THE CHANGE IN BASE ELEVATION ALONG THE REACH DOES NOT EXCEED 1/2 THE HEIGHT OF THE LINEAR BARRIER.
2. IN NO CASE SHALL THE REACH LENGTH EXCEED 500 FEET.
3. PLACE SANDBAGS TIGHTLY.
4. DIMENSIONS MAY VARY TO FIT FIELD CONDITIONS.
5. SANDBAG BARRIER SHALL BE A MINIMUM OF 3 BAGS HIGH.
6. THE END OF THE BARRIER SHALL BE TURNED UP SLOPE.
7. CROSS BARRIERS SHALL BE A MIN OF 1/2 AND A MAX OF 2/3 OF THE HEIGHT OF THE LINEAR BARRIER.
8. SANDBAG MATERIAL MUST CONFORM TO ASTM D3786 AND ASTM D4355.
9. SANDBAG BARRIERS ARE ALLOWED IN -STREAM PROVIDED THAT THEY WILL NOT BECOME FLOOD HAZARDS, SANDBAG CONTENTS DO NOT LEAK, AND THEY ARE REMOVED ONCE THE PROJECT IS COMPLETED.

SANDBAG BARRIER

Figure 46-2. Example of a sandbag cross barrier

47 Brush or Rock Filter

Image Source: State of Hawaii Department of Transportation, Highways Division, *Construction Best Management Practices Field Manual,* 2021.

47.1 Description

Filter berms constructed of brush or rock placed across a level contour area where sheet flow may occur to trap sediment and reduce flow velocity.

47.2 Applications

- Check dams across construction roads with mild slopes.
- Below the toe of slopes.
- Along the site perimeter, streams, or channels.
- Around temporary spoil areas.
- Downstream of small cleared areas.
- Sediment traps at culvert or pipe outlets.

47.3 Installation and Implementation

- Use stones between 0.75 to 3 inches in diameter or brush wrapped in geotextile filter fabric. Brush from site clearing may be used. Place across areas of sheet flow.
- Installation of rock filter berms with geotextile filter fabric should be used when possible.
- A brush filter berm can be made of brush, small tree limbs, grass, leaves or other waste material from clearing and grubbing.
- Brush filter berms must be 2 to 5 feet in height to detain storm water. The base width of the berm must be 5 to 10 feet with a shape that is either a triangle or slightly rounded.
- Install filter 5 to 7 feet from toe of slope to allow ponding.
- Larger rocks must be placed as the base of the berm. Smaller rocks must be placed on the uphill side to form a natural filter.
- Place larger rocks without fines in a gabion to stabilize areas of concentrated flow.

- Use larger stones placed in staked and woven wire sheathing if stones are used across an area of concentrated flow.
- Construct along a level contour.
- Provide an area behind berm for detention and sedimentation.
- Geotextile filter fabric, rope, or wire mesh screen can be used to keep the shape of the berm intact.
- Install the geotextile filter fabric into a 6-inch-deep trench uphill from berm.
- Secure filter fabric with staples, stakes, or rope to protect the brush from being displaced from wind or a storm.

47.4 Considerations

- Adequate detention area behind berm is necessary to prevent flooding upstream.
- Drainage area shall not exceed 5 acres.
- Removal of stone berms may be difficult, resulting in limited usefulness in landscaped areas.
- Must not be used in continuously flowing streams.
- Ponding may occur if not sized properly.

47.5 What to Inspect

- Has rock or brush been displaced?
- Is ponding occurring in undesired areas?
- Is there evidence of erosion or sheet flow?
- Is the height and width of the device appropriate for the flow?

47.6 Maintenance

- Reshape berm and replace any missing or dislodged stone or brush.
- Remove and dispose of sediment on upstream site of filter upon reaching a depth of 6 inches.
- Replace geotextile filter fabric when tears and rips limit effectiveness.

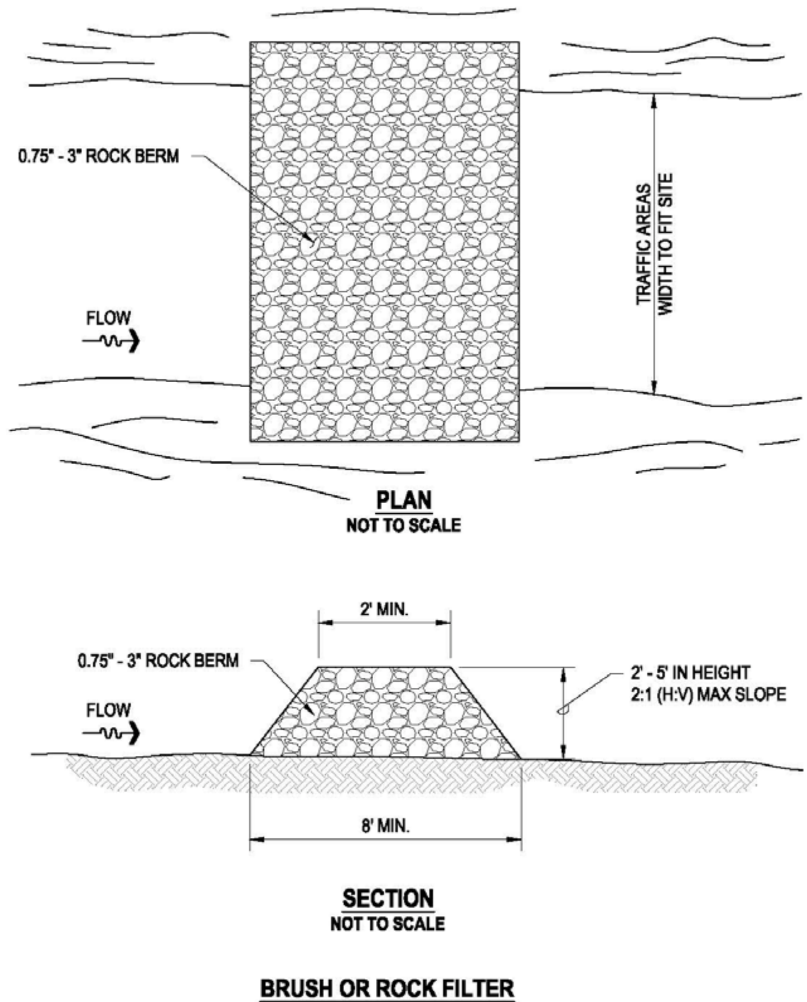


Figure 47-1. Example of a brush or rock filter

48 Construction Road and Parking Lot Stabilization

Image Source: State of Hawaii Department of Transportation, Highways Division, *Construction Best Management Practices Field Manual,* 2021.

48.1 Description

Stabilization and maintenance of temporary construction roads and parking areas after grading to minimize erosion and dust from vehicular traffic.

48.2 Applications

- Temporary construction roads.
- Parking areas for construction equipment and vehicles.
- On-site vehicular routes.
- Areas where sediment tracking may be a problem during wet weather.
- Areas where dust may be a problem during dry weather.
- Areas adjacent to bodies of water.
- Along steep grades or areas where additional traction is necessary.

48.3 Installation and Implementation

- Grade roadway to follow topographic contours to reduce erosion and divert surface water off the roadway.
- Roadway grade shall not exceed 15%.
- Properly grade roadway to prevent runoff from leaving site.
- Stabilize the temporary construction roads and parking areas with aggregate, asphalt cement, or concrete.

Table 48-1 Summary of materials used for temporary construction roads and parking areas

Allowable Materials	Not Allowable Materials
• Aggregate • Concrete • Asphalt cement • Compacted base course	• Cold mix asphalt • Uncompacted and compacted asphalt cement grindings • Crushed concrete • Concrete-treated Base

48.4 Considerations

- Although allowed under certain circumstances by the 2005 Hawaii Standard Specifications for Road and Bridge Construction, whenever possible, avoid chemicals stabilization methods, which may contribute to soil pollution and increase runoff.
- Construction traffic management may be subject to air quality control measures. Contact the local air quality management agency for more information.
- Roadway grade and site conditions.

48.5 What to Inspect

- Is there sediment buildup within aggregate?
- Is there dust generated from vehicles traveling on construction roads?
- Is the proper aggregate type and size being used?
- Is there geotextile under the coarse aggregate?
- Is there evidence of tracking on public roads?

48.6 Maintenance

- Periodically apply additional aggregate to refresh void spots on construction roads and parking areas.
- Remove sediment on the aggregate periodically to minimize polluted runoff.
- Temporary construction roads may require frequent dust control.
- Reshape roadway as needed for drainage and runoff control.

49 Stabilized Construction Entrance/Exit

49.1 Description

Designated areas for entry and/or exit from a construction site to reduce the amount of sediment tracked off-site by construction vehicles.

49.2 Applications

Stabilized construction entrances/exits shall be used at all points where access to a construction site from paved roads is required.

49.3 Installation and Implementation

- Restrict vehicle use to properly designated entrance/exit points.
- Grade the stabilized entrance/exit to prevent runoff from discharging off-site. Construct stabilized entrance/exit on level ground where possible.
- Provide ample turning radii, when applicable.
- Coarse aggregate, that are free of fine material, shall be 3 to 6 inches in diameter. The use of crushed concrete and asphalt concrete millings/grindings are not allowed.

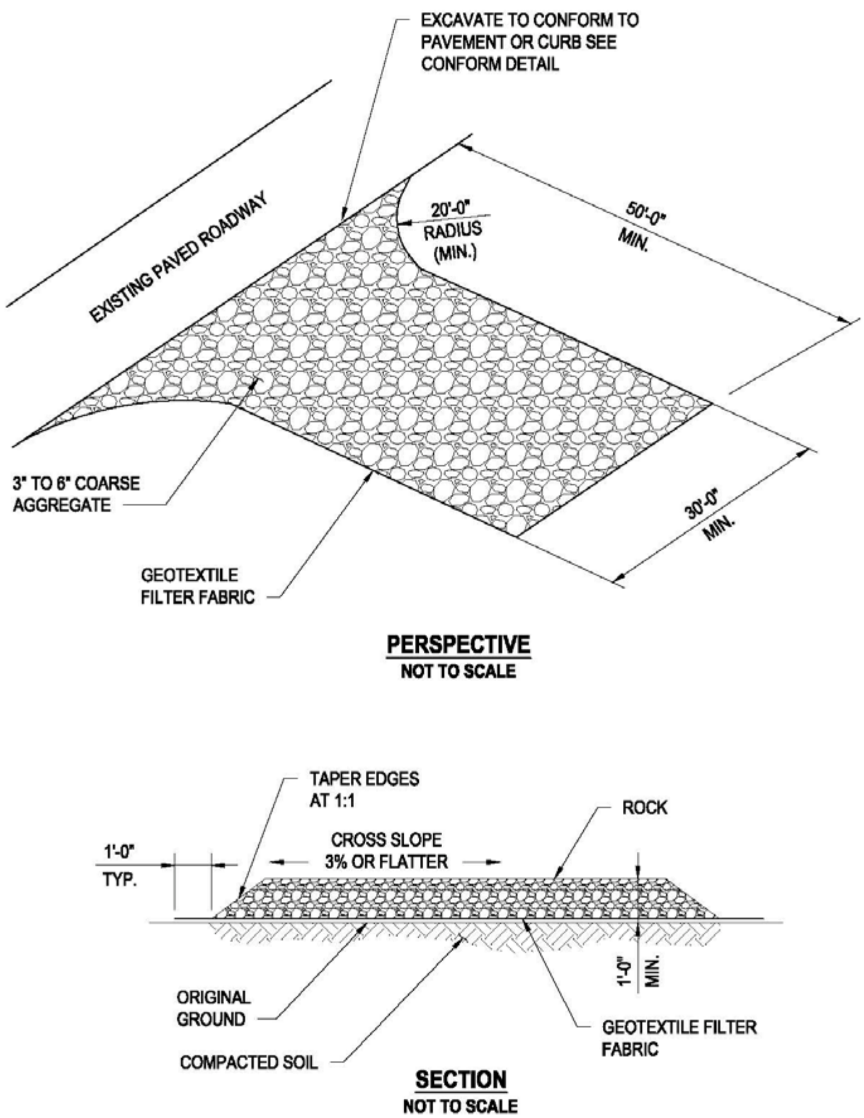
- Depth of aggregate shall be 12 inches or as recommended by the Soils Engineer. Contractor is responsible to design stabilized construction entrance/exit to support heaviest vehicles and equipment that will use it.
- Place geotextile filter fabric beneath the 12-inch- deep layer of aggregate.
- Dimensions shall be a minimum of 50 feet in length and 30 feet in width. If project site layout will not accommodate minimum dimensions, install additional BMPs to remove sediment from the vehicles prior to entering/exiting the site.
- Alternative commercial construction entrance/exit products may be used in lieu of aggregate if approved by the Engineer and installed per manufacturer's specifications.
- Installation of a stabilized entrance/exit is required if ground-disturbing activity will occur and exiting the construction site onto paved roads and sidewalks is needed.
- A tire wash can be incorporated with a stabilized construction entrance/exit to assist with the removal of sediment from construction vehicles.
- The tire wash must be designed for the anticipated traffic load and located a minimum of 50 feet from a state water.
- Automatic shutoff nozzles must be used to avoid wasting water.
- The wash waters must be retained on the project site and drain to a properly constructed sediment trap or similar device.
- Sediment tracked onto adjacent roadways or paved areas shall be removed by the end of the same day that the tracking occurred or immediately when sediment is tracked more than 50 feet from the construction entrance/exit, whichever occurs sooner.
- Use dry methods to remove the sediment from the adjacent roadways or paved areas. This includes, but is not limited to, mechanical street sweepers, brooms, shovels, vacuums, or other similarly effective methods. The sediment collected shall be removed or stabilized on-site.
- The pavement shall not be cleaned by washing down the street into any storm water conveyance (unless it's connected to a sediment basin, sediment trap, or similarly effective control), storm drain inlet, or state water.
- Limit points of entry onto the construction site to minimize possible areas of tracking.

49.4 Considerations

- Surface aggregate shall be periodically replenished.
- If the construction exit is not preventing sediment from being tracked onto the pavement, consider increasing the dimensions of the entrance, and/or installing a tire wash.
- A sediment trapping device is required if a tire wash is used in conjunction with the stabilized construction entrance/exit.
- The speed of the construction truck through the tire wash is crucial to the effectiveness of the cleaning. The slower the truck moves through the wash, the better the cleaning.
- A turnout or doublewide exit should be used to prevent entering vehicles from driving through the tire wash area.
- Sediment accumulates between the aggregate and reduces the effectiveness of the construction entrance/exit.

49.5 Maintenance

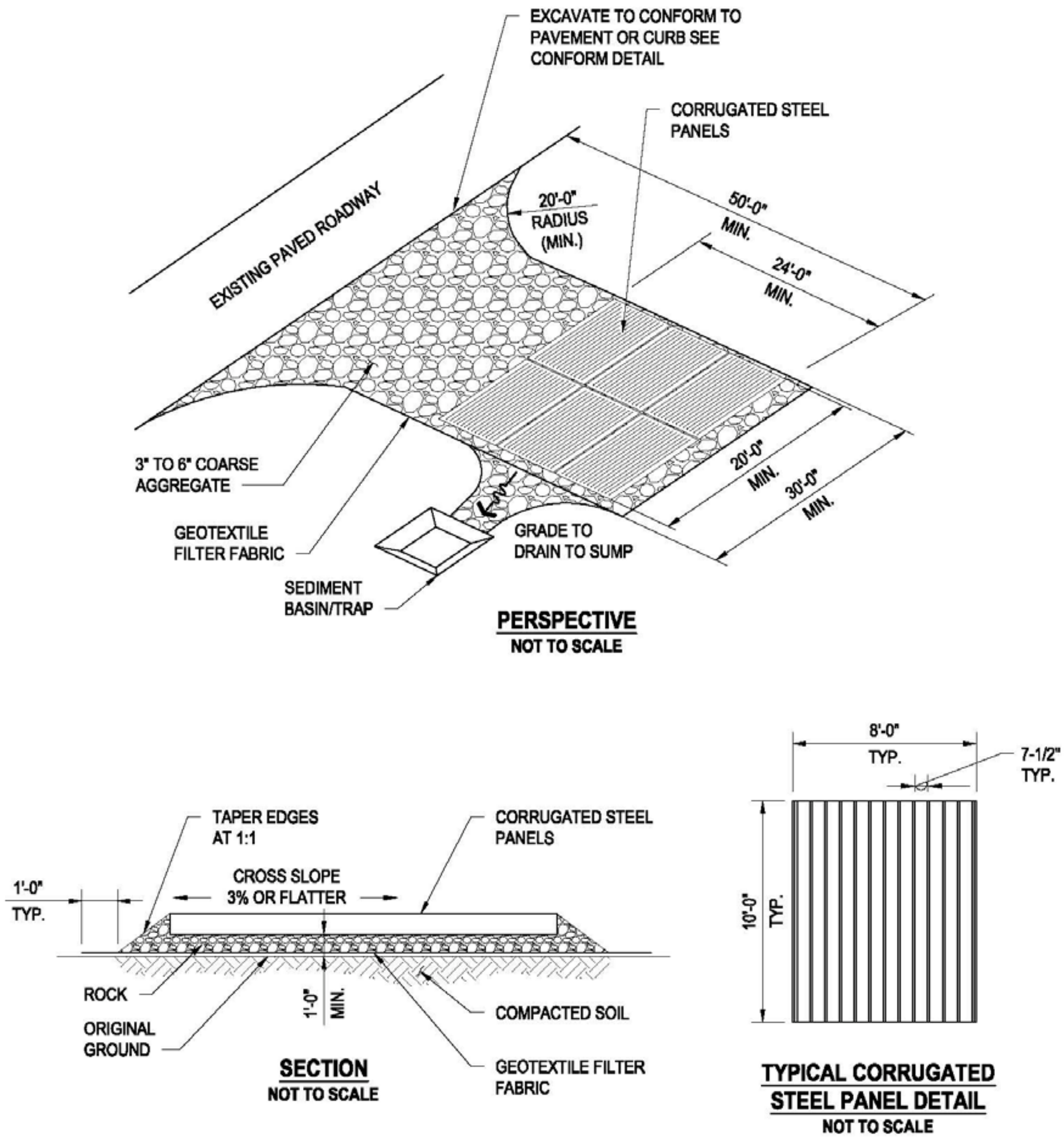
- Clean dirt, mud, or other material tracked onto the road, sidewalk, or other paved area by the end of the same day in which the trackout occurs.
- Remove aggregate, separate and dispose of sediment, when no longer in use.
- Perform street sweeping as needed. Washing of the roads to address sediment trackout is not permitted
- Adjust street sweeping schedule as needed.
- Replenish surface aggregate periodically.
- Remove accumulated sediment from the construction entrance/exit.
- Upon project completion, all construction entrances/exits shall be removed by the contractor and stabilized in accordance with the 2005 Hawaii Standard Specifications for Road and Bridge Construction and Special Provisions, or other regulatory requirements.



STABILIZED CONSTRUCTION ENTRANCE

NOTES:
1. GEOTEXTILE FILTER FABRIC MUST BE INSTALLED BENEATH THE 12" DEEP LAYER OF AGGREGATE.

Figure 49-1. Example of stabilized construction entrance



STABILIZED CONSTRUCTION ENTRANCE WITH CORRUGATED STEEL PLATES

NOTES:
1. GEOTEXTILE FILTER FABRIC MUST BE INSTALLED BENEATH THE 12" DEEP LAYER OF AGGREGATE.

Figure 49-2. Example of stabilized entrance with corrugated steel plates

APPENDIX 5-1

Plan for Requiring Low Impact Development in the Standards

1 INTRODUCTION

Low Impact Development (LID) refers to storm water management practices which aim to mimic a site's predevelopment hydrology by minimizing ground disturbance and impervious cover and then infiltrating, storing, detaining, evapotranspiring, and/or biotreating storm water runoff close to its source. LID employs principles such as preserving and recreating natural landscape features and minimizing imperviousness to create functional and appealing site drainage that treats storm water as a resource, rather than a waste product. LID treatment measures include harvesting and use, infiltration, evapotranspiration, or biotreatment.

NPDES PERMIT REQUIREMENTS

As of the effective date, September 1, 2021, Marine Corps Base Hawaii (MCBH) is required to comply with the conditions of National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4) Permit Number HI S000007. Per Part D.1.e.(1) of the Permit, MCBH is required to revise its Plan for Requiring Low Impact Development in the Standards to the maximum extent practicable including revisions to the plan review and inspection checklist to include LID requirements. The standards are applicable to all construction projects disturbing at least one (1) acre as well as smaller projects that have the potential to discharge pollutants to the MCBH small MS4.

This plan will identify the following:

- Criteria for requiring implementation of LID
- Quantitative criteria for a specific design storm to be managed by LID techniques
- Infeasibility criteria for circumstances in which a waiver could be granted for the LID requirements
- List of alternatives that may be implemented when an LID waiver is granted
- LID planning and design example checklist

MCBH has developed the Post-Construction BMP Manual to establish post-construction BMP policy for development and redevelopment projects. The manual is a primary tool of the Post-construction Program to ensure that permanent controls are incorporated into all applicable projects and protect the MCBH MS4. The Post-Construction BMP Manual provides guidance on post-construction BMP selection, inspection, and maintenance. The manual also includes detailed fact sheets with the description, purpose, application, design criteria, pretreatment requirements, construction considerations, limitations, and inspection and maintenance requirements for selected post-construction BMPs. The Post-Construction BMP Manual is included in Appendix 5-3 of the SWMP Plan. Permanent post-construction BMP inspection example checklists are included in Attachment 1 of the Post-Construction BMP Manual.

2 CRITERIA FOR REQUIRING IMPLEMENTATION OF LID

Section 438 of the Energy Independence and Security Act of 2007 (EISA) enacted by Congress establishes strict storm water runoff requirements for federal development and redevelopment projects. The legislation reads as follows:

> Storm water runoff requirements for federal development projects. The sponsor of any development or redevelopment project involving a Federal facility with a footprint that exceeds 5,000 square feet shall use site planning, design, construction, and maintenance strategies for the property to maintain or restore, to the maximum extent technically feasible, the predevelopment hydrology of the property with regard to the temperature, rate, volume, and duration of flow.

Resulting from the legislation, a Deputy Under Secretary of Defense, Installation and Environment memorandum defines Department of Defense (DoD) policy for implementation of EISA Section 438 using LID techniques and requires the policy be incorporated into applicable DoD Unified Facilities Criteria (UFC).

Per DoD policy the criteria for requiring implementation of LID are as follows:

> EISA Section 438 requirements apply to projects that construct facilities with a footprint greater than 5,000 gross square feet or expand the footprint of existing facilities by more than 5,000 gross square feet. The project footprint consists of all horizontal hard surfaces and disturbed areas associated with the project development, including both building area and pavements (such as roads, parking, and sidewalks). These requirements do not apply to internal renovations, maintenance, or resurfacing of existing pavements.

The standards are not limited to the storm water requirements under EIS Section 438 and will apply to all projects that have the potential to impact water quality to the extent practical. All MCBH projects will be reviewed and accepted for suitable use of permanent BMPs and LID features.

3 QUANTITATIVE CRITERIA FOR DESIGN STORM

The UFC system provides planning, design, and construction criteria for DoD projects. UFC 3-210-10, Low Impact Development, provides technical criteria for the planning and design of applicable projects to comply with storm water requirements under EISA Section 438. In accordance with Section 3-1.2 of UFC 3-201-01, Civil Engineering, MCBH projects use a minimum 10-year design storm frequency.

UFC 3-210-10 (Appendix B: Chapter B-4 – LID Design, Section B- 4.2.3) describes investigation into three principal approaches in determining the design storm to be managed by LID techniques:

Prince George's County Methodology (Soil Conservation Service, TR-55 Method):

> As previously mentioned, any rainfall over and above the initial abstraction will result in direct surface runoff. It is prudent to design and implement LID features for the rainfall event that exceeds initial abstraction (Eq. 1) in the pre-development conditions. The design methodology would apply a modifying factor of 1.5 times the initial abstraction (as suggested in the Prince George's County LID manual) to serve as a practical approach to design LID features.

EPA Methodology:

See EPA 841-B-09-001 - Technical Guidance On Implementing The Stormwater Runoff Requirements For Federal Projects Under Section 438 Of The Energy Independence And Security Act, Guidance prepared by EPA, December 2009 for Option 1 methodology: Retain the 95th Percentile Rainfall Event.

First-Flush Water Quality Volume:

Many States and localities have adopted the conventional approach of collecting and treating the *first-flush* or *water-quality* depth of rainfall. These terms are defined by the local regulatory agency. In certain areas, this first flush depth is generally taken to be the first one inch of rainfall. In other localities with sensitive coastal or reservoir watersheds, the first-flush depth is taken to be the first 1.5 inches of rainfall. The water quality volume is equated to the volume of stormwater runoff generated by the first-flush rainfall depth. Therefore, it would be practical to design LID features to handle the first-flush rainfall depth. Additionally, conventional Storm Water Management practices may be required to meet state or local regulations.

Most Local and State stormwater regulations include a first-flush or water quality depth for 2-, 5-, 10-, 25-, 50-, or 100-year regulated storm events.

UFC 3-210-10 (Appendix B: Chapter B-4 – LID Design, Section B-4.7) provides additional clarification that:

> The design storm event is based on the regional 95th percentile, annual 24-hour rainfall depth averaged over several years (a minimum of 10-year daily, 24-hour precipitation events would be used). The 'design storm' will be used to calculate pre- and post-development LID volumes in order to determine the design objective. LID features will be used throughout the site design to manage the LID storage volume.

4 INFEASIBILITY CRITERIA FOR LID WAIVER

EISA Section 438 and DoD policy require LID to be implemented for applicable projects to the maximum extent technically feasible (METF). UFC 3-210-10, Section 2-1.3, defines METF as follows:

> The "maximum extent technically feasible" criterion requires full employment of accepted and reasonable stormwater retention and reuse technologies subject to in-situ site conditions and applicable regulatory constraints (e.g., site size, soil types, vegetation, demand for recycled water, existing structural limitations and state or local prohibitions on water collection).

All site-specific technical constraints that limit implementation of LID techniques to the METF shall be documented. Documentation shall include reference to the appropriate technical constraint listed below in Table 1, complete description of the limiting factors, supporting evidence such as design calculations and/or laboratory results, and the name and contact information of the waiver applicant.

LID WAIVER ALTERNATIVE MEASURES

LID waiver applicants shall also provide a description of alternative measures or non-LID BMPs that could be implemented if an LID waiver is granted due to a properly documented technical constraint.

Potential alternative measures include:

- Post-construction treatment control BMPs employing detention, filtration, settling, and/or hydrodynamic separation;
- Retention or biofiltration at an offsite location. (Note: offsite mitigation projects must undergo a proposal and review process and ultimately require MCBH Facilities Department approval.)

Table 1 – Technical Constraints Limiting Implementation of LID to the METF	
A	Retaining stormwater on-site would adversely impact receiving water flows
B	Site has shallow bedrock, contaminated soils, high groundwater table, underground facilities or utilities
C	Soil infiltration capacity is limited
D	Site is too small to infiltrate significant volume
E	Non-potable water demand (i.e., irrigation, toilets, and wash-water) is too small to warrant water harvesting and reuse system
F	Structural, plumbing, and other modifications to existing building to manage stormwater are infeasible
G	State or local regulations restrict water harvesting
H	State or local regulations restrict use of green infrastructure or LID
X	Other technical constraint documented by the project owner/overseeing agency and documented as acceptable to the MCBH Facilities Department

(Note: A through H taken from UFC 3-210-10, Section 2-1.4)

LID PLANNING AND DESIGN EXAMPLE CHECKLIST

A revised LID planning and design example checklist is provided in Attachment 1.

5 REFERENCES

1. Energy Independence and Security Act of 2007, Public Law 110-140, 2007.

2. Department of Defense Implementation of Storm Water Requirements under Section 438 of the Energy Independence and Security Act (EISA), Deputy Under Secretary of Defense (Installations and Environment) Memorandum, January 2010.

3. Unified Facilities Criteria, UFC 3-210-10, Low Impact Development, June 1, 2015.

4. Unified Facilities Criteria, UFC 3-201-01, Civil Engineering, April 1, 2018

ATTACHMENT 1

LID Planning and Design Example Checklist

LOW IMPACT DEVELOPMENT (LID)

PLANNING & DESIGN CHECKLIST

GENERAL PROJECT INFORMATION

Project Address: ____

Installation: ______________ Building No. (if applicable): ______________

Project Type: ❑ Residential ❑ Commercial ❑ Industrial ❑ Office / Agency

Project is: ❑ New Development ❑ Redevelopment / Retrofit ❑ Renovation

Project Description: ____

____

Submittal: ❑ Design / Pre-Construction ❑ Construction Complete

APPLICANT INFORMATION

Agency/Company: ____

Contact Person: ____

Address: ____

Phone: ______________________ Email: ______________________

PROJECT FOOTPRINT

EISA Section 438 requirements apply to projects that construct facilities with a footprint greater than 5,000 gross square feet, or expand the footprint of existing facilities by more than 5,000 gross square feet. The project footprint consists of all horizontal hard surfaces and disturbed areas associated with the project development, including both building area and pavements (such as roads, parking, and sidewalks). These requirements do not apply to internal renovations, maintenance, or resurfacing of existing pavements.

Proposed New Facilities Footprint (square feet) ______________________

Proposed Expanded Footprint of Existing Facilities (square feet) ______________________

Total Proposed Project Footprint (square feet) ______________________

EISA SECTION 438 APPLICABILITY

Do EISA Section 438 requirements apply?

❑ Yes ❑ No (Yes if Total Proposed Project Footprint is 5,000 square feet or more. If No, LID techniques apply to the extent practical.)

DESIGN OBJECTIVE

The overall design objective for each project is to maintain predevelopment hydrology and prevent any net increase in storm water runoff. DoD defines "predevelopment hydrology" as the pre-project hydrologic conditions of temperature, rate, volume, and duration of storm water flow from the project site.

The Design Objective is (select one):

❑ Option 1: Total volume of rainfall from 95th percentile storm is to be managed onsite.

❑ Option 2: Determine predevelopment hydrology based on site-specific conditions and local meteorology by using continuous simulation modeling techniques, published data, studies, or other established tools. Determine water volume to be managed onsite.

LOW IMPACT DEVELOPMENT (LID)

PLANNING & DESIGN CHECKLIST

GENERAL PROJECT HYDROLOGY

The design storm will be used to calculate pre- and post-development LID volumes in order to determine the amount of excess runoff that must be controlled onsite so that the site contributes no net increase downstream.

Provide runoff volumes to demonstrate the design objective is being met. Note that complete analysis and calculations shall be provided separately in the project's engineering drainage report.
Pre-project Runoff Volume (cubic feet) ____
Post-project Runoff Volume (cubic feet) ____
Minimum Runoff Retention Volume to Be Managed Onsite (cubic feet) __________________________

LOW IMPACT DEVELOPMENT BMPs

Low Impact Development (LID) is a stormwater management strategy designed to maintain site hydrology and mitigate the adverse impacts of stormwater runoff and nonpoint source pollution. LID actively manages stormwater runoff by mimicking a project site's pre-development hydrology using design techniques that infiltrate, store, and evaporate runoff close to its source of origin.

Non-structural LID BMPs

Non-structural LID BMPs seek to reduce storm water runoff impacts through sound site planning and design practices that focus on conservation and minimizing impacts. Use of non-structural LID BMPs should be maximized prior to consideration of structural LID BMPs.

Review the following non-structural LID BMPs and indicate whether or not they will be incorporated onsite. If not incorporated, provide justification.

Minimize Total Disturbed Area ❑ Incorporated ❑ Not Feasible ❑ Not Applicable
Justification: ____
____

Preserve Natural Flow Pathways and Patterns ❑ Incorporated ❑ Not Feasible ❑ Not Applicable
Justification: ____
____

Protect Riparian Buffer Areas / Sensitive Areas ❑ Incorporated ❑ Not Feasible ❑ Not Applicable
Justification: ____
____

Cluster Development ❑ Incorporated ❑ Not Feasible ❑ Not Applicable
Justification: ____
____

Minimize Soil Compaction ❑ Incorporated ❑ Not Feasible ❑ Not Applicable
Justification: ____
____

LOW IMPACT DEVELOPMENT (LID)

PLANNING & DESIGN CHECKLIST

LOW IMPACT DEVELOPMENT BMPs (CONTINUED)
Non-structural LID BMPs (Continued)

Reduce Impervious Surfaces ❑ Incorporated ❑ Not Feasible ❑ Not Applicable
Justification: ____
____

Site Fingerprinting ❑ Incorporated ❑ Not Feasible ❑ Not Applicable
Justification: ____
____

Structural LID BMPs
Structural LID BMPs are small scale treatment controls close to the source of runoff that mimic natural processes. (For more information, refer to the Unified Facilities Criteria 3-210-10, 15 November 2010 and the Army Low Impact Development Technical User Guide, 4 January 2013.)

Review the following structural LID BMPs and indicate whether or not they will be incorporated onsite. If not incorporated, provide justification (refer to the Infeasibility Criteria listed in the Plan for Requiring LID in the Standards). Additionally, provide operations and maintenance requirements necessary for proper function of the BMP.

Bioretention ❑ Incorporated ❑ Not Feasible ❑ Not Applicable
Justification: ____
____
Operation Requirements: ____
____
Operation Requirements Frequency: ____
Maintenance Requirements: ____
____
Maintenance Requirements Frequency: ____

Vegetated Swale ❑ Incorporated ❑ Not Feasible ❑ Not Applicable
Justification: ____
____
Operation Requirements: ____
____
Operation Requirements Frequency: ____
Maintenance Requirements: ____
____
Maintenance Requirements Frequency: ____

LOW IMPACT DEVELOPMENT (LID)

PLANNING & DESIGN CHECKLIST

LOW IMPACT DEVELOPMENT BMPs (CONTINUED)
Structural LID BMPs (Continued)

Infiltration Trench ❑ Incorporated ❑ Not Feasible ❑ Not Applicable
Justification: ____
____
Operation Requirements: ____
____
Operation Requirements Frequency: ____
Maintenance Requirements: ____
____
Maintenance Requirements Frequency: ____

Permeable Pavement ❑ Incorporated ❑ Not Feasible ❑ Not Applicable
Justification: ____
____
Operation Requirements: ____
____
Operation Requirements Frequency: ____
Maintenance Requirements: ____
____
Maintenance Requirements Frequency: ____

Rainwater Harvesting ❑ Incorporated ❑ Not Feasible ❑ Not Applicable
Justification: ____
____
Operation Requirements: ____
____
Operation Requirements Frequency: ____
Maintenance Requirements: ____
____
Maintenance Requirements Frequency: ____

Green Roof ❑ Incorporated ❑ Not Feasible ❑ Not Applicable
Justification: ____
____
Operation Requirements: ____
____
Operation Requirements Frequency: ____
Maintenance Requirements: ____
____
Maintenance Requirements Frequency: ____

LOW IMPACT DEVELOPMENT (LID)

PLANNING & DESIGN CHECKLIST

LOW IMPACT DEVELOPMENT BMPs (CONTINUED)
Structural LID BMPs (Continued)

Other Structural LID BMP ❑ Incorporated ❑ Not Feasible ❑ Not Applicable
Description: ____
____
Justification: ____
____
Operation Requirements: ____
____
Operation Requirements Frequency: ____
Maintenance Requirements: ____
____
Maintenance Requirements Frequency: ____

ALTERNATIVE NON-LID POST-CONSTRUCTION BMPs
Non-LID post-construction treatment control BMPs employ detention, filtration, settling, and/or vortex separation to remove pollutants from storm runoff. Non-LID methods should be considered only if LID BMPs are determined to not be feasible per the Infeasibility Criteria listed in the Plan for Requiring LID in the Standards.

Review the following Non-LID post-construction BMPs and indicate whether or not they will be incorporated onsite. If not incorporated, provide justification. Additionally, provide operations and maintenance requirements necessary for proper function of the BMP.

Underground Detention / Retention Structure ❑ Incorporated ❑ Not Feasible ❑ Not Applicable
(Note that underground structures that allow infiltration may require Underground Injection Control permitting with the State of Hawaii Department of Health. Please contact the MCBH Environmental Compliance and Protection Division for more information.)
Justification: ____
____
Operation Requirements: ____
____
Operation Requirements Frequency: ____
Maintenance Requirements: ____
____
Maintenance Requirements Frequency: ____

LOW IMPACT DEVELOPMENT (LID)
PLANNING & DESIGN CHECKLIST

ALTERNATIVE NON-LID POST-CONSTRUCTION BMPs (CONTINUED)

Vortex / Hydrodynamic Separator ❑ Incorporated ❑ Not Feasible ❑ Not Applicable
Justification: ____
____
Operation Requirements: ____
____
Operation Requirements Frequency: ____
Maintenance Requirements: ____
____
Maintenance Requirements Frequency: ____

Other Non-LID post-construction BMP ❑ Incorporated ❑ Not Feasible ❑ Not Applicable
Description: ____
____
Justification: ____
____
Operation Requirements: ____
____
Operation Requirements Frequency: ____
Maintenance Requirements: ____
____
Maintenance Requirements Frequency: ____

LOCATION AND BOUNDARY DRAWING FOR LID AND NON-LID BMPs
A drawing showing the locations and boundaries of all incorporated LID and non-LID BMP features will assist inspectors and operations and maintenance staff with proper identification and assessment of the BMPs.

❑ Location and boundary drawing is attached. (Check box to confirm)

CERTIFICATION STATEMENT
Designer / Applicant: I certify that the design is complete, accurate, and addresses the specified requirements to the best of my knowledge.

Print Name: ____

Signature: ____ Date: ____________________

REVIEWED BY
Agency: ____
Print Name: ____
Signature: ____ Date:____________________
Review Comments Attached: ❑ Yes ❑ No

APPENDIX 5-2

LID/EISA Constraints Review and Waiver Request

LID/EISA Constraints Review and Waiver Request

[This page has notes written for your convenience, the fillable form has the notes embedded.]

(UNCLASSIFIED)

1. Request Date	1a. Date Needed Date at which construction schedule will be impacted if waiver not appr.	**2. Review Number: HI-20 -LID**001 Issued by TDC, sequentially numbered by FY

3. eProjects Work Order Number(s) _____ Fiscal Year _____ Project Number _____ MILCON P#, Special Project # or SPM#
If request covers projects at contiguous sites, all should be included in this form
Title: _____ as noted on DD1391; if no DD1391, title of the solicitation documents
Installation, City, State: _____
Fund Type: _____ MILCON, O&MN, NWCF, etc.

4. Construction Solicitation or Contract Number(s): N62478-
Task Order Number N/A TO# applicable only for MACC Modification Number(s) N/A if applicable

5. Execution Team: _____ as shown in eProjects record
Project Manager (PM): _____ " " " " " "
Design Manager (DM): _____ " " " " " "
Designer of Record (DOR) A/E Firm & Project Manager (*if applicable*):
_____ For DB this is construction contractor's A/E and there will not be any A/E contract number
A/E Contract # (*if applicable*): _____ T.O. # _____

PM Contact Information
Telephone: ( ) ext. N/A
DSN:
DOR (*provide DM information if DOR is In-House*):
Telephone: ( )

6. Construction Office: _____ as shown in eProjects record
Responsible Person (*Name & Title or Rank*): _____ PM&E, FEAD Director, or ROICC at Marine Corps installations

Contact Information
Telephone: ( ) ext. N/A
DSN:

7. Project Purpose and Description:
Very brief description of what the project is to provide

8. Attachments: ☐ Plans ☐ Stormwater Calculations ☐ Other Supporting Documentation

9. Has LID been used to manage any portion of the pre- to post-development increase in stormwater runoff volume or sediment/nutrient loading for the design storm event ? ☐ Yes ☐ No

10. What is the volume increase (for the design storm event) from pre-construction conditions? __ **%** increase from pre-development amount that is not being mitigated by LID

11. Storm Water Management Features (Planned or Actual, structural and non-structural) that will be implemented by this project: _____ List any features that this project will provide, including any that are off-site

12. Reason(s) that LID goals cannot be achieved for this Project:
- ☐ Technical:
  - ☐ Non-potable water demand (for irrigation, toilets, wash-water, etc.) is too small to warrant water harvesting and reuse systems
  - ☐ Retaining storm water on site would adversely impact receiving water flows
  - ☐ Site has
    - ☐ shallow bedrock
    - ☐ contaminated soils
    - ☐ high groundwater
    - ☐ underground facilities or utilities
  - ☐ Site is too small to infiltrate significant volume
  - ☐ Soil infiltration capacity is limited
- ☐ Economic
- ☐ Other:
  - ☐ State or local requirements restrict the use of green infrastructure/LID
  - ☐ State or local requirements restrict water harvesting
  - ☐ Structural, plumbing, or other modifications to existing buildings to manage storm water are infeasible

LID/EISA Constraints Review and Waiver Request

(UNCLASSIFIED)

1. Request Date	1a. Date Needed	**2. Review Number: HI-20 -LID001**

3. eProjects Work Order Number(s) _____ Fiscal Year _____ Project Number _____
Title: _____
Installation, City, State: _____
Fund Type: _____

4. Construction Solicitation or Contract Number(s): N62478-
Task Order Number N/A Modification Number(s) N/A

5. Execution Team: _____
Project Manager (PM): _____
Design Manager (DM): _____
Designer of Record (DOR) A/E Firm & Project Manager (*if applicable*): _____
A/E Contract # (*if applicable*): _____ T.O. # _____

PM Contact Information
Telephone: ( ) ext. N/A
DSN:
DOR (*provide DM information if DOR is In-House*):
Telephone: ( )

6. Construction Office: _____
Responsible Person (*Name & Title or Rank*): _____

Contact Information
Telephone: ( ) ext. N/A
DSN:

7. Project Purpose and Description:

8. Attachments: ☐ Plans ☐ Stormwater Calculations ☐ Other Supporting Documentation

9. Has LID been used to manage any portion of the pre- to post-development increase in stormwater runoff volume or sediment/nutrient loading for the design storm event ? ☐ Yes ☐ No

10. What is the volume increase (for the design storm event) from pre-construction conditions? __ %

11. Storm Water Management Features (Planned or Actual, structural and non-structural) that will be implemented by this project: _____

12. Reason(s) that LID goals cannot be achieved for this Project:

- ☐ Technical:
  - ☐ Non-potable water demand (for irrigation, toilets, wash-water, etc.) is too small to warrant water harvesting and reuse systems
  - ☐ Retaining storm water on site would adversely impact receiving water flows
  - ☐ Site has
    - ☐ shallow bedrock
    - ☐ contaminated soils
    - ☐ high groundwater
    - ☐ underground facilities or utilities
  - ☐ Site is too small to infiltrate significant volume
  - ☐ Soil infiltration capacity is limited
- ☐ Economic
- ☐ Other:
  - ☐ State or local requirements restrict the use of green infrastructure/LID
  - ☐ State or local requirements restrict water harvesting
  - ☐ Structural, plumbing, or other modifications to existing buildings to manage storm water are infeasible

NAVFAC Naval Facilities Engineering Command NAVFAC HAWAII

LID/EISA Constraints Review and Waiver Request

(UNCLASSIFIED)

REVIEW CHAIN		Comments
Project Manager (PM) Name: Date: Signature: ______________________	☐ Concur ☐ **Do Not Concur**	
Design Manager (DM) Name: Date: Signature: ______________________	☐ Concur ☐ **Do Not Concur**	
Designer of Record (DOR) Name: If in-house DBB, DOR is DM Date: Signature: ______________________	☐ Concur ☐ **Do Not Concur**	
FEAD/ROICC (if Design Build) Name: Title/Rank: Date: Signature: ______________________	☐ Concur ☐ **Do Not Concur**	
Environmental Program Director (N45), NRH Name: Date: Signature: ______________________	☐ Concur ☐ **Do Not Concur**	
Civil Technical Discipline Coordinator, NAVFAC HI Name: Date: Signature: ______________________	☐ Concur ☐ **Do Not Concur**	
Chief Engineer, NAVFAC HI Name: Date: Signature: ______________________	☐ Concur ☐ **Do Not Concur**	
Regional Engineer (N4), NRH Name: Date: Signature: ______________________	☐ APPROVED ☐ **DISAPPROVED**	

APPENDIX 5-3

Post-Construction BMP Manual

FINAL

MCBH POST-CONSTRUCTION BMP MANUAL

Storm Water Management Program Plan

Marine Corps Base Hawaii, Oahu, Hawaii

NPDES Permit No. HI S000007

Prepared by:

Marine Corps Base Hawaii

July 2022

Table of Contents

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List of Acronyms and Abbreviations

AMS	Asset Management System
BAT	Best Available Technology
BCT	Best Conventional Technology
BFM	Bonded Fiber Matrix
BMP	Best Management Practice
C&D	Construction and Demolition
CO	Commanding Officer
CFR	Code of Federal Regulations
CFS	Cubic Feet per Second
CTB	Cement-Treated Base
CWA	Clean Water Act
CWB	State of Hawaii Department of Health, Clean Water Branch
CWRM	State of Hawaii Department of Land and Natural Resources, Commission on Water Resource Management
DLNR	State of Hawaii Department of Land and Natural Resources
DOE	Department of Education
DOH	State of Hawaii Department of Health
EAL	Environmental Action Level
EC	Erosion Control
ECPD	Environmental Compliance and Protection Division
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
FEAD	Facilities Engineering and Acquisition Division
GDI	Grated Drop Inlet
GHS	Globally Harmonized System
H:V	Horizontal to Vertical Slope
HAR	Hawaii Administrative Rules
HDOA	State of Hawaii Department of Agriculture
HEER	State of Hawaii Department of Health, Hazard Evaluation and Emergency Response
LBP	Lead-Based Paint

LID	Low Impact Development
L/SD	Length to Settling Depth
LFPE	Logistics Facilities Public Works Engineering
LOS	Lines of Study
MCBH	Marine Corps Base Hawaii
MCCS	Marine Corps Community Services
MCD	Facilities Engineering Maintenance Control Division
MEP	Maximum Extent Practicable
MRO	Facilities Engineering Maintenance Repair Operations
MS4	Municipal Separate Storm Sewer System
NRCS	United States Department of Agriculture, Natural Resource Conservation Service
NGPC	Notice of General Permit Coverage
NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System
NRC	U.S. Coast Guard National Response Center
OMC	Ohana Military Communities
OSHA	Occupational Safety and Health Administration
PCBs	Polychlorinated Biphenyls
PCC	Portland Cement Concrete
PM	Project Manager
PPE	Personal Protective Equipment
PPV	Public-Private Venture
PS&E	Plan, Specifications, and Estimate Documents for a Plan Submittal
RCRA	Resource Conservation and Recovery Act
SC	Sediment Control
SDS	Safety Data Sheet
SHWB	State of Hawaii Department of Health, Solid and Hazardous Waste Branch
SM	Site Management
SPCC	Spill Prevention Control Countermeasures
SSBMP	Site-Specific Best Management Practice
SWMP	Storm Water Management Plan
SWPPP	Storm Water Pollution Prevention Plan

Tm	Recurrence Interval
TMDL	Total Maximum Daily Load
USACE	United States Army Corps of Engineers
USGS	United States Geological Survey
WLAs	Waste Load Allocations
WQDV	Water Quality Design Volume
WQFR	Water Quality Flow Rate
WQLS	Water Quality Limited Segments

List of Figures

List of Tables

1 Introduction

1.1 Purpose and Scope

The purpose of this *Marine Corps Base Hawaii (MCBH) Post-Construction Best Management Practice (BMP) Manual* is to provide guidance on BMP selection, installation, and maintenance procedures that aim to eliminate or reduce the discharge of pollutants to State waters. While this manual does not constitute an exhaustive list of all BMPs available, it does provide guidance suitable for use by a wide range of individuals involved in pollution control. Each user of the manual is responsible for working within their capabilities obtained through training and experience, and for seeking the advice and consultation of appropriate experts at all times. The target audience for this manual includes MCBH personnel, consultants, contractors, and other agencies involved in the planning, design, construction, and maintenance of construction projects at MCBH.

As of the effective date, September 1, 2021, MCBH is required to comply with the conditions of the National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4) Permit No. HIS000007. In accordance with Part D.1.d.(1) of the MS4 Permit, MCBH is required to develop and implement a Storm Water Permanent BMP Manual (referred to herein as the Post-Construction BMP Manual) to establish MCBH policy for permanent measures or post-construction BMPs. The Post-Construction BMP Manual is a key element of the MCBH's Post-Construction Storm Water Management Program (Post-Construction Program) to ensure that permanent controls are incorporated into all applicable construction projects and protect the MCBH MS4. Refer to Chapter 5 of the Storm Water Management Program (SWMP) Plan for additional information on the objectives of MCBH's Post-Construction Program.

1.2 Water Quality Impacts Related to Developed Areas

Under natural and undeveloped conditions, surface runoff can range from 10 to 30 percent (%) of the total annual precipitation. Depending on the level of development and the site planning methods used, the alteration of physical conditions can result in a significant increase of surface runoff to over 50 % of the overall precipitation.

Alteration in site runoff characteristics can cause an increase in the volume and frequency of runoff flows (discharge) and flow velocities that cause flooding, accelerated erosion, and reduced groundwater recharge. This contributes to degradation of water quality and the ecological integrity of streams and nearshore ecosystems. Pollutants that are commonly associated with stormwater include sediment, nutrients, bacteria and viruses, oil and grease, metals, organics, pesticides, and trash (floatables).

1.3 Requirements for Post-Construction BMPS

Per Part D.1.e of the MS4 Permit, MCBH is required to implement a Post-Construction Storm Water Management Program. The Post-Construction Program applies to all new development and redevelopment projects that result in a disturbance of one (1) acre or more and smaller projects that have the potential to discharge pollutants to MCBH's MS4. The Post-Construction Program will ensure that post-construction BMPs are in place to prevent or minimize water quality impacts to the Maximum Extent Practicable (MEP).

2 Post-Construction Program Organization

The Post-Construction Program organization is similar to that of the Construction Program as described in Chapter 4 of the MCBH SWMP Plan and the MCBH Construction BMP Field Manual. The main differences are that Post-Construction Program begins in the planning stages and includes a long-term maintenance component which is coordinated by the Environmental Compliance and Protection Division (ECPD) and Facilities Engineering Maintenance Control Division/Maintenance Repair Operations (MCD/MRO). As part of this component there is a required management of the maintenance and associated tracking for each construction project.

Figure 2-1 outlines the organization of the Post-Construction Program. The grey boxes indicate the agency responsible for general oversight of the project. Typically, construction projects at MCBH are categorized as either:

(i) *In-house Maintenance and Construction* – projects are scoped and planned by MCD, and the construction work is completed by MRO. Typically, these projects are less than 5,000 sf and/or related to emergency repair work.

(ii) *Military Construction* – These are projects that would typically be handled as in-house construction, but due to limited manpower have been contracted out. These projects are managed by Logistics Facilities Public Works Engineering (LFPE), with all storm water management managed by ECPD.

(iii) *Contract Maintenance and Construction* – These projects are conducted by an outside contractor, but are managed as follows:

- *Naval Facilities Engineering Systems Command (NAVFAC) Construction Projects* are managed by the Facilities Engineering and Acquisition Division (FEAD).
- *Mokapu Elementary School Projects* are managed by the Department of Education (DOE).
- *Public-Private Venture (PPV) Housing Projects* are managed by Ohana Military Communities (OMC)/Hunt.
- *Commercial Tenant Projects* are managed by Marine Corps Community Services (MCCS).
- *Various other contract maintenance and construction projects* are managed by MCD.

To address the MS4 Permit requirements, construction projects subject to the requirements of the Post-Construction Program are those that disturb one (1) or more acres, or smaller projects that have the potential to discharge pollutants into MCBH's MS4. This Post-Construction Program covers all new development and redevelopment projects.

The following construction activities are *not* considered for classification as "redevelopment" projects:

- Routine maintenance to maintain the original hydraulic capacity, line and grade, or the original purpose of the facility;
- Trenching and pavement resurfacing activities, of the same surfacing material, related only to utility work;
- Resurfacing or replacement of damaged pavement, with the same surfacing material;
- Construction of sidewalks, ramps, or related pedestrian/bicyclist features on existing paved roadways;
- Emergency construction activities required to immediately protect public health and safety;
- Interior remodeling that involves no outside exposure of construction materials/waste to storm water; and
- Exterior building renovation that does not disturb ground or increase the footprint of impermeable surfaces.

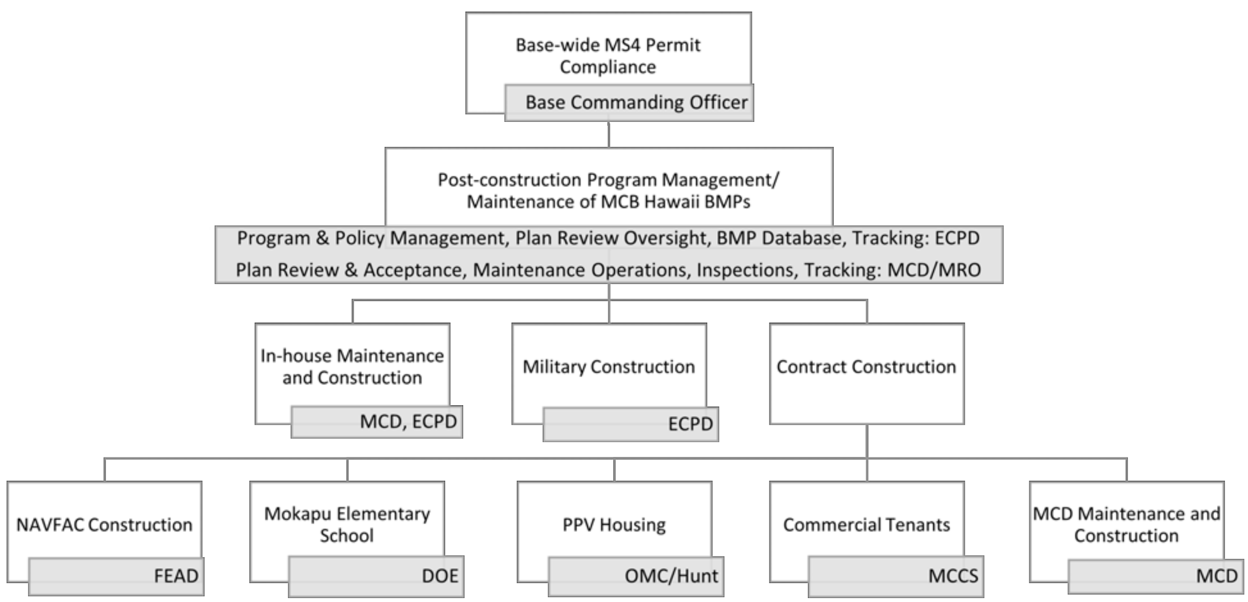

Figure 2-1 Post-Construction Program Organizational Chart

3 New Development and Redevelopment Construction Project Process

A primary goal of the Post-Construction Program is to ensure that no construction project will proceed without the inclusion of the appropriate post-construction BMPs and documentation outlining future BMP maintenance requirements. To achieve this goal, all projects, design-bid-build and design-build alike, must be reviewed and accepted for suitable use of post-construction BMPs.

3.1 Project Review Roles and Responsibilities

The review and acceptance process is conducted by the overseeing agency shown in Figure 2-1. All project owners have access to the criteria for requiring Low Impact Development (LID), and the "Low Impact Development Planning and Design Checklist," (Refer to the LID Design Checklist in SWMP Plan Appendix 5-1). Applicants are required to submit this checklist which facilitates the incorporation of BMPs into the initial stages of design development. This review process is intended to assist with the early identification of design conflicts and selection of preferred alternatives. At the time of review, the project owner must also submit documentation of required maintenance activities. These will also be reviewed for long-term feasibility and may require reviewers to collaborate with MCD/MRO.

To guarantee the implementation of adequate post-construction BMPs, no construction shall begin or be awarded until the plans have been appropriately reviewed and accepted by the overseeing agency. If it is determined that it is infeasible for a construction project to meet all of the post-construction BMP requirements, the applicant must submit a completed "LID/EISA Constraints and Waiver Request" (SWMP Plan Appendix 5-2). As part of the Plan for Requiring LID (SWMP Plan Appendix 5-1), the applicant must also submit a description of the alternative measures or non-LID BMPs that will be implemented should the LID waiver be granted by MCBH due to technical constraints.

MCBH encourages the collaboration of applicants, reviewers, ECPD, and MCD/MRO, as necessary to meet program requirements, and develop successful solutions for post-construction BMP implementation.

ECPD is responsible for general oversight of the Post-Construction Program. This includes revising design checklists/criteria or policies, as needed, to meet program requirements and to facilitate program implementation within the various types of construction projects at MCBH.

For design-bid-build projects, MCBH shall not advertise any construction project nor award any construction contract until the project design has been reviewed and accepted to ensure that appropriate post-construction BMPs.

For design-build projects, MCBH shall review and approve the project design the same as for design-bid-build projects prior to implementation. No project shall proceed without the inclusion of appropriate post-construction BMPs unless a waiver is granted by the Permittee based on specific documentation demonstrating that such post-construction BMPs are not feasible.

Project documents for projects that will include installation of post-construction BMPs shall also include appropriate requirements for their future continued maintenance.

3.2 Stabilization and Project Closure

There is a stabilization period over which the contractor is responsible for maintenance of vegetated BMPs. This stabilization period can be helpful in identifying design problems and/or oversights during installation. Unvegetated, structural BMPs are to be clean when ready to turnover to the base. To facilitate the turnover of BMP ownership to MCBH, the contractor may document any observed maintenance baseline or other information that may be useful to MCD/MRO. The process for a contractor to turn a new or redeveloped facility over to ownership of MCBH includes submittal of:

- As-built plans, with clear distinction of all post-construction BMPs (supplemental written documentation may be submitted for additional clarification of any details);
- All relevant documentation outlining post-construction BMP/LID specifications and required future maintenance; and
- Proof of BMP stabilization (photos, prior maintenance records, etc.), if applicable.

These documents are to be submitted to MCD/MRO and LFPE. Before the contractor demobilizes, ECPD or a qualified inspector will conduct a post-construction BMP inspection. Once MCD/MRO has accepted the proof of stabilization, the maintenance of applicable BMPs will fall under the responsibility of MCD/MRO. It is up to the project owner/contractor to ensure that all relevant information is provided to MCBH.

A copy of the as-built plans will also be provided to LFPE to be used to update MCBH's existing Geographic Information System (GIS) file and its existing overall storm drain system database, MAXIMO. LFPE will incorporate all structural BMP components into these Asset Management Systems (AMSs), such as inlets, pipes, vaults, etc., within 150 days of the beneficial occupancy date. Notification of MCD/MRO BMP acceptance, along with applicable plans and relevant documentation, showing post-construction BMPs, LID features, and required maintenance, will be directed to ECPD for incorporation into an inventory of post-construction BMPs (BMP Database within the AMS). To supplement the BMP database, ECPD is working with LFPE to develop a new layer in the MCBH's GIS file which will map vegetated BMPs. When available, this layer will be maintained by ECPD.

4 Post-Construction BMP Selection

To reduce pollution associated with stormwater runoff, new development and redevelopment projects should consider using BMPs that fall within three categories: LID Site Design Strategies, Source Control BMPs, and Post-Construction Treatment Control BMPs. These practices reduce peak runoff and improve water quality by allowing rainwater to infiltrate into the ground, evaporate and transpire, or collect in a storage system for irrigation and other methods of reuse. Rather than moving stormwater off-site through a conveyance system, the goal of LID is to restore the natural ability of a developed site to absorb storm water, resulting in an area more closely resembling pre-development hydrology. Importantly, the LID strategy seeks to control stormwater quality at its source, using a range of small-scale, economical devices such as native landscaping and constructed green spaces, bioretention facilities, vegetated swales, infiltration through permeable pavement, and green roofs to name a few.

4.1 Types of Post-Construction BMPs

Post-construction BMPs such as Site Design Strategies, Source Control, and Treatment Control BMPs should be considered during the planning and design phases of a project.

Table 4-1 LID Site Design Strategies

<table>
<tr><th colspan="2">Element</th><th>Description</th></tr>
<tr><td colspan="2">LID Site Design Strategies</td><td>Reducing the hydrologic impact of development and incorporating techniques that maintain or restore the site's hydrologic and hydraulic functions.</td></tr>
<tr><td colspan="2">Source Control</td><td>Preventing pollutants from coming in contact with runoff and preventing polluted runoff from discharging into small MS4.</td></tr>
<tr><td rowspan="3">Treatment Control</td><td>LID Retention</td><td>Retaining runoff on-site with no off-site discharge by infiltration, evapotranspiration, and harvesting/reuse.</td></tr>
<tr><td>LID Biofiltration</td><td>Removing pollutants from runoff by filtering stormwater through vegetation and soils.</td></tr>
<tr><td>Other Treatment</td><td>Removing pollutants from runoff by detention, settling, filtration, and vortex separation.</td></tr>
</table>

Projects should be designed to minimize directly connected impervious surfaces, promote infiltration using LID techniques, and minimize the introduction of pollutants generated from site runoff to the stormwater conveyance system. Mimicking a site's natural hydrologic regime can be accomplished by:

- Reducing imperviousness, conserving natural resources and areas, maintaining and using natural drainage courses in the stormwater conveyance system, and minimizing clearing and grading.
- Providing runoff storage measures dispersed throughout a site's landscape with the use of bioretention facilities and detention, retention, and infiltration practices.
- Implementing on-lot hydrologically functional landscape design and management practices.

The following five LID components, should be considered for each applicable project:

4.1.1 Conserve Natural Areas, Soils, and Vegetation

This LID design strategy helps retain numerous functions of predevelopment hydrology including rainfall interception, evapotranspiration, and infiltration. Maximizing these functions reduces the amount of runoff that must be treated. Protection of mature trees and vegetation provides habitat, prevents erosion, captures significant rainfall, provides summer shading, and reduces runoff volume and velocity.

4.1.2 Minimize Disturbances to Natural Drainages

Natural drainages offer a benefit to stormwater management as the soils and habitat already function as a natural filtering/infiltrating swale. Minimizing disturbances to natural drainage patterns preserves the predevelopment timing, rate, and duration of runoff as well as preserving streamside habitats. When determining the development footprint of the site, natural drainages should be avoided. By keeping the development envelope set back from natural drainages, the drainage can retain its water quality benefit to the watershed.

4.1.3 Minimize Soil Compaction

Clearing, grading, and compaction by construction traffic reduces the natural absorption and infiltration capacities of the native soils. Soil compaction damages soil structure, reduces infiltration rates, limits root growth and plant survivability, and destroys soil organisms. Subsequent tilling and/or addition of soil amendments such as compost can help but may not restore the original infiltration capacity of the soils. By protecting native soils and vegetation in appropriate areas during the clearing and grading phase of development, the site can retain some of its existing beneficial hydrologic function.

4.1.4 Minimize Impervious Surfaces

The increased volume, increased velocity, and discharge-duration of stormwater runoff from developed areas has the potential to accelerate downstream erosion and impair stream habitat in natural drainages. Studies have demonstrated a direct correlation between the degree of imperviousness of an area and the degradation of its receiving waters. Impervious surfaces (such as pavement and concrete) can neither absorb water nor remove pollutants. Reducing impervious surfaces to the minimum amount needed retains the permeability of the project site, allowing natural processes to filter and reduce non-point sources of pollution.

4.1.5 Direct Runoff to Landscaped Areas

Any impervious surface that drains into a catch basin, area drain, or other conveyance structure is a “directly connected impervious area.” As stormwater runoff flows across parking lots, roadways, and paved areas, the oils, sediments, metals, and other pollutants are collected and concentrated. If this runoff is collected by a drainage system and carried directly along impervious gutters or in closed underground pipes, it has no opportunity for filtering by plant material or infiltration into the soil. It also increases in speed and volume, which may cause higher peak flows downstream, and may require larger capacity storm drain systems, increasing flood and erosion potential. Solutions that reduce “directly connected impervious areas” prevent runoff, detain or retain surface water, attenuate peak runoff rates, benefit water quality and convey stormwater.

4.2 Source Control BMPs

Proactively controlling pollutants at their source is fundamental to effective stormwater quality management. Design of BMPs to minimize or prevent pollutant generation is guided by two general principles:

- Prevent stormwater from contacting operation and storage areas. These areas should be designed to prevent stormwater runoff from passing through industrial areas, vehicle maintenance yards, and other workplaces before it reaches storm drains.
- Prevent pollutants from contacting surfaces that come into contact with stormwater runoff or wash-water runoff.

4.3 Treatment Control BMPs

When a site cannot retain all or a portion of the Water Quality Volume on-site, the remaining portions of the water must be treated using Treatment Control BMPs. Treatment Control BMPs are engineered technologies designed to remove pollutants from stormwater runoff prior to discharge to the storm drain system or receiving waters. Details on BMP numeric sizing criteria and general requirements for infiltration BMPs can be found in the following individual fact sheets.

4.4 Maintenance Requirements

The long-term performance of BMPs hinges on ongoing and proper maintenance. Consideration of the time and funding necessary to support long term maintenance should be included as part of the process when selecting BMPs. Maintenance costs will also include disposal of accumulated residuals such as trash, oil and grease, filter media and fine sediments. An effective operation and maintenance (O&M) Plan should contain following major components:

- The designated responsible party to manage the post-construction stormwater BMPs.
- Post-construction operating schedule, maintenance frequency, and specific maintenance activities.
- Any necessary employee training and duties.
- Recordkeeping and reporting on inspection and servicing of all post-construction BMPs (on source/treatment control) at least on an annual basis, which uses a project-specific inspection form submitted with the O&M Plan.

4.5 BMP Selection Summary

Selection of BMPs must be site-specific. No single BMP can be applied to all scenarios. The designer should consider the benefits, pollutant removal efficiency, historical data from other installations, aesthetics, community acceptance, the lifecycle cost, and maintenance factors. Refer to the Department of Defense (DOD) Unified Facilities Criteria (UFC) 3-210-10 document on LID considerations for more in-depth discussion on BMP selection and sizing. Regarding Non-LID methods, this manual does not endorse any particular type of BMP. When selecting treatment control devices, it is recommended that the project designer consults with BMP device manufacturer to obtain independent performance testing data to ensure the device will target the pollutants of concern. For this reason, this manual does not include any proprietary BMPs. Table 9-1 lists BMP Fact Sheets included in this field manual.

5 Post-Construction BMP Inspections and Maintenance

MCBH's maintenance program allocates its resources to prioritize the operation and maintenance of facilities with the maximum potential to affect storm water quality. The BMP Database and AMS will be used by ECPD to collaborate with MCD/MRO, to ensure that annual inspection requirements of all post-construction BMPs, and LID features are met. At a minimum, this requires at least one inspection be conducted annually for each post-construction BMP, with maintenance performed as necessary to retain its function. Inspections will be conducted using the guidance of the LID and Post-Construction BMP Inspection Checklists.

Routine maintenance activities will also be conducted to the MEP, but priority will be given to BMPs that have been identified by inspection, or public notification, as malfunctioning. Inspection and maintenance records will be tracked via work orders generated by MCBH's current AMS MAXIMO, and by field notes documented by maintenance personnel. All inspection/maintenance records will be maintained by MCD/MRO and made available to ECPD upon request.

Post-Construction BMP Inspection Checklists are included as Attachment 1.

6 Reporting, Documentation, and the Asset Management System

Effectively managing project information and post-construction assets will ensure the long-term effectiveness of LID and other post-construction items. This will enable MCBH to easily identify and correct compliance issues and recognize recurring issues within the Stormwater Pollution Prevention Program or repeat offenders of its MS4 Permit requirements. This AMS allows a user to determine the current performance, likelihood of failure, and the consequences of failure for a particular asset. The ability to easily identify and address current/potential problems will further promote the continual improvement of the MCBH Stormwater Program and facilitate its effectiveness in reducing storm water pollution across MCBH.

The MS4 permit requires that post-construction assets are well documented in the MCBH AMS. At a minimum, the BMP information tracked in the AMS will include:

- General Information: Project name, owner, general location, start/end date of construction, date of acceptance by MCBH (MCD/MRO);
- Type and number of LID practices;
- Type and number of Source Control BMPs;
- Type and number of Treatment Control BMPs;
- Latitude/Longitude coordinates of controls using Global Positioning Systems and NAD83 or other Datum as long as the datum remains consistent;
- Photographs of controls;
- Operation and maintenance requirements;
- Frequency of inspections;
- Frequency of maintenance and entity responsible for maintenance;

- Current performance;
- Likelihood and consequences of failure;
- Records of upsets or malfunctioning of the BMPs.

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- HDOTb, 2015, *Storm Water Permanent Best Management Practices Manual.* State of Hawaii, Department of Transportation, Highways Division, Oahu District, April 2015.
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- State of Hawaii, Department of Health, *Hawaii Administrative Rules (HAR), Title 11, Chapter 55, Appendix C*, 2019.

- State of Hawaii, Department of Health, *Hawaii Administrative Rules (HAR), Title 11, Chapter 55, Appendix F and G*, 2022.
- State of Hawaii Department of Transportation, Highways Division, Oahu District, *Storm Water Permanent Best Management Practices Manual,* 2015.

8 Disclaimer

The information presented in this Post-Construction BMP Manual was adopted from available and most recent sources that have locally acceptable BMPs and stormwater runoff control measures. This manual has been prepared as a reference guideline, however, due to site-specific conditions, the selection of the BMPs and suggested installation specifications must be made in conjunction with the best professional judgment and sound engineering principles to assure proper function and performance of the BMPs contained herein. The author does not guarantee the accuracy or completeness of this document and will not assume any liability or responsibility for the use of, or for any damages resulting from the use of any information contained herein. The detail and the wording in this manual will not necessarily result in compliance with NPDES permit requirements or other requirements specific to the user's site or construction contract. Application of BMPs should comply with applicable federal, state, and county regulations.

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9 Post-Construction BMP Fact Sheets

Table 9-1 Post-Construction BMP Fact Sheets

Section	BMP Category	BMP Name	MCBH BMP ID
1	LID	Dry Swale	MCBH-PBMP-01
2	LID	Wet Swale	MCBH-PBMP-02
3	LID	Infiltration Trench	MCBH-PBMP-03
4	LID	Infiltration Basin	MCBH-PBMP-04
5	LID	Bioretention	MCBH-PBMP-05
6	LID	Shallow Wetland	MCBH-PBMP-06
7	LID	Pocket Wetland	MCBH-PBMP-07
8	LID	Wet Extended-Detention Pond	MCBH-PBMP-08
9	LID	Wet Pond	MCBH-PBMP-09
10	Non-LID	Surface Sand Filter	MCBH-PBMP-10
11	Non-LID	Underground Sand Filter	MCBH-PBMP-11
12	Non-LID	Organic Sand Filter	MCBH-PBMP-12
13	LID	Green Roof	MCBH-PBMP-13
14	LID	Dry Wells	MCBH-PBMP-14
15	Non-LID	Downspout Disconnection	MCBH-PBMP-15
16	Non-LID	Rain Harvest and Reuse	MCBH-PBMP-16
17	LID	Permeable Hardscape	MCBH-PBMP-17
18	Non-LID	Proprietary Non-LID BMPs	MCBH-PBMP-18

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1 Dry Swale

Image Source – Mark M. Holeman, Inc.

1.1 Description & Purpose

Swales are vegetated open channels that are designed to capture and treat the full water quality volume within dry or wet cells that are formed by check dams or other means. A dry swale, often referred to as a bioswale, receives runoff during rain events but generally does not have ponded or standing water during dry periods.

1.2 Applications

Dry swales are used at low density residential projects or for very small impervious areas. Dry swales are applicable for land uses such as roads, highways, residential development, and pervious areas.

1.3 Suggested Design Criteria

- Volume is based on a rainfall intensity of 0.4 inches per hour.
- WQFR: C*0.4”*A is the Water Quality Flow Rate (cfs).
- C is the runoff coefficient, calculated using tables.
- 0.4 inches is the hourly rainfall intensity.
- A is the site area in acres.
- Longitudinal slopes shall be less than 4.0% to qualify for water quality volume treatment.
- Channels shall have moderate side slopes (flatter than 3:1) for most conditions and may NOT be steeper than 2:1.
- Peak velocity shall be non-erosive for the soil and vegetative cover provided.
- The maximum allowable ponding time shall be less than 48 hours, and the minimum ponding time shall be 30 minutes is recommended.

- A bottom width of no wider than 8 feet or a meandering drainage pattern shall be established.
- There should be a maximum ponding depth of one foot at the mid-point of the channel profile and a maximum depth of 18 inches at the downstream end of the channel.
- At the water quality flow rate, the swale width should be that which will have a flow depth of no greater than 4 inches and the hydraulic grade line is no greater than 2% between structures.
- The flow length in the swale should be a minimum of 100 feet.

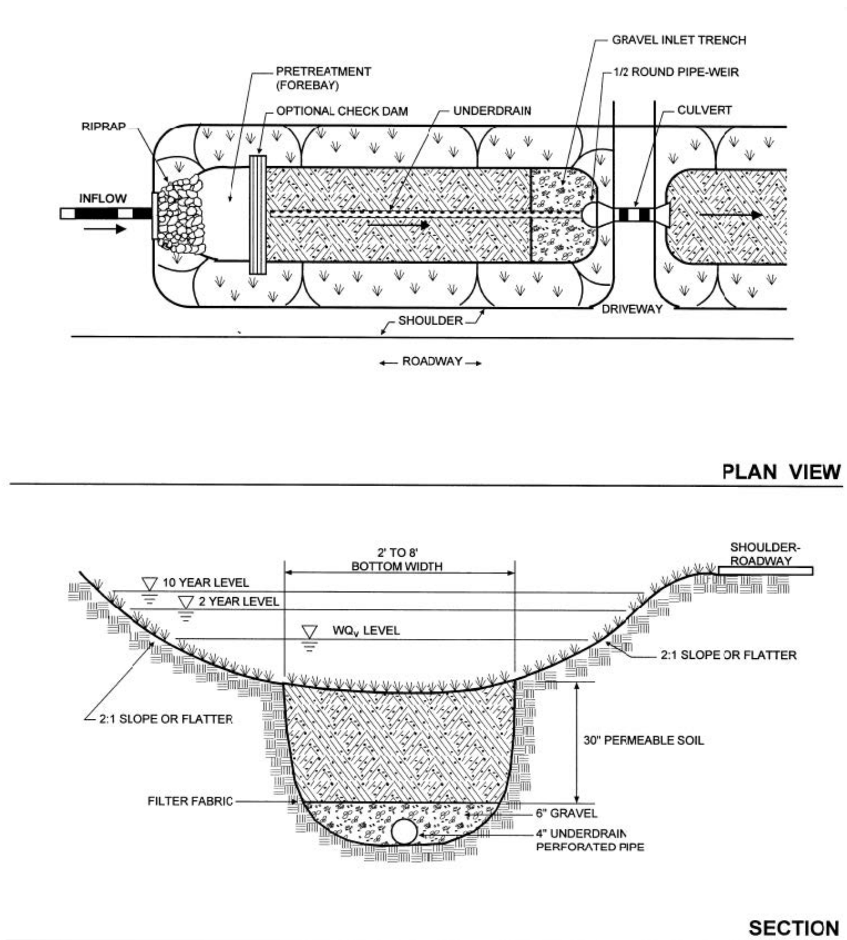


Figure 1. Example of a Dry Swale. Source- Maryland Department of the Environment 2000

1.4 Pretreatment Requirements

- Pretreatment storage of 0.1 inches of runoff per impervious acre storage shall be provided, which is usually obtained by check dams at pipe inlets and/or driveway crossings.
- A diaphragm of pea gravel and gentle side slopes should be provided along the top of channels to accommodate pretreatment for lateral sheet flows.
- Direct discharge of concentrated flow shall be pretreated.

1.5 Construction Considerations

- The inflow should be directed towards the upstream end of the swale but should occur evenly over the swale.
- Swales that directly receive runoff from impervious surfaces may have a six inch drop onto a protected shelf of pea gravel to minimizing the clogging of the inlet.
- An underdrain shall be provided to ensure maximum ponding time of 48 hours.

1.6 Landscaping Requirements

- Landscape design should specify proper grass species and wetland plants based on the specific site, soils and hydric conditions present along the channel.
- A permeable soil mixture 30”-30” deep should meet the bioretention “planting” soil specifications listed in the Bioretention section.
- Seed should be flood and drought resistant grasses.

1.7 Maintenance And Inspections

- Swales should be mowed as required during the growing season to maintain heights in the 4-6 inch range.
- Sediment buildup in the bottom of the swale shall be removed when 25% of the original water quality volume has been exceeded.

1.8 Limitations

- The bottom of the facility shall be above the seasonally high water table.
- No gravel or perforated pipe shall be placed under driveways.

2 Wet Swale

Image Source -limno.com

2.1 Description & Purpose

Swales are vegetated open channels that are designed to capture and treat the full water quality volume within dry or wet cells that are formed by check dams or other means. Wet swales are differentiated from dry swales in that they function with the likely presence of moist or wet conditions. A wet swale functions similarly to stormwater wetlands and is designed to fit into linear environments.

2.2 Applications

Wet swales are ideal for treating highway runoff in low lying or flat areas. Wet swales are applicable for land uses such as roads, highways, and pervious areas.

2.3 Suggested Design Criteria

- Volume is based on a rainfall intensity of 0.4 inches per hour.
- WQFR: C*0.4”*A is the Water Quality Flow Rate (cfs).
- C is the runoff coefficient, calculated using tables.
- 0.4 inches is the hourly rainfall intensity.
- A is the site area in acres.
- Longitudinal slopes shall be less than 4.0% to qualify for water quality volume treatment.
- Channels shall have moderate side slopes (flatter than 3:1) for most conditions and may NOT be steeper than 2:1.
- Peak velocity shall be non-erosive for the soil and vegetative cover provided.
- The maximum allowable ponding time shall be less than 48 hours, and the minimum ponding time shall be 30 minutes is recommended.
- A bottom width of no wider than 8 feet or a meandering drainage pattern shall be

established.

- There should be a maximum ponding depth of one foot at the mid-point of the channel profile and a maximum depth of 18 inches at the downstream end of the channel.
- At the water quality flow rate, the swale width should be that which will have a flow depth of no greater than 4 inches and the hydraulic grade line is no greater than 2% between structures.
- The flow length in the swale should be a minimum of 100 feet.

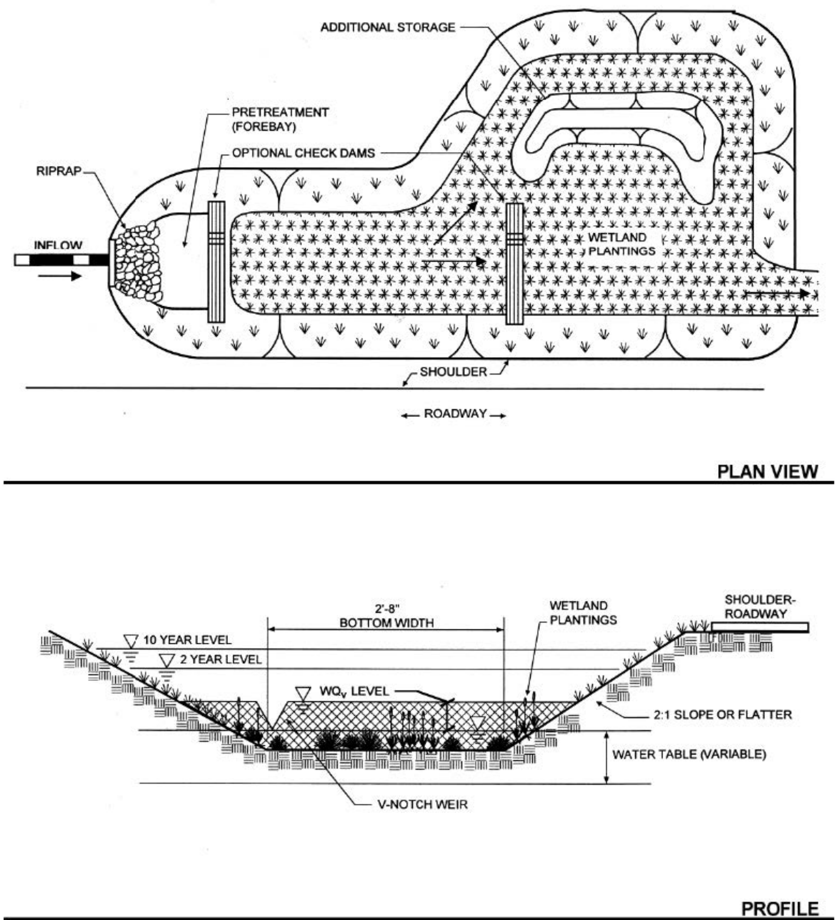


Figure 2. Example of a Wet Swale. Source- Maryland Department of the Environment 2000

2.4 Pretreatment Requirements

- Pretreatment storage of 0.1 inches of runoff per impervious acre storage shall be provided, which is usually obtained by check dams at pipe inlets and/or driveway crossings.
- A diaphragm of pea gravel and gentle side slopes should be provided along the top of channels to accommodate pretreatment for lateral sheet flows.
- Direct discharge of concentrated flow shall be pretreated.

2.5 Construction Considerations

- The inflow should be directed towards the upstream end of the swale but should occur evenly over the swale.
- Swales that directly receive runoff from impervious surfaces may have a six inch drop onto a protected shelf of pea gravel to minimizing the clogging of the inlet.
- Excavation should be performed in undisturbed areas.
- No underdrain system should be used.

2.6 Landscaping Requirements

- Landscape design should specify proper grass species and wetland plants based on the specific site, soils and hydric conditions present along the channel.
- A permeable soil mixture 30"-30" deep should meet the bioretention "planting" soil specifications listed in the Bioretention section.
- Seed should be flood and drought resistant grasses.

2.7 Maintenance and Inspections

- Swales should be mowed as required during the growing season to maintain heights in the 4-6 inch range.
- Sediment buildup in the bottom of the swale shall be removed when 25% of the original water quality volume has been exceeded.
- Swales with wetland vegetation or other low maintenance ground cover do not require frequent mowing of the channel.

2.8 Limitations

- The seasonally high-water table may inundate the swale, but not above the bottom of the channel.
- No gravel or perforated pipe shall be placed under driveways.
- Not recommended for residential developments since they can create potential nuisance or mosquito breeding conditions.

3 Infiltration Trench

Image Source - sudswales.com

3.1 Description & Purpose

Infiltration trenches are linear ditches that collect rainwater from adjacent surfaces, and their highly permeable soils allow the water to quickly seep into the ground.

3.2 Applications

Infiltrated storm water shall be infiltrated through soils capable of filtering prior to entering groundwater. Other suitable media filters pollutants that are accompanied by a certification from a licensed civil engineer that the filter/device will remove 80 percent of total suspended solids from the design flow rate are also acceptable. Infiltration shall only be used where soil conditions and slope stability are suitable.

3.3 Suggested Design Criteria

- A porosity value “n” (n=Vv/Vt) of 0.40 should be used in the design of stone reservoirs for infiltration methods.
- Volume is based on a rainfall intensity of 0.4 inches per hour.
- WQFR: C*0.4”*A is the Water Quality Flow Rate (cfs).
- C is the runoff coefficient, calculated using tables.
- 0.4 inches is the hourly rainfall intensity.
- A is the site area in acres.
- Groundwater shall be protected from possible contamination by avoiding potential storm water areas.
- The bottom of the facility shall be separated by at least 4’ (vertically) from the seasonally high-water table or bedrock layer.
- Facilities shall be located at least 100 feet from any water supply well.
- Facilities shall have a maximum contributing area of five acres.
- The facility should not be placed in locations that cause water problems to downgrade properties and should be setback (25’) downgrade from structures

- All trenches shall be designed to fully de-water the entire water quality volume within 48 hours after the storm event.
- Adequate storm water outfalls shall be provided for the overflow associated with the ten- year design storm event.
- Since the trench will be located "off-line" from the main conveyance system, a flow splitter will be required to divert the water quality volume into the filter.

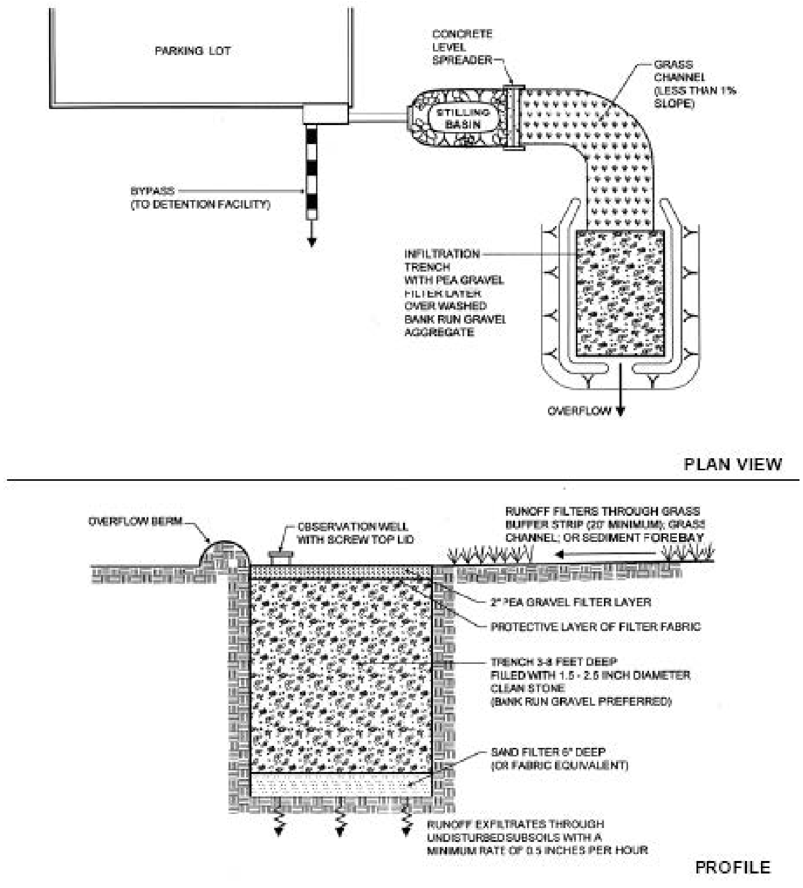


Figure 3. Example of an Infiltration Trench- Maryland Department of the Environment 2000

3.4 Pretreatment Requirements

- A minimum of 25% of the water quality volume is to be pretreated in the stilling basin prior to entering the facility.
- Exit velocities shall be non-erosive during the two-year design storm.
- Long-term techniques for infiltration protection (2 per trench):
    - Grass channel;
    - Grass filter strip (minimum 20 feet and only if sheet flow is established and maintained);
    - Bottom sand layer;
    - Upper sand layer (6 inches minimum) with filter fabric at sand/gravel interface; and
    - Washed bank run gravel used as aggregate.

3.5 Construction Considerations

- Phases of trench construction shall be coordinated with the overall project construction schedule.
- Rough excavation and rough grading phases of construction should be scheduled together to permit the exchange of cut and fill. The partially excavated trench **CANNOT** serve as a sedimentation basin.
- Trench construction specifications should state:
    - The earliest point in progress when storm drainage may be directed to the trench;
    - The means by which the delay will be accomplished.
- Initial trench excavation should be carried to within 2 feet of the final elevation of the trench floor.
- Final excavation to the final grade should be done after all disturbed areas in the watershed area stabilized or protected.
- Final phase excavation should remove all accumulated sediment.
- Light tracked equipment is recommended to avoid compaction in the trench.
- After the completion of final grading, the trench should be well-aerated and have a highly porous surface texture.
- Trenches may be lined with a 6 to 12 inch layer of filter material, such as coarse sand to help prevent the buildup of impervious deposits. The filter layer can be replaced or cleaned when clogged.
- Establish dense vegetation on trench side slopes and floor, preventing erosion, sloughing, and a natural means of maintaining high infiltration rates.
- Use NRCS requirements for vegetative materials for side slopes and other areas to be vegetated.
- Fescue family grasses are recommended for seeding.

3.6 Landscaping Requirements

- Dense and vigorous vegetative cover is to be established over the contributing pervious drainage areas before runoff can be accepted into the facility. Infiltration trenches are not to be constructed until all of the contributing drainage areas have been completely stabilized.

3.7 Maintenance and Inspections

- Are not to serve as a sediment control device during site construction.
- Erosion and sediment plans for the site must clearly indicate methods that will prevent sediment from entering the infiltration device.
- Recommended that infiltration designs include dewatering methods such as underdrain pipe systems to accommodate drawdown in the event of a failure.
- Direct access provided to all infiltration practices for maintenance and rehabilitation.
- Should not be covered by an impermeable surface.

3.8 Limitations

- Often best used with other BMPs downstream.
- Underlying soils shall have specific infiltration rates to be tested with geotechnical borings.
- Soils shall have a clay content of less than 20% and a silt/clay content of less than 40%.
- Infiltration cannot be located on slopes greater than 15% or within fill soils.

4 Infiltration Basin

Image Source - trianglepondmanagement.com

4.1 Description & Purpose

Water quality volume is retained in an infiltration basin, where it percolates through the basin in a 2-day period. The facility must be able to completely treat the flow rate as determined from storm water quality control flow rate charts. Flows above this rate can either be by-passed or routed through the facility if it can be demonstrated that velocities will not re-entrain captured pollutants.

4.2 Applications

Infiltrated storm water shall be infiltrated through soils capable of filtering prior to entering groundwater. Other suitable media filters pollutants that are accompanied by a certification from a licensed civil engineer that the filter/device will remove 80 percent of total suspended solids from the design flow rate are also acceptable. Infiltration shall only be used where soil conditions and slope stability are suitable.

4.3 Limitations

- Often best used with other BMPs downstream.
- Underlying soils shall have specific infiltration rates to be tested with geotechnical borings.
- Soils shall have a clay content of less than 20% and a silt/clay content of less than 40%.
- Infiltration cannot be located on slopes greater than 15% or within fill soils.

4.4 Suggested Design Criteria

- A porosity value "n" (n=Vv/Vt) of 0.40 should be used in the design of stone reservoirs for infiltration methods.
- Volume is based on a rainfall intensity of 0.4 inches per hour.
- WQFR: C*0.4"*A is the Water Quality Flow Rate (cfs).
- C is the runoff coefficient, calculated using tables.
- 0.4 inches is the hourly rainfall intensity.
- A is the site area in acres.
- Groundwater shall be protected from possible contamination by avoiding potential storm water areas.
- The bottom of the facility shall be separated by at least 4' (vertically) from the seasonally high-water table or bedrock layer.
- Facilities shall be located at least 100 feet from any water supply well.
- Facilities shall have a maximum contributing area of five acres.
- The facility should not be placed in locations that cause water problems to downgrade properties and should be setback 25' downgrade from structures.
- All basins shall be designed to fully de-water the entire water quality volume within 48 hours after the storm event.
- Adequate storm water outfalls shall be provided for the overflow associated with the ten- year design storm event.

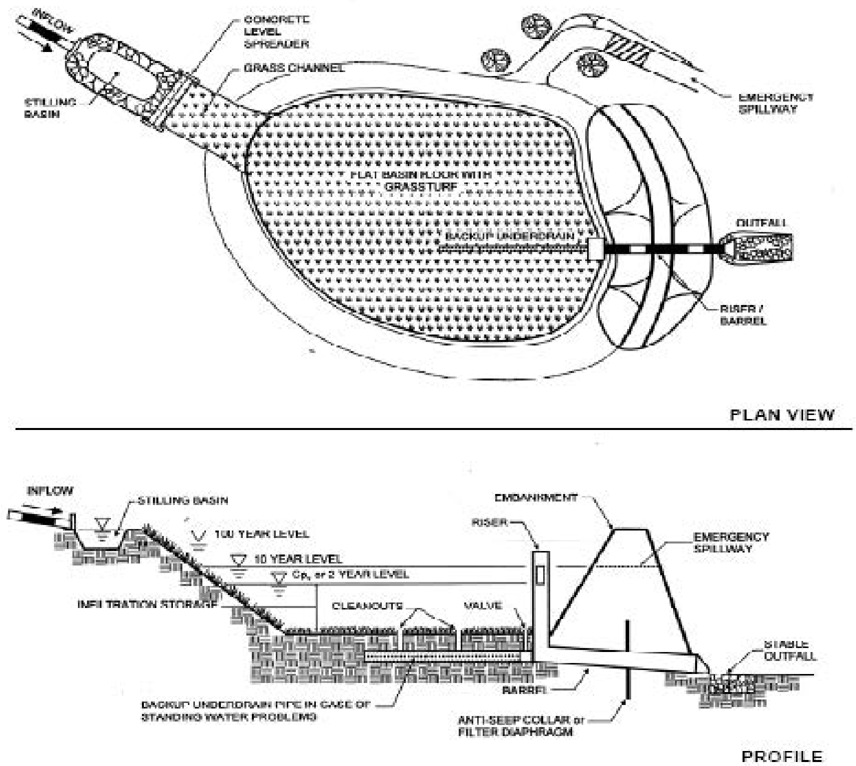


Figure 4. Example of an Infiltration Basin- Maryland Department of the Environment 2000

4.5 Pretreatment Requirements

- A minimum of 25% of the water quality volume is to be pretreated in the stilling basin prior to entering the facility.
- Exit velocities shall be non-erosive during the two-year design storm.
- Long-term techniques for infiltration protection (2 per basin)
  - Grass channel;
  - Grass filter strip (minimum 20 feet and only if sheet flow is established and maintained);
  - Bottom sand layer;
  - Upper sand layer (6 inches minimum) with filter fabric at sand/gravel interface; and
  - Washed bank run gravel used as aggregate.

4.6 Construction Considerations

- Phases of basin construction shall be coordinated with the overall project construction schedule.
- Rough excavation and rough grading phases of construction should be scheduled together to permit the exchange of cut and fill. The partially excavated basin **CANNOT** serve as a sedimentation basin.
- Basin construction specifications should state:

    - The earliest point in progress when storm drainage may be directed to the basin; and
    - The means by which the delay will be accomplished.
- Initial basin excavation should be carried to within 2 feet of the final elevation of the basin floor.
- Final excavation to the final grade should be done after all disturbed areas in the watershed area stabilized or protected.
- Final phase excavation should remove all accumulated sediment.
- Light tracked equipment is recommended to avoid compaction in the basin.
- After the completion of final grading, the basin should be well-aerated and have a highly porous surface texture.
- Basins may be lined with a 6 to 12 inch layer of filter material, such as coarse sand to help prevent the buildup of impervious deposits. The filter layer can be replaced or cleaned when clogged.
- Establish dense vegetation on basin side slopes and floor, preventing erosion, sloughing, and a natural means of maintaining high infiltration rates.
- Use NRCS requirements for vegetative materials for side slopes and other areas to be vegetated.
- Fescue family grasses are recommended for seeding.

4.7 Landscaping Requirements

- Dense and vigorous vegetative cover is to be established over the contributing pervious drainage areas before runoff can be accepted into the facility. Infiltration trenches are not to be constructed until all of the contributing drainage areas have been completely stabilized.

4.8 Maintenance and Inspections

- Are not to serve as a sediment control device during site construction.
- Erosion and sediment plans for the site must clearly indicate methods that will prevent sediment from entering the infiltration device.
- Recommended that infiltration designs include dewatering methods such as underdrain pipe systems to accommodate drawdown in the event of a failure.
- Direct access provided to all infiltration practices for maintenance and rehabilitation.
- Should not be covered by an impermeable surface.

5 Bioretention

Image Source - owp.csus.edu/lid/

5.1 Description & Purpose

Bioretention combines open space with storm water treatment in vegetated areas where runoff is directed through vegetation and soils for filtration. It captures and temporarily stores the water quality volume and passes it through a filter bed of sand, organic matter, soil, or other media.

5.2 Applications

Filtered runoff may be collected and returned to the conveyance system or allowed to partially exfiltrate into the soil.

5.3 Suggested Design Criteria

- A porosity value "n" (n=Vv/Vt) of 0.40 should be used in the design of stone reservoirs for infiltration methods.
- Volume is based on a rainfall intensity of 0.4 inches per hour.
- WQFR: C*0.4"*A is the Water Quality Flow Rate (cfs).
- C is the runoff coefficient, calculated using tables.
- 0.4 inches is the hourly rainfall intensity.
- A is the site area in acres.
- The required filter bed area (Af) is computed using the following equation: Af= (WQv) (df) / [(k) (hf+df) (tf)]
    - WQv is the water quality volume (cu. ft);
    - df is the filter bed depth (ft);
    - k is the coefficient pf permeability of the filter bed (ft/day);
    - hf is the height of water above the filter bed (ft); and

- tf is the design filter bed drain time (days)- 2 days recommended.

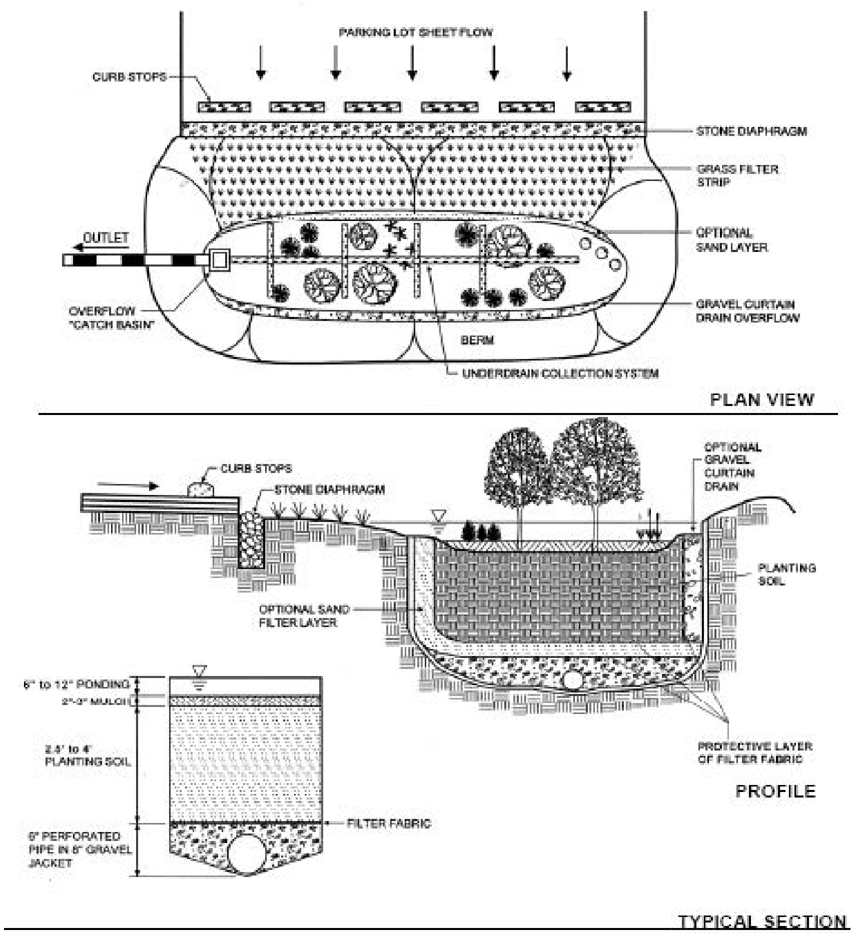


Figure 5. Example of a Bioretention Plan. Source- Maryland Department of the Environment 2000

5.4 Pretreatment Requirements

- Pretreatment is provided when all of the following are provided:
  - 20’ grass filter strip below a level spreader or sand filter layer;
  - Gravel diaphragm; and
  - Mulch layer.
- Treatment components shall include:
  - 2 ½ to 4 foot deep planting soil bed;
  - Surface mulch layer; and
  - 12 inches deep surface ponding area.

5.5 Construction Considerations

- Overflow for the ten-year storm event shall be provided to a non-erosive outlet point and non-erosive velocities shall result.
- A flow regulator shall be provided to divert the water quality volume to the filtering practice.
- The filters shall have a 6-inch perforated underdrain pipe in a gravel layer.

- A permeable filter fabric shall be places between the gravel layer and the filter media.

5.6 Landscaping Requirements

- Landscaping is critical to the function and performance of the bioretention areas. A landscaping plan shall be provided for these areas.
- Planting recommendations:
  - Native plant species;
  - Select vegetation based on the zone of hydric tolerance;
  - Trees with an understory of shrubs and herbaceous materials should be selected; and
  - Woody vegetation should not be used at inflow locations.
- The ponding depth should be 6 inches or less with a mulch layer of 2 to 3 inches.
- A sandy planting soil of 2 to 3 inches should be used.
- Dense and vigorous vegetation should be established over the contributing drainage area before accepting runoff into the facility.

5.7 Maintenance and Inspections

- Direct maintenance access is to be provided to the pretreatment area and the filter bed.
- At least a six-inch drop shall be provided at the inlet of the facility (stone diaphragm).
- Dead or diseased plants shall be replaced.
- Areas with mulch that has been washed out should be re-mulched annually.

5.8 Limitations

- Unless there is adequate infiltration capacity, underdrains and overflow drains should be included to collect and discharge filtered runoff to the storm drainage system.

6 Shallow Wetland

Image Source – Maryland DOT State Highway Administration

6.1 Description & Purpose

Shallow wetlands provide water quality volume in a shallow pool that has a large surface area.

6.2 Applications

Practices that create shallow wetland areas to treat urban storm water and often incorporate small permanent pools and/or extended detention storage to achieve the full water quality volume.

6.3 Suggested Design Criteria

- Volume based on the 1-inch storm.
- C=0.05+0.009*IMP is the runoff coefficient.
- IMP is the percentage of impervious area.
- WQDV=C*1”*A*3630 (Water Quality Design Volume (cf)).
- C is the runoff coefficient.
- 1 inches is the 1-inch storm.
- A is the area of the site in acres.
- 3630 is a conversion factor.
- The volume must meet minimum detention times.
- Flowpaths from inflow points to outflow points within storm water wetlands shall be maximized.
- Flowpaths of 1.5:1 (L:W) and irregular shapes are recommended and achieved by constructing internal berms.
- Microtopography is encouraged to enhance diversity in the wetland.
- Surface area shall be at least 1.5 percent of the total drainage area to the facility.

- At least 25% of the total water quality volume shall be in deepwater zones with a minimum depth of four feet. This may be reduced if the wetland is located where thermal impacts area a primary concern.
- A minimum of 35% of the total surface area shall have a depth of 6 inches or less.
- At least 65% of the total surface area shall be shallower than 18 inches.
- If using extended detention, the extended detention volume shall not comprise more than 50% of the total wetland design. Maximum surface elevation shall not extend more than 3 feet above the normal pool.
- In order to promote greater nitrogen removal, rock beds may be used as a medium for growth of wetland plants. Rock should be 1-3 inches in diameter and placed up to the normal pool elevation. Rock beds should be open to flow-through from either direction.

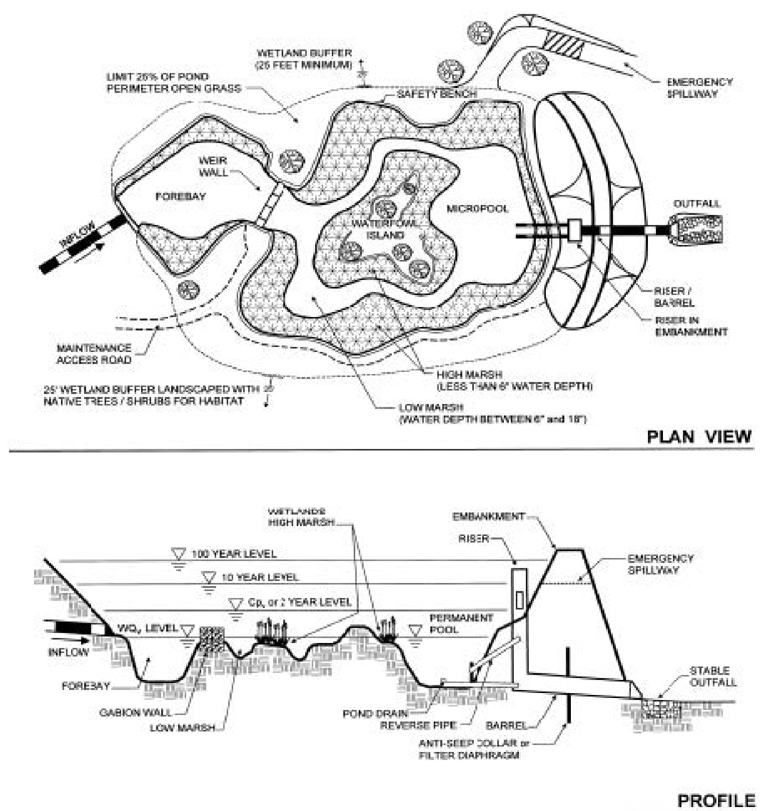


Figure 6. Example of a Shallow Wetland. Source- Maryland Department of the Environment 2000

6.4 Pretreatment Requirements

- Sediment regulation is critical for sustaining storm water wetlands.
- Sediment forebay:
  - Located at the inlet and the micropool shall be located at the inlet;
  - Micropool located at the outlet; and
  - Forebay shall be sized to contain 0.1 inches per impervious acre of contributing

drainage. The storage in the forebay counts toward the total amount of water quality volume required to be treated.

- Micropool is a 3-6 foot deep pool used to protect the low flow pipe from clogging and prevent sediment resuspension.
- Exit velocities shall be non-erosive.

6.5 Construction Considerations

- The wetland bed should be graded to create maximum internal flowpaths and microtopography.

6.6 Landscaping Requirements

- Landscaping plans shall be provided that indicate methods used to establish and maintain wetland coverage.
- Minimum plan elements include:
  - Delineation of pondscaping zones;
  - Selection of corresponding plant species;
  - Planting configuration; and
  - Sequence for preparing wetland bed.
- Landscaping plans for Use III and IV watersheds should incorporate plant species and plants found in wooded wetlands.
- Fascines, coconut rolls, or straw bales can be used in high energy areas of the storm water wetland to create shallow marsh cells.
- Landscaping plans should promote greater wildlife and waterfowl use within the watershed.
- A wetland buffer should extend 25 feet outward from the maximum water surface elevation with an additional 15 foot setback to structures.

6.7 Maintenance and Inspections

- If a minimum coverage of 50% is not achieved in the planted wetland zones after the second growing season, a reinforcement planting will be required.
- Storm water wetlands are created in upland areas and away from jurisdictional wetlands and are not regulated by state and federal laws as long as regular maintenance is performed.

6.8 Limitations

- A water balance must be performed to demonstrate that a wetland can withstand a thirty-day drought at summer evaporation rates without completely drawing down.
- Storm water wetlands may not be located within jurisdictional waters, including wetlands without obtaining a wetlands and waterways permit from the state.
- Use III watersheds may require a small pond review and approval from dam safety in wetlands that include permanent ponds as design components.

7 Pocket Wetland

Image Source – Center for Watershed Protection, Inc.

7.1 Description & Purpose

A high-water table or groundwater interception helps maintain the shallow wetland pool in the pocket wetland.

7.2 Applications

Practices that create wetland areas to treat urban storm water and often incorporate small permanent pools and/or extended detention storage to achieve the full water quality volume.

7.3 Suggested Design Criteria

- Volume based on the 1-inch storm.
- C=0.05+0.009*IMP is the runoff coefficient.
- IMP is the percentage of impervious area.
- WQDV=C*1”*A*3630 (Water Quality Design Volume (cf)).
- C is the runoff coefficient.
- 1 inches is the 1-inch storm.
- A is the area of the site in acres.
- 3630 is a conversion factor.
- The volume must meet minimum detention times.
- Flowpaths from inflow points to outflow points within storm water wetlands shall be maximized.
- Flowpaths of 1.5:1 (L:W) and irregular shapes are recommended and achieved by constructing internal berms.
- Microtopography is encouraged to enhance diversity in the wetland.

- Surface area shall be at least one percent of the total drainage area to the facility.
- At least 25% of the total water quality volume shall be in deepwater zones with a minimum depth of four feet. This may be reduced if the wetland is located where thermal impacts area a primary concern.
- A minimum of 35% of the total surface area shall have a depth of 6 inches or less.
- At least 65% of the total surface area shall be shallower than 18 inches.
- If using extended detention, the extended detention volume shall not comprise more than 50% of the total wetland design. Maximum surface elevation shall not extend more than 3 feet above the normal pool.
- In order to promote greater nitrogen removal, rock beds may be used as a medium for growth of wetland plants. Rock should be 1-3 inches in diameter and placed up to the normal pool elevation. Rock beds should be open to flow-through from either direction.

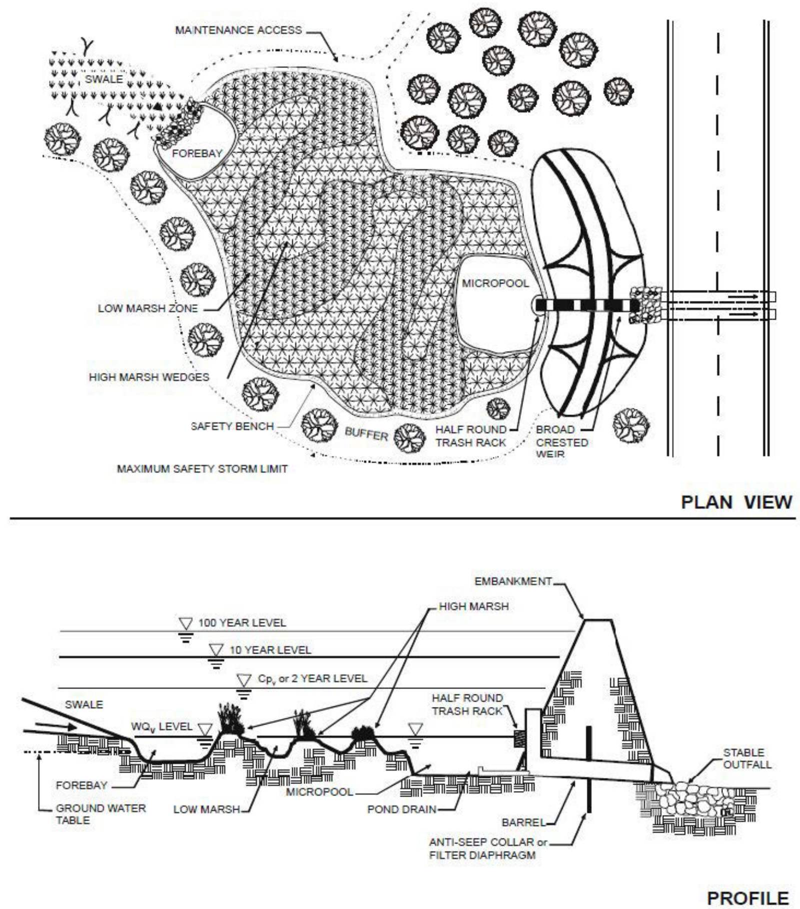


Figure 7. Example of a Pocket Wetland. Source- Maryland Department of the Environment 2000

7.4 Pretreatment Requirements

- Sediment regulation is critical for sustaining storm water wetlands.
- Sediment forebay:

    - Located at the inlet and the micropool shall be located at the inlet;
    - Micropool located at the outlet; and
    - Forebay shall be sized to contain 0.1 inches per impervious acre of contributing drainage. The storage in the forebay counts toward the total amount of water quality volume required to be treated.
- Micropool is a 3-6 foot deep pool used to protect the low flow pipe from clogging and prevent sediment resuspension.
- Exit velocities shall be non-erosive.

7.5 Construction Considerations

- The wetland bed should be graded to create maximum internal flowpaths and microtopography.

7.6 Landscaping Requirements

- Landscaping plans shall be provided that indicate methods used to establish and maintain wetland coverage.
- Minimum plan elements include:
    - Delineation of pondscaping zones;
    - Selection of corresponding plant species;
    - Planting configuration; and
    - Sequence for preparing wetland bed.
- Landscaping plans for Use III and IV watersheds should incorporate plant species and plants found in wooded wetlands.
- Fascines, coconut rolls, or straw bales can be used in high energy areas of the storm water wetland to create shallow marsh cells.
- Landscaping plans should promote greater wildlife and waterfowl use within the watershed.
- A wetland buffer should extend 25 feet outward from the maximum water surface elevation with an additional 15 foot setback to structures.

7.7 Maintenance and Inspections

- If a minimum coverage of 50% is not achieved in the planted wetland zones after the second growing season, a reinforcement planting will be required.
- Storm water wetlands are created in upland areas and away from jurisdictional wetlands and are not regulated by state and federal laws as long as regular maintenance is performed

7.8 Limitations

- A water balance must be performed to demonstrate that a wetland can withstand a thirty-day drought at summer evaporation rates without completely drawing down.
- Storm water wetlands may not be located within jurisdictional waters, including wetlands without obtaining a wetlands and waterways permit from the state.
- Use III watersheds may require a small pond review and approval from dam safety in wetlands that include permanent ponds as design components.

8 Wet Extended Detention Pond

Image Source – Highpointnc.gov

8.1 Description & Purpose

Water quality storage is provided through a combination of permanent pool and extended detention storage.

8.2 Applications

Detention of storm water runoff allows for the settling of fine particles and pollutants that are associated with these particles.

8.3 Suggested Design Criteria

- Volume based on the 1-inch storm.
- C=0.05+0.009*IMP is the runoff coefficient.
- IMP is the percentage of impervious area.
- WQDV=C*1”*A*3630 (Water Quality Design Volume (cf))
    - C is the runoff coefficient;
    - 1 inches is the 1-inch storm;
    - A is the area of the site in acres; and
    - 3630 is a conversion factor
- The volume must meet minimum detention times.
- The draw-down time for the detention volume shall be greater than or equal to 48 hours. For the bottom half of the detention volume, the draw-down time shall be greater than or equal to 36 hours.
- The detention system shall be designed to maximize the distance between the inlet and outlet, and to minimize “dead spaces” (areas with little or no exchange occurs

during a storm event), limiting short-circuiting. A minimum flow path length to width ratio of 3 should be utilized.

- The outlet shall be sized to achieve the above required detention times. It shall also be large enough that clogging is unlikely to occur. It should be 4 inches or larger in diameter. If this is not possible, the use of flow-through based measures should be considered, unless it can be demonstrated that clogging can be avoided.
- There shall be a minimum contributing drainage area of ten acres or more unless groundwater ground water is the primary water source.
- The ten-year design storm is to be used to design for a stable outfall.
- Dams shall meet class A dam safety hazard classification.
- The principal spillway/riser shall provide anti-floatation, anti-vortex, and trash-rack designs.
- One foot of freeboard shall be provided above the design high water for the 10-year storm.
- Woody vegetation is prohibited on the embankment.
- Pond benches:
    - The safety bench extends outward from the normal water edge to the toe of the pond side slope. Maximum slope=6%; and
    - Aquatic bench extends inward from the normal shoreline and has a maximum depth of 18 inches below normal pool water surface elevation. Not required in forebays.
- Pond buffers and setbacks:
    - Buffer should be provided that extends 25 feet outward from the maximum water surface elevation of the pond and should be contiguous with other required buffer areas; and
    - Existing trees should be preserved during construction and forest conservation areas should be located.
- Non-clogging low flow orifice:
    - Shall have a minimum diameter of 3 inches and shall be adequately protected from clogging by an external trash rack;
    - Orifice diameter can be reduced to 1 inch if using an internal orifice;
    - Submerged reverse-slope pipe that extends downward from the riser to an inflow point one foot below normal pool elevation is preferred;
    - Alternatives include broad crested rectangular, v-notch, or proportional weird, protected by half-round CMP that extends 12 inches below permanent pool;
    - Horizontal perforated pipe protected by geotextile and gravel not recommended; and
    - Vertical pipes can be used if a permanent pool is present.
- Riser:
    - Shall be located within the embankment for maintenance access, safety and aesthetics;
    - Access to riser to be provided by lockable manhole covers and steps within reach of valves and controls; and
    - Openings should be fenced with pipe or rebar to prevent trash accumulation.

- Pond Drain:
  - Ponds shall have a drain pipe that can drain the pond within 24 hours;
  - Prevent downstream discharge of sediment and slope instability caused by drawdown by exercising care during these processes; and
  - Appropriate jurisdictions shall be notified before draining a pond.
- Valves:
  - Drain shall be equipped with adjustable valve;
  - Drain should be sized one pipe size larger than the calculated design diameter;
  - Controls should be located inside of the riser they will not be inundated and can be operated safely; and
  - Handwheel shall be chained to a ringbolt or manhole step to prevent vandalism.

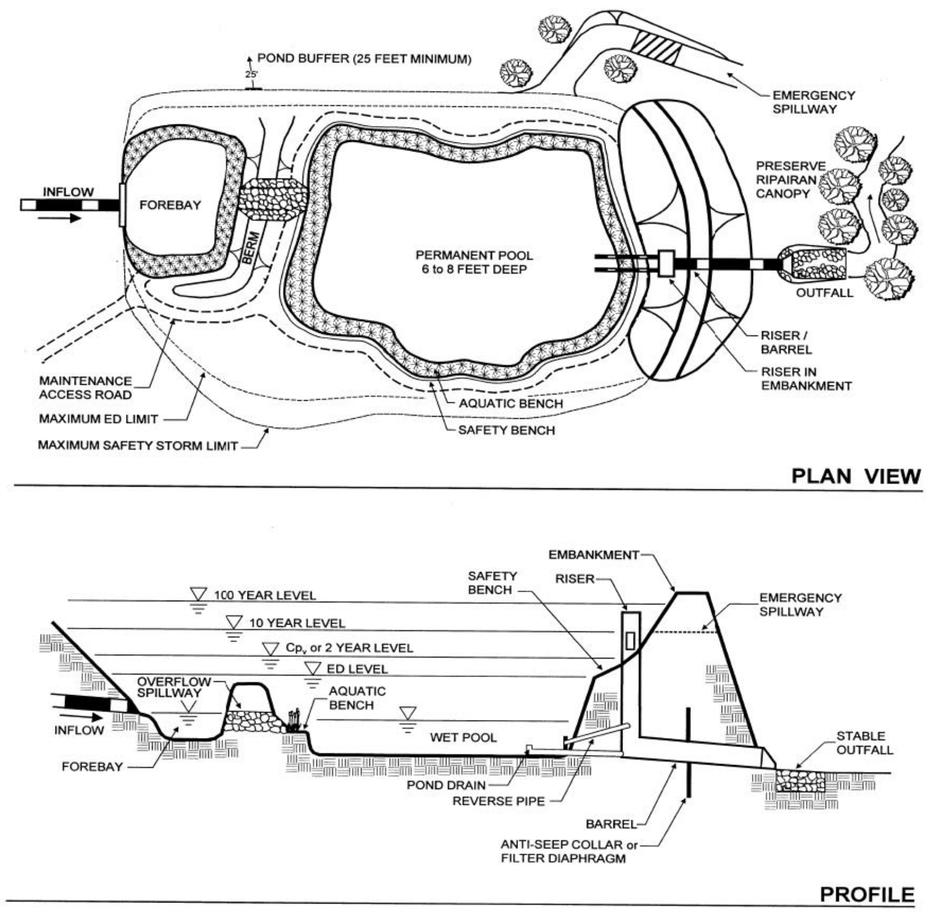


Figure 8. Example of a Wet Extended Detention Pond. Source- Maryland Department of the Environment 2000

8.4 Pretreatment Requirements

- Sediment forebay:
  - Each pond shall have a sediment forebay or equivalent upstream treatment and shall consist of a separate cell, formed by an adequate barrier; and
  - Forebay shall be sized to contain 0.1 inches per impervious acre of contributing drainage. The storage in the forebay counts toward the total amount of water quality volume required to be treated.

- Exit velocities shall be non-erosive.
- The bottom may be hardened to make sediment removal easier.
- The fixed vertical sediment depth marker should be installed to measure sediment deposition over time.

8.5 Construction Considerations

- Inlet protection shall not be fully submerged at normal pool elevations.
- A forebay shall be provided at each inlet, unless the inlet provides less than 10% of the total design storm inflow to the pond.
- Flared pipe sections that discharge at or near the stream invert or into a step-pool arrangement should be used at the spillway outlet.
- The channel immediately below the pond outfall shall be modified to prevent erosion and conform to natural dimensions in the shortest possible distance, usually by the use of large riprap over filter cloth.
- A stilling basin or other outlet protection should be used to reduce flow velocities form the principal spillway to non-erosive.
- In ponds that daylight to channels with dry weather flow, tree clearing should be minimized along the downstream channel. Avoiding the excessive use of riprap is important to prevent stream warming.
- Pond liners should be used in areas of karst topography, gravelly sands or fractured bedrock.

8.6 Landscaping Requirements

- The landscaping plan for storm water ponds and its buffer shall indicate how aquatic and terrestrial areas will be vegetatively stabilized and established.
- Wetland plants are encouraged either along the aquatic bench, safety bench and side slopes, or within shallow areas of the pool. The best elevations for establishing these plants are within six inches of the normal pool.
- It is advised to excavate large and deep holes around the proposed planting sites and backfill with uncompacted topsoil.
- Planting holes should be at least six inches larger than the diameter of the rootball (balled and burlap stock) and three inches wider for container grown stock.
- Avoid species requiring full shade which are prone to wind damage.
- Extra mulching around the base is strongly recommended to conserve moisture and prevent weeds.

8.7 Maintenance and Inspections

- Maintenance responsibility for the pond and its buffer shall be given to a responsible party by means of a legally binding and enforceable maintenance agreement.
- The principal spillway shall be equipped with a trash rack that has maintenance access.
- Sediment removal in the forebay shall take place when 50% of the forebay capacity is lost.
- Sediment removed from ponds shall be disposed of according to current erosion

and sediment control regulations.

- A maintenance right-of-way or easement at least 12 feet wide and a maximum slope of 15% and stabilized shall extend to a pond from a public or private road.
- Maintenance access should extend to the forebay, safety bench, riser, and outlet and should allow vehicles to turn around.
- Annual mowing of the buffer is only required on maintenance rights-of-way.

8.8 Limitations

- Although a detention system for water quality could be combined with a flood control system, the volume assigned for water quality control must meet minimum detention times. This volume will typically not be available for peak rate volume control.
- Ponds cannot be located within jurisdictional waters such as wetlands without obtaining proper permits.

9 Wet Pond

Image Source – charlottenc.gov

9.1 Description & Purpose

A wet pond provides all of the water quality volume storage in a permanent pool.

9.2 Applications

Detention of storm water runoff allows for the settling of fine particles and pollutants that are associated with these particles. The wet pond volume is equal to the water quality design volume and is entirely a permanent wet pond, where storm water exchanges with the pond water to achieve treatment.

9.3 Suggested Design Criteria

- Volume based on the 1-inch storm.
- C=0.05+0.009*IMP is the runoff coefficient.
- IMP is the percentage of impervious area.
- WQDV=C*1”*A*3630 (Water Quality Design Volume (cf))
    - C is the runoff coefficient;
    - 1 inch is the 1-inch storm;
    - A is the area of the site in acres; and
    - 3630 is a conversion factor.
- Detention time requirements do not apply.
- The draw-down time for the detention volume shall be greater than or equal to 48 hours. For the bottom half of the detention volume, the draw-down time shall be greater than or equal to 36 hours.
- The detention system shall be designed to maximize the distance between the inlet and outlet, and to minimize “dead spaces” (areas with little or no exchange occurs

during a storm event), limiting short-circuiting. A minimum flow path length to width ratio of 3 should be utilized.

- The outlet shall be sized to achieve the above required detention times. It shall also be large enough that clogging is unlikely to occur. It should be 4 inches or larger in diameter. If this is not possible, the use of flow-through based measures should be considered, unless it can be demonstrated that clogging can be avoided.
- There shall be a minimum contributing drainage area of ten acres or more unless groundwater ground water is the primary water source.
- The ten-year design storm is to be used to design for a stable outfall.
- Dams shall meet class A dam safety hazard classification.
- The principal spillway/riser shall provide anti-floatation, anti-vortex, and trash-rack designs.
- One foot of freeboard shall be provided above the design high water for the 10-year storm.
- Woody vegetation is prohibited on the embankment.
- Pond benches:
    - The safety bench extends outward from the normal water edge to the toe of the pond side slope. Maximum slope=6%; and
    - Aquatic bench extends inward from the normal shoreline and has a maximum depth of 18 inches below normal pool water surface elevation. Not required in forebays.
- Pond buffers and setbacks:
    - Buffer should be provided that extends 25 feet outward from the maximum water surface elevation of the pond and should be contiguous with other required buffer areas; and
    - Existing trees should be preserved during construction and forest conservation areas should be located.
- Non-clogging low flow orifice:
    - Shall have a minimum diameter of 3 inches and shall be adequately protected from clogging by an external trash rack;
    - Orifice diameter can be reduced to 1 inch if using an internal orifice;
    - Submerged reverse-slope pipe that extends downward from the riser to an inflow point one foot below normal pool elevation is preferred;
    - Alternatives include broad crested rectangular, v-notch, or proportional weir, protected by half-round CMP that extends 12 inches below permanent pool;
    - Horizontal perforated pipe protected by geotextile and gravel not recommended; and
    - Vertical pipes can be used if a permanent pool is present.
- Riser:
    - Shall be located within the embankment for maintenance access, safety and aesthetics;
    - Access to riser to be provided by lockable manhole covers and steps within reach of valves and controls; and
    - Openings should be fenced with pipe or rebar to prevent trash accumulation.

- Pond Drain:
  - Ponds shall have a drain pipe that can drain the pond within 24 hours;
  - Prevent downstream discharge of sediment and slope instability caused by drawdown by exercising care during these processes; and
  - Appropriate jurisdictions shall be notified before draining a pond.
- Valves:
  - Drain shall be equipped with adjustable valve;
  - Drain should be sized one pipe size larger than the calculated design diameter;
  - Controls should be located inside of the riser they will not be inundated and can be operated safely;
  - Handwheel shall be chained to a ringbolt or manhole step to prevent vandalism; and
  - Applicant must show a water balance that demonstrates that there will be sufficient dry weather flows to maintain the planned pool volume, without creating stagnant conditions.

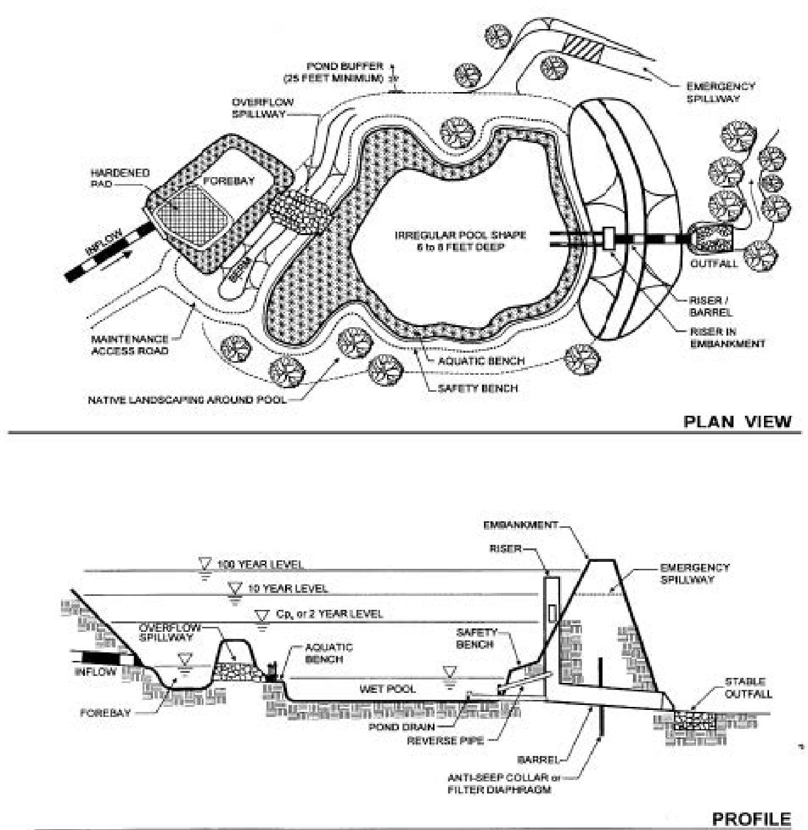


Figure 9. Example of a Wet Pond. Source- Maryland Department of the Environment 2000

9.4 Pretreatment Requirements

- Sediment forebay:
  - Each pond shall have a sediment forebay or equivalent upstream treatment and shall consist of a separate cell, formed by an adequate barrier; and
  - Forebay shall be sized to contain 0.1 inches per impervious acre of contributing drainage. The storage in the forebay counts toward the total amount of water quality volume required to be treated.
- Exit velocities shall be non-erosive.
- The bottom may be hardened to make sediment removal easier.
- The fixed vertical sediment depth marker should be installed to measure sediment deposition over time.

9.5 Construction Considerations

- Inlet protection shall not be fully submerged at normal pool elevations.
- A forebay shall be provided at each inlet, unless the inlet provides less than 10% of the total design storm inflow to the pond.
- Flared pipe sections that discharge at or near the stream invert or into a step-pool arrangement should be used at the spillway outlet.
- The channel immediately below the pond outfall shall be modified to prevent erosion and conform to natural dimensions in the shortest possible distance, usually by the use of large riprap over filter cloth.
- A stilling basin or other outlet protection should be used to reduce flow velocities form the principal spillway to non-erosive.
- In ponds that daylight to channels with dry weather flow, tree clearing should be minimized along the downstream channel. Avoiding the excessive use of riprap is important to prevent stream warming.
- Pond liners should be used in areas of karst topography, gravelly sands or fractured bedrock.

9.6 Landscaping Requirements

- The landscaping plan for storm water ponds and its buffer shall indicate how aquatic and terrestrial areas will be vegetatively stabilized and established.
- Wetland plants are encouraged either along the aquatic bench, safety bench and side slopes, or within shallow areas of the pool. The best elevations for establishing these plants are within six inches of the normal pool.
- It is advised to excavate large and deep holes around the proposed planting sites and backfill with uncompacted topsoil.
- Planting holes should be at least six inches larger than the diameter of the rootball (balled and burlap stock) and three inches wider for container grown stock.
- Avoid species requiring full shade which are prone to wind damage.
- Extra mulching around the base is strongly recommended to conserve moisture and prevent weeds.

9.7 Maintenance And Inspections

- Maintenance responsibility for the pond and its buffer shall be given to a responsible party by means of a legally binding and enforceable maintenance agreement.
- The principal spillway shall be equipped with a trash rack that has maintenance access.
- Sediment removal in the forebay shall take place when 50% of the forebay capacity is lost.
- Sediment removed from ponds shall be disposed of according to current erosion and sediment control regulations.
- A maintenance right-of-way or easement at least 12 feet wide and a maximum slope of 15% and stabilized shall extend to a pond from a public or private road.
- Maintenance access should extend to the forebay, safety bench, riser, and outlet and should allow vehicles to turn around.
- Annual mowing of the buffer is only required on maintenance rights-of-way.

9.8 Limitations

- Although a detention system for water quality could be combined with a flood control system, the volume assigned for water quality control must meet minimum detention times. This volume will typically not be available for peak rate volume control.
- Ponds cannot be located within jurisdictional waters such as wetlands without obtaining proper permits.

10 Surface Sand Filter

Image Source – Montgomerycountymd.gov

10.1 Description & Purpose

Surface sand filters can treat the largest drainage area of all the filtering systems. It captures and temporarily stores the water quality volume and passes it through a filter bed of sand, organic matter, soil, or other media.

10.2 Applications

Filtered runoff may be collected and returned to the conveyance system or allowed to partially exfiltrate into the soil. Applied to land uses with a high percentage of impervious surfaces.
Drainage areas with imperviousness less than 75% discharging to a filtering practice shall require full sedimentation pretreatment techniques.

10.3 Suggested Design Criteria

- A porosity value “n” (n=Vv/Vt) of 0.40 should be used in the design of stone reservoirs for infiltration methods.
- Volume is based on a rainfall intensity of 0.4 inches per hour.
- WQFR: C*0.4”*A is the Water Quality Flow Rate (cfs).
- C is the runoff coefficient, calculated using tables.
- 0.4 inches is the hourly rainfall intensity.
- A is the site area in acres.
- The required filter bed area (Af) is computed using the following equation: Af= (WQv) (df) / [(k) (hf+df) (tf)]
    - WQv is the water quality volume (cu. ft);
    - df is the filter bed depth (ft);
    - k is the coefficient pf permeability of the filter bed (ft/day);
    - hf is the height of water above the filter bed (ft); and
    - tf is the design filter bed drain time (days)- 2 days recommended.
- If runoff is delivered by a storm drain pipe or is along the main conveyance system, the filtering practice shall be designed off-line.

- Filter bed has a minimum depth of 12”.

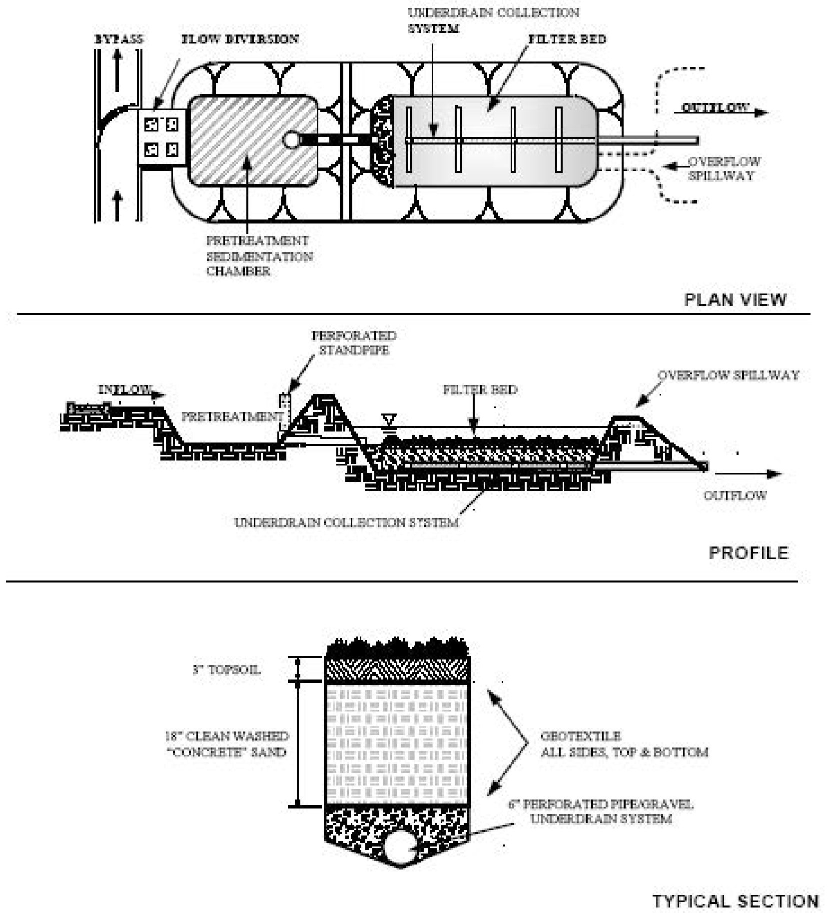


Figure 10. Example of a Surface Sand Filter. Source- Maryland Department of the Environment 2000

10.4 Pretreatment Requirements

- Dry or wet pretreatment equivalent to at least 25% of the computed water quality volume shall be provided prior to the filter media.
- Typically, sedimentation basins with a length to width ratio of 2:1 are used.
- Pretreatment is provided when all of the following are provided:
  - 20’ grass filter strip below a level spreader or sand filter layer;
  - Gravel diaphragm; and
  - Mulch layer.
- Treatment components shall include:
  - 2 ½ to 4 foot deep planting soil bed;
  - Surface mulch layer; and
  - 12 inches deep surface ponding area.

10.5 Construction Considerations

- Overflow for the ten-year storm event shall be provided to a non-erosive outlet point

and non-erosive velocities shall result.
- A flow regulator shall be provided to divert the water quality volume to the filtering practice.
- The filters shall have a 6-inch perforated underdrain pipe in a gravel layer.
- A permeable filter fabric shall be places between the gravel layer and the filter media.

10.6 Landscaping Requirements

- The ponding depth should be 6 inches or less with a mulch layer of 2 to 3 inches.
- A sandy planting soil of 2 to 3 inches should be used.
- Dense and vigorous should be established over the contributing drainage area before accepting runoff into the facility.
- A grass cover is permitted to aid in pollutant adsorption and should be cable of withstanding frequent periods of inundation and drought.

10.7 Maintenance and Inspections

- Direct maintenance access is to be provided to the pretreatment area and the filter bed.
- Dead or diseased plants shall be replaced.
- Areas with mulch that has been washed out should be re-mulched annually.
- The sediment chamber outlet devices shall be cleaned/repaired when drawdown times within the chamber exceed 36 hours. Trash and debris shall be removed as necessary.
- Sediment shall be cleaned out of the sedimentation chamber when it accumulates to a depth of more than 6 inches.
- Vegetation in the sediment chamber should be no greater than 18 inches in height.
- When water ponds on the surface of the filter for more than 72 hours, the top few inches of the discolored material shall be replaced with fresh material, and the removed sediment should be disposed of (landfill).
- When silt and sediment accumulation exceeds one inch, it should be removed from the filter bed.
- Filters with a grass cover should be mowed at least 3 times per growing season to maintain grass heights of less than 12 inches.

10.8 Limitations

Unless there is adequate infiltration capacity, underdrains and overflow drains should be included to collect and discharge filtered runoff to the storm drainage system.

11 Underground Sand Filter

Image Source – rotondo-es.com

11.1 Description & Purpose

The underground sand filter is an option for providing water quality volume where space is limited.

11.2 Applications

Filtered runoff may be collected and returned to the conveyance system or allowed to partially exfiltrate into the soil. Applied to land uses with a high percentage of impervious surfaces. Drainage areas with imperviousness less than 75% discharging to a filtering practice shall require full sedimentation pretreatment techniques.

11.3 Suggested Design Criteria

- A porosity value “n” (n=Vv/Vt) of 0.40 should be used in the design of stone reservoirs for infiltration methods.
- Volume is based on a rainfall intensity of 0.4 inches per hour.
- WQFR: C*0.4”*A is the Water Quality Flow Rate (cfs).
- C is the runoff coefficient, calculated using tables.
- 0.4 inches is the hourly rainfall intensity.
- A is the site area in acres.
- The required filter bed area (Af) is computed using the following equation: Af= (WQv) (df) / [(k) (hf+df) (tf)]
    - WQv is the water quality volume (cu. ft);
    - df is the filter bed depth (ft);
    - k is the coefficient pf permeability of the filter bed (ft/day);
    - hf is the height of water above the filter bed (ft); and

- tf is the design filter bed drain time (days)- 2 days recommended
- If runoff is delivered by a storm drain pipe or is along the main conveyance system, the filtering practice shall be designed off-line.
- Filter bed has a minimum depth of 12”.

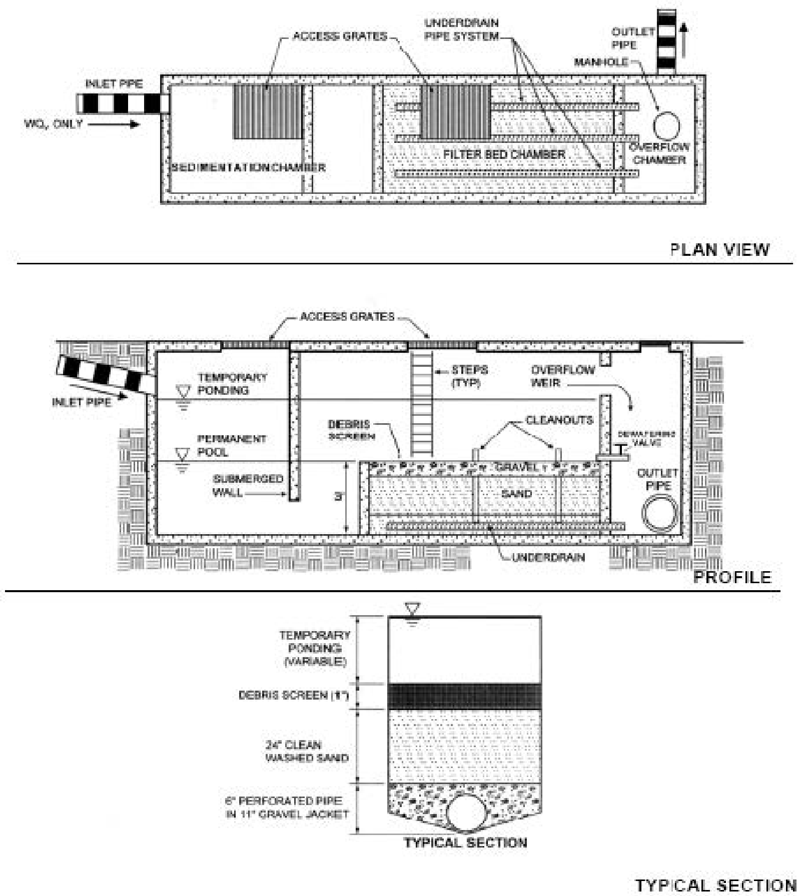


Figure 11. Example of an Underground Sand Filter. Source- Maryland Department of the Environment 2000

11.4 Pretreatment Requirements

- Dry or wet pretreatment equivalent to at least 25% of the computed water quality volume shall be provided prior to the filter media.
- Typically, sedimentation basins with a length to width ratio of 2:1 are used.
- Pretreatment is provided when all of the following are provided:
  - 20’ grass filter strip below a level spreader or sand filter layer;
  - Gravel diaphragm; and
  - Mulch layer.
- Treatment components shall include:
  - 2 ½ to 4 foot deep planting soil bed;
  - Surface mulch layer; and
  - 12 inches deep surface ponding area.

11.5 Construction Considerations

- Overflow for the ten-year storm event shall be provided to a non-erosive outlet point and non-erosive velocities shall result.
- A flow regulator shall be provided to divert the water quality volume to the filtering practice.
- The filters shall have a 6-inch perforated underdrain pipe in a gravel layer.
- A permeable filter fabric shall be places between the gravel layer and the filter media.

11.6 Landscaping Requirements

- The ponding depth should be 6 inches or less with a mulch layer of 2 to 3 inches.
- A sandy planting soil of 2 to 3 inches should be used.
- Dense and vigorous should be established over the contributing drainage area before accepting runoff into the facility.

11.7 Maintenance and Inspections

- Direct maintenance access is to be provided to the pretreatment area and the filter bed.
- Dead or diseased plants shall be replaced.
- Areas with mulch that has been washed out should be re-mulched annually.
- The sediment chamber outlet devices shall be cleaned/repaired when drawdown times within the chamber exceed 36 hours. Trash and debris shall be removed as necessary.
- Sediment shall be cleaned out of the sedimentation chamber when it accumulates to a depth of more than 6 inches.
- Vegetation in the sediment chamber should be no greater than 18 inches in height.
- When water ponds on the surface of the filter for more than 72 hours, the top few inches of the discolored material shall be replaced with fresh material, and the removed sediment should be disposed of (landfill).
- When silt and sediment accumulation exceed one inch, it should be removed from the filter bed.

11.8 Limitations

- Unless there is adequate infiltration capacity, underdrains and overflow drains should be included to collect and discharge filtered runoff to the storm drainage system.

12 Organic Sand Filter

12.1 Description & Purpose

The organic filter is used when maximum nutrient or trace metal removals are desired.

12.2 Applications

Filtered runoff may be collected and returned to the conveyance system or allowed to partially exfiltrate into the soil. Applied to land uses with a high percentage of impervious surfaces. Drainage areas with imperviousness less than 75% discharging to a filtering practice shall require full sedimentation pretreatment techniques.

12.3 Suggested Design Criteria

- A porosity value “n” (n=Vv/Vt) of 0.40 should be used in the design of stone reservoirs for infiltration methods.
- Volume is based on a rainfall intensity of 0.4 inches per hour.
- WQFR: C*0.4”*A is the Water Quality Flow Rate (cfs).
- C is the runoff coefficient, calculated using tables.
- 0.4 inches is the hourly rainfall intensity.
- A is the site area in acres.
- The required filter bed area (Af) is computed using the following equation: Af= (WQv) (df) / [(k) (hf+df) (tf)]
    - WQv is the water quality volume (cu. ft);
    - df is the filter bed depth (ft);
    - k is the coefficient pf permeability of the filter bed (ft/day);
    - hf is the height of water above the filter bed (ft); and

- tf is the design filter bed drain time (days)- 2 days recommended.

- If runoff is delivered by a storm drain pipe or is along the main conveyance system, the filtering practice shall be designed off-line.
- Filter bed has a minimum depth of 12”.

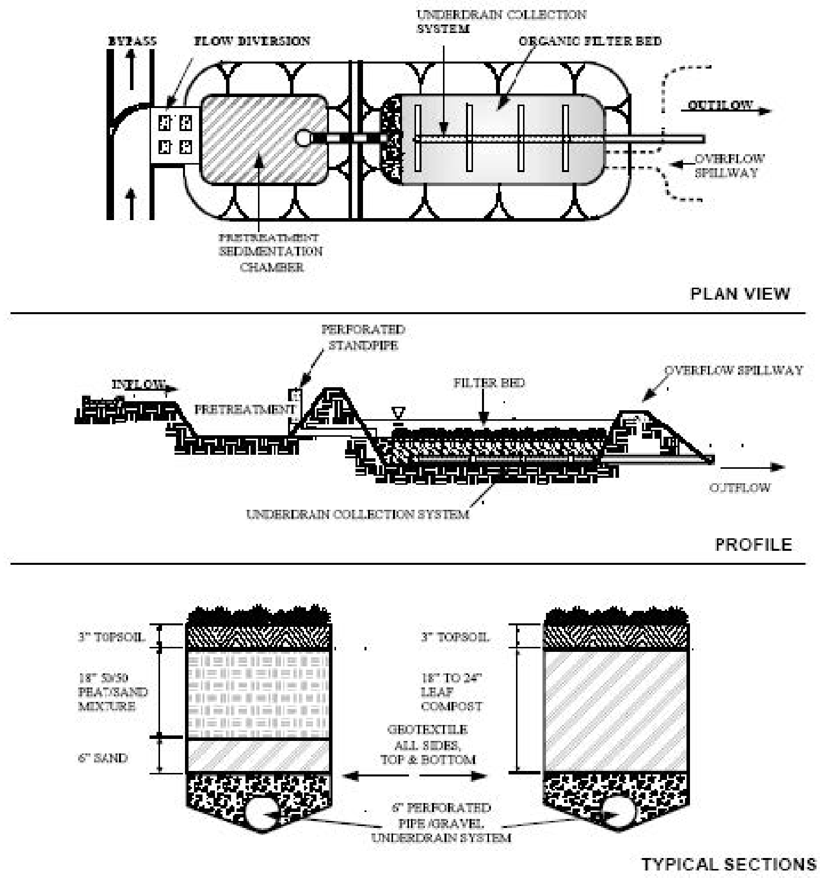


Figure 12. Example of an Organic Sand Filter. Source- Maryland Department of the Environment 2000

12.4 Pretreatment Requirements

- Dry or wet pretreatment equivalent to at least 25% of the computed water quality volume shall be provided prior to the filter media.
- Typically, sedimentation basins with a length to width ratio of 2:1 are used.
- Pretreatment is provided when all of the following are provided:
  - 20’ grass filter strip below a level spreader or sand filter layer;
  - Gravel diaphragm; and
  - Mulch layer.
- Treatment components shall include:
  - 2 ½ to 4 foot deep planting soil bed;
  - Surface mulch layer; and
  - 12 inches deep surface ponding area.

12.5 Construction Considerations

- Overflow for the ten-year storm event shall be provided to a non-erosive outlet point and non-erosive velocities shall result.
- A flow regulator shall be provided to divert the water quality volume to the filtering practice.
- The filters shall have a 6-inch perforated underdrain pipe in a gravel layer.
- A permeable filter fabric shall be places between the gravel layer and the filter media.

12.6 Landscaping Requirements

- The ponding depth should be 6 inches or less with a mulch layer of 2 to 3 inches.
- A sandy planting soil of 2 to 3 inches should be used.
- Dense and vigorous should be established over the contributing drainage area before accepting runoff into the facility.
- A grass cover is permitted to aid in pollutant adsorption and should be cable of withstanding frequent periods of inundation and drought.

12.7 Maintenance and Inspections

- Direct maintenance access is to be provided to the pretreatment area and the filter bed.
- Dead or diseased plants shall be replaced.
- Areas with mulch that has been washed out should be re-mulched annually.
- The sediment chamber outlet devices shall be cleaned/repaired when drawdown times within the chamber exceed 36 hours. Trash and debris shall be removed as necessary.
- Sediment shall be cleaned out of the sedimentation chamber when it accumulates to a depth of more than 6 inches.
- Vegetation in the sediment chamber should be no greater than 18 inches in height.
- When water ponds on the surface of the filter for more than 72 hours, the top few inches of the discolored material shall be replaced with fresh material, and the removed sediment should be disposed of (landfill).
- When silt and sediment accumulation exceed one inch, it should be removed from the filter bed.
- Filters with a grass cover should be mowed at least 3 times per growing season to maintain grass heights of less than 12 inches.

12.8 Limitations

- Unless there is adequate infiltration capacity, underdrains and overflow drains should be included to collect and discharge filtered runoff to the storm drainage system.

13 Green Roof

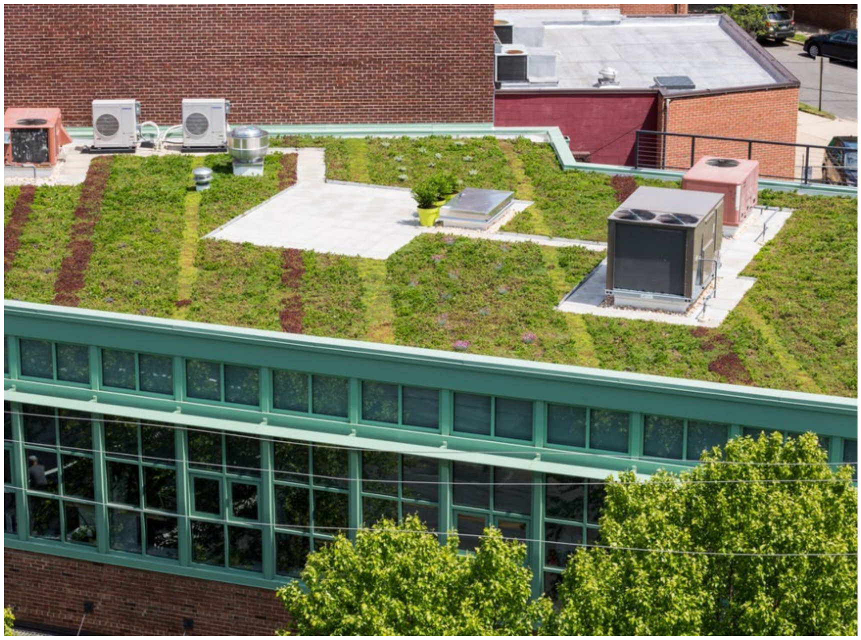


Image Source – Landdesign.com

13.1 Description & Purpose

Sometimes referred to as a vegetated roof or eco-roof, a green roof is a roof that is entirely or partially covered with vegetation and soils. It is a vegetative layer grown on top of an elevated impervious surface.

13.2 Applications

Green Roofs assist in the filtering, absorbing, evapotranspirating, and retaining/detaining of rain that lands on structural roofs. Green roofs offer additional benefits including the reduction of urban heat island effects, increased thermal insulation and energy efficiency, increased acoustic insulation, and increased durability and lifespan compared to conventional roofs. Green roofs can be applied to new or existing structures of residential, commercial, or industrial buildings.

13.3 Suggested Design Criteria

- Minimum depth of soil media = 2 inches
- Minimum depth of drainage layer = 2 inches
- Maximum slope of roof = 20%
- The design must include adequate roof access for delivery of construction materials and for routine maintenance.

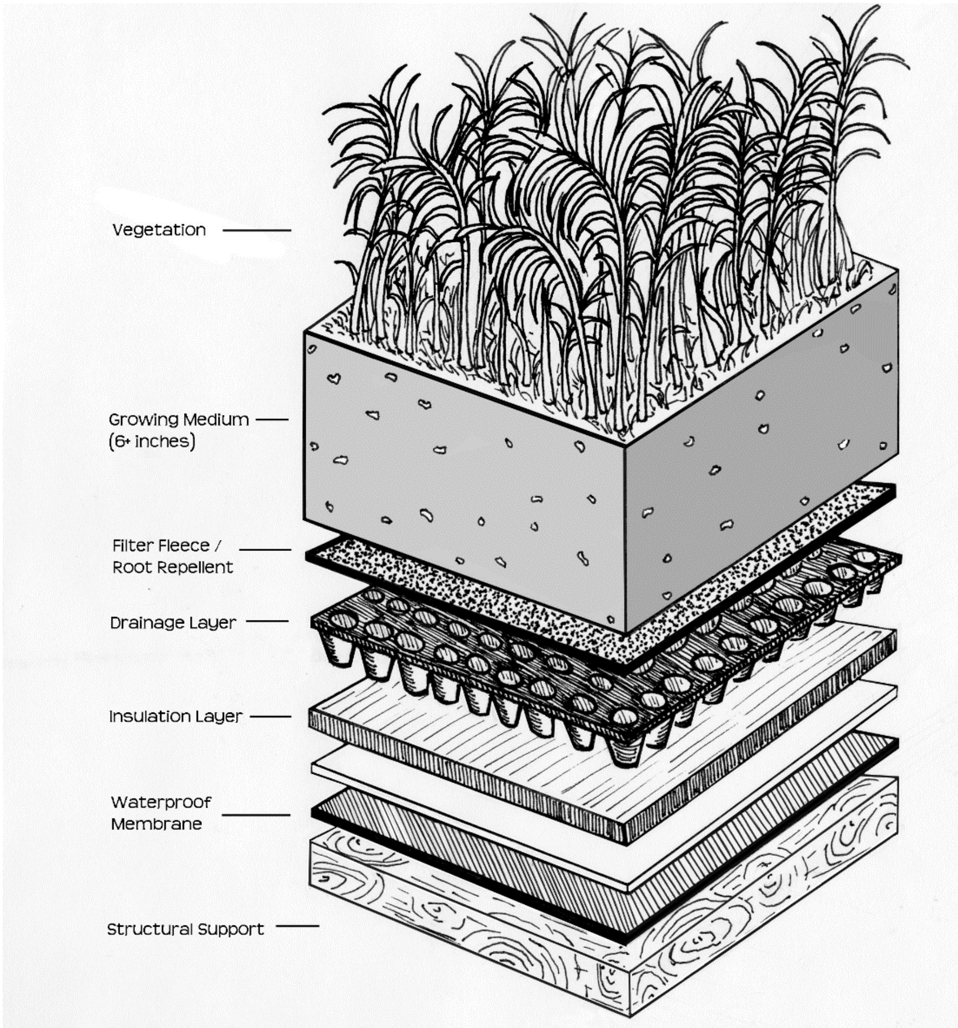


Figure 13. Example of an Extensive Green Roof Design. – Source: Greenroofplan.com

13.4 Pretreatment Requirements

- Green roofs do not require pretreatment.

13.5 Construction Considerations

- Safety measures against wind uplift must be taken into account during design, especially for areas susceptible to high winds.
- The maximum load bearing capacity of the roof construction must be considered. The water saturated weight of the green roof system, including vegetation must be calculated as permanent load. Generally, vegetated roofs weigh between 15 and 30 lb/ sqft depending on the thickness of the vegetated roof system. In addition, construction elements such as pergolas and walkways cause high point loads and, therefore, have to be calculated accordingly.
- The drainage layer below the growth media should be designed to convey the flood design storm without backing water up to into the growing media. The drainage layer should convey flow to an outlet or overflow system such as a traditional rooftop

drainage system with inlets set slightly above the elevation of the vegetated roof surface.

- Green roofs can be designed to be either intensive, semi-intensive, or extensive green roofs. The type of design chosen will depend upon loading capacity, budget, design goals, and stormwater retention desired. There will also be variations in the type of green roof selected depending upon climate, types of plants chosen, soil layer depth desired and feasibility and other design considerations. Green roofs can be constructed layer by layer or can be purchased as a system. Some vendors offer modular trays containing the green roof components.
- Generally, extensive green roofs have six inches or less of growing medium, whereas intensive green roofs have greater than 6 inches of substrate. Semi-intensive green roofs can be defined as a hybrid between intensive and extensive green roofs, where at least 25 percent of the roof square footage is above or below the 6-inch threshold.
- Extensive green roofs provide many of the environmental benefits of intensive green roofs, but they are designed to be very low-maintenance and are not typically designed for public access. Semi-intensive and intensive green roofs are designed to be used by the public or building tenants as a park or relaxation area. However, they also require greater capital and maintenance investments than extensive green roofs. Intensive green roofs are particularly attractive for developers, property owners, and municipalities, in areas where land prices command a premium, but property owners want to provide some of the amenities associated with parks.
- Extensive green roofs range in price from approximately 5 dollars per square foot to 20 dollars per square foot. However, there are significant cost savings associated with reducing energy consumption and longer roof lifespan.
- Intensive green roofs can be considerably more expensive than extensive green roofs. Estimates range from 20 dollars to 80 dollars per square foot. Other benefits should be taken into account, however, such as recreational space provided and costs relative to the price of land in an area.
- All green roof systems should include a waterproofing layer that will prevent stormwater runoff from damaging the underlying rooftop. Waterproofing materials typically used in green roof installations include reinforced thermoplastic and synthetic rubber membranes.
- The waterproofing layer should be protected from root penetration by an impermeable, physical root barrier. Chemical root barriers or physical root barriers that have been impregnated with pesticides, metals or other chemicals that may leach into postconstruction stormwater runoff should not be used.
- To help prevent compaction of the engineered growing media, heavy foot traffic should be kept off green roof surfaces during and after construction.

13.6 Landscaping Requirements

- Plants selected need to be suited for local climatic conditions and can range from sedums, grasses, and wildflowers on extensive roofs to shrubs and small trees on intensive roofs.

- Succulent and other hardy varieties of plants that do not require shade as well as other vegetation general suitable for the environment in Hawaii.
- A landscaping plan should be prepared for all green roofs. The landscaping plan should be reviewed and approved by the local development review authority prior to construction. When developing a landscaping plan, site planning and design teams are encouraged to consult with a botanist, landscape architect or other qualified professional to identify plants that will tolerate the harsh growing conditions found on rooftops in the area.

13.7 Maintenance and Inspections

- Immediately after construction, green roofs need to be monitored regularly to ensure the vegetation thrives.
- During the first season, green roofs may need to be watered periodically if there is not sufficient precipitation. After the first season, extensive green roofs may only need to be inspected and lightly fertilized approximately once per year.
- The roofs may need occasional weeding and may require some watering during exceptionally dry periods.
- Green roofs are less prone to leaking than conventional roofs. In most cases, detecting and fixing a leak under a green roof is no more difficult than doing the same for a conventional roof.
- Intensive green roofs need to be maintained as any other landscaped area. This can involve gardening and irrigation, in addition to other roof maintenance.
- Direct maintenance access is to be provided to the pretreatment area and the filter bed.

13.8 Limitations

- In most climates, green roofs will need to have drought tolerant plant species or an irrigation system to sustain vegetation.
- In new construction, buildings should be designed to manage a potentially increased load associated with the green roof. When designing green roofs for existing structures, engineers must take the load restrictions of the building into account.
- Green roofs can be difficult to install on rooftops with slopes of 10% or greater.
- The amount of rainfall retained by a green roof will depend primarily on the depth of the growing medium and may also be affected by the roof slope.
- Green roofs should only be used to replace traditional impervious roof surfaces. They should not be used to “receive” any stormwater runoff generated elsewhere on the development site.

14 Dry Wells

Image Source- thisoldhouse.com

Description & Purpose

A dry well is a well that is used to transmit surface water underground and is deeper than its width at the surface. They are lined with perforated casings and can be filled with gravel or rock or left empty.

14.1 Applications

Dry wells are used to redirect stormwater and runoff into the subsurface to promote infiltration and temporary storage. This has the added benefit of returning water to aquifers and recharging local groundwater supplies.

14.2 Suggested Design Criteria

- Most drywells are 30 to 70 feet deep and 3 feet wide at the surface.
- Some states provide guidelines for where to install dry wells as part of their permitting process. These guidelines include minimum vertical separation distances between the dry well and groundwater, horizontal separation from municipal wells, the amount of pretreatment required, and appropriate land use surrounding a potential dry well.
- Typically, 10 feet of vertical separation is required between the dry well bottom and the water table, and a vadose zone of sand/gravel and clay is ideal for removing contaminants while still allowing aquifer recharge.

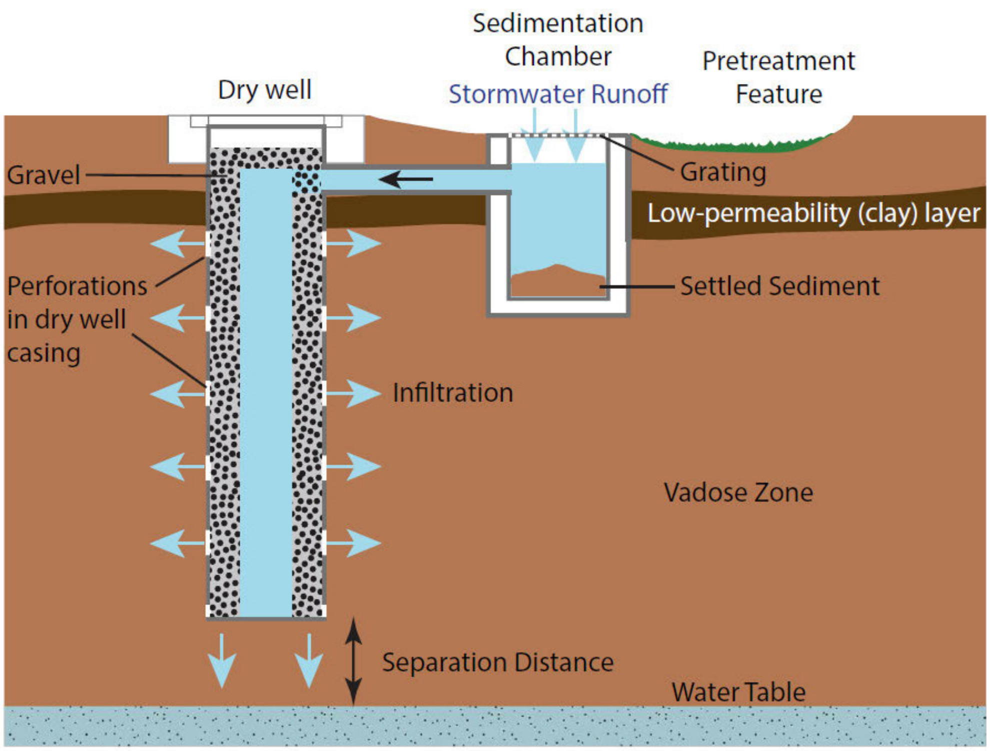


Figure 14. Typical dry well design with pretreatment features. Source – E. Edwards and B. Mandler

14.3 Pretreatment Requirements

- Efficient pretreatment is the key to keeping contaminants out of groundwater.
- Vegetation helps to trap sediment and associated contaminants.

14.4 Construction Considerations

- A percolation test of the soil is suggested to ensure infiltration rates are sufficient.
- Ideally, dry wells should be large enough to collect runoff without overflowing in typical rain events.
- Position the wells near the natural drainage path but at a safe distance from structural foundations.
- Smaller pre-fabricated dry wells are available at some retail stores.
- The size of the well will ultimately depend on the infiltration rate of the soil and the volume of water expected during storm events.

14.5 Maintenance and Inspections

- Many dry wells function for years without problems, but sometimes sediment and debris washed along with runoff can clog the pit walls and reduce the dry well's ability to disperse water.
- Regular inspection and maintenance of pretreatment items is essential to the long-term functionality of dry wells.

14.6 Limitations

- Dry well use has been limited in some places by the concern that dry wells could contaminate groundwater, including drinking water, by reducing the distance contaminated stormwater must travel through sediment in order to reach groundwater. Surface soil and underground sediment remove contaminants by acting as a natural filter, but dry wells allow stormwater contaminants to bypass many underground layers.
- Groundwater contamination has occurred in the past when surface contaminant spills have entered dry wells, or when substances have been illegally dumped into open dry well. However, groundwater contamination is rare when dry wells are used as intended and when appropriate precautions are taken. Contamination risk can be reduced by using dry wells at sites where spills are unlikely or installing emergency shut-off valves to keep out contaminated water.
- Contaminant-rich areas, such as gas stations and many industrial sites, are often unsuitable for dry well installation.

15 Downspout Disconnection

Image Source- stormwater.allianceforthebay.org

15.1 Description & Purpose

Downspout disconnection involves the redirection of stormwater from roof downspouts to permeable surfaces or containers, such as cisterns and rain barrels, for collection and reuse. This directly reduces the amount of stormwater and associated pollutants that reaches sensitive ecosystems. Additional benefits of allowing water to infiltrate into soils include water filtration and increased groundwater supplies.

15.2 Applications

Many industrial, commercial, and residential structures have downspouts that discharge water to paved surfaces or directly to stormwater systems. The redirection of this water to permeable surfaces reduces the volume of stormwater runoff and associated pollutants, flooding, and erosion while increasing groundwater supplies.

15.3 Suggested Design Criteria

- Measure and cut the existing downspout 9 inches from the standpipe if directing water to a permeable surface.
- Cap the standpipe so water cannot continue to enter the storm drain through this entrance.
- Utilize a downspout extension to direct water 5 ft away from structures to a downward sloping area if possible.

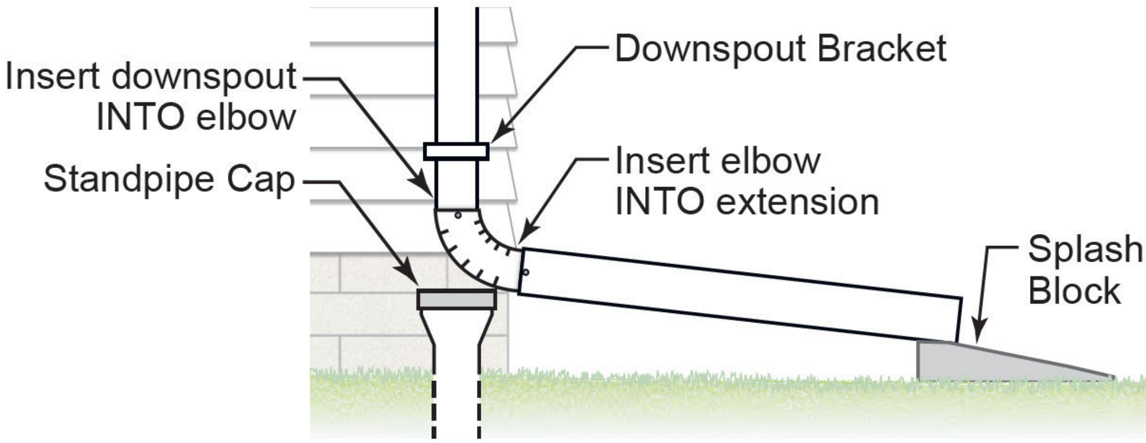


Figure 15. Example of a Downspout Disconnection – Source: City and County of Honolulu

15.4 Pretreatment Requirements

- Pretreatment is typically not required unless roof surfaces are prone to debris.
- Roof gutter guards or leaf gutter screens may be used to keep downspouts from clogging.
- Downspout debris filters can also be installed before the elbow joint to remove debris.

15.5 Construction Considerations

- While downspout water may be discharged directly to vegetated landscapes, consider the velocity of the water and potential erosion issues.
- A splash block should be used to direct water away from buildings.
- A rock or similar velocity dissipator should be considered for concentrated, high velocity discharge.
- A rain chain is decorative feature used in place of a downspout to slow the flow of water from the gutter. The base of the chain should be secured to the ground and surrounded by vegetation or rocks to minimize erosion.
- Consider directing water to cistern or rain barrel for reuse. See fact sheet 16 – Rain Harvest and Reuse.

15.6 Landscaping Requirements

- Thick, well-established grass may be adequate for infrequent, low-velocity flows on relatively level ground that slopes away from the building.
- Shade or sun exposure should be considered when selecting the vegetation.
- Stormwater may also be directed to rain gardens or other vegetated areas.

15.7 Maintenance and Inspections

- Clean gutters and downspouts at the beginning of the rainy season and inspect after severe storms. Use a plumber's or electrician's snake to clean out any obstructions.
- Adjust or replace the outlet protection (splash block, gravel, etc.) as needed to prevent

erosion at the outlet.

- Check for leaks and defects.

15.8 Limitations

- Concentrated, higher velocity flows may result in erosion.

16 Rain Harvest and Reuse

Image Source - doityourself.com

16.1 Description & Purpose

Rain harvest and reuse, sometimes referred to as capture/reuse or rainwater harvesting, is the collection and temporary storage of roof runoff in rain barrels, cisterns, or other tanks for subsequent non-potable outdoor use (i.e., landscape irrigation, vehicle washing).

16.2 Applications

Harvesting of rainwater from roof surfaces prevents water runoff to storm drain systems or sensitive habitats. This resource can then be used onsite in a way that allows for it infiltrate back into the ground or provide plants with irrigation. This has the added benefit of reducing potable water consumption and improved filtration of roof runoff.

16.3 Suggested Design Criteria

- Size storage systems for 80% of average annual (long term) runoff volume and meet 80% of the annual overall demand.
- Storage tank requires an inlet for water to enter and outlet for water to exit.
- Overflow pipe should be as large as inlet pipe.
- Include an air vent or similar to allow air to escape while filling.
- Multiple tanks can be connected to increase storage capacity.

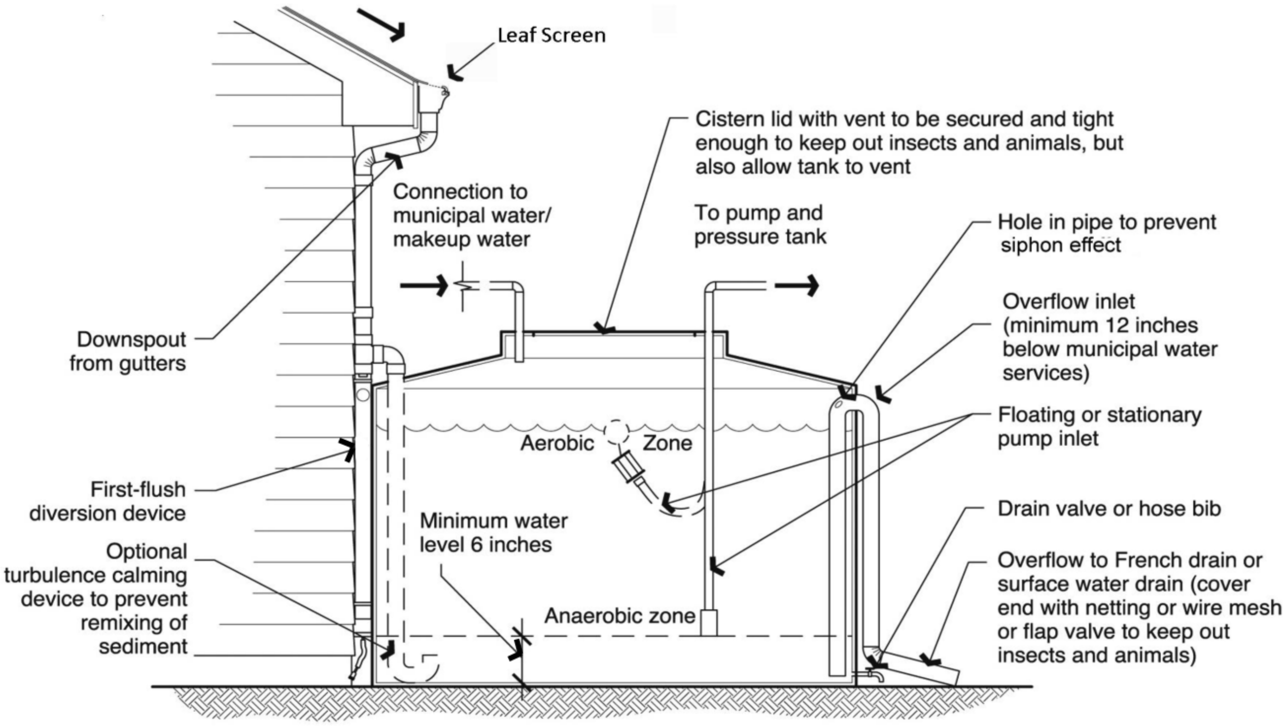


Figure 16. Example of Rainwater Storage System – Source: The University of Arizona Cooperative Extension

16.4 Pretreatment Requirements

- Roof gutter guards or leaf gutter screens are required to keep water clean and prevent clogging.
- A strainer basket or screen at the inlet serves as further protection from debris and animals.

16.5 Construction Considerations

- Rain barrel/cistern sizes can vary greatly depending on the project area, roof size, and irrigation area. The size can be anywhere from less than 1,000 gallons to more than 10,000 gallons per 1,000 sq-ft of roof area.
- Local pan evaporation and rainfall data may be used if available.
- Tanks should have tight fitting covers to exclude contaminants and animals, and above ground tanks should not allow penetration of sunlight to limit algae growth.
- In areas where the tank is to be buried partially below the water table, special design features must be employed to keep it from “floating.”
- Consider installing pumps for irrigation systems and irrigation controllers.
- Gravity-fed discharge of water from the tank is also possible.
- Place tanks at least as far away from foundations as the foundation is deep—usually 10-18 inches, and on a surface such as a cement pad, contained pea gravel, or compacted earth.
- An access hatch or inspection port on a tank eases maintenance.

- Consider a first flush diversion or turbulence calming device or for cleaner water.

16.6 Landscaping Requirements

- Place collection tanks near landscapes that require irrigation.

16.7 Maintenance and Inspections

- Requires frequent cleaning of gutters, filter screens, or basket if installed.
- Tanks do not need to be cleaned unless storing poor quality water.
- Check the system regularly to identify potential problems.

16.8 Limitations

- Stored water should not be used as potable unless further treatment is obtained.
- Mosquito and other insect growth can become a problem if not maintained properly.
- May be an unreliable source of water in areas with infrequent rain.

17 Permeable Hardscape

Image Source – Sprouse et al., 2020, doi.org/10.3390/su12187422

17.1 Description & Purpose

A permeable hardscape is a hard surface that allows water to soak into the ground. Permeable hardscapes represent an alternative to traditional impervious paving surfaces. They typically consist of an underlying drainage layer and an overlying permeable surface layer. A permeable pavement system allows stormwater runoff to pass through the surface course (i.e., pavement surface) into an underlying stone reservoir, where it is temporarily stored and allowed to infiltrate into the surrounding soils or conveyed back into the storm drain system through an underdrain. Permeable hardscapes can slow down the flow of runoff from rooftops, sidewalks, and driveways and filter out sediment and nutrients. Slowing down the flow helps to decrease the amount of pollutants washed into streams and the ocean. Permeable hardscapes also increase the amount of rainwater that soaks into the ground, which helps to replenish the ground water supply.

17.2 Applications

Permeable hardscapes can be constructed using various types of traditional pavers, permeable pavers, plastic reinforced grids, and porous asphalt/concrete pavement. Combinations of these materials are used to create terraces, walkways, driveways, and parking areas. Porous asphalt/concrete can replace traditional impervious pavement for most pedestrian and vehicular applications and are often used in the construction of parking lots for office buildings and shopping centers. Other uses include traffic islands, emergency stopping areas, road shoulders, residential driveways, airport parking aprons, and maintenance roads.

17.3 Suggested Design Criteria

- The load-bearing and infiltration capacities of the subgrade soil, the infiltration capacity of the porous material, and the storage capacity of the stone base/subbase are the key stormwater design parameters.
- Porous asphalt should be designed and sited to intercept, contain, filter, and infiltrate stormwater on site.
- Permeable pavement systems should be designed to completely drain within 48 hours of the end of a rainfall event.
- Determine the infiltration rate based on the known storm events and soil type. Soils should have an infiltration rate of 0.5 inches per hour.
- If the infiltration rate of the native soils located beneath a permeable pavement system do not meet or exceed 0.25 in/hr, an underdrain should be included in the design.
- Although permeable pavement systems may be installed on development sites with slopes of up to 6%, they should be designed with slopes that are as close to flat as possible to help ensure that stormwater runoff is evenly distributed throughout the stone reservoir.
- Permeable pavement requires a footprint equivalent to 5% - 18% of its contributing impervious drainage area. The lower value reflects the maximum allowable infiltration rate and minimum allowable factor of safety, while the upper value reflects the minimum allowable infiltration rate and maximum allowable factor of safety.
- For permeable pavers, the openings typically comprise 5% to 15% of the paver surface area and are filled with highly permeable, small-sized aggregates.

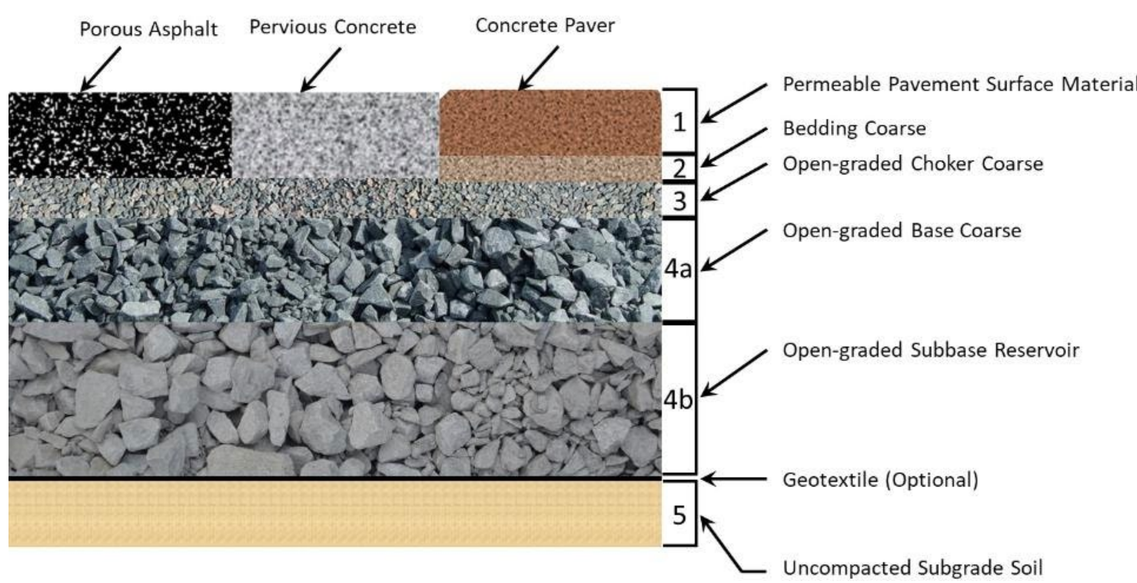


Figure 17. Example of a Permeable Hardscape Cross-section – Source: Eban Bean, University of Florida IFAS Extension

17.4 Pretreatment Requirements

- Pretreatment is not required as long as the permeable pavement does not receive run-on from other surfaces. If it does, pretreatment is necessary to prevent premature failure due to clogging with fine sediment, and may be achieved with gravel filter strips, vegetated buffer strips, or vegetated swales.

17.5 Construction Considerations

- Permeable hardscapes work best over sandy or well-drained soils that are relatively flat.
- Permeable pavement systems should generally not be used to “receive” any stormwater runoff generated elsewhere on the development site.
- All porous paving and permeable paver with storage bed systems must include measures that will allow runoff from the design storm to enter the storage bed in the event that the porous or permeable paver surface course becomes clogged or otherwise incapable of conveying the maximum design storm runoff to the bed.
- Additional design details on specific pavement systems are provided by the National Asphalt Pavement Association, the National Ready Mix Concrete Association, the Interlocking Concrete Pavement Institute, and the American Association of State Highway and Transportation Officials.
- Perforated pipes along the bottom of the bed may be used to evenly distribute runoff over the entire bed bottom. Pipes should lay flat along the bed bottom and provide for uniform distribution of water. Depending on size, these pipes may provide additional storage volume.
- Flows in excess of the design capacity of the permeable pavement system will require an overflow system connected to a downstream conveyance or other storm water runoff BMP.
- The pavement should be constructed in a single operation, as one of the last items to be built, on a development site.

17.6 Landscaping Requirements

- Landscaping upland of the alternative pavers is important to reduce sediment loads in the runoff.
- Landscape development should be completed before pavement construction to avoid contamination by silt or soil from this source.

17.7 Maintenance and Inspections

- The most prevalent maintenance concern is the potential clogging of the porous surfaces. Fine particles that can clog the pores are deposited from vehicles, the atmosphere, and runoff from adjacent land surfaces. Clogging will increase with age and use.
- Frequent sweeping/vacuum sweeping is important to prevent clogging.
- Inspect pavers for weathering including paver breakage and cracking as well as potential pollutants, such as oil leaks and sediment build-up.
- Respond to oil leaks with absorbent materials and/or remove the contaminated sediment.

- Inspect permeable pavement system for drawdown following rainfall events. Failure to drawdown within 72 hours after the end of a rainfall event may indicate permeable pavement system failure.
- Inspect permeable pavement surface for deterioration or spalling. Repair or replace any damaged areas as needed.

17.8 Limitations

- Permeable hardscapes are not suitable for areas near or downslope of loose or eroded materials, as sediment may clog the soil layers.
- They generally have relatively high construction costs, which are typically offset by savings on stormwater infrastructure (e.g., storm drain system).
- Permeable pavement systems should be installed only by experienced personnel.
- Alternative pavers are not recommended for high traffic volumes.
- Permeable hardscapes are not appropriate for stormwater hotspots where hazardous materials are loaded, unloaded, or stored or where there is a potential for spills and fuel leakage.

18 Proprietary Non-LID BMPs

18.1 Catch Basin Inserts

Catch basin inserts consist of a frame that fits below the inlet grate of a catch basin and can be fitted with various trays that target specific pollutants. The trays may also contain a variety of media. The device is typically designed to accept the design flow rate of the inlet grate with bypasses as the trays become clogged with debris. The media require routine maintenance for replacement and cleaning. Catch basin inserts are typically used for smaller drainage areas.

Image Source – cleanwayusa.com

18.2 Water Quality Inlets

Water quality inlets are underground retention systems designed to remove settleable solids. There are several water quality inlet designs. Some water quality inlets include a second chamber with a sand filter to remove finer suspended solids by filtration.

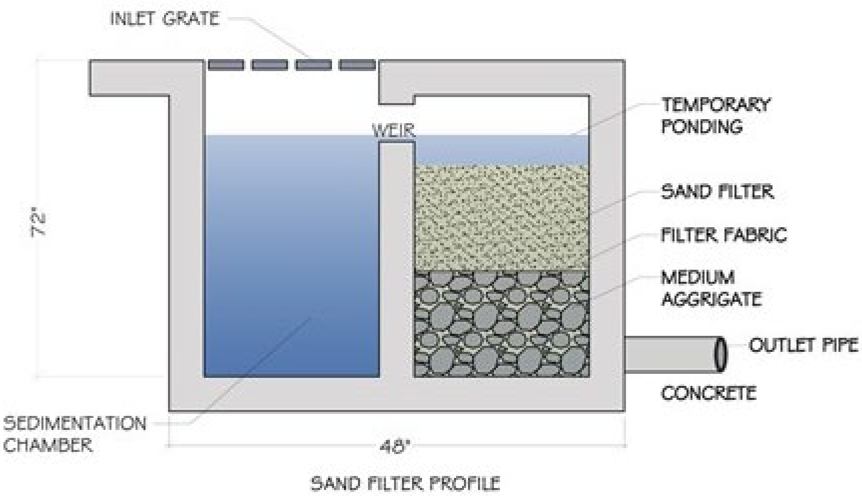


Image Source - psara.com

18.3 Oil/Grit Separators

Typical oil/grit separators consist of three chambers. The first chamber removes coarse material and debris; the second chamber separates oil, grease, and gasoline; and the third chamber provides safety relief if blockage occurs. Similar to water quality inlets, frequent maintenance and disposal of trapped residuals and hydrocarbons are necessary for oil/grit separators.

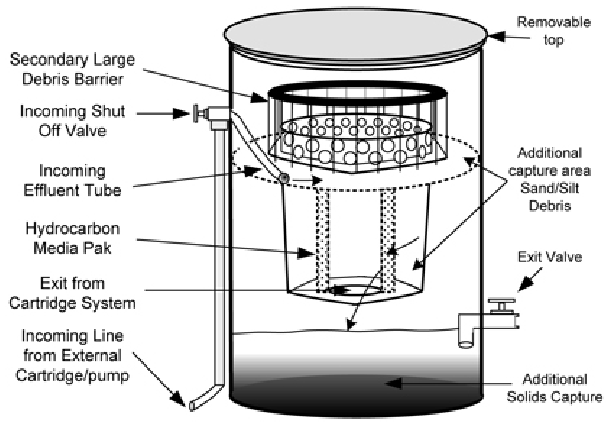


Image Source -remfilters.com

18.4 Hydrodynamic Devices

A variety of manufactured hydrodynamic devices are available for removing pollutants from storm water runoff. The hydrodynamic separation concept these devices are based on involves the settlement of sediment as runoff moves in a swirling path. Typically, these devices are prefabricated in a range of sizes targeted at specific flow rates.

One type of hydrodynamic device is designed to remove suspended particles, oil, and grease during low flow conditions. Higher flows are diverted around the treatment chamber to prevent scour and high velocity from carrying the collected pollutants out of the treatment chamber. Maintenance requirements include the periodic removal of oil/grease and sediments by using a vacuum truck.

A second type of hydrodynamic device utilizes centrifugal motion to remove litter, floatable debris, and larger sediment particles from runoff. Since this technology is designed to capture trash rather than pollutants, these devices are most applicable in coastal areas or areas that receive heavy trash loads. These devices are constructed so that a vacuum truck can regularly remove the floatable and settled debris collected in the treatment chamber.

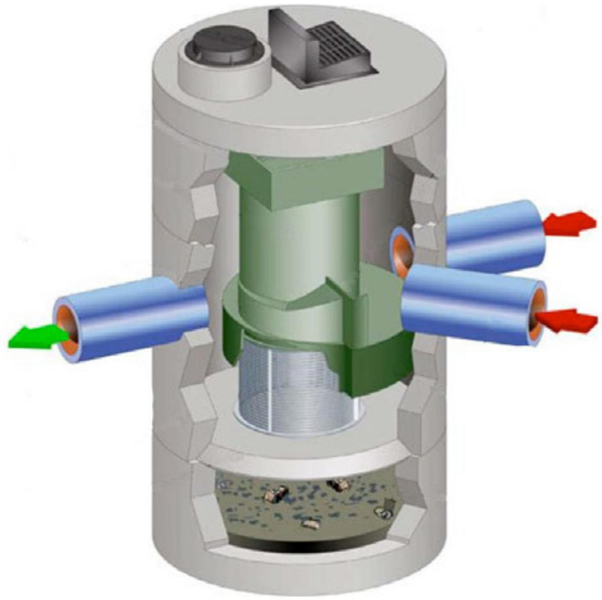


Image Source - cfwep.org

18.5 Recommended Performance Standards

Ultimately, choosing a proprietary BMP will be based on document performance standards. There are numerous performance standards and testing done by third parties for various proprietary BMPs.

ATTACHMENT 1

Post-Construction BMP Inspection Example Checklists

Example Inspection Checklist	Applicable BMPs	MCBH BMP IDs
Bioretention	Dry Swale Wet Swale Bioretention	MCBH-PBMP-01 MCBH-PBMP-02 MCBH-PBMP-05
Hydrodynamic Separator	Hydrodynamic Devices	MCBH-PBMP-18
Underground Detention	Underground Sand Filter Dry Wells	MCBH-PBMP-11 MCBH-PBMP-14

BIORETENTION INSPECTION CHECKLIST

BMP ID Number: ___________ Installation: __________ Location: ___________________________

Date: ___________________ Inspector: ____

Code Key:

NP = No Problem Observed	WN = Work Needed	N/A = Not Applicable

ASSESSMENT	CODE	COMMENTS
Inlet / Outlet		
Structural condition		
Debris accumulation		
Overflow catch basin debris accumulation		
Erosion control (e.g., rock, mat)		
Pretreatment for Sediment		
Device functioning to trap sediment		
Sediment accumulation		
Bioretention Surface		
Sediment accumulation		
Debris accumulation		
Erosion		
Vegetative cover		
Mulch cover		
Overall Functionality		
Is bioretention area functioning properly (professional landscape architect recommended)		

Additional Comments:

HYDRODYNAMIC SEPARATOR INSPECTION CHECKLIST

BMP ID Number: ___________ Installation: ________ Location: ______________________________
Date: ____________________ Inspector: ____

Code Key:

NP = No Problem Observed	WN = Work Needed	N/A = Not Applicable

ASSESSMENT	CODE	COMMENTS
Inflow Points		
Obstruction: vegetation / debris / sediment		
Structural condition		
Filter condition		
Separator Body		
Sediment / debris accumulation		
Separator structural condition		
Central shaft condition		
Oil accumulation		
Standing water		
Outlet Device		
Obstruction: vegetation / debris / sediment		
Erosion / undercutting		
Joint failure / loss of joint material		
Leaking device		
Emergency bypass condition		
Miscellaneous		
Trash / debris		
Access		
Odors present		
Other (describe)		

Additional Comments:

UNDERGROUND DETENTION STRUCTURE INSPECTION CHECKLIST

BMP ID Number: ___________ Installation: ________ Location: ______________________________

Date: ____________________ Inspector: ____

Code Key:

NP = No Problem Observed WN = Work Needed N/A = Not Applicable

ASSESSMENT	CODE	COMMENTS
Inflow Points		
Obstruction: trash / debris / sediment		
Structural condition		
Pipe condition		
Other (describe)		
Underground Vault		
Sediment / debris accumulation		
Access hatch condition		
Access ladder / steps condition		
Vault structural condition		
Baffles / weir condition		
Oil accumulation		
Blocked / damaged air vents		
Proper drainage		
Other (describe)		
Outlet Device		
Obstruction: vegetation / debris / sediment		
Erosion / undercutting		
Joint failure / loss of joint material		
Leaking device		
Control valve / bottom drain operation		
Emergency bypass condition		
Displacement / blockage of outlet or rock, apron, mat, etc.		
Other (describe)		
Miscellaneous		
Trash / debris		
Access		
Odors present		
Other (describe)		

UNDERGROUND DETENTION STRUCTURE INSPECTION CHECKLIST

Additional Comments:

APPENDIX 6-1

Trash Reduction Plan

FINAL

TRASH REDUCTION PLAN

Storm Water Management Program Plan

Marine Corps Base Hawaii

NPDES Permit No. HI 000007

Prepared by:

Marine Corps Base Hawaii

March 2023

Table of Contents

Tables

List of Acronyms and Abbreviations

BMP	Best Management Practice
C&D	Construction and Demolition
CWA	Clean Water Act
DOD	Department of Defense
DOH	State of Hawaii Department of Health
ECC	Environmental Compliance Coordinator
ECPD	Environmental Compliance and Protection Division
HDPE	High Density Polyethylene
ISWM	Integrated Solid Waste Management
ISWMP	Integrated Solid Waste Management Program
MCBH	Marine Corps Base Hawaii
MCD	Facilities Maintenance Control Division
MCDC	Mokapu Central Drainage Channel
MCO	Marine Corps Order
MS4	Municipal Separate Storm Sewer System
MS4 Permit	Marine Corps Base Hawaii's NPDES Permit No. HI S000007
NAVFAC	Naval Facilities Engineering Systems Command
NPDES	National Pollutant Discharge Elimination System
OPNAV	Office of the Chief of Naval Operations
OPNAVINST	Office of the Chief of Naval Operations Instruction
QRP	Qualified Recycling Program

1 Introduction

As of the effective date, September 1, 2021, the Marine Corps Base Hawaii (MCBH) is required to comply with the conditions of the National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4) Permit No. HIS000007 (referred to hereinafter as the "MS4 Permit"). The MS4 Permit includes authorized storm water and specified non-storm water discharges into Kaneohe Bay, Nuupia, Halekou, and Kaluapuhi Ponds, Kailua Bay, and the Mokapu Central Drainage Channel (MCDC). Per the MS4 Permit, Part D.1.f.(1)(v), MCBH is required to provide a Trash Reduction Plan. The MS4 Permit states:

> *Pollution Prevention/Good Housekeeping, Part D.1.f.(1)(v)*
>
> *"Trash Reduction Plan - The Permittee shall implement its trash reduction plan which assesses the issue, identifies and implements control measures, and monitors the control measures to reduce trash loads from the MS4. The plan shall include, at a minimum and be formatted consistent with the following:*
>
> - *Quantitative estimate of the debris currently being discharged (baseline load) from the MS4, including methodology used to determine the load.*
> - *Description of control measures currently being implemented as well as those needed to reduce debris discharges from the MS4 consistent with short-term and long-term reduction targets.*
> - *A short-term plan and proposed compliance deadline for reducing debris discharges from the MS4 by 50% from the baseline load.*
> - *A long-term plan and proposed compliance deadline for reducing debris discharges from the MS4 to zero.*
> - *Geographical targets for trash reduction activities with priority on waterbodies listed as impaired for trash on the State's CWA Section 303(d) list.*
> - *Trash reduction-related education activities as a component of Part D.1.a. [Public Education and Outreach].*
> - *Integration of control measures, education and monitoring to measure progress toward reducing trash discharges.*
> - *An implementation schedule.*
> - *Monitoring plan to aid with source identification and loading patterns as well as measuring progress in reducing the debris discharges from the MS4.*
> - *The Annual Report shall include a summary of its trash load reduction actions (control measures and best management practices) including the types of actions and levels of implementation, the total trash loads and dominant types of trash removed by its actions, and the total trash loads and dominant types of trash for each type of action.*
>
> *The plan shall provide for compliance with the above short-term and long-term discharge limits in the shortest practicable timeframe. The Trash Reduction Plan shall be included in the SWMP and any revisions noted in the Annual Report."*

2 Trash Defined

For the purposes of this plan, "trash" will be considered analogous to "litter" as defined below by the Hawaii Revised Statutes §339-1.

> *"Litter" means rubbish, refuse, waste material, garbage, trash, offal, or any debris of whatever kind or description, whether or not it is of value, and includes improperly discarded paper, metal, plastic, glass, or solid waste.*

A distinction is made that trash is not inclusive of natural materials, such as branches, leaves, and other vegetation, that are deposited into waterbodies naturally.

3 Marine Corps Solid Waste Policy and Program

3.1 Marine Corps Solid Waste Policy

The solid waste program at MCBH is governed by federal, state, local, Department of Defense (DOD), and MCBH policies.

The Marine Corps, in conjunction with the Navy, has adopted the Environmental Readiness Program Manual, Office of the Chief of Naval Operations (OPNAV) M-5090.1, implementing the policy established by OPNAV Instruction (OPNAVINST) 5090.1E, Environmental Readiness Program.

The Environmental Readiness Program outlines requirements, responsibilities, and policy for the management of environmental resources. OPNAV M-5090.1, Chapter 28, Solid Waste Management and Resource Recovery Ashore, is applicable to all Navy installations worldwide that generate one or more tons of solid waste per day. OPNAV M-5090.1, Chapter 28 requires that a written an Integrated Solid Waste Management Plan (ISWMP) be developed and implemented. Chapter 28 also states that a Qualified Recycling Program (QRP) should be established where economically beneficial to retain the proceeds from the sale of recyclables.

Marine Corps Order (MCO) 5090.2 is the Marine Corps' Environmental Compliance and Protection Program. MCO 5090.2 provides updated policy, guidelines, and procedures to maintain environmental compliance and protect human health and the environment. MCO 5090.2, Volume 17 establishes Marine Corps policy for Integrated Solid Waste Management (ISWM). MCO 5090.2 states:

> *Volume 17, Chapter 3, Part 030202.*
>
> *"The Marine Corps shall implement installation ISWM programs that properly and cost-effectively manage solid waste diversion, waste prevention, and solid waste disposal in accordance with the hierarchy outlined below. ISWM programs will be designed as total systems that consider the relative economic advantages of the latest technology as well as the potential for recycling. The Marine Corps should also explore shredding, compacting, energy recovery, and similar processes; and develop installation ISWM Plans according to the following hierarchy:*
>
> > *A. Source reduction.*
> >
> > *B. Sustainable procurement of goods and services.*
> >
> > *C. Reuse generated materials to prevent waste.*
> >
> > *D. Donation.*
> >
> > *E. Recycling.*
> >
> > *F. Composting and mulching.*
> >
> > *G. Volume reduction (incineration and waste to energy recovery).*
> >
> > *H. Landfilling."*

Volume 17, Chapter 3, Part 030501.

"All Marine Corps installations shall establish an installation recycling program, where cost-effective, for the following purposes:

A. To protect the environment and prevent the depletion of valuable natural resources.

B. To comply with federal, state, and local environmental laws and regulations.

C. To reduce the volume of waste disposed in landfills.

D. To reuse readily available resources.

E. To avoid excessive costs for the disposal of solid waste by other means.

F. To obtain proceeds from the sale of recyclable material."

MCBH Base Order 5233.1A (June 2016) provides guidance on proper solid waste disposal and identifies enforcement for littering and illegal dumping. MCBH Base Order 5233.1A specifies that there will be absolutely no dumping, dredging, filling, or disposing of any solid or liquid matter in or near the Nuupia Ponds Complex and MCDC.

3.2 Marine Corps Base Hawaii Integrated Solid Waste Management Plan

Implementation of an effective ISWM program is achieved through the development of an ISWMP. MCBH's updated ISWMP was completed in October 2018. The ISWMP establishes historic and existing solid waste generation and recycling quantities. The updated ISWMP also presents the results of the landfill optimization study that assessed the MCBH landfill operations and determined future operational requirements.

The MCBH landfill services approximately 11,000 military and civilian employees and residents working and/or living on the base. Solid waste is accepted from unaccompanied personnel housing, industrial, administrative, and commercial activities. The MCBH landfill is also used for the disposal of a portion of the construction and demolition (C&D) debris, wastewater treatment sludge, rock, coral, and wood that is not suitable for reuse.

In fiscal years 2012 through 2017, MCBH generated an average of 6,865 tons of non-hazardous solid waste without C&D debris and diverted an average of 3,007 tons from the landfill resulting in an average diversion rate of 43.8%. In 2012 through 2017, MCBH generated an average of 12,464 tons of C&D waste debris of which 10,582 tons were diverted through recycling efforts by contractors resulting in an average C&D diversion rate of 84.9%. Additionally, some approved alternate daily cover that is generated from approved green wastes, wood wastes, and soil from C&D projects is accepted into the landfill.

The ISWMP presented a framework for MCBH to increase their solid waste diversion through the following means:

- Source reduction – includes recommendations for administration, custodians, dining facilities, barracks, shops, Exchange and Commissary, and Supply Department.
- Recycling – includes recommendations for increasing recycling.
- Green waste management – includes alternatives for green waste management.

- C&D demolition debris management – includes recommendations for source reduction and recycling of building materials.
- Sustainable acquisition – includes recommendations for acquisition of environmentally friendly products.
- Education – includes recommendations for public awareness outreach to workers and residents.

Additional information about the ongoing base initiatives to reduce solid waste are presented in the ISWMP.

4 Existing Control Measures and BMPs

MCBH has already implemented the following control measures and best management practices (BMPs) to reduce trash.

4.1 Public Education and Outreach

Trash reduction and recycling initiatives are presented to workers and residents through the following means:

- Informational brochures in the orientation packet presented to new arrivals including the MCBH Recycling and Waste Guide (January 2019).
- BMP training as part of the annual general storm water awareness training conducted by the MCBH Environmental Compliance and Protection Division (ECPD).

4.2 Litter Clean Up

MCBH has a dedicated team of Environmental Compliance Coordinators (ECC). ECCs are MCBH personnel designated as environmental liaisons between their activity or facility and ECPD. The ECPD Compliance Inspection Team and ECCs conduct routine base-wide monitoring and beautification and pick up litter encountered during their rounds.

MCBH conducts annual clean-up events, including trash pick-up or beach clean-ups, to help to raise public awareness about the impacts of trash and illicit discharges on storm water runoff quality.

Additionally, ECPD organizes community litter clean up events such as the Weed Warrior Service Project. The Weed Warrior Service Project is held on the second Saturday of even numbered months and focuses on removal of weeds and trash at various wetland and beach areas. ECPD has also solicited the assistance of students and faculty of Mokapu Elementary School with stenciling of storm drain inlets.

4.3 Street Sweeping

The Facilities Maintenance Control Division (MCD) conducts routine street sweeping throughout the Base. The street sweeping is completed on a priority basis with industrial and commercial areas of the Base being swept at least twice a month.

4.4 Trash Pickup

Regular trash pickup is provided to assure proper disposal of solid wastes. Trash pickup in residential areas is performed by contractors twice per week. Trash pickup in industrial and commercial areas of the Base is performed by MCD twice per week.

4.5 Structural BMPs

Structural BMPs for trash collection have been installed in a few select locations as follows.

- A concrete debris collector has been installed at the inlet to the sediment basin installed along the restored portion of the MCDC.

- Two debris/sediment collectors have been installed at discharge points into the high-density polyethylene (HDPE) lined drainage channel starting at Uli Street along Daly Road.

In addition, MCD inspects and maintains the storm drain lines, manholes, and inlets/catch basins in accordance with a priority-based schedule.

4.6 Inspections

The ECPD Compliance Inspection Team and ECCs conduct routine inspections of the residential, industrial, and commercial areas of the Base. The inspectors will document and report any illicit dumping, including litter. Any illicit dumping observed by the inspectors will be reported to ECPD for follow-up corrective actions. All litter is collected and properly disposed. If necessary, the Inspectors will initiate the enforcement procedures in the Enforcement Response Plan included in the SWMP Plan, Appendix 3-4.

5 Estimation of Baseline Discharge Load

A Baseline Load Study will be initiated in 2023 to quantitatively determine the baseline load discharging to the MS4 and update the existing ISWMP.

The study will include a visual survey of representative sites and existing debris/sediment collectors. As a minimum, the outlets to the following debris/sediment collectors will be surveyed.

- Concrete debris collector installed at the inlet to the sediment basin installed along the restored portion of the MCDC
- Two debris/sediment collectors installed at discharge points into the HDPE lined drainage channel starting at Uli Street along Daly Road

In addition, four representative sites will be selected for monitoring, two representing housing areas and two representing industrial/commercial areas. The four representative sites will be selected based on an initial visual survey of the entire system for trash collection points and personal interviews with maintenance staff.

Monitoring will be conducted quarterly for eighteen (18) months to accurately determine seasonal variability. The survey will include documentation of the nature, type, and quantity (e.g., volume) of debris, and potential upstream sources. A survey inspection checklist detailing the data to be collected is attached to this plan. The Trash Survey Inspection Checklist should be used during inspections to report observations and document recommended corrective actions.

During each quarterly survey event, trash will be removed from each observation point and quantified. In addition, records of trash removed during routine maintenance by MCD, the ECPD Compliance Inspection Team, ECCs, and during special clean-up events will be documented for the corresponding quarter. The quantity of trash removed through routine maintenance and special clean-up events will be added to the observation point data to determine the baseline load.

The exact data collection methods will be refined after the first two quarterly survey events and may be subject to change throughout the eighteen (18) month survey period.

Following the completion of the survey, a technical report will be prepared to present the methodology, results, and the calculated annual baseline load. The survey results will be used to develop short-term and long-term plans to meet the trash reduction objectives of the MS4 Permit.

6 Short-Term Plan

The goal of the Short-Term Plan is to reduce the debris discharges from the MS4 by 50% from the baseline load. The Short-Term Plan consists of three steps: (1) establish the baseline load; (2) identify source and problem areas and determine preventative and corrective actions; and (3) implementation of actions.

6.1 Establish the Baseline Load

The first step will be to establish the baseline load. This will be accomplished by completing the Baseline Load Survey described in Section 5. One of the outcomes of the survey will be the identification of problem areas and potential sources. The data collected will help determine target areas for improvement to achieve the 50% reduction goal.

6.2 Data Analysis and Development of Reduction Actions

The Baseline Load Survey data will be analyzed to determine the location of trash accumulation areas and potential sources related to the accumulation areas. Based on the nature of the problem, alternative actions will be developed and prioritized for implementation. Alternative actions may be both preventative (i.e., eliminate the source of trash) and corrective (i.e., collection and disposal of trash). This Trash Reduction Plan will be updated with results of the Baseline Load Survey, identified target areas, detailed alternatives, and proposed short-term corrective actions.

6.3 Implementation of Short-Term Actions

Possible short-term actions to be taken to achieve the 50% reduction goal include:

- Public Education and Outreach – pamphlets and educational materials specific to trash reduction distributed to residents, workers, and schools.
- Implementation of Pollution Prevention BMPs – implement BMPs to reduce trash generation at the source.
- Implementation of Structural BMPS – construction of structural BMPs to capture trash and debris prior to discharge.
- Storm Drain System Maintenance – routine maintenance of the storm drain system that includes trash collection and disposal.
- Special Clean-up Events – continue litter clean-up events that involve residents and workers.
- Adopt-a-Neighborhood Program – engage residents, workers, and schools in an adopt-a-neighborhood program to foster public awareness and facilitate litter clean-up.

7 Long-Term Plan

The goal of the Long-Term Plan is to reduce debris discharges from the MS4 by 100% from the baseline load. The Long-Term Plan consists of two steps: (1) develop a Long-Term Implementation and Monitoring Strategy; and (2) implement Long-Term Reduction Actions and Monitoring.

7.1 Long-Term Reduction Implementation and Monitoring Strategy

The Long-Term Reduction Implementation and Monitoring Strategy will specify how MCBH will achieve the 100% baseline load reduction goal. The strategy will consist of two components:

(1) Implementation Plan – will identify specific actions that will be implemented to achieve the 100% reduction goal. The actions will include public education and outreach, implementation of BMPs, and trash collection. It is envisioned that this will be an extension of the actions implemented during the Short-Term Plan.
(2) Monitoring Plan – will present the monitoring and tracking required to demonstrate the efforts to meet the reduction requirements and to assess the effectiveness of the reduction actions.

Implementation and Monitoring Plans will be developed following the Short-Term Plan. Once developed, this Trash Reduction Plan will be revised to include the Implementation and Monitoring Plans.

The long-term actions and monitoring will be implemented to achieve the 100% baseline load reduction goal. Progress towards meeting the goal will be evaluated annually and will be revised as necessary.

8 Trash Reduction Related Education Activities

Public education and outreach are an important component in achieving the short-term and long-term goals of this Trash Reduction Plan. As a component of Part D.1.a of the Permit and as outlined in Section 6.3, trash reduction education activities may include:

- Education Materials;
- Special Clean-up Events;
- School Outreach; and
- Adopt-a-Neighborhood Projects.

9 Measuring Program Success

Program success will be measured both quantitatively and qualitatively. Quantitative measures will include measurements of trash collected and monitoring for trash reduction. Qualitative measures will include number of educational materials distributed and increase in public participation in special clean-up events and projects. As previously mentioned, a Long-Term Monitoring Plan will be developed to track the success of the program in meeting the reduction requirements and to assess the effectiveness of the trash reduction actions. This Trash Reduction Plan will be revised to include the Implementation Plan and Monitoring Plans.

10 Implementation Schedule

The proposed implementation schedule is presented in Table 1 below.

Table 1: Implementation Schedule

Task	Completion Date
Short-Term Plan	
Baseline Load Survey	October 2023
Data Analysis and Development of Short-Term Actions	April 2024
Implementation of Short-Term Actions	April 2024
Update ISWMP	October 2024
Long-Term Plan	
Implementation and Monitoring Strategy	April 2025
Long-Term Implementation Plan and Monitoring Plan	April 2035

11 References

1. *Integrated Solid Waste Management Plan, Marine Corps Base Hawaii*. Prepared for MCBH, by the Naval Facilities Engineering Command, Engineering and Expeditionary Warfare Center. October 2018.
2. *Strategic Sustainability Performance Plan.* Department of Defense. 2012.
3. *Environmental Compliance and Protection Program, Marine Corps Order 5090.2.* Department of the Navy, Headquarters United States Marine Corps. June 11, 2018.
4. *Environmental Readiness Program, OPNAVINST 5090.1E.* Department of the Navy. September 3, 2019.
5. *Environmental Readiness Program Manual, OPNAV M-5090.1.* Department of the Navy. September 3, 2019.

Attachment

Trash Survey Inspection Checklist

Trash Survey Inspection Checklist			
Inspection Date:		Name and phone # of those present during inspection:	
Time:			

Site Information		
Site name:	Inlet/Outlet ID No.(*if available)*:	
Location/Type of Structure:		
Date of Last Inspection:	Weather during inspection:	Amount of Rainfall in past 24 hrs (inches): ___________
Site Drainage Description:		

General Observations/Notes:

____

____

____

Describe Type of Trash Observed (if any):

☐ Plastic

☐ Metal

☐ Wood

☐ Rubber

☐ Disposable Food Containers/Wrappers

☐ Clothing

☐ Other *(describe)*:

____

____

____

____

Estimate Quantity *(approximate volume, or no. of each item if feasible)***:**

Potential Source:

Photos Taken: Yes ☐ No ☐

Photo Reference IDs:

Recommendations/Additional Notes:

____

____

____

____

____

Inspector Information	
Inspector Name:	Inspector Title:
Signature:	Date:

APPENDIX 6-2

Action Plan for Retrofitting Structural BMPs

FINAL

ACTION PLAN FOR RETROFITTING STRUCTURAL BEST MANAGEMENT PRACTICES

Storm Water Management Program Plan

Marine Corps Base Hawaii

NPDES Permit No. HI 000007

Prepared by:

Marine Corps Base Hawaii

March 2023

Table of Contents

Tables

Figures

List of Acronyms and Abbreviations

AMS	Asset Management System
BMP	Best Management Practice
CFR	Code of Federal Regulations
CWA	Clean Water Act
DOH	State of Hawaii Department of Health
ECPD	Environmental Compliance and Protection Division
EISA	Energy Independence and Security Act
EPA	United States Environmental Protection Agency
GIS	Geographic Information Systems
INRMP	Integrated Natural Resources Management Plan
LID	low impact development
MCBH	Marine Corps Base Hawaii
MCDC	Mokapu Central Drainage Channel
MS4	Municipal Separate Storm Sewer System
MS4 Permit	Marine Corps Base Hawaii’s NPDES Permit No. HI S000007
MSL	Mean Sea Level
NPDES	National Pollutant Discharge Elimination System
SWMP	Storm Water Management Program
UFC	Unified Facilities Criteria
U.S.	United States

1 Introduction

As of the effective date, September 1, 2021, the Marine Corps Base Hawaii (MCBH) is required to comply with the conditions of the National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4) Permit No. HIS000007 (referred to hereinafter as the "MS4 Permit"). The MS4 Permit includes authorized storm water and specified non-storm water discharges into Kaneohe Bay, Nuupia, Halekou, and Kaluapuhi Ponds, Kailua Bay, and the Mokapu Central Drainage Channel. Per the MS4 Permit, Part D.1.f.(1)(iv), MCBH is required to provide an Action Plan for Retrofitting Structural Best Management Practices (BMPs). The MS4 Permit states:

> *Pollution Prevention/Good Housekeeping, Part D.1.f.(1)(iv)*
>
> *"Action Plan for Retrofitting Structural BMPs – The Permittee shall implement an Action Plan for Retrofitting Structural BMPs within twelve (12) months of the effective date of this permit which shall identify retrofits to be implemented, and include an explanation of the basis for their selection and an implementation schedule. The implementation schedule shall cover a five (5) year period and be updated annually to include additional retrofit projects with water quality protection measures.*
>
> *The annual updates to the implementation schedule shall be included in the Annual Report with a description of the project's status. The Action Plan may include, but not be limited to projects in compliance with any TMDL implementation and monitoring plan."*

The purpose of the Action Plan for Retrofitting Structural BMPs is to reduce storm water pollution by designing and constructing or installing appropriate and cost-effective retrofit structural BMPs in strategic locations and structures within the existing MS4.

2 Structural Best Management Practices (BMPs)

Structural BMPs are engineered systems designed to control or store runoff or remove pollutants from storm water runoff via a chemical or physically based treatment system. These systems improve storm water runoff water quality by addressing issues of erosion and trash. Examples include:

- Stabilization of Erodible Surfaces
- Detention/Infiltration Basins
- Retention Basins
- Sand Filters
- Infiltration Trenches
- Porous/Permeable Pavement
- Vegetated Swales
- Vegetated Buffers/Biofilters
- Bio-retention Cells
- Storm Water Inlet Water Quality Inserts
- Vortex Separation/Continuous Deflection Systems

3 Summary of Recent Improvement Projects

3.1 Prioritization of Improvement Projects

Various studies and surveys at MCBH have been conducted to identify improvement projects at MCBH, many of which have direct or indirect impacts on improving storm water runoff water quality. Prioritization of potential improvement projects include the following factors:

- Most immediate threat to public safety or potential to cause property damage;
- Level of onsite usage;
- Proximity to and potential impact on the ocean or receiving water; and
- Potential to route pollutants into receiving waters.

3.2 Documented Areas of Concern

3.2.1 MCBH Landfill

Erosion within the landfill is confined within the boundaries of the parcel (see Figure 1). In addition to storm water pollution concerns, erosion at the landfill is monitored with respect to regulatory agency rules regarding minimum and maintained fill and cover depths to prevent exposure of buried trash.

The main areas of concern are located along the access roads. The 2004 *Landfill and Northeast Crater Catchment Erosion Assessment Report and Recommendations* identified the following issues associated with erosion and sediment transport:

- At the main entrance, runoff from the roadway flows onto the shoulder of Middaugh Road.
- At the secondary access road (dump truck wash zone), runoff flows down the roadway and across Middaugh Road toward the ocean.
- Suspended solids may be transported offsite via spillway pipes.
- Dust control issues associated with vehicles and equipment entering, leaving, and working on the site.

3.2.2 Ulupau Crater

The Ulupau Crater Catchment area includes approximately 155 acres, ranging in elevation from 638 feet mean sea level (MSL) to sea level (see Figure 1). Naturally formed gullies and cliffs, in addition to manmade features like military training berms, have the potential to contribute eroded sediment into the MS4 and receiving waters.

3.3 Summary of Recent Retrofit Projects

Various erosion assessment and recommendation studies have been conducted at MCBH, resulting in BMP projects that have had a direct impact on improving storm water runoff quality. Table 1 shows examples of retrofit improvement projects that have been implemented as a result of those studies.

Table 1: List of Retrofit Projects

	Issue Addressed by Corrective Action	
BMP Retrofit Project	***Erosion***	***Trash***
Southeast Ulupau Crater Shoreline: An unlined dirt ditch was lined with HDPE for runoff velocity dissipation.	X	
Southeast Ulupau Crater Shoreline: Stabilization of eroding slopes along southern shoreline cliffs with waddles.	X	
Southeast Ulupau Crater Shoreline: Drainage improvements at Weapons Range Parking Lot.	X	
North-facing Ulupau Crater Slopes: An unlined dirt ditch was lined with HDPE for runoff velocity dissipation.	X	
North-facing Ulupau Crater Slopes: The eroding slopes along the north-facing side of Ulupau Crater cliffs were stabilized with waddles.	X	
Sustain Weapons Range: Improvements to access road, drainage improvements, installation of erosion BMPs.	X	
Mokapu Central Drainage Channel (MCDC): Drainage improvement project. Three acres of weed-choked land along the west bank were replaced with a meandering, re-sloped corridor to increase flood storage capacity.	X	
MCDC: Sediment basin installed on the west side of MCDC, north of the footbridge near Seldon St.	X	
MCDC: Trash collector installed at inlet to sediment basin.	X	X
Drainage channel located along Daly Road at Uli Street: Channel lined with HDPE for runoff velocity dissipation.	X	
HDPE Drainage channel located along Daly Road at Uli Street: Two (2) concrete trash/sediment collectors installed at the two discharge points into the channel.		X
Drainage channel located along Daly Road at Middaugh Street: Channel lined with HDPE for runoff velocity dissipation.	X	
Golf course drainage channel perpendicular to Manning Street: Channel regraded with flattened slopes to allow for maintenance access.	X	X
Nuupia Ponds (wetlands): Sediment trap and retention basin installed upstream of discharge outlet into Nuupia Ponds	X	

SOURCE: SEE REFERENCES 2 & 3

DATE:	PROJECT TITLE:
SEP 2022	MCBH STORM WATER MANAGEMENT PROGRAM PLAN - ACTION PLAN FOR RETROFITTING STRUCTURAL BMPS

FIGURE TITLE:	FIGURE NO.:
POTENTIAL AREAS OF CONCERN	1

4 Proposed Actions

MCBH's plan for retrofitting structural BMPs will continue to build on the improvements that have been implemented throughout the property. Low impact development (LID) is mandatory for all large development and redevelopment projects in accordance with:

1. The Energy Independence and Security Act (EISA), signed December 2007, which aims to increase the efficiency of products, buildings and vehicles, and establishes strict storm water runoff requirements for Federal development projects.
2. The Assistant Secretary of the Navy implemented policy for LID, dated November 2007, that sets an objective of "no net increase in storm water runoff volume and sediment or nutrient loading from major renovation and construction projects."
3. The Unified Facilities Criteria (UFC) 3-210-10, Low Impact Development, published June 1, 2015,, which presents the criteria necessary to comply with the 2007 policy and legislation updates regarding LID implementation.

4.1 Base-wide Survey

The initial step in the BMP retrofit process will be a base-wide survey to document:

1. Locations of existing structural BMPs.
2. Maintenance requirements for existing structural BMPs (including proprietary product information).
3. Areas with observed or potential storm water pollution issues.

4.2 Asset Management System

In conjunction with the preliminary base-wide survey, the MCBH Facilities Department's existing GIS database will be upgraded to a comprehensive GIS-based Asset Management System (AMS) including an inventory of structural BMPs. The AMS will be used to identify the maintenance and inspection requirements.

4.3 Assessment of Areas of Concern

Using the information gathered in the preliminary base-wide survey, the areas identified with potential storm water pollution issues will be prioritized by the MCBH Environmental Compliance and Protection Division (ECPD) using the following steps:

- ECPD will investigate whether the issue can be resolved through simple, cost-effective non-structural BMPs, such as increased awareness and education, or improved good housekeeping techniques.
- If the issue requires additional assessment for the design of a structural BMP, the site will be prioritized based on:
    - Most immediate threat to public safety or potential to cause property damage;
    - Level of onsite usage;
    - Proximity to and potential impact on the ocean or receiving water; and
    - Potential to route pollutants into receiving waters.
- If a permanent solution for a high priority hot spot cannot be constructed within 18 months of the effective date of permit, the site will be addressed with temporary BMP controls, such as silt

fences, bio-filter socks, geotextiles, etc., and a work order request should be generated for increased frequency of maintenance at the site.

4.4 Evaluation of Existing and Installed BMP Structures

Following preliminary investigations and installation, structural BMP inspections will commence at an inspection frequency based on the outcome of previous inspections. If there are no reported high priority concerns after two consecutive rainfall events, a site will be downgraded to a reduced inspection frequency:

- Low priority sites shall be inspected at least once every five years.
- Medium priority sites shall be inspected at least annually.
- High priority sites shall be inspected at least semiannually.

Training will be provided to designers, contractors, and maintenance staff on optimizing use of BMPs, and to ensure the use of appropriate BMPs during all stages of the implementation of temporary and permanent BMPs.

All applicable documents and field manuals, provided with MCBH's Storm Water Management Program (SWMP) Plan update, will be used to guide implementation, inspection, and maintenance of new and existing structural BMPs.

Annual status reports will be used to evaluate and revise the Action Plan for Retrofitting Structural BMPs, as required by the MS4 permit.

5 Proposed Implementation Schedule

Based on the outcome of preliminary surveys and the number of high priority sites identified, if any, the following implementation schedule is proposed. The implementation year is the year in which the proposed retrofit project is scheduled to be completed. This schedule is subject to change due to funding availability, permitting delays, or other unforeseen circumstances.

Changes to the implementation schedule will be provided in the Annual Report and in revisions to this Action Plan for Retrofitting Structural BMPs.

Table 2: Implementation Schedule

Task	*Year 1*	*Year 2*	*Year 3*	*Year 4*	*Year 5*
Conduct Base-wide inventory survey	X	X			
Develop GIS database and AMS to tracking structural BMPs	X	X	X		
Develop a prioritized ranking of hot spots and other potential retrofit opportunities	X	X			
Develop Maintenance and Field Inspection Plan		X			
Implementation of temporary BMPs at high priority sites, as needed	X	X	X	X	X
Implementation of Maintenance and Field Inspection Plan		X	X	X	X
Design and Appropriation of Funding for Permanent BMPs:	X	X	X	X	X
Implementation of permanent BMPs:	X	X	X	X	X
Update internal database for tracking of maintenance and inspections, as needed		X	X	X	X
Update GIS database and AMS	X	X	X	X	X
BMP Retrofit Program Status Updates (in Annual Report) – Evaluation		X	X	X	X

6 References

1. *Final Marine Corps Base Hawaii Integrated Natural Resources Management Plan (INRMP), Update 2012-2016* (2011). Prepared for MCBH, by the Environmental Compliance and Protection Department MCBH and Sustainable Resources Group Int'l Inc. November 2011.
2. *Erosion Assessment with Recommendations: Outer Slopes and Southeast Shoreline, Ulupau Crater, Marine Corps Base Hawaii* (2007). Prepared for MCBH - ENV, by Sustainable Resource Group Int'l Inc. May 2007.
3. *Landfill and Northeast Crater Catchment Erosion Assessment Report with Recommendations* (2004). Prepared for the MCBH -ENV, by Sustainable Resource Group Int'l Inc. June 2004.

APPENDIX 6-3

Best Management Practices for Disposal of Waste Materials

Appendix 6-3
Options for Disposal of Waste Materials

Discharge/Activity	Disposal Priorities
General Construction and Painting; Street and Utility Maintenance	
Excess paint (oil-based)	1. Recycle/reuse. 2. Dispose waste in accordance with Federal, State and Local regulations.
Excess paint (water-based)	1. Recycle/reuse. 2. Dry residue of less than one inch of substance in cans, dispose as trash. 3. Dispose waste in accordance with Federal, State and Local regulations.
Paint cleanup (oil-based)	Wipe paint out of brushes, then: 1. Filter and reuse thinner and solvents. 2. Dispose waste in accordance with Federal, State and Local regulations.
Paint cleanup (water-based)	Wipe paint out of brushes, then: 1. Rinse to sanitary sewer.
Empty paint cans (dry)	1. Remove lids, dispose lid and can as trash.
Paint stripping (with solvent)	1. Dispose waste in accordance with Federal, State and Local regulations.
Cleaning of building exteriors which have hazardous material (e.g., mercury, lead in paints)	1. Use dry cleaning methods. 2. Contain and Dispose waste in accordance with Federal, State and Local regulations. (Suggestion: dry material first to reduce volume.)
Non-hazardous paint scraping or sandblasting	1. Dry sweep, dispose as trash.
Hazardous paint scraping or sandblasting (e.g., marine paints or paints containing lead or tributyl tin)	1. Dry sweep and dispose waste in accordance with Federal, State and Local regulations.
Soil from excavations during periods when storms are forecast	1. Should not be placed in street or on paved areas. 2. Remove from site or backfill by end of day. 3. Cover with tarpaulin, surround with hay bales, or use other runoff controls. 4. Place filter mat over storm water system. Note: Thoroughly sweep following removal of dirt in all four alternatives.
Soil from excavations placed on paved surfaces during periods when storms are not forecast	1. Keep material out of storm water systems and thoroughly remove via sweeping following removal of soil.

Discharge/Activity	Disposal Priorities
Cleaning streets in construction areas	1. Dry sweep and minimize tracking of mud. 2. Use silt ponds or similar pollutant reduction techniques when flushing pavement.
Soil erosion, sediments	1. Cover disturbed soils, use erosion controls, block entry to storm water system. 2. Seed or plant immediately.
Fresh cement, grout, mortar	1. Use/reuse excess. 2. Dispose to trash.
Wash water from concrete or mortar cleanup	1. Wash onto earthen area, spade in. 2. Pump and remove to appropriate disposal facility. 3. Settle, pump water to sanitary sewer system.
Aggregate wash from construction	1. Wash onto earthen area, spade in. 2. Pump and remove to appropriate disposal facility. 3. Settle, pump water to sanitary sewer system.
Rinse water from concrete mixing trucks	1. Return truck to yard for rinsing into pond or earthen area. 2. At construction site, wash into pond or earthen area.
Non-hazardous construction and demolition debris	1. Recycle/reuse (concrete, wood, etc.). 2. Dispose as trash.
Hazardous demolition and construction debris (e.g., asbestos)	1. Dispose material with shipping document into a regulated landfill.
Saw-cut slurry	1. Use dry cutting technique and sweep up residue. 2. Vacuum slurry and dispose off-site. 3. Block storm water system or berm with low weir as necessary to allow most solids to settle. Shovel out gutters; dispose residue to earthen area, construction yard or landfill.
Portable toilet waste	1. MCBH, Kaneohe Bay shall dispose to sanitary sewer as specified by the State.
Leakage from garbage dumpsters	1. Collect or contain leaking material. Eliminate leak, keep covered; return to leasing company for immediate repair. 2. If dumpster is used for liquid waste, use plastic liner.
Leaks from construction debris bins	1. Ensure that bins are used for dry non-hazardous materials only. (Suggestion: Fencing and covering help prevent misuse.)
Dumpster cleaning water	1. Clean at dumpster owner's facility and discharge waste through grease interceptor to sanitary sewer system. 2. Clean on-site and discharge through grease interceptor to sanitary sewer system.

Discharge/Activity	Disposal Priorities
Cleaning paved areas	1. Sweep and dispose as trash (dry cleaning only). 2. For vehicle leaks, follow this 3-step process: a. Clean up leaks with rags or absorbents. b. Sweep using granular absorbent material (cat litter). c. Mop and dispose of mop water to sanitary sewer system (or collect rinse water and pump to the sanitary sewer system). 3. Same as 2 above, except for 2c. Instead, discharge rinse water (no soap) to soil or grassy area.
Landscape/Garden Maintenance	
Pesticides	1. Use up. Rinse containers; use rinse water as product. Dispose rinsed containers as trash. 2. Dispose waste in accordance with Federal, State and Local regulations.
Garden clippings	1. Compost. 2. Take to landfill.
Tree trimming	1. Chip, if necessary, before composting or recycling.
Decorative fountains and ponds (no fish)	1. Do not use metal-based algicides (i.e., copper sulfate). 2. Recycle/reuse (e.g., irrigation). 3. Discharge to sanitary sewer system. 4. Determine chlorine residual = 0, wait 24 hours, and then discharge to storm water system.
Acid or other pool/fountain cleaning	1. Neutralize and discharge to sanitary sewer.
Swimming pool and decorative fountain filter backwash (Dechlorinated water only)	1. Reuse for irrigation. 2. Dispose on pervious areas. 3. Settle, dispose to sanitary sewer system.
Vehicle Wastes	
Used motor oil	1. Use secondary containment while storing.
Antifreeze	1. Use secondary containment while storing. Dispose waste in accordance with Federal, State and Local regulations.
Other vehicle fluids and solvents	1. Dispose waste in accordance with Federal, State and Local regulations.
Automobile batteries	1. Send to auto battery recycler. 2. Take to recycling center. 3. Store in appropriate storage containers or on containment pallets.
Construction trailer waste	1. Use holding tank. Dispose to sanitary sewer system.
Vehicle and boat washings (using detergent or other compounds)	1. Recycle. 2. Discharge to sanitary sewer system, never to storm water system.

Discharge/Activity	Disposal Priorities
Rinse water from dust removal at new fleet vehicles	1. Discharge to sanitary sewer system. 2. If rinsing dust from exterior surfaces for appearance purposes, use no soap (water only); discharge to soil or grassy area.
Vehicle leaks at vehicle repair facilities	Follow this 3-step process: 1. Clean up leaks with rags or absorbents. 2. Sweep, using granular absorbent material (cat litter). 3. Mop and dispose of mop water to sanitary sewer.
Other Wastes	
Spent fix from photo processing	1. Collect for hauling as hazardous waste. 2. Treat to silver discharge limit.
Cooling water and demineralized water	1. Recycle/reuse. 2. Discharge to sanitary sewer system.
Kitchen grease	1. Provide secondary containment, collect, send to recycler. 2. Provide secondary containment, collect, send to wastewater treatment plant by hauler.
Cleaning of kitchen floor mats, exhaust filters, and compressed air line flushing, etc.	1. Clean inside building and route discharge through grease trap to sanitary sewer system. 2. Clean outside in container or bermed area and route discharge to sanitary sewer system.
Cleanup wastewater from sewer backup	Follow this procedure: 1. Block storm water system, contain, collect, and return spilled material to the sanitary sewer system. 2. Block storm water system, rinse remaining material to collection point, and pump to sanitary sewer system. (No rinse water may flow to storm water system.)

Notes:
1. "Discharge to sanitary sewer" - Dispose into sink, toilet, or sanitary sewer clean-out connection
2. "Dispose as trash" - Dispose in dumpsters or trash containers for pickup or eventual disposal in landfill
3. "Dispose as hazardous waste" - Contract with a hazardous waste hauler to remove and dispose

APPENDIX 10-1

Industrial and Commercial Facility Inspection Checklist

INDUSTRIAL AND COMMERCIAL FACILITY INSPECTION CHECKLIST		
Bldg. No./Area:		Facility Description:
Inspection Date:		Priority Ranking: ______________ Inspection Type: Permit Required ☐ Follow-up ☐
Time:	Weather:	Facility POC — Name:
Inspected by:		Facility POC — Email/Phone:

ITEM	Y	N	N/A	COMMENTS
Section 1 – Training/Education				
Employees receive training for storm water pollution prevention.	☐	☐	☐	
Employees demonstrate awareness of activity-specific BMPs, and willingness to implement these practices.	☐	☐	☐	
Training brochure was provided during inspection.	☐	☐	☐	
Section 2 – Material/Waste Handling and Storage				
Safety Data Sheets (SDSs) are easily accessible.	☒	☐	☐	
Potential storm water pollutants are properly stored (i.e., labelled, adequate secondary containment).	☐	☐	☐	
Loading and unloading occurs indoors or with adequate BMPs to prevent pollutant exposure to storm water.	☐	☐	☐	
Activities that generate dust/paint chips (e.g., sandblasting, wood/metal work) are contained and wastes collected and properly disposed of.	☐	☐	☐	
Waste and recycling are collected regularly, by qualified personnel.	☐	☐	☐	
Storage and disposal BMPs adequately minimize risk of pollutant exposure to storm water.	☐	☐	☐	
Spill kits are readily available and sufficiently stocked.	☐	☐	☐	
Section 3 – Good Housekeeping				
Outdoor areas (e.g., sidewalks, parking lots) are clear of sediment and debris.	☐	☐	☐	
Trash and recycling bin are kept covered and contained (i.e., leak free).	☐	☐	☐	
Unused equipment and supplies are properly disposed of.	☐	☐	☐	
Work areas kept orderly. Spills/leaks can be easily identified and cleaned.	☐	☐	☐	
Site surfaces are free of spills and stains.	☐	☐	☐	
Wash water is properly contained and disposed of (e.g., to sewer or offsite contractor).	☐	☐	☐	

ITEM	Y	N	N/A	COMMENTS
Section 4 – Restaurant/Food Service				
Grease trap/interceptor is adequately maintained and functions properly.	☐	☐	☐	
Floor, floor mats, trays, range hoods, etc., are washed in utility sink or drain connected to the sewer system.	☐	☐	☐	
ITEM	**Y**	**N**	**N/A**	**COMMENTS**
Section 5 – Vehicle/Equipment Maintenance and Storage				
Onsite equipment appears well maintained.	☐	☐	☐	
Maintenance is conducted indoors or with adequate BMPs to prevent pollutant exposure to storm water.	☐	☐	☐	
BMPs (e.g., drip pans, absorbents) are used to contain spills/leaks during maintenance and storage.	☐	☐	☐	
Painting operations are contained to prevent overspray or conducted at a paint booth.	☐	☐	☐	
Salvage equipment is drained of fluids prior to outdoor storage.	☐	☐	☐	
Section 6 – Vehicle/Equipment Washing				
When possible, vehicle and equipment washing is conducted at a designated wash rack or offsite location.	☐	☐	☐	
Wash water, wash residue, and debris are properly contained and disposed of.	☐	☐	☐	
Section 7 – Fueling				
When possible, fueling is conducted at a designated fueling area.	☐	☐	☐	
Fueling is conducted on a paved surface, in a covered area.	☐	☐	☐	
BMPs for fueling appear to be adequate and well maintained.	☐	☐	☐	
Section 8 – Storm Drain System				
Storm drain inlets and waterways are adequately protected.	☐	☐	☐	
Storm drain inlets and BMPs are adequately maintained.	☐	☐	☐	
Storm drain stencil or placard is installed to promote pollution prevention.	☐	☐	☐	
Section 9 – General Observations				
Dry weather discharge.	☐	☐	☐	
Illicit connections to the MS4 (e.g., floor drains).	☐	☐	☐	
Subject to flooding/impacts from offsite storm water.	☐	☐	☐	
Evidence of erosion.	☐	☐	☐	
Other *(specify)*:	☐	☐	☐	

Structural BMPs *(check all that apply)*:

- ☐ Grease Trap (indoor) / Grease Interceptor (outdoor)
- ☐ Vacuum System for Sanding/Sawdust
- ☐ Wash Rack
- ☐ Oil Water Separator
- ☐ Sediment/Debris Trap
- ☐ Berm Around Critical Areas
- ☐ Impervious Surfaces Used at Critical Areas
- ☐ Detention/Retention Basin
- ☐ Inlet Protection (i.e., filter fabric, filter sock)
- ☐ Hydrodynamic Separator
- ☐ Infiltration Pit (i.e., gravel or sand)
- ☐ Vegetated Swale
- ☐ Erosion/Slope Protection (i.e., rip rap, geotextiles)
- ☐ Other *(specify)*:

ADDITIONAL COMMENTS

NO.	DEFICIENCIES *Note: Deficiency types and procedures for corrective action are described in the Enforcement Response Plan (SWMP Plan Appendix 3-4)*	DEFICIENCY TYPE	PHOTO ID	CORRECTIVE ACTION DEADLINE
1				
2				
3				
4				
5				
6				
7				
8				

APPENDIX 10-2

Prioritized Area Plan for Industrial and Commercial Facilities

Prioritized Area Plan for Industrial and Commercial Facilities

MCBH has compiled a base-wide inventory of both industrial and commercial facilities. Each facility has been assigned a priority ranking from 1 (High Priority) to 3 (Low Priority). The priority ranking is based on several factors that affect the relative risk of contaminated runoff from that facility entering the MS4 such as outcomes of previous inspections, proximity to other industrial/commercial facilities, daily activities at the site, proximity to receiving waters, etc. These priority rankings are reviewed annually and revised as needed.

Industrial facilities that fall under qualifying SIC codes were identified and are included in the Part E.1 of the MS4 Permit. Four additional facilities have been identified by MCBH for additional coverage under the Permit. Facilities 3073, 6892, 4050, and 1295 are vehicle and aircraft maintenance facilities. Facility-specific Storm Water Pollution Prevention Plans (SWPPPs) for the additional maintenance facilities have been developed and are included in Appendix 11-2. To develop the SWPPPs, inspections of all facilities were conducted, and the facility managers were interviewed regarding activities and existing BMPs.

Tables 1 and 2 summarize the inventory and priority ranking of industrial and commercial facilities, respectively. See Figure 10-2-1 for a general location map of each facility identified.

Table 1 Industrial Facilities at MCBH

Building No.	Description	General Category	SIC Code	Priority Ranking
P-3 Apron	Aircraft Wash Facility	Maintenance	45	1
132	Recycle Center	Recycling Facility	50	1
1698	Marina Small Boat Repair Shop	Maintenance	44	1
351	Vehicle Maintenance Shop	Maintenance	41	1
6874	3rd Radio Battalion	Maintenance	42	1
1170, 1171	Aircraft Fuel Islands	POL Storage	45	1
1252, 1253	Fuel Division Supply Department	Storage	51	1
6801, 6802	Waterfront Ops Lab/Boat Shop	Maintenance	44	1
1619	Ground Support Equipment Shop	Maintenance	42	1
1631	Aircraft Wash & Rinse Facility	Maintenance	45	1
6107	Aircraft Rinse Facility	Maintenance	45	1
6900, 6182	Fuel Delivery Branch & Refueler Truck Parking	Storage	51	1
6183	Engine Test Facility	Maintenance	45	1
6479	Aircraft Ready Fuel Storage	Storage	51	1
Sanitary Landfill	Sanitary Landfill	Sanitary Landfill	49	1
Water Reclamation Facility	Water Reclamation Facility	Utility	49	1
3014	Combat Logistics Battalion (CLB-3) Support Company Transportation Services	Maintenance	42	1
5011	12th Marine Motor T	Maintenance	42	1
3073	Helicopter Wash Facility	Maintenance	45	2
6892	Aircraft Wash Facility	Maintenance	45	2
4050	Golf Cart Barn	Maintenance	75	2
1295	Golf Course Maintenance Shop	Maintenance	75	2

Table 2 Commercial Facilities at MCBH

Building No.	Description	General Category	Priority Ranking
1667	Mokapu Marine Mart, gas Lanes, Car Wash, and Firestone Complete Auto Care	Auto Wash & Repair	1
3071, 6766	Main Gate Marine Mart/Subway/Gas Lanes	Food & Gas Vendor	1
3097, 6882, 6883, 1267	Five-O Motors	Auto Repair	1
502	Officers' Club	Restaurant/Bar	2
1255	L&L Hawaiian Grill	Food Vendor	2
1629	Kahuna's Bar & Grill	Food Vendor	2
3088	Staff NCO Club and Da Coop at the Golf Course	Restaurant/Bar	2
6477	MCBH Food Court (Blue River Mexican Grill, Taco Bell, Papa Johns, Ninja Sushi, Subway)	Shops & Food Vendors	2
6477	Starbucks	Food Vendor	2
6691	McDonalds	Food Vendor	2
6919	Selden Street Marine Mart, Panda Express, Infinitea	Food Vendor	2
219	Lava Java Coffee Cart	Food Vendor	3
1666	Striker's Grill & Tap	Restaurant/Bar	3
6797	Flight Line Marine Mart	Basic Commodities	3
6823	Flying Leatherneck Inn	Food Vendor	3

Inspection Schedules

Industrial and commercial facilities are subject to an activity inspection frequency based on assigned priority ranking. The inspection frequencies, for applicable sites, are summarized below:

Table 3 Inspection Frequency

Priority Ranking	Type of Facility	Frequency of Inspections
1	Industrial (Listed in MS4 Permit)	At least once per MS4 Permit term
2	Industrial (Not listed in MS4 Permit)	At least twice per MS4 Permit term
1	Commercial	At least once per MS4 Permit term

NOTE: Commercial facilities that have been designated as low priority (Priority Ranking 2 or 3) are not subject to mandatory inspections. Inspections will be conducted at these facilities, as needed, based on complaint investigation and/or findings of base-wide inspections.

At this time, all industrial facilities at MCBH are listed in the MS4 Permit and have been designated as Priority Ranking 1. The priority ranking of each facility will be reviewed annually and revised as needed. New industrial and commercial facilities will also be subject to this prioritization process. New facilities will be added to this plan and any changes to the priority ranking will be identified in the storm water Annual Report. Any newly identified industrial facility discharging industrial storm water, will be reported to DOH within 30 days of inspection.

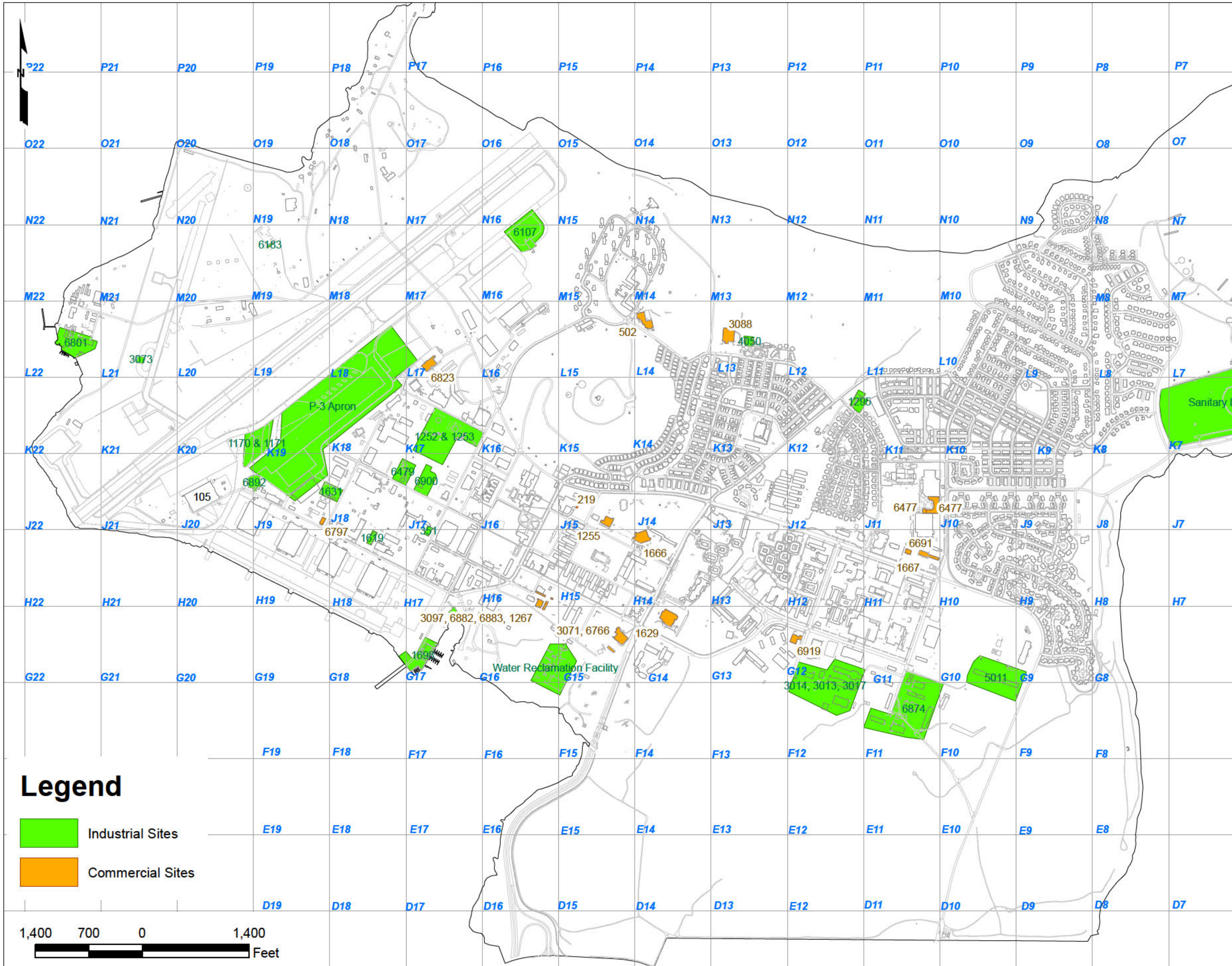
Preliminary inspection schedules, for both industrial and commercial facilities, have been outlined in Tables 4 and 5 respectively. The industrial and commercial facility inspection schedules are subject to change, at the discretion of ECPD.

Table 4 Inspection Schedule - Industrial Facilities

Building No.	Description	Priority Ranking	Fiscal Year				
			1	2	3	4	5
P-3 Apron	Aircraft Wash Facility	1	X	X			
132	Recycle Center	1	X	X			
1698	Marina Small Boat Repair Shop	1	X	X			
351	Vehicle Maintenance Shop	1	X	X			
6874	3rd Radio Battalion	1	X	X			
1170, 1171	Aircraft Fuel Islands	1	X	X			
1252, 1253	Fuel Division Supply Department	1	X			X	
6801, 6802	Waterfront Ops Lab/Boat Shop	1	X			X	
1619	Ground Support Equipment Shop	1	X			X	
1631	Aircraft Wash & Rinse Facility	1	X			X	
6107	Aircraft Rinse Facility	1	X			X	
6900, 6182	Fuel Delivery Branch & Refueler Truck Parking	1	X			X	
6183	Engine Test Facility	1	X				X
6479	Aircraft Ready Fuel Storage	1	X				X
Sanitary Landfill	Sanitary Landfill	1	X				X
Water Reclamation Facility	Water Reclamation Facility	1	X				X
3014	Combat Logistics Battalion (CLB-3) Support Company Transportation Services	1	X				X
5011	12th Marine Motor T	1	X				X
3073	Helicopter Wash Facility	2	X		X		
6892	Aircraft Wash Facility	2	X		X		
4050	Golf Cart Maintenance/Storage Shed	2	X		X		
1295	Golf Course Maintenance Shed	2	X		X		

Table 5 Inspection Schedule - Commercial Facilities

Building No.	Description	Priority Ranking	Fiscal Year				
			1	2	3	4	5
1667	Mokapu Marine Mart, gas Lanes, Car Wash, and Firestone Complete Auto Care	1			X		
3071, 6766	Main Gate Marine Mart/Subway/Gas Lanes	1			X		
3097, 6882, 6883, 1267	Five-O Motors	1			X		
502	Officers' Club	2					
1255	L&L Hawaiian Grill	2					
1629	Kahuna's Bar & Grill	2					
3088	Staff NCO Club and Da Coop at the Golf Course	2					
6477	MCBH Food Court (Blue River Mexican Grill, Taco Bell, Papa Johns, Ninja Sushi, Subway)	2					
6477	Starbuck's	2					
6691	McDonalds	2					
6919	Selden Street Marine Mart, Panda Express, Infinitea	2					
219	Lava Java Coffee Cart	3					
1666	Striker's Grill & Tap	3					
6797	Flight Line Marine Mart	3					
6823	Flying Leatherneck Inn	3					



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MCBH SWPPP
Storm Water Management Program Plan

FIGURE TITLE

General Location Map

DATE	FIGURE NO.
September 2022	10-2-1

APPENDIX 11-1

SIC Codes for Industrial Facilities Requiring Permit Coverage

Standard Industrial Classification (SIC) Codes for Industrial Facilities Requiring Permit Coverage

Hawaii Administrative Rules (HAR) Chapter 11-55, Appendix B authorizes storm water discharges associated with industrial activities from the following facilities:

1. *Facilities Subject to Storm Water Effluent Limitations Guidelines*: Facilities subject to storm water effluent limitations guidelines, new source performance standards, or toxic pollutant effluent standards under 40 CFR Subchapter N (except facilities with toxic pollutant effluent standards that are exempted under category (i) to (ix) and (xi) of this definition). The categories of facilities specified in 40 CFR Subchapter N currently are: Cement Manufacturing (40 CFR 411), Feedlots (40 CFR 412), Fertilizer Manufacturing (40 CFR 418), Petroleum Refining (40 CFR 419), Phosphate Manufacturing (40 CFR 422), Steam Electric (40 CFR 423), Coal Mining (40 CFR 434), Mineral Mining and Processing (40 CFR 436), Ore Mining and Dressing (40 CFR 440), and Asphalt Emulation (40 CFR 443).
2. *Manufacturing Facilities*: Standard Industrial Classifications (SICs) 24 (except 2434), 26 (except 265 and 267), 28 (except 283 and 285), 29, 311, 32 (except 323), 33, 3441, and 373.
3. *Oil and Gas/Mining Facilities:* SICs 10 through 14 including active or inactive mining operations and oil and gas exploration, production, processing, or treatment operations, or transmission facilities that discharge storm water contaminated by contact with or that has come into contact with any overburden, raw material, intermediate products, finished products, by-products or waste products.
4. *Hazardous Waste Treatment, Storage, or Disposal Facilities:* Includes those operating under interim status or a permit under Subtitle C of the Resource Conservation and Recovery Act (RCRA).
5. *Landfills, Land Application Sites, and Open Dumps*: Sites that receive or have received industrial waste from any facilities described in this subsection, sites subject to regulation under Subtitle D of RCRA.
6. *Recycling Facilities:* SICs 5015 and 5093. These codes include metal scrapyards, battery reclaimers, salvage yards, and automobile junkyards, including but limited to those classified as:

   SIC 5015 - Motor Vehicle Parts, Used

   SIC 5093 - Scrap and Waste Materials
7. *Steam Electric Power Generating Facilities*: Includes coal handling sites.
8. *Transportation Facilities:* SICs 40, 41, 42 (except 4221-25), 43, 44, 45, and 5171 which have vehicle maintenance shops, equipment cleaning operations, or airport deicing operations. Only those portions of the facility involved in vehicle maintenance (including vehicle rehabilitation, mechanical repairs, painting, fueling, equipment cleaning operations, airport deicing operations, and lubrication) or other operations identified herein that are associated with industrial activity.

9. *Sewage or Wastewater Treatment Works:* Treatment works treating domestic sewage or any other sewage sludge; or wastewater treatment device or system used in the storage, treatment, recycling, and reclamation of municipal or domestic sewage, including land dedicated to the disposal of sewage sludge that are located within the confines of the facility, with a design flow of one million gallons per day or more, or required to have an approved pretreatment program under 40 CFR Part 403. Not included are farm lands, domestic gardens, or lands used for sludge management where sludge is beneficially reused and which are not physically located in the confines of the facility, or areas that are in compliance with Section 405 of the CWA.

10. *Manufacturing Facilities Where Materials are Exposed to Storm Water:* SICs 20, 21, 22, 23, 2434, 25, 265, 267, 27, 283, 285, 30, 31, (except 311), 323, 34 (except 3441), 35, 36, 37 (except 373), 38, 39, 4221-25, and 42.25.

APPENDIX 11-2

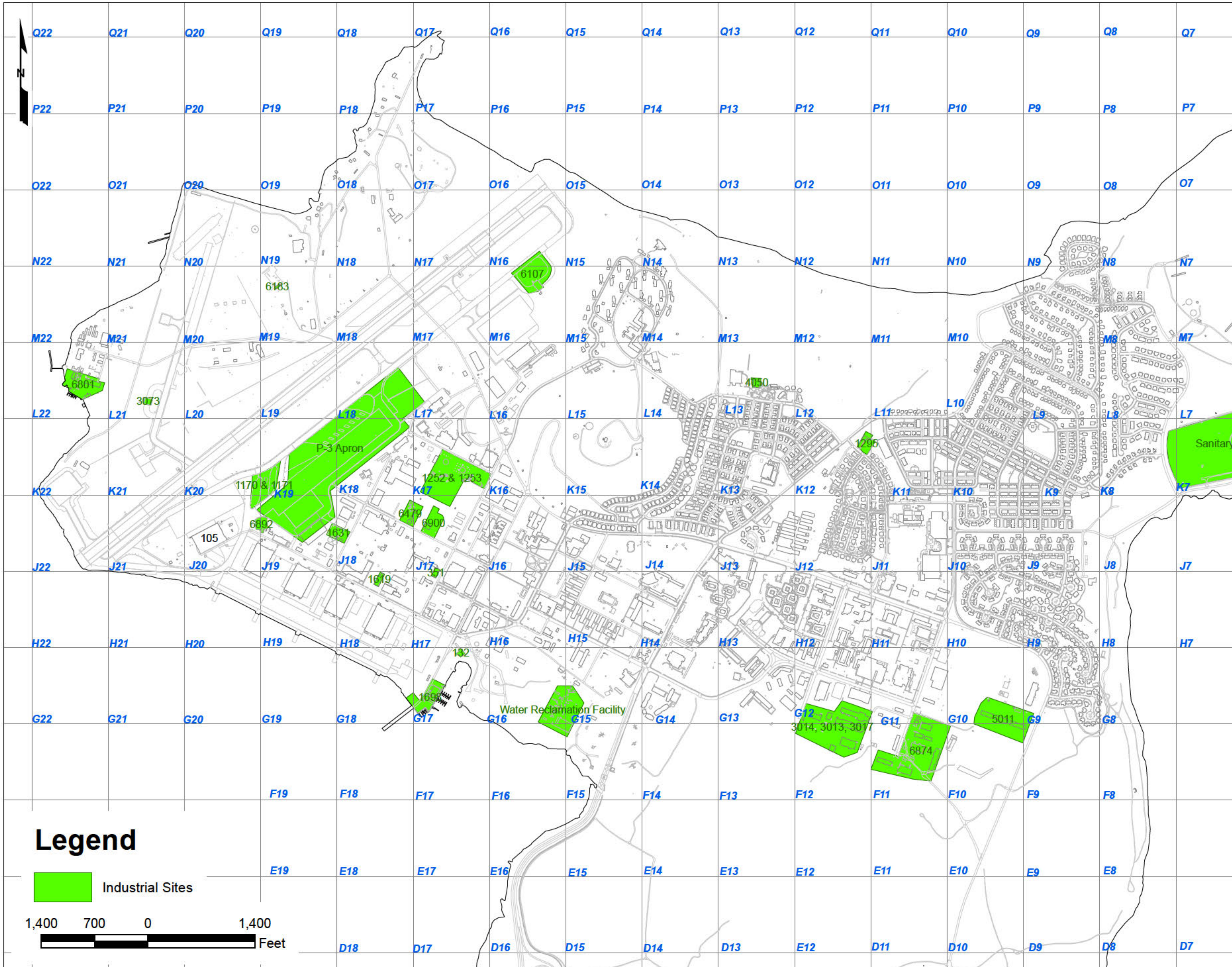
Storm Water Pollution Prevention Plans:

- List of Industrial Facilities
- MCBH Industrial Facilities and Base Drainage Map
- Storm Water Pollution Prevention Plans

Table 11-2-1 displays the order in which the SWPPPs are organized in Appendix 11-2. Figure 11-2-1 shows the location of industrial facilities at MCBH.

Table 11-2-1 Industrial Facilities at MCB Hawaii

No.	Building No.	General Category	Description
1	P-3 Apron	Maintenance	Aircraft Wash Facility
2	132	Utility	Recycle Center
3	1698	Maintenance	Small Boat Repair Shop
4	351	Maintenance	Vehicle Maintenance Shop
5	6874	Maintenance	3rd Radio Battalion
6	1170, 1171	POL Storage	Aircraft Fuel Islands
7	1252, 1253	Storage	Fuel Division Supply Department
8	6801 (6802)	Maintenance	Lab/Boat Shop
9	1619	Maintenance	Ground Support Equipment Shop
10	1631	Maintenance	Aircraft Wash & Rinse Facility
11	6107	Maintenance	Aircraft Rinse Facility
12	6900 (formerly 6182)	Storage	Fuel Delivery Branch & Refueler Truck Parking
13	6183	Maintenance	Engine Test Facility
14	6479	Storage	Aircraft Ready Fuel Storage
15	Sanitary Landfill	Sanitary Landfill	Sanitary Landfill
16	Water Reclamation Facility	Utility	Water Reclamation Facility
17	3014	Maintenance	Combat Logistics Battalion (CLB-3) Support Company Transportation Services
18	5011	Maintenance	12th Marine Motor T
19	3073	Maintenance	Helicopter Wash Facility
20	6892	Maintenance	Aircraft Wash Facility
21	4050	Maintenance	Golf Cart Barn
22	1295	Maintenance	Golf Course Maintenance Shop



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Storm Water Management Program Plan

FIGURE TITLE
General Location Map

DATE
September 2022

FIGURE NO.
11-2-1

Final

STORM WATER POLLUTION PREVENTION PLAN

Storm Water Management Program Plan

Marine Corps Base Hawaii, Oahu, Hawaii

NPDES Permit No. HI S000007

P-3 AIRCRAFT PARKING APRON

Prepared by:

Marine Corps Base Hawaii

August 2022

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Tables

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List of Acronyms and Abbreviations

BMP	Best Management Practice
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CWA	Clean Water Act
CWB	Clean Water Branch
DOH	State of Hawaii Department of Health
ECC	Environmental Compliance Coordinator
ECE	Environmental Compliance Evaluation
ECPD	Environmental Compliance and Protection Division
EPA	United States Environmental Protection Agency
HAZMAT	Hazardous Material
HAZMIN	Hazardous Material Minimization
MCBH	Marine Corps Base Hawaii
MS4	Municipal Separate Storm Sewer System
MS4 Permit	Marine Corps Base Hawaii's NPDES Permit No. HI S000007
NPDES	National Pollutant Discharge Elimination System
POC	Point of Contact
SWMP	Storm Water Management Program
SWPPP	Storm Water Pollution Prevention Plan

Certification Statement

MCBH is committed to the prevention of discharges of polluted storm water to navigable waters or the environment and maintains the highest standards for best management practices through periodic review, updating, and implementation of this Storm Water Pollution Prevention Plan (SWPPP).

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information contained therein. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Name: ______________________________ Title: ______________________________

Signature: ____________________________ Date: ____________________________

Management Review

Refer to Section 1.2 for more information on required SWPPP updates.

Review Dates	Signature	Amendment Required? (Y/N)
____________	__________________	__________
____________	__________________	_________
____________	__________________	_________
____________	__________________	_________
____________	__________________	_________
____________	__________________	_________

1 Introduction

As part of Federal regulations administered through the Clean Water Act (CWA), the State of Hawaii, Department of Health (DOH) has issued the National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4) Permit No. HI S000007 (referred to herein at the “MS4 Permit”) to Marine Corps Base Hawaii (MCBH). The MS4 Permit requires that MCBH provide all existing industrial facilities, identified in MCBH’s MS4 Permit application, and any newly identified industrial facilities, submitted to DOH using the “MS4 NPDES Individual Permit – Industrial Storm Water Discharge Notification Form,” with a Storm Water Pollution Prevention Plan (SWPPP) for storm water associated with industrial activities.

The purpose of the regulations is to protect water quality by reducing the amount of pollutants in storm water runoff caused by industrial activities.

1.1 SWPPP Implementation

The storm water management controls of this plan will become MCBH procedure for the applicable industrial facility. An up-to-date copy of the SWPPP shall be maintained on site and at the MCBH Environmental Compliance and Protection Division (ECPD). Management staff, maintenance personnel, contractor staff, and other personnel involved in onsite industrial activities, will be knowledgeable of the plan and follow the guidelines set forth in it, in addition to any other pertinent base-wide, state, and federal regulations.

Day-to-day implementation of the SWPPP is primarily the responsibility of the current facility Environmental Compliance Coordinator (ECC) or Point of Contact (POC) as identified in Table 2-1. Enforcement of the permit conditions and this SWPPP are ultimately the responsibility of ECPD and additional escalating levels of authority as specified in the Enforcement Response Plan developed by MCBH for its base-wide Storm Water Management Program (SWMP) Plan.

1.2 Updating the SWPPP

This SWPPP will be reviewed as needed to identify necessary changes, at a minimum of every five years. Updates may be required due to current best management practice (BMP) failures, spill events, changes in industrial activities, changes in features, corrective actions, or other necessary changes. Personnel changes to the Storm Water Pollution Control Team (Section 2.1) should be logged in Table 2-1. Storm Water Pollution Control Team Log. ECPD will be responsible for approving revisions to the SWPPP. In the event the plan is modified, a copy of the updated SWPPP will remain at ECPD and will be provided to the applicable facility. Additionally, ECPD shall document and report the SWPPP changes to the DOH, Clean Water Branch (CWB), within thirty days of when the changes arise.

2 P-3 Aircraft Parking Apron

The P-3 Aircraft Parking Apron (Aircraft Parking Apron) is located within MCBH, Kaneohe Bay, roughly parallel to Taxiway “A” and extending from 1st Street (see grid [redacted] of Figure I-1) to the Aircraft Fire and Rescue Building, Building 6822. The facility can be found in grids [redacted] of the MCBH Base Map, see Figure 4-1. The facility-specific map is shown on Figure 4-2.

2.1 Storm Water Pollution Control Team

The Storm Water Pollution Control Team consists of the Storm Water Program Manager, ECC, and the Hazardous Material (HAZMAT) and Hazardous Material Minimization (HAZMIN) team. The Storm Water Program Manager is responsible for the enforcement of the MS4 permit at all industrial sites and provides annual training to the ECC and other personnel. The ECC is the primary unit POC for storm water related items and the day-to-day environmental matters at a specific facility. ECC's are responsible for SWPPP implementation including BMP and facility inspections, storm water assessments/sampling, BMP maintenance, and corrective actions. The HAZMAT and HAZMIN team shall be contacted if assistance is needed. The role, name, phone number, and start date of individuals on the Storm Water Pollution Control Team is recorded in Table 2-1 below. In the event of personnel turnover, Table 2-1 shall be updated accordingly.

TABLE 2-1. STORM WATER POLLUTION CONTROL TEAM LOG

Role	Name	Phone	Start Date
MCBH Storm Water Program Manager	CIV Whitney Anderson	Office: 808-257-4359	6/6/22
ECC	SSgt Michael Hinrichs	Office: 808-257-7066 Cell: 760-576-9694	2/1/2020
HAZMAT/HAZMIN	CIV Tim Cawthon	HAZMAT Center Building 6409 Office: 808-257-9913 HAZMIN Center Building 6407 Office: 808-257-0770	N/A

2.2 P-3 Aircraft Parking Apron Activities

The Aircraft Parking Apron consists of a concrete slab where aircraft are parked and cold-fueled, and electrical systems are charged. The facility is approximately 2,100 feet in length, extending from the Direct Refueler Support Office, Building 6893 in the west to the Aircraft Fire and Rescue (AFR), and Building 6822 in the east. The Aircraft Parking Apron encompasses an area of approximately 23 acres.

The facility is located on a relatively flat area of MCBH, Kaneohe Bay. Storm water runoff is intercepted by a storm water conveyance system consisting of a series of inlets, drain lines (A, B, C, and D), and an outfall (Outfall 024) into Kaneohe Bay. Runoff from the Aircraft Parking Apron enters this system through a series of inlets located northeast of the fuel islands and through a double inlet near Building 6822. Drain Line 3 runs perpendicular to Drain Lines C and D and conveys runoff from the radar stations, a series of roads, the fuel island area, and part of the runway.

Storm water runoff from the north and northeast areas of the Aircraft Parking Apron sheet flows across concrete or asphalt areas and into Drain Lines C and D. Runoff to the northwest enters the four inlets for Drain Line 3. Storm water runoff to the southeast and southwest sheet flows across concrete or asphalt areas to grass buffers, a series of swales, and then to Drain Lines A and B. Drain Line 3 conveys runoff to Outfall 024. Other drain lines in the Aircraft parking Apron drainage system converge into Drain Line A1, which conveys runoff to Outfalls 018 and 021. Outfall 018 is an existing outfall that was expanded to accommodate the increased runoff from the Aircraft Parking Apron. The designated storm water monitoring point is located at the sluice gate shown in Figure 4-2 at Outfall 01. A substantially similar outfall (Outfall 02) is located at an inlet connected to Drain Line 3.

2.3 Sources of Pollutants

The following is an inventory of potential pollutants associated with P-3 Aircraft Parking Apron:

A. Material Loading and Unloading Areas

Materials that are spilled, leaked, or lost during loading or unloading may collect on vegetated or paved surfaces and be carried away by storm runoff.

B. On-Site Material Storage and Disposal Practices

Leaks, drips, or spills of materials that are stored or disposed of in areas exposed to rainfall can be carried away by storm water. Significant materials are not stored on site.

C. Outdoor Activities

Many outdoor activities at MCBH, Kaneohe Bay use materials or create wastes that have the potential to pollute storm water runoff. Refueler trucks are used to fuel aircraft parked on the apron.

D. Significant Materials Inventory

The following is a list of significant materials found at the P-3 Aircraft Parking Apron:

- Jet Fuel

2.4 Potential Storm Water Pollutants

The following pollutants have been identified as having a reasonable potential to be present in storm water discharges from P-3 Aircraft Parking Apron, if not properly managed:

- Jet Fuel

Materials that have *not* been included as a potential storm water pollutant but have been included as part of the significant materials inventory list, are considered to present a negligible risk to storm water quality. This is based on the nature/location of the primary activities performed with these materials and the BMPs that are in place. Material transport (loading/unloading) is not considered to be a significant threat to storm water, due to spill response procedures, training, and spill kit materials available onsite.

2.5 Best Management Practices (BMPs)

Best Management Practices (BMPs) are techniques or methods that aim to manage the quantity and improve the quality of storm water runoff from a facility or other site. Storm water BMPs intend to reduce or eliminate pollution and contaminants collected by runoff before the runoff reaches the MCBH storm water system or sensitive ecosystems such as streams, wetlands, and marine environments. The following is a summary of BMPs currently in place at the P-3 Aircraft Parking Apron:

A. Good Housekeeping Practices

In general, P-3 Aircraft Parking Apron, employs good housekeeping practices throughout its operations. Good housekeeping practices for P-3 Aircraft Parking Apron, are included in Table 2-2.

B. Preventative Maintenance

Preventive maintenance is important as water pollution control measures may be of little or no use if devices and equipment have not been properly maintained. Facility personnel conduct inspection of facility equipment and storage systems on a regular basis. The preventive maintenance program involves inspections of equipment and storage systems that are exposed to storm water. Inspections of the satellite accumulation site are conducted on a monthly basis by HAZMIN, with monthly inspection reports submitted to ECPD.

C. Visual Inspections

Visual inspection provides a valuable subjective assessment of the status of storm water management systems. They are easily performed and allow the opportunity for corrective action, if necessary. Site inspections and documentation requirements are addressed in in Section 3 of this SWPPP. MCBH HAZMIN Center staff perform hazardous material inspections monthly. Annual facility inspections are performed by EPCD as part of the MCBH Environmental Compliance Evaluation (ECE).

D. Spill Prevention and Response

Areas where significant material spill or leakage can occur are identified in Section 2.1 and shown on Figure 4-2. The storm water systems and their accompanying drainage points are also shown on Figure 4-2. Refer to Table 2-2 for BMPs related to spill preventative measures for material handling procedures, storage requirements, and equipment usage.

In the event of a hazardous substance or oil spill, the ECC and ECPD shall be notified immediately (ECPD; 808-630-8246). If the spill cannot be easily addressed using an onsite spill kit and personal protective equipment, call Fed Fire (Military 911). The spill source should be immediately controlled if it is safe to do so by closing valves, switches, and/or turning off power to a device. Then, contain the spill by using sorbent socks or absorbent materials found in a spill kit. After it has been contained, clean up the spilled material in a safe manner using dry methods. All materials should then be properly disposed of.

Each Refueler truck has an onboard spill kit.

E. Erosion and Sediment Controls

No areas at the P-3 Aircraft Parking Apron have been identified as having high potential for significant soil erosion that would require erosion and sediment control measures.

F. Best Management Practices to Minimize Pollutant Contact with Storm Water

Facility personnel receive annual training from ECPD at minimum, as well as an initial training for all new personnel. Training information will include the BMPs that have been developed for the facility and a general overview of the storm water program and its objectives. Existing BMPs at the P-3 Aircraft Parking Apron are shown in Table 2-2 and attached as fact sheets to this SWPPP in Appendix A.

TABLE 2-2. BEST MANAGEMENT PRACTICES

BMP No.	BMP Title	Description
002	Restrict Access to Area and Equipment	The facilities are located on the flight line, which is restricted to unauthorized personnel.
004	Avoid Hosing Down the Site	Sweeping with a push broom or street sweeper is performed as needed.
006	Control Spills	Any spill of significant materials is controlled immediately to prevent pollutant from being transported to receiving water. A spill kit is stored onsite.
028	Keep Equipment and Vehicles Clean	Refueler trucks are kept clean and well-maintained.
033	Check Vehicles and Equipment for Leaks	Refueler Trucks are checked for leaks on a regular basis.
041	Wash Equipment in Designated Areas	Refueler trucks and aircraft are washed offsite.
110	Regularly Inspect and Maintain Storm Water Conveyance System	Aircraft Parking Apron storm drainage facilities are inspected regularly as part of the MCBH, Kaneohe Bay storm drain inspection program.
113	Conduct Personnel Training Regarding the SWPPP	Personnel are trained regularly (initial orientation and annual refresher).
140	Inlet Protection	The AFR places protection around storm drain inlets in the grass if there is a major spill at the Aircraft Parking Apron.

3 Inspections, Assessments and Monitoring

3.1 Routine Quarterly Site Inspections

The MS4 Permit requires a routine quarterly site inspection by a qualified person with at least one member of the storm water pollution control team participating. At least once each calendar year, the routine inspection must be conducted during a period when a storm water discharge is occurring. The site inspection is an overall evaluation of the effectiveness of the BMPs implemented at that facility. A Routine Facility Inspection Checklist (Appendix B) shall be completed during each routine site inspection and kept onsite with this SWPPP. During normal facility operating hours, inspections must be conducted of areas of the facility including, but not limited to, the following:

- Areas where industrial materials or activities are exposed to storm water;
- Areas identified in the SWPPP and those that are potential pollutant sources;
- Areas where spills and leaks have occurred in the past three years;
- Discharge points; and
- Control measures used to comply with the effluent limits contained in this permit.

3.2 Visual Assessment of Storm Water Discharges

A Quarterly Visual Assessment of storm water discharge is required for all industrial facilities at MCBH. Storm water samples for this visual assessment but must be collected in such a manner that the samples are representative of the storm water discharge from the facility. Therefore, the water sample must be collected at the designated storm water monitoring point (Outfall 01) as shown in Figure 4-2. The Quarterly Visual Assessment checklist (Appendix C) shall be completed by the current facility ECC and kept onsite with this SWPPP.

The visual assessment must be made:

- Of a sample collected in a clean, colorless glass or plastic container, and examined in a well-lit area;
- On samples collected within the first 30 minutes of an actual discharge from a storm event. If it is not possible to collect the sample within the first 30 minutes of discharge, the sample must be collected as soon as practicable after the first 30 minutes and documented why it was not possible to take the sample within the first 30 minutes; and
- For storm events, on discharges that occur at least 72 hours (three days) from the previous discharge.

Whenever the visual assessment shows evidence of storm water pollution, corrective action procedures to remedy the pollutants must be taken and documented. Refer to Section 4 for corrective action procedures.

4 Corrective Actions

A corrective action is defined as any action taken, or required to be taken, to (1) repair, modify, or replace any storm water control used at the site; (2) clean up and dispose of spills, releases, or other deposits found on the site; and (3) remedy a permit violation. Corrective actions should be documented using the Corrective Action Log (Appendix D).

4.1 Immediate Actions

If corrective action is needed, you must immediately take all reasonable steps necessary to minimize or prevent the discharge of pollutants until a permanent solution is installed and made operational, including cleaning up any contaminated surfaces so that the material will not discharge in subsequent storm events. Note: In this context, the term "immediately" requires you to, on the same day a condition requiring corrective action is found, take all reasonable steps to minimize or prevent the discharge of pollutants until a permanent solution is installed and made operational. However, if a problem is identified at a time in the workday when it is too late to initiate corrective action, the initiation of corrective action must begin no later than the following workday. "All reasonable steps" means that the permittee has undertaken initial actions to assess and address the condition causing the corrective action, including, for example, cleaning up any exposed materials that may be discharged in a storm event (e.g., through sweeping, vacuuming) or making arrangements (i.e., scheduling) for a new BMP to be installed at a later date.

4.2 Escalating Actions

If additional actions are necessary beyond those implemented or if the conditions continue to occur, additional corrective actions (e.g., install a new or modified control and make it operational, complete the repair) must be completed before the next storm event if possible, and within 14 calendar days from the time of discovery of the corrective action condition. If it is infeasible to complete the corrective action within 14 calendar days, document why it is infeasible to complete the corrective action within the 14-day timeframe and identify a schedule for completing the work, which must be done as soon as practicable after the 14-day timeframe but no longer than 45 days after discovery. If the completion of corrective action will exceed the 45-day timeframe, the minimum additional time necessary to complete the corrective action can be taken, provided that MCBH ECPD and DOH is notified of your intention to exceed 45 days. Where your corrective actions result in changes to any of the controls or procedures documented in your SWPPP, you must modify your SWPPP accordingly within 14 calendar days of completing corrective action work.

4.3 Corrective Actions for Substantially Identical Outfalls

If the event triggering corrective action is associated with an outfall that had been identified as a "substantially identical outfall", the review must assess the need for corrective action for all related substantially identical outfalls. Any necessary changes to control measures that affect these other outfalls must also be made before the next storm event if possible, or as soon as practicable following that storm event. Any corrective actions must be conducted within the timeframes discussed above.

4.4 Record of Past Spills or Leaks of Hazardous Pollutants

Table 4-1 is used to record significant spills and leaks that have occur or have occurred within three years prior to the preparation or amendment of this SWPPP. Significant spills and leaks include, but are not limited to, releases of oil or hazardous substances in excess of quantities that are reportable under CWA Section 311 (see 40 CFR 110.6 and 40 CFR 117.21) or Section 102 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 USC §9602.

At the time of this SWPPP update, there have been no past spill or leak incidents reported for the P-3 Aircraft Parking Apron.

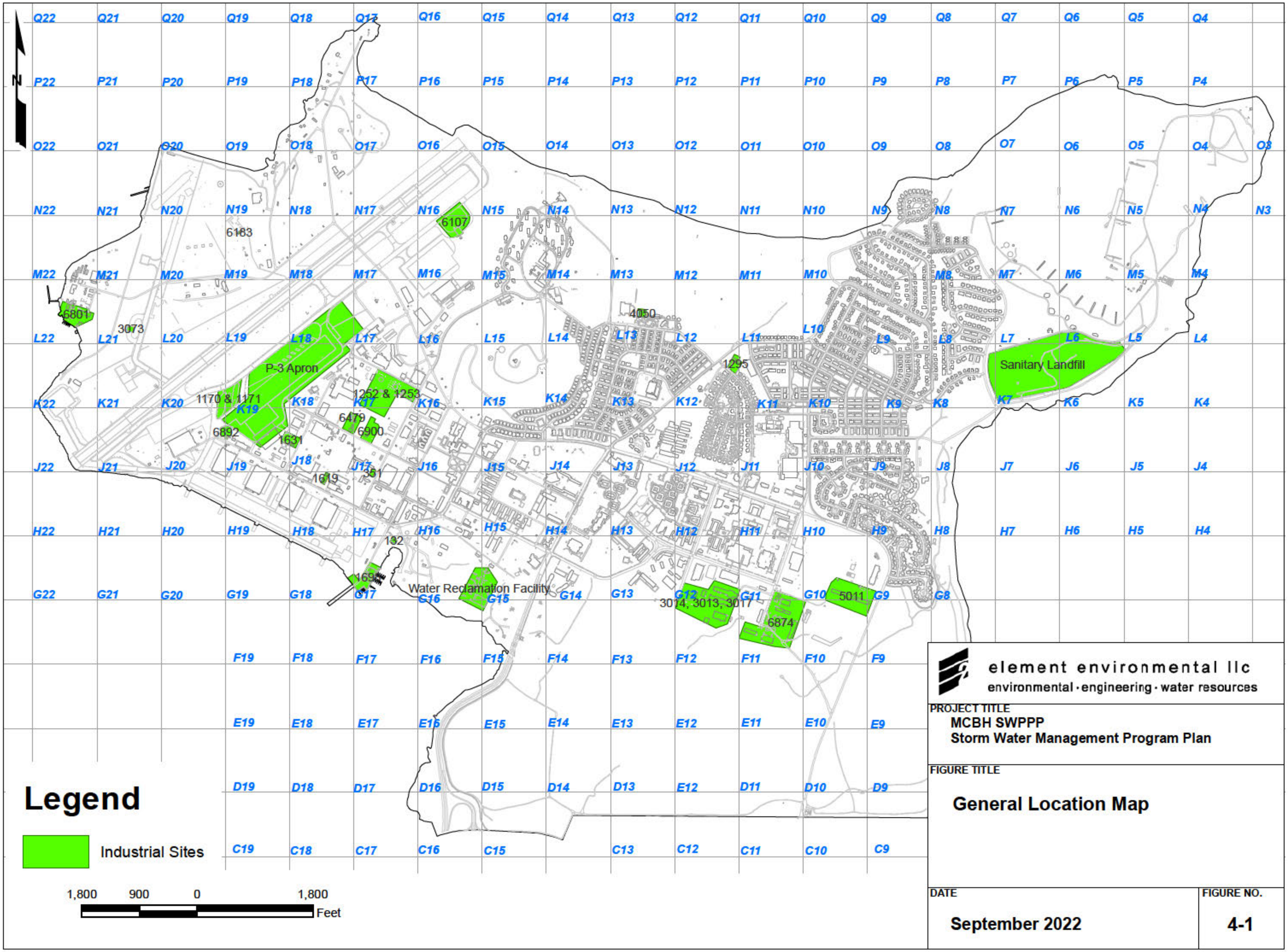
TABLE 4-1. PAST SPILLS OR LEAKS OF HAZARDOUS POLLUTANTS

Date of Incident	Brief Summary of Incident (POC Active at Time of Incident, Pollutant Type, Estimated Quantity, Location of Spill)

4.5 Record of Unauthorized Non-Storm Water Discharges

TABLE 4-2. UNAUTHORIZED NON-STORM WATER DISCHARGE EVALUATION

Date of Evaluation	Brief Summary of Evaluation (Description of the evaluation criteria, outfalls or onsite drainage points that were directly observed, action(s) taken, such as a list of control measures used to eliminate unauthorized discharge)



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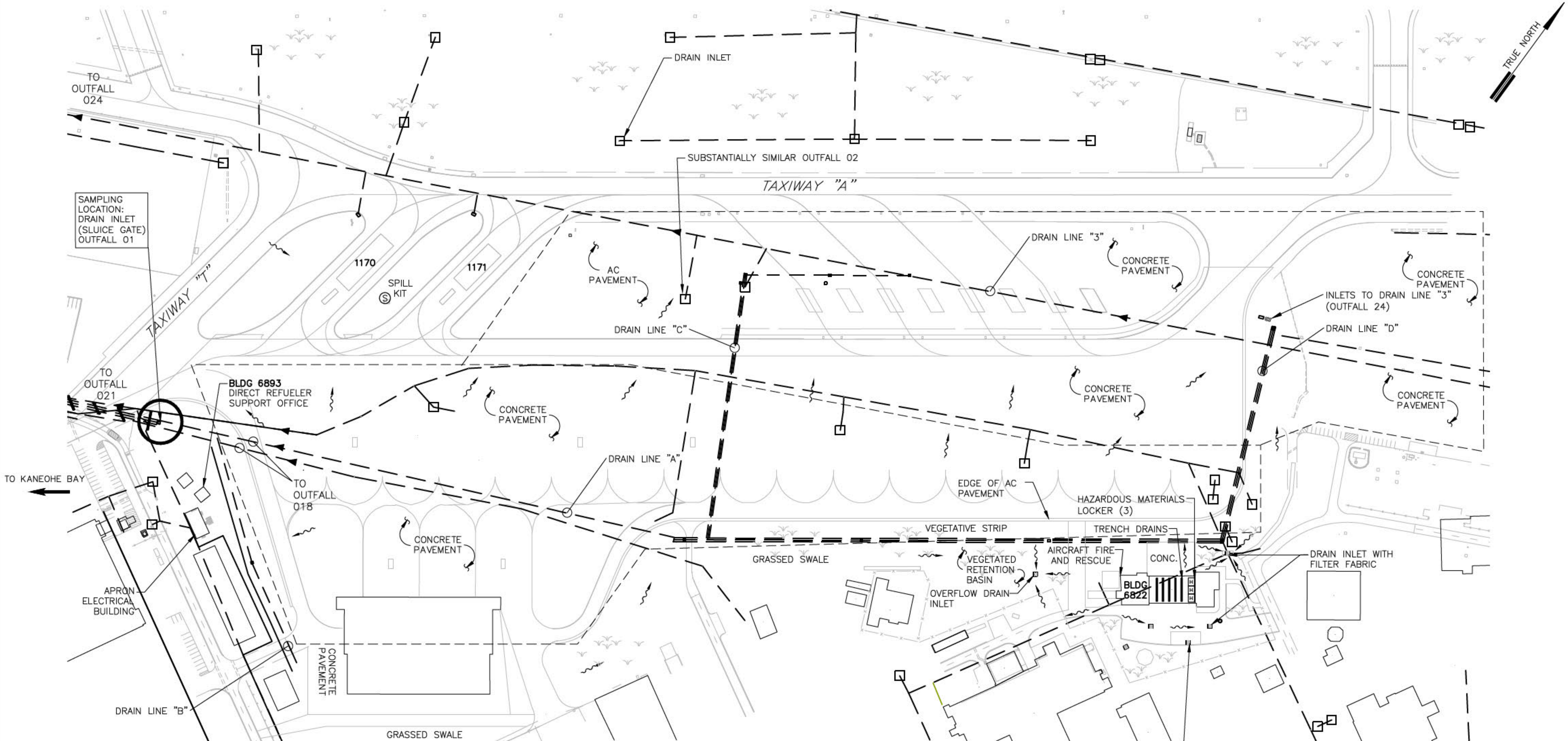
PROJECT TITLE
MCBH SWPPP
Storm Water Management Program Plan

FIGURE TITLE
General Location Map

DATE	FIGURE NO.
September 2022	**4-1**



LEGEND

- H HAZARDOUS MATERIALS LOCKER
- S SPILL KIT
- STORM WATER CONVEYANCE
- STORM DRAIN INLET
- FLOW ARROW
- DRAINAGE AREA BOUNDARY

NOTE:

1. STORM WATER, FROM APPROXIMATELY 25.8 ACRES ASSOCIATED WITH THE P–3 AIRCRAFT PARKING APRON, DISCHARGES TO KANEOHE BAY VIA OUTFALLS 018, 021, AND 024.
2. NOT TO SCALE

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PROJECT TITLE:
STORM WATER POLLUTION PREVENTION PLAN
MCBH, KANEOHE BAY, OAHU, HAWAII

FIGURE TITLE:
P-3 AIRCRAFT PARKING APRON

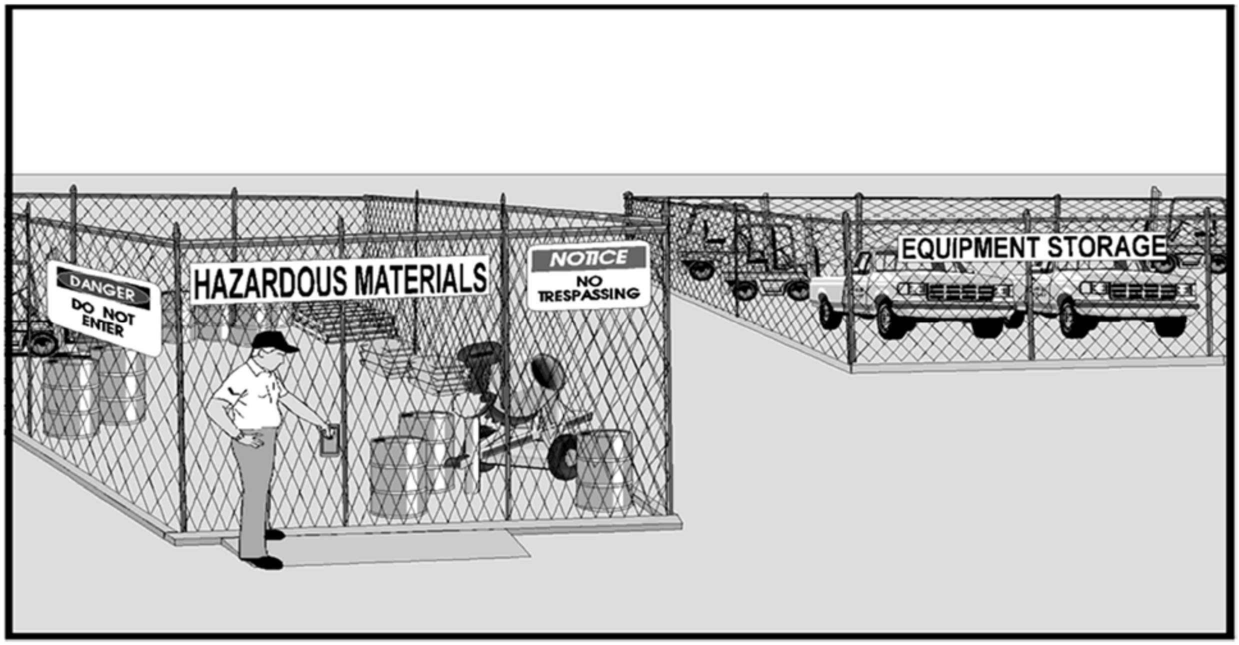
DATE: JULY 2022

FIGURE NO.: 4-2

APPENDIX A

SELECTED BMP FACT SHEETS

BMP 002 - RESTRICT ACCESS TO AREA AND EQUIPMENT



Description of Potential Pollutant and Source: Vandalism of vehicles and facility property may result in the release of significant materials.

Description of BMP: Provide fences and gate areas where vehicles, equipment and materials are stored and are accessible to the public to discourage trespassing. Access to equipment will also be restricted. Only authorized personnel will be allowed to operate equipment. The fences and gates will be properly maintained, and additional security measures including lighting of the area will be implemented if the fencing alone proves insufficient. Where appropriate, security guards or alarms will be used.

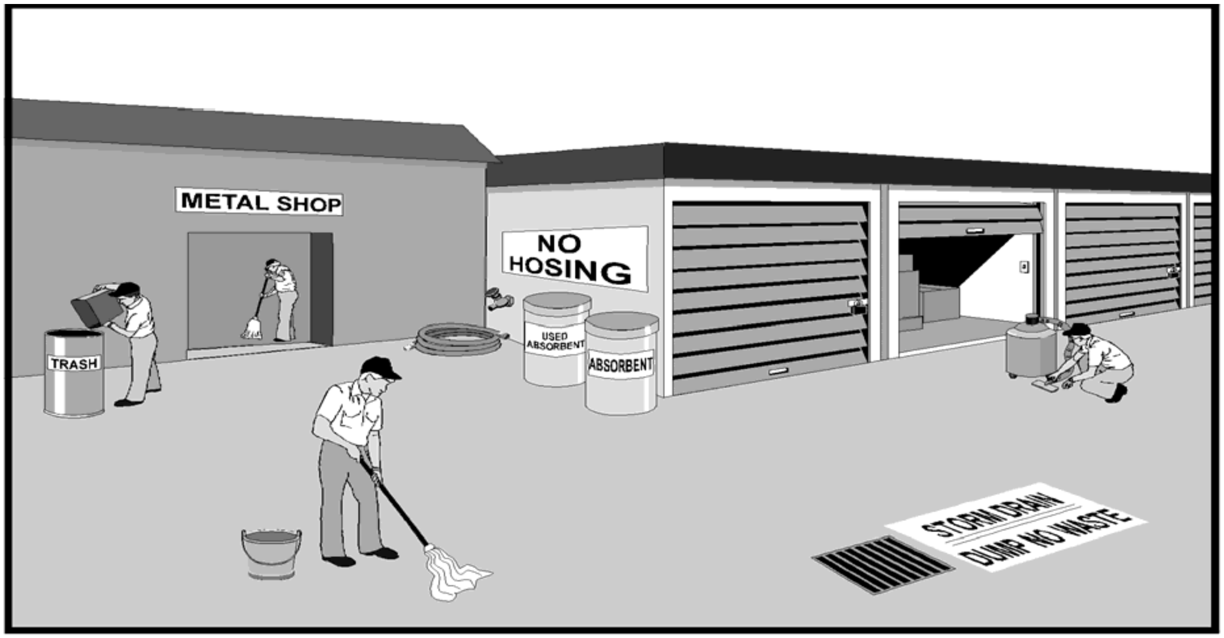
Application Guidance: As needed.

Training: N/A

Effectiveness and Cost: Effectiveness and costs will vary depending on the application.

Limitations: None

BMP 004 - AVOID HOSING DOWN THE SITE



Description of Potential Pollutant and Source: Cleaning work sites by hosing down causes wash water to transport pollutants to the storm drain where it can be exposed to storm water.

Description of BMP: Use dry methods to clean work sites. Dry methods include sweeping or using damp rags or mops. If possible or practical, hoses will be removed. If hosing down is unavoidable, the downstream drain will be temporarily plugged as described in the following BMPs:

- BMP 023 - Place portable Rubber Mats Over Storm Drain Inlets
- BMP 024 - Insert Filter in Catch Basin
- BMP 025 - Place Absorbent Blankets in Catch Basin

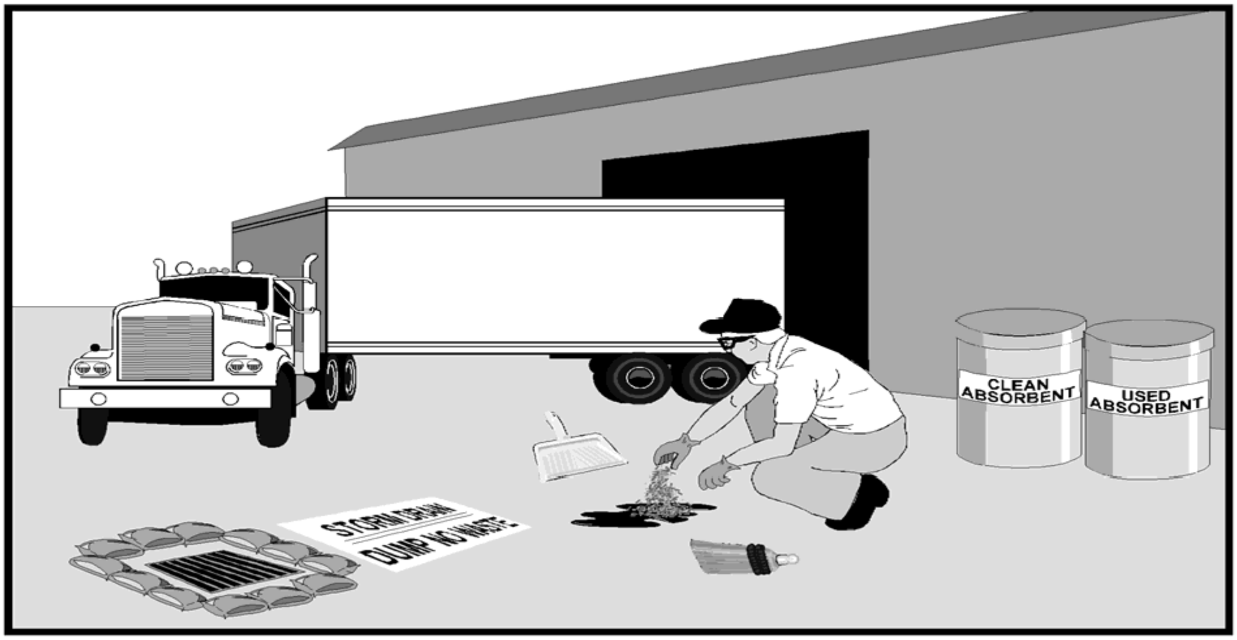
Application Guidance: Methods of dry cleaning will be used whenever possible at all workstations, loading/unloading sites, storage areas, and parking lots.

Training: New personnel will be notified of the policy and signs will be posted. If possible or practical, hoses will be removed.

Effectiveness and Cost: Eliminating hosing down is a highly effective, low-cost BMP.

Limitations: None

BMP 006 - CONTROL SPILLS



Description of Potential Pollutant and Source: Spills of significant materials may be exposed to storm water and transported to storm drains and/or receiving waters.

Description of BMP: Follow safety data sheets (SDS) for handling, storage, and cleanup of all significant materials to reduce the potential for spills.

Any spill, large or small, of significant materials will be controlled to prevent pollutants from being transported to storm drains and/or receiving waters. Appropriate spill control material will be kept on site. Smaller spills will be contained using absorbent material such as kitty litter, straw, or sawdust. Drums of absorbent material will be easily accessible and clearly marked, and containers for spent absorbent material will be readily available. Spent absorbent material will be managed appropriately and disposed of in accordance with applicable regulations. Larger spills will be controlled using spill kits, brooms, and other response equipment commensurate with the size of the spill. The methods outlined in the Activity’s spill prevention and response plans (BMP 112) for hazardous materials will be followed for spills of any potential storm water pollutants. The date, time, nature and volume of material spilled, and cleanup measures taken will be recorded for all spills and kept as part of the SWPPP.

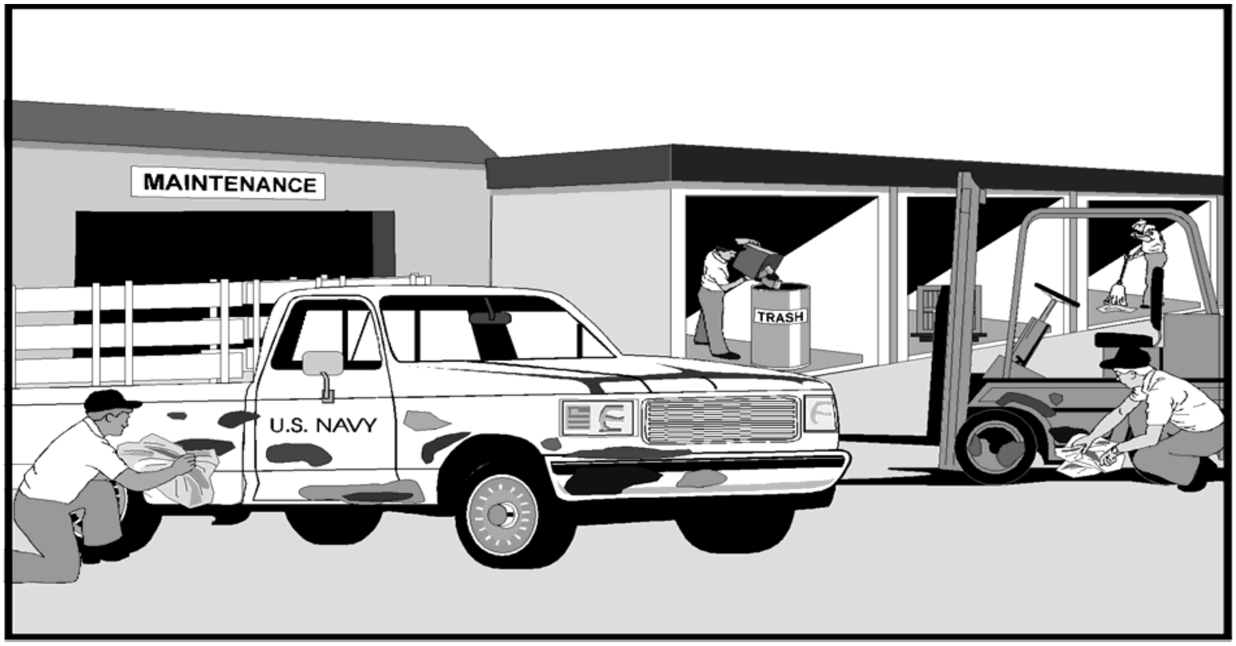
Application Guidance: Controlling spills will be practiced under all working conditions.

Training: Personnel will be trained in spill prevention and response procedures including the use of personal protection equipment (gloves, eye and face protection, etc.). This will include what absorbent or equipment to use, how to use the absorbent or equipment, where to find it, how to dispose of the spent absorbent or other material, and who to notify in the event of a spill.

Effectiveness and Cost: Spill control is a moderately effective, low-cost BMP.

Limitations: None

BMP 028 - KEEP EQUIPMENT AND VEHICLES CLEAN



Description of Potential Pollutant and Source: Through usage, equipment and vehicles accumulate oil and grease. During rain events, these pollutants are exposed to storm water and transported into the receiving waters.

Description of BMP: Clean equipment and vehicles regularly using either dry or wet methods to reduce the amount of pollutants exposed to rainfall. Dry methods of cleaning are further explained in BMP 003, "Perform Regular Cleaning." Wet methods are further described in BMP 049, "Centralize Liquid Solvent Cleaning to One Location," and BMP 041, "Wash Equipment and Vehicles in Designated Areas."

Application Guidance: All vehicles and equipment exposed to storm water will be washed monthly and as needed to be kept clean. The frequency for implementing this BMP has been provided as general guidance. However, a facility operator may wish to establish a more suitable frequency. This will require SWPPP implementors to make judgements based on facility operations and conditions. To assign a frequency other than what has been suggested (i.e., more or less frequent), the following criteria will be considered and rated either High, Medium, or Low. If many of the criteria are assigned a High rating, the frequency may be increased. Similarly, if many criteria are assigned a Low rating, the frequency may be decreased. The goal of implementing this BMP is to minimize exposure of pollutants to stormwater.

CRITERIA	Rating H=High M=Medium L=Low
Probability of exposure of significant materials to storm water	
Frequency of use of equipment and vehicles	
Proximity of vehicle/equipment use to outfall or receiving water	
Sensitivity of receiving water to potentially exposed significant materials (e.g., waters with beneficial uses such as human contact, recreation, significant species habitat, etc.)	

Training: Personnel will be instructed on how often to clean and wash vehicles or equipment.

Effectiveness and Cost: Keeping equipment and vehicles clean is a highly effective, low-cost BMP.

Limitations: None

BMP 033 - CHECK VEHICLES AND EQUIPMENT FOR LEAKS

Description of Potential Pollutant and Source: Vehicles, aircraft, or equipment entering or stored at a maintenance facility may be leaking a variety of fluids (fuel, oil, antifreeze, freon, etc.). These materials can be exposed to storm water.

Description of BMP: Inspect all vehicles and equipment at the site, whether incoming, parked, stored, or salvaged, for oil and fluid leaks. Drivers of fleet vehicles, such as delivery trucks, will also check under their vehicles each morning for fluid leaks. If leaks are present, drip pans will be placed under the vehicle or equipment. Once the vehicle is removed from the site, the former parking area will be inspected for stains, and these stains will be cleaned using rags or dry solvents.

Application Guidance: Any vehicle or equipment coming in for repairs, painting, or storage will be inspected for leaks. Fleet vehicles will be inspected each morning. Vehicles that are parked, stored, or salvaged will be provided with drip pans, as will tanker rail cars waiting to be unloaded. The frequency for implementing this BMP has been provided as general guidance. However, a facility operator may wish to establish a more suitable frequency. This will require SWPPP implementors to make judgements based on facility operations and conditions. To assign a frequency other than what has been suggested (i.e., more or less frequent), the following criteria will be considered and rated either High, Medium, or Low. If many of the criteria are assigned a High rating, the frequency may be increased. Similarly, if many criteria are assigned a Low rating, the frequency may be decreased. The goal of implementing this BMP is to minimize exposure of pollutants to storm water.

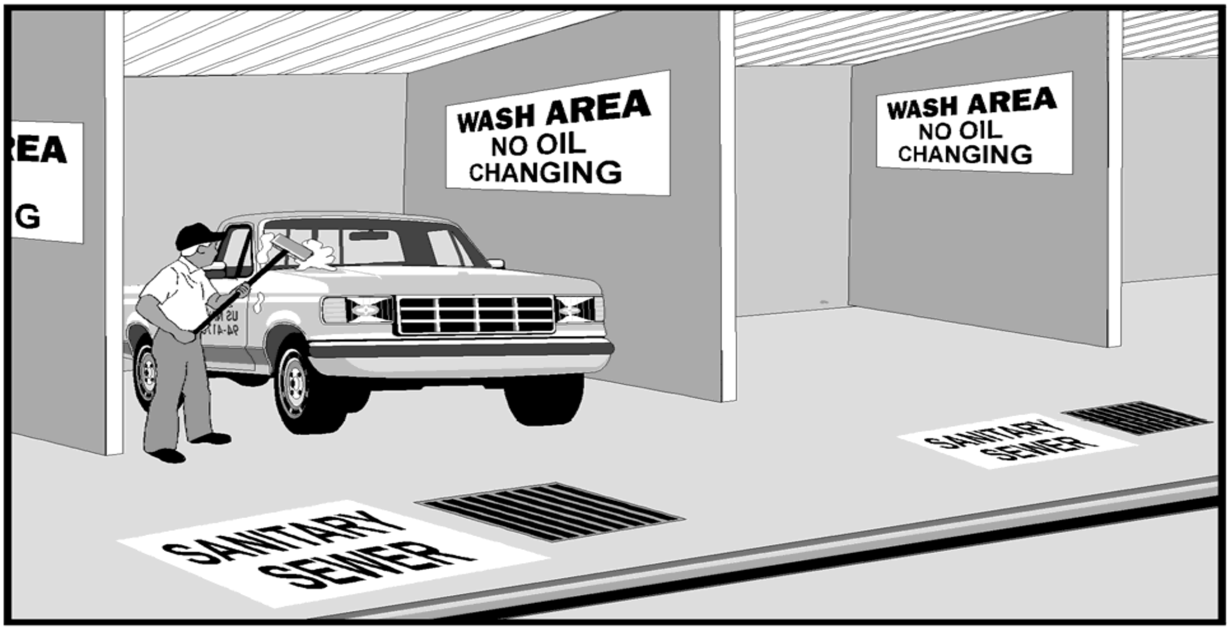
CRITERIA	Rating H=High M=Medium L=Low
Probability of exposure of significant materials to storm water	
Old age or poor condition of equipment and vehicles	
Evidence of exposure (e.g., stains on pavement)	
Proximity of source area to outfall or receiving water	
Sensitivity of receiving water to potentially exposed significant materials (e.g., waters with beneficial uses such as human contact, recreation, significant species habitat, etc.)	

<u>Training:</u> Signs will be posted to remind personnel of proper procedures.

<u>Effectiveness and Cost:</u> Checking for leaks is a moderately effective, low-cost BMP.

<u>Limitations:</u> None

BMP 041 - WASH EQUIPMENT AND VEHICLES IN DESIGNATED AREA



Description of Potential Pollutant and Source: Washing equipment and vehicles outdoors or in areas where wash water flows onto the ground can pollute storm water. It is difficult to control the wastewater from washing operations if it is not done in a designated area.

Description of BMP: Facilities will designate bermed wash areas that contain wash water and prevent contact with storm water. These areas will drain to the sanitary sewer (BMP 042) or to a sump. If a sump is used, wash water will be recycled.

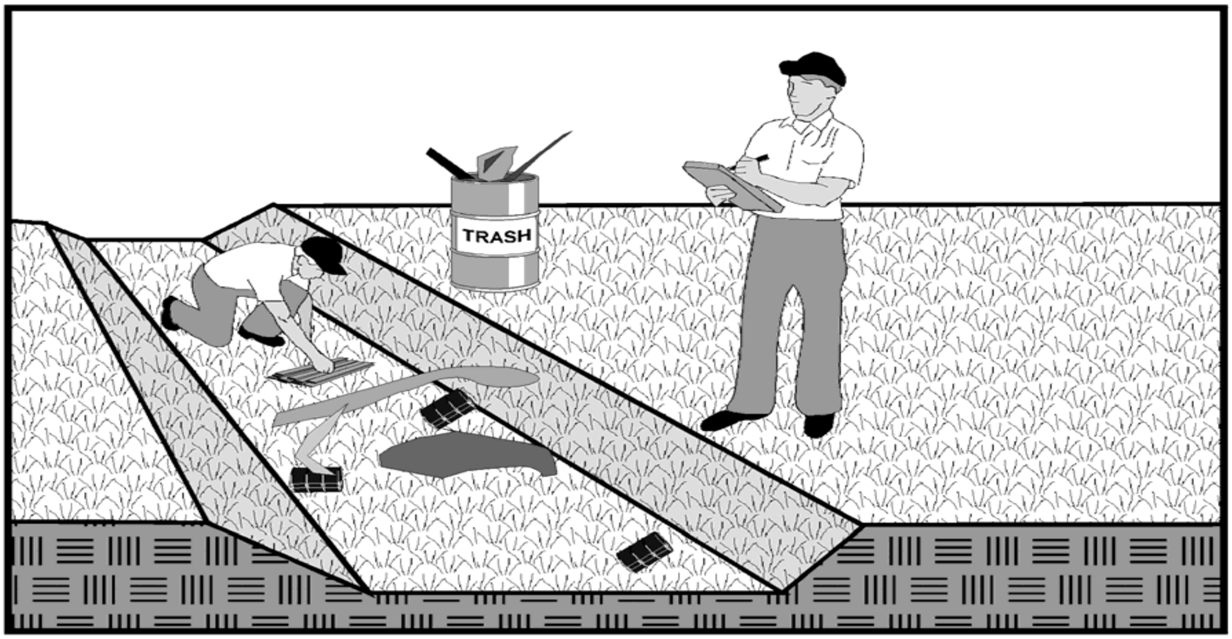
Application Guidance: This practice will be followed wherever vehicles, equipment and aircraft are washed.

Training: N/A

Effectiveness and Cost: This is a highly effective, variable-cost BMP.

Limitations: Pretreatment and monitoring of wash waster discharges to the sanitary sewer may be required. This would greatly increase the cost of this practice. The treatment plant operator will be notified and approval obtained before discharge.

BMP 110 - REGULARLY INSPECT AND MAINTAIN STORM WATER CONVEYANCE SYSTEMS



Description of Potential Pollutant and Source: Over time, storm water conveyance systems may fill up with sediments and clog. Also, drainage swales may erode and be a source of sediment pollution to storm water.

Description of BMP: Inspect and maintain storm water conveyance systems on a regular basis. This will include inspection of drainage swales and outfall pipes to ensure that the area is not eroding.

Other storm water conveyance systems, such as oil/water separators, catch basins, and detention ponds, will be inspected and properly maintained.

Application Guidance: Storm water conveyance systems will be inspected monthly. The frequency for implementing of the BMP has been provided as general guidance. However, a facility operator may wish to establish a more suitable frequency. This will require SWPPP implementors to make judgements based on facility operations and conditions. To assign a frequency other than what has been suggested (i.e., more or less frequent), the following criteria will be considered and rated either High, Medium or Low. If many of the criteria are assigned a High rating, the frequency may be increased. Similarly, if many criteria are assigned a Low rating, the frequency may be decreased. The goal of implementing this BMP is to minimize exposure of pollutants to storm water.

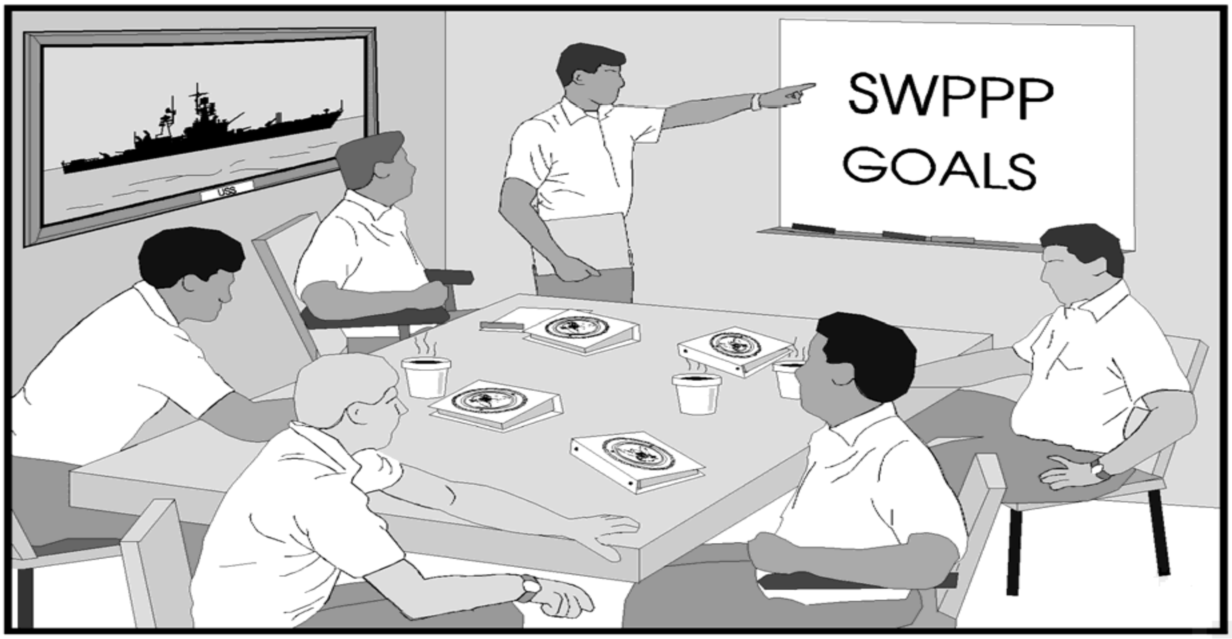
CRITERIA	Rating H=High M=Medium L=Low
Probability of exposure of significant materials to storm water in area draining to storm water conveyance system	
Quantity of significant materials potentially exposed in area draining to storm water conveyance system	
Toxicity of significant materials potentiality exposed in area draining to storm water conveyance system	
Frequency of use of significant materials potentially exposed in area draining to storm water conveyance system	
Evident of exposure (e.g., stains on pavement, evidence of significant materials in drainage system)	
Proximity of source area to outfall or receiving water	
Sensitivity of receiving water to potentially exposed significant materials (e.g., waters with beneficial uses such as human contact, recreation, significant species habitat, etc.)	

Training: The Storm Water Pollution Prevention Personnel will assign personnel responsible for inspections. Personnel will be provided a copy of a site plan showing the location of all storm water conveyance systems which need to be inspected.

Effectiveness and Cost: This is a moderately effective, low-cost BMP.

Limitations: None

BMP 113 - CONDUCT PERSONNEL TRAINING REGARDING THE SWPPP



Description of Potential Pollutant and Source: When properly trained, personnel are more capable of preventing spills, responding safely and effectively to an accident when it occurs, and recognizing situations that could lead to storm water contamination.

Description of BMP: Train personnel at all levels of responsibility in the components and goals of the SWPPP.

Application Guidance: Training will be conducted quarterly and at new personnel orientations.

Training: Training will address each component of the SWPPP, including how and why tasks are to be implemented. Topics will include:

- Good housekeeping
- Material management practices
- Spill prevention and response

Effectiveness and Cost: This is a highly effective, moderate-cost BMP.

Limitations: None

BMP #140 - INLET PROTECTION

Targeted Pollutants	
●	Sediment
○	Phosphorus
○	Trace metals
○	Bacteria
○	Petroleum hydrocarbons

Physical Limits	
Drainage area	1 ac
Max slope	5%
Min bedrock depth	2 ft
Min water table	2 ft
SCS soil type	ABCD
Freeze/Thaw	good
Drainage/Flood control	no

Description: Inlet protection consists of a filtering measure placed around an inlet or drain to trap sediment and prevent the sediment from entering the storm drain system.
Additionally, it serves to prevent the silting-in of inlets, storm drainage systems, or receiving channels. Inlet protection may be composed of gravel and stone with a wire mesh filter, block and gravel, filter fabric, or sod. Care must be taken not to cause flooding with diverted flow.

Applications: Inlet protection is appropriate for small drainage areas (less than 1 acre) where storm drains will be ready for use before the drainage area reaches final stabilization. Storm drain inlet protection is also used where:

- A permanent storm drain structure is being constructed on site and there is danger of sediment silting it in before permanent site stabilization.
- There is a threat of sediment silting in an inlet which is in place prior to permanent stabilization.
- Ponding around the inlet structure could be a problem to traffic on site.

Filter fabric is used for inlet protection when storm water flows are relatively small, with low velocities. Filter fabric inlet protection is appropriate for most types of inlets where the drainage area is 1 acre or less.

Block and gravel filters can be used where velocities are higher. They may be used with most types of inlets where overflow capability is needed and in areas of heavy flows (238 gal/min (15 liters/second) or greater).

Gravel and mesh filters can be used where flows are higher and in locations subject to disturbance by site traffic. This type of protection may be used with most inlets where overflow capability is needed and in areas of heavy flows (238 gal/min (15 liters/second) or greater).

Sod inlet filters are usually used where sediments in the storm water runoff are low.

Limitations: Filter fabric inlet protection cannot be used where inlets are paved because the fabric must be staked.

Straw bales (BMP #143) are not recommended for inlet protection when the area adjacent to the inlet is paved. Additionally, the bales must be anchored. Consider sandbags (BMP #151) in situations where anchoring of straw bales is not possible (e.g., paved road surfaces).

Inlet protection is a high maintenance item compared with other more permanent measures.

Design parameters: Several different designs are in use and the configurations vary. Most of the following design considerations apply to all three main types of inlet protection (filter fabric, gravel and mesh, and block and gravel). Some additional concerns apply to only one or two of the types.

Drainage area: Not to exceed 1 acre. Overland flow to the inlet should be no greater than 15 liters/second.

Slope gradient: The drainage area should be fairly flat, with slopes of 5 percent or less. With filter fabric designs, the area immediately surrounding the inlet should not exceed a slope of one percent.

Height of filter fabric: To avoid failure caused by pressure against the fabric when overtopping occurs, it is recommended that the height of the filter fabric be limited to 16 in (0.4 meters) above the crest of the drop inlet.

Sump: Where possible, a filter fabric or block-and-gravel protection device should be provided with a sediment trapping sump 12 to 20 in (300 to 500 mm) deep as measured from the crest of the inlet. Side slopes should be 2:1. The recommended volume of excavation is 860 ft^3/acre (60 cubic meters/hectare) of ground disturbed.

Orientation: To achieve maximum trapping efficiency in gravel-and-mesh or block- and-gravel traps, the longest dimension of the basin should be oriented toward the longest inflow area.

Materials for filter fabric inlet protection:

- Filter fabric (see the fabric specifications for silt fence, BMP#144)
- Wooden stakes 2x2 in (50 mm x 50 mm) (or 2x4 in (50 mm x 100 mm)), with a minimum length of 3 ft (1.0 meter)
- Heavy-duty wire staples at least 45 in (10 mm) long
- Washed gravel 0.8 to 1.2 in (20 to 30 mm) in diameter, with less than 5 percent fines

Materials for excavated gravel inlet protection:

- Hardware cloth or wire mesh with 2/5 to 3/5 in (10 to 15 mm) openings
- Filter fabric (see the fabric specifications for silt fence, BMP#144)
- Washed gravel 0.8 to 4 in (20 mm to 100 mm) in diameter

Materials for block and gravel inlet protection:

- Hardware cloth or wire mesh with 2/5 to 3/5 in (10 to 15 mm) openings
- Filter fabric (see the fabric specifications for silt fence, BMP#135)
- Concrete blocks 4 to 12 in (100 mm to 300 mm) wide
- Washed gravel 0.8 to 4 in (20 mm to 100 mm) in diameter

Construction guidelines:
Filter fabric:

- Place a stake at each corner of the inlet and around the edges at no more than 3 ft (1 meter) apart. Drive the stakes into the ground 20 in (500 mm) if possible, or a minimum of 8 in (200 mm). For stability, install a framework of wood strips around the stakes at the crest of the overflow area, 20 in (500 mm) above the crest of the drop inlet.

- Excavate a trench 8 to 12 in (200 to 300 mm) deep around the outside perimeter of the stakes. If a sediment trapping sump is being provided, then the excavation may be as deep as 2 ft (600 mm).

- Staple the filter fabric to the wooden stakes with heavy-duty staples, overlapping the joints to the next stake. Ensure that 12 to 32 in (300 to 800 mm) of filter fabric extends at the bottom so it can be formed into the trench.

- Place the bottom of the fabric in the trench and backfill the trench all the way around, using washed gravel to a minimum depth of 4 in (100 mm). Use enough gravel to ensure contact between the filter fabric and the underlying surface.

Gravel and mesh:

- Remove any obstructions to excavating and grading. Excavate sump area, grade slopes, and properly dispose of soil.

- Secure the inlet grate to prevent seepage of sediment-laden water.

- Place wire mesh over the drop inlet so the wire extends a minimum of 12 in (300 mm) beyond each side of the inlet structure. Overlap the strips of mesh if more than one is necessary.

- Place filter fabric over the mesh, extending it at least 20 in (500 mm) beyond the inlet opening on all sides. Ensure that weep holes in the inlet structure are protected by filter fabric and gravel.

- Place stone or gravel over the fabric/wire mesh to a depth of at least 12 in (300 mm).

Block and gravel:

- Secure the inlet grate to prevent seepage of sediment-laden water.

- Place wire mesh over the drop inlet so the wire extends a minimum of 12 to 20 in (300 mm to 500 mm) beyond each side of the inlet structure. Overlap the strips of mesh if more than one is necessary.

- Place filter fabric (optional) over the mesh and extend it at least 20 in (500 mm) beyond the inlet structure.

- Place concrete blocks over the filter fabric in a single row lengthwise on their sides along the sides of the inlet. Excavate the foundation a minimum of 2 in (50 mm) below the crest of the inlet. The bottom row of blocks should be against the edge of the structure for lateral support.

- The open ends of the block should face outward, not upward, and the ends of adjacent blocks should abut. Lay one block on each side of the structure on its side to allow for dewatering of the pool.

- The block barrier should be at least 12 in (300 mm) high and may be up to a maximum of 24 in (600 m) high. It may be from 4 to 12in (100 mm to 300 mm) deep, depending on the size of block used. Prior to backfilling, place wire mesh over the outside vertical end of the blocks so that stone does not wash down the inlet.
- Place gravel against the wire mesh to the top of the blocks.

Swale, ditch line or yard inlet protection:

- Excavate completely around inlet to a depth of 18" below notch elevation.
- Drive 2 x 4 post 1' into ground at four corners of inlet. Place nail strips between posts on ends of inlet. Assemble top portion of 2 x 4 frame using overlap joint shown. Top of frame (weir) must be 6" below edge of roadway adjacent to inlet.
- Stretch wire mesh tightly around frame and fasten securely. Ends must meet at post.
- Stretch filter cloth tightly over wire mesh, the cloth must extend from top of frame to 18" below inlet notch elevation. Fasten securely to frame. Ends must meet at post, be overlapped and folded, then fastened down.
- Backfill around inlet in compacted 6" layers until layer of earth is even with notch elevation on ends and top elevation on sides.
- If the inlet is not in a low point, construct a compacted earth dike in the ditch line below it. The top of the dike is to be at least 6" higher than the top of frame (weir).
- This structure must be inspected frequently and the filter fabric replaced when clogged.

Curb Inlet Protection:

- Attach a continuous piece of wire mesh (30" min. width by throat length plus 4') to the 2" x 4" weir (measuring throat length plus 2') as shown on the standard drawing.
- Place a piece of approved filter cloth (40-85 sieve) of the same dimensions as the wire mesh over the wire mesh and securely attach to the 2" of 4" weir.
- Securely nail the 2" x 4" weir to 9" long vertical spacers to be located between the weir and inlet face (max. 6' apart).
- Place the assembly against the inlet throat and nail (minimum 2') lengths of 2" x 4" to the top of the weir at spacer locations. These 2" x 4" anchors shall extend across the inlet top and be held in place by sandbags or alternate weight.
- The assembly shall be placed so that the end spacers are a minimum 1' beyond both ends of the throat opening.
- Form the wire mesh and filter cloth to the concrete gutter and against the face of curb on both sides of the inlet. Place clean 2" stone over the wire mesh and filter fabric in such a manner as to prevent water from entering the inlet under or around the filter cloth.
- This type of protection must be inspected frequently and the filter cloth and stone replaced when

clogged with sediment. Assure that storm flow does not bypass inlet by installing temporary earth or asphalt dikes directing flow into inlet.

Maintenance

- Inspect regularly and after every storm. Make any repairs necessary to ensure the measure is in good working order.
- Remove accumulated sediment and restore the trap to its original dimensions when sediment has accumulated to half the design depth of the trap. All sediments removed must be disposed of properly.
- On gravel-and-mesh devices, clean (or remove and replace) the stone filter or filter fabric if it becomes clogged.
- On filter fabric devices, replace the fabric immediately if it becomes clogged. Make sure the stakes are firmly in the ground and that the filter fabric continues to be securely anchored.
- Inlet protection should remain in place and operational up to 30 days after the drainage area is completely stabilized.

APPENDIX B

ROUTINE FACILITY INSPECTION CHECKLIST

Routine Facility Inspection Checklist

Activity Name: ______________________ **Date of Inspection:** ______________________

Inspector(s): ______________________ **Facility Name/Number:** ______________________

Column 1	Column 2	Column 3	Column 4	Column 5	
Source Area	BMP Number and Title	Status: F, P, N, NA[1]	Briefly Describe Effectiveness (Good or Other [describe])	Corrective Measures	
				What	By When

Note 1: F – Fully implemented, P – Partially implemented, N – Not implemented , NA – Not Applicable

APPENDIX C

QUARTERLY VISUAL ASSESSMENT CHECKLIST

Quarterly Visual Assessment Checklist

Facility ID and Location: ______________________

Date: ____________________

Sampler Name (Printed): ______________________________________

Signature: ____

Time of Rainfall Begin: ________________

Time of Rainfall End: ____________________

Time of Flow Begin: ________________

Time of Flow End: ____________________

Rainfall event more than 72 hours since last event? Yes / No

Rainfall Event Total: ____________________

Sample: sample in a clean, colorless glass or plastic container, and examined in a well-lit area

On samples collected within the first 30 minutes of an actual discharge from a storm event

Sample Characteristics:

Color: ____________________

Floating Solids: _____________________________

Odor: ____________________

Settled Solids: _____________________________

Clarity: ____________________

Suspended Solids: _____________________________

Oil Sheen: ____________________

Foam: _____________________________

Other Obvious Indicators of Storm Water Pollution (describe): ____

Nature of the discharge (i.e., runoff):

Results of observations of the storm water discharge:

Probable sources of any observed storm water contamination:

If applicable, why it was not possible to take samples within the first 30 minutes:

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

APPENDIX D

CORRECTIVE ACTION LOG

Corrective Action Log

Use this form to document SWPPP corrective actions. This form is to be completed by the Environmental Compliance Coordinator (ECC) or a person designated by ECC and submitted to the MCBH Storm Water Program Manager. The Storm Water Program Manager is responsible for any notification to the State of Hawaii Department of Health (DOH), if required.

A corrective action is defined as an action taken to:

a) Repair, modify, or replace any storm water control used at the site;

b) Clean up and properly dispose of spills, releases, or other deposits; or

c) Remedy a permit violation.

1. Corrective Action Triggers

The following events trigger a corrective action to be taken (this triggering condition is to be documented *within 24 hours* of discovering the occurrence):

a) A required storm water control was never installed, was installed incorrectly, or is not in accordance with the requirements in the SWMP Plan.

b) A member of the **Storm Water Pollution Control Team** becomes aware that the storm water controls installed and being maintained are not effective enough for the discharge to meet applicable water quality standards or applicable requirements in the MCBH SWMP Plan. The facility ECC shall notify the Storm Water Program Manager immediately. The Storm Water Program Manager will notify DOH *by the end of the next work day*.

1.1 Log Notifications:

Date/time Storm Water Program Manager notified by ECC: ________________________

Date/time DOH notified by Storm Water Program Manager: ________________________

1.2 Describe Discharge:

Indicate which one of the following prohibited discharges is occurring or has occurred:

- ❐ Wastewater from washout of concrete
- ❐ Wastewater from washout and cleanout of stucco, paint, form release oils, curing compounds, or other construction materials
- ❐ Fuels, oils, or other pollutants used in vehicle and equipment operation and maintenance
- ❐ Soaps, solvents, or detergents used in vehicle and equipment washing
- ❐ Toxic or hazardous substances from a spill or other release
- ❐ Other, Explain: ____

2. Requirements for Taking Corrective Actions

The ECC shall complete corrective actions in accordance with the deadlines specified below. In all circumstances, site personnel shall *immediately* take all reasonable steps to minimize or prevent the discharge of pollutants until a permanent solution is installed and made operational, including cleaning up any contaminated surfaces so that the material will not discharge in subsequent storm events. *Immediately* means the same day the condition is discovered, unless it is too late in the day, in which initiation of corrective action must begin on the following work day.

Following any of the above triggering events, the ECC shall install a new or modified control and make it operational, or complete the repair, by *no later than 7 calendar days from the time of discovery*. If it is not feasible to complete the installation or repair within 7 calendar days, the ECC shall document and submit to the Storm Water Program Manager, for their agreement, why it is not feasible to complete the installation or repair within the 7-calendar day timeframe and document a schedule for installing the storm water control and making it operational as soon as practicable after the 7-day timeframe.

If the issue is not adequately addressed within 7 calendar days or the agreed upon timeframe, enforcement procedures will be initiated. Unaddressed issues will be escalated through the chain of command. The MCBH Environmental Compliance and Protection Division Director will give the responsible party a formal notice with an appropriate deadline for action. If the problem remains unchanged, the situation will be brought to the attention of the next higher authority. The ultimate penalty for non-compliance of MS4 Permit regulations is eviction or discharge of the responsible party from MCBH. This is placed at the discretion of the Base Commander. See the Enforcement Response Plan in Appendix 3-6 of the SWMP Plan for further information on MCBH's enforcement policies.

3. Corrective Action Report

Within 24 hours of discovering the occurrence of one of the triggering conditions in SWPPP Section 4.1 at the site, the ECC must complete the following:

3.1 Describe the triggering condition:

____
____
____
____

3.2 Record the date/time of the condition identified. How was the condition identified?

____
____
____
____

3.3 Describe the corrective action taken:

____
____
____

Date/time installation or repair was completed:
(or date/time the prohibited discharge ceased) ____

Or describe why it is not feasible to complete installation or repair within 7 calendar days and detail a proposed schedule (if applicable)

____
____
____

4. Resolution of the Corrective Action Trigger

Within 7 calendar days of initiating the Corrective Action Report, the ECC must complete a report of the following:

4.1 Follow-up Actions

Describe any follow-up actions taken to review the design, installation, and maintenance of storm water controls, including the dates such actions occurred:

____
____
____

4.2 Storm Water Control Modifications

Provide a summary of storm water control modifications implemented. Include a schedule of activities required to implement changes and the date the modifications were completed or will be completed:

____
____
____

5. SWPPP Modification Due to Corrective Actions

Where corrective actions result in changes to any of the storm water controls or procedures documented in the SWPPP, modify the SWPPP accordingly *within 7 calendar days* of completing corrective action work.

Are modifications to the SWPPP necessary? ❑ Yes ❑ No

Date modifications to the SWPPP shall be completed _______________

6. Corrective Actions Required by DOH

The facility shall comply with any corrective actions required by DOH as a result of permit violations found during an inspection by DOH or the Environmental Protection Agency (EPA).

Was the Corrective Action triggered by a DOH/EPA inspection?

❑ Yes ❑ No

❑ Date of DOH/EPA Inspection __________________

7. Additional Comments:

____
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Final

STORM WATER POLLUTION PREVENTION PLAN

Storm Water Management Program Plan

Marine Corps Base Hawaii, Oahu, Hawaii

NPDES Permit No. HI S000007

RECYCLE CENTER (BUILDING 132)

Prepared by:

Marine Corps Base Hawaii

August 2022

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List of Acronyms and Abbreviations

BMP	Best Management Practice
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CWA	Clean Water Act
CWB	Clean Water Branch
DOH	State of Hawaii Department of Health
ECC	Environmental Compliance Coordinator
ECE	Environmental Compliance Evaluation
ECPD	Environmental Compliance and Protection Division
EPA	United States Environmental Protection Agency
HAZMAT	Hazardous Material
HAZMIN	Hazardous Material Minimization
MCBH	Marine Corps Base Hawaii
MS4	Municipal Separate Storm Sewer System
MS4 Permit	Marine Corps Base Hawaii's NPDES Permit No. HI S000007
NPDES	National Pollutant Discharge Elimination System
POC	Point of Contact
SWMP	Storm Water Management Program
SWPPP	Storm Water Pollution Prevention Plan

Certification Statement

MCBH is committed to the prevention of discharges of polluted stormwater to navigable waters or the environment and maintains the highest standards for best management practices through periodic review, updating, and implementation of this Stormwater Pollution Prevention Plan (SWPPP).

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information contained therein. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Name: ______________________ Title: ______________________

Signature: ______________________ Date: ______________________

Management Review

Refer to Section 1.2 for more information on required SWPPP updates.

Review Dates	Signature	Amendment Required? (Y/N)
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1 Introduction

As part of Federal regulations administered through the Clean Water Act (CWA), the State of Hawaii, Department of Health (DOH) has issued the National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4) Permit No. HI S000007 (referred to herein at the "MS4 Permit") to Marine Corps Base Hawaii (MCBH). The MS4 Permit requires that MCBH provide all existing industrial facilities, identified in MCBH's MS4 Permit application, and any newly identified industrial facilities, submitted to DOH using the "MS4 NPDES Individual Permit – Industrial Storm Water Discharge Notification Form," with a Storm Water Pollution Prevention Plan (SWPPP) for storm water associated with industrial activities.

The purpose of the regulations is to protect water quality by reducing the amount of pollutants in storm water runoff caused by industrial activities.

1.1 SWPPP Implementation

The storm water management controls of this plan will become MCBH procedure for the applicable industrial facility. An up-to-date copy of the SWPPP shall be maintained on site and at the MCBH Environmental Compliance and Protection Division (ECPD). Management staff, maintenance personnel, contractor staff, and other personnel involved in onsite industrial activities, will be knowledgeable of the plan and follow the guidelines set forth in it, in addition to any other pertinent base-wide, state and federal regulations.

Day-to-day implementation of the SWPPP is primarily the responsibility of the current facility Environmental Compliance Coordinator (ECC) or Point of Contact (POC) as identified in Table 2-1. Enforcement of the permit conditions and this SWPPP are ultimately the responsibility of ECPD and additional escalating levels of authority as specified in the Enforcement Response Plan developed by MCBH for its base-wide Storm Water Management Program (SWMP) Plan.

1.2 Updating the SWPPP

This SWPPP will be reviewed as needed to identify necessary changes, at a minimum of every five years. Updates may be required due to current best management practice (BMP) failures, spill events, changes in industrial activities, changes in features, corrective actions, or other necessary changes. Personnel changes to the Storm Water Pollution Control Team (Section 2.1) should be logged in Table 2-1. Storm Water Pollution Control Team Log. ECPD will be responsible for approving revisions to the SWPPP. In the event the plan is modified, a copy of the updated SWPPP will remain at ECPD and will be provided to the applicable facility. Additionally, ECPD shall document and report the SWPPP changes to the DOH, Clean Water Branch (CWB), within thirty days of when the changes arise.

2 Recycle Center, Building 132

The Recycle Center, Building 132, is located at the southern end of MCBH, Kaneohe Bay, to the south of the intersection of D Street and 1st Street. The facility encompasses approximately 2.0 acres and can be found in grid [redacted] of the MCBH Base Map, see Figure 4-1. The facility-specific map is shown on Figure 4-2. The Recycle Center complex is asphalt-paved and bounded by a chain-linked, screened fence. Access to the Recycle Center complex is located at gates at the north and east ends of the center. Recyclables are accepted at the facility on Wednesdays.

2.1 Storm Water Pollution Control Team

The Storm Water Pollution Control Team consists of the Storm Water Program Manager, ECC, and the Hazardous Material (HAZMAT) and Hazardous Material Minimization (HAZMIN) team. The Storm Water Program Manager is responsible for the enforcement of the MS4 permit at all industrial sites and provides annual training to the ECC and other personnel. The ECC is the primary unit POC for storm water related items and the day-to-day environmental matters at a specific facility. ECC's are responsible for SWPPP implementation including BMP and facility inspections, storm water assessments/sampling, BMP maintenance, and corrective actions. The HAZMAT and HAZMIN team shall be contacted if assistance is needed. The role, name, phone number, and start date of individuals on the Storm Water Pollution Control Team is recorded in Table 2-1 below. In the event of personnel turnover, Table 2-1 shall be updated accordingly.

TABLE 2-1. STORM WATER POLLUTION CONTROL TEAM LOG

Role	Name	Phone	Start Date
MCBH Storm Water Program Manager	CIV Whitney Anderson	Office: 808-257-4359	6/6/22
ECC	CIV Joseph Pasco	Office: 808-257-4300 Mobile: 808-479-7364	12/1/2018
HAZMAT/HAZMIN	CIV Tim Cawthon	HAZMAT Center Building 6409 Office: 808-257-9913 HAZMIN Center Building 6407 Office: 808-257-0770	N/A

2.2 Recycle Center, Building 132 Facility Activities

The Recycle Center is classified as an industrial facility under United States Environmental Protection Agency (EPA) industrial sector N – Scrap Recycling and Waste Recycling. Building 132 is a single-story building that houses office space/break room to the north, a covered cardboard and paper sorting/shredding/baling area with an industrial shredder to the southeast, a concrete block shed to the south, and a bundled paper storage area to the southwest. The western wing of Building 132 has rollup bay doors and is used for general storage and recycled munition parts. The concrete block shed to the south stores chemicals such as paints, propane, Simple Green, gasoline, WD-40, soaps, bleach, grease, and cleaning products. A forklift and skid steer are parked under cover next to concrete block shed. The interior of Building 132 is swept as needed, and the paved areas of the facility are swept with a street sweeper as needed. No rinsing of recyclables is performed on-site. Equipment maintenance is performed in the covered portion of the facility as needed, but only on rare occasions. Three forklifts (2 diesel and 1 propane powered) and a skid steer are used onsite to transport materials but are stored under cover when not in use.

To the north of Building 132 is a large scale used to measure recyclables loaded on vehicles. A concrete ramp northwest of the building leads up to the concrete pad, which is used to store blue recycling bins. These bins are rinsed as needed in the grassy area to the south of this concrete pad allowing water to percolate into the soil.

The Recycle Center complex also contains various recycled materials storage areas around the perimeter of the facility that are exposed to storm water. Items along the northern boundary include scrap metal bins and other bulky metal items. Items along the western boundary include plastics sorting bins, stacks of wooden pallets, bundled cardboard, blue bins, and scrap appliances, and regular trash bins. The southern and southeastern perimeter is used for miscellaneous storage of bulky items including appliances, metal, glass, and pallets. Along the eastern perimeter fence, a large rolloff trash bin, other trash bins, and metal bins are also located.

Storm water at the Recycle center discharges from the site at three locations that are considered substantially identical outfalls; Outfalls 01, 02, and 03 (Figure 4-2). Runoff along the northern and western sides of the facility flows via sheet flow offsite. Storm water along the northwestern end of the site is directed off site by curbing to a catch basin along D Street. Storm water at the southwest flows to a shallow asphalt swale and ponds onsite or is carried offsite to the west. Storm water on the southeastern side of the facility flows via sheet flow offsite to the southeast. The storm water collection system near the Recycle Center discharges into the receiving water Kaneohe Bay via Outfall 017. Kaneohe Bay is not considered to be an impaired waterbody.

2.1 Sources of Pollutants

The following is an inventory of potential pollutants associated with Recycle Center, Building 132:

A. Material Loading and Unloading Areas

Materials that are spilled, leaked, or lost during loading or unloading may collect on vegetated or paved surfaces and be carried away by storm runoff. Materials are loaded and unloaded at nearly all areas of the facility. Pollutants derived from scrap metals, appliances, paper/cardboard, beverage containers etc. that are exposed to storm water have the potential to enter the MS4 or sheet flow offsite.

B. On-Site Material Storage and Disposal Practices

Leaks, drips, or spills of materials that are stored or disposed of in areas exposed to rainfall can be carried away by storm water. The Recycle Center does not store significant amounts of hazardous waste materials onsite. Small amounts of consumer cleaners, oil, gasoline, hydraulic fluid, paint, grease, and lubricants are stored in the concrete shed but are not considered to present a significant risk to storm water quality.

C. Outdoor Activities

Many outdoor activities at MCBH, Kaneohe Bay use materials or create wastes that have the potential to pollute storm water runoff. Outdoor activities at Recycle Center, Building 132 include the handling, sorting, and storage of materials to be recycled, including metals, paper, cardboard, wood, glass, and plastics. There are also trash dumpsters and rolloff bins stored onsite. These activities have the potential to produce misc. debris and dissolved metals in storm water runoff. The facility has parking areas for personal vehicles.

D. Significant Materials Inventory

The following significant materials are located at Recycle Center, Building 132:

- Gasoline
- Cleaners
- Oil
- Hydraulic fluid
- Paint
- Metals (scrap)
- Grease
- Lubricants

2.2 Potential Storm Water Pollutants

The following pollutants have been identified as having a reasonable potential to be present in storm water discharges from Recycle Center, Building 132 if not properly managed:

- Metals (scrap)
- Miscellaneous debris (floatables)

Materials that have *not* been included as a potential storm water pollutant but have been included as part of the significant materials inventory list, are considered to present a negligible risk to storm water quality. This is based on the nature/location of the primary activities performed with these materials and the BMPs that are in place. Material transport (loading/unloading) is not considered to be a significant threat to storm water, due to spill response procedures, training, and spill kit materials available onsite.

2.3 Best Management Practices (BMPs)

Best Management Practices (BMPs) are techniques or methods that aim to manage the quantity and improve the quality of storm water runoff from a facility or other site. Storm water BMPs intend to reduce or eliminate pollution and contaminants collected by runoff before the runoff reaches the MCBH storm water system or sensitive ecosystems such as streams, wetlands, and marine environments. The following is a summary of BMPs currently in place at the Recycle Center, Building 132.

A. Good Housekeeping Practices

In general, Recycle Center, Building 132 employs good housekeeping practices throughout its operations. Good housekeeping practices for Recycle Center, Building 132 are included in Table 2-2.

B. Preventative Maintenance

Preventive maintenance is important as water pollution control measures may be of little or no use if devices and equipment have not been properly maintained. Facility personnel conduct inspection of facility equipment and storage systems on a regular basis. The preventive maintenance program involves inspections of equipment and storage systems that are exposed to storm water.

C. Visual Inspections

Visual inspection provides a valuable subjective assessment of the status of storm water management systems. They are easily performed and allow the opportunity for corrective action, if necessary. Site inspections and documentation requirements are addressed in in Section 3 of this SWPPP. MCBH HAZMIN Center staff perform hazardous material inspections monthly. Annual facility inspections are performed by EPCD as part of the MCBH Environmental Compliance Evaluation (ECE).

D. Spill Prevention and Response

Areas where significant material spill or leakage can occur are identified in Section 2.1 and shown on Figure 4-2. The storm water systems and their accompanying drainage points are also shown on Figure 4-2. Refer to Table 2-2 for BMPs related to spill preventative measures for material handling procedures, storage requirements, and equipment usage.

In the event of a hazardous substance or oil spill, the ECC and ECPD shall be notified immediately (**ECPD; 808-630-8246**). If the spill cannot be easily addressed using an onsite spill kit and personal protective equipment, call Fed Fire (Military 911). The spill source should be immediately controlled if it is safe to do so by closing valves, switches, and/or turning off power to a device. Then, contain the spill by using sorbent socks or absorbent materials found in a spill kit. After it has been contained, clean up the spilled material in a safe manner using dry methods. All materials should then be properly disposed of.

The locations of spill kits are shown in Figure 4-2.

E. Erosion and Sediment Controls

No areas of the facility were found to have exposed dirt or other sediment that could be a source of pollution. All surfaces are paved, well vegetated, or covered in gravel (Figure 4-2).

F. Best Management Practices to Minimize Pollutant Contact with Storm Water

Facility personnel receive annual training from ECPD at minimum, as well as an initial training for all new personnel. Training information will include the BMPs that have been developed for the facility and a general overview of the storm water program and its objectives.

Existing BMPs at the Recycle Center are shown in Table 2-2 and attached as fact sheets to this SWPPP in Appendix A.

TABLE 2-2. BEST MANAGEMENT PRACTICES

BMP No.	BMP Title	Description
001	Label All Drums, Cans, Containers, Tanks, and Valves	All containers and drums are labeled.
002	Restrict Access to Area and Equipment	Area is completely enclosed by chain-linked fencing.
004	Avoid Hosing Down the Site	Sweeping with a push broom is performed as needed.
006	Control Spills	Any spill of significant materials is controlled immediately to prevent pollutant from being transported to receiving water. A spill kit is stored onsite.
007	Place Trash Receptacles at Appropriate Locations	Covered trash bins are located throughout the facility
015	Recycle	The facility is used to recycle materials from the Base. Materials to be recycled are generally stored together at the facility.
016	Store Waste and Recycling Materials in Proper Containers	Waste and recycling containers are located Waste containers will be emptied regularly. Dumpsters should all have lids; lids should be kept closed when not in use.
033	Check Vehicles and Equipment for Leaks	Vehicles and equipment are checked for leaks on a regular basis.
041	Wash Equipment in Designated Areas	A designated wash area allows wash water to percolate into a vegetated area.
061B	Store Liquids and Significant Materials within a Building or Covered Area	All significant materials are properly stored undercover and in secondary containment where required.
113	Conduct Personnel Training Regarding the SWPPP	Personnel are trained regularly (initial orientation and annual refresher.

3 Inspections, Assessments and Monitoring

3.1 Routine Quarterly Site Inspections

The MS4 Permit requires a routine quarterly site inspection by a qualified person with at least one member of the storm water pollution control team participating. At least once each calendar year, the routine inspection must be conducted during a period when a storm water discharge is occurring. The site inspection is an overall evaluation of the effectiveness of the BMPs implemented at that facility. A Routine Facility Inspection Checklist (Appendix B) shall be completed during each routine site inspection and kept onsite with this SWPPP. During normal facility operating hours, inspections must be conducted of areas of the facility including, but not limited to, the following:

- Areas where industrial materials or activities are exposed to storm water;
- Areas identified in the SWPPP and those that are potential pollutant sources;
- Areas where spills and leaks have occurred in the past three years;
- Discharge points; and
- Control measures used to comply with the effluent limits contained in this permit.

3.2 Visual Assessment of Storm Water Discharges

A Quarterly Visual Assessment of storm water discharge is required for all industrial facilities at MCBH. Storm water samples for this visual assessment but must be collected in such a manner that the samples are representative of the storm water discharge from the facility. Therefore, the water sample must be collected at the designated storm water monitoring point, at the end of the drainage swale just outside of the gate on the northwest side of the facility, as shown in Figure 4-2. The Quarterly Visual Assessment checklist (Appendix C) shall be completed by the current facility ECC and kept onsite with this SWPPP.

The visual assessment must be made:

- Of a sample collected in a clean, colorless glass or plastic container, and examined in a well-lit area;
- On samples collected within the first 30 minutes of an actual discharge from a storm event. If it is not possible to collect the sample within the first 30 minutes of discharge, the sample must be collected as soon as practicable after the first 30 minutes and documented why it was not possible to take the sample within the first 30 minutes; and
- For storm events, on discharges that occur at least 72 hours (three days) from the previous discharge.

Whenever the visual assessment shows evidence of storm water pollution, corrective action procedures to remedy the pollutants must be taken and documented. Refer to Section 4 for corrective action procedures.

3.3 Storm Water Monitoring – Quarterly Benchmark Sampling

The Recycle Center, Building 132 is considered to be under industrial activity sector N- Scrap Recycling and Waste Recycling Facilities, and thus is required to perform Quarterly Benchmark Sampling. Benchmark monitoring data are primarily for MCBH's use to determine the overall effectiveness of control measures and to assist in determining when additional corrective action(s) may be necessary. A benchmark exceedance is not a permit violation, however, if corrective action is required as a result of a benchmark exceedance, failure to conduct required corrective action is a permit violation.

Quarterly Benchmark Sampling of storm water discharge from the representative sampling location at the Recycle Center (Figure 4-2) will be monitored in accordance with Table 3-1. Benchmark samples can be collected during the same storm event as the Quarterly Visual Assessment as described in Section 3.2.

TABLE 3-1. Recycle Center Quarterly Benchmark Monitoring Requirements

Parameter	Units	Daily Maximum
Chemical Oxygen Demand (COD)	mg/L	120
Total Suspended Solids (TSS)	mg/L	100
Aluminum Total Recoverable	mg/L	0.75
Copper Total Recoverable	mg/L	0.0048
Iron Total Recoverable	mg/L	1
Lead Total Recoverable	mg/L	0.21
Zinc Total Recoverable	mg/L	0.09

Data not exceeding benchmarks: After collection of four quarterly samples, if the average of the four monitoring values for any parameter does not exceed the benchmark, MCBH has fulfilled monitoring requirements for that parameter for the permit term.

Data exceeding benchmarks: After collection of four quarterly samples, if the average of the four monitoring values for any parameter exceeds the benchmark, review the selection, design, installation, and implementation of control measures to determine if modifications are necessary to meet the effluent limits in this permit, and either:

- Make the necessary modifications and continue quarterly monitoring until four additional quarters of monitoring are completed for which the average does not exceed the benchmark; or
- Make a determination that no further pollutant reductions are technologically available and economically practicable and achievable in light of best industry practice to meet the technology-based effluent limits or are necessary to meet the water-quality-based effluent limitations, in which case monitoring must continue once per year. Furthermore, documentation of the

rationale for concluding that no further pollutant reductions are achievable must be completed and all records related to this documentation shall be retained with the site SWPPP.

Control measures must be reviewed, and any required corrective action performed immediately (or document why no corrective action is required), without waiting for the full four quarters of monitoring data, when an exceedance of the four-quarter average is mathematically certain. If after modifying control measures and conducting four additional quarters of monitoring, the average still exceeds the benchmark (or if an exceedance of the benchmark by the four-quarter average is mathematically certain prior to conducting the full four additional quarters of monitoring), review of control measures must be conducted and take one of the two actions above.

Natural background pollutant levels: Following the first four quarters of benchmark monitoring (or sooner if the exceedance is triggered by less than four quarters of data; see above), if the average concentration of a pollutant exceeds a benchmark value, and a determination has been made that exceedance of the benchmark is attributable solely to the presence of that pollutant in the natural background, MCBH is not required to perform corrective action or additional benchmark monitoring provided that:

- The average concentration of your benchmark monitoring results is less than or equal to the concentration of that pollutant in the natural background; and
- Supporting documentation is produced with rationale for concluding that benchmark exceedances are in fact attributable solely to natural background pollutant levels. The supporting rationale must include any data previously collected (including literature studies) that describe the levels of natural background pollutants in the storm water discharge. Natural background pollutants are those substances that are naturally occurring in soils or ground water. Natural background pollutants do not include legacy pollutants from earlier activity on the site, or pollutants in run-on from neighboring sources which are not naturally occurring, such as other industrial sites or roadways. However, the DOH may determine that MCBH is eligible to discontinue monitoring for pollutants that occur solely from run-on sources.

3.3.1 Benchmark Sampling Methods and Protocol

A minimum of one grab sample shall be collected from a discharge resulting from a measurable storm event. Samples must be collected within the first 30 minutes of a discharge associated with a measurable storm event. If it is not possible to collect the sample within the first 30 minutes of a measurable storm event, the sample must be collected as soon as practicable after the first 30 minutes and documentation must be kept with the SWPPP explaining why it was not possible to take samples within the first 30 minutes.

When adverse weather conditions prevent the collection of samples according to the relevant monitoring schedule, a substitute sample must be taken during the next qualifying storm event. Adverse weather does not exempt filing a benchmark monitoring report in accordance with the sampling schedule. NetDMR shall be used to report any failure to monitor using a “no data” or “NODI” code during the regular reporting period.

Monitoring requirements in this permit begin in the first full quarter following either 90 days after permit issuance or the date of discharge authorization, whichever date comes later. If the monitoring is required on a quarterly basis (e.g., benchmark monitoring), monitoring must occur at least once in each of the following 3-month intervals:

- **January 1 – March 31;**
- **April 1 – June 30;**
- **July 1 – September 30;**
- **October 1 – December 31.**

3.3.2 Storm Event Selection Criteria

MCBH's MS4 Permit No. HI S000007 requires dischargers to collect and analyze grab and composite samples by manual or automatic monitoring methods, from a measurable storm event. The permit states that a measurable storm event is defined as *a storm event that produces actual discharge from your site and that occurs at least 72 hours after any previous measurable events.*

Samples may be collected using automatic sampling devices or manually. For manual sampling, the sample bottles will be filled directly from the discharge flow, by using a peristaltic pump, or by other appropriate sample collection device.

Table 3-2 lists the specific pollutants that are required to be tested. It is important that samples be submitted by the ECC to an appropriate laboratory in specific containers and within a specific amount of time in order to achieve compliance with regulations. Specific analytical parameters and their associated sampling methods, such as container type, sample holding time and required analytical methodology, are listed below in Table 3-2.

TABLE 3-2. Quality Assurance / Quality Control Objectives

Parameter Name	Analytical Method	Units	Methodology	Maximum Holding Time	Preservation	Container Type/ Size
Metals	EPA 200.7, 200.8	µg/L	ICP	6 months	pH<2, HNO_3	500 mL plastic
COD	SM 5220D	mg/L	Photo Spectroscopy	28 days	4ºC, pH<2, H_2SO_4	50 mL plastic
TSS	SM 2540D	mg/L	Gravimetric	7 days	4ºC	100 mL plastic

4 Corrective Actions

A corrective action is defined as any action taken, or required to be taken, to (1) repair, modify, or replace any stormwater control used at the site; (2) clean up and dispose of spills, releases, or other deposits found on the site; and (3) remedy a permit violation. Corrective actions should be documented using the Corrective Action Log (Appendix D).

4.1 Immediate Actions

If corrective action is needed, you must immediately take all reasonable steps necessary to minimize or prevent the discharge of pollutants until a permanent solution is installed and made operational, including cleaning up any contaminated surfaces so that the material will not discharge in subsequent storm events. Note: In this context, the term "immediately" requires you to, on the same day a condition requiring corrective action is found, take all reasonable steps to minimize or prevent the discharge of pollutants until a permanent solution is installed and made operational. However, if a problem is identified at a time in the workday when it is too late to initiate corrective action, the initiation of corrective action must begin no later than the following workday. "All reasonable steps" means that the permittee has undertaken initial actions to assess and address the condition causing the corrective action, including, for example, cleaning up any exposed materials that may be discharged in a storm event (e.g., through sweeping, vacuuming) or making arrangements (i.e., scheduling) for a new BMP to be installed at a later date.

4.2 Escalating Actions

If additional actions are necessary beyond those implemented or if the conditions continue to occur, additional corrective actions (e.g., install a new or modified control and make it operational, complete the repair) must be completed before the next storm event if possible, and within 14 calendar days from the time of discovery of the corrective action condition. If it is infeasible to complete the corrective action within 14 calendar days, document why it is infeasible to complete the corrective action within the 14-day timeframe and identify a schedule for completing the work, which must be done as soon as practicable after the 14-day timeframe but no longer than 45 days after discovery. If the completion of corrective action will exceed the 45-day timeframe, the minimum additional time necessary to complete the corrective action can be taken, provided that MCBH ECPD and DOH is notified of your intention to exceed 45 days. Where your corrective actions result in changes to any of the controls or procedures documented in your SWPPP, you must modify your SWPPP accordingly within 14 calendar days of completing corrective action work.

4.3 Corrective Actions for Substantially Identical Outfalls

If the event triggering corrective action is associated with an outfall that had been identified as a "substantially identical outfall", the review must assess the need for corrective action for all related substantially identical outfalls. Any necessary changes to control measures that affect these other outfalls must also be made before the next storm event if possible, or as soon as practicable following that storm event. Any corrective actions must be conducted within the timeframes discussed above.

4.4 Record of Past Spills or Leaks of Hazardous Pollutants

Table 4-1 is used to record significant spills and leaks that have occur or have occurred within three years prior to the preparation or amendment of this SWPPP. Significant spills and leaks include, but are not limited to, releases of oil or hazardous substances in excess of quantities that are reportable under CWA

Section 311 (see 40 CFR 110.6 and 40 CFR 117.21) or Section 102 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 USC §9602.

At the time of this SWPPP update, there have been no past spill or leak incidents reported for the Recycle Center.

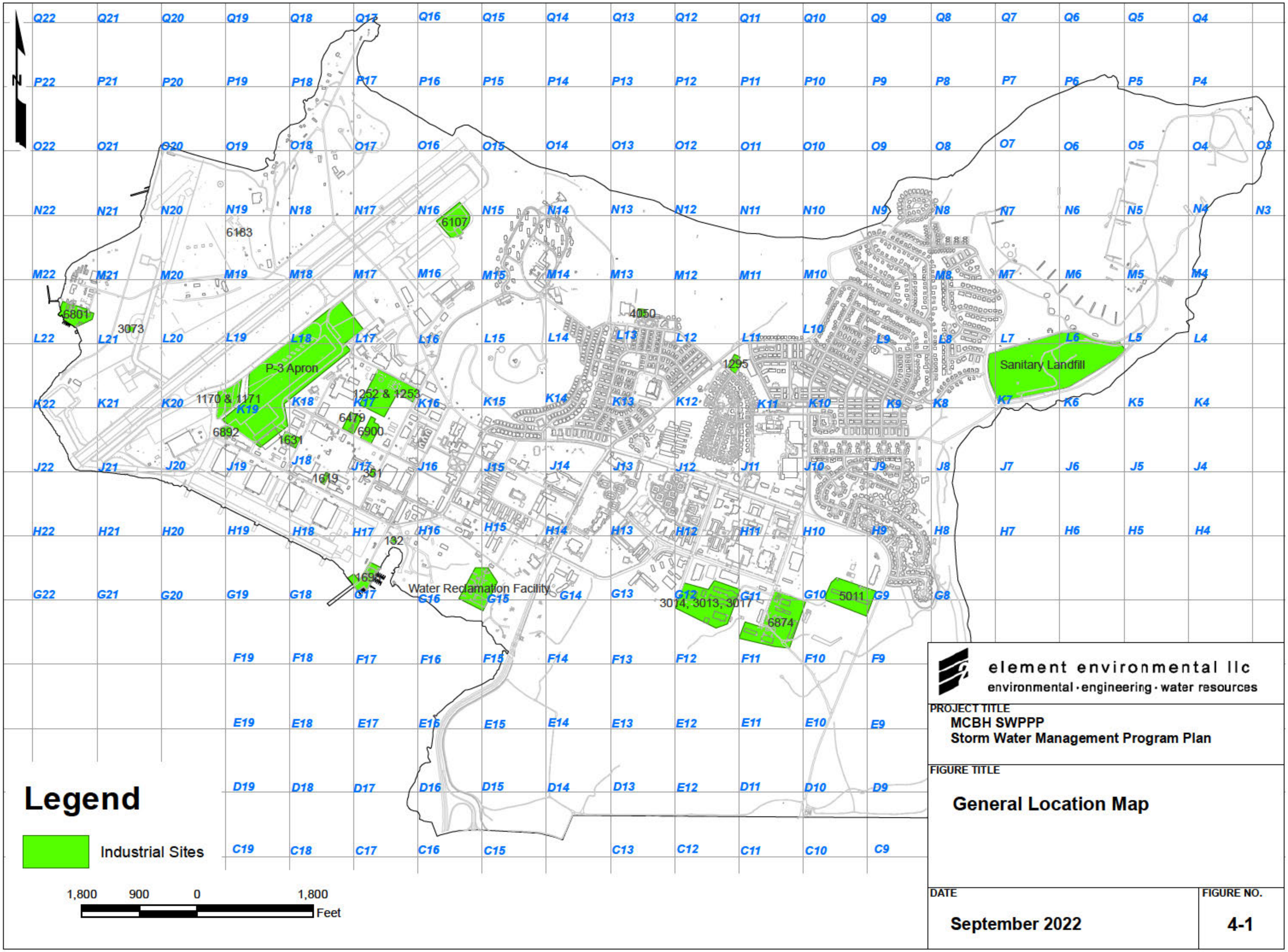
TABLE 4-1. PAST SPILLS OR LEAKS OF HAZARDOUS POLLUTANTS

Date of Incident	Brief Summary of Incident (POC Active at Time of Incident, Pollutant Type, Estimated Quantity, Location of Spill)

4.5 Record of Unauthorized Non-Storm Water Discharges

TABLE 4-2. Unauthorized Non-Storm Water Discharge Evaluation

Date of Evaluation	Brief Summary of Evaluation (Description of the evaluation criteria, outfalls or onsite drainage points that were directly observed, action(s) taken, such as a list of control measures used to eliminate unauthorized discharge)



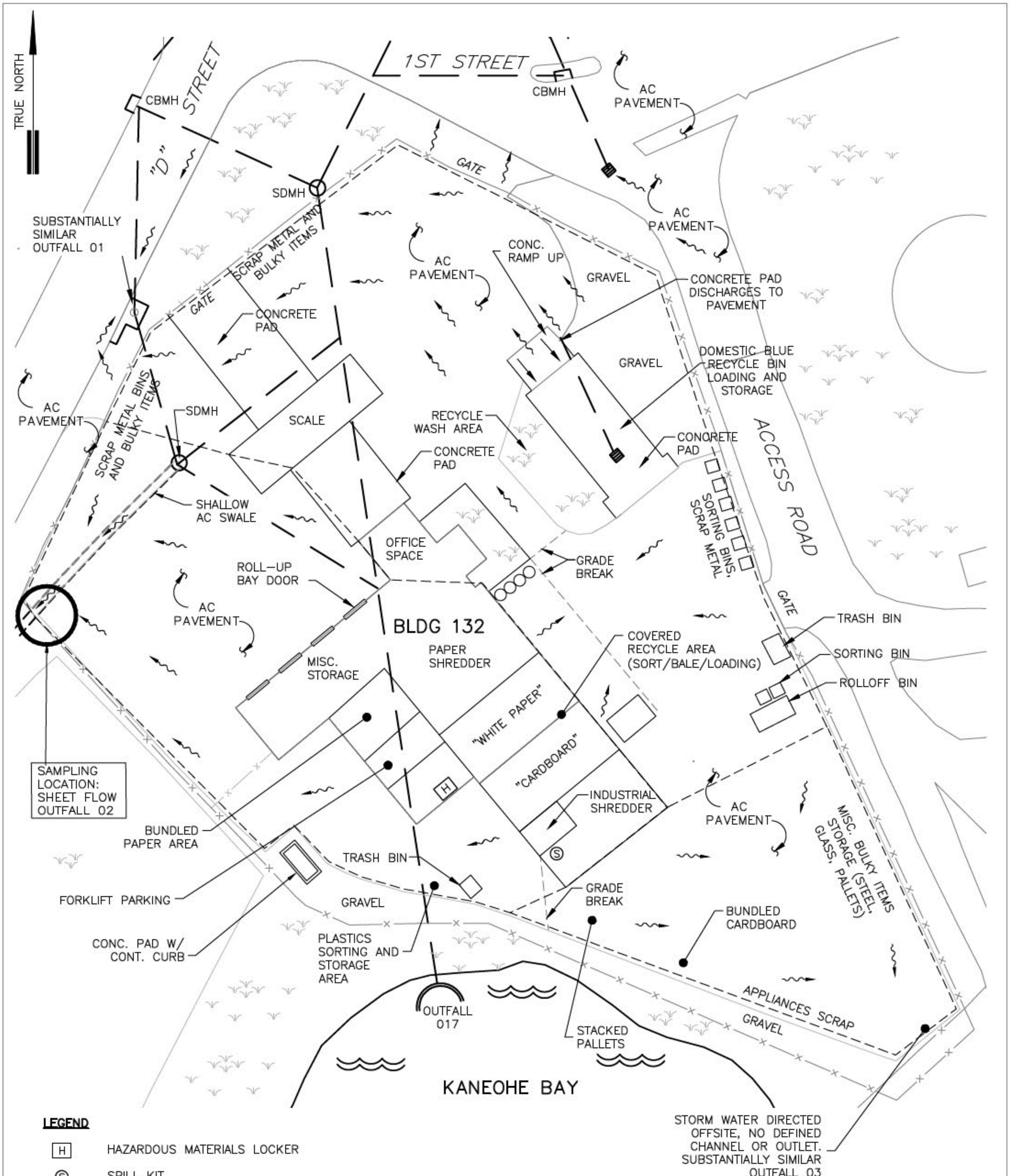
element environmental llc
environmental · engineering · water resources

PROJECT TITLE
MCBH SWPPP
Storm Water Management Program Plan

FIGURE TITLE
General Location Map

DATE
September 2022

FIGURE NO.
4-1



LEGEND

H	HAZARDOUS MATERIALS LOCKER
S	SPILL KIT
— —	STORM WATER CONVEYANCE
~~→	FLOW ARROW
– – – – –	DRAINAGE AREA BOUNDARY

NOTES:

1. STORM WATER, FROM APPROXIMATELY 2.0 ACRES ASSOCIATED WITH BUILDING 132, DISCHARGES TO KANEOHE BAY VIA SURFACE RUNOFF AND OUTFALL 017.
2. NOT TO SCALE

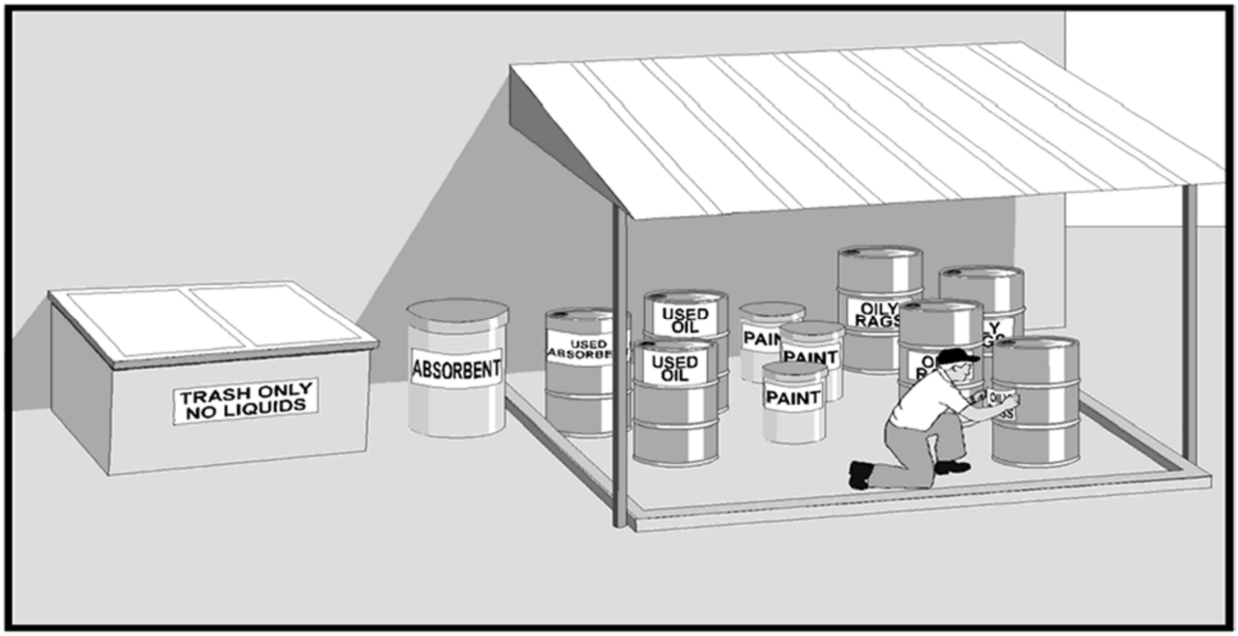
10/20/2022 3:49:58 PM
FIG 4-2 Bldg 132 – Recycling Center.dwg

DATE:	PROJECT TITLE:	
JULY 2022	STORM WATER POLLUTION PREVENTION PLAN MCBH, KANEOHE BAY, OAHU, HAWAII	
FIGURE TITLE:		FIGURE NO.:
RECYCLING CENTER (BUILDING 132)		4-2

APPENDIX A

SELECTED BMP FACT SHEETS

BMP 001 - LABEL ALL DRUMS, CANS, CONTAINERS, AND TANKS



Description of Potential Pollutant and Source: Drums, cans, and containers can be improperly managed and disposed of due to uncertainty of the container's contents. Tanks which are not labeled may result in improper use of the tank or fuel, which may result in the exposure of significant materials to storm water and/or receiving waters. Similarly, unlabeled valves may be opened without proper precaution due to lack of user information. Storm water quality will be affected if significant materials are improperly disposed to the storm drain and/or receiving waters. Lack of labeling will also make it difficult to quickly identify the type of material released so facility personnel can respond correctly. Labels also identify hazardous materials at the facility and are a good way to request caution in certain areas (e.g., drums indicating flammability).

Description of BMP: Label all drums, valves, pumps, cans, tanks, and containers to reduce the chance of misuse and eventual spills. Labeling ensures that the appropriate procedures, equipment, and storage containers are used. All containers will be labeled as to what is in them.

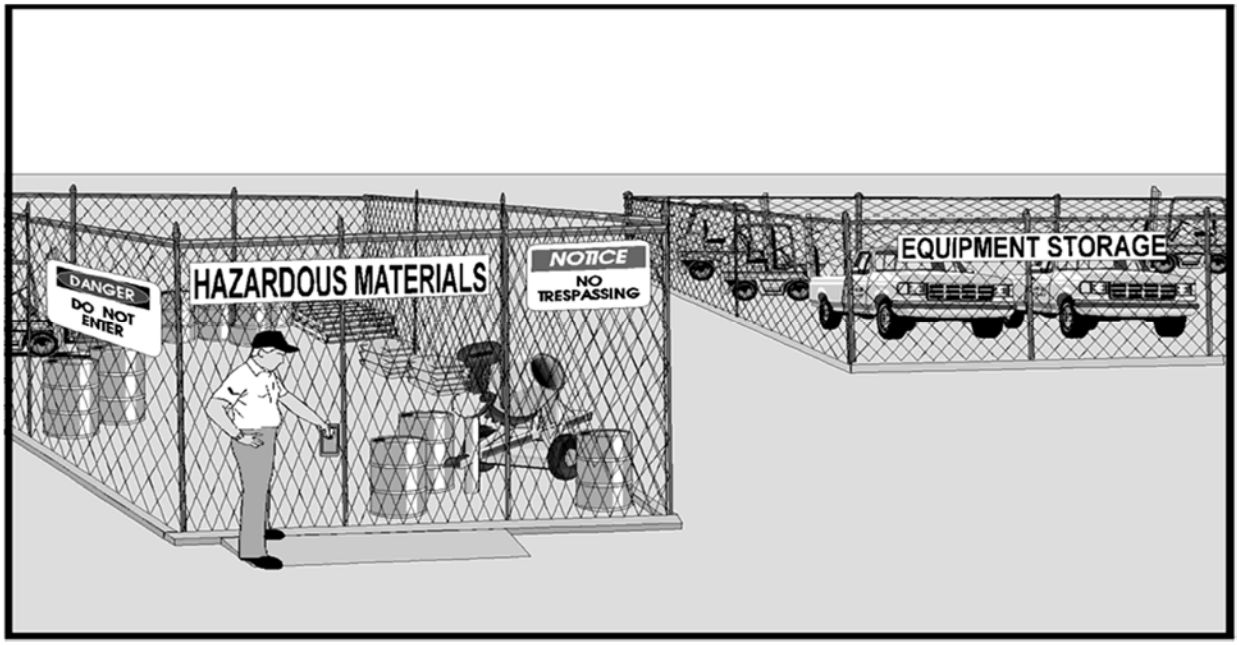
Application Guidance: As needed.

Training: N/A

Effectiveness and Cost: Effectiveness and costs will vary depending on the application.

Limitations: None

BMP 002 - RESTRICT ACCESS TO AREA AND EQUIPMENT



Description of Potential Pollutant and Source: Vandalism of vehicles and facility property may result in the release of significant materials.

Description of BMP: Provide fences and gate areas where vehicles, equipment and materials are stored and are accessible to the public to discourage trespassing. Access to equipment will also be restricted. Only authorized personnel will be allowed to operate equipment. The fences and gates will be properly maintained, and additional security measures including lighting of the area will be implemented if the fencing alone proves insufficient. Where appropriate, security guards or alarms will be used.

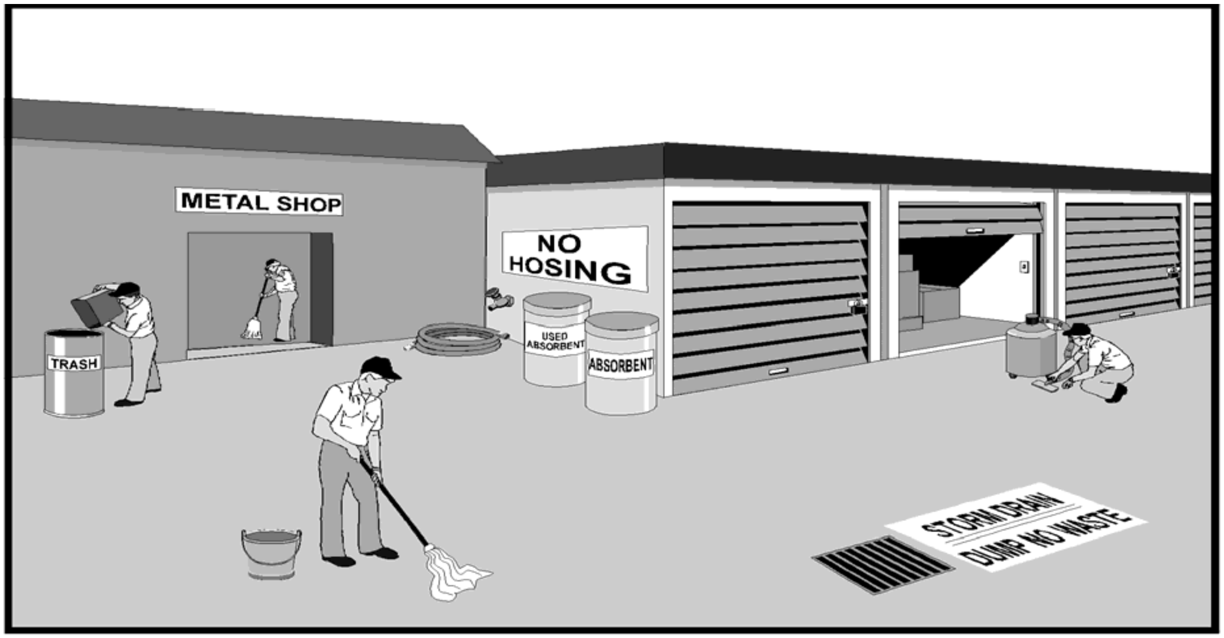
Application Guidance: As needed.

Training: N/A

Effectiveness and Cost: Effectiveness and costs will vary depending on the application.

Limitations: None

BMP 004 - AVOID HOSING DOWN THE SITE



Description of Potential Pollutant and Source: Cleaning work sites by hosing down causes wash water to transport pollutants to the storm drain where it can be exposed to storm water.

Description of BMP: Use dry methods to clean work sites. Dry methods include sweeping or using damp rags or mops. If possible or practical, hoses will be removed. If hosing down is unavoidable, the downstream drain will be temporarily plugged as described in the following BMPs:

- BMP 023 - Place portable Rubber Mats Over Storm Drain Inlets
- BMP 024 - Insert Filter in Catch Basin
- BMP 025 - Place Absorbent Blankets in Catch Basin

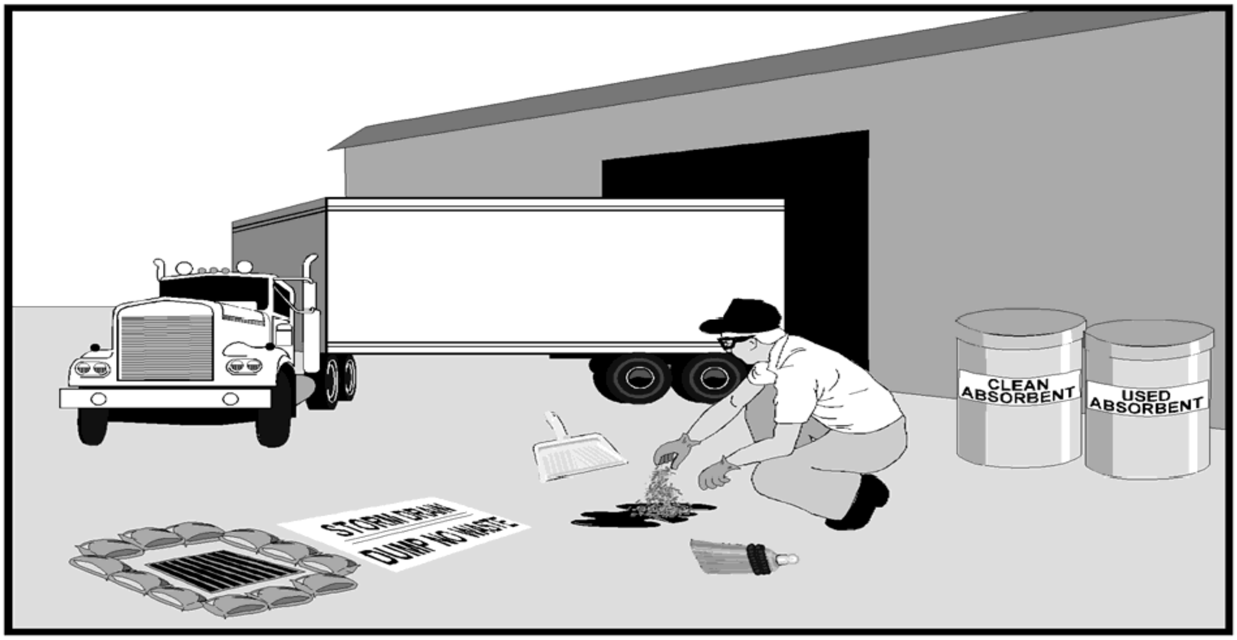
Application Guidance: Methods of dry cleaning will be used whenever possible at all workstations, loading/unloading sites, storage areas, and parking lots.

Training: New personnel will be notified of the policy and signs will be posted. If possible or practical, hoses will be removed.

Effectiveness and Cost: Eliminating hosing down is a highly effective, low-cost BMP.

Limitations: None

BMP 006 - CONTROL SPILLS



Description of Potential Pollutant and Source: Spills of significant materials may be exposed to storm water and transported to storm drains and/or receiving waters.

Description of BMP: Follow safety data sheets (SDS) for handling, storage, and cleanup of all significant materials to reduce the potential for spills.

Any spill, large or small, of significant materials will be controlled to prevent pollutants from being transported to storm drains and/or receiving waters. Appropriate spill control material will be kept on site. Smaller spills will be contained using absorbent material such as kitty litter, straw, or sawdust. Drums of absorbent material will be easily accessible and clearly marked, and containers for spent absorbent material will be readily available. Spent absorbent material will be managed appropriately and disposed of in accordance with applicable regulations. Larger spills will be controlled using spill kits, brooms, and other response equipment commensurate with the size of the spill. The methods outlined in the Activity's spill prevention and response plans (BMP 112) for hazardous materials will be followed for spills of any potential storm water pollutants. The date, time, nature and volume of material spilled, and cleanup measures taken will be recorded for all spills and kept as part of the SWPPP.

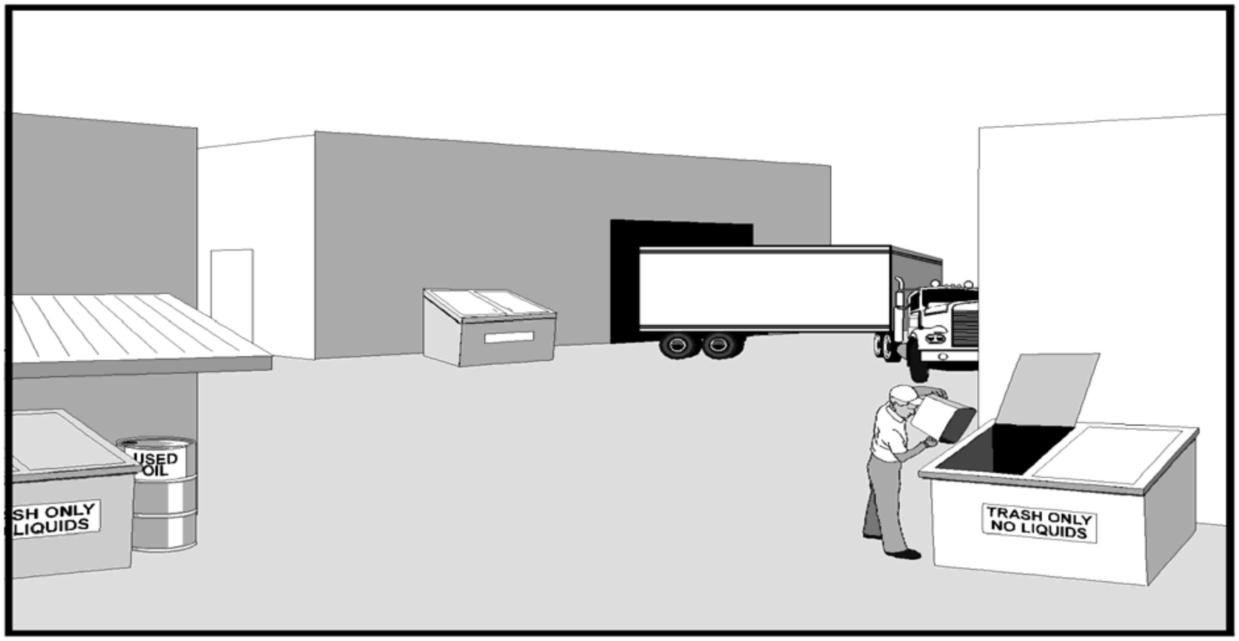
Application Guidance: Controlling spills will be practiced under all working conditions.

Training: Personnel will be trained in spill prevention and response procedures including the use of personal protection equipment (gloves, eye and face protection, etc.). This will include what absorbent or equipment to use, how to use the absorbent or equipment, where to find it, how to dispose of the spent absorbent or other material, and who to notify in the event of a spill.

Effectiveness and Cost: Spill control is a moderately effective, low-cost BMP.

Limitations: None

BMP 007 - PLACE TRASH RECEPTACLES AT APPROPRIATE LOCATIONS



Description of Potential Pollutant and Source: Improperly located or insufficient numbers of trash receptacles will promote poor housekeeping practices. This will increase the opportunity for pollutants from all source areas to reach storm water.

Description of BMP: Properly located and sufficient numbers of trash receptacles will promote the proper disposal of waste materials. This reduces the opportunity for pollutants to reach storm water. Trash receptacles will be easily accessible for personnel.

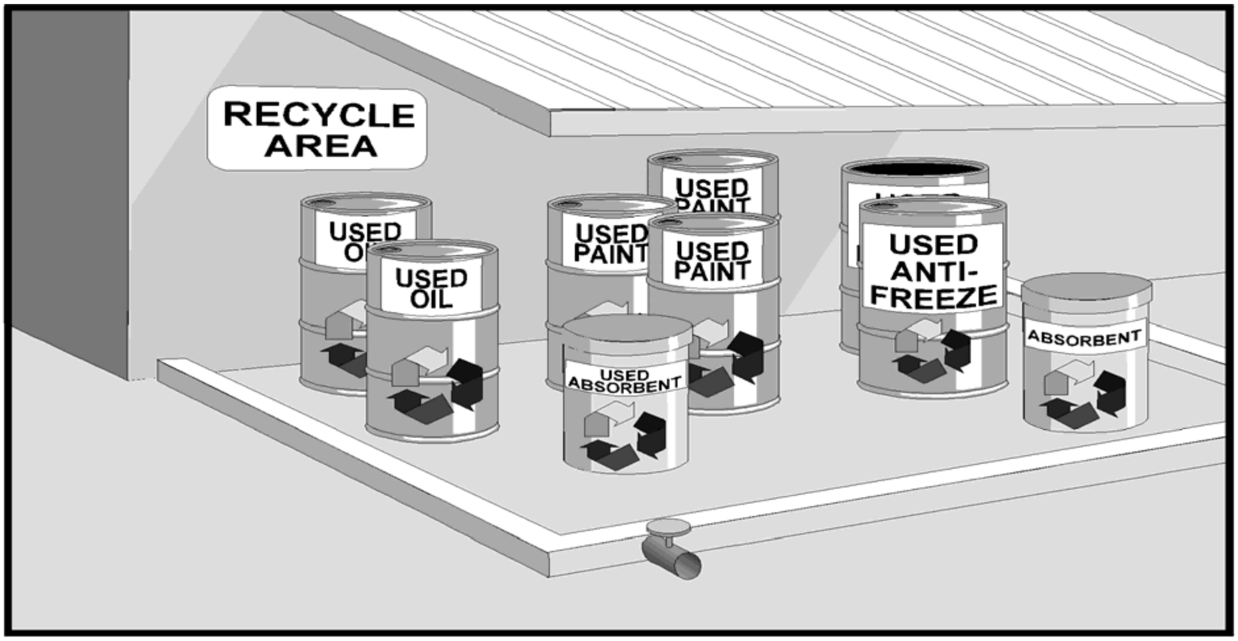
Application Guidelines: Placement of trash receptacles at appropriate locations will always be practiced.

Training: Personnel will be trained as to the location of trash receptacles.

Effectiveness and Cost: Appropriately located trash receptacles are an effective, low-cost BMP.

Limitations: None

BMP 015 – RECYCLE



Description of Potential Pollutant and Source: Many materials, both hazardous and non-hazardous, can be sources of pollutants. Recycling will be employed to reduce the amount of waste material exposed to storm water on the Activity.

Description of BMP: Recycle materials to the fullest extent possible in all situations.

Application Guidance: Recycling collections will be conducted at least weekly for recyclable items such as solvents, oil, scrap metals, wash water and absorbent materials. Separating the recyclable items facilitates recycling.

The frequency for implementing this BMP has been provided as general guidance. However, a facility operator may wish to establish a more suitable frequency. This will require SWPPP implementors to make judgements based on facility operations and conditions. To assign a frequency other than what has been suggested (i.e., more or less frequent), the following criteria will be considered and rated either High, Medium, or Low. If many of the criteria are assigned a High rating, the frequency may be increased. Similarly, if many criteria are assigned a Low rating, the frequency may be decreased. The goal of implementing this BMP is to minimize exposure of pollutants to storm water.

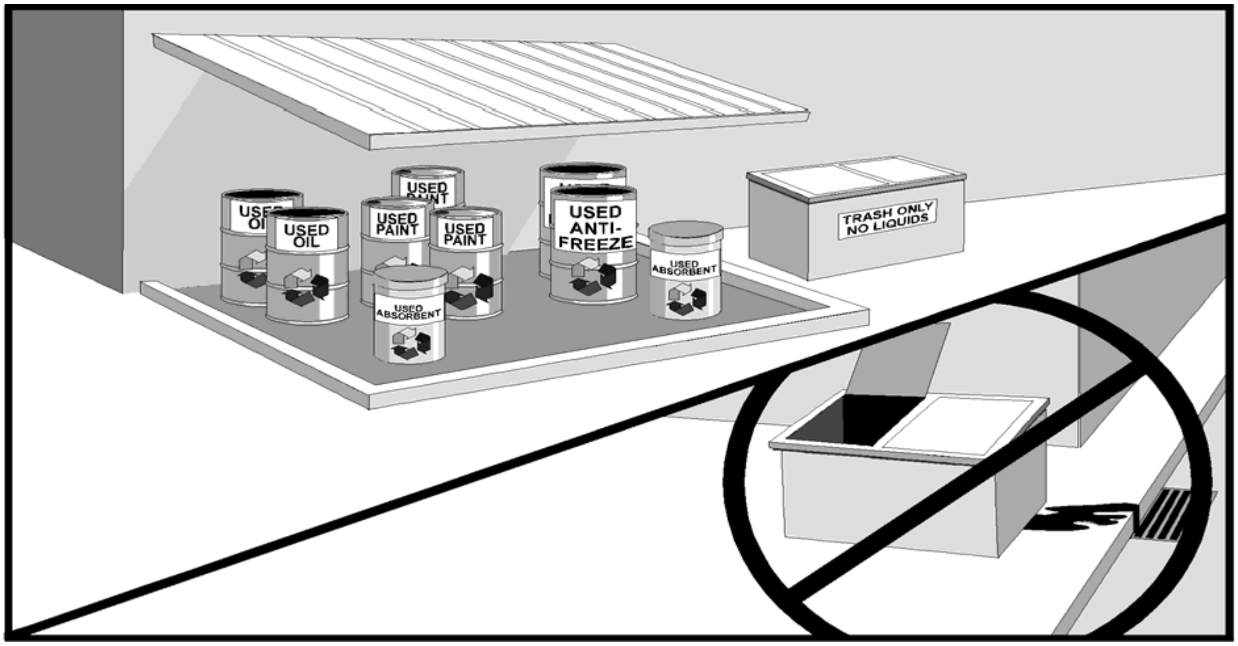
CRITERIA	Rating H=High M=Medium L=Low
Probability of exposure of significant materials to storm water	
Quantity of significant materials potentially exposed	
Toxicity of significant materials potentially exposed	
Frequency of use of significant materials potentially exposed	
Evidence of exposure (e.g., stains on pavement, etching of concrete	
Proximity of source area to outfall or receiving water	
Sensitivity of receiving water to potentially exposed significant materials (e.g., waters with beneficial uses such as human contact, recreation, significant species habitat, etc.)	

Training: Personnel will be trained on proper recycling techniques along with posting and maintenance of signs.

Effectiveness and Cost: Effectiveness and cost will be site specific.

Limitations: Local vendors may not be available to receive certain recyclable materials.

BMP 016 - STORE WASTE AND RECYCLING MATERIALS IN PROPER CONTAINERS



Description of Potential Pollutant and Source: Dry waste, including items such as scrap metal, floor sweepings, metal chips, and paper goods, can be dispersed by wind or operational error if not stored properly. If a dumpster's lid is not kept closed, animals may carry garbage out of the containers. Uncovered dumpsters also expose waste to storm water, which may leak out of the dumpster and into the storm sewer system.

Description of BMP: Locate waste and recycling drums and containers in centralized areas, using proper labeling (both containers and location) and providing easy access. If possible, the area will have secondary containment (see BMPs 012, 013, and 014). Waste containers will be emptied regularly. Dumpsters will all have lids; lids will be kept closed when not in use. If the dumpster has inadequate capacity and it is not possible to keep the cover closed, the frequency of pick-up will be increased, or the dumpster will be replaced with a model of greater capacity.

Application Guidance: This BMP will be applied to all waste and recycling storage areas.

Training: Personnel will be trained to monitor waste and recycling storage sites to ensure their materials are properly stored and that there are no overflowing containers.

Effectiveness and Cost: This is a moderately effective, low-cost BMP.

Limitations: None

BMP 033 - CHECK VEHICLES AND EQUIPMENT FOR LEAKS

Description of Potential Pollutant and Source: Vehicles, aircraft, or equipment entering or stored at a maintenance facility may be leaking a variety of fluids (fuel, oil, antifreeze, freon, etc.). These materials can be exposed to storm water.

Description of BMP: Inspect all vehicles and equipment at the site, whether incoming, parked, stored, or salvaged, for oil and fluid leaks. Drivers of fleet vehicles, such as delivery trucks, will also check under their vehicles each morning for fluid leaks. If leaks are present, drip pans will be placed under the vehicle or equipment. Once the vehicle is removed from the site, the former parking area will be inspected for stains, and these stains will be cleaned using rags or dry solvents.

Application Guidance: Any vehicle or equipment coming in for repairs, painting, or storage will be inspected for leaks. Fleet vehicles will be inspected each morning. Vehicles that are parked, stored, or salvaged will be provided with drip pans, as will tanker rail cars waiting to be unloaded. The frequency for implementing this BMP has been provided as general guidance. However, a facility operator may wish to establish a more suitable frequency. This will require SWPPP implementors to make judgements based on facility operations and conditions. To assign a frequency other than what has been suggested (i.e., more or less frequent), the following criteria will be considered and rated either High, Medium, or Low. If many of the criteria are assigned a High rating, the frequency may be increased. Similarly, if many criteria are assigned a Low rating, the frequency may be decreased. The goal of implementing this BMP is to minimize exposure of pollutants to storm water.

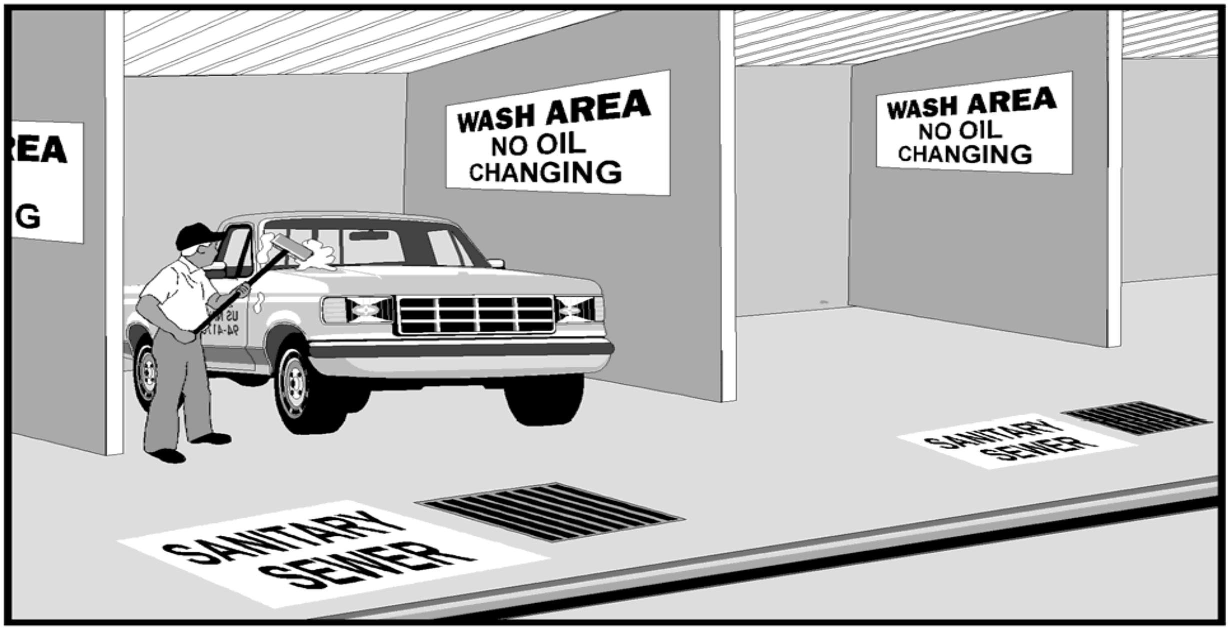
CRITERIA	Rating H=High M=Medium L=Low
Probability of exposure of significant materials to storm water	
Old age or poor condition of equipment and vehicles	
Evidence of exposure (e.g., stains on pavement)	
Proximity of source area to outfall or receiving water	
Sensitivity of receiving water to potentially exposed significant materials (e.g., waters with beneficial uses such as human contact, recreation, significant species habitat, etc.)	

<u>Training:</u> Signs will be posted to remind personnel of proper procedures.

<u>Effectiveness and Cost:</u> Checking for leaks is a moderately effective, low-cost BMP.

<u>Limitations:</u> None

BMP 041 - WASH EQUIPMENT AND VEHICLES IN DESIGNATED AREA



Description of Potential Pollutant and Source: Washing equipment and vehicles outdoors or in areas where wash water flows onto the ground can pollute storm water. It is difficult to control the wastewater from washing operations if it is not done in a designated area.

Description of BMP: Facilities will designate bermed wash areas that contain wash water and prevent contact with storm water. These areas will drain to the sanitary sewer (BMP 042) or to a sump. If a sump is used, wash water will be recycled.

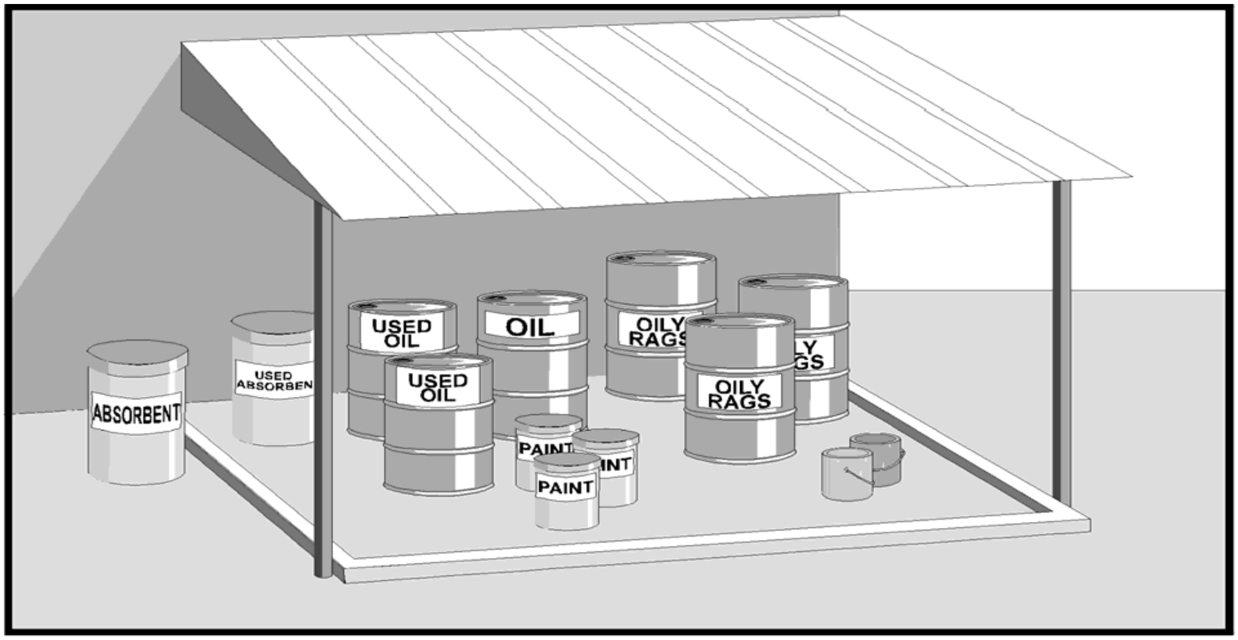
Application Guidance: This practice will be followed wherever vehicles, equipment and aircraft are washed.

Training: N/A

Effectiveness and Cost: This is a highly effective, variable-cost BMP.

Limitations: Pretreatment and monitoring of wash waster discharges to the sanitary sewer may be required. This would greatly increase the cost of this practice. The treatment plant operator will be notified and approval obtained before discharge.

BMP 061B - STORE LIQUIDS AND SIGNIFICANT MATERIALS WITHIN A BUILDING OR COVERED AREA



Description of Potential Pollutant and Source: Many significant materials may be leaked or spilled during storage, handling, or transport. If significant materials are stored outside, in covered areas, these materials can be exposed to storm water, which can transport the leaked or spilled material into the storm drain system.

Description of BMP: To the extent practical, store significant materials within a building or covered area. The materials will be stored on an impervious surface, such as a concrete pad. Rainfall runoff from the pad will be directed to a storm water treatment facility or contained. Leaks and spills will be cleaned up as soon as possible using rags or dry absorbents (see BMP 006). Used rags and absorbents will be disposed of properly. Any wash water from cleaning the floor will be disposed of in the sanitary sewer (see BMP 042).

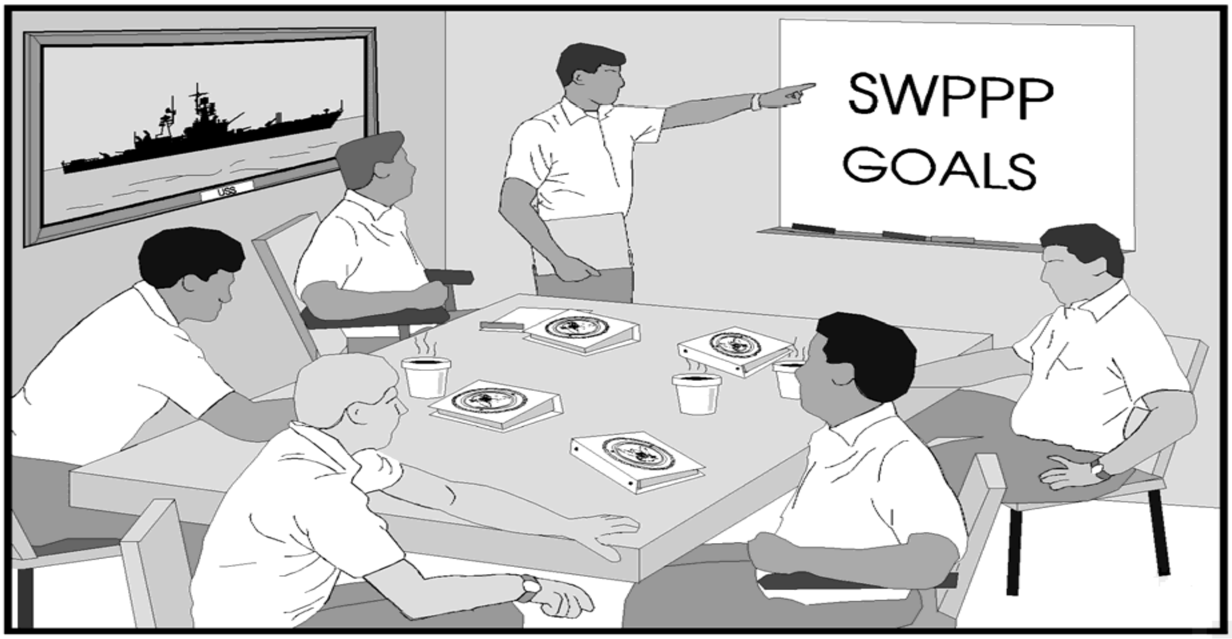
Application Guidance: All significant materials will be stored within a building or covered area.

Training: Personnel will be trained to store significant materials in designated areas.

Effectiveness and Cost: This is a moderately effective BMP. The cost will vary based on whether a building for storing the substances is available.

Limitations: None

BMP 113 - CONDUCT PERSONNEL TRAINING REGARDING THE SWPPP



Description of Potential Pollutant and Source: When properly trained, personnel are more capable of preventing spills, responding safely and effectively to an accident when it occurs, and recognizing situations that could lead to storm water contamination.

Description of BMP: Train personnel at all levels of responsibility in the components and goals of the SWPPP.

Application Guidance: Training will be conducted quarterly and at new personnel orientations.

Training: Training will address each component of the SWPPP, including how and why tasks are to be implemented. Topics will include:

- Good housekeeping
- Material management practices
- Spill prevention and response

Effectiveness and Cost: This is a highly effective, moderate-cost BMP.

Limitations: None

APPENDIX B

ROUTINE FACILITY INSPECTION CHECKLIST

Routine Facility Inspection Checklist

Activity Name: ______________________ **Date of Inspection:** ______________________

Inspector(s): ______________________ **Facility Name/Number:** ______________________

Column 1	Column 2	Column 3	Column 4	Column 5	
Source Area	BMP Number and Title	Status: F, P, N, NA[1]	Briefly Describe Effectiveness (Good or Other [describe])	Corrective Measures	
				What	By When

Note 1: F – Fully implemented, P – Partially implemented, N – Not implemented , NA – Not Applicable

APPENDIX C

QUARTERLY VISUAL ASSESSMENT CHECKLIST

Quarterly Visual Assessment Checklist

Facility ID and Location: ______________________

Date: ____________________

Sampler Name (Printed): ______________________________________

Signature: ______________________________________

Time of Rainfall Begin: ________________ Time of Rainfall End: ____________________

Time of Flow Begin: ________________ Time of Flow End: ____________________

Rainfall event more than 72 hours since last event? Yes / No

Rainfall Event Total: ____________________

Sample: sample in a clean, colorless glass or plastic container, and examined in a well-lit area

On samples collected within the first 30 minutes of an actual discharge from a storm event

Sample Characteristics:

Color: ____________________ Floating Solids: ____________________________

Odor: ____________________ Settled Solids: ____________________________

Clarity: ____________________ Suspended Solids: ____________________________

Oil Sheen: ____________________ Foam: ____________________________

Other Obvious Indicators of Storm Water Pollution

(describe): ____

Nature of the discharge (i.e., runoff):

Results of observations of the storm water discharge:

Probable sources of any observed storm water contamination:

If applicable, why it was not possible to take samples within the first 30 minutes:

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

APPENDIX D

CORRECTIVE ACTION LOG

Corrective Action Log

Use this form to document SWPPP corrective actions. This form is to be completed by the Environmental Compliance Coordinator (ECC) or a person designated by ECC and submitted to the MCBH Storm Water Program Manager. The Storm Water Program Manager is responsible for any notification to the State of Hawaii Department of Health (DOH), if required.

A corrective action is defined as an action taken to:

a) **Repair, modify, or replace any storm water control used at the site;**
b) **Clean up and properly dispose of spills, releases, or other deposits; or**
c) **Remedy a permit violation.**

1. Corrective Action Triggers

The following events trigger a corrective action to be taken (this triggering condition is to be documented *within 24 hours* of discovering the occurrence):

a) A required storm water control was never installed, was installed incorrectly, or is not in accordance with the requirements in the SWMP Plan.

b) A member of the **Storm Water Pollution Control Team** becomes aware that the storm water controls installed and being maintained are not effective enough for the discharge to meet applicable water quality standards or applicable requirements in the MCBH SWMP Plan. The facility ECC shall notify the Storm Water Program Manager immediately. The Storm Water Program Manager will notify DOH *by the end of the next work day*.

1.1 Log Notifications:

Date/time Storm Water Program Manager notified by ECC: ________________________

Date/time DOH notified by Storm Water Program Manager: ________________________

1.2 Describe Discharge:

Indicate which one of the following prohibited discharges is occurring or has occurred:

- ❒ Wastewater from washout of concrete
- ❒ Wastewater from washout and cleanout of stucco, paint, form release oils, curing compounds, or other construction materials
- ❒ Fuels, oils, or other pollutants used in vehicle and equipment operation and maintenance
- ❒ Soaps, solvents, or detergents used in vehicle and equipment washing
- ❒ Toxic or hazardous substances from a spill or other release
- ❒ Other, Explain: ____

2. Requirements for Taking Corrective Actions

The ECC shall complete corrective actions in accordance with the deadlines specified below. In all circumstances, site personnel shall *immediately* take all reasonable steps to minimize or prevent the discharge of pollutants until a permanent solution is installed and made operational, including cleaning up any contaminated surfaces so that the material will not discharge in subsequent storm events. *Immediately* means the same day the condition is discovered, unless it is too late in the day, in which initiation of corrective action must begin on the following work day.

Following any of the above triggering events, the ECC shall install a new or modified control and make it operational, or complete the repair, by *no later than 7 calendar days from the time of discovery*. If it is not feasible to complete the installation or repair within 7 calendar days, the ECC shall document and submit to the Storm Water Program Manager, for their agreement, why it is not feasible to complete the installation or repair within the 7-calendar day timeframe and document a schedule for installing the storm water control and making it operational as soon as practicable after the 7-day timeframe.

If the issue is not adequately addressed within 7 calendar days or the agreed upon timeframe, enforcement procedures will be initiated. Unaddressed issues will be escalated through the chain of command. The MCBH Environmental Compliance and Protection Division Director will give the responsible party a formal notice with an appropriate deadline for action. If the problem remains unchanged, the situation will be brought to the attention of the next higher authority. The ultimate penalty for non-compliance of MS4 Permit regulations is eviction or discharge of the responsible party from MCBH. This is placed at the discretion of the Base Commander. See the Enforcement Response Plan in Appendix 3-6 of the SWMP Plan for further information on MCBH's enforcement policies.

3. Corrective Action Report

Within 24 hours of discovering the occurrence of one of the triggering conditions in SWPPP Section 4.1 at the site, the ECC must complete the following:

3.1 Describe the triggering condition:

____
____
____
____

3.2 Record the date/time of the condition identified. How was the condition identified?

____
____
____
____

3.3 Describe the corrective action taken:

____
____
____

Date/time installation or repair was completed:
(or date/time the prohibited discharge ceased) ____

Or describe why it is not feasible to complete installation or repair within 7 calendar days and detail a proposed schedule (if applicable)

____
____
____

4. Resolution of the Corrective Action Trigger

Within 7 calendar days of initiating the Corrective Action Report, the ECC must complete a report of the following:

4.1 Follow-up Actions

Describe any follow-up actions taken to review the design, installation, and maintenance of storm water controls, including the dates such actions occurred:

____
____
____

4.2 Storm Water Control Modifications

Provide a summary of storm water control modifications implemented. Include a schedule of activities required to implement changes and the date the modifications were completed or will be completed:

____
____
____

5. SWPPP Modification Due to Corrective Actions

Where corrective actions result in changes to any of the storm water controls or procedures documented in the SWPPP, modify the SWPPP accordingly *within 7 calendar days* of completing corrective action work.

Are modifications to the SWPPP necessary? ❑ Yes ❑ No

Date modifications to the SWPPP shall be completed _______________

6. Corrective Actions Required by DOH

The facility shall comply with any corrective actions required by DOH as a result of permit violations found during an inspection by DOH or the Environmental Protection Agency (EPA).

Was the Corrective Action triggered by a DOH/EPA inspection?

❑ Yes ❑ No

❑ Date of DOH/EPA Inspection __________________

7. Additional Comments:

____
____

Final

STORM WATER POLLUTION PREVENTION PLAN

Storm Water Management Program Plan

Marine Corps Base Hawaii, Oahu, Hawaii

NPDES Permit No. HI S000007

SMALL BOAT REPAIR SHOP (BUILDING 1698)

Prepared by:

Marine Corps Base Hawaii

August 2022

Table of Contents

Tables

Figures

Appendices

List of Acronyms and Abbreviations

AST	Aboveground Storage Tank
BMP	Best Management Practice
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CMU	Concrete Masonry Unit
CWA	Clean Water Act
CWB	Clean Water Branch
DOH	State of Hawaii Department of Health
ECC	Environmental Compliance Coordinator
ECE	Environmental Compliance Evaluation
ECPD	Environmental Compliance and Protection Division
EPA	United States Environmental Protection Agency
HAZMAT	Hazardous Material
HAZMIN	Hazardous Material Minimization
HEPA	High-Efficiency Particulate Air
MCBH	Marine Corps Base Hawaii
MS4	Municipal Separate Storm Sewer System
MS4 Permit	Marine Corps Base Hawaii's NPDES Permit No. HI S000007
NPDES	National Pollutant Discharge Elimination System
POC	Point of Contact
SWMP	Storm Water Management Program
SWPPP	Storm Water Pollution Prevention Plan

Certification Statement

MCBH is committed to the prevention of discharges of polluted storm water to navigable waters or the environment and maintains the highest standards for best management practices through periodic review, updating, and implementation of this Storm Water Pollution Prevention Plan (SWPPP).

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information contained therein. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Name: ______________________________ Title: ______________________________

Signature: ____________________________ Date: ______________________________

Management Review

Refer to Section 1.2 for more information on required SWPPP updates.

Review Dates	Signature	Amendment Required? (Y/N)
____________	__________________	__________
____________	__________________	__________
____________	__________________	__________
____________	__________________	__________
____________	__________________	__________
____________	__________________	__________

1 Introduction

As part of Federal regulations administered through the Clean Water Act (CWA), the State of Hawaii, Department of Health (DOH) has issued the National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4) Permit No. HI S000007 (referred to herein at the "MS4 Permit") to Marine Corps Base Hawaii (MCBH). The MS4 Permit requires that MCBH provide all existing industrial facilities, identified in MCBH's MS4 Permit application, and any newly identified industrial facilities, submitted to DOH using the "MS4 NPDES Individual Permit – Industrial Storm Water Discharge Notification Form," with a Storm Water Pollution Prevention Plan (SWPPP) for storm water associated with industrial activities.

The purpose of the regulations is to protect water quality by reducing the amount of pollutants in storm water runoff caused by industrial activities.

1.1 SWPPP Implementation

The storm water management controls of this plan will become MCBH procedure for the applicable industrial facility. An up-to-date copy of the SWPPP shall be maintained on site and at the MCBH Environmental Compliance and Protection Division (ECPD). Management staff, maintenance personnel, contractor staff, and other personnel involved in onsite industrial activities, will be knowledgeable of the plan and follow the guidelines set forth in it, in addition to any other pertinent base-wide, state and federal regulations.

Day-to-day implementation of the SWPPP is primarily the responsibility of the current facility Environmental Compliance Coordinator (ECC) or Point of Contact (POC) as identified in Table 2-1. Enforcement of the permit conditions and this SWPPP are ultimately the responsibility of ECPD and additional escalating levels of authority as specified in the Enforcement Response Plan developed by MCBH for its base-wide Storm Water Management Program (SWMP) Plan.

1.2 Updating the SWPPP

This SWPPP will be reviewed as needed to identify necessary changes, at a minimum of every five years. Updates may be required due to current best management practice (BMP) failures, spill events, changes in industrial activities, changes in features, corrective actions, or other necessary changes. Personnel changes to the Storm Water Pollution Control Team (Section 2.1) should be logged in Table 2-1. Storm Water Pollution Control Team Log. ECPD will be responsible for approving revisions to the SWPPP. In the event the plan is modified, a copy of the updated SWPPP will remain at ECPD and will be provided to the applicable facility. Additionally, ECPD shall document and report the SWPPP changes to the DOH, Clean Water Branch (CWB), within thirty days of when the changes arise.

2 Small Boat Repair Shop, Building 1698

The Small Boat Repair Shop, Building 1698, is located near the southern tip of "D" Street at MCBH. It encompasses an area of approximately 3.4 acres and can be found in grid [redacted] of the MCBH Base Map, see Figure 4-1. The facility consists of four main areas: The repair shop (Building 1698), Retail shop (Building 6800), a boat fueling area, and the boneyard. The facility-specific map is shown on Figure 4-2.

2.1 Storm Water Pollution Control Team

The Storm Water Pollution Control Team consists of the Storm Water Program Manager, ECC, and the Hazardous Material (HAZMAT) and Hazardous Material Minimization (HAZMIN) team. The Storm Water Program Manager is responsible for the enforcement of the MS4 permit at all industrial sites and provides annual training to the ECC and other personnel. The ECC is the primary unit POC for storm water related items and the day-to-day environmental matters at a specific facility. ECC's are responsible for SWPPP implementation including BMP and facility inspections, storm water assessments/sampling, BMP maintenance, and corrective actions. The HAZMAT and HAZMIN team shall be contacted if assistance is needed. The role, name, phone number, and start date of individuals on the Storm Water Pollution Control Team is recorded in Table 2-1 below. In the event of personnel turnover, Table 2-1 shall be updated accordingly.

TABLE 2-1. STORM WATER POLLUTION CONTROL TEAM LOG

Role	Name	Phone	Start Date
MCBH Storm Water Program Manager	CIV Whitney Anderson	Office: 808-257-4359	6/6/22
ECC	CIV Keegan Ross	Office: 808-257-4300 Mobile: 808-479-7364	12/13/15
HAZMAT/HAZMIN	CIV Tim Cawthon	HAZMAT Center Building 6409 Office: 808-257-9913 HAZMIN Center Building 6407 Office: 808-257-0770	N/A

2.2 Small Boat Repair Shop, Building 1698 Facility Activities

The Small Boat Repair Shop is classified as an industrial facility under United States Environmental Protection Agency (EPA) industrial sector Q – Water Transportation. The Small Boat Repair Shop is a facility that conducts minor repairs on recreational boats docked in the small boat harbor.

Building 1698 is a single-story corrugated metal structure with repair and storage areas. Hazardous materials (mostly fuel and oil) are stored is a new hazardous materials locker to the north of Building 1698. There are also used oil drums on spill containment pallets inside the building.

Repair activities at Building 1698 include sanding, fiberglass/resin application/repair, and brush painting of boats. These activities are done using high-efficiency particulate air (HEPA) vacuum-shrouded sanding tools. Repair activities are either conducted indoors or outdoors on a concrete slab south of the building (for larger boats). Occasional work on motors is also performed in the bay, if needed.

Building 1698 is generally surrounded by pavement. Storm water runoff north and east of the building sheet flows easterly over the concrete pavement and discharges directly into Kaneohe Bay. Runoff south of the building sheet flows across the concrete paved outdoor repair area and percolates into the adjacent grass/dirt picnic area. Grass has not taken root, so there are very large patches of damp dirt. Runoff on the southwest side of the building flows to two drain inlets in the gravel parking area that discharge to Kaneohe Bay via Outfall 017A. Runoff on the west side of building flows past “D” Street toward the gravel parking area and appears to pond there.

Building 6800 is a single-story concrete masonry unit (CMU) building that has a retail/rental store/showroom in front and warehouse storage of rental equipment in back. An outdoor shower next to the restrooms allows rinse water to discharge to the concrete surface, flowing into the Kaneohe Bay. Rinse water is an allowable discharge as long as it no detergents or other chemicals are used. The warehouse is dry swept daily and wet mopped about twice every week, while the showroom is mopped about once every week.

A Convault, double-walled, gasoline fuel aboveground storage tank (AST), Building 1192, is located north of Building 6800. A boat ramp is situated between the tank and building. The fuel tank is a pedestal-mounted, double-walled tank within a concrete bermed area for vehicles to drive into and park while fueling. Galvanized steel pipe conveys fuel from the tank to a fuel dispensing pump located near the edge of the adjacent pier. The pump can be utilized 24 hours a day, 7 days a week.

The asphalt paved Boat Storage Parking Area is located further north of the fueling area, surrounded by chain-linked fencing. Across “D” Street from the boat storage is a gravel area located to the east of Building 120 and designated for “Boat Washdown Area”.

At the southernmost portion of the facility, across “D” Street from the grass/dirt picnic area, there is a chain-linked fenced compound called the “Boneyard”. This area is used to store derelict boating equipment, tires, buoys, wooden pallets, and various scrap metal. It is recommended that these materials be discarded if possible or stored in bins off of the ground to prevent contact with storm water.

Storm water runoff generated at the Small Boat Repair Facility percolates into the ground or flows via sheet flow into Kaneohe Bay. There are no storm water drain inlets in the immediate area of the facility but two grated inlets are located in the gravel parking lot between Building 1698 and the Boneyard. It is not clear exactly where these inlets discharge, but it is assumed that they drain to the adjacent coastal water near the marina pier. The storm water sample collection site is located at the southern side of the concrete boat repair slab near Building 1698. The sampling location (Outfall 01) is a sheet flow location along a seam in the concrete where a puddle forms prior to running into the harbor (Figure 4-2). Sheet flow into the harbor from all other locations is considered substantially similar in quality to Outfall 01.

2.1 Sources of Pollutants

The following is an inventory of potential pollutants associated with Small Boat Repair Shop, Building 1698:

A. Material Loading and Unloading Areas

Materials that are spilled, leaked, or lost during loading or unloading may collect on vegetated or paved surfaces and be carried away by storm runoff. Materials are loaded and unloaded near the entrance to (west side of) the Building 1698 and at the gasoline AST and fuel pump dispenser by the larger boat ramp.

B. On-Site Material Storage and Disposal Practices

Leaks, drips, or spills of materials that are stored or disposed of in areas exposed to rainfall can be carried away by storm water. Significant materials are stored in the new hazardous material locker (primarily gasoline) north of Building 1698. There are also used oil drums on spill containment pallets inside the building. Filled drums of used oil and other wastes are turned into the base HAZMIN Facility.

C. Outdoor Activities

Many outdoor activities at MCBH, Kaneohe Bay use materials or create wastes that have the potential to pollute storm water runoff. Outdoor activities include loading and unloading of materials; maintenance work, including sanding, fiberglass/resin application/repair, and brush painting of boats; gasoline dispensing; boat storage; rinsing within the outdoor shower, and boat washing/rinsing.

D. Significant Materials Inventory

The following is a list of significant materials found at the Small Boat Repair Shop:

- Paints
- Paint Thinner
- Wood Stain
- Resin
- Acetone
- Batteries
- Lubricants
- Solvents
- Sanding Wastes
- Fiberglass
- Used Oil
- Gasoline
- Metals

2.2 Potential Storm Water Pollutants

The following pollutants have been identified as having a reasonable potential to be present in storm water discharges from the Small Boat Repair Shop if not properly managed:

- Paints
- Paint Thinner
- Wood Stain
- Resin
- Acetone
- Metals
- Lubricants
- Solvents
- Sanding Wastes
- Fiberglass
- Used Oil
- Gasoline
- Sediment

Materials that have ***not*** been included as a potential storm water pollutant but have been included as part of the significant materials inventory list, are considered to present a negligible risk to storm water quality. This is based on the nature/location of the primary activities performed with these materials and the BMPs that are in place. Material transport (loading/unloading) is not considered to be a significant threat to storm water, due to spill response procedures, training, and spill kit materials available onsite.

2.3 Best Management Practices (BMPs)

Best Management Practices (BMPs) are techniques or methods that aim to manage the quantity and improve the quality of storm water runoff from a facility or other site. Storm water BMPs intend to reduce or eliminate pollution and contaminants collected by runoff before the runoff reaches the MCBH storm water system or sensitive ecosystems such as streams, wetlands, and marine environments. The following is a summary of BMPs currently in place at the Small Boat Repair Shop, Building 1698.

A. Good Housekeeping Practices

In general, Small Boat Repair Shop, Building 1698 employs good housekeeping practices throughout its operations. Good housekeeping practices for Small Boat Repair Shop, Building 1698 are included in Table 2-2. Work areas are cleaned daily to minimize the risk of storm water pollution.

B. Preventative Maintenance

Preventive maintenance is important as water pollution control measures may be of little or no use if devices and equipment have not been properly maintained. Facility personnel conduct inspection of facility equipment and storage systems on a regular basis. The preventive maintenance program involves inspections of equipment and storage systems that are exposed to storm water.

C. Visual Inspections

Visual inspection provides a valuable subjective assessment of the status of storm water management systems. They are easily performed and allow the opportunity for corrective action, if necessary. Site inspections and documentation requirements are addressed in in Section 3 of this SWPPP. MCBH HAZMIN Center staff perform hazardous material inspections monthly. Annual facility inspections are performed by EPCD as part of the MCBH Environmental Compliance Evaluation (ECE).

D. Spill Prevention and Response

Areas where significant material spill or leakage can occur are identified in Section 2.1 and shown on Figure 4-2. The storm water systems and their accompanying drainage points are also shown on Figure 4-2. Refer to Table 2-2 for BMPs related to spill preventative measures for material handling procedures, storage requirements, and equipment usage.

In the event of a hazardous substance or oil spill, the ECC and ECPD shall be notified immediately (ECPD; 808-630-8246). If the spill cannot be easily addressed using an onsite spill kit and personal protective equipment, call Fed Fire (Military 911). The spill source should be immediately controlled if it is safe to do so by closing valves, switches, and/or turning off power to a device. Then, contain the spill by using sorbent socks or absorbent materials found in a spill kit. After it has been contained, clean up the spilled material in a safe manner using dry methods. All materials should then be properly disposed of.

The locations of spill kits are shown in Figure 4-2.

E. Erosion and Sediment Controls

No areas of the facility were found to have exposed dirt or other sediment that could be a source of pollution. All surfaces are paved, well vegetated, or covered in gravel (Figure 4-2).

F. Best Management Practices to Minimize Pollutant Contact with Storm Water

Facility personnel receive annual training from ECPD at minimum, as well as an initial training for all new personnel. Training information will include the BMPs that have been developed for the facility and a general overview of the storm water program and its objectives.

Existing BMPs at the Small Boat Repair Shop are shown in Table 2-2 and attached as fact sheets to this SWPPP in Appendix A.

TABLE 2-2. BEST MANAGEMENT PRACTICES

BMP No.	BMP Title	Description
001	Label All Drums, Cans, Containers, Tanks, and Valves	All containers and drums are labeled.
004	Avoid Hosing Down the Site	Sweeping with a push broom is performed as needed.
006	Control Spills	Any spill of significant materials is controlled immediately to prevent pollutant from being transported to receiving water. A spill kit is stored onsite.
007	Place Trash Receptacles at Appropriate Locations	Covered trash bins are located throughout the facility

BMP No.	BMP Title	Description
016	Store Waste and Recycling Materials in Proper Containers	Waste and recycling containers are located Waste containers will be emptied regularly. Dumpsters should all have lids; lids should be kept closed when not in use.
032	Dispose of Obsolete Equipment, Inoperable Vehicles, and Surplus Materials	Dispose of hazardous waste materials, unused, derelict boating equipment, and various scrap metal in the boneyard. Any metals that cannot be discarded, will be stored in a bin off of the ground to prevent contact with storm water.
033	Check Vehicles and Equipment for Leaks	Vehicles and equipment are checked for leaks on a regular basis.
041	Wash Equipment and Vehicles in Designated Area	Boats are rinsed at the designated “Boat Washdown Area” at Building 120. Ensure no detergents or cleaners are utilized during rinsing. Rinse only with fresh water at the showers outside Building 6800 and the wash basin outside Building 1698. Prohibit the use of detergents and cleaners.
061B	Store Liquids and Significant Materials within a Building or Covered Area	All significant materials are properly stored undercover and in secondary containment where required.
072	Protect Tanks from Being Damaged by Vehicles	Bollards are erected in front of the gasoline AST to protect it from being damaged by vehicles.
076	Enclose Outdoor Sanding and Painting Operations and Use Tarps to Contain and Collect Solid Wastes	Maintain and use vacuum-shrouded hand tools, portable containment berms, and tent enclosures. Contain repair and related wastes by conducting all sanding and painting activities within the containment berm and tent enclosure and by utilizing the vacuum-shrouded sanding tools.
113	Conduct Personnel Training Regarding the SWPPP	Personnel are trained regularly (initial orientation and annual refresher).

3 Inspections, Assessments and Monitoring

3.1 Routine Quarterly Site Inspections

The MS4 Permit requires a routine quarterly site inspection by a qualified person with at least one member of the storm water pollution control team participating. At least once each calendar year, the routine inspection must be conducted during a period when a storm water discharge is occurring. The site inspection is an overall evaluation of the effectiveness of the BMPs implemented at that facility. A Routine Facility Inspection Checklist (Appendix B) shall be completed during each routine site inspection and kept onsite with this SWPPP. During normal facility operating hours, inspections must be conducted of areas of the facility including, but not limited to, the following:

- Areas where industrial materials or activities are exposed to storm water;
- Areas identified in the SWPPP and those that are potential pollutant sources;
- Areas where spills and leaks have occurred in the past three years;
- Discharge points; and
- Control measures used to comply with the effluent limits contained in this permit.

3.2 Visual Assessment of Storm Water Discharges

A Quarterly Visual Assessment of storm water discharge is required for all industrial facilities at MCBH. Storm water samples for this visual assessment but must be collected in such a manner that the samples are representative of the storm water discharge from the facility. Therefore, the water sample must be collected at the designated storm water monitoring point (Outfall 01) as shown in Figure 4-2. The Quarterly Visual Assessment checklist (Appendix C) shall be completed by the current facility ECC and kept onsite with this SWPPP.

The visual assessment must be made:

- Of a sample collected in a clean, colorless glass or plastic container, and examined in a well-lit area;
- On samples collected within the first 30 minutes of an actual discharge from a storm event. If it is not possible to collect the sample within the first 30 minutes of discharge, the sample must be collected as soon as practicable after the first 30 minutes and documented why it was not possible to take the sample within the first 30 minutes; and
- For storm events, on discharges that occur at least 72 hours (three days) from the previous discharge.

Whenever the visual assessment shows evidence of storm water pollution, corrective action procedures to remedy the pollutants must be taken and documented. Refer to Section 4 for corrective action procedures.

3.3 Storm Water Monitoring – Quarterly Benchmark Sampling

The Small Boat Repair Shop, Building 1698 is considered to be under industrial activity sector Q- Water Transportation, and thus is required to perform Quarterly Benchmark Sampling. Benchmark monitoring data are primarily for MCBH's use to determine the overall effectiveness of control measures and to assist in determining when additional corrective action(s) may be necessary. A benchmark exceedance is not a permit violation, however, if corrective action is required as a result of a benchmark exceedance, failure to conduct required corrective action is a permit violation.

Quarterly Benchmark Sampling of storm water discharge from the representative sampling location at the Small Boat Repair Shop (Figure 4-2) will be monitored in accordance with Table 3-1. Benchmark samples can be collected during the same storm event as the Quarterly Visual Assessment as described in Section 3.2.

TABLE 3-1. SMALL BOAT REPAIR SHOP QUARTERLY BENCHMARK MONITORING REQUIREMENTS

Parameter	Units	Daily Maximum
Aluminum Total Recoverable	mg/L	0.75
Iron Total Recoverable	mg/L	1
Lead Total Recoverable	mg/L	0.21
Zinc Total Recoverable	mg/L	0.09

Data not exceeding benchmarks: After collection of four quarterly samples, if the average of the four monitoring values for any parameter does not exceed the benchmark, MCBH has fulfilled monitoring requirements for that parameter for the permit term.

Data exceeding benchmarks: After collection of four quarterly samples, if the average of the four monitoring values for any parameter exceeds the benchmark, review the selection, design, installation, and implementation of control measures to determine if modifications are necessary to meet the effluent limits in this permit, and either:

- Make the necessary modifications and continue quarterly monitoring until four additional quarters of monitoring are completed for which the average does not exceed the benchmark; or
- Make a determination that no further pollutant reductions are technologically available and economically practicable and achievable in light of best industry practice to meet the technology-based effluent limits or are necessary to meet the water-quality-based effluent limitations, in which case monitoring must continue once per year. Furthermore, documentation of the rationale for concluding that no further pollutant reductions are achievable must be completed and all records related to this documentation shall be retained with the site SWPPP.

Control measures must be reviewed, and any required corrective action performed immediately (or document why no corrective action is required), without waiting for the full four quarters of monitoring data, when an exceedance of the four-quarter average is mathematically certain. If after modifying control measures and conducting four additional quarters of monitoring, the average still exceeds the benchmark (or if an exceedance of the benchmark by the four-quarter average is mathematically certain prior to conducting the full four additional quarters of monitoring), review of control measures must be conducted and take one of the two actions above.

***Natural background pollutant levels*:** Following the first four quarters of benchmark monitoring (or sooner if the exceedance is triggered by less than four quarters of data; see above), if the average concentration of a pollutant exceeds a benchmark value, and a determination has been made that exceedance of the benchmark is attributable solely to the presence of that pollutant in the natural background, MCBH is not required to perform corrective action or additional benchmark monitoring provided that:

- The average concentration of your benchmark monitoring results is less than or equal to the concentration of that pollutant in the natural background; and
- Supporting documentation is produced with rationale for concluding that benchmark exceedances are in fact attributable solely to natural background pollutant levels. The supporting rationale must include any data previously collected (including literature studies) that describe the levels of natural background pollutants in the storm water discharge. Natural background pollutants are those substances that are naturally occurring in soils or ground water. Natural background pollutants do not include legacy pollutants from earlier activity on the site, or pollutants in run-on from neighboring sources which are not naturally occurring, such as other industrial sites or roadways. However, the DOH may determine that MCBH is eligible to discontinue monitoring for pollutants that occur solely from run-on sources.

3.3.1 Benchmark Sampling Methods and Protocol

A minimum of one grab sample shall be collected from a discharge resulting from a measurable storm event. Samples must be collected within the first 30 minutes of a discharge associated with a measurable storm event. If it is not possible to collect the sample within the first 30 minutes of a measurable storm event, the sample must be collected as soon as practicable after the first 30 minutes and documentation must be kept with the SWPPP explaining why it was not possible to take samples within the first 30 minutes.

When adverse weather conditions prevent the collection of samples according to the relevant monitoring schedule, a substitute sample must be taken during the next qualifying storm event. Adverse weather does not exempt filing a benchmark monitoring report in accordance with the sampling schedule. NetDMR shall be used to report any failure to monitor using a “no data” or “NODI” code during the regular reporting period.

Monitoring requirements in this permit begin in the first full quarter following either 90 days after permit issuance or the date of discharge authorization, whichever date comes later. If the monitoring is required on a quarterly basis (e.g., benchmark monitoring), monitoring must occur at least once in each of the following 3-month intervals:

- January 1 – March 31;
- April 1 – June 30;
- July 1 – September 30;
- October 1 – December 31.

3.3.2 Storm Event Selection Criteria

MCBH's MS4 Permit No. HI S000007 requires dischargers to collect and analyze grab and composite samples by manual or automatic monitoring methods, from a measurable storm event. The permit states that a measurable storm event is defined as *a storm event that produces actual discharge from your site and that occurs at least 72 hours after any previous measurable events.*

Samples may be collected using automatic sampling devices or manually. For manual sampling, the sample bottles will be filled directly from the discharge flow, by using a peristaltic pump, or by other appropriate sample collection device.

Table 3-2 lists the specific pollutants that are required to be tested. It is important that samples be submitted by the ECC to an appropriate laboratory in specific containers and within a specific amount of time in order to achieve compliance with regulations. Specific analytical parameters and their associated sampling methods, such as container type, sample holding time and required analytical methodology, are listed below in Table 3-2.

TABLE 3-2. QUALITY ASSURANCE / QUALITY CONTROL OBJECTIVES

Parameter Name	Analytical Method	Units	Methodology	Maximum Holding Time	Preservation	Container Type/ Size
Metals	EPA 200.7, 200.8	µg/L	ICP	6 months	pH<2, HNO_3	500 mL plastic

4 Corrective Actions

A corrective action is defined as any action taken, or required to be taken, to (1) repair, modify, or replace any storm water control used at the site; (2) clean up and dispose of spills, releases, or other deposits found on the site; and (3) remedy a permit violation. Corrective actions should be documented using the Corrective Action Log (Appendix D).

4.1 Immediate Actions

If corrective action is needed, you must immediately take all reasonable steps necessary to minimize or prevent the discharge of pollutants until a permanent solution is installed and made operational, including cleaning up any contaminated surfaces so that the material will not discharge in subsequent storm events. Note: In this context, the term "immediately" requires you to, on the same day a condition requiring corrective action is found, take all reasonable steps to minimize or prevent the discharge of pollutants until a permanent solution is installed and made operational. However, if a problem is identified at a time in the workday when it is too late to initiate corrective action, the initiation of corrective action must begin no later than the following workday. "All reasonable steps" means that the permittee has undertaken initial actions to assess and address the condition causing the corrective action, including, for example, cleaning up any exposed materials that may be discharged in a storm event (e.g., through sweeping, vacuuming) or making arrangements (i.e., scheduling) for a new BMP to be installed at a later date.

4.2 Escalating Actions

If additional actions are necessary beyond those implemented or if the conditions continue to occur, additional corrective actions (e.g., install a new or modified control and make it operational, complete the repair) must be completed before the next storm event if possible, and within 14 calendar days from the time of discovery of the corrective action condition. If it is infeasible to complete the corrective action within 14 calendar days, document why it is infeasible to complete the corrective action within the 14-day timeframe and identify a schedule for completing the work, which must be done as soon as practicable after the 14-day timeframe but no longer than 45 days after discovery. If the completion of corrective action will exceed the 45-day timeframe, the minimum additional time necessary to complete the corrective action can be taken, provided that MCBH ECPD and DOH is notified of your intention to exceed 45 days. Where your corrective actions result in changes to any of the controls or procedures documented in your SWPPP, you must modify your SWPPP accordingly within 14 calendar days of completing corrective action work.

4.3 Record of Past Spills or Leaks of Hazardous Pollutants

Table 4-1 is used to record significant spills and leaks that have occur or have occurred within three years prior to the preparation or amendment of this SWPPP. Significant spills and leaks include, but are not limited to, releases of oil or hazardous substances in excess of quantities that are reportable under CWA Section 311 (see 40 CFR 110.6 and 40 CFR 117.21) or Section 102 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 USC §9602.

At the time of this SWPPP update, there have been no past spill or leak incidents reported for the Small Boat Repair Shop.

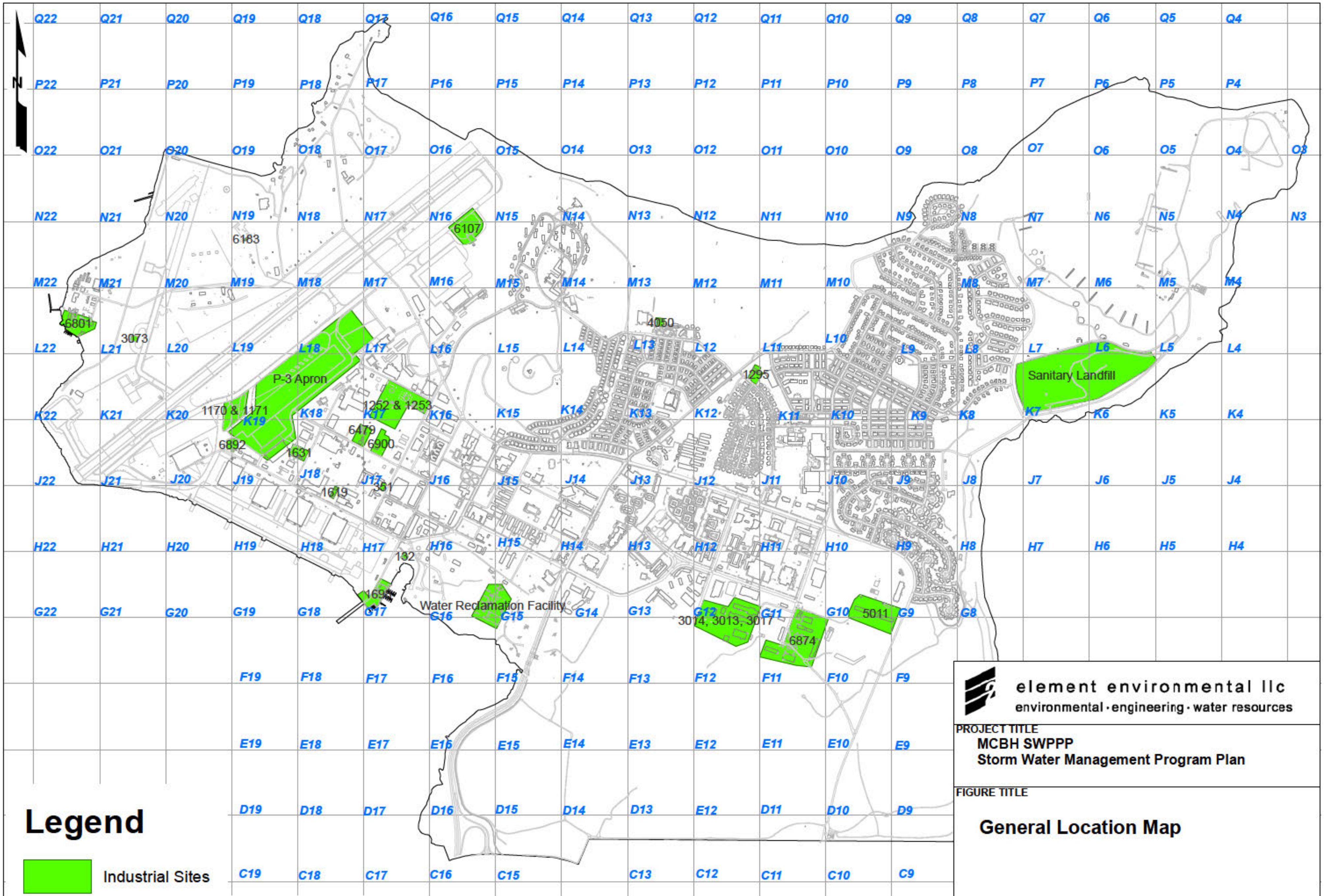
TABLE 4-1. PAST SPILLS OR LEAKS OF HAZARDOUS POLLUTANTS

Date of Incident	Brief Summary of Incident (POC Active at Time of Incident, Pollutant Type, Estimated Quantity, Location of Spill)

4.4 Record of Unauthorized Non-Storm Water Discharges

TABLE 4-2. UNAUTHORIZED NON-STORM WATER DISCHARGE EVALUATION

Date of Evaluation	Brief Summary of Evaluation (Description of the evaluation criteria, outfalls or onsite drainage points that were directly observed, action(s) taken, such as a list of control measures used to eliminate unauthorized discharge)



Legend

Industrial Sites

1,800 900 0 1,800 Feet

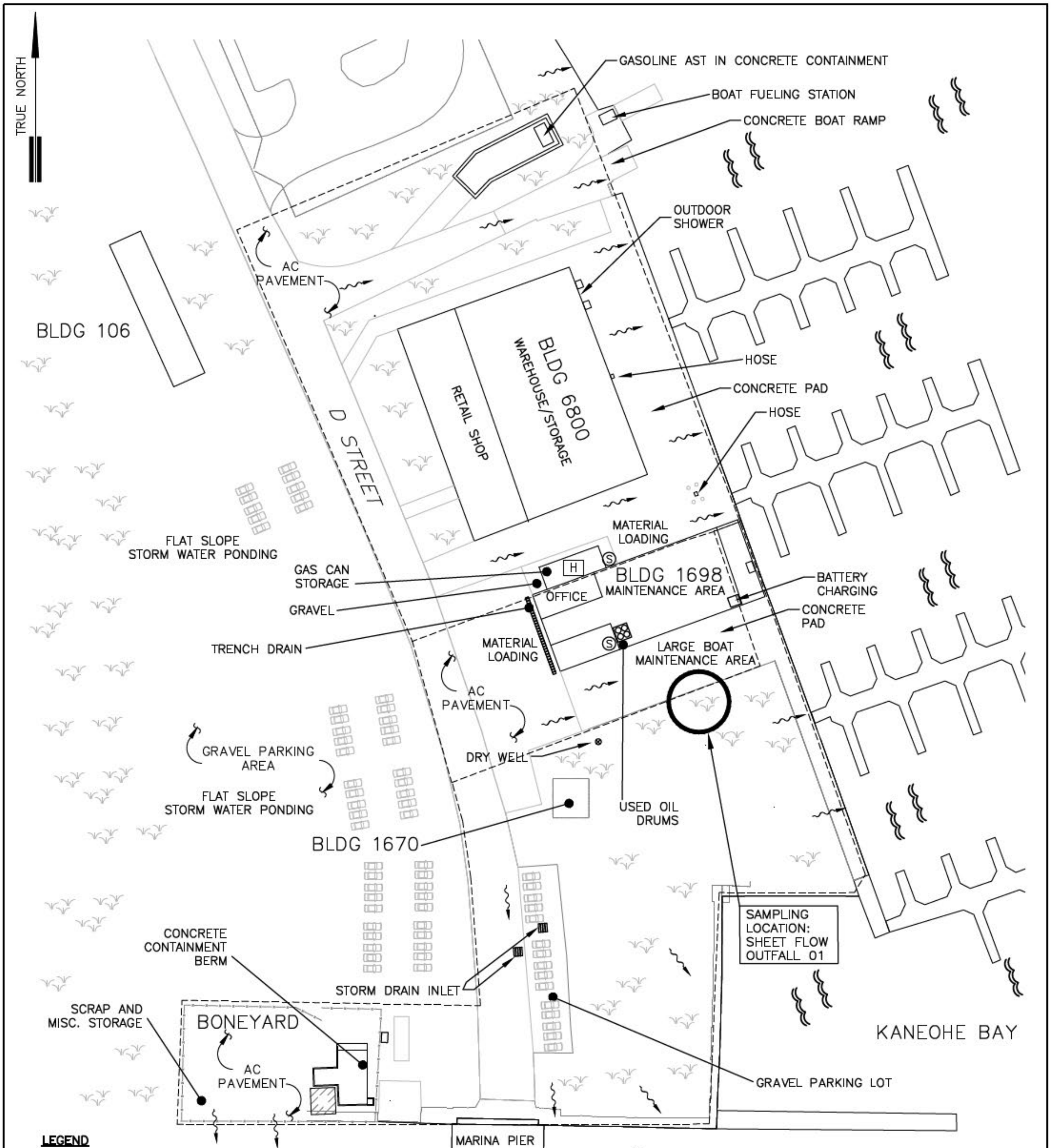
element environmental llc
environmental · engineering · water resources

PROJECT TITLE
MCBH SWPPP
Storm Water Management Program Plan

FIGURE TITLE
General Location Map

DATE
September 2022

FIGURE NO.
4-1



LEGEND

H	HAZARDOUS MATERIALS LOCKER
S	SPILL KIT
	FLOW ARROW
-------	DRAINAGE AREA BOUNDARY
	SPILL PALLET

NOTES:

1. STORM WATER, FROM APPROXIMATELY 3.4 ACRES ASSOCIATED WITH THE SMALL BOAT REPAIR SHOP, DISCHARGES AS SHEET FLOW TO KANEOHE BAY.
2. NOT TO SCALE

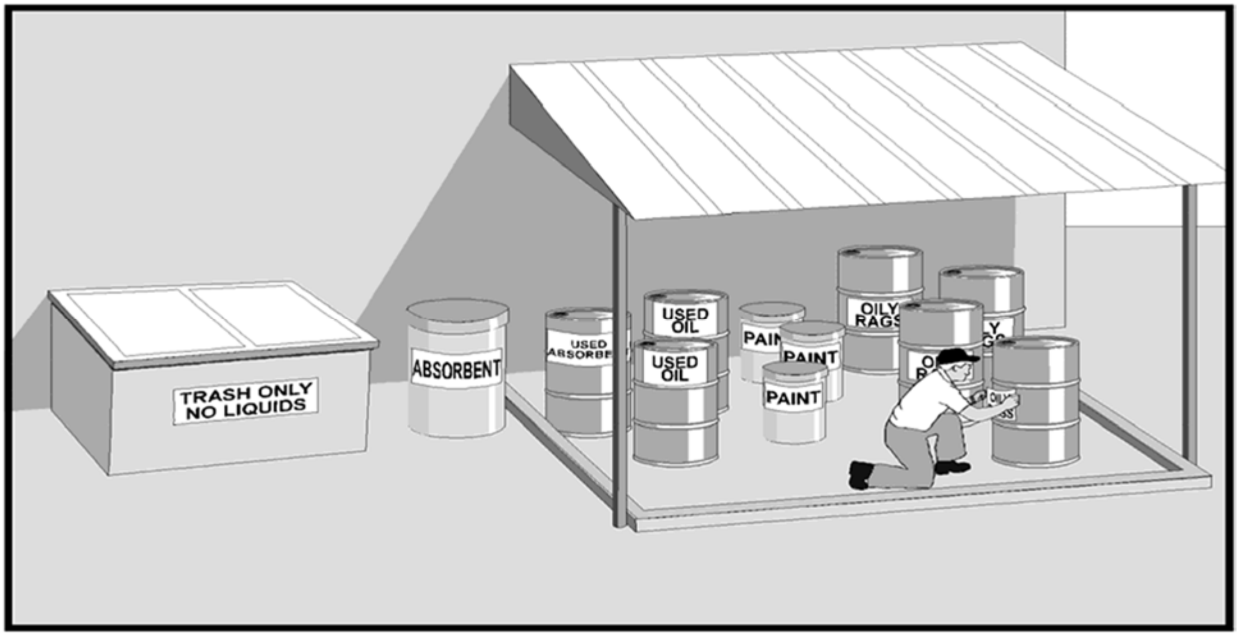
DATE:	PROJECT TITLE:	
JULY 2022	STORM WATER POLLUTION PREVENTION PLAN MCBH, KANEOHE BAY, OAHU, HAWAII	
FIGURE TITLE:		FIGURE NO.:
SMALL BOAT REPAIR SHOP (BUILDING 1698)		4-2

7/28/2022 11:09:57 AM
FIG 4-2 Bldg 1698 – Small Boat Repair Shop.dwg

APPENDIX A

SELECTED BMP FACT SHEETS

BMP 001 - LABEL ALL DRUMS, CANS, CONTAINERS, AND TANKS



Description of Potential Pollutant and Source: Drums, cans, and containers can be improperly managed and disposed of due to uncertainty of the container's contents. Tanks which are not labeled may result in improper use of the tank or fuel, which may result in the exposure of significant materials to storm water and/or receiving waters. Similarly, unlabeled valves may be opened without proper precaution due to lack of user information. Storm water quality will be affected if significant materials are improperly disposed to the storm drain and/or receiving waters. Lack of labeling will also make it difficult to quickly identify the type of material released so facility personnel can respond correctly. Labels also identify hazardous materials at the facility and are a good way to request caution in certain areas (e.g., drums indicating flammability).

Description of BMP: Label all drums, valves, pumps, cans, tanks, and containers to reduce the chance of misuse and eventual spills. Labeling ensures that the appropriate procedures, equipment, and storage containers are used. All containers will be labeled as to what is in them.

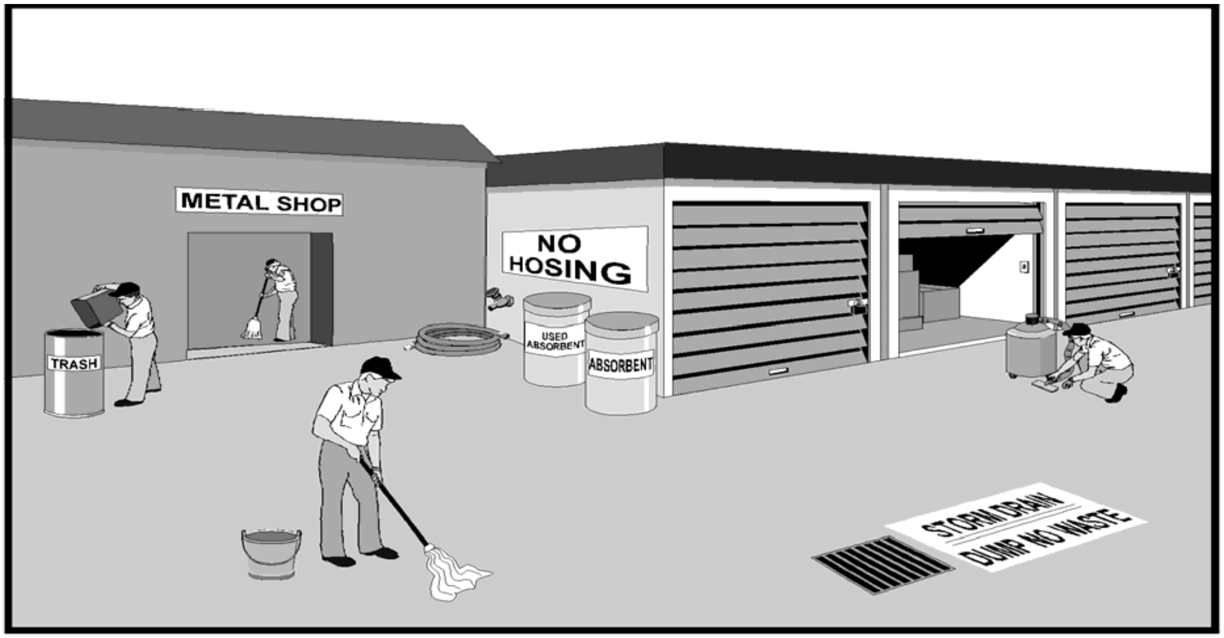
Application Guidance: As needed.

Training: N/A

Effectiveness and Cost: Effectiveness and costs will vary depending on the application.

Limitations: None

BMP 004 - AVOID HOSING DOWN THE SITE



Description of Potential Pollutant and Source: Cleaning work sites by hosing down causes wash water to transport pollutants to the storm drain where it can be exposed to storm water.

Description of BMP: Use dry methods to clean work sites. Dry methods include sweeping or using damp rags or mops. If possible or practical, hoses will be removed. If hosing down is unavoidable, the downstream drain will be temporarily plugged as described in the following BMPs:

- BMP 023 - Place portable Rubber Mats Over Storm Drain Inlets
- BMP 024 - Insert Filter in Catch Basin
- BMP 025 - Place Absorbent Blankets in Catch Basin

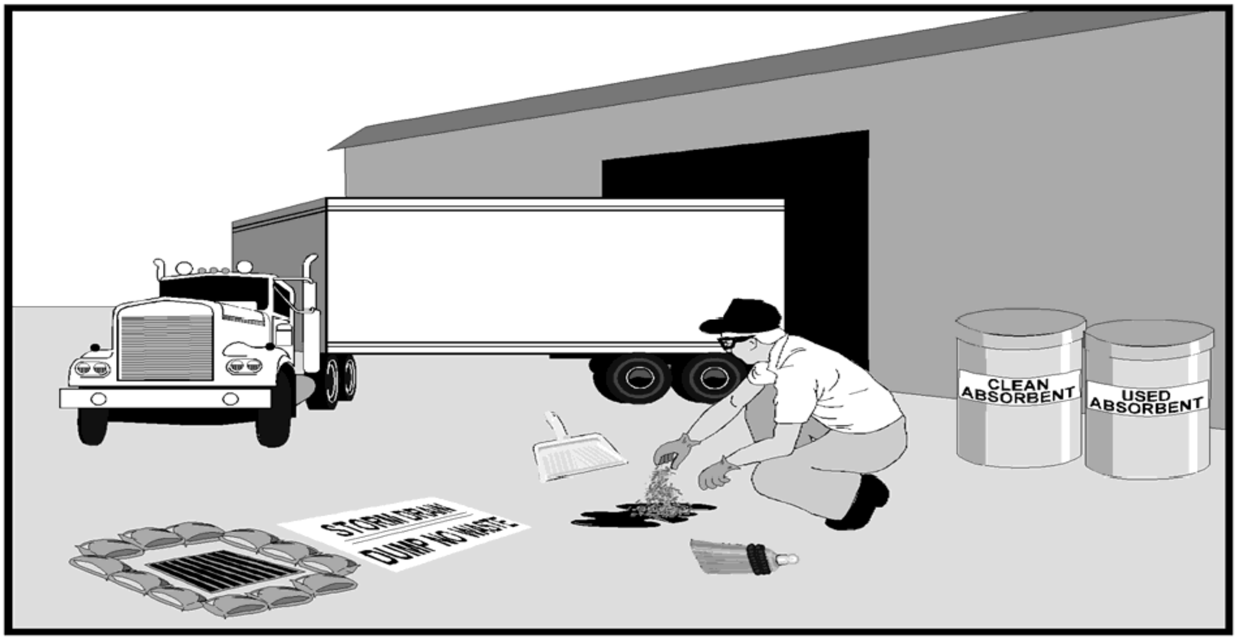
Application Guidance: Methods of dry cleaning will be used whenever possible at all workstations, loading/unloading sites, storage areas, and parking lots.

Training: New personnel will be notified of the policy and signs will be posted. If possible or practical, hoses will be removed.

Effectiveness and Cost: Eliminating hosing down is a highly effective, low-cost BMP.

Limitations: None

BMP 006 - CONTROL SPILLS



Description of Potential Pollutant and Source: Spills of significant materials may be exposed to storm water and transported to storm drains and/or receiving waters.

Description of BMP: Follow safety data sheets (SDS) for handling, storage, and cleanup of all significant materials to reduce the potential for spills.

Any spill, large or small, of significant materials will be controlled to prevent pollutants from being transported to storm drains and/or receiving waters. Appropriate spill control material will be kept on site. Smaller spills will be contained using absorbent material such as kitty litter, straw, or sawdust. Drums of absorbent material will be easily accessible and clearly marked, and containers for spent absorbent material will be readily available. Spent absorbent material will be managed appropriately and disposed of in accordance with applicable regulations. Larger spills will be controlled using spill kits, brooms, and other response equipment commensurate with the size of the spill. The methods outlined in the Activity's spill prevention and response plans (BMP 112) for hazardous materials will be followed for spills of any potential storm water pollutants. The date, time, nature and volume of material spilled, and cleanup measures taken will be recorded for all spills and kept as part of the SWPPP.

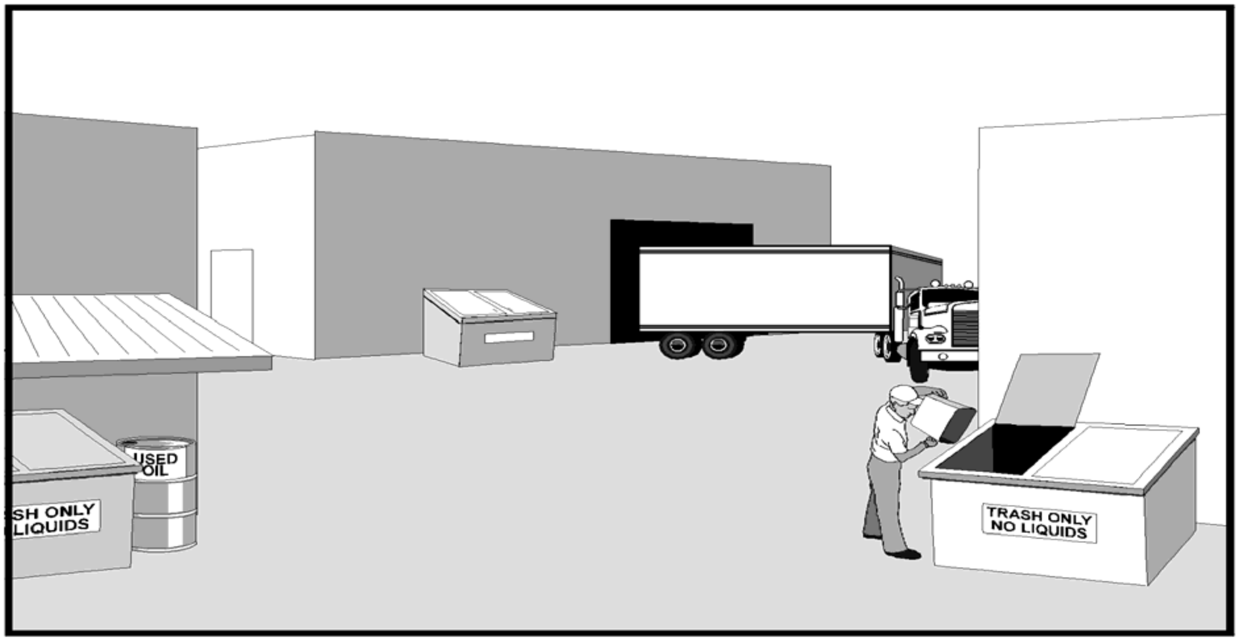
Application Guidance: Controlling spills will be practiced under all working conditions.

Training: Personnel will be trained in spill prevention and response procedures including the use of personal protection equipment (gloves, eye and face protection, etc.). This will include what absorbent or equipment to use, how to use the absorbent or equipment, where to find it, how to dispose of the spent absorbent or other material, and who to notify in the event of a spill.

Effectiveness and Cost: Spill control is a moderately effective, low-cost BMP.

Limitations: None

BMP 007 - PLACE TRASH RECEPTACLES AT APPROPRIATE LOCATIONS



Description of Potential Pollutant and Source: Improperly located or insufficient numbers of trash receptacles will promote poor housekeeping practices. This will increase the opportunity for pollutants from all source areas to reach storm water.

Description of BMP**:** Properly located and sufficient numbers of trash receptacles will promote the proper disposal of waste materials. This reduces the opportunity for pollutants to reach storm water. Trash receptacles will be easily accessible for personnel.

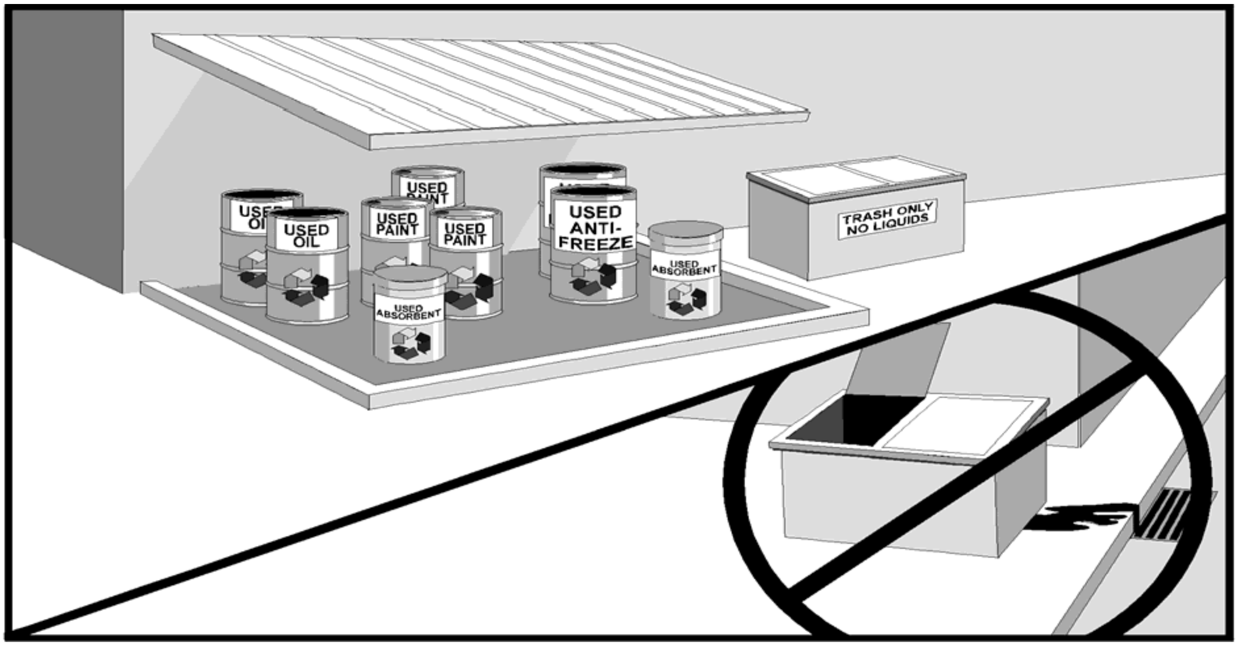
Application Guidelines: Placement of trash receptacles at appropriate locations will always be practiced.

Training: Personnel will be trained as to the location of trash receptacles.

Effectiveness and Cost: Appropriately located trash receptacles are an effective, low-cost BMP.

Limitations: None

BMP 016 - STORE WASTE AND RECYCLING MATERIALS IN PROPER CONTAINERS



Description of Potential Pollutant and Source: Dry waste, including items such as scrap metal, floor sweepings, metal chips, and paper goods, can be dispersed by wind or operational error if not stored properly. If a dumpster's lid is not kept closed, animals may carry garbage out of the containers. Uncovered dumpsters also expose waste to storm water, which may leak out of the dumpster and into the storm sewer system.

Description of BMP: Locate waste and recycling drums and containers in centralized areas, using proper labeling (both containers and location) and providing easy access. If possible, the area will have secondary containment (see BMPs 012, 013, and 014). Waste containers will be emptied regularly. Dumpsters will all have lids; lids will be kept closed when not in use. If the dumpster has inadequate capacity and it is not possible to keep the cover closed, the frequency of pick-up will be increased, or the dumpster will be replaced with a model of greater capacity.

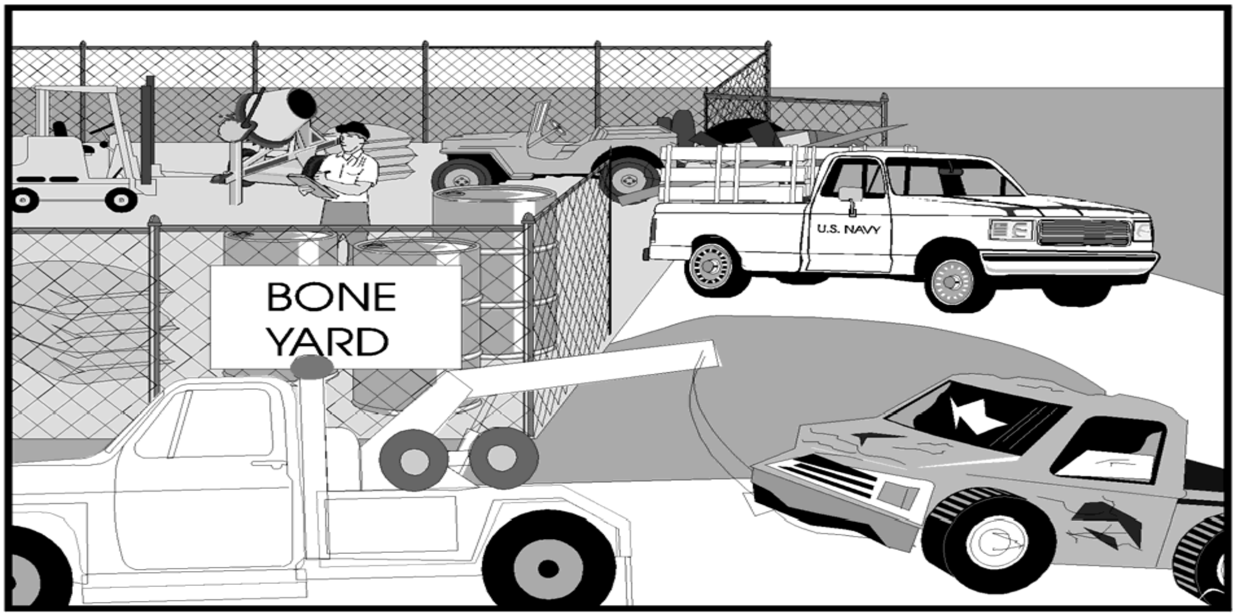
Application Guidance: This BMP will be applied to all waste and recycling storage areas.

Training: Personnel will be trained to monitor waste and recycling storage sites to ensure their materials are properly stored and that there are no overflowing containers.

Effectiveness and Cost: This is a moderately effective, low-cost BMP.

Limitations: None

BMP 032 - DISPOSE OF OBSOLETE EQUIPMENT, INOPERABLE VEHICLES, AND SURPLUS MATERIALS



Description of Potential Pollutant and Source: Obsolete equipment, inoperable vehicles, and surplus materials are often stored in areas not subject to routine inspection. These materials often leak a variety of fluids which can be exposed to storm water.

Description of BMP: Dispose of obsolete equipment, inoperable vehicles, and surplus materials at proper sites to reduce the chances of pollutants reaching storm water.

Application Guidance: This practice will be implemented quarterly.

The frequency for implementing this BMP has been provided as general guidance. However, a facility operator may wish to establish a more suitable frequency. This will require SWPPP implementors to make judgements based on facility operations and conditions. To assign a frequency other than what has been suggested (i.e., more or less frequent), the following criteria will be considered and rated either High, Medium, or Low. If many of the criteria are assigned a High rating, the frequency may be increased. Similarly, if many criteria are assigned a Low rating, the frequency may be decreased. The goal of implementing this BMP is to minimize exposure of pollutants to storm water.

CRITERIA	Rating H=High M=Medium L=Low
Probability of exposure of significant materials to storm water	
Quantity of significant materials potentially exposed	
Toxicity of significant materials potentially exposed	
Evidence of exposure (e.g., stains on pavement, evidence of significant materials in drainage system) Proximity of source area to outfall or receiving water	
Sensitivity of receiving water to potentially exposed significant materials (e.g., waters with beneficial uses such as human contact, recreation, significant species habitat, etc.)	

Training: N/A

Effectiveness and Cost: Disposing of unused equipment and supplies is a highly effective, moderate-cost BMP.

Limitations: None

BMP 033 - CHECK VEHICLES AND EQUIPMENT FOR LEAKS

Description of Potential Pollutant and Source: Vehicles, aircraft, or equipment entering or stored at a maintenance facility may be leaking a variety of fluids (fuel, oil, antifreeze, freon, etc.). These materials can be exposed to storm water.

Description of BMP: Inspect all vehicles and equipment at the site, whether incoming, parked, stored, or salvaged, for oil and fluid leaks. Drivers of fleet vehicles, such as delivery trucks, will also check under their vehicles each morning for fluid leaks. If leaks are present, drip pans will be placed under the vehicle or equipment. Once the vehicle is removed from the site, the former parking area will be inspected for stains, and these stains will be cleaned using rags or dry solvents.

Application Guidance: Any vehicle or equipment coming in for repairs, painting, or storage will be inspected for leaks. Fleet vehicles will be inspected each morning. Vehicles that are parked, stored, or salvaged will be provided with drip pans, as will tanker rail cars waiting to be unloaded. The frequency for implementing this BMP has been provided as general guidance. However, a facility operator may wish to establish a more suitable frequency. This will require SWPPP implementors to make judgements based on facility operations and conditions. To assign a frequency other than what has been suggested (i.e., more or less frequent), the following criteria will be considered and rated either High, Medium, or Low. If many of the criteria are assigned a High rating, the frequency may be increased. Similarly, if many criteria are assigned a Low rating, the frequency may be decreased. The goal of implementing this BMP is to minimize exposure of pollutants to storm water.

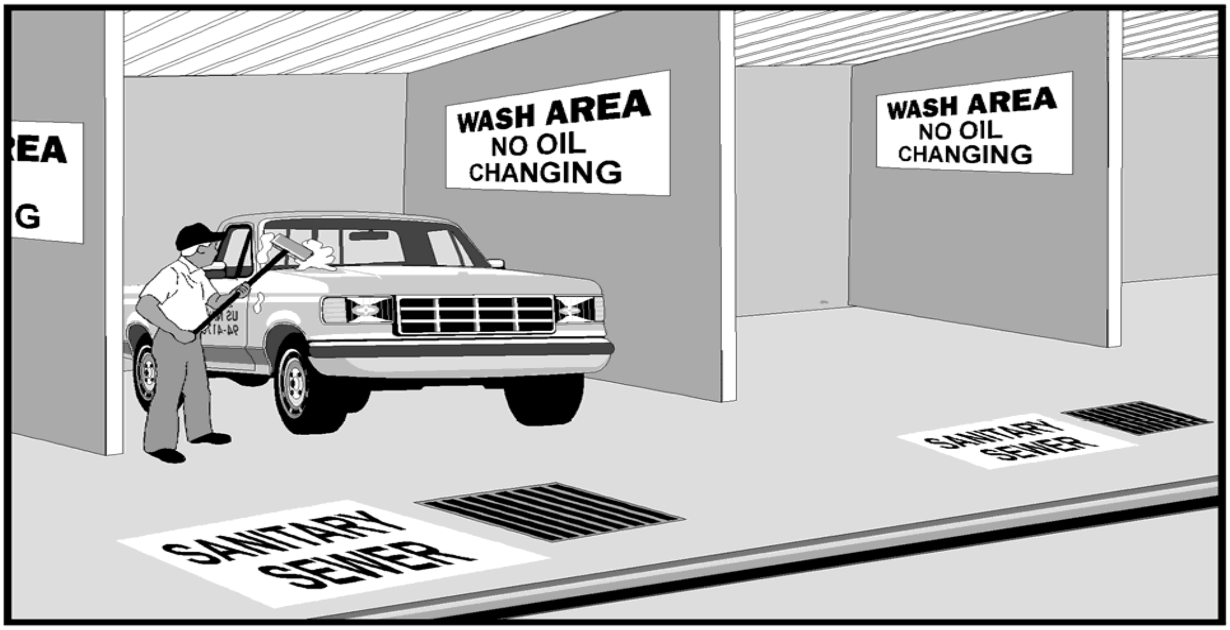
CRITERIA	Rating H=High M=Medium L=Low
Probability of exposure of significant materials to storm water	
Old age or poor condition of equipment and vehicles	
Evidence of exposure (e.g., stains on pavement)	
Proximity of source area to outfall or receiving water	
Sensitivity of receiving water to potentially exposed significant materials (e.g., waters with beneficial uses such as human contact, recreation, significant species habitat, etc.)	

<u>Training:</u> Signs will be posted to remind personnel of proper procedures.

<u>Effectiveness and Cost:</u> Checking for leaks is a moderately effective, low-cost BMP.

<u>Limitations:</u> None

BMP 041 - WASH EQUIPMENT AND VEHICLES IN DESIGNATED AREA



Description of Potential Pollutant and Source: Washing equipment and vehicles outdoors or in areas where wash water flows onto the ground can pollute storm water. It is difficult to control the wastewater from washing operations if it is not done in a designated area.

Description of BMP: Facilities will designate bermed wash areas that contain wash water and prevent contact with storm water. These areas will drain to the sanitary sewer (BMP 042) or to a sump. If a sump is used, wash water will be recycled.

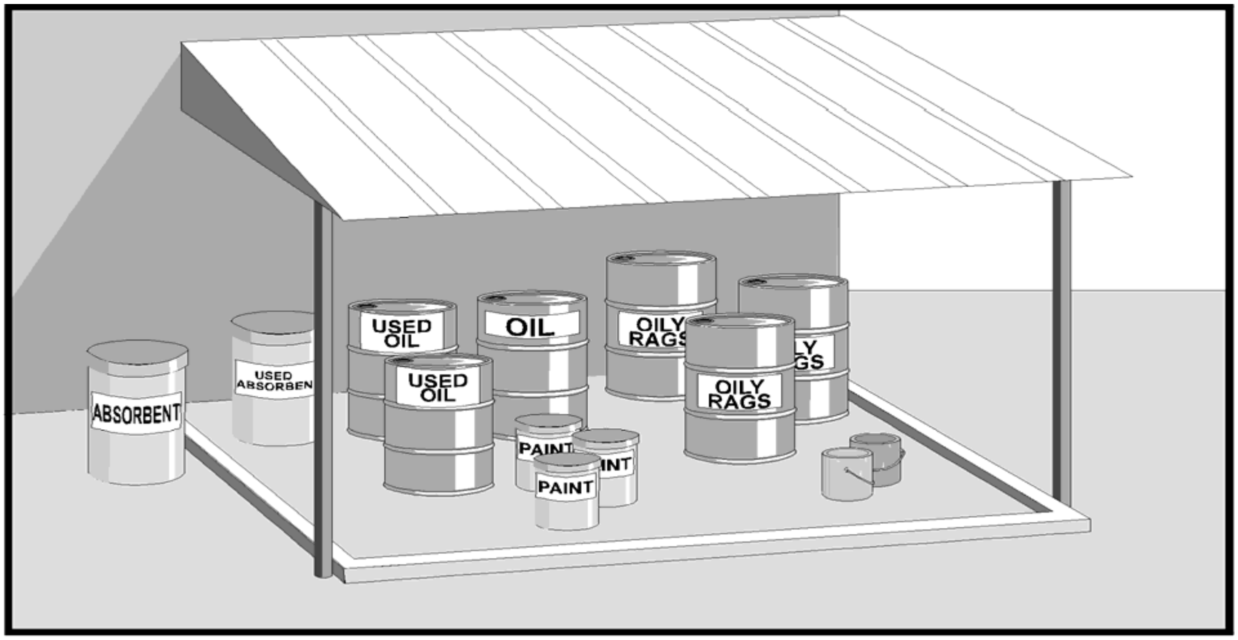
Application Guidance: This practice will be followed wherever vehicles, equipment and aircraft are washed.

Training: N/A

Effectiveness and Cost: This is a highly effective, variable-cost BMP.

Limitations: Pretreatment and monitoring of wash waster discharges to the sanitary sewer may be required. This would greatly increase the cost of this practice. The treatment plant operator will be notified and approval obtained before discharge.

BMP 061B - STORE LIQUIDS AND SIGNIFICANT MATERIALS WITHIN A BUILDING OR COVERED AREA



Description of Potential Pollutant and Source: Many significant materials may be leaked or spilled during storage, handling, or transport. If significant materials are stored outside, in covered areas, these materials can be exposed to storm water, which can transport the leaked or spilled material into the storm drain system.

Description of BMP: To the extent practical, store significant materials within a building or covered area. The materials will be stored on an impervious surface, such as a concrete pad. Rainfall runoff from the pad will be directed to a storm water treatment facility or contained. Leaks and spills will be cleaned up as soon as possible using rags or dry absorbents (see BMP 006). Used rags and absorbents will be disposed of properly. Any wash water from cleaning the floor will be disposed of in the sanitary sewer (see BMP 042).

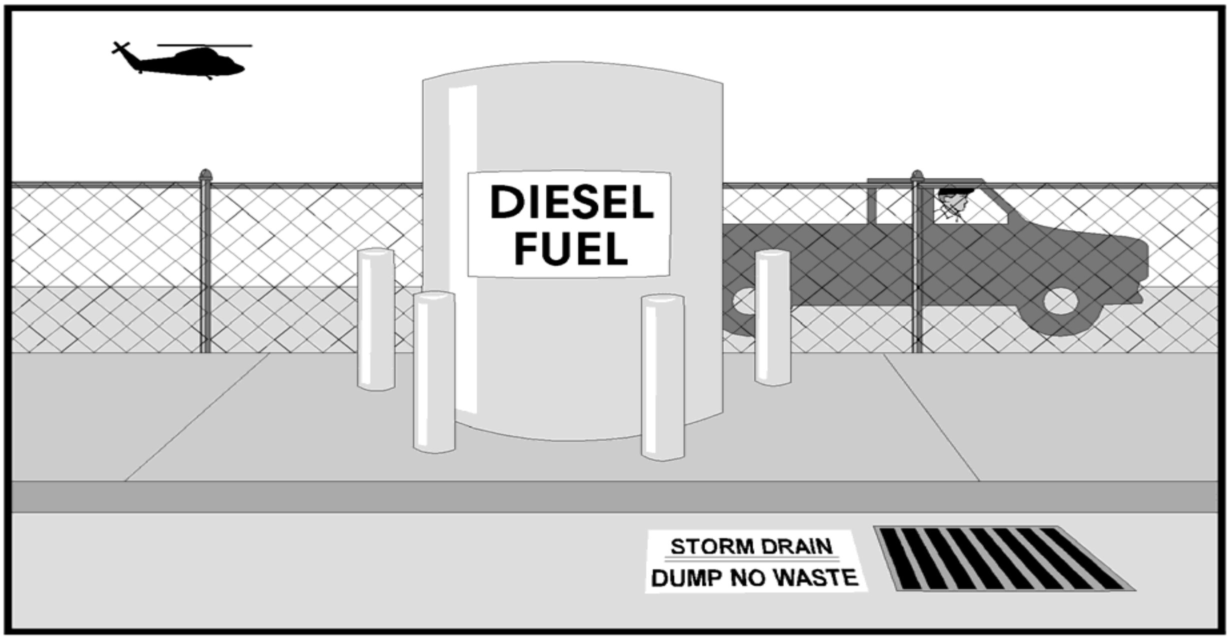
Application Guidance: All significant materials will be stored within a building or covered area.

Training: Personnel will be trained to store significant materials in designated areas.

Effectiveness and Cost: This is a moderately effective BMP. The cost will vary based on whether a building for storing the substances is available.

Limitations: None

BMP 072 - PROTECT TANKS FROM BEING DAMAGED BY VEHICLES



Description of Potential Pollutant and Source: If a tank is damaged by a vehicle, fuel, or other significant materials may be leaked from the tank and become exposed to storm water. The materials can then be transported to the storm drain and/or receiving waters.

Description of BMP: Protect tanks from being damaged by vehicles. Bollards or traffic barriers may be used if the tank location is accessible to vehicles. Fences and curbs may also protect the tanks.

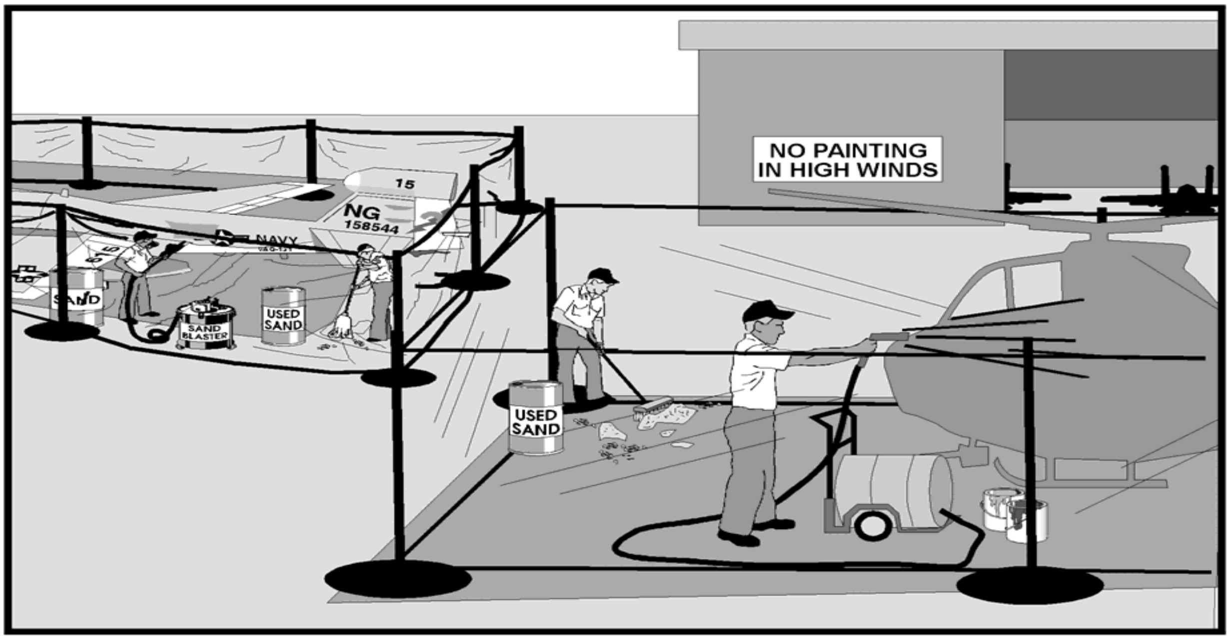
Application Guidance: Tanks will be guarded from being damaged by vehicles.

Training: N/A

Effectiveness and Cost: This is an effective, low-cost BMP.

Limitations: None

BMP 076 - ENCLOSE OUTDOOR SANDING AND PAINTING OPERATIONS AND USE TARPS TO CONTAIN AND COLLECT SOLID WASTES



Description of Potential Pollutant and Source: Sanding, in preparation for painting, and painting itself creates wastes including glass, metal, stone and other wastes that may become exposed to storm water if not properly collected and disposed. These materials can then be transported to storm drains and/or receiving waters.

Description of BMP: Contain paint-related wastes by covering all sanding and painting activities with tarps or plastic sheeting and by placing a tarp under and/or around all sanding and painting operations. These wastes will be collected in labeled drums and disposed of appropriately.

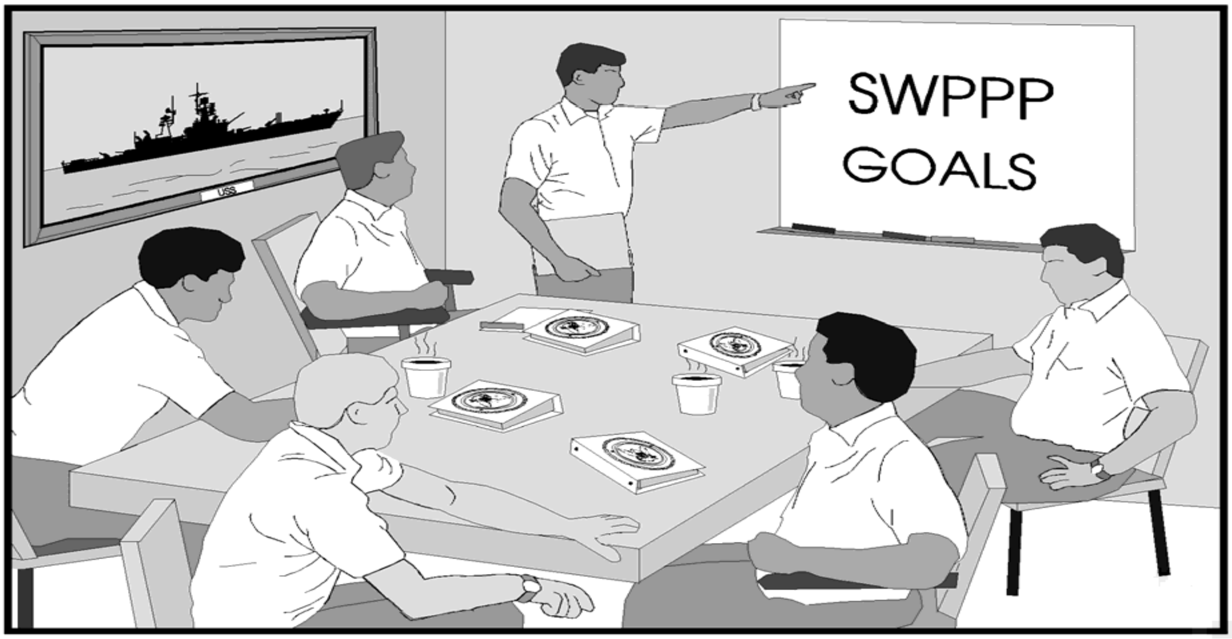
Application Guidance: This practice will be used in all sanding and painting operations performed outside of sanding or painting booths.

Training: Personnel will be instructed in procedures for the containment, collection and disposal for the control of particulates from sanding and painting; tarps will be monitored for holes. The waste will be recycled or disposed in a landfill if it is not a hazardous waste. Signs will be posted where sandblasting activities take place to remind personnel about proper disposal practices.

Effectiveness and Cost: Containment, collection and disposal of sandblasting wastes is a highly effective, usually moderate-cost BMP. However, costs for large-scale painting and sanding activities (e.g., ships and large equipment) could be high.

Limitations: The size of some operations may make implementation of this practice difficult.

BMP 113 - CONDUCT PERSONNEL TRAINING REGARDING THE SWPPP



Description of Potential Pollutant and Source: When properly trained, personnel are more capable of preventing spills, responding safely and effectively to an accident when it occurs, and recognizing situations that could lead to storm water contamination.

Description of BMP: Train personnel at all levels of responsibility in the components and goals of the SWPPP.

Application Guidance: Training will be conducted quarterly and at new personnel orientations.

Training: Training will address each component of the SWPPP, including how and why tasks are to be implemented. Topics will include:

- Good housekeeping
- Material management practices
- Spill prevention and response

Effectiveness and Cost: This is a highly effective, moderate-cost BMP.

Limitations: None

APPENDIX B

ROUTINE FACILITY INSPECTION CHECKLIST

Routine Facility Inspection Checklist

Activity Name: ____________________ **Date of Inspection:** ____________________

Inspector(s): ____________________ **Facility Name/Number:** ____________________

Column 1	Column 2	Column 3	Column 4	Column 5	
Source Area	BMP Number and Title	Status: F, P, N, NA[1]	Briefly Describe Effectiveness (Good or Other [describe])	Corrective Measures	
				What	By When

Note 1: F – Fully implemented, P – Partially implemented, N – Not implemented , NA – Not Applicable

APPENDIX C

QUARTERLY VISUAL ASSESSMENT CHECKLIST

Quarterly Visual Assessment Checklist

Facility ID and Location: ______________________

Date: ____________________

Sampler Name (Printed): ______________________________ Signature: ______________________________

Time of Rainfall Begin: ______________ Time of Rainfall End: ______________

Time of Flow Begin: ______________ Time of Flow End: ______________

Rainfall event more than 72 hours since last event? Yes / No

Rainfall Event Total: ______________

Sample: sample in a clean, colorless glass or plastic container, and examined in a well-lit area

On samples collected within the first 30 minutes of an actual discharge from a storm event

Sample Characteristics:

Color: ______________ Floating Solids: ______________

Odor: ______________ Settled Solids: ______________

Clarity: ______________ Suspended Solids: ______________

Oil Sheen: ______________ Foam: ______________

Other Obvious Indicators of Storm Water Pollution

(describe): ____

Nature of the discharge (i.e., runoff):

Results of observations of the storm water discharge:

Probable sources of any observed storm water contamination:

If applicable, why it was not possible to take samples within the first 30 minutes:

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

APPENDIX D

CORRECTIVE ACTION LOG

Corrective Action Log

Use this form to document SWPPP corrective actions. This form is to be completed by the Environmental Compliance Coordinator (ECC) or a person designated by ECC and submitted to the MCBH Storm Water Program Manager. The Storm Water Program Manager is responsible for any notification to the State of Hawaii Department of Health (DOH), if required.

A corrective action is defined as an action taken to:

a) **Repair, modify, or replace any storm water control used at the site;**
b) **Clean up and properly dispose of spills, releases, or other deposits; or**
c) **Remedy a permit violation.**

1. Corrective Action Triggers

The following events trigger a corrective action to be taken (this triggering condition is to be documented *within 24 hours* of discovering the occurrence):

a) A required storm water control was never installed, was installed incorrectly, or is not in accordance with the requirements in the SWMP Plan.
b) A member of the **Storm Water Pollution Control Team** becomes aware that the storm water controls installed and being maintained are not effective enough for the discharge to meet applicable water quality standards or applicable requirements in the MCBH SWMP Plan. The facility ECC shall notify the Storm Water Program Manager immediately. The Storm Water Program Manager will notify DOH *by the end of the next work day*.

1.1 Log Notifications:

Date/time Storm Water Program Manager notified by ECC: ________________________

Date/time DOH notified by Storm Water Program Manager: ________________________

1.2 Describe Discharge:

Indicate which one of the following prohibited discharges is occurring or has occurred:

❒ Wastewater from washout of concrete

❒ Wastewater from washout and cleanout of stucco, paint, form release oils, curing compounds, or other construction materials

❒ Fuels, oils, or other pollutants used in vehicle and equipment operation and maintenance

❒ Soaps, solvents, or detergents used in vehicle and equipment washing

❒ Toxic or hazardous substances from a spill or other release

❒ Other, Explain: ____

2. Requirements for Taking Corrective Actions

The ECC shall complete corrective actions in accordance with the deadlines specified below. In all circumstances, site personnel shall *immediately* take all reasonable steps to minimize or prevent the discharge of pollutants until a permanent solution is installed and made operational, including cleaning up any contaminated surfaces so that the material will not discharge in subsequent storm events. *Immediately* means the same day the condition is discovered, unless it is too late in the day, in which initiation of corrective action must begin on the following work day.

Following any of the above triggering events, the ECC shall install a new or modified control and make it operational, or complete the repair, by *no later than 7 calendar days from the time of discovery*. If it is not feasible to complete the installation or repair within 7 calendar days, the ECC shall document and submit to the Storm Water Program Manager, for their agreement, why it is not feasible to complete the installation or repair within the 7-calendar day timeframe and document a schedule for installing the storm water control and making it operational as soon as practicable after the 7-day timeframe.

If the issue is not adequately addressed within 7 calendar days or the agreed upon timeframe, enforcement procedures will be initiated. Unaddressed issues will be escalated through the chain of command. The MCBH Environmental Compliance and Protection Division Director will give the responsible party a formal notice with an appropriate deadline for action. If the problem remains unchanged, the situation will be brought to the attention of the next higher authority. The ultimate penalty for non-compliance of MS4 Permit regulations is eviction or discharge of the responsible party from MCBH. This is placed at the discretion of the Base Commander. See the Enforcement Response Plan in Appendix 3-6 of the SWMP Plan for further information on MCBH's enforcement policies.

3. Corrective Action Report

Within 24 hours of discovering the occurrence of one of the triggering conditions in SWPPP Section 4.1 at the site, the ECC must complete the following:

3.1 Describe the triggering condition:

____
____
____
____

3.2 Record the date/time of the condition identified. How was the condition identified?

____
____
____
____

3.3 Describe the corrective action taken:

____
____
____

Date/time installation or repair was completed:
(or date/time the prohibited discharge ceased) ____

Or describe why it is not feasible to complete installation or repair within 7 calendar days and detail a proposed schedule (if applicable)

____
____
____

4. Resolution of the Corrective Action Trigger

Within 7 calendar days of initiating the Corrective Action Report, the ECC must complete a report of the following:

4.1 Follow-up Actions

Describe any follow-up actions taken to review the design, installation, and maintenance of storm water controls, including the dates such actions occurred:

____
____
____

4.2 Storm Water Control Modifications

Provide a summary of storm water control modifications implemented. Include a schedule of activities required to implement changes and the date the modifications were completed or will be completed:

____
____
____

5. SWPPP Modification Due to Corrective Actions

Where corrective actions result in changes to any of the storm water controls or procedures documented in the SWPPP, modify the SWPPP accordingly *within 7 calendar days* of completing corrective action work.

Are modifications to the SWPPP necessary? ❑ Yes ❑ No

Date modifications to the SWPPP shall be completed _______________

6. Corrective Actions Required by DOH

The facility shall comply with any corrective actions required by DOH as a result of permit violations found during an inspection by DOH or the Environmental Protection Agency (EPA).

Was the Corrective Action triggered by a DOH/EPA inspection?

❑ Yes ❑ No

❑ Date of DOH/EPA Inspection __________________

7. Additional Comments:

____
____

Final

STORM WATER POLLUTION PREVENTION PLAN

Storm Water Management Program Plan

Marine Corps Base Hawaii, Oahu, Hawaii

NPDES Permit No. HI S000007

VEHICLE MAINTENANCE SHOP (BUILDING 351)

Prepared by:

Marine Corps Base Hawaii

August 2022

Table of Contents

Tables

Figures

Appendices

List of Acronyms and Abbreviations

AST	Aboveground Storage Tank
BMP	Best Management Practice
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CWA	Clean Water Act
CWB	Clean Water Branch
DOH	State of Hawaii Department of Health
ECC	Environmental Compliance Coordinator
ECE	Environmental Compliance Evaluation
ECPD	Environmental Compliance and Protection Division
EPA	United States Environmental Protection Agency
HAZMAT	Hazardous Material
HAZMIN	Hazardous Material Minimization
MCBH	Marine Corps Base Hawaii
MoGas	Motor Gasoline
MS4	Municipal Separate Storm Sewer System
MS4 Permit	Marine Corps Base Hawaii's NPDES Permit No. HI S000007
NPDES	National Pollutant Discharge Elimination System
OWS	Oil/Water Separator
POC	Point of Contact
SAS	Satellite Accumulation Site
SWMP	Storm Water Management Program
SWPPP	Storm Water Pollution Prevention Plan
UST	Underground Storage Tank

Certification Statement

MCBH is committed to the prevention of discharges of polluted stormwater to navigable waters or the environment and maintains the highest standards for best management practices through periodic review, updating, and implementation of this Stormwater Pollution Prevention Plan (SWPPP).

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information contained therein. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Name: ______________________ Title: ______________________

Signature: ______________________ Date: ______________________

Management Review

Refer to Section 1.2 for more information on required SWPPP updates.

Review Dates	Signature	Amendment Required? (Y/N)
____________	__________________	__________
____________	__________________	_________
____________	__________________	_________
____________	__________________	_________
____________	__________________	_________
____________	__________________	_________

1 Introduction

As part of Federal regulations administered through the Clean Water Act (CWA), the State of Hawaii, Department of Health (DOH) has issued the National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4) Permit No. HI S000007 (referred to herein at the “MS4 Permit”) to Marine Corps Base Hawaii (MCBH). The MS4 Permit requires that MCBH provide all existing industrial facilities, identified in MCBH’s MS4 Permit application, and any newly identified industrial facilities, submitted to DOH using the “MS4 NPDES Individual Permit – Industrial Storm Water Discharge Notification Form,” with a Storm Water Pollution Prevention Plan (SWPPP) for storm water associated with industrial activities.

The purpose of the regulations is to protect water quality by reducing the amount of pollutants in storm water runoff caused by industrial activities.

1.1 SWPPP Implementation

The storm water management controls of this plan will become MCBH procedure for the applicable industrial facility. An up-to-date copy of the SWPPP shall be maintained on site and at the MCBH Environmental Compliance and Protection Division (ECPD). Management staff, maintenance personnel, contractor staff, and other personnel involved in onsite industrial activities, will be knowledgeable of the plan and follow the guidelines set forth in it, in addition to any other pertinent base-wide, state and federal regulations.

Day-to-day implementation of the SWPPP is primarily the responsibility of the current facility Environmental Compliance Coordinator (ECC) or Point of Contact (POC) as identified in Table 2-1. Enforcement of the permit conditions and this SWPPP are ultimately the responsibility of ECPD and additional escalating levels of authority as specified in the Enforcement Response Plan developed by MCBH for its base-wide Storm Water Management Program (SWMP) Plan.

1.2 Updating the SWPPP

This SWPPP will be reviewed as needed to identify necessary changes, at a minimum of every five years. Updates may be required due to current best management practice (BMP) failures, spill events, changes in industrial activities, changes in features, corrective actions, or other necessary changes. Personnel changes to the Storm Water Pollution Control Team (Section 2.1) should be logged in Table 2-1. Storm Water Pollution Control Team Log. ECPD will be responsible for approving revisions to the SWPPP. In the event the plan is modified, a copy of the updated SWPPP will remain at ECPD and will be provided to the applicable facility. Additionally, ECPD shall document and report the SWPPP changes to the DOH, Clean Water Branch (CWB), within thirty days of when the changes arise.

2 Vehicle Maintenance Shop, Building 351

The Vehicle Maintenance Shop, Building 351, is located within MCBH, Kaneohe Bay at the northeast corner of the intersection of "C" Street and 2nd Street. The facility encompasses approximately 7.0 acres and can be found in grid [redacted] of the MCBH Base Map, see Figure 4-1. The facility-specific map is shown on Figure 4-2. The Vehicle Maintenance Shop complex is paved and bounded by a chain-linked fence.

2.1 Storm Water Pollution Control Team

The Storm Water Pollution Control Team consists of the Storm Water Program Manager, ECC, and the Hazardous Material (HAZMAT) and Hazardous Material Minimization (HAZMIN) team. The Storm Water Program Manager is responsible for the enforcement of the MS4 permit at all industrial sites and provides annual training to the ECC and other personnel. The ECC is the primary unit POC for storm water related items and the day-to-day environmental matters at a specific facility. ECC's are responsible for SWPPP implementation including BMP and facility inspections, storm water assessments/sampling, BMP maintenance, and corrective actions. The HAZMAT and HAZMIN team shall be contacted if assistance is needed. The role, name, phone number, and start date of individuals on the Storm Water Pollution Control Team is recorded in Table 2-1 below. In the event of personnel turnover, Table 2-1 shall be updated accordingly.

TABLE 2-1. STORM WATER POLLUTION CONTROL TEAM LOG

Role	Name	Phone	Start Date
MCBH Storm Water Program Manager	CIV Whitney Anderson	Office: 808-257-4359	6/6/22
ECC	CIV William Otto	Office: 808-257-2304	
HAZMAT/HAZMIN	CIV Tim Cawthon	HAZMAT Center Building 6409 Office: 808-257-9913 HAZMIN Center Building 6407 Office: 808-257-0770	N/A

2.2 Vehicle Maintenance Shop, Building 351 Facility Activities

The central area of the vehicle maintenance complex is comprised of four buildings that are attached to form a single "U"-shaped structure: Buildings 351, 399, 377, and 322. The structure is single-story and of metal construction with concrete flooring and encloses an asphalt paved area for facility vehicle parking. The remainder of the vehicle maintenance complex consists of grass/gravel parking areas for buses, trucks, fuel trucks, trailers, and facility vehicles at the southwest side of the facility; a gravel area at the northeast side of the facility that is used for storage of scrapped and salvaged vehicles, dumpsters, trucks, empty drums, generators, and an asphalt parking area near the center of the facility.

Building 351 is used to conduct maintenance on buses, sweepers, and light to medium duty trucks, fuel trucks, and has a hydraulic lift. Supply and equipment records for the entire complex are centrally stored in the main office in the building. There are three trash trucks and three diesel forklifts used onsite.

Building 399, which is attached to the southeast end of Building 351, has a forklift repair section at its northwest end, a spray-painting booth (currently used as storage area) in the midsection, and a section for vehicle repair and battery shop (currently used as a storage area), including a hydraulic lift, at the southeast end. The southeast section is primarily used for repair of facility trucks.

Building 1545, located at the northernmost corner of the facility, is a metal building used as a covered parking bay. Building 352 is used as a maintenance area for fuel trucks.

Building 377, which is attached to the northwest end of Building 399, houses the tire, sheet metal, welding, and a maintenance bay. An oil filter press and used oil drum are located in the tire shop; and a parts washer (not in service) is located in the machine shop. Oxygen and acetylene cylinders associate with the welding shop are stored in metal sheds behind Building 377.

Building 322, which is attached to the southeast end of Building 377, consists of a below-grade grease rack facility. A used oil underground storage tank (UST) is located outside the northwest side of the building. A trench drain runs the full length of the southeast entrance and drains to a below-grade oil/water separator (OWS), which is located to the southwest of the building and drains to the sanitary sewer system. A steam cleaning area is located southwest of the grease rack and has a concrete surface that slopes toward the trench drain connected to a second OWS with a used oil aboveground storage tank (AST). Building 4051, located at the southern portion of the facility, houses an outdoor vehicle wash rack that is currently out of service. Wash water from the auto wash facility drains to a third OWS, the effluent of which then drains by gravity to Kaneohe Bay via Outfall 017. It is recommended that use of this OWS discontinue immediately, until it is removed or connected to the sanitary sewer system. To prevent any chance of overflow reaching the storm drain system, the connection of the OWS to the storm drain system is to be permanently sealed.

Building 300, located southeast of the steam cleaning area, and is used for storage. Building 385, located southeast of Building 300, houses the Auto Parts Warehouse. The building has a parts department, office, and lunchroom.

Hazardous materials are stored within hazardous supply lockers inside Building 399. Additional hazardous materials lockers are located inside Building 377 for storage of paints and thinners. Waste materials are stored in the satellite accumulation site (SAS) near Building 322 in appropriate spill containment pallets and over-pack containers. The flammable lockers do not have inventory logs and some lockers were not properly locked during the site inspection. It is recommended that these lockers remain locked at all times when not in use.

In general, the storm water for the majority of the facility percolates into the porous ground or evaporates. A drain inlet (351-1) and two trench drains (351-2 and -3) at the western corner of the facility direct storm water runoff to Outfall 021. The designated storm water sample location is the at the trench drain 351-3. A headwall in the same area directs storm water runoff to Outfall 017. Runoff at the eastern portion of the facility sheet flows into two drain inlets along "C" Street, which also discharge to Outfall 017. All five discharge points from the facility are considered substantially identical outfalls. Refer to Figure 4-2 for the location of the storm water sample point and other relevant site features.

2.3 Sources of Pollutants

The following is an inventory of potential pollutants associated with Vehicle Maintenance Shop, Building 351:

A. Material Loading and Unloading Areas

Materials that are spilled, leaked, or lost during loading or unloading may collect on vegetated or paved surfaces and be carried away by storm runoff. Materials are loaded and unloaded at nearly all areas of the facility. Materials are loaded and unloaded near the entrances to the various buildings / tanks on asphalt paved surfaces.

B. On-Site Material Storage and Disposal Practices

Leaks, drips, or spills of materials that are stored or disposed of in areas exposed to rainfall can be carried away by storm water. Smaller containers of significant materials are stored in flammable materials storage lockers at the northwest end of Building 399 and in Building 377. All containers of significant materials at Building 351 are double-contained or stored in over-pack containers.

C. Outdoor Activities

Many outdoor activities at MCBH, Kaneohe Bay use materials or create wastes that have the potential to pollute storm water runoff. Outdoor activities at the Vehicle Maintenance Shop include loading and unloading materials, steam cleaning, vehicle parking, and salvage/storage scrap yard.

D. Significant Materials Inventory

The following is a list of significant materials found at the Vehicle Maintenance Shop:

- Gasoline
- Diesel
- Lube Oil
- Grease
- Paints
- Hydraulic Oil
- Transmission Oil
- Power Steering Fluid
- Battery Acid
- Solvents
- Adhesive
- Sealant
- JP-8
- Oily Sludge
- Used Fuel
- Used Oil (AST and UST)

- Brake Fluid
- Exhaust Fluid
- Metals (scrap)
- Detergents

2.4 Potential Storm Water Pollutants

The following pollutants have been identified as having a reasonable potential to be present in storm water discharges from Vehicle Maintenance Shop, Building 351 if not properly managed:

- Gasoline
- Diesel
- Metals (scrap)
- Used Oil
- JP-8

Materials that have *not* been included as a potential storm water pollutant but have been included as part of the significant materials inventory list, are considered to present a negligible risk to storm water quality. This is based on the nature/location of the primary activities performed with these materials and the BMPs that are in place. Material transport (loading/unloading) is not considered to be a significant threat to storm water, due to spill response procedures, training, and spill kit materials available onsite.

2.5 Best Management Practices (BMPs)

Best Management Practices (BMPs) are techniques or methods that aim to manage the quantity and improve the quality of storm water runoff from a facility or other site. Storm water BMPs intend to reduce or eliminate pollution and contaminants collected by runoff before the runoff reaches the MCBH storm water system or sensitive ecosystems such as streams, wetlands, and marine environments. The following is a summary of BMPs currently in place at the Vehicle Maintenance Shop, Building 351.

A. Good Housekeeping Practices

In general, Vehicle Maintenance Shop, Building 351 employs good housekeeping practices throughout its operations. Good housekeeping practices for Vehicle Maintenance Shop, Building 351 are included in Table 2-2. Filled drums of crushed oil filters, batteries, waste fuel, and waste oil are turned into HAZMIN Facility. Absorbent blankets from the OWS are regularly removed, dried, bagged, and taken to the SAS for disposal by HAZMIN. The OWS is regularly maintained by HAZMIN. Tires are regularly recycled by a contractor. Salvaged vehicles and equipment are drained of all fluids prior to storage outside on asphalt pavement. Sweeping with a push broom is performed daily; mopping is performed occasionally. A street sweeper is scheduled as needed. The trench drain near the oil change area is occasionally cleaned with vacuum trucks as needed.

B. Preventative Maintenance

Preventive maintenance is important as water pollution control measures may be of little or no use if devices and equipment have not been properly maintained. Facility personnel conduct inspection of facility equipment and storage systems on a regular basis. The preventive maintenance program involves inspections of equipment and storage systems that are exposed to storm water. Inspections of the SAS are conducted on a monthly basis by HAZMIN, with monthly inspection reports submitted to ECPD. Maintenance work is performed under cover, and no maintenance work is performed outdoors.

C. Visual Inspections

Visual inspection provides a valuable subjective assessment of the status of storm water management systems. They are easily performed and allow the opportunity for corrective action, if necessary. Site inspections and documentation requirements are addressed in in Section 3 of this SWPPP. MCBH HAZMIN Center staff perform hazardous material inspections monthly. Annual facility inspections are performed by EPCD as part of the MCBH Environmental Compliance Evaluation (ECE).

D. Spill Prevention and Response

Areas where significant material spill or leakage can occur are identified in Section 2.1 and shown on Figure 4-2. The storm water systems and their accompanying drainage points are also shown on Figure 4-2. Refer to Table 2-2 for BMPs related to spill preventative measures for material handling procedures, storage requirements, and equipment usage.

In the event of a hazardous substance or oil spill, the ECC and ECPD shall be notified immediately (ECPD; **808-630-8246**). If the spill cannot be easily addressed using an onsite spill kit and personal protective equipment, call Fed Fire (Military 911). The spill source should be immediately controlled if it is safe to do so by closing valves, switches, and/or turning off power to a device. Then, contain the spill by using sorbent socks or absorbent materials found in a spill kit. After it has been contained, clean up the spilled material in a safe manner using dry methods. All materials should then be properly disposed of.

Oil-absorbent booms are used to protect all trench drains at the facility. The locations of spill kits are shown in Figure 4-2.

E. Erosion and Sediment Controls

The soil/gravel area near drain inlet 351-1 at the Vehicle Maintenance Shop has been identified as having high potential for significant soil erosion that would require erosion and sediment control measures (Figure 4-2). Booms surround all trench drains at the facility.

F. Best Management Practices to Minimize Pollutant Contact with Storm Water

Facility personnel receive annual training from ECPD at minimum, as well as an initial training for all new personnel. Training information will include the BMPs that have been developed for the facility and a general overview of the storm water program and its objectives.

Existing BMPs at the Vehicle Maintenance Shop are shown in Table 2-2 and attached as fact sheets to this SWPPP in Appendix A.

TABLE 2-2. BEST MANAGEMENT PRACTICES

BMP No.	BMP Title	Description
001	Label All Drums, Cans, Containers, Tanks, and Valves	All containers and drums are labeled.
002	Restrict Access to Area and Equipment	Area is completely enclosed by chain-linked fencing.
004	Avoid Hosing Down the Site	Sweeping with a push broom is performed as needed.
006	Control Spills	Any spill of significant materials is controlled immediately to prevent pollutant from being transported to receiving water. A spill kit is stored onsite.
007	Place Trash Receptacles at Appropriate Locations	Covered trash bins are located throughout the facility
015	Recycle	Recyclable materials are stored in appropriate containers until it can be transported to the Recycle Center.
016	Store Waste and Recycling Materials in Proper Containers	Waste and recycling containers are located Waste containers will be emptied regularly. Dumpsters should all have lids; lids should be kept closed when not in use.
033	Check Vehicles and Equipment for Leaks	Vehicles and equipment are checked for leaks on a regular basis.
041	Wash Equipment in Designated Areas	A designated wash area allows wash water to percolate into a vegetated area.
061B	Store Liquids and Significant Materials within a Building or Covered Area	All significant materials are properly stored undercover and in secondary containment where required.
113	Conduct Personnel Training Regarding the SWPPP	Personnel are trained regularly (initial orientation and annual refresher.

3 Inspections, Assessments and Monitoring

3.1 Routine Quarterly Site Inspections

The MS4 Permit requires a routine quarterly site inspection by a qualified person with at least one member of the storm water pollution control team participating. At least once each calendar year, the routine inspection must be conducted during a period when a storm water discharge is occurring. The site inspection is an overall evaluation of the effectiveness of the BMPs implemented at that facility. A Routine Facility Inspection Checklist (Appendix B) shall be completed during each routine site inspection and kept onsite with this SWPPP. During normal facility operating hours, inspections must be conducted of areas of the facility including, but not limited to, the following:

- Areas where industrial materials or activities are exposed to storm water;
- Areas identified in the SWPPP and those that are potential pollutant sources;
- Areas where spills and leaks have occurred in the past three years;
- Discharge points; and
- Control measures used to comply with the effluent limits contained in this permit.

3.2 Visual Assessment of Storm Water Discharges

A Quarterly Visual Assessment of storm water discharge is required for all industrial facilities at MCBH. Storm water samples for this visual assessment but must be collected in such a manner that the samples are representative of the storm water discharge from the facility. Therefore, the water sample must be collected at the designated storm water monitoring point (trench drain 351-3) as shown in Figure 4-2. The Quarterly Visual Assessment checklist (Appendix C) shall be completed by the current facility ECC and kept onsite with this SWPPP.

The visual assessment must be made:

- Of a sample collected in a clean, colorless glass or plastic container, and examined in a well-lit area;
- On samples collected within the first 30 minutes of an actual discharge from a storm event. If it is not possible to collect the sample within the first 30 minutes of discharge, the sample must be collected as soon as practicable after the first 30 minutes and documented why it was not possible to take the sample within the first 30 minutes; and
- For storm events, on discharges that occur at least 72 hours (three days) from the previous discharge.

Whenever the visual assessment shows evidence of storm water pollution, corrective action procedures to remedy the pollutants must be taken and documented. Refer to Section 4 for corrective action procedures.

4 Corrective Actions

A corrective action is defined as any action taken, or required to be taken, to (1) repair, modify, or replace any stormwater control used at the site; (2) clean up and dispose of spills, releases, or other deposits found on the site; and (3) remedy a permit violation. Corrective actions should be documented using the Corrective Action Log (Appendix D).

4.1 Immediate Actions

If corrective action is needed, you must immediately take all reasonable steps necessary to minimize or prevent the discharge of pollutants until a permanent solution is installed and made operational, including cleaning up any contaminated surfaces so that the material will not discharge in subsequent storm events. Note: In this context, the term "immediately" requires you to, on the same day a condition requiring corrective action is found, take all reasonable steps to minimize or prevent the discharge of pollutants until a permanent solution is installed and made operational. However, if a problem is identified at a time in the workday when it is too late to initiate corrective action, the initiation of corrective action must begin no later than the following workday. "All reasonable steps" means that the permittee has undertaken initial actions to assess and address the condition causing the corrective action, including, for example, cleaning up any exposed materials that may be discharged in a storm event (e.g., through sweeping, vacuuming) or making arrangements (i.e., scheduling) for a new BMP to be installed at a later date.

4.2 Escalating Actions

If additional actions are necessary beyond those implemented or if the conditions continue to occur, additional corrective actions (e.g., install a new or modified control and make it operational, complete the repair) must be completed before the next storm event if possible, and within 14 calendar days from the time of discovery of the corrective action condition. If it is infeasible to complete the corrective action within 14 calendar days, document why it is infeasible to complete the corrective action within the 14-day timeframe and identify a schedule for completing the work, which must be done as soon as practicable after the 14-day timeframe but no longer than 45 days after discovery. If the completion of corrective action will exceed the 45-day timeframe, the minimum additional time necessary to complete the corrective action can be taken, provided that MCBH ECPD and DOH is notified of your intention to exceed 45 days. Where your corrective actions result in changes to any of the controls or procedures documented in your SWPPP, you must modify your SWPPP accordingly within 14 calendar days of completing corrective action work.

4.3 Corrective Actions for Substantially Identical Outfalls

If the event triggering corrective action is associated with an outfall that had been identified as a "substantially identical outfall", the review must assess the need for corrective action for all related substantially identical outfalls. Any necessary changes to control measures that affect these other outfalls must also be made before the next storm event if possible, or as soon as practicable following that storm event. Any corrective actions must be conducted within the timeframes discussed above.

4.4 Record of Past Spills or Leaks of Hazardous Pollutants

Table 4-1 is used to record significant spills and leaks that have occur or have occurred within three years prior to the preparation or amendment of this SWPPP. Significant spills and leaks include, but are not limited to, releases of oil or hazardous substances in excess of quantities that are reportable under CWA Section 311 (see 40 CFR 110.6 and 40 CFR 117.21) or Section 102 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 USC §9602.

At the time of this SWPPP update, there have been no past spill or leak incidents reported for the Vehicle Maintenance Shop.

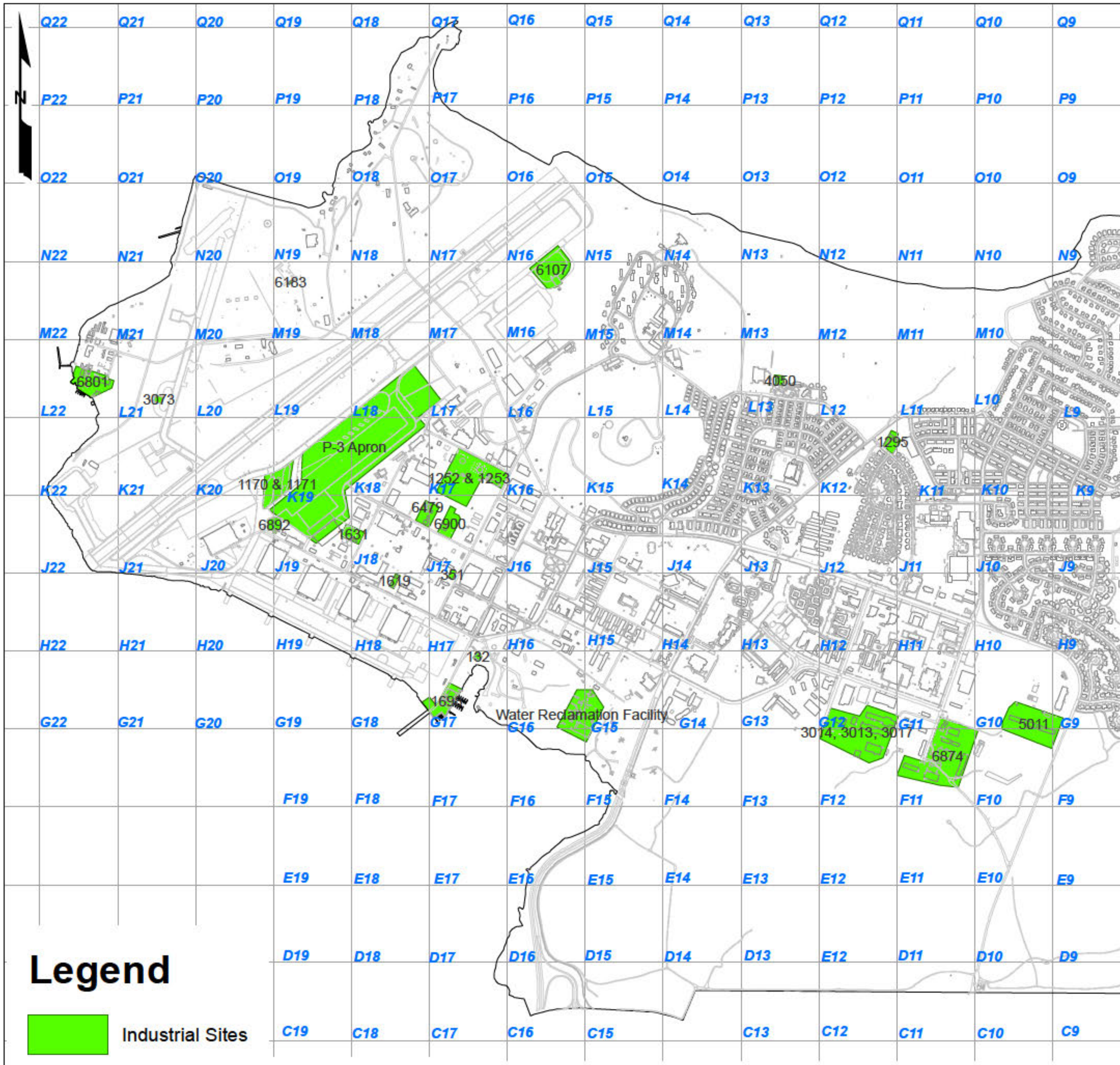
TABLE 4-1. PAST SPILLS OR LEAKS OF HAZARDOUS POLLUTANTS

Date of Incident	Brief Summary of Incident (POC Active at Time of Incident, Pollutant Type, Estimated Quantity, Location of Spill)

4.5 Record of Unauthorized Non-Storm Water Discharges

TABLE 4-2. UNAUTHORIZED NON-STORM WATER DISCHARGE EVALUATION

Date of Evaluation	Brief Summary of Evaluation (Description of the evaluation criteria, outfalls or onsite drainage points that were directly observed, action(s) taken, such as a list of control measures used to eliminate unauthorized discharge)



Legend

Industrial Sites

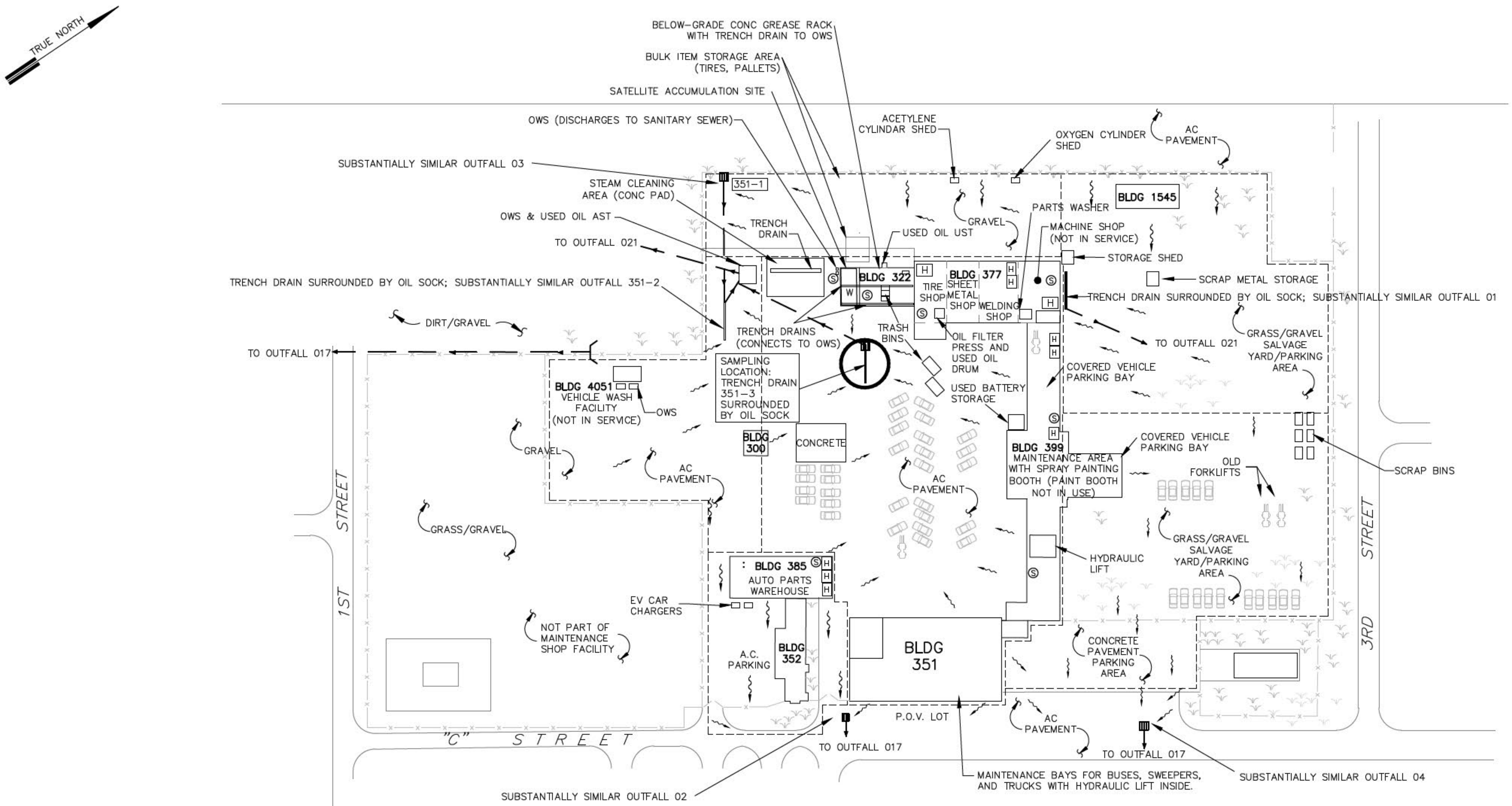
1,800 900 0 1,800
Feet

element environmental llc
environmental · engineering · water resources

PROJECT TITLE
MCBH SWPPP
Storm Water Management Program Plan

FIGURE TITLE
General Location Map

DATE	FIGURE NO.
September 2022	**4-1**



LEGEND

- H — HAZARDOUS MATERIALS LOCKER
- SPILL PALLET W/DRUMS
- W — WASTE ACCUMULATION SITE
- S — SPILL KIT
- STORM DRAIN SYSTEM
- FLOW ARROW
- DRAINAGE AREA

NOTES:

1. STORM WATER, FROM APPROXIMATELY 7.0 ACRES ASSOCIATED WITH BUILDING 351, DISCHARGES TO KANEOHE BAY VIA SUBSTANTIALLY SIMILAR DRAINAGE AREAS TO MCBH OUTFALLS 017 AND 021.
2. NOT TO SCALE

DAMATO
7/27/2022 11:54:06 AM
FIG 4-2 Bldg 351 - Vehicle Maintenance Shop.dwg

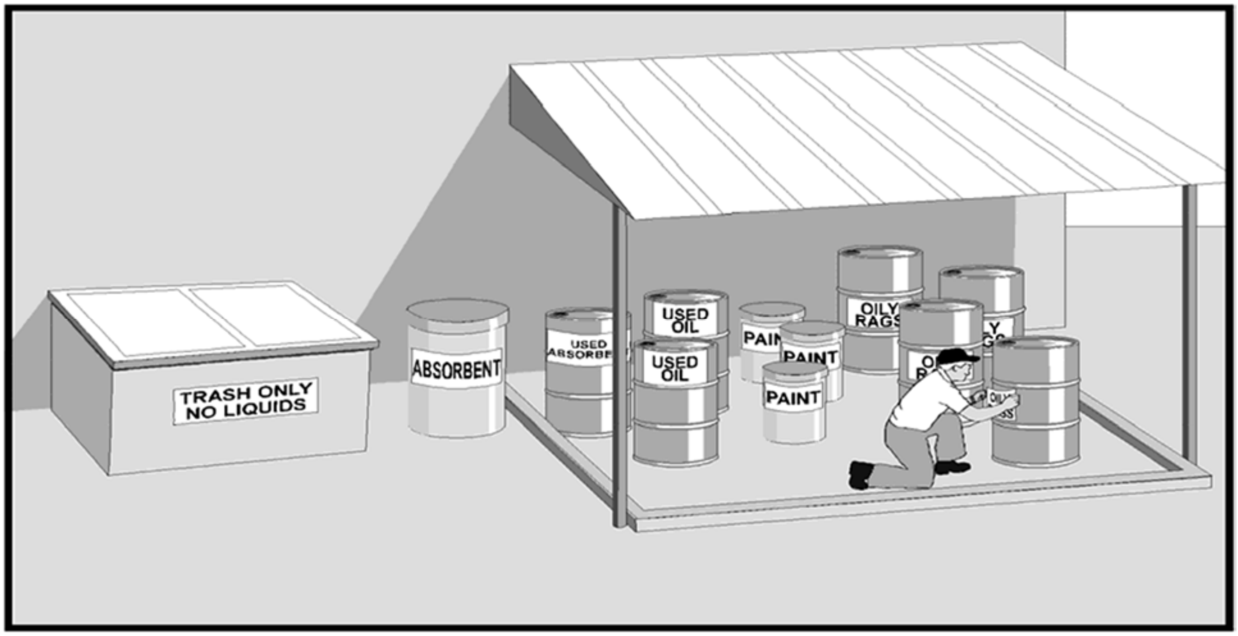
element environmental llc
environmental · engineering · water resources

PROJECT TITLE: STORM WATER POLLUTION PREVENTION PLAN MCBH, KANEOHE BAY, OAHU, HAWAII	
FIGURE TITLE: VEHICLE MAINTENANCE SHOP (BUILDING 351)	
DATE: JULY 2022	FIGURE NO.: 4-2

APPENDIX A

SELECTED BMP FACT SHEETS

BMP 001 - LABEL ALL DRUMS, CANS, CONTAINERS, AND TANKS



Description of Potential Pollutant and Source: Drums, cans, and containers can be improperly managed and disposed of due to uncertainty of the container's contents. Tanks which are not labeled may result in improper use of the tank or fuel, which may result in the exposure of significant materials to storm water and/or receiving waters. Similarly, unlabeled valves may be opened without proper precaution due to lack of user information. Storm water quality will be affected if significant materials are improperly disposed to the storm drain and/or receiving waters. Lack of labeling will also make it difficult to quickly identify the type of material released so facility personnel can respond correctly. Labels also identify hazardous materials at the facility and are a good way to request caution in certain areas (e.g., drums indicating flammability).

Description of BMP: Label all drums, valves, pumps, cans, tanks, and containers to reduce the chance of misuse and eventual spills. Labeling ensures that the appropriate procedures, equipment, and storage containers are used. All containers will be labeled as to what is in them.

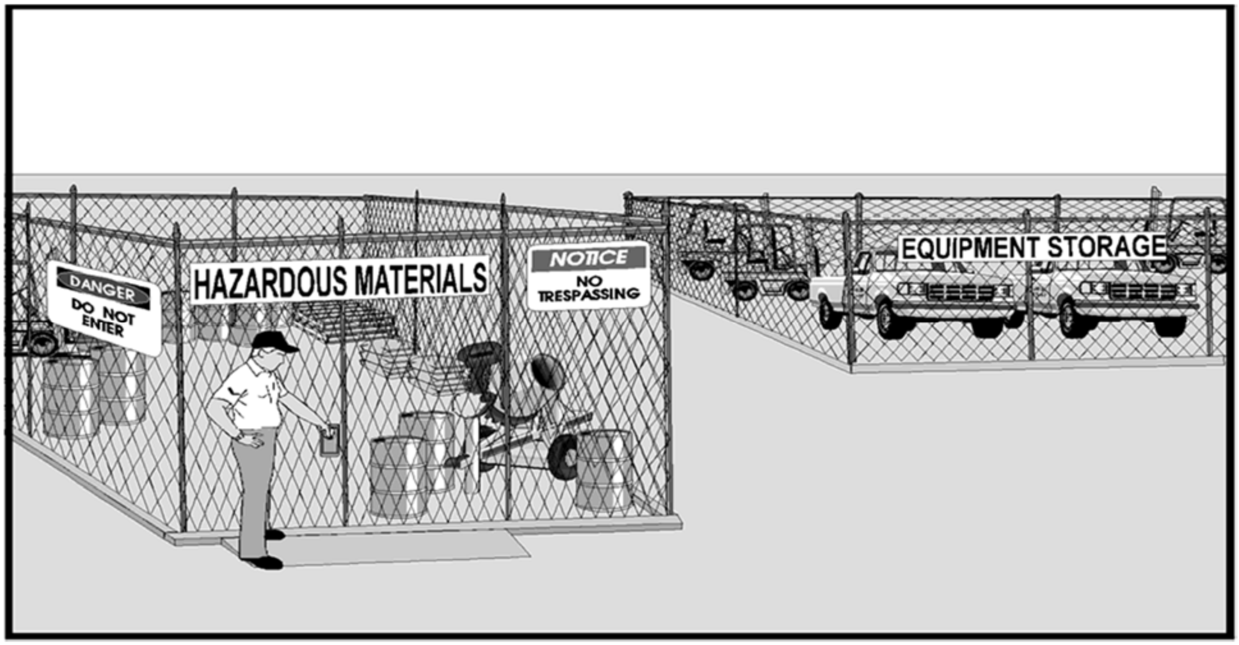
Application Guidance: As needed.

Training: N/A

Effectiveness and Cost: Effectiveness and costs will vary depending on the application.

Limitations: None

BMP 002 - RESTRICT ACCESS TO AREA AND EQUIPMENT



Description of Potential Pollutant and Source: Vandalism of vehicles and facility property may result in the release of significant materials.

Description of BMP: Provide fences and gate areas where vehicles, equipment and materials are stored and are accessible to the public to discourage trespassing. Access to equipment will also be restricted. Only authorized personnel will be allowed to operate equipment. The fences and gates will be properly maintained, and additional security measures including lighting of the area will be implemented if the fencing alone proves insufficient. Where appropriate, security guards or alarms will be used.

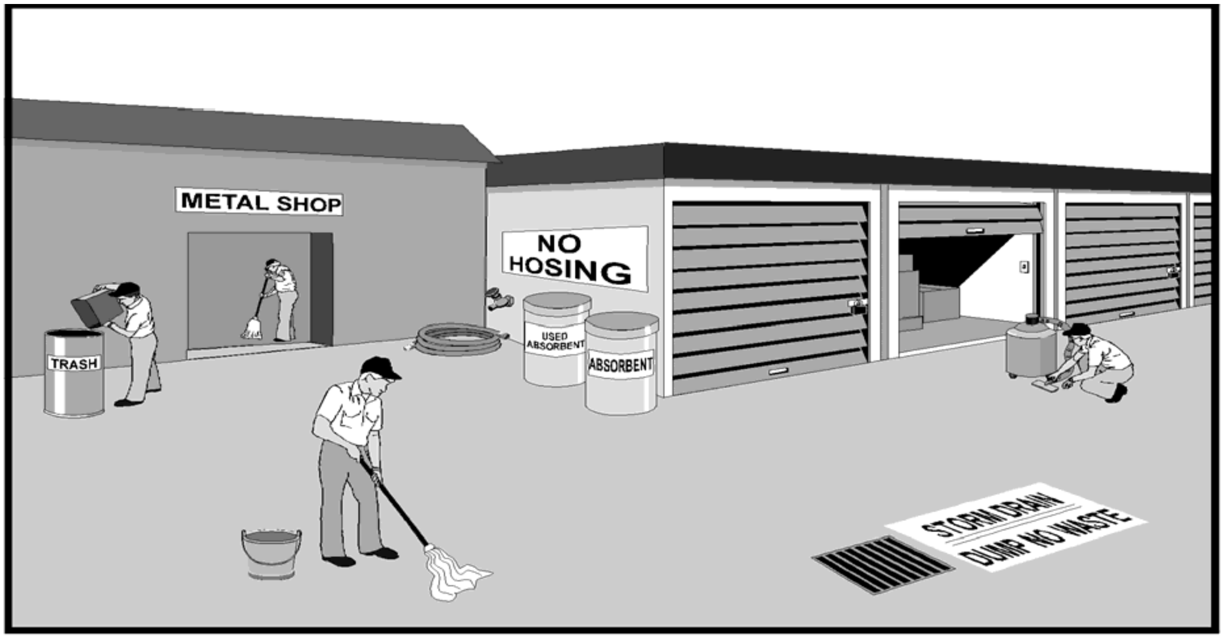
Application Guidance: As needed.

Training: N/A

Effectiveness and Cost: Effectiveness and costs will vary depending on the application.

Limitations: None

BMP 004 - AVOID HOSING DOWN THE SITE



Description of Potential Pollutant and Source: Cleaning work sites by hosing down causes wash water to transport pollutants to the storm drain where it can be exposed to storm water.

Description of BMP: Use dry methods to clean work sites. Dry methods include sweeping or using damp rags or mops. If possible or practical, hoses will be removed. If hosing down is unavoidable, the downstream drain will be temporarily plugged as described in the following BMPs:

- BMP 023 - Place portable Rubber Mats Over Storm Drain Inlets
- BMP 024 - Insert Filter in Catch Basin
- BMP 025 - Place Absorbent Blankets in Catch Basin

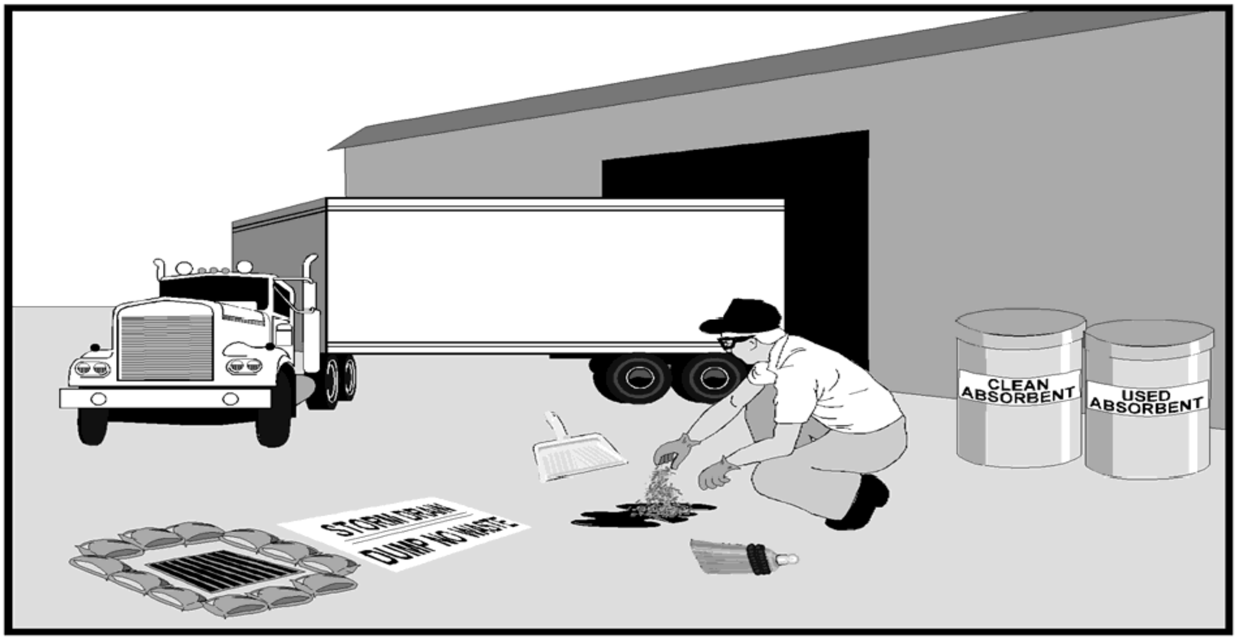
Application Guidance: Methods of dry cleaning will be used whenever possible at all workstations, loading/unloading sites, storage areas, and parking lots.

Training: New personnel will be notified of the policy and signs will be posted. If possible or practical, hoses will be removed.

Effectiveness and Cost: Eliminating hosing down is a highly effective, low-cost BMP.

Limitations: None

BMP 006 - CONTROL SPILLS



Description of Potential Pollutant and Source: Spills of significant materials may be exposed to storm water and transported to storm drains and/or receiving waters.

Description of BMP: Follow safety data sheets (SDS) for handling, storage, and cleanup of all significant materials to reduce the potential for spills.

Any spill, large or small, of significant materials will be controlled to prevent pollutants from being transported to storm drains and/or receiving waters. Appropriate spill control material will be kept on site. Smaller spills will be contained using absorbent material such as kitty litter, straw, or sawdust. Drums of absorbent material will be easily accessible and clearly marked, and containers for spent absorbent material will be readily available. Spent absorbent material will be managed appropriately and disposed of in accordance with applicable regulations. Larger spills will be controlled using spill kits, brooms, and other response equipment commensurate with the size of the spill. The methods outlined in the Activity's spill prevention and response plans (BMP 112) for hazardous materials will be followed for spills of any potential storm water pollutants. The date, time, nature and volume of material spilled, and cleanup measures taken will be recorded for all spills and kept as part of the SWPPP.

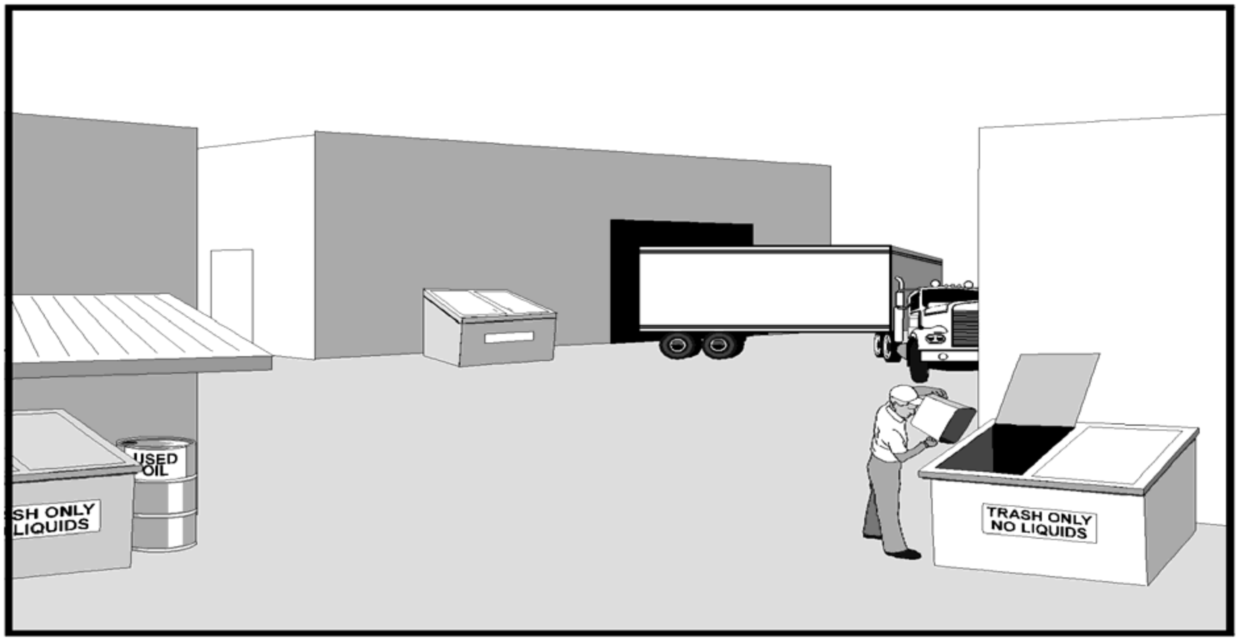
Application Guidance: Controlling spills will be practiced under all working conditions.

Training: Personnel will be trained in spill prevention and response procedures including the use of personal protection equipment (gloves, eye and face protection, etc.). This will include what absorbent or equipment to use, how to use the absorbent or equipment, where to find it, how to dispose of the spent absorbent or other material, and who to notify in the event of a spill.

Effectiveness and Cost: Spill control is a moderately effective, low-cost BMP.

Limitations: None

BMP 007 - PLACE TRASH RECEPTACLES AT APPROPRIATE LOCATIONS



Description of Potential Pollutant and Source: Improperly located or insufficient numbers of trash receptacles will promote poor housekeeping practices. This will increase the opportunity for pollutants from all source areas to reach storm water.

Description of BMP**:** Properly located and sufficient numbers of trash receptacles will promote the proper disposal of waste materials. This reduces the opportunity for pollutants to reach storm water. Trash receptacles will be easily accessible for personnel.

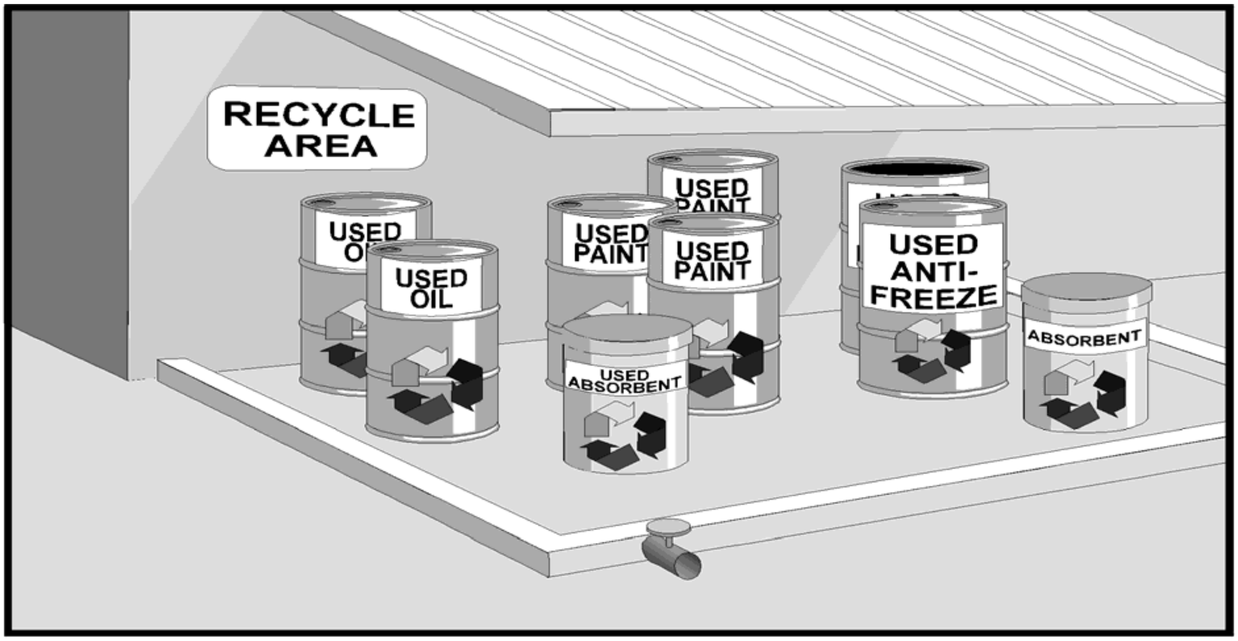
Application Guidelines: Placement of trash receptacles at appropriate locations will always be practiced.

Training: Personnel will be trained as to the location of trash receptacles.

Effectiveness and Cost: Appropriately located trash receptacles are an effective, low-cost BMP.

Limitations: None

BMP 015 – RECYCLE



Description of Potential Pollutant and Source: Many materials, both hazardous and non-hazardous, can be sources of pollutants. Recycling will be employed to reduce the amount of waste material exposed to storm water on the Activity.

Description of BMP: Recycle materials to the fullest extent possible in all situations.

Application Guidance: Recycling collections will be conducted at least weekly for recyclable items such as solvents, oil, scrap metals, wash water and absorbent materials. Separating the recyclable items facilitates recycling.

The frequency for implementing this BMP has been provided as general guidance. However, a facility operator may wish to establish a more suitable frequency. This will require SWPPP implementors to make judgements based on facility operations and conditions. To assign a frequency other than what has been suggested (i.e., more or less frequent), the following criteria will be considered and rated either High, Medium, or Low. If many of the criteria are assigned a High rating, the frequency may be increased. Similarly, if many criteria are assigned a Low rating, the frequency may be decreased. The goal of implementing this BMP is to minimize exposure of pollutants to storm water.

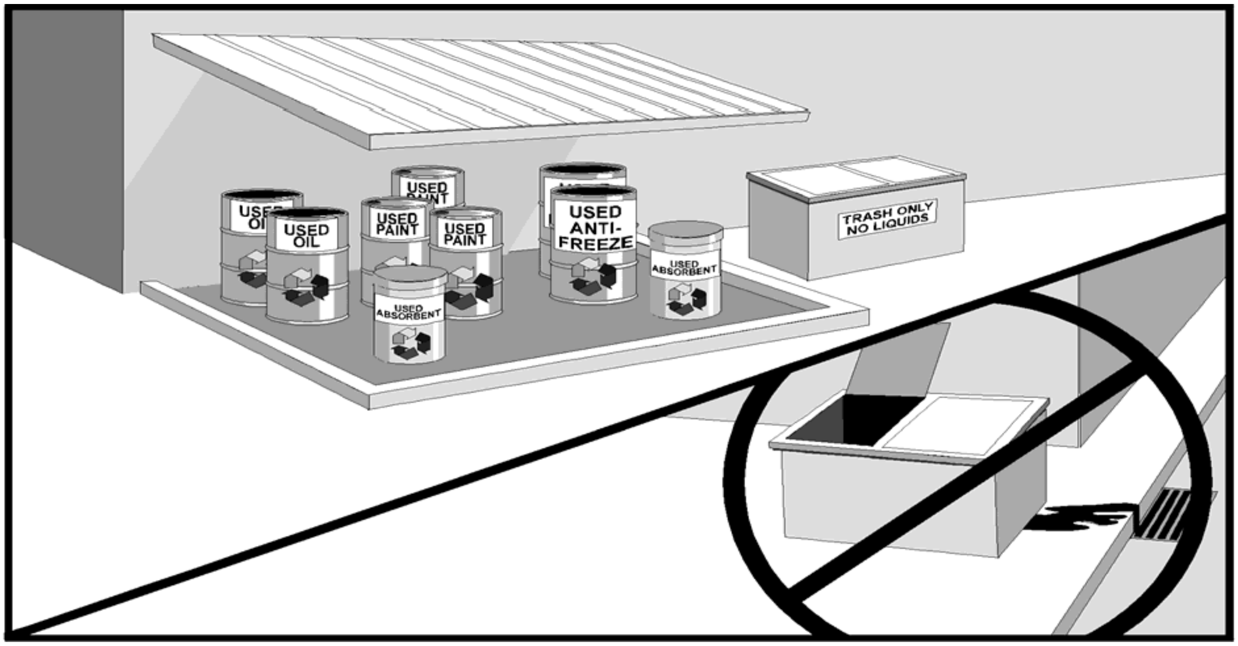
CRITERIA	Rating H=High M=Medium L=Low
Probability of exposure of significant materials to storm water	
Quantity of significant materials potentially exposed	
Toxicity of significant materials potentially exposed	
Frequency of use of significant materials potentially exposed	
Evidence of exposure (e.g., stains on pavement, etching of concrete	
Proximity of source area to outfall or receiving water	
Sensitivity of receiving water to potentially exposed significant materials (e.g., waters with beneficial uses such as human contact, recreation, significant species habitat, etc.)	

Training: Personnel will be trained on proper recycling techniques along with posting and maintenance of signs.

Effectiveness and Cost: Effectiveness and cost will be site specific.

Limitations: Local vendors may not be available to receive certain recyclable materials.

BMP 016 - STORE WASTE AND RECYCLING MATERIALS IN PROPER CONTAINERS



Description of Potential Pollutant and Source: Dry waste, including items such as scrap metal, floor sweepings, metal chips, and paper goods, can be dispersed by wind or operational error if not stored properly. If a dumpster's lid is not kept closed, animals may carry garbage out of the containers. Uncovered dumpsters also expose waste to storm water, which may leak out of the dumpster and into the storm sewer system.

Description of BMP: Locate waste and recycling drums and containers in centralized areas, using proper labeling (both containers and location) and providing easy access. If possible, the area will have secondary containment (see BMPs 012, 013, and 014). Waste containers will be emptied regularly. Dumpsters will all have lids; lids will be kept closed when not in use. If the dumpster has inadequate capacity and it is not possible to keep the cover closed, the frequency of pick-up will be increased, or the dumpster will be replaced with a model of greater capacity.

Application Guidance: This BMP will be applied to all waste and recycling storage areas.

Training: Personnel will be trained to monitor waste and recycling storage sites to ensure their materials are properly stored and that there are no overflowing containers.

Effectiveness and Cost: This is a moderately effective, low-cost BMP.

Limitations: None

BMP 033 - CHECK VEHICLES AND EQUIPMENT FOR LEAKS

Description of Potential Pollutant and Source: Vehicles, aircraft, or equipment entering or stored at a maintenance facility may be leaking a variety of fluids (fuel, oil, antifreeze, freon, etc.). These materials can be exposed to storm water.

Description of BMP: Inspect all vehicles and equipment at the site, whether incoming, parked, stored, or salvaged, for oil and fluid leaks. Drivers of fleet vehicles, such as delivery trucks, will also check under their vehicles each morning for fluid leaks. If leaks are present, drip pans will be placed under the vehicle or equipment. Once the vehicle is removed from the site, the former parking area will be inspected for stains, and these stains will be cleaned using rags or dry solvents.

Application Guidance: Any vehicle or equipment coming in for repairs, painting, or storage will be inspected for leaks. Fleet vehicles will be inspected each morning. Vehicles that are parked, stored, or salvaged will be provided with drip pans, as will tanker rail cars waiting to be unloaded. The frequency for implementing this BMP has been provided as general guidance. However, a facility operator may wish to establish a more suitable frequency. This will require SWPPP implementors to make judgements based on facility operations and conditions. To assign a frequency other than what has been suggested (i.e., more or less frequent), the following criteria will be considered and rated either High, Medium, or Low. If many of the criteria are assigned a High rating, the frequency may be increased. Similarly, if many criteria are assigned a Low rating, the frequency may be decreased. The goal of implementing this BMP is to minimize exposure of pollutants to storm water.

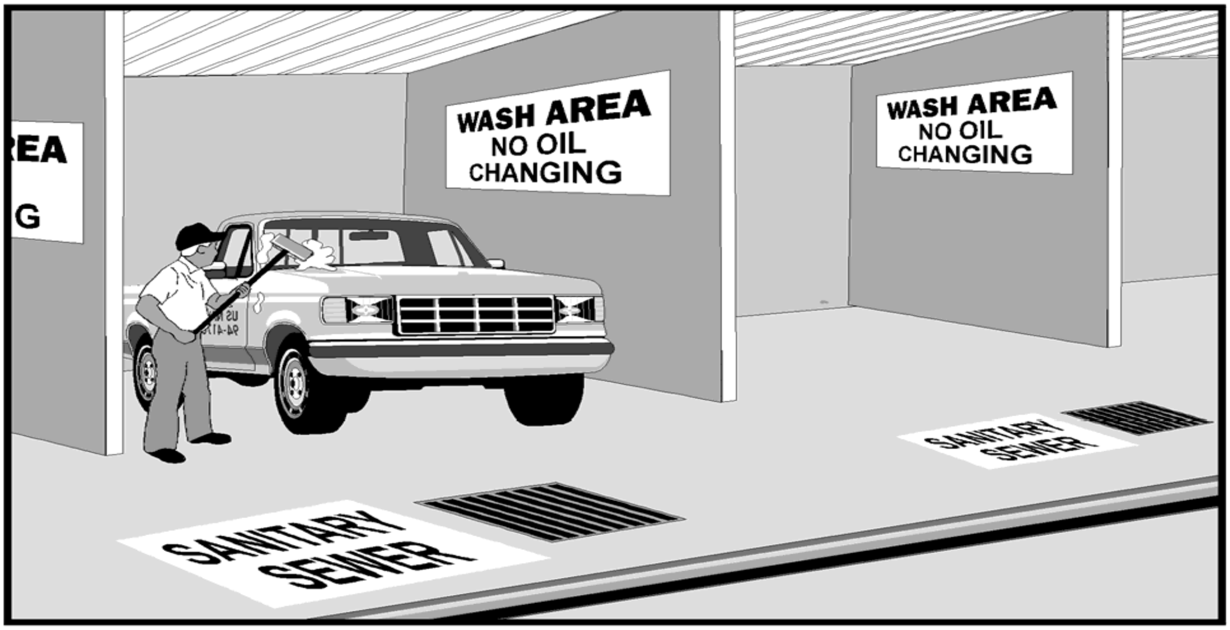
CRITERIA	Rating H=High M=Medium L=Low
Probability of exposure of significant materials to storm water	
Old age or poor condition of equipment and vehicles	
Evidence of exposure (e.g., stains on pavement)	
Proximity of source area to outfall or receiving water	
Sensitivity of receiving water to potentially exposed significant materials (e.g., waters with beneficial uses such as human contact, recreation, significant species habitat, etc.)	

Training: Signs will be posted to remind personnel of proper procedures.

Effectiveness and Cost: Checking for leaks is a moderately effective, low-cost BMP.

Limitations: None

BMP 041 - WASH EQUIPMENT AND VEHICLES IN DESIGNATED AREA



Description of Potential Pollutant and Source: Washing equipment and vehicles outdoors or in areas where wash water flows onto the ground can pollute storm water. It is difficult to control the wastewater from washing operations if it is not done in a designated area.

Description of BMP: Facilities will designate bermed wash areas that contain wash water and prevent contact with storm water. These areas will drain to the sanitary sewer (BMP 042) or to a sump. If a sump is used, wash water will be recycled.

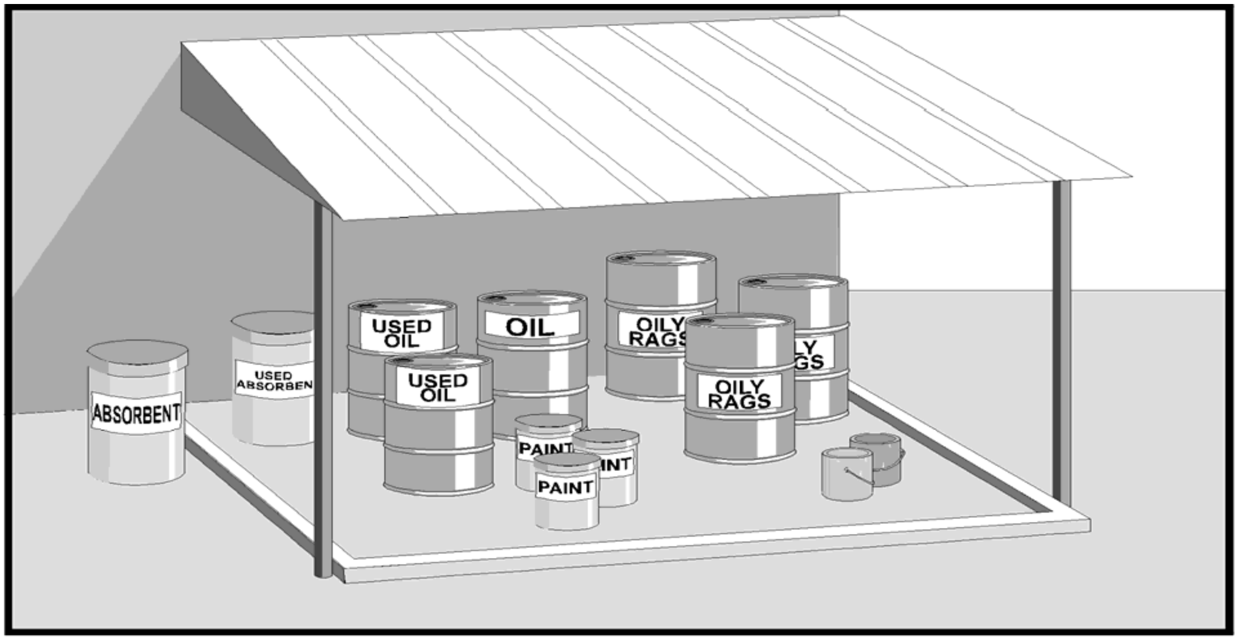
Application Guidance: This practice will be followed wherever vehicles, equipment and aircraft are washed.

Training: N/A

Effectiveness and Cost: This is a highly effective, variable-cost BMP.

Limitations: Pretreatment and monitoring of wash waster discharges to the sanitary sewer may be required. This would greatly increase the cost of this practice. The treatment plant operator will be notified and approval obtained before discharge.

BMP 061B - STORE LIQUIDS AND SIGNIFICANT MATERIALS WITHIN A BUILDING OR COVERED AREA



Description of Potential Pollutant and Source: Many significant materials may be leaked or spilled during storage, handling, or transport. If significant materials are stored outside, in covered areas, these materials can be exposed to storm water, which can transport the leaked or spilled material into the storm drain system.

Description of BMP: To the extent practical, store significant materials within a building or covered area. The materials will be stored on an impervious surface, such as a concrete pad. Rainfall runoff from the pad will be directed to a storm water treatment facility or contained. Leaks and spills will be cleaned up as soon as possible using rags or dry absorbents (see BMP 006). Used rags and absorbents will be disposed of properly. Any wash water from cleaning the floor will be disposed of in the sanitary sewer (see BMP 042).

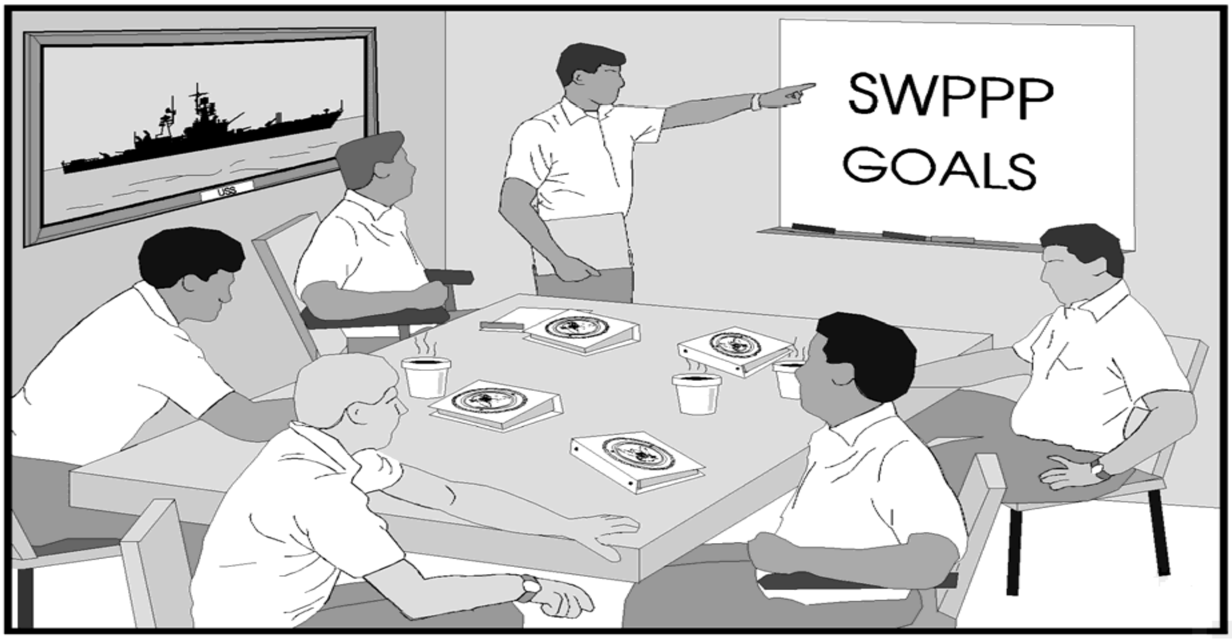
Application Guidance: All significant materials will be stored within a building or covered area.

Training: Personnel will be trained to store significant materials in designated areas.

Effectiveness and Cost: This is a moderately effective BMP. The cost will vary based on whether a building for storing the substances is available.

Limitations: None

BMP 113 - CONDUCT PERSONNEL TRAINING REGARDING THE SWPPP



Description of Potential Pollutant and Source: When properly trained, personnel are more capable of preventing spills, responding safely and effectively to an accident when it occurs, and recognizing situations that could lead to storm water contamination.

Description of BMP: Train personnel at all levels of responsibility in the components and goals of the SWPPP.

Application Guidance: Training will be conducted quarterly and at new personnel orientations.

Training: Training will address each component of the SWPPP, including how and why tasks are to be implemented. Topics will include:

- Good housekeeping
- Material management practices
- Spill prevention and response

Effectiveness and Cost: This is a highly effective, moderate-cost BMP.

Limitations: None

APPENDIX B

ROUTINE FACILITY INSPECTION CHECKLIST

Routine Facility Inspection Checklist

Activity Name: ______________________ **Date of Inspection:** ______________________

Inspector(s): ______________________ **Facility Name/Number:** ______________________

Column 1	Column 2	Column 3	Column 4	Column 5	
Source Area	BMP Number and Title	Status: F, P, N, NA[1]	Briefly Describe Effectiveness (Good or Other [describe])	Corrective Measures	
				What	By When

Note 1: F – Fully implemented, P – Partially implemented, N – Not implemented , NA – Not Applicable

APPENDIX C

QUARTERLY VISUAL ASSESSMENT CHECKLIST

Quarterly Visual Assessment Checklist

Facility ID and Location: ______________________

Date: ____________________

Sampler Name (Printed): ______________________ Signature: ______________________

Time of Rainfall Begin: ______________ Time of Rainfall End: ______________

Time of Flow Begin: ______________ Time of Flow End: ______________

Rainfall event more than 72 hours since last event? Yes / No Rainfall Event Total: ______________

Sample: sample in a clean, colorless glass or plastic container, and examined in a well-lit area

On samples collected within the first 30 minutes of an actual discharge from a storm event

Sample Characteristics:

Color: ______________ Floating Solids: ______________

Odor: ______________ Settled Solids: ______________

Clarity: ______________ Suspended Solids: ______________

Oil Sheen: ______________ Foam: ______________

Other Obvious Indicators of Storm Water Pollution

(describe): ______________________________

Nature of the discharge (i.e., runoff):

Results of observations of the storm water discharge:

Probable sources of any observed storm water contamination:

If applicable, why it was not possible to take samples within the first 30 minutes:

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

APPENDIX D

CORRECTIVE ACTION LOG

Corrective Action Log

Use this form to document SWPPP corrective actions. This form is to be completed by the Environmental Compliance Coordinator (ECC) or a person designated by ECC and submitted to the MCBH Storm Water Program Manager. The Storm Water Program Manager is responsible for any notification to the State of Hawaii Department of Health (DOH), if required.

A corrective action is defined as an action taken to:

- **a) Repair, modify, or replace any storm water control used at the site;**
- **b) Clean up and properly dispose of spills, releases, or other deposits; or**
- **c) Remedy a permit violation.**

1. Corrective Action Triggers

The following events trigger a corrective action to be taken (this triggering condition is to be documented *within 24 hours* of discovering the occurrence):

- a) A required storm water control was never installed, was installed incorrectly, or is not in accordance with the requirements in the SWMP Plan.
- b) A member of the **Storm Water Pollution Control Team** becomes aware that the storm water controls installed and being maintained are not effective enough for the discharge to meet applicable water quality standards or applicable requirements in the MCBH SWMP Plan. The facility ECC shall notify the Storm Water Program Manager immediately. The Storm Water Program Manager will notify DOH *by the end of the next work day*.

1.1 Log Notifications:

Date/time Storm Water Program Manager notified by ECC: ________________________

Date/time DOH notified by Storm Water Program Manager: ________________________

1.2 Describe Discharge:

Indicate which one of the following prohibited discharges is occurring or has occurred:

- ❒ Wastewater from washout of concrete
- ❒ Wastewater from washout and cleanout of stucco, paint, form release oils, curing compounds, or other construction materials
- ❒ Fuels, oils, or other pollutants used in vehicle and equipment operation and maintenance
- ❒ Soaps, solvents, or detergents used in vehicle and equipment washing
- ❒ Toxic or hazardous substances from a spill or other release
- ❒ Other, Explain: ____

2. Requirements for Taking Corrective Actions

The ECC shall complete corrective actions in accordance with the deadlines specified below. In all circumstances, site personnel shall *immediately* take all reasonable steps to minimize or prevent the discharge of pollutants until a permanent solution is installed and made operational, including cleaning up any contaminated surfaces so that the material will not discharge in subsequent storm events. *Immediately* means the same day the condition is discovered, unless it is too late in the day, in which initiation of corrective action must begin on the following work day.

Following any of the above triggering events, the ECC shall install a new or modified control and make it operational, or complete the repair, by *no later than 7 calendar days from the time of discovery*. If it is not feasible to complete the installation or repair within 7 calendar days, the ECC shall document and submit to the Storm Water Program Manager, for their agreement, why it is not feasible to complete the installation or repair within the 7-calendar day timeframe and document a schedule for installing the storm water control and making it operational as soon as practicable after the 7-day timeframe.

If the issue is not adequately addressed within 7 calendar days or the agreed upon timeframe, enforcement procedures will be initiated. Unaddressed issues will be escalated through the chain of command. The MCBH Environmental Compliance and Protection Division Director will give the responsible party a formal notice with an appropriate deadline for action. If the problem remains unchanged, the situation will be brought to the attention of the next higher authority. The ultimate penalty for non-compliance of MS4 Permit regulations is eviction or discharge of the responsible party from MCBH. This is placed at the discretion of the Base Commander. See the Enforcement Response Plan in Appendix 3-6 of the SWMP Plan for further information on MCBH’s enforcement policies.

3. Corrective Action Report

Within 24 hours of discovering the occurrence of one of the triggering conditions in SWPPP Section 4.1 at the site, the ECC must complete the following:

3.1 Describe the triggering condition:

____
____
____
____

3.2 Record the date/time of the condition identified. How was the condition identified?

____
____
____
____

3.3 Describe the corrective action taken:

____
____
____

Date/time installation or repair was completed:
(or date/time the prohibited discharge ceased) ____

Or describe why it is not feasible to complete installation or repair within 7 calendar days and detail a proposed schedule (if applicable)

____
____
____

4. Resolution of the Corrective Action Trigger

Within 7 calendar days of initiating the Corrective Action Report, the ECC must complete a report of the following:

4.1 Follow-up Actions

Describe any follow-up actions taken to review the design, installation, and maintenance of storm water controls, including the dates such actions occurred:

____
____
____

4.2 Storm Water Control Modifications

Provide a summary of storm water control modifications implemented. Include a schedule of activities required to implement changes and the date the modifications were completed or will be completed:

____
____
____

5. SWPPP Modification Due to Corrective Actions

Where corrective actions result in changes to any of the storm water controls or procedures documented in the SWPPP, modify the SWPPP accordingly *within 7 calendar days* of completing corrective action work.

Are modifications to the SWPPP necessary? ❑ Yes ❑ No

Date modifications to the SWPPP shall be completed _______________

6. Corrective Actions Required by DOH

The facility shall comply with any corrective actions required by DOH as a result of permit violations found during an inspection by DOH or the Environmental Protection Agency (EPA).

Was the Corrective Action triggered by a DOH/EPA inspection?

❑ Yes ❑ No

❑ Date of DOH/EPA Inspection __________________

7. Additional Comments:

____
____

Final

STORM WATER POLLUTION PREVENTION PLAN

Storm Water Management Program Plan

Marine Corps Base Hawaii, Oahu, Hawaii

NPDES Permit No. HI S000007

MOTOR VEHICLE MAINTENANCE – 3RD RADIO BATTALION (BUILDING 6874)

Prepared by:

Marine Corps Base Hawaii

August 2022

Table of Contents

Tables

Figures

Appendices

List of Acronyms and Abbreviations

AST	Aboveground Storage Tank
BMP	Best Management Practice
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CWA	Clean Water Act
CWB	Clean Water Branch
DOH	State of Hawaii Department of Health
ECC	Environmental Compliance Coordinator
ECE	Environmental Compliance Evaluation
ECPD	Environmental Compliance and Protection Division
EPA	United States Environmental Protection Agency
HAZMAT	Hazardous Material
HAZMIN	Hazardous Material Minimization
HMMWV	High Mobility Multipurpose Wheeled Vehicle
JLTV	Joint Light Tactical Vehicle
MCBH	Marine Corps Base Hawaii
MoGas	Motor Gasoline
MS4	Municipal Separate Storm Sewer System
MS4 Permit	Marine Corps Base Hawaii's NPDES Permit No. HI S000007
MMV	Millennia Military Vehicle
MTVR	Medium Tactical Vehicle Replacements
NPDES	National Pollutant Discharge Elimination System
OWS	Oil/Water Separator
POC	Point of Contact
SAS	Satellite Accumulation Site
SWMP	Storm Water Management Program
SWPPP	Storm Water Pollution Prevention Plan

Certification Statement

MCBH is committed to the prevention of discharges of polluted stormwater to navigable waters or the environment and maintains the highest standards for best management practices through periodic review, updating, and implementation of this Stormwater Pollution Prevention Plan (SWPPP).

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information contained therein. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Name: ______________________________ Title: ______________________________

Signature: ____________________________ Date: ______________________________

Management Review

Refer to Section 1.2 for more information on required SWPPP updates.

Review Dates	Signature	Amendment Required? (Y/N)
___________	________________	_________
___________	________________	_________
___________	________________	_________
___________	________________	_________
___________	________________	_________
___________	________________	_________

1 Introduction

As part of Federal regulations administered through the Clean Water Act (CWA), the State of Hawaii, Department of Health (DOH) has issued the National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4) Permit No. HI S000007 (referred to herein at the "MS4 Permit") to Marine Corps Base Hawaii (MCBH). The MS4 Permit requires that MCBH provide all existing industrial facilities, identified in MCBH's MS4 Permit application, and any newly identified industrial facilities, submitted to DOH using the "MS4 NPDES Individual Permit – Industrial Storm Water Discharge Notification Form," with a Storm Water Pollution Prevention Plan (SWPPP) for storm water associated with industrial activities.

The purpose of the regulations is to protect water quality by reducing the amount of pollutants in storm water runoff caused by industrial activities.

1.1 SWPPP Implementation

The storm water management controls of this plan will become MCBH procedure for the applicable industrial facility. An up-to-date copy of the SWPPP shall be maintained on site and at the MCBH Environmental Compliance and Protection Division (ECPD). Management staff, maintenance personnel, contractor staff, and other personnel involved in onsite industrial activities, will be knowledgeable of the plan and follow the guidelines set forth in it, in addition to any other pertinent base-wide, state and federal regulations.

Day-to-day implementation of the SWPPP is primarily the responsibility of the current facility Environmental Compliance Coordinator (ECC) or Point of Contact (POC) as identified in Table 2-1. Enforcement of the permit conditions and this SWPPP are ultimately the responsibility of ECPD and additional escalating levels of authority as specified in the Enforcement Response Plan developed by MCBH for its base-wide Storm Water Management Program (SWMP) Plan.

1.2 Updating the SWPPP

This SWPPP will be reviewed as needed to identify necessary changes, at a minimum of every five years. Updates may be required due to current best management practice (BMP) failures, spill events, changes in industrial activities, changes in features, corrective actions, or other necessary changes. Personnel changes to the Storm Water Pollution Control Team (Section 2.1) should be logged in Table 2-1. Storm Water Pollution Control Team Log. ECPD will be responsible for approving revisions to the SWPPP. In the event the plan is modified, a copy of the updated SWPPP will remain at ECPD and will be provided to the applicable facility. Additionally, ECPD shall document and report the SWPPP changes to the DOH, Clean Water Branch (CWB), within thirty days of when the changes arise.

2 Motor Vehicle Maintenance - 3rd Radio Battalion, Building 6874

The Motor Vehicle Maintenance (3rd Radio Battalion), Building 6874, is located within MCBH, Kaneohe Bay at southern end of Harris Ave. The facility encompasses approximately 10 buildings across 11.0 acres and can be found in grid [redacted] of the MCBH Base Map, see Figure 4-1. The facility-specific map is shown on Figure 4-2.

2.1 Storm Water Pollution Control Team

The Storm Water Pollution Control Team consists of the Storm Water Program Manager, ECC, and the Hazardous Material (HAZMAT) and Hazardous Material Minimization (HAZMIN) team. The Storm Water Program Manager is responsible for the enforcement of the MS4 permit at all industrial sites and provides annual training to the ECC and other personnel. The ECC is the primary unit POC for storm water related items and the day-to-day environmental matters at a specific facility. ECC's are responsible for SWPPP implementation including BMP and facility inspections, storm water assessments/sampling, BMP maintenance, and corrective actions. The safety manager is also available to assist the ECC. The HAZMAT and HAZMIN team shall be contacted if assistance is needed. The role, name, phone number, and start date of individuals on the Storm Water Pollution Control Team is recorded in Table 2-1 below. In the event of personnel turnover, Table 2-1 shall be updated accordingly.

TABLE 2-1. STORM WATER POLLUTION CONTROL TEAM LOG

Role	Name	Phone	Start Date
MCBH Storm Water Program Manager	CIV Whitney Anderson	Office: 808-257-4359	6/6/22
ECC	SSgt Keegan Prichett	Office: 808-257-1304 808-257-5642	7/1/2021
Safety Manager	GySgt Daniel J. Barlow	Office: 808-257-7503 Cell: 209-992-9362	09/1/2019
HAZMAT/HAZMIN	CIV Tim Cawthon	HAZMAT Center Building 6409 Office: 808-257-9913 HAZMIN Center Building 6407 Office: 808-257-0770	N/A

2.2 Motor Vehicle Maintenance - 3rd Radio Battalion, Building 6874 Activities

Building 6874 is a newly constructed vehicle maintenance facility with many large bays and office space. The facility services and stores about 80 vehicles. There are approximately 16 Joint Light Tactical Vehicles (JLTVs), 15 Medium Tactical Vehicle Replacements (MTVR, aka 7-tons), 25 High Mobility Multipurpose Wheeled Vehicles (HMMWVs, aka Humvees), 20 trailers, and 16 water tanks trailers. The Vehicles are generally stored along the southern and western area of the asphalt lot. All maintenance is done undercover within the maintenance bays at Building 6874 and vehicles are fueled offsite at the fuel farm. Bays 1 and 2 at the north end of the building store electrical supplies, boats, spill kits, generators, and many empty boat-fuel cans stored in a gear cage with spill containment. Vehicle maintenance occurs within Bays 3-8. Near Bay 3, there is a battery room and flammable lockers for refrigerant and paints. Bays 5 and 6 contain recessed maintenance pits that are coved with storage materials and not utilized. There is a satellite accumulation site (SAS) in Bay 8 at the southern end of the building. Antifreeze, fuel, oil, coolant, rags, pads and scrap metal are all stored in secondary containment at the SAS.

Directly south of Building 6874 is a vehicle wash rack and HAZMAT locker (Building 6875). The wash rack, which is used daily, discharges water to an oil/water separator (OWS). The OWS is inspected weekly by the ECC. The HAZMAT locker, Building 6875, stores oil, lubricants, fuel, hydraulic fluid, and antifreeze. A large backup generator with built in diesel tank is located directly north of Building 6874. The generator is surrounded by bollards. Smaller generators, a Millennia Military Vehicle (MMV) diesel forklift, and other miscellaneous equipment is stored just north of the generator on the asphalt lot.

Building 6002 is the only other building in the 3rd Radio Battalion compound with storage for significant materials. Building 6002 is used for storing communication equipment and has office space. Along the southern exterior wall, an outdoor flammable cabinet stores boat fuel bladders, lubricants, grease, oil, and spill materials. A [redacted]-gallon diesel generator is installed on a concrete pad surrounded by fencing between Building 6002 and Building 6003. Buildings 6003, 6874, 4099, 4072, 6842 contain office space and do not store hazardous materials. Building 3095 is a general storage warehouse with six portable shelters/offices stored outside to the east. General supplies are stored in Building 4078.

Storm water that falls within the majority of the newly constructed Building 6874 facility flows toward grated inlets that run from north to south along the asphalt lot and discharge to the east in a grassy area. The storm water monitoring sample point (Outfall 01) is located at the southernmost inlet to the southwest of building 6875. Storm water falling within other areas of the 3rd radio battalion compound either percolates into grassy areas or flows into drain inlets. Stormwater discharge from buildings other than Building 6874 likely flows to the south of the compound at the substantially similar Outfall 02. The receiving water, Nu'upia Pond is approximately 500 ft to the south of the compound. During larger rain events, water tends to pond at the southern end of Harris Ave and eventually flows into storm drains in the western end of the vehicle parking lot north of Building 6003. A storm water headwall/outfall is located at the southwestern corner the Building 6874 lot. This headwall discharges storm water that is collected north of the 3rd Radio Battalion facility.

2.3 Sources of Pollutants

The following is an inventory of potential pollutants associated with Motor Vehicle Maintenance - 3rd Radio Battalion, Building 6874:

A. Material Loading and Unloading Areas

Materials that are spilled, leaked, or lost during loading or unloading may collect on vegetated or paved surfaces and be carried away by storm runoff. Materials are loaded and unloaded near the outdoor storage areas by the Building 6874, Building 6875, and the supplies warehouses (Buildings 3095 and 4078).

B. On-Site Material Storage and Disposal Practices

Leaks, drips, or spills of materials that are stored or disposed of in areas exposed to rainfall can be carried away by storm water. All significant materials are procured through the HAZMIN. Significant materials are stored in hazardous materials lockers, or on spill pallets located at the SAS located in Bay 8 and Building 6875.

C. Outdoor Activities

Many outdoor activities at MCBH, Kaneohe Bay use materials or create wastes that have the potential to pollute storm water runoff. Outdoor activities at the Motor Vehicle Maintenance facility include the loading and unloading of significant materials, parking of heavy equipment, and washing of vehicles at the wash rack.

D. Significant Materials Inventory

The following is a list of significant materials found at the Motor Vehicle Maintenance - 3rd Radio Battalion:

- Diesel Fuel
- Mixed Fuels
- Antifreeze
- Lube Oil
- Grease
- Transmission Fluid
- Brake Fluid
- Mineral Spirits
- New and Used Oil
- Grease
- Paint
- Solvents
- Battery Acid
- MoGas

2.4 Potential Storm Water Pollutants

The following pollutants have been identified as having a reasonable potential to be present in storm water discharges from Motor Vehicle Maintenance - 3rd Radio Battalion, Building 6874 if not properly managed:

- Grease
- Oil

Materials that have *not* been included as a potential storm water pollutant but have been included as part of the significant materials inventory list, are considered to present a negligible risk to storm water quality. This is based on the nature/location of the primary activities performed with these materials and the BMPs that are in place. Material transport (loading/unloading) is not considered to be a significant threat to storm water, due to spill response procedures, training, and spill kit materials available onsite.

2.5 Best Management Practices (BMPs)

Best Management Practices (BMPs) are techniques or methods that aim to manage the quantity and improve the quality of storm water runoff from a facility or other site. Storm water BMPs intend to reduce or eliminate pollution and contaminants collected by runoff before the runoff reaches the MCBH storm water system or sensitive ecosystems such as streams, wetlands, and marine environments. The following is a summary of BMPs currently in place at the Motor Vehicle Maintenance - 3rd Radio Battalion, Building 6874.

A. Good Housekeeping Practices

In general, Motor Vehicle Maintenance - 3rd Radio Battalion, Building 6874 employs good housekeeping practices throughout its operations. Good housekeeping practices for Motor Vehicle Maintenance - 3rd Radio Battalion, Building 6874 are included in Table 2-2.

B. Preventative Maintenance

Preventive maintenance is important as water pollution control measures may be of little or no use if devices and equipment have not been properly maintained. Facility personnel conduct inspection of facility equipment and storage systems on a regular basis. The preventive maintenance program involves inspections of equipment and storage systems that are exposed to storm water. Inspections of the SAS are conducted on a monthly basis by HAZMIN, with monthly inspection reports submitted to ECPD. Maintenance work is performed under cover, and no maintenance work is performed outdoors.

C. Visual Inspections

Visual inspection provides a valuable subjective assessment of the status of storm water management systems. They are easily performed and allow the opportunity for corrective action, if necessary. Site inspections and documentation requirements are addressed in in Section 3 of this SWPPP. MCBH HAZMIN Center staff perform hazardous material inspections monthly. Annual facility inspections are performed by EPCD as part of the MCBH Environmental Compliance Evaluation (ECE).

D. Spill Prevention and Response

Areas where significant material spill or leakage can occur are identified in Section 2.1 and shown on Figure 4-2. The storm water systems and their accompanying drainage points are also shown on Figure 4-2. Refer to Table 2-2 for BMPs related to spill preventative measures for material handling procedures, storage requirements, and equipment usage.

In the event of a hazardous substance or oil spill, the ECC and ECPD shall be notified immediately (ECPD; 808-630-8246). If the spill cannot be easily addressed using an onsite spill kit and personal protective equipment, call Fed Fire (Military 911). The spill source should be immediately controlled if it is safe to do so by closing valves, switches, and/or turning off power to a device. Then, contain the spill by using sorbent socks or absorbent materials found in a spill kit. After it has been contained, clean up the spilled material in a safe manner using dry methods. All materials should then be properly disposed of.

Drip pans are used under every vehicle parked at Building 6874. Oil-absorbent socks are placed around all drains at Building 6874 when it is raining during work hours.

The locations of spill kits are shown in Figure 4-2.

E. Erosion and Sediment Controls

No areas at the Motor Vehicle Maintenance Facility have been identified as having high potential for significant soil erosion that would require erosion and sediment control measures.

F. Best Management Practices to Minimize Pollutant Contact with Storm Water

Facility personnel receive annual training from ECPD at minimum, as well as an initial training for all new personnel. Training information will include the BMPs that have been developed for the facility and a general overview of the storm water program and its objectives.

Existing BMPs at the Motor Vehicle Maintenance - 3rd Radio Battalion are shown in Table 2-2 and attached as fact sheets to this SWPPP in Appendix A.

TABLE 2-2. BEST MANAGEMENT PRACTICES

BMP No.	BMP Title	Description
001	Label All Drums, Cans, Containers, Tanks, and Valves	All containers and drums are labeled.
002	Restrict Access to Area and Equipment	Area is completely enclosed by chain-linked fencing.
004	Avoid Hosing Down the Site	Sweeping with a push broom is performed as needed.
006	Control Spills	Any spill of significant materials is controlled immediately to prevent pollutant from being transported to receiving water. A spill kits are stored onsite.
007	Place Trash Receptacles at Appropriate Locations	Covered trash bins are located throughout the facility
015	Recycle	Recyclable materials are stored in appropriate containers until it can be transported to the Recycle Center.
016	Store Waste and Recycling Materials in Proper Containers	Waste and recycling containers are located Waste containers will be emptied regularly. Dumpsters should all have lids; lids should be kept closed when not in use.
033	Check Vehicles and Equipment for Leaks	Vehicles and equipment are checked for leaks on a regular basis.
041	Wash Equipment in Designated Areas	A designated wash pad is connected to an OWS.
061B	Store Liquids and Significant Materials within a Building or Covered Area	All significant materials are properly stored undercover and in secondary containment where required.
113	Conduct Personnel Training Regarding the SWPPP	Personnel are trained regularly (initial orientation and annual refresher).

3 Inspections, Assessments and Monitoring

3.1 Routine Quarterly Site Inspections

The MS4 Permit requires a routine quarterly site inspection by a qualified person with at least one member of the storm water pollution control team participating. At least once each calendar year, the routine inspection must be conducted during a period when a storm water discharge is occurring. The site inspection is an overall evaluation of the effectiveness of the BMPs implemented at that facility. A Routine Facility Inspection Checklist (Appendix B) shall be completed during each routine site inspection and kept onsite with this SWPPP. During normal facility operating hours, inspections must be conducted of areas of the facility including, but not limited to, the following:

- Areas where industrial materials or activities are exposed to storm water;
- Areas identified in the SWPPP and those that are potential pollutant sources;
- Areas where spills and leaks have occurred in the past three years;
- Discharge points; and
- Control measures used to comply with the effluent limits contained in this permit.

3.2 Visual Assessment of Storm Water Discharges

A Quarterly Visual Assessment of storm water discharge is required for all industrial facilities at MCBH. Storm water samples for this visual assessment but must be collected in such a manner that the samples are representative of the storm water discharge from the facility. Therefore, the water sample must be collected at the designated storm water monitoring point (Outfall 01) as shown in Figure 4-2. The Quarterly Visual Assessment checklist (Appendix C) shall be completed by the current facility ECC and kept onsite with this SWPPP.

The visual assessment must be made:

- Of a sample collected in a clean, colorless glass or plastic container, and examined in a well-lit area;
- On samples collected within the first 30 minutes of an actual discharge from a storm event. If it is not possible to collect the sample within the first 30 minutes of discharge, the sample must be collected as soon as practicable after the first 30 minutes and documented why it was not possible to take the sample within the first 30 minutes; and
- For storm events, on discharges that occur at least 72 hours (three days) from the previous discharge.

Whenever the visual assessment shows evidence of storm water pollution, corrective action procedures to remedy the pollutants must be taken and documented. Refer to Section 4 for corrective action procedures.

4 Corrective Actions

A corrective action is defined as any action taken, or required to be taken, to (1) repair, modify, or replace any stormwater control used at the site; (2) clean up and dispose of spills, releases, or other deposits found on the site; and (3) remedy a permit violation. Corrective actions should be documented using the Corrective Action Log (Appendix D).

4.1 Immediate Actions

If corrective action is needed, you must immediately take all reasonable steps necessary to minimize or prevent the discharge of pollutants until a permanent solution is installed and made operational, including cleaning up any contaminated surfaces so that the material will not discharge in subsequent storm events. Note: In this context, the term "immediately" requires you to, on the same day a condition requiring corrective action is found, take all reasonable steps to minimize or prevent the discharge of pollutants until a permanent solution is installed and made operational. However, if a problem is identified at a time in the workday when it is too late to initiate corrective action, the initiation of corrective action must begin no later than the following workday. "All reasonable steps" means that the permittee has undertaken initial actions to assess and address the condition causing the corrective action, including, for example, cleaning up any exposed materials that may be discharged in a storm event (e.g., through sweeping, vacuuming) or making arrangements (i.e., scheduling) for a new BMP to be installed at a later date.

4.2 Escalating Actions

If additional actions are necessary beyond those implemented or if the conditions continue to occur, additional corrective actions (e.g., install a new or modified control and make it operational, complete the repair) must be completed before the next storm event if possible, and within 14 calendar days from the time of discovery of the corrective action condition. If it is infeasible to complete the corrective action within 14 calendar days, document why it is infeasible to complete the corrective action within the 14-day timeframe and identify a schedule for completing the work, which must be done as soon as practicable after the 14-day timeframe but no longer than 45 days after discovery. If the completion of corrective action will exceed the 45-day timeframe, the minimum additional time necessary to complete the corrective action can be taken, provided that MCBH ECPD and DOH is notified of your intention to exceed 45 days. Where your corrective actions result in changes to any of the controls or procedures documented in your SWPPP, you must modify your SWPPP accordingly within 14 calendar days of completing corrective action work.

4.3 Corrective Actions for Substantially Identical Outfalls

If the event triggering corrective action is associated with an outfall that had been identified as a "substantially identical outfall", the review must assess the need for corrective action for all related substantially identical outfalls. Any necessary changes to control measures that affect these other outfalls must also be made before the next storm event if possible, or as soon as practicable following that storm event. Any corrective actions must be conducted within the timeframes discussed above.

4.4 Record of Past Spills or Leaks of Hazardous Pollutants

Table 4-1 is used to record significant spills and leaks that have occur or have occurred within three years prior to the preparation or amendment of this SWPPP. Significant spills and leaks include, but are not limited to, releases of oil or hazardous substances in excess of quantities that are reportable under CWA Section 311 (see 40 CFR 110.6 and 40 CFR 117.21) or Section 102 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 USC §9602.

At the time of this SWPPP update, there have been no past spill or leak incidents reported for the Motor Vehicle Maintenance - 3rd Radio Battalion.

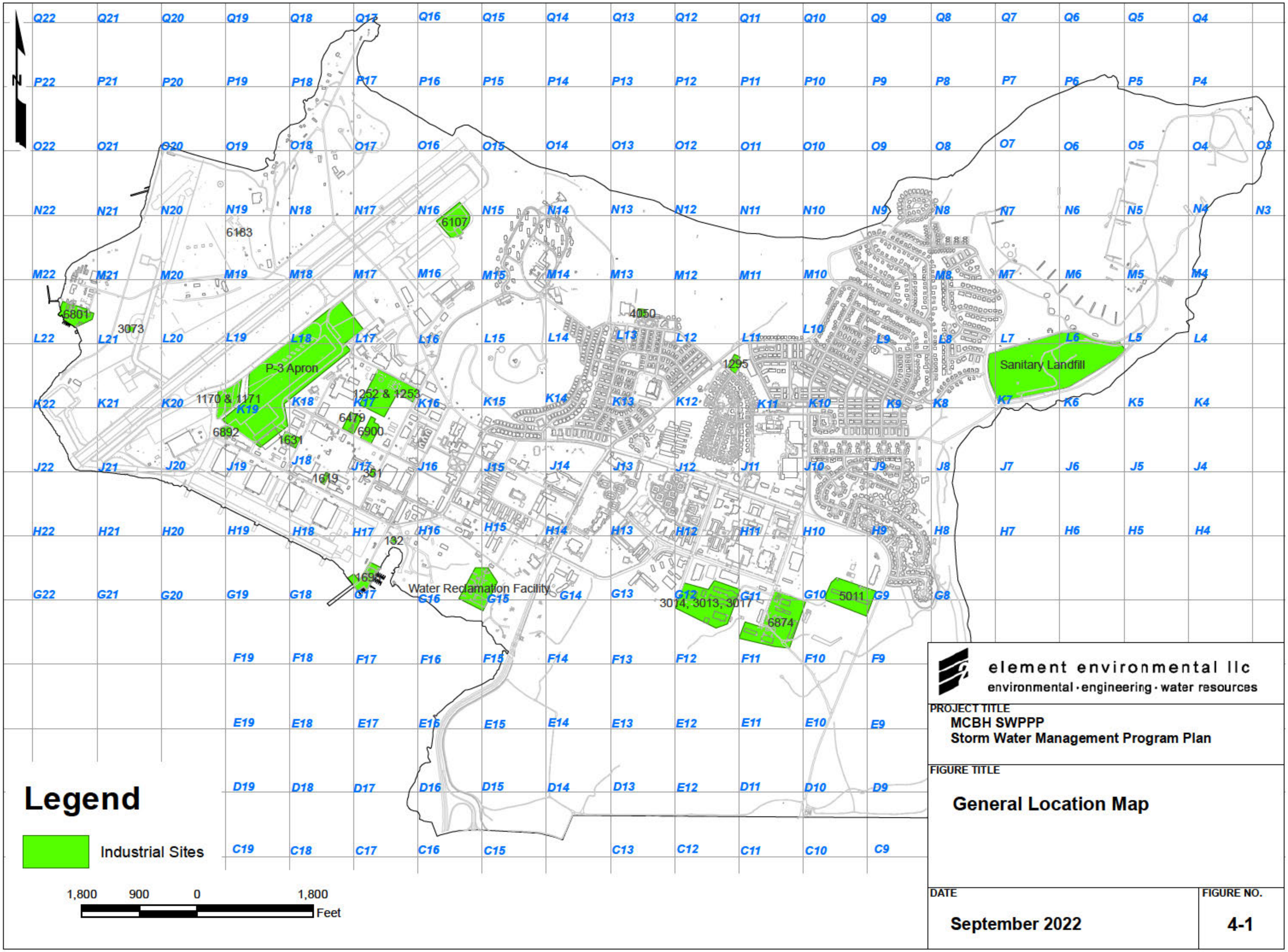
TABLE 4-1. PAST SPILLS OR LEAKS OF HAZARDOUS POLLUTANTS

Date of Incident	Brief Summary of Incident (POC Active at Time of Incident, Pollutant Type, Estimated Quantity, Location of Spill)

4.5 Record of Unauthorized Non-Storm Water Discharges

TABLE 4-2. UNAUTHORIZED NON-STORM WATER DISCHARGE EVALUATION

Date of Evaluation	**Brief Summary of Evaluation** **(Description of the evaluation criteria, outfalls or onsite drainage points that were directly observed, action(s) taken, such as a list of control measures used to eliminate unauthorized discharge)**



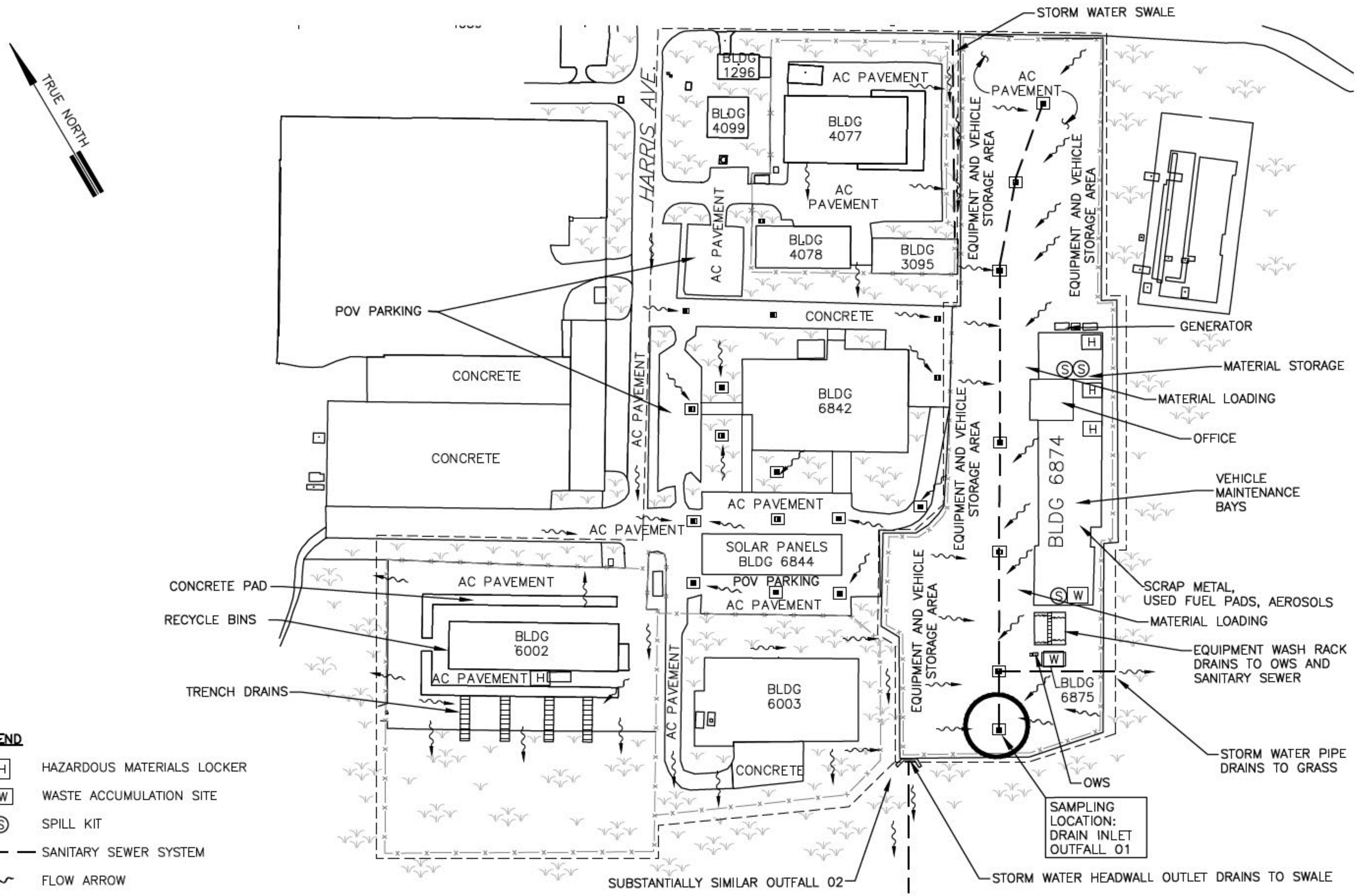
element environmental llc
environmental · engineering · water resources

PROJECT TITLE
MCBH SWPPP
Storm Water Management Program Plan

FIGURE TITLE
General Location Map

DATE
September 2022

FIGURE NO.
4-1



LEGEND

- H — HAZARDOUS MATERIALS LOCKER
- W — WASTE ACCUMULATION SITE
- S — SPILL KIT
- — — — SANITARY SEWER SYSTEM
- FLOW ARROW
- - - - - DRAINAGE AREA BOUNDARY
- ▪ STORM DRAIN INLET

NOTES:

1. STORM WATER FROM THE 3RD RADIO BATTALION COMPOUND, WHICH IS APPROXIMATELY 11 ACRES, ULTIMATELY FLOWS TO VEGETATED AREAS.
2. NUUPIA POND IS THE NEAREST WATER BODY, APPROXIMATELY 500 FT TO THE SOUTH.
3. NOT TO SCALE

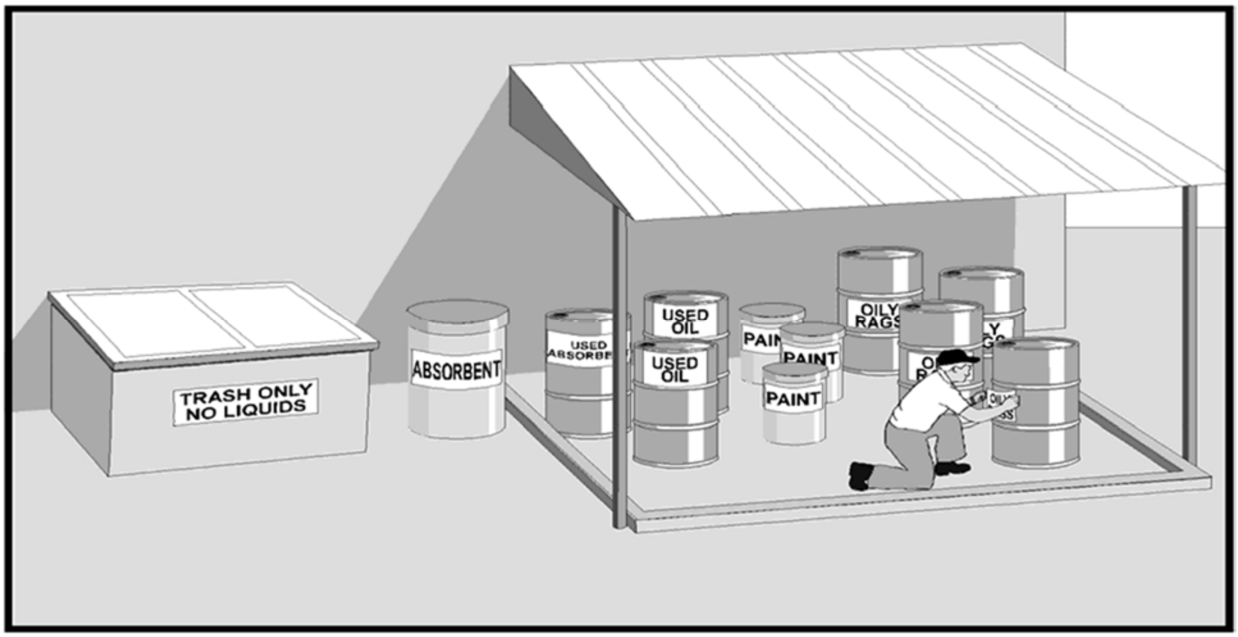
DATE: JULY 2022	PROJECT TITLE: STORM WATER POLLUTION PREVENTION PLAN MCBH, KANEOHE BAY, OAHU, HAWAII	
FIGURE TITLE: MOTOR VEHICLE MAINTENANCE 3RD RADIO BATTALION (BUILDING 6874)		FIGURE NO.: 4-2

DAMATO
7/29/2022 12:59:15 PM
FIG 4-2 Bldg 6874 - 3rd Radio Battalion.dwg

APPENDIX A

SELECTED BMP FACT SHEETS

BMP 001 - LABEL ALL DRUMS, CANS, CONTAINERS, AND TANKS



Description of Potential Pollutant and Source: Drums, cans, and containers can be improperly managed and disposed of due to uncertainty of the container's contents. Tanks which are not labeled may result in improper use of the tank or fuel, which may result in the exposure of significant materials to storm water and/or receiving waters. Similarly, unlabeled valves may be opened without proper precaution due to lack of user information. Storm water quality will be affected if significant materials are improperly disposed to the storm drain and/or receiving waters. Lack of labeling will also make it difficult to quickly identify the type of material released so facility personnel can respond correctly. Labels also identify hazardous materials at the facility and are a good way to request caution in certain areas (e.g., drums indicating flammability).

Description of BMP: Label all drums, valves, pumps, cans, tanks, and containers to reduce the chance of misuse and eventual spills. Labeling ensures that the appropriate procedures, equipment, and storage containers are used. All containers will be labeled as to what is in them.

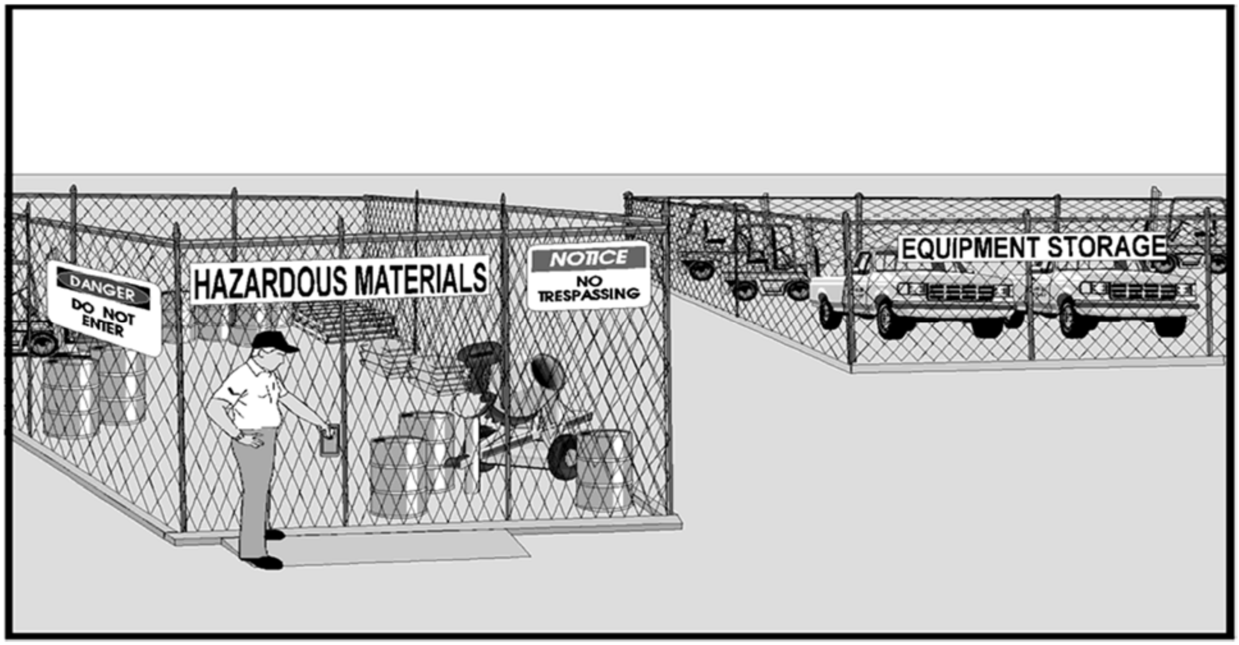
Application Guidance: As needed.

Training: N/A

Effectiveness and Cost: Effectiveness and costs will vary depending on the application.

Limitations: None

BMP 002 - RESTRICT ACCESS TO AREA AND EQUIPMENT



Description of Potential Pollutant and Source: Vandalism of vehicles and facility property may result in the release of significant materials.

Description of BMP: Provide fences and gate areas where vehicles, equipment and materials are stored and are accessible to the public to discourage trespassing. Access to equipment will also be restricted. Only authorized personnel will be allowed to operate equipment. The fences and gates will be properly maintained, and additional security measures including lighting of the area will be implemented if the fencing alone proves insufficient. Where appropriate, security guards or alarms will be used.

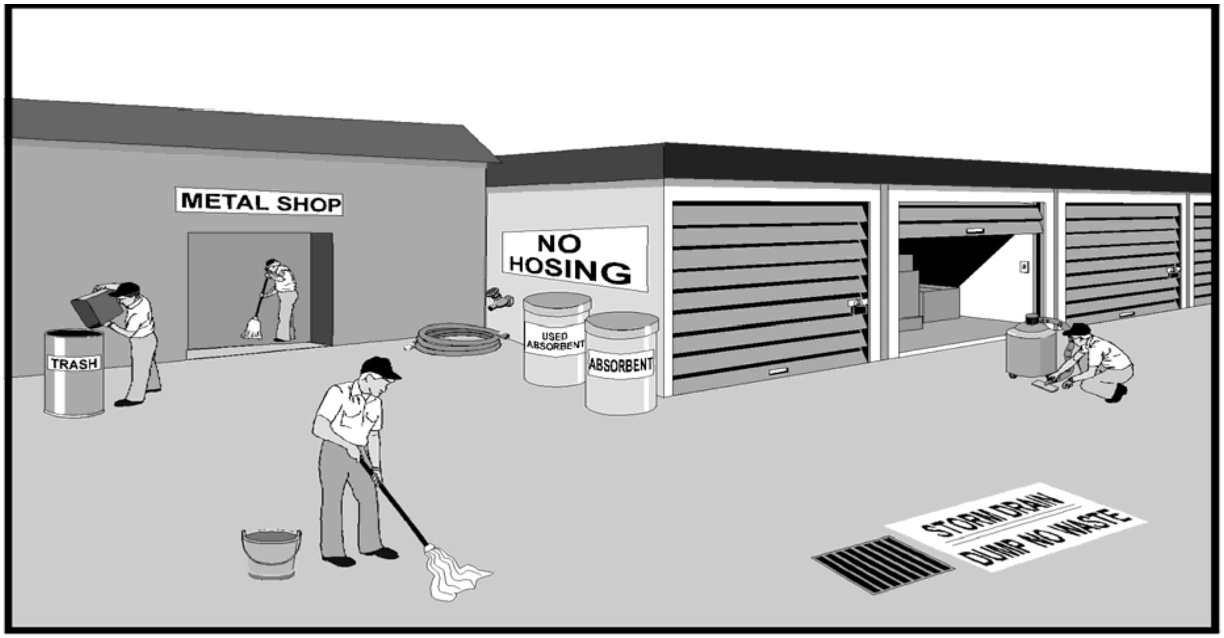
Application Guidance: As needed.

Training: N/A

Effectiveness and Cost: Effectiveness and costs will vary depending on the application.

Limitations: None

BMP 004 - AVOID HOSING DOWN THE SITE



Description of Potential Pollutant and Source: Cleaning work sites by hosing down causes wash water to transport pollutants to the storm drain where it can be exposed to storm water.

Description of BMP: Use dry methods to clean work sites. Dry methods include sweeping or using damp rags or mops. If possible or practical, hoses will be removed. If hosing down is unavoidable, the downstream drain will be temporarily plugged as described in the following BMPs:

- BMP 023 - Place portable Rubber Mats Over Storm Drain Inlets
- BMP 024 - Insert Filter in Catch Basin
- BMP 025 - Place Absorbent Blankets in Catch Basin

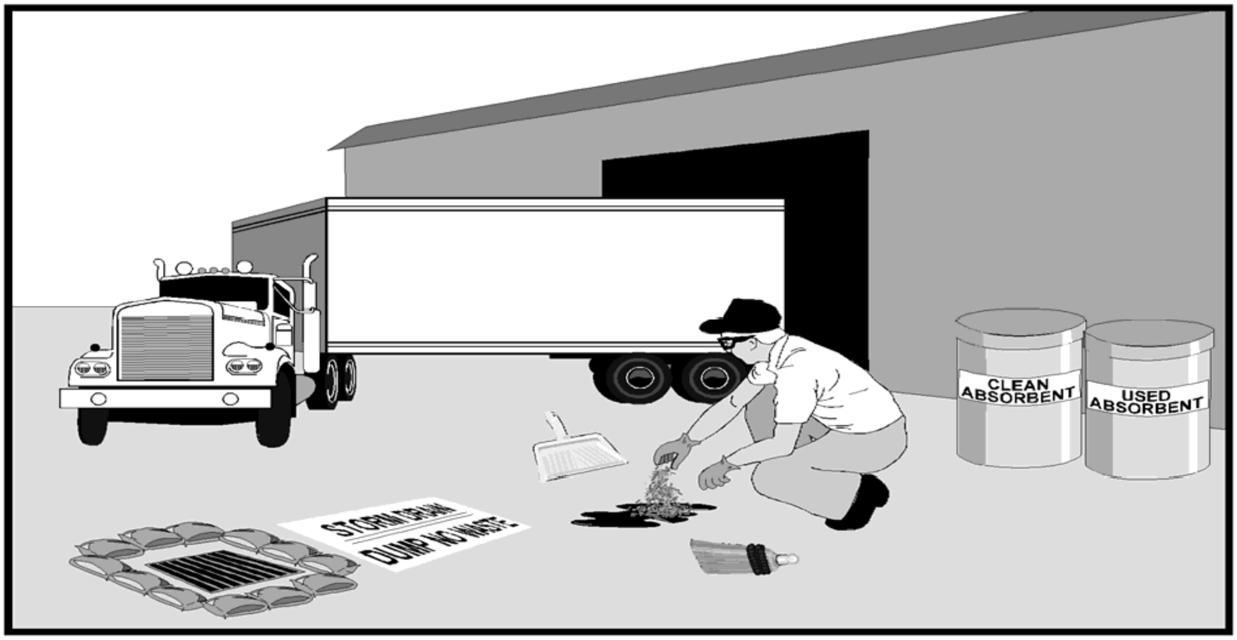
Application Guidance: Methods of dry cleaning will be used whenever possible at all workstations, loading/unloading sites, storage areas, and parking lots.

Training: New personnel will be notified of the policy and signs will be posted. If possible or practical, hoses will be removed.

Effectiveness and Cost: Eliminating hosing down is a highly effective, low-cost BMP.

Limitations: None

BMP 006 - CONTROL SPILLS



Description of Potential Pollutant and Source: Spills of significant materials may be exposed to storm water and transported to storm drains and/or receiving waters.

Description of BMP: Follow safety data sheets (SDS) for handling, storage, and cleanup of all significant materials to reduce the potential for spills.

Any spill, large or small, of significant materials will be controlled to prevent pollutants from being transported to storm drains and/or receiving waters. Appropriate spill control material will be kept on site. Smaller spills will be contained using absorbent material such as kitty litter, straw, or sawdust. Drums of absorbent material will be easily accessible and clearly marked, and containers for spent absorbent material will be readily available. Spent absorbent material will be managed appropriately and disposed of in accordance with applicable regulations. Larger spills will be controlled using spill kits, brooms, and other response equipment commensurate with the size of the spill. The methods outlined in the Activity's spill prevention and response plans (BMP 112) for hazardous materials will be followed for spills of any potential storm water pollutants. The date, time, nature and volume of material spilled, and cleanup measures taken will be recorded for all spills and kept as part of the SWPPP.

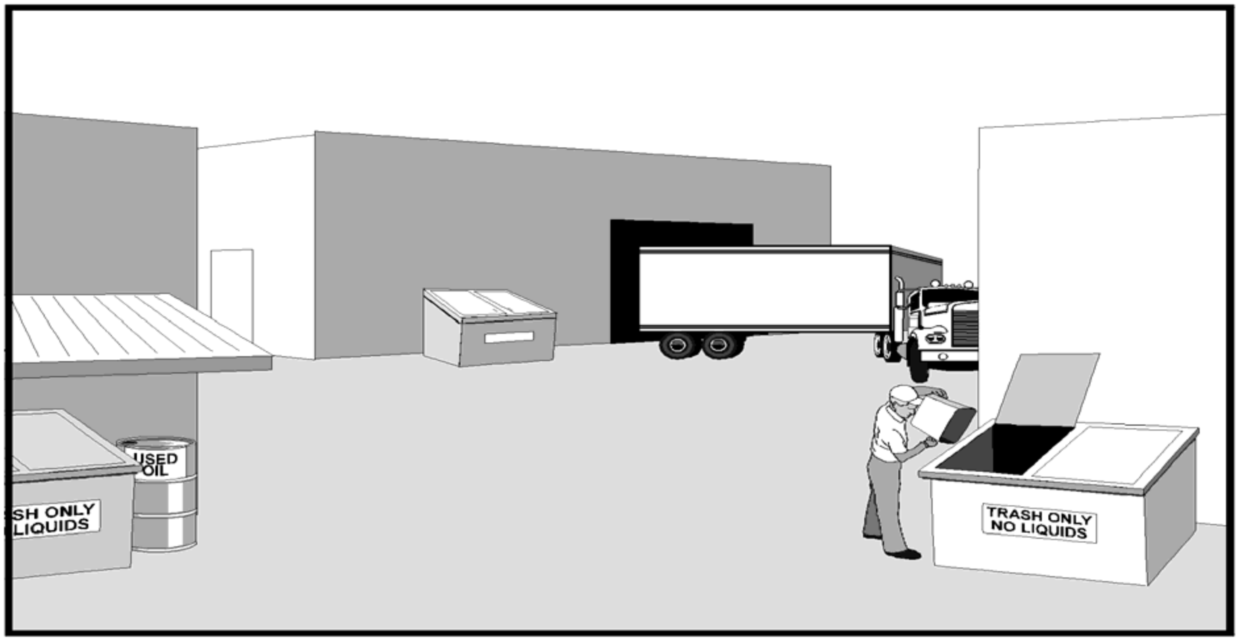
Application Guidance: Controlling spills will be practiced under all working conditions.

Training: Personnel will be trained in spill prevention and response procedures including the use of personal protection equipment (gloves, eye and face protection, etc.). This will include what absorbent or equipment to use, how to use the absorbent or equipment, where to find it, how to dispose of the spent absorbent or other material, and who to notify in the event of a spill.

Effectiveness and Cost: Spill control is a moderately effective, low-cost BMP.

Limitations: None

BMP 007 - PLACE TRASH RECEPTACLES AT APPROPRIATE LOCATIONS



Description of Potential Pollutant and Source: Improperly located or insufficient numbers of trash receptacles will promote poor housekeeping practices. This will increase the opportunity for pollutants from all source areas to reach storm water.

Description of BMP: Properly located and sufficient numbers of trash receptacles will promote the proper disposal of waste materials. This reduces the opportunity for pollutants to reach storm water. Trash receptacles will be easily accessible for personnel.

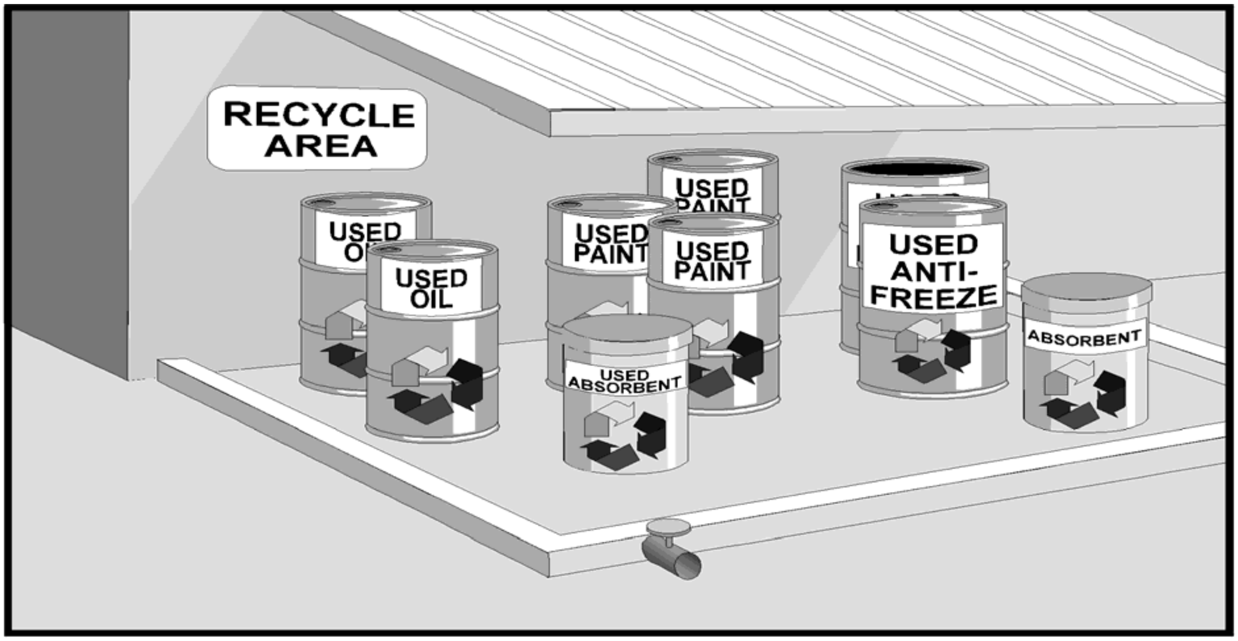
Application Guidelines: Placement of trash receptacles at appropriate locations will always be practiced.

Training: Personnel will be trained as to the location of trash receptacles.

Effectiveness and Cost: Appropriately located trash receptacles are an effective, low-cost BMP.

Limitations: None

BMP 015 – RECYCLE



Description of Potential Pollutant and Source: Many materials, both hazardous and non-hazardous, can be sources of pollutants. Recycling will be employed to reduce the amount of waste material exposed to storm water on the Activity.

Description of BMP: Recycle materials to the fullest extent possible in all situations.

Application Guidance: Recycling collections will be conducted at least weekly for recyclable items such as solvents, oil, scrap metals, wash water and absorbent materials. Separating the recyclable items facilitates recycling.

The frequency for implementing this BMP has been provided as general guidance. However, a facility operator may wish to establish a more suitable frequency. This will require SWPPP implementors to make judgements based on facility operations and conditions. To assign a frequency other than what has been suggested (i.e., more or less frequent), the following criteria will be considered and rated either High, Medium, or Low. If many of the criteria are assigned a High rating, the frequency may be increased. Similarly, if many criteria are assigned a Low rating, the frequency may be decreased. The goal of implementing this BMP is to minimize exposure of pollutants to storm water.

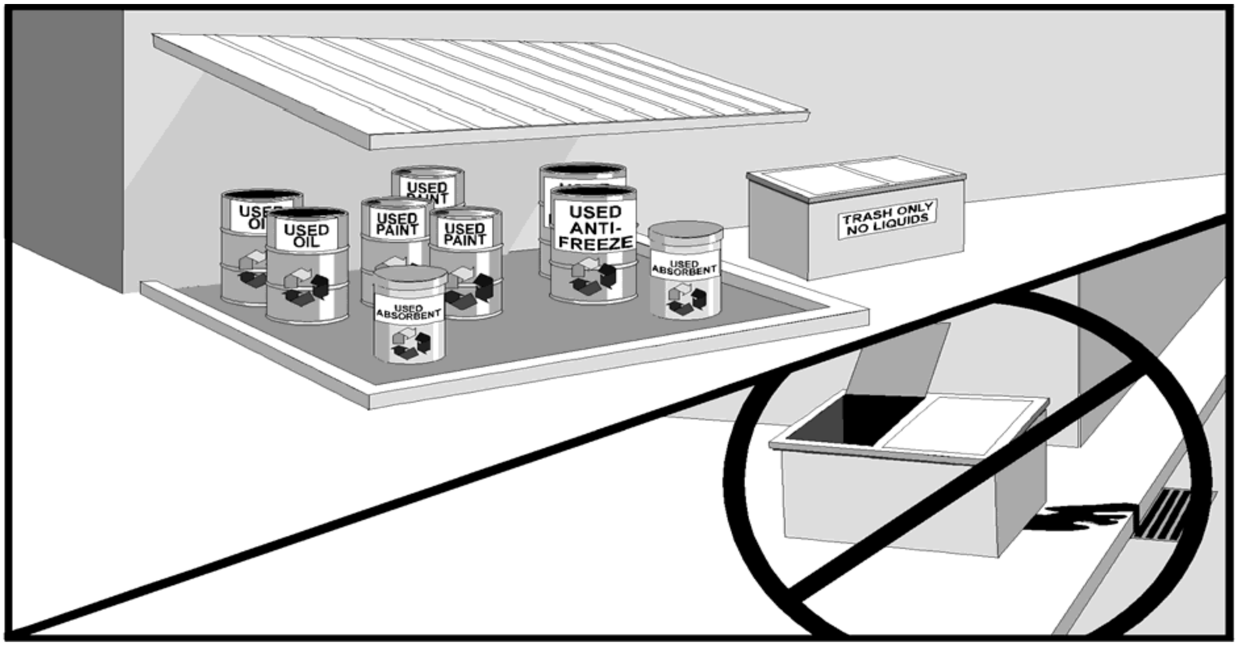
CRITERIA	Rating H=High M=Medium L=Low
Probability of exposure of significant materials to storm water	
Quantity of significant materials potentially exposed	
Toxicity of significant materials potentially exposed	
Frequency of use of significant materials potentially exposed	
Evidence of exposure (e.g., stains on pavement, etching of concrete	
Proximity of source area to outfall or receiving water	
Sensitivity of receiving water to potentially exposed significant materials (e.g., waters with beneficial uses such as human contact, recreation, significant species habitat, etc.)	

Training: Personnel will be trained on proper recycling techniques along with posting and maintenance of signs.

Effectiveness and Cost: Effectiveness and cost will be site specific.

Limitations: Local vendors may not be available to receive certain recyclable materials.

BMP 016 - STORE WASTE AND RECYCLING MATERIALS IN PROPER CONTAINERS



Description of Potential Pollutant and Source: Dry waste, including items such as scrap metal, floor sweepings, metal chips, and paper goods, can be dispersed by wind or operational error if not stored properly. If a dumpster's lid is not kept closed, animals may carry garbage out of the containers. Uncovered dumpsters also expose waste to storm water, which may leak out of the dumpster and into the storm sewer system.

Description of BMP: Locate waste and recycling drums and containers in centralized areas, using proper labeling (both containers and location) and providing easy access. If possible, the area will have secondary containment (see BMPs 012, 013, and 014). Waste containers will be emptied regularly. Dumpsters will all have lids; lids will be kept closed when not in use. If the dumpster has inadequate capacity and it is not possible to keep the cover closed, the frequency of pick-up will be increased, or the dumpster will be replaced with a model of greater capacity.

Application Guidance: This BMP will be applied to all waste and recycling storage areas.

Training: Personnel will be trained to monitor waste and recycling storage sites to ensure their materials are properly stored and that there are no overflowing containers.

Effectiveness and Cost: This is a moderately effective, low-cost BMP.

Limitations: None

BMP 033 - CHECK VEHICLES AND EQUIPMENT FOR LEAKS

Description of Potential Pollutant and Source: Vehicles, aircraft, or equipment entering or stored at a maintenance facility may be leaking a variety of fluids (fuel, oil, antifreeze, freon, etc.). These materials can be exposed to storm water.

Description of BMP: Inspect all vehicles and equipment at the site, whether incoming, parked, stored, or salvaged, for oil and fluid leaks. Drivers of fleet vehicles, such as delivery trucks, will also check under their vehicles each morning for fluid leaks. If leaks are present, drip pans will be placed under the vehicle or equipment. Once the vehicle is removed from the site, the former parking area will be inspected for stains, and these stains will be cleaned using rags or dry solvents.

Application Guidance: Any vehicle or equipment coming in for repairs, painting, or storage will be inspected for leaks. Fleet vehicles will be inspected each morning. Vehicles that are parked, stored, or salvaged will be provided with drip pans, as will tanker rail cars waiting to be unloaded. The frequency for implementing this BMP has been provided as general guidance. However, a facility operator may wish to establish a more suitable frequency. This will require SWPPP implementors to make judgements based on facility operations and conditions. To assign a frequency other than what has been suggested (i.e., more or less frequent), the following criteria will be considered and rated either High, Medium, or Low. If many of the criteria are assigned a High rating, the frequency may be increased. Similarly, if many criteria are assigned a Low rating, the frequency may be decreased. The goal of implementing this BMP is to minimize exposure of pollutants to storm water.

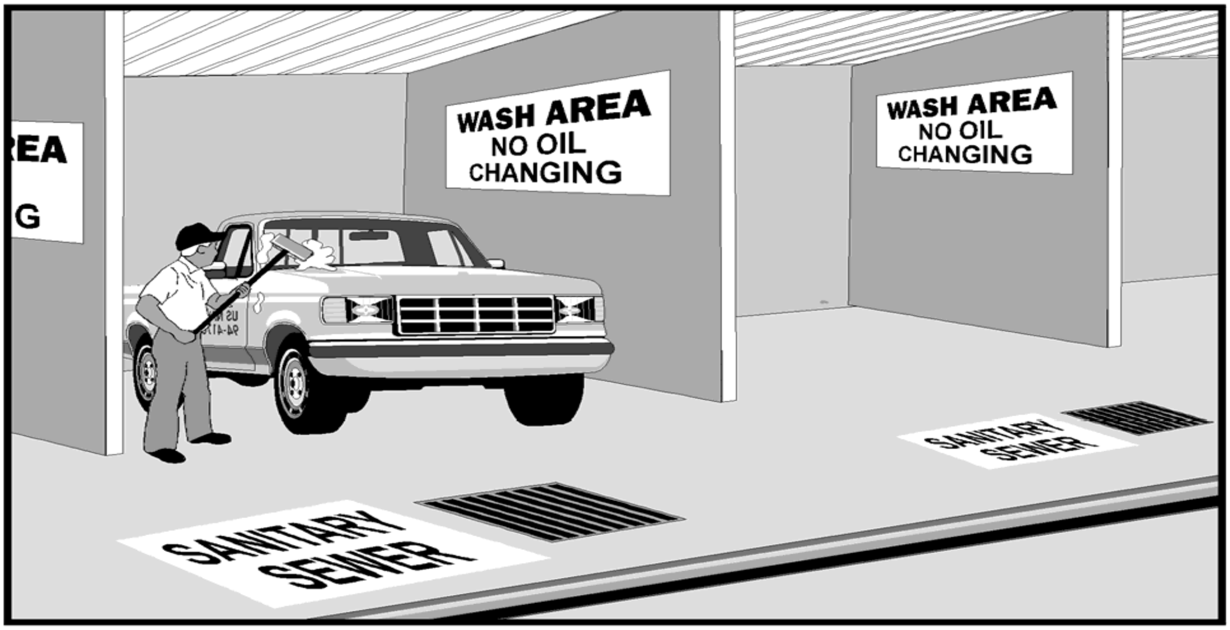
CRITERIA	Rating H=High M=Medium L=Low
Probability of exposure of significant materials to storm water	
Old age or poor condition of equipment and vehicles	
Evidence of exposure (e.g., stains on pavement)	
Proximity of source area to outfall or receiving water	
Sensitivity of receiving water to potentially exposed significant materials (e.g., waters with beneficial uses such as human contact, recreation, significant species habitat, etc.)	

Training: Signs will be posted to remind personnel of proper procedures.

Effectiveness and Cost: Checking for leaks is a moderately effective, low-cost BMP.

Limitations: None

BMP 041 - WASH EQUIPMENT AND VEHICLES IN DESIGNATED AREA



Description of Potential Pollutant and Source: Washing equipment and vehicles outdoors or in areas where wash water flows onto the ground can pollute storm water. It is difficult to control the wastewater from washing operations if it is not done in a designated area.

Description of BMP: Facilities will designate bermed wash areas that contain wash water and prevent contact with storm water. These areas will drain to the sanitary sewer (BMP 042) or to a sump. If a sump is used, wash water will be recycled.

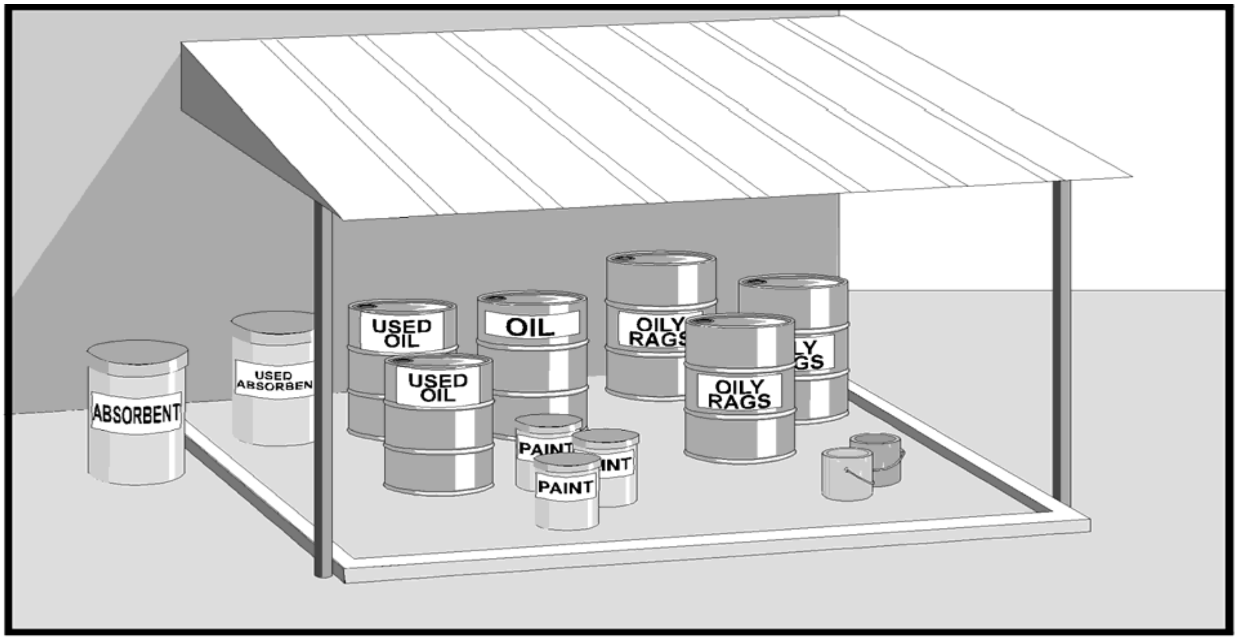
Application Guidance: This practice will be followed wherever vehicles, equipment and aircraft are washed.

Training: N/A

Effectiveness and Cost: This is a highly effective, variable-cost BMP.

Limitations: Pretreatment and monitoring of wash waster discharges to the sanitary sewer may be required. This would greatly increase the cost of this practice. The treatment plant operator will be notified and approval obtained before discharge.

BMP 061B - STORE LIQUIDS AND SIGNIFICANT MATERIALS WITHIN A BUILDING OR COVERED AREA



Description of Potential Pollutant and Source: Many significant materials may be leaked or spilled during storage, handling, or transport. If significant materials are stored outside, in covered areas, these materials can be exposed to storm water, which can transport the leaked or spilled material into the storm drain system.

Description of BMP: To the extent practical, store significant materials within a building or covered area. The materials will be stored on an impervious surface, such as a concrete pad. Rainfall runoff from the pad will be directed to a storm water treatment facility or contained. Leaks and spills will be cleaned up as soon as possible using rags or dry absorbents (see BMP 006). Used rags and absorbents will be disposed of properly. Any wash water from cleaning the floor will be disposed of in the sanitary sewer (see BMP 042).

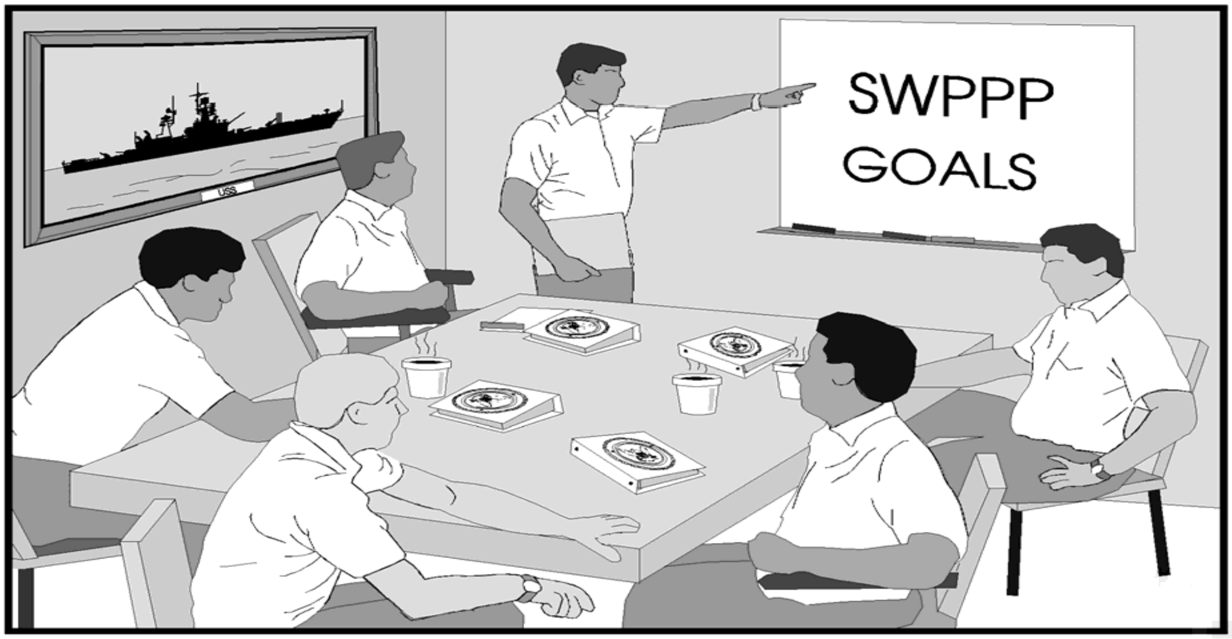
Application Guidance: All significant materials will be stored within a building or covered area.

Training: Personnel will be trained to store significant materials in designated areas.

Effectiveness and Cost: This is a moderately effective BMP. The cost will vary based on whether a building for storing the substances is available.

Limitations: None

BMP 113 - CONDUCT PERSONNEL TRAINING REGARDING THE SWPPP



Description of Potential Pollutant and Source: When properly trained, personnel are more capable of preventing spills, responding safely and effectively to an accident when it occurs, and recognizing situations that could lead to storm water contamination.

Description of BMP: Train personnel at all levels of responsibility in the components and goals of the SWPPP.

Application Guidance: Training will be conducted quarterly and at new personnel orientations.

Training: Training will address each component of the SWPPP, including how and why tasks are to be implemented. Topics will include:

- Good housekeeping
- Material management practices
- Spill prevention and response

Effectiveness and Cost: This is a highly effective, moderate-cost BMP.

Limitations: None

APPENDIX B

ROUTINE FACILITY INSPECTION CHECKLIST

Routine Facility Inspection Checklist

Activity Name: ______________________ **Date of Inspection:** ______________________

Inspector(s): ______________________ **Facility Name/Number:** ______________________

Column 1	Column 2	Column 3	Column 4	Column 5	
Source Area	BMP Number and Title	Status: F, P, N, NA[1]	Briefly Describe Effectiveness (Good or Other [describe])	Corrective Measures	
				What	By When

Note 1: F – Fully implemented, P – Partially implemented, N – Not implemented , NA – Not Applicable

APPENDIX C

QUARTERLY VISUAL ASSESSMENT CHECKLIST

Quarterly Visual Assessment Checklist

Facility ID and Location: ______________________

Date: ____________________

Sampler Name (Printed): ______________________ Signature: ______________________

Time of Rainfall Begin: ________________ Time of Rainfall End: ________________

Time of Flow Begin: ________________ Time of Flow End: ________________

Rainfall event more than 72 hours since last event? Yes / No Rainfall Event Total: ________________

Sample: sample in a clean, colorless glass or plastic container, and examined in a well-lit area

On samples collected within the first 30 minutes of an actual discharge from a storm event

Sample Characteristics:

Color: ________________ Floating Solids: ________________

Odor: ________________ Settled Solids: ________________

Clarity: ________________ Suspended Solids: ________________

Oil Sheen: ________________ Foam: ________________

Other Obvious Indicators of Storm Water Pollution

(describe): ____

Nature of the discharge (i.e., runoff):

Results of observations of the storm water discharge:

Probable sources of any observed storm water contamination:

If applicable, why it was not possible to take samples within the first 30 minutes:

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

APPENDIX D

CORRECTIVE ACTION LOG

Corrective Action Log

Use this form to document SWPPP corrective actions. This form is to be completed by the Environmental Compliance Coordinator (ECC) or a person designated by ECC and submitted to the MCBH Storm Water Program Manager. The Storm Water Program Manager is responsible for any notification to the State of Hawaii Department of Health (DOH), if required.

A corrective action is defined as an action taken to:

a) **Repair, modify, or replace any storm water control used at the site;**
b) **Clean up and properly dispose of spills, releases, or other deposits; or**
c) **Remedy a permit violation.**

1. Corrective Action Triggers

The following events trigger a corrective action to be taken (this triggering condition is to be documented *within 24 hours* of discovering the occurrence):

a) A required storm water control was never installed, was installed incorrectly, or is not in accordance with the requirements in the SWMP Plan.
b) A member of the **Storm Water Pollution Control Team** becomes aware that the storm water controls installed and being maintained are not effective enough for the discharge to meet applicable water quality standards or applicable requirements in the MCBH SWMP Plan. The facility ECC shall notify the Storm Water Program Manager immediately. The Storm Water Program Manager will notify DOH *by the end of the next work day*.

1.1 Log Notifications:

Date/time Storm Water Program Manager notified by ECC: ________________________

Date/time DOH notified by Storm Water Program Manager: ________________________

1.2 Describe Discharge:

Indicate which one of the following prohibited discharges is occurring or has occurred:

- ❒ Wastewater from washout of concrete
- ❒ Wastewater from washout and cleanout of stucco, paint, form release oils, curing compounds, or other construction materials
- ❒ Fuels, oils, or other pollutants used in vehicle and equipment operation and maintenance
- ❒ Soaps, solvents, or detergents used in vehicle and equipment washing
- ❒ Toxic or hazardous substances from a spill or other release
- ❒ Other, Explain: ____

2. Requirements for Taking Corrective Actions

The ECC shall complete corrective actions in accordance with the deadlines specified below. In all circumstances, site personnel shall *immediately* take all reasonable steps to minimize or prevent the discharge of pollutants until a permanent solution is installed and made operational, including cleaning up any contaminated surfaces so that the material will not discharge in subsequent storm events. *Immediately* means the same day the condition is discovered, unless it is too late in the day, in which initiation of corrective action must begin on the following work day.

Following any of the above triggering events, the ECC shall install a new or modified control and make it operational, or complete the repair, by *no later than 7 calendar days from the time of discovery*. If it is not feasible to complete the installation or repair within 7 calendar days, the ECC shall document and submit to the Storm Water Program Manager, for their agreement, why it is not feasible to complete the installation or repair within the 7-calendar day timeframe and document a schedule for installing the storm water control and making it operational as soon as practicable after the 7-day timeframe.

If the issue is not adequately addressed within 7 calendar days or the agreed upon timeframe, enforcement procedures will be initiated. Unaddressed issues will be escalated through the chain of command. The MCBH Environmental Compliance and Protection Division Director will give the responsible party a formal notice with an appropriate deadline for action. If the problem remains unchanged, the situation will be brought to the attention of the next higher authority. The ultimate penalty for non-compliance of MS4 Permit regulations is eviction or discharge of the responsible party from MCBH. This is placed at the discretion of the Base Commander. See the Enforcement Response Plan in Appendix 3-6 of the SWMP Plan for further information on MCBH's enforcement policies.

3. Corrective Action Report

Within 24 hours of discovering the occurrence of one of the triggering conditions in SWPPP Section 4.1 at the site, the ECC must complete the following:

3.1 Describe the triggering condition:

____
____
____
____

3.2 Record the date/time of the condition identified. How was the condition identified?

____
____
____
____

3.3 Describe the corrective action taken:

____
____
____

Date/time installation or repair was completed:
(or date/time the prohibited discharge ceased) ____

Or describe why it is not feasible to complete installation or repair within 7 calendar days and detail a proposed schedule (if applicable)

____
____
____

4. Resolution of the Corrective Action Trigger

Within 7 calendar days of initiating the Corrective Action Report, the ECC must complete a report of the following:

4.1 Follow-up Actions

Describe any follow-up actions taken to review the design, installation, and maintenance of storm water controls, including the dates such actions occurred:

____
____
____

4.2 Storm Water Control Modifications

Provide a summary of storm water control modifications implemented. Include a schedule of activities required to implement changes and the date the modifications were completed or will be completed:

____
____
____

5. SWPPP Modification Due to Corrective Actions

Where corrective actions result in changes to any of the storm water controls or procedures documented in the SWPPP, modify the SWPPP accordingly *within 7 calendar days* of completing corrective action work.

Are modifications to the SWPPP necessary? ☐ Yes ☐ No

Date modifications to the SWPPP shall be completed _______________

6. Corrective Actions Required by DOH

The facility shall comply with any corrective actions required by DOH as a result of permit violations found during an inspection by DOH or the Environmental Protection Agency (EPA).

Was the Corrective Action triggered by a DOH/EPA inspection?

☐ Yes ☐ No

☐ Date of DOH/EPA Inspection __________________

7. Additional Comments:

____
____

Final

STORM WATER POLLUTION PREVENTION PLAN

Storm Water Management Program Plan

Marine Corps Base Hawaii, Oahu, Hawaii

NPDES Permit No. HI S000007

AIRCRAFT FUEL ISLANDS (FACILITY 1170 / 1171)

Prepared by:

Marine Corps Base Hawaii

August 2022

Table of Contents

Tables

Figures

Appendices

List of Acronyms and Abbreviations

BMP	Best Management Practice
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CWA	Clean Water Act
CWB	Clean Water Branch
DOH	State of Hawaii Department of Health
ECC	Environmental Compliance Coordinator
ECE	Environmental Compliance Evaluation
ECPD	Environmental Compliance and Protection Division
EPA	United States Environmental Protection Agency
HAZMAT	Hazardous Material
HAZMIN	Hazardous Material Minimization
MCBH	Marine Corps Base Hawaii
MS4	Municipal Separate Storm Sewer System
MS4 Permit	Marine Corps Base Hawaii's NPDES Permit No. HI S000007
NPDES	National Pollutant Discharge Elimination System
OWS	Oil/Water Separator
POC	Point of Contact
SWMP	Storm Water Management Program
SWPPP	Storm Water Pollution Prevention Plan
UST	Underground Storage Tank

Certification Statement

MCBH is committed to the prevention of discharges of polluted stormwater to navigable waters or the environment and maintains the highest standards for best management practices through periodic review, updating, and implementation of this Stormwater Pollution Prevention Plan (SWPPP).

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information contained therein. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Name: ______________________________ Title: ______________________________

Signature: ______________________________ Date: ______________________________

Management Review

Refer to Section 1.2 for more information on required SWPPP updates.

Review Dates	Signature	Amendment Required? (Y/N)
____________	__________________	__________
____________	__________________	__________
____________	__________________	__________
____________	__________________	__________
____________	__________________	__________
____________	__________________	__________

1 Introduction

As part of Federal regulations administered through the Clean Water Act (CWA), the State of Hawaii, Department of Health (DOH) has issued the National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4) Permit No. HI S000007 (referred to herein at the “MS4 Permit”) to Marine Corps Base Hawaii (MCBH). The MS4 Permit requires that MCBH provide all existing industrial facilities, identified in MCBH’s MS4 Permit application, and any newly identified industrial facilities, submitted to DOH using the “MS4 NPDES Individual Permit – Industrial Storm Water Discharge Notification Form,” with a Storm Water Pollution Prevention Plan (SWPPP) for storm water associated with industrial activities.

The purpose of the regulations is to protect water quality by reducing the amount of pollutants in storm water runoff caused by industrial activities.

1.1 SWPPP Implementation

The storm water management controls of this plan will become MCBH procedure for the applicable industrial facility. An up-to-date copy of the SWPPP shall be maintained on site and at the MCBH Environmental Compliance and Protection Division (ECPD). Management staff, maintenance personnel, contractor staff, and other personnel involved in onsite industrial activities, will be knowledgeable of the plan and follow the guidelines set forth in it, in addition to any other pertinent base-wide, state and federal regulations.

Day-to-day implementation of the SWPPP is primarily the responsibility of the current facility Environmental Compliance Coordinator (ECC) or Point of Contact (POC) as identified in Table 2-1. Enforcement of the permit conditions and this SWPPP are ultimately the responsibility of ECPD and additional escalating levels of authority as specified in the Enforcement Response Plan developed by MCBH for its base-wide Storm Water Management Program (SWMP) Plan.

1.2 Updating the SWPPP

This SWPPP will be reviewed as needed to identify necessary changes, at a minimum of every five years. Updates may be required due to current best management practice (BMP) failures, spill events, changes in industrial activities, changes in features, corrective actions, or other necessary changes. Personnel changes to the Storm Water Pollution Control Team (Section 2.1) should be logged in Table 2-1. Storm Water Pollution Control Team Log. ECPD will be responsible for approving revisions to the SWPPP. In the event the plan is modified, a copy of the updated SWPPP will remain at ECPD and will be provided to the applicable facility. Additionally, ECPD shall document and report the SWPPP changes to the DOH, Clean Water Branch (CWB), within thirty days of when the changes arise.

2 Aircraft Fuel Islands, Facility 1170 and 1171

The Aircraft Fuel Islands, Facility 1170 and 1171, is located within MCBH, Kaneohe Bay to the northeast of Hangar 105 and east of the Runway. The facility encompasses approximately 3.3 acres and can be found in gri[redacted] of the MCBH Base Map, see Figure 4-1. The facility-specific map is shown on Figure 4-2.

2.1 Storm Water Pollution Control Team

The Storm Water Pollution Control Team consists of the Storm Water Program Manager, ECC, and the Hazardous Material (HAZMAT) and Hazardous Material Minimization (HAZMIN) team. The Storm Water Program Manager is responsible for the enforcement of the MS4 permit at all industrial sites and provides annual training to the ECC and other personnel. The ECC is the primary unit POC for storm water related items and the day-to-day environmental matters at a specific facility. ECC's are responsible for SWPPP implementation including BMP and facility inspections, storm water assessments/sampling, BMP maintenance, and corrective actions. The HAZMAT and HAZMIN team shall be contacted if assistance is needed. The role, name, phone number, and start date of individuals on the Storm Water Pollution Control Team is recorded in Table 2-1 below. In the event of personnel turnover, Table 2-1 shall be updated accordingly.

TABLE 2-1. STORM WATER POLLUTION CONTROL TEAM LOG

Role	Name	Phone	Start Date
MCBH Storm Water Program Manager	CIV Whitney Anderson	Office: 808-257-4359	6/6/22
ECC	CIV Kahana Kauahi	Office: 808-257-2234	8/1/2019
HAZMAT/HAZMIN	CIV Tim Cawthon	HAZMAT Center Building 6409 Office: 808-257-9913 HAZMIN Center Building 6407 Office: 808-257-0770	N/A

2.2 Aircraft Fuel Islands, Facility 1170 and 1171 Activities

The Aircraft Fuel Islands are two identical outdoor fuel pumping facilities that are used for “hot-fueling” of fixed and rotary-wing aircraft while aircraft are running to enable quick turn-around time between missions. The fuel islands receive fuel from the Aircraft Ready Fuel Storage (Tank 6479) and are operated by the MCBH Fuel Division (located in Building 370). Aircraft fly 24 hours a day, 7 days a week; however, jets can fly only until 10 pm.

Each fuel island contains two fueling lanes (identified as Pits “A” through “D”), each of which has a concrete pavement fueling area with 6-inch containment curbs. The aircraft parks next to a station, the fuel hose that sits on metal supports are wheeled to the aircraft and fueling is conducted. When aircraft are actively fueling, a spill kit and fire extinguisher are available nearby. When fueling is complete, the pressure in the line enables return of fuel within the hose. Facility 1170 was recently renovated to move fuel pump A from the center of the fueling lane to the western edge of lane in a similar arrangement to that of facility 1171.

Storm water runoff from the Aircraft Fuel Islands flows northerly via sheet flow toward a trench drain that extends across the full width of the two fueling lanes at each island. Both trench drains terminate at a concrete sump, where collected storm water is pumped onto the adjacent grass areas via sump pumps. The sump pumps are automatically controlled by level float switches.

Fuel filters, piping, and other equipment are located on a concrete pad located in the open area between the two facilities. Storm water that accumulates in these areas drains to the trench drain sump associated with Fueling Island Facility 1170. In the unlikely event that the concrete sumps overflow, there are storm drain inlets between runways, near the Pit “A” and Pit “C” signage. These inlets discharge storm water to Kaneohe Bay via Outfall 024. The storm monitoring point is at the grated inlet neat the pit A sign (Outfall 01). Storm drain inlets at facility 1171 (Outfall 02) are considered to be a substantially similar outfall.

2.3 Sources of Pollutants

The following is an inventory of potential pollutants associated with Aircraft Fuel Islands, facility 1170 and 1171:

A. Material Loading and Unloading Areas

Materials that are spilled, leaked, or lost during loading or unloading may collect on vegetated or paved surfaces and be carried away by storm runoff. Active fueling is conducted at the Aircraft Fuel Islands.

B. On-Site Material Storage and Disposal Practices

Leaks, drips, or spills of materials that are stored or disposed of in areas exposed to rainfall can be carried away by storm water. The only fuel stored onsite is the small amount within the fuel delivery pipes. No other materials are stored onsite.

C. Outdoor Activities

Many outdoor activities at MCBH, Kaneohe Bay use materials or create wastes that have the potential to pollute storm water runoff. Outdoor activities at the Aircraft Fuel Islands include the hot-fueling of various aircraft within the two fuel lanes near the fuel islands 1170 and 1171.

D. Significant Materials Inventory

The following is a list of significant materials found at the Aircraft Fuel Islands:

- Jet Fuel

2.4 Potential Storm Water Pollutants

The following pollutants have been identified as having a reasonable potential to be present in storm water discharges from Aircraft Fuel Islands, Facility 1170 and 1171 if not properly managed:

- Jet Fuel

2.5 Best Management Practices (BMPs)

Best Management Practices (BMPs) are techniques or methods that aim to manage the quantity and improve the quality of storm water runoff from a facility or other site. Storm water BMPs intend to reduce or eliminate pollution and contaminants collected by runoff before the runoff reaches the MCBH storm water system or sensitive ecosystems such as streams, wetlands, and marine environments. The following is a summary of BMPs currently in place at the Aircraft Fuel Islands, Facility 1170 and 1171.

A. Good Housekeeping Practices

In general, Aircraft Fuel Islands, Facility 1170 and 1171 employs good housekeeping practices throughout its operations. Good housekeeping practices for Aircraft Fuel Islands, Facility 1170 and 1171 are included in Table 2-2.

B. Preventative Maintenance

Preventive maintenance is important as water pollution control measures may be of little or no use if devices and equipment have not been properly maintained. Facility personnel conduct inspection of facility equipment and storage systems on a regular basis. The preventive maintenance program involves inspections of equipment and storage systems that are exposed to storm water.

C. Visual Inspections

Visual inspection provides a valuable subjective assessment of the status of storm water management systems. They are easily performed and allow the opportunity for corrective action, if necessary. Site inspections and documentation requirements are addressed in in Section 3 of this SWPPP. MCBH HAZMIN Center staff perform hazardous material inspections monthly. Annual facility inspections are performed by EPCD as part of the MCBH Environmental Compliance Evaluation (ECE).

D. Spill Prevention and Response

Areas where significant material spill or leakage can occur are identified in Section 2.1 and shown on Figure 4-2. The storm water systems and their accompanying drainage points are also shown on Figure 4-2. Refer to Table 2-2 for BMPs related to spill preventative measures for material handling procedures, storage requirements, and equipment usage.

In the event of a hazardous substance or oil spill, the ECC and ECPD shall be notified immediately (ECPD; 808-630-8246). If the spill cannot be easily addressed using an onsite spill kit and personal protective equipment, call Fed Fire (Military 911). The spill source should be immediately controlled if it is safe to do so by closing valves, switches, and/or turning off power to a device. Then, contain the spill by using sorbent socks or absorbent materials found in a spill kit. After it has been contained, clean up the spilled material in a safe manner using dry methods. All materials should then be properly disposed of.

If fuel is visually detected within the concrete sump, it is manually pumped into drums for disposal and the sump is hand cleaned using dry methods. The locations of spill kits are shown in Figure 4-2.

E. Erosion and Sediment Controls

No areas at the Aircraft Fuel Islands have been identified as having high potential for significant soil erosion that would require erosion and sediment control measures. The facility is entirely paved.

F. Best Management Practices to Minimize Pollutant Contact with Storm Water

Facility personnel receive annual training from ECPD at minimum, as well as an initial training for all new personnel. Training information will include the BMPs that have been developed for the facility and a general overview of the storm water program and its objectives.

Existing BMPs at the Aircraft Fuel Islands are shown in Table 2-2 and attached as fact sheets to this SWPPP in Appendix A.

TABLE 2-2. BEST MANAGEMENT PRACTICES

BMP No.	BMP Title	Description
002	Restrict Access to Area and Equipment	The facilities are located on the flight line, which is restricted to unauthorized personnel.
006	Control Spills	Spill kits are available nearby during active fueling. Only dry clean up methods used to maintain sumps.
010	Permanently Seal Drain Inlets that Discharge to Storm Drain System	Grated inlets terminate in sumps with manually controlled discharge pumps to prevent fuel from entering the storm water system.
012	Construct Berm or Dike around Critical Areas	Curbing exists around each fueling station, and along the edges of each facility.
014	Provide Valve for Outlet Pipe in Containment Area	Bermed areas in the refueler parking area have 4 manual valves that are opened to release accumulated storm water only after water is found to be free of oily sheen.
024	Insert Filter in Catch Basin	Four drain inlets are equipped with filter fabric.
033	Check Equipment for Leaks	Fueling equipment are checked for leaks on a regular basis.
064	Monitor Major Fueling Operations	All fueling operations are closely monitored.
071	Keep Tanks, Piping, and Valves in Good Condition	Fueling pipes are inspected on a regular basis.
110	Regularly Inspect and Maintain Storm Water Conveyance System	Inspect and maintain storm water conveyance systems on a regular basis.
113	Conduct Personnel Training Regarding the SWPPP	Personnel are trained regularly (initial orientation and annual refresher).

3 Inspections, Assessments and Monitoring

3.1 Routine Quarterly Site Inspections

The MS4 Permit requires a routine quarterly site inspection by a qualified person with at least one member of the storm water pollution control team participating. At least once each calendar year, the routine inspection must be conducted during a period when a storm water discharge is occurring. The site inspection is an overall evaluation of the effectiveness of the BMPs implemented at that facility. A Routine Facility Inspection Checklist (Appendix B) shall be completed during each routine site inspection and kept onsite with this SWPPP. During normal facility operating hours, inspections must be conducted of areas of the facility including, but not limited to, the following:

- Areas where industrial materials or activities are exposed to storm water;
- Areas identified in the SWPPP and those that are potential pollutant sources;
- Areas where spills and leaks have occurred in the past three years;
- Discharge points; and
- Control measures used to comply with the effluent limits contained in this permit.

3.2 Visual Assessment of Storm Water Discharges

A Quarterly Visual Assessment of storm water discharge is required for all industrial facilities at MCBH. Storm water samples for this visual assessment but must be collected in such a manner that the samples are representative of the storm water discharge from the facility. Therefore, the water sample must be collected at the designated storm water monitoring point (Outfall 01) as shown in Figure 4-2. The Quarterly Visual Assessment checklist (Appendix C) shall be completed by the current facility ECC and kept onsite with this SWPPP.

The visual assessment must be made:

- Of a sample collected in a clean, colorless glass or plastic container, and examined in a well-lit area;
- On samples collected within the first 30 minutes of an actual discharge from a storm event. If it is not possible to collect the sample within the first 30 minutes of discharge, the sample must be collected as soon as practicable after the first 30 minutes and documented why it was not possible to take the sample within the first 30 minutes; and
- For storm events, on discharges that occur at least 72 hours (three days) from the previous discharge.

Whenever the visual assessment shows evidence of storm water pollution, corrective action procedures to remedy the pollutants must be taken and documented. Refer to Section 4 for corrective action procedures.

4 Corrective Actions

A corrective action is defined as any action taken, or required to be taken, to (1) repair, modify, or replace any stormwater control used at the site; (2) clean up and dispose of spills, releases, or other deposits found on the site; and (3) remedy a permit violation. Corrective actions should be documented using the Corrective Action Log (Appendix D).

4.1 Immediate Actions

If corrective action is needed, you must immediately take all reasonable steps necessary to minimize or prevent the discharge of pollutants until a permanent solution is installed and made operational, including cleaning up any contaminated surfaces so that the material will not discharge in subsequent storm events. Note: In this context, the term "immediately" requires you to, on the same day a condition requiring corrective action is found, take all reasonable steps to minimize or prevent the discharge of pollutants until a permanent solution is installed and made operational. However, if a problem is identified at a time in the workday when it is too late to initiate corrective action, the initiation of corrective action must begin no later than the following workday. "All reasonable steps" means that the permittee has undertaken initial actions to assess and address the condition causing the corrective action, including, for example, cleaning up any exposed materials that may be discharged in a storm event (e.g., through sweeping, vacuuming) or making arrangements (i.e., scheduling) for a new BMP to be installed at a later date.

4.2 Escalating Actions

If additional actions are necessary beyond those implemented or if the conditions continue to occur, additional corrective actions (e.g., install a new or modified control and make it operational, complete the repair) must be completed before the next storm event if possible, and within 14 calendar days from the time of discovery of the corrective action condition. If it is infeasible to complete the corrective action within 14 calendar days, document why it is infeasible to complete the corrective action within the 14-day timeframe and identify a schedule for completing the work, which must be done as soon as practicable after the 14-day timeframe but no longer than 45 days after discovery. If the completion of corrective action will exceed the 45-day timeframe, the minimum additional time necessary to complete the corrective action can be taken, provided that MCBH ECPD and DOH is notified of your intention to exceed 45 days. Where your corrective actions result in changes to any of the controls or procedures documented in your SWPPP, you must modify your SWPPP accordingly within 14 calendar days of completing corrective action work.

4.3 Corrective Actions for Substantially Identical Outfalls

If the event triggering corrective action is associated with an outfall that had been identified as a "substantially identical outfall", the review must assess the need for corrective action for all related substantially identical outfalls. Any necessary changes to control measures that affect these other outfalls must also be made before the next storm event if possible, or as soon as practicable following that storm event. Any corrective actions must be conducted within the timeframes discussed above.

4.4 Record of Past Spills or Leaks of Hazardous Pollutants

Table 4-1 is used to record significant spills and leaks that have occur or have occurred within three years prior to the preparation or amendment of this SWPPP. Significant spills and leaks include, but are not limited to, releases of oil or hazardous substances in excess of quantities that are reportable under CWA Section 311 (see 40 CFR 110.6 and 40 CFR 117.21) or Section 102 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 USC §9602.

At the time of this SWPPP update, there have been no past spill or leak incidents reported for the Aircraft Fuel Islands.

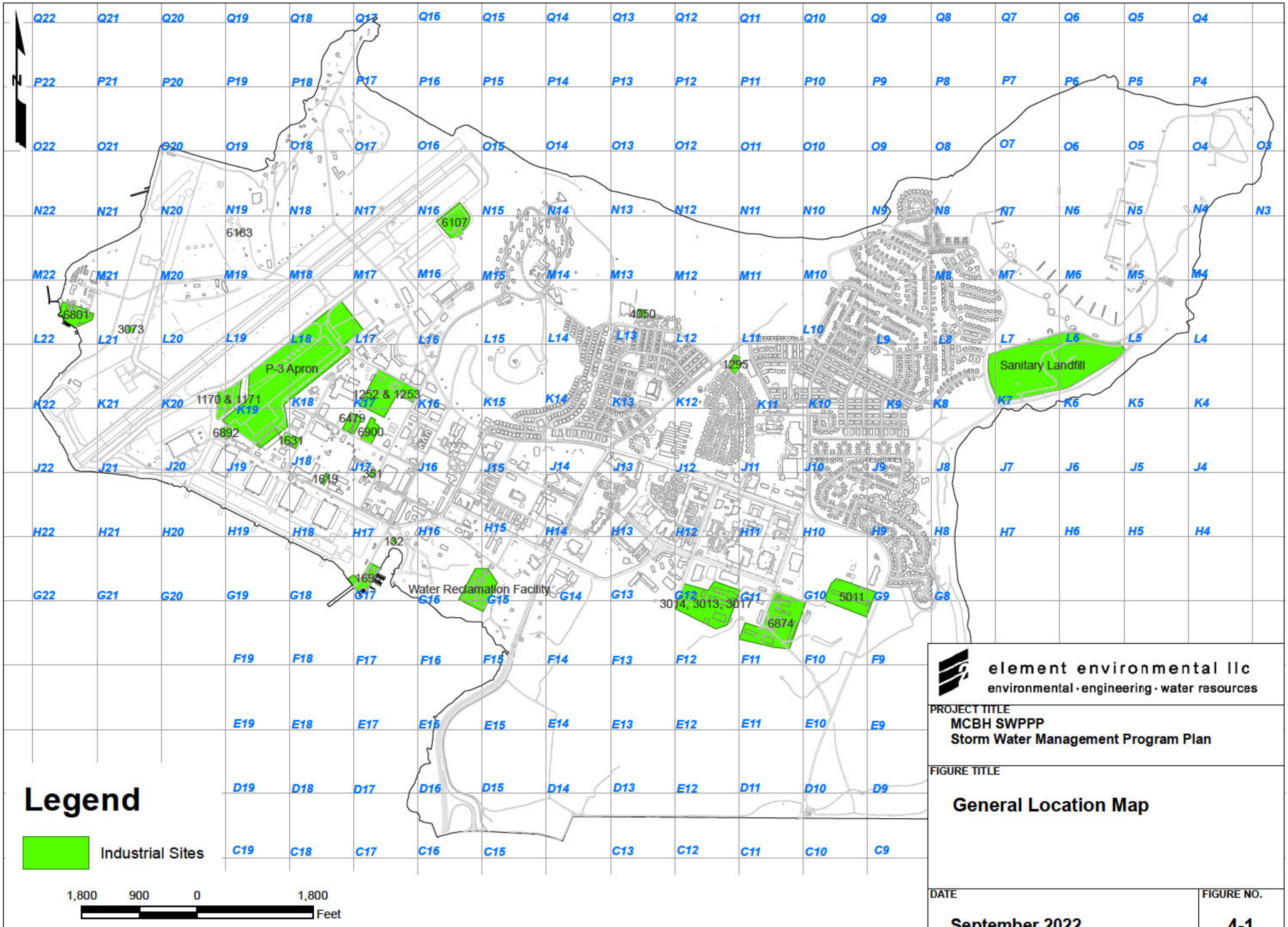
TABLE 4-1. PAST SPILLS OR LEAKS OF HAZARDOUS POLLUTANTS

Date of Incident	Brief Summary of Incident (POC Active at Time of Incident, Pollutant Type, Estimated Quantity, Location of Spill)

4.5 Record of Unauthorized Non-Storm Water Discharges

TABLE 4-2. UNAUTHORIZED NON-STORM WATER DISCHARGE EVALUATION

Date of Evaluation	Brief Summary of Evaluation (Description of the evaluation criteria, outfalls or onsite drainage points that were directly observed, action(s) taken, such as a list of control measures used to eliminate unauthorized discharge)

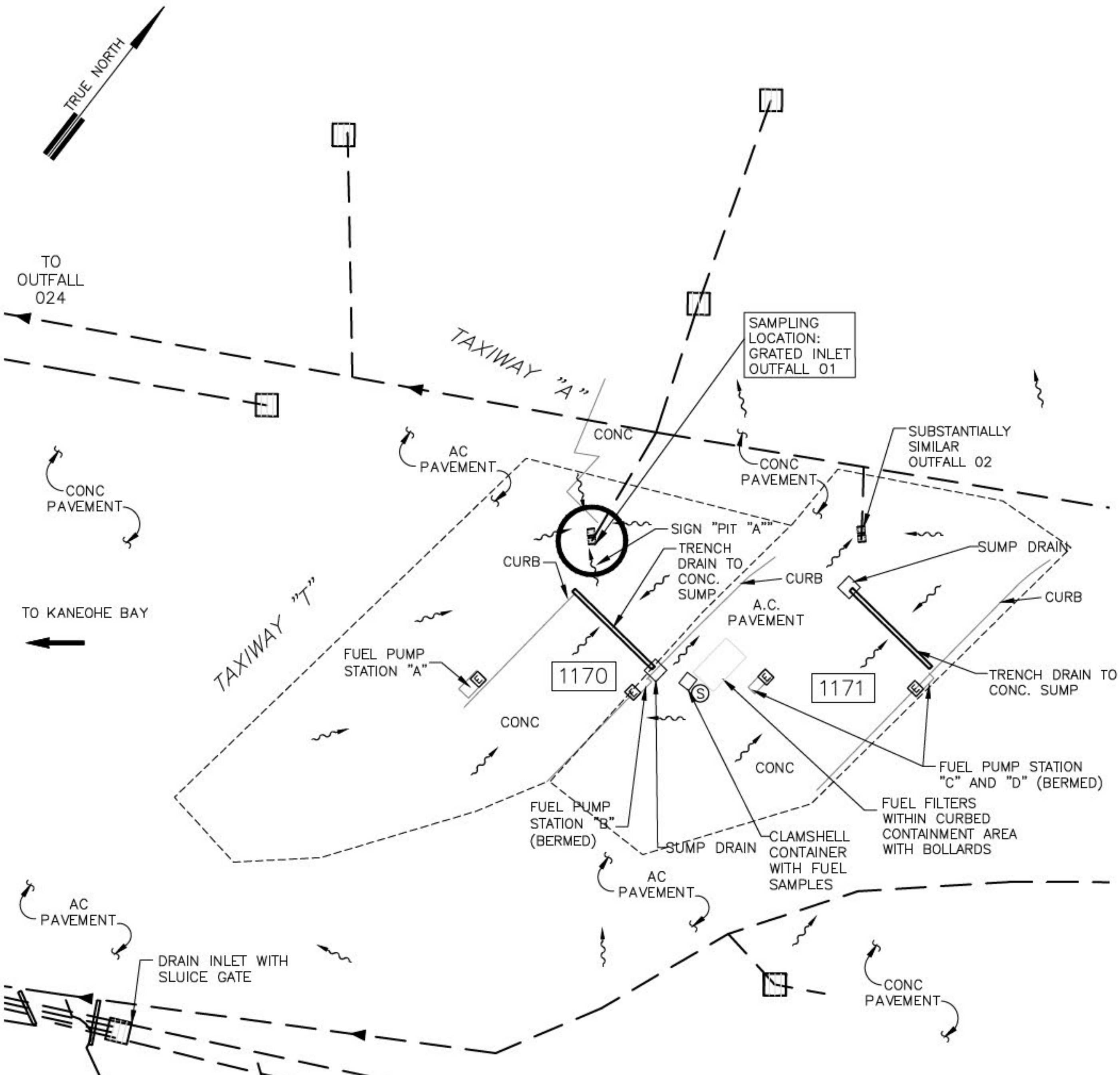


element environmental llc
environmental · engineering · water resources

PROJECT TITLE
MCBH SWPPP
Storm Water Management Program Plan

FIGURE TITLE
General Location Map

DATE	FIGURE NO.
September 2022	**4-1**



LEGEND

E EYEWASH STATION

S SPILL KIT

STORM WATER CONVEYANCE

STORM DRAIN INLET

FLOW ARROW

DRAINAGE AREA BOUNDARY

NOTE:

1. STORM WATER, FROM APPROXIMATELY 3.3 ACRES ASSOCIATED WITH FACILITIES 1170 & 1171, DISCHARGES TO KANEOHE BAY VIA OUTFALL 024 AND SHEET FLOWS TO SURROUNDING GRASS.

2. STORM WATER CONVEYANCE PIPE LOCATIONS ARE APPROXIMATE.

3. NOT TO SCALE.

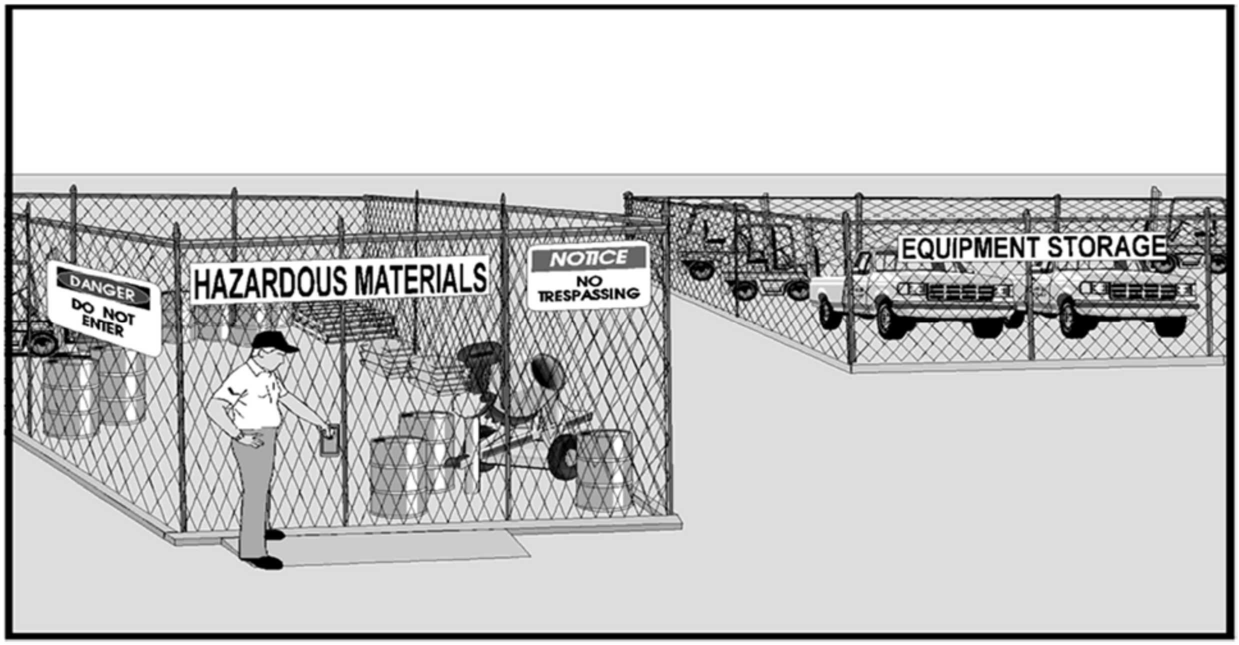
DATE:	PROJECT TITLE:	
JULY 2022	STORM WATER POLLUTION PREVENTION PLAN MCBH, KANEOHE BAY, OAHU, HAWAII	
FIGURE TITLE:		FIGURE NO.:
AIRCRAFT FUEL ISLANDS (FACILITIES 1170 & 1171)		4-2

DAMATO
8/10/2022 12:02:33 PM
FIG 4-2 Bldg 1170, 1171 - Aircraft Fueling Islands.dwg

APPENDIX A

SELECTED BMP FACT SHEETS

BMP 002 - RESTRICT ACCESS TO AREA AND EQUIPMENT



Description of Potential Pollutant and Source: Vandalism of vehicles and facility property may result in the release of significant materials.

Description of BMP: Provide fences and gate areas where vehicles, equipment and materials are stored and are accessible to the public to discourage trespassing. Access to equipment will also be restricted. Only authorized personnel will be allowed to operate equipment. The fences and gates will be properly maintained, and additional security measures including lighting of the area will be implemented if the fencing alone proves insufficient. Where appropriate, security guards or alarms will be used.

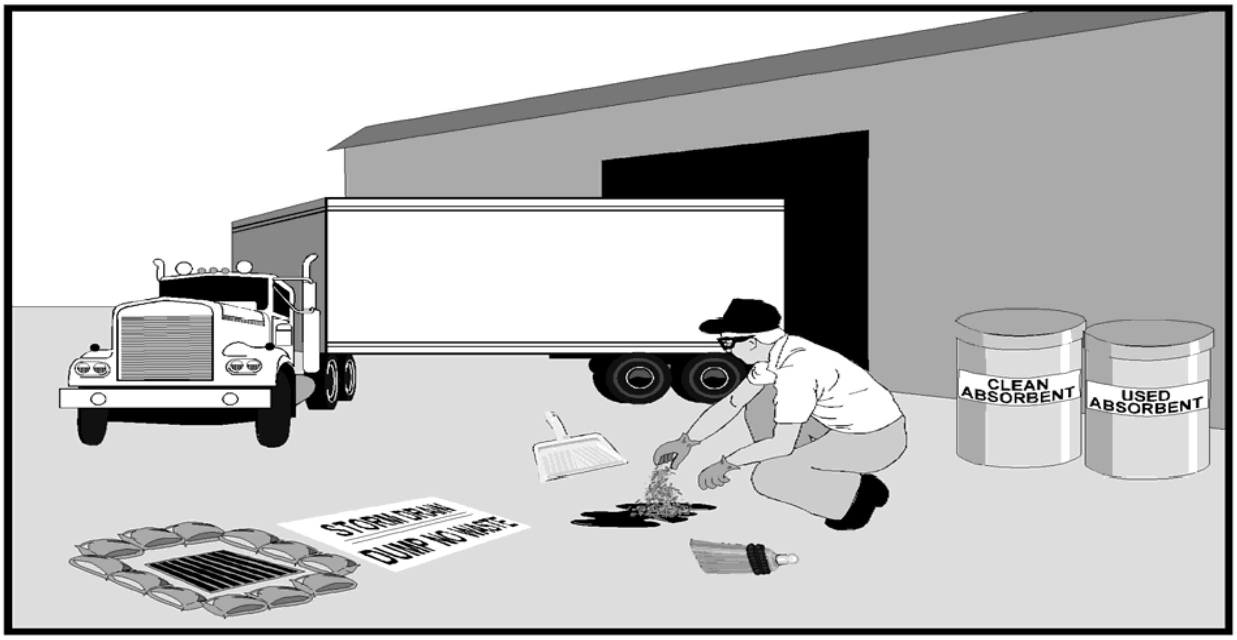
Application Guidance: As needed.

Training: N/A

Effectiveness and Cost: Effectiveness and costs will vary depending on the application.

Limitations: None

BMP 006 - CONTROL SPILLS



Description of Potential Pollutant and Source: Spills of significant materials may be exposed to storm water and transported to storm drains and/or receiving waters.

Description of BMP: Follow safety data sheets (SDS) for handling, storage, and cleanup of all significant materials to reduce the potential for spills.

Any spill, large or small, of significant materials will be controlled to prevent pollutants from being transported to storm drains and/or receiving waters. Appropriate spill control material will be kept on site. Smaller spills will be contained using absorbent material such as kitty litter, straw, or sawdust. Drums of absorbent material will be easily accessible and clearly marked, and containers for spent absorbent material will be readily available. Spent absorbent material will be managed appropriately and disposed of in accordance with applicable regulations. Larger spills will be controlled using spill kits, brooms, and other response equipment commensurate with the size of the spill. The methods outlined in the Activity's spill prevention and response plans (BMP 112) for hazardous materials will be followed for spills of any potential storm water pollutants. The date, time, nature and volume of material spilled, and cleanup measures taken will be recorded for all spills and kept as part of the SWPPP.

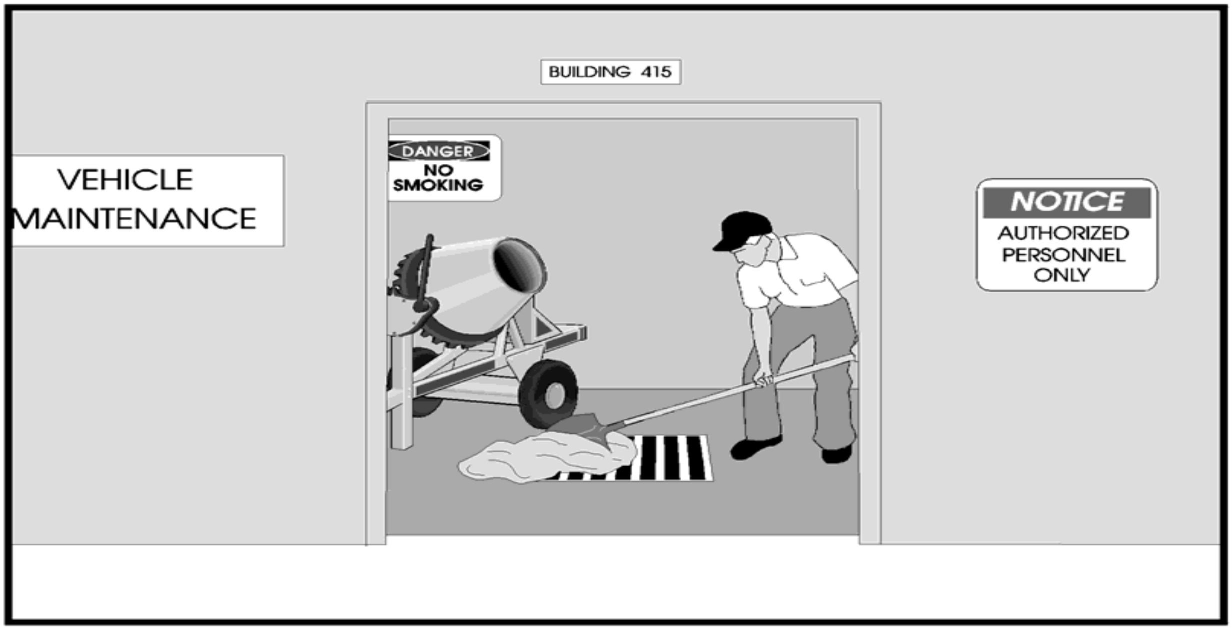
Application Guidance: Controlling spills will be practiced under all working conditions.

Training: Personnel will be trained in spill prevention and response procedures including the use of personal protection equipment (gloves, eye and face protection, etc.). This will include what absorbent or equipment to use, how to use the absorbent or equipment, where to find it, how to dispose of the spent absorbent or other material, and who to notify in the event of a spill.

Effectiveness and Cost: Spill control is a moderately effective, low-cost BMP.

Limitations: None

BMP 010 - PERMANENTLY SEAL FLOOR DRAINS THAT DISCHARGE TO THE STORM DRAIN SYSTEM



Description of Potential Pollutant and Source: Floor drains that are connected to the storm drain system provide a pathway for spilled or leaked material to enter the system.

Description of BMP: Permanently seal floor drains inside buildings (whenever this would not adversely affect safety or structural integrity) to prevent accidental illegal dumping of pollutants into the storm water system.

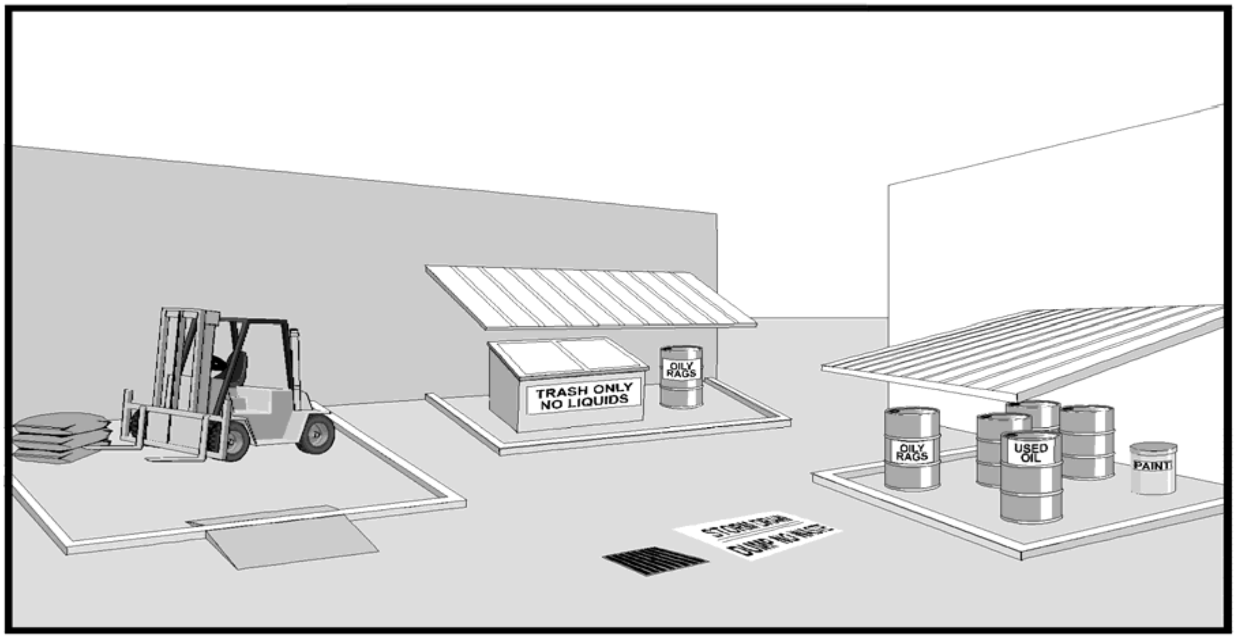
Application Guidance: N/A

Training: N/A

Effectiveness and Cost: This is a highly effective, low-cost BMP.

Limitations: None

BMP 012 - CONSTRUCT BERM OR DIKE AROUND CRITICAL AREAS



Description of Potential Pollutant and Source: Critical areas are source areas that have a high likelihood for the release of pollutants. This includes material handling areas, material storage areas, and equipment repair and maintenance areas. As a result of spills and leaks or exposure to storm water, pollutants can flow from critical areas into the storm water system. In addition, small spills and leaks can accumulate on the surface area and be washed away by storm water.

Description of BMP: Construct a raised berm or dike around critical areas. This will provide secondary containment and prevent any spills or leaks from leaving the area. This secondary containment will also be provided where mobile tankers containing fuel are customarily stationed. Construct a ramp to allow vehicle access into the area. (Note: double walled tanks do not require this BMP. Also, 40 CFR 112.7 requires bulk petroleum storage tanks be provided with secondary containment.) A drain valve will be installed and procedures to drain storm water from the bermed area will be posted (see BMP 014).

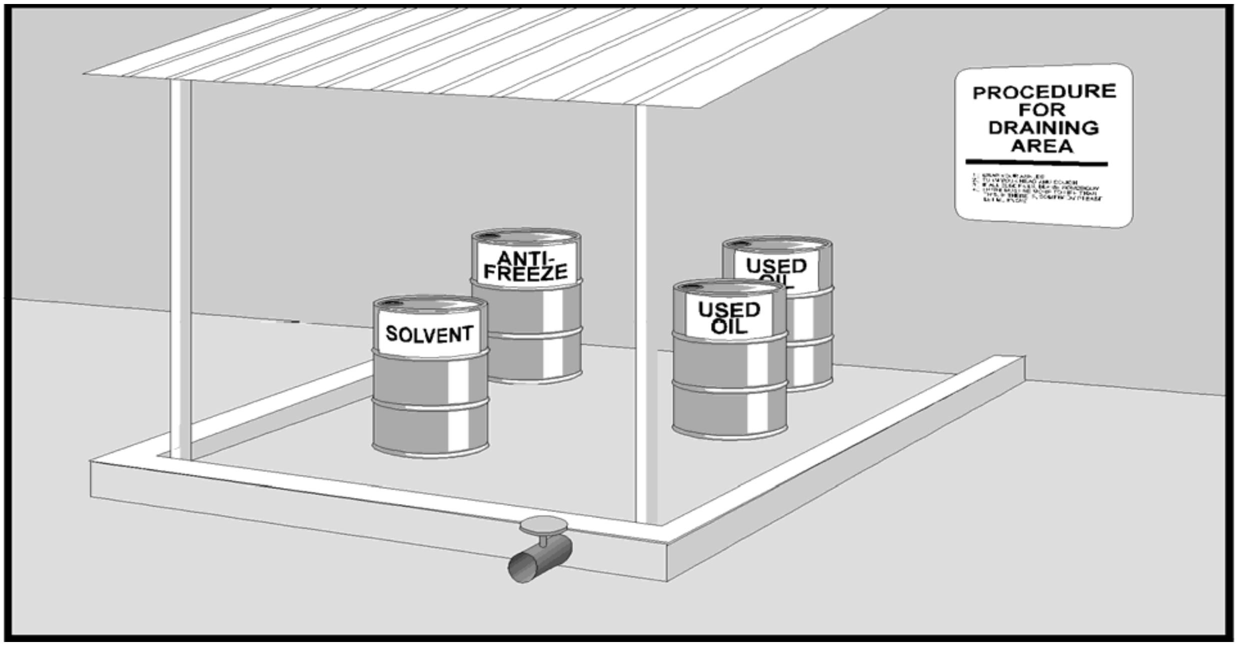
Application Guidance: Install as needed.

Training: N/A

Effectiveness and Cost: This is a highly effective BMP. The cost will vary depending on the size of the fueling operation.

Limitations: The size of some tank and fueling operations areas could make this BMP relatively expensive.

BMP 014 - PROVIDE VALVE FOR OUTLET PIPE IN CONTAINMENT AREA



Description of Potential Pollutant and Source: Spilled or leaked material may be discharged from containment areas through open outlet pipe valves or by overflowing.

Description of BMP: Install outlet pipe valves and keep closed. During storm events, containment areas will be drained following guidelines specifically developed for that area. Storm water accumulated in containment areas may be released to the storm drain system after the water quality has been evaluated based on the types of materials stored in the containment area and/or after laboratory analyses. If sheening, discoloration, odor, or evidence of spills is observed, the water will not be discharged to the storm drain system prior to treatment or further evaluation.

In containment areas where oils are stored, skimming spilled oil off the water using absorbents will be adequate treatment prior to discharge to storm drain system. However, the water will either be pumped out and stored pending chemical analytical results or properly disposed.

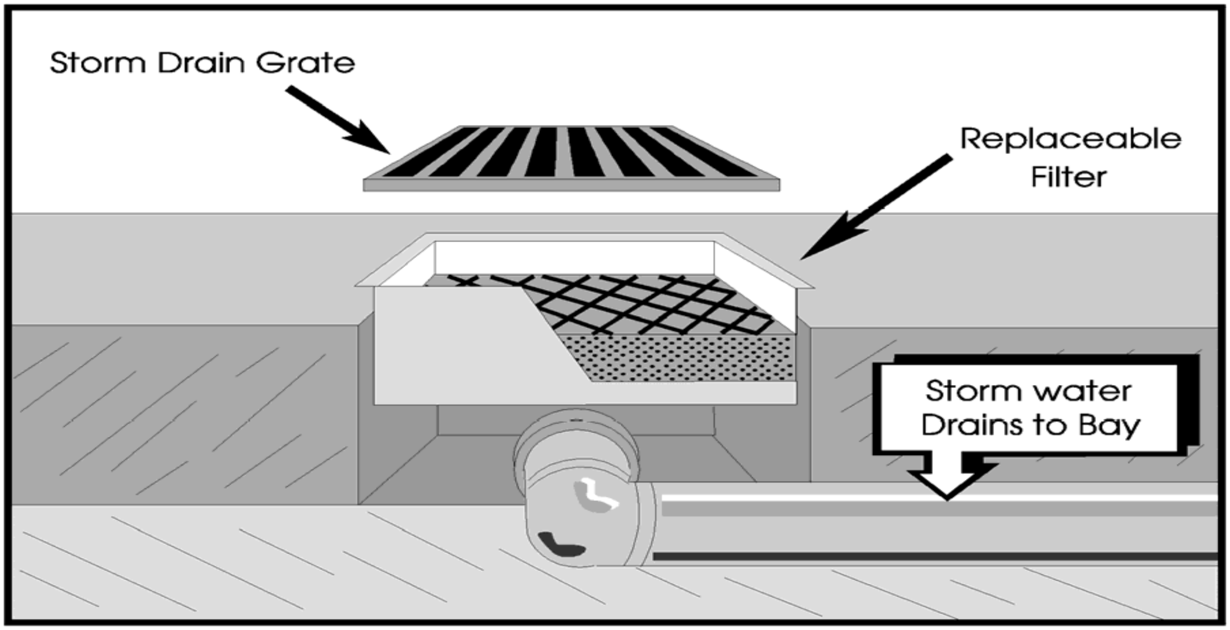
Application Guidance: The accumulated storm water will be released or removed at least every 24 hours during storm events.

Training: Personnel will be trained to drain containment areas according to the procedures developed for each containment area. Personnel will also be trained in the proper method of disposing materials that have been contained in the area after a spill.

Effectiveness and Cost: This is an effective, low to moderate-cost BMP.

Limitations: None

BMP 024 - INSERT FILTER IN CATCH BASIN



Description of Potential Pollutant and Source: Sediments, oil, and other pollutants generated from industrial activities can pollute storm water.

Description of BMP: Use catch basin filters of sand and organic material to trap sediments, oil, and other storm water contaminants. The filters are designed to be easily retrofitted into existing catch basins by suspending the device inside catch basins. Filters will be replaced regularly according to manufacturer's recommendations.

Application Guidance: This BMP will be used in areas where high concentrations of pollutants enter a storm drain catch basin.

Training: None

Effectiveness and Cost: Catch basin filters appear to be a moderately effective, moderate-cost BMP.

Limitations: This BMP should only be used where storm water with high concentrations of pollutants drains into a storm drain inlet.

BMP 033 - CHECK VEHICLES AND EQUIPMENT FOR LEAKS

Description of Potential Pollutant and Source: Vehicles, aircraft, or equipment entering or stored at a maintenance facility may be leaking a variety of fluids (fuel, oil, antifreeze, freon, etc.). These materials can be exposed to storm water.

Description of BMP: Inspect all vehicles and equipment at the site, whether incoming, parked, stored, or salvaged, for oil and fluid leaks. Drivers of fleet vehicles, such as delivery trucks, will also check under their vehicles each morning for fluid leaks. If leaks are present, drip pans will be placed under the vehicle or equipment. Once the vehicle is removed from the site, the former parking area will be inspected for stains, and these stains will be cleaned using rags or dry solvents.

Application Guidance: Any vehicle or equipment coming in for repairs, painting, or storage will be inspected for leaks. Fleet vehicles will be inspected each morning. Vehicles that are parked, stored, or salvaged will be provided with drip pans, as will tanker rail cars waiting to be unloaded. The frequency for implementing this BMP has been provided as general guidance. However, a facility operator may wish to establish a more suitable frequency. This will require SWPPP implementors to make judgements based on facility operations and conditions. To assign a frequency other than what has been suggested (i.e., more or less frequent), the following criteria will be considered and rated either High, Medium, or Low. If many of the criteria are assigned a High rating, the frequency may be increased. Similarly, if many criteria are assigned a Low rating, the frequency may be decreased. The goal of implementing this BMP is to minimize exposure of pollutants to storm water.

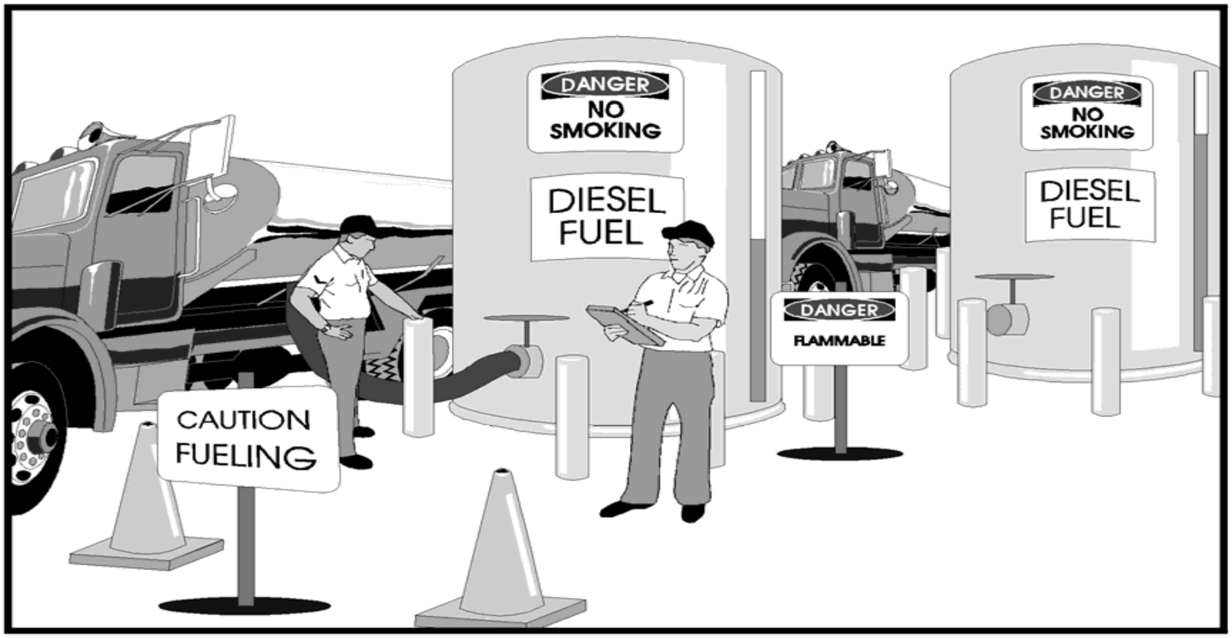
CRITERIA	Rating H=High M=Medium L=Low
Probability of exposure of significant materials to storm water	
Old age or poor condition of equipment and vehicles	
Evidence of exposure (e.g., stains on pavement)	
Proximity of source area to outfall or receiving water	
Sensitivity of receiving water to potentially exposed significant materials (e.g., waters with beneficial uses such as human contact, recreation, significant species habitat, etc.)	

Training: Signs will be posted to remind personnel of proper procedures.

Effectiveness and Cost: Checking for leaks is a moderately effective, low-cost BMP.

Limitations: None

BMP 064 - MONITOR MAJOR FUELING OPERATIONS



Description of Potential Pollutant and Source: Overflows during fueling or transfer of fuels or liquids to the storage tanks can expose significant materials to storm water. These materials can then be transported to the storm drain or receiving waters.

Description of BMP: Monitor fuel transfer operations carefully to reduce overfilling. A policy mandating second party monitoring of fuel transfers will be adopted.

Application Guidance: Fuel transfer operations will be observed during all high-volume transfers. High-volume transfers typically involve a fuel tanker truck.

Training: Personnel will be trained in appropriate emergency spill response actions and proper fueling procedures. Fueling procedures will include the following items: Determine that sufficient space is available in the storage tank or drum to receive the entire trailer compartment's capacity by gauging the tank or drum immediately before discharging additional product into the storage tank. Gauging can be accomplished by using stick readings, sight gauges, or sensor readouts.

- Ensure that the tank trailer is accurately spotted at the proper unloading spot.
- Ensure that the tank trailer brakes are set; the driver remains with the vehicle and observes the transfer lines during the entire unloading procedure.
- Place caution signs in the proximity of the tank trailer to give necessary warning to approaching vehicles and personnel. These signs must remain posted until after the tank trailer is unloaded and disconnected from the discharge connection.
- Ensure that no open flames of any kind are permitted within 100 feet of the tank trailer. Smoking is strictly forbidden within this area. Only spark-proof tools are to be used (see BMP 059).
- Limit performance of unloading operations only to reliable persons properly instructed and made responsible for careful compliance with applicable regulations (see BMP 031).
- Attach ground strap at the facility to bumper of tank trailer unless the transfer hose provides the proper ground, once the products in the tank and trailer and compartments have been

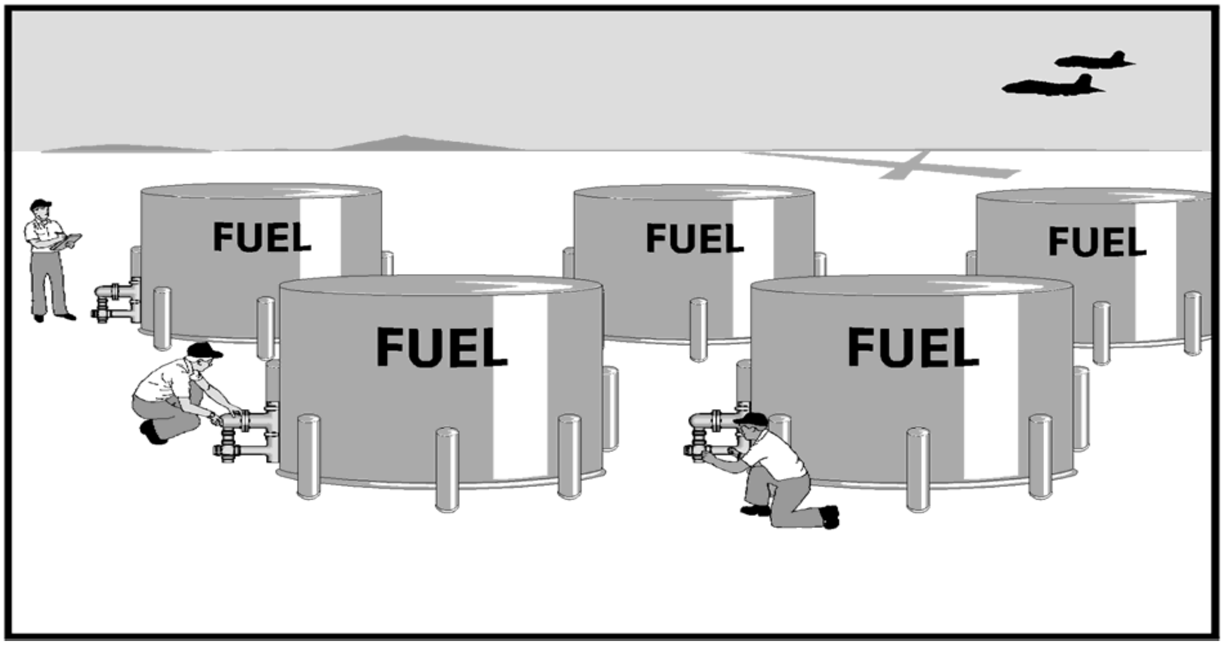
verified as being the same.

- Ensure that the facility storage tank is vented before connecting the unloading line unless unloading uses a vapor recovery system. Connect vapor recovery system(s) if applicable.
- Attach unloading line to the proper connection on the outlet leg of the tank truck.
- Open bottom outlet valve and proper valves in the unloading lines.
- Start product unloading, checking to ensure that there is no leakage at any of the connections. Should leakage appear, immediately stop the unloading process by closing the necessary outlet valves. The driver must continuously observe the connections to ensure that they are secure throughout the fluid transfer process.
- After liquid has been removed, close all valves, disconnect facility unloading from tank trailer, replace cap to outlet, and tighten all other closures.
- Gauge the tank after delivery to ensure that the product amount delivered agrees with the manifest or bill of lading. Be certain that any discrepancies noted at the time of delivery are noted on the manifest or bill of lading and are initialed by the driver.
- Remove all portable signs and release the tank trailer.

Effectiveness and Cost: Observing major fueling operations is a moderately effective, low-cost BMP.

Limitations: None

BMP 071- KEEP TANKS, PIPING, AND VALVES IN GOOD CONDITION



Description of Potential Pollutant and Source: Tanks, piping, and valves may leak fuel or other significant materials due to corrosion, loose fittings, poor welding, or improperly or poorly fitted gaskets. This can expose these materials to storm water, which can transport them to storm drains and/or receiving waters.

Description of BMP: Keep tanks, piping, and valves in good working condition. Tanks, piping, or valves which are leaking will be repaired or replaced.

Application Guidance: Tanks, piping, and valves will be inspected monthly and kept in good condition at all times. If applicable, preventive maintenance will be performed.

The frequency for implementing this BMP has been provided as general guidance. However, a facility operator may wish to establish a more suitable frequency. This will require SWPPP implementors to make judgements based on facility operations and conditions. To assign a frequency other than what has been suggested (i.e., more or less frequent), the following criteria will be considered and rated either High, Medium, or Low. If many of the criteria are assigned a High rating, the frequency may be increased. Similarly, if many criteria are assigned a Low rating, the frequency may be decreased. The goal of implementing this BMP is to minimize exposure of pollutants to storm water.

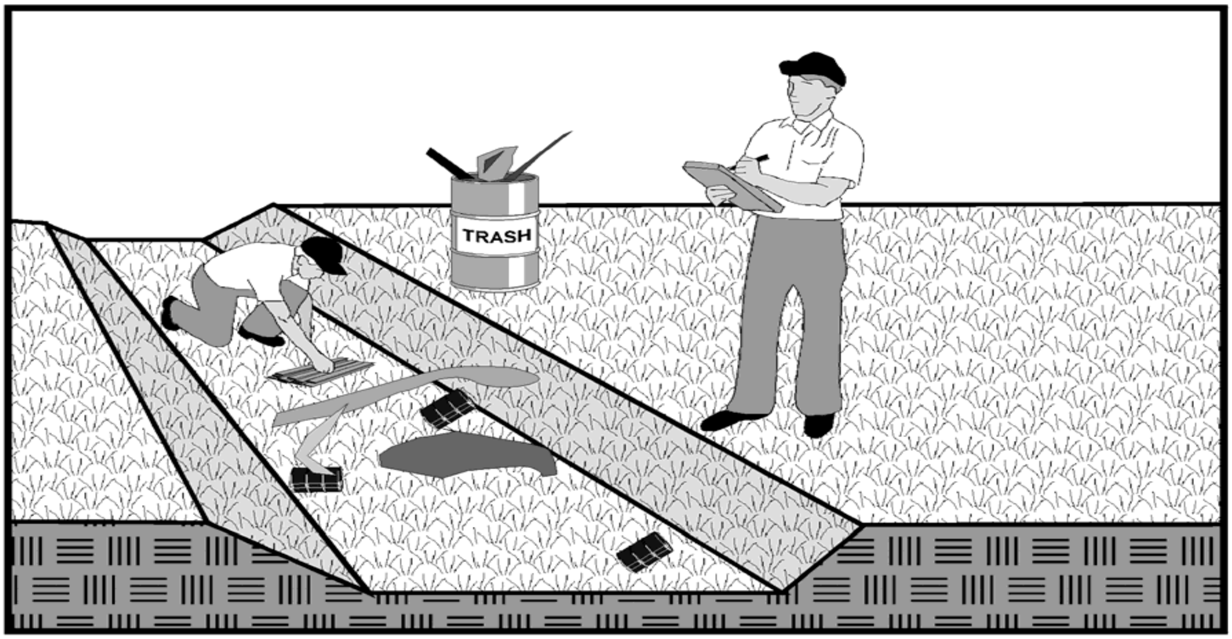
CRITERIA	Rating H=High M=Medium L=Low
Probability of exposure of significant materials to storm water	
Quantity of significant materials potentially exposed	
Toxicity of significant materials potentially exposed	
Frequency of use of tanks, piping, and valves	
Intensity of use of tanks, piping, and valves	
Old age or poor condition of tanks, piping, and valves	
Evidence of exposure (e.g., stains on ground surface)	
Proximity of source area to outfall or receiving water	
Sensitivity of receiving water to potentially exposed significant materials (e.g., waters with beneficial uses such as human contact, recreation, significant species habitat, etc.)	

Training: Personnel will be trained to regularly inspect for leaks or conditions that could lead to the discharge of chemicals, or storm water contact with waste materials. Personnel will be trained to routinely inspect equipment before each use. Tanks, piping, and valves which are not frequently used, will be inspected weekly. Procedures for notifying the appropriate maintenance personnel if a leak is found, will be established.

Effectiveness and Cost: Keeping tanks, piping, and valves in good condition is a highly effective BMP. The cost of repairing or replacing piping and valves is typically low. The cost of repairing or replacing tanks will vary based on the size of the tank and its present condition.

Limitations: None

BMP 110 - REGULARLY INSPECT AND MAINTAIN STORM WATER CONVEYANCE SYSTEMS



Description of Potential Pollutant and Source: Over time, storm water conveyance systems may fill up with sediments and clog. Also, drainage swales may erode and be a source of sediment pollution to storm water.

Description of BMP: Inspect and maintain storm water conveyance systems on a regular basis. This will include inspection of drainage swales and outfall pipes to ensure that the area is not eroding.

Other storm water conveyance systems, such as oil/water separators, catch basins, and detention ponds, will be inspected and properly maintained.

Application Guidance: Storm water conveyance systems will be inspected monthly. The frequency for implementing of the BMP has been provided as general guidance. However, a facility operator may wish to establish a more suitable frequency. This will require SWPPP implementors to make judgements based on facility operations and conditions. To assign a frequency other than what has been suggested (i.e., more or less frequent), the following criteria will be considered and rated either High, Medium or Low. If many of the criteria are assigned a High rating, the frequency may be increased. Similarly, if many criteria are assigned a Low rating, the frequency may be decreased. The goal of implementing this BMP is to minimize exposure of pollutants to storm water.

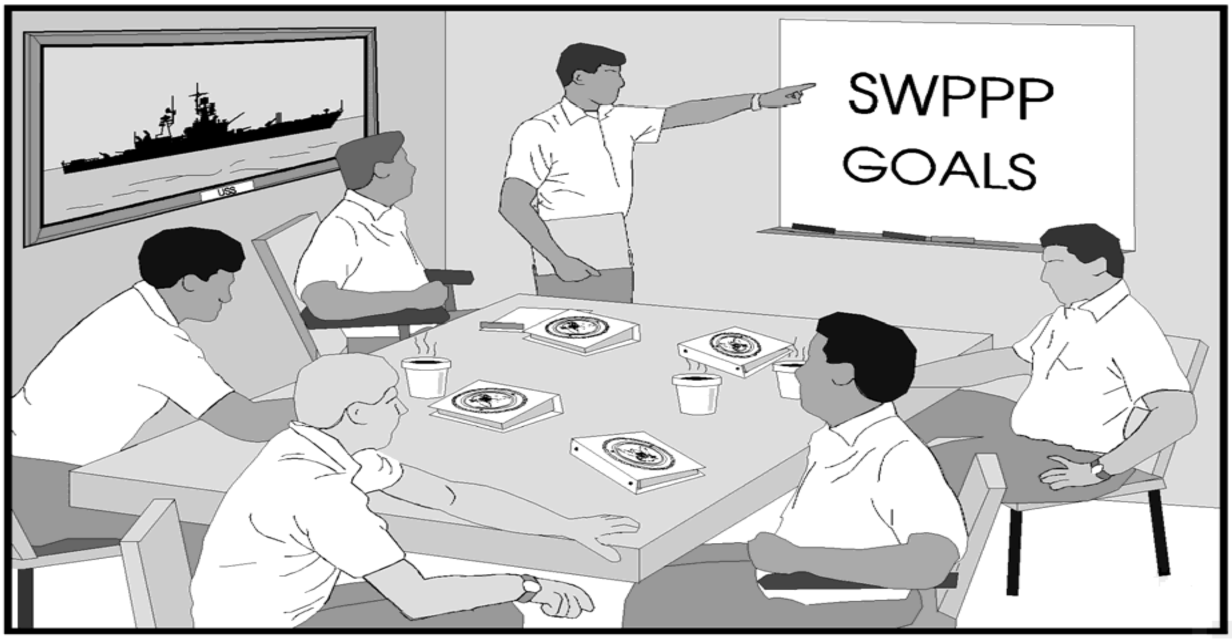
CRITERIA	Rating H=High M=Medium L=Low
Probability of exposure of significant materials to storm water in area draining to storm water conveyance system	
Quantity of significant materials potentially exposed in area draining to storm water conveyance system	
Toxicity of significant materials potentiality exposed in area draining to storm water conveyance system	
Frequency of use of significant materials potentially exposed in area draining to storm water conveyance system	
Evident of exposure (e.g., stains on pavement, evidence of significant materials in drainage system)	
Proximity of source area to outfall or receiving water	
Sensitivity of receiving water to potentially exposed significant materials (e.g., waters with beneficial uses such as human contact, recreation, significant species habitat, etc.)	

Training: The Storm Water Pollution Prevention Personnel will assign personnel responsible for inspections. Personnel will be provided a copy of a site plan showing the location of all storm water conveyance systems which need to be inspected.

Effectiveness and Cost: This is a moderately effective, low-cost BMP.

Limitations: None

BMP 113 - CONDUCT PERSONNEL TRAINING REGARDING THE SWPPP



Description of Potential Pollutant and Source: When properly trained, personnel are more capable of preventing spills, responding safely and effectively to an accident when it occurs, and recognizing situations that could lead to storm water contamination.

Description of BMP: Train personnel at all levels of responsibility in the components and goals of the SWPPP.

Application Guidance: Training will be conducted quarterly and at new personnel orientations.

Training: Training will address each component of the SWPPP, including how and why tasks are to be implemented. Topics will include:

- Good housekeeping
- Material management practices
- Spill prevention and response

Effectiveness and Cost: This is a highly effective, moderate-cost BMP.

Limitations: None

APPENDIX B

ROUTINE FACILITY INSPECTION CHECKLIST

Routine Facility Inspection Checklist

Activity Name: ______________________ **Date of Inspection:** ______________________

Inspector(s): ______________________ **Facility Name/Number:** ______________________

Column 1	Column 2	Column 3	Column 4	Column 5	
Source Area	BMP Number and Title	Status: F, P, N, NA[1]	Briefly Describe Effectiveness (Good or Other [describe])	Corrective Measures	
				What	By When

Note 1: F – Fully implemented, P – Partially implemented, N – Not implemented , NA – Not Applicable

APPENDIX C

QUARTERLY VISUAL ASSESSMENT CHECKLIST

Quarterly Visual Assessment Checklist

Facility ID and Location: ______________________

Date: ____________________

Sampler Name (Printed): Signature:

_____________________________________ ____

Time of Rainfall Begin: ________________ Time of Rainfall End: ____________________

Time of Flow Begin: ________________ Time of Flow End: ____________________

Rainfall event more than 72 hours since last event? Rainfall Event Total: ____________________

Yes / No

Sample: sample in a clean, colorless glass or plastic container, and examined in a well-lit area

On samples collected within the first 30 minutes of an actual discharge from a storm event

Sample Characteristics:

Color: ____________________ Floating Solids: ____________________________

Odor: ____________________ Settled Solids: ____________________________

Clarity: ____________________ Suspended Solids: ____________________________

Oil Sheen: ____________________ Foam: ____________________________

Other Obvious Indicators of Storm Water Pollution

(describe): ____

Nature of the discharge (i.e., runoff):

Results of observations of the storm water discharge:

Probable sources of any observed storm water contamination:

If applicable, why it was not possible to take samples within the first 30 minutes:

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

APPENDIX D

CORRECTIVE ACTION LOG

Corrective Action Log

Use this form to document SWPPP corrective actions. This form is to be completed by the Environmental Compliance Coordinator (ECC) or a person designated by ECC and submitted to the MCBH Storm Water Program Manager. The Storm Water Program Manager is responsible for any notification to the State of Hawaii Department of Health (DOH), if required.

A corrective action is defined as an action taken to:

a) **Repair, modify, or replace any storm water control used at the site;**
b) **Clean up and properly dispose of spills, releases, or other deposits; or**
c) **Remedy a permit violation.**

1. Corrective Action Triggers

The following events trigger a corrective action to be taken (this triggering condition is to be documented *within 24 hours* of discovering the occurrence):

a) A required storm water control was never installed, was installed incorrectly, or is not in accordance with the requirements in the SWMP Plan.
b) A member of the **Storm Water Pollution Control Team** becomes aware that the storm water controls installed and being maintained are not effective enough for the discharge to meet applicable water quality standards or applicable requirements in the MCBH SWMP Plan. The facility ECC shall notify the Storm Water Program Manager immediately. The Storm Water Program Manager will notify DOH *by the end of the next work day*.

1.1 Log Notifications:

Date/time Storm Water Program Manager notified by ECC: ________________________

Date/time DOH notified by Storm Water Program Manager: ________________________

1.2 Describe Discharge:

Indicate which one of the following prohibited discharges is occurring or has occurred:

- ❒ Wastewater from washout of concrete
- ❒ Wastewater from washout and cleanout of stucco, paint, form release oils, curing compounds, or other construction materials
- ❒ Fuels, oils, or other pollutants used in vehicle and equipment operation and maintenance
- ❒ Soaps, solvents, or detergents used in vehicle and equipment washing
- ❒ Toxic or hazardous substances from a spill or other release
- ❒ Other, Explain: ____

2. Requirements for Taking Corrective Actions

The ECC shall complete corrective actions in accordance with the deadlines specified below. In all circumstances, site personnel shall *immediately* take all reasonable steps to minimize or prevent the discharge of pollutants until a permanent solution is installed and made operational, including cleaning up any contaminated surfaces so that the material will not discharge in subsequent storm events. *Immediately* means the same day the condition is discovered, unless it is too late in the day, in which initiation of corrective action must begin on the following work day.

Following any of the above triggering events, the ECC shall install a new or modified control and make it operational, or complete the repair, by *no later than 7 calendar days from the time of discovery*. If it is not feasible to complete the installation or repair within 7 calendar days, the ECC shall document and submit to the Storm Water Program Manager, for their agreement, why it is not feasible to complete the installation or repair within the 7-calendar day timeframe and document a schedule for installing the storm water control and making it operational as soon as practicable after the 7-day timeframe.

If the issue is not adequately addressed within 7 calendar days or the agreed upon timeframe, enforcement procedures will be initiated. Unaddressed issues will be escalated through the chain of command. The MCBH Environmental Compliance and Protection Division Director will give the responsible party a formal notice with an appropriate deadline for action. If the problem remains unchanged, the situation will be brought to the attention of the next higher authority. The ultimate penalty for non-compliance of MS4 Permit regulations is eviction or discharge of the responsible party from MCBH. This is placed at the discretion of the Base Commander. See the Enforcement Response Plan in Appendix 3-6 of the SWMP Plan for further information on MCBH's enforcement policies.

3. Corrective Action Report

Within 24 hours of discovering the occurrence of one of the triggering conditions in SWPPP Section 4.1 at the site, the ECC must complete the following:

3.1 Describe the triggering condition:

____
____
____
____

3.2 Record the date/time of the condition identified. How was the condition identified?

____
____
____
____

3.3 Describe the corrective action taken:

____
____
____

Date/time installation or repair was completed:
(or date/time the prohibited discharge ceased) ____

Or describe why it is not feasible to complete installation or repair within 7 calendar days and detail a proposed schedule (if applicable)

____
____
____

4. Resolution of the Corrective Action Trigger

Within 7 calendar days of initiating the Corrective Action Report, the ECC must complete a report of the following:

4.1 Follow-up Actions

Describe any follow-up actions taken to review the design, installation, and maintenance of storm water controls, including the dates such actions occurred:

____
____
____

4.2 Storm Water Control Modifications

Provide a summary of storm water control modifications implemented. Include a schedule of activities required to implement changes and the date the modifications were completed or will be completed:

____
____
____

5. SWPPP Modification Due to Corrective Actions

Where corrective actions result in changes to any of the storm water controls or procedures documented in the SWPPP, modify the SWPPP accordingly *within 7 calendar days* of completing corrective action work.

Are modifications to the SWPPP necessary? ❑ Yes ❑ No

Date modifications to the SWPPP shall be completed _______________

6. Corrective Actions Required by DOH

The facility shall comply with any corrective actions required by DOH as a result of permit violations found during an inspection by DOH or the Environmental Protection Agency (EPA).

Was the Corrective Action triggered by a DOH/EPA inspection?

❑ Yes ❑ No

❑ Date of DOH/EPA Inspection __________________

7. Additional Comments:

____
____

Final

STORM WATER POLLUTION PREVENTION PLAN

Storm Water Management Program Plan

Marine Corps Base Hawaii, Oahu, Hawaii

NPDES Permit No. HI S000007

FUEL DIVISION SUPPLY DEPARTMENT

(FACILITY 1252 AND 1253)

Prepared by:

Marine Corps Base Hawaii

August 2022

Table of Contents

Tables

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List of Acronyms and Abbreviations

AST	Aboveground Storage Tank
BMP	Best Management Practice
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CWA	Clean Water Act
CWB	Clean Water Branch
DOH	State of Hawaii Department of Health
ECC	Environmental Compliance Coordinator
ECE	Environmental Compliance Evaluation
ECPD	Environmental Compliance and Protection Division
EPA	United States Environmental Protection Agency
HAZMAT	Hazardous Material
HAZMIN	Hazardous Material Minimization
JP-5	Jet Propellant 5
JP-8	Jet Propellant 8
MCBH	Marine Corps Base Hawaii
MoGas	Motor Gasoline
MS4	Municipal Separate Storm Sewer System
MS4 Permit	Marine Corps Base Hawaii's NPDES Permit No. HI S000007
NPDES	National Pollutant Discharge Elimination System
OWS	Oil/Water Separator
POC	Point of Contact
SWMP	Storm Water Management Program
SWPPP	Storm Water Pollution Prevention Plan
UST	Underground Storage Tank

Certification Statement

MCBH is committed to the prevention of discharges of polluted storm water to navigable waters or the environment and maintains the highest standards for best management practices through periodic review, updating, and implementation of this Storm Water Pollution Prevention Plan (SWPPP).

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information contained therein. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Name: ______________________ Title: ______________________

Signature: ______________________ Date: ______________________

Management Review

Refer to Section 1.2 for more information on required SWPPP updates.

Review Dates	Signature	Amendment Required? (Y/N)
____________	__________________	__________
____________	__________________	__________
____________	__________________	__________
____________	__________________	__________
____________	__________________	__________
____________	__________________	__________

1 Introduction

As part of Federal regulations administered through the Clean Water Act (CWA), the State of Hawaii, Department of Health (DOH) has issued the National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4) Permit No. HI S000007 (referred to herein at the "MS4 Permit") to Marine Corps Base Hawaii (MCBH). The MS4 Permit requires that MCBH provide all existing industrial facilities, identified in MCBH's MS4 Permit application, and any newly identified industrial facilities, submitted to DOH using the "MS4 NPDES Individual Permit – Industrial Storm Water Discharge Notification Form," with a Storm Water Pollution Prevention Plan (SWPPP) for storm water associated with industrial activities.

The purpose of the regulations is to protect water quality by reducing the amount of pollutants in storm water runoff caused by industrial activities.

1.1 SWPPP Implementation

The storm water management controls of this plan will become MCBH procedure for the applicable industrial facility. An up-to-date copy of the SWPPP shall be maintained on site and at the MCBH Environmental Compliance and Protection Division (ECPD). Management staff, maintenance personnel, contractor staff, and other personnel involved in onsite industrial activities, will be knowledgeable of the plan and follow the guidelines set forth in it, in addition to any other pertinent base-wide, state and federal regulations.

Day-to-day implementation of the SWPPP is primarily the responsibility of the current facility Environmental Compliance Coordinator (ECC) or Point of Contact (POC) as identified in Table 2-1. Enforcement of the permit conditions and this SWPPP are ultimately the responsibility of ECPD and additional escalating levels of authority as specified in the Enforcement Response Plan developed by MCBH for its base-wide Storm Water Management Program (SWMP) Plan.

1.2 Updating the SWPPP

This SWPPP will be reviewed as needed to identify necessary changes, at a minimum of every five years. Updates may be required due to current best management practice (BMP) failures, spill events, changes in industrial activities, changes in features, corrective actions, or other necessary changes. Personnel changes to the Storm Water Pollution Control Team (Section 2.1) should be logged in Table 2-1. Storm Water Pollution Control Team Log. ECPD will be responsible for approving revisions to the SWPPP. In the event the plan is modified, a copy of the updated SWPPP will remain at ECPD and will be provided to the applicable facility. Additionally, ECPD shall document and report the SWPPP changes to the DOH, Clean Water Branch (CWB), within thirty days of when the changes arise.

2 Fuel Division Supply Department, Facility 1252 and 1253

The Fuel Division Supply Department is located within MCBH, Kaneohe Bay at the southwest corner of the intersection of "C" Street and 6th Street. The entire facility (with the exception of the government fueling area) is enclosed by chain-linked fencing with access gates, opened only during normal working hours. The Fuel Division Supply Department encompasses approximately 9.5 acres and can be found in grid [redacted] of the MCBH Base Map, see Figure 4-1. The facility-specific map is shown on Figure 4-2.

2.1 Storm Water Pollution Control Team

The Storm Water Pollution Control Team consists of the Storm Water Program Manager, ECC, and the Hazardous Material (HAZMAT) and Hazardous Material Minimization (HAZMIN) team. The Storm Water Program Manager is responsible for the enforcement of the MS4 permit at all industrial sites and provides annual training to the ECC and other personnel. The ECC is the primary unit POC for storm water related items and the day-to-day environmental matters at a specific facility. ECC's are responsible for SWPPP implementation including BMP and facility inspections, storm water assessments/sampling, BMP maintenance, and corrective actions. The HAZMAT and HAZMIN team shall be contacted if assistance is needed. The role, name, phone number, and start date of individuals on the Storm Water Pollution Control Team is recorded in Table 2-1 below. In the event of personnel turnover, Table 2-1 shall be updated accordingly.

TABLE 2-1. STORM WATER POLLUTION CONTROL TEAM LOG

Role	Name	Phone	Start Date
MCBH Storm Water Program Manager	CIV Whitney Anderson	Office: 808-257-4359	6/6/22
ECC	CIV Kahana Kauahi	Office: 808-257-2234	8/1/2019
HAZMAT/HAZMIN	CIV Tim Cawthon	HAZMAT Center Building 6409 Office: 808-257-9913 HAZMIN Center Building 6407 Office: 808-257-0770	N/A

2.2 Fuel Division Supply Department, Facility 1252 and 1253 Activities

The Fuel Division Supply Department fuel farm consists of two [redacted]-barrel ([redacted] gallons) aboveground storage tanks (ASTs), distribution piping and pumping facilities that serve as a fuel storage and a distribution station. The facility dispenses approximately [redacted] gallons of fuel per day. The two ASTs are located on impervious liners within containment berms and are interconnected through a system of piping and valves.

The ASTs receive fuel from tanker trucks through unloading pump stations located next to the ASTs. Fuel is distributed through a series of pumps to pump stations, to Tank 6479 and Building 1563, located within the fuel farm. An underground receiving pipe and supporting infrastructure has been installed for fuel delivery from Tank 6479 to the Aircraft Fuel Islands (Facility 1170 and 1171). The underground system is inspected for leaks once every six months. Each week, accumulated water is drained from each tank and pumped into a holding tank beside Building 1563. The fuel is separated for reuse onsite, using a Bowser truck, and the remaining water is collected in a separate tank and disposed of as hazardous waste.

Storm water accumulates within the lined containment berms of Tanks 1252 and 1253 and is allowed to evaporate. Each bermed area contains a sump and pump to remove accumulated storm water, as necessary. The storm water is visually inspected for signs of fuel or oil, and if detected the storm water is pumped into a holding tank beside Building 1563, after which the fuel is separated for reuse, and the remaining water is disposed of as hazardous waste. If no fuel or oil is detected, the storm water is discharged onto the adjacent gravel road and grass areas.

Building 1563 has four pump stations that pump jet fuel to tanker trucks. Tanker truck loading racks and pump stations, Buildings 1254, 347 and 6504, are located to the south of Tank 1253. Building 347 pumps jet fuel to the [redacted]-barrel ASTs, while Building 6504 pumps jet fuel to the [redacted]-barrel ASTs as well as diesel and gasoline to the five [redacted]-gallon ASTs located to the east of Tank 1253. The tanker truck delivery area for Buildings 1563, 1254, 347, and 6504 consists of a concrete pad with roll-over curbing. At the time of inspection, temporary pumps were being used to supply JP-5 fuel from Tank 6496 to the loading rack. Two decommissioned fuel ASTs and two fuel bowsers were stored on the concrete containment pad at Building 1563. Additional items on this containment pad included clamshell containers, drums on spill pallets, and a spill kit.

Storm water is directed to concrete sumps, one for Building 1563/Tank 6496 and one for Buildings 1254/347/6504, and pumped onto the surrounding grass area, where storm water accumulates. If fuel or oil is observed during manual inspection of the sump, absorbent pads are used prior to discharging the remaining storm water to grass areas. Manual valves are located at the sumps and remain normally open to allow storm water to discharge onto adjacent grass areas. At the time of inspection, PVC pipe associated with discharge from the sump at Building 6504 was broken and in need of repair.

Facility 6506 is located east of Tank 1253 and normally consists of five [redacted]-gallon ASTs: two motor gasoline (MoGas), one biodiesel, one diesel, and one jet fuel (JP-8). During the time of inspection, Facility 6506 was under renovation and only three of the five ASTs were present. The ASTs are constructed with double-walled steel equipped with leak detection and are mounted on individual concrete pads with concrete curbing. Storm water is allowed to drain onto adjacent grass areas through manually operated valves. The valves appear to normally remain open, although there are warnings painted on the curbing to keep the valves closed.

To the east of the ASTs (outside the fenced compound, at the corner of 6th Street and "C" Street) is a concrete-paved fueling area supplied by the five ASTs with roll-over curbing. There are three fueling islands with four pumps and six dispensers, which are used to fuel government vehicles. The first island has one dispenser (#1) for JP-8, the second island has one dispenser (#2) for B-20 (fuel comprised of 20% biodiesel and 80% petroleum diesel), and the third island has two pumps – one with dispensers for MoGas and diesel respectively, and one with two dispensers for E-85 (fuel comprised of 85% denatured ethanol and 15% gasoline). The E-85 pump is supplied by a [redacted]-gallon AST, located to the east of the fueling area, stored on a concrete pad within chain-linked fencing. Storm water is allowed to drain onto adjacent grass areas through a manually operated valve. The valve normally remains open.

Figure 4-2 shows the direction of storm water flow at the facility. Runoff outside of the bermed areas or curbed/containment areas generally flows toward and percolates into the grass areas nearby. Storm water runoff to the north of the facility that does not percolate into the ground flows northerly toward catch basins along 6th Street and discharges to Kaneohe Bay through Outfall 021. Runoff from the northeast of the facility that does not percolate into the ground flows southeast toward catch basins on “C” Street (substantially similar Outfall 02) and discharges through Outfall 16B to Kaneohe Bay. Runoff flowing from the majority of the facility flows in a southwesterly direction along an asphalt access road toward 3rd Street where it enters the storm drain system and discharges to Kaneohe Bay via Outfalls 18 and 21. The storm water monitoring sample point is a sheet flow point at the side of the asphalt access road about halfway between Building 1563 and 3rd Street.

2.3 Sources of Pollutants

The following is an inventory of potential pollutants associated with Fuel Division Supply Department, facility 1252 and 1253:

A. *Material Loading and Unloading Areas*

Materials that are spilled, leaked, or lost during loading or unloading may collect on vegetated or paved surfaces and be carried away by storm runoff. Fuel is loaded and unloaded into tanks and tanker trucks through various pump and aboveground piping systems. Fuel is supplied to the dispensers through various above and belowground pump and piping systems.

B. *On-Site Material Storage and Disposal Practices*

Leaks, drips, or spills of materials that are stored or disposed of in areas exposed to rainfall can be carried away by storm water. All significant material associated with Fuel Division Supply Department is stored in ASTs (stationary and portable). Smaller quantities of hazardous materials are stored on spill containment pallets, in drums over spill containment pallets, or within poly overpacks, near Building 1563. Fuel is recovered and reused on site as much as possible.

C. Outdoor Activities

Many outdoor activities at MCBH, Kaneohe Bay use materials or create wastes that have the potential to pollute storm water runoff. Outdoor activities at the Fuel Division Supply Department include the storage, pumping, and dispensing of fuels.

D. Significant Materials Inventory

The following pollutants have been identified as having a reasonable potential to be present in storm water discharges from the Fuel Division Supply Department if not properly managed:

- Jet Fuel
- Diesel Fuel
- Biodiesel Fuel
- Gasoline
- Ethanol Fuel
- Engine Oil

2.4 Potential Storm Water Pollutants

The following pollutants have been identified as having a reasonable potential to be present in storm water discharges from the Fuel Division Supply Department if not properly managed:

- Jet Fuel
- Diesel Fuel
- Biodiesel Fuel
- Gasoline
- Ethanol Fuel
- Engine Oil

2.5 Best Management Practices (BMPs)

Best Management Practices (BMPs) are techniques or methods that aim to manage the quantity and improve the quality of storm water runoff from a facility or other site. Storm water BMPs intend to reduce or eliminate pollution and contaminants collected by runoff before the runoff reaches the MCBH storm water system or sensitive ecosystems such as streams, wetlands, and marine environments. The following is a summary of BMPs currently in place at the Fuel Division Supply Department, Facility 1252 and 1253.

A. Good Housekeeping Practices

In general, Fuel Division Supply Department, Facility 1252 and 1253 employs good housekeeping practices throughout its operations. Good housekeeping practices for Fuel Division Supply Department, Facility 1252 and 1253 are included in Table 2-2.

B. Preventative Maintenance

Preventive maintenance is important as water pollution control measures may be of little or no use if devices and equipment have not been properly maintained. Facility personnel conduct inspection of facility equipment and storage systems on a regular basis. The preventive maintenance program involves inspections of equipment and storage systems that are exposed to storm water.

C. Visual Inspections

Visual inspection provides a valuable subjective assessment of the status of storm water management systems. They are easily performed and allow the opportunity for corrective action, if necessary. Site inspections and documentation requirements are addressed in in Section 3 of this SWPPP. MCBH HAZMIN Center staff perform hazardous material inspections monthly. Annual facility inspections are performed by EPCD as part of the MCBH Environmental Compliance Evaluation (ECE).

D. Spill Prevention and Response

Areas where significant material spill or leakage can occur are identified in Section 2.1 and shown on Figure 4-2. The storm water systems and their accompanying drainage points are also shown on Figure 4-2. Refer to Table 2-2 for BMPs related to spill preventative measures for material handling procedures, storage requirements, and equipment usage.

In the event of a hazardous substance or oil spill, the ECC and ECPD shall be notified immediately (ECPD; 808-630-8246). If the spill cannot be easily addressed using an onsite spill kit and personal protective equipment, call Fed Fire (Military 911). The spill source should be immediately controlled if it is safe to do so by closing valves, switches, and/or turning off power to a device. Then, contain the spill by using sorbent socks or absorbent materials found in a spill kit. After it has been contained, clean up the spilled material in a safe manner using dry methods. All materials should then be properly disposed of.

The locations of spill kits are shown in Figure 4-2.

E. Erosion and Sediment Controls

No areas at the Fuel Division Supply Department have been identified as having high potential for significant soil erosion that would require erosion and sediment control measures.

F. Best Management Practices to Minimize Pollutant Contact with Storm Water

Facility personnel receive annual training from ECPD at minimum, as well as an initial training for all new personnel. Training information will include the BMPs that have been developed for the facility and a general overview of the storm water program and its objectives.

Existing BMPs at the Fuel Division Supply Department are shown in Table 2-2 and attached as fact sheets to this SWPPP in Appendix A.

TABLE 2-2. BEST MANAGEMENT PRACTICES

BMP No.	BMP Title	Description
002	Restrict Access to Area and Equipment	The facilities are located on the flight line, which is restricted to unauthorized personnel.
006	Control Spills	Spill kits are available nearby during active fueling. Only dry clean up methods used to maintain sumps.
012	Construct Berm or Dike around Critical Areas	Fuel tanks are contained within large berms.
014	Provide Valve for Outlet Pipe in Containment Area	Bermed areas have a manual valve that is opened to release accumulated storm water only after water is found to be free of oily sheen.
033	Check Equipment for Leaks	Fueling equipment are checked for leaks on a regular basis.
055	Use Overpack Containers or Containment Pallets to Store 55-Gallon Drums or Containers Outside of Storage Area	Overpack containers and containment pallets are used to store drums and containers outside of storage area (and within Building 1563 containment area).
064	Monitor Major Fueling Operations	All fueling operations are closely monitored.
069	Restrict Access to Tanks	The E-85 tank is surrounded by chain-linked fencing.
071	Keep Tanks, Piping, and Valves in Good Condition	ASTs, valves, and piping are inspected for leaks and/or signs of structural deficiencies.
113	Conduct Personnel Training Regarding the SWPPP	Personnel are trained regularly (initial orientation and annual refresher).

3 Inspections, Assessments and Monitoring

3.1 Routine Quarterly Site Inspections

The MS4 Permit requires a routine quarterly site inspection by a qualified person with at least one member of the storm water pollution control team participating. At least once each calendar year, the routine inspection must be conducted during a period when a storm water discharge is occurring. The site inspection is an overall evaluation of the effectiveness of the BMPs implemented at that facility. A Routine Facility Inspection Checklist (Appendix B) shall be completed during each routine site inspection and kept onsite with this SWPPP. During normal facility operating hours, inspections must be conducted of areas of the facility including, but not limited to, the following:

- Areas where industrial materials or activities are exposed to storm water;
- Areas identified in the SWPPP and those that are potential pollutant sources;
- Areas where spills and leaks have occurred in the past three years;
- Discharge points; and
- Control measures used to comply with the effluent limits contained in this permit.

3.2 Visual Assessment of Storm Water Discharges

A Quarterly Visual Assessment of storm water discharge is required for all industrial facilities at MCBH. Storm water samples for this visual assessment but must be collected in such a manner that the samples are representative of the storm water discharge from the facility. Therefore, the water sample must be collected at the designated storm water monitoring point (Outfall 01) as shown in Figure 4-2. The Quarterly Visual Assessment checklist (Appendix C) shall be completed by the current facility ECC and kept onsite with this SWPPP.

The visual assessment must be made:

- Of a sample collected in a clean, colorless glass or plastic container, and examined in a well-lit area;
- On samples collected within the first 30 minutes of an actual discharge from a storm event. If it is not possible to collect the sample within the first 30 minutes of discharge, the sample must be collected as soon as practicable after the first 30 minutes and documented why it was not possible to take the sample within the first 30 minutes; and
- For storm events, on discharges that occur at least 72 hours (three days) from the previous discharge.

Whenever the visual assessment shows evidence of storm water pollution, corrective action procedures to remedy the pollutants must be taken and documented. Refer to Section 4 for corrective action procedures.

4 Corrective Actions

A corrective action is defined as any action taken, or required to be taken, to (1) repair, modify, or replace any stormwater control used at the site; (2) clean up and dispose of spills, releases, or other deposits found on the site; and (3) remedy a permit violation. Corrective actions should be documented using the Corrective Action Log (Appendix D).

4.1 Immediate Actions

If corrective action is needed, you must immediately take all reasonable steps necessary to minimize or prevent the discharge of pollutants until a permanent solution is installed and made operational, including cleaning up any contaminated surfaces so that the material will not discharge in subsequent storm events. Note: In this context, the term "immediately" requires you to, on the same day a condition requiring corrective action is found, take all reasonable steps to minimize or prevent the discharge of pollutants until a permanent solution is installed and made operational. However, if a problem is identified at a time in the workday when it is too late to initiate corrective action, the initiation of corrective action must begin no later than the following workday. "All reasonable steps" means that the permittee has undertaken initial actions to assess and address the condition causing the corrective action, including, for example, cleaning up any exposed materials that may be discharged in a storm event (e.g., through sweeping, vacuuming) or making arrangements (i.e., scheduling) for a new BMP to be installed at a later date.

4.2 Escalating Actions

If additional actions are necessary beyond those implemented or if the conditions continue to occur, additional corrective actions (e.g., install a new or modified control and make it operational, complete the repair) must be completed before the next storm event if possible, and within 14 calendar days from the time of discovery of the corrective action condition. If it is infeasible to complete the corrective action within 14 calendar days, document why it is infeasible to complete the corrective action within the 14-day timeframe and identify a schedule for completing the work, which must be done as soon as practicable after the 14-day timeframe but no longer than 45 days after discovery. If the completion of corrective action will exceed the 45-day timeframe, the minimum additional time necessary to complete the corrective action can be taken, provided that MCBH ECPD and DOH is notified of your intention to exceed 45 days. Where your corrective actions result in changes to any of the controls or procedures documented in your SWPPP, you must modify your SWPPP accordingly within 14 calendar days of completing corrective action work.

4.3 Corrective Actions for Substantially Identical Outfalls

If the event triggering corrective action is associated with an outfall that had been identified as a "substantially identical outfall", the review must assess the need for corrective action for all related substantially identical outfalls. Any necessary changes to control measures that affect these other outfalls must also be made before the next storm event if possible, or as soon as practicable following that storm event. Any corrective actions must be conducted within the timeframes discussed above.

4.4 Record of Past Spills or Leaks of Hazardous Pollutants

Table 4-1 is used to record significant spills and leaks that have occur or have occurred within three years prior to the preparation or amendment of this SWPPP. Significant spills and leaks include, but are not limited to, releases of oil or hazardous substances in excess of quantities that are reportable under CWA Section 311 (see 40 CFR 110.6 and 40 CFR 117.21) or Section 102 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 USC §9602.

At the time of this SWPPP update, there have been no past spill or leak incidents reported for the Fuel Division Supply Department.

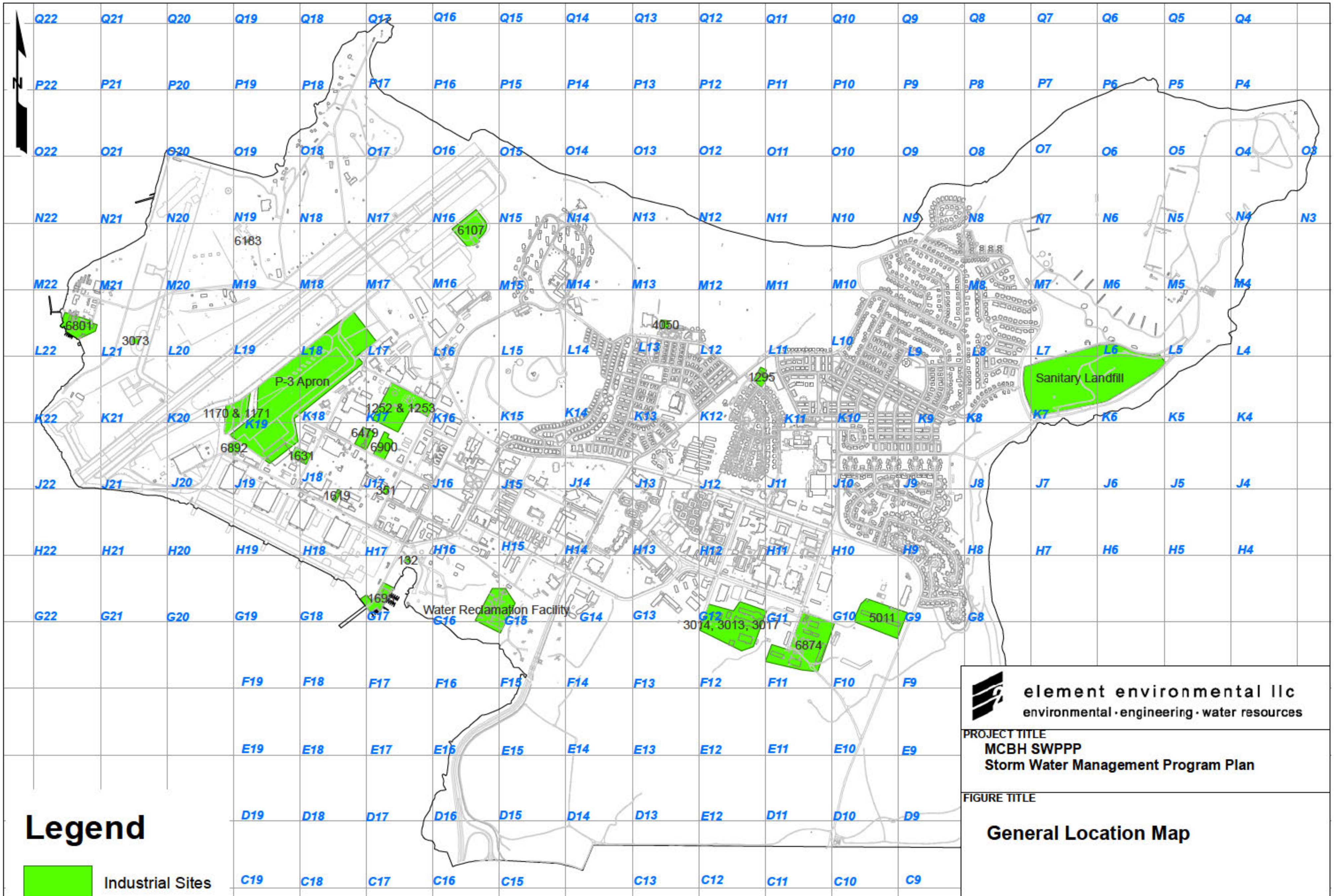
TABLE 4-1. PAST SPILLS OR LEAKS OF HAZARDOUS POLLUTANTS

Date of Incident	Brief Summary of Incident (POC Active at Time of Incident, Pollutant Type, Estimated Quantity, Location of Spill)

4.5 Record of Unauthorized Non-Storm Water Discharges

TABLE 4-2. UNAUTHORIZED NON-STORM WATER DISCHARGE EVALUATION

Date of Evaluation	Brief Summary of Evaluation (Description of the evaluation criteria, outfalls or onsite drainage points that were directly observed, action(s) taken, such as a list of control measures used to eliminate unauthorized discharge)



Legend

Industial Sites

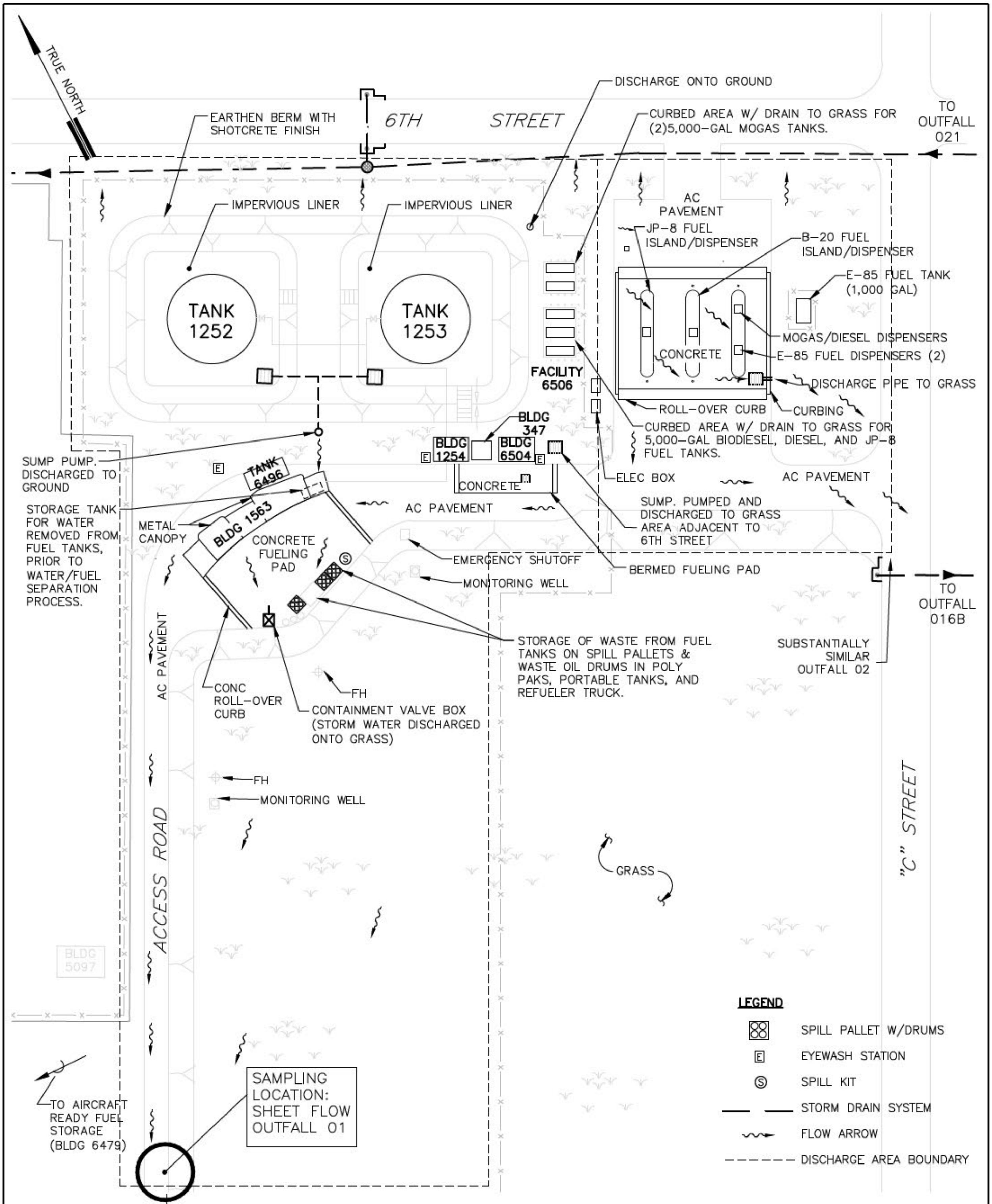
1,800 900 0 1,800 Feet

element environmental llc
environmental · engineering · water resources

PROJECT TITLE
MCBH SWPPP
Storm Water Management Program Plan

FIGURE TITLE
General Location Map

DATE	FIGURE NO.
September 2022	4-1



NOTE:

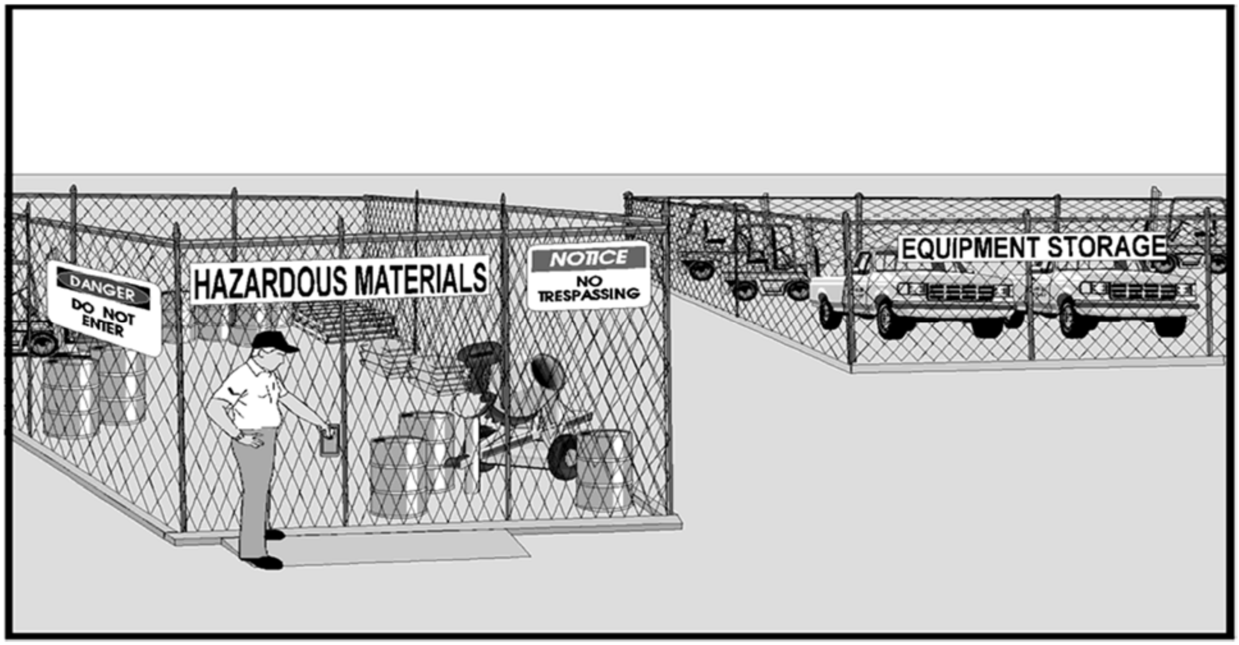
1. STORM WATER, FROM APPROXIMATELY 9.5 ACRES ASSOCIATED WITH BUILDINGS 1252 & 1253, IS DISCHARGED TO KANEOHE BAY VIA OUTFALLS 016B, 018 AND 021.
2. NOT TO SCALE

DATE:	PROJECT TITLE:	
JULY 2022	STORM WATER POLLUTION PREVENTION PLAN MCBH, KANEOHE BAY, OAHU, HAWAII	
FIGURE TITLE:		FIGURE NO.:
FUEL DIVISION SUPPLY DEPARTMENT (BUILDINGS 1252 & 1253)		4-2

APPENDIX A

SELECTED BMP FACT SHEETS

BMP 002 - RESTRICT ACCESS TO AREA AND EQUIPMENT



Description of Potential Pollutant and Source: Vandalism of vehicles and facility property may result in the release of significant materials.

Description of BMP: Provide fences and gate areas where vehicles, equipment and materials are stored and are accessible to the public to discourage trespassing. Access to equipment will also be restricted. Only authorized personnel will be allowed to operate equipment. The fences and gates will be properly maintained, and additional security measures including lighting of the area will be implemented if the fencing alone proves insufficient. Where appropriate, security guards or alarms will be used.

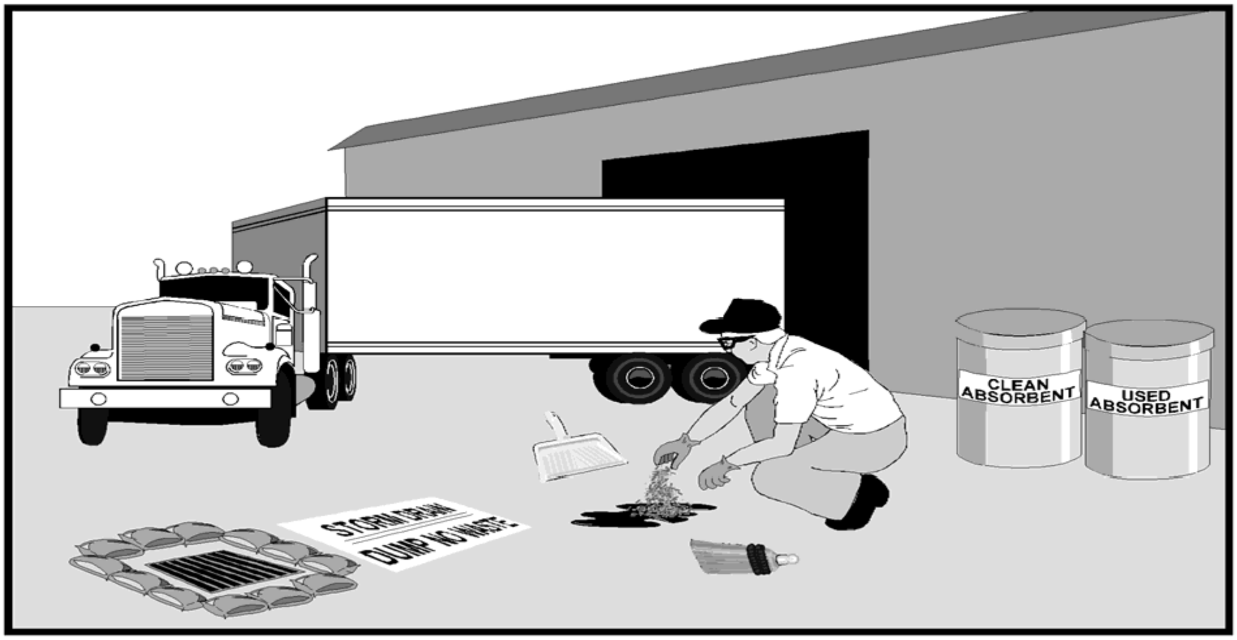
Application Guidance: As needed.

Training: N/A

Effectiveness and Cost: Effectiveness and costs will vary depending on the application.

Limitations: None

BMP 006 - CONTROL SPILLS



Description of Potential Pollutant and Source: Spills of significant materials may be exposed to storm water and transported to storm drains and/or receiving waters.

Description of BMP: Follow safety data sheets (SDS) for handling, storage, and cleanup of all significant materials to reduce the potential for spills.

Any spill, large or small, of significant materials will be controlled to prevent pollutants from being transported to storm drains and/or receiving waters. Appropriate spill control material will be kept on site. Smaller spills will be contained using absorbent material such as kitty litter, straw, or sawdust. Drums of absorbent material will be easily accessible and clearly marked, and containers for spent absorbent material will be readily available. Spent absorbent material will be managed appropriately and disposed of in accordance with applicable regulations. Larger spills will be controlled using spill kits, brooms, and other response equipment commensurate with the size of the spill. The methods outlined in the Activity's spill prevention and response plans (BMP 112) for hazardous materials will be followed for spills of any potential storm water pollutants. The date, time, nature and volume of material spilled, and cleanup measures taken will be recorded for all spills and kept as part of the SWPPP.

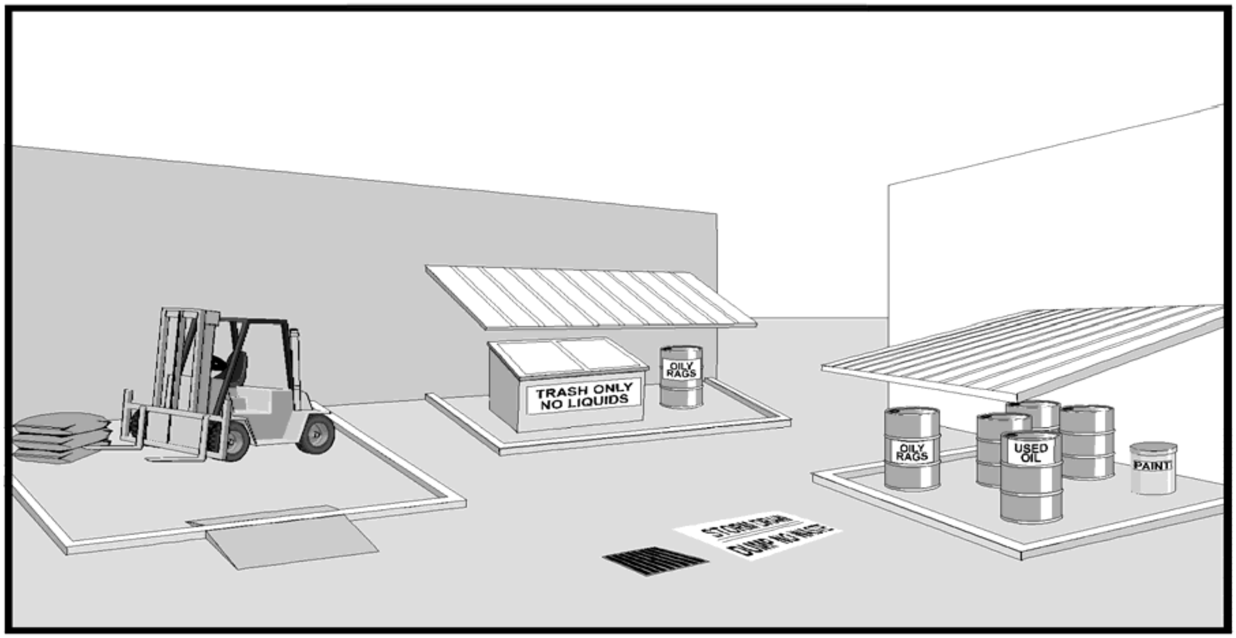
Application Guidance: Controlling spills will be practiced under all working conditions.

Training: Personnel will be trained in spill prevention and response procedures including the use of personal protection equipment (gloves, eye and face protection, etc.). This will include what absorbent or equipment to use, how to use the absorbent or equipment, where to find it, how to dispose of the spent absorbent or other material, and who to notify in the event of a spill.

Effectiveness and Cost: Spill control is a moderately effective, low-cost BMP.

Limitations: None

BMP 012 - CONSTRUCT BERM OR DIKE AROUND CRITICAL AREAS



Description of Potential Pollutant and Source: Critical areas are source areas that have a high likelihood for the release of pollutants. This includes material handling areas, material storage areas, and equipment repair and maintenance areas. As a result of spills and leaks or exposure to storm water, pollutants can flow from critical areas into the storm water system. In addition, small spills and leaks can accumulate on the surface area and be washed away by storm water.

Description of BMP: Construct a raised berm or dike around critical areas. This will provide secondary containment and prevent any spills or leaks from leaving the area. This secondary containment will also be provided where mobile tankers containing fuel are customarily stationed. Construct a ramp to allow vehicle access into the area. (Note: double walled tanks do not require this BMP. Also, 40 CFR 112.7 requires bulk petroleum storage tanks be provided with secondary containment.) A drain valve will be installed and procedures to drain storm water from the bermed area will be posted (see BMP 014).

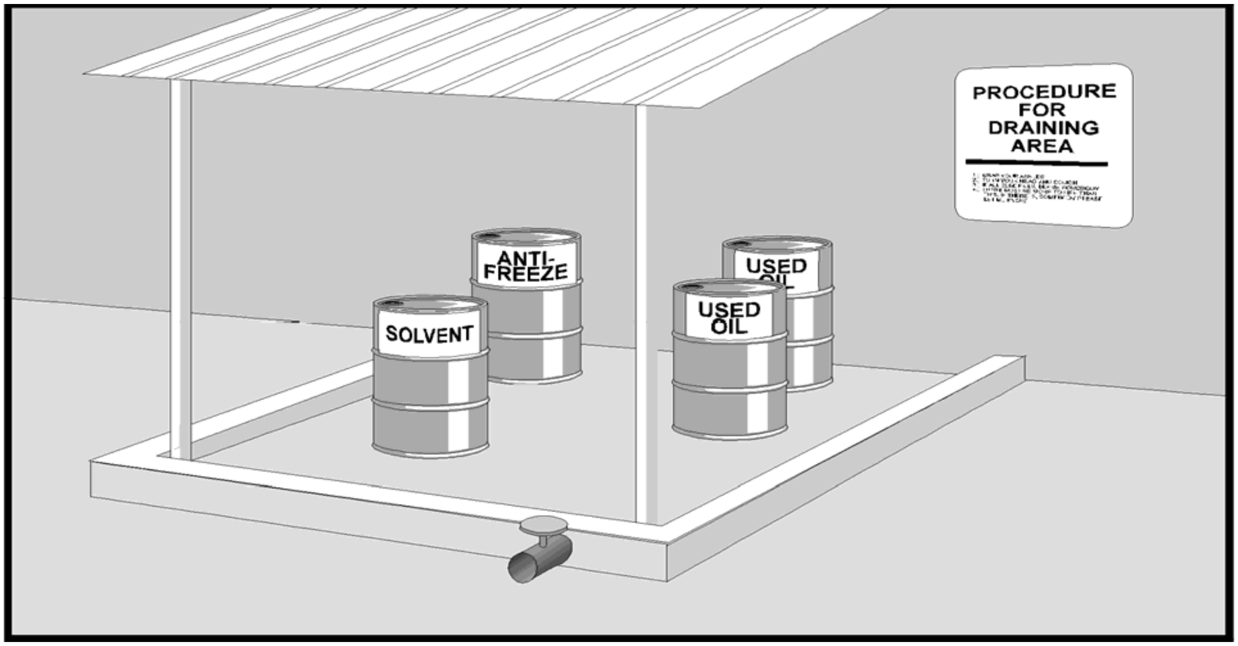
Application Guidance: Install as needed.

Training: N/A

Effectiveness and Cost: This is a highly effective BMP. The cost will vary depending on the size of the fueling operation.

Limitations: The size of some tank and fueling operations areas could make this BMP relatively expensive.

BMP 014 - PROVIDE VALVE FOR OUTLET PIPE IN CONTAINMENT AREA



Description of Potential Pollutant and Source: Spilled or leaked material may be discharged from containment areas through open outlet pipe valves or by overflowing.

Description of BMP: Install outlet pipe valves and keep closed. During storm events, containment areas will be drained following guidelines specifically developed for that area. Storm water accumulated in containment areas may be released to the storm drain system after the water quality has been evaluated based on the types of materials stored in the containment area and/or after laboratory analyses. If sheening, discoloration, odor, or evidence of spills is observed, the water will not be discharged to the storm drain system prior to treatment or further evaluation.

In containment areas where oils are stored, skimming spilled oil off the water using absorbents will be adequate treatment prior to discharge to storm drain system. However, the water will either be pumped out and stored pending chemical analytical results or properly disposed.

Application Guidance: The accumulated storm water will be released or removed at least every 24 hours during storm events.

Training: Personnel will be trained to drain containment areas according to the procedures developed for each containment area. Personnel will also be trained in the proper method of disposing materials that have been contained in the area after a spill.

Effectiveness and Cost: This is an effective, low to moderate-cost BMP.

Limitations: None

BMP 033 - CHECK VEHICLES AND EQUIPMENT FOR LEAKS

Description of Potential Pollutant and Source: Vehicles, aircraft, or equipment entering or stored at a maintenance facility may be leaking a variety of fluids (fuel, oil, antifreeze, freon, etc.). These materials can be exposed to storm water.

Description of BMP: Inspect all vehicles and equipment at the site, whether incoming, parked, stored, or salvaged, for oil and fluid leaks. Drivers of fleet vehicles, such as delivery trucks, will also check under their vehicles each morning for fluid leaks. If leaks are present, drip pans will be placed under the vehicle or equipment. Once the vehicle is removed from the site, the former parking area will be inspected for stains, and these stains will be cleaned using rags or dry solvents.

Application Guidance: Any vehicle or equipment coming in for repairs, painting, or storage will be inspected for leaks. Fleet vehicles will be inspected each morning. Vehicles that are parked, stored, or salvaged will be provided with drip pans, as will tanker rail cars waiting to be unloaded. The frequency for implementing this BMP has been provided as general guidance. However, a facility operator may wish to establish a more suitable frequency. This will require SWPPP implementors to make judgements based on facility operations and conditions. To assign a frequency other than what has been suggested (i.e., more or less frequent), the following criteria will be considered and rated either High, Medium, or Low. If many of the criteria are assigned a High rating, the frequency may be increased. Similarly, if many criteria are assigned a Low rating, the frequency may be decreased. The goal of implementing this BMP is to minimize exposure of pollutants to storm water.

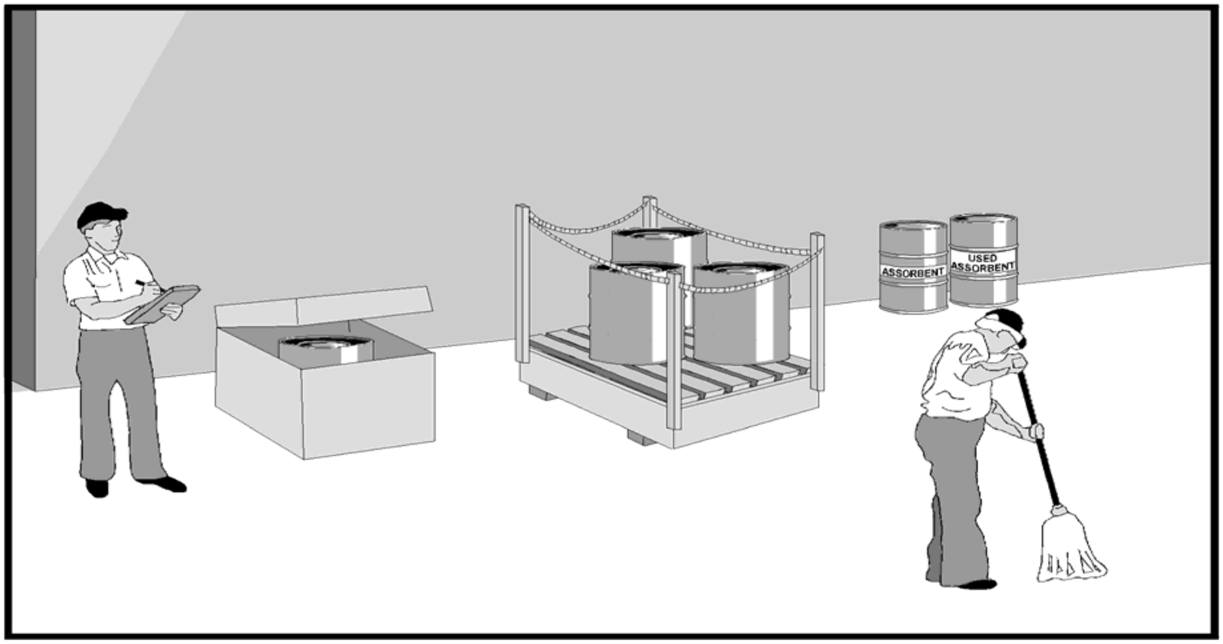
CRITERIA	Rating H=High M=Medium L=Low
Probability of exposure of significant materials to storm water	
Old age or poor condition of equipment and vehicles	
Evidence of exposure (e.g., stains on pavement)	
Proximity of source area to outfall or receiving water	
Sensitivity of receiving water to potentially exposed significant materials (e.g., waters with beneficial uses such as human contact, recreation, significant species habitat, etc.)	

Training: Signs will be posted to remind personnel of proper procedures.

Effectiveness and Cost: Checking for leaks is a moderately effective, low-cost BMP.

Limitations: None

BMP 055 - USE OVERPACK CONTAINERS OR CONTAINMENT PALLETS TO STORE 55-GALLON DRUMS OUTSIDE OF STORAGE AREAS



Description of Potential Pollutant and Source: Chemicals, oils, solvents or liquid materials stored outside in 55-gallon drums may leak. The leaking material can then be exposed to storm water and transported to the storm drain system receiving waters.

Description of BMP: Use overpack containers and containment pallets for 55-gallon drums stored outside. Overpack containers and containment pallets are secondary containers usually constructed of plastic. They are large enough to hold the contents of the containers stored in them if they should break or leak. Using overpack containers or containment pallets minimizes the amount of pollutants reaching surface waters due to leaks. Overpack containers will be protected against damage from vehicles.

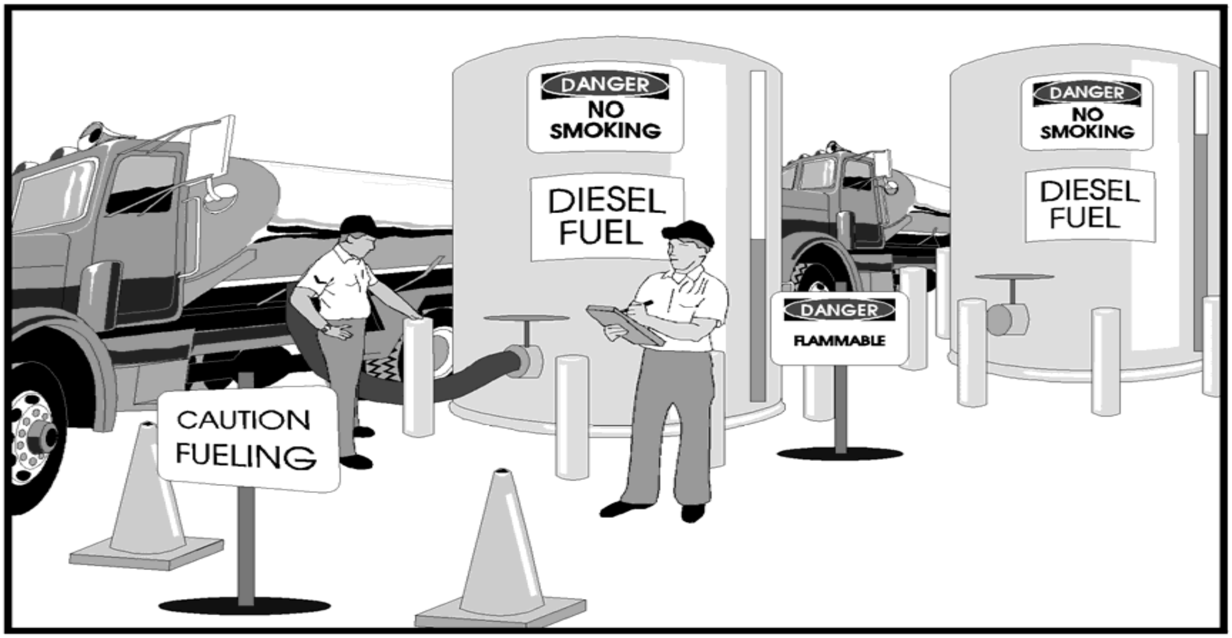
Application Guidance: Overpack containers or containment pallets will be used whenever 55-gallon drums of hazardous materials must be stored outside.

Training: Personnel will be trained to ensure that overpack containers or containment pallets are used.

Effectiveness and Cost: Overpack containers and containment pallets are a highly effective, moderate-cost BMP.

Limitations: Cost could be high if the number of drums needing containment is high.

BMP 064 - MONITOR MAJOR FUELING OPERATIONS



Description of Potential Pollutant and Source: Overflows during fueling or transfer of fuels or liquids to the storage tanks can expose significant materials to storm water. These materials can then be transported to the storm drain or receiving waters.

Description of BMP: Monitor fuel transfer operations carefully to reduce overfilling. A policy mandating second party monitoring of fuel transfers will be adopted.

Application Guidance: Fuel transfer operations will be observed during all high-volume transfers. High-volume transfers typically involve a fuel tanker truck.

Training: Personnel will be trained in appropriate emergency spill response actions and proper fueling procedures. Fueling procedures will include the following items: Determine that sufficient space is available in the storage tank or drum to receive the entire trailer compartment's capacity by gauging the tank or drum immediately before discharging additional product into the storage tank. Gauging can be accomplished by using stick readings, sight gauges, or sensor readouts.

- Ensure that the tank trailer is accurately spotted at the proper unloading spot.
- Ensure that the tank trailer brakes are set; the driver remains with the vehicle and observes the transfer lines during the entire unloading procedure.
- Place caution signs in the proximity of the tank trailer to give necessary warning to approaching vehicles and personnel. These signs must remain posted until after the tank trailer is unloaded and disconnected from the discharge connection.
- Ensure that no open flames of any kind are permitted within 100 feet of the tank trailer. Smoking is strictly forbidden within this area. Only spark-proof tools are to be used (see BMP 059).
- Limit performance of unloading operations only to reliable persons properly instructed and made responsible for careful compliance with applicable regulations (see BMP 031).
- Attach ground strap at the facility to bumper of tank trailer unless the transfer hose provides the proper ground, once the products in the tank and trailer and compartments have been

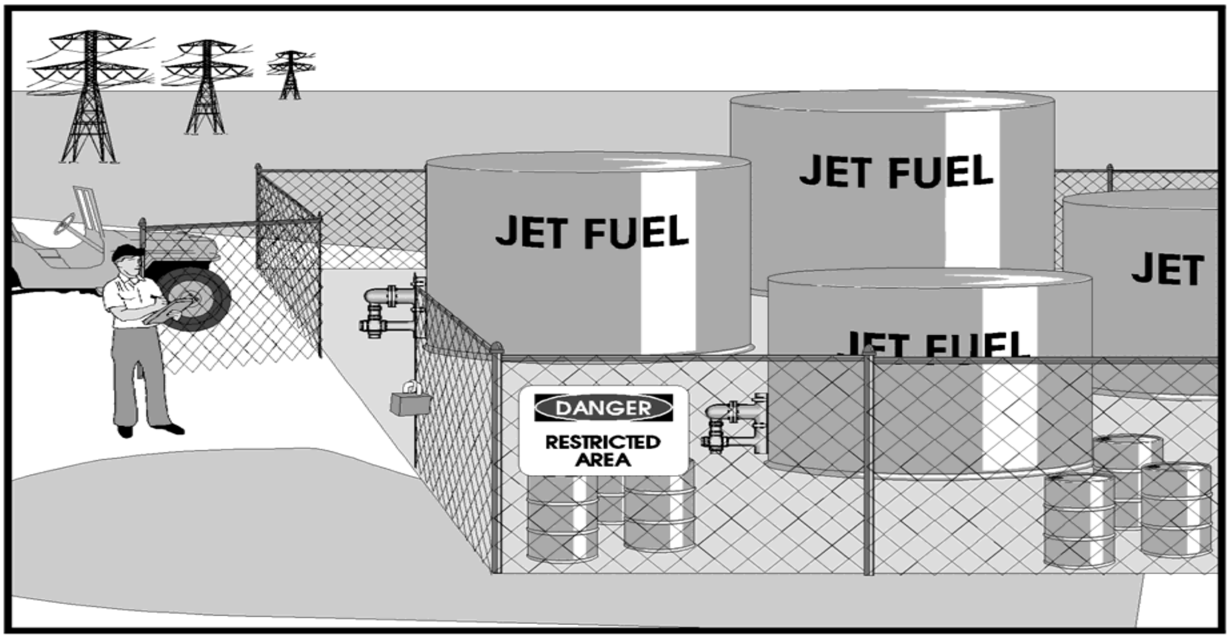
verified as being the same.

- Ensure that the facility storage tank is vented before connecting the unloading line unless unloading uses a vapor recovery system. Connect vapor recovery system(s) if applicable.
- Attach unloading line to the proper connection on the outlet leg of the tank truck.
- Open bottom outlet valve and proper valves in the unloading lines.
- Start product unloading, checking to ensure that there is no leakage at any of the connections. Should leakage appear, immediately stop the unloading process by closing the necessary outlet valves. The driver must continuously observe the connections to ensure that they are secure throughout the fluid transfer process.
- After liquid has been removed, close all valves, disconnect facility unloading from tank trailer, replace cap to outlet, and tighten all other closures.
- Gauge the tank after delivery to ensure that the product amount delivered agrees with the manifest or bill of lading. Be certain that any discrepancies noted at the time of delivery are noted on the manifest or bill of lading and are initialed by the driver.
- Remove all portable signs and release the tank trailer.

Effectiveness and Cost: Observing major fueling operations is a moderately effective, low-cost BMP.

Limitations: None

BMP 069 - RESTRICT ACCESS TO TANKS



Description of Potential Pollutant and Source: Improper use or vandalism of fuel tanks may result in discharge of fuel to the ground. This fuel may then be exposed to storm water and transported to the storm drain and/or receiving waters.

Description of BMP: Restrict access to fuel tanks and valves to properly trained personnel. The area can be restricted by a locked gate. This BMP is recommended for fuel tank farms.

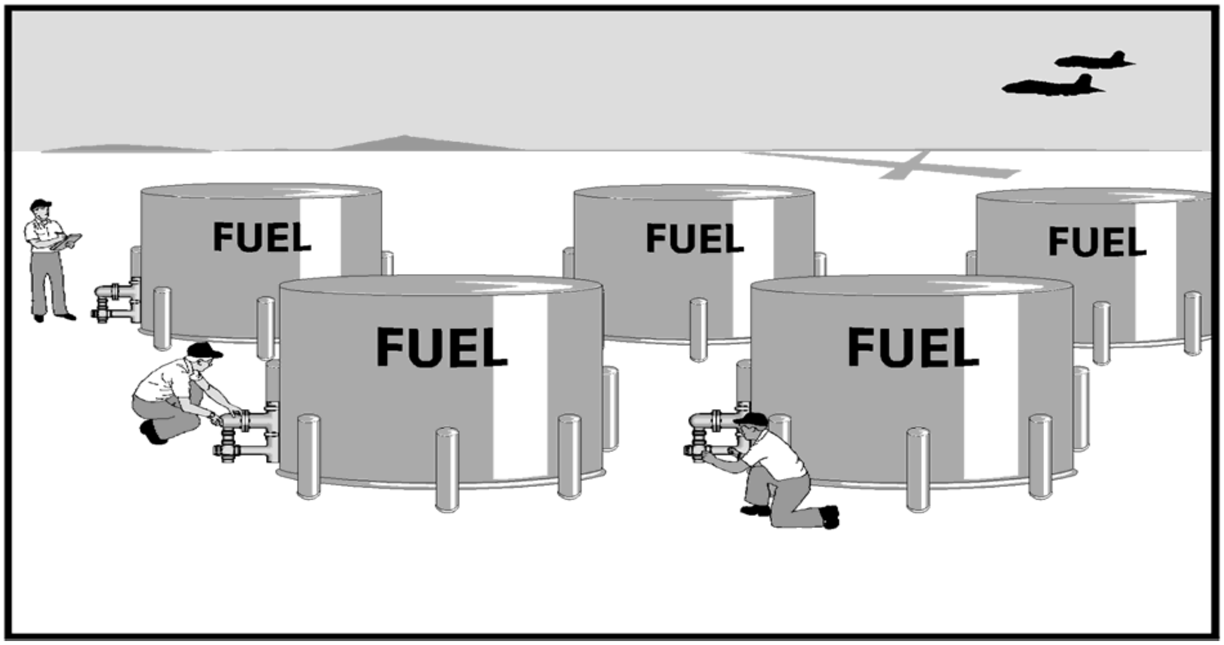
Application Guidance: Access to valves will be restricted at all times to properly trained personnel.

Training: Personnel who use fuel tanks will be trained in the proper operation of the system. Non-trained personnel who need fuel will be informed how to contact trained personnel for fuel dispensing.

Effectiveness and Cost: This is an effective, low-cost BMP.

Limitations: The placement of some tanks may make it difficult to restrict access them.

BMP 071- KEEP TANKS, PIPING, AND VALVES IN GOOD CONDITION



Description of Potential Pollutant and Source: Tanks, piping, and valves may leak fuel or other significant materials due to corrosion, loose fittings, poor welding, or improperly or poorly fitted gaskets. This can expose these materials to storm water, which can transport them to storm drains and/or receiving waters.

Description of BMP: Keep tanks, piping, and valves in good working condition. Tanks, piping, or valves which are leaking will be repaired or replaced.

Application Guidance: Tanks, piping, and valves will be inspected monthly and kept in good condition at all times. If applicable, preventive maintenance will be performed.

The frequency for implementing this BMP has been provided as general guidance. However, a facility operator may wish to establish a more suitable frequency. This will require SWPPP implementors to make judgements based on facility operations and conditions. To assign a frequency other than what has been suggested (i.e., more or less frequent), the following criteria will be considered and rated either High, Medium, or Low. If many of the criteria are assigned a High rating, the frequency may be increased. Similarly, if many criteria are assigned a Low rating, the frequency may be decreased. The goal of implementing this BMP is to minimize exposure of pollutants to storm water.

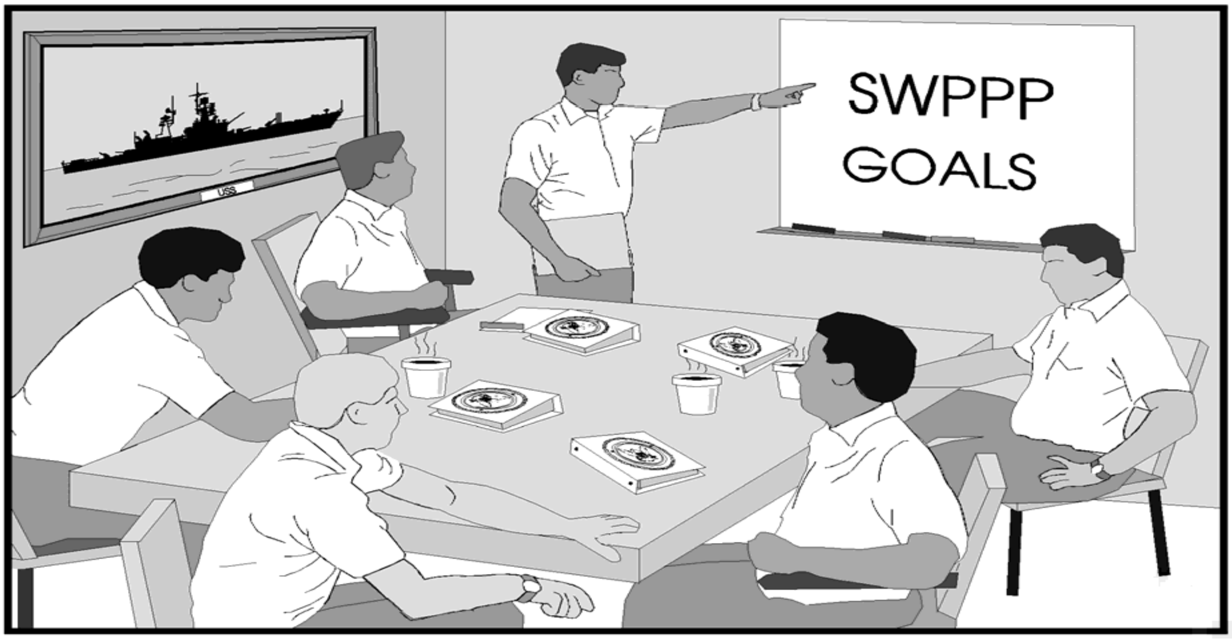
CRITERIA	Rating H=High M=Medium L=Low
Probability of exposure of significant materials to storm water	
Quantity of significant materials potentially exposed	
Toxicity of significant materials potentially exposed	
Frequency of use of tanks, piping, and valves	
Intensity of use of tanks, piping, and valves	
Old age or poor condition of tanks, piping, and valves	
Evidence of exposure (e.g., stains on ground surface)	
Proximity of source area to outfall or receiving water	
Sensitivity of receiving water to potentially exposed significant materials (e.g., waters with beneficial uses such as human contact, recreation, significant species habitat, etc.)	

<u>Training:</u> Personnel will be trained to regularly inspect for leaks or conditions that could lead to the discharge of chemicals, or storm water contact with waste materials. Personnel will be trained to routinely inspect equipment before each use. Tanks, piping, and valves which are not frequently used, will be inspected weekly. Procedures for notifying the appropriate maintenance personnel if a leak is found, will be established.

<u>Effectiveness and Cost:</u> Keeping tanks, piping, and valves in good condition is a highly effective BMP. The cost of repairing or replacing piping and valves is typically low. The cost of repairing or replacing tanks will vary based on the size of the tank and its present condition.

<u>Limitations:</u> None

BMP 113 - CONDUCT PERSONNEL TRAINING REGARDING THE SWPPP



Description of Potential Pollutant and Source: When properly trained, personnel are more capable of preventing spills, responding safely and effectively to an accident when it occurs, and recognizing situations that could lead to storm water contamination.

Description of BMP: Train personnel at all levels of responsibility in the components and goals of the SWPPP.

Application Guidance: Training will be conducted quarterly and at new personnel orientations.

Training: Training will address each component of the SWPPP, including how and why tasks are to be implemented. Topics will include:

- Good housekeeping
- Material management practices
- Spill prevention and response

Effectiveness and Cost: This is a highly effective, moderate-cost BMP.

Limitations: None

APPENDIX B

ROUTINE FACILITY INSPECTION CHECKLIST

Routine Facility Inspection Checklist

Activity Name: ____________________ **Date of Inspection:** ____________________

Inspector(s): ____________________ **Facility Name/Number:** ____________________

Column 1	Column 2	Column 3	Column 4	Column 5	
Source Area	BMP Number and Title	Status: F, P, N, NA[1]	Briefly Describe Effectiveness (Good or Other [describe])	Corrective Measures	
				What	By When

Note 1: F – Fully implemented, P – Partially implemented, N – Not implemented , NA – Not Applicable

APPENDIX C

QUARTERLY VISUAL ASSESSMENT CHECKLIST

Quarterly Visual Assessment Checklist

Facility ID and Location: ______________________

Date: ____________________

Sampler Name (Printed): ______________________________________

Signature: ____

Time of Rainfall Begin: _________________ Time of Rainfall End: ____________________

Time of Flow Begin: _________________ Time of Flow End: ____________________

Rainfall event more than 72 hours since last event? Rainfall Event Total: ____________________

Yes / No

Sample: sample in a clean, colorless glass or plastic container, and examined in a well-lit area

On samples collected within the first 30 minutes of an actual discharge from a storm event

Sample Characteristics:

Color: ____________________ Floating Solids: _____________________________

Odor: ____________________ Settled Solids: _____________________________

Clarity: ____________________ Suspended Solids: _____________________________

Oil Sheen: ____________________ Foam: _____________________________

Other Obvious Indicators of Storm Water Pollution

(describe): ____

Nature of the discharge (i.e., runoff):

Results of observations of the storm water discharge:

Probable sources of any observed storm water contamination:

If applicable, why it was not possible to take samples within the first 30 minutes:

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

APPENDIX D

CORRECTIVE ACTION LOG

Corrective Action Log

Use this form to document SWPPP corrective actions. This form is to be completed by the Environmental Compliance Coordinator (ECC) or a person designated by ECC and submitted to the MCBH Storm Water Program Manager. The Storm Water Program Manager is responsible for any notification to the State of Hawaii Department of Health (DOH), if required.

A corrective action is defined as an action taken to:

- **a) Repair, modify, or replace any storm water control used at the site;**
- **b) Clean up and properly dispose of spills, releases, or other deposits; or**
- **c) Remedy a permit violation.**

1. Corrective Action Triggers

The following events trigger a corrective action to be taken (this triggering condition is to be documented *within 24 hours* of discovering the occurrence):

- a) A required storm water control was never installed, was installed incorrectly, or is not in accordance with the requirements in the SWMP Plan.
- b) A member of the **Storm Water Pollution Control Team** becomes aware that the storm water controls installed and being maintained are not effective enough for the discharge to meet applicable water quality standards or applicable requirements in the MCBH SWMP Plan. The facility ECC shall notify the Storm Water Program Manager immediately. The Storm Water Program Manager will notify DOH *by the end of the next work day*.

1.1 Log Notifications:

Date/time Storm Water Program Manager notified by ECC: ________________________

Date/time DOH notified by Storm Water Program Manager: ________________________

1.2 Describe Discharge:

Indicate which one of the following prohibited discharges is occurring or has occurred:

- ❒ Wastewater from washout of concrete
- ❒ Wastewater from washout and cleanout of stucco, paint, form release oils, curing compounds, or other construction materials
- ❒ Fuels, oils, or other pollutants used in vehicle and equipment operation and maintenance
- ❒ Soaps, solvents, or detergents used in vehicle and equipment washing
- ❒ Toxic or hazardous substances from a spill or other release
- ❒ Other, Explain: ____

2. Requirements for Taking Corrective Actions

The ECC shall complete corrective actions in accordance with the deadlines specified below. In all circumstances, site personnel shall *immediately* take all reasonable steps to minimize or prevent the discharge of pollutants until a permanent solution is installed and made operational, including cleaning up any contaminated surfaces so that the material will not discharge in subsequent storm events. *Immediately* means the same day the condition is discovered, unless it is too late in the day, in which initiation of corrective action must begin on the following work day.

Following any of the above triggering events, the ECC shall install a new or modified control and make it operational, or complete the repair, by *no later than 7 calendar days from the time of discovery*. If it is not feasible to complete the installation or repair within 7 calendar days, the ECC shall document and submit to the Storm Water Program Manager, for their agreement, why it is not feasible to complete the installation or repair within the 7-calendar day timeframe and document a schedule for installing the storm water control and making it operational as soon as practicable after the 7-day timeframe.

If the issue is not adequately addressed within 7 calendar days or the agreed upon timeframe, enforcement procedures will be initiated. Unaddressed issues will be escalated through the chain of command. The MCBH Environmental Compliance and Protection Division Director will give the responsible party a formal notice with an appropriate deadline for action. If the problem remains unchanged, the situation will be brought to the attention of the next higher authority. The ultimate penalty for non-compliance of MS4 Permit regulations is eviction or discharge of the responsible party from MCBH. This is placed at the discretion of the Base Commander. See the Enforcement Response Plan in Appendix 3-6 of the SWMP Plan for further information on MCBH's enforcement policies.

3. Corrective Action Report

Within 24 hours of discovering the occurrence of one of the triggering conditions in SWPPP Section 4.1 at the site, the ECC must complete the following:

3.1 Describe the triggering condition:

____
____
____
____

3.2 Record the date/time of the condition identified. How was the condition identified?

____
____
____
____

3.3 Describe the corrective action taken:

____
____
____

Date/time installation or repair was completed:
(or date/time the prohibited discharge ceased) ____

Or describe why it is not feasible to complete installation or repair within 7 calendar days and detail a proposed schedule (if applicable)

____
____
____

4. Resolution of the Corrective Action Trigger

Within 7 calendar days of initiating the Corrective Action Report, the ECC must complete a report of the following:

4.1 Follow-up Actions

Describe any follow-up actions taken to review the design, installation, and maintenance of storm water controls, including the dates such actions occurred:

____
____
____

4.2 Storm Water Control Modifications

Provide a summary of storm water control modifications implemented. Include a schedule of activities required to implement changes and the date the modifications were completed or will be completed:

____
____
____

5. SWPPP Modification Due to Corrective Actions

Where corrective actions result in changes to any of the storm water controls or procedures documented in the SWPPP, modify the SWPPP accordingly *within 7 calendar days* of completing corrective action work.

Are modifications to the SWPPP necessary? ❑ Yes ❑ No

Date modifications to the SWPPP shall be completed _______________

6. Corrective Actions Required by DOH

The facility shall comply with any corrective actions required by DOH as a result of permit violations found during an inspection by DOH or the Environmental Protection Agency (EPA).

Was the Corrective Action triggered by a DOH/EPA inspection?

❑ Yes ❑ No

❑ Date of DOH/EPA Inspection __________________

7. Additional Comments:

____
____

Final

STORM WATER POLLUTION PREVENTION PLAN

Storm Water Management Program Plan

Marine Corps Base Hawaii, Oahu, Hawaii

NPDES Permit No. HI S000007

LAB/BOAT SHOP (BUILDING 6801 / 6802)

Prepared by:

Marine Corps Base Hawaii

August 2022

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List of Acronyms and Abbreviations

AST	Aboveground Storage Tank
BMP	Best Management Practice
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CMU	Concrete Masonry Unit
CWA	Clean Water Act
CWB	Clean Water Branch
DOH	State of Hawaii Department of Health
ECC	Environmental Compliance Coordinator
ECE	Environmental Compliance Evaluation
ECPD	Environmental Compliance and Protection Division
EPA	United States Environmental Protection Agency
HAZMAT	Hazardous Material
HAZMIN	Hazardous Material Minimization
HEPA	High-Efficiency Particulate Air
MCBH	Marine Corps Base Hawaii
MS4	Municipal Separate Storm Sewer System
MS4 Permit	Marine Corps Base Hawaii's NPDES Permit No. HI S000007
NPDES	National Pollutant Discharge Elimination System
POC	Point of Contact
SAS	Satellite Accumulation Site
SWMP	Storm Water Management Program
SWPPP	Storm Water Pollution Prevention Plan

Certification Statement

MCBH is committed to the prevention of discharges of polluted stormwater to navigable waters or the environment and maintains the highest standards for best management practices through periodic review, updating, and implementation of this Stormwater Pollution Prevention Plan (SWPPP).

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information contained therein. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Name: ______________________ Title: ______________________

Signature: ______________________ Date: ______________________

Management Review

Refer to Section 1.2 for more information on required SWPPP updates.

Review Dates	Signature	Amendment Required? (Y/N)
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1 Introduction

As part of Federal regulations administered through the Clean Water Act (CWA), the State of Hawaii, Department of Health (DOH) has issued the National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4) Permit No. HI S000007 (referred to herein at the "MS4 Permit") to Marine Corps Base Hawaii (MCBH). The MS4 Permit requires that MCBH provide all existing industrial facilities, identified in MCBH's MS4 Permit application, and any newly identified industrial facilities, submitted to DOH using the "MS4 NPDES Individual Permit – Industrial Storm Water Discharge Notification Form," with a Storm Water Pollution Prevention Plan (SWPPP) for storm water associated with industrial activities.

The purpose of the regulations is to protect water quality by reducing the amount of pollutants in storm water runoff caused by industrial activities.

1.1 SWPPP Implementation

The storm water management controls of this plan will become MCBH procedure for the applicable industrial facility. An up-to-date copy of the SWPPP shall be maintained on site and at the MCBH Environmental Compliance and Protection Division (ECPD). Management staff, maintenance personnel, contractor staff, and other personnel involved in onsite industrial activities, will be knowledgeable of the plan and follow the guidelines set forth in it, in addition to any other pertinent base-wide, state and federal regulations.

Day-to-day implementation of the SWPPP is primarily the responsibility of the current facility Environmental Compliance Coordinator (ECC) or Point of Contact (POC) as identified in Table 2-1. Enforcement of the permit conditions and this SWPPP are ultimately the responsibility of ECPD and additional escalating levels of authority as specified in the Enforcement Response Plan developed by MCBH for its base-wide Storm Water Management Program (SWMP) Plan.

1.2 Updating the SWPPP

This SWPPP will be reviewed as needed to identify necessary changes, at a minimum of every five years. Updates may be required due to current best management practice (BMP) failures, spill events, changes in industrial activities, changes in features, corrective actions, or other necessary changes. Personnel changes to the Storm Water Pollution Control Team (Section 2.1) should be logged in Table 2-1. Storm Water Pollution Control Team Log. ECPD will be responsible for approving revisions to the SWPPP. In the event the plan is modified, a copy of the updated SWPPP will remain at ECPD and will be provided to the applicable facility. Additionally, ECPD shall document and report the SWPPP changes to the DOH, Clean Water Branch (CWB), within thirty days of when the changes arise.

2 Lab/Boat Shop, Building 6802

The Lab/Boat Shop, Building 6801 / 6802, is located near the western end of Sumner Road. The facility encompasses approximately 3.2 acres and can be found in grid [redacted] of the MCBH Base Map, see Figure 4-1. The facility-specific map is shown on Figure 4-2.

2.1 Storm Water Pollution Control Team

The Storm Water Pollution Control Team consists of the Storm Water Program Manager, ECC, and the Hazardous Material (HAZMAT) and Hazardous Material Minimization (HAZMIN) team. The Storm Water Program Manager is responsible for the enforcement of the MS4 permit at all industrial sites and provides annual training to the ECC and other personnel. The ECC is the primary unit POC for storm water related items and the day-to-day environmental matters at a specific facility. ECC's are responsible for SWPPP implementation including BMP and facility inspections, storm water assessments/sampling, BMP maintenance, and corrective actions. The HAZMAT and HAZMIN team shall be contacted if assistance is needed. The role, name, phone number, and start date of individuals on the Storm Water Pollution Control Team is recorded in Table 2-1 below. In the event of personnel turnover, Table 2-1 shall be updated accordingly.

TABLE 2-1. STORM WATER POLLUTION CONTROL TEAM LOG

Role	Name	Phone	Start Date
MCBH Storm Water Program Manager	CIV Whitney Anderson	Office: 808-257-4359	6/6/22
ECC/Spill Response Coordinator	CIV David A. Carter	Office: 808-349-7300	8/1/21
HAZMAT/HAZMIN	CIV Tim Cawthon	HAZMAT Center Building 6409 Office: 808-257-9913 HAZMIN Center Building 6407 Office: 808-257-0770	N/A

2.2 Lab/Boat Shop, Building 6802 Facility Activities

The Lab/Boat Shop is classified as an industrial facility under United States Environmental Protection Agency (EPA) industrial sector Q – Water Transportation. The Lab/Boat compound, which is enclosed in chain-linked fencing, consists of three main buildings (Buildings 6801, 6802, and 1623) and ancillary structures, including Buildings 1620 and Tank 1203. This facility houses the Waterfront Operations, responsible for security and spill response at MCBH.

Building 6801 serves as the Waterfront Operations Administration Building and does not contain any significant materials. The Boat Shop, Building 6802, is located at the northeast corner of the compound and has eight large bays. Boat parking, repair, welding, painting, battery charging, woodworking, and vessel maintenance activities take place inside the building. A hazardous materials storage room at the northeast corner of Building 6802 contains seven flammable lockers with various contents. A parts washer, additional hazardous materials lockers, and spill kits are also stored in Building 6802. Used rags are stored in cans and used oil is stored in 55-gallon drums on spill containment pallets inside the building. Drip pans are used under leaking equipment.

Boats and trailers are parked outside on the concrete pavement to the south of the building. A concrete pad is located adjacent to Building 6802 to the east with a hazardous materials containment locker that functions as a satellite accumulation site (SAS). Used materials, such as drums of used oil and fuel, are stored in the left compartment of the hazmat locker. New materials, such as oil and paint are stored other side of hazmat locker. Several shipping containers with floating containment booms are stored next to the hazmat locker.

Across the compound to the south is Building 1623, which serves as storage for Waterfront Operations. Equipment and dry materials, such as piping, racks, and wood are stored here. The building is designed as a containment facility with concrete curb berms on all sides. At the time of inspection, outboard boat motors were stored/repaired in building 1623.

To the southwest of the compound is Building 1620 (gym) and boat ramp. Between the building and boat ramp is a concrete-paved Boat Rinse Facility and [redacted]-gallon gasoline aboveground storage tank (AST) equipped with a dispensing pump (Tank 1203). Boats on trailers are also rinsed at various locations at the facility using hoses. Boats are rinsed with fresh water (no detergents). The AST is used to fuel small boats. The concrete access driveway to the boat rinse facility has concrete curbs on all sides, with roll-over curbs for vehicle access. Personal floatation devices (PFDs) and other boat-related items are stored in a metal shed (Building 5006) south of the volleyball court.

Storm water collected in the boat rinse containment area is released to the ground after visual inspection, through a manually operated valve near the southeast corner of the pad. The valve is kept in the closed position until visual inspection is complete. The majority of storm water at the facility is collected by a trench drain which discharges to Kaneohe Bay at the adjacent MCBH Outfall 027. The designated storm water sample location (Outfall 01) is located at the eastern end of this trench drain near Building 1623 (Figure 4-2). Storm water falling on the rest of the facility either infiltrates into the grassy areas and infiltration trenches or discharges as sheet flow to Kaneohe Bay. Sheet flow discharging near the Boat Ramp is considered a substantially similar outfall (Outfall 02).

2.1 Sources of Pollutants

The following is an inventory of potential pollutants associated with Lab/Boat Shop, Building 6802:

A. Material Loading and Unloading Areas

Materials that are spilled, leaked, or lost during loading or unloading may collect on vegetated or paved surfaces and be carried away by storm runoff. Loading and unloading of significant materials is conducted at the entrance of Building 6802 and at the gasoline AST.

B. On-Site Material Storage and Disposal Practices

Leaks, drips, or spills of materials that are stored or disposed of in areas exposed to rainfall can be carried away by storm water. Significant materials associated with boat repairs are stored inside hazardous materials lockers and wastes are stored on spill containment pallets within Building 6802. The gasoline AST is located near Building 1620.

C. Outdoor Activities

Many outdoor activities at MCBH, Kaneohe Bay use materials or create wastes that have the potential to pollute storm water runoff. Outdoor activities at the Boat Shop include boat rinsing (with fresh water only and no detergent), maintenance, parking, and fueling. Boat rinsing, with fresh water only and no detergent, is considered an allowable occasional incidental non-storm water discharge for this facility. Any boat rinsing activities using engine wash or detergents with be conducted in the concrete, bermed Boat Rinse Facility, with discharge released to the adjacent grass area after passing a visual inspection.

Significant Materials Inventory

The following significant materials are located at the Lab/Boat Shop:

- Gasoline
- Fuel Conditioner
- Paint
- Paint Thinner
- Hydraulic Fluid
- Brake Fluid
- Grease
- Lube Oil
- Air Tool Oil
- Adhesive
- Used Oil
- Engine Wash (“Salt Away”)

2.2 Potential Storm Water Pollutants

The following pollutants have been identified as having a reasonable potential to be present in storm water discharges from the Lab/Boat Shop if not properly managed:

- Gasoline

Materials that have *not* been included as a potential storm water pollutant but have been included as part of the significant materials inventory list, are considered to present a negligible risk to storm water quality. This is based on the nature/location of the primary activities performed with these materials and the

BMPs that are in place. Material transport (loading/unloading) is not considered to be a significant threat to storm water, due to spill response procedures, training, and spill kit materials available onsite.

2.3 Best Management Practices (BMPs)

Best Management Practices (BMPs) are techniques or methods that aim to manage the quantity and improve the quality of storm water runoff from a facility or other site. Storm water BMPs intend to reduce or eliminate pollution and contaminants collected by runoff before the runoff reaches the MCBH storm water system or sensitive ecosystems such as streams, wetlands, and marine environments. The following is a summary of BMPs currently in place at the Lab/Boat Shop, Building 6802.

A. Good Housekeeping Practices

In general, Lab/Boat Shop, Building 6802 employs good housekeeping practices throughout its operations. Good housekeeping practices for Lab/Boat Shop, Building 6802 are included in Table 2-2. Regular sweeping is conducted at Building 6802.

B. Preventative Maintenance

Preventive maintenance is important as water pollution control measures may be of little or no use if devices and equipment have not been properly maintained. Facility personnel conduct inspection of facility equipment and storage systems that are exposed to storm water on a regular basis. Inspections of the SAS are conducted on a weekly basis, with monthly inspection reports submitted to ECPD. Boats are inspected daily during an informal equipment check as well.

C. Visual Inspections

Visual inspection provides a valuable subjective assessment of the status of storm water management systems. They are easily performed and allow the opportunity for corrective action, if necessary. Site inspections and documentation requirements are addressed in in Section 3 of this SWPPP. MCBH HAZMIN Center staff perform hazardous material inspections monthly. Annual facility inspections are performed by EPCD as part of the MCBH Environmental Compliance Evaluation (ECE).

D. Spill Prevention and Response

Areas where significant material spill or leakage can occur are identified in Section 2.1 and shown on Figure 4-2. The storm water systems and their accompanying drainage points are also shown on Figure 4-2. Refer to Table 2-2 for BMPs related to spill preventative measures for material handling procedures, storage requirements, and equipment usage.

In the event of a hazardous substance or oil spill, the ECC and ECPD shall be notified immediately (ECPD; 808-630-8246). If the spill cannot be easily addressed using an onsite spill kit and personal protective equipment, call Fed Fire (Military 911). The spill source should be immediately controlled if it is safe to do so by closing valves, switches, and/or turning off power to a device. Then, contain the spill by using sorbent socks or absorbent materials found in a spill kit. After it has been contained, clean up the spilled material in a safe manner using dry methods. All materials should then be properly disposed of.

The locations of spill kits are shown in Figure 4-2.

E. Erosion and Sediment Controls

No areas of the facility were found to have exposed dirt or other sediment that could be a source of pollution. All surfaces are paved, well vegetated, or covered in gravel (Figure 4-2).

F. Best Management Practices to Minimize Pollutant Contact with Storm Water

Facility personnel receive annual training from ECPD at minimum, as well as an initial training for all new personnel. Training information will include the BMPs that have been developed for the facility and a general overview of the storm water program and its objectives.

Existing BMPs at the Lab/Boat Shop are shown in Table 2-2 and attached as fact sheets to this SWPPP in Appendix A.

TABLE 2-2. BEST MANAGEMENT PRACTICES

BMP No.	BMP Title	Description
001	Label All Drums, Cans, Containers, Tanks, and Valves	All containers, drums, and the AST are labeled.
003	Perform Regular Cleaning	Regular sweeping is conducted at Building 6802.
004	Avoid Hosing Down the Site	Sweeping with a push broom is performed as needed.
006	Control Spills	Any spill of significant materials is controlled immediately to prevent pollutant from being transported to receiving water. A spill kit is stored onsite.
007	Place Trash Receptacles at Appropriate Locations	Covered trash bins are located throughout the facility
012	Construct Berm or Dike around Critical Areas	The concrete access driveway to the boat rinse facility/AST fuel dispensing area has concrete curbs on all sides, with roll-over curbs for vehicle access.
016	Store Waste and Recycling Materials in Proper Containers	Waste and recycling containers are located Waste containers will be emptied regularly. Dumpsters should all have lids; lids should be kept closed when not in use.
032	Dispose of Obsolete Equipment, Inoperable Vehicles, and Surplus Materials	Dispose of hazardous waste materials, unused, derelict boating equipment, and various scrap metal in the boneyard. Any metals that cannot be discarded, will be

BMP No.	BMP Title	Description
		stored in a bin off of the ground to prevent contact with storm water.
033	Check Vehicles and Equipment for Leaks	Vehicles and equipment are checked for leaks on a regular basis.
037	Park Vehicles on an Impervious Surface	Boats and trailers are parked on the concrete floor inside Building 6802 and outside on the concrete pavement to the south of the building.
041	Wash Equipment and Vehicles in Designated Area	Boats are washed at the designated boat rinse facility and at other locations on the asphalt lot only with fresh water (no detergents).
061B	Store Liquids and Significant Materials within a Building or Covered Area	All significant material containers, including used rag containers, are located within a covered area (in Building 6802) and the HAZMAT locker to the east.
072	Protect Tanks from Being Damaged by Vehicles	Bollards are erected in front of the gasoline AST to protect it from being damaged by vehicles.
113	Conduct Personnel Training Regarding the SWPPP	Personnel are trained regularly (initial orientation and annual refresher).

3 Inspections, Assessments and Monitoring

3.1 Routine Quarterly Site Inspections

The MS4 Permit requires a routine quarterly site inspection by a qualified person with at least one member of the storm water pollution control team participating. At least once each calendar year, the routine inspection must be conducted during a period when a storm water discharge is occurring. The site inspection is an overall evaluation of the effectiveness of the BMPs implemented at that facility. A Routine Facility Inspection Checklist (Appendix B) shall be completed during each routine site inspection and kept onsite with this SWPPP. During normal facility operating hours, inspections must be conducted of areas of the facility including, but not limited to, the following:

- Areas where industrial materials or activities are exposed to storm water;
- Areas identified in the SWPPP and those that are potential pollutant sources;
- Areas where spills and leaks have occurred in the past three years;
- Discharge points; and
- Control measures used to comply with the effluent limits contained in this permit.

3.2 Visual Assessment of Storm Water Discharges

A Quarterly Visual Assessment of storm water discharge is required for all industrial facilities at MCBH. Storm water samples for this visual assessment but must be collected in such a manner that the samples are representative of the storm water discharge from the facility. Therefore, the water sample must be collected at the designated storm water monitoring point (Outfall 01) as shown in Figure 4-2. The Quarterly Visual Assessment checklist (Appendix C) shall be completed by the current facility ECC and kept onsite with this SWPPP.

The visual assessment must be made:

- Of a sample collected in a clean, colorless glass or plastic container, and examined in a well-lit area;
- On samples collected within the first 30 minutes of an actual discharge from a storm event. If it is not possible to collect the sample within the first 30 minutes of discharge, the sample must be collected as soon as practicable after the first 30 minutes and documented why it was not possible to take the sample within the first 30 minutes; and
- For storm events, on discharges that occur at least 72 hours (three days) from the previous discharge.

Whenever the visual assessment shows evidence of storm water pollution, corrective action procedures to remedy the pollutants must be taken and documented. Refer to Section 4 for corrective action procedures.

3.3 Storm Water Monitoring – Quarterly Benchmark Sampling

The Lab/Boat Shop, Building 6802 is considered to be under industrial activity sector Q- Water Transportation, and thus is required to perform Quarterly Benchmark Sampling. Benchmark monitoring data are primarily for MCBH's use to determine the overall effectiveness of control measures and to assist in determining when additional corrective action(s) may be necessary. A benchmark exceedance is not a permit violation, however, if corrective action is required as a result of a benchmark exceedance, failure to conduct required corrective action is a permit violation.

Quarterly Benchmark Sampling of storm water discharge from the representative sampling location at the Lab/Boat Shop (Figure 4-2) will be monitored in accordance with Table 3-1. Benchmark samples can be collected during the same storm event as the Quarterly Visual Assessment as described in Section 3.2.

TABLE 3-1. LAB/BOAT SHOP QUARTERLY BENCHMARK MONITORING REQUIREMENTS

Parameter	Units	Daily Maximum
Aluminum Total Recoverable	mg/L	0.75
Iron Total Recoverable	mg/L	1
Lead Total Recoverable	mg/L	0.21
Zinc Total Recoverable	mg/L	0.09

Data not exceeding benchmarks: After collection of four quarterly samples, if the average of the four monitoring values for any parameter does not exceed the benchmark, MCBH has fulfilled monitoring requirements for that parameter for the permit term.

Data exceeding benchmarks: After collection of four quarterly samples, if the average of the four monitoring values for any parameter exceeds the benchmark, review the selection, design, installation, and implementation of control measures to determine if modifications are necessary to meet the effluent limits in this permit, and either:

- Make the necessary modifications and continue quarterly monitoring until four additional quarters of monitoring are completed for which the average does not exceed the benchmark; or
- Make a determination that no further pollutant reductions are technologically available and economically practicable and achievable in light of best industry practice to meet the technology-based effluent limits or are necessary to meet the water-quality-based effluent limitations, in which case monitoring must continue once per year. Furthermore, documentation of the rationale for concluding that no further pollutant reductions are achievable must be completed and all records related to this documentation shall be retained with the site SWPPP.

Control measures must be reviewed, and any required corrective action performed immediately (or document why no corrective action is required), without waiting for the full four quarters of monitoring data, when an exceedance of the four-quarter average is mathematically certain. If after modifying control measures and conducting four additional quarters of monitoring, the average still exceeds the benchmark (or if an exceedance of the benchmark by the four-quarter average is mathematically certain prior to conducting the full four additional quarters of monitoring), review of control measures must be conducted and take one of the two actions above.

Natural background pollutant levels: Following the first four quarters of benchmark monitoring (or sooner if the exceedance is triggered by less than four quarters of data; see above), if the average concentration of a pollutant exceeds a benchmark value, and a determination has been made that exceedance of the benchmark is attributable solely to the presence of that pollutant in the natural background, MCBH is not required to perform corrective action or additional benchmark monitoring provided that:

- The average concentration of your benchmark monitoring results is less than or equal to the concentration of that pollutant in the natural background; and
- Supporting documentation is produced with rationale for concluding that benchmark exceedances are in fact attributable solely to natural background pollutant levels. The supporting rationale must include any data previously collected (including literature studies) that describe the levels of natural background pollutants in the storm water discharge. Natural background pollutants are those substances that are naturally occurring in soils or ground water. Natural background pollutants do not include legacy pollutants from earlier activity on the site, or pollutants in run-on from neighboring sources which are not naturally occurring, such as other industrial sites or roadways. However, the DOH may determine that MCBH is eligible to discontinue monitoring for pollutants that occur solely from run-on sources.

3.3.1 Benchmark Sampling Methods and Protocol

A minimum of one grab sample shall be collected from a discharge resulting from a measurable storm event. Samples must be collected within the first 30 minutes of a discharge associated with a measurable storm event. If it is not possible to collect the sample within the first 30 minutes of a measurable storm event, the sample must be collected as soon as practicable after the first 30 minutes and documentation must be kept with the SWPPP explaining why it was not possible to take samples within the first 30 minutes.

When adverse weather conditions prevent the collection of samples according to the relevant monitoring schedule, a substitute sample must be taken during the next qualifying storm event. Adverse weather does not exempt filing a benchmark monitoring report in accordance with the sampling schedule. NetDMR shall be used to report any failure to monitor using a “no data” or “NODI” code during the regular reporting period.

Monitoring requirements in this permit begin in the first full quarter following either 90 days after permit issuance or the date of discharge authorization, whichever date comes later. If the monitoring is required on a quarterly basis (e.g., benchmark monitoring), monitoring must occur at least once in each of the following 3-month intervals:

- January 1 – March 31;
- April 1 – June 30;
- July 1 – September 30;
- October 1 – December 31.

3.3.2 Storm Event Selection Criteria

MCBH’s MS4 Permit No. HI S000007 requires dischargers to collect and analyze grab and composite samples by manual or automatic monitoring methods, from a measurable storm event. The permit states that a measurable storm event is defined as *a storm event that produces actual discharge from your site and that occurs at least 72 hours after any previous measurable events.*

Samples may be collected using automatic sampling devices or manually. For manual sampling, the sample bottles will be filled directly from the discharge flow, by using a peristaltic pump, or by other appropriate sample collection device.

Table 3-2 lists the specific pollutants that are required to be tested. It is important that samples be submitted by the ECC to an appropriate laboratory in specific containers and within a specific amount of time in order to achieve compliance with regulations. Specific analytical parameters and their associated sampling methods, such as container type, sample holding time and required analytical methodology, are listed below in Table 3-2.

TABLE 3-2. QUALITY ASSURANCE / QUALITY CONTROL OBJECTIVES

Parameter Name	Analytical Method	Units	Methodology	Maximum Holding Time	Preservation	Container Type/ Size
Metals	EPA 200.7, 200.8	µg/L	ICP	6 months	pH<2, HNO_3	500 mL plastic

4 Corrective Actions

A corrective action is defined as any action taken, or required to be taken, to (1) repair, modify, or replace any stormwater control used at the site; (2) clean up and dispose of spills, releases, or other deposits found on the site; and (3) remedy a permit violation. Corrective actions should be documented using the Corrective Action Log (Appendix D).

4.1 Immediate Actions

If corrective action is needed, you must immediately take all reasonable steps necessary to minimize or prevent the discharge of pollutants until a permanent solution is installed and made operational, including cleaning up any contaminated surfaces so that the material will not discharge in subsequent storm events. Note: In this context, the term "immediately" requires you to, on the same day a condition requiring corrective action is found, take all reasonable steps to minimize or prevent the discharge of pollutants until a permanent solution is installed and made operational. However, if a problem is identified at a time in the workday when it is too late to initiate corrective action, the initiation of corrective action must begin no later than the following workday. "All reasonable steps" means that the permittee has undertaken initial actions to assess and address the condition causing the corrective action, including, for example, cleaning up any exposed materials that may be discharged in a storm event (e.g., through sweeping, vacuuming) or making arrangements (i.e., scheduling) for a new BMP to be installed at a later date.

4.2 Escalating Actions

If additional actions are necessary beyond those implemented or if the conditions continue to occur, additional corrective actions (e.g., install a new or modified control and make it operational, complete the

repair) must be completed before the next storm event if possible, and within 14 calendar days from the time of discovery of the corrective action condition. If it is infeasible to complete the corrective action within 14 calendar days, document why it is infeasible to complete the corrective action within the 14-day timeframe and identify a schedule for completing the work, which must be done as soon as practicable after the 14-day timeframe but no longer than 45 days after discovery. If the completion of corrective action will exceed the 45-day timeframe, the minimum additional time necessary to complete the corrective action can be taken, provided that MCBH ECPD and DOH is notified of your intention to exceed 45 days. Where your corrective actions result in changes to any of the controls or procedures documented in your SWPPP, you must modify your SWPPP accordingly within 14 calendar days of completing corrective action work.

4.3 Record of Past Spills or Leaks of Hazardous Pollutants

Table 4-1 is used to record significant spills and leaks that have occur or have occurred within three years prior to the preparation or amendment of this SWPPP. Significant spills and leaks include, but are not limited to, releases of oil or hazardous substances in excess of quantities that are reportable under CWA Section 311 (see 40 CFR 110.6 and 40 CFR 117.21) or Section 102 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 USC §9602.

At the time of this SWPPP update, there have been no past spill or leak incidents reported for the Lab/Boat Shop.

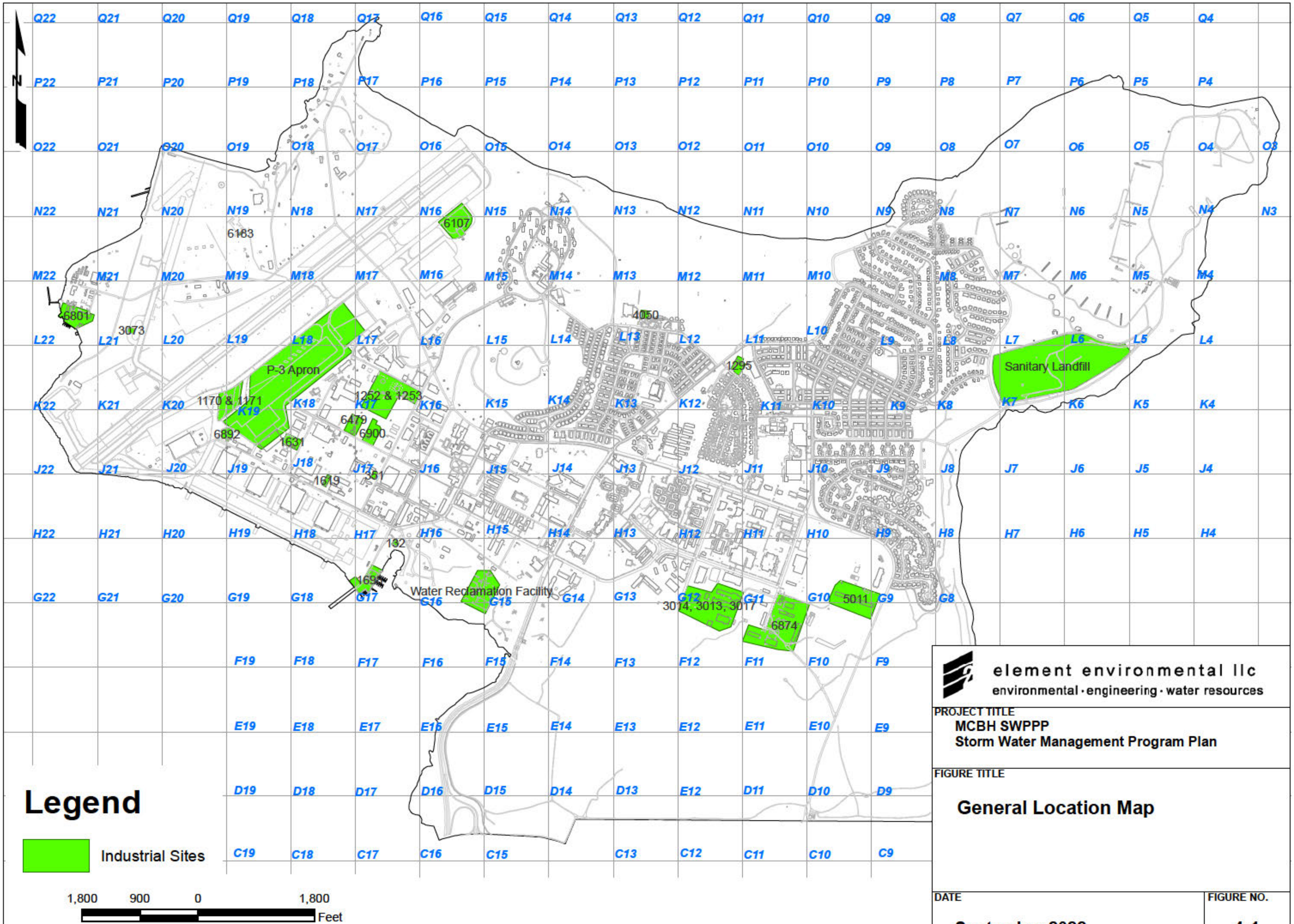
TABLE 4-1. PAST SPILLS OR LEAKS OF HAZARDOUS POLLUTANTS

Date of Incident	Brief Summary of Incident (POC Active at Time of Incident, Pollutant Type, Estimated Quantity, Location of Spill)

4.4 Record of Unauthorized Non-Storm Water Discharges

TABLE 4-2. UNAUTHORIZED NON-STORM WATER DISCHARGE EVALUATION

Date of Evaluation	Brief Summary of Evaluation (Description of the evaluation criteria, outfalls or onsite drainage points that were directly observed, action(s) taken, such as a list of control measures used to eliminate unauthorized discharge)



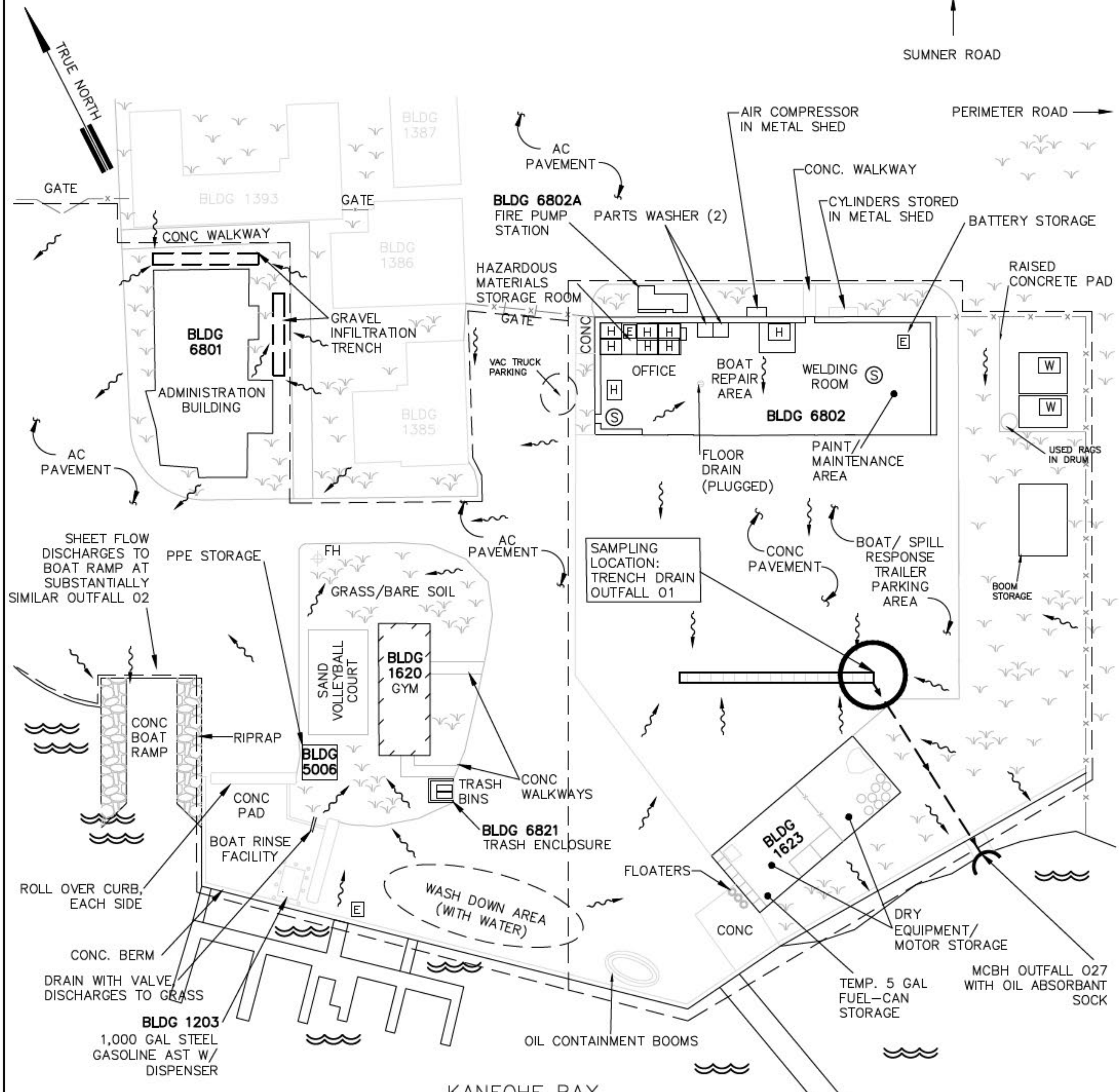
element environmental llc
environmental · engineering · water resources

PROJECT TITLE
MCBH SWPPP
Storm Water Management Program Plan

FIGURE TITLE
General Location Map

DATE
September 2022

FIGURE NO.
4-1



LEGEND

H HAZARDOUS MATERIALS LOCKER

W WASTE ACCUMULATION SITE

E EYE WASH STATION

S SPILL KIT

— — STORM WATER CONFLUENCE

STORM DRAIN INLET

FLOW ARROW

— — — DISCHARGE AREA BOUNDARY

NOTES:

1. STORM WATER, FROM APPROXIMATELY 3.2 ACRES ASSOCIATED WITH BUILDING 6801/6802 IS DISCHARGED TO KANEOHE BAY VIA MCBH OUTFALL 027 AND SHEET FLOW.
2. NOT TO SCALE

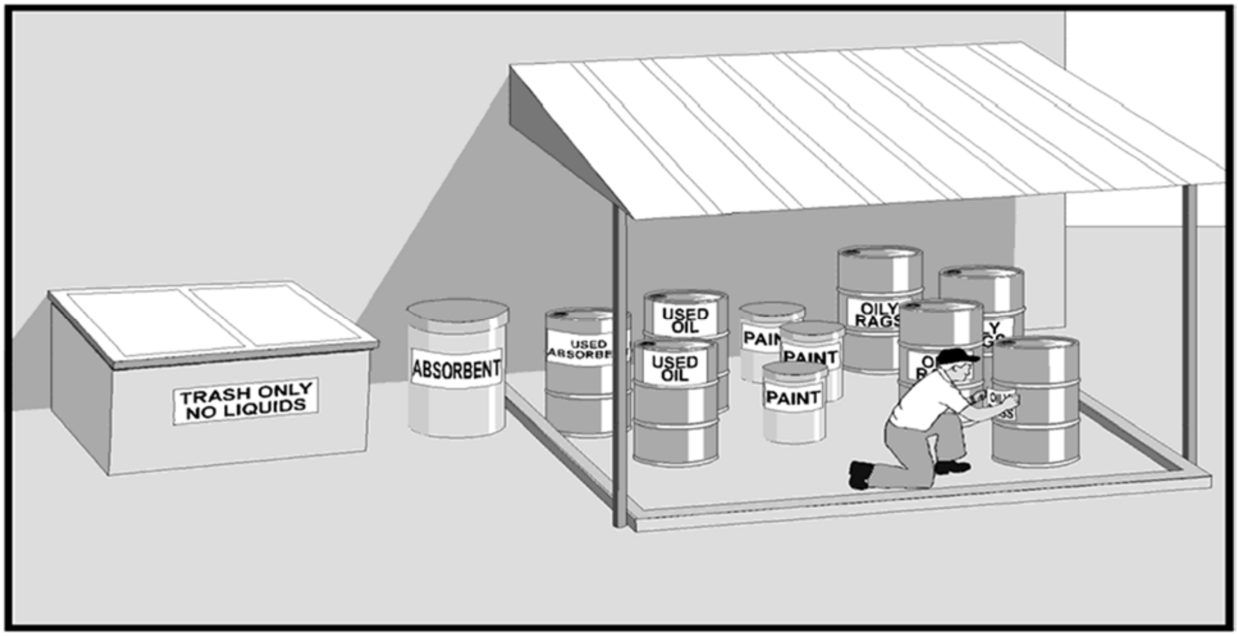
DATE:	PROJECT TITLE:	
JULY 2022	STORM WATER POLLUTION PREVENTION PLAN MCBH, KANEOHE BAY, OAHU, HAWAII	
FIGURE TITLE: LAB/BOAT SHOP (BUILDING 6801)		FIGURE NO.: 4-2

DAMATO
8/1/2022 10:40:33 AM
FIG 4-2 Bldg 6801,6802 – Lab_Boat Shop.dwg

APPENDIX A

SELECTED BMP FACT SHEETS

BMP 001 - LABEL ALL DRUMS, CANS, CONTAINERS, AND TANKS



<u>Description of Potential Pollutant and Source</u>: Drums, cans, and containers can be improperly managed and disposed of due to uncertainty of the container's contents. Tanks which are not labeled may result in improper use of the tank or fuel, which may result in the exposure of significant materials to storm water and/or receiving waters. Similarly, unlabeled valves may be opened without proper precaution due to lack of user information. Storm water quality will be affected if significant materials are improperly disposed to the storm drain and/or receiving waters. Lack of labeling will also make it difficult to quickly identify the type of material released so facility personnel can respond correctly. Labels also identify hazardous materials at the facility and are a good way to request caution in certain areas (e.g., drums indicating flammability).

<u>Description of BMP:</u> Label all drums, valves, pumps, cans, tanks, and containers to reduce the chance of misuse and eventual spills. Labeling ensures that the appropriate procedures, equipment, and storage containers are used. All containers will be labeled as to what is in them.

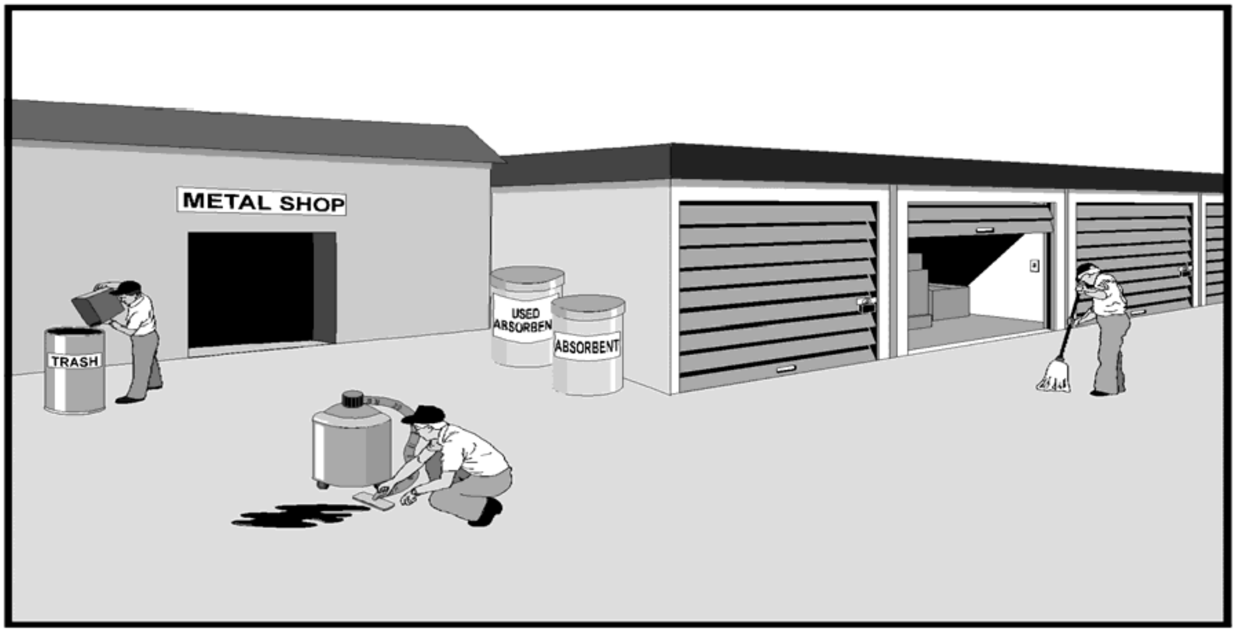
<u>Application Guidance:</u> As needed.

<u>Training:</u> N/A

<u>Effectiveness and Cost:</u> Effectiveness and costs will vary depending on the application.

<u>Limitations:</u> None

BMP 003 - PERFORM REGULAR CLEANING



Description of Potential Pollutant and Source: Dirt, surplus materials, and spilled or dropped materials are often allowed to accumulate in areas such as maintenance shops, manufacturing facilities, metal fabrication shops, loading docks, and storage areas. Pollutants from the accumulated material can be transported by storm water to the storm drain system. A clean and orderly work area reduces the possibility of accidental spills caused by mishandling of chemicals and equipment and should reduce safety hazards to personnel.

Description of BMP: Maintain a regular general sweeping and cleaning schedule to reduce buildup of waste materials and minimizes the amount of significant materials exposed to storm water. General cleaning includes dusting and keeping work areas neat and organized.

Floors and ground surfaces will be kept dry using brooms, shovels, vacuum cleaners, or cleaning machines. It is important to perform dry sweeping and dry cleaning (as opposed to hosing down areas as discussed in BMP 004). Garbage and waste materials will be collected and disposed regularly. Particular emphases will be placed on sweeping and cleaning outdoor areas as close as possible to a forecasted rainfall. Any granular absorbent materials used for spill cleanup will be removed and properly disposed before a rainfall.

Application Guidance: Cleanup and sweeping will be performed daily and more often as necessary to remove all loose trash, paint cans, discarded construction materials, sediment, oil, solvents, plastics and other significant materials. Additional clean up and sweeping will be performed before anticipated storm events. Additionally, a regular sweeping schedule will be maintained.

The frequency for implementing this BMP has been provided as general guidance. However, a facility operator may wish to establish a more suitable frequency. This will require SWPPP implementor to make judgements based on facility operations and conditions. To assign a frequency other than what has been suggested (i.e., more or less frequent), the following criteria will be considered and rated either High, Medium, or Low. If many of the criteria are assigned a High rating, the frequency may be increased. Similarly, if many criteria are assigned a Low rating, the frequency may be decreased. The goal of implementing this BMP is to minimize exposure of pollutants to storm water.

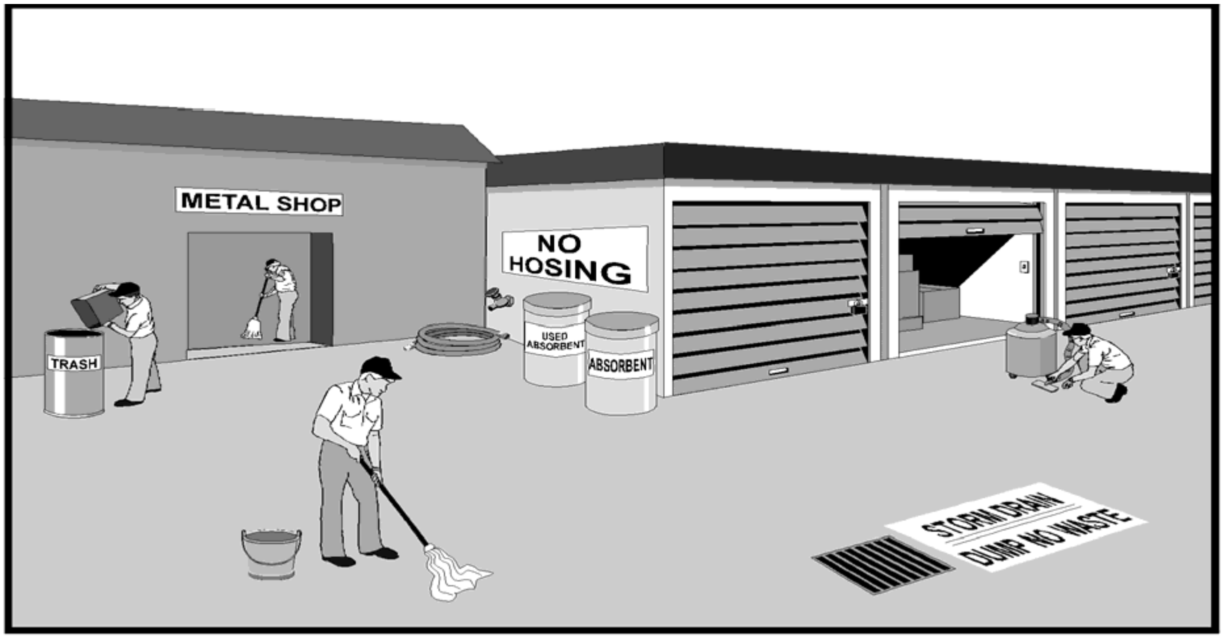
CRITERIA	Rating H=High BMOM=Medium L = Low
Probability of exposure of significant materials to storm water	
Quantity of significant materials potentially exposed	
Toxicity of significant materials potentially exposed	
Frequency of use of significant materials potentially exposed	
Evidence of exposure (e.g., stains on pavement, etching of concrete)	
Proximity of source area to outfall or receiving water	
Sensitivity of receiving water to potentially exposed significant materials (e.g., waters with beneficial uses such as human contact, recreation, significant species habitat, etc.)	

Training: Personnel will be trained to ensure that all waste be managed within guidelines of applicable federal, state, and local regulations. Signs will be posted as reminders.

Effectiveness and Cost: Regular general cleaning is a highly effective, low-cost BMP.

Limitations: None

BMP 004 - AVOID HOSING DOWN THE SITE



Description of Potential Pollutant and Source: Cleaning work sites by hosing down causes wash water to transport pollutants to the storm drain where it can be exposed to storm water.

Description of BMP: Use dry methods to clean work sites. Dry methods include sweeping or using damp rags or mops. If possible or practical, hoses will be removed. If hosing down is unavoidable, the downstream drain will be temporarily plugged as described in the following BMPs:

- BMP 023 - Place portable Rubber Mats Over Storm Drain Inlets
- BMP 024 - Insert Filter in Catch Basin
- BMP 025 - Place Absorbent Blankets in Catch Basin

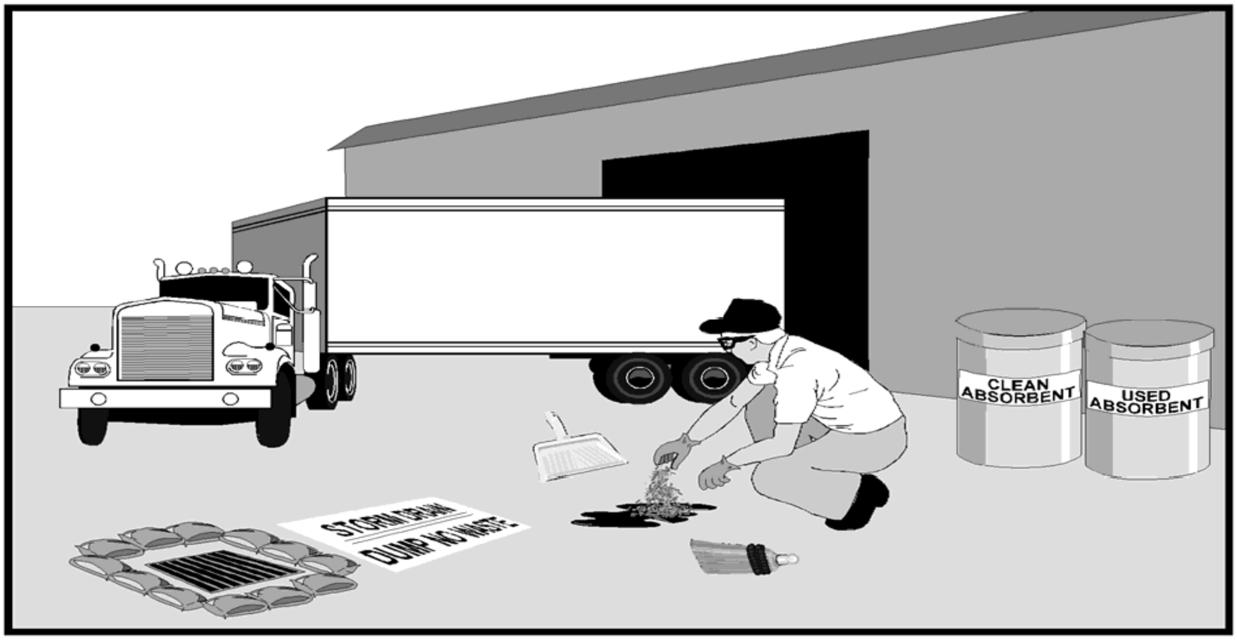
Application Guidance: Methods of dry cleaning will be used whenever possible at all workstations, loading/unloading sites, storage areas, and parking lots.

Training: New personnel will be notified of the policy and signs will be posted. If possible or practical, hoses will be removed.

Effectiveness and Cost: Eliminating hosing down is a highly effective, low-cost BMP.

Limitations: None

BMP 006 - CONTROL SPILLS



Description of Potential Pollutant and Source: Spills of significant materials may be exposed to storm water and transported to storm drains and/or receiving waters.

Description of BMP: Follow safety data sheets (SDS) for handling, storage, and cleanup of all significant materials to reduce the potential for spills.

Any spill, large or small, of significant materials will be controlled to prevent pollutants from being transported to storm drains and/or receiving waters. Appropriate spill control material will be kept on site. Smaller spills will be contained using absorbent material such as kitty litter, straw, or sawdust. Drums of absorbent material will be easily accessible and clearly marked, and containers for spent absorbent material will be readily available. Spent absorbent material will be managed appropriately and disposed of in accordance with applicable regulations. Larger spills will be controlled using spill kits, brooms, and other response equipment commensurate with the size of the spill. The methods outlined in the Activity’s spill prevention and response plans (BMP 112) for hazardous materials will be followed for spills of any potential storm water pollutants. The date, time, nature and volume of material spilled, and cleanup measures taken will be recorded for all spills and kept as part of the SWPPP.

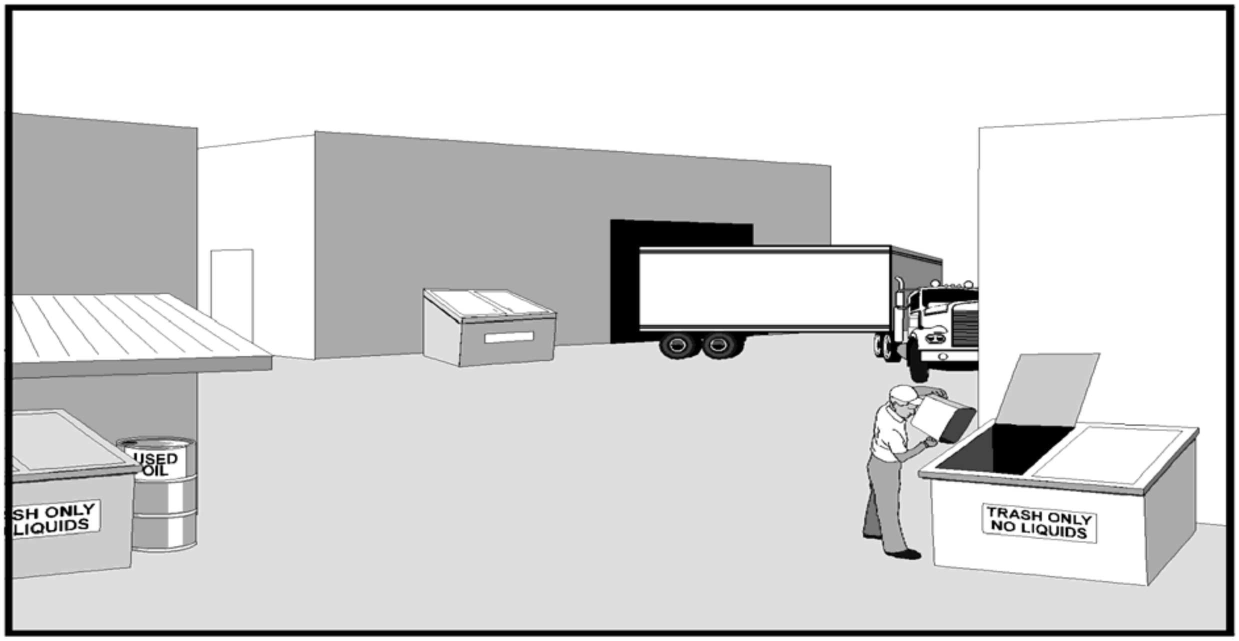
Application Guidance: Controlling spills will be practiced under all working conditions.

Training: Personnel will be trained in spill prevention and response procedures including the use of personal protection equipment (gloves, eye and face protection, etc.). This will include what absorbent or equipment to use, how to use the absorbent or equipment, where to find it, how to dispose of the spent absorbent or other material, and who to notify in the event of a spill.

Effectiveness and Cost: Spill control is a moderately effective, low-cost BMP.

Limitations: None

BMP 007 - PLACE TRASH RECEPTACLES AT APPROPRIATE LOCATIONS



Description of Potential Pollutant and Source: Improperly located or insufficient numbers of trash receptacles will promote poor housekeeping practices. This will increase the opportunity for pollutants from all source areas to reach storm water.

Description of BMP**:** Properly located and sufficient numbers of trash receptacles will promote the proper disposal of waste materials. This reduces the opportunity for pollutants to reach storm water. Trash receptacles will be easily accessible for personnel.

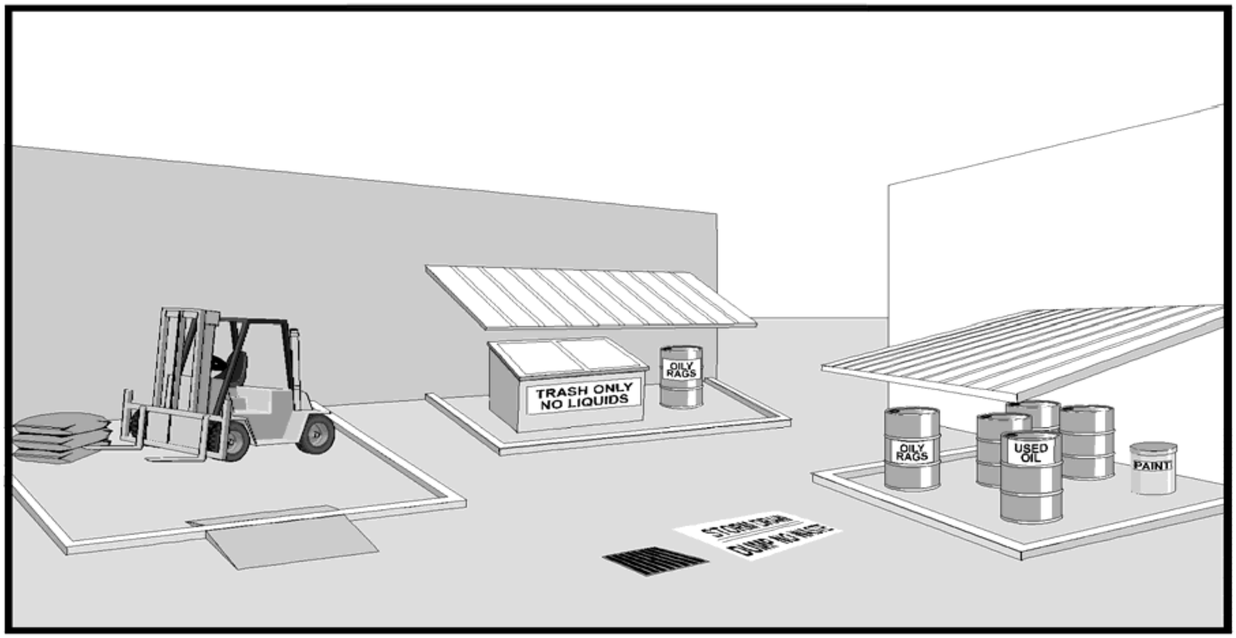
Application Guidelines: Placement of trash receptacles at appropriate locations will always be practiced.

Training: Personnel will be trained as to the location of trash receptacles.

Effectiveness and Cost: Appropriately located trash receptacles are an effective, low-cost BMP.

Limitations: None

BMP 012 - CONSTRUCT BERM OR DIKE AROUND CRITICAL AREAS



Description of Potential Pollutant and Source: Critical areas are source areas that have a high likelihood for the release of pollutants. This includes material handling areas, material storage areas, and equipment repair and maintenance areas. As a result of spills and leaks or exposure to storm water, pollutants can flow from critical areas into the storm water system. In addition, small spills and leaks can accumulate on the surface area and be washed away by storm water.

Description of BMP: Construct a raised berm or dike around critical areas. This will provide secondary containment and prevent any spills or leaks from leaving the area. This secondary containment will also be provided where mobile tankers containing fuel are customarily stationed. Construct a ramp to allow vehicle access into the area. (Note: double walled tanks do not require this BMP. Also, 40 CFR 112.7 requires bulk petroleum storage tanks be provided with secondary containment.) A drain valve will be installed and procedures to drain storm water from the bermed area will be posted (see BMP 014).

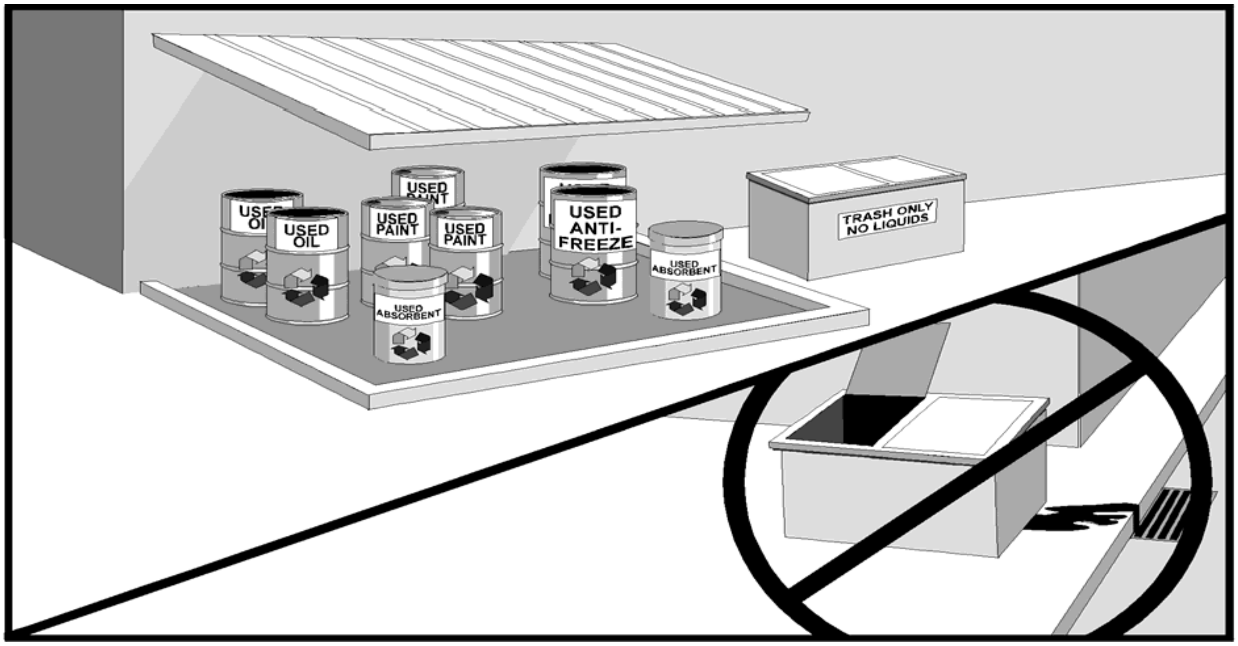
Application Guidance: Install as needed.

Training: N/A

Effectiveness and Cost: This is a highly effective BMP. The cost will vary depending on the size of the fueling operation.

Limitations: The size of some tank and fueling operations areas could make this BMP relatively expensive.

BMP 016 - STORE WASTE AND RECYCLING MATERIALS IN PROPER CONTAINERS



Description of Potential Pollutant and Source: Dry waste, including items such as scrap metal, floor sweepings, metal chips, and paper goods, can be dispersed by wind or operational error if not stored properly. If a dumpster's lid is not kept closed, animals may carry garbage out of the containers. Uncovered dumpsters also expose waste to storm water, which may leak out of the dumpster and into the storm sewer system.

Description of BMP: Locate waste and recycling drums and containers in centralized areas, using proper labeling (both containers and location) and providing easy access. If possible, the area will have secondary containment (see BMPs 012, 013, and 014). Waste containers will be emptied regularly. Dumpsters will all have lids; lids will be kept closed when not in use. If the dumpster has inadequate capacity and it is not possible to keep the cover closed, the frequency of pick-up will be increased, or the dumpster will be replaced with a model of greater capacity.

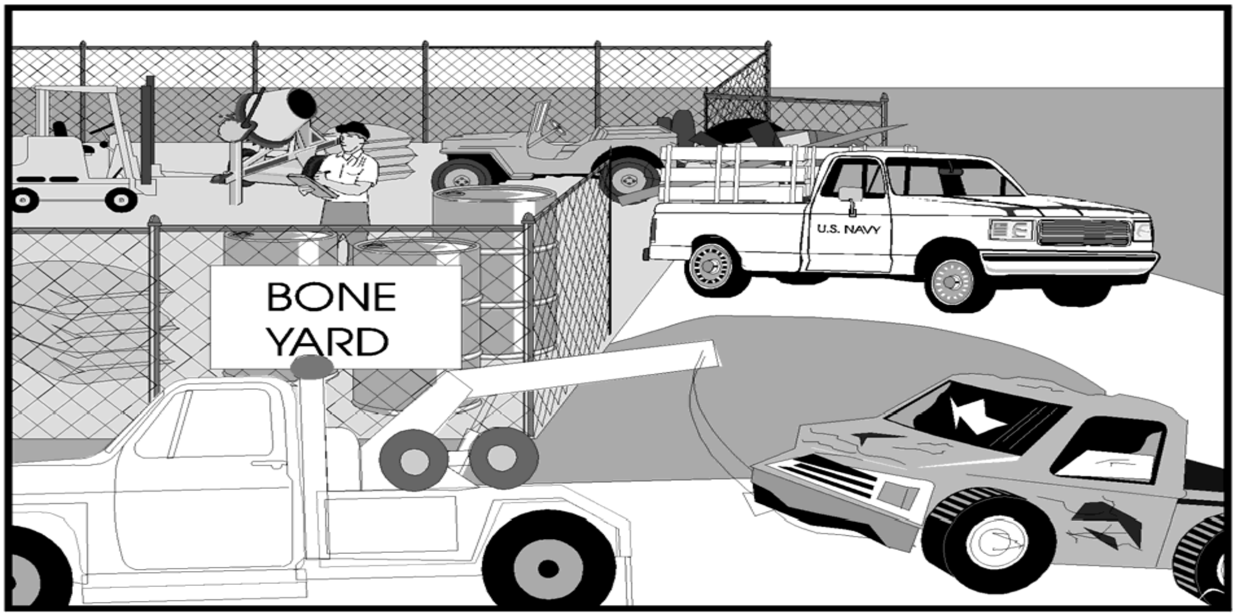
Application Guidance: This BMP will be applied to all waste and recycling storage areas.

Training: Personnel will be trained to monitor waste and recycling storage sites to ensure their materials are properly stored and that there are no overflowing containers.

Effectiveness and Cost: This is a moderately effective, low-cost BMP.

Limitations: None

BMP 032 - DISPOSE OF OBSOLETE EQUIPMENT, INOPERABLE VEHICLES, AND SURPLUS MATERIALS



Description of Potential Pollutant and Source: Obsolete equipment, inoperable vehicles, and surplus materials are often stored in areas not subject to routine inspection. These materials often leak a variety of fluids which can be exposed to storm water.

Description of BMP: Dispose of obsolete equipment, inoperable vehicles, and surplus materials at proper sites to reduce the chances of pollutants reaching storm water.

Application Guidance: This practice will be implemented quarterly.

The frequency for implementing this BMP has been provided as general guidance. However, a facility operator may wish to establish a more suitable frequency. This will require SWPPP implementors to make judgements based on facility operations and conditions. To assign a frequency other than what has been suggested (i.e., more or less frequent), the following criteria will be considered and rated either High, Medium, or Low. If many of the criteria are assigned a High rating, the frequency may be increased. Similarly, if many criteria are assigned a Low rating, the frequency may be decreased. The goal of implementing this BMP is to minimize exposure of pollutants to storm water.

CRITERIA	Rating H=High M=Medium L=Low
Probability of exposure of significant materials to storm water	
Quantity of significant materials potentially exposed	
Toxicity of significant materials potentially exposed	
Evidence of exposure (e.g., stains on pavement, evidence of significant materials in drainage system) Proximity of source area to outfall or receiving water	
Sensitivity of receiving water to potentially exposed significant materials (e.g., waters with beneficial uses such as human contact, recreation, significant species habitat, etc.)	

Training: N/A

Effectiveness and Cost: Disposing of unused equipment and supplies is a highly effective, moderate-cost BMP.

Limitations: None

BMP 033 - CHECK VEHICLES AND EQUIPMENT FOR LEAKS

Description of Potential Pollutant and Source: Vehicles, aircraft, or equipment entering or stored at a maintenance facility may be leaking a variety of fluids (fuel, oil, antifreeze, freon, etc.). These materials can be exposed to storm water.

Description of BMP: Inspect all vehicles and equipment at the site, whether incoming, parked, stored, or salvaged, for oil and fluid leaks. Drivers of fleet vehicles, such as delivery trucks, will also check under their vehicles each morning for fluid leaks. If leaks are present, drip pans will be placed under the vehicle or equipment. Once the vehicle is removed from the site, the former parking area will be inspected for stains, and these stains will be cleaned using rags or dry solvents.

Application Guidance: Any vehicle or equipment coming in for repairs, painting, or storage will be inspected for leaks. Fleet vehicles will be inspected each morning. Vehicles that are parked, stored, or salvaged will be provided with drip pans, as will tanker rail cars waiting to be unloaded. The frequency for implementing this BMP has been provided as general guidance. However, a facility operator may wish to establish a more suitable frequency. This will require SWPPP implementors to make judgements based on facility operations and conditions. To assign a frequency other than what has been suggested (i.e., more or less frequent), the following criteria will be considered and rated either High, Medium, or Low. If many of the criteria are assigned a High rating, the frequency may be increased. Similarly, if many criteria are assigned a Low rating, the frequency may be decreased. The goal of implementing this BMP is to minimize exposure of pollutants to storm water.

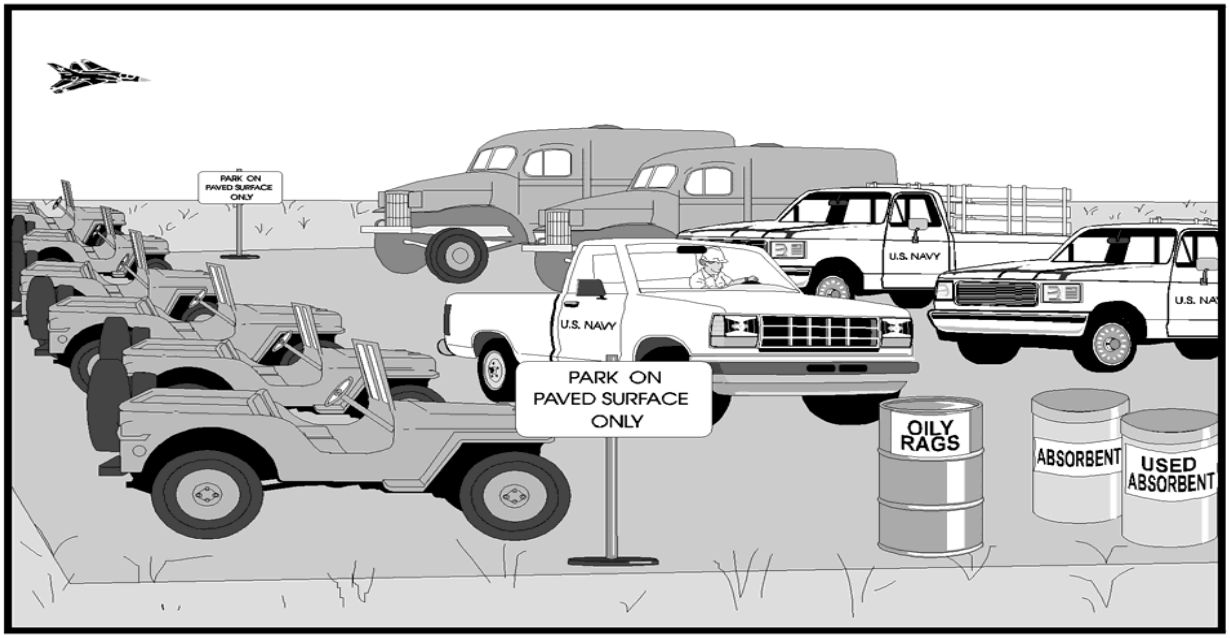
CRITERIA	Rating H=High M=Medium L=Low
Probability of exposure of significant materials to storm water	
Old age or poor condition of equipment and vehicles	
Evidence of exposure (e.g., stains on pavement)	
Proximity of source area to outfall or receiving water	
Sensitivity of receiving water to potentially exposed significant materials (e.g., waters with beneficial uses such as human contact, recreation, significant species habitat, etc.)	

<u>Training:</u> Signs will be posted to remind personnel of proper procedures.

<u>Effectiveness and Cost:</u> Checking for leaks is a moderately effective, low-cost BMP.

<u>Limitations:</u> None

BMP 037 - PARK VEHICLES ON AN IMPERVIOUS SURFACE



Description of Potential Pollutant and Source: Pollutants leaking or spilled onto the ground surface from vehicles can infiltrate into the soil. These pollutants (i.e., oil, fuel, etc.) may then be exposed to storm water and transported to surface water.

Description of BMP: Park vehicles on an impervious surface. For this BMP, an impervious surface is defined as a surface that cannot be readily penetrated by rainfall, such as concrete and asphalt pavement. Leaks and spills will be cleaned from these surfaces.

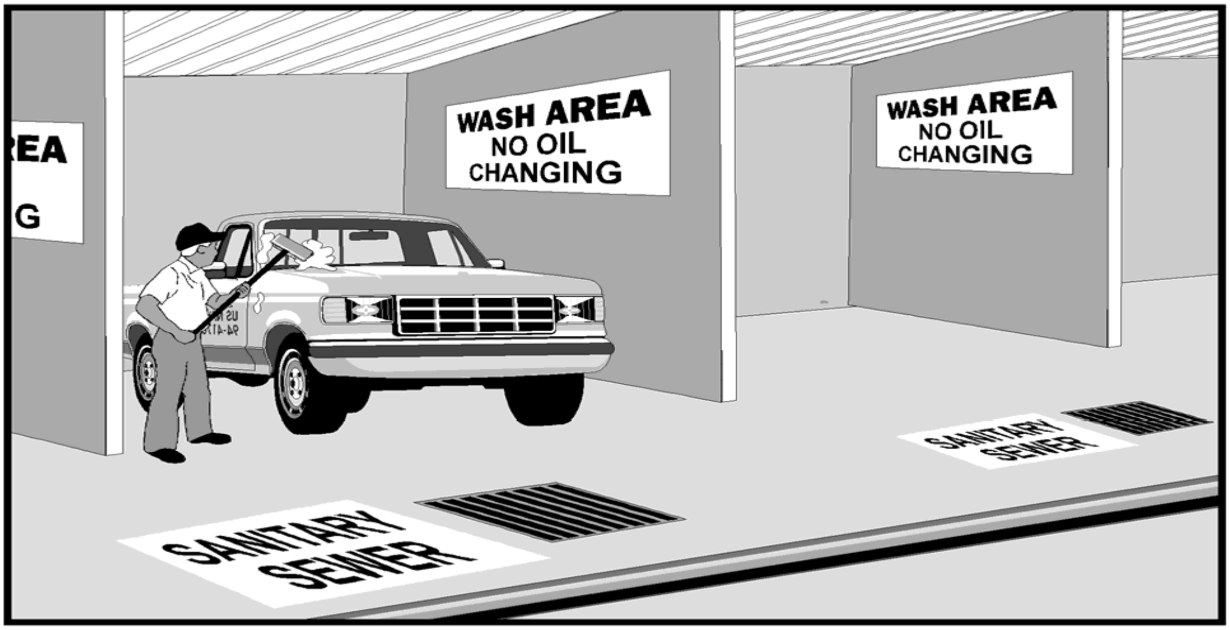
Application Guidance: Vehicles will always be parked on impervious surfaces, especially during the rainy season.

Training: Signs will be posted to remind personnel that all vehicles are to be parked on paved surfaces.

Effectiveness and Cost: Parking vehicles on impervious surfaces is a moderately effective, low-cost BMP.

Limitations: Very large traffic volumes may make implementation of this BMP difficult.

BMP 041 - WASH EQUIPMENT AND VEHICLES IN DESIGNATED AREA



Description of Potential Pollutant and Source: Washing equipment and vehicles outdoors or in areas where wash water flows onto the ground can pollute storm water. It is difficult to control the wastewater from washing operations if it is not done in a designated area.

Description of BMP: Facilities will designate bermed wash areas that contain wash water and prevent contact with storm water. These areas will drain to the sanitary sewer (BMP 042) or to a sump. If a sump is used, wash water will be recycled.

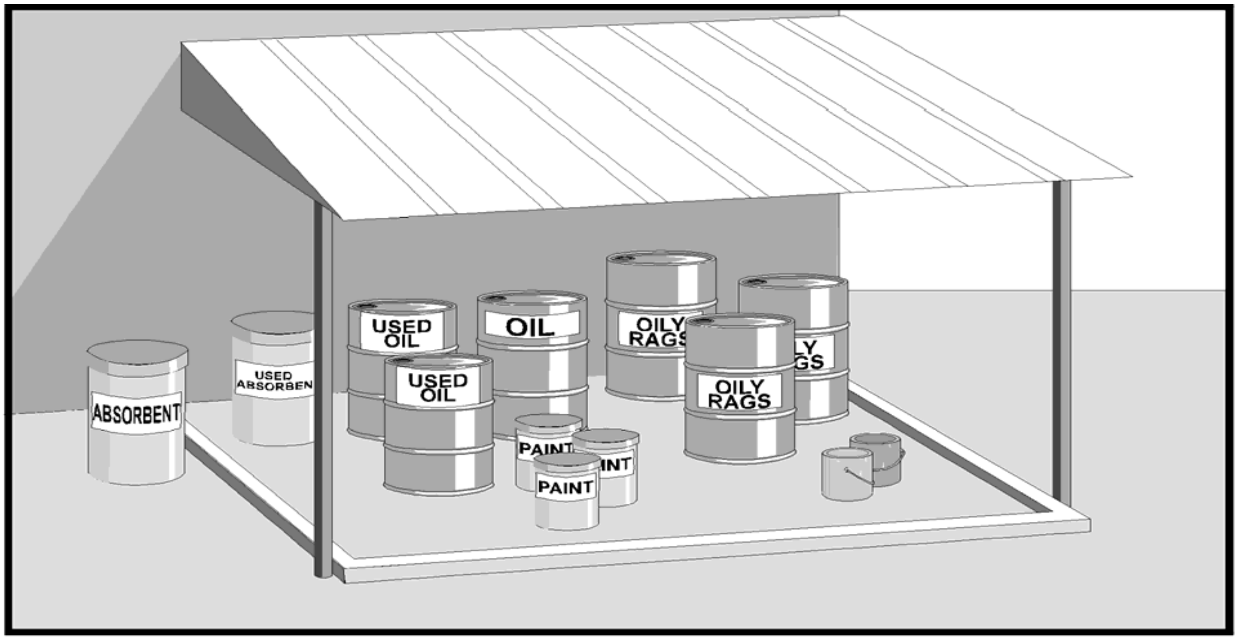
Application Guidance: This practice will be followed wherever vehicles, equipment and aircraft are washed.

Training: N/A

Effectiveness and Cost: This is a highly effective, variable-cost BMP.

Limitations: Pretreatment and monitoring of wash waster discharges to the sanitary sewer may be required. This would greatly increase the cost of this practice. The treatment plant operator will be notified and approval obtained before discharge.

BMP 061B - STORE LIQUIDS AND SIGNIFICANT MATERIALS WITHIN A BUILDING OR COVERED AREA



Description of Potential Pollutant and Source: Many significant materials may be leaked or spilled during storage, handling, or transport. If significant materials are stored outside, in covered areas, these materials can be exposed to storm water, which can transport the leaked or spilled material into the storm drain system.

Description of BMP: To the extent practical, store significant materials within a building or covered area. The materials will be stored on an impervious surface, such as a concrete pad. Rainfall runoff from the pad will be directed to a storm water treatment facility or contained. Leaks and spills will be cleaned up as soon as possible using rags or dry absorbents (see BMP 006). Used rags and absorbents will be disposed of properly. Any wash water from cleaning the floor will be disposed of in the sanitary sewer (see BMP 042).

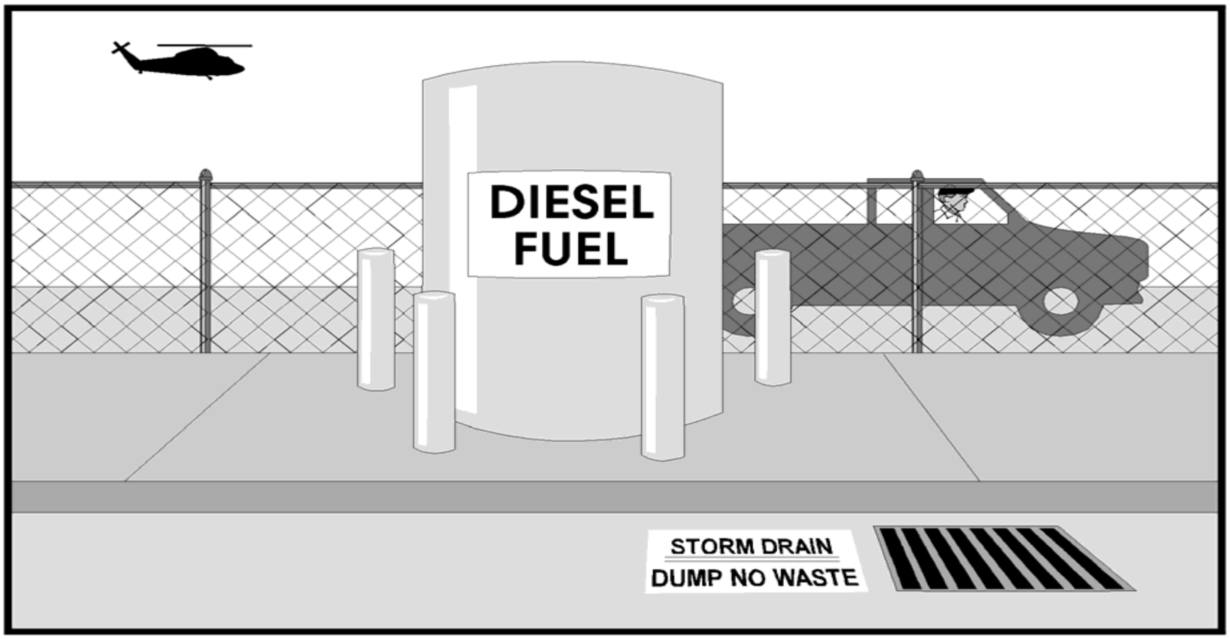
Application Guidance: All significant materials will be stored within a building or covered area.

Training: Personnel will be trained to store significant materials in designated areas.

Effectiveness and Cost: This is a moderately effective BMP. The cost will vary based on whether a building for storing the substances is available.

Limitations: None

BMP 072 - PROTECT TANKS FROM BEING DAMAGED BY VEHICLES



Description of Potential Pollutant and Source: If a tank is damaged by a vehicle, fuel, or other significant materials may be leaked from the tank and become exposed to storm water. The materials can then be transported to the storm drain and/or receiving waters.

Description of BMP: Protect tanks from being damaged by vehicles. Bollards or traffic barriers may be used if the tank location is accessible to vehicles. Fences and curbs may also protect the tanks.

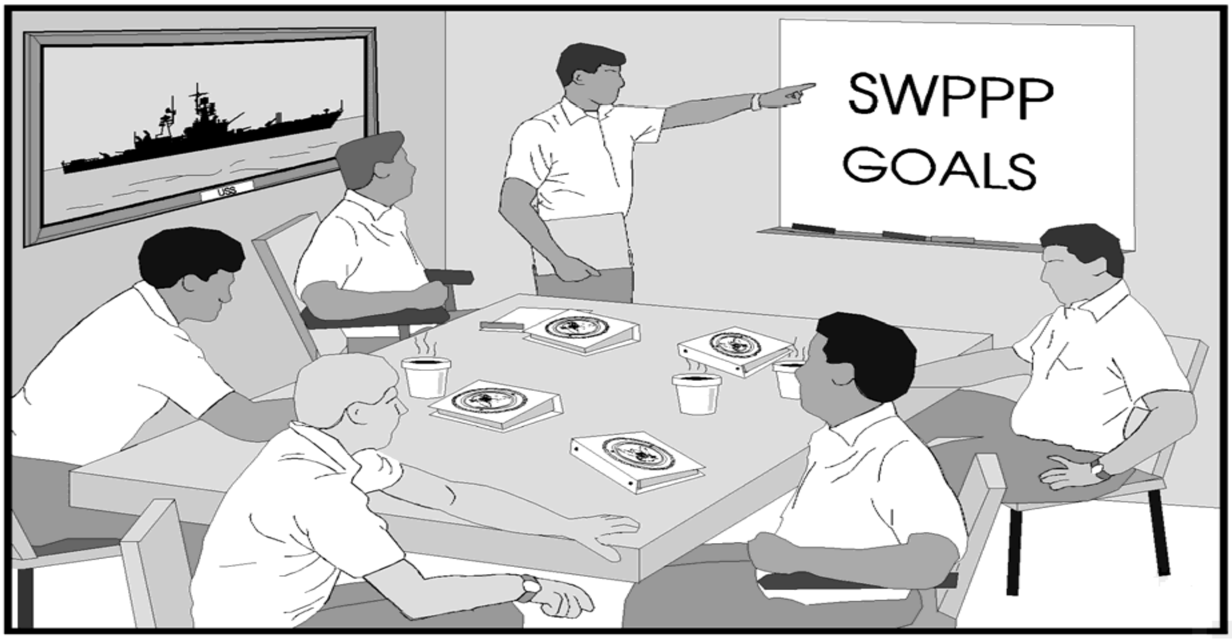
Application Guidance: Tanks will be guarded from being damaged by vehicles.

Training: N/A

Effectiveness and Cost: This is an effective, low-cost BMP.

Limitations: None

BMP 113 - CONDUCT PERSONNEL TRAINING REGARDING THE SWPPP



Description of Potential Pollutant and Source: When properly trained, personnel are more capable of preventing spills, responding safely and effectively to an accident when it occurs, and recognizing situations that could lead to storm water contamination.

Description of BMP: Train personnel at all levels of responsibility in the components and goals of the SWPPP.

Application Guidance: Training will be conducted quarterly and at new personnel orientations.

Training: Training will address each component of the SWPPP, including how and why tasks are to be implemented. Topics will include:

- Good housekeeping
- Material management practices
- Spill prevention and response

Effectiveness and Cost: This is a highly effective, moderate-cost BMP.

Limitations: None

APPENDIX B

ROUTINE FACILITY INSPECTION CHECKLIST

Routine Facility Inspection Checklist

Activity Name: ______________________ **Date of Inspection:** ______________________

Inspector(s): ______________________ **Facility Name/Number:** ______________________

Column 1	Column 2	Column 3	Column 4	Column 5	
Source Area	BMP Number and Title	Status: F, P, N, NA[1]	Briefly Describe Effectiveness (Good or Other [describe])	Corrective Measures	
				What	By When

Note 1: F – Fully implemented, P – Partially implemented, N – Not implemented , NA – Not Applicable

APPENDIX C

QUARTERLY VISUAL ASSESSMENT CHECKLIST

Quarterly Visual Assessment Checklist

Facility ID and Location: ______________________

Date: ____________________

Sampler Name (Printed): ______________________ Signature: ______________________

Time of Rainfall Begin: ______________ Time of Rainfall End: ______________

Time of Flow Begin: ______________ Time of Flow End: ______________

Rainfall event more than 72 hours since last event? Yes / No Rainfall Event Total: ______________

Sample: sample in a clean, colorless glass or plastic container, and examined in a well-lit area

On samples collected within the first 30 minutes of an actual discharge from a storm event

Sample Characteristics:

Color: ______________ Floating Solids: ______________

Odor: ______________ Settled Solids: ______________

Clarity: ______________ Suspended Solids: ______________

Oil Sheen: ______________ Foam: ______________

Other Obvious Indicators of Storm Water Pollution

(describe): ____________________________________

Nature of the discharge (i.e., runoff):

Results of observations of the storm water discharge:

Probable sources of any observed storm water contamination:

If applicable, why it was not possible to take samples within the first 30 minutes:

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

APPENDIX D

CORRECTIVE ACTION LOG

Corrective Action Log

Use this form to document SWPPP corrective actions. This form is to be completed by the Environmental Compliance Coordinator (ECC) or a person designated by ECC and submitted to the MCBH Storm Water Program Manager. The Storm Water Program Manager is responsible for any notification to the State of Hawaii Department of Health (DOH), if required.

A corrective action is defined as an action taken to:

a) **Repair, modify, or replace any storm water control used at the site;**
b) **Clean up and properly dispose of spills, releases, or other deposits; or**
c) **Remedy a permit violation.**

1. Corrective Action Triggers

The following events trigger a corrective action to be taken (this triggering condition is to be documented *within 24 hours* of discovering the occurrence):

a) A required storm water control was never installed, was installed incorrectly, or is not in accordance with the requirements in the SWMP Plan.
b) A member of the **Storm Water Pollution Control Team** becomes aware that the storm water controls installed and being maintained are not effective enough for the discharge to meet applicable water quality standards or applicable requirements in the MCBH SWMP Plan. The facility ECC shall notify the Storm Water Program Manager immediately. The Storm Water Program Manager will notify DOH *by the end of the next work day*.

1.1 Log Notifications:

Date/time Storm Water Program Manager notified by ECC: ________________________

Date/time DOH notified by Storm Water Program Manager: ________________________

1.2 Describe Discharge:

Indicate which one of the following prohibited discharges is occurring or has occurred:

- ❒ Wastewater from washout of concrete
- ❒ Wastewater from washout and cleanout of stucco, paint, form release oils, curing compounds, or other construction materials
- ❒ Fuels, oils, or other pollutants used in vehicle and equipment operation and maintenance
- ❒ Soaps, solvents, or detergents used in vehicle and equipment washing
- ❒ Toxic or hazardous substances from a spill or other release
- ❒ Other, Explain: ____

2. Requirements for Taking Corrective Actions

The ECC shall complete corrective actions in accordance with the deadlines specified below. In all circumstances, site personnel shall *immediately* take all reasonable steps to minimize or prevent the discharge of pollutants until a permanent solution is installed and made operational, including cleaning up any contaminated surfaces so that the material will not discharge in subsequent storm events. *Immediately* means the same day the condition is discovered, unless it is too late in the day, in which initiation of corrective action must begin on the following work day.

Following any of the above triggering events, the ECC shall install a new or modified control and make it operational, or complete the repair, by *no later than 7 calendar days from the time of discovery*. If it is not feasible to complete the installation or repair within 7 calendar days, the ECC shall document and submit to the Storm Water Program Manager, for their agreement, why it is not feasible to complete the installation or repair within the 7-calendar day timeframe and document a schedule for installing the storm water control and making it operational as soon as practicable after the 7-day timeframe.

If the issue is not adequately addressed within 7 calendar days or the agreed upon timeframe, enforcement procedures will be initiated. Unaddressed issues will be escalated through the chain of command. The MCBH Environmental Compliance and Protection Division Director will give the responsible party a formal notice with an appropriate deadline for action. If the problem remains unchanged, the situation will be brought to the attention of the next higher authority. The ultimate penalty for non-compliance of MS4 Permit regulations is eviction or discharge of the responsible party from MCBH. This is placed at the discretion of the Base Commander. See the Enforcement Response Plan in Appendix 3-6 of the SWMP Plan for further information on MCBH's enforcement policies.

3. Corrective Action Report

Within 24 hours of discovering the occurrence of one of the triggering conditions in SWPPP Section 4.1 at the site, the ECC must complete the following:

3.1 Describe the triggering condition:

____
____
____
____

3.2 Record the date/time of the condition identified. How was the condition identified?

____
____
____
____

3.3 Describe the corrective action taken:

____
____
____

Date/time installation or repair was completed:
(or date/time the prohibited discharge ceased) ____

Or describe why it is not feasible to complete installation or repair within 7 calendar days and detail a proposed schedule (if applicable)

____
____
____

4. Resolution of the Corrective Action Trigger

Within 7 calendar days of initiating the Corrective Action Report, the ECC must complete a report of the following:

4.1 Follow-up Actions

Describe any follow-up actions taken to review the design, installation, and maintenance of storm water controls, including the dates such actions occurred:

____
____
____

4.2 Storm Water Control Modifications

Provide a summary of storm water control modifications implemented. Include a schedule of activities required to implement changes and the date the modifications were completed or will be completed:

____
____
____

5. SWPPP Modification Due to Corrective Actions

Where corrective actions result in changes to any of the storm water controls or procedures documented in the SWPPP, modify the SWPPP accordingly *within 7 calendar days* of completing corrective action work.

Are modifications to the SWPPP necessary? ❑ Yes ❑ No

Date modifications to the SWPPP shall be completed _______________

6. Corrective Actions Required by DOH

The facility shall comply with any corrective actions required by DOH as a result of permit violations found during an inspection by DOH or the Environmental Protection Agency (EPA).

Was the Corrective Action triggered by a DOH/EPA inspection?

❑ Yes ❑ No

❑ Date of DOH/EPA Inspection __________________

7. Additional Comments:

____
____

Final

STORM WATER POLLUTION PREVENTION PLAN

Storm Water Management Program Plan

Marine Corps Base Hawaii, Oahu, Hawaii

NPDES Permit No. HI S000007

GROUND SUPPORT EQUIPMENT SHOP (BUILDING 1619)

Prepared by:

Marine Corps Base Hawaii

August 2022

Table of Contents

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Figures

Appendices

List of Acronyms and Abbreviations

BMP	Best Management Practice
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CWA	Clean Water Act
CWB	Clean Water Branch
DOH	State of Hawaii Department of Health
ECC	Environmental Compliance Coordinator
ECE	Environmental Compliance Evaluation
ECPD	Environmental Compliance and Protection Division
EPA	United States Environmental Protection Agency
HAZMAT	Hazardous Material
HAZMIN	Hazardous Material Minimization
MCBH	Marine Corps Base Hawaii
MS4	Municipal Separate Storm Sewer System
MS4 Permit	Marine Corps Base Hawaii's NPDES Permit No. HI S000007
NPDES	National Pollutant Discharge Elimination System
OWS	Oil/Water Separator
POC	Point of Contact
SAS	Satellite Accumulation Site
SWMP	Storm Water Management Program
SWPPP	Storm Water Pollution Prevention Plan

Certification Statement

MCBH is committed to the prevention of discharges of polluted stormwater to navigable waters or the environment and maintains the highest standards for best management practices through periodic review, updating, and implementation of this Stormwater Pollution Prevention Plan (SWPPP).

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information contained therein. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Name: ____________________ Title: ____________________

Signature: ____________________ Date: ____________________

Management Review

Refer to Section 1.2 for more information on required SWPPP updates.

Review Dates	Signature	Amendment Required? (Y/N)
____________	____________________	__________
____________	____________________	__________
____________	____________________	__________
____________	____________________	__________
____________	____________________	__________
____________	____________________	__________

1 Introduction

As part of Federal regulations administered through the Clean Water Act (CWA), the State of Hawaii, Department of Health (DOH) has issued the National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4) Permit No. HI S000007 (referred to herein at the "MS4 Permit") to Marine Corps Base Hawaii (MCBH). The MS4 Permit requires that MCBH provide all existing industrial facilities, identified in MCBH's MS4 Permit application, and any newly identified industrial facilities, submitted to DOH using the "MS4 NPDES Individual Permit – Industrial Storm Water Discharge Notification Form," with a Storm Water Pollution Prevention Plan (SWPPP) for storm water associated with industrial activities.

The purpose of the regulations is to protect water quality by reducing the amount of pollutants in storm water runoff caused by industrial activities.

1.1 SWPPP Implementation

The storm water management controls of this plan will become MCBH procedure for the applicable industrial facility. An up-to-date copy of the SWPPP shall be maintained on site and at the MCBH Environmental Compliance and Protection Division (ECPD). Management staff, maintenance personnel, contractor staff, and other personnel involved in onsite industrial activities, will be knowledgeable of the plan and follow the guidelines set forth in it, in addition to any other pertinent base-wide, state and federal regulations.

Day-to-day implementation of the SWPPP is primarily the responsibility of the current facility Environmental Compliance Coordinator (ECC) or Point of Contact (POC) as identified in Table 2-1. Enforcement of the permit conditions and this SWPPP are ultimately the responsibility of ECPD and additional escalating levels of authority as specified in the Enforcement Response Plan developed by MCBH for its base-wide Storm Water Management Program (SWMP) Plan.

1.2 Updating the SWPPP

This SWPPP will be reviewed as needed to identify necessary changes, at a minimum of every five years. Updates may be required due to current best management practice (BMP) failures, spill events, changes in industrial activities, changes in features, corrective actions, or other necessary changes. Personnel changes to the Storm Water Pollution Control Team (Section 2.1) should be logged in Table 2-1. Storm Water Pollution Control Team Log. ECPD will be responsible for approving revisions to the SWPPP. In the event the plan is modified, a copy of the updated SWPPP will remain at ECPD and will be provided to the applicable facility. Additionally, ECPD shall document and report the SWPPP changes to the DOH, Clean Water Branch (CWB), within thirty days of when the changes arise.

2 Ground Support Equipment Shop, Building 1619

The Ground Support Equipment (GSE) Shop, Building 1619, is located within MCBH, Kaneohe Bay on 1st Street between "B" Street and "C" Street. The facility encompasses approximately 3.8 acres and can be found in grid [redacted] of the MCBH Base Map, see Figure 4-1. The facility-specific map is shown on Figure 4-2.

2.1 Storm Water Pollution Control Team

The Storm Water Pollution Control Team consists of the Storm Water Program Manager, ECC, and the Hazardous Material (HAZMAT) and Hazardous Material Minimization (HAZMIN) team. The Storm Water Program Manager is responsible for the enforcement of the MS4 permit at all industrial sites and provides annual training to the ECC and other personnel. The ECC is the primary unit POC for storm water related items and the day-to-day environmental matters at a specific facility. ECC's are responsible for SWPPP implementation including BMP and facility inspections, storm water assessments/sampling, BMP maintenance, and corrective actions. The safety manager is also available to assist the ECC. The HAZMAT and HAZMIN team shall be contacted if assistance is needed. The role, name, phone number, and start date of individuals on the Storm Water Pollution Control Team is recorded in Table 2-1 below. In the event of personnel turnover, Table 2-1 shall be updated accordingly.

TABLE 2-1. STORM WATER POLLUTION CONTROL TEAM LOG

Role	Name	Phone	Start Date
MCBH Storm Water Program Manager	CIV Whitney Anderson	Office: 808-257-4359	6/6/22
ECC	Sgt Jadarius Anderson	Office: 808-257-4603 Cell: 704-953-9408	03/29/2022
HAZMAT/HAZMIN	CIV Tim Cawthon	HAZMAT Center Building 6409 Office: 808-257-9913 HAZMIN Center Building 6407 Office: 808-257-0770	N/A

2.2 Ground Support Equipment Shop, Building 1619 Activities

The GSE Shop stores and maintains ground support equipment such as bucket lifts, cranes, tugs, engine hoists, pulleys, Pre-oilers, and stands. The shop supports up to 2000 assets. The facility is used by the Marine Aviation Logistics Squadron 24 (MALS-24) The facility consists of five main buildings and storage locker (Building 5052). Building 1619 located at the west side of the compound houses offices and a maintenance area with a parts washer and a battery charging station. A hazardous waste accumulation area is located at the N end of the building.

Building 4036 is located at the south (front) of the compound and is used as a GSE Holding Shed. A roof structure covers the area between Buildings 4035 and 4036 and extends to the western side of Building 320. The covered area is used for storage of equipment as well as the two satellite accumulation sites (SASs) along with other amounts of significant materials stored in flammable lockers or on spill pallets. The equipment is typically stored within spill containment bladders and drip pans are used under any leaking equipment. Landscaping equipment such as push mowers and string trimmers are also stored under cover at Building 4036. Building 6847 is a recently constructed “Preservation Barn” or climate-controlled storage area located north of Building 4036.

Building 4035, attached to Building 4036 to its northwest, is a completely self-contained spray painting booth, internally divided for painting and sandblasting. A precipitator for collecting sand particles is attached on the north-central side of the booth. An open concrete slab with a grated inlet adjacent to Building 4036 is used for support vehicle and equipment washing. The grated inlet drains to a below-grade oil/water separator (OWS), located at the southwest corner of the facility, and discharges to the sanitary sewer system.

Building 320, located to the east of Building 4036, was formerly used as the Field Maintenance Shop, but is currently used as a locker room and long-term storage area. The building is a Quonset-hut style structure with domed metal roof and concrete slab floor. The concrete floors in Buildings 1619 and 4036 are swept at the end of each day. Any oil spills are hand-wiped with absorbents, collected together with any used absorbents from the drip pans/pallets or bladders, double-bagged, and stored in the SAS. Once about every three months, the floors are cleared for pressure-washing after the daily procedure of sweeping and cleaning of oil spills. The wash water enters the drain at the center of the concrete wash down area, which is connected to an oil water separator and discharges to the sanitary sewer system. Hydroponic pads are used to collect grease and occasionally dirt from the wash down and are disposed along with the other absorbents in the SAS.

The majority of the compound (with the exception of a small grass/gravel area to the southeast of Buildings 320 and 4036) is paved with asphalt or concrete. Storm water runoff from the concrete surfaces west of Building 1619 flows into a trench drain that is connected to the OWS. Storm water runoff from the paved areas between Buildings 1619 and 4035/4036 flows southerly down the driveway, enters 1st Street (substantially similar Outfall 002), and then flows southeasterly into two catch basins (320-1 and the other identified) associated with Outfall 017, which discharges to Kaneohe Bay. A trench-drain at the west side of Building 4036 (constructed primarily to collected rainwater from the roof gutters of Building 4036) can also collect water in this area, conveying water to the same catch basin manhole (CBMH 320-

1). The remaining runoff drains away from the building in all directions and percolates into the grass areas outside of the compound. The location of the designated sampling location (Outfall 01), and other relevant site features are shown in Figure 4-2.

During the site visit, it was observed that a trench drain adjacent to the west side of Building 4036 is connected to the storm drain system. It is recommended that this drain be disconnected from the storm drain system and all runoff directed to the OWS which connects to the sanitary sewer system. Interim protection BMPs should be added immediately to prevent this drain from coming into contact with pollutants. Any washing or temporary equipment or material storage activities should be conducted away from this area, and in secondary containment.

2.3 Sources of Pollutants

The following is an inventory of potential pollutants associated with Ground Support Equipment Shop, Building 1619:

A. Material Loading and Unloading Areas

Materials that are spilled, leaked, or lost during loading or unloading may collect on vegetated or paved surfaces and be carried away by storm runoff. Loading and unloading of significant materials is conducted at the roll-up doors at the southeast side of Building 1619 and along the southwest and south sides of Building 4036 and Building 6847.

B. On-Site Material Storage and Disposal Practices

Leaks, drips, or spills of materials that are stored or disposed of in areas exposed to rainfall can be carried away by storm water. Significant materials stored in flammable lockers or on spill containment pallets are primarily located throughout Building 4036. Waste materials are stored in SAS Lockers T036 and T037 in Building 4036. Additional amounts of materials are stored in Building 1619 and Building 4035. MALS-24 also utilizes Building 5055 as a HAZMAT distribution center for GSE shop materials.

C. Outdoor Activities

Many outdoor activities at MCBH, Kaneohe Bay use materials or create wastes that have the potential to pollute storm water runoff. Outdoor activities at the GSE Shop include the loading/unloading and transporting of materials, washing GSE and the floors of Building 4036 (wash water is swept outside to drain into the OWS), and vehicle parking. GSE maintenance is performed under cover.

D. Significant Materials Inventory

The following is a list of significant materials found at the GSE Shop:

- Gasoline
- Diesel Fuel
- Hydraulic Fluid
- Lube Oil
- Grease
- Solvents
- Paints
- Paint Thinner
- Antifreeze
- Brake Fluid
- Battery Acid
- Used Oil

- Isopropyl Alcohol
- Used Fuel

2.4 Potential Storm Water Pollutants

The following pollutants have been identified as having a reasonable potential to be present in storm water discharges from Ground Support Equipment Shop, Building 1619 if not properly managed:

- Used Oil

Materials that have *not* been included as a potential storm water pollutant but have been included as part of the significant materials inventory list, are considered to present a negligible risk to storm water quality. This is based on the nature/location of the primary activities performed with these materials and the BMPs that are in place. Material transport (loading/unloading) is not considered to be a significant threat to storm water, due to spill response procedures, training, and spill kit materials available onsite.

2.5 Best Management Practices (BMPs)

Best Management Practices (BMPs) are techniques or methods that aim to manage the quantity and improve the quality of storm water runoff from a facility or other site. Storm water BMPs intend to reduce or eliminate pollution and contaminants collected by runoff before the runoff reaches the MCBH storm water system or sensitive ecosystems such as streams, wetlands, and marine environments. The following is a summary of BMPs currently in place at the Ground Support Equipment Shop, Building 1619.

A. Good Housekeeping Practices

In general, Ground Support Equipment Shop, Building 1619 employs good housekeeping practices throughout its operations. Good housekeeping practices for Ground Support Equipment Shop, Building 1619 are included in Table 2-2. At the end of each working day, GSE shop personnel do a sitewide inspection and clean up any drips or spills on the ground or in drip pans using dry methods.

B. Preventative Maintenance

Preventive maintenance is important as water pollution control measures may be of little or no use if devices and equipment have not been properly maintained. Facility personnel conduct inspection of facility equipment and storage systems on a regular basis. The preventive maintenance program involves inspections of equipment and storage systems that are exposed to storm water. Inspections of the SAS are conducted on a monthly basis by HAZMIN, with monthly inspection reports submitted to ECPD. Maintenance work is performed under cover, and no maintenance work is performed outdoors.

C. Visual Inspections

Visual inspection provides a valuable subjective assessment of the status of storm water management systems. They are easily performed and allow the opportunity for corrective action, if necessary. Site inspections and documentation requirements are addressed in in Section 3 of this SWPPP. MCBH HAZMIN Center staff perform hazardous material inspections monthly. Annual facility inspections are performed by EPCD as part of the MCBH Environmental Compliance Evaluation (ECE).

D. Spill Prevention and Response

Areas where significant material spill or leakage can occur are identified in Section 2.1 and shown on Figure 4-2. The storm water systems and their accompanying drainage points are also shown on Figure 4-2. Refer to Table 2-2 for BMPs related to spill preventative measures for material handling procedures, storage requirements, and equipment usage.

In the event of a hazardous substance or oil spill, the ECC and ECPD shall be notified immediately (ECPD; 808-630-8246). If the spill cannot be easily addressed using an onsite spill kit and personal protective equipment, call Fed Fire (Military 911). The spill source should be immediately controlled if it is safe to do so by closing valves, switches, and/or turning off power to a device. Then, contain the spill by using sorbent socks or absorbent materials found in a spill kit. After it has been contained, clean up the spilled material in a safe manner using dry methods. All materials should then be properly disposed of.

Drip pans are used under leaking equipment. The locations of spill kits are shown in Figure 4-2.

E. Erosion and Sediment Controls

No areas at the Ground Support Equipment Shop have been identified as having high potential for significant soil erosion that would require erosion and sediment control measures.

F. Best Management Practices to Minimize Pollutant Contact with Storm Water

Facility personnel receive annual training from ECPD at minimum, as well as an initial training for all new personnel. Training information will include the BMPs that have been developed for the facility and a general overview of the storm water program and its objectives.

Existing BMPs at the Ground Support Equipment Shop are shown in Table 2-2 and attached as fact sheets to this SWPPP in Appendix A.

TABLE 2-2. BEST MANAGEMENT PRACTICES

BMP No.	BMP Title	Description
001	Label All Drums, Cans, Containers, Tanks, and Valves	All containers and drums are labeled.
002	Restrict Access to Area and Equipment	The facility is fenced and gates padlocked outside normal working hours to restrict access to the site.
006	Control Spills	Spill kits are provided at the facility. Absorbents are used to clean spill on a daily basis. Absorbents are also utilized within drip pans/bladders to facilitate cleaning.
007	Place Trash Receptacles at Appropriate Locations	Covered trash bins are located throughout the facility
015	Recycle	Recyclable materials are stored in appropriate containers until it can be transported to the Recycle Center.
016	Store Waste and Recycling Materials in Proper Containers	Waste and recycling containers are located Waste containers will be emptied regularly. Dumpsters should all have lids; lids should be kept closed when not in use.
033	Check Vehicles and Equipment for Leaks	Vehicles and equipment are checked for leaks on a regular basis.
037	Park Vehicles on an Impervious Surface	All vehicles are parked on an impervious surface.
041	Wash Equipment in Designated Areas	Vehicles and equipment are washed at a designated area.
042	Discharge Wash Water to Sanitary Sewer	The wash down water collects in the OWS and discharges to the sanitary sewer.
044	Use Drip Pans under Leaking Equipment	Drip pans/pallets and bladders, along with absorbent pads, are utilized under leaking equipment.
061B	Store Liquids and Significant Materials within a Building or Covered Area	All significant materials are properly stored undercover and in secondary containment where required.
077	Vacuum Particulate Wastes from Sanding or Painting Operations	Precipitator is constructed for particulate wastes from the spray painting booth.

BMP No.	BMP Title	Description
098	Construct Oil/Water Separator	A below-grade OWS for the wash down area is located at the southwestern corner of the facility.
113	Conduct Personnel Training Regarding the SWPPP	Personnel are trained regularly (initial orientation and annual refresher).

3 Inspections, Assessments and Monitoring

3.1 Routine Quarterly Site Inspections

The MS4 Permit requires a routine quarterly site inspection by a qualified person with at least one member of the storm water pollution control team participating. At least once each calendar year, the routine inspection must be conducted during a period when a storm water discharge is occurring. The site inspection is an overall evaluation of the effectiveness of the BMPs implemented at that facility. A Routine Facility Inspection Checklist (Appendix B) shall be completed during each routine site inspection and kept onsite with this SWPPP. During normal facility operating hours, inspections must be conducted of areas of the facility including, but not limited to, the following:

- Areas where industrial materials or activities are exposed to storm water;
- Areas identified in the SWPPP and those that are potential pollutant sources;
- Areas where spills and leaks have occurred in the past three years;
- Discharge points; and
- Control measures used to comply with the effluent limits contained in this permit.

3.2 Visual Assessment of Storm Water Discharges

A Quarterly Visual Assessment of storm water discharge is required for all industrial facilities at MCBH. Storm water samples for this visual assessment but must be collected in such a manner that the samples are representative of the storm water discharge from the facility. Therefore, the water sample must be collected at the designated storm water monitoring point (Outfall 01) as shown in Figure 4-2. The Quarterly Visual Assessment checklist (Appendix C) shall be completed by the current facility ECC and kept onsite with this SWPPP.

The visual assessment must be made:

- Of a sample collected in a clean, colorless glass or plastic container, and examined in a well-lit area;
- On samples collected within the first 30 minutes of an actual discharge from a storm event. If it is not possible to collect the sample within the first 30 minutes of discharge, the sample must be collected as soon as practicable after the first 30 minutes and documented why it was not possible to take the sample within the first 30 minutes; and
- For storm events, on discharges that occur at least 72 hours (three days) from the previous discharge.

Whenever the visual assessment shows evidence of storm water pollution, corrective action procedures to remedy the pollutants must be taken and documented. Refer to Section 4 for corrective action procedures.

4 Corrective Actions

A corrective action is defined as any action taken, or required to be taken, to (1) repair, modify, or replace any stormwater control used at the site; (2) clean up and dispose of spills, releases, or other deposits found on the site; and (3) remedy a permit violation. Corrective actions should be documented using the Corrective Action Log (Appendix D).

4.1 Immediate Actions

If corrective action is needed, you must immediately take all reasonable steps necessary to minimize or prevent the discharge of pollutants until a permanent solution is installed and made operational, including cleaning up any contaminated surfaces so that the material will not discharge in subsequent storm events. Note: In this context, the term "immediately" requires you to, on the same day a condition requiring corrective action is found, take all reasonable steps to minimize or prevent the discharge of pollutants until a permanent solution is installed and made operational. However, if a problem is identified at a time in the workday when it is too late to initiate corrective action, the initiation of corrective action must begin no later than the following workday. "All reasonable steps" means that the permittee has undertaken initial actions to assess and address the condition causing the corrective action, including, for example, cleaning up any exposed materials that may be discharged in a storm event (e.g., through sweeping, vacuuming) or making arrangements (i.e., scheduling) for a new BMP to be installed at a later date.

4.2 Escalating Actions

If additional actions are necessary beyond those implemented or if the conditions continue to occur, additional corrective actions (e.g., install a new or modified control and make it operational, complete the repair) must be completed before the next storm event if possible, and within 14 calendar days from the time of discovery of the corrective action condition. If it is infeasible to complete the corrective action within 14 calendar days, document why it is infeasible to complete the corrective action within the 14-day timeframe and identify a schedule for completing the work, which must be done as soon as practicable after the 14-day timeframe but no longer than 45 days after discovery. If the completion of corrective action will exceed the 45-day timeframe, the minimum additional time necessary to complete the corrective action can be taken, provided that MCBH ECPD and DOH is notified of your intention to exceed 45 days. Where your corrective actions result in changes to any of the controls or procedures documented in your SWPPP, you must modify your SWPPP accordingly within 14 calendar days of completing corrective action work.

4.3 Corrective Actions for Substantially Identical Outfalls

If the event triggering corrective action is associated with an outfall that had been identified as a "substantially identical outfall", the review must assess the need for corrective action for all related substantially identical outfalls. Any necessary changes to control measures that affect these other outfalls must also be made before the next storm event if possible, or as soon as practicable following that storm event. Any corrective actions must be conducted within the timeframes discussed above.

4.4 Record of Past Spills or Leaks of Hazardous Pollutants

Table 4-1 is used to record significant spills and leaks that have occur or have occurred within three years prior to the preparation or amendment of this SWPPP. Significant spills and leaks include, but are not limited to, releases of oil or hazardous substances in excess of quantities that are reportable under CWA Section 311 (see 40 CFR 110.6 and 40 CFR 117.21) or Section 102 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 USC §9602.

At the time of this SWPPP update, there have been no past spill or leak incidents reported for the Ground Support Equipment Shop.

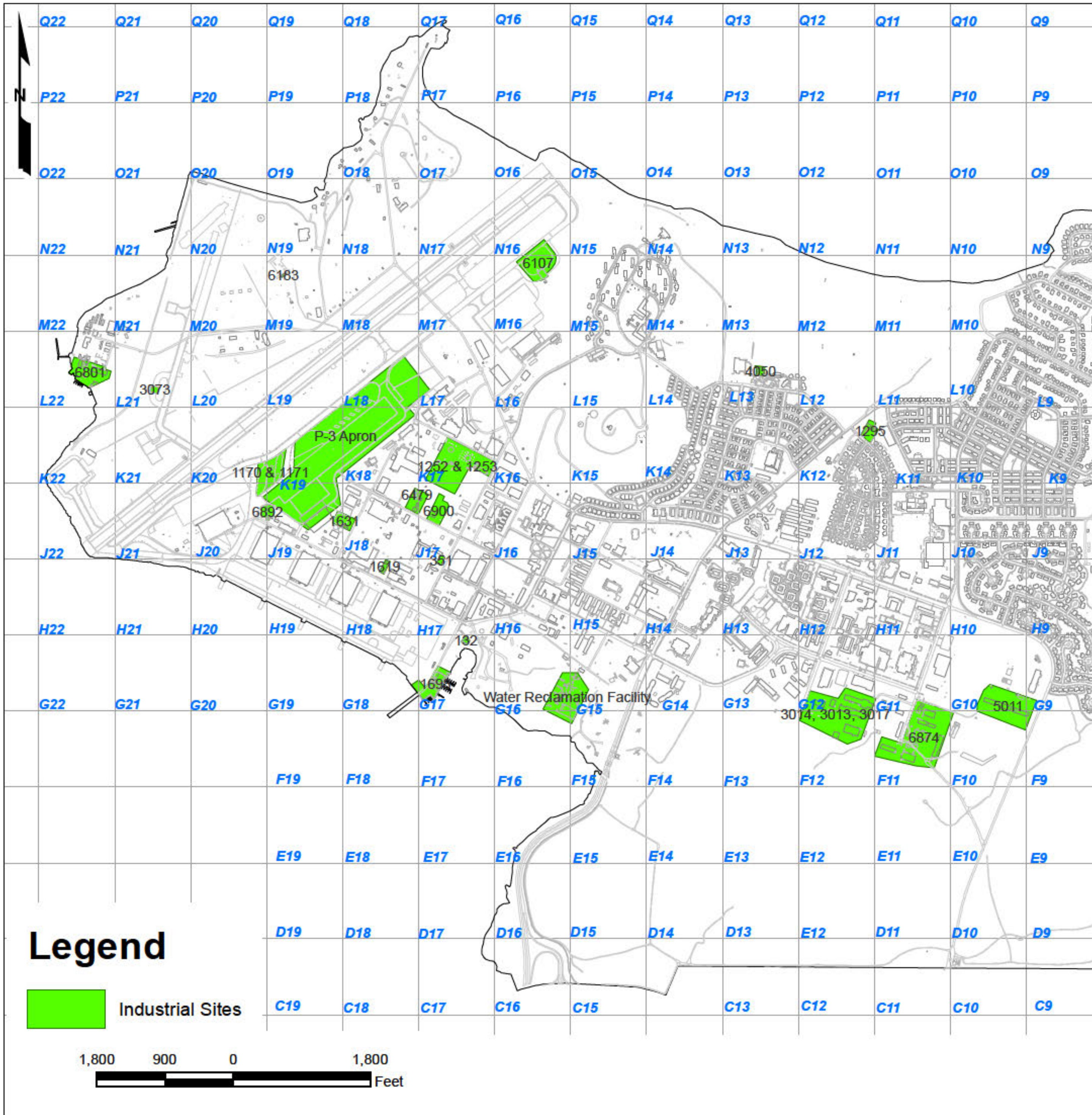
TABLE 4-1. PAST SPILLS OR LEAKS OF HAZARDOUS POLLUTANTS

Date of Incident	Brief Summary of Incident (POC Active at Time of Incident, Pollutant Type, Estimated Quantity, Location of Spill)

4.5 Record of Unauthorized Non-Storm Water Discharges

TABLE 4-2. UNAUTHORIZED NON-STORM WATER DISCHARGE EVALUATION

Date of Evaluation	Brief Summary of Evaluation (Description of the evaluation criteria, outfalls or onsite drainage points that were directly observed, action(s) taken, such as a list of control measures used to eliminate unauthorized discharge)



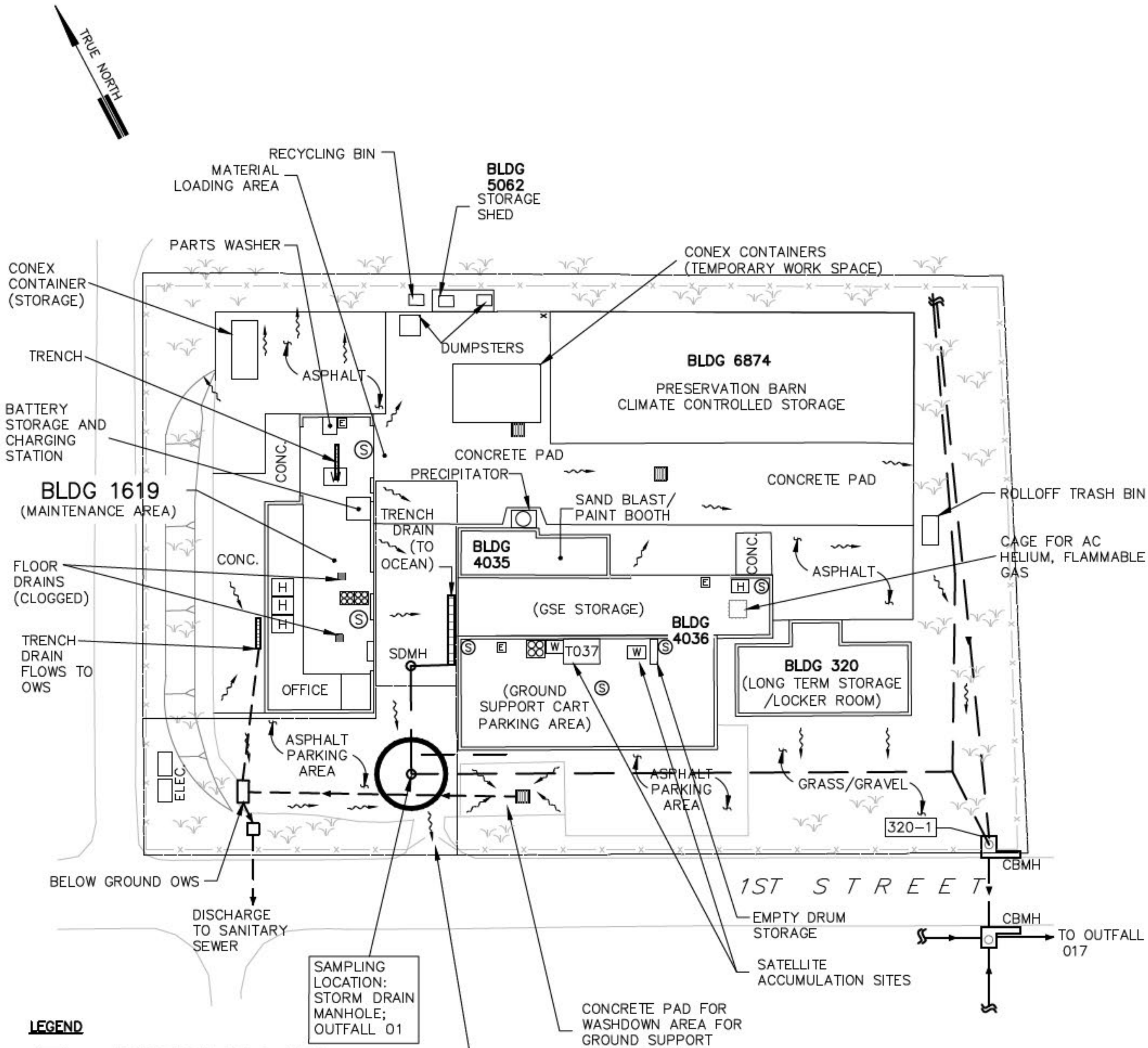
element environmental llc
environmental · engineering · water resources

PROJECT TITLE
MCBH SWPPP
Storm Water Management Program Plan

FIGURE TITLE
General Location Map

DATE
September 2022

FIGURE NO.
4-1



LEGEND

- H — HAZARDOUS MATERIALS LOCKER
- SPILL PALLET W/DRUMS
- W — WASTE ACCUMULATION SITE
- S — SPILL KIT
- E — EYEWASH STATION
- STORM DRAIN SYSTEM
- STORM DRAIN INLET
- SANITARY SEWER SYSTEM
- FLOW ARROW
- DRAINAGE AREA BOUNDARY

NOTES:

1. STORM WATER, FROM APPROXIMATELY 3.8 ACRES ASSOCIATED WITH BUILDING 1619, DISCHARGES TO KANEOHE BAY VIA OUTFALL 017.
2. FLOOR DRAINS IN BUILDING 1619 DRAIN TO OWS.
3. NOT TO SCALE

DATE: JULY 2022	PROJECT TITLE: STORM WATER POLLUTION PREVENTION PLAN MCBH, KANEOHE BAY, OAHU, HAWAII	
FIGURE TITLE: GROUND SUPPORT EQUIPMENT SHOP (BUILDING 1619)		FIGURE NO.: 4-2

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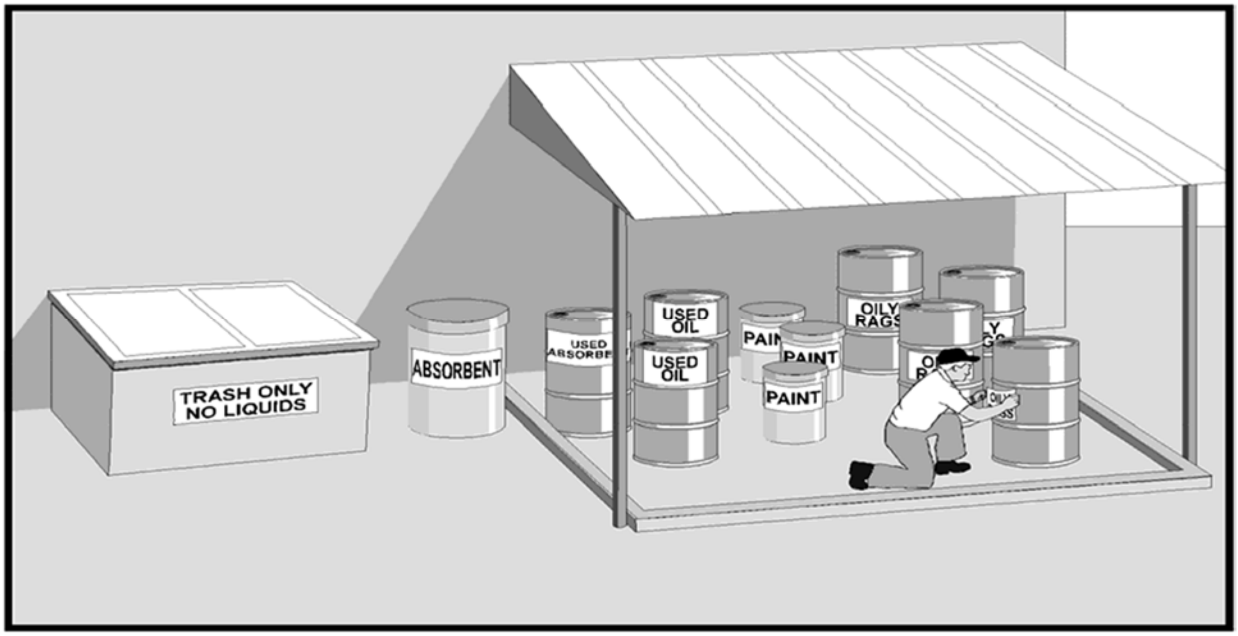
FIG 12-9 Bldg 1619 — Ground Support Equipment Shop.dwg

APPENDIX A

SELECTED BMP FACT SHEETS

BMP 001 - LABEL ALL DRUMS, CANS, CONTAINERS, AND TANKS



Description of Potential Pollutant and Source: Drums, cans, and containers can be improperly managed and disposed of due to uncertainty of the container's contents. Tanks which are not labeled may result in improper use of the tank or fuel, which may result in the exposure of significant materials to storm water and/or receiving waters. Similarly, unlabeled valves may be opened without proper precaution due to lack of user information. Storm water quality will be affected if significant materials are improperly disposed to the storm drain and/or receiving waters. Lack of labeling will also make it difficult to quickly identify the type of material released so facility personnel can respond correctly. Labels also identify hazardous materials at the facility and are a good way to request caution in certain areas (e.g., drums indicating flammability).

Description of BMP: Label all drums, valves, pumps, cans, tanks, and containers to reduce the chance of misuse and eventual spills. Labeling ensures that the appropriate procedures, equipment, and storage containers are used. All containers will be labeled as to what is in them.

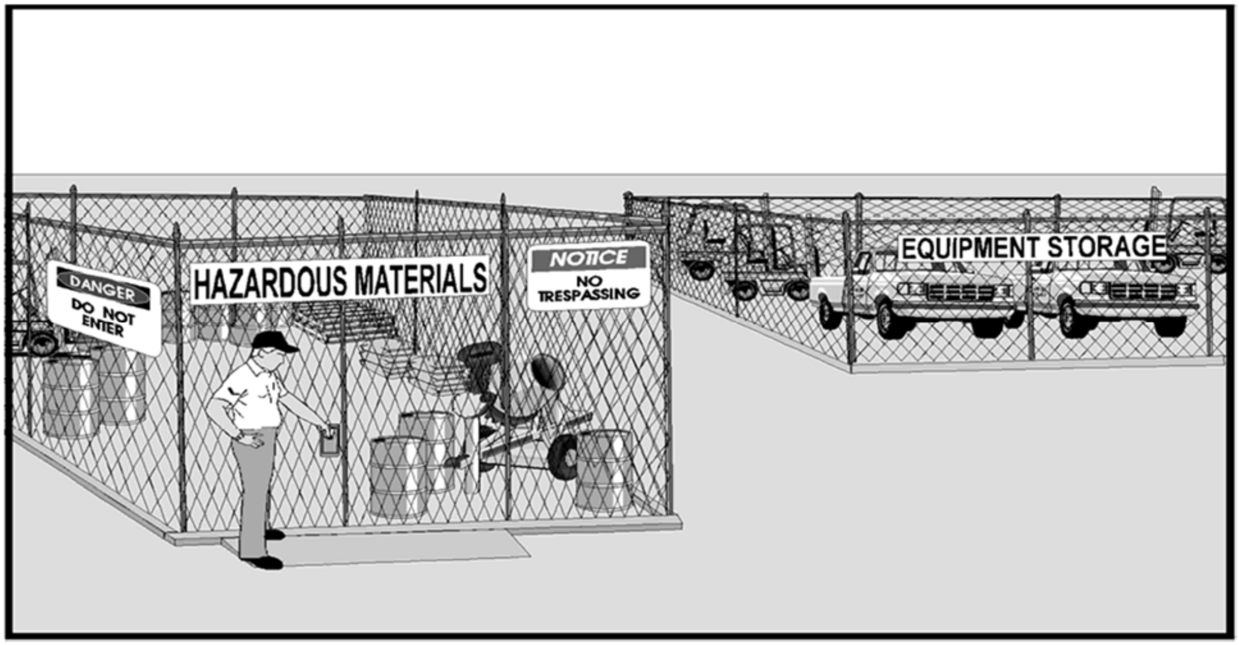
Application Guidance: As needed.

Training: N/A

Effectiveness and Cost: Effectiveness and costs will vary depending on the application.

Limitations: None

BMP 002 - RESTRICT ACCESS TO AREA AND EQUIPMENT



Description of Potential Pollutant and Source: Vandalism of vehicles and facility property may result in the release of significant materials.

Description of BMP: Provide fences and gate areas where vehicles, equipment and materials are stored and are accessible to the public to discourage trespassing. Access to equipment will also be restricted. Only authorized personnel will be allowed to operate equipment. The fences and gates will be properly maintained, and additional security measures including lighting of the area will be implemented if the fencing alone proves insufficient. Where appropriate, security guards or alarms will be used.

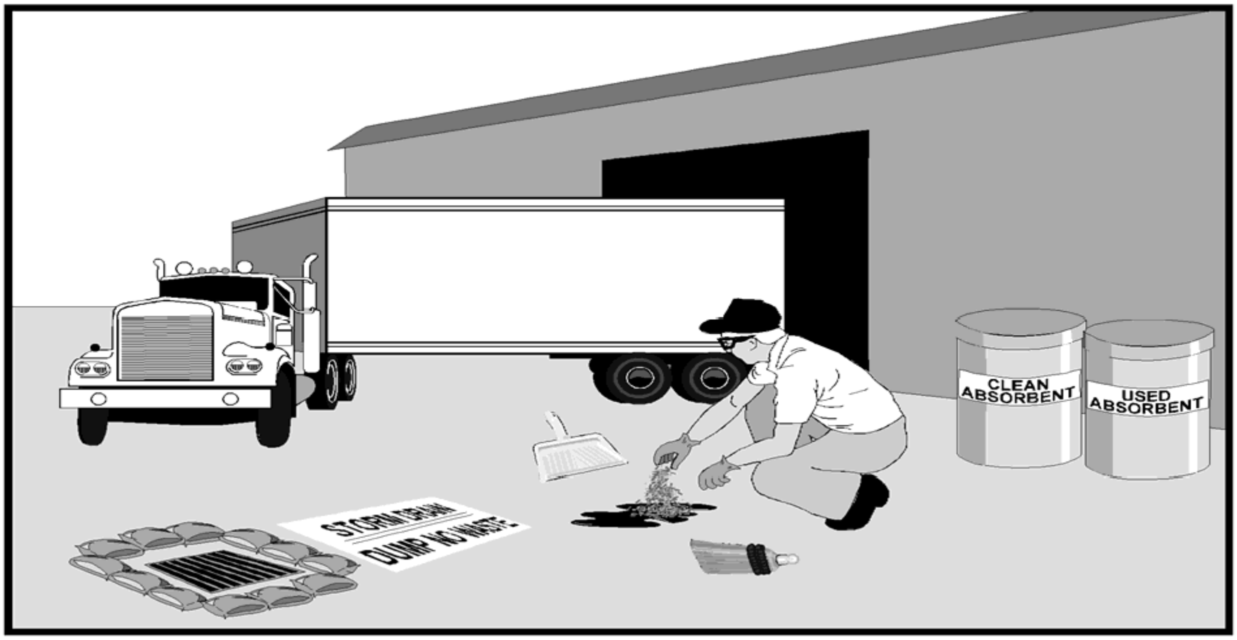
Application Guidance: As needed.

Training: N/A

Effectiveness and Cost: Effectiveness and costs will vary depending on the application.

Limitations: None

BMP 006 - CONTROL SPILLS



Description of Potential Pollutant and Source: Spills of significant materials may be exposed to storm water and transported to storm drains and/or receiving waters.

Description of BMP: Follow safety data sheets (SDS) for handling, storage, and cleanup of all significant materials to reduce the potential for spills.

Any spill, large or small, of significant materials will be controlled to prevent pollutants from being transported to storm drains and/or receiving waters. Appropriate spill control material will be kept on site. Smaller spills will be contained using absorbent material such as kitty litter, straw, or sawdust. Drums of absorbent material will be easily accessible and clearly marked, and containers for spent absorbent material will be readily available. Spent absorbent material will be managed appropriately and disposed of in accordance with applicable regulations. Larger spills will be controlled using spill kits, brooms, and other response equipment commensurate with the size of the spill. The methods outlined in the Activity's spill prevention and response plans (BMP 112) for hazardous materials will be followed for spills of any potential storm water pollutants. The date, time, nature and volume of material spilled, and cleanup measures taken will be recorded for all spills and kept as part of the SWPPP.

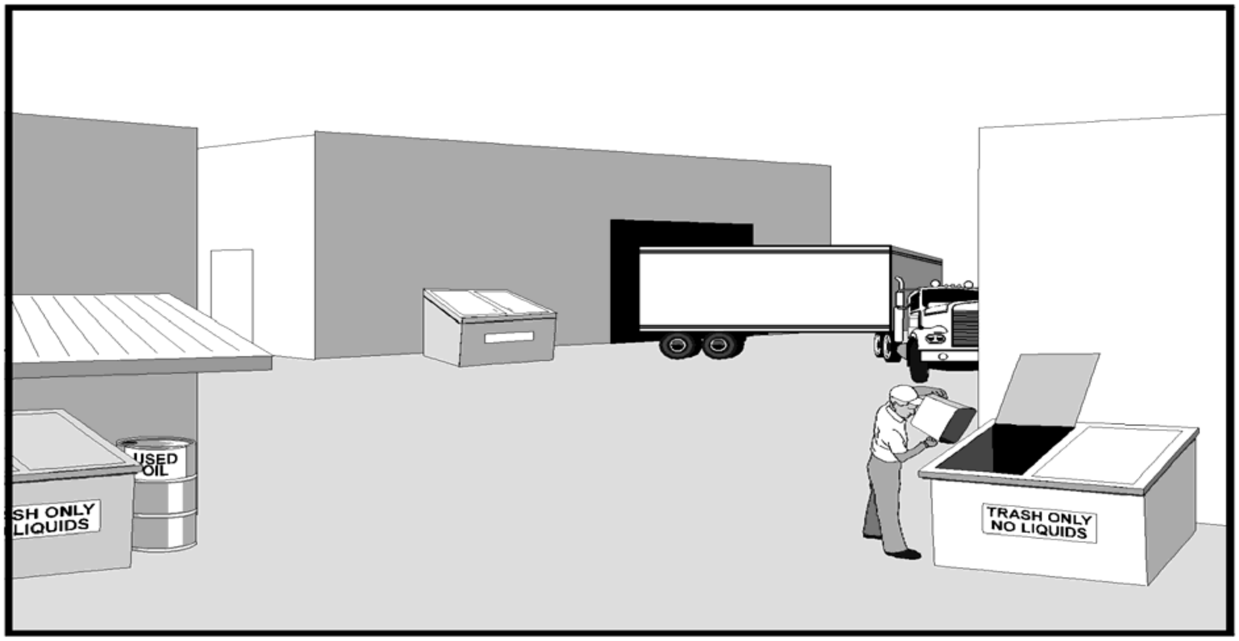
Application Guidance: Controlling spills will be practiced under all working conditions.

Training: Personnel will be trained in spill prevention and response procedures including the use of personal protection equipment (gloves, eye and face protection, etc.). This will include what absorbent or equipment to use, how to use the absorbent or equipment, where to find it, how to dispose of the spent absorbent or other material, and who to notify in the event of a spill.

Effectiveness and Cost: Spill control is a moderately effective, low-cost BMP.

Limitations: None

BMP 007 - PLACE TRASH RECEPTACLES AT APPROPRIATE LOCATIONS



Description of Potential Pollutant and Source: Improperly located or insufficient numbers of trash receptacles will promote poor housekeeping practices. This will increase the opportunity for pollutants from all source areas to reach storm water.

Description of BMP**:** Properly located and sufficient numbers of trash receptacles will promote the proper disposal of waste materials. This reduces the opportunity for pollutants to reach storm water. Trash receptacles will be easily accessible for personnel.

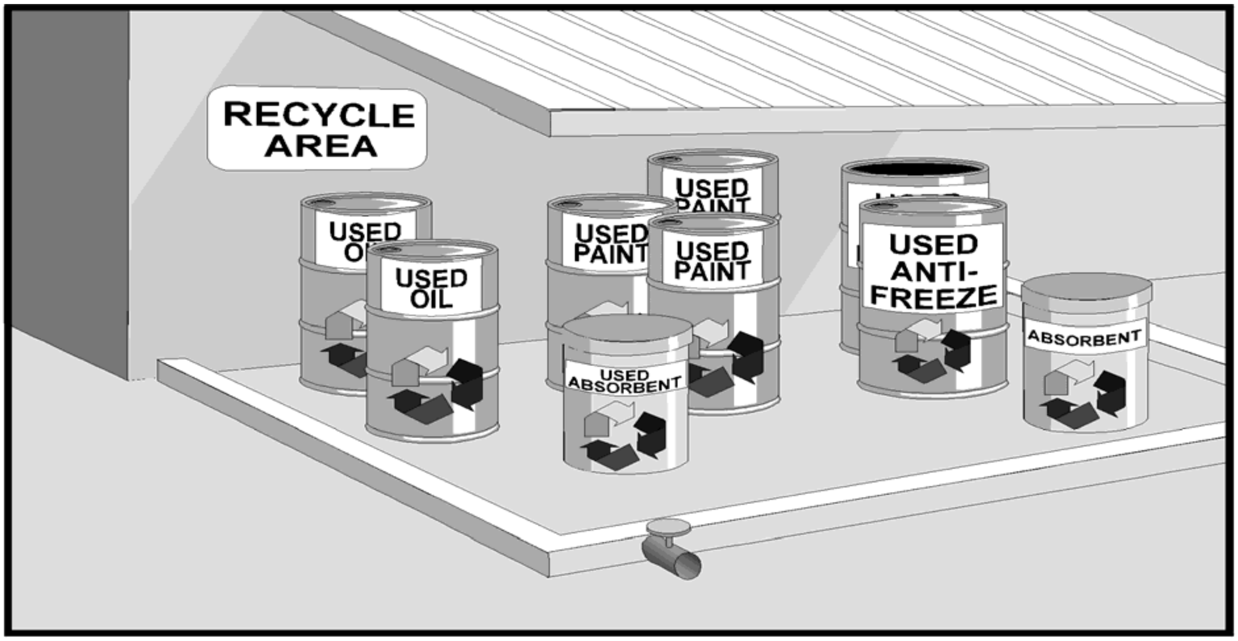
Application Guidelines: Placement of trash receptacles at appropriate locations will always be practiced.

Training: Personnel will be trained as to the location of trash receptacles.

Effectiveness and Cost: Appropriately located trash receptacles are an effective, low-cost BMP.

Limitations: None

BMP 015 – RECYCLE



Description of Potential Pollutant and Source: Many materials, both hazardous and non-hazardous, can be sources of pollutants. Recycling will be employed to reduce the amount of waste material exposed to storm water on the Activity.

Description of BMP: Recycle materials to the fullest extent possible in all situations.

Application Guidance: Recycling collections will be conducted at least weekly for recyclable items such as solvents, oil, scrap metals, wash water and absorbent materials. Separating the recyclable items facilitates recycling.

The frequency for implementing this BMP has been provided as general guidance. However, a facility operator may wish to establish a more suitable frequency. This will require SWPPP implementors to make judgements based on facility operations and conditions. To assign a frequency other than what has been suggested (i.e., more or less frequent), the following criteria will be considered and rated either High, Medium, or Low. If many of the criteria are assigned a High rating, the frequency may be increased. Similarly, if many criteria are assigned a Low rating, the frequency may be decreased. The goal of implementing this BMP is to minimize exposure of pollutants to storm water.

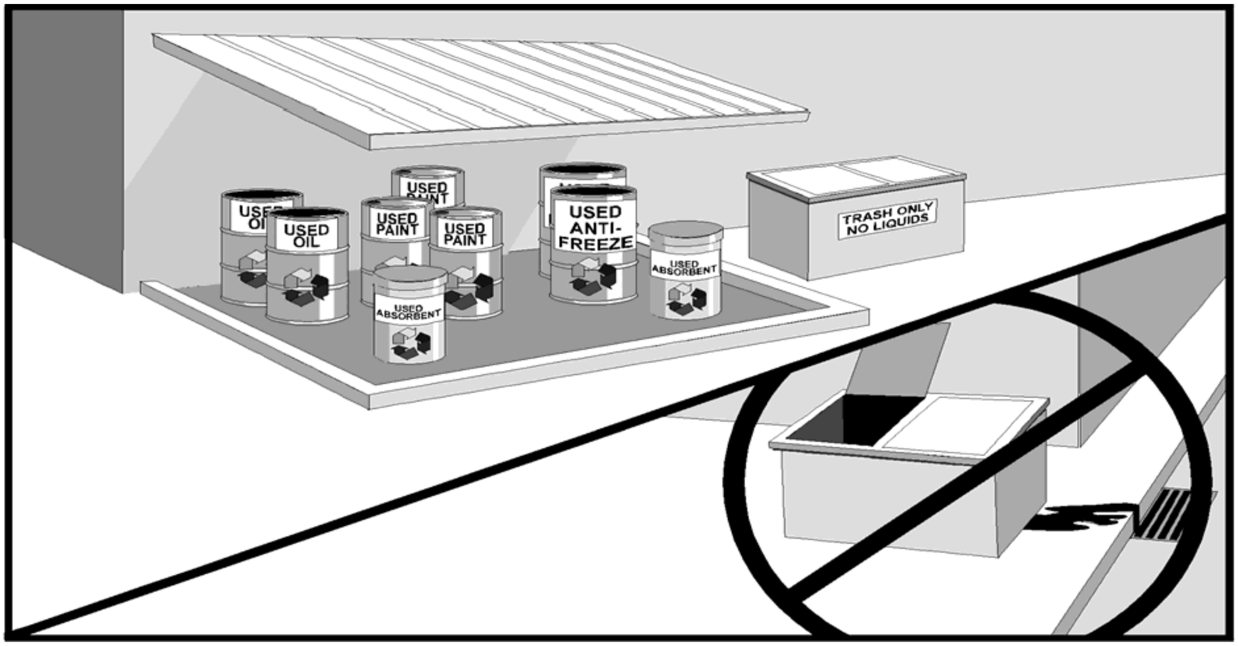
CRITERIA	Rating H=High M=Medium L=Low
Probability of exposure of significant materials to storm water	
Quantity of significant materials potentially exposed	
Toxicity of significant materials potentially exposed	
Frequency of use of significant materials potentially exposed	
Evidence of exposure (e.g., stains on pavement, etching of concrete	
Proximity of source area to outfall or receiving water	
Sensitivity of receiving water to potentially exposed significant materials (e.g., waters with beneficial uses such as human contact, recreation, significant species habitat, etc.)	

Training: Personnel will be trained on proper recycling techniques along with posting and maintenance of signs.

Effectiveness and Cost: Effectiveness and cost will be site specific.

Limitations: Local vendors may not be available to receive certain recyclable materials.

BMP 016 - STORE WASTE AND RECYCLING MATERIALS IN PROPER CONTAINERS



Description of Potential Pollutant and Source: Dry waste, including items such as scrap metal, floor sweepings, metal chips, and paper goods, can be dispersed by wind or operational error if not stored properly. If a dumpster's lid is not kept closed, animals may carry garbage out of the containers. Uncovered dumpsters also expose waste to storm water, which may leak out of the dumpster and into the storm sewer system.

Description of BMP: Locate waste and recycling drums and containers in centralized areas, using proper labeling (both containers and location) and providing easy access. If possible, the area will have secondary containment (see BMPs 012, 013, and 014). Waste containers will be emptied regularly. Dumpsters will all have lids; lids will be kept closed when not in use. If the dumpster has inadequate capacity and it is not possible to keep the cover closed, the frequency of pick-up will be increased, or the dumpster will be replaced with a model of greater capacity.

Application Guidance: This BMP will be applied to all waste and recycling storage areas.

Training: Personnel will be trained to monitor waste and recycling storage sites to ensure their materials are properly stored and that there are no overflowing containers.

Effectiveness and Cost: This is a moderately effective, low-cost BMP.

Limitations: None

BMP 033 - CHECK VEHICLES AND EQUIPMENT FOR LEAKS

Description of Potential Pollutant and Source: Vehicles, aircraft, or equipment entering or stored at a maintenance facility may be leaking a variety of fluids (fuel, oil, antifreeze, freon, etc.). These materials can be exposed to storm water.

Description of BMP: Inspect all vehicles and equipment at the site, whether incoming, parked, stored, or salvaged, for oil and fluid leaks. Drivers of fleet vehicles, such as delivery trucks, will also check under their vehicles each morning for fluid leaks. If leaks are present, drip pans will be placed under the vehicle or equipment. Once the vehicle is removed from the site, the former parking area will be inspected for stains, and these stains will be cleaned using rags or dry solvents.

Application Guidance: Any vehicle or equipment coming in for repairs, painting, or storage will be inspected for leaks. Fleet vehicles will be inspected each morning. Vehicles that are parked, stored, or salvaged will be provided with drip pans, as will tanker rail cars waiting to be unloaded. The frequency for implementing this BMP has been provided as general guidance. However, a facility operator may wish to establish a more suitable frequency. This will require SWPPP implementors to make judgements based on facility operations and conditions. To assign a frequency other than what has been suggested (i.e., more or less frequent), the following criteria will be considered and rated either High, Medium, or Low. If many of the criteria are assigned a High rating, the frequency may be increased. Similarly, if many criteria are assigned a Low rating, the frequency may be decreased. The goal of implementing this BMP is to minimize exposure of pollutants to storm water.

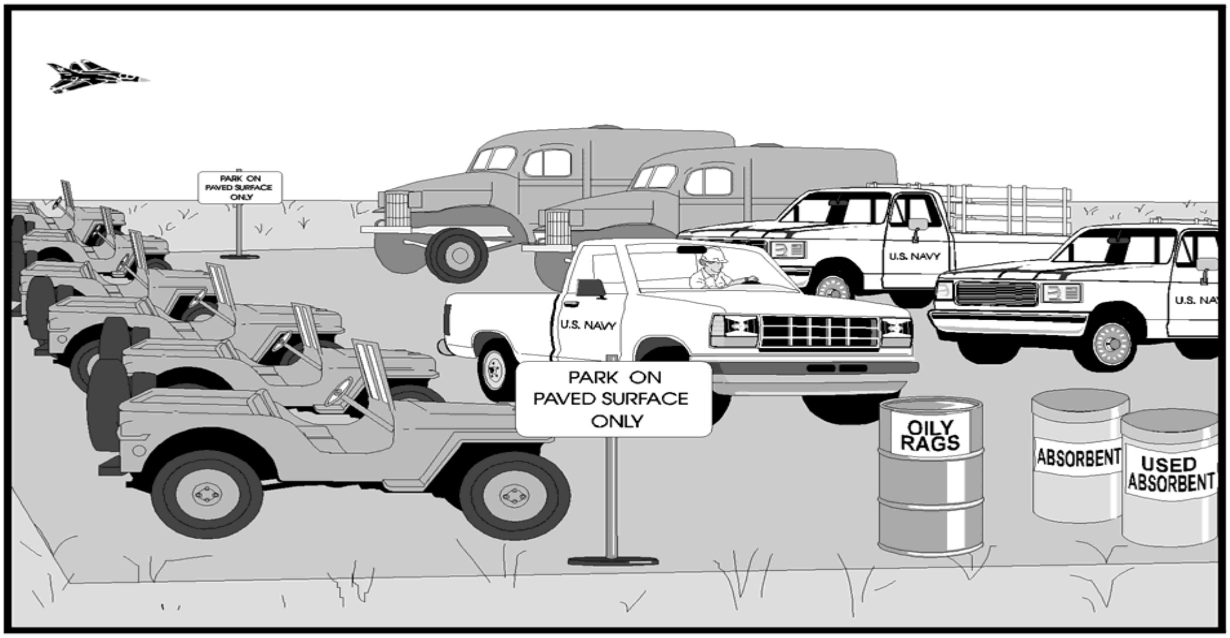
CRITERIA	Rating H=High M=Medium L=Low
Probability of exposure of significant materials to storm water	
Old age or poor condition of equipment and vehicles	
Evidence of exposure (e.g., stains on pavement)	
Proximity of source area to outfall or receiving water	
Sensitivity of receiving water to potentially exposed significant materials (e.g., waters with beneficial uses such as human contact, recreation, significant species habitat, etc.)	

<u>Training:</u> Signs will be posted to remind personnel of proper procedures.

<u>Effectiveness and Cost:</u> Checking for leaks is a moderately effective, low-cost BMP.

<u>Limitations:</u> None

BMP 037 - PARK VEHICLES ON AN IMPERVIOUS SURFACE



Description of Potential Pollutant and Source: Pollutants leaking or spilled onto the ground surface from vehicles can infiltrate into the soil. These pollutants (i.e., oil, fuel, etc.) may then be exposed to storm water and transported to surface water.

Description of BMP: Park vehicles on an impervious surface. For this BMP, an impervious surface is defined as a surface that cannot be readily penetrated by rainfall, such as concrete and asphalt pavement. Leaks and spills will be cleaned from these surfaces.

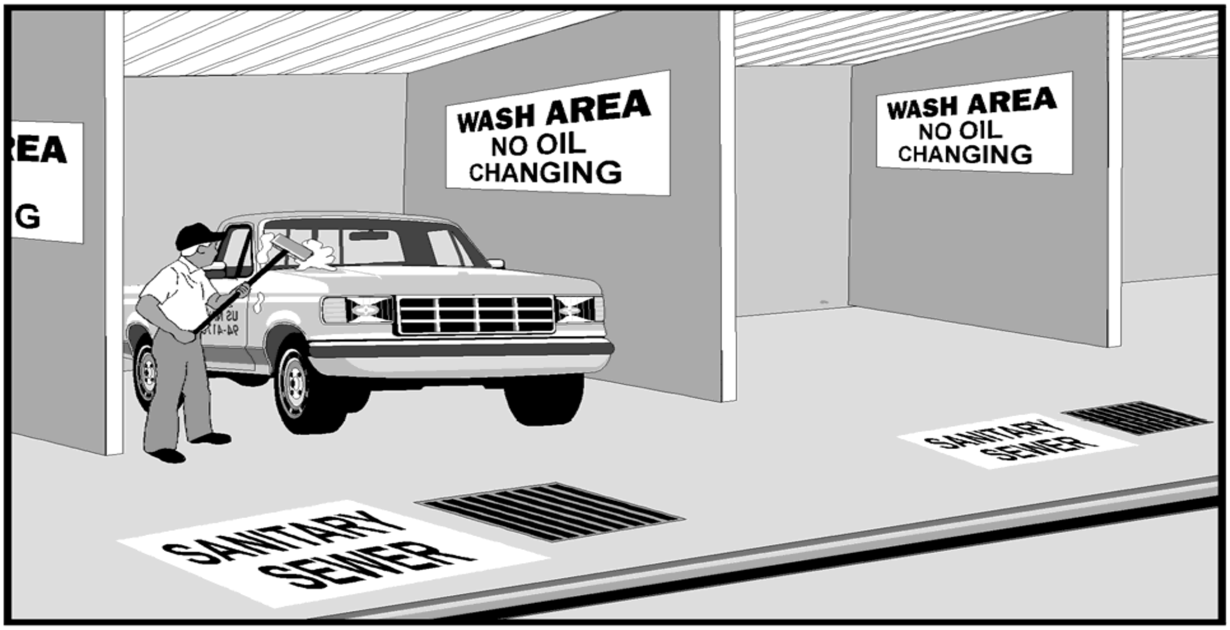
Application Guidance: Vehicles will always be parked on impervious surfaces, especially during the rainy season.

Training: Signs will be posted to remind personnel that all vehicles are to be parked on paved surfaces.

Effectiveness and Cost: Parking vehicles on impervious surfaces is a moderately effective, low-cost BMP.

Limitations: Very large traffic volumes may make implementation of this BMP difficult.

BMP 041 - WASH EQUIPMENT AND VEHICLES IN DESIGNATED AREA



Description of Potential Pollutant and Source: Washing equipment and vehicles outdoors or in areas where wash water flows onto the ground can pollute storm water. It is difficult to control the wastewater from washing operations if it is not done in a designated area.

Description of BMP: Facilities will designate bermed wash areas that contain wash water and prevent contact with storm water. These areas will drain to the sanitary sewer (BMP 042) or to a sump. If a sump is used, wash water will be recycled.

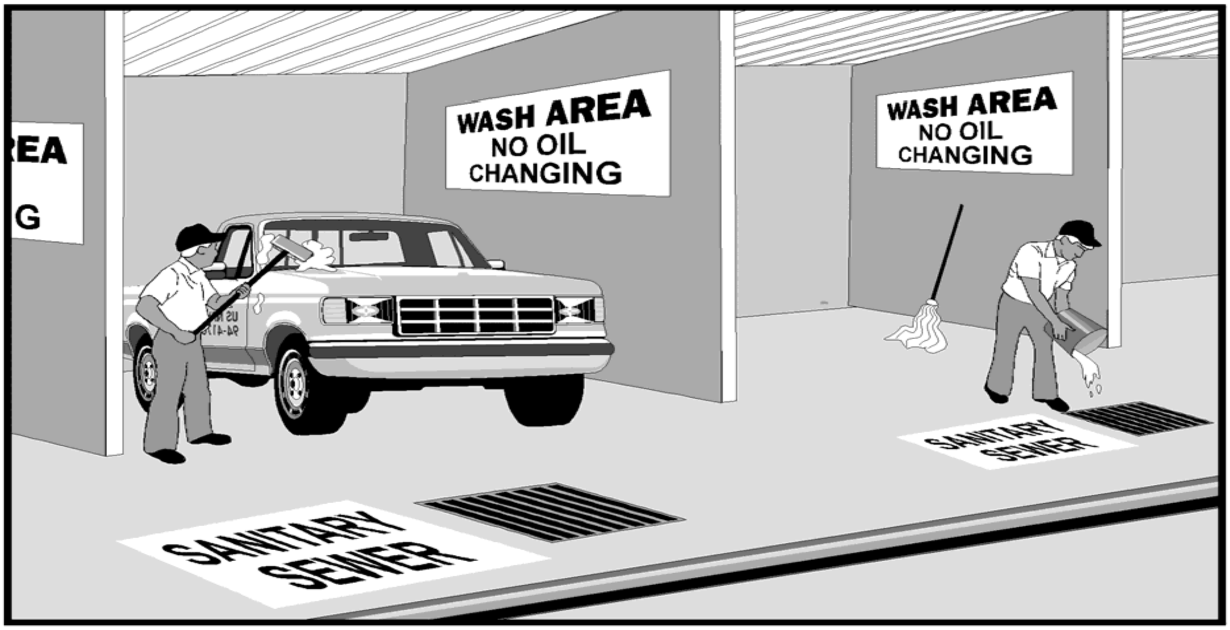
Application Guidance: This practice will be followed wherever vehicles, equipment and aircraft are washed.

Training: N/A

Effectiveness and Cost: This is a highly effective, variable-cost BMP.

Limitations: Pretreatment and monitoring of wash waster discharges to the sanitary sewer may be required. This would greatly increase the cost of this practice. The treatment plant operator will be notified and approval obtained before discharge.

BMP 042 - DISCHARGE WASH WATER TO A SANITARY SEWER



Description of Potential Pollutant and Source: Wash water from vehicle, equipment, and floor cleaning activities often contains such as grease, oil, and gasoline which can be exposed to storm water. Wash water must not be discharged to the storm drain.

Description of BMP: Discharge wash water to a sanitary sewer to ensure that is does not enter a storm drain. (See BMP 041, "Wash Equipment and Vehicles in Designated Areas.") Wash water from mopping floors will also be discharged to the sanitary sewer.

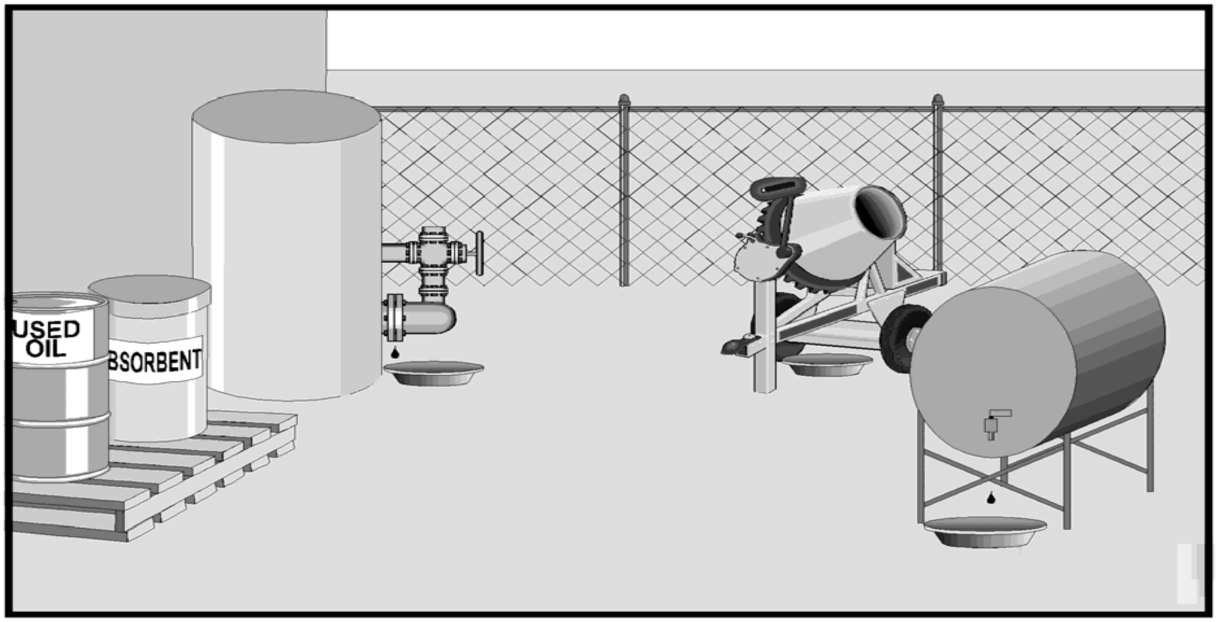
Application Guidance: All wash water from vehicle and equipment cleaning activities will be discharged to a sanitary sewer. In areas where wash water cannot be discharged to a sanitary sewer, wash water will be collected in a dead-end sump, tank, or other device and transported or pumped to the nearest treatment facility for proper disposal.

Training: Personnel will be trained to know where cleaning activities will be performed.

Effectiveness and Cost: Discharging wash water to a sanitary sewer is a highly effective, variable-cost BMP.

Limitations: Pretreatment and monitoring of wash water discharges to the sanitary sewer may be required. This would greatly increase the cost of this practice. The treatment plant operator will be notified and approval obtained before discharge.

BMP 044 - USE DRIP PANS UNDER LEAKING EQUIPMENT



Description of Potential Pollutant and Source: Equipment such as pumps, air conditioners, and boilers may leak fluids. These fluids typically contain pollutants that may be exposed to storm water and transported into the storm sewer system if they are not collected.

Description of BMP: Place drip pans under leaking equipment to collect any leaking fluid., This temporary BMP will be used until the equipment is properly repaired or replaced.

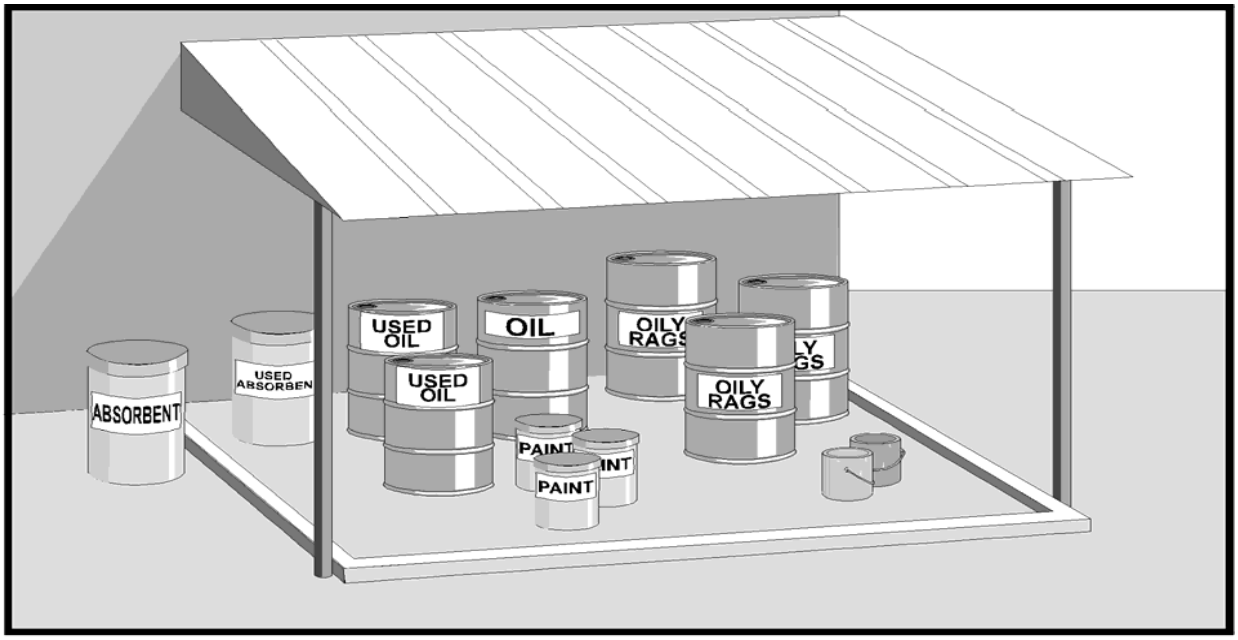
Application Guidance: Any equipment which is leaking fluid will be repaired or replaced. However, until the leak is stopped, a drip pan will be used to collect the fluid.

Training: Personnel will be trained to immediately place a drip pan under leaking equipment and notify the appropriate maintenance personnel. The drip pan will be routinely checked and the collected material disposed properly.

Effectiveness and Cost: This is a highly effective, low-cost BMP

Limitations: None

BMP 061B - STORE LIQUIDS AND SIGNIFICANT MATERIALS WITHIN A BUILDING OR COVERED AREA



Description of Potential Pollutant and Source: Many significant materials may be leaked or spilled during storage, handling, or transport. If significant materials are stored outside, in covered areas, these materials can be exposed to storm water, which can transport the leaked or spilled material into the storm drain system.

Description of BMP: To the extent practical, store significant materials within a building or covered area. The materials will be stored on an impervious surface, such as a concrete pad. Rainfall runoff from the pad will be directed to a storm water treatment facility or contained. Leaks and spills will be cleaned up as soon as possible using rags or dry absorbents (see BMP 006). Used rags and absorbents will be disposed of properly. Any wash water from cleaning the floor will be disposed of in the sanitary sewer (see BMP 042).

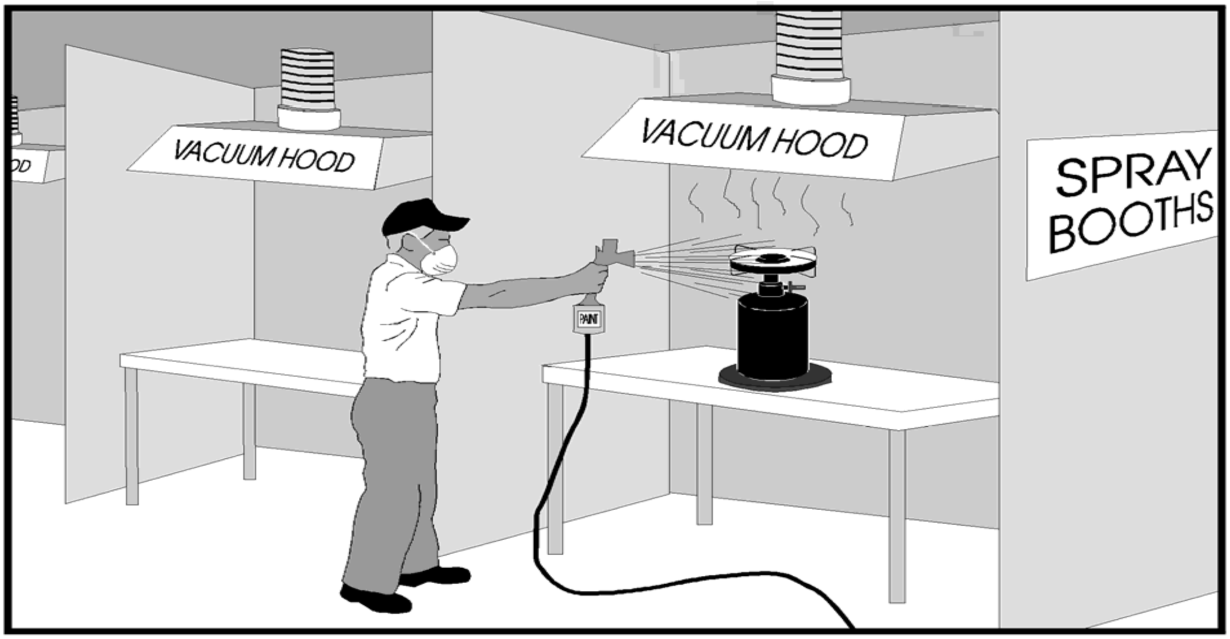
Application Guidance: All significant materials will be stored within a building or covered area.

Training: Personnel will be trained to store significant materials in designated areas.

Effectiveness and Cost: This is a moderately effective BMP. The cost will vary based on whether a building for storing the substances is available.

Limitations: None

BMP 077 - VACUUM PARTICULATE WASTES FROM SANDING OR PAINTING OPERATIONS



Description of Potential Pollutant and Source: Sanding, in preparation for painting, and painting itself creates wastes that may become exposed to storm water and transported to storm drains and/or receiving waters.

Description of BMP: Contain paint-related wastes by performing painting and sanding activities in facilities equipped with a vacuum and filters.

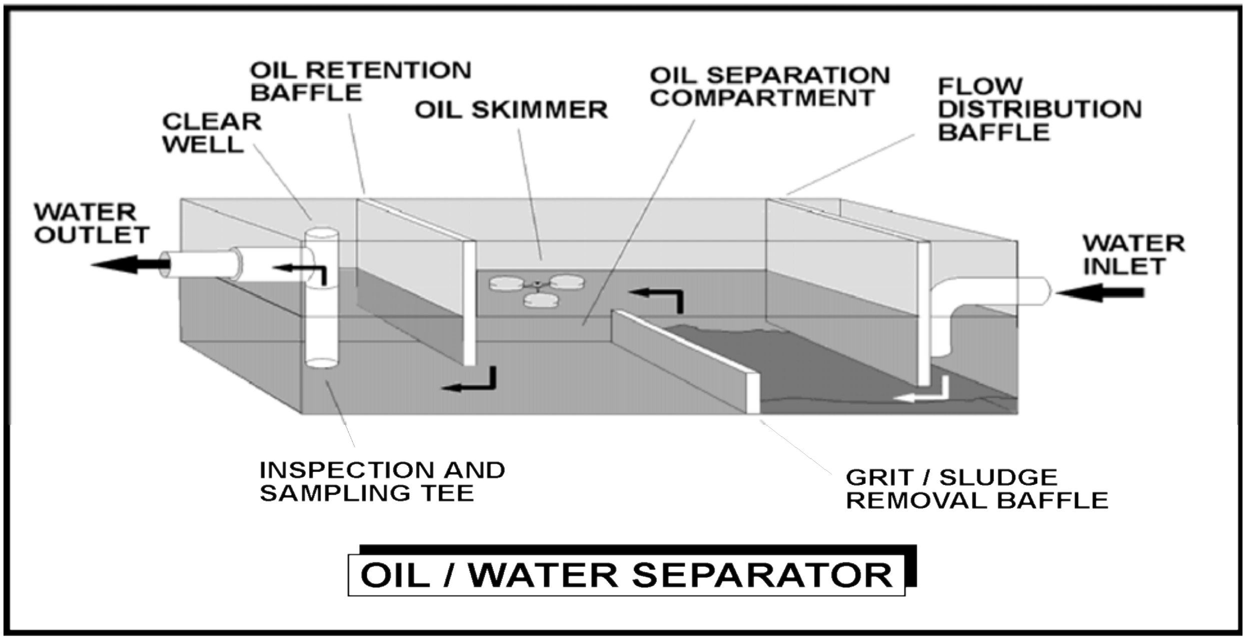
Application Guidance: This practice will be used in all sanding and painting operations.

Training: Personnel will be instructed in procedures for proper operation of vacuum and filters.

Effectiveness and Cost: Performing sanding and painting operations under vacuum is a highly effective, usually moderate-cost BMP. However, costs for large-scale sanding and painting activities (e.g., ships and large equipment) could be high.

Limitations: The size of some operations may make implementation of this practice difficult.

BMP 098 - CONSTRUCT OIL/WATER SEPARATOR



Description of Potential Pollutants and Source: Oil/water separators are designed to remove petroleum compounds and grease from storm water. Separators will also remove floatable debris and settleable solids.

Description of BMP: Construct oil/water separators. Oil/water separators are underground vaults where storm water is piped in and out of the separator. Oil/water separators come in many configurations. A common configuration is the three-chamber oil/water separator. The first chamber is the sedimentation chamber that allows for sedimentation of coarse materials and screening of debris. The second chamber provides separation of oil, grease and gasoline. The third chamber is provided to prevent any possibility of a surcharge pressure from occurring and as a safety relief for the structure if a blockage occurs.

Application Guidance: Oil/water separators are applicable to situations where the concentrations of oil-and-grease-related compounds will be usually high and source control cannot provide effective control. This generally occurs at equipment maintenance and washing facilities, gas stations and loading areas. Separators may also be used in areas heavily used by mobile equipment such as loading wharfs at marine ports.

Operation and Maintenance: The degree and frequency of maintenance significantly affects the performance of the oil/water separator. Cleaning the oil/water separator will prevent the accumulated debris and oil to be discharged from the structure during intense storms.

Oil/water separators will be checked monthly during the wet season and will be cleaned at least four times a year. They will always be cleaned in October, before the start of the wet season. The accumulated oil will be properly disposed.
The frequency for implementing this BMP has been provided as general guidance. However, a facility operator may wish to establish a more suitable frequency. This will require SWPPP implementors to make judgements based on facility operations and conditions. To assign a frequency other than what has been suggested (i.e., more or less frequent), the following criteria will be considered and rated either High, Medium or Low. If many of the criteria are assigned a High rating, the frequency may be

increased. Similarly, if many criteria are assigned a Low rating, The frequency may be decreased. The goal of implementing this BMP is to minimize exposure of pollutants to storm water.

CRITERIA	Rating H=High M=Medium L=Low
Probability of exposure of significant materials to storm water in area draining to oil/water separator	
Quantity of significant materials potentially exposed in area draining to oil/water separator	
Frequency of use of significant materials potentially exposed in area draining to oil/water separator	
Evidence of exposure (e.g., stains on pavement, etching of concrete) in area draining to oil/water separator	
Proximity of source are to outfall	
Sensitivity of receiving water to potentially exposed significant material (e.g., waters with beneficial uses such as human contact, recreation, significant species habitat, etc.)	

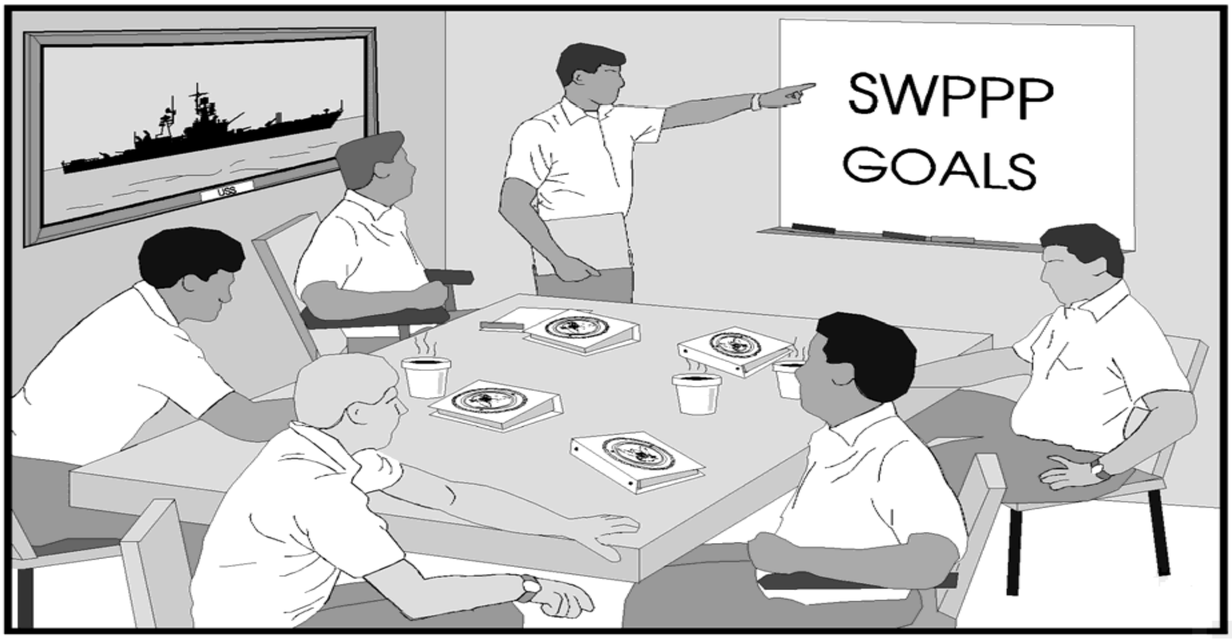
Effectiveness and Cost: This is a moderately effective, high-cost BMP.

Limitations: Oil/water separators are less effective when storm water runoff has high sediment concentrations or detergent levels which disperse oil.

Oil/water separators are only effective for highly pervious drainage areas. Oil/water separators cannot effectively treat large volumes of runoff. The maximum drainage area to oil/water separators is typically one acre.

The sediment removed during maintenance will be tested. If it is a hazardous waste, it will be disposed of accordingly.

BMP 113 - CONDUCT PERSONNEL TRAINING REGARDING THE SWPPP



Description of Potential Pollutant and Source: When properly trained, personnel are more capable of preventing spills, responding safely and effectively to an accident when it occurs, and recognizing situations that could lead to storm water contamination.

Description of BMP: Train personnel at all levels of responsibility in the components and goals of the SWPPP.

Application Guidance: Training will be conducted quarterly and at new personnel orientations.

Training: Training will address each component of the SWPPP, including how and why tasks are to be implemented. Topics will include:

- Good housekeeping
- Material management practices
- Spill prevention and response

Effectiveness and Cost: This is a highly effective, moderate-cost BMP.

Limitations: None

APPENDIX B

ROUTINE FACILITY INSPECTION CHECKLIST

Routine Facility Inspection Checklist

Activity Name: ____________________ **Date of Inspection:** ____________________

Inspector(s): ____________________ **Facility Name/Number:** ____________________

Column 1	Column 2	Column 3	Column 4	Column 5	
Source Area	BMP Number and Title	Status: F, P, N, NA[1]	Briefly Describe Effectiveness (Good or Other [describe])	Corrective Measures	
				What	By When

Note 1: F – Fully implemented, P – Partially implemented, N – Not implemented , NA – Not Applicable

APPENDIX C

QUARTERLY VISUAL ASSESSMENT CHECKLIST

Quarterly Visual Assessment Checklist

Facility ID and Location: ______________________

Date: ____________________

Sampler Name (Printed): ______________________ Signature: ______________________

Time of Rainfall Begin: ________________ Time of Rainfall End: ____________________

Time of Flow Begin: ________________ Time of Flow End: ____________________

Rainfall event more than 72 hours since last event? Yes / No Rainfall Event Total: ____________________

Sample: sample in a clean, colorless glass or plastic container, and examined in a well-lit area

On samples collected within the first 30 minutes of an actual discharge from a storm event

Sample Characteristics:

Color: ____________________ Floating Solids: ____________________

Odor: ____________________ Settled Solids: ____________________

Clarity: ____________________ Suspended Solids: ____________________

Oil Sheen: ____________________ Foam: ____________________

Other Obvious Indicators of Storm Water Pollution

(describe): ____

Nature of the discharge (i.e., runoff):

Results of observations of the storm water discharge:

Probable sources of any observed storm water contamination:

If applicable, why it was not possible to take samples within the first 30 minutes:

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

APPENDIX D

CORRECTIVE ACTION LOG

Corrective Action Log

Use this form to document SWPPP corrective actions. This form is to be completed by the Environmental Compliance Coordinator (ECC) or a person designated by ECC and submitted to the MCBH Storm Water Program Manager. The Storm Water Program Manager is responsible for any notification to the State of Hawaii Department of Health (DOH), if required.

A corrective action is defined as an action taken to:

a) **Repair, modify, or replace any storm water control used at the site;**
b) **Clean up and properly dispose of spills, releases, or other deposits; or**
c) **Remedy a permit violation.**

1. Corrective Action Triggers

The following events trigger a corrective action to be taken (this triggering condition is to be documented *within 24 hours* of discovering the occurrence):

a) A required storm water control was never installed, was installed incorrectly, or is not in accordance with the requirements in the SWMP Plan.
b) A member of the **Storm Water Pollution Control Team** becomes aware that the storm water controls installed and being maintained are not effective enough for the discharge to meet applicable water quality standards or applicable requirements in the MCBH SWMP Plan. The facility ECC shall notify the Storm Water Program Manager immediately. The Storm Water Program Manager will notify DOH *by the end of the next work day*.

1.1 Log Notifications:

Date/time Storm Water Program Manager notified by ECC: ________________________

Date/time DOH notified by Storm Water Program Manager: ________________________

1.2 Describe Discharge:

Indicate which one of the following prohibited discharges is occurring or has occurred:

- ❒ Wastewater from washout of concrete
- ❒ Wastewater from washout and cleanout of stucco, paint, form release oils, curing compounds, or other construction materials
- ❒ Fuels, oils, or other pollutants used in vehicle and equipment operation and maintenance
- ❒ Soaps, solvents, or detergents used in vehicle and equipment washing
- ❒ Toxic or hazardous substances from a spill or other release
- ❒ Other, Explain: ____

2. Requirements for Taking Corrective Actions

The ECC shall complete corrective actions in accordance with the deadlines specified below. In all circumstances, site personnel shall *immediately* take all reasonable steps to minimize or prevent the discharge of pollutants until a permanent solution is installed and made operational, including cleaning up any contaminated surfaces so that the material will not discharge in subsequent storm events. *Immediately* means the same day the condition is discovered, unless it is too late in the day, in which initiation of corrective action must begin on the following work day.

Following any of the above triggering events, the ECC shall install a new or modified control and make it operational, or complete the repair, by *no later than 7 calendar days from the time of discovery*. If it is not feasible to complete the installation or repair within 7 calendar days, the ECC shall document and submit to the Storm Water Program Manager, for their agreement, why it is not feasible to complete the installation or repair within the 7-calendar day timeframe and document a schedule for installing the storm water control and making it operational as soon as practicable after the 7-day timeframe.

If the issue is not adequately addressed within 7 calendar days or the agreed upon timeframe, enforcement procedures will be initiated. Unaddressed issues will be escalated through the chain of command. The MCBH Environmental Compliance and Protection Division Director will give the responsible party a formal notice with an appropriate deadline for action. If the problem remains unchanged, the situation will be brought to the attention of the next higher authority. The ultimate penalty for non-compliance of MS4 Permit regulations is eviction or discharge of the responsible party from MCBH. This is placed at the discretion of the Base Commander. See the Enforcement Response Plan in Appendix 3-6 of the SWMP Plan for further information on MCBH's enforcement policies.

3. Corrective Action Report

Within 24 hours of discovering the occurrence of one of the triggering conditions in SWPPP Section 4.1 at the site, the ECC must complete the following:

3.1 Describe the triggering condition:

____
____
____
____

3.2 Record the date/time of the condition identified. How was the condition identified?

____
____
____
____

3.3 Describe the corrective action taken:

____
____
____

Date/time installation or repair was completed:
(or date/time the prohibited discharge ceased) ____

Or describe why it is not feasible to complete installation or repair within 7 calendar days and detail a proposed schedule (if applicable)

____
____
____

4. Resolution of the Corrective Action Trigger

Within 7 calendar days of initiating the Corrective Action Report, the ECC must complete a report of the following:

4.1 Follow-up Actions

Describe any follow-up actions taken to review the design, installation, and maintenance of storm water controls, including the dates such actions occurred:

____
____
____

4.2 Storm Water Control Modifications

Provide a summary of storm water control modifications implemented. Include a schedule of activities required to implement changes and the date the modifications were completed or will be completed:

____
____
____

5. SWPPP Modification Due to Corrective Actions

Where corrective actions result in changes to any of the storm water controls or procedures documented in the SWPPP, modify the SWPPP accordingly *within 7 calendar days* of completing corrective action work.

Are modifications to the SWPPP necessary? ❑ Yes ❑ No

Date modifications to the SWPPP shall be completed _______________

6. Corrective Actions Required by DOH

The facility shall comply with any corrective actions required by DOH as a result of permit violations found during an inspection by DOH or the Environmental Protection Agency (EPA).

Was the Corrective Action triggered by a DOH/EPA inspection?

❑ Yes ❑ No

❑ Date of DOH/EPA Inspection __________________

7. Additional Comments:

____
____

Final

STORM WATER POLLUTION PREVENTION PLAN

Storm Water Management Program Plan

Marine Corps Base Hawaii, Oahu, Hawaii

NPDES Permit No. HI S000007

AIRCRAFT WASH AND RINSE FACILITY (BUILDING 1631)

Prepared by:

Marine Corps Base Hawaii

August 2022

Table of Contents

Tables

Figures

Appendices

List of Acronyms and Abbreviations

AST	Aboveground Storage Tank
BMP	Best Management Practice
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CWA	Clean Water Act
CWB	Clean Water Branch
DOH	State of Hawaii Department of Health
ECC	Environmental Compliance Coordinator
ECE	Environmental Compliance Evaluation
ECPD	Environmental Compliance and Protection Division
EPA	United States Environmental Protection Agency
HAZMAT	Hazardous Material
HAZMIN	Hazardous Material Minimization
MCBH	Marine Corps Base Hawaii
MS4	Municipal Separate Storm Sewer System
MS4 Permit	Marine Corps Base Hawaii's NPDES Permit No. HI S000007
NPDES	National Pollutant Discharge Elimination System
OWS	Oil/Water Separator
POC	Point of Contact
SWMP	Storm Water Management Program
SWPPP	Storm Water Pollution Prevention Plan

Certification Statement

MCBH is committed to the prevention of discharges of polluted stormwater to navigable waters or the environment and maintains the highest standards for best management practices through periodic review, updating, and implementation of this Stormwater Pollution Prevention Plan (SWPPP).

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information contained therein. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Name: ______________________________ Title: ______________________________

Signature: ______________________________ Date: ______________________________

Management Review

Refer to Section 1.2 for more information on required SWPPP updates.

Review Dates	Signature	Amendment Required? (Y/N)
____________	__________________	__________
____________	__________________	__________
____________	__________________	__________
____________	__________________	__________
____________	__________________	__________
____________	__________________	__________

1 Introduction

As part of Federal regulations administered through the Clean Water Act (CWA), the State of Hawaii, Department of Health (DOH) has issued the National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4) Permit No. HI S000007 (referred to herein at the "MS4 Permit") to Marine Corps Base Hawaii (MCBH). The MS4 Permit requires that MCBH provide all existing industrial facilities, identified in MCBH's MS4 Permit application, and any newly identified industrial facilities, submitted to DOH using the "MS4 NPDES Individual Permit – Industrial Storm Water Discharge Notification Form," with a Storm Water Pollution Prevention Plan (SWPPP) for storm water associated with industrial activities.

The purpose of the regulations is to protect water quality by reducing the amount of pollutants in storm water runoff caused by industrial activities.

1.1 SWPPP Implementation

The storm water management controls of this plan will become MCBH procedure for the applicable industrial facility. An up-to-date copy of the SWPPP shall be maintained on site and at the MCBH Environmental Compliance and Protection Division (ECPD). Management staff, maintenance personnel, contractor staff, and other personnel involved in onsite industrial activities, will be knowledgeable of the plan and follow the guidelines set forth in it, in addition to any other pertinent base-wide, state and federal regulations.

Day-to-day implementation of the SWPPP is primarily the responsibility of the current facility Environmental Compliance Coordinator (ECC) or Point of Contact (POC) as identified in Table 2-1. Enforcement of the permit conditions and this SWPPP are ultimately the responsibility of ECPD and additional escalating levels of authority as specified in the Enforcement Response Plan developed by MCBH for its base-wide Storm Water Management Program (SWMP) Plan.

1.2 Updating the SWPPP

This SWPPP will be reviewed as needed to identify necessary changes, at a minimum of every five years. Updates may be required due to current best management practice (BMP) failures, spill events, changes in industrial activities, changes in features, corrective actions, or other necessary changes. Personnel changes to the Storm Water Pollution Control Team (Section 2.1) should be logged in Table 2-1. Storm Water Pollution Control Team Log. ECPD will be responsible for approving revisions to the SWPPP. In the event the plan is modified, a copy of the updated SWPPP will remain at ECPD and will be provided to the applicable facility. Additionally, ECPD shall document and report the SWPPP changes to the DOH, Clean Water Branch (CWB), within thirty days of when the changes arise.

2 Aircraft Wash and Rinse Facility, Building 1631

The Aircraft Wash and Rinse Facility, Building 1631, is located within MCBH, Kaneohe Bay on "B" Street between 1st Street and 3rd Street. The facility encompasses approximately 1.6 acres and can be found in grid [redacted] of the MCBH Base Map, see Figure 4-1. The facility-specific map is shown on Figure 4-2.

2.1 Storm Water Pollution Control Team

The Storm Water Pollution Control Team consists of the Storm Water Program Manager, ECC, and the Hazardous Material (HAZMAT) and Hazardous Material Minimization (HAZMIN) team. The Storm Water Program Manager is responsible for the enforcement of the MS4 permit at all industrial sites and provides annual training to the ECC and other personnel. The ECC is the primary unit POC for storm water related items and the day-to-day environmental matters at a specific facility. ECC's are responsible for SWPPP implementation including BMP and facility inspections, storm water assessments/sampling, BMP maintenance, and corrective actions. The HAZMAT and HAZMIN team shall be contacted if assistance is needed. The role, name, phone number, and start date of individuals on the Storm Water Pollution Control Team is recorded in Table 2-1 below. In the event of personnel turnover, Table 2-1 shall be updated accordingly.

TABLE 2-1. STORM WATER POLLUTION CONTROL TEAM LOG

Role	Name	Phone	Start Date
MCBH Storm Water Program Manager	CIV Whitney Anderson	Office: 808-257-4359	6/6/22
ECC	Sgt Jadarius Anderson	Office: 808-257-4603	03/29/2022
HAZMAT/HAZMIN	CIV Tim Cawthon	HAZMAT Center Building 6409 Office: 808-257-9913 HAZMIN Center Building 6407 Office: 808-257-0770	N/A

2.2 Aircraft Wash and Rinse Facility, Building 1631 Activities

The Aircraft Wash and Rinse Facility was used in the past to hand-wash aircraft using detergents and to rinse aircraft using high pressure water. The facility is comprised of a bermed concrete pad with roll-over curbing at its north side. The pad is sloped toward two drains that empty into a large below-grade oil/water separator (OWS) located to the east of the pad. The OWS separates oil from the wash water before discharging the wash water to the sanitary sewer system. The separated oil is pumped to a double-walled steel aboveground storage tank (AST), within a concrete containment structure, where the oil is stored until 75 percent of its capacity is reached. Maintenance of the OWS and AST is performed by personnel from Building 375 (MALS-24, Aircraft Maintenance).

The Aircraft Wash and Rinse Facility is used by various occupants for vehicle and aircraft washing. Each occupant brings their own detergent at the time of use. Detergent and cleaning suppliers are also stored in Building 1631. Due to the potential for wash water residue, containing detergent, dirt, and petroleum constituents on the concrete wash pad, MCBH keeps the manual valve closed at all times so that all storm water discharging from the wash area goes directly to the OWS from which it is conveyed to the sanitary sewer system.

The Aircraft Wash and Rinse Facility is located on a relatively flat area. Areas outside of the bermed concrete wash pad are grass on all sides, with the exception of an asphalt taxiway to the north. Storm water runoff from the western and southern areas of the facility flows to grass areas and percolates into the ground. A large infiltration trench with overflow inlet is located to the west of the wash pad. Another infiltration trench is located to the east of the OWS. The nearest storm drains to the OWS are two trench drains to the east on “B” Street. Runoff from the eastern area of the facility flows easterly, and either enters trench drain or percolates into the grass/bare soil ground. The storm water drainage system discharges through Outfall 018 to Kaneohe Bay. The designated storm water sample point (Outfall 01) is located at the western end of trench drain. Another significantly similar outfall (Outfall 02) is located to the east of Building 1631 at the edge of B Street. See Figure 4-2 for these outfall locations and other relevant features.

The Aircraft Wash and Rinse Facility has been out of service since 2015 when it was designated as a laydown area for a nearby construction site. At the time of inspection, the facility was still out of service and being used to store construction related equipment. A large Conex and miscellaneous items were located at the eastern side of the wash pad. Seven portable storage containers were also observed at the western perimeter of the wash pad. In addition, the used oil AST appeared to have been recently replaced.

2.3 Sources of Pollutants

The following is an inventory of potential pollutants associated with Aircraft Wash and Rinse Facility, Building 1631:

A. Material Loading and Unloading Areas

Materials that are spilled, leaked, or lost during loading or unloading may collect on vegetated or paved surfaces and be carried away by storm runoff. Removal of oil from the OWS occurs regularly.

B. On-Site Material Storage and Disposal Practices

Significant materials are not onsite. However, there is an OWS that is serviced regularly.

C. Outdoor Activities

Outdoor activities at the Aircraft Wash and Rinse Facility include rinsing of aircraft with water. No detergents are used.

D. Significant Materials Inventory

The following significant materials are located at the Aircraft Wash and Rinse Facility:

- Waste Oil

2.4 Potential Storm Water Pollutants

No pollutants have been identified as having a reasonable potential to be present in storm water discharges from the Aircraft Wash and Rinse Facility.

2.5 Best Management Practices (BMPs)

Best Management Practices (BMPs) are techniques or methods that aim to manage the quantity and improve the quality of storm water runoff from a facility or other site. Storm water BMPs intend to reduce or eliminate pollution and contaminants collected by runoff before the runoff reaches the MCBH storm water system or sensitive ecosystems such as streams, wetlands, and marine environments. The following is a summary of BMPs currently in place at the Aircraft Wash and Rinse Facility, Building 1631.

A. Good Housekeeping Practices

In general, Aircraft Wash and Rinse Facility, Building 1631 employs good housekeeping practices throughout its operations. Good housekeeping practices for Aircraft Wash and Rinse Facility, Building 1631 are included in Table 2-2.

B. Preventative Maintenance

Preventive maintenance is important as water pollution control measures may be of little or no use if devices and equipment have not been properly maintained. Facility personnel conduct inspection of facility equipment and storage systems on a regular basis. The preventive maintenance program involves inspections of equipment and storage systems that are exposed to storm water. Inspections of the OWS are conducted weekly by the ECC.

C. Visual Inspections

Visual inspection provides a valuable subjective assessment of the status of storm water management systems. They are easily performed and allow the opportunity for corrective action, if necessary. Site inspections and documentation requirements are addressed in in Section 3 of this SWPPP. MCBH HAZMIN Center staff perform hazardous material inspections monthly. Annual facility inspections are performed by EPCD as part of the MCBH Environmental Compliance Evaluation (ECE). Inspections of the OWS are conducted weekly by the ECC.

D. Spill Prevention and Response

Areas where significant material spill or leakage can occur are identified in Section 2.1 and shown on Figure 4-2. The storm water systems and their accompanying drainage points are also shown on Figure 4-2. Refer to Table 2-2 for BMPs related to spill preventative measures for material handling procedures, storage requirements, and equipment usage.

In the event of a hazardous substance or oil spill, the ECC and ECPD shall be notified immediately (ECPD; 808-630-8246). If the spill cannot be easily addressed using an onsite spill kit and personal protective equipment, call Fed Fire (Military 911). The spill source should be immediately controlled if it is safe to do so by closing valves, switches, and/or turning off power to a device. Then, contain the spill by using sorbent socks or absorbent materials found in a spill kit. After it has been contained, clean up the spilled material in a safe manner using dry methods. All materials should then be properly disposed of.

E. Erosion and Sediment Controls

No areas at the Aircraft Wash and Rinse Facility have been identified as having high potential for significant soil erosion that would require erosion and sediment control measures.

F. Best Management Practices to Minimize Pollutant Contact with Storm Water

Facility personnel receive annual training from ECPD at minimum, as well as an initial training for all new personnel. Training information will include the BMPs that have been developed for the facility and a general overview of the storm water program and its objectives. Existing BMPs at the Aircraft Wash and Rinse Facility are shown in Table 2-2 and attached as fact sheets to this SWPPP in Appendix A.

TABLE 2-2. BEST MANAGEMENT PRACTICES

BMP No.	BMP Title	Description
006	Control Spills	Any spill of significant materials is controlled immediately to prevent pollutant from being transported to receiving water.
012	Construct Berm or Dike Around Critical Areas	The Aircraft Wash and Rinse Facility wash pad is located within a containment berm.
033	Check Vehicles and Equipment for Leaks	The OWS and tank and piping are checked for leaks on a regular basis.
071	Keep Tanks, Piping, and Valves in Good Condition	Tanks, pumps, seals, piping and valves are visually inspected for signs of structural integrity and/or leaks.
098	Construct Oil/Water Separator	Storm water and wash water flows to the OWS and the sanitary sewer system.
113	Conduct Personnel Training Regarding the SWPPP	Personnel are trained regularly (initial orientation and annual refresher).

3 Inspections, Assessments and Monitoring

3.1 Routine Quarterly Site Inspections

The MS4 Permit requires a routine quarterly site inspection by a qualified person with at least one member of the storm water pollution control team participating. At least once each calendar year, the routine inspection must be conducted during a period when a storm water discharge is occurring. The site inspection is an overall evaluation of the effectiveness of the BMPs implemented at that facility. A Routine Facility Inspection Checklist (Appendix B) shall be completed during each routine site inspection and kept onsite with this SWPPP. During normal facility operating hours, inspections must be conducted of areas of the facility including, but not limited to, the following:

- Areas where industrial materials or activities are exposed to storm water;
- Areas identified in the SWPPP and those that are potential pollutant sources;
- Areas where spills and leaks have occurred in the past three years;
- Discharge points; and
- Control measures used to comply with the effluent limits contained in this permit.

3.2 Visual Assessment of Storm Water Discharges

A Quarterly Visual Assessment of storm water discharge is required for all industrial facilities at MCBH. Storm water samples for this visual assessment but must be collected in such a manner that the samples are representative of the storm water discharge from the facility. Therefore, the water sample must be collected at the designated storm water monitoring point (Outfall 01) as shown in Figure 4-2. The Quarterly Visual Assessment checklist (Appendix C) shall be completed by the current facility ECC and kept onsite with this SWPPP.

The visual assessment must be made:

- Of a sample collected in a clean, colorless glass or plastic container, and examined in a well-lit area;
- On samples collected within the first 30 minutes of an actual discharge from a storm event. If it is not possible to collect the sample within the first 30 minutes of discharge, the sample must be collected as soon as practicable after the first 30 minutes and documented why it was not possible to take the sample within the first 30 minutes; and
- For storm events, on discharges that occur at least 72 hours (three days) from the previous discharge.

Whenever the visual assessment shows evidence of storm water pollution, corrective action procedures to remedy the pollutants must be taken and documented. Refer to Section 4 for corrective action procedures.

4 Corrective Actions

A corrective action is defined as any action taken, or required to be taken, to (1) repair, modify, or replace any stormwater control used at the site; (2) clean up and dispose of spills, releases, or other deposits found on the site; and (3) remedy a permit violation. Corrective actions should be documented using the Corrective Action Log (Appendix D).

4.1 Immediate Actions

If corrective action is needed, you must immediately take all reasonable steps necessary to minimize or prevent the discharge of pollutants until a permanent solution is installed and made operational, including cleaning up any contaminated surfaces so that the material will not discharge in subsequent storm events. Note: In this context, the term "immediately" requires you to, on the same day a condition requiring corrective action is found, take all reasonable steps to minimize or prevent the discharge of pollutants until a permanent solution is installed and made operational. However, if a problem is identified at a time in the workday when it is too late to initiate corrective action, the initiation of corrective action must begin no later than the following workday. "All reasonable steps" means that the permittee has undertaken initial actions to assess and address the condition causing the corrective action, including, for example, cleaning up any exposed materials that may be discharged in a storm event (e.g., through sweeping, vacuuming) or making arrangements (i.e., scheduling) for a new BMP to be installed at a later date.

4.2 Escalating Actions

If additional actions are necessary beyond those implemented or if the conditions continue to occur, additional corrective actions (e.g., install a new or modified control and make it operational, complete the repair) must be completed before the next storm event if possible, and within 14 calendar days from the time of discovery of the corrective action condition. If it is infeasible to complete the corrective action within 14 calendar days, document why it is infeasible to complete the corrective action within the 14-day timeframe and identify a schedule for completing the work, which must be done as soon as practicable after the 14-day timeframe but no longer than 45 days after discovery. If the completion of corrective action will exceed the 45-day timeframe, the minimum additional time necessary to complete the corrective action can be taken, provided that MCBH ECPD and DOH is notified of your intention to exceed 45 days. Where your corrective actions result in changes to any of the controls or procedures documented in your SWPPP, you must modify your SWPPP accordingly within 14 calendar days of completing corrective action work.

4.3 Corrective Actions for Substantially Identical Outfalls

If the event triggering corrective action is associated with an outfall that had been identified as a "substantially identical outfall", the review must assess the need for corrective action for all related substantially identical outfalls. Any necessary changes to control measures that affect these other outfalls must also be made before the next storm event if possible, or as soon as practicable following that storm event. Any corrective actions must be conducted within the timeframes discussed above.

4.4 Record of Past Spills or Leaks of Hazardous Pollutants

Table 4-1 is used to record significant spills and leaks that have occur or have occurred within three years prior to the preparation or amendment of this SWPPP. Significant spills and leaks include, but are not limited to, releases of oil or hazardous substances in excess of quantities that are reportable under CWA Section 311 (see 40 CFR 110.6 and 40 CFR 117.21) or Section 102 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 USC §9602.

At the time of this SWPPP update, there have been no past spill or leak incidents reported for the Aircraft Wash and Rinse Facility.

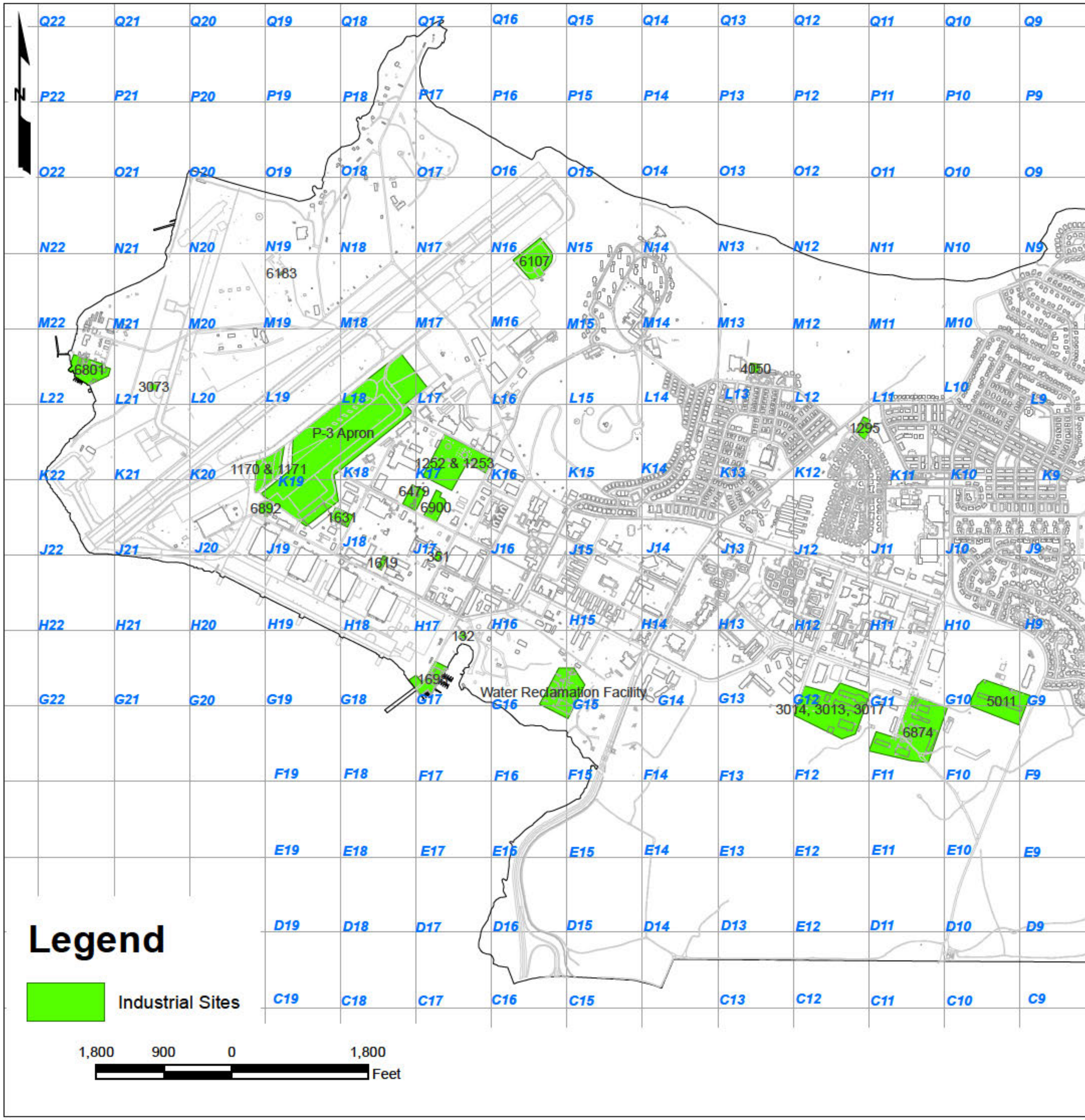
TABLE 4-1. PAST SPILLS OR LEAKS OF HAZARDOUS POLLUTANTS

Date of Incident	Brief Summary of Incident (POC Active at Time of Incident, Pollutant Type, Estimated Quantity, Location of Spill)

4.5 Record of Unauthorized Non-Storm Water Discharges

TABLE 4-2. UNAUTHORIZED NON-STORM WATER DISCHARGE EVALUATION

Date of Evaluation	Brief Summary of Evaluation (Description of the evaluation criteria, outfalls or onsite drainage points that were directly observed, action(s) taken, such as a list of control measures used to eliminate unauthorized discharge)



element environmental llc

environmental · engineering · water resources

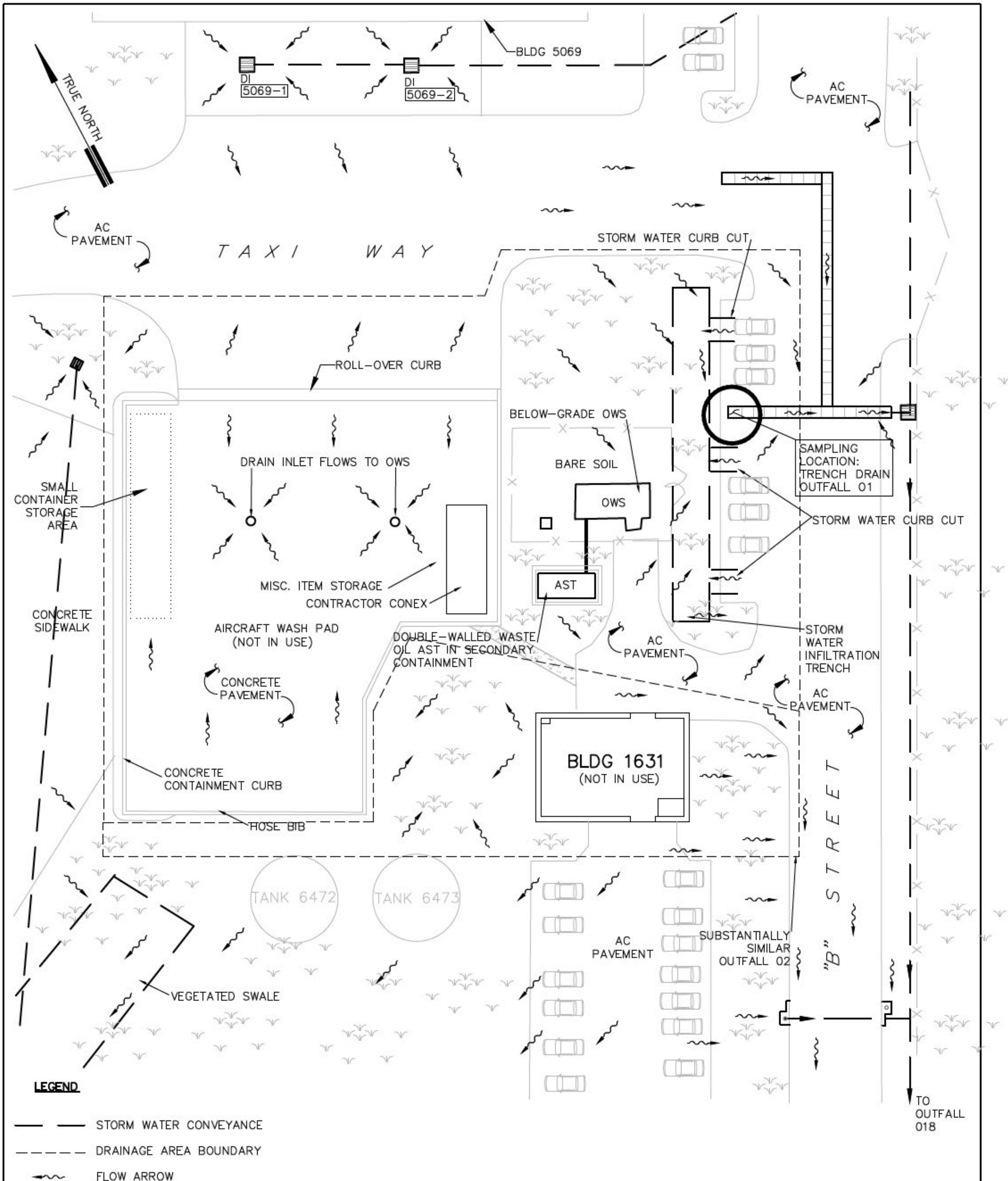
PROJECT TITLE

MCBH SWPPP
Storm Water Management Program Plan

FIGURE TITLE

General Location Map

DATE	FIGURE NO.
September 2022	**4-1**



NOTES:

1. STORM WATER, FROM APPROXIMATELY 1.6 ACRES ASSOCIATED WITH BUILDING 1631, DISCHARGE TO THE SANITARY SEWER (IF ON THE WASH PAD) OR TO KANEOHE BAY VIA MCBH OUTFALL 018.
2. STORM WATER PIPE LOCATIONS ARE APPROXIMATE
3. NOT TO SCALE

DATE: JULY 2022	PROJECT TITLE: STORM WATER POLLUTION PREVENTION PLAN MCBH, KANEOHE BAY, OAHU, HAWAII	
FIGURE TITLE: AIRCRAFT WASH & RINSE FACILITY (BUILDING 1631)		FIGURE NO.: 4-2

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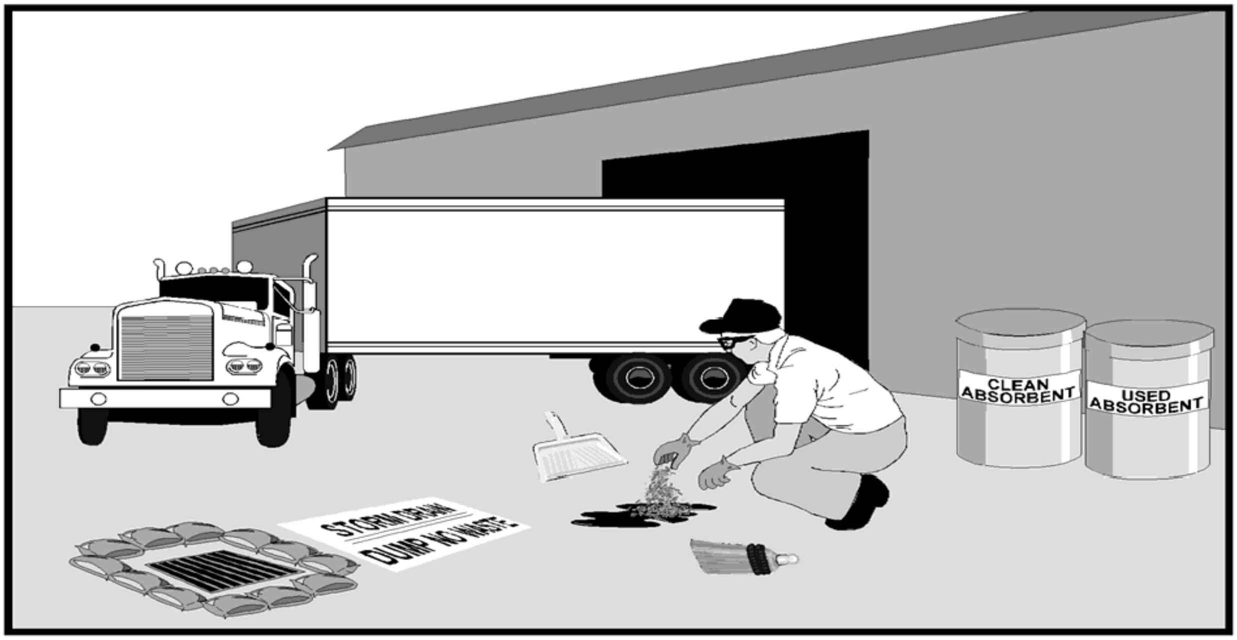
FIG 4-2 Bldg 1631 – Aircraft Wash & Rinse Facility.dwg

APPENDIX A

SELECTED BMP FACT SHEETS

BMP 006 - CONTROL SPILLS



Description of Potential Pollutant and Source: Spills of significant materials may be exposed to storm water and transported to storm drains and/or receiving waters.

Description of BMP: Follow safety data sheets (SDS) for handling, storage, and cleanup of all significant materials to reduce the potential for spills.

Any spill, large or small, of significant materials will be controlled to prevent pollutants from being transported to storm drains and/or receiving waters. Appropriate spill control material will be kept on site. Smaller spills will be contained using absorbent material such as kitty litter, straw, or sawdust. Drums of absorbent material will be easily accessible and clearly marked, and containers for spent absorbent material will be readily available. Spent absorbent material will be managed appropriately and disposed of in accordance with applicable regulations. Larger spills will be controlled using spill kits, brooms, and other response equipment commensurate with the size of the spill. The methods outlined in the Activity's spill prevention and response plans (BMP 112) for hazardous materials will be followed for spills of any potential storm water pollutants. The date, time, nature and volume of material spilled, and cleanup measures taken will be recorded for all spills and kept as part of the SWPPP.

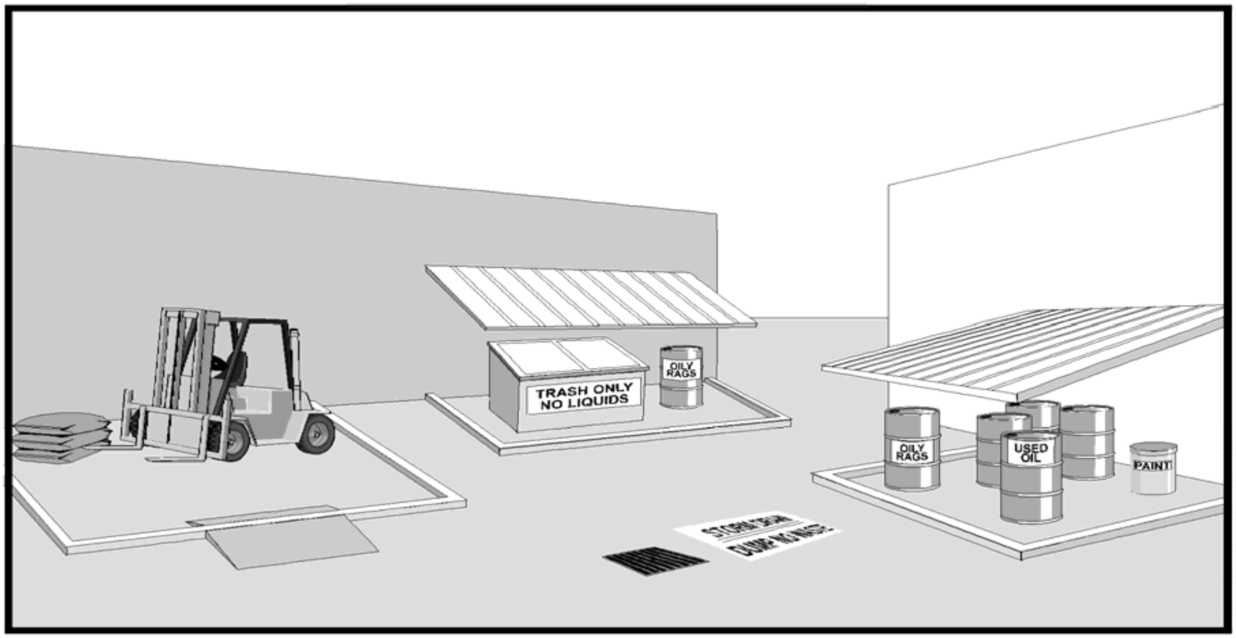
Application Guidance: Controlling spills will be practiced under all working conditions.

Training: Personnel will be trained in spill prevention and response procedures including the use of personal protection equipment (gloves, eye and face protection, etc.). This will include what absorbent or equipment to use, how to use the absorbent or equipment, where to find it, how to dispose of the spent absorbent or other material, and who to notify in the event of a spill.

Effectiveness and Cost: Spill control is a moderately effective, low-cost BMP.

Limitations: None

BMP 012 - CONSTRUCT BERM OR DIKE AROUND CRITICAL AREAS



Description of Potential Pollutant and Source: Critical areas are source areas that have a high likelihood for the release of pollutants. This includes material handling areas, material storage areas, and equipment repair and maintenance areas. As a result of spills and leaks or exposure to storm water, pollutants can flow from critical areas into the storm water system. In addition, small spills and leaks can accumulate on the surface area and be washed away by storm water.

Description of BMP: Construct a raised berm or dike around critical areas. This will provide secondary containment and prevent any spills or leaks from leaving the area. This secondary containment will also be provided where mobile tankers containing fuel are customarily stationed. Construct a ramp to allow vehicle access into the area. (Note: double walled tanks do not require this BMP. Also, 40 CFR 112.7 requires bulk petroleum storage tanks be provided with secondary containment.) A drain valve will be installed and procedures to drain storm water from the bermed area will be posted (see BMP 014).

Application Guidance: Install as needed.

Training: N/A

Effectiveness and Cost: This is a highly effective BMP. The cost will vary depending on the size of the fueling operation.

Limitations: The size of some tank and fueling operations areas could make this BMP relatively expensive.

BMP 033 - CHECK VEHICLES AND EQUIPMENT FOR LEAKS

Description of Potential Pollutant and Source: Vehicles, aircraft, or equipment entering or stored at a maintenance facility may be leaking a variety of fluids (fuel, oil, antifreeze, freon, etc.). These materials can be exposed to storm water.

Description of BMP: Inspect all vehicles and equipment at the site, whether incoming, parked, stored, or salvaged, for oil and fluid leaks. Drivers of fleet vehicles, such as delivery trucks, will also check under their vehicles each morning for fluid leaks. If leaks are present, drip pans will be placed under the vehicle or equipment. Once the vehicle is removed from the site, the former parking area will be inspected for stains, and these stains will be cleaned using rags or dry solvents.

Application Guidance: Any vehicle or equipment coming in for repairs, painting, or storage will be inspected for leaks. Fleet vehicles will be inspected each morning. Vehicles that are parked, stored, or salvaged will be provided with drip pans, as will tanker rail cars waiting to be unloaded. The frequency for implementing this BMP has been provided as general guidance. However, a facility operator may wish to establish a more suitable frequency. This will require SWPPP implementors to make judgements based on facility operations and conditions. To assign a frequency other than what has been suggested (i.e., more or less frequent), the following criteria will be considered and rated either High, Medium, or Low. If many of the criteria are assigned a High rating, the frequency may be increased. Similarly, if many criteria are assigned a Low rating, the frequency may be decreased. The goal of implementing this BMP is to minimize exposure of pollutants to storm water.

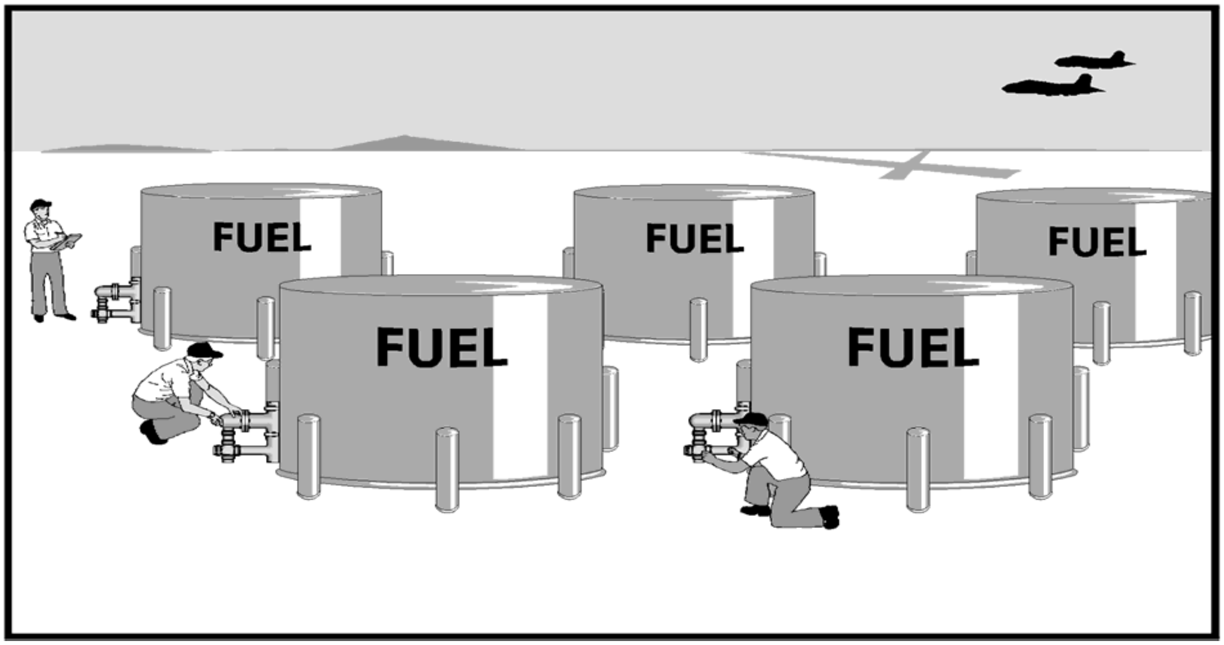
CRITERIA	Rating H=High M=Medium L=Low
Probability of exposure of significant materials to storm water	
Old age or poor condition of equipment and vehicles	
Evidence of exposure (e.g., stains on pavement)	
Proximity of source area to outfall or receiving water	
Sensitivity of receiving water to potentially exposed significant materials (e.g., waters with beneficial uses such as human contact, recreation, significant species habitat, etc.)	

<u>Training:</u> Signs will be posted to remind personnel of proper procedures.

<u>Effectiveness and Cost:</u> Checking for leaks is a moderately effective, low-cost BMP.

<u>Limitations:</u> None

BMP 071- KEEP TANKS, PIPING, AND VALVES IN GOOD CONDITION



Description of Potential Pollutant and Source: Tanks, piping, and valves may leak fuel or other significant materials due to corrosion, loose fittings, poor welding, or improperly or poorly fitted gaskets. This can expose these materials to storm water, which can transport them to storm drains and/or receiving waters.

Description of BMP: Keep tanks, piping, and valves in good working condition. Tanks, piping, or valves which are leaking will be repaired or replaced.

Application Guidance: Tanks, piping, and valves will be inspected monthly and kept in good condition at all times. If applicable, preventive maintenance will be performed.

The frequency for implementing this BMP has been provided as general guidance. However, a facility operator may wish to establish a more suitable frequency. This will require SWPPP implementors to make judgements based on facility operations and conditions. To assign a frequency other than what has been suggested (i.e., more or less frequent), the following criteria will be considered and rated either High, Medium, or Low. If many of the criteria are assigned a High rating, the frequency may be increased. Similarly, if many criteria are assigned a Low rating, the frequency may be decreased. The goal of implementing this BMP is to minimize exposure of pollutants to storm water.

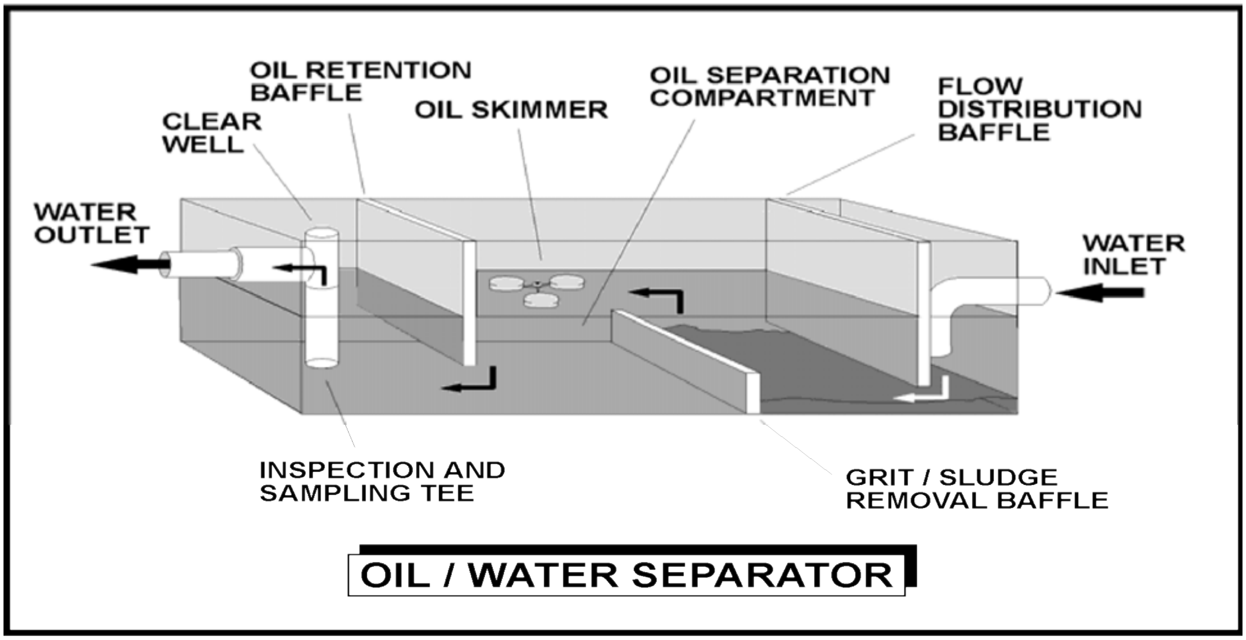
CRITERIA	Rating H=High M=Medium L=Low
Probability of exposure of significant materials to storm water	
Quantity of significant materials potentially exposed	
Toxicity of significant materials potentially exposed	
Frequency of use of tanks, piping, and valves	
Intensity of use of tanks, piping, and valves	
Old age or poor condition of tanks, piping, and valves	
Evidence of exposure (e.g., stains on ground surface)	
Proximity of source area to outfall or receiving water	
Sensitivity of receiving water to potentially exposed significant materials (e.g., waters with beneficial uses such as human contact, recreation, significant species habitat, etc.)	

<u>Training:</u> Personnel will be trained to regularly inspect for leaks or conditions that could lead to the discharge of chemicals, or storm water contact with waste materials. Personnel will be trained to routinely inspect equipment before each use. Tanks, piping, and valves which are not frequently used, will be inspected weekly. Procedures for notifying the appropriate maintenance personnel if a leak is found, will be established.

<u>Effectiveness and Cost:</u> Keeping tanks, piping, and valves in good condition is a highly effective BMP. The cost of repairing or replacing piping and valves is typically low. The cost of repairing or replacing tanks will vary based on the size of the tank and its present condition.

<u>Limitations:</u> None

BMP 098 - CONSTRUCT OIL/WATER SEPARATOR



Description of Potential Pollutants and Source: Oil/water separators are designed to remove petroleum compounds and grease from storm water. Separators will also remove floatable debris and settleable solids.

Description of BMP: Construct oil/water separators. Oil/water separators are underground vaults where storm water is piped in and out of the separator. Oil/water separators come in many configurations. A common configuration is the three-chamber oil/water separator. The first chamber is the sedimentation chamber that allows for sedimentation of coarse materials and screening of debris. The second chamber provides separation of oil, grease and gasoline. The third chamber is provided to prevent any possibility of a surcharge pressure from occurring and as a safety relief for the structure if a blockage occurs.

Application Guidance: Oil/water separators are applicable to situations where the concentrations of oil-and-grease-related compounds will be usually high and source control cannot provide effective control. This generally occurs at equipment maintenance and washing facilities, gas stations and loading areas. Separators may also be used in areas heavily used by mobile equipment such as loading wharfs at marine ports.

Operation and Maintenance: The degree and frequency of maintenance significantly affects the performance of the oil/water separator. Cleaning the oil/water separator will prevent the accumulated debris and oil to be discharged from the structure during intense storms.

Oil/water separators will be checked monthly during the wet season and will be cleaned at least four times a year. They will always be cleaned in October, before the start of the wet season. The accumulated oil will be properly disposed.
The frequency for implementing this BMP has been provided as general guidance. However, a facility operator may wish to establish a more suitable frequency. This will require SWPPP implementors to make judgements based on facility operations and conditions. To assign a frequency other than what has been suggested (i.e., more or less frequent), the following criteria will be considered and rated either High, Medium or Low. If many of the criteria are assigned a High rating, the frequency may be

increased. Similarly, if many criteria are assigned a Low rating, The frequency may be decreased. The goal of implementing this BMP is to minimize exposure of pollutants to storm water.

CRITERIA	Rating H=High M=Medium L=Low
Probability of exposure of significant materials to storm water in area draining to oil/water separator	
Quantity of significant materials potentially exposed in area draining to oil/water separator	
Frequency of use of significant materials potentially exposed in area draining to oil/water separator	
Evidence of exposure (e.g., stains on pavement, etching of concrete) in area draining to oil/water separator	
Proximity of source are to outfall	
Sensitivity of receiving water to potentially exposed significant material (e.g., waters with beneficial uses such as human contact, recreation, significant species habitat, etc.)	

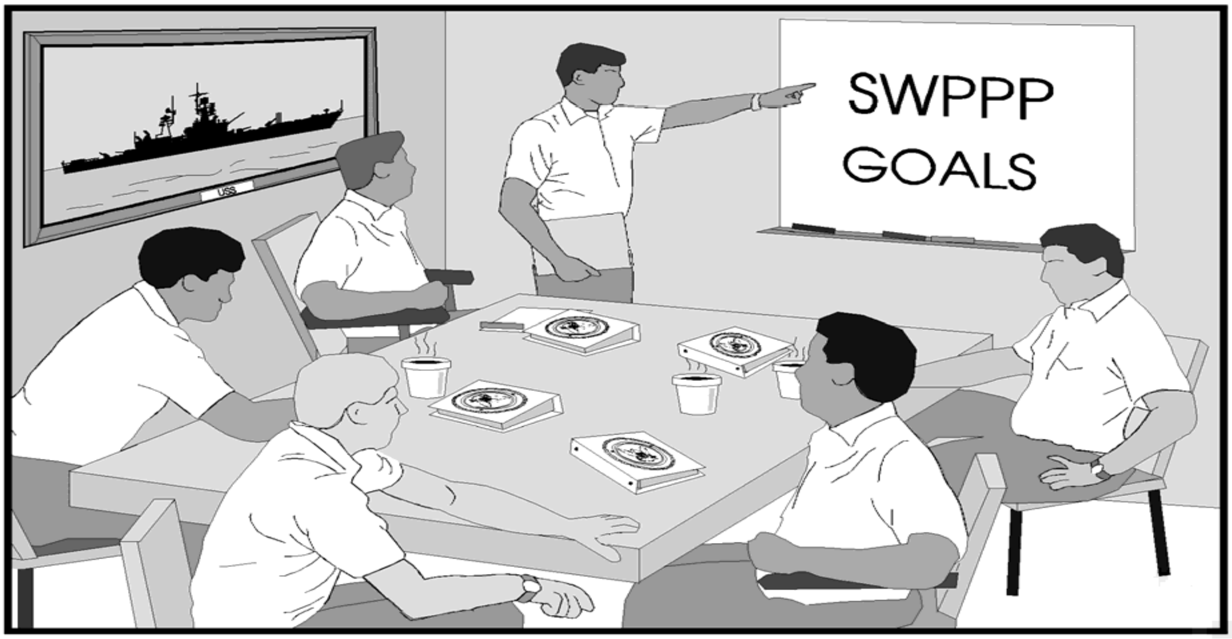
Effectiveness and Cost: This is a moderately effective, high-cost BMP.

Limitations: Oil/water separators are less effective when storm water runoff has high sediment concentrations or detergent levels which disperse oil.

Oil/water separators are only effective for highly pervious drainage areas. Oil/water separators cannot effectively treat large volumes of runoff. The maximum drainage area to oil/water separators is typically one acre.

The sediment removed during maintenance will be tested. If it is a hazardous waste, it will be disposed of accordingly.

BMP 113 - CONDUCT PERSONNEL TRAINING REGARDING THE SWPPP



Description of Potential Pollutant and Source: When properly trained, personnel are more capable of preventing spills, responding safely and effectively to an accident when it occurs, and recognizing situations that could lead to storm water contamination.

Description of BMP: Train personnel at all levels of responsibility in the components and goals of the SWPPP.

Application Guidance: Training will be conducted quarterly and at new personnel orientations.

Training: Training will address each component of the SWPPP, including how and why tasks are to be implemented. Topics will include:

- Good housekeeping
- Material management practices
- Spill prevention and response

Effectiveness and Cost: This is a highly effective, moderate-cost BMP.

Limitations: None

APPENDIX B

ROUTINE FACILITY INSPECTION CHECKLIST

Routine Facility Inspection Checklist

Activity Name: ______________________ **Date of Inspection:** ______________________

Inspector(s): ______________________ **Facility Name/Number:** ______________________

Column 1	Column 2	Column 3	Column 4	Column 5	
Source Area	BMP Number and Title	Status: F, P, N, NA[1]	Briefly Describe Effectiveness (Good or Other [describe])	Corrective Measures	
				What	By When

Note 1: F – Fully implemented, P – Partially implemented, N – Not implemented , NA – Not Applicable

APPENDIX C

QUARTERLY VISUAL ASSESSMENT CHECKLIST

Quarterly Visual Assessment Checklist

Facility ID and Location: ______________________

Date: ____________________

Sampler Name (Printed): Signature:

______________________________________ ____

Time of Rainfall Begin: ________________ Time of Rainfall End: ____________________

Time of Flow Begin: ________________ Time of Flow End: ____________________

Rainfall event more than 72 hours since last event? Rainfall Event Total: ____________________

Yes / No

Sample: sample in a clean, colorless glass or plastic container, and examined in a well-lit area

On samples collected within the first 30 minutes of an actual discharge from a storm event

Sample Characteristics:

Color: ____________________ Floating Solids: ____________________________

Odor: ____________________ Settled Solids: ____________________________

Clarity: ____________________ Suspended Solids: ____________________________

Oil Sheen: ____________________ Foam: ____________________________

Other Obvious Indicators of Storm Water Pollution

(describe): ____

Nature of the discharge (i.e., runoff):

Results of observations of the storm water discharge:

Probable sources of any observed storm water contamination:

If applicable, why it was not possible to take samples within the first 30 minutes:

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

APPENDIX D

CORRECTIVE ACTION LOG

Corrective Action Log

Use this form to document SWPPP corrective actions. This form is to be completed by the Environmental Compliance Coordinator (ECC) or a person designated by ECC and submitted to the MCBH Storm Water Program Manager. The Storm Water Program Manager is responsible for any notification to the State of Hawaii Department of Health (DOH), if required.

A corrective action is defined as an action taken to:

- **a) Repair, modify, or replace any storm water control used at the site;**
- **b) Clean up and properly dispose of spills, releases, or other deposits; or**
- **c) Remedy a permit violation.**

1. Corrective Action Triggers

The following events trigger a corrective action to be taken (this triggering condition is to be documented *within 24 hours* of discovering the occurrence):

- a) A required storm water control was never installed, was installed incorrectly, or is not in accordance with the requirements in the SWMP Plan.
- b) A member of the **Storm Water Pollution Control Team** becomes aware that the storm water controls installed and being maintained are not effective enough for the discharge to meet applicable water quality standards or applicable requirements in the MCBH SWMP Plan. The facility ECC shall notify the Storm Water Program Manager immediately. The Storm Water Program Manager will notify DOH *by the end of the next work day*.

1.1 Log Notifications:

Date/time Storm Water Program Manager notified by ECC: ________________________

Date/time DOH notified by Storm Water Program Manager: ________________________

1.2 Describe Discharge:

Indicate which one of the following prohibited discharges is occurring or has occurred:

- ❒ Wastewater from washout of concrete
- ❒ Wastewater from washout and cleanout of stucco, paint, form release oils, curing compounds, or other construction materials
- ❒ Fuels, oils, or other pollutants used in vehicle and equipment operation and maintenance
- ❒ Soaps, solvents, or detergents used in vehicle and equipment washing
- ❒ Toxic or hazardous substances from a spill or other release
- ❒ Other, Explain: ____

2. Requirements for Taking Corrective Actions

The ECC shall complete corrective actions in accordance with the deadlines specified below. In all circumstances, site personnel shall *immediately* take all reasonable steps to minimize or prevent the discharge of pollutants until a permanent solution is installed and made operational, including cleaning up any contaminated surfaces so that the material will not discharge in subsequent storm events. *Immediately* means the same day the condition is discovered, unless it is too late in the day, in which initiation of corrective action must begin on the following work day.

Following any of the above triggering events, the ECC shall install a new or modified control and make it operational, or complete the repair, by *no later than 7 calendar days from the time of discovery*. If it is not feasible to complete the installation or repair within 7 calendar days, the ECC shall document and submit to the Storm Water Program Manager, for their agreement, why it is not feasible to complete the installation or repair within the 7-calendar day timeframe and document a schedule for installing the storm water control and making it operational as soon as practicable after the 7-day timeframe.

If the issue is not adequately addressed within 7 calendar days or the agreed upon timeframe, enforcement procedures will be initiated. Unaddressed issues will be escalated through the chain of command. The MCBH Environmental Compliance and Protection Division Director will give the responsible party a formal notice with an appropriate deadline for action. If the problem remains unchanged, the situation will be brought to the attention of the next higher authority. The ultimate penalty for non-compliance of MS4 Permit regulations is eviction or discharge of the responsible party from MCBH. This is placed at the discretion of the Base Commander. See the Enforcement Response Plan in Appendix 3-6 of the SWMP Plan for further information on MCBH's enforcement policies.

3. Corrective Action Report

Within 24 hours of discovering the occurrence of one of the triggering conditions in SWPPP Section 4.1 at the site, the ECC must complete the following:

3.1 Describe the triggering condition:

____
____
____
____

3.2 Record the date/time of the condition identified. How was the condition identified?

____
____
____
____

3.3 Describe the corrective action taken:

____
____
____

Date/time installation or repair was completed:
(or date/time the prohibited discharge ceased) ______________________________

Or describe why it is not feasible to complete installation or repair within 7 calendar days and detail a proposed schedule (if applicable)

____
____
____

4. Resolution of the Corrective Action Trigger

Within 7 calendar days of initiating the Corrective Action Report, the ECC must complete a report of the following:

4.1 Follow-up Actions

Describe any follow-up actions taken to review the design, installation, and maintenance of storm water controls, including the dates such actions occurred:

____
____
____

4.2 Storm Water Control Modifications

Provide a summary of storm water control modifications implemented. Include a schedule of activities required to implement changes and the date the modifications were completed or will be completed:

____
____
____

5. SWPPP Modification Due to Corrective Actions

Where corrective actions result in changes to any of the storm water controls or procedures documented in the SWPPP, modify the SWPPP accordingly *within 7 calendar days* of completing corrective action work.

Are modifications to the SWPPP necessary? ❑ Yes ❑ No

Date modifications to the SWPPP shall be completed _______________

6. Corrective Actions Required by DOH

The facility shall comply with any corrective actions required by DOH as a result of permit violations found during an inspection by DOH or the Environmental Protection Agency (EPA).

Was the Corrective Action triggered by a DOH/EPA inspection?

❑ Yes ❑ No

❑ Date of DOH/EPA Inspection __________________

7. Additional Comments:

____
____

Final

STORM WATER POLLUTION PREVENTION PLAN

Storm Water Management Program Plan

Marine Corps Base Hawaii, Oahu, Hawaii

NPDES Permit No. HI S000007

AIRCRAFT RINSE FACILITY (BUILDING 6107)

Prepared by:

Marine Corps Base Hawaii

August 2022

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Figures

Appendices

List of Acronyms and Abbreviations

AST	Aboveground Storage Tank
BMP	Best Management Practice
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CWA	Clean Water Act
CWB	Clean Water Branch
DOH	State of Hawaii Department of Health
ECC	Environmental Compliance Coordinator
ECE	Environmental Compliance Evaluation
ECPD	Environmental Compliance and Protection Division
EPA	United States Environmental Protection Agency
HAZMAT	Hazardous Material
HAZMIN	Hazardous Material Minimization
MCBH	Marine Corps Base Hawaii
MS4	Municipal Separate Storm Sewer System
MS4 Permit	Marine Corps Base Hawaii's NPDES Permit No. HI S000007
NPDES	National Pollutant Discharge Elimination System
OWS	Oil/Water Separator
POC	Point of Contact
SWMP	Storm Water Management Program
SWPPP	Storm Water Pollution Prevention Plan

Certification Statement

MCBH is committed to the prevention of discharges of polluted stormwater to navigable waters or the environment and maintains the highest standards for best management practices through periodic review, updating, and implementation of this Stormwater Pollution Prevention Plan (SWPPP).

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information contained therein. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Name: ______________________________ Title: ______________________________

Signature: ____________________________ Date: ______________________________

Management Review

Refer to Section 1.2 for more information on required SWPPP updates.

Review Dates	Signature	Amendment Required? (Y/N)
____________	__________________	__________
____________	__________________	_________
____________	__________________	_________
____________	__________________	_________
____________	__________________	_________
____________	__________________	_________

1 Introduction

As part of Federal regulations administered through the Clean Water Act (CWA), the State of Hawaii, Department of Health (DOH) has issued the National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4) Permit No. HI S000007 (referred to herein at the “MS4 Permit”) to Marine Corps Base Hawaii (MCBH). The MS4 Permit requires that MCBH provide all existing industrial facilities, identified in MCBH’s MS4 Permit application, and any newly identified industrial facilities, submitted to DOH using the “MS4 NPDES Individual Permit – Industrial Storm Water Discharge Notification Form,” with a Storm Water Pollution Prevention Plan (SWPPP) for storm water associated with industrial activities.

The purpose of the regulations is to protect water quality by reducing the amount of pollutants in storm water runoff caused by industrial activities.

1.1 SWPPP Implementation

The storm water management controls of this plan will become MCBH procedure for the applicable industrial facility. An up-to-date copy of the SWPPP shall be maintained on site and at the MCBH Environmental Compliance and Protection Division (ECPD). Management staff, maintenance personnel, contractor staff, and other personnel involved in onsite industrial activities, will be knowledgeable of the plan and follow the guidelines set forth in it, in addition to any other pertinent base-wide, state and federal regulations.

Day-to-day implementation of the SWPPP is primarily the responsibility of the current facility Environmental Compliance Coordinator (ECC) or Point of Contact (POC) as identified in Table 2-1. Enforcement of the permit conditions and this SWPPP are ultimately the responsibility of ECPD and additional escalating levels of authority as specified in the Enforcement Response Plan developed by MCBH for its base-wide Storm Water Management Program (SWMP) Plan.

1.2 Updating the SWPPP

This SWPPP will be reviewed as needed to identify necessary changes, at a minimum of every five years. Updates may be required due to current best management practice (BMP) failures, spill events, changes in industrial activities, changes in features, corrective actions, or other necessary changes. Personnel changes to the Storm Water Pollution Control Team (Section 2.1) should be logged in Table 2-1. Storm Water Pollution Control Team Log. ECPD will be responsible for approving revisions to the SWPPP. In the event the plan is modified, a copy of the updated SWPPP will remain at ECPD and will be provided to the applicable facility. Additionally, ECPD shall document and report the SWPPP changes to the DOH, Clean Water Branch (CWB), within thirty days of when the changes arise.

2 Aircraft Rinse Facility, Building 6107

The Aircraft Rinse Facility, Building 6107, is located within MCBH, Kaneohe Bay near the northwestern end of Taxiway A. The facility encompasses approximately 1.4 acres and can be found in grid [redacted] of the MCBH Base Map, see Figure 4-1. The facility-specific map is shown on Figure 4-2.

2.1 Storm Water Pollution Control Team

The Storm Water Pollution Control Team consists of the Storm Water Program Manager, ECC, and the Hazardous Material (HAZMAT) and Hazardous Material Minimization (HAZMIN) team. The Storm Water Program Manager is responsible for the enforcement of the MS4 permit at all industrial sites and provides annual training to the ECC and other personnel. The ECC is the primary unit POC for storm water related items and the day-to-day environmental matters at a specific facility. ECC's are responsible for SWPPP implementation including BMP and facility inspections, storm water assessments/sampling, BMP maintenance, and corrective actions. The HAZMAT and HAZMIN team shall be contacted if assistance is needed. The role, name, phone number, and start date of individuals on the Storm Water Pollution Control Team is recorded in Table 2-1 below. In the event of personnel turnover, Table 2-1 shall be updated accordingly.

TABLE 2-1. STORM WATER POLLUTION CONTROL TEAM LOG

Role	Name	Phone	Start Date
MCBH Storm Water Program Manager	CIV Whitney Anderson	Office: 808-257-4359	6/6/22
ECC	SSgt Michael Hinrichs	Office: 808-257-7066 Cell: 760-576-9694	2/1/2020
HAZMAT/HAZMIN	CIV Tim Cawthon	HAZMAT Center Building 6409 Office: 808-257-9913 HAZMIN Center Building 6407 Office: 808-257-0770	N/A

2.2 Aircraft Rinse Facility, Building 6107 Activities

The Aircraft Rinse Facility (referred to as "Alpha Rinse") is used to rinse aircraft after returning from missions. The facility was recently renovated to completely replace the previous aircraft rinse facility. Aircraft pull up to the eastern edge of the wash pad and select the type of wash cycle that is appropriate for the aircraft. The wash cycles are programed to respond to a wind sensor that adjusts the direction of the water spray to reduce water loss. Sensors at the Aircraft Rinse Facility automatically turns the facility on and off based on the presence of an aircraft.

The outdoor facility is comprised of a concrete pad with containment curbing, a trench drain, various piping, spray nozzles, and an oil/water separator (OWS). The water jet spray system used to rinse the surface of aircraft is activated by airfield personnel. Wash water and storm water flowing on the wash pad flows to a central trench drain and then to the OWS. Treated water in the OWS is filtered and then pumped to a [redacted]-gallon holding tank for reuse in the next wash cycle. Excess water from the OWS flows to the sanitary sewer. No detergents or other chemicals are added to the water used to rinse aircraft.

Building 6107 is located to the south of the wash pad but is no longer in use. A new building (not numbered) was constructed at the southeast corner of the wash pad to house the control center and pumping equipment for the facility.

The Aircraft Rinse Facility is surrounded by vegetation and grass. Storm water that falls on the asphalt next to the wash pad generally sheet flows into the grassy area between the wash pad and Alpha Taxiway or a concrete ditch that runs along the southern end of the asphalt loop. This grassy area between the wash pad and taxiway has a grassy swale that runs through the allows water to infiltrate. Overflow water from the swale enters a storm drain inlet that discharges to a vegetated area west of the facility. The designated storm water monitoring point (Outfall 01) is located to the southwest of the rinse pad. During larger storm events, there is a potential for sheet flow off the southwestern rinse pad ramp. This monitoring point is for sheet flow on asphalt before it discharges to the grassy area near the storm water inlet. Water discharging from the concrete ditch ultimately discharges to a vegetated area to the east of the facility. A substantially similar outfall (Outfall 02) is located in the concrete ditch to the east of the control room. Refer to Figure 4-2 for the location of the stormwater monitoring point and other relevant features.

2.3 Sources of Pollutants

The following is an inventory of potential pollutants associated with Aircraft Rinse Facility, Building 6107:

A. Material Loading and Unloading Areas

Materials that are spilled, leaked, or lost during loading or unloading may collect on vegetated or paved surfaces and be carried away by storm runoff. Removal of oil from the OWS occurs regularly.

B. On-Site Material Storage and Disposal Practices

Significant materials are not onsite. However, there is an OWS that is serviced regularly.

C. Outdoor Activities

Outdoor activities at the Aircraft Rinse Facility include rinsing of aircraft with water. No detergents are used.

D. Significant Materials Inventory

The following significant materials are located at the Aircraft Rinse Facility:

- Waste Oils

2.4 Potential Storm Water Pollutants

No pollutants have been identified as having a reasonable potential to be present in storm water discharges from the Aircraft Rinse Facility.

2.5 Best Management Practices (BMPs)

Best Management Practices (BMPs) are techniques or methods that aim to manage the quantity and improve the quality of storm water runoff from a facility or other site. Storm water BMPs intend to reduce or eliminate pollution and contaminants collected by runoff before the runoff reaches the MCBH storm water system or sensitive ecosystems such as streams, wetlands, and marine environments. The following is a summary of BMPs currently in place at the Aircraft Rinse Facility, Building 6107.

A. Good Housekeeping Practices

In general, Aircraft Rinse Facility, Building 6107 employs good housekeeping practices throughout its operations. Good housekeeping practices for Aircraft Rinse Facility, Building 6107 are included in Table 2-2 .

B. Preventative Maintenance

Preventive maintenance is important as water pollution control measures may be of little or no use if devices and equipment have not been properly maintained. Facility personnel conduct inspection of facility equipment and storage systems on a regular basis. The preventive maintenance program involves inspections of equipment and storage systems that are exposed to storm water. Inspections of the OWS are conducted weekly by the ECC.

C. Visual Inspections

Visual inspection provides a valuable subjective assessment of the status of storm water management systems. They are easily performed and allow the opportunity for corrective action, if necessary. Site inspections and documentation requirements are addressed in in Section 3 of this SWPPP. MCBH HAZMIN Center staff perform hazardous material inspections monthly. Annual facility inspections are performed by EPCD as part of the MCBH Environmental Compliance Evaluation (ECE). Inspections of the OWS are conducted weekly by the ECC.

D. Spill Prevention and Response

Areas where significant material spill or leakage can occur are identified in Section 2.1 and shown on Figure 4-2. The storm water systems and their accompanying drainage points are also shown on Figure 4-2. Refer to Table 2-2 for BMPs related to spill preventative measures for material handling procedures, storage requirements, and equipment usage.

In the event of a hazardous substance or oil spill, the ECC and ECPD shall be notified immediately (ECPD; 808-630-8246). If the spill cannot be easily addressed using an onsite spill kit and personal protective equipment, call Fed Fire (Military 911). The spill source should be immediately controlled if it is safe to do so by closing valves, switches, and/or turning off power to a device. Then, contain the spill by using sorbent socks or absorbent materials found in a spill kit. After it has been contained, clean up the spilled material in a safe manner using dry methods. All materials should then be properly disposed of.

E. Erosion and Sediment Controls

No areas at the Aircraft Rinse Facility have been identified as having high potential for significant soil erosion that would require erosion and sediment control measures.

F. Best Management Practices to Minimize Pollutant Contact with Storm Water

Facility personnel receive annual training from ECPD at minimum, as well as an initial training for all new personnel. Training information will include the BMPs that have been developed for the facility and a general overview of the storm water program and its objectives. Existing BMPs at the Aircraft Rinse Facility are shown in Table 2-2 and attached as fact sheets to this SWPPP in Appendix A.

TABLE 2-2. BEST MANAGEMENT PRACTICES

BMP No.	BMP Title	Description
006	Control Spills	Any spill of significant materials is controlled immediately to prevent pollutant from being transported to receiving water.
012	Construct Berm or Dike Around Critical Areas	The Aircraft Rinse Facility wash pad is located within a containment berm.
033	Check Vehicles and Equipment for Leaks	The OWS and tank and piping are checked for leaks on a regular basis.
071	Keep Tanks, Piping, and Valves in Good Condition	Tanks, pumps, seals, piping and valves are visually inspected for signs of structural integrity and/or leaks.
098	Construct Oil/Water Separator	Storm water and wash water flows to the OWS and the sanitary sewer system.
113	Conduct Personnel Training Regarding the SWPPP	Personnel are trained regularly (initial orientation and annual refresher).

3 Inspections, Assessments and Monitoring

3.1 Routine Quarterly Site Inspections

The MS4 Permit requires a routine quarterly site inspection by a qualified person with at least one member of the storm water pollution control team participating. At least once each calendar year, the routine inspection must be conducted during a period when a storm water discharge is occurring. The site inspection is an overall evaluation of the effectiveness of the BMPs implemented at that facility. A Routine Facility Inspection Checklist (Appendix B) shall be completed during each routine site inspection and kept onsite with this SWPPP. During normal facility operating hours, inspections must be conducted of areas of the facility including, but not limited to, the following:

- Areas where industrial materials or activities are exposed to storm water;
- Areas identified in the SWPPP and those that are potential pollutant sources;
- Areas where spills and leaks have occurred in the past three years;
- Discharge points; and
- Control measures used to comply with the effluent limits contained in this permit.

3.2 Visual Assessment of Storm Water Discharges

A Quarterly Visual Assessment of storm water discharge is required for all industrial facilities at MCBH. Storm water samples for this visual assessment but must be collected in such a manner that the samples are representative of the storm water discharge from the facility. Therefore, the water sample must be collected at the designated storm water monitoring point (Outfall 01) as shown in Figure 4-2. The Quarterly Visual Assessment checklist (Appendix C) shall be completed by the current facility ECC and kept onsite with this SWPPP.

The visual assessment must be made:

- Of a sample collected in a clean, colorless glass or plastic container, and examined in a well-lit area;
- On samples collected within the first 30 minutes of an actual discharge from a storm event. If it is not possible to collect the sample within the first 30 minutes of discharge, the sample must be collected as soon as practicable after the first 30 minutes and documented why it was not possible to take the sample within the first 30 minutes; and
- For storm events, on discharges that occur at least 72 hours (three days) from the previous discharge.

Whenever the visual assessment shows evidence of storm water pollution, corrective action procedures to remedy the pollutants must be taken and documented. Refer to Section 4 for corrective action procedures.

4 Corrective Actions

A corrective action is defined as any action taken, or required to be taken, to (1) repair, modify, or replace any stormwater control used at the site; (2) clean up and dispose of spills, releases, or other deposits found on the site; and (3) remedy a permit violation. Corrective actions should be documented using the Corrective Action Log (Appendix D).

4.1 Immediate Actions

If corrective action is needed, you must immediately take all reasonable steps necessary to minimize or prevent the discharge of pollutants until a permanent solution is installed and made operational, including cleaning up any contaminated surfaces so that the material will not discharge in subsequent storm events. Note: In this context, the term "immediately" requires you to, on the same day a condition requiring corrective action is found, take all reasonable steps to minimize or prevent the discharge of pollutants until a permanent solution is installed and made operational. However, if a problem is identified at a time in the workday when it is too late to initiate corrective action, the initiation of corrective action must begin no later than the following workday. "All reasonable steps" means that the permittee has undertaken initial actions to assess and address the condition causing the corrective action, including, for example, cleaning up any exposed materials that may be discharged in a storm event (e.g., through sweeping, vacuuming) or making arrangements (i.e., scheduling) for a new BMP to be installed at a later date.

4.2 Escalating Actions

If additional actions are necessary beyond those implemented or if the conditions continue to occur, additional corrective actions (e.g., install a new or modified control and make it operational, complete the repair) must be completed before the next storm event if possible, and within 14 calendar days from the time of discovery of the corrective action condition. If it is infeasible to complete the corrective action within 14 calendar days, document why it is infeasible to complete the corrective action within the 14-day timeframe and identify a schedule for completing the work, which must be done as soon as practicable after the 14-day timeframe but no longer than 45 days after discovery. If the completion of corrective action will exceed the 45-day timeframe, the minimum additional time necessary to complete the corrective action can be taken, provided that MCBH ECPD and DOH is notified of your intention to exceed 45 days. Where your corrective actions result in changes to any of the controls or procedures documented in your SWPPP, you must modify your SWPPP accordingly within 14 calendar days of completing corrective action work.

4.3 Corrective Actions for Substantially Identical Outfalls

If the event triggering corrective action is associated with an outfall that had been identified as a "substantially identical outfall", the review must assess the need for corrective action for all related substantially identical outfalls. Any necessary changes to control measures that affect these other outfalls must also be made before the next storm event if possible, or as soon as practicable following that storm event. Any corrective actions must be conducted within the timeframes discussed above.

4.4 Record of Past Spills or Leaks of Hazardous Pollutants

Table 4-1 is used to record significant spills and leaks that have occur or have occurred within three years prior to the preparation or amendment of this SWPPP. Significant spills and leaks include, but are not limited to, releases of oil or hazardous substances in excess of quantities that are reportable under CWA Section 311 (see 40 CFR 110.6 and 40 CFR 117.21) or Section 102 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 USC §9602.

At the time of this SWPPP update, there have been no past spill or leak incidents reported for the Aircraft Rinse Facility.

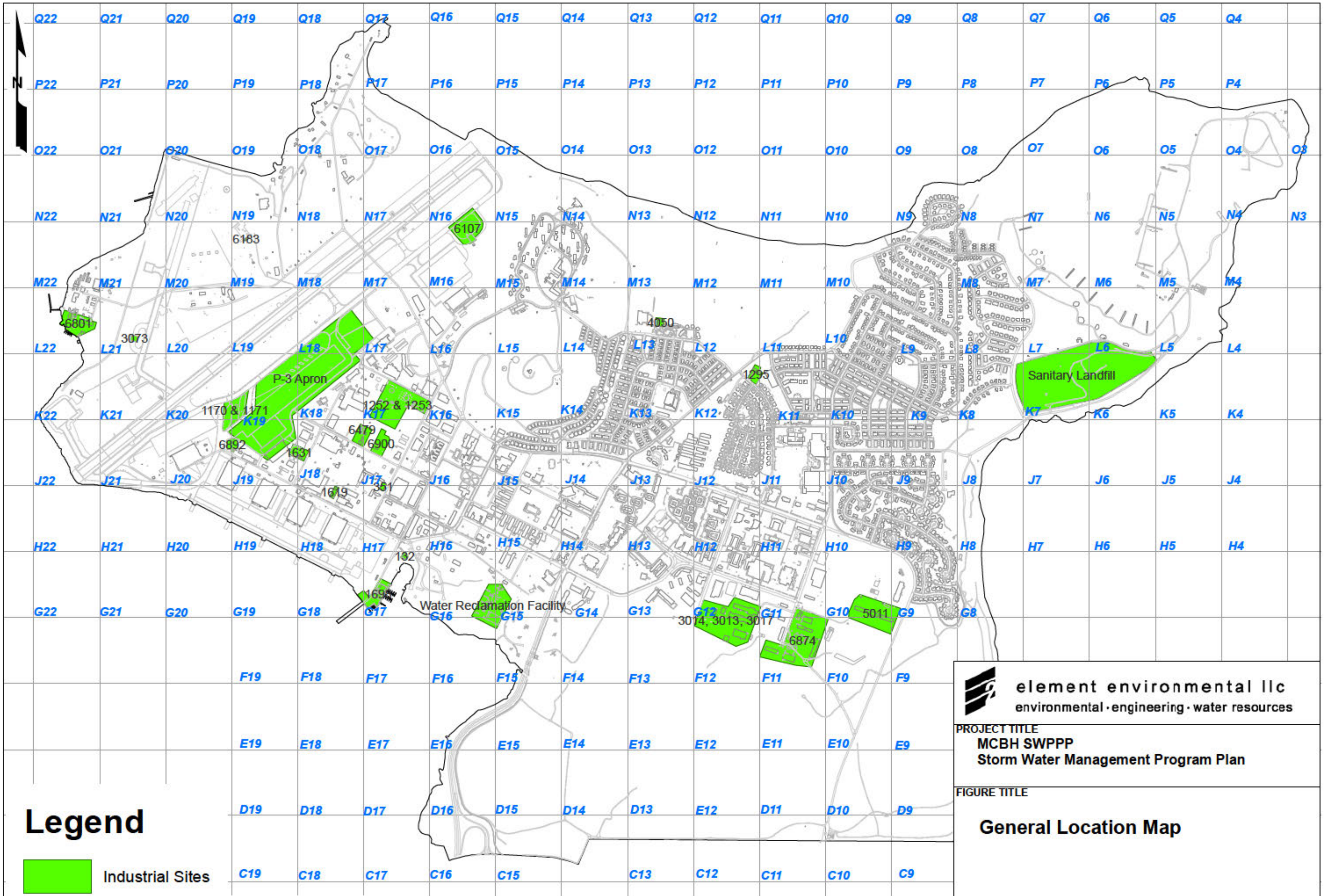
TABLE 4-1. PAST SPILLS OR LEAKS OF HAZARDOUS POLLUTANTS

Date of Incident	Brief Summary of Incident (POC Active at Time of Incident, Pollutant Type, Estimated Quantity, Location of Spill)

4.5 Record of Unauthorized Non-Storm Water Discharges

TABLE 4-2. UNAUTHORIZED NON-STORM WATER DISCHARGE EVALUATION

Date of Evaluation	Brief Summary of Evaluation (Description of the evaluation criteria, outfalls or onsite drainage points that were directly observed, action(s) taken, such as a list of control measures used to eliminate unauthorized discharge)



Legend

Industrial Sites

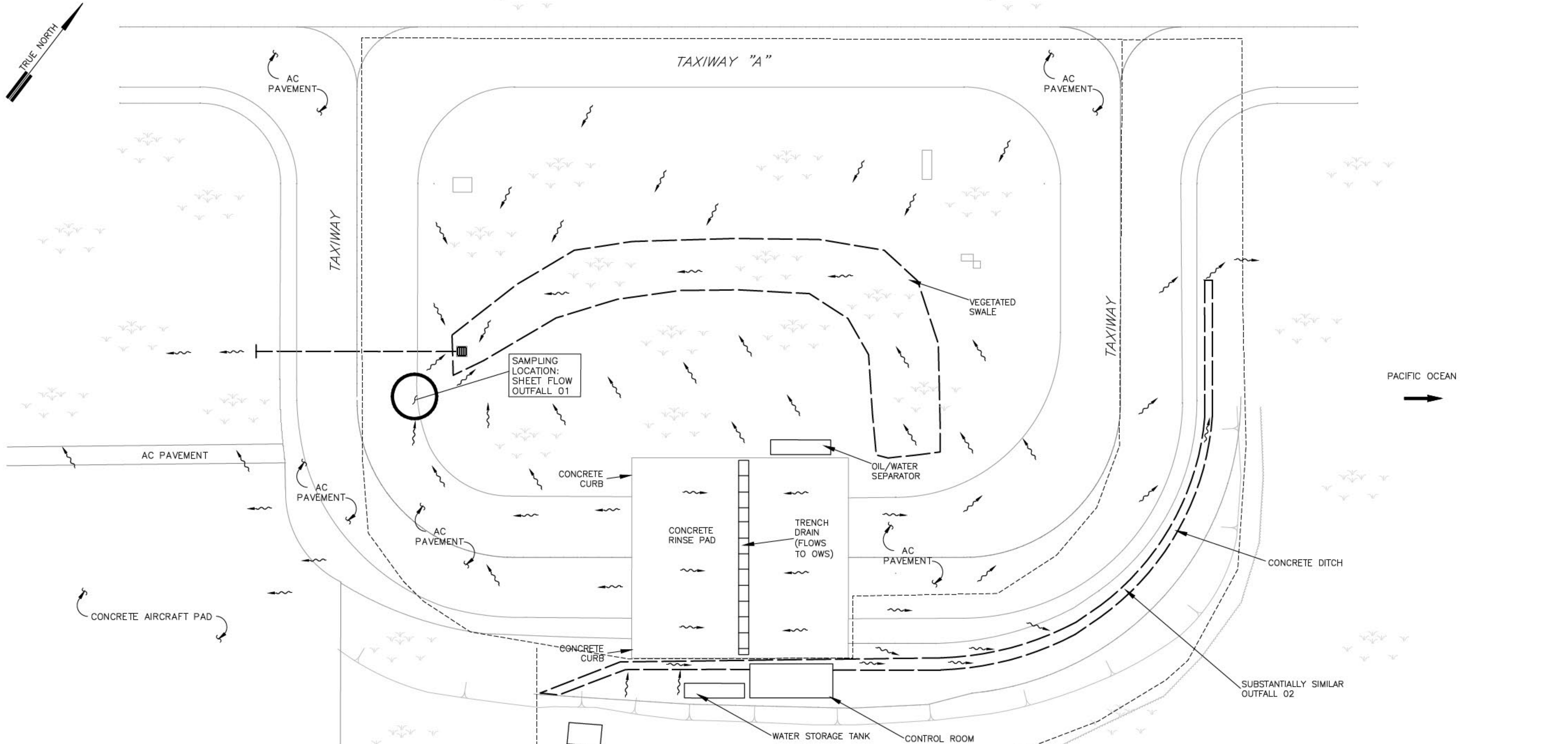
1,800 900 0 1,800
Feet

element environmental llc
environmental · engineering · water resources

PROJECT TITLE
MCBH SWPPP
Storm Water Management Program Plan

FIGURE TITLE
General Location Map

DATE	FIGURE NO.
September 2022	4-1



LEGEND

STORM WATER CONVEYANCE

FLOW ARROW

STORM DRAIN INLET

DRAINAGE AREA BOUNDARY

NOTES:

1. STORM WATER, FROM APPROXIMATELY 1.4 ACRES ASSOCIATED WITH FACILITY 6107, PRIMARILY DISCHARGES TO AN OIL/WATER SEPARATOR AND ADJACENT GRASSY AREAS. THE NEAREST RECEIVING WATER BODY IS THE PACIFIC OCEAN.
2. NOT TO SCALE

element environmental llc
environmental · engineering · water resources

PROJECT TITLE:

STORM WATER POLLUTION PREVENTION PLAN
MCBH, KANEOHE BAY, OAHU, HAWAII

FIGURE TITLE:

AIRCRAFT RINSE FACILITY
(BUILDING 6107)

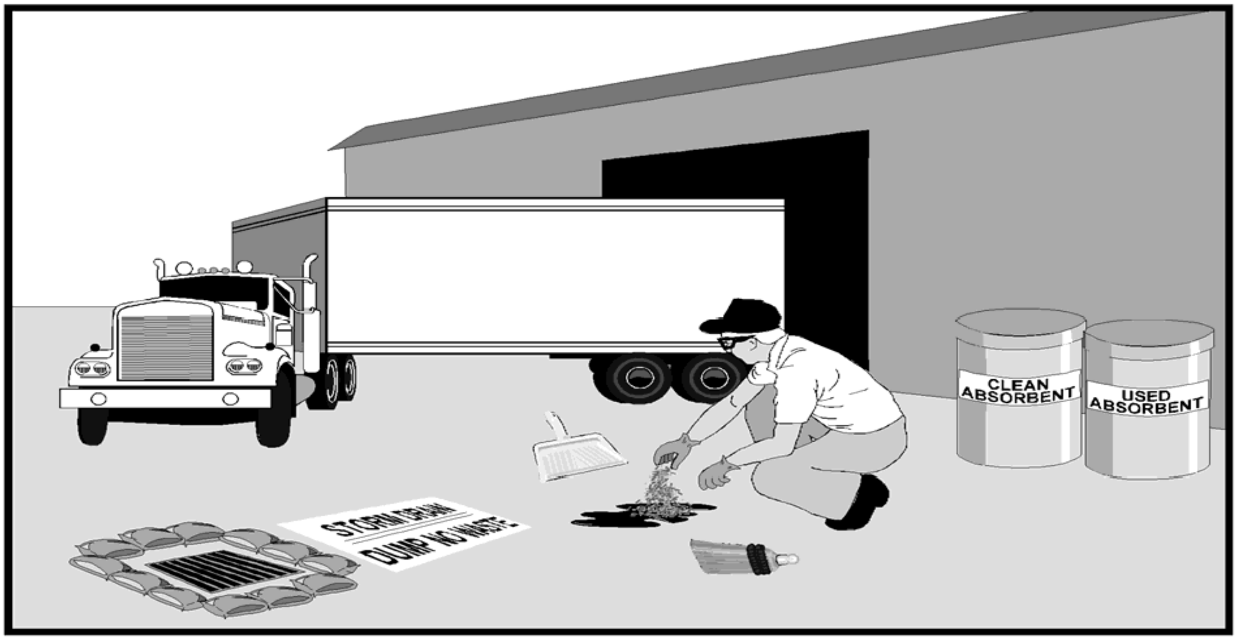
DATE:	FIGURE NO.:
JULY 2022	4-2

DAMATO
8/10/2022 11:31:24 AM
FIG 4-2 Bldg 6107 — Aircraft Rinse Facility.dwg

APPENDIX A

SELECTED BMP FACT SHEETS

BMP 006 - CONTROL SPILLS



Description of Potential Pollutant and Source: Spills of significant materials may be exposed to storm water and transported to storm drains and/or receiving waters.

Description of BMP: Follow safety data sheets (SDS) for handling, storage, and cleanup of all significant materials to reduce the potential for spills.

Any spill, large or small, of significant materials will be controlled to prevent pollutants from being transported to storm drains and/or receiving waters. Appropriate spill control material will be kept on site. Smaller spills will be contained using absorbent material such as kitty litter, straw, or sawdust. Drums of absorbent material will be easily accessible and clearly marked, and containers for spent absorbent material will be readily available. Spent absorbent material will be managed appropriately and disposed of in accordance with applicable regulations. Larger spills will be controlled using spill kits, brooms, and other response equipment commensurate with the size of the spill. The methods outlined in the Activity's spill prevention and response plans (BMP 112) for hazardous materials will be followed for spills of any potential storm water pollutants. The date, time, nature and volume of material spilled, and cleanup measures taken will be recorded for all spills and kept as part of the SWPPP.

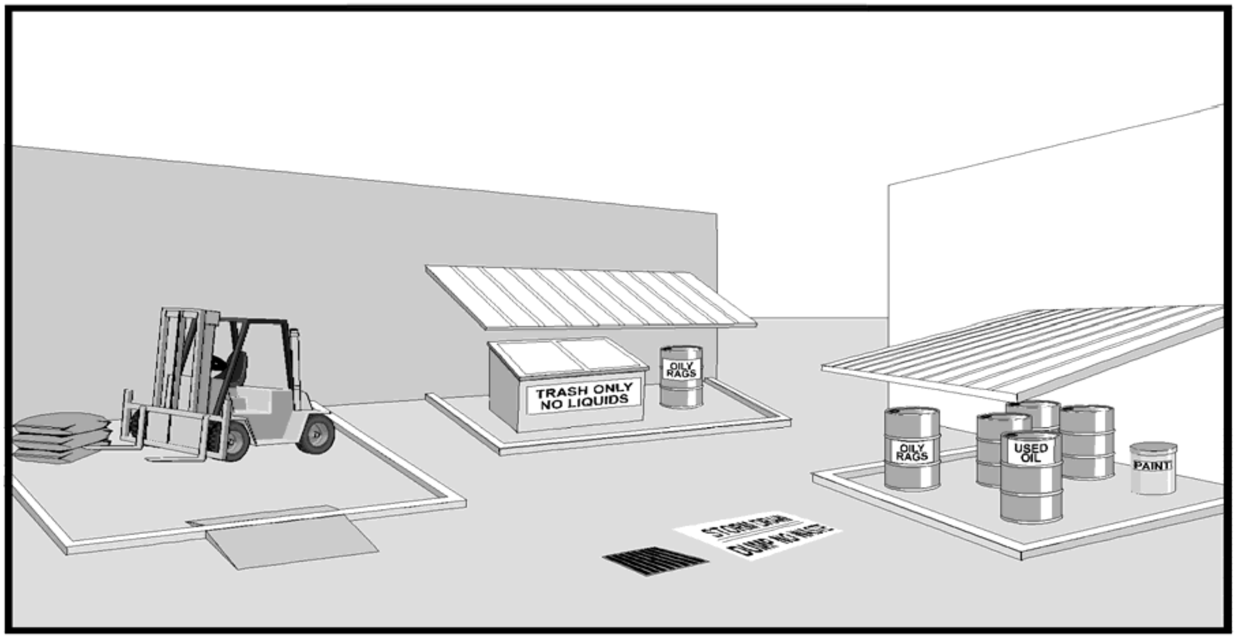
Application Guidance: Controlling spills will be practiced under all working conditions.

Training: Personnel will be trained in spill prevention and response procedures including the use of personal protection equipment (gloves, eye and face protection, etc.). This will include what absorbent or equipment to use, how to use the absorbent or equipment, where to find it, how to dispose of the spent absorbent or other material, and who to notify in the event of a spill.

Effectiveness and Cost: Spill control is a moderately effective, low-cost BMP.

Limitations: None

BMP 012 - CONSTRUCT BERM OR DIKE AROUND CRITICAL AREAS



Description of Potential Pollutant and Source: Critical areas are source areas that have a high likelihood for the release of pollutants. This includes material handling areas, material storage areas, and equipment repair and maintenance areas. As a result of spills and leaks or exposure to storm water, pollutants can flow from critical areas into the storm water system. In addition, small spills and leaks can accumulate on the surface area and be washed away by storm water.

Description of BMP: Construct a raised berm or dike around critical areas. This will provide secondary containment and prevent any spills or leaks from leaving the area. This secondary containment will also be provided where mobile tankers containing fuel are customarily stationed. Construct a ramp to allow vehicle access into the area. (Note: double walled tanks do not require this BMP. Also, 40 CFR 112.7 requires bulk petroleum storage tanks be provided with secondary containment.) A drain valve will be installed and procedures to drain storm water from the bermed area will be posted (see BMP 014).

Application Guidance: Install as needed.

Training: N/A

Effectiveness and Cost: This is a highly effective BMP. The cost will vary depending on the size of the fueling operation.

Limitations: The size of some tank and fueling operations areas could make this BMP relatively expensive.

BMP 033 - CHECK VEHICLES AND EQUIPMENT FOR LEAKS

Description of Potential Pollutant and Source: Vehicles, aircraft, or equipment entering or stored at a maintenance facility may be leaking a variety of fluids (fuel, oil, antifreeze, freon, etc.). These materials can be exposed to storm water.

Description of BMP: Inspect all vehicles and equipment at the site, whether incoming, parked, stored, or salvaged, for oil and fluid leaks. Drivers of fleet vehicles, such as delivery trucks, will also check under their vehicles each morning for fluid leaks. If leaks are present, drip pans will be placed under the vehicle or equipment. Once the vehicle is removed from the site, the former parking area will be inspected for stains, and these stains will be cleaned using rags or dry solvents.

Application Guidance: Any vehicle or equipment coming in for repairs, painting, or storage will be inspected for leaks. Fleet vehicles will be inspected each morning. Vehicles that are parked, stored, or salvaged will be provided with drip pans, as will tanker rail cars waiting to be unloaded. The frequency for implementing this BMP has been provided as general guidance. However, a facility operator may wish to establish a more suitable frequency. This will require SWPPP implementors to make judgements based on facility operations and conditions. To assign a frequency other than what has been suggested (i.e., more or less frequent), the following criteria will be considered and rated either High, Medium, or Low. If many of the criteria are assigned a High rating, the frequency may be increased. Similarly, if many criteria are assigned a Low rating, the frequency may be decreased. The goal of implementing this BMP is to minimize exposure of pollutants to storm water.

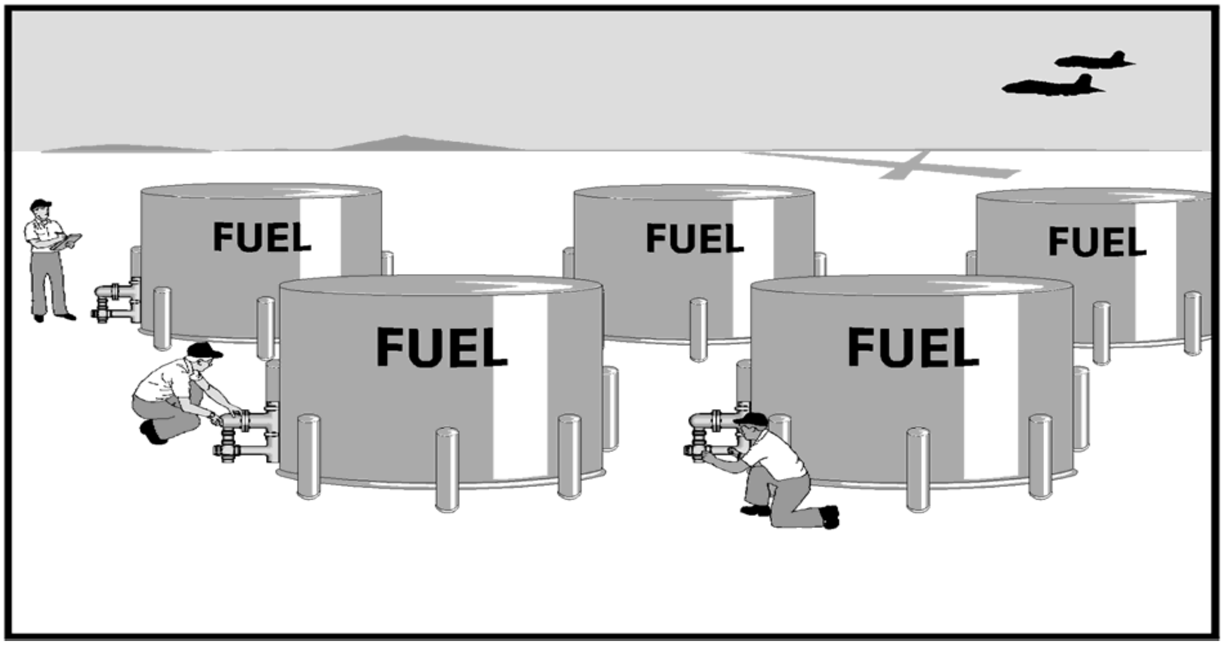
CRITERIA	Rating H=High M=Medium L=Low
Probability of exposure of significant materials to storm water	
Old age or poor condition of equipment and vehicles	
Evidence of exposure (e.g., stains on pavement)	
Proximity of source area to outfall or receiving water	
Sensitivity of receiving water to potentially exposed significant materials (e.g., waters with beneficial uses such as human contact, recreation, significant species habitat, etc.)	

Training: Signs will be posted to remind personnel of proper procedures.

Effectiveness and Cost: Checking for leaks is a moderately effective, low-cost BMP.

Limitations: None

BMP 071- KEEP TANKS, PIPING, AND VALVES IN GOOD CONDITION



Description of Potential Pollutant and Source: Tanks, piping, and valves may leak fuel or other significant materials due to corrosion, loose fittings, poor welding, or improperly or poorly fitted gaskets. This can expose these materials to storm water, which can transport them to storm drains and/or receiving waters.

Description of BMP: Keep tanks, piping, and valves in good working condition. Tanks, piping, or valves which are leaking will be repaired or replaced.

Application Guidance: Tanks, piping, and valves will be inspected monthly and kept in good condition at all times. If applicable, preventive maintenance will be performed.

The frequency for implementing this BMP has been provided as general guidance. However, a facility operator may wish to establish a more suitable frequency. This will require SWPPP implementors to make judgements based on facility operations and conditions. To assign a frequency other than what has been suggested (i.e., more or less frequent), the following criteria will be considered and rated either High, Medium, or Low. If many of the criteria are assigned a High rating, the frequency may be increased. Similarly, if many criteria are assigned a Low rating, the frequency may be decreased. The goal of implementing this BMP is to minimize exposure of pollutants to storm water.

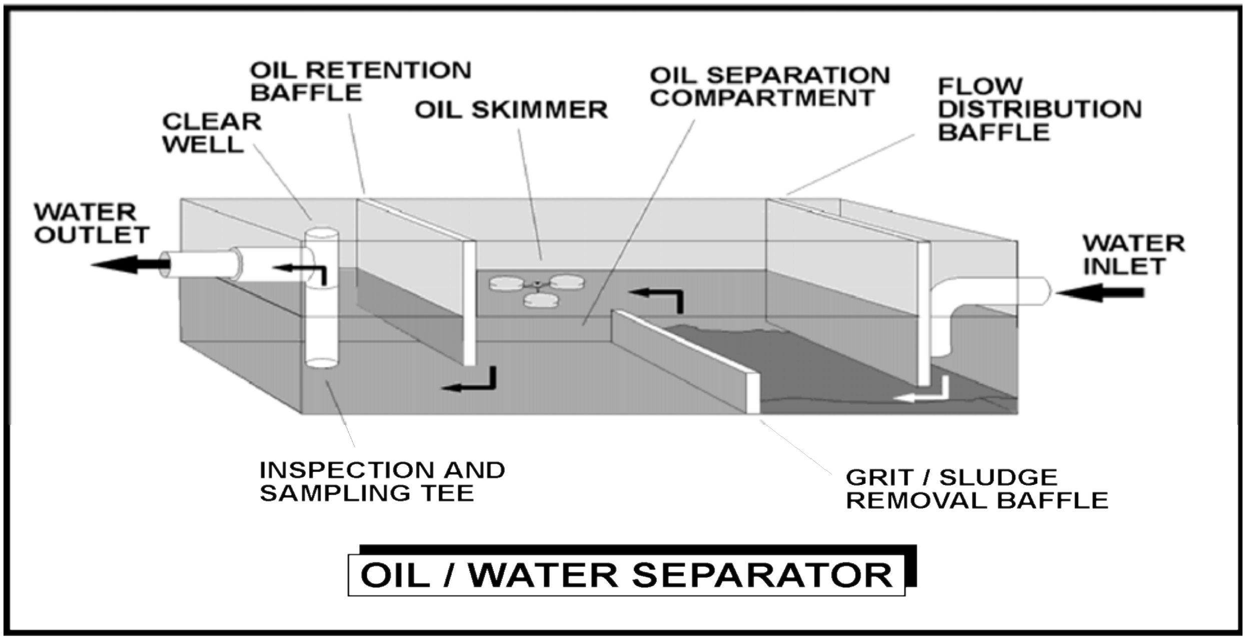
CRITERIA	Rating H=High M=Medium L=Low
Probability of exposure of significant materials to storm water	
Quantity of significant materials potentially exposed	
Toxicity of significant materials potentially exposed	
Frequency of use of tanks, piping, and valves	
Intensity of use of tanks, piping, and valves	
Old age or poor condition of tanks, piping, and valves	
Evidence of exposure (e.g., stains on ground surface)	
Proximity of source area to outfall or receiving water	
Sensitivity of receiving water to potentially exposed significant materials (e.g., waters with beneficial uses such as human contact, recreation, significant species habitat, etc.)	

Training: Personnel will be trained to regularly inspect for leaks or conditions that could lead to the discharge of chemicals, or storm water contact with waste materials. Personnel will be trained to routinely inspect equipment before each use. Tanks, piping, and valves which are not frequently used, will be inspected weekly. Procedures for notifying the appropriate maintenance personnel if a leak is found, will be established.

Effectiveness and Cost: Keeping tanks, piping, and valves in good condition is a highly effective BMP. The cost of repairing or replacing piping and valves is typically low. The cost of repairing or replacing tanks will vary based on the size of the tank and its present condition.

Limitations: None

BMP 098 - CONSTRUCT OIL/WATER SEPARATOR



Description of Potential Pollutants and Source: Oil/water separators are designed to remove petroleum compounds and grease from storm water. Separators will also remove floatable debris and settleable solids.

Description of BMP: Construct oil/water separators. Oil/water separators are underground vaults where storm water is piped in and out of the separator. Oil/water separators come in many configurations. A common configuration is the three-chamber oil/water separator. The first chamber is the sedimentation chamber that allows for sedimentation of coarse materials and screening of debris. The second chamber provides separation of oil, grease and gasoline. The third chamber is provided to prevent any possibility of a surcharge pressure from occurring and as a safety relief for the structure if a blockage occurs.

Application Guidance: Oil/water separators are applicable to situations where the concentrations of oil-and-grease-related compounds will be usually high and source control cannot provide effective control. This generally occurs at equipment maintenance and washing facilities, gas stations and loading areas. Separators may also be used in areas heavily used by mobile equipment such as loading wharfs at marine ports.

Operation and Maintenance: The degree and frequency of maintenance significantly affects the performance of the oil/water separator. Cleaning the oil/water separator will prevent the accumulated debris and oil to be discharged from the structure during intense storms.

Oil/water separators will be checked monthly during the wet season and will be cleaned at least four times a year. They will always be cleaned in October, before the start of the wet season. The accumulated oil will be properly disposed.
The frequency for implementing this BMP has been provided as general guidance. However, a facility operator may wish to establish a more suitable frequency. This will require SWPPP implementors to make judgements based on facility operations and conditions. To assign a frequency other than what has been suggested (i.e., more or less frequent), the following criteria will be considered and rated either High, Medium or Low. If many of the criteria are assigned a High rating, the frequency may be

increased. Similarly, if many criteria are assigned a Low rating, The frequency may be decreased. The goal of implementing this BMP is to minimize exposure of pollutants to storm water.

CRITERIA	Rating H=High M=Medium L=Low
Probability of exposure of significant materials to storm water in area draining to oil/water separator	
Quantity of significant materials potentially exposed in area draining to oil/water separator	
Frequency of use of significant materials potentially exposed in area draining to oil/water separator	
Evidence of exposure (e.g., stains on pavement, etching of concrete) in area draining to oil/water separator	
Proximity of source are to outfall	
Sensitivity of receiving water to potentially exposed significant material (e.g., waters with beneficial uses such as human contact, recreation, significant species habitat, etc.)	

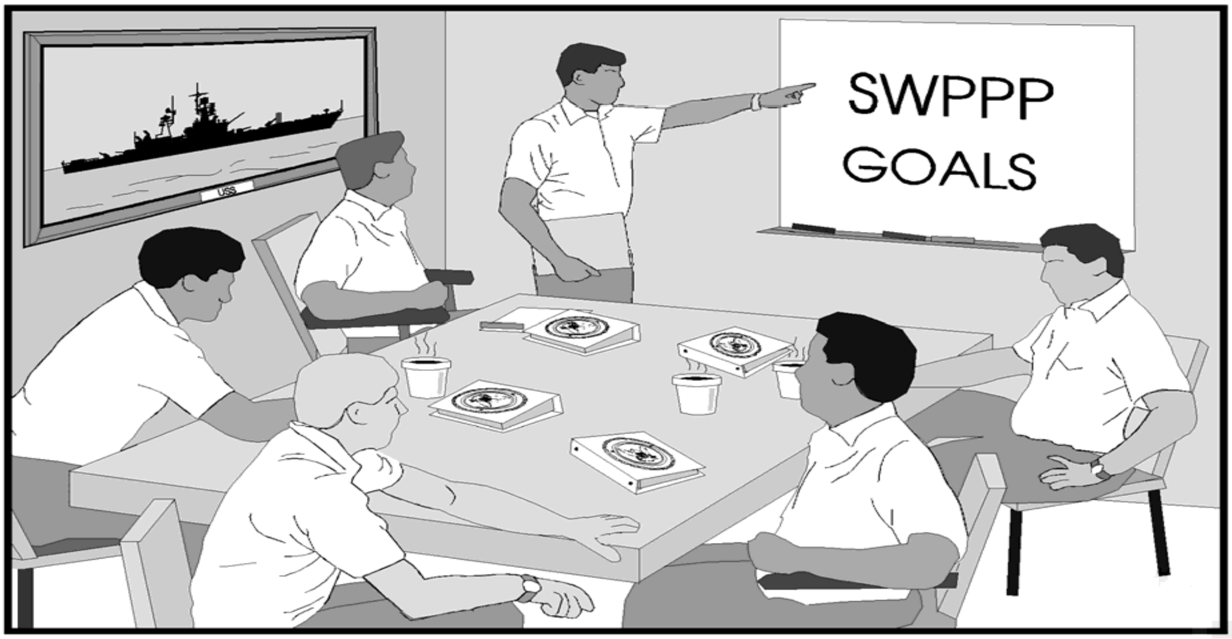
Effectiveness and Cost: This is a moderately effective, high-cost BMP.

Limitations: Oil/water separators are less effective when storm water runoff has high sediment concentrations or detergent levels which disperse oil.

Oil/water separators are only effective for highly pervious drainage areas. Oil/water separators cannot effectively treat large volumes of runoff. The maximum drainage area to oil/water separators is typically one acre.

The sediment removed during maintenance will be tested. If it is a hazardous waste, it will be disposed of accordingly.

BMP 113 - CONDUCT PERSONNEL TRAINING REGARDING THE SWPPP



Description of Potential Pollutant and Source: When properly trained, personnel are more capable of preventing spills, responding safely and effectively to an accident when it occurs, and recognizing situations that could lead to storm water contamination.

Description of BMP: Train personnel at all levels of responsibility in the components and goals of the SWPPP.

Application Guidance: Training will be conducted quarterly and at new personnel orientations.

Training: Training will address each component of the SWPPP, including how and why tasks are to be implemented. Topics will include:

- Good housekeeping
- Material management practices
- Spill prevention and response

Effectiveness and Cost: This is a highly effective, moderate-cost BMP.

Limitations: None

APPENDIX B

ROUTINE FACILITY INSPECTION CHECKLIST

Routine Facility Inspection Checklist

Activity Name: ______________________ **Date of Inspection:** ______________________

Inspector(s): ______________________ **Facility Name/Number:** ______________________

Column 1	Column 2	Column 3	Column 4	Column 5	
Source Area	BMP Number and Title	Status: F, P, N, NA[1]	Briefly Describe Effectiveness (Good or Other [describe])	Corrective Measures	
				What	By When

Note 1: F – Fully implemented, P – Partially implemented, N – Not implemented , NA – Not Applicable

APPENDIX C

QUARTERLY VISUAL ASSESSMENT CHECKLIST

Quarterly Visual Assessment Checklist

Facility ID and Location: ______________________

Date: ____________________

Sampler Name (Printed): Signature:

______________________________________ ______________________________________

Time of Rainfall Begin: ________________ Time of Rainfall End: ____________________

Time of Flow Begin: ________________ Time of Flow End: ____________________

Rainfall event more than 72 hours since last event? Rainfall Event Total: ____________________

Yes / No

Sample: sample in a clean, colorless glass or plastic container, and examined in a well-lit area

On samples collected within the first 30 minutes of an actual discharge from a storm event

Sample Characteristics:

Color: ____________________ Floating Solids: ____________________________

Odor: ____________________ Settled Solids: ____________________________

Clarity: ____________________ Suspended Solids: ____________________________

Oil Sheen: ____________________ Foam: ____________________________

Other Obvious Indicators of Storm Water Pollution

(describe): ____

Nature of the discharge (i.e., runoff):

Results of observations of the storm water discharge:

Probable sources of any observed storm water contamination:

If applicable, why it was not possible to take samples within the first 30 minutes:

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

APPENDIX D

CORRECTIVE ACTION LOG

Corrective Action Log

Use this form to document SWPPP corrective actions. This form is to be completed by the Environmental Compliance Coordinator (ECC) or a person designated by ECC and submitted to the MCBH Storm Water Program Manager. The Storm Water Program Manager is responsible for any notification to the State of Hawaii Department of Health (DOH), if required.

A corrective action is defined as an action taken to:

- **a) Repair, modify, or replace any storm water control used at the site;**
- **b) Clean up and properly dispose of spills, releases, or other deposits; or**
- **c) Remedy a permit violation.**

1. Corrective Action Triggers

The following events trigger a corrective action to be taken (this triggering condition is to be documented *within 24 hours* of discovering the occurrence):

- a) A required storm water control was never installed, was installed incorrectly, or is not in accordance with the requirements in the SWMP Plan.
- b) A member of the **Storm Water Pollution Control Team** becomes aware that the storm water controls installed and being maintained are not effective enough for the discharge to meet applicable water quality standards or applicable requirements in the MCBH SWMP Plan. The facility ECC shall notify the Storm Water Program Manager immediately. The Storm Water Program Manager will notify DOH *by the end of the next work day*.

1.1 Log Notifications:

Date/time Storm Water Program Manager notified by ECC: ________________________

Date/time DOH notified by Storm Water Program Manager: ________________________

1.2 Describe Discharge:

Indicate which one of the following prohibited discharges is occurring or has occurred:

- ❒ Wastewater from washout of concrete
- ❒ Wastewater from washout and cleanout of stucco, paint, form release oils, curing compounds, or other construction materials
- ❒ Fuels, oils, or other pollutants used in vehicle and equipment operation and maintenance
- ❒ Soaps, solvents, or detergents used in vehicle and equipment washing
- ❒ Toxic or hazardous substances from a spill or other release
- ❒ Other, Explain: ____

2. Requirements for Taking Corrective Actions

The ECC shall complete corrective actions in accordance with the deadlines specified below. In all circumstances, site personnel shall *immediately* take all reasonable steps to minimize or prevent the discharge of pollutants until a permanent solution is installed and made operational, including cleaning up any contaminated surfaces so that the material will not discharge in subsequent storm events. *Immediately* means the same day the condition is discovered, unless it is too late in the day, in which initiation of corrective action must begin on the following work day.

Following any of the above triggering events, the ECC shall install a new or modified control and make it operational, or complete the repair, by *no later than 7 calendar days from the time of discovery*. If it is not feasible to complete the installation or repair within 7 calendar days, the ECC shall document and submit to the Storm Water Program Manager, for their agreement, why it is not feasible to complete the installation or repair within the 7-calendar day timeframe and document a schedule for installing the storm water control and making it operational as soon as practicable after the 7-day timeframe.

If the issue is not adequately addressed within 7 calendar days or the agreed upon timeframe, enforcement procedures will be initiated. Unaddressed issues will be escalated through the chain of command. The MCBH Environmental Compliance and Protection Division Director will give the responsible party a formal notice with an appropriate deadline for action. If the problem remains unchanged, the situation will be brought to the attention of the next higher authority. The ultimate penalty for non-compliance of MS4 Permit regulations is eviction or discharge of the responsible party from MCBH. This is placed at the discretion of the Base Commander. See the Enforcement Response Plan in Appendix 3-6 of the SWMP Plan for further information on MCBH's enforcement policies.

3. Corrective Action Report

Within 24 hours of discovering the occurrence of one of the triggering conditions in SWPPP Section 4.1 at the site, the ECC must complete the following:

3.1 Describe the triggering condition:

____
____
____
____

3.2 Record the date/time of the condition identified. How was the condition identified?

____
____
____
____

3.3 Describe the corrective action taken:

____
____
____

Date/time installation or repair was completed:
(or date/time the prohibited discharge ceased) ____

Or describe why it is not feasible to complete installation or repair within 7 calendar days and detail a proposed schedule (if applicable)

____
____
____

4. Resolution of the Corrective Action Trigger

Within 7 calendar days of initiating the Corrective Action Report, the ECC must complete a report of the following:

4.1 Follow-up Actions

Describe any follow-up actions taken to review the design, installation, and maintenance of storm water controls, including the dates such actions occurred:

____
____
____

4.2 Storm Water Control Modifications

Provide a summary of storm water control modifications implemented. Include a schedule of activities required to implement changes and the date the modifications were completed or will be completed:

____
____
____

5. SWPPP Modification Due to Corrective Actions

Where corrective actions result in changes to any of the storm water controls or procedures documented in the SWPPP, modify the SWPPP accordingly *within 7 calendar days* of completing corrective action work.

Are modifications to the SWPPP necessary? ❑ Yes ❑ No

Date modifications to the SWPPP shall be completed _______________

6. Corrective Actions Required by DOH

The facility shall comply with any corrective actions required by DOH as a result of permit violations found during an inspection by DOH or the Environmental Protection Agency (EPA).

Was the Corrective Action triggered by a DOH/EPA inspection?

❑ Yes ❑ No

❑ Date of DOH/EPA Inspection __________________

7. Additional Comments:

____
____

Final

STORM WATER POLLUTION PREVENTION PLAN

Storm Water Management Program Plan

Marine Corps Base Hawaii, Oahu, Hawaii

NPDES Permit No. HI S000007

FUEL DELIVERY BRANCH & REFUELER TRUCK PARKING (BUILDING 6900, FORMERLY 6182)

Prepared by:

Marine Corps Base Hawaii

August 2022

Table of Contents

Tables

Figures

Appendices

List of Acronyms and Abbreviations

BMP	Best Management Practice
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CWA	Clean Water Act
CWB	Clean Water Branch
DOH	State of Hawaii Department of Health
ECC	Environmental Compliance Coordinator
ECE	Environmental Compliance Evaluation
ECPD	Environmental Compliance and Protection Division
EPA	United States Environmental Protection Agency
HAZMAT	Hazardous Material
HAZMIN	Hazardous Material Minimization
MCBH	Marine Corps Base Hawaii
MS4	Municipal Separate Storm Sewer System
MS4 Permit	Marine Corps Base Hawaii's NPDES Permit No. HI S000007
NPDES	National Pollutant Discharge Elimination System
POC	Point of Contact
SAS	Satellite Accumulation Site
SWMP	Storm Water Management Program
SWPPP	Storm Water Pollution Prevention Plan

Certification Statement

MCBH is committed to the prevention of discharges of polluted stormwater to navigable waters or the environment and maintains the highest standards for best management practices through periodic review, updating, and implementation of this Stormwater Pollution Prevention Plan (SWPPP).

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information contained therein. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Name: ______________________________ Title: ______________________________

Signature: ______________________________ Date: ______________________________

Management Review

Refer to Section 1.2 for more information on required SWPPP updates.

Review Dates	Signature	Amendment Required? (Y/N)
__________	______________	________
__________	______________	________
__________	______________	________
__________	______________	________
__________	______________	________
__________	______________	________

1 Introduction

As part of Federal regulations administered through the Clean Water Act (CWA), the State of Hawaii, Department of Health (DOH) has issued the National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4) Permit No. HI S000007 (referred to herein at the "MS4 Permit") to Marine Corps Base Hawaii (MCBH). The MS4 Permit requires that MCBH provide all existing industrial facilities, identified in MCBH's MS4 Permit application, and any newly identified industrial facilities, submitted to DOH using the "MS4 NPDES Individual Permit – Industrial Storm Water Discharge Notification Form," with a Storm Water Pollution Prevention Plan (SWPPP) for storm water associated with industrial activities.

The purpose of the regulations is to protect water quality by reducing the amount of pollutants in storm water runoff caused by industrial activities.

1.1 SWPPP Implementation

The storm water management controls of this plan will become MCBH procedure for the applicable industrial facility. An up-to-date copy of the SWPPP shall be maintained on site and at the MCBH Environmental Compliance and Protection Division (ECPD). Management staff, maintenance personnel, contractor staff, and other personnel involved in onsite industrial activities, will be knowledgeable of the plan and follow the guidelines set forth in it, in addition to any other pertinent base-wide, state and federal regulations.

Day-to-day implementation of the SWPPP is primarily the responsibility of the current facility Environmental Compliance Coordinator (ECC) or Point of Contact (POC) as identified in Table 2-1. Enforcement of the permit conditions and this SWPPP are ultimately the responsibility of ECPD and additional escalating levels of authority as specified in the Enforcement Response Plan developed by MCBH for its base-wide Storm Water Management Program (SWMP) Plan.

1.2 Updating the SWPPP

This SWPPP will be reviewed as needed to identify necessary changes, at a minimum of every five years. Updates may be required due to current best management practice (BMP) failures, spill events, changes in industrial activities, changes in features, corrective actions, or other necessary changes. Personnel changes to the Storm Water Pollution Control Team (Section 2.1) should be logged in Table 2-1. Storm Water Pollution Control Team Log. ECPD will be responsible for approving revisions to the SWPPP. In the event the plan is modified, a copy of the updated SWPPP will remain at ECPD and will be provided to the applicable facility. Additionally, ECPD shall document and report the SWPPP changes to the DOH, Clean Water Branch (CWB), within thirty days of when the changes arise.

2 Fuel Delivery Branch & Refueler Truck Parking, Building 6900

The Fuel Delivery Branch & Refueler Truck Parking, Building 6900, is located within MCBH, Kaneohe Bay at the northwest corner of the intersection of "C" Street and 3rd Street. The former Fuel Delivery Branch office, Building 6182, has been demolished. A newly constructed office building (Building 6900) was placed in the grassy area to the north of the refueler parking lot. The facility encompasses an area of approximately 2.1 acres and can be found in grid [redacted] of the MCBH Base Map, see Figure 4-1. The facility-specific map is shown on Figure 4-2.

2.1 Storm Water Pollution Control Team

The Storm Water Pollution Control Team consists of the Storm Water Program Manager, ECC, and the Hazardous Material (HAZMAT) and Hazardous Material Minimization (HAZMIN) team. The Storm Water Program Manager is responsible for the enforcement of the MS4 permit at all industrial sites and provides annual training to the ECC and other personnel. The ECC is the primary unit POC for storm water related items and the day-to-day environmental matters at a specific facility. ECC's are responsible for SWPPP implementation including BMP and facility inspections, storm water assessments/sampling, BMP maintenance, and corrective actions. The HAZMAT and HAZMIN team shall be contacted if assistance is needed. The role, name, phone number, and start date of individuals on the Storm Water Pollution Control Team is recorded in Table 2-1 below. In the event of personnel turnover, Table 2-1 shall be updated accordingly.

TABLE 2-1. STORM WATER POLLUTION CONTROL TEAM LOG

Role	Name	Phone	Start Date
MCBH Storm Water Program Manager	CIV Whitney Anderson	Office: 808-257-4359	6/6/22
ECC	CIV Kahana Kauahi	Office: 808-257-2234	8/1/2019
HAZMAT/HAZMIN	CIV Tim Cawthon	HAZMAT Center Building 6409 Office: 808-257-9913 HAZMIN Center Building 6407 Office: 808-257-0770	N/A

2.2 Fuel Delivery Branch & Refueler Truck Parking, Building 6900 Activities

The Fuel Delivery Branch & Refueler Truck Parking Facility is operated under the MCBH Fuel Division and consists of two structures and a large concrete paved parking area, enclosed within barbed-wire, chain-linked fencing. Building 6900 is a single-story structure that is used as offices for administrative needs for fuel handling requests. It is located to the west of the refueler parking area. This building replaced the original fuel office Building 6182 originally located to the east of the refueler lot. A vegetated swale that runs parallel to the Refueler Truck Parking Lot is located just east of Building 6900.

A small satellite accumulation site (SAS) shed is located at the northeastern corner of the parking area. The shed consists of chain-linked fencing on three sides, a sloped roof, and concrete floor with a concrete containment berm on three sides. The open side of the shed and containment berm faces the refueler parking area. Waste fuel, gathered from fuel samples taken onsite, is stored in 55-gallons drums on containment pallets. A spill kit is also located in the shed.

The concrete paved area is used as parking for 12 refueler trucks the facility operates and maintains. Ten of the refueler trucks are [redacted]-gallon capacity and are used to transport JP-8 fuel. The remaining two refueler trucks are [redacted]-gallon capacity; one is used to transport diesel fuel and the other is used to transport gasoline. The refueler trucks are normally kept full when parked at the facility.

A concrete berm surrounds the entire parking area, with the entry and exit driveways sloped to retain liquids within the parking area. Storm water that accumulates within the bermed parking area flows to a series of four drain lines located at the eastern side of the parking area. Each drain line has a manually operated valve that is normally kept closed. If no sheen or other indication of contamination is present in collected storm water based on visual inspection, the valve is opened. The drain lines are connected to a perforated piping system that allows the storm water to percolate into the ground and/or flow into a grassy area near D Street. Runoff generated on the entry and exit driveways sheet flows south (down) the driveways and into a catch basin along 3rd Street, where it is discharged to Kaneohe Bay via Outfall 021. The stormwater sampling location (Outfall 01) is located at the east entrance to the refueler parking lot at 3rd Street (Figure 4-2).

2.3 Sources of Pollutants

The following is an inventory of potential pollutants associated with Fuel Delivery Branch & Refueler Truck Parking, Building 6900:

A. Material Loading and Unloading Areas

Materials that are spilled, leaked, or lost during loading or unloading may collect on vegetated or paved surfaces and be carried away by storm runoff. There are no loading or unloading activities done at the facility. All refueler trucks are loaded at the tanker truck loading racks, located at Buildings 1254, 1563, and 6504.

B. On-Site Material Storage and Disposal Practices

Leaks, drips, or spills of materials that are stored or disposed of in areas exposed to rainfall can be carried away by storm water. The refueler trucks are kept full when parked at the facility. Waste fuels from samples that are collected from the refueler trucks are stored in 55-gallon drums in the SAS at the northeastern corner of the parking area. Full drums are brought to the HAZMIN Center.

C. Outdoor Activities

Many outdoor activities at MCBH, Kaneohe Bay use materials or create wastes that have the potential to pollute storm water runoff. Refueler trucks are parked outside in the concrete parking area. Occasionally, fuel samples are drawn from the refueler trucks when they are parked.

D. Significant Materials Inventory

The following is a list of significant materials found at the Fuel Delivery Branch & Truck Refueler Parking:

- Jet Fuel
- Diesel Fuel
- Gasoline

2.4 Potential Storm Water Pollutants

The following pollutants have been identified as having a reasonable potential to be present in storm water discharges from Fuel Delivery Branch & Truck Refueler Parking, Building 6900 if not properly managed:

- Jet Fuel
- Diesel Fuel
- Gasoline

Materials that have *not* been included as a potential storm water pollutant but have been included as part of the significant materials inventory list, are considered to present a negligible risk to storm water quality. This is based on the nature/location of the primary activities performed with these materials and the BMPs that are in place. Material transport (loading/unloading) is not considered to be a significant threat to storm water, due to spill response procedures, training, and spill kit materials available onsite.

2.5 Best Management Practices (BMPs)

Best Management Practices (BMPs) are techniques or methods that aim to manage the quantity and improve the quality of storm water runoff from a facility or other site. Storm water BMPs intend to reduce or eliminate pollution and contaminants collected by runoff before the runoff reaches the MCBH storm water system or sensitive ecosystems such as streams, wetlands, and marine environments. The following is a summary of BMPs currently in place at the Fuel Delivery Branch & Truck Refueler Parking , Building 6900.

A. Good Housekeeping Practices

In general, Fuel Delivery Branch, Building 6900 employs good housekeeping practices throughout its operations. Good housekeeping practices for Fuel Delivery Branch, Building 6900 are included in Table 2-2.

B. Preventative Maintenance

Preventive maintenance is important as water pollution control measures may be of little or no use if devices and equipment have not been properly maintained. Facility personnel conduct inspection of facility equipment and storage systems on a regular basis. The preventive maintenance program involves inspections of equipment and storage systems that are exposed to storm water. Inspections of the SAS are conducted on a monthly basis by HAZMIN, with monthly inspection reports submitted to ECPD.

C. Visual Inspections

Visual inspection provides a valuable subjective assessment of the status of storm water management systems. They are easily performed and allow the opportunity for corrective action, if necessary. Site inspections and documentation requirements are addressed in in Section 3 of this SWPPP. MCBH HAZMIN Center staff perform hazardous material inspections monthly. Annual facility inspections are performed by EPCD as part of the MCBH Environmental Compliance Evaluation (ECE).

D. Spill Prevention and Response

Areas where significant material spill or leakage can occur are identified in Section 2.1 and shown on Figure 4-2. The storm water systems and their accompanying drainage points are also shown on Figure 4-2. Refer to Table 2-2 for BMPs related to spill preventative measures for material handling procedures, storage requirements, and equipment usage.

In the event of a hazardous substance or oil spill, the ECC and ECPD shall be notified immediately (ECPD; 808-630-8246). If the spill cannot be easily addressed using an onsite spill kit and personal protective equipment, call Fed Fire (Military 911). The spill source should be immediately controlled if it is safe to do so by closing valves, switches, and/or turning off power to a device. Then, contain the spill by using sorbent socks or absorbent materials found in a spill kit. After it has been contained, clean up the spilled material in a safe manner using dry methods. All materials should then be properly disposed of.

Each Refueler truck has an onboard spill kit. The locations of additional spill kits are shown in Figure 4-2.

E. Erosion and Sediment Controls

No areas at the Fuel Delivery Branch & Refueler Truck Parking have been identified as having high potential for significant soil erosion that would require erosion and sediment control measures. The Refueler parking lot is paved and all other areas are grass.

F. Best Management Practices to Minimize Pollutant Contact with Storm Water

Facility personnel receive annual training from ECPD at minimum, as well as an initial training for all new personnel. Training information will include the BMPs that have been developed for the facility and a general overview of the storm water program and its objectives.

Existing BMPs at the Fuel Delivery Branch & Refueler Truck Parking are shown in Table 2-2 and attached as fact sheets to this SWPPP in Appendix A.

TABLE 2-2. BEST MANAGEMENT PRACTICES

BMP No.	BMP Title	Description
001	Label All Drums, Cans, Containers, Tanks, and Valves	All containers and drums are labeled.
004	Avoid Hosing Down the Site	Sweeping with a push broom is performed as needed.
006	Control Spills	Any spill of significant materials is controlled immediately to prevent pollutant from being transported to receiving water. A spill kit is stored onsite.
007	Place Trash Receptacles at Appropriate Locations	Covered trash bins are located throughout the facility
012	Construct Berm or Dike Around Critical Areas	A concrete berm surrounds the entire parking area and satellite accumulation site.
028	Keep Equipment and Vehicles Clean	Refueler trucks are kept clean and well-maintained.
033	Check Vehicles and Equipment for Leaks	Refueler Trucks are checked for leaks on a regular basis.
037	Park Vehicles on an Impervious Surface	Refueler trucks are parked on an impervious surface.
041	Wash Equipment in Designated Areas	Refueler trucks are washed offsite.
061B	Store Liquids and Significant Materials within a Building or Covered Area	All significant materials are properly stored undercover and in secondary containment where required.
113	Conduct Personnel Training Regarding the SWPPP	Personnel are trained regularly (initial orientation and annual refresher).

3 Inspections, Assessments and Monitoring

3.1 Routine Quarterly Site Inspections

The MS4 Permit requires a routine quarterly site inspection by a qualified person with at least one member of the storm water pollution control team participating. At least once each calendar year, the routine inspection must be conducted during a period when a storm water discharge is occurring. The site inspection is an overall evaluation of the effectiveness of the BMPs implemented at that facility. A Routine Facility Inspection Checklist (Appendix B) shall be completed during each routine site inspection and kept onsite with this SWPPP. During normal facility operating hours, inspections must be conducted of areas of the facility including, but not limited to, the following:

- Areas where industrial materials or activities are exposed to storm water;
- Areas identified in the SWPPP and those that are potential pollutant sources;
- Areas where spills and leaks have occurred in the past three years;
- Discharge points; and
- Control measures used to comply with the effluent limits contained in this permit.

3.2 Visual Assessment of Storm Water Discharges

A Quarterly Visual Assessment of storm water discharge is required for all industrial facilities at MCBH. Storm water samples for this visual assessment but must be collected in such a manner that the samples are representative of the storm water discharge from the facility. Therefore, the water sample must be collected at the designated storm water sampling point (Outfall 01) as shown in Figure 4-2. The Quarterly Visual Assessment checklist (Appendix C) shall be completed by the current facility ECC and kept onsite with this SWPPP.

The visual assessment must be made:

- Of a sample collected in a clean, colorless glass or plastic container, and examined in a well-lit area;
- On samples collected within the first 30 minutes of an actual discharge from a storm event. If it is not possible to collect the sample within the first 30 minutes of discharge, the sample must be collected as soon as practicable after the first 30 minutes and documented why it was not possible to take the sample within the first 30 minutes; and
- For storm events, on discharges that occur at least 72 hours (three days) from the previous discharge.

Whenever the visual assessment shows evidence of storm water pollution, corrective action procedures to remedy the pollutants must be taken and documented. Refer to Section 4 for corrective action procedures.

4 Corrective Actions

A corrective action is defined as any action taken, or required to be taken, to (1) repair, modify, or replace any stormwater control used at the site; (2) clean up and dispose of spills, releases, or other deposits found on the site; and (3) remedy a permit violation. Corrective actions should be documented using the Corrective Action Log (Appendix D).

4.1 Immediate Actions

If corrective action is needed, you must immediately take all reasonable steps necessary to minimize or prevent the discharge of pollutants until a permanent solution is installed and made operational, including cleaning up any contaminated surfaces so that the material will not discharge in subsequent storm events. Note: In this context, the term "immediately" requires you to, on the same day a condition requiring corrective action is found, take all reasonable steps to minimize or prevent the discharge of pollutants until a permanent solution is installed and made operational. However, if a problem is identified at a time in the workday when it is too late to initiate corrective action, the initiation of corrective action must begin no later than the following workday. "All reasonable steps" means that the permittee has undertaken initial actions to assess and address the condition causing the corrective action, including, for example, cleaning up any exposed materials that may be discharged in a storm event (e.g., through sweeping, vacuuming) or making arrangements (i.e., scheduling) for a new BMP to be installed at a later date.

4.2 Escalating Actions

If additional actions are necessary beyond those implemented or if the conditions continue to occur, additional corrective actions (e.g., install a new or modified control and make it operational, complete the repair) must be completed before the next storm event if possible, and within 14 calendar days from the time of discovery of the corrective action condition. If it is infeasible to complete the corrective action within 14 calendar days, document why it is infeasible to complete the corrective action within the 14-day timeframe and identify a schedule for completing the work, which must be done as soon as practicable after the 14-day timeframe but no longer than 45 days after discovery. If the completion of corrective action will exceed the 45-day timeframe, the minimum additional time necessary to complete the corrective action can be taken, provided that MCBH ECPD and DOH is notified of your intention to exceed 45 days. Where your corrective actions result in changes to any of the controls or procedures documented in your SWPPP, you must modify your SWPPP accordingly within 14 calendar days of completing corrective action work.

4.3 Corrective Actions for Substantially Identical Outfalls

If the event triggering corrective action is associated with an outfall that had been identified as a "substantially identical outfall", the review must assess the need for corrective action for all related substantially identical outfalls. Any necessary changes to control measures that affect these other outfalls must also be made before the next storm event if possible, or as soon as practicable following that storm event. Any corrective actions must be conducted within the timeframes discussed above.

4.4 Record of Past Spills or Leaks of Hazardous Pollutants

Table 4-1 is used to record significant spills and leaks that have occur or have occurred within three years prior to the preparation or amendment of this SWPPP. Significant spills and leaks include, but are not limited to, releases of oil or hazardous substances in excess of quantities that are reportable under CWA Section 311 (see 40 CFR 110.6 and 40 CFR 117.21) or Section 102 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 USC §9602.

At the time of this SWPPP update, there have been no past spill or leak incidents reported for the Fuel Delivery Branch & Truck Refueler Parking.

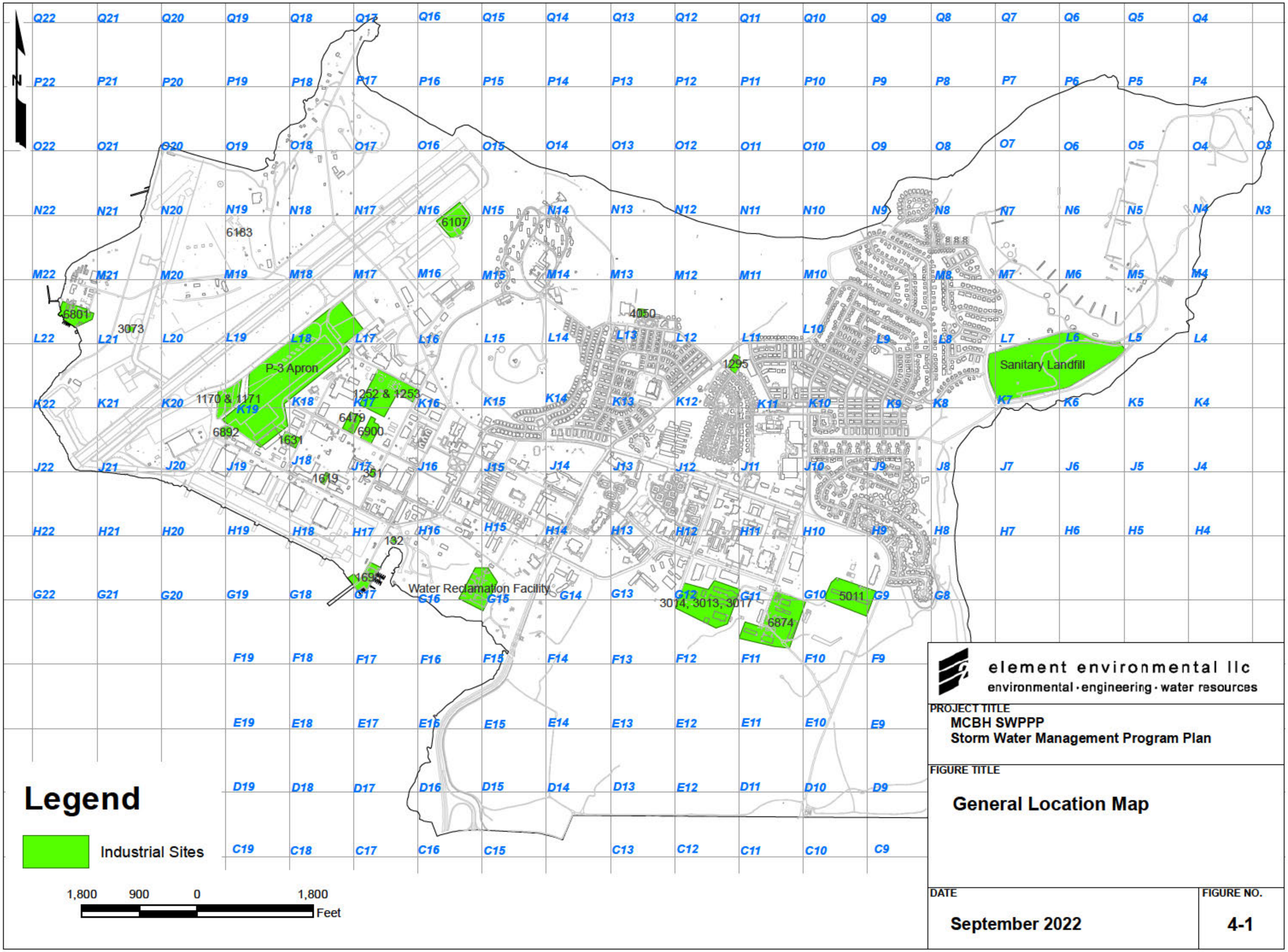
TABLE 4-1. PAST SPILLS OR LEAKS OF HAZARDOUS POLLUTANTS

Date of Incident	Brief Summary of Incident (POC Active at Time of Incident, Pollutant Type, Estimated Quantity, Location of Spill)

4.5 Record of Unauthorized Non-Storm Water Discharges

TABLE 4-2. UNAUTHORIZED NON-STORM WATER DISCHARGE EVALUATION

Date of Evaluation	Brief Summary of Evaluation (Description of the evaluation criteria, outfalls or onsite drainage points that were directly observed, action(s) taken, such as a list of control measures used to eliminate unauthorized discharge)



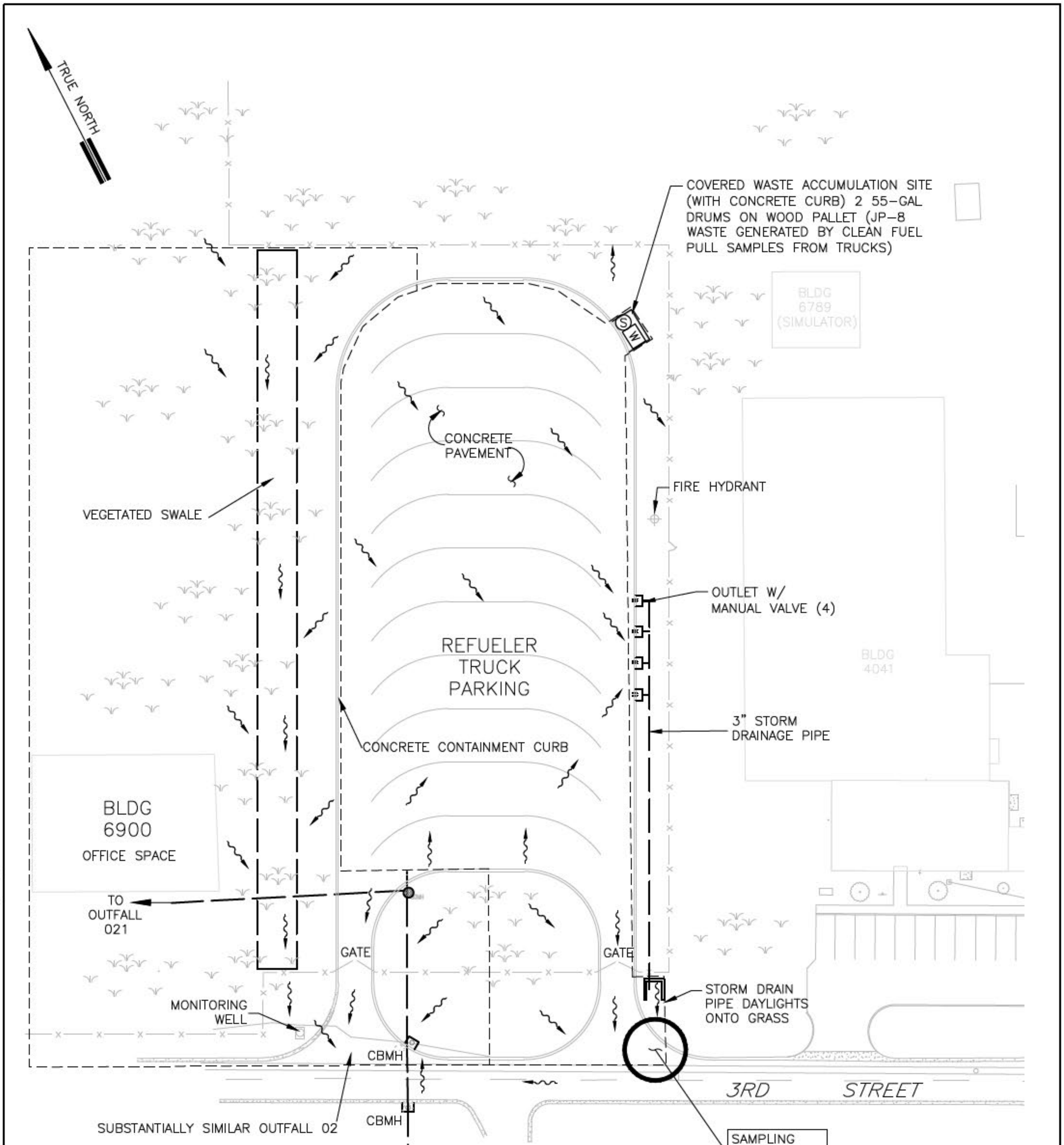
element environmental llc
environmental · engineering · water resources

PROJECT TITLE
MCBH SWPPP
Storm Water Management Program Plan

FIGURE TITLE
General Location Map

DATE
September 2022

FIGURE NO.
4-1



LEGEND

- W — WASTE ACCUMULATION SITE
- S — SPILL KIT
- STORM WATER CONVEYANCE
- FLOW ARROW
- DRAINAGE AREA BOUNDARY

NOTES:

1. STORM WATER, FROM APPROXIMATELY 2.1 ACRES ASSOCIATED WITH BUILDING 6900 IS DISCHARGED TO KANEOHE BAY VIA MCBH OUTFALL 021.
2. NOT TO SCALE

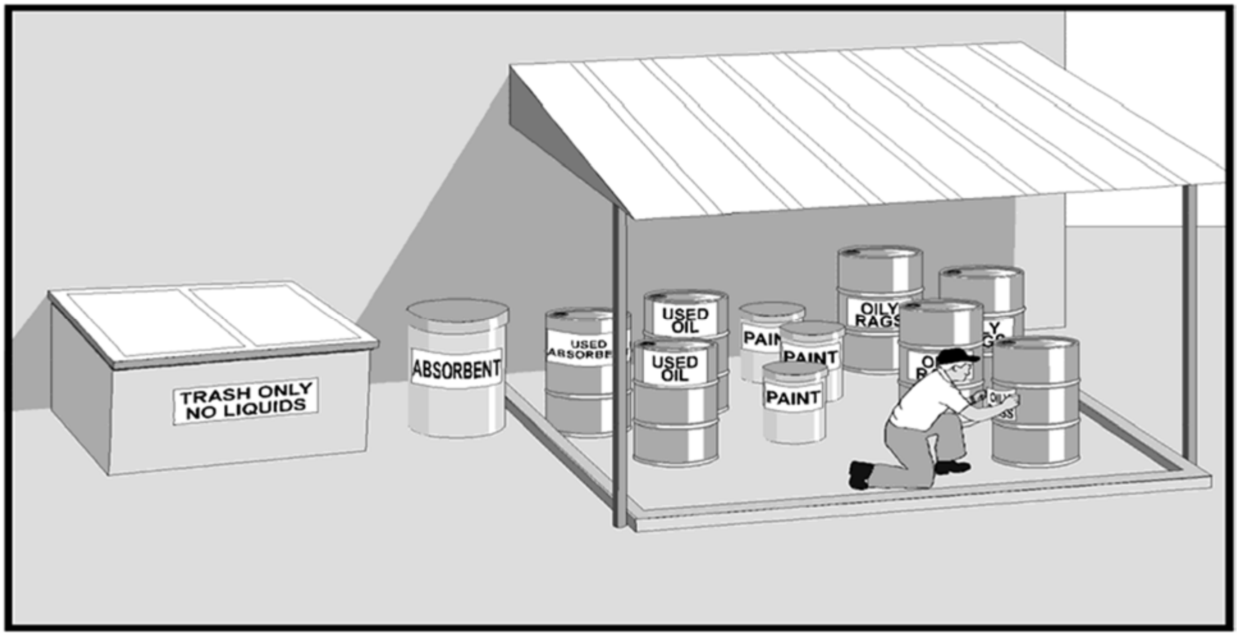
DATE:	PROJECT TITLE:	
JULY 2022	STORM WATER POLLUTION PREVENTION PLAN MCBH, KANEOHE BAY, OAHU, HAWAII	
FIGURE TITLE:		FIGURE NO.:
FUEL DELIVERY BRANCH/REFUELER TRUCK PARKING (BUILDING 6900)		4-2

DAMATO
7/28/2022 3:10:32 PM
FIG 4-2 Bldg 6182 (6900) - Fuel Delivery Branch and Refueler Truck Parking.dwg

APPENDIX A

SELECTED BMP FACT SHEETS

BMP 001 - LABEL ALL DRUMS, CANS, CONTAINERS, AND TANKS



Description of Potential Pollutant and Source: Drums, cans, and containers can be improperly managed and disposed of due to uncertainty of the container's contents. Tanks which are not labeled may result in improper use of the tank or fuel, which may result in the exposure of significant materials to storm water and/or receiving waters. Similarly, unlabeled valves may be opened without proper precaution due to lack of user information. Storm water quality will be affected if significant materials are improperly disposed to the storm drain and/or receiving waters. Lack of labeling will also make it difficult to quickly identify the type of material released so facility personnel can respond correctly. Labels also identify hazardous materials at the facility and are a good way to request caution in certain areas (e.g., drums indicating flammability).

Description of BMP: Label all drums, valves, pumps, cans, tanks, and containers to reduce the chance of misuse and eventual spills. Labeling ensures that the appropriate procedures, equipment, and storage containers are used. All containers will be labeled as to what is in them.

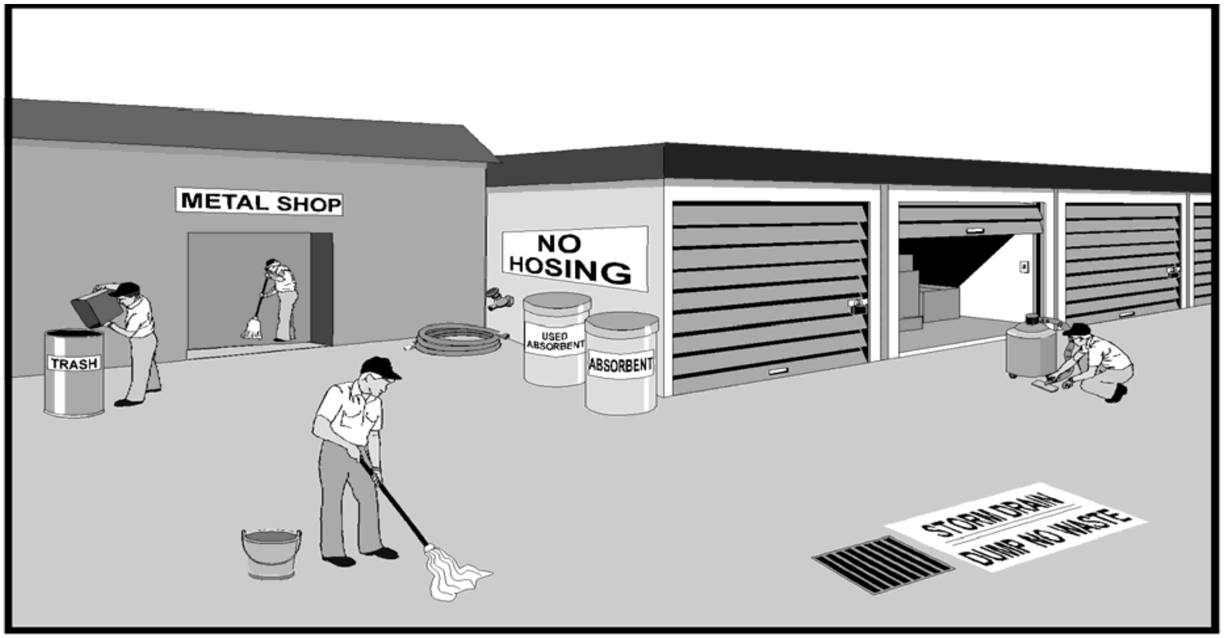
Application Guidance: As needed.

Training: N/A

Effectiveness and Cost: Effectiveness and costs will vary depending on the application.

Limitations: None

BMP 004 - AVOID HOSING DOWN THE SITE



Description of Potential Pollutant and Source: Cleaning work sites by hosing down causes wash water to transport pollutants to the storm drain where it can be exposed to storm water.

Description of BMP: Use dry methods to clean work sites. Dry methods include sweeping or using damp rags or mops. If possible or practical, hoses will be removed. If hosing down is unavoidable, the downstream drain will be temporarily plugged as described in the following BMPs:

- BMP 023 - Place portable Rubber Mats Over Storm Drain Inlets
- BMP 024 - Insert Filter in Catch Basin
- BMP 025 - Place Absorbent Blankets in Catch Basin

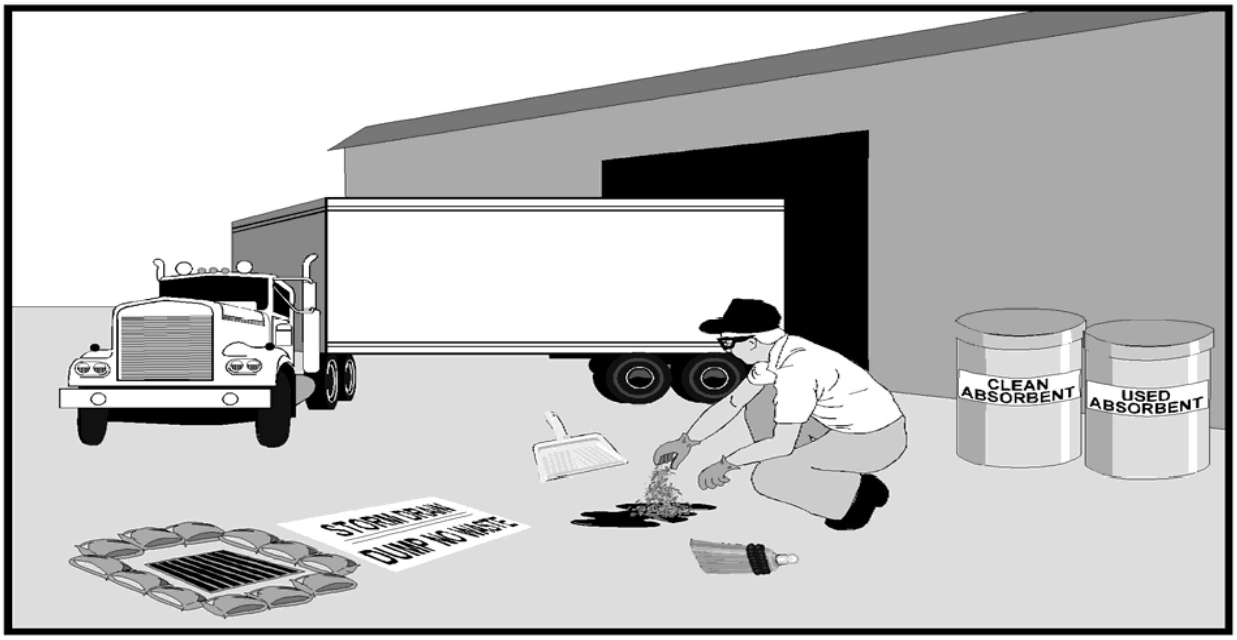
Application Guidance: Methods of dry cleaning will be used whenever possible at all workstations, loading/unloading sites, storage areas, and parking lots.

Training: New personnel will be notified of the policy and signs will be posted. If possible or practical, hoses will be removed.

Effectiveness and Cost: Eliminating hosing down is a highly effective, low-cost BMP.

Limitations: None

BMP 006 - CONTROL SPILLS



Description of Potential Pollutant and Source: Spills of significant materials may be exposed to storm water and transported to storm drains and/or receiving waters.

Description of BMP: Follow safety data sheets (SDS) for handling, storage, and cleanup of all significant materials to reduce the potential for spills.

Any spill, large or small, of significant materials will be controlled to prevent pollutants from being transported to storm drains and/or receiving waters. Appropriate spill control material will be kept on site. Smaller spills will be contained using absorbent material such as kitty litter, straw, or sawdust. Drums of absorbent material will be easily accessible and clearly marked, and containers for spent absorbent material will be readily available. Spent absorbent material will be managed appropriately and disposed of in accordance with applicable regulations. Larger spills will be controlled using spill kits, brooms, and other response equipment commensurate with the size of the spill. The methods outlined in the Activity's spill prevention and response plans (BMP 112) for hazardous materials will be followed for spills of any potential storm water pollutants. The date, time, nature and volume of material spilled, and cleanup measures taken will be recorded for all spills and kept as part of the SWPPP.

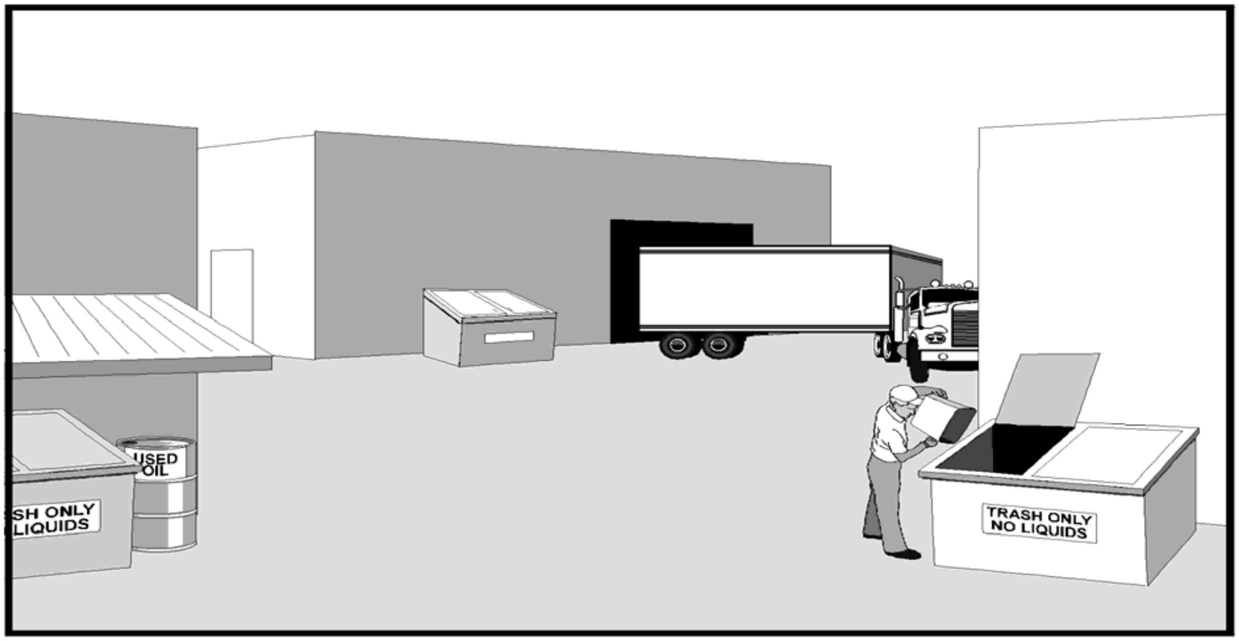
Application Guidance: Controlling spills will be practiced under all working conditions.

Training: Personnel will be trained in spill prevention and response procedures including the use of personal protection equipment (gloves, eye and face protection, etc.). This will include what absorbent or equipment to use, how to use the absorbent or equipment, where to find it, how to dispose of the spent absorbent or other material, and who to notify in the event of a spill.

Effectiveness and Cost: Spill control is a moderately effective, low-cost BMP.

Limitations: None

BMP 007 - PLACE TRASH RECEPTACLES AT APPROPRIATE LOCATIONS



Description of Potential Pollutant and Source: Improperly located or insufficient numbers of trash receptacles will promote poor housekeeping practices. This will increase the opportunity for pollutants from all source areas to reach storm water.

Description of BMP**:** Properly located and sufficient numbers of trash receptacles will promote the proper disposal of waste materials. This reduces the opportunity for pollutants to reach storm water. Trash receptacles will be easily accessible for personnel.

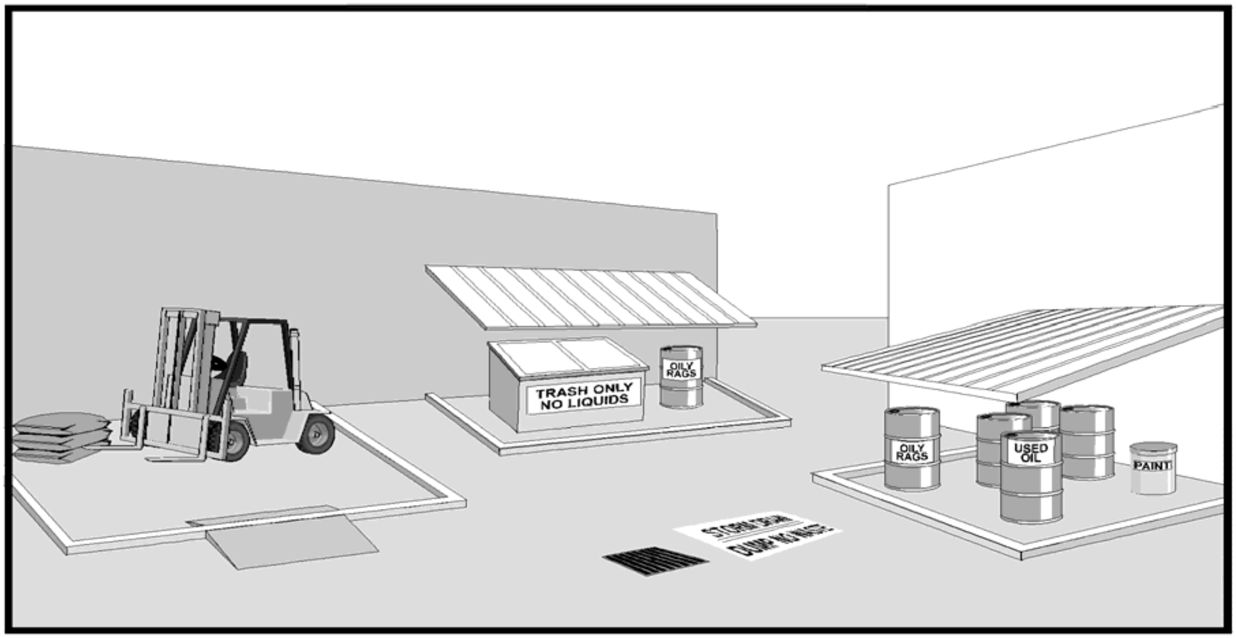
Application Guidelines: Placement of trash receptacles at appropriate locations will always be practiced.

Training: Personnel will be trained as to the location of trash receptacles.

Effectiveness and Cost: Appropriately located trash receptacles are an effective, low-cost BMP.

Limitations: None

BMP 012 - CONSTRUCT BERM OR DIKE AROUND CRITICAL AREAS



Description of Potential Pollutant and Source: Critical areas are source areas that have a high likelihood for the release of pollutants. This includes material handling areas, material storage areas, and equipment repair and maintenance areas. As a result of spills and leaks or exposure to storm water, pollutants can flow from critical areas into the storm water system. In addition, small spills and leaks can accumulate on the surface area and be washed away by storm water.

Description of BMP: Construct a raised berm or dike around critical areas. This will provide secondary containment and prevent any spills or leaks from leaving the area. This secondary containment will also be provided where mobile tankers containing fuel are customarily stationed. Construct a ramp to allow vehicle access into the area. (Note: double walled tanks do not require this BMP. Also, 40 CFR 112.7 requires bulk petroleum storage tanks be provided with secondary containment.) A drain valve will be installed and procedures to drain storm water from the bermed area will be posted (see BMP 014).

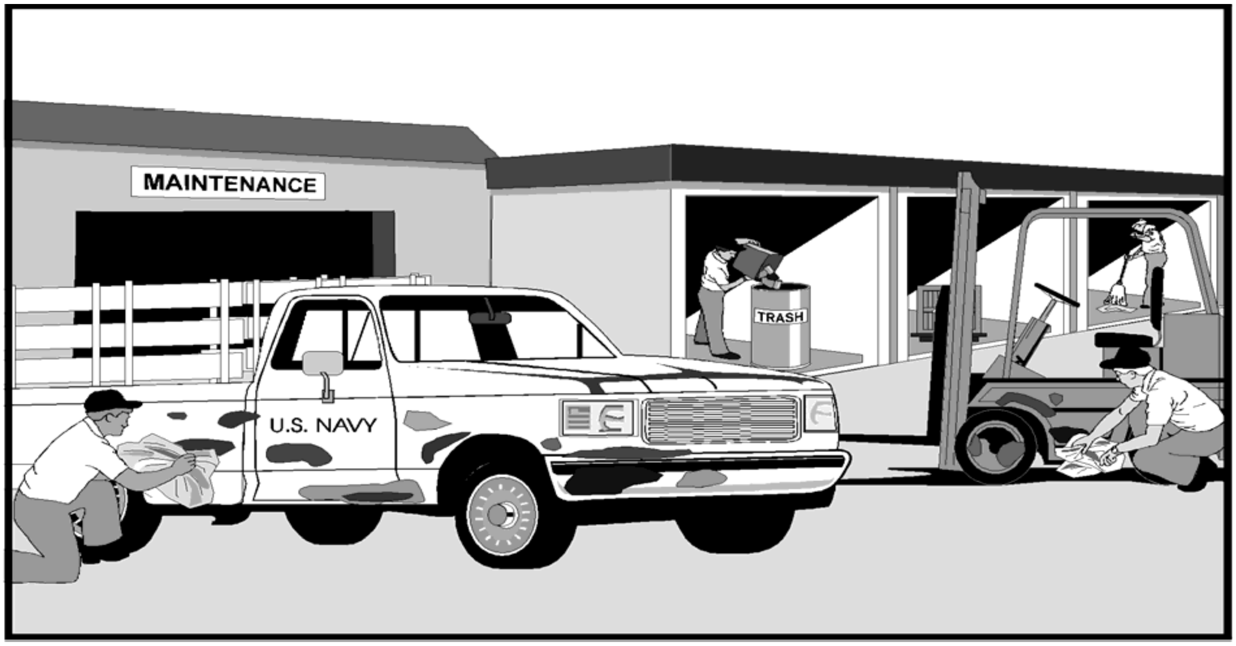
Application Guidance: Install as needed.

Training: N/A

Effectiveness and Cost: This is a highly effective BMP. The cost will vary depending on the size of the fueling operation.

Limitations: The size of some tank and fueling operations areas could make this BMP relatively expensive.

BMP 028 - KEEP EQUIPMENT AND VEHICLES CLEAN



Description of Potential Pollutant and Source: Through usage, equipment and vehicles accumulate oil and grease. During rain events, these pollutants are exposed to storm water and transported into the receiving waters.

Description of BMP: Clean equipment and vehicles regularly using either dry or wet methods to reduce the amount of pollutants exposed to rainfall. Dry methods of cleaning are further explained in BMP 003, "Perform Regular Cleaning." Wet methods are further described in BMP 049, "Centralize Liquid Solvent Cleaning to One Location," and BMP 041, "Wash Equipment and Vehicles in Designated Areas."

Application Guidance: All vehicles and equipment exposed to storm water will be washed monthly and as needed to be kept clean. The frequency for implementing this BMP has been provided as general guidance. However, a facility operator may wish to establish a more suitable frequency. This will require SWPPP implementors to make judgements based on facility operations and conditions. To assign a frequency other than what has been suggested (i.e., more or less frequent), the following criteria will be considered and rated either High, Medium, or Low. If many of the criteria are assigned a High rating, the frequency may be increased. Similarly, if many criteria are assigned a Low rating, the frequency may be decreased. The goal of implementing this BMP is to minimize exposure of pollutants to storm water.

CRITERIA	Rating H=High M=Medium L=Low
Probability of exposure of significant materials to storm water	
Frequency of use of equipment and vehicles	
Proximity of vehicle/equipment use to outfall or receiving water	
Sensitivity of receiving water to potentially exposed significant materials (e.g., waters with beneficial uses such as human contact, recreation, significant species habitat, etc.)	

Training: Personnel will be instructed on how often to clean and wash vehicles or equipment.

Effectiveness and Cost: Keeping equipment and vehicles clean is a highly effective, low-cost BMP.

Limitations: None

BMP 033 - CHECK VEHICLES AND EQUIPMENT FOR LEAKS

Description of Potential Pollutant and Source: Vehicles, aircraft, or equipment entering or stored at a maintenance facility may be leaking a variety of fluids (fuel, oil, antifreeze, freon, etc.). These materials can be exposed to storm water.

Description of BMP: Inspect all vehicles and equipment at the site, whether incoming, parked, stored, or salvaged, for oil and fluid leaks. Drivers of fleet vehicles, such as delivery trucks, will also check under their vehicles each morning for fluid leaks. If leaks are present, drip pans will be placed under the vehicle or equipment. Once the vehicle is removed from the site, the former parking area will be inspected for stains, and these stains will be cleaned using rags or dry solvents.

Application Guidance: Any vehicle or equipment coming in for repairs, painting, or storage will be inspected for leaks. Fleet vehicles will be inspected each morning. Vehicles that are parked, stored, or salvaged will be provided with drip pans, as will tanker rail cars waiting to be unloaded. The frequency for implementing this BMP has been provided as general guidance. However, a facility operator may wish to establish a more suitable frequency. This will require SWPPP implementors to make judgements based on facility operations and conditions. To assign a frequency other than what has been suggested (i.e., more or less frequent), the following criteria will be considered and rated either High, Medium, or Low. If many of the criteria are assigned a High rating, the frequency may be increased. Similarly, if many criteria are assigned a Low rating, the frequency may be decreased. The goal of implementing this BMP is to minimize exposure of pollutants to storm water.

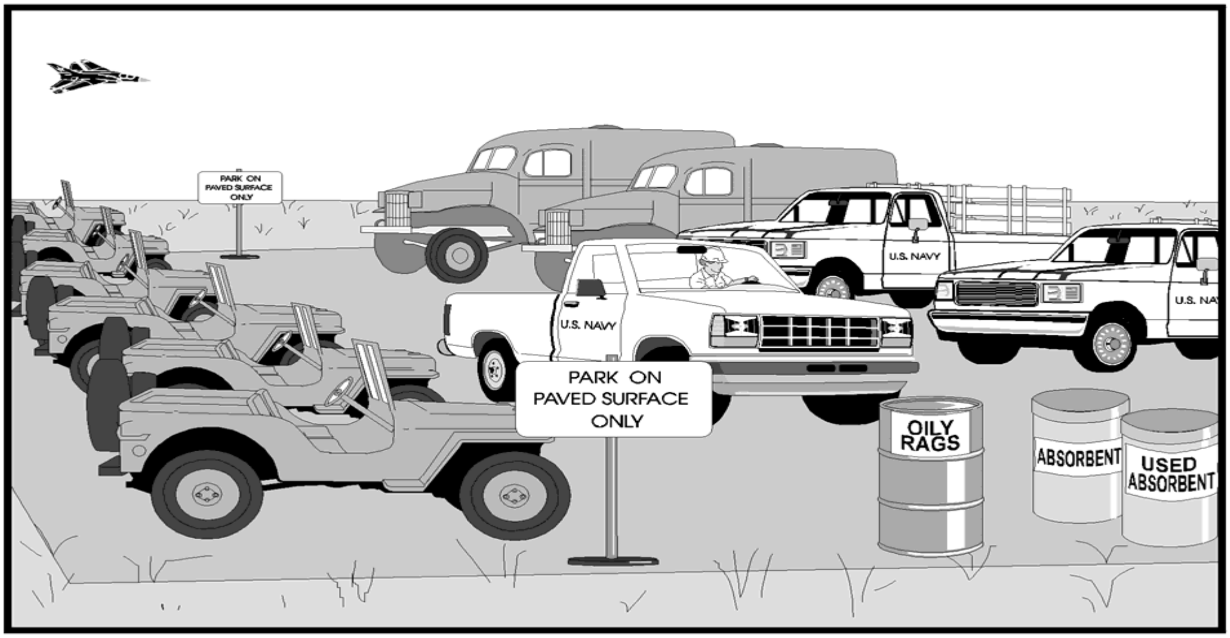
CRITERIA	Rating H=High M=Medium L=Low
Probability of exposure of significant materials to storm water	
Old age or poor condition of equipment and vehicles	
Evidence of exposure (e.g., stains on pavement)	
Proximity of source area to outfall or receiving water	
Sensitivity of receiving water to potentially exposed significant materials (e.g., waters with beneficial uses such as human contact, recreation, significant species habitat, etc.)	

Training: Signs will be posted to remind personnel of proper procedures.

Effectiveness and Cost: Checking for leaks is a moderately effective, low-cost BMP.

Limitations: None

BMP 037 - PARK VEHICLES ON AN IMPERVIOUS SURFACE



Description of Potential Pollutant and Source: Pollutants leaking or spilled onto the ground surface from vehicles can infiltrate into the soil. These pollutants (i.e., oil, fuel, etc.) may then be exposed to storm water and transported to surface water.

Description of BMP: Park vehicles on an impervious surface. For this BMP, an impervious surface is defined as a surface that cannot be readily penetrated by rainfall, such as concrete and asphalt pavement. Leaks and spills will be cleaned from these surfaces.

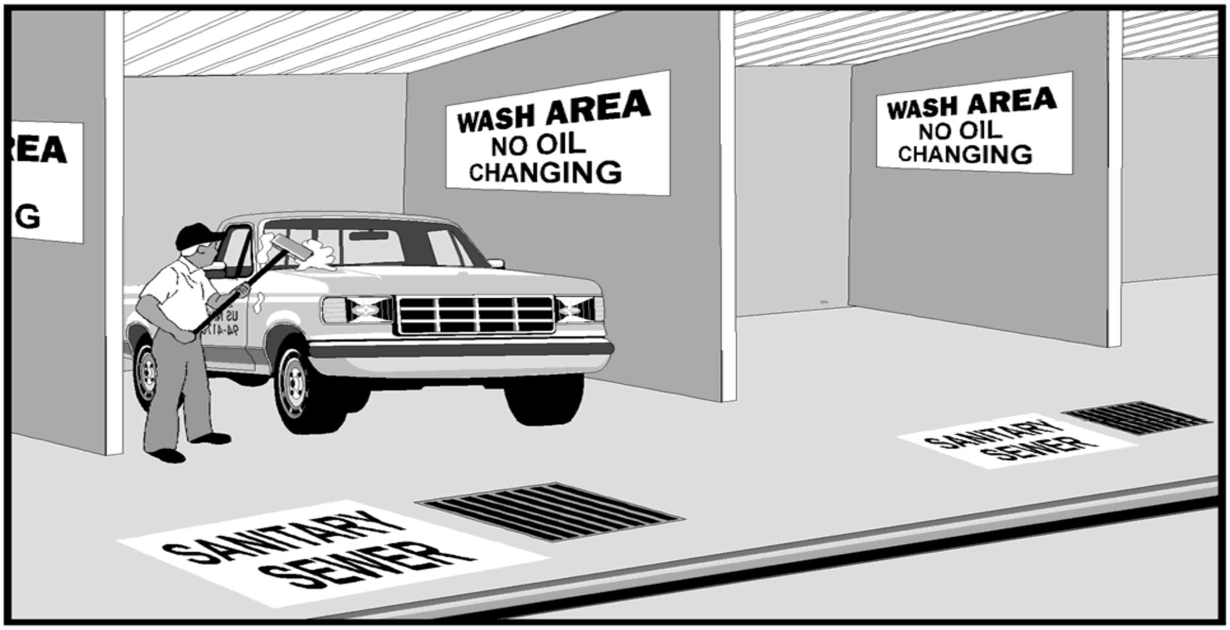
Application Guidance: Vehicles will always be parked on impervious surfaces, especially during the rainy season.

Training: Signs will be posted to remind personnel that all vehicles are to be parked on paved surfaces.

Effectiveness and Cost: Parking vehicles on impervious surfaces is a moderately effective, low-cost BMP.

Limitations: Very large traffic volumes may make implementation of this BMP difficult.

BMP 041 - WASH EQUIPMENT AND VEHICLES IN DESIGNATED AREA



Description of Potential Pollutant and Source: Washing equipment and vehicles outdoors or in areas where wash water flows onto the ground can pollute storm water. It is difficult to control the wastewater from washing operations if it is not done in a designated area.

Description of BMP: Facilities will designate bermed wash areas that contain wash water and prevent contact with storm water. These areas will drain to the sanitary sewer (BMP 042) or to a sump. If a sump is used, wash water will be recycled.

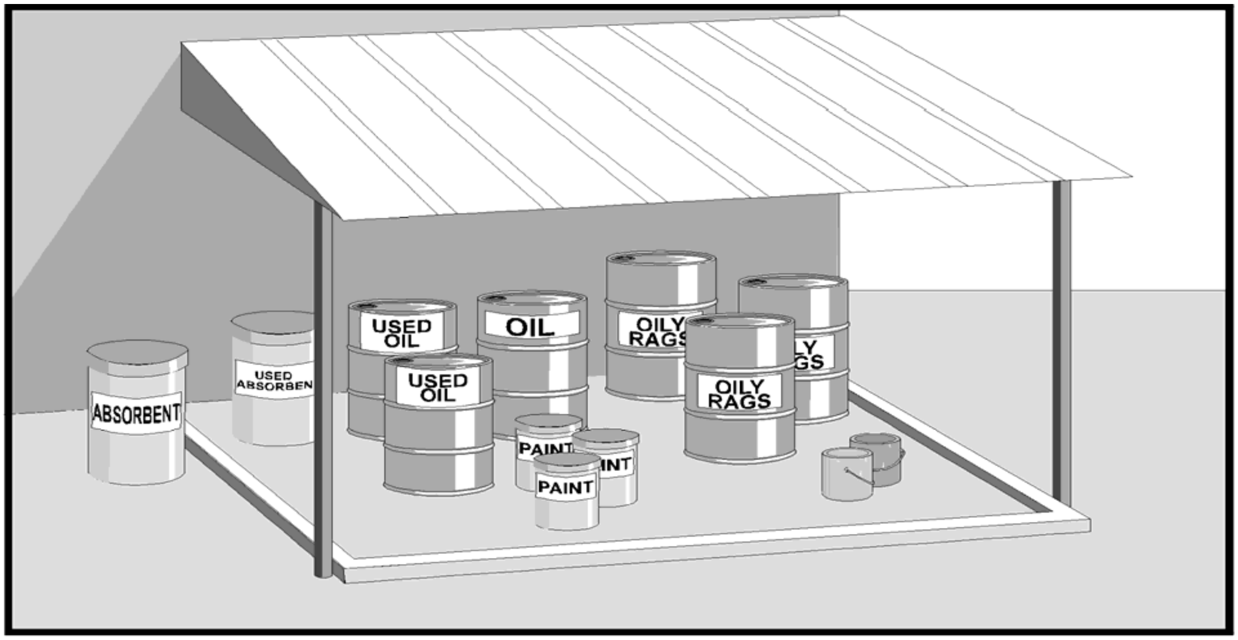
Application Guidance: This practice will be followed wherever vehicles, equipment and aircraft are washed.

Training: N/A

Effectiveness and Cost: This is a highly effective, variable-cost BMP.

Limitations: Pretreatment and monitoring of wash waster discharges to the sanitary sewer may be required. This would greatly increase the cost of this practice. The treatment plant operator will be notified and approval obtained before discharge.

BMP 061B - STORE LIQUIDS AND SIGNIFICANT MATERIALS WITHIN A BUILDING OR COVERED AREA



Description of Potential Pollutant and Source: Many significant materials may be leaked or spilled during storage, handling, or transport. If significant materials are stored outside, in covered areas, these materials can be exposed to storm water, which can transport the leaked or spilled material into the storm drain system.

Description of BMP: To the extent practical, store significant materials within a building or covered area. The materials will be stored on an impervious surface, such as a concrete pad. Rainfall runoff from the pad will be directed to a storm water treatment facility or contained. Leaks and spills will be cleaned up as soon as possible using rags or dry absorbents (see BMP 006). Used rags and absorbents will be disposed of properly. Any wash water from cleaning the floor will be disposed of in the sanitary sewer (see BMP 042).

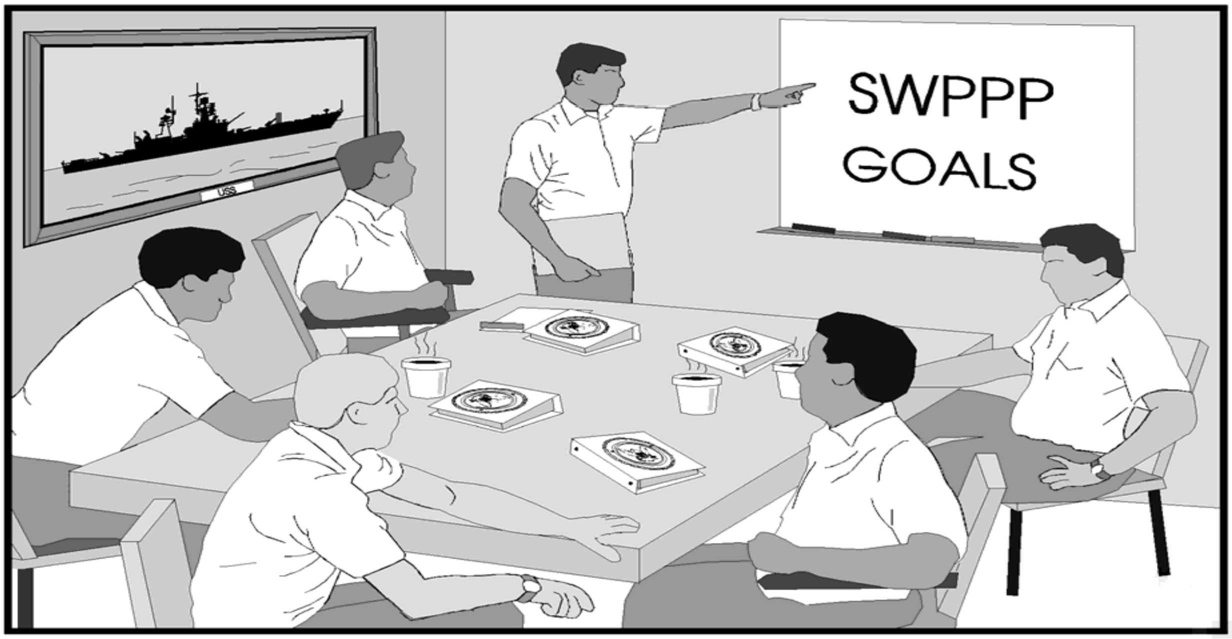
Application Guidance: All significant materials will be stored within a building or covered area.

Training: Personnel will be trained to store significant materials in designated areas.

Effectiveness and Cost: This is a moderately effective BMP. The cost will vary based on whether a building for storing the substances is available.

Limitations: None

BMP 113 - CONDUCT PERSONNEL TRAINING REGARDING THE SWPPP



Description of Potential Pollutant and Source: When properly trained, personnel are more capable of preventing spills, responding safely and effectively to an accident when it occurs, and recognizing situations that could lead to storm water contamination.

Description of BMP: Train personnel at all levels of responsibility in the components and goals of the SWPPP.

Application Guidance: Training will be conducted quarterly and at new personnel orientations.

Training: Training will address each component of the SWPPP, including how and why tasks are to be implemented. Topics will include:

- Good housekeeping
- Material management practices
- Spill prevention and response

Effectiveness and Cost: This is a highly effective, moderate-cost BMP.

Limitations: None

APPENDIX B

ROUTINE FACILITY INSPECTION CHECKLIST

Routine Facility Inspection Checklist

Activity Name: ____________________ **Date of Inspection:** ____________________

Inspector(s): ____________________ **Facility Name/Number:** ____________________

Column 1	Column 2	Column 3	Column 4	Column 5	
Source Area	BMP Number and Title	Status: F, P, N, NA[1]	Briefly Describe Effectiveness (Good or Other [describe])	Corrective Measures	
				What	By When

Note 1: F – Fully implemented, P – Partially implemented, N – Not implemented , NA – Not Applicable

APPENDIX C

QUARTERLY VISUAL ASSESSMENT CHECKLIST

Quarterly Visual Assessment Checklist

Facility ID and Location: ______________________

Date: ____________________

Sampler Name (Printed): ______________________________________

Signature: ____

Time of Rainfall Begin: _________________ Time of Rainfall End: ____________________

Time of Flow Begin: _________________ Time of Flow End: ____________________

Rainfall event more than 72 hours since last event? Yes / No

Rainfall Event Total: ____________________

Sample: sample in a clean, colorless glass or plastic container, and examined in a well-lit area

On samples collected within the first 30 minutes of an actual discharge from a storm event

Sample Characteristics:

Color: ____________________ Floating Solids: _____________________________

Odor: ____________________ Settled Solids: _____________________________

Clarity: ____________________ Suspended Solids: _____________________________

Oil Sheen: ____________________ Foam: _____________________________

Other Obvious Indicators of Storm Water Pollution

(describe): ____

Nature of the discharge (i.e., runoff):

Results of observations of the storm water discharge:

Probable sources of any observed storm water contamination:

If applicable, why it was not possible to take samples within the first 30 minutes:

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

APPENDIX D

CORRECTIVE ACTION LOG

Corrective Action Log

Use this form to document SWPPP corrective actions. This form is to be completed by the Environmental Compliance Coordinator (ECC) or a person designated by ECC and submitted to the MCBH Storm Water Program Manager. The Storm Water Program Manager is responsible for any notification to the State of Hawaii Department of Health (DOH), if required.

A corrective action is defined as an action taken to:

a) **Repair, modify, or replace any storm water control used at the site;**
b) **Clean up and properly dispose of spills, releases, or other deposits; or**
c) **Remedy a permit violation.**

1. Corrective Action Triggers

The following events trigger a corrective action to be taken (this triggering condition is to be documented *within 24 hours* of discovering the occurrence):

a) A required storm water control was never installed, was installed incorrectly, or is not in accordance with the requirements in the SWMP Plan.
b) A member of the **Storm Water Pollution Control Team** becomes aware that the storm water controls installed and being maintained are not effective enough for the discharge to meet applicable water quality standards or applicable requirements in the MCBH SWMP Plan. The facility ECC shall notify the Storm Water Program Manager immediately. The Storm Water Program Manager will notify DOH *by the end of the next work day*.

1.1 Log Notifications:

Date/time Storm Water Program Manager notified by ECC: ________________________

Date/time DOH notified by Storm Water Program Manager: ________________________

1.2 Describe Discharge:

Indicate which one of the following prohibited discharges is occurring or has occurred:

- ❐ Wastewater from washout of concrete
- ❐ Wastewater from washout and cleanout of stucco, paint, form release oils, curing compounds, or other construction materials
- ❐ Fuels, oils, or other pollutants used in vehicle and equipment operation and maintenance
- ❐ Soaps, solvents, or detergents used in vehicle and equipment washing
- ❐ Toxic or hazardous substances from a spill or other release
- ❐ Other, Explain: ____

2. Requirements for Taking Corrective Actions

The ECC shall complete corrective actions in accordance with the deadlines specified below. In all circumstances, site personnel shall *immediately* take all reasonable steps to minimize or prevent the discharge of pollutants until a permanent solution is installed and made operational, including cleaning up any contaminated surfaces so that the material will not discharge in subsequent storm events. *Immediately* means the same day the condition is discovered, unless it is too late in the day, in which initiation of corrective action must begin on the following work day.

Following any of the above triggering events, the ECC shall install a new or modified control and make it operational, or complete the repair, by *no later than 7 calendar days from the time of discovery*. If it is not feasible to complete the installation or repair within 7 calendar days, the ECC shall document and submit to the Storm Water Program Manager, for their agreement, why it is not feasible to complete the installation or repair within the 7-calendar day timeframe and document a schedule for installing the storm water control and making it operational as soon as practicable after the 7-day timeframe.

If the issue is not adequately addressed within 7 calendar days or the agreed upon timeframe, enforcement procedures will be initiated. Unaddressed issues will be escalated through the chain of command. The MCBH Environmental Compliance and Protection Division Director will give the responsible party a formal notice with an appropriate deadline for action. If the problem remains unchanged, the situation will be brought to the attention of the next higher authority. The ultimate penalty for non-compliance of MS4 Permit regulations is eviction or discharge of the responsible party from MCBH. This is placed at the discretion of the Base Commander. See the Enforcement Response Plan in Appendix 3-6 of the SWMP Plan for further information on MCBH's enforcement policies.

3. Corrective Action Report

Within 24 hours of discovering the occurrence of one of the triggering conditions in SWPPP Section 4.1 at the site, the ECC must complete the following:

3.1 Describe the triggering condition:

____
____
____
____

3.2 Record the date/time of the condition identified. How was the condition identified?

____
____
____
____

3.3 Describe the corrective action taken:

____
____
____

Date/time installation or repair was completed:
(or date/time the prohibited discharge ceased) ____

Or describe why it is not feasible to complete installation or repair within 7 calendar days and detail a proposed schedule (if applicable)

____
____
____

4. Resolution of the Corrective Action Trigger

Within 7 calendar days of initiating the Corrective Action Report, the ECC must complete a report of the following:

4.1 Follow-up Actions

Describe any follow-up actions taken to review the design, installation, and maintenance of storm water controls, including the dates such actions occurred:

____
____
____

4.2 Storm Water Control Modifications

Provide a summary of storm water control modifications implemented. Include a schedule of activities required to implement changes and the date the modifications were completed or will be completed:

____
____
____

5. SWPPP Modification Due to Corrective Actions

Where corrective actions result in changes to any of the storm water controls or procedures documented in the SWPPP, modify the SWPPP accordingly ***within 7 calendar days*** of completing corrective action work.

Are modifications to the SWPPP necessary? ❑ Yes ❑ No

Date modifications to the SWPPP shall be completed _______________

6. Corrective Actions Required by DOH

The facility shall comply with any corrective actions required by DOH as a result of permit violations found during an inspection by DOH or the Environmental Protection Agency (EPA).

Was the Corrective Action triggered by a DOH/EPA inspection?

❑ Yes ❑ No

❑ Date of DOH/EPA Inspection __________________

7. Additional Comments:

____
____

Final

STORM WATER POLLUTION PREVENTION PLAN

Storm Water Management Program Plan

Marine Corps Base Hawaii, Oahu, Hawaii

NPDES Permit No. HI S000007

ENGINE TEST FACILITY (BUILDING 6183)

Prepared by:

Marine Corps Base Hawaii

August 2022

Table of Contents

Tables

Figures

Appendices

List of Acronyms and Abbreviations

AST	Aboveground Storage Tank
BMP	Best Management Practice
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CWA	Clean Water Act
CWB	Clean Water Branch
DOH	State of Hawaii Department of Health
ECC	Environmental Compliance Coordinator
ECE	Environmental Compliance Evaluation
ECPD	Environmental Compliance and Protection Division
EPA	United States Environmental Protection Agency
HAZMAT	Hazardous Material
HAZMIN	Hazardous Material Minimization
MCBH	Marine Corps Base Hawaii
MS4	Municipal Separate Storm Sewer System
MS4 Permit	Marine Corps Base Hawaii's NPDES Permit No. HI S000007
NPDES	National Pollutant Discharge Elimination System
OWS	Oil/Water Separator
POC	Point of Contact
SAS	Satellite Accumulation Site
SWMP	Storm Water Management Program
SWPPP	Storm Water Pollution Prevention Plan

Certification Statement

MCBH is committed to the prevention of discharges of polluted stormwater to navigable waters or the environment and maintains the highest standards for best management practices through periodic review, updating, and implementation of this Stormwater Pollution Prevention Plan (SWPPP).

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information contained therein. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Name: ______________________________ Title: ______________________________

Signature: ____________________________ Date: ______________________________

Management Review

Refer to Section 1.2 for more information on required SWPPP updates.

Review Dates	Signature	Amendment Required? (Y/N)
_____________	___________________	__________
_____________	___________________	__________
_____________	___________________	__________
_____________	___________________	__________
_____________	___________________	__________
_____________	___________________	__________

1 Introduction

As part of Federal regulations administered through the Clean Water Act (CWA), the State of Hawaii, Department of Health (DOH) has issued the National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4) Permit No. HI S000007 (referred to herein at the "MS4 Permit") to Marine Corps Base Hawaii (MCBH). The MS4 Permit requires that MCBH provide all existing industrial facilities, identified in MCBH's MS4 Permit application, and any newly identified industrial facilities, submitted to DOH using the "MS4 NPDES Individual Permit – Industrial Storm Water Discharge Notification Form," with a Storm Water Pollution Prevention Plan (SWPPP) for storm water associated with industrial activities.

The purpose of the regulations is to protect water quality by reducing the amount of pollutants in storm water runoff caused by industrial activities.

1.1 SWPPP Implementation

The storm water management controls of this plan will become MCBH procedure for the applicable industrial facility. An up-to-date copy of the SWPPP shall be maintained on site and at the MCBH Environmental Compliance and Protection Division (ECPD). Management staff, maintenance personnel, contractor staff, and other personnel involved in onsite industrial activities, will be knowledgeable of the plan and follow the guidelines set forth in it, in addition to any other pertinent base-wide, state and federal regulations.

Day-to-day implementation of the SWPPP is primarily the responsibility of the current facility Environmental Compliance Coordinator (ECC) or Point of Contact (POC) as identified in Table 2-1. Enforcement of the permit conditions and this SWPPP are ultimately the responsibility of ECPD and additional escalating levels of authority as specified in the Enforcement Response Plan developed by MCBH for its base-wide Storm Water Management Program (SWMP) Plan.

1.2 Updating the SWPPP

This SWPPP will be reviewed as needed to identify necessary changes, at a minimum of every five years. Updates may be required due to current best management practice (BMP) failures, spill events, changes in industrial activities, changes in features, corrective actions, or other necessary changes. Personnel changes to the Storm Water Pollution Control Team (Section 2.1) should be logged in Table 2-1. Storm Water Pollution Control Team Log. ECPD will be responsible for approving revisions to the SWPPP. In the event the plan is modified, a copy of the updated SWPPP will remain at ECPD and will be provided to the applicable facility. Additionally, ECPD shall document and report the SWPPP changes to the DOH, Clean Water Branch (CWB), within thirty days of when the changes arise.

2 Engine Test Facility, Building 6183

The Engine Test Facility, Building 6183, is located within MCBH, Kaneohe Bay along an inactive runway north of Sumner Street and west of Palikilo Road. The facility encompasses approximately 1.1 acres and can be found in grid [redacted] of the MCBH Base Map, see Figure 4-1. The facility-specific map is shown on Figure 4-2.

2.1 Storm Water Pollution Control Team

The Storm Water Pollution Control Team consists of the Storm Water Program Manager, ECC, and the Hazardous Material (HAZMAT) and Hazardous Material Minimization (HAZMIN) team. The Storm Water Program Manager is responsible for the enforcement of the MS4 permit at all industrial sites and provides annual training to the ECC and other personnel. The ECC is the primary unit POC for storm water related items and the day-to-day environmental matters at a specific facility. ECC's are responsible for SWPPP implementation including BMP and facility inspections, storm water assessments/sampling, BMP maintenance, and corrective actions. The HAZMAT and HAZMIN team shall be contacted if assistance is needed. The role, name, phone number, and start date of individuals on the Storm Water Pollution Control Team is recorded in Table 2-1 below. In the event of personnel turnover, Table 2-1 shall be updated accordingly.

TABLE 2-1. STORM WATER POLLUTION CONTROL TEAM LOG

Role	Name	Phone	Start Date
MCBH Storm Water Program Manager	CIV Whitney Anderson	Office: 808-257-4359	6/6/22
ECC	Sgt Jadarius Anderson	Office: 808-257-4603	03/29/2022
HAZMAT/HAZMIN	CIV Tim Cawthon	HAZMAT Center Building 6409 Office: 808-257-9913 HAZMIN Center Building 6407 Office: 808-257-0770	N/A

2.2 Engine Test Facility, Building 6183 Activities

The Engine Test Facility is used to test aircraft engines that have been repaired, prior to reinstallation on aircraft. Portable generators are located at the facility to provide the necessary electrical power for engine testing. The facility, which is enclosed within barbed-wire chain-linked fencing, consists of an office building (Building 6183), storage shed, and a concrete test pad area.

Building 6183, which has offices, and the storage shed, are located at the southeast corner of the concrete test pad area. Significant materials on containment pallets and waste materials are stored within the shed in a satellite accumulation site (SAS) enclosed by a concrete containment curb. Two spill kits and spill response equipment are also located in the shed. Other areas within the shed are used for the storage of dry materials and other equipment used for engine testing activities.

There are also two storage tents and various storage containers located throughout the facility on the concrete test pad area. A concrete berm completely surrounds the test pad, except at the entry and exit driveways, which are sloped to retain liquid within the concrete test pad area. The concrete test pad area is sloped so that liquids flow towards a series of drains that convey the liquids to an oil/water separator (OWS), located at the eastern corner of the concrete test pad area. Effluent from the OWS is discharged to the sanitary sewer system. Waste oil recovered from the OWS is pumped into a [redacted]-gallon capacity aboveground storage tank (AST), within its own containment structure, adjacent to the OWS. The OWS skimmed weekly.

Storm water runoff generated outside and on all sides of the facility sheet flows away from the concrete pad area and percolates into the soil and grass areas adjacent to the facility. The facility is surrounded by grass, and the nearest pathway to receiving water is Kaneohe Bay approximately 750-ft away. The sample location (Outfall 01) is located at the main gate of the facility (Figure 4-2).

The Engine Test Facility is in the process of shutting down operations at the current site, Building 6183. Facility personnel were not aware of any future plans for the facility.

2.3 Sources of Pollutants

The following is an inventory of potential pollutants associated with Engine Test Facility, Building 6183:

A. Material Loading and Unloading Areas

Materials that are spilled, leaked, or lost during loading or unloading may collect on vegetated or paved surfaces and be carried away by storm runoff. Loading and unloading of materials is done at the engine test area, the Building 6183 shed, portable generators, and the OWS used oil AST.

B. On-Site Material Storage and Disposal Practices

Significant materials are stored in hazardous materials lockers, or on spill pallets, located centrally under Building 6183 shed. Waste materials are also stored under Building 6183 shed, before being sent to the HAZMIN Center for disposal. Other significant materials are stored in the fuel tanks of the portable generators, located on the concrete test pad area.

C. Outdoor Activities

Outdoor activities at the Engine Test Facility include the testing of aircraft engines, removing of oil and sludge from the OWS, and loading and unloading of materials.

D. Significant Materials Inventory

The following significant materials are located at the Engine Test Facility:

- Jet Fuel (JP-8)
- Diesel
- Paint
- Hydraulic Fluid
- Lube Oil
- Detergent
- Used Oil
- Isopropyl Alcohol

2.4 Potential Storm Water Pollutants

No pollutants have been identified as having a reasonable potential to be present in storm water discharges from Building 6183 or the Engine Test Area.

2.5 Best Management Practices (BMPs)

Best Management Practices (BMPs) are techniques or methods that aim to manage the quantity and improve the quality of storm water runoff from a facility or other site. Storm water BMPs intend to reduce or eliminate pollution and contaminants collected by runoff before the runoff reaches the MCBH storm water system or sensitive ecosystems such as streams, wetlands, and marine environments. The following is a summary of BMPs currently in place at the Engine Test Facility, Building 6183.

A. Good Housekeeping Practices

In general, Engine Test Facility, Building 6183 employs good housekeeping practices throughout its operations. Good housekeeping practices for Engine Test Facility, Building 6183 are included in Table 2-2.

B. Preventative Maintenance

Preventive maintenance is important as water pollution control measures may be of little or no use if devices and equipment have not been properly maintained. Facility personnel conduct inspection of facility equipment and storage systems on a regular basis. The preventive maintenance program involves inspections of equipment and storage systems that are exposed to storm water. Inspections of the SAS are conducted on a monthly basis by HAZMIN, with monthly inspection reports submitted to ECPD.

C. Visual Inspections

Visual inspection provides a valuable subjective assessment of the status of storm water management systems. They are easily performed and allow the opportunity for corrective action, if necessary. Site inspections and documentation requirements are addressed in in Section 3 of this SWPPP. MCBH HAZMIN Center staff perform hazardous material inspections monthly. Annual facility inspections are performed by EPCD as part of the MCBH Environmental Compliance Evaluation (ECE).

D. Spill Prevention and Response

Areas where significant material spill or leakage can occur are identified in Section 2.1 and shown on Figure 4-2. The storm water systems and their accompanying drainage points are also shown on Figure 4-2. Refer to Table 2-2 for BMPs related to spill preventative measures for material handling procedures, storage requirements, and equipment usage.

In the event of a hazardous substance or oil spill, the ECC and ECPD shall be notified immediately (ECPD; 808-630-8246). If the spill cannot be easily addressed using an onsite spill kit and personal protective equipment, call Fed Fire (Military 911). The spill source should be immediately controlled if it is safe to do so by closing valves, switches, and/or turning off power to a device. Then, contain the spill by using sorbent socks or absorbent materials found in a spill kit. After it has been contained, clean up the spilled material in a safe manner using dry methods. All materials should then be properly disposed of.

The locations of additional spill kits are shown in Figure 4-2.

E. Erosion and Sediment Controls

No areas at the Engine Test Facility have been identified as having high potential for significant soil erosion that would require erosion and sediment control measures.

F. Best Management Practices to Minimize Pollutant Contact with Storm Water

Facility personnel receive annual training from ECPD at minimum, as well as an initial training for all new personnel. Training information will include the BMPs that have been developed for the facility and a general overview of the storm water program and its objectives. Existing BMPs at the Engine Test Facility are shown in Table 2-2 and attached as fact sheets to this SWPPP in Appendix A.

TABLE 2-2. BEST MANAGEMENT PRACTICES

BMP No.	BMP Title	Description
001	Label All Drums, Cans, Containers, Tanks, and Valves	All containers and drums are labeled.
002	Restrict Access to Areas and Equipment	The facility is surrounded by chain-linked fencing.
006	Control Spills	Any spill of significant materials is controlled immediately to prevent pollutant from being transported to receiving water. A spill kit is stored onsite.
012	Construct Berm or Dike Around Critical Areas	All of the Engine Test Facility facilities are located within a containment berm. The AST is also located within a secondary containment berm.
018	Provide Roof to Cover Source Area	A roof over Building 6183 exists over the significant materials storage and waste accumulation areas.
033	Check Vehicles and Equipment for Leaks	Tanks and piping are checked for leaks on a regular basis.
054	Properly Store Containers	Significant materials are stored in hazardous materials lockers or on spill pallets.
061B	Store Liquids and Significant Materials within a Building or Covered Area	All significant materials are properly stored undercover and in secondary containment where required.
071	Keep Tanks, Piping, and Valves in Good Condition	Tanks, pumps, seals, piping and valves are visually inspected for signs of structural integrity and/or leaks.
098	Construct Oil/Water Separator	Storm water is collected in the OWS connected to the sanitary sewer system.
113	Conduct Personnel Training Regarding the SWPPP	Personnel are trained regularly (initial orientation and annual refresher).
115	Store Containers Inside Secondary Containment	Fuel tanks for the portable generators are double-walled. The used oil AST is stored inside a secondary containment structure. Significant materials are stored in hazardous materials lockers or on spill containment pallets under cover.

3 Inspections, Assessments and Monitoring

3.1 Routine Quarterly Site Inspections

The MS4 Permit requires a routine quarterly site inspection by a qualified person with at least one member of the storm water pollution control team participating. At least once each calendar year, the routine inspection must be conducted during a period when a storm water discharge is occurring. The site inspection is an overall evaluation of the effectiveness of the BMPs implemented at that facility. A Routine Facility Inspection Checklist (Appendix B) shall be completed during each routine site inspection and kept onsite with this SWPPP. During normal facility operating hours, inspections must be conducted of areas of the facility including, but not limited to, the following:

- Areas where industrial materials or activities are exposed to storm water;
- Areas identified in the SWPPP and those that are potential pollutant sources;
- Areas where spills and leaks have occurred in the past three years;
- Discharge points; and
- Control measures used to comply with the effluent limits contained in this permit.

3.2 Visual Assessment of Storm Water Discharges

A Quarterly Visual Assessment of storm water discharge is required for all industrial facilities at MCBH. Storm water samples for this visual assessment but must be collected in such a manner that the samples are representative of the storm water discharge from the facility. Therefore, the water sample must be collected at the designated storm water monitoring point as shown in Figure 4-2. The Quarterly Visual Assessment checklist (Appendix C) shall be completed by the current facility ECC and kept onsite with this SWPPP.

The visual assessment must be made:

- Of a sample collected in a clean, colorless glass or plastic container, and examined in a well-lit area;
- On samples collected within the first 30 minutes of an actual discharge from a storm event. If it is not possible to collect the sample within the first 30 minutes of discharge, the sample must be collected as soon as practicable after the first 30 minutes and documented why it was not possible to take the sample within the first 30 minutes; and
- For storm events, on discharges that occur at least 72 hours (three days) from the previous discharge.

Whenever the visual assessment shows evidence of storm water pollution, corrective action procedures to remedy the pollutants must be taken and documented. Refer to Section 4 for corrective action procedures.

4 Corrective Actions

A corrective action is defined as any action taken, or required to be taken, to (1) repair, modify, or replace any stormwater control used at the site; (2) clean up and dispose of spills, releases, or other deposits found on the site; and (3) remedy a permit violation. Corrective actions should be documented using the Corrective Action Log (Appendix D).

4.1 Immediate Actions

If corrective action is needed, you must immediately take all reasonable steps necessary to minimize or prevent the discharge of pollutants until a permanent solution is installed and made operational, including cleaning up any contaminated surfaces so that the material will not discharge in subsequent storm events. Note: In this context, the term "immediately" requires you to, on the same day a condition requiring corrective action is found, take all reasonable steps to minimize or prevent the discharge of pollutants until a permanent solution is installed and made operational. However, if a problem is identified at a time in the workday when it is too late to initiate corrective action, the initiation of corrective action must begin no later than the following workday. "All reasonable steps" means that the permittee has undertaken initial actions to assess and address the condition causing the corrective action, including, for example, cleaning up any exposed materials that may be discharged in a storm event (e.g., through sweeping, vacuuming) or making arrangements (i.e., scheduling) for a new BMP to be installed at a later date.

4.2 Escalating Actions

If additional actions are necessary beyond those implemented or if the conditions continue to occur, additional corrective actions (e.g., install a new or modified control and make it operational, complete the repair) must be completed before the next storm event if possible, and within 14 calendar days from the time of discovery of the corrective action condition. If it is infeasible to complete the corrective action within 14 calendar days, document why it is infeasible to complete the corrective action within the 14-day timeframe and identify a schedule for completing the work, which must be done as soon as practicable after the 14-day timeframe but no longer than 45 days after discovery. If the completion of corrective action will exceed the 45-day timeframe, the minimum additional time necessary to complete the corrective action can be taken, provided that MCBH ECPD and DOH is notified of your intention to exceed 45 days. Where your corrective actions result in changes to any of the controls or procedures documented in your SWPPP, you must modify your SWPPP accordingly within 14 calendar days of completing corrective action work.

4.3 Corrective Actions for Substantially Identical Outfalls

If the event triggering corrective action is associated with an outfall that had been identified as a "substantially identical outfall", the review must assess the need for corrective action for all related substantially identical outfalls. Any necessary changes to control measures that affect these other outfalls must also be made before the next storm event if possible, or as soon as practicable following that storm event. Any corrective actions must be conducted within the timeframes discussed above.

4.4 Record of Past Spills or Leaks of Hazardous Pollutants

Table 4-1 is used to record significant spills and leaks that have occur or have occurred within three years prior to the preparation or amendment of this SWPPP. Significant spills and leaks include, but are not limited to, releases of oil or hazardous substances in excess of quantities that are reportable under CWA Section 311 (see 40 CFR 110.6 and 40 CFR 117.21) or Section 102 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 USC §9602.

At the time of this SWPPP update, there have been no past spill or leak incidents reported for the Engine Test Facility.

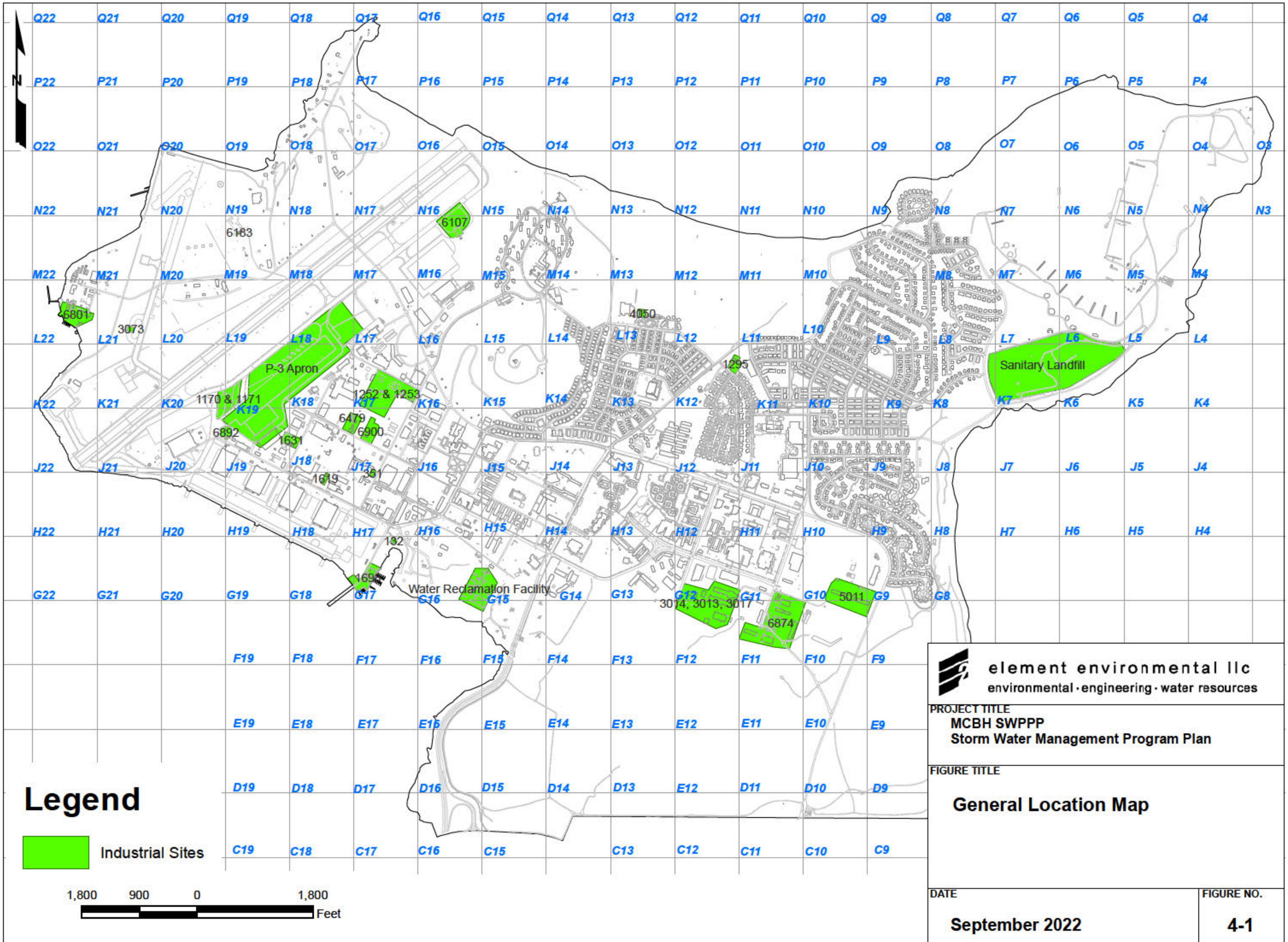
TABLE 4-1. PAST SPILLS OR LEAKS OF HAZARDOUS POLLUTANTS

Date of Incident	Brief Summary of Incident (POC Active at Time of Incident, Pollutant Type, Estimated Quantity, Location of Spill)

4.5 Record of Unauthorized Non-Storm Water Discharges

TABLE 4-2. UNAUTHORIZED NON-STORM WATER DISCHARGE EVALUATION

Date of Evaluation	Brief Summary of Evaluation (Description of the evaluation criteria, outfalls or onsite drainage points that were directly observed, action(s) taken, such as a list of control measures used to eliminate unauthorized discharge)



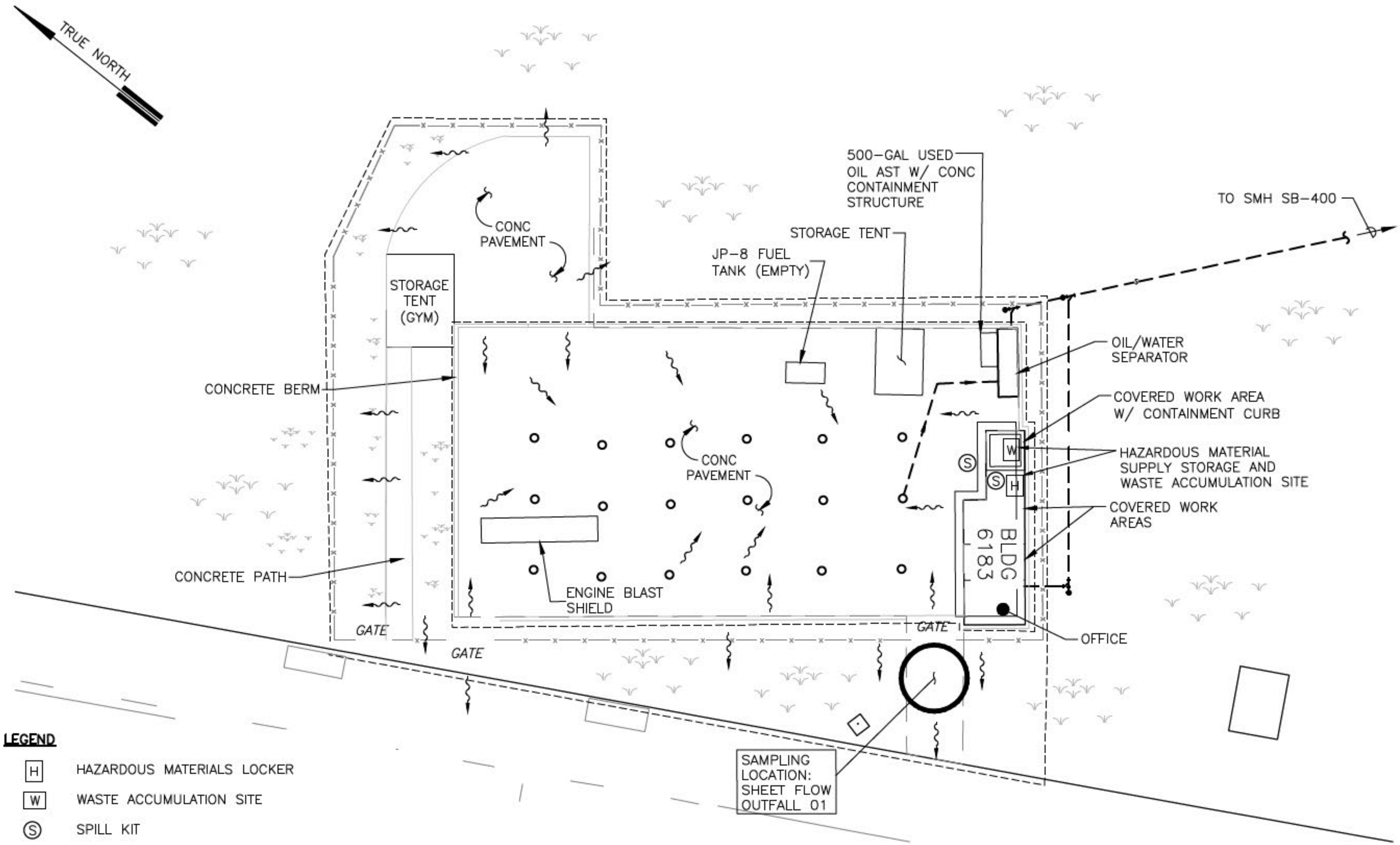
element environmental llc
environmental · engineering · water resources

PROJECT TITLE
MCBH SWPPP
Storm Water Management Program Plan

FIGURE TITLE
General Location Map

DATE
September 2022

FIGURE NO.
4-1



LEGEND

H	HAZARDOUS MATERIALS LOCKER
W	WASTE ACCUMULATION SITE
S	SPILL KIT
— — —	SANITARY SEWER SYSTEM
~~>	FLOW ARROW
- - - - -	DRAINAGE AREA
o	DRAIN INLET– FLOWS TO OWS

NOTES:

1. STORM WATER COLLECTED BY FLOOR DRAINS IS DISHCARGED TO THE OIL/WATER SEPARATOR. ANY OVERFLOW OF STORM WATER, FROM APPROXIMATELY 1.1 ACRES ASSOCIATED WITH BUILDING 6183, IS DISCHARGED AS SHEET FLOW TO ADJACENT GRASS AND PAVEMENT. THE NEAREST RECEIVING WATER IS KANEOHE BAY.
2. NOT TO SCALE

DATE:	PROJECT TITLE:	
JULY 2022	STORM WATER POLLUTION PREVENTION PLAN MCBH, KANEOHE BAY, OAHU, HAWAII	
FIGURE TITLE:		FIGURE NO.:
ENGINE TEST FACILITY (BUILDING 6183)		4-2

DAMATO
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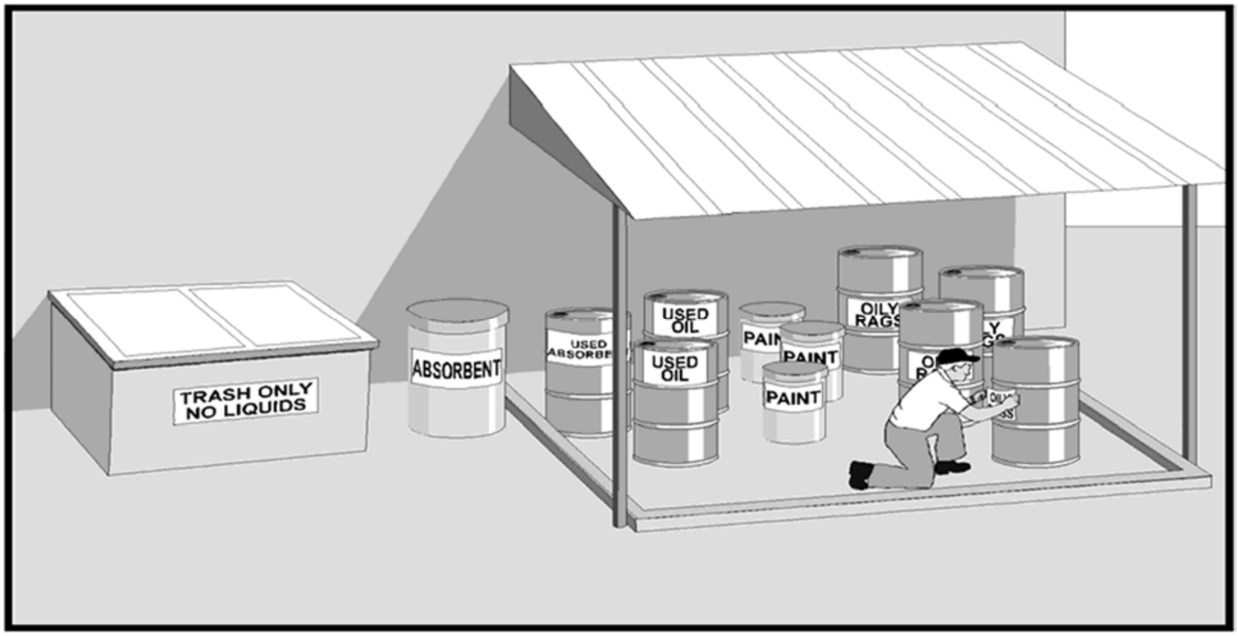
FIG 4-2 Bldg 6183 – Engine Test Facility.dwg

APPENDIX A

SELECTED BMP FACT SHEETS

BMP 001 - LABEL ALL DRUMS, CANS, CONTAINERS, AND TANKS



Description of Potential Pollutant and Source: Drums, cans, and containers can be improperly managed and disposed of due to uncertainty of the container's contents. Tanks which are not labeled may result in improper use of the tank or fuel, which may result in the exposure of significant materials to storm water and/or receiving waters. Similarly, unlabeled valves may be opened without proper precaution due to lack of user information. Storm water quality will be affected if significant materials are improperly disposed to the storm drain and/or receiving waters. Lack of labeling will also make it difficult to quickly identify the type of material released so facility personnel can respond correctly. Labels also identify hazardous materials at the facility and are a good way to request caution in certain areas (e.g., drums indicating flammability).

Description of BMP: Label all drums, valves, pumps, cans, tanks, and containers to reduce the chance of misuse and eventual spills. Labeling ensures that the appropriate procedures, equipment, and storage containers are used. All containers will be labeled as to what is in them.

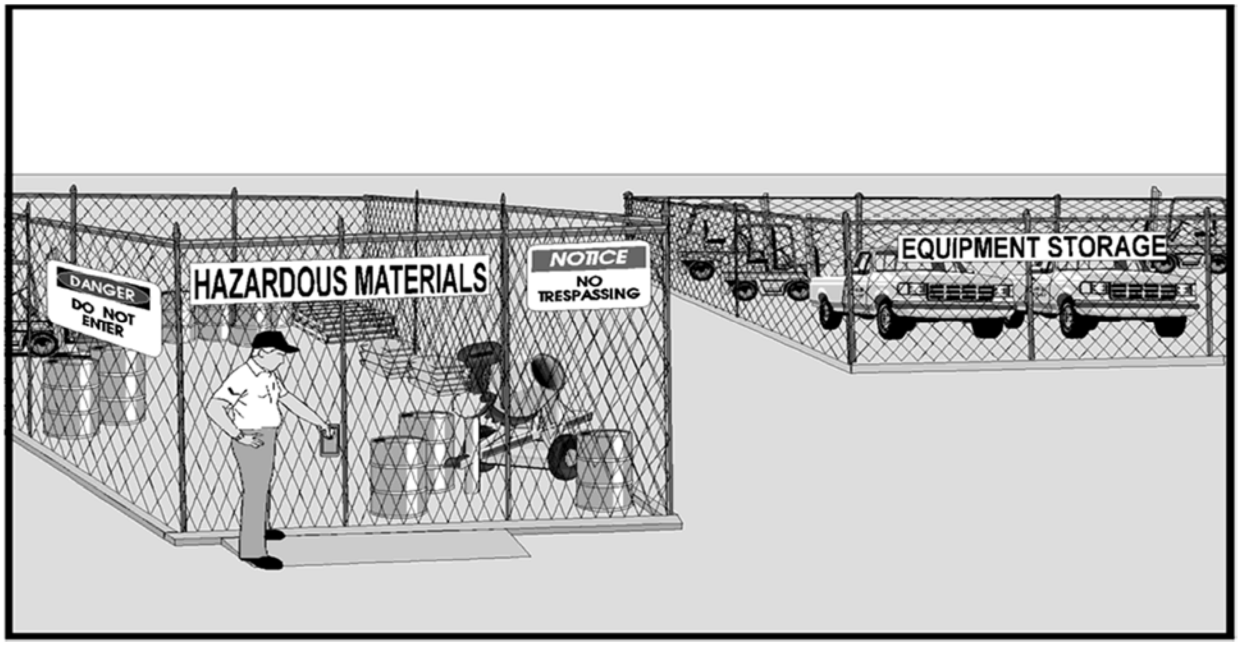
Application Guidance: As needed.

Training: N/A

Effectiveness and Cost: Effectiveness and costs will vary depending on the application.

Limitations: None

BMP 002 - RESTRICT ACCESS TO AREA AND EQUIPMENT



Description of Potential Pollutant and Source: Vandalism of vehicles and facility property may result in the release of significant materials.

Description of BMP: Provide fences and gate areas where vehicles, equipment and materials are stored and are accessible to the public to discourage trespassing. Access to equipment will also be restricted. Only authorized personnel will be allowed to operate equipment. The fences and gates will be properly maintained, and additional security measures including lighting of the area will be implemented if the fencing alone proves insufficient. Where appropriate, security guards or alarms will be used.

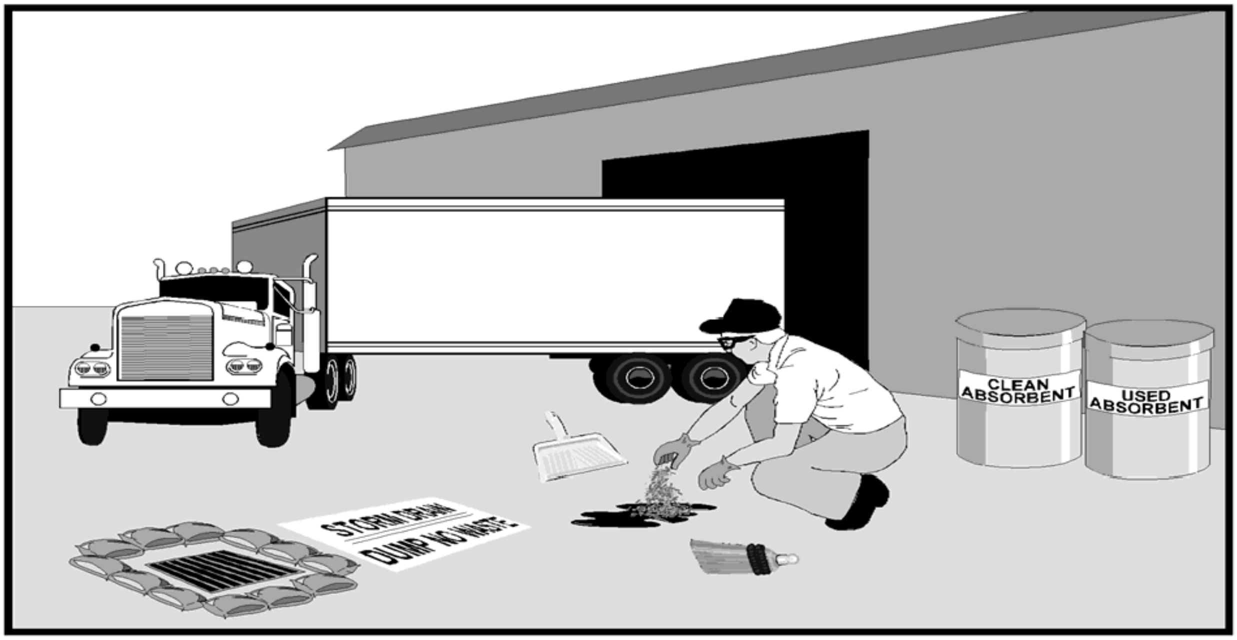
Application Guidance: As needed.

Training: N/A

Effectiveness and Cost: Effectiveness and costs will vary depending on the application.

Limitations: None

BMP 006 - CONTROL SPILLS



Description of Potential Pollutant and Source: Spills of significant materials may be exposed to storm water and transported to storm drains and/or receiving waters.

Description of BMP: Follow safety data sheets (SDS) for handling, storage, and cleanup of all significant materials to reduce the potential for spills.

Any spill, large or small, of significant materials will be controlled to prevent pollutants from being transported to storm drains and/or receiving waters. Appropriate spill control material will be kept on site. Smaller spills will be contained using absorbent material such as kitty litter, straw, or sawdust. Drums of absorbent material will be easily accessible and clearly marked, and containers for spent absorbent material will be readily available. Spent absorbent material will be managed appropriately and disposed of in accordance with applicable regulations. Larger spills will be controlled using spill kits, brooms, and other response equipment commensurate with the size of the spill. The methods outlined in the Activity's spill prevention and response plans (BMP 112) for hazardous materials will be followed for spills of any potential storm water pollutants. The date, time, nature and volume of material spilled, and cleanup measures taken will be recorded for all spills and kept as part of the SWPPP.

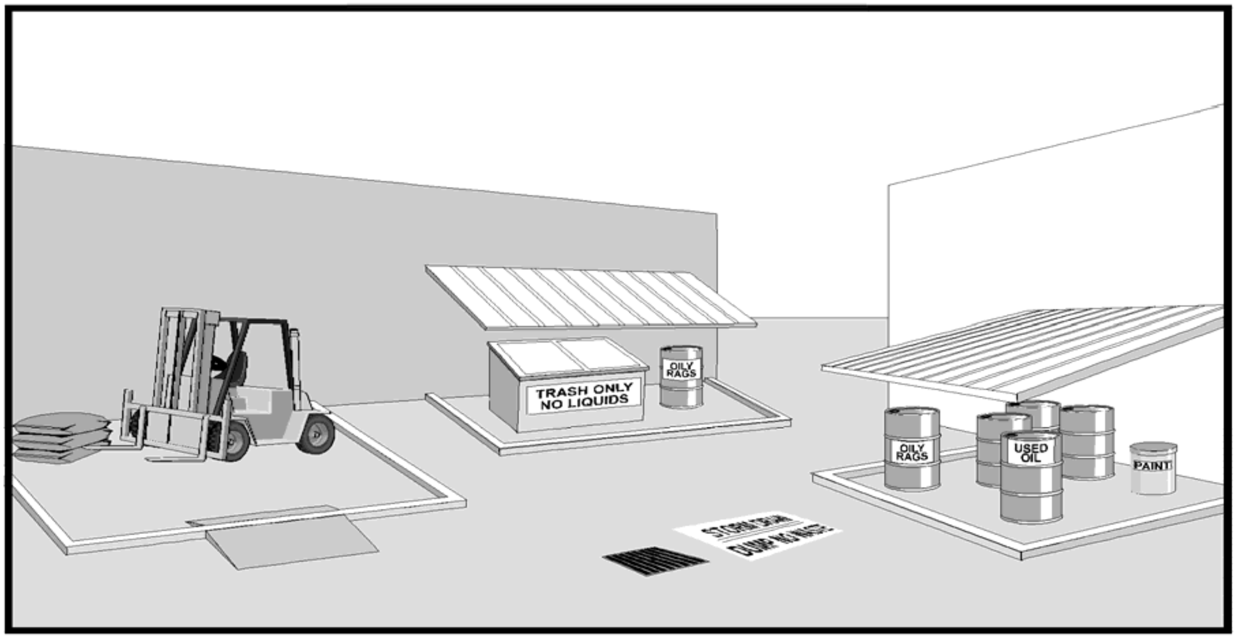
Application Guidance: Controlling spills will be practiced under all working conditions.

Training: Personnel will be trained in spill prevention and response procedures including the use of personal protection equipment (gloves, eye and face protection, etc.). This will include what absorbent or equipment to use, how to use the absorbent or equipment, where to find it, how to dispose of the spent absorbent or other material, and who to notify in the event of a spill.

Effectiveness and Cost: Spill control is a moderately effective, low-cost BMP.

Limitations: None

BMP 012 - CONSTRUCT BERM OR DIKE AROUND CRITICAL AREAS



Description of Potential Pollutant and Source: Critical areas are source areas that have a high likelihood for the release of pollutants. This includes material handling areas, material storage areas, and equipment repair and maintenance areas. As a result of spills and leaks or exposure to storm water, pollutants can flow from critical areas into the storm water system. In addition, small spills and leaks can accumulate on the surface area and be washed away by storm water.

Description of BMP: Construct a raised berm or dike around critical areas. This will provide secondary containment and prevent any spills or leaks from leaving the area. This secondary containment will also be provided where mobile tankers containing fuel are customarily stationed. Construct a ramp to allow vehicle access into the area. (Note: double walled tanks do not require this BMP. Also, 40 CFR 112.7 requires bulk petroleum storage tanks be provided with secondary containment.) A drain valve will be installed and procedures to drain storm water from the bermed area will be posted (see BMP 014).

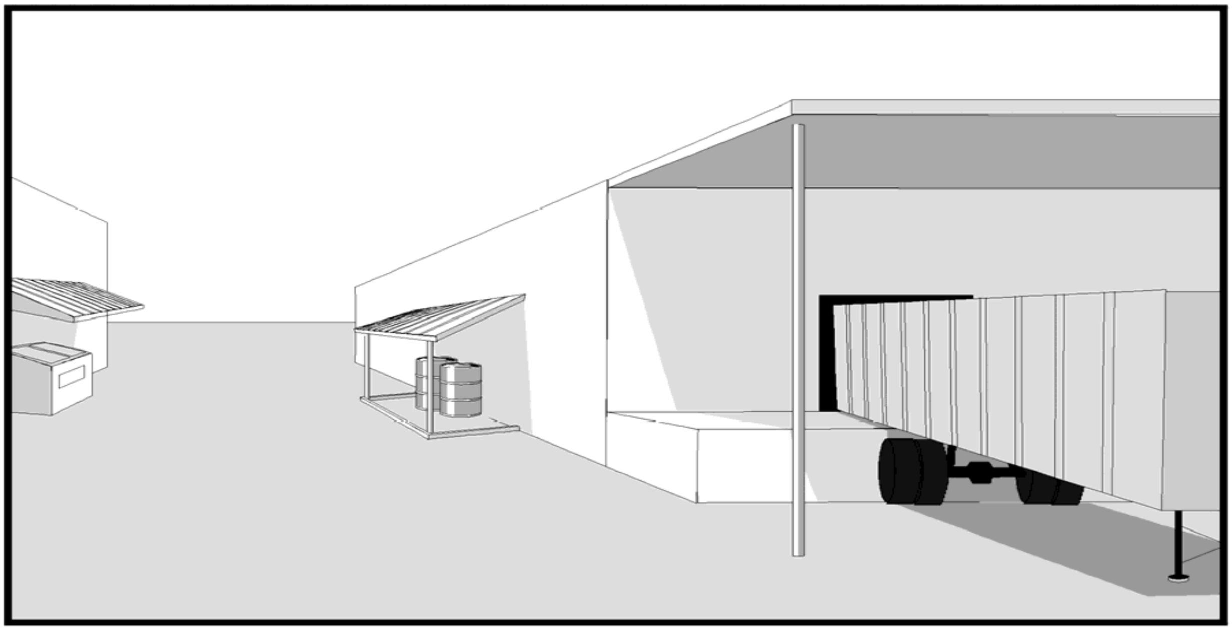
Application Guidance: Install as needed.

Training: N/A

Effectiveness and Cost: This is a highly effective BMP. The cost will vary depending on the size of the fueling operation.

Limitations: The size of some tank and fueling operations areas could make this BMP relatively expensive.

BMP 018 - PROVIDE ROOF TO COVER SOURCE AREA



Description of Potential Pollutant and Source: Spills, leaks and outdoor storage of materials can result in the exposure of significant materials to storm water.

Description of BMP: Construct roofs over areas with significant materials to minimize contact with storm water. Roofs are effective covering for fuel transfer areas, material loading/unloading areas, equipment maintenance, metal fabrication, hazardous waste storage, and materials storage areas.

Application Guidance: Install as needed.

Training: N/A

Effectiveness and Cost: Roofs are an effective, variable-cost BMP. Cost can be high for large areas.

Limitations: The height of the equipment or the size of the area may make this BMP infeasible.

BMP 033 - CHECK VEHICLES AND EQUIPMENT FOR LEAKS

Description of Potential Pollutant and Source: Vehicles, aircraft, or equipment entering or stored at a maintenance facility may be leaking a variety of fluids (fuel, oil, antifreeze, freon, etc.). These materials can be exposed to storm water.

Description of BMP: Inspect all vehicles and equipment at the site, whether incoming, parked, stored, or salvaged, for oil and fluid leaks. Drivers of fleet vehicles, such as delivery trucks, will also check under their vehicles each morning for fluid leaks. If leaks are present, drip pans will be placed under the vehicle or equipment. Once the vehicle is removed from the site, the former parking area will be inspected for stains, and these stains will be cleaned using rags or dry solvents.

Application Guidance: Any vehicle or equipment coming in for repairs, painting, or storage will be inspected for leaks. Fleet vehicles will be inspected each morning. Vehicles that are parked, stored, or salvaged will be provided with drip pans, as will tanker rail cars waiting to be unloaded. The frequency for implementing this BMP has been provided as general guidance. However, a facility operator may wish to establish a more suitable frequency. This will require SWPPP implementors to make judgements based on facility operations and conditions. To assign a frequency other than what has been suggested (i.e., more or less frequent), the following criteria will be considered and rated either High, Medium, or Low. If many of the criteria are assigned a High rating, the frequency may be increased. Similarly, if many criteria are assigned a Low rating, the frequency may be decreased. The goal of implementing this BMP is to minimize exposure of pollutants to storm water.

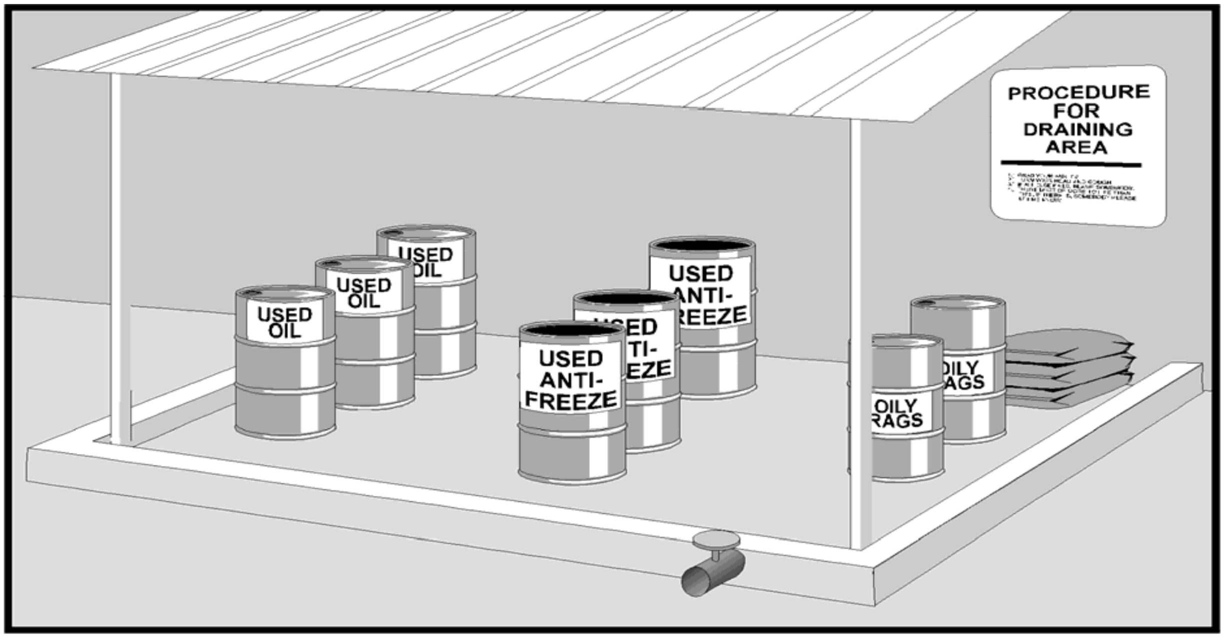
CRITERIA	Rating H=High M=Medium L=Low
Probability of exposure of significant materials to storm water	
Old age or poor condition of equipment and vehicles	
Evidence of exposure (e.g., stains on pavement)	
Proximity of source area to outfall or receiving water	
Sensitivity of receiving water to potentially exposed significant materials (e.g., waters with beneficial uses such as human contact, recreation, significant species habitat, etc.)	

Training: Signs will be posted to remind personnel of proper procedures.

Effectiveness and Cost: Checking for leaks is a moderately effective, low-cost BMP.

Limitations: None

BMP 054 - PROPERLY STORE CONTAINERS



Description of Potential Pollutant and Source: Improper storage of containers can result in the exposure of significant materials to storm water.

Description of BMP: Store containers will be properly. This includes the following:

- Providing adequate aisle space (typically 3 feet) to facilitate material transfer and easy access for inspections.
- Storing containers, drums, and bags away from vehicle traffic routes to reduce the potential for mechanical impact and accidental spills. Do not store bags that are easily punctured near high-traffic areas where they may be hit by moving equipment or personnel. Stacking containers according to manufacturer's instructions to avoid damaging the containers from improper weight distribution.
- Storing liquid containers in a bermedarea.

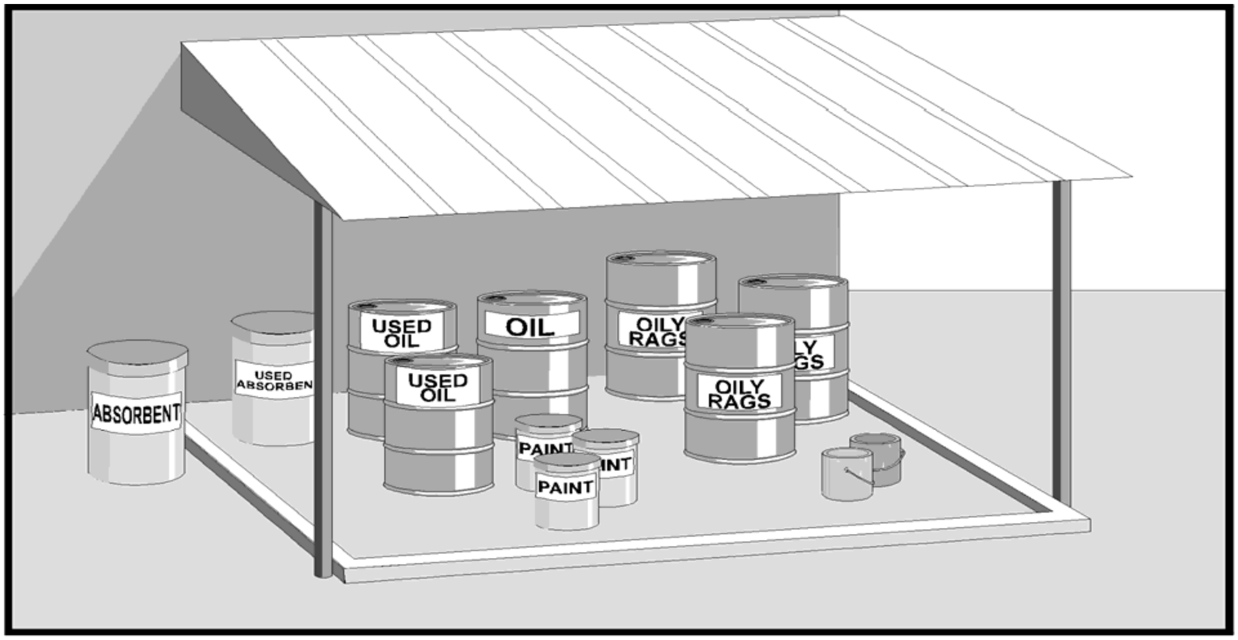
Application Guidance: Containers will be properly stored.

Training: Training on the proper storage of materials will be provided periodically to the appropriate personnel.

Effectiveness and Cost: This is a moderately effective, low-cost BMP.

Limitations: None

BMP 061B - STORE LIQUIDS AND SIGNIFICANT MATERIALS WITHIN A BUILDING OR COVERED AREA



Description of Potential Pollutant and Source: Many significant materials may be leaked or spilled during storage, handling, or transport. If significant materials are stored outside, in covered areas, these materials can be exposed to storm water, which can transport the leaked or spilled material into the storm drain system.

Description of BMP: To the extent practical, store significant materials within a building or covered area. The materials will be stored on an impervious surface, such as a concrete pad. Rainfall runoff from the pad will be directed to a storm water treatment facility or contained. Leaks and spills will be cleaned up as soon as possible using rags or dry absorbents (see BMP 006). Used rags and absorbents will be disposed of properly. Any wash water from cleaning the floor will be disposed of in the sanitary sewer (see BMP 042).

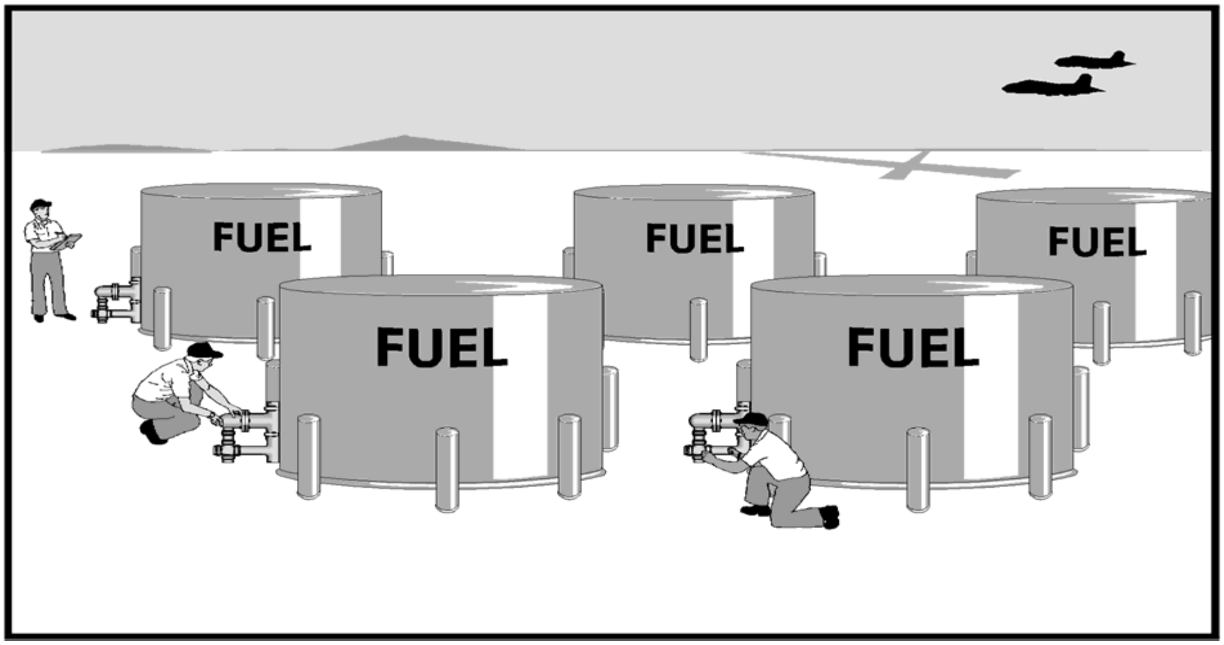
Application Guidance: All significant materials will be stored within a building or covered area.

Training: Personnel will be trained to store significant materials in designated areas.

Effectiveness and Cost: This is a moderately effective BMP. The cost will vary based on whether a building for storing the substances is available.

Limitations: None

BMP 071- KEEP TANKS, PIPING, AND VALVES IN GOOD CONDITION



Description of Potential Pollutant and Source: Tanks, piping, and valves may leak fuel or other significant materials due to corrosion, loose fittings, poor welding, or improperly or poorly fitted gaskets. This can expose these materials to storm water, which can transport them to storm drains and/or receiving waters.

Description of BMP: Keep tanks, piping, and valves in good working condition. Tanks, piping, or valves which are leaking will be repaired or replaced.

Application Guidance: Tanks, piping, and valves will be inspected monthly and kept in good condition at all times. If applicable, preventive maintenance will be performed.

The frequency for implementing this BMP has been provided as general guidance. However, a facility operator may wish to establish a more suitable frequency. This will require SWPPP implementors to make judgements based on facility operations and conditions. To assign a frequency other than what has been suggested (i.e., more or less frequent), the following criteria will be considered and rated either High, Medium, or Low. If many of the criteria are assigned a High rating, the frequency may be increased. Similarly, if many criteria are assigned a Low rating, the frequency may be decreased. The goal of implementing this BMP is to minimize exposure of pollutants to storm water.

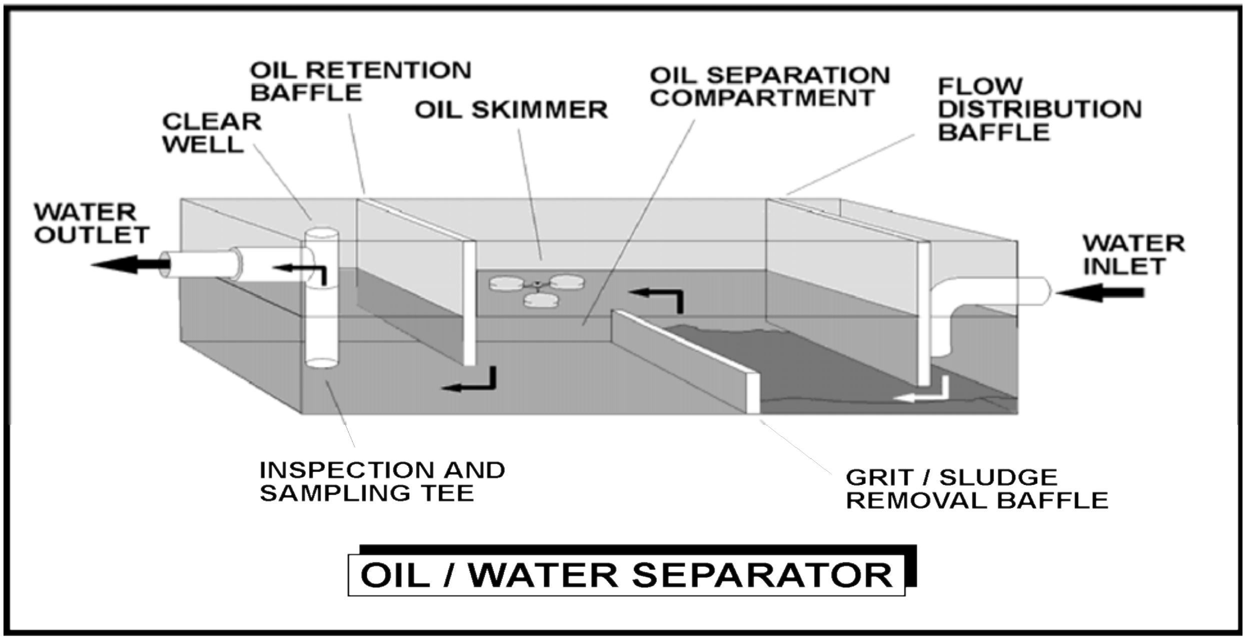
CRITERIA	Rating H=High M=Medium L=Low
Probability of exposure of significant materials to storm water	
Quantity of significant materials potentially exposed	
Toxicity of significant materials potentially exposed	
Frequency of use of tanks, piping, and valves	
Intensity of use of tanks, piping, and valves	
Old age or poor condition of tanks, piping, and valves	
Evidence of exposure (e.g., stains on ground surface)	
Proximity of source area to outfall or receiving water	
Sensitivity of receiving water to potentially exposed significant materials (e.g., waters with beneficial uses such as human contact, recreation, significant species habitat, etc.)	

<u>Training:</u> Personnel will be trained to regularly inspect for leaks or conditions that could lead to the discharge of chemicals, or storm water contact with waste materials. Personnel will be trained to routinely inspect equipment before each use. Tanks, piping, and valves which are not frequently used, will be inspected weekly. Procedures for notifying the appropriate maintenance personnel if a leak is found, will be established.

<u>Effectiveness and Cost:</u> Keeping tanks, piping, and valves in good condition is a highly effective BMP. The cost of repairing or replacing piping and valves is typically low. The cost of repairing or replacing tanks will vary based on the size of the tank and its present condition.

<u>Limitations:</u> None

BMP 098 - CONSTRUCT OIL/WATER SEPARATOR



Description of Potential Pollutants and Source: Oil/water separators are designed to remove petroleum compounds and grease from storm water. Separators will also remove floatable debris and settleable solids.

Description of BMP: Construct oil/water separators. Oil/water separators are underground vaults where storm water is piped in and out of the separator. Oil/water separators come in many configurations. A common configuration is the three-chamber oil/water separator. The first chamber is the sedimentation chamber that allows for sedimentation of coarse materials and screening of debris. The second chamber provides separation of oil, grease and gasoline. The third chamber is provided to prevent any possibility of a surcharge pressure from occurring and as a safety relief for the structure if a blockage occurs.

Application Guidance: Oil/water separators are applicable to situations where the concentrations of oil-and-grease-related compounds will be usually high and source control cannot provide effective control. This generally occurs at equipment maintenance and washing facilities, gas stations and loading areas. Separators may also be used in areas heavily used by mobile equipment such as loading wharfs at marine ports.

Operation and Maintenance: The degree and frequency of maintenance significantly affects the performance of the oil/water separator. Cleaning the oil/water separator will prevent the accumulated debris and oil to be discharged from the structure during intense storms.

Oil/water separators will be checked monthly during the wet season and will be cleaned at least four times a year. They will always be cleaned in October, before the start of the wet season. The accumulated oil will be properly disposed.
The frequency for implementing this BMP has been provided as general guidance. However, a facility operator may wish to establish a more suitable frequency. This will require SWPPP implementors to make judgements based on facility operations and conditions. To assign a frequency other than what has been suggested (i.e., more or less frequent), the following criteria will be considered and rated either High, Medium or Low. If many of the criteria are assigned a High rating, the frequency may be

increased. Similarly, if many criteria are assigned a Low rating, The frequency may be decreased. The goal of implementing this BMP is to minimize exposure of pollutants to storm water.

CRITERIA	Rating H=High M=Medium L=Low
Probability of exposure of significant materials to storm water in area draining to oil/water separator	
Quantity of significant materials potentially exposed in area draining to oil/water separator	
Frequency of use of significant materials potentially exposed in area draining to oil/water separator	
Evidence of exposure (e.g., stains on pavement, etching of concrete) in area draining to oil/water separator	
Proximity of source are to outfall	
Sensitivity of receiving water to potentially exposed significant material (e.g., waters with beneficial uses such as human contact, recreation, significant species habitat, etc.)	

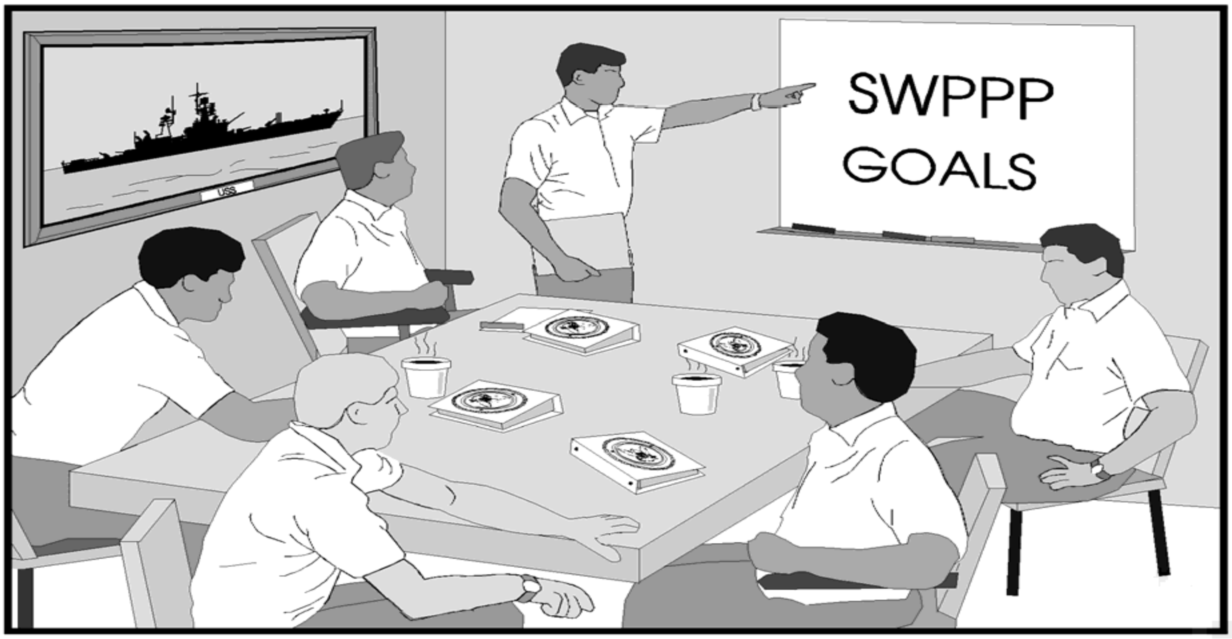
Effectiveness and Cost: This is a moderately effective, high-cost BMP.

Limitations: Oil/water separators are less effective when storm water runoff has high sediment concentrations or detergent levels which disperse oil.

Oil/water separators are only effective for highly pervious drainage areas. Oil/water separators cannot effectively treat large volumes of runoff. The maximum drainage area to oil/water separators is typically one acre.

The sediment removed during maintenance will be tested. If it is a hazardous waste, it will be disposed of accordingly.

BMP 113 - CONDUCT PERSONNEL TRAINING REGARDING THE SWPPP



Description of Potential Pollutant and Source: When properly trained, personnel are more capable of preventing spills, responding safely and effectively to an accident when it occurs, and recognizing situations that could lead to storm water contamination.

Description of BMP: Train personnel at all levels of responsibility in the components and goals of the SWPPP.

Application Guidance: Training will be conducted quarterly and at new personnel orientations.

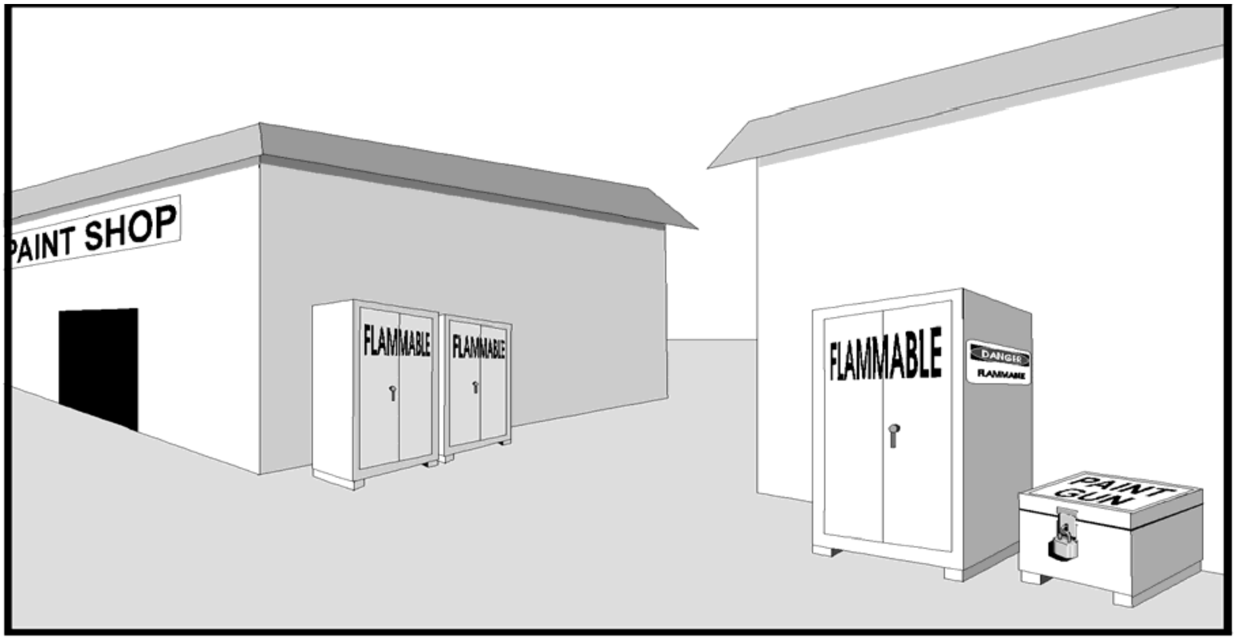
Training: Training will address each component of the SWPPP, including how and why tasks are to be implemented. Topics will include:

- Good housekeeping
- Material management practices
- Spill prevention and response

Effectiveness and Cost: This is a highly effective, moderate-cost BMP.

Limitations: None

BMP 115 - STORE CONTAINERS INSIDE SECONDARY CONTAINMENT



Description of Potential Pollutant and Source: Improper storage of containers of significant materials can result in the release of materials and chemicals that can cause storm water runoff pollution. Secondary containment can prevent storm water runoff pollution.

Description of BMP: Provide secondary containers for significant materials. Containers of significant materials will be stored inside secondary containment cabinets appropriate to the size and quantity of the substances stored. Cabinets will have covered shelves and provide secondary containment for spills of the substances that spill inside the cabinets. In many instances the cabinets will be locked to restrict access to the substances. Metal lockers typically used to store flammable substances are usually appropriate for preventing contact between significant materials and storm water.

The secondary containment will be placed away from vehicle traffic routes to reduce the potential for mechanical impact and accidental spills. A manifest list of the materials stored inside the locker will be posted on or inside the locker.

Application Guidance: Containers will always be properly stored.

Training: Personnel will be trained in preventing substances stored outside from entering the storm water and storing substance effectively.

Effectiveness and Cost: This is a moderately effective, low-cost BMP.

Limitations: None

APPENDIX B

ROUTINE FACILITY INSPECTION CHECKLIST

Routine Facility Inspection Checklist

Activity Name: ______________________ **Date of Inspection:** ______________________

Inspector(s): ______________________ **Facility Name/Number:** ______________________

Column 1	Column 2	Column 3	Column 4	Column 5	
Source Area	BMP Number and Title	Status: F, P, N, NA[1]	Briefly Describe Effectiveness (Good or Other [describe])	Corrective Measures	
				What	By When

Note 1: F – Fully implemented, P – Partially implemented, N – Not implemented , NA – Not Applicable

APPENDIX C

QUARTERLY VISUAL ASSESSMENT CHECKLIST

Quarterly Visual Assessment Checklist

Facility ID and Location: ______________________

Date: ____________________

Sampler Name (Printed): Signature:

_____________________________________ ____

Time of Rainfall Begin: ________________ Time of Rainfall End: ____________________

Time of Flow Begin: ________________ Time of Flow End: ____________________

Rainfall event more than 72 hours since last event? Rainfall Event Total: ____________________

Yes / No

Sample: sample in a clean, colorless glass or plastic container, and examined in a well-lit area

On samples collected within the first 30 minutes of an actual discharge from a storm event

Sample Characteristics:

Color: ____________________ Floating Solids: ____________________________

Odor: ____________________ Settled Solids: ____________________________

Clarity: ____________________ Suspended Solids: ____________________________

Oil Sheen: ____________________ Foam: ____________________________

Other Obvious Indicators of Storm Water Pollution

(describe): ____

Nature of the discharge (i.e., runoff):

Results of observations of the storm water discharge:

Probable sources of any observed storm water contamination:

If applicable, why it was not possible to take samples within the first 30 minutes:

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

APPENDIX D

CORRECTIVE ACTION LOG

Corrective Action Log

Use this form to document SWPPP corrective actions. This form is to be completed by the Environmental Compliance Coordinator (ECC) or a person designated by ECC and submitted to the MCBH Storm Water Program Manager. The Storm Water Program Manager is responsible for any notification to the State of Hawaii Department of Health (DOH), if required.

A corrective action is defined as an action taken to:

- **a) Repair, modify, or replace any storm water control used at the site;**
- **b) Clean up and properly dispose of spills, releases, or other deposits; or**
- **c) Remedy a permit violation.**

1. Corrective Action Triggers

The following events trigger a corrective action to be taken (this triggering condition is to be documented *within 24 hours* of discovering the occurrence):

- a) A required storm water control was never installed, was installed incorrectly, or is not in accordance with the requirements in the SWMP Plan.
- b) A member of the **Storm Water Pollution Control Team** becomes aware that the storm water controls installed and being maintained are not effective enough for the discharge to meet applicable water quality standards or applicable requirements in the MCBH SWMP Plan. The facility ECC shall notify the Storm Water Program Manager immediately. The Storm Water Program Manager will notify DOH *by the end of the next work day*.

1.1 Log Notifications:

Date/time Storm Water Program Manager notified by ECC: ________________________

Date/time DOH notified by Storm Water Program Manager: ________________________

1.2 Describe Discharge:

Indicate which one of the following prohibited discharges is occurring or has occurred:

- ❒ Wastewater from washout of concrete
- ❒ Wastewater from washout and cleanout of stucco, paint, form release oils, curing compounds, or other construction materials
- ❒ Fuels, oils, or other pollutants used in vehicle and equipment operation and maintenance
- ❒ Soaps, solvents, or detergents used in vehicle and equipment washing
- ❒ Toxic or hazardous substances from a spill or other release
- ❒ Other, Explain: ____

2. Requirements for Taking Corrective Actions

The ECC shall complete corrective actions in accordance with the deadlines specified below. In all circumstances, site personnel shall *immediately* take all reasonable steps to minimize or prevent the discharge of pollutants until a permanent solution is installed and made operational, including cleaning up any contaminated surfaces so that the material will not discharge in subsequent storm events. *Immediately* means the same day the condition is discovered, unless it is too late in the day, in which initiation of corrective action must begin on the following work day.

Following any of the above triggering events, the ECC shall install a new or modified control and make it operational, or complete the repair, by *no later than 7 calendar days from the time of discovery*. If it is not feasible to complete the installation or repair within 7 calendar days, the ECC shall document and submit to the Storm Water Program Manager, for their agreement, why it is not feasible to complete the installation or repair within the 7-calendar day timeframe and document a schedule for installing the storm water control and making it operational as soon as practicable after the 7-day timeframe.

If the issue is not adequately addressed within 7 calendar days or the agreed upon timeframe, enforcement procedures will be initiated. Unaddressed issues will be escalated through the chain of command. The MCBH Environmental Compliance and Protection Division Director will give the responsible party a formal notice with an appropriate deadline for action. If the problem remains unchanged, the situation will be brought to the attention of the next higher authority. The ultimate penalty for non-compliance of MS4 Permit regulations is eviction or discharge of the responsible party from MCBH. This is placed at the discretion of the Base Commander. See the Enforcement Response Plan in Appendix 3-6 of the SWMP Plan for further information on MCBH's enforcement policies.

3. Corrective Action Report

Within 24 hours of discovering the occurrence of one of the triggering conditions in SWPPP Section 4.1 at the site, the ECC must complete the following:

3.1 Describe the triggering condition:

____

____

____

____

3.2 Record the date/time of the condition identified. How was the condition identified?

____

____

____

____

3.3 Describe the corrective action taken:

____

____

____

Date/time installation or repair was completed:
(or date/time the prohibited discharge ceased) ____

Or describe why it is not feasible to complete installation or repair within 7 calendar days and detail a proposed schedule (if applicable)

____
____
____

4. Resolution of the Corrective Action Trigger

Within 7 calendar days of initiating the Corrective Action Report, the ECC must complete a report of the following:

4.1 Follow-up Actions

Describe any follow-up actions taken to review the design, installation, and maintenance of storm water controls, including the dates such actions occurred:

____
____
____

4.2 Storm Water Control Modifications

Provide a summary of storm water control modifications implemented. Include a schedule of activities required to implement changes and the date the modifications were completed or will be completed:

____
____
____

5. SWPPP Modification Due to Corrective Actions

Where corrective actions result in changes to any of the storm water controls or procedures documented in the SWPPP, modify the SWPPP accordingly *within 7 calendar days* of completing corrective action work.

Are modifications to the SWPPP necessary? ❑ Yes ❑ No

Date modifications to the SWPPP shall be completed _______________

6. Corrective Actions Required by DOH

The facility shall comply with any corrective actions required by DOH as a result of permit violations found during an inspection by DOH or the Environmental Protection Agency (EPA).

Was the Corrective Action triggered by a DOH/EPA inspection?

❑ Yes ❑ No

❑ Date of DOH/EPA Inspection __________________

7. Additional Comments:

____
____

Final

STORM WATER POLLUTION PREVENTION PLAN

Storm Water Management Program Plan

Marine Corps Base Hawaii, Oahu, Hawaii

NPDES Permit No. HI S000007

AIRCRAFT READY FUEL STORAGE
(BUILDING 6479)

Prepared by:

Marine Corps Base Hawaii

August 2022

Table of Contents

Tables

Figures

Appendices

List of Acronyms and Abbreviations

BMP	Best Management Practice
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CWA	Clean Water Act
CWB	Clean Water Branch
DEF	Diesel Exhaust Fluid
DOH	State of Hawaii Department of Health
ECC	Environmental Compliance Coordinator
ECE	Environmental Compliance Evaluation
ECPD	Environmental Compliance and Protection Division
EPA	United States Environmental Protection Agency
HAZMAT	Hazardous Material
HAZMIN	Hazardous Material Minimization
JP-5	Jet Propellant 5
MCBH	Marine Corps Base Hawaii
MS4	Municipal Separate Storm Sewer System
MS4 Permit	Marine Corps Base Hawaii's NPDES Permit No. HI S000007
NPDES	National Pollutant Discharge Elimination System
OWS	Oil/Water Separator
POC	Point of Contact
SAS	Satellite Accumulation Site
SWMP	Storm Water Management Program
SWPPP	Storm Water Pollution Prevention Plan

Certification Statement

MCBH is committed to the prevention of discharges of polluted storm water to navigable waters or the environment and maintains the highest standards for best management practices through periodic review, updating, and implementation of this Storm Water Pollution Prevention Plan (SWPPP).

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information contained therein. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Name: ______________________ Title: ______________________

Signature: ______________________ Date: ______________________

Management Review

Refer to Section 1.2 for more information on required SWPPP updates.

Review Dates	Signature	Amendment Required? (Y/N)
____________	__________________	__________
____________	__________________	_________
____________	__________________	_________
____________	__________________	_________
____________	__________________	_________
____________	__________________	_________

1 Introduction

As part of Federal regulations administered through the Clean Water Act (CWA), the State of Hawaii, Department of Health (DOH) has issued the National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4) Permit No. HI S000007 (referred to herein at the "MS4 Permit") to Marine Corps Base Hawaii (MCBH). The MS4 Permit requires that MCBH provide all existing industrial facilities, identified in MCBH's MS4 Permit application, and any newly identified industrial facilities, submitted to DOH using the "MS4 NPDES Individual Permit – Industrial Storm Water Discharge Notification Form," with a Storm Water Pollution Prevention Plan (SWPPP) for storm water associated with industrial activities.

The purpose of the regulations is to protect water quality by reducing the amount of pollutants in storm water runoff caused by industrial activities.

1.1 SWPPP Implementation

The storm water management controls of this plan will become MCBH procedure for the applicable industrial facility. An up-to-date copy of the SWPPP shall be maintained on site and at the MCBH Environmental Compliance and Protection Division (ECPD). Management staff, maintenance personnel, contractor staff, and other personnel involved in onsite industrial activities, will be knowledgeable of the plan and follow the guidelines set forth in it, in addition to any other pertinent base-wide, state and federal regulations.

Day-to-day implementation of the SWPPP is primarily the responsibility of the current facility Environmental Compliance Coordinator (ECC) or Point of Contact (POC) as identified in Table 2-1. Enforcement of the permit conditions and this SWPPP are ultimately the responsibility of ECPD and additional escalating levels of authority as specified in the Enforcement Response Plan developed by MCBH for its base-wide Storm Water Management Program (SWMP) Plan.

1.2 Updating the SWPPP

This SWPPP will be reviewed as needed to identify necessary changes, at a minimum of every five years. Updates may be required due to current best management practice (BMP) failures, spill events, changes in industrial activities, changes in features, corrective actions, or other necessary changes. Personnel changes to the Storm Water Pollution Control Team (Section 2.1) should be logged in Table 2-1. Storm Water Pollution Control Team Log. ECPD will be responsible for approving revisions to the SWPPP. In the event the plan is modified, a copy of the updated SWPPP will remain at ECPD and will be provided to the applicable facility. Additionally, ECPD shall document and report the SWPPP changes to the DOH, Clean Water Branch (CWB), within thirty days of when the changes arise.

2 Aircraft Ready Fuel Storage, Building 6479

The Aircraft Ready Fuel Storage is located within MCBH, Kaneohe Bay along the north side of 3rd Street between "B" and "C" Streets. The facility encompasses approximately 1.4 acres and can be found in grid [redacted] of the MCBH Base Map, see Figure 4-1. The facility-specific map is shown on Figure 4-2.

2.1 Storm Water Pollution Control Team

The Storm Water Pollution Control Team consists of the Storm Water Program Manager, ECC, and the Hazardous Material (HAZMAT) and Hazardous Material Minimization (HAZMIN) team. The Storm Water Program Manager is responsible for the enforcement of the MS4 permit at all industrial sites and provides annual training to the ECC and other personnel. The ECC is the primary unit POC for storm water related items and the day-to-day environmental matters at a specific facility. ECC's are responsible for SWPPP implementation including BMP and facility inspections, storm water assessments/sampling, BMP maintenance, and corrective actions. The HAZMAT and HAZMIN team shall be contacted if assistance is needed. The role, name, phone number, and start date of individuals on the Storm Water Pollution Control Team is recorded in Table 2-1 below. In the event of personnel turnover, Table 2-1 shall be updated accordingly.

TABLE 2-1. STORM WATER POLLUTION CONTROL TEAM LOG

Role	Name	Phone	Start Date
MCBH Storm Water Program Manager	CIV Whitney Anderson	Office: 808-257-4359	6/6/22
ECC	CIV Kahana Kauahi	Office: 808-257-2234	8/1/2019
HAZMAT/HAZMIN	CIV Tim Cawthon	HAZMAT Center Building 6409 Office: 808-257-9913 HAZMIN Center Building 6407 Office: 808-257-0770	N/A

2.2 Aircraft Ready Fuel Storage, Building 6479 Activities

The Aircraft Ready Fuel Storage consists of a jet fuel (JP-5 fuel) aboveground storage tank (AST, Tank 6479) and fuel pumps that transfer the fuel underground to the Aircraft Fuel Islands (Facilities 1170 and 1171). The fuel is received at the facility (Monday through Friday) via pumping through a series of aboveground piping from Tanks 1252 and 1253, located about 500 feet to the northeast of the compound. Tank 6479 is located within an impervious, lined, secondary containment berm. Fuel filters, a sump with pumps, piping, and two smaller rectangular, double-walled, fuel ASTs (Tanks 6139 and 6140, not in service) are also located inside the berm. Tank system leak tests are completed every six months.

A tanker truck loading concrete pad, with concrete curbing and roll-over curbs at both ends, is adjacent to the containment berm, where fuel returned for testing is transferred for temporary storage in Tanks 6139 and 6140. Upon approval of test results, the returned fuel is transferred back to Tank 6479. If the fuel does not meet approval, it is removed and disposed of in accordance with standard Fuel Division procedures. During the time of inspection, facility staff indicated that Building 349, the fuel delivery pad, and both small fuel ASTs (Tanks 6139 and 6140) are scheduled for demolition.

Buildings 370 and 349 are located at the south-central portion of the compound. Building 370 is used as office space, fuel laboratory, and storage bay/shop for a forklift and other small vehicles. Small amounts of fuel are tested and temporarily stored in the fuel lab within flammable lockers. A small floor drain in the fuel lab flows to an OWS located to the west of Building 370.

Building 349 is a corrugated metal shed used for the storage of maintenance materials, such as pump parts, cleaners, cleaning supplies, hoses, wood, pallets, trailers, empty drums, and flammable lockers used to store fuel retention samples, DEF, gasoline for pumps, and oil. A riding lawn mower is also stored under cover within Building 349. Various items intended for disposal are stored along the exterior walls of Building 349 such as various carts, trailers, and an old mower. A cylindrical propane AST is located between the two buildings.

The area around the Aircraft Ready Fuel Storage Facility is generally flat. Storm water runoff generated within the containment berm flows to the collection sump where, upon visual verification of the lack of sheen or other signs of contamination, it is pumped onto the adjacent grass areas. Runoff generated outside of the containment berm percolates into the surrounding grass and gravel areas. Storm water that reaches 3rd Street flows into catch basins that eventually discharges to Kaneohe Bay through MCBH Outfall 018. Runoff generated around Building 370 flow into drain inlets at the northwest and southeast sides of the building. An aboveground manhole is located near the northwest drain inlet. These features are a part of the same drainage system to Kaneohe Bay via MCBH Outfall 021. The storm water sampling location is the drain inlet (Outfall 01) located in the grass swale southeast of Buildings 370 and 336 (Figure 4-2). Two other drainage areas discharge at locations that are considered substantially similar outfalls. Refer to Figure 4-2 for the location of the storm water sample point and other relevant site features.

2.3 Sources of Pollutants

The following is an inventory of potential pollutants associated with Aircraft Ready Fuel Storage, Building 6479:

A. Material Loading and Unloading Areas

Materials that are spilled, leaked, or lost during loading or unloading may collect on vegetated or paved surfaces and be carried away by storm runoff. Loading and unloading associated with the Aircraft Ready Fuel Storage facility include fuel transfers via pipelines and pumps at Tank 6479. Returned fuel that does not meet reuse criteria is loaded back onto tanker trucks via a hose connection that extends beyond the containment berm near Tanks 6139 and 6140. Additional loading and unloading of small amounts of materials occurs at Building 349.

B. On-Site Material Storage and Disposal Practices

Leaks, drips, or spills of materials that are stored or disposed of in areas exposed to rainfall can be carried away by storm water. Aircraft fuel is stored in Tank 6479 within the lined containment berm. Storage of small amounts of materials in flammable lockers occurs at Building 349.

C. Outdoor Activities

Many outdoor activities at MCBH, Kaneohe Bay use materials or create wastes that have the potential to pollute storm water runoff. Outdoor activities at the Aircraft Ready Fuel Storage facility include storage and transfer of fuel via pumps and piping to the fueling pad. Small vehicles for disposal are stored outdoors at Building 349.

D. Significant Materials Inventory

The following significant materials are located at the Aircraft Ready Fuel Storage:

- Jet Fuel
- Oil
- Antifreeze
- Grease
- Cleaners

2.4 Potential Storm Water Pollutants

The following pollutants have been identified as having a reasonable potential to be present in storm water discharges from Aircraft Ready Fuel Storage, Building 6479 if not properly managed:

- Jet Fuel

Materials that have *not* been included as a potential storm water pollutant but have been included as part of the significant materials inventory list, are considered to present a negligible risk to storm water quality. This is based on the nature/location of the primary activities performed with these materials and the BMPs that are in place. Material transport (loading/unloading) is not considered to be a significant threat to storm water, due to spill response procedures, training, and spill kit materials available onsite.

2.5 Best Management Practices (BMPs)

Best Management Practices (BMPs) are techniques or methods that aim to manage the quantity and improve the quality of storm water runoff from a facility or other site. Storm water BMPs intend to reduce or eliminate pollution and contaminants collected by runoff before the runoff reaches the MCBH storm water system or sensitive ecosystems such as streams, wetlands, and marine environments. The following is a summary of BMPs currently in place at the Aircraft Ready Fuel Storage, Building 6479.

A. Good Housekeeping Practices

In general, Aircraft Ready Fuel Storage, Building 6479 employs good housekeeping practices throughout its operations. Good housekeeping practices for Aircraft Ready Fuel Storage, Building 6479 are included in Table 2-2.

B. Preventative Maintenance

Preventive maintenance is important as water pollution control measures may be of little or no use if devices and equipment have not been properly maintained. Facility personnel conduct inspection of facility equipment and storage systems on a regular basis. The preventive maintenance program involves inspections of equipment and storage systems that are exposed to storm water. Inspections of the SAS are conducted on a monthly basis by HAZMIN, with monthly inspection reports submitted to ECPD.

C. Visual Inspections

Visual inspection provides a valuable subjective assessment of the status of storm water management systems. They are easily performed and allow the opportunity for corrective action, if necessary. Site inspections and documentation requirements are addressed in in Section 3 of this SWPPP. MCBH HAZMIN Center staff perform hazardous material inspections monthly. Annual facility inspections are performed by EPCD as part of the MCBH Environmental Compliance Evaluation (ECE).

D. Spill Prevention and Response

Areas where significant material spill or leakage can occur are identified in Section 2.1 and shown on Figure 4-2. The storm water systems and their accompanying drainage points are also shown on Figure 4-2. Refer to Table 2-2 for BMPs related to spill preventative measures for material handling procedures, storage requirements, and equipment usage.

In the event of a hazardous substance or oil spill, the ECC and ECPD shall be notified immediately (ECPD; 808-630-8246). If the spill cannot be easily addressed using an onsite spill kit and personal protective equipment, call Fed Fire (Military 911). The spill source should be immediately controlled if it is safe to do so by closing valves, switches, and/or turning off power to a device. Then, contain the spill by using sorbent socks or absorbent materials found in a spill kit. After it has been contained, clean up the spilled material in a safe manner using dry methods. All materials should then be properly disposed of.

The locations of additional spill kits are shown in Figure 4-2.

E. Erosion and Sediment Controls

No areas at the Aircraft Ready Fuel Storage have been identified as having high potential for significant soil erosion that would require erosion and sediment control measures.

F. Best Management Practices to Minimize Pollutant Contact with Storm Water

Facility personnel receive annual training from ECPD at minimum, as well as an initial training for all new personnel. Training information will include the BMPs that have been developed for the facility and a general overview of the storm water program and its objectives. Existing BMPs at the Aircraft Ready Fuel Storage are shown in Table 2-2 and attached as fact sheets to this SWPPP in Appendix A.

TABLE 2-2. BEST MANAGEMENT PRACTICES

BMP No.	BMP Title	Description
001	Label All Drums, Cans, Containers, Tanks, and Valves	All containers and drums are labeled.
002	Restrict Access to Areas and Equipment	The facility is surrounded by chain-linked fencing.
004	Avoid Hosing Down the Site	Sweeping with a push broom is performed as needed.
006	Control Spills	Any spill of significant materials is controlled immediately to prevent pollutant from being transported to receiving water. A spill kit is stored onsite.
007	Place Trash Receptacles at Appropriate Locations	Covered trash bins are located at the facility
012	Construct Berm or Dike Around Critical Areas	All of the Aircraft Ready Fuel Storage facilities are located within an impervious, lined, secondary containment berm. The return fuel holding ASTs (Tanks 6139 and 6140) are double-walled tanks and also stored within the berm.
033	Check Vehicles and Equipment for Leaks	Tanks and piping are checked for leaks on a regular basis.
061B	Store Liquids and Significant Materials within a Building or Covered Area	All significant materials are properly stored undercover and in secondary containment where required.
071	Keep Tanks, Piping, and Valves in Good Condition	Tanks, pumps, seals, piping and valves are visually inspected for signs of structural integrity and/or leaks.
113	Conduct Personnel Training Regarding the SWPPP	Personnel are trained regularly (initial orientation and annual refresher).

3 Inspections, Assessments and Monitoring

3.1 Routine Quarterly Site Inspections

The MS4 Permit requires a routine quarterly site inspection by a qualified person with at least one member of the storm water pollution control team participating. At least once each calendar year, the routine inspection must be conducted during a period when a storm water discharge is occurring. The site inspection is an overall evaluation of the effectiveness of the BMPs implemented at that facility. A Routine Facility Inspection Checklist (Appendix B) shall be completed during each routine site inspection and kept onsite with this SWPPP. During normal facility operating hours, inspections must be conducted of areas of the facility including, but not limited to, the following:

- Areas where industrial materials or activities are exposed to storm water;
- Areas identified in the SWPPP and those that are potential pollutant sources;
- Areas where spills and leaks have occurred in the past three years;
- Discharge points; and
- Control measures used to comply with the effluent limits contained in this permit.

3.2 Visual Assessment of Storm Water Discharges

A Quarterly Visual Assessment of storm water discharge is required for all industrial facilities at MCBH. Storm water samples for this visual assessment but must be collected in such a manner that the samples are representative of the storm water discharge from the facility. Therefore, the water sample must be collected at the designated storm water monitoring point (Outfall 01) as shown in Figure 4-2. The Quarterly Visual Assessment checklist (Appendix C) shall be completed by the current facility ECC and kept onsite with this SWPPP.

The visual assessment must be made:

- Of a sample collected in a clean, colorless glass or plastic container, and examined in a well-lit area;
- On samples collected within the first 30 minutes of an actual discharge from a storm event. If it is not possible to collect the sample within the first 30 minutes of discharge, the sample must be collected as soon as practicable after the first 30 minutes and documented why it was not possible to take the sample within the first 30 minutes; and
- For storm events, on discharges that occur at least 72 hours (three days) from the previous discharge.

Whenever the visual assessment shows evidence of storm water pollution, corrective action procedures to remedy the pollutants must be taken and documented. Refer to Section 4 for corrective action procedures.

4 Corrective Actions

A corrective action is defined as any action taken, or required to be taken, to (1) repair, modify, or replace any storm water control used at the site; (2) clean up and dispose of spills, releases, or other deposits found on the site; and (3) remedy a permit violation. Corrective actions should be documented using the Corrective Action Log (Appendix D).

4.1 Immediate Actions

If corrective action is needed, you must immediately take all reasonable steps necessary to minimize or prevent the discharge of pollutants until a permanent solution is installed and made operational, including cleaning up any contaminated surfaces so that the material will not discharge in subsequent storm events. Note: In this context, the term "immediately" requires you to, on the same day a condition requiring corrective action is found, take all reasonable steps to minimize or prevent the discharge of pollutants until a permanent solution is installed and made operational. However, if a problem is identified at a time in the workday when it is too late to initiate corrective action, the initiation of corrective action must begin no later than the following workday. "All reasonable steps" means that the permittee has undertaken initial actions to assess and address the condition causing the corrective action, including, for example, cleaning up any exposed materials that may be discharged in a storm event (e.g., through sweeping, vacuuming) or making arrangements (i.e., scheduling) for a new BMP to be installed at a later date.

4.2 Escalating Actions

If additional actions are necessary beyond those implemented or if the conditions continue to occur, additional corrective actions (e.g., install a new or modified control and make it operational, complete the repair) must be completed before the next storm event if possible, and within 14 calendar days from the time of discovery of the corrective action condition. If it is infeasible to complete the corrective action within 14 calendar days, document why it is infeasible to complete the corrective action within the 14-day timeframe and identify a schedule for completing the work, which must be done as soon as practicable after the 14-day timeframe but no longer than 45 days after discovery. If the completion of corrective action will exceed the 45-day timeframe, the minimum additional time necessary to complete the corrective action can be taken, provided that MCBH ECPD and DOH is notified of your intention to exceed 45 days. Where your corrective actions result in changes to any of the controls or procedures documented in your SWPPP, you must modify your SWPPP accordingly within 14 calendar days of completing corrective action work.

4.3 Corrective Actions for Substantially Identical Outfalls

If the event triggering corrective action is associated with an outfall that had been identified as a "substantially identical outfall", the review must assess the need for corrective action for all related substantially identical outfalls. Any necessary changes to control measures that affect these other outfalls must also be made before the next storm event if possible, or as soon as practicable following that storm event. Any corrective actions must be conducted within the timeframes discussed above.

4.4 Record of Past Spills or Leaks of Hazardous Pollutants

Table 4-1 is used to record significant spills and leaks that have occur or have occurred within three years prior to the preparation or amendment of this SWPPP. Significant spills and leaks include, but are not limited to, releases of oil or hazardous substances in excess of quantities that are reportable under CWA Section 311 (see 40 CFR 110.6 and 40 CFR 117.21) or Section 102 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 USC §9602.

At the time of this SWPPP update, there have been no past spill or leak incidents reported for the Aircraft Ready Fuel Storage.

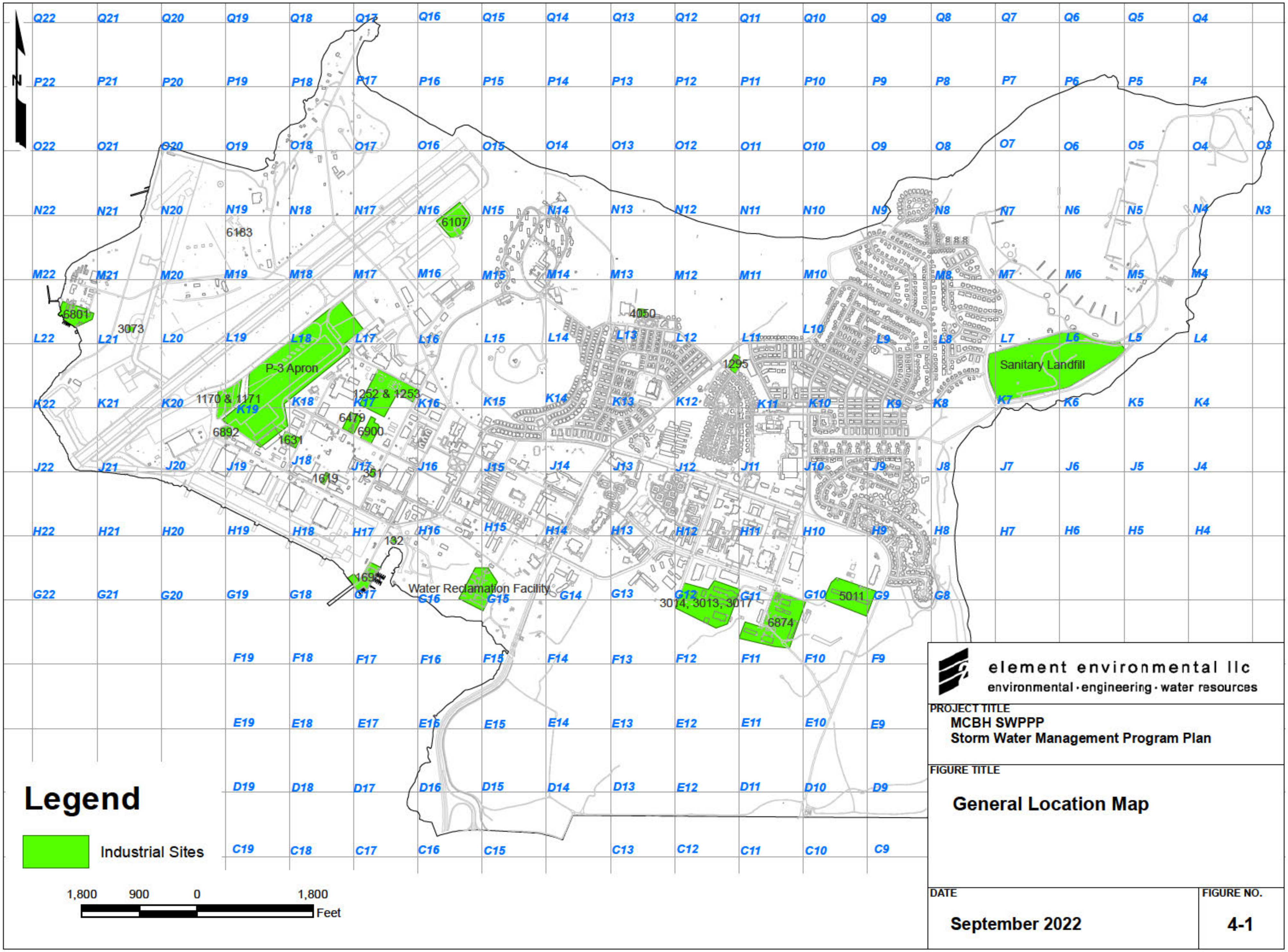
TABLE 4-1. PAST SPILLS OR LEAKS OF HAZARDOUS POLLUTANTS

Date of Incident	Brief Summary of Incident (POC Active at Time of Incident, Pollutant Type, Estimated Quantity, Location of Spill)

4.5 Record of Unauthorized Non-Storm Water Discharges

TABLE 4-2. UNAUTHORIZED NON-STORM WATER DISCHARGE EVALUATION

Date of Evaluation	Brief Summary of Evaluation (Description of the evaluation criteria, outfalls or onsite drainage points that were directly observed, action(s) taken, such as a list of control measures used to eliminate unauthorized discharge)



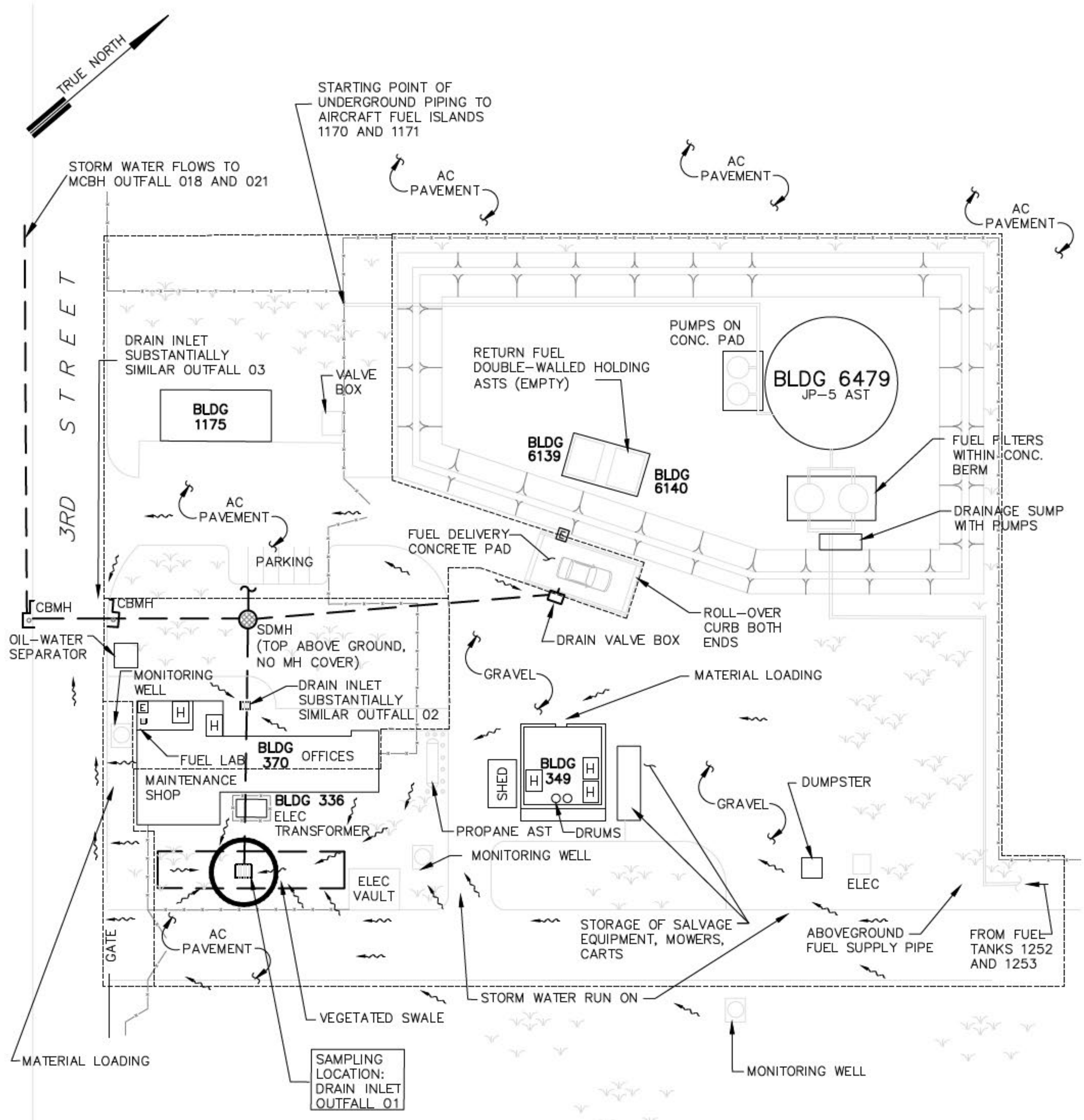
element environmental llc
environmental · engineering · water resources

PROJECT TITLE
MCBH SWPPP
Storm Water Management Program Plan

FIGURE TITLE
General Location Map

DATE
September 2022

FIGURE NO.
4-1



LEGEND

H HAZARDOUS MATERIALS LOCKER

E EYEWASH STATION

STORM WATER CONVEYANCE

FLOW ARROW

DRAINAGE AREA BOUNDARY

NOTES:

1. STORM WATER, FROM APPROXIMATELY 1.4 ACRES ASSOCIATED WITH BUILDING 6479, DISCHARGES TO KANEOHE BAY VIA OUTFALLS 018 & 021.
2. STORM WATER CONVEYANCE PIPE LOCATIONS ARE APPROXIMATE.
3. NOT TO SCALE

DATE:	PROJECT TITLE:
JULY 2022	STORM WATER POLLUTION PREVENTION PLAN MCBH, KANEOHE BAY, OAHU, HAWAII

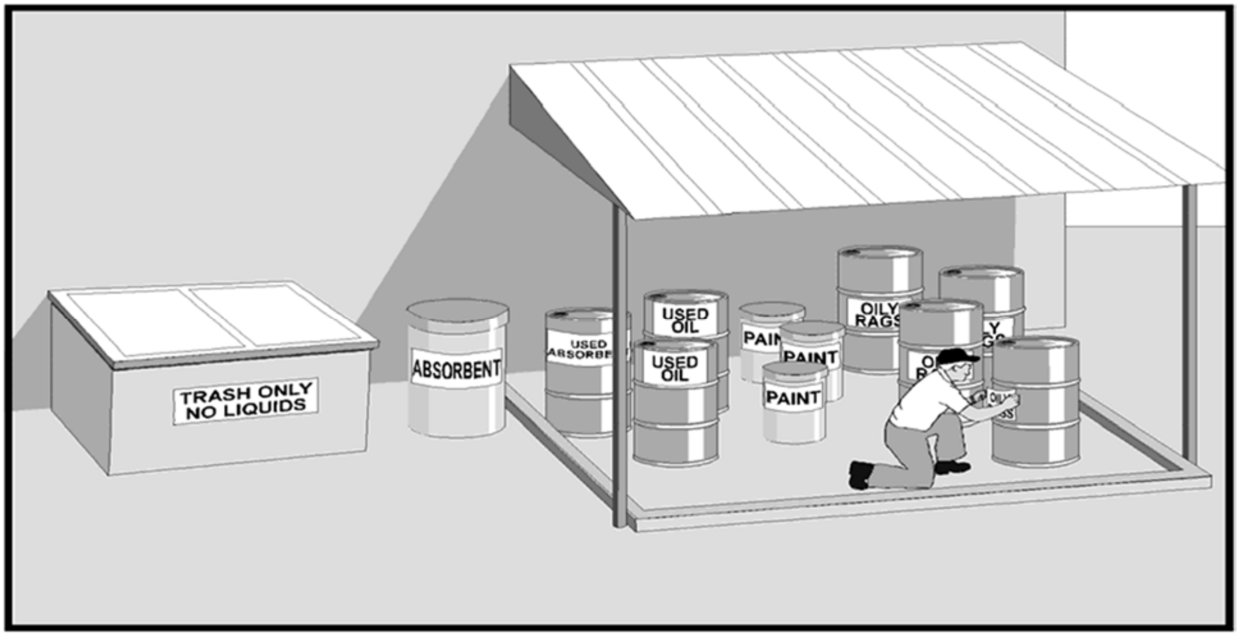
FIGURE TITLE:	FIGURE NO.:
AIRCRAFT READY FUEL STORAGE (BUILDING 6479)	4-2

DAMATO
8/10/2022 11:40:35 AM
FIG 4-2 Bldg 6479 – Aircraft Ready Fuel Storage.dwg

APPENDIX A

SELECTED BMP FACT SHEETS

BMP 001 - LABEL ALL DRUMS, CANS, CONTAINERS, AND TANKS



<u>Description of Potential Pollutant and Source</u>: Drums, cans, and containers can be improperly managed and disposed of due to uncertainty of the container's contents. Tanks which are not labeled may result in improper use of the tank or fuel, which may result in the exposure of significant materials to storm water and/or receiving waters. Similarly, unlabeled valves may be opened without proper precaution due to lack of user information. Storm water quality will be affected if significant materials are improperly disposed to the storm drain and/or receiving waters. Lack of labeling will also make it difficult to quickly identify the type of material released so facility personnel can respond correctly. Labels also identify hazardous materials at the facility and are a good way to request caution in certain areas (e.g., drums indicating flammability).

<u>Description of BMP:</u> Label all drums, valves, pumps, cans, tanks, and containers to reduce the chance of misuse and eventual spills. Labeling ensures that the appropriate procedures, equipment, and storage containers are used. All containers will be labeled as to what is in them.

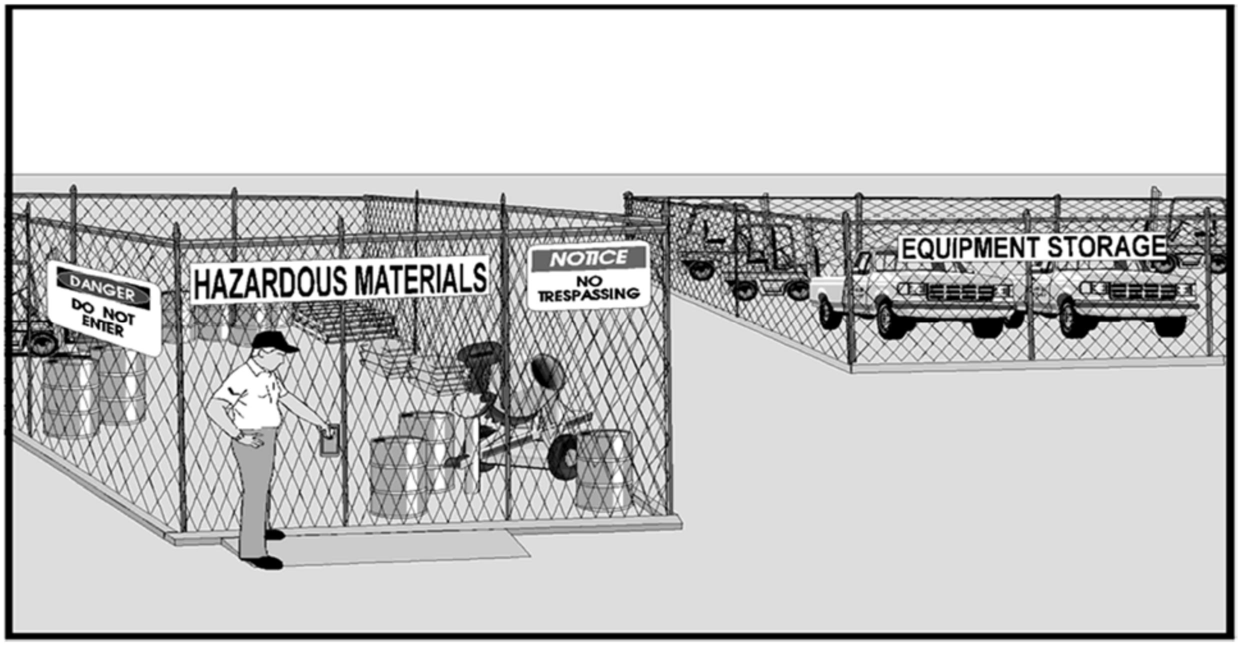
<u>Application Guidance:</u> As needed.

<u>Training:</u> N/A

<u>Effectiveness and Cost:</u> Effectiveness and costs will vary depending on the application.

<u>Limitations:</u> None

BMP 002 - RESTRICT ACCESS TO AREA AND EQUIPMENT



Description of Potential Pollutant and Source: Vandalism of vehicles and facility property may result in the release of significant materials.

Description of BMP: Provide fences and gate areas where vehicles, equipment and materials are stored and are accessible to the public to discourage trespassing. Access to equipment will also be restricted. Only authorized personnel will be allowed to operate equipment. The fences and gates will be properly maintained, and additional security measures including lighting of the area will be implemented if the fencing alone proves insufficient. Where appropriate, security guards or alarms will be used.

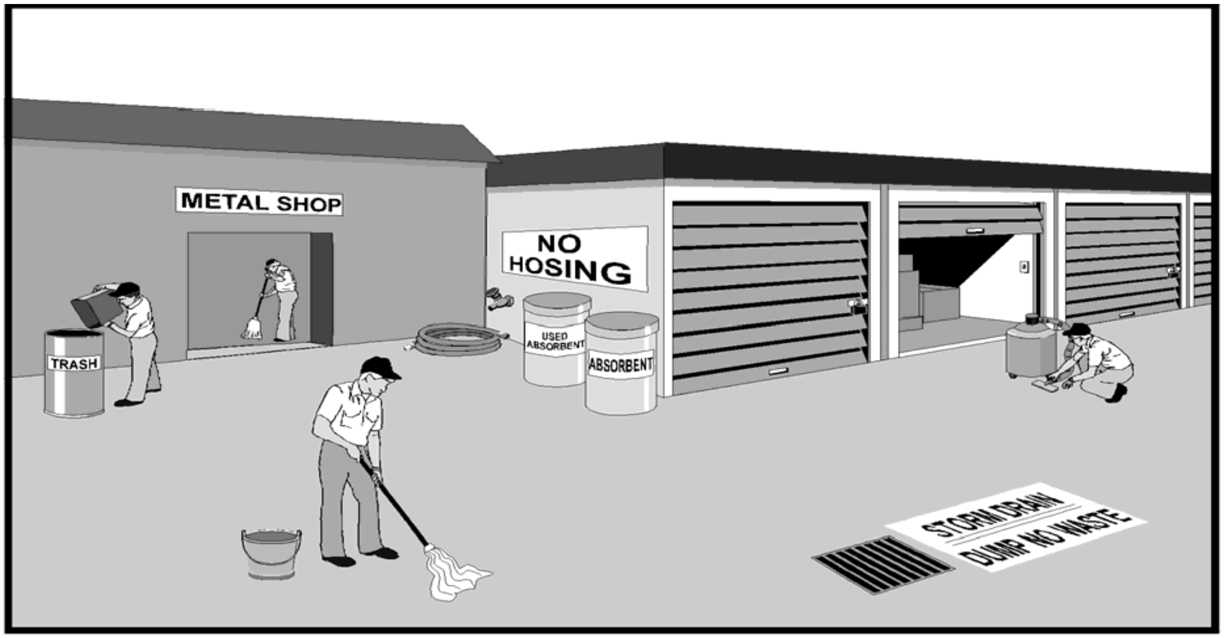
Application Guidance: As needed.

Training: N/A

Effectiveness and Cost: Effectiveness and costs will vary depending on the application.

Limitations: None

BMP 004 - AVOID HOSING DOWN THE SITE



Description of Potential Pollutant and Source: Cleaning work sites by hosing down causes wash water to transport pollutants to the storm drain where it can be exposed to storm water.

Description of BMP: Use dry methods to clean work sites. Dry methods include sweeping or using damp rags or mops. If possible or practical, hoses will be removed. If hosing down is unavoidable, the downstream drain will be temporarily plugged as described in the following BMPs:

- BMP 023 - Place portable Rubber Mats Over Storm Drain Inlets
- BMP 024 - Insert Filter in Catch Basin
- BMP 025 - Place Absorbent Blankets in Catch Basin

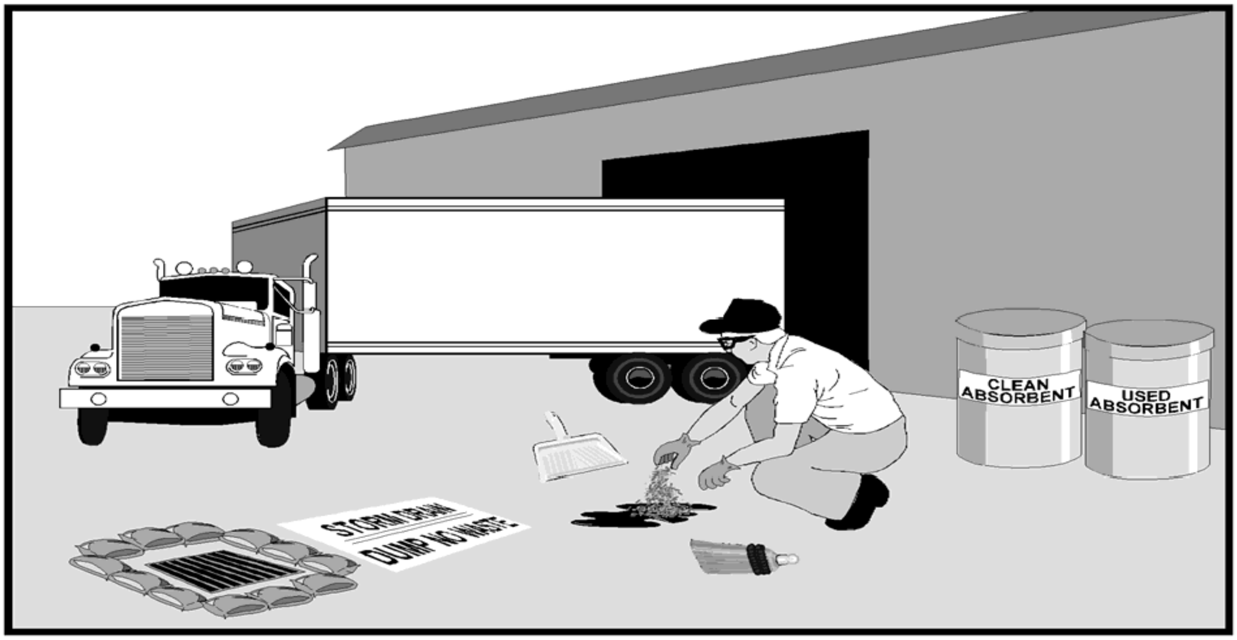
Application Guidance: Methods of dry cleaning will be used whenever possible at all workstations, loading/unloading sites, storage areas, and parking lots.

Training: New personnel will be notified of the policy and signs will be posted. If possible or practical, hoses will be removed.

Effectiveness and Cost: Eliminating hosing down is a highly effective, low-cost BMP.

Limitations: None

BMP 006 - CONTROL SPILLS



Description of Potential Pollutant and Source: Spills of significant materials may be exposed to storm water and transported to storm drains and/or receiving waters.

Description of BMP: Follow safety data sheets (SDS) for handling, storage, and cleanup of all significant materials to reduce the potential for spills.

Any spill, large or small, of significant materials will be controlled to prevent pollutants from being transported to storm drains and/or receiving waters. Appropriate spill control material will be kept on site. Smaller spills will be contained using absorbent material such as kitty litter, straw, or sawdust. Drums of absorbent material will be easily accessible and clearly marked, and containers for spent absorbent material will be readily available. Spent absorbent material will be managed appropriately and disposed of in accordance with applicable regulations. Larger spills will be controlled using spill kits, brooms, and other response equipment commensurate with the size of the spill. The methods outlined in the Activity’s spill prevention and response plans (BMP 112) for hazardous materials will be followed for spills of any potential storm water pollutants. The date, time, nature and volume of material spilled, and cleanup measures taken will be recorded for all spills and kept as part of the SWPPP.

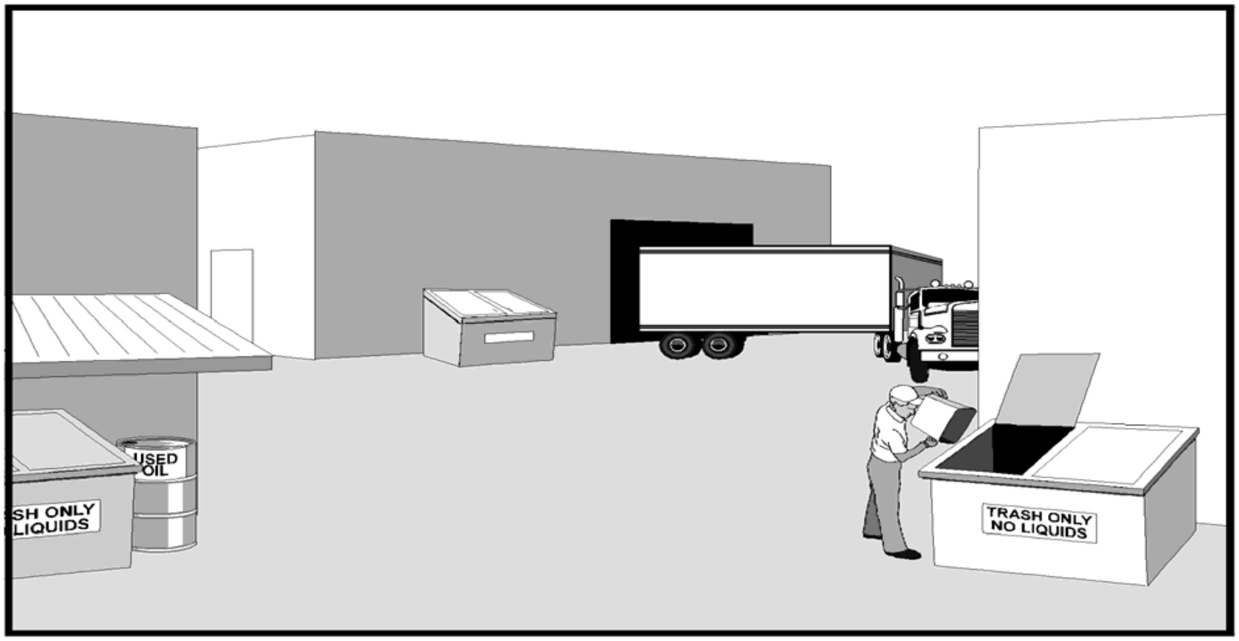
Application Guidance: Controlling spills will be practiced under all working conditions.

Training: Personnel will be trained in spill prevention and response procedures including the use of personal protection equipment (gloves, eye and face protection, etc.). This will include what absorbent or equipment to use, how to use the absorbent or equipment, where to find it, how to dispose of the spent absorbent or other material, and who to notify in the event of a spill.

Effectiveness and Cost: Spill control is a moderately effective, low-cost BMP.

Limitations: None

BMP 007 - PLACE TRASH RECEPTACLES AT APPROPRIATE LOCATIONS



Description of Potential Pollutant and Source: Improperly located or insufficient numbers of trash receptacles will promote poor housekeeping practices. This will increase the opportunity for pollutants from all source areas to reach storm water.

Description of BMP**:** Properly located and sufficient numbers of trash receptacles will promote the proper disposal of waste materials. This reduces the opportunity for pollutants to reach storm water. Trash receptacles will be easily accessible for personnel.

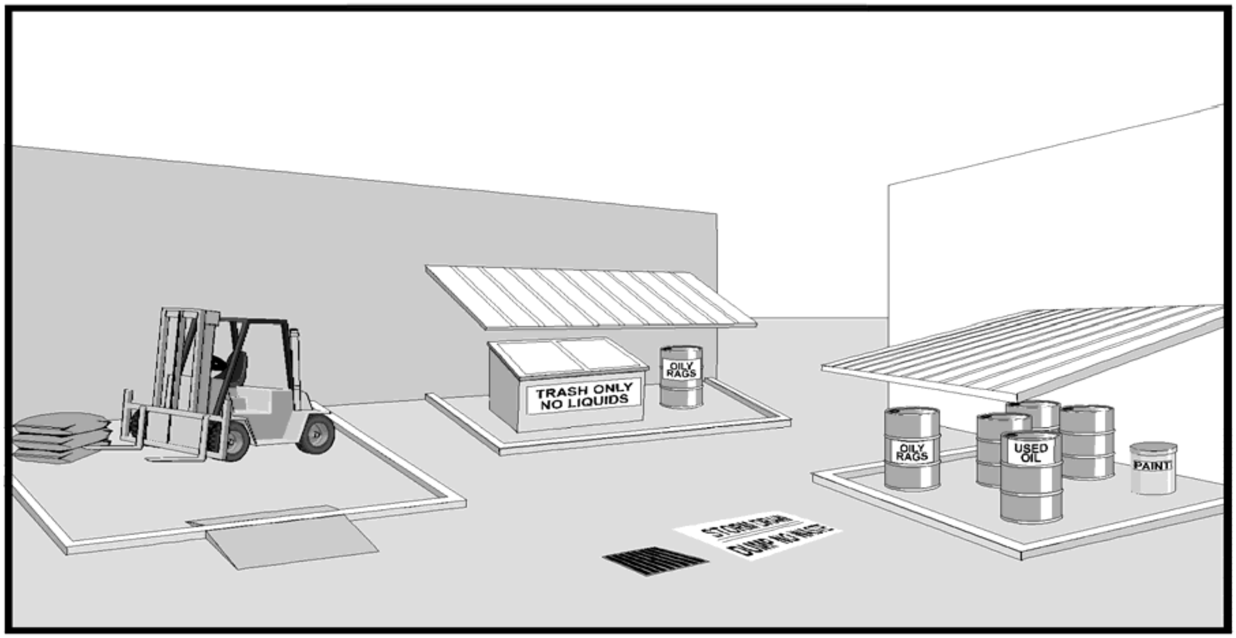
Application Guidelines: Placement of trash receptacles at appropriate locations will always be practiced.

Training: Personnel will be trained as to the location of trash receptacles.

Effectiveness and Cost: Appropriately located trash receptacles are an effective, low-cost BMP.

Limitations: None

BMP 012 - CONSTRUCT BERM OR DIKE AROUND CRITICAL AREAS



Description of Potential Pollutant and Source: Critical areas are source areas that have a high likelihood for the release of pollutants. This includes material handling areas, material storage areas, and equipment repair and maintenance areas. As a result of spills and leaks or exposure to storm water, pollutants can flow from critical areas into the storm water system. In addition, small spills and leaks can accumulate on the surface area and be washed away by storm water.

Description of BMP: Construct a raised berm or dike around critical areas. This will provide secondary containment and prevent any spills or leaks from leaving the area. This secondary containment will also be provided where mobile tankers containing fuel are customarily stationed. Construct a ramp to allow vehicle access into the area. (Note: double walled tanks do not require this BMP. Also, 40 CFR 112.7 requires bulk petroleum storage tanks be provided with secondary containment.) A drain valve will be installed and procedures to drain storm water from the bermed area will be posted (see BMP 014).

Application Guidance: Install as needed.

Training: N/A

Effectiveness and Cost: This is a highly effective BMP. The cost will vary depending on the size of the fueling operation.

Limitations: The size of some tank and fueling operations areas could make this BMP relatively expensive.

BMP 033 - CHECK VEHICLES AND EQUIPMENT FOR LEAKS

Description of Potential Pollutant and Source: Vehicles, aircraft, or equipment entering or stored at a maintenance facility may be leaking a variety of fluids (fuel, oil, antifreeze, freon, etc.). These materials can be exposed to storm water.

Description of BMP: Inspect all vehicles and equipment at the site, whether incoming, parked, stored, or salvaged, for oil and fluid leaks. Drivers of fleet vehicles, such as delivery trucks, will also check under their vehicles each morning for fluid leaks. If leaks are present, drip pans will be placed under the vehicle or equipment. Once the vehicle is removed from the site, the former parking area will be inspected for stains, and these stains will be cleaned using rags or dry solvents.

Application Guidance: Any vehicle or equipment coming in for repairs, painting, or storage will be inspected for leaks. Fleet vehicles will be inspected each morning. Vehicles that are parked, stored, or salvaged will be provided with drip pans, as will tanker rail cars waiting to be unloaded. The frequency for implementing this BMP has been provided as general guidance. However, a facility operator may wish to establish a more suitable frequency. This will require SWPPP implementors to make judgements based on facility operations and conditions. To assign a frequency other than what has been suggested (i.e., more or less frequent), the following criteria will be considered and rated either High, Medium, or Low. If many of the criteria are assigned a High rating, the frequency may be increased. Similarly, if many criteria are assigned a Low rating, the frequency may be decreased. The goal of implementing this BMP is to minimize exposure of pollutants to storm water.

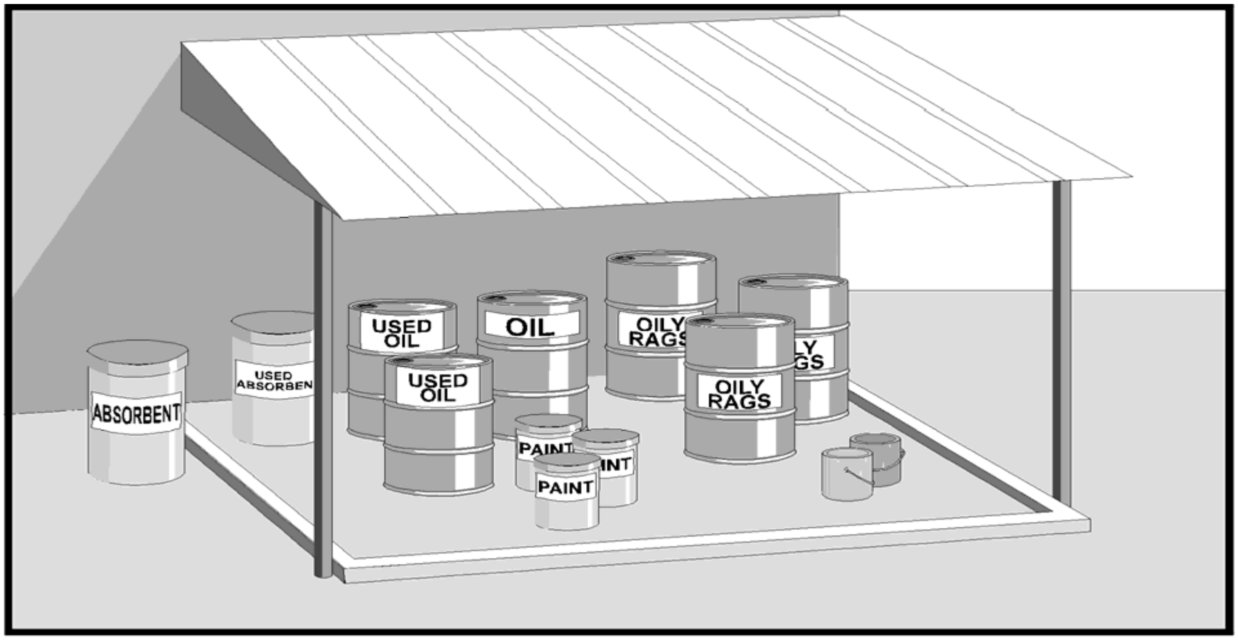
CRITERIA	Rating H=High M=Medium L=Low
Probability of exposure of significant materials to storm water	
Old age or poor condition of equipment and vehicles	
Evidence of exposure (e.g., stains on pavement)	
Proximity of source area to outfall or receiving water	
Sensitivity of receiving water to potentially exposed significant materials (e.g., waters with beneficial uses such as human contact, recreation, significant species habitat, etc.)	

Training: Signs will be posted to remind personnel of proper procedures.

Effectiveness and Cost: Checking for leaks is a moderately effective, low-cost BMP.

Limitations: None

BMP 061B - STORE LIQUIDS AND SIGNIFICANT MATERIALS WITHIN A BUILDING OR COVERED AREA



Description of Potential Pollutant and Source: Many significant materials may be leaked or spilled during storage, handling, or transport. If significant materials are stored outside, in covered areas, these materials can be exposed to storm water, which can transport the leaked or spilled material into the storm drain system.

Description of BMP: To the extent practical, store significant materials within a building or covered area. The materials will be stored on an impervious surface, such as a concrete pad. Rainfall runoff from the pad will be directed to a storm water treatment facility or contained. Leaks and spills will be cleaned up as soon as possible using rags or dry absorbents (see BMP 006). Used rags and absorbents will be disposed of properly. Any wash water from cleaning the floor will be disposed of in the sanitary sewer (see BMP 042).

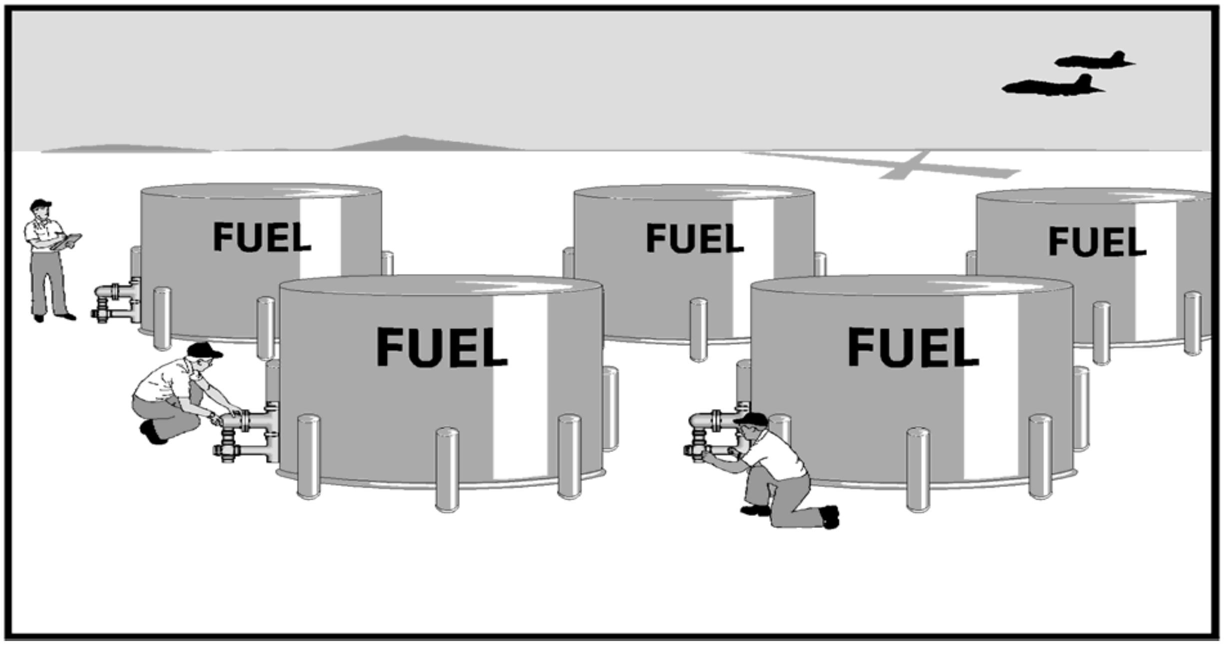
Application Guidance: All significant materials will be stored within a building or covered area.

Training: Personnel will be trained to store significant materials in designated areas.

Effectiveness and Cost: This is a moderately effective BMP. The cost will vary based on whether a building for storing the substances is available.

Limitations: None

BMP 071- KEEP TANKS, PIPING, AND VALVES IN GOOD CONDITION



Description of Potential Pollutant and Source: Tanks, piping, and valves may leak fuel or other significant materials due to corrosion, loose fittings, poor welding, or improperly or poorly fitted gaskets. This can expose these materials to storm water, which can transport them to storm drains and/or receiving waters.

Description of BMP: Keep tanks, piping, and valves in good working condition. Tanks, piping, or valves which are leaking will be repaired or replaced.

Application Guidance: Tanks, piping, and valves will be inspected monthly and kept in good condition at all times. If applicable, preventive maintenance will be performed.

The frequency for implementing this BMP has been provided as general guidance. However, a facility operator may wish to establish a more suitable frequency. This will require SWPPP implementors to make judgements based on facility operations and conditions. To assign a frequency other than what has been suggested (i.e., more or less frequent), the following criteria will be considered and rated either High, Medium, or Low. If many of the criteria are assigned a High rating, the frequency may be increased. Similarly, if many criteria are assigned a Low rating, the frequency may be decreased. The goal of implementing this BMP is to minimize exposure of pollutants to storm water.

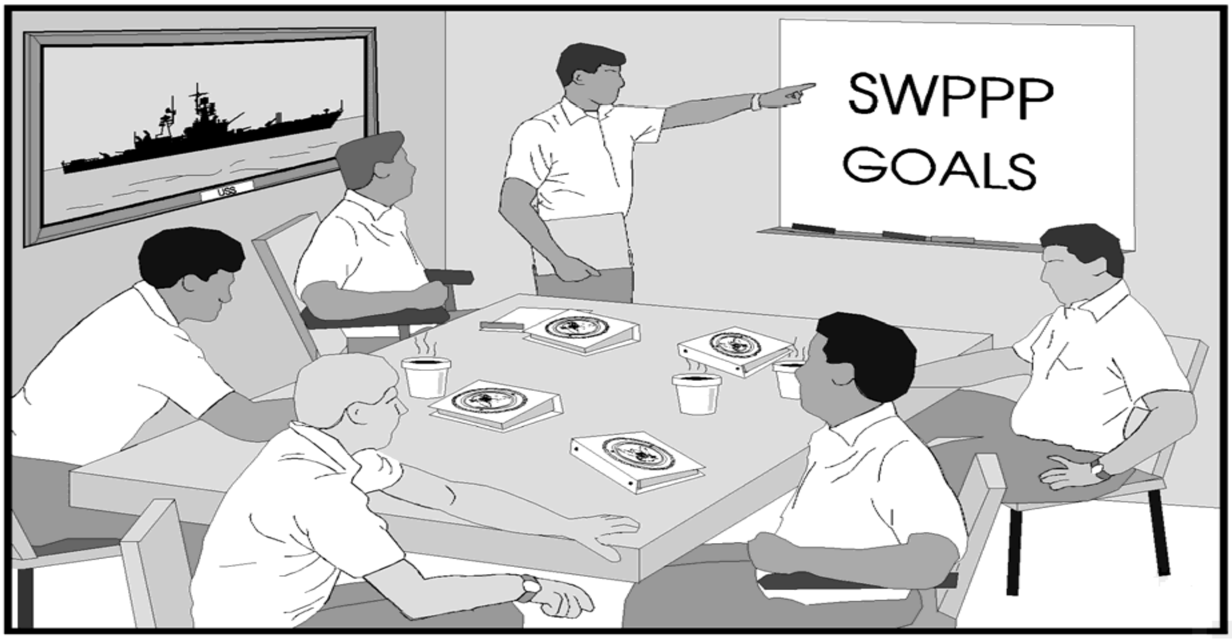
CRITERIA	Rating H=High M=Medium L=Low
Probability of exposure of significant materials to storm water	
Quantity of significant materials potentially exposed	
Toxicity of significant materials potentially exposed	
Frequency of use of tanks, piping, and valves	
Intensity of use of tanks, piping, and valves	
Old age or poor condition of tanks, piping, and valves	
Evidence of exposure (e.g., stains on ground surface)	
Proximity of source area to outfall or receiving water	
Sensitivity of receiving water to potentially exposed significant materials (e.g., waters with beneficial uses such as human contact, recreation, significant species habitat, etc.)	

Training: Personnel will be trained to regularly inspect for leaks or conditions that could lead to the discharge of chemicals, or storm water contact with waste materials. Personnel will be trained to routinely inspect equipment before each use. Tanks, piping, and valves which are not frequently used, will be inspected weekly. Procedures for notifying the appropriate maintenance personnel if a leak is found, will be established.

Effectiveness and Cost: Keeping tanks, piping, and valves in good condition is a highly effective BMP. The cost of repairing or replacing piping and valves is typically low. The cost of repairing or replacing tanks will vary based on the size of the tank and its present condition.

Limitations: None

BMP 113 - CONDUCT PERSONNEL TRAINING REGARDING THE SWPPP



Description of Potential Pollutant and Source: When properly trained, personnel are more capable of preventing spills, responding safely and effectively to an accident when it occurs, and recognizing situations that could lead to storm water contamination.

Description of BMP: Train personnel at all levels of responsibility in the components and goals of the SWPPP.

Application Guidance: Training will be conducted quarterly and at new personnel orientations.

Training: Training will address each component of the SWPPP, including how and why tasks are to be implemented. Topics will include:

- Good housekeeping
- Material management practices
- Spill prevention and response

Effectiveness and Cost: This is a highly effective, moderate-cost BMP.

Limitations: None

APPENDIX B

ROUTINE FACILITY INSPECTION CHECKLIST

Routine Facility Inspection Checklist

Activity Name: ______________________ **Date of Inspection:** ______________________

Inspector(s): ______________________ **Facility Name/Number:** ______________________

Column 1	Column 2	Column 3	Column 4	Column 5	
Source Area	BMP Number and Title	Status: F, P, N, NA[1]	Briefly Describe Effectiveness (Good or Other [describe])	Corrective Measures	
				What	By When

Note 1: F – Fully implemented, P – Partially implemented, N – Not implemented , NA – Not Applicable

APPENDIX C

QUARTERLY VISUAL ASSESSMENT CHECKLIST

Quarterly Visual Assessment Checklist

Facility ID and Location: ______________________

Date: ____________________

Sampler Name (Printed): Signature:

_____________________________________ ____

Time of Rainfall Begin: ________________ Time of Rainfall End: ____________________

Time of Flow Begin: ________________ Time of Flow End: ____________________

Rainfall event more than 72 hours since last event? Rainfall Event Total: ____________________

Yes / No

Sample: sample in a clean, colorless glass or plastic container, and examined in a well-lit area

On samples collected within the first 30 minutes of an actual discharge from a storm event

Sample Characteristics:

Color: ____________________ Floating Solids: ____________________________

Odor: ____________________ Settled Solids: ____________________________

Clarity: ____________________ Suspended Solids: ____________________________

Oil Sheen: ____________________ Foam: ____________________________

Other Obvious Indicators of Storm Water Pollution

(describe): ____

Nature of the discharge (i.e., runoff):

Results of observations of the storm water discharge:

Probable sources of any observed storm water contamination:

If applicable, why it was not possible to take samples within the first 30 minutes:

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

APPENDIX D

CORRECTIVE ACTION LOG

Corrective Action Log

Use this form to document SWPPP corrective actions. This form is to be completed by the Environmental Compliance Coordinator (ECC) or a person designated by ECC and submitted to the MCBH Storm Water Program Manager. The Storm Water Program Manager is responsible for any notification to the State of Hawaii Department of Health (DOH), if required.

A corrective action is defined as an action taken to:

a) **Repair, modify, or replace any storm water control used at the site;**
b) **Clean up and properly dispose of spills, releases, or other deposits; or**
c) **Remedy a permit violation.**

1. Corrective Action Triggers

The following events trigger a corrective action to be taken (this triggering condition is to be documented *within 24 hours* of discovering the occurrence):

a) A required storm water control was never installed, was installed incorrectly, or is not in accordance with the requirements in the SWMP Plan.
b) A member of the **Storm Water Pollution Control Team** becomes aware that the storm water controls installed and being maintained are not effective enough for the discharge to meet applicable water quality standards or applicable requirements in the MCBH SWMP Plan. The facility ECC shall notify the Storm Water Program Manager immediately. The Storm Water Program Manager will notify DOH *by the end of the next work day*.

1.1 Log Notifications:

Date/time Storm Water Program Manager notified by ECC: ________________________

Date/time DOH notified by Storm Water Program Manager: ________________________

1.2 Describe Discharge:

Indicate which one of the following prohibited discharges is occurring or has occurred:

- ☐ Wastewater from washout of concrete
- ☐ Wastewater from washout and cleanout of stucco, paint, form release oils, curing compounds, or other construction materials
- ☐ Fuels, oils, or other pollutants used in vehicle and equipment operation and maintenance
- ☐ Soaps, solvents, or detergents used in vehicle and equipment washing
- ☐ Toxic or hazardous substances from a spill or other release
- ☐ Other, Explain: ____

2. Requirements for Taking Corrective Actions

The ECC shall complete corrective actions in accordance with the deadlines specified below. In all circumstances, site personnel shall *immediately* take all reasonable steps to minimize or prevent the discharge of pollutants until a permanent solution is installed and made operational, including cleaning up any contaminated surfaces so that the material will not discharge in subsequent storm events. *Immediately* means the same day the condition is discovered, unless it is too late in the day, in which initiation of corrective action must begin on the following work day.

Following any of the above triggering events, the ECC shall install a new or modified control and make it operational, or complete the repair, by *no later than 7 calendar days from the time of discovery*. If it is not feasible to complete the installation or repair within 7 calendar days, the ECC shall document and submit to the Storm Water Program Manager, for their agreement, why it is not feasible to complete the installation or repair within the 7-calendar day timeframe and document a schedule for installing the storm water control and making it operational as soon as practicable after the 7-day timeframe.

If the issue is not adequately addressed within 7 calendar days or the agreed upon timeframe, enforcement procedures will be initiated. Unaddressed issues will be escalated through the chain of command. The MCBH Environmental Compliance and Protection Division Director will give the responsible party a formal notice with an appropriate deadline for action. If the problem remains unchanged, the situation will be brought to the attention of the next higher authority. The ultimate penalty for non-compliance of MS4 Permit regulations is eviction or discharge of the responsible party from MCBH. This is placed at the discretion of the Base Commander. See the Enforcement Response Plan in Appendix 3-6 of the SWMP Plan for further information on MCBH's enforcement policies.

3. Corrective Action Report

Within 24 hours of discovering the occurrence of one of the triggering conditions in SWPPP Section 4.1 at the site, the ECC must complete the following:

3.1 Describe the triggering condition:

____
____
____
____

3.2 Record the date/time of the condition identified. How was the condition identified?

____
____
____
____

3.3 Describe the corrective action taken:

____
____
____

Date/time installation or repair was completed:
(or date/time the prohibited discharge ceased) ____

Or describe why it is not feasible to complete installation or repair within 7 calendar days and detail a proposed schedule (if applicable)

____
____
____

4. Resolution of the Corrective Action Trigger

Within 7 calendar days of initiating the Corrective Action Report, the ECC must complete a report of the following:

4.1 Follow-up Actions

Describe any follow-up actions taken to review the design, installation, and maintenance of storm water controls, including the dates such actions occurred:

____
____
____

4.2 Storm Water Control Modifications

Provide a summary of storm water control modifications implemented. Include a schedule of activities required to implement changes and the date the modifications were completed or will be completed:

____
____
____

5. SWPPP Modification Due to Corrective Actions

Where corrective actions result in changes to any of the storm water controls or procedures documented in the SWPPP, modify the SWPPP accordingly *within 7 calendar days* of completing corrective action work.

Are modifications to the SWPPP necessary? ❑ Yes ❑ No

Date modifications to the SWPPP shall be completed _______________

6. Corrective Actions Required by DOH

The facility shall comply with any corrective actions required by DOH as a result of permit violations found during an inspection by DOH or the Environmental Protection Agency (EPA).

Was the Corrective Action triggered by a DOH/EPA inspection?

❑ Yes ❑ No

❑ Date of DOH/EPA Inspection __________________

7. Additional Comments:

____
____

Final

STORM WATER POLLUTION PREVENTION PLAN

Storm Water Management Program Plan

Marine Corps Base Hawaii, Oahu, Hawaii

NPDES Permit No. HI S000007

SANITARY LANDFILL

Prepared by:

Marine Corps Base Hawaii

August 2022

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List of Acronyms and Abbreviations

BMP	Best Management Practice
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CWA	Clean Water Act
CWB	Clean Water Branch
DEF	Diesel Exhaust Fluid
DOH	State of Hawaii Department of Health
ECC	Environmental Compliance Coordinator
ECE	Environmental Compliance Evaluation
ECPD	Environmental Compliance and Protection Division
EPA	United States Environmental Protection Agency
HAZMAT	Hazardous Material
HAZMIN	Hazardous Material Minimization
JP-8	Jet Propellant 8
MCBH	Marine Corps Base Hawaii
MS4	Municipal Separate Storm Sewer System
MS4 Permit	Marine Corps Base Hawaii's NPDES Permit No. HI S000007
NPDES	National Pollutant Discharge Elimination System
POC	Point of Contact
SWMP	Storm Water Management Program
SWPPP	Storm Water Pollution Prevention Plan

Certification Statement

MCBH is committed to the prevention of discharges of polluted stormwater to navigable waters or the environment and maintains the highest standards for best management practices through periodic review, updating, and implementation of this Stormwater Pollution Prevention Plan (SWPPP).

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information contained therein. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Name: ______________________________ Title: ______________________________

Signature: ______________________________ Date: ______________________________

Management Review

Refer to Section 1.2 for more information on required SWPPP updates.

Review Dates	Signature	Amendment Required? (Y/N)
_____________	___________________	__________
_____________	___________________	__________
_____________	___________________	__________
_____________	___________________	__________
_____________	___________________	__________
_____________	___________________	__________

1 Introduction

As part of Federal regulations administered through the Clean Water Act (CWA), the State of Hawaii, Department of Health (DOH) has issued the National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4) Permit No. HI S000007 (referred to herein at the “MS4 Permit”) to Marine Corps Base Hawaii (MCBH). The MS4 Permit requires that MCBH provide all existing industrial facilities, identified in MCBH’s MS4 Permit application, and any newly identified industrial facilities, submitted to DOH using the “MS4 NPDES Individual Permit – Industrial Storm Water Discharge Notification Form,” with a Storm Water Pollution Prevention Plan (SWPPP) for storm water associated with industrial activities.

The purpose of the regulations is to protect water quality by reducing the amount of pollutants in storm water runoff caused by industrial activities.

1.1 SWPPP Implementation

The storm water management controls of this plan will become MCBH procedure for the applicable industrial facility. An up-to-date copy of the SWPPP shall be maintained on site and at the MCBH Environmental Compliance and Protection Division (ECPD). Management staff, maintenance personnel, contractor staff, and other personnel involved in onsite industrial activities, will be knowledgeable of the plan and follow the guidelines set forth in it, in addition to any other pertinent base-wide, state and federal regulations.

Day-to-day implementation of the SWPPP is primarily the responsibility of the current facility Environmental Compliance Coordinator (ECC) or Point of Contact (POC) as identified in Table 2-1. Enforcement of the permit conditions and this SWPPP are ultimately the responsibility of ECPD and additional escalating levels of authority as specified in the Enforcement Response Plan developed by MCBH for its base-wide Storm Water Management Program (SWMP) Plan.

1.2 Updating the SWPPP

This SWPPP will be reviewed as needed to identify necessary changes, at a minimum of every five years. Updates may be required due to current best management practice (BMP) failures, spill events, changes in industrial activities, changes in features, corrective actions, or other necessary changes. Personnel changes to the Storm Water Pollution Control Team (Section 2.1) should be logged in Table 2-1. Storm Water Pollution Control Team Log. ECPD will be responsible for approving revisions to the SWPPP. In the event the plan is modified, a copy of the updated SWPPP will remain at ECPD and will be provided to the applicable facility. Additionally, ECPD shall document and report the SWPPP changes to the DOH, Clean Water Branch (CWB), within thirty days of when the changes arise.

2 Sanitary Landfill,

The Sanitary Landfill is located on the eastern side of MCBH, Kaneohe Bay between Lower Magazine Road to the north and Middaugh Street to the south on the eastern slope of Ulupau Crater. Daly Road is located further to the west. The facility encompasses approximately 34.1 acres and can be found in grids [redacted] and [redacted] of the MCBH Base Map, see Figure 4-1. The facility-specific map is shown on Figure 4-2. The Sanitary Landfill facility bounded by a chain-linked fence. Access to the Sanitary Landfill is located at the main gate at the east side of the facility.

2.1 Storm Water Pollution Control Team

The Storm Water Pollution Control Team consists of the Storm Water Program Manager, ECC, and the Hazardous Material (HAZMAT) and Hazardous Material Minimization (HAZMIN) team. The Storm Water Program Manager is responsible for the enforcement of the MS4 permit at all industrial sites and provides annual training to the ECC and other personnel. The ECC is the primary unit POC for storm water related items and the day-to-day environmental matters at a specific facility. ECC's are responsible for SWPPP implementation including BMP and facility inspections, storm water assessments/sampling, BMP maintenance, and corrective actions. The HAZMAT and HAZMIN team shall be contacted if assistance is needed. The role, name, phone number, and start date of individuals on the Storm Water Pollution Control Team is recorded in Table 2-1 below. In the event of personnel turnover, Table 2-1 shall be updated accordingly.

TABLE 2-1. STORM WATER POLLUTION CONTROL TEAM LOG

Role	Name	Phone	Start Date
MCBH Storm Water Program Manager	CIV Whitney Anderson	Office: 808-257-4359	6/6/22
ECC	CIV William Otto	Office: 808-257-2304	
HAZMAT/HAZMIN	CIV Tim Cawthon	HAZMAT Center Building 6409 Office: 808-257-9913 HAZMIN Center Building 6407 Office: 808-257-0770	N/A

2.2 Sanitary Landfill, Facility Activities

The Sanitary Landfill is the designated landfill for MCBH and is comprised of 3 general areas: an area of active landfill operations (active work area), a storm water infiltration / sedimentation basin, and an equipment storage area. The landfill is utilized as a disposal site for certain types of solid wastes generated at MCBH facilities including industrial areas, offices, administration facilities, and various barracks areas. Solid waste generated from military family housing areas and food wastes generated by the dining facilities are disposed of off-site by a commercial waste hauler on Mondays, Wednesdays, and Fridays. Three covered trash dumpsters are located onsite as a temporary site for smaller loads of approved trash. Green waste, wooden pallets, and miscellaneous pieces of wood are chipped using a large Morbark 1200XL chipper on Tuesday and Thursday. If available, the wooden chips are placed over the compacted trash at the end of the workday on Mondays and Wednesdays. Soil from onsite stockpiles (soil generally originates from other construction projects at MCBH) is used to cover the weeks trash on Friday afternoon.

Portable windscreens are located upwind of the area where trash is actively being compacted. Large nets located immediately downwind of this area act as portable "trash catchers" to collect any airborne debris. A water truck is stored onsite and used as needed to minimize dust. An additional 4-foot-high metal fence at the western boundary of the active work zone is permanently installed as an additional barrier for airborne trash. Within the active work area, a containment clamshell is used to store hazardous materials for the heavy machinery such as antifreeze, diesel exhaust fluid (DEF), oil, and hydraulic fluid. A spill kit and portable toilet, secured to a concrete platform, is also located in this area. Equipment maintenance does not occur onsite except for minor activities like fluid fill ups, etc.

Three front loaders, a general tractor, and a drum compactor use Jet Propellant 8 (JP-8) and are operated onsite. The equipment is fueled about once per weeks by a fuel truck onsite. When not in use, these machines and the water truck are stored under or near the equipment storage hangar/tent located at the northwest corner of the site. Trash trucks are routinely cleaned with water near the sedimentation basin. Trash truck wash-water flows into a vegetated area at the southwest corner of the site and any small debris is immediately disposed in a trash bin in the area. At the time of inspection, a new truck wash area was in the process of being constructed directly adjacent to the western edge of the sedimentation basin. This new wash area is designed to allow wash water to flow into the sedimentation basin for infiltration.

Figure 4-2 shows the direction of storm water flow and associated monitoring points at the Sanitary Landfill. The topography of the Sanitary Landfill slopes southerly toward Middaugh Street. The northern boundary adjacent to Lower Magazine Road is bounded by a bermed vegetated area. A chain-linked fence runs along the perimeter of the landfill. Storm water runoff flows outside the bermed area and along Middaugh Street in concrete-lined channels that discharge to the sedimentation basin. Storm water runoff in the sedimentation basin either percolates into the ground or enters two concrete drainage structures (LF1 and LF2), which convey the runoff underneath Middaugh Street to discharge into Kailua Bay during large rain events. There are two designated storm water monitoring points for the Sanitary Landfill. The sampling location Outfall 01 is located at a concrete drainage structure along the southern fence line and receives water only when the overflow of the sedimentation basin discharges water. The other sampling location (Outfall 02) is at the fence line directly south of the current truck wash area. There is a substantial amount of vegetation between the truck wash area and the fence line. Coastal marine waters are located about 200 ft south of the southern facility fence line.

2.1 Sources of Pollutants

The following is an inventory of potential pollutants associated with the Sanitary Landfill:

A. Material Loading and Unloading Areas

Materials that are spilled, leaked, or lost during loading or unloading may collect on vegetated or paved surfaces and be carried away by storm runoff. Trash is taken by trucks to the landfill via the entrance from Middaugh Street and is deposited at the designated disposal area for the given day.

B. On-Site Material Storage and Disposal Practices

Leaks, drips, or spills of materials that are stored or disposed of in areas exposed to rainfall can be carried away by storm water. The Sanitary Landfill is serviced by heavy equipment on a daily basis. Waste is spread on the working surface, compacted by the loader/ bulldozer and covered with wood chips or soil depending on the day. Four covered trash dumpsters are used for temporary storage of trash. Heavy equipment is stored under cover at the storage hangar/tent when possible.

C. Outdoor Activities

Many outdoor activities at MCBH, Kaneohe Bay use materials or create wastes that have the potential to pollute storm water runoff. Outdoor activities at the Sanitary Landfill include the depositing, compacting, and covering of various solid wastes in the active work area. Trash trucks are washed on site. Heavy equipment is routinely fueled onsite using the BMPs in Table 2-2.

D. Significant Materials Inventory

The following significant materials are located at the Sanitary Landfill:

- JP-8
- Hydraulic fluid
- Antifreeze
- Motor Oil
- Household hazardous waste
- Municipal solid waste
- DEF

2.2 Potential Storm Water Pollutants

The following pollutants have been identified as having a reasonable potential to be present in storm water discharges from the Sanitary Landfill if not properly managed:

- Sediments
- Solid Waste
- Phenol
- Metals
- Nitrogen

Materials that have *not* been included as a potential storm water pollutant but have been included as part of the significant materials inventory list, are considered to present a negligible risk to storm water quality.

This is based on the nature/location of the primary activities performed with these materials and the BMPs that are in place. Material transport (loading/unloading) is not considered to be a significant threat to storm water, due to spill response procedures, training, and spill kit materials available onsite.

2.3 Best Management Practices (BMPs)

Best Management Practices (BMPs) are techniques or methods that aim to manage the quantity and improve the quality of storm water runoff from a facility or other site. Storm water BMPs intend to reduce or eliminate pollution and contaminants collected by runoff before the runoff reaches the MCBH storm water system or sensitive ecosystems such as streams, wetlands, and marine environments. The following is a summary of BMPs currently in place at the Sanitary Landfill.

A. Good Housekeeping Practices

In general, the Sanitary Landfill employs good housekeeping practices throughout its operations. Good housekeeping practices for the Sanitary Landfill, are included in Table 2-2.

B. Preventative Maintenance

Preventive maintenance is important as water pollution control measures may be of little or no use if devices and equipment have not been properly maintained. Facility personnel conduct inspection of facility equipment and storage systems on a regular basis. The preventive maintenance program involves inspections of equipment and storage systems that are exposed to storm water.

C. Visual Inspections

Visual inspection provides a valuable subjective assessment of the status of storm water management systems. They are easily performed and allow the opportunity for corrective action, if necessary. Site inspections and documentation requirements are addressed in in Section 3 of this SWPPP. MCBH HAZMIN Center staff perform hazardous material inspections monthly. Annual facility inspections are performed by EPCD as part of the MCBH Environmental Compliance Evaluation (ECE).

D. Spill Prevention and Response

Areas where significant material spill or leakage can occur are identified in Section 2.1 and shown on Figure 4-2. The storm water systems and their accompanying drainage points are also shown on Figure 4-2. Refer to Table 2-2 for BMPs related to spill preventative measures for material handling procedures, storage requirements, and equipment usage.

In the event of a hazardous substance or oil spill, the ECC and ECPD shall be notified immediately (ECPD; 808-630-8246). If the spill cannot be easily addressed using an onsite spill kit and personal protective equipment, call Fed Fire (Military 911). The spill source should be immediately controlled if it is safe to do so by closing valves, switches, and/or turning off power to a device. Then, contain the spill by using sorbent socks or absorbent materials found in a spill kit. After it has been contained, clean up the spilled material in a safe manner using dry methods. All materials should then be properly disposed of.

The locations of spill kits are shown in Figure 4-2.

E. Erosion and Sediment Controls

The actively worked area and some roads within the Sanitary Landfill have exposed dirt. However, storm water from the majority of the facility is directed to the sedimentation basin or vegetated berms (Figure 4-2) and does discharge from the facility during a typical storm event.

F. Best Management Practices to Minimize Pollutant Contact with Storm Water

Facility personnel receive annual training from ECPD at minimum, as well as an initial training for all new personnel. Training information will include the BMPs that have been developed for the facility and a general overview of the storm water program and its objectives.

Existing BMPs at the Sanitary Landfill are shown in Table 2-2 and attached as fact sheets to this SWPPP in Appendix A.

TABLE 2-2. BEST MANAGEMENT PRACTICES

BMP No.	BMP Title	Description
001	Label All Drums, Cans, Containers, Tanks, and Valves	All containers and drums are labeled.
002	Restrict Access to Area and Equipment	Area is completely enclosed by chain-linked fencing.
006	Control Spills	Any spill of significant materials is controlled immediately to prevent pollutant from being transported to receiving water. A spill kit is stored onsite.
007	Place Trash Receptacles at Appropriate Locations	Covered trash bins are located at multiple locations within the facility.
033	Check Vehicles and Equipment for Leaks	Vehicles and equipment are checked for leaks on a regular basis.
041	Wash Equipment in Designated Areas	Trash trucks and other equipment should only be washed in the designated wash area.
061B	Store Liquids and Significant Materials within a Building or Covered Area	Keep hazardous materials in a covered and contained device like clamshell.
066	Eliminate Topping off Tanks	Do not allow topping of equipment fuel tanks
068	Designate Areas for Fueling from Mobile Fuel Tankers	Fueling of equipment should be done in a designated area near a spill kit.
110	Regularly Inspect and Maintain Storm Water Conveyance System	The drainage structures located along Lower Magazine Road shall be maintained free of sediment build-up to and vegetation help prevent clogging or blockage of the drainage system.
113	Conduct Personnel Training Regarding the SWPPP	Personnel are trained regularly (initial orientation and annual refresher).

BMP No.	BMP Title	Description
124	Erosion Prevention on Temporary and Private Roads	Train site personnel on the proper construction and management of temporary soil slopes. Use gravel to reduce erosion on sloped roads.
125	Dust Control	The facility utilizes wind screens or water truck to keep dust and debris on site.
145	Vegetative Buffer Strip	Maintain vegetation buffers along perimeter fence where possible
146	Sedimentation Trap (Basin)	Remove sediment that accumulates in the sedimentation basin.
152	Temporary Storm Drain Diversion	A storm water run-on/run-off control system has been constructed at the landfill. The system includes a sedimentation basin to control storm water run-off generated within the landfill. Under typical rainfall events, storm water will be retained within the basin and allowed to evaporate and percolate into the soil.
153	Topsoiling	Daily soil cover or wood chips are applied over the solid waste material disposed of and compacted that day.

3 Inspections, Assessments and Monitoring

3.1 Routine Quarterly Site Inspections

The MS4 Permit requires a routine quarterly site inspection by a qualified person with at least one member of the storm water pollution control team participating. At least once each calendar year, the routine inspection must be conducted during a period when a storm water discharge is occurring. The site inspection is an overall evaluation of the effectiveness of the BMPs implemented at that facility. A Routine Facility Inspection Checklist (Appendix B) shall be completed during each routine site inspection and kept onsite with this SWPPP. During normal facility operating hours, inspections must be conducted of areas of the facility including, but not limited to, the following:

- Areas where industrial materials or activities are exposed to storm water;
- Areas identified in the SWPPP and those that are potential pollutant sources;
- Areas where spills and leaks have occurred in the past three years;
- Discharge points; and
- Control measures used to comply with the effluent limits contained in this permit.

3.2 Visual Assessment of Storm Water Discharges

A Quarterly Visual Assessment of storm water discharge is required for all industrial facilities at MCBH. Storm water samples for this visual assessment but must be collected in such a manner that the samples are representative of the storm water discharge from the facility. Therefore, the water sample must be collected at the designated storm water monitoring points as shown in Figure 4-2. The Quarterly Visual

Assessment checklist (Appendix C) shall be completed by the current facility ECC and kept onsite with this SWPPP.

The visual assessment must be made:

- Of a sample collected in a clean, colorless glass or plastic container, and examined in a well-lit area;
- On samples collected within the first 30 minutes of an actual discharge from a storm event. If it is not possible to collect the sample within the first 30 minutes of discharge, the sample must be collected as soon as practicable after the first 30 minutes and documented why it was not possible to take the sample within the first 30 minutes; and
- For storm events, on discharges that occur at least 72 hours (three days) from the previous discharge.

Whenever the visual assessment shows evidence of storm water pollution, corrective action procedures to remedy the pollutants must be taken and documented. Refer to Section 4 for corrective action procedures.

3.3 Storm Water Monitoring

The Sanitary Landfill is considered to be under industrial activity sector L- *Landfills, Land Application Sites, and Open Dumps*. Required storm water monitoring includes Quarterly Benchmark Sampling in addition to Annual Effluent Monitoring.

3.3.1 Quarterly Benchmark Sampling

Quarterly benchmark sampling of storm water discharge from the representative sampling locations at the Sanitary Landfill (Figure 4-2) will be monitored in accordance with Table 3-1 using sampling methods described in Section 3.3.3. Benchmark samples can be collected during the same storm event as the Quarterly Visual Assessment as described in Section 3.2.

The sampling points are identified as sampling point LF-1 and the monitoring location for the sediment tire wash-off area is on the other side of the vegetated berm (Figure 4-2).

TABLE 3-1. SANITARY LANDFILL QUARTERLY BENCHMARK MONITORING REQUIREMENTS

Parameter	Units	Daily Maximum
Total Suspended Solids	mg/L	100
Total Iron	mg/L	1.0

Benchmark monitoring data are primarily for MCBH's use to determine the overall effectiveness of control measures and to assist in determining when additional corrective action(s) may be necessary. A benchmark exceedance is not a permit violation, however, if corrective action is required as a result of a benchmark exceedance, failure to conduct required corrective action is a permit violation.

Data not exceeding benchmarks: After collection of four quarterly samples, if the average of the four monitoring values for any parameter does not exceed the benchmark, MCBH has fulfilled monitoring requirements for that parameter for the permit term.

Data exceeding benchmarks: After collection of four quarterly samples, if the average of the four monitoring values for any parameter exceeds the benchmark, review the selection, design, installation, and implementation of control measures to determine if modifications are necessary to meet the effluent limits in this permit, and either:

- Make the necessary modifications and continue quarterly monitoring until four additional quarters of monitoring are completed for which the average does not exceed the benchmark; or
- Make a determination that no further pollutant reductions are technologically available and economically practicable and achievable in light of best industry practice to meet the technology-based effluent limits or are necessary to meet the water-quality-based effluent limitations, in which case monitoring must continue once per year. Furthermore, documentation of the rationale for concluding that no further pollutant reductions are achievable must be completed and all records related to this documentation shall be retained with the site SWPPP.

Control measures must be reviewed, and any required corrective action performed immediately (or document why no corrective action is required), without waiting for the full four quarters of monitoring data, when an exceedance of the four-quarter average is mathematically certain. If after modifying control measures and conducting four additional quarters of monitoring, the average still exceeds the benchmark (or if an exceedance of the benchmark by the four-quarter average is mathematically certain prior to conducting the full four additional quarters of monitoring), review of control measures must be conducted and take one of the two actions above.

Natural background pollutant levels**:** Following the first four quarters of benchmark monitoring (or sooner if the exceedance is triggered by less than four quarters of data; see above), if the average concentration of a pollutant exceeds a benchmark value, and a determination has been made that exceedance of the benchmark is attributable solely to the presence of that pollutant in the natural background, MCBH is not required to perform corrective action or additional benchmark monitoring provided that:

- The average concentration of your benchmark monitoring results is less than or equal to the concentration of that pollutant in the natural background; and
- Supporting documentation is produced with rationale for concluding that benchmark exceedances are in fact attributable solely to natural background pollutant levels. The supporting rationale must include any data previously collected (including literature studies) that describe the levels of natural background pollutants in the storm water discharge. Natural background pollutants are those substances that are naturally occurring in soils or ground water. Natural background pollutants do not include legacy pollutants from earlier activity on the site, or pollutants in run-on from neighboring sources which are not naturally occurring, such as other

industrial sites or roadways. However, the DOH may determine that MCBH is eligible to discontinue monitoring for pollutants that occur solely from run-on sources.

3.3.2 Annual Effluent Monitoring

An annual storm water discharge from the representative outfalls at the Sanitary Landfill will be monitored in accordance with Table 3-2.

TABLE 3-2. EFFLUENT LIMITATIONS FOR STORM WATER ASSOCIATED WITH THE SANITARY LANDFILL

Parameter	Units	Daily Maximum	Monthly Average
Biochemical Oxygen Demand (BOD5)	mg/L	140	37
Total Suspended Solids (TSS)	mg/L	88	27
Ammonia	mg/L	10	4.9
Alpha Terpineol	mg/L	0.033	0.016
Benzoic Acid	mg/L	0.12	0.071
p-Cresol	mg/L	0.025	0.014
Phenol	mg/L	0.026	0.015
Total Zinc	mg/L	0.2	0.11
pH	s.u.	Within the range of 6-9 standard pH units	

In the case any analyte fails to meet the daily maximum limits, the site must be evaluated, BMPs corrected, and the site shall be re-sampled to determine compliance. Annual Effluent Monitoring Samples maybe collected during the same storm event as the quarterly visual or benchmark samples.

3.3.3 Sampling Methods and Protocol

A minimum of one grab sample shall be collected from a discharge resulting from a measurable storm event. Samples must be collected within the first 30 minutes of a discharge associated with a measurable storm event. If it is not possible to collect the sample within the first 30 minutes of a measurable storm event, the sample must be collected as soon as practicable after the first 30 minutes and documentation must be kept with the SWPPP explaining why it was not possible to take samples within the first 30 minutes.

When adverse weather conditions prevent the collection of samples according to the relevant monitoring schedule, a substitute sample must be taken during the next qualifying storm event. Adverse weather does not exempt filing a benchmark monitoring report in accordance with the sampling schedule. NetDMR shall be used to report any failure to monitor using a “no data” or “NODI” code during the regular reporting period.

Monitoring requirements in this permit begin in the first full quarter following either 90 days after permit issuance or the date of discharge authorization, whichever date comes later. If the monitoring is required on a quarterly basis (e.g., benchmark monitoring), monitoring must occur at least once in each of the following 3-month intervals:

- January 1 – March 31;
- April 1 – June 30;
- July 1 – September 30;
- October 1 – December 31.

3.3.4 Storm Event Selection Criteria

MCBH's MS4 Permit No. HI S000007 requires dischargers to collect and analyze grab and composite samples by manual or automatic monitoring methods, from a measurable storm event. The permit states that a measurable storm event is defined as *a storm event that produces actual discharge from your site and that occurs at least 72 hours after any previous measurable events.*

Samples may be collected using automatic sampling devices or manually. For manual sampling, the sample bottles will be filled directly from the discharge flow, by using a peristaltic pump, or by other appropriate sample collection device.

Table 3-3 lists the specific pollutants that are required to be tested. It is important that samples be submitted by the ECC to an appropriate laboratory in specific containers and within a specific amount of time in order to achieve compliance with regulations. Specific analytical parameters and their associated sampling methods, such as container type, sample holding time and required analytical methodology, are listed below in Table 3-3.

TABLE 3-3. QUALITY ASSURANCE / QUALITY CONTROL OBJECTIVES

Parameter Name	Analytical Method	Units	Methodology	Maximum Holding Time	Preservation	Container Type/ Size
Metals	EPA 200.7, 200.8	µg/L	ICP	6 months	pH<2, HNO_3	500 mL plastic
BOD5	SM 5210B	mg/L	Electrode	48 hours	4ºC	1000 mL plastic
TSS	SM 2540D	mg/L	Gravimetric	7 days	4ºC	100 mL plastic
Semi volatile Organics	EPA 625.1	µg/L	GC/MS	7 days	4ºC	1000ml amber glass
pH	EPA 150.1	units	Electrode	ASAP	4ºC	100 mL plastic
NH4+	SM 4500 NH3 D	mg/L	Colorimetric	14 days	4ºC, pH<2, H_2SO_4	500 mL plastic

4 Corrective Actions

A corrective action is defined as any action taken, or required to be taken, to (1) repair, modify, or replace any stormwater control used at the site; (2) clean up and dispose of spills, releases, or other deposits found on the site; and (3) remedy a permit violation. Corrective actions should be documented using the Corrective Action Log (Appendix D).

4.1 Immediate Actions

If corrective action is needed, you must immediately take all reasonable steps necessary to minimize or prevent the discharge of pollutants until a permanent solution is installed and made operational, including cleaning up any contaminated surfaces so that the material will not discharge in subsequent storm events. Note: In this context, the term "immediately" requires you to, on the same day a condition requiring corrective action is found, take all reasonable steps to minimize or prevent the discharge of pollutants until a permanent solution is installed and made operational. However, if a problem is identified at a time in the workday when it is too late to initiate corrective action, the initiation of corrective action must begin no later than the following workday. "All reasonable steps" means that the permittee has undertaken initial actions to assess and address the condition causing the corrective action, including, for example, cleaning up any exposed materials that may be discharged in a storm event (e.g., through sweeping, vacuuming) or making arrangements (i.e., scheduling) for a new BMP to be installed at a later date.

4.2 Escalating Actions

If additional actions are necessary beyond those implemented or if the conditions continue to occur, additional corrective actions (e.g., install a new or modified control and make it operational, complete the repair) must be completed before the next storm event if possible, and within 14 calendar days from the time of discovery of the corrective action condition. If it is infeasible to complete the corrective action within 14 calendar days, document why it is infeasible to complete the corrective action within the 14-day timeframe and identify a schedule for completing the work, which must be done as soon as practicable after the 14-day timeframe but no longer than 45 days after discovery. If the completion of corrective action will exceed the 45-day timeframe, the minimum additional time necessary to complete the corrective action can be taken, provided that MCBH ECPD and DOH is notified of your intention to exceed 45 days. Where your corrective actions result in changes to any of the controls or procedures documented in your SWPPP, you must modify your SWPPP accordingly within 14 calendar days of completing corrective action work.

4.3 Corrective Actions for Substantially Identical Outfalls

If the event triggering corrective action is associated with an outfall that had been identified as a "substantially identical outfall", the review must assess the need for corrective action for all related substantially identical outfalls. Any necessary changes to control measures that affect these other outfalls must also be made before the next storm event if possible, or as soon as practicable following that storm event. Any corrective actions must be conducted within the timeframes discussed above.

4.4 Record of Past Spills or Leaks of Hazardous Pollutants

Table 4-1 is used to record significant spills and leaks that have occur or have occurred within three years prior to the preparation or amendment of this SWPPP. Significant spills and leaks include, but are not limited to, releases of oil or hazardous substances in excess of quantities that are reportable under CWA Section 311 (see 40 CFR 110.6 and 40 CFR 117.21) or Section 102 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 USC §9602.

At the time of this SWPPP update, there have been no past spill or leak incidents reported for the Sanitary Landfill.

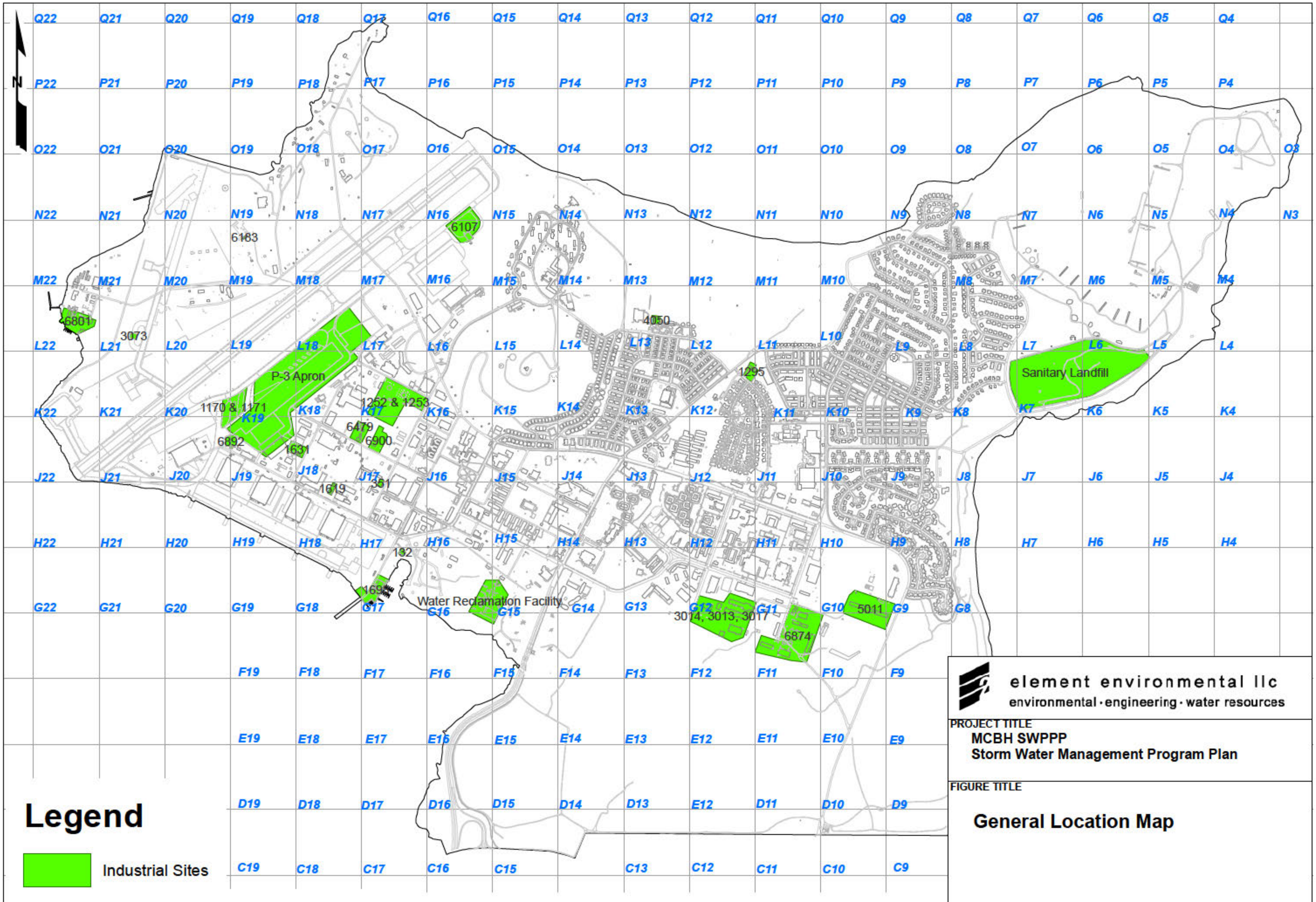
TABLE 4-1. PAST SPILLS OR LEAKS OF HAZARDOUS POLLUTANTS

Date of Incident	Brief Summary of Incident (POC Active at Time of Incident, Pollutant Type, Estimated Quantity, Location of Spill)

4.5 Record of Unauthorized Non-Storm Water Discharges

TABLE 4-2. UNAUTHORIZED NON-STORM WATER DISCHARGE EVALUATION

Date of Evaluation	Brief Summary of Evaluation (Description of the evaluation criteria, outfalls or onsite drainage points that were directly observed, action(s) taken, such as a list of control measures used to eliminate unauthorized discharge)



Legend

Industial Sites

1,800 900 0 1,800
Feet

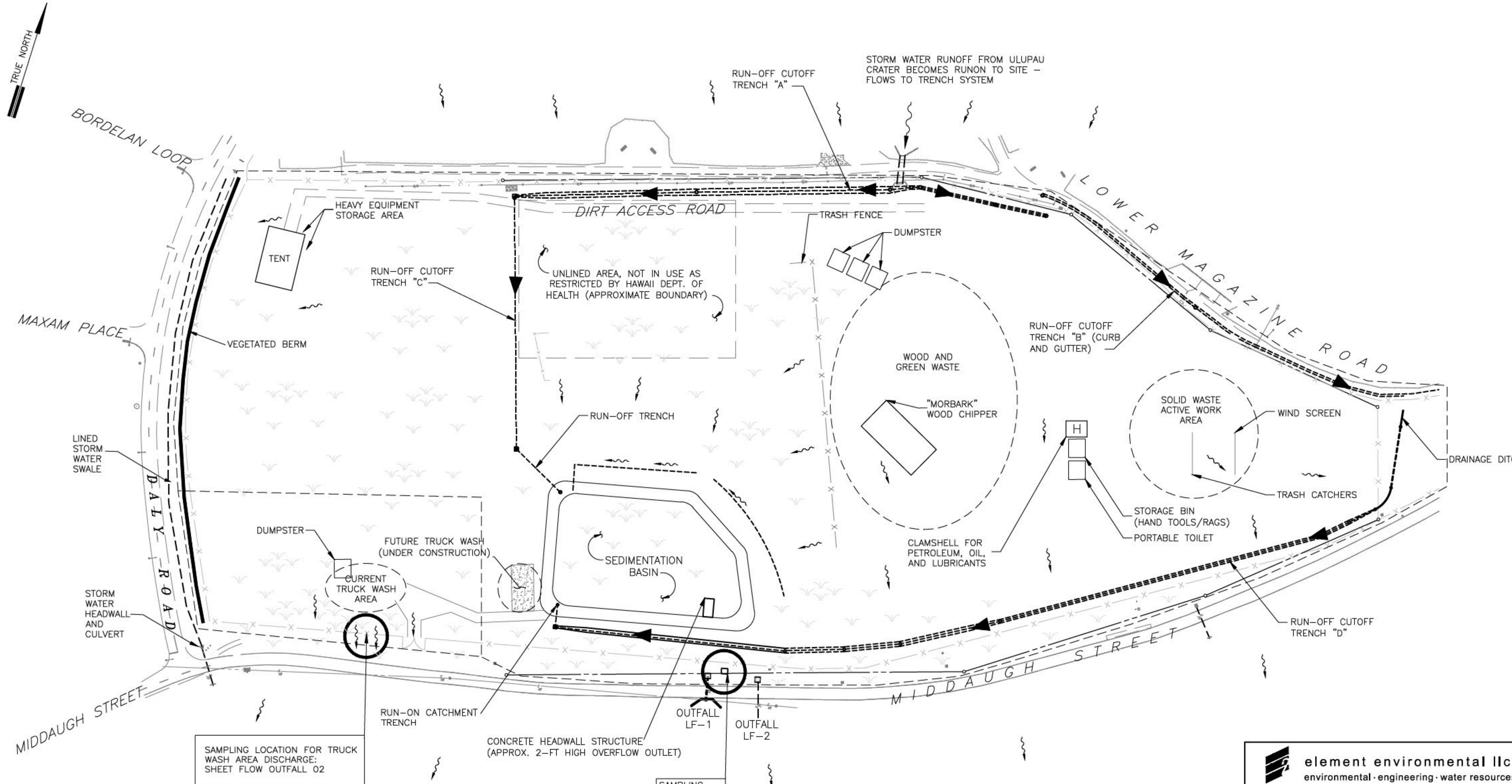
element environmental llc
environmental · engineering · water resources

PROJECT TITLE
MCBH SWPPP
Storm Water Management Program Plan

FIGURE TITLE
General Location Map

DATE
September 2022

FIGURE NO.
4-1



LEGEND

- H HAZARDOUS MATERIALS STORAGE
- FLOW ARROW
- STORM WATER CONVEYANCE
- DRAINAGE AREA BOUNDARY

NOTE:

1. STORM WATER, FROM APPROXIMATELY 34.1 ACRES ASSOCIATED WITH THE SANITARY LANDFILL, IS DISCHARGED TO KAILUA BAY VIA OUTFALLS LF-1 AND LF-2.
2. NOT TO SCALE

element environmental llc
environmental · engineering · water resources

PROJECT TITLE:
STORM WATER POLLUTION PREVENTION PLAN
MCBH, KANEOHE BAY, OAHU, HAWAII

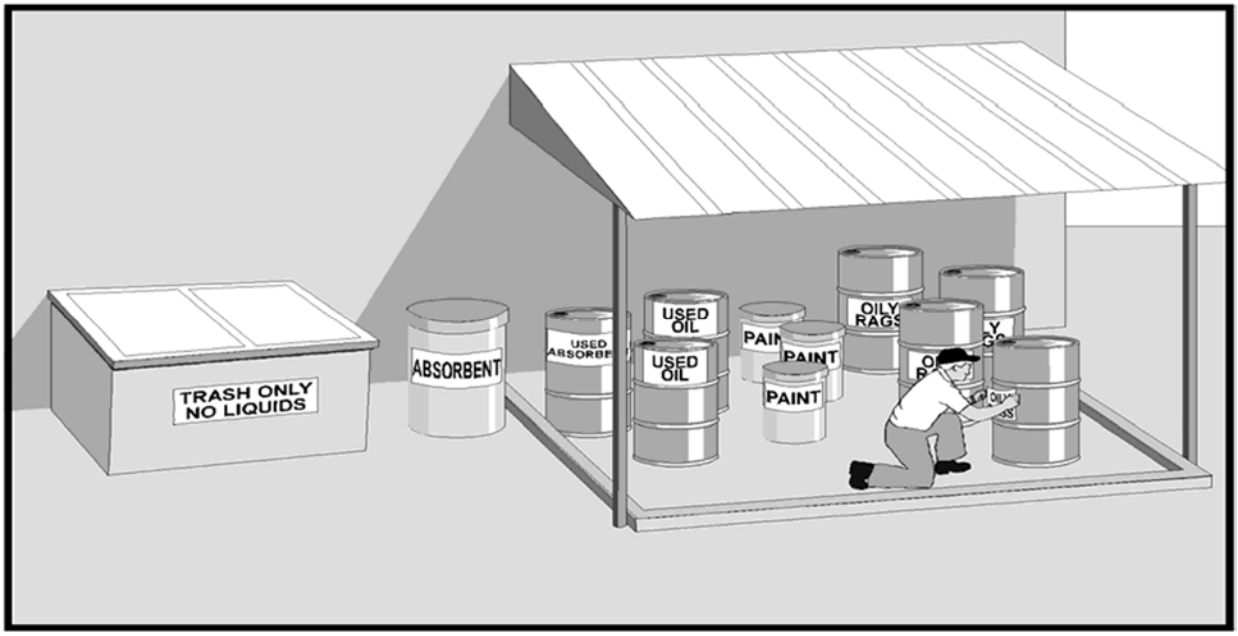
FIGURE TITLE:
SANITARY LANDFILL

DATE:	FIGURE NO.:
JULY 2022	4-2

APPENDIX A

SELECTED BMP FACT SHEETS

BMP 001 - LABEL ALL DRUMS, CANS, CONTAINERS, AND TANKS



Description of Potential Pollutant and Source: Drums, cans, and containers can be improperly managed and disposed of due to uncertainty of the container's contents. Tanks which are not labeled may result in improper use of the tank or fuel, which may result in the exposure of significant materials to storm water and/or receiving waters. Similarly, unlabeled valves may be opened without proper precaution due to lack of user information. Storm water quality will be affected if significant materials are improperly disposed to the storm drain and/or receiving waters. Lack of labeling will also make it difficult to quickly identify the type of material released so facility personnel can respond correctly. Labels also identify hazardous materials at the facility and are a good way to request caution in certain areas (e.g., drums indicating flammability).

Description of BMP: Label all drums, valves, pumps, cans, tanks, and containers to reduce the chance of misuse and eventual spills. Labeling ensures that the appropriate procedures, equipment, and storage containers are used. All containers will be labeled as to what is in them.

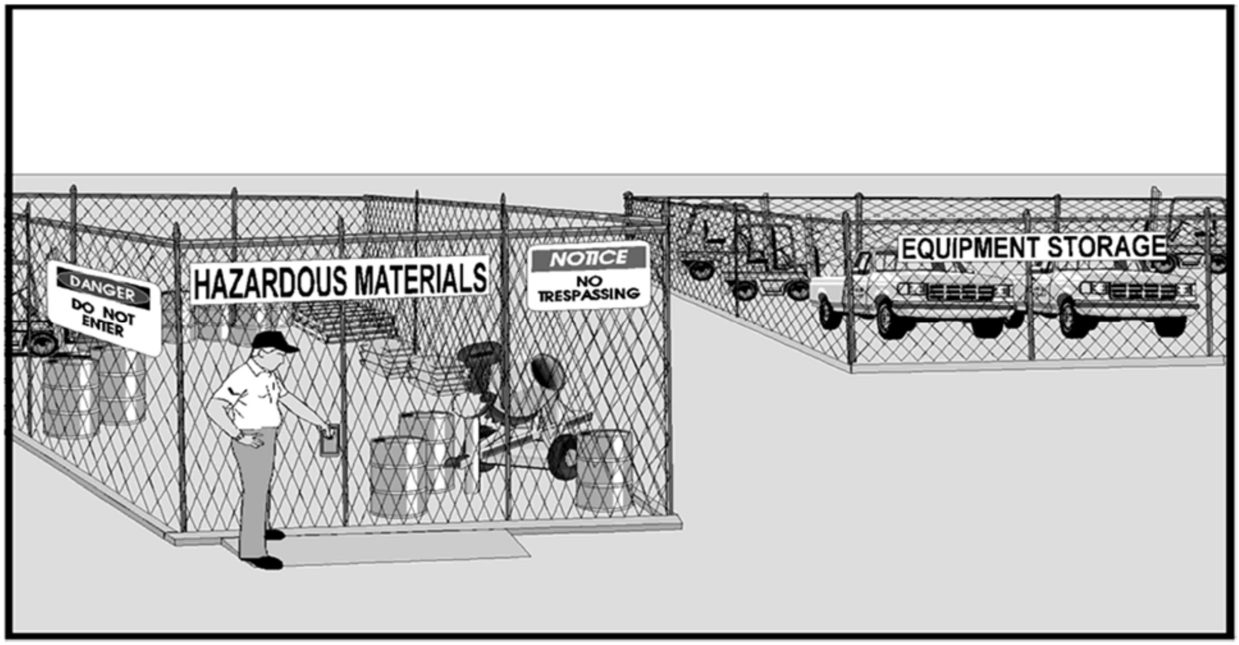
Application Guidance: As needed.

Training: N/A

Effectiveness and Cost: Effectiveness and costs will vary depending on the application.

Limitations: None

BMP 002 - RESTRICT ACCESS TO AREA AND EQUIPMENT



Description of Potential Pollutant and Source: Vandalism of vehicles and facility property may result in the release of significant materials.

Description of BMP: Provide fences and gate areas where vehicles, equipment and materials are stored and are accessible to the public to discourage trespassing. Access to equipment will also be restricted. Only authorized personnel will be allowed to operate equipment. The fences and gates will be properly maintained, and additional security measures including lighting of the area will be implemented if the fencing alone proves insufficient. Where appropriate, security guards or alarms will be used.

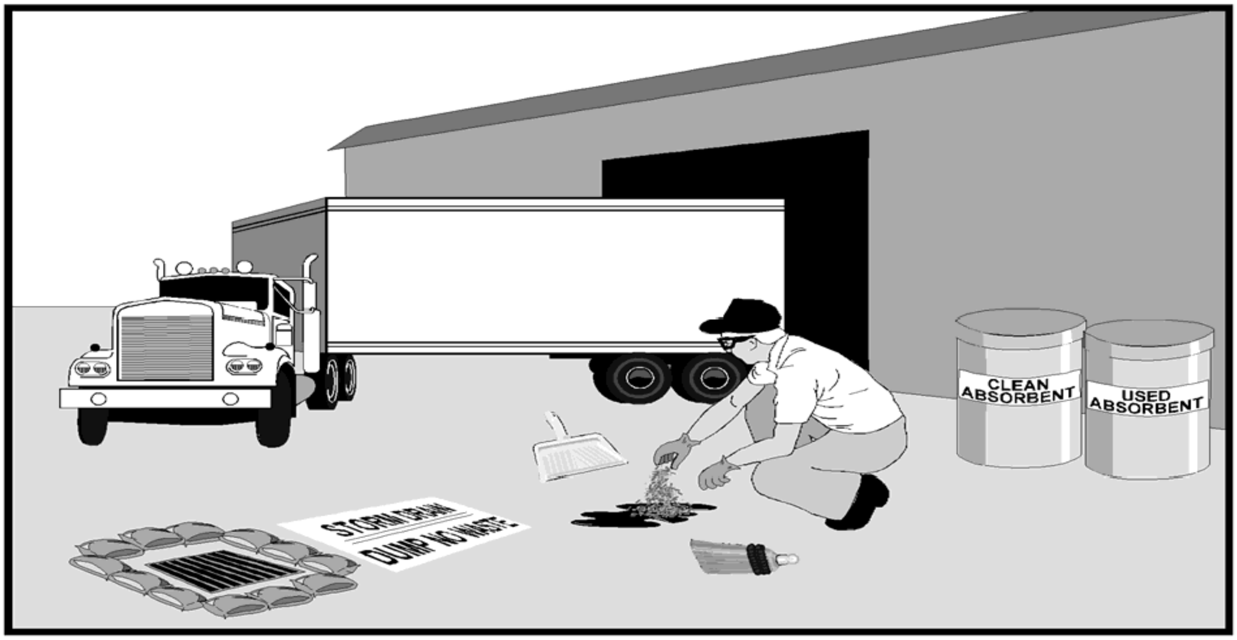
Application Guidance: As needed.

Training: N/A

Effectiveness and Cost: Effectiveness and costs will vary depending on the application.

Limitations: None

BMP 006 - CONTROL SPILLS



Description of Potential Pollutant and Source: Spills of significant materials may be exposed to storm water and transported to storm drains and/or receiving waters.

Description of BMP: Follow safety data sheets (SDS) for handling, storage, and cleanup of all significant materials to reduce the potential for spills.

Any spill, large or small, of significant materials will be controlled to prevent pollutants from being transported to storm drains and/or receiving waters. Appropriate spill control material will be kept on site. Smaller spills will be contained using absorbent material such as kitty litter, straw, or sawdust. Drums of absorbent material will be easily accessible and clearly marked, and containers for spent absorbent material will be readily available. Spent absorbent material will be managed appropriately and disposed of in accordance with applicable regulations. Larger spills will be controlled using spill kits, brooms, and other response equipment commensurate with the size of the spill. The methods outlined in the Activity's spill prevention and response plans (BMP 112) for hazardous materials will be followed for spills of any potential storm water pollutants. The date, time, nature and volume of material spilled, and cleanup measures taken will be recorded for all spills and kept as part of the SWPPP.

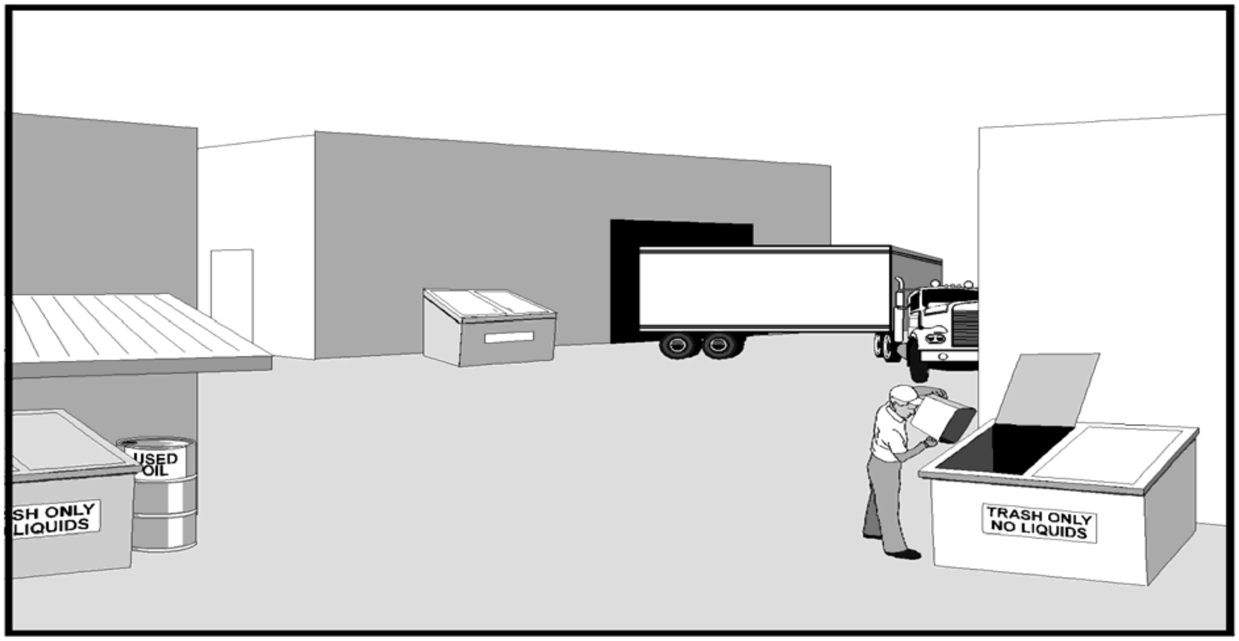
Application Guidance: Controlling spills will be practiced under all working conditions.

Training: Personnel will be trained in spill prevention and response procedures including the use of personal protection equipment (gloves, eye and face protection, etc.). This will include what absorbent or equipment to use, how to use the absorbent or equipment, where to find it, how to dispose of the spent absorbent or other material, and who to notify in the event of a spill.

Effectiveness and Cost: Spill control is a moderately effective, low-cost BMP.

Limitations: None

BMP 007 - PLACE TRASH RECEPTACLES AT APPROPRIATE LOCATIONS



Description of Potential Pollutant and Source: Improperly located or insufficient numbers of trash receptacles will promote poor housekeeping practices. This will increase the opportunity for pollutants from all source areas to reach storm water.

Description of BMP: Properly located and sufficient numbers of trash receptacles will promote the proper disposal of waste materials. This reduces the opportunity for pollutants to reach storm water. Trash receptacles will be easily accessible for personnel.

Application Guidelines: Placement of trash receptacles at appropriate locations will always be practiced.

Training: Personnel will be trained as to the location of trash receptacles.

Effectiveness and Cost: Appropriately located trash receptacles are an effective, low-cost BMP.

Limitations: None

BMP 033 - CHECK VEHICLES AND EQUIPMENT FOR LEAKS

Description of Potential Pollutant and Source: Vehicles, aircraft, or equipment entering or stored at a maintenance facility may be leaking a variety of fluids (fuel, oil, antifreeze, freon, etc.). These materials can be exposed to storm water.

Description of BMP: Inspect all vehicles and equipment at the site, whether incoming, parked, stored, or salvaged, for oil and fluid leaks. Drivers of fleet vehicles, such as delivery trucks, will also check under their vehicles each morning for fluid leaks. If leaks are present, drip pans will be placed under the vehicle or equipment. Once the vehicle is removed from the site, the former parking area will be inspected for stains, and these stains will be cleaned using rags or dry solvents.

Application Guidance: Any vehicle or equipment coming in for repairs, painting, or storage will be inspected for leaks. Fleet vehicles will be inspected each morning. Vehicles that are parked, stored, or salvaged will be provided with drip pans, as will tanker rail cars waiting to be unloaded. The frequency for implementing this BMP has been provided as general guidance. However, a facility operator may wish to establish a more suitable frequency. This will require SWPPP implementors to make judgements based on facility operations and conditions. To assign a frequency other than what has been suggested (i.e., more or less frequent), the following criteria will be considered and rated either High, Medium, or Low. If many of the criteria are assigned a High rating, the frequency may be increased. Similarly, if many criteria are assigned a Low rating, the frequency may be decreased. The goal of implementing this BMP is to minimize exposure of pollutants to storm water.

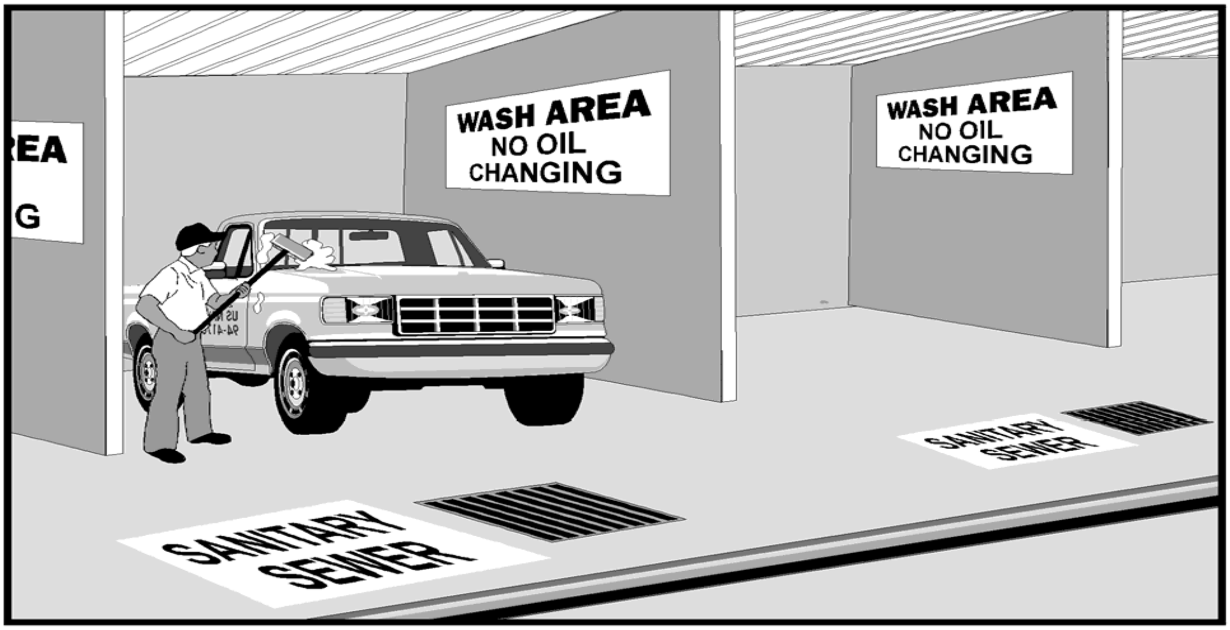
CRITERIA	Rating H=High M=Medium L=Low
Probability of exposure of significant materials to storm water	
Old age or poor condition of equipment and vehicles	
Evidence of exposure (e.g., stains on pavement)	
Proximity of source area to outfall or receiving water	
Sensitivity of receiving water to potentially exposed significant materials (e.g., waters with beneficial uses such as human contact, recreation, significant species habitat, etc.)	

Training: Signs will be posted to remind personnel of proper procedures.

Effectiveness and Cost: Checking for leaks is a moderately effective, low-cost BMP.

Limitations: None

BMP 041 - WASH EQUIPMENT AND VEHICLES IN DESIGNATED AREA



Description of Potential Pollutant and Source: Washing equipment and vehicles outdoors or in areas where wash water flows onto the ground can pollute storm water. It is difficult to control the wastewater from washing operations if it is not done in a designated area.

Description of BMP: Facilities will designate bermed wash areas that contain wash water and prevent contact with storm water. These areas will drain to the sanitary sewer (BMP 042) or to a sump. If a sump is used, wash water will be recycled.

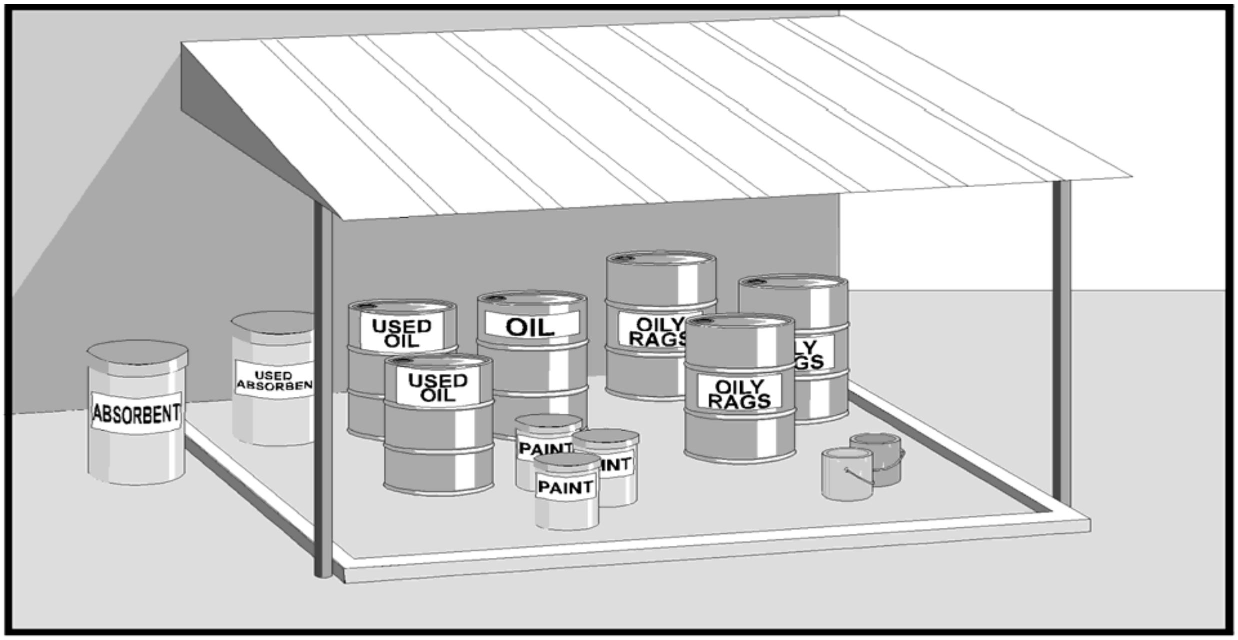
Application Guidance: This practice will be followed wherever vehicles, equipment and aircraft are washed.

Training: N/A

Effectiveness and Cost: This is a highly effective, variable-cost BMP.

Limitations: Pretreatment and monitoring of wash waster discharges to the sanitary sewer may be required. This would greatly increase the cost of this practice. The treatment plant operator will be notified and approval obtained before discharge.

BMP 061B - STORE LIQUIDS AND SIGNIFICANT MATERIALS WITHIN A BUILDING OR COVERED AREA



Description of Potential Pollutant and Source: Many significant materials may be leaked or spilled during storage, handling, or transport. If significant materials are stored outside, in covered areas, these materials can be exposed to storm water, which can transport the leaked or spilled material into the storm drain system.

Description of BMP: To the extent practical, store significant materials within a building or covered area. The materials will be stored on an impervious surface, such as a concrete pad. Rainfall runoff from the pad will be directed to a storm water treatment facility or contained. Leaks and spills will be cleaned up as soon as possible using rags or dry absorbents (see BMP 006). Used rags and absorbents will be disposed of properly. Any wash water from cleaning the floor will be disposed of in the sanitary sewer (see BMP 042).

Application Guidance: All significant materials will be stored within a building or covered area.

Training: Personnel will be trained to store significant materials in designated areas.

Effectiveness and Cost: This is a moderately effective BMP. The cost will vary based on whether a building for storing the substances is available.

Limitations: None

BMP 066 - ELIMINATE TOPPING OFF TANKS

Description of Potential Pollutant and Source: Trying to completely fill tanks after the pumps automatically shut off, or "topping off," often results in fuel spills and exposure of significant materials to storm water.

Description of BMP: Eliminate "topping off" fuel tanks. A policy will be developed to discourage "topping off" tanks. The policy will include incentives, posting signs stating the policy, or penalties.

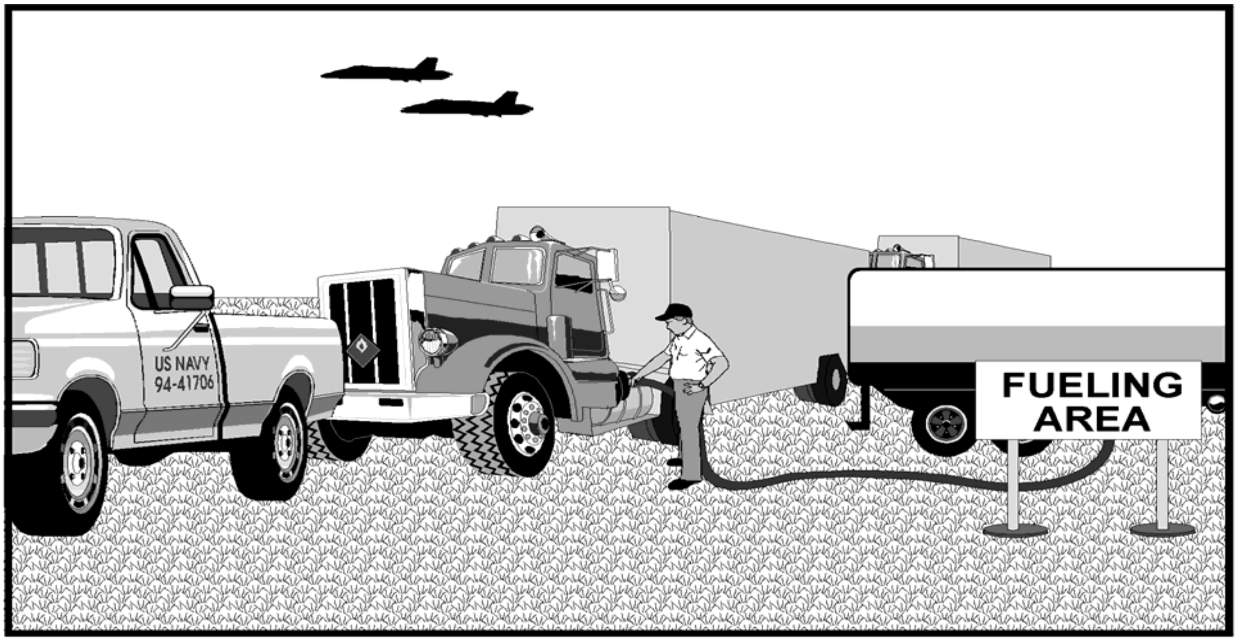
Application Guidance: This BMP will be applied to all fuel or liquid handling operations.

Training: New personnel will be informed of policy and signs should be posted as a reminder.

Effectiveness and Cost: Eliminating "topping off" is a highly effective, low-cost BMP.

Limitations: None

BMP 068 - DESIGNATE AREAS FOR FUELING FROM MOBILE FUEL TANKERS



Description of Potential Pollutant and Source: Overflows during fueling can expose significant materials to storm water. These materials can be transported to the storm drain and/or receiving waters.

Description of BMP: Designate areas for fueling to reduce the chances of fuel spills reaching storm water. Minimize the use of mobile fuel tankers. Most vehicles, with the exception of tracked vehicles such as tanks and bulldozers, should be able to travel to designated areas with minimal lost time.

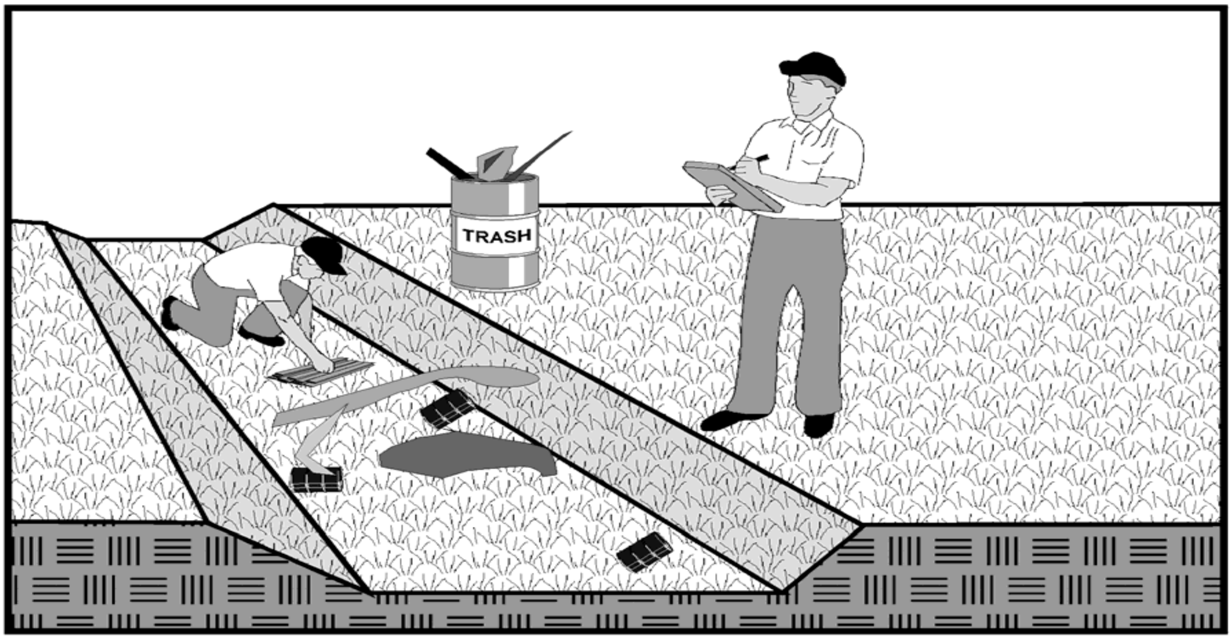
Application Guidance: Fueling areas will be designated whenever a large number of mobile equipment are being used.

Training: Personnel will be notified of the locations of designated fueling areas.

Effectiveness and Cost: Designated fueling areas are a highly effective, low-cost BMP.

Limitations: None

BMP 110 - REGULARLY INSPECT AND MAINTAIN STORM WATER CONVEYANCE SYSTEMS



Description of Potential Pollutant and Source: Over time, storm water conveyance systems may fill up with sediments and clog. Also, drainage swales may erode and be a source of sediment pollution to storm water.

Description of BMP: Inspect and maintain storm water conveyance systems on a regular basis. This will include inspection of drainage swales and outfall pipes to ensure that the area is not eroding.

Other storm water conveyance systems, such as oil/water separators, catch basins, and detention ponds, will be inspected and properly maintained.

Application Guidance: Storm water conveyance systems will be inspected monthly. The frequency for implementing of the BMP has been provided as general guidance. However, a facility operator may wish to establish a more suitable frequency. This will require SWPPP implementors to make judgements based on facility operations and conditions. To assign a frequency other than what has been suggested (i.e., more or less frequent), the following criteria will be considered and rated either High, Medium or Low. If many of the criteria are assigned a High rating, the frequency may be increased. Similarly, if many criteria are assigned a Low rating, the frequency may be decreased. The goal of implementing this BMP is to minimize exposure of pollutants to storm water.

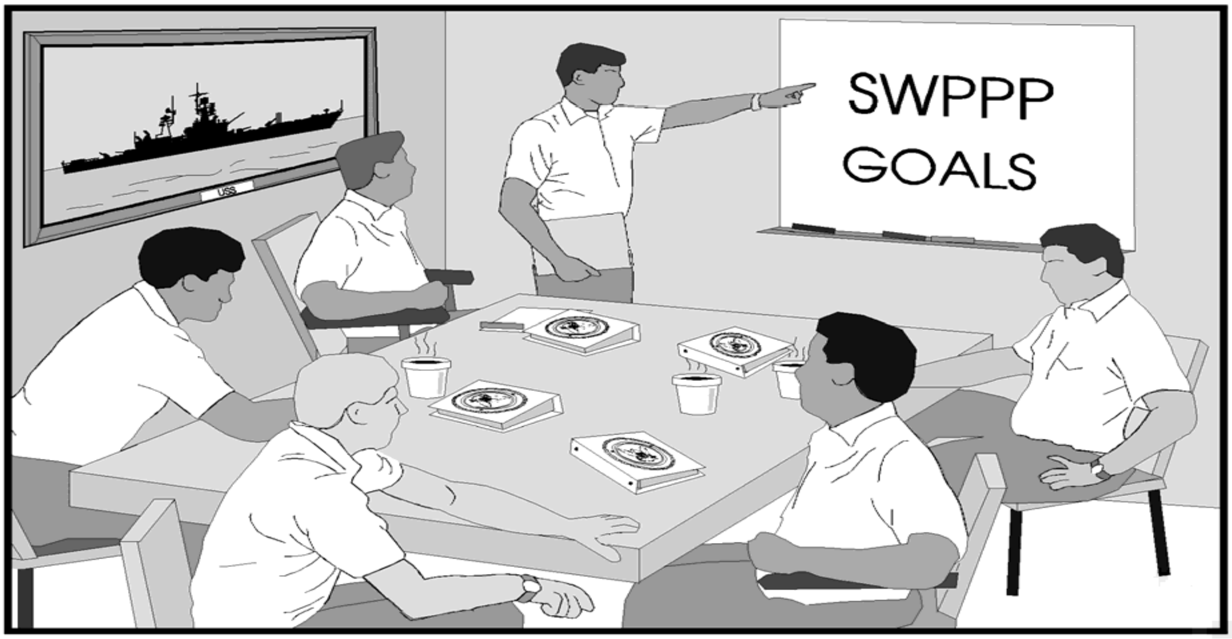
CRITERIA	Rating H=High M=Medium L=Low
Probability of exposure of significant materials to storm water in area draining to storm water conveyance system	
Quantity of significant materials potentially exposed in area draining to storm water conveyance system	
Toxicity of significant materials potentiality exposed in area draining to storm water conveyance system	
Frequency of use of significant materials potentially exposed in area draining to storm water conveyance system	
Evident of exposure (e.g., stains on pavement, evidence of significant materials in drainage system)	
Proximity of source area to outfall or receiving water	
Sensitivity of receiving water to potentially exposed significant materials (e.g., waters with beneficial uses such as human contact, recreation, significant species habitat, etc.)	

Training: The Storm Water Pollution Prevention Personnel will assign personnel responsible for inspections. Personnel will be provided a copy of a site plan showing the location of all storm water conveyance systems which need to be inspected.

Effectiveness and Cost: This is a moderately effective, low-cost BMP.

Limitations: None

BMP 113 - CONDUCT PERSONNEL TRAINING REGARDING THE SWPPP



Description of Potential Pollutant and Source: When properly trained, personnel are more capable of preventing spills, responding safely and effectively to an accident when it occurs, and recognizing situations that could lead to storm water contamination.

Description of BMP: Train personnel at all levels of responsibility in the components and goals of the SWPPP.

Application Guidance: Training will be conducted quarterly and at new personnel orientations.

Training: Training will address each component of the SWPPP, including how and why tasks are to be implemented. Topics will include:

- Good housekeeping
- Material management practices
- Spill prevention and response

Effectiveness and Cost: This is a highly effective, moderate-cost BMP.

Limitations: None

BMP #124 - EROSION PREVENTION ON TEMPORARY AND PRIVATE ROADS

Targeted Pollutants
● Sediment
◒ Phosphorus
◒ Trace metals
○ Bacteria
◒ Petroleum hydrocarbons

Physical Limits	
Drainage area	unlimited
Max slope	15%
Min bedrock depth	3 ft
Min water table	N/A
SCS soil type	ABCD
Freeze/Thaw	good
Drainage/Flood control	no

Description: Any of several measures can be used to control erosion and sedimentation originating with haul roads, detours, access roads, and other unpaved or temporary roadbeds associated with a construction project. Possible measures include:

Road Placement: Place temporary roads as far as possible away from streams, surface waters or wetlands.

Open-Top Box Culvert: A wooden culvert installed across the road grade to convey surface runoff and roadside ditch flows to the downslope side. Open-top box culverts are useful for collecting surface runoff and ditch flows and channeling this water across the road without eroding the drainage system or road surface.

Waterbar (or Cross Ditch): A cut and berm built at a downward angle across the roadway, extending from the cutbank to the opposite fill shoulder. Waterbars reduce erosion by diverting storm water runoff from the road surface and directing it to a safe discharge area.

Road Sloping: Constructing the road with an outward slope of 1 to 2 percent from the cut slope to the fill slope. Sloped roads are designed to divert surface water off the entire road surface so that water does not concentrate in any specific location.

Rolling Dip: Constructing the road with shallow, outward- sloping dips or undulations to collect surface runoff and convey it away from the road surface.

Level Spreader: A drainage outlet constructed by cutting a shallow trench at zero grade across a slope to disperse concentrated runoff. Level spreaders convert concentrated flow into sheet flow for discharge at nonerosive velocities onto areas stabilized by vegetation. By reducing runoff velocity, they help reduce erosion, enable sediment to settle out, and enhance infiltration.

Applications:

Open-Top Box Culvert: Used, as a substitute for pipe culverts, for cross drainage on lightly used, unpaved roads on steep grades (greater than 6 percent).

Waterbar: Used as a temporary or permanent drainage facility on light-use, low-maintenance, unpaved roads. Waterbars should be placed above grade changes to prevent water from flowing down steeper portions of roads or skid trails. Bars may also be placed above intersections of roads, skid trails, or landings to protect these disturbed areas.

Road Sloping: Used as a drainage measure on temporary or low-traffic haul roads where erosion of the roadbed and fill slope is unlikely due to low runoff volume or intensity.

Rolling Dip: Used as a runoff diversion measure to prevent erosion of the road surface. Rolling dips are effective on long inclines to keep storm water from flowing directly down the road, where it may cause gullying and other damage to the road surface and grade.

Level Spreader: Useful where concentrated runoff from bare ground or other unstabilized areas can be diverted onto stabilized areas under sheet flow conditions. Level spreaders are often placed at the outlets of diversion dikes or runoff interception trenches to control runoff, dissipate water velocity, and disperse the water over a broad surface area. Level spreaders are relatively inexpensive to install. They may be used on slopes of 3:1 or flatter.

Limitations:

Open-Top Box Culvert: Generally, box culverts are not required on grades of 6 percent or less and are ineffective under continuous or recurrent use where cleaning is sporadic.

Waterbar: Suitable only for light-use, low-maintenance, unpaved roads.

Road Sloping: Suitable only for low-traffic haul roads where runoff volume and intensity are low.

Rolling Dip: Not suitable on road grades steeper than 5 percent.

Level Spreader: Level spreaders are not recommended for use in most situations. They are not suitable on slopes steeper than 3:1 or where the soils are easily erodible. They should be constructed only on natural soils, not on fill material. Level spreaders cannot handle large quantities of sediment-laden storm water. If altered by erosion or other disturbance, they may "short circuit" and actually concentrate flows into small streams instead of spreading the flows into sheet flow.

Design parameters

Open-Top Box Culvert: Box culverts can be built from logs; lumber; discarded guardrail; or commercial, corrugated steel. They are installed at a skewed angle downgrade across the roadway, with the discharge end extending 6 to 12 in (150 to 300 mm) beyond the surface of the roadbed.

Spacing between culverts should be in accordance with recommended cross drainage spacing in Table 1. Where recommended spacing is less than 33 ft (10 meters), the road should be paved with gravel or crushed rock.

Waterbar: Waterbars are generally constructed using a blade-equipped tractor or by hand. The size of the waterbar depends on the amount of precipitation in the area, the soil erodibility, and anticipated traffic.

- The waterbar should extend from the cutbank side of the road completely across to the fillslope side.
- Cut dimensions: Up to 16 in (400 mm) deep across road, 8 to 16 in (200 to 400 mm) deep at outlet, 3 to 4 ft (1.0 to 1.2 meters) wide.
- Berm dimensions and orientation: 1 to 2 ft (300 to 600 mm) high 5 in (150 mm) minimum height,

skewed at angle of 30^{o} to 40^{o} across road.

- Spacing between bars: Use Table 1, for recommended cross drain spacing on low to relatively moderately steep topography.
- Discharge: Runoff should not be directed onto fill material without proper energy dissipation and drainage away from the fill.

Road Sloping:

- The slope should be approximately 1 to 2 percent from the cut slope outward to the fill slope.
- Berms on the outside of the road should be limited or removed to allow water to flow off the road surface.
- Provide sediment collection or erosion-control measures at the toe of the fill slope to prevent excessive erosion and sediment transport.

Rolling Dip: (applies to roads greater that 150 ft long only)

- The dip should be approximately 1 ft (0.3 meter) below the surface plane of the road. The upgrade approach to the bottom of the dip should be approximately 66 ft (20 meters) long. The downgrade approach to the bottom of the dip should be approximately 23 ft (7 meters) long.
- Align the dip across the road at nearly a 90-degree angle and slope it outward approximately 5 percent.

Table 1. Recommended Cross Drain Spacing (Source: ITD, 1994)

Road Grade (percent)	Spacing Between Open-Top Culverts, feet (meters)
2 to 5	300 to 500 (90 to 150)
6 to 10	200 to 300 (60 to 90)
11 to 15	100 to 200 (30 to 60)
16 to 20	<100 (<30)

Construction guidelines:

Open-Top Box Culvert: Construct a box-like frame (three-sided, open-topped) of logs; lumber; discarded guardrail; or commercial, corrugated steel. Install it flush with the road surface, skewed at an angle downgrade across the roadway. Set the inflow end at the same grade as the side ditches on the road and extend it into the cut bank. The discharge end should extend 6 to 12 in (150 to 300 mm) beyond the surface of the roadbed and should be directed onto vegetated ground or riprap or into another erosion-control structure such as a sediment trap or catch basin.

Waterbar: Cut each water sbar into solid soil to a minimum depth of 6 in (150 mm) next to the cutbank and 8 in (200 mm) at the road shoulder, with an adverse grade on the down road or downgrade side of the water bar. Build a continuous, firm berm of soil, at least 6 in (150 mm) above normal grade, parallel to the water bar cut on its downhill side. Include a bank tie-in point, cut 6 to 12 in (150 to 300 mm) into the roadbed. For added stability, the bar may be compacted with a nonerosive fill material. The water bar must extend across the full roadway width, aligned at an angle of 30^{o} to 40^{o} degrees relative to the roadway. A dissipation or filter device (such as riprap or silt fence) may be needed below the water bar to control erosion and trap sediment.

Road Sloping: Road sloping is built into the road during construction. Install erosion- and sediment-control measures downslope before completing the finish grade of the sloped road. Then construct the outward slope of 1 to 2 percent, as specified in the contract plans.

Rolling Dip: Rolling dips are built into the road, during construction, following the natural contours of the land. Install erosion and sediment measures at the low point of the dip (drainage outfall to fillslope) before final grading to direct storm water discharge from the dip. Construct the dip according to the specifications shown in the contract plans. If not specified, make the dip 1 ft (300 mm) deep, with a 23 ft (7- meter)-long approach on the downgrade side and a 66 ft (20-meter)-long approach on the upgrade side.

Maintenance

Inspect all devices regularly according to provisions of the contract or project site plan. Make repairs promptly to avoid progressive damage. Remove accumulated sediments as necessary to ensure proper functioning.

Open-Top Box Culvert: Clean and repair the culverts on a regular basis. Remove sediments and other debris which may block drainage flow or decrease structural efficiency.

Waterbar: Properly constructed bars should require little or no maintenance. However, all waterbars need to be open at the lower end so water can easily flow away from the roadway. Hand shovel work may be necessary following high runoff periods or severe storms to ensure unrestricted flow.

Road Sloping: Minor regrading may be required to maintain slope angle.

Rolling Dip: Outflows should be kept free of debris to prevent ponding.

BMP #125 - DUST CONTROL

Description: This fact sheet describes products or measures used for reducing or preventing wind erosion by protecting the soil surface, roughening the surface reducing the surface wind velocity. Several dust control treatments are described below. Other methods are also available.

Targeted Pollutants

- ● Sediment
- ○ Phosphorus
- ◒ Trace metals
- ○ Bacteria
- ◒ Petroleum hydrocarbons

Physical Limits

Drainage area	N/A
Max slope	5%
Min bedrock depth	N/A
Min water table	N/A
SCS soil type	N/A
Freeze/Thaw	N/A
Drainage/Flood control	no

Vegetative Cover: For disturbed areas not subject to traffic, vegetation provides the most practical method of dust control (see BMP #154-Seeding and BMP #155-Sodding).

Mulch (including gravel mulch): When properly applied, mulch offers a fast, effective means of controlling dust (see BMP#130- Mulching).

Spray-On Adhesive: Asphalt emulsions, latex emulsions, or resin in water can be sprayed onto mineral soil to prevent their blowing away (see BMP #131-Hydromulching).

Sprinkling: The site may be sprinkled with water until the surface is wet. Sprinkling is especially effective for dust control on haul roads and other traffic routes.

Stone: Stone or gravel used to stabilize construction roads and disturbed soils can also be effective for dust control and reduce soil losses from those areas by up to 80 percent.

Surface Roughening: Tilling or discing the surface of disturbed soils to produce a rough surface or ridges which when perpendicular to prevailing winds can reduce soil losses due to wind by 80 percent (see BMP #135-Slope Roughening).

Barriers: A board fence, wind fence, sediment fence, or similar barrier can control air currents and blowing soil. All of these fences are normally constructed of wood.
Perennial grass and stands of existing trees may also serve as wind barriers. Barriers prevent erosion by obstructing the wind near the ground and preventing the soil from blowing off-site.

Applications

The above measures for dust control should be used when open dry areas of soil are anticipated on the site. Clearing and grading activities create the opportunity for large amounts of dust to be blown. Therefore, one or several dust control measures should be considered prior to clearing and grading. In many cases, water erosion control measures incorporated into the project will indirectly prevent wind erosion.

As a standard practice, any exposed area should be stabilized using vegetation to prevent both wind and water erosion. When rainfall is insufficient to establish vegetative cover, mulching is an effective way of conserving moisture, preventing surface crusting, reducing runoff and erosion, and helping to establish vegetation. It is a critical treatment on sites with erosive slopes.

Limitations: Vegetative measures may not be practical during dry periods unless a reliable supply of establishment water is available. Other methods should be stipulated in the project contract to ensure that dust control is not overlooked.

Barriers (such as walls or fences) can be part of the long-term dust control strategy in arid and semiarid areas, but they are not a substitute for permanent stabilization.

Design parameters: Dust Prevention: The best method of controlling dust is to prevent dust production. This can best be accomplished by limiting the amount of bare soil exposed at one time. In project design, identify all areas where ground disturbance will not be allowed. Design and locate haul roads, detours, and staging areas to avoid unnecessary exposure of bare ground and avoid using areas that are the most susceptible to wind erosion.

In the stormwater site plan, specify staging or work sequencing techniques that minimize the risk of wind erosion from bare soil. In most cases, this will require a change from traditional construction techniques that allow large areas to be disturbed at the outset of construction and to remain exposed for long periods of time.

Vegetative Cover: Follow recommended seeding and planting specifications. If site conditions are favorable, use an extended seeding season to ensure that seeding becomes established over as much of the project as possible before winter shutdown or substantial completion. Specify the use of establishment water to accelerate vegetative stabilization if other means of long-term slope protection are not feasible.

Mulch: Apply according to the design parameter for BMP #130.

Sprinkling: Apply at a rate of 3.2 gallons per acre (35 liters per hectare) so that the soil is wet but not saturated or muddy and so that air quality requirements are maintained.

Stone: At ingress/egress to public highways, apply as indicated in BMP #123- Stabilization of Construction Entrance. For detours, haul roads, or temporary traffic routes through the construction site, provide a 2.4 in (60 mm) minimum thick layer of fractured stone 1 to 2 in (25 to 50) mm in diameter. Also see BMP#124-Erosion Prevention on Temporary Roads.

Surface Roughening: Tilling or discing should leave 6 in (150 mm) (minimum) furrows, preferably perpendicular to the prevailing wind direction, to gain the greatest reduction in wind erosion. If the surface cannot be furrowed perpendicular to the prevailing wind direction, roughening the surface by using a ripper/scarified (grader) or a ripper (cat) will produce the desired result of a 6 in (150mm) irregular surface.

Barriers: A wind barrier generally protects soil downwind for a distance of 10 times the height of the barrier. If additional protection is needed, use other methods in conjunction with the barrier.

Construction guidelines:

Site Assessment: Assess the potential problem of wind erosion and dust generation at the project site. Consider the soil type, prevailing wind direction, and the effect of other prescribed erosion control measures.

Use Preventive Strategies Wherever Possible:

- Minimize amount of bare ground exposed at one time.
- Minimize amount of ground disturbance occurring when wind erosion is highest.

Implement Dust Control Measures as Needed:

- Provide stabilized roadway to minimize amount of dust generated by construction vehicles and highway traffic (gravel, pave or moisten the bare areas of the highway or detour route).
- Apply protective materials to exposed areas (e.g., stone, mulch, adhesive/ emulsions).
- Install barriers to prevent dust from blowing off site.
- Establish vegetation at the earliest possible opportunity (using establishment water if necessary to ensure viability).
- Keep haul roads, detours, and other bare areas moist by sprinkling them with water.

Maintenance: Dust control requires constant attention--it is not a one-time or once-in-awhile activity. Dust control sprinkling may have to be done several times a day during hot, dry weather.

Areas protected by mulch, adhesive emulsions, or barriers need to be checked at regular intervals according to the inspection schedule set forth in the stormwater plan. Remove sediments that accumulate behind any sediment fence or barrier when the accumulation reaches one half the height of the barrier. Dispose of the sediments only in an approved location (not in wetlands or where they will contribute to pollution at the disposal site).

Apply chemical controls (emulsions and resins) at the manufacturer's specified rates and in accordance with all federal, state, and local regulations governing their use. Chemical products must be stored, handled, and disposed of in accordance with all applicable regulations and department policies.

BMP #145 - VEGETATIVE BUFFER STRIP

Targeted Pollutants

- ● Sediment
- ○ Phosphorus
- ○ Trace metals
- ○ Bacteria
- ○ Petroleum hydrocarbons

Physical Limits

Drainage area	unlimited
Max slope	20%
Min bedrock depth	5 ft
Min water table	3 ft
SCS soil type	ABCD
Freeze/Thaw	fair
Drainage/Flood control	no

Description: A vegetative buffer strip is a gently sloping area of vegetative cover that runoff water flows through before entering a stream, storm sewer, or other conveyance. The buffer strip may be an undisturbed strip of natural vegetation or it can be a graded and planted area .

Vegetative buffer strips act as living sediment filters that intercept and detain storm water runoff. They reduce the flow and velocity of surface runoff, promote infiltration, and reduce pollutant discharge by capturing and holding sediments and other pollutants carried in the runoff water. Vegetative buffer strips function much like vegetated or grassed swales. Buffer strips, however, are fairly level and treat sheet flow across them, whereas grassed swales are indentations that treat concentrated flows running along them (see treatment BMP #100 - vegetated swale).

Applications

- Used for temporary or permanent control, usually in conjunction with other sediment collection and slope protection practices. Consider use with level spreaders or diversion measures such as earth dikes (BMP #149) and slope drains (BMP #134). Also, silt fences (BMP #144) installed up-gradient can prevent overloading of the buffer strip.
- May be placed at many locations between the source of sediment (road surface, side slopes) and a natural or constructed waterway. They are inexpensive and easily constructed, and can be put into place at any time if climatic conditions allow for planting.
- May be used at almost any site that can support vegetation, but is best suited for areas where the soils are well drained or moderately well drained and where the bedrock and the water table are well below the surface.
- Provides low to moderate treatment of pollutants in storm water while providing a natural look to a site.
- Can provide habitat for wildlife.
- Can screen noise and views if trees or high shrubs are planted on the filter strips.

Limitations

- Not effective for filtering high velocity flows from large paved areas, steep slopes, or hilly areas. Consider other measures if slopes exceed 15 percent.
- Requires significant land space.
- May have a short useful life due to clogging by sediments and oil and grease.
- Do not use planted or seeded ground as a buffer strip for sediment trapping until the vegetation is well established.

Design Parameters

Width and length: A buffer strip must be at least 20 ft (6 meters) wide to function well. Along live streams or above wetlands, the minimum width should be 100 ft (30 meters). The length of the strip should be approximately 50 to 82 ft (15 to 25 meters). Where slopes become steeper, increase the length of the strip.

Plant materials: Tall, dense stands of grass form good sediment traps, as do willows and alder. The willows and alder can be native or planted. A combination of grasses with willows or alder is also effective. Any planted species should be deep rooted and able to adjust to low oxygen levels. Vegetative cover should be at least 75 percent to assure adequate removal of sediments. Forested strips are always preferred to vegetated strips, and existing vegetation is preferred to planted vegetation. In planning for vegetated strips, consider climatic conditions, since vegetation may not take hold in especially dry and/or cold regions.

Effectiveness: In many cases, a vegetative buffer strip will not effectively control runoff and retain sediments unless employed in conjunction with other control measures. Where heavy runoff or large volumes of sediment are expected, provide diversion measures or other filtering measures above or below the buffer strip.

Construction guidelines

- Try to direct sediment-laden water onto naturally vegetated or stabilized planted ground.
- Fertilizing seeded or planted ground may enhance growth (and improve its effectiveness as a buffer strip).
- Do not place any equipment, construction debris, or extra soil in the buffer strip (or the strip will be damaged).

Maintenance

Inspections: Inspect the buffer strip at regular intervals to ensure proper functioning. Check for damage by equipment and vehicles. In newly planted areas, check the progress of germination and plant growth, and arrange for fertilizing, if needed, to enhance growth and establishment. (Planted ground must not be used for a sediment trap until the vegetation is well established.) Make sure that water flowing through the buffer strip is not causing additional erosion nearby, and not forming ponds due to erosion within the buffer strip.

Maintenance: Buffer strips in natural vegetation do not generally require maintenance; however, on some sites it may be necessary to remove sediments and replant on a regular basis. Promptly repair any damage from equipment, vehicles, or erosion.

BMP #146 - SEDIMENTATION TRAP (BASIN)

Targeted Pollutants	
●	Sediment
○	Phosphorus
◒	Trace metals
○	Bacteria
○	Petroleum hydrocarbons

Physical Limits	
Drainage area	5 ac
Max slope	10%
Min bedrock depth	3 ft
Min water table	2 ft
SCS soil type	BCD
Freeze/Thaw	good
Drainage/Flood control	no

Description: A temporary or permanent dam or basin used to collect, trap, and store sediment produced by construction activities, or as a flow detention facility for reducing peak runoff rates. Sediment basins can be designed to maintain a permanent pool or to drain completely dry. Either way, the basin detains sediment-laden runoff long enough to allow most of the sediment to settle out.

A sediment basin can be constructed by excavation or by placing an earthen embankment across a low area or drainage swale. The pond has a riser and pipe outlet with a gravel outlet or spillway to slow the release of runoff and provide some sediment filtration.

Applications : Sediment traps are appropriate where physical site conditions or land ownership restrictions preclude the effective use of barrier-type erosion control measures. It may be used below construction operations which expose critical areas to soil erosion.

A temporary sediment basin used in combination with other control measures, such as seeding or mulching, is especially effective for removing sediments.

Note that the use of sedimentation basins on construction sites greater than or equal to 5 acres with an NPDES stormwater permit has special requirements. Refer to NPDES stormwater general permit for onsite activities.

Limitations

- May not be feasible downstream of narrow right-of-way due to lack of space.
- May not be practical in highly erodible soil types (0.01 and smaller, very fine sand, silt and clay) due to extremely large basin size requirements.
- May not remove enough of the fine silts. Additional control measures such as filter cloth around riser should be used to minimize release of fine silts. If filter cloth is used, regular inspection and replacement is required to deal with clogging.
- Should not be located in any active stream channel.

Design of the basin should be based upon the total drainage area lying upstream and (if permanent) on the future use of such lands. Design should be approved by a professional engineer.

The volume of the sediment basin should be at least 1800 ft^3 /acre (125 cubic meters per hectare) of total drainage area (about 1/2 in (13 mm) over the watershed). Disturbed areas greater than 10 acres (4 hectares) within the same drainage basin should be provided a basin with a capacity of 3600 ft^3 (250 cubic meters) per hectare of total drainage area (1 in (25 mm) over the watershed) to meet the NPDES regulations.

Design Parameters

The basin should be designed with baffles or other deflectors to spread the flow throughout the basin. It should also include an emergency spillway and riser pipe(s). These structures must be designed on a site-specific basis using standard engineering practices. The basin pond must be sized by calculating the settling zone volume and adding the necessary sediment storage volume. The settling zone volume is determined by the pond surface area calculated using the following equation:

$SA = 1.2Q_x / V_{sed}$ Where:
SA = the pond surface area in square meters

Q_x = the design inflow (in cubic meters per second) based on the runoff from the design storm event for the drainage area.

V_{sed} = the settling velocity for the design soil particle in meters per second. The following table lists theoretical settling velocities for different particle sizes (#200 sieve=0.074 mm).

Size in (mm)	**V_{sed} in/sec (m/sec.)**
0.02 (0.5)	0.0023 (0.058)
0.008 (0.2)	0.00079 (0.020)
0.004 (0.1)	0.00028 (0.007)
0.002 (0.05)	0.000079 (0.002)
0.0008 (0.02)	0.000012 (0.0003)
0.0004 (0.01)	0.0000028 (0.00007)
0.0002 (0.005)	0.00000079 (0.00002)

For particle sizes of 0.01 and smaller, the V_{sed}'s are so low that the SA becomes extremely large, often making the overall basin size requirement too large to be practical. In this case, extra protection measures should be taken to negate the need for the basin.

The settling volume requirement is then calculated by multiplying the surface area by the settling depth. The settling depth must be a minimum of 1 ft (0.6 meter) and a maximum of 4 ft (1.2 meters) and is governed by a relationship with the basin length (distance from the inlet to the outlet). The ratio of length to settling depth should be greater than 200. For example, if the length was (120 meters), the settling depth must be less than 2 ft (0.6 meters) to achieve the ratio of greater than 200.

Typically, a sediment storage depth of 3 ft (1.0 meter) is appropriate unless large volumes of soil are expected from highly erodible site conditions. In this case use the "universal soil loss equation" or other applicable estimating methods to design the storage depth on a site-specific basis.

Determine the final pond dimensions and volume as follows:

1) Determine the pond geometry for the sediment settling volume calculated above by adding a sediment storage depth of 3 ft(1.0 meter) and 3:1 side slopes from the bottom of the basin. The bottom must be level.

2) Extend the side slopes (at 3:1) as necessary to obtain the settling zone volume at the settling zone depth determined above.

3) Adjust the geometry of the basin to effectively combine the settling zone volume and sediment storage volume while preserving the depth and side slope criteria listed above.

Sediment basins covered by this standard should be limited to the following category:

The water surface at the crest elevation of the pipe spillway should not exceed 10 ft (3 meters) measured upward from the original stream bed to the crest elevation of the pipe spillway; and the drainage area should not exceed 150 acres (60 hectares).

Because finer silts may not settle out completely, additional erosion control measures should be used to minimize release of the fine silt. Runoff should enter the basin as far from the outlet as possible to provide maximum retention time.

<u>Construction Guidelines</u>**:** The temporary sediment basin should be installed before clearing and grading is undertaken. It should not be built within an active stream channel. Putting a dam in such a site could destroy aquatic habitat, and failure of the dam could result in flooding. A temporary sediment basin should be constructed only if there is sufficient space and appropriate topography. The basin should be made large enough to handle the maximum expected amount of site drainage. Fencing around the basin may be necessary for safety reasons or to discourage vandalism.

The following general construction criteria are critical to successful installation and operation of sediment basins.

- Locate the dam to provide maximum volume capacity for silt behind the structure.

- Prepare the dam site by clearing vegetation and removing topsoil before beginning dam construction. Areas under the embankment and any structural works should be cleared and grubbed, and the topsoil stripped to remove all trees, vegetation, roots and other objectionable material. To facilitate cleanout and restoration, the pool area (measured at the top of the pipe spillway) should be cleaned of all brush, trees or other debris.

- Level the bed for the pipe spillway to provide uniform support through its entire length under the dam.

- Construct an emergency spillway (as per design) on undisturbed soil--not on fill. The design width and entrance/exit channel slopes are critical to the spillway's ability to successfully protect the dam with a minimum of erosion hazard in the spillway channel. The spillway should be lined with 4 in (100 mm) of concrete, reinforced with 6 X 6 in (150 mm x 150 mm) 10/10 wire mesh extending to a minimum of 36 in (900 mm) down each face of the embankment. The spillway should be at least 20 in (500 mm) deep with 1:1.5 slide slopes.

- All pipe joints must be securely fastened and watertight. The riser should be rigidly and securely fastened to the barrel and the bottom of the riser should be sealed (watertight). The barrel should be placed on a firm foundation according to the lines and grades shown on the plans.
- Place at least 1 ft (600 mm) of hand-compacted backfill (maximum 6 in (150 mm) lifts) over the pipe spillway before crossing it with construction equipment. The movement of the hauling and spreading equipment over the fill should be controlled so that the entire surface of each lift will be traversed by not less than one tread tract of the equipment.
- The pipe spillway should discharge at ground elevation below the dam, and not more than 12 in (300 mm) above any streambed.
- Fill material should be taken from approved designated borrow areas, and should be of the type and quality conforming to that specified for the adjoining fill material. It should be free of roots, woody vegetation, oversize stones, rocks exceeding 6 in (150 mm) diameter, or other objectionable materials. Do not use frozen material.
- Areas on which fill is to be placed should be scarified prior to placement of fill. Fill materials should be placed in 6 in (150 mm) maximum lifts, compacted by construction equipment. The embankment should be raised and compacted to an elevation which provides for anticipated settlement to design elevation (allow at least 10 percent for settlement). Lifts should be continuous over the entire length of the fill and approximately horizontal.
- Stabilize the embankment and emergency spillway with revegetation or other stabilization measures.

MAINTENANCE

Sediment basins should be readily accessible for maintenance and sediment removal. They should be inspected after each rainfall and be cleaned out when about half the volume has been filled with sediment. Poorly draining basins require maintenance to clean clogged riser or filter cloth. Removed sediment should be disposed of and stabilized in an approved location such that spoils do not re-enter waters of the state. Sediment may not be dumped into any water of the U.S. without appropriate permitting.

The sediment basin should remain in operation and be properly maintained until vegetation or other measures permanently stabilize the drainage area. A well built temporary sediment basin that is large enough to handle the post-construction runoff volume may later be converted to use as a permanent storm water management structure.

If the pond is located near a residential area, it is recommended for safety reasons that a sign be posted and that the area be secured by a fence.

BMP #152 - TEMPORARY STORM DRAIN DIVERSION

Targeted Pollutants
● Sediment
○ Phosphorus
○ Trace metals
○ Bacteria
○ Petroleum hydrocarbons

Physical Limits
Drainage area 5 ac
Max slope 50%
Min bedrock depth NA
Min water table NA
SCS soil type ABCD
Freeze/Thaw good
Drainage/Flood control yes

Description: The re-direction of a storm drain line or outfall channel so that it may temporarily discharge into a sediment trapping device. The purpose is to prevent sediment laden water from entering a watercourse, public or private property through a storm drain system, or to temporarily provide underground conveyance of sediment laden water to a sediment trapping device.

Applications: One of the following practices or procedures shall be used whenever the off-site drainage area is less than 50 percent of the on-site drainage area to that system. A special exception may be given, at the discretion of the local permitting authority, where site conditions make this procedure impossible.

Design Methods for Temporary Diversion

- Construction of a sediment trap (basin) (see BMP #146) below a permanent storm drain outfall: Temporarily divert storm flow into the basin or trap constructed below permanent outfall channel.
- In-line diversion of storm drain at an inlet or manhole: Achieved by installing a pipe stub in the side of a manhole or inlet and temporarily blocking the permanent outfall pipe from that structure. A temporary outfall ditch or pipe may be used to convey storm flow from the stub to a sediment trap or basin. This method may be used just above a permanent outfall or prior to connecting into an existing storm drain system.
- Delay completion of the permanent storm drain outfall and temporarily divert storm flow into a sediment trap: Earth dike (BMP #149), swale (BMP #148) or designed diversion is used, depending on the drainage area, to direct flow into a sediment trap. The trap should be constructed to one side of the proposed permanent storm drain location whenever possible.
- Installation of a stormwater management basin early in the construction sequence: Install temporary measures to allow use as a sediment basin. Since these structures are designed to receive storm drain outfalls, diversion should not be necessary.

Completion and Disposition

When the areas contributing sediment to the system have been stabilized procedures can be taken to restore the system to its planned use.

The following removal and restoration procedure is recommended:

1. Flush the storm drain system to remove any accumulated sediment.
1. Remove the sediment control devices, such as traps, basins, dikes, swales, etc.
2. For sites where an inlet was modified, brick shut the temporary pipe stub and open the permanent outfall pipe.
3. Establish permanent stabilized outfall channel as noted on the plans.
4. Restore the area to grades shown on the plan and stabilize with vegetative measures.
5. For basins that will be converted to stormwater management, remove the accumulated sediment, open the low flow orifice, and seed all disturbed areas to permanent vegetation.

BMP #153 - TOPSOILING

Targeted Pollutants

- ● Sediment
- ○ Phosphorus
- ○ Trace metals
- ○ Bacteria
- ○ Petroleum hydrocarbons

Physical Limits

Drainage area	unlimited
Max slope	50%
Min bedrock depth	3 ft
Min water table	2 ft
SCS soil type	N/A
Freeze/Thaw	fair
Drainage/Flood control	no

Description**:** This BMP includes the placement of topsoil or other suitable plant growth material over disturbed lands to provide a suitable soil medium for vegetative growth and a supply of native or locally occurring seeds and propagules. Topsoiling may involve bringing in soils from off site or merely replacing fertile topsoils that were stripped and stockpiled during earlier site development activities.

Applications**:** Topsoiling is recommended on slopes 2:1 or flatter where the native soil is unsuitable for vegetative growth. It is an effective way of improving plant establishment on sites where moisture, nutrients, or pH levels are low, or where the remaining soil is too shallow to support root systems.

Limitations**:** Be careful not to apply topsoil over a subsoil of contrasting texture. For instance, a clay-like topsoil placed over a sandy soil may cause the topsoil to slough as water flows between the two soil layers of different permeability. Also, topsoil should not be applied when the subsoil is frozen or extremely wet.

Design Parameters

Plan to maintain the existing or established grade of the subsoil. The topsoil should be uniformly distributed at a minimum compacted depth of 2 inches (50 mm) on slopes 3:1 or steeper, and 4 inches (100 mm) deep on flatter slopes. The soil should be a loam, sandy loam, clay loam, silt loam, sandy clay loam, or other mixture approved by an agronomist. It should be free of subsoil, refuse, sticks, noxious weed seeds, other extraneous materials, and stones larger than 1.5 inches (40 mm) diameter.

Topsoil can either be obtained commercially or stripped, stockpiled, and replaced on the construction site. Stockpiled topsoil should undergo a laboratory analysis to determine organic content, pH, and soluble salts. A pH of 6.0 to 7.5 and organic content of not less than 1.5 percent by weight is recommended. Where soil pH is less than 6.0, lime may be applied to adjust pH to 6.5 or higher. Any soils having soluble salt content greater than 500 parts per million should not be used.

If desired, it is possible to place a thin layer of topsoil 1.2 to 2 inches (30 to 50 mm) thick on benched slopes. In such applications, it is important not to apply so much topsoil that the value of the benches is destroyed. This method is especially valuable on rocky benches, especially on south- or west-facing slopes, however, proper placement of the soil is often a problem. In some cases, soil has been bucketed onto slopes. This produces an uneven spread and the quantity is hard to control. Soil can also be blown onto the slope using a snow blower. In that case, organic matter can be mixed with the soil, but the soil should be screened to remove any rocks larger than 2 inches (50 mm). The advantage is that the amount of soil needed is much less and it can be spread very rapidly on the horizontal surfaces. The soil may need some form of stabilization before the next rain event. Consider whether mulch, matting, geotextiles or seeding is required and when.

CONSTRUCTION GUIDELINES

The following guidelines apply to the placement of topsoil:

- The existing or established grade of subsoil should be maintained.
- Lime may be uniformly applied over designated areas where subsoil is highly acidic or heavy in clay content.
- Prior to spreading topsoil, loosen the subgrade by discing (or other method) to a depth of 2 inches (50 mm) to permit bonding of subsoil to topsoil. Tracking a bulldozer vertically over the slope will pack the soil and create horizontal erosion check slots to prevent topsoil from sliding down the slope.
- Spread the topsoil uniformly at a minimum compacted depth of 2 inches (50 mm) on 1:3 or steeper slopes and 4 inches (100 mm) on flatter slopes. A depth of 6 to 12 inches (150 to 300 mm) is preferred. Any surface irregularities should be corrected in an effort to prevent formation of water- holding depressions.
- Where quantities of stockpiled topsoil on site are limited, it is more desirable to cover all areas of exposed subsoil to a lesser depth than to cover partial areas to the suggested minimum depth of 3.1 inches (80 mm).
- Topsoil should not be placed when the subgrade is frozen, excessively wet or in a condition that may otherwise be detrimental to proper grading or proposed sodding or vegetation establishment.

MAINTENANCE

Periodically and after major storm events, inspect, repair, and reseed as necessary to control slope erosion and subsequent topsoil losses.

APPENDIX B

ROUTINE FACILITY INSPECTION CHECKLIST

Routine Facility Inspection Checklist

Activity Name: ______________________ **Date of Inspection:** ______________________

Inspector(s): ______________________ **Facility Name/Number:** ______________________

Column 1	Column 2	Column 3	Column 4	Column 5	
Source Area	BMP Number and Title	Status: F, P, N, NA[1]	Briefly Describe Effectiveness (Good or Other [describe])	Corrective Measures	
				What	By When

Note 1: F – Fully implemented, P – Partially implemented, N – Not implemented , NA – Not Applicable

APPENDIX C

QUARTERLY VISUAL ASSESSMENT CHECKLIST

Quarterly Visual Assessment Checklist

Facility ID and Location: ______________________

Date: ____________________

Sampler Name (Printed): ______________________________ Signature: ______________________________

Time of Rainfall Begin: ________________ Time of Rainfall End: ________________

Time of Flow Begin: ________________ Time of Flow End: ________________

Rainfall event more than 72 hours since last event? Yes / No Rainfall Event Total: ________________

Sample: sample in a clean, colorless glass or plastic container, and examined in a well-lit area

On samples collected within the first 30 minutes of an actual discharge from a storm event

Sample Characteristics:

Color: ________________ Floating Solids: ________________

Odor: ________________ Settled Solids: ________________

Clarity: ________________ Suspended Solids: ________________

Oil Sheen: ________________ Foam: ________________

Other Obvious Indicators of Storm Water Pollution

(describe): ____

Nature of the discharge (i.e., runoff):

Results of observations of the storm water discharge:

Probable sources of any observed storm water contamination:

If applicable, why it was not possible to take samples within the first 30 minutes:

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

APPENDIX D

CORRECTIVE ACTION LOG

Corrective Action Log

Use this form to document SWPPP corrective actions. This form is to be completed by the Environmental Compliance Coordinator (ECC) or a person designated by ECC and submitted to the MCBH Storm Water Program Manager. The Storm Water Program Manager is responsible for any notification to the State of Hawaii Department of Health (DOH), if required.

A corrective action is defined as an action taken to:

- **a) Repair, modify, or replace any storm water control used at the site;**
- **b) Clean up and properly dispose of spills, releases, or other deposits; or**
- **c) Remedy a permit violation.**

1. Corrective Action Triggers

The following events trigger a corrective action to be taken (this triggering condition is to be documented *within 24 hours* of discovering the occurrence):

- a) A required storm water control was never installed, was installed incorrectly, or is not in accordance with the requirements in the SWMP Plan.
- b) A member of the **Storm Water Pollution Control Team** becomes aware that the storm water controls installed and being maintained are not effective enough for the discharge to meet applicable water quality standards or applicable requirements in the MCBH SWMP Plan. The facility ECC shall notify the Storm Water Program Manager immediately. The Storm Water Program Manager will notify DOH *by the end of the next work day*.

1.1 Log Notifications:

Date/time Storm Water Program Manager notified by ECC: ________________________

Date/time DOH notified by Storm Water Program Manager: ________________________

1.2 Describe Discharge:

Indicate which one of the following prohibited discharges is occurring or has occurred:

- ☐ Wastewater from washout of concrete
- ☐ Wastewater from washout and cleanout of stucco, paint, form release oils, curing compounds, or other construction materials
- ☐ Fuels, oils, or other pollutants used in vehicle and equipment operation and maintenance
- ☐ Soaps, solvents, or detergents used in vehicle and equipment washing
- ☐ Toxic or hazardous substances from a spill or other release
- ☐ Other, Explain: ____

2. Requirements for Taking Corrective Actions

The ECC shall complete corrective actions in accordance with the deadlines specified below. In all circumstances, site personnel shall *immediately* take all reasonable steps to minimize or prevent the discharge of pollutants until a permanent solution is installed and made operational, including cleaning up any contaminated surfaces so that the material will not discharge in subsequent storm events. *Immediately* means the same day the condition is discovered, unless it is too late in the day, in which initiation of corrective action must begin on the following work day.

Following any of the above triggering events, the ECC shall install a new or modified control and make it operational, or complete the repair, by *no later than 7 calendar days from the time of discovery*. If it is not feasible to complete the installation or repair within 7 calendar days, the ECC shall document and submit to the Storm Water Program Manager, for their agreement, why it is not feasible to complete the installation or repair within the 7-calendar day timeframe and document a schedule for installing the storm water control and making it operational as soon as practicable after the 7-day timeframe.

If the issue is not adequately addressed within 7 calendar days or the agreed upon timeframe, enforcement procedures will be initiated. Unaddressed issues will be escalated through the chain of command. The MCBH Environmental Compliance and Protection Division Director will give the responsible party a formal notice with an appropriate deadline for action. If the problem remains unchanged, the situation will be brought to the attention of the next higher authority. The ultimate penalty for non-compliance of MS4 Permit regulations is eviction or discharge of the responsible party from MCBH. This is placed at the discretion of the Base Commander. See the Enforcement Response Plan in Appendix 3-6 of the SWMP Plan for further information on MCBH's enforcement policies.

3. Corrective Action Report

Within 24 hours of discovering the occurrence of one of the triggering conditions in SWPPP Section 4.1 at the site, the ECC must complete the following:

3.1 Describe the triggering condition:

____
____
____
____

3.2 Record the date/time of the condition identified. How was the condition identified?

____
____
____
____

3.3 Describe the corrective action taken:

____
____
____

Date/time installation or repair was completed:
(or date/time the prohibited discharge ceased) ____

Or describe why it is not feasible to complete installation or repair within 7 calendar days and detail a proposed schedule (if applicable)

____
____
____

4. Resolution of the Corrective Action Trigger

Within 7 calendar days of initiating the Corrective Action Report, the ECC must complete a report of the following:

4.1 Follow-up Actions

Describe any follow-up actions taken to review the design, installation, and maintenance of storm water controls, including the dates such actions occurred:

____
____
____

4.2 Storm Water Control Modifications

Provide a summary of storm water control modifications implemented. Include a schedule of activities required to implement changes and the date the modifications were completed or will be completed:

____
____
____

5. SWPPP Modification Due to Corrective Actions

Where corrective actions result in changes to any of the storm water controls or procedures documented in the SWPPP, modify the SWPPP accordingly *within 7 calendar days* of completing corrective action work.

Are modifications to the SWPPP necessary? ❑ Yes ❑ No

Date modifications to the SWPPP shall be completed _______________

6. Corrective Actions Required by DOH

The facility shall comply with any corrective actions required by DOH as a result of permit violations found during an inspection by DOH or the Environmental Protection Agency (EPA).

Was the Corrective Action triggered by a DOH/EPA inspection?

❑ Yes ❑ No

❑ Date of DOH/EPA Inspection __________________

7. Additional Comments:

____
____

Final

STORM WATER POLLUTION PREVENTION PLAN

Storm Water Management Program Plan

Marine Corps Base Hawaii, Oahu, Hawaii

NPDES Permit No. HI S000007

WATER RECLAMATION FACILTY

Prepared by:

Marine Corps Base Hawaii

August 2022

Table of Contents

Tables

Figures

Appendices

List of Acronyms and Abbreviations

BMP	Best Management Practice
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CWA	Clean Water Act
CWB	Clean Water Branch
DOH	State of Hawaii Department of Health
ECC	Environmental Compliance Coordinator
ECE	Environmental Compliance Evaluation
ECPD	Environmental Compliance and Protection Division
EPA	United States Environmental Protection Agency
HAZMAT	Hazardous Material
HAZMIN	Hazardous Material Minimization
MCBH	Marine Corps Base Hawaii
MoGas	Motor Gasoline
MS4	Municipal Separate Storm Sewer System
MS4 Permit	Marine Corps Base Hawaii's NPDES Permit No. HI S000007
NPDES	National Pollutant Discharge Elimination System
POC	Point of Contact
SAS	Satellite Accumulation Site
SWMP	Storm Water Management Program
SWPPP	Storm Water Pollution Prevention Plan
WRF	Water Reclamation Facility

Certification Statement

MCBH is committed to the prevention of discharges of polluted stormwater to navigable waters or the environment and maintains the highest standards for best management practices through periodic review, updating, and implementation of this Stormwater Pollution Prevention Plan (SWPPP).

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information contained therein. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Name: ______________________________ Title: ______________________________

Signature: ____________________________ Date: ______________________________

Management Review

Refer to Section 1.2 for more information on required SWPPP updates.

Review Dates	Signature	Amendment Required? (Y/N)
____________	__________________	__________
____________	__________________	__________
____________	__________________	__________
____________	__________________	__________
____________	__________________	__________
____________	__________________	__________

1 Introduction

As part of Federal regulations administered through the Clean Water Act (CWA), the State of Hawaii, Department of Health (DOH) has issued the National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4) Permit No. HI S000007 (referred to herein at the "MS4 Permit") to Marine Corps Base Hawaii (MCBH). The MS4 Permit requires that MCBH provide all existing industrial facilities, identified in MCBH's MS4 Permit application, and any newly identified industrial facilities, submitted to DOH using the "MS4 NPDES Individual Permit – Industrial Storm Water Discharge Notification Form," with a Storm Water Pollution Prevention Plan (SWPPP) for storm water associated with industrial activities.

The purpose of the regulations is to protect water quality by reducing the amount of pollutants in storm water runoff caused by industrial activities.

1.1 SWPPP Implementation

The storm water management controls of this plan will become MCBH procedure for the applicable industrial facility. An up-to-date copy of the SWPPP shall be maintained on site and at the MCBH Environmental Compliance and Protection Division (ECPD). Management staff, maintenance personnel, contractor staff, and other personnel involved in onsite industrial activities, will be knowledgeable of the plan and follow the guidelines set forth in it, in addition to any other pertinent base-wide, state and federal regulations.

Day-to-day implementation of the SWPPP is primarily the responsibility of the current facility Environmental Compliance Coordinator (ECC) or Point of Contact (POC) as identified in Table 2-1. Enforcement of the permit conditions and this SWPPP are ultimately the responsibility of ECPD and additional escalating levels of authority as specified in the Enforcement Response Plan developed by MCBH for its base-wide Storm Water Management Program (SWMP) Plan.

1.2 Updating the SWPPP

This SWPPP will be reviewed as needed to identify necessary changes, at a minimum of every five years. Updates may be required due to current best management practice (BMP) failures, spill events, changes in industrial activities, changes in features, corrective actions, or other necessary changes. Personnel changes to the Storm Water Pollution Control Team (Section 2.1) should be logged in Table 2-1. Storm Water Pollution Control Team Log. ECPD will be responsible for approving revisions to the SWPPP. In the event the plan is modified, a copy of the updated SWPPP will remain at ECPD and will be provided to the applicable facility. Additionally, ECPD shall document and report the SWPPP changes to the DOH, Clean Water Branch (CWB), within thirty days of when the changes arise.

2 Water Reclamation Facility

The Water Reclamation Facility (WRF) is located within MCBH, Kaneohe Bay at the southern end of MCBH, south of 3rd Street, approximately 1,000 feet northwest of the H-3 Main Gate entrance to MCBH, Kaneohe Bay. The facility includes approximately twenty-four numerically identified structures and encompasses approximately 4.6 acres. The WRF and can be found in grids [redacted] and [redacted] of the MCBH Base Map, see Figure 4-1. The facility-specific map is shown on Figure 4-2. The Water Reclamation Facility complex is a mix of asphalt-paved roads and grass bounded by a chain-linked fence.

2.1 Storm Water Pollution Control Team

The Storm Water Pollution Control Team consists of the Storm Water Program Manager, ECC, and the Hazardous Material (HAZMAT) and Hazardous Material Minimization (HAZMIN) team. The Storm Water Program Manager is responsible for the enforcement of the MS4 permit at all industrial sites and provides annual training to the ECC and other personnel. The ECC is the primary unit POC for storm water related items and the day-to-day environmental matters at a specific facility. ECC's are responsible for SWPPP implementation including BMP and facility inspections, storm water assessments/sampling, BMP maintenance, and corrective actions. The HAZMAT and HAZMIN team shall be contacted if assistance is needed. The role, name, phone number, and start date of individuals on the Storm Water Pollution Control Team is recorded in Table 2-1 below. In the event of personnel turnover, Table 2-1 shall be updated accordingly.

TABLE 2-1. STORM WATER POLLUTION CONTROL TEAM LOG

Role	Name	Phone	Start Date
MCBH Storm Water Program Manager	CIV Whitney Anderson	Office: 808-257-4359	6/6/22
ECC	CIV Sidney Remiticado	Office: 808-257-1216	
HAZMAT/HAZMIN	CIV Tim Cawthon	HAZMAT Center Building 6409 Office: 808-257-9913 HAZMIN Center Building 6407 Office: 808-257-0770	N/A

2.2 Water Reclamation Facility Activities

The Water Reclamation Facility (WRF) treats an average of approximately [redacted] gallons per day of wastewater generated at MCBH using advanced secondary treatment technology. Treated effluent from the WRF is either pumped to the City and County of Honolulu Mokapu ocean outfall or sanitized with chlorine for reuse at MCBH.

Untreated wastewater influent flows into the WRF at the headworks, Building 894. Bulk lime is stored at the headworks in a covered bin next to a covered trash container for debris that gets screened out of the influent. More bulk lime is stored in a covered bin next to Building 1682 and to the south of the secondary clarifier, Building 1379. Building 1403 located east of Headworks is the influent pump station for the facility.

Water treated for reuse at MCBH is disinfected with a liquid chlorine system located in a covered area at the southeast side of the facility. Two large chlorine mixing tanks, flammable locker, a small shed labeled 1380, and spill kit are located here. Although not commonly used, solid chlorine tablets are stored nearby in clamshell containers. Building 896 is the facility satellite accumulation site (SAS) and houses most of the new and used hazardous materials. Flammable lockers, clamshell containers, and a spill kit is located here. A single propane-powered forklift is used onsite.

Storm water runoff generated at the WRF either percolates into the ground or flows via sheet flow into the surrounding vegetated areas. The nearest receiving water is Kaneohe Bay. No storm water drain inlets connected to outfalls exist at the facility but there are a few inlets that direct water back to the headworks. A grated inlet is located next to the grit chamber (Building 1378) near the headworks to capture wastewater lost during transfer of materials for disposal. The inlet is surrounded by a biosock and conveys the water back to the WRF headworks. A bioswale is currently under construction along the southern side of the sludge drying beds to direct water toward the southern fence line. To the western end of the sludge drying beds, surface runoff leaves the site at a low point near the southwest corner toward the adjacent wetland and Kaneohe Bay. This location, shown as Outfall 01 on Figure 4-2, is also the designated sampling point for the site. The nearest point from the WRF to Kaneohe Bay is approximately 220-ft along flat vegetated ground/wetland. Storm water that does not infiltrate in the northeastern corner of the facility may discharge at the eastern fence line at the substantially similar Outfall 02 (Figure 4-2).

2.1 Sources of Pollutants

The following is an inventory of potential pollutants associated with Water Reclamation Facility:

A. Material Loading and Unloading Areas

Materials that are spilled, leaked, or lost during loading or unloading may collect on vegetated or paved surfaces and be carried away by storm runoff. Material loading and unloading at Building 896 is done on the southeast side through a bermed door. Additional materials are unloaded outside of the building on the northwest and northeast sides. Material loading and unloading at Building 1403 is done on the northwest side of the building. Material unloading at Building 1413 is done on the southeast side of the building.

B. On-Site Material Storage and Disposal Practices

Leaks, drips, or spills of materials that are stored or disposed of in areas exposed to rainfall can be carried away by storm water. Six structures are used to store significant materials (Buildings 1380, 896, 1413, 1682, 894 and 6850)

Building 896 is a bermed concrete block structure used as a flammable storage locker for hydraulic oil, new and used oil, MoGas and used old lithium-ion batteries for computer UPS. Five-gallon containers of paint and 55-gallon drums of hydraulic fluid are stored outdoors in flammable lockers and clamshell containment under a covered awning at the northeastern side of the building. A spill kit is also located at Building 896. Building 1413 a tool storage area with hazardous materials stored in flammable lockers.

The facility's liquid bleach contact system and equipment are located near the southern corner of the compound. The contact system consists of two liquid bleach mixing tanks. Chlorine tablets are also stored in a shed next to the contact system. Bulk lime is stored at the headworks and next to building 1682. Clamshell containers near the secondary clarifier (Building 1379) store interior sanitizing solutions (ChemSan 3400) and oxidizers such as calcium hypochlorite and potassium permanganate.

A temporary generator trailer is located to the west of the effluent polishing pond. Two diesel ASTs are located on site adjacent to the two emergency generator buildings (Buildings 1682 and 6850). In the near future, the generator in Building 6850 will be the only permanent generator at the facility.

C. Outdoor Activities

Many outdoor activities at MCBH, Kaneohe Bay use materials or create wastes that have the potential to pollute storm water runoff. Outdoor activities at the WRF include loading and unloading of significant materials, sewage treatment, parking of heavy vehicles, and maintenance of WRF equipment.

Two algae strainers are located at each end of the polishing pond. A significant amount of wastewater was observed to spill out of the strainers to the ground during operation. It is recommended that this wastewater spillage be contained and returned to the polishing pond. Wastewater sludge from the digesters is pumped into one of four sludge drying beds. These concrete sludge drying beds are contained so materials and storm water cannot flow to the environment.

D. Significant Materials Inventory

The following significant materials are located at the WRF:

- Liquid Chlorine
- Hydraulic Fluid
- New and Used Oils
- Solvents
- Paint Thinner
- Grease
- Diesel Fuel
- Raw and Treated Wastewater
- Sludge
- Paints
- General Purpose Cleaner
- Oxidizers

2.2 Potential Storm Water Pollutants

Treated wastewater leaking from the algae strainers to the ground has the potential to interact with stormwater and discharge from the facility along the southern fence.

Materials that have *not* been included as a potential storm water pollutant but have been included as part of the significant materials inventory list, are considered to present a negligible risk to storm water quality. This is based on the nature/location of the primary activities performed with these materials and the BMPs that are in place. Material transport (loading/unloading) is not considered to be a significant threat to storm water, due to spill response procedures, training, and spill kit materials available onsite.

2.3 Best Management Practices (BMPs)

Best Management Practices (BMPs) are techniques or methods that aim to manage the quantity and improve the quality of storm water runoff from a facility or other site. Storm water BMPs intend to reduce or eliminate pollution and contaminants collected by runoff before the runoff reaches the MCBH storm water system or sensitive ecosystems such as streams, wetlands, and marine environments. The following is a summary of BMPs currently in place at the Water Reclamation Facility.

A. Good Housekeeping Practices

In general, Water Reclamation Facility employs good housekeeping practices throughout its operations. Three dumpsters for screened debris collected at the headworks are always covered and lined with this plastic bags. Good housekeeping practices for the WRF are included in Table 2-2.

B. Preventative Maintenance

Preventive maintenance is important as water pollution control measures may be of little or no use if devices and equipment have not been properly maintained. Facility personnel conduct inspection of facility equipment and storage systems that are exposed to storm water on a regular basis. Inspections of the satellite accumulation sites are conducted on a monthly basis, with monthly inspection reports submitted to ECPD, if applicable.

C. Visual Inspections

Visual inspection provides a valuable subjective assessment of the status of storm water management systems. They are easily performed and allow the opportunity for corrective action, if necessary. Site inspections and documentation requirements are addressed in in Section 3 of this SWPPP. MCBH HAZMIN Center staff perform hazardous material inspections monthly. Annual facility inspections are performed by EPCD as part of the MCBH Environmental Compliance Evaluation (ECE).

D. Spill Prevention and Response

Areas where significant material spill or leakage can occur are identified in Section 2.1 and shown on Figure 4-2. The storm water systems and their accompanying drainage points are also shown on Figure 4-2. Refer to Table 2-2 for BMPs related to spill preventative measures for material handling procedures, storage requirements, and equipment usage.

In the event of a hazardous substance or oil spill, the ECC and ECPD shall be notified immediately (ECPD; 808-630-8246). If the spill cannot be easily addressed using an onsite spill kit and personal protective equipment, call Fed Fire (Military 911). The spill source should be immediately controlled if it is safe to do so by closing valves, switches, and/or turning off power to a device. Then, contain the spill by using sorbent socks or absorbent materials found in a spill kit. After it has been contained, clean up the spilled material in a safe manner using dry methods. All materials should then be properly disposed of.

The locations of spill kits are shown in Figure 4-2.

E. Erosion and Sediment Controls

No areas of the WRF have been identified as having a high potential for significant soil erosion that would require erosion and sediment control measures. However, the graded inlet near the headworks is surrounded by a biosock to filter sediment or debris.

F. Best Management Practices to Minimize Pollutant Contact with Storm Water

Facility personnel receive annual training from ECPD at minimum, as well as an initial training for all new personnel. Training information will include the BMPs that have been developed for the facility and a general overview of the storm water program and its objectives.

Existing BMPs at the Water Reclamation Facility are shown in Table 2-2 and attached as fact sheets to this SWPPP in Appendix A.

TABLE 2-2. BEST MANAGEMENT PRACTICES

BMP No.	BMP Title	Description
001	Label All Drums, Cans, Containers, Tanks, and Valves	All containers and drums are labeled.
002	Restrict Access to Area and Equipment	Area is completely enclosed by chain-linked fencing.
003	Perform Regular Cleaning	The facility is clean and well kept, with cleaning conducted on a routine basis.
006	Control Spills	Any spill of significant materials is controlled immediately to prevent pollutant from being transported to receiving water. Spill kits are stored onsite.
016	Store Waste and Recycling Materials in Proper Containers	Waste and recycling containers are located Waste containers will be emptied regularly. Dumpsters should all have lids; lids should be kept closed when not in use.

BMP No.	BMP Title	Description
029	Maintain Equipment in Good Condition	Equipment and facilities are well maintained and in excellent working condition.
055	Use Over-pack Containers or Containment Pallets to Store 1-Pint to 55-Gallon Drums or Containers Outside of Storage Areas	Pallets and containment pallets are used to prevent contact with storm water.
061B	Store Liquids and Significant Materials within a Building or Covered Area	All significant materials are properly stored undercover and in secondary containment where required.
096	Divert Drainage to Treatment Facility/Sanitary Sewer	An area drain, located outside of Building 1378 (grit chamber), is connected to a sanitary sewer line.
113	Conduct Personnel Training Regarding the SWPPP	Personnel are trained regularly (initial orientation and annual refresher).

3 Inspections and Visual Assessments

3.1 Routine Quarterly Site Inspections

The MS4 Permit requires a routine quarterly site inspection by a qualified person with at least one member of the storm water pollution control team participating. At least once each calendar year, the routine inspection must be conducted during a period when a storm water discharge is occurring. The site inspection is an overall evaluation of the effectiveness of the BMPs implemented at that facility. A Routine Facility Inspection Checklist (Appendix B) shall be completed during each routine site inspection and kept onsite with this SWPPP. During normal facility operating hours, inspections must be conducted of areas of the facility including, but not limited to, the following:

- Areas where industrial materials or activities are exposed to storm water;
- Areas identified in the SWPPP and those that are potential pollutant sources;
- Areas where spills and leaks have occurred in the past three years;
- Discharge points; and
- Control measures used to comply with the effluent limits contained in this permit.

3.2 Visual Assessment of Storm Water Discharges

A Quarterly Visual Assessment of storm water discharge is required for all industrial facilities at MCBH. Storm water samples for this visual assessment but must be collected in such a manner that the samples are representative of the storm water discharge from the facility. Therefore, the water sample must be collected at the designated storm water monitoring point as shown in Figure 4-2. The Quarterly Visual Assessment checklist (Appendix C) shall be completed by the current facility ECC and kept onsite with this SWPPP.

The visual assessment must be made:

- Of a sample collected in a clean, colorless glass or plastic container, and examined in a well-lit area;
- On samples collected within the first 30 minutes of an actual discharge from a storm event. If it is not possible to collect the sample within the first 30 minutes of discharge, the sample must be collected as soon as practicable after the first 30 minutes and documented why it was not possible to take the sample within the first 30 minutes; and
- For storm events, on discharges that occur at least 72 hours (three days) from the previous discharge.

Whenever the visual assessment shows evidence of storm water pollution, corrective action procedures to remedy the pollutants must be taken and documented. Refer to Section 4 for corrective action procedures.

4 Corrective Actions

A corrective action is defined as any action taken, or required to be taken, to (1) repair, modify, or replace any stormwater control used at the site; (2) clean up and dispose of spills, releases, or other deposits found on the site; and (3) remedy a permit violation. Corrective actions should be documented using the Corrective Action Log (Appendix D).

4.1 Immediate Actions

If corrective action is needed, you must immediately take all reasonable steps necessary to minimize or prevent the discharge of pollutants until a permanent solution is installed and made operational, including cleaning up any contaminated surfaces so that the material will not discharge in subsequent storm events. Note: In this context, the term "immediately" requires you to, on the same day a condition requiring corrective action is found, take all reasonable steps to minimize or prevent the discharge of pollutants until a permanent solution is installed and made operational. However, if a problem is identified at a time in the workday when it is too late to initiate corrective action, the initiation of corrective action must begin no later than the following workday. "All reasonable steps" means that the permittee has undertaken initial actions to assess and address the condition causing the corrective action, including, for example, cleaning up any exposed materials that may be discharged in a storm event (e.g., through sweeping, vacuuming) or making arrangements (i.e., scheduling) for a new BMP to be installed at a later date.

4.2 Escalating Actions

If additional actions are necessary beyond those implemented or if the conditions continue to occur, additional corrective actions (e.g., install a new or modified control and make it operational, complete the repair) must be completed before the next storm event if possible, and within 14 calendar days from the time of discovery of the corrective action condition. If it is infeasible to complete the corrective action within 14 calendar days, document why it is infeasible to complete the corrective action within the 14-day timeframe and identify a schedule for completing the work, which must be done as soon as practicable after the 14-day timeframe but no longer than 45 days after discovery. If the completion of corrective action will exceed the 45-day timeframe, the minimum additional time necessary to complete the corrective action can be taken, provided that MCBH ECPD and DOH is notified of your intention to exceed 45 days. Where your corrective actions result in changes to any of the controls or procedures documented in your SWPPP, you must modify your SWPPP accordingly within 14 calendar days of completing corrective action work.

4.3 Record of Past Spills or Leaks of Hazardous Pollutants

Table 4-1 is used to record significant spills and leaks that have occur or have occurred within three years prior to the preparation or amendment of this SWPPP. Significant spills and leaks include, but are not limited to, releases of oil or hazardous substances in excess of quantities that are reportable under CWA Section 311 (see 40 CFR 110.6 and 40 CFR 117.21) or Section 102 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 USC §9602.

At the time of this SWPPP update, there have been no past spill or leak incidents reported for the Water Reclamation Facility.

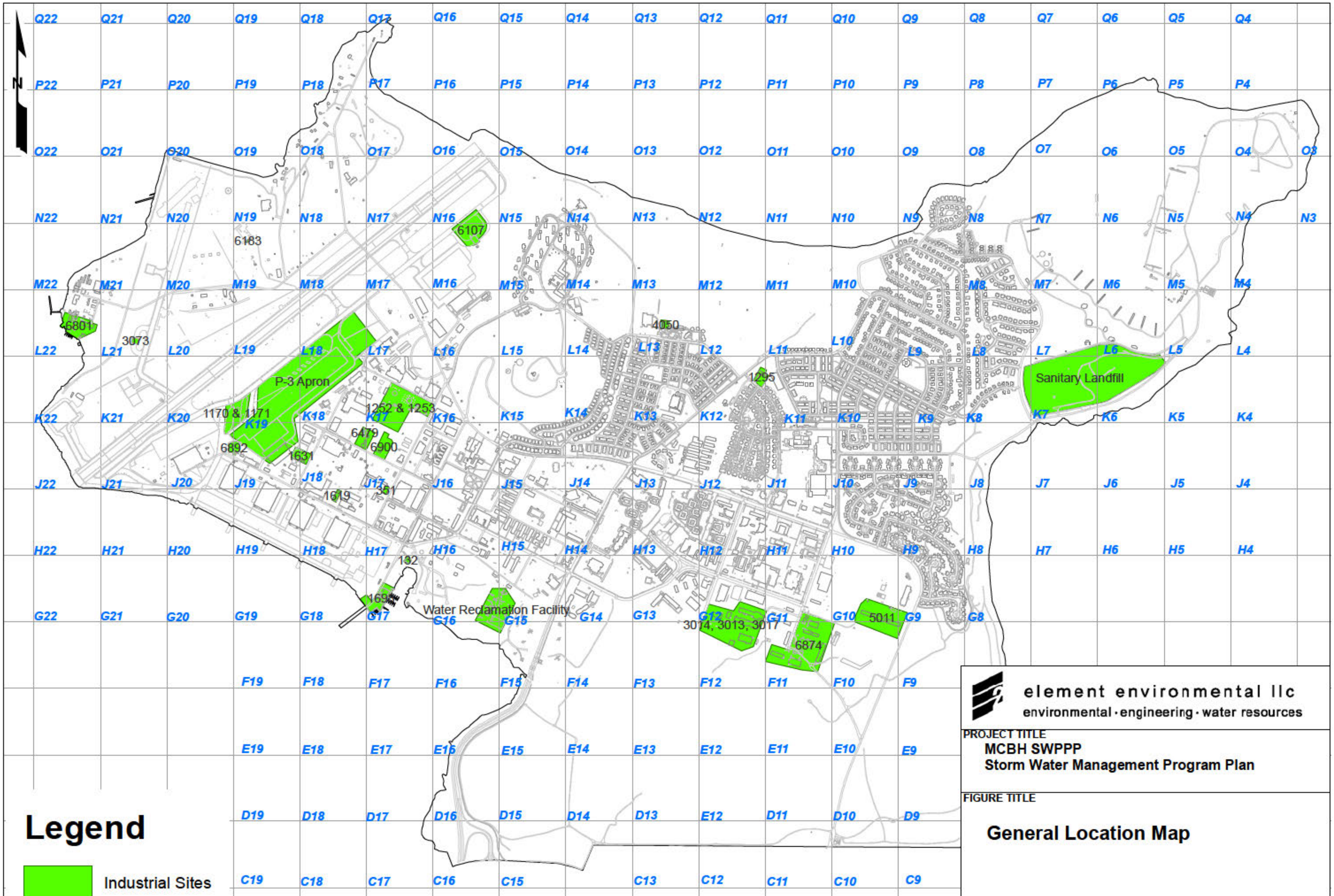
TABLE 4-1. PAST SPILLS OR LEAKS OF HAZARDOUS POLLUTANTS

Date of Incident	Brief Summary of Incident (POC Active at Time of Incident, Pollutant Type, Estimated Quantity, Location of Spill)

4.4 Record of Unauthorized Non-Storm Water Discharges

TABLE 4-2. UNAUTHORIZED NON-STORM WATER DISCHARGE EVALUATION

Date of Evaluation	**Brief Summary of Evaluation** **(Description of the evaluation criteria, outfalls or onsite drainage points that were directly observed, action(s) taken, such as a list of control measures used to eliminate unauthorized discharge)**



Legend

Industial Sites

1,800 900 0 1,800 Feet

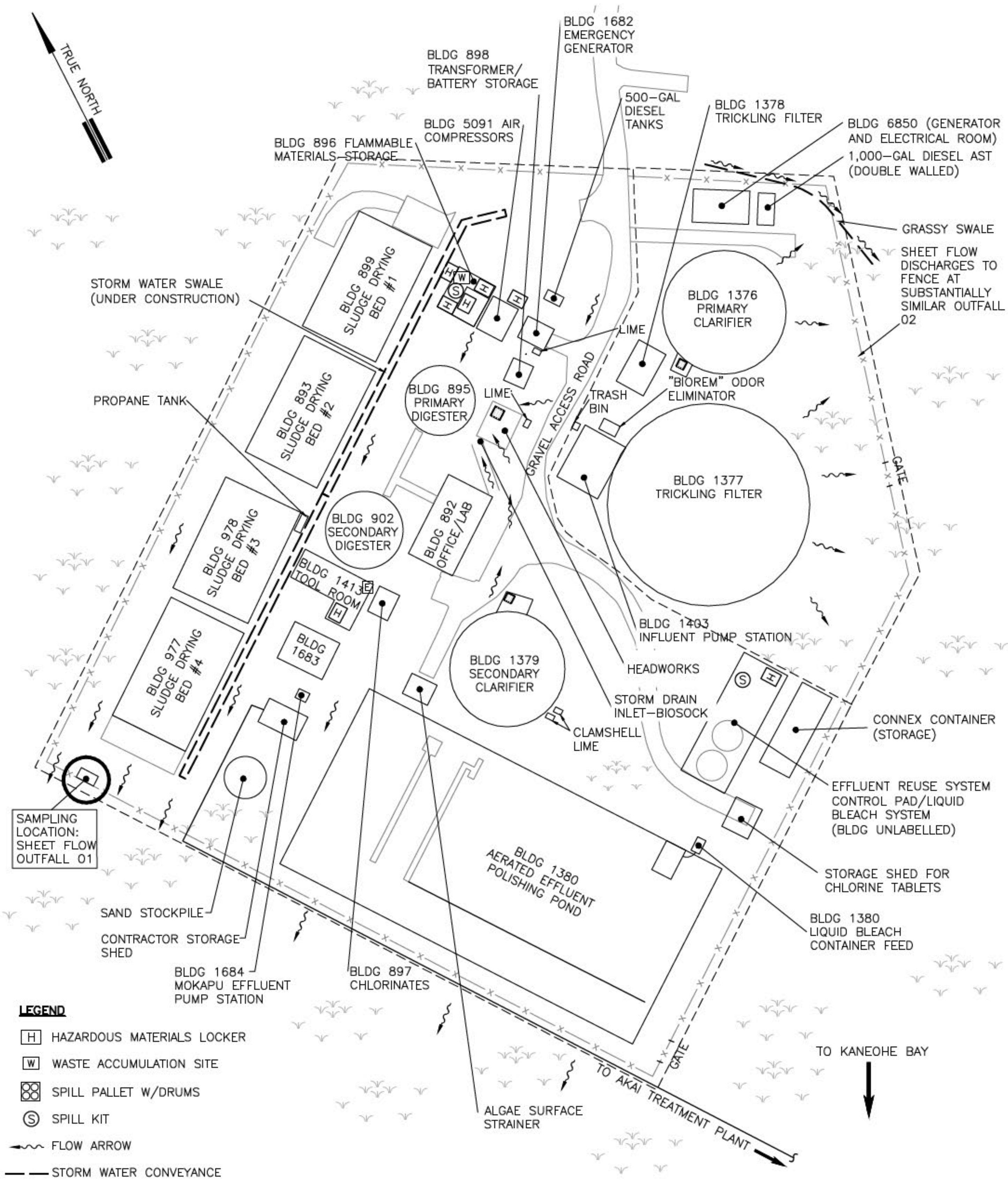
element environmental llc
environmental · engineering · water resources

PROJECT TITLE
MCBH SWPPP
Storm Water Management Program Plan

FIGURE TITLE
General Location Map

DATE
September 2022

FIGURE NO.
4-1



LEGEND

- H HAZARDOUS MATERIALS LOCKER
- W WASTE ACCUMULATION SITE
- SPILL PALLET W/DRUMS
- S SPILL KIT
- FLOW ARROW
- STORM WATER CONVEYANCE
- DISCHARGE AREA BOUNDARY

NOTES:

1. STORM WATER, FROM APPROXIMATELY 4.6 ACRES, ASSOCIATED WITH THE WATER RECLAMATION FACILITY, DISCHARGES TO KANEOHE BAY VIA SURFACE RUNOFF.
2. NOT TO SCALE

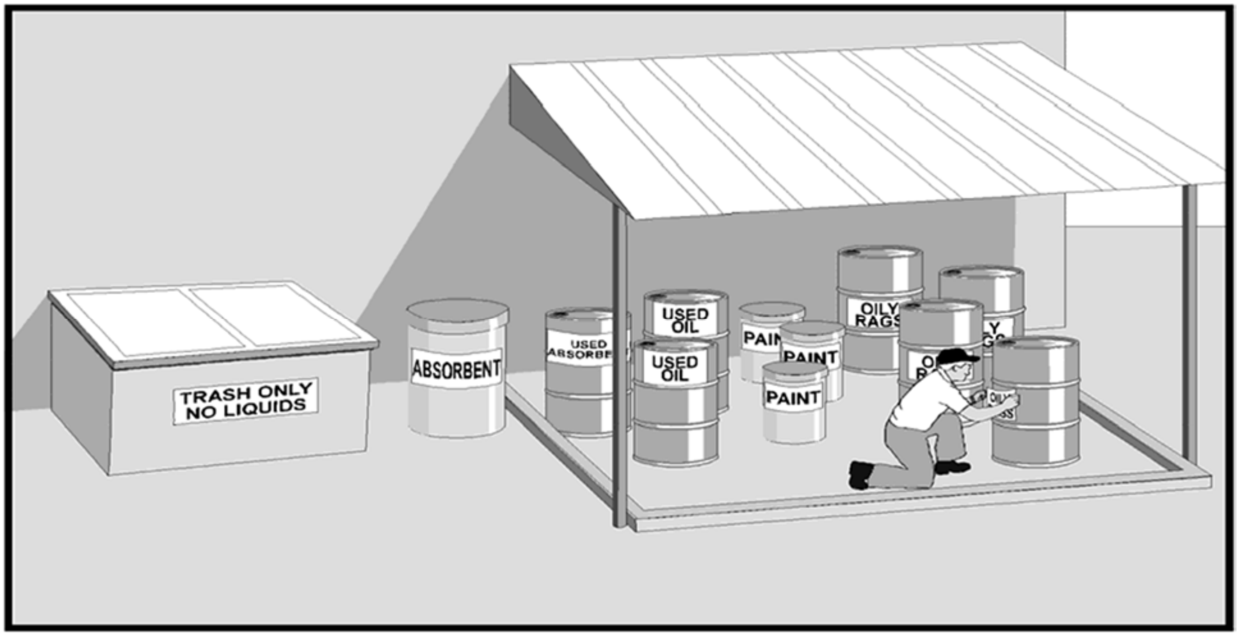
DATE:	PROJECT TITLE:	
JULY 2022	STORM WATER POLLUTION PREVENTION PLAN MCBH, KANEOHE BAY, OAHU, HAWAII	
FIGURE TITLE:		FIGURE NO.:
WATER RECLAMATION FACILITY		4-2

DAMATO
8/1/2022 1:08:32 PM
FIG 4-2 Water Reclamation Facility.dwg

APPENDIX A

SELECTED BMP FACT SHEETS

BMP 001 - LABEL ALL DRUMS, CANS, CONTAINERS, AND TANKS



<u>Description of Potential Pollutant and Source</u>: Drums, cans, and containers can be improperly managed and disposed of due to uncertainty of the container's contents. Tanks which are not labeled may result in improper use of the tank or fuel, which may result in the exposure of significant materials to storm water and/or receiving waters. Similarly, unlabeled valves may be opened without proper precaution due to lack of user information. Storm water quality will be affected if significant materials are improperly disposed to the storm drain and/or receiving waters. Lack of labeling will also make it difficult to quickly identify the type of material released so facility personnel can respond correctly. Labels also identify hazardous materials at the facility and are a good way to request caution in certain areas (e.g., drums indicating flammability).

<u>Description of BMP:</u> Label all drums, valves, pumps, cans, tanks, and containers to reduce the chance of misuse and eventual spills. Labeling ensures that the appropriate procedures, equipment, and storage containers are used. All containers will be labeled as to what is in them.

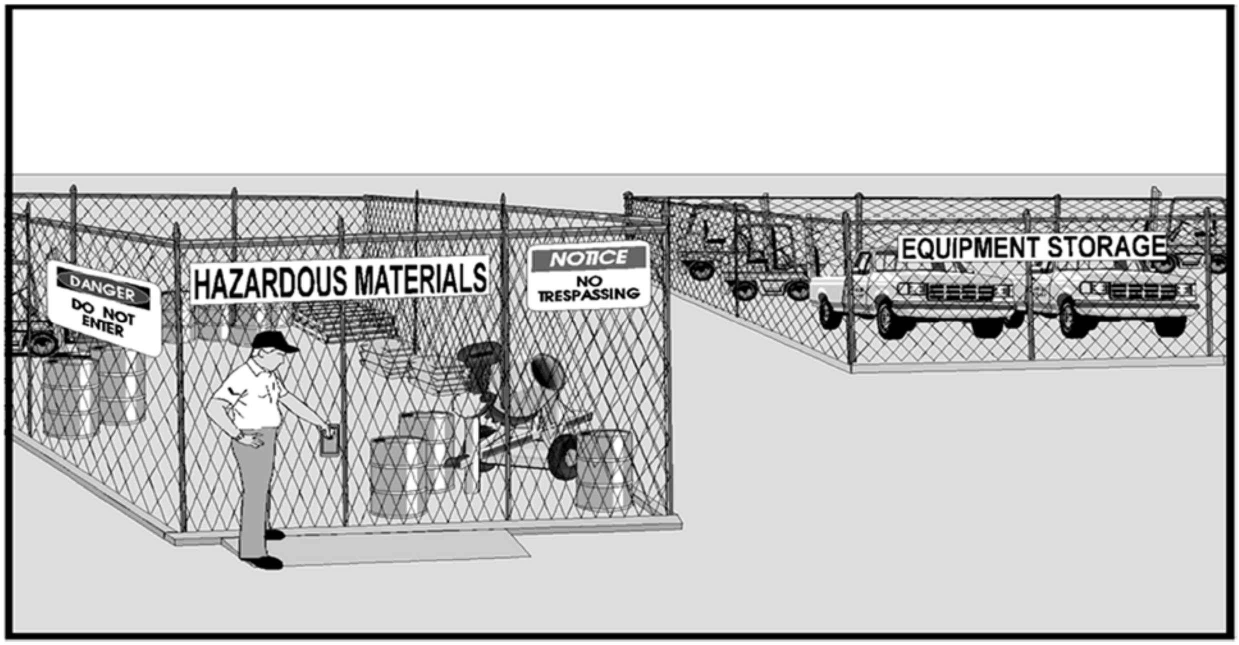
<u>Application Guidance:</u> As needed.

<u>Training:</u> N/A

<u>Effectiveness and Cost:</u> Effectiveness and costs will vary depending on the application.

<u>Limitations:</u> None

BMP 002 - RESTRICT ACCESS TO AREA AND EQUIPMENT



Description of Potential Pollutant and Source: Vandalism of vehicles and facility property may result in the release of significant materials.

Description of BMP: Provide fences and gate areas where vehicles, equipment and materials are stored and are accessible to the public to discourage trespassing. Access to equipment will also be restricted. Only authorized personnel will be allowed to operate equipment. The fences and gates will be properly maintained, and additional security measures including lighting of the area will be implemented if the fencing alone proves insufficient. Where appropriate, security guards or alarms will be used.

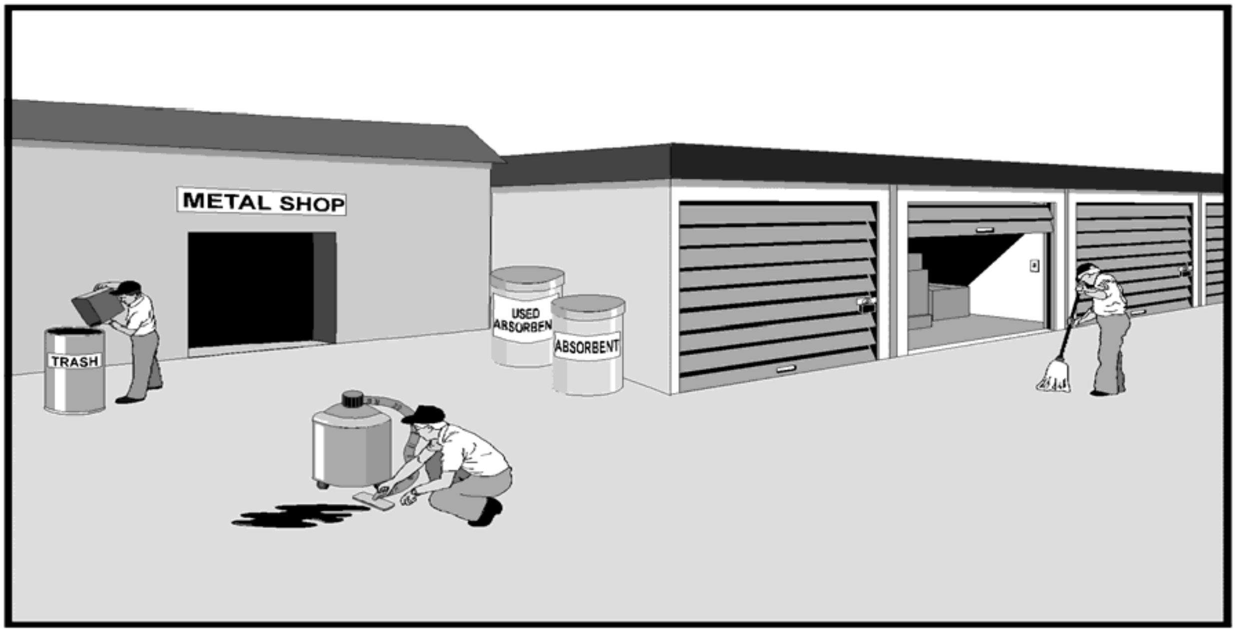
Application Guidance: As needed.

Training: N/A

Effectiveness and Cost: Effectiveness and costs will vary depending on the application.

Limitations: None

BMP 003 - PERFORM REGULAR CLEANING



Description of Potential Pollutant and Source: Dirt, surplus materials, and spilled or dropped materials are often allowed to accumulate in areas such as maintenance shops, manufacturing facilities, metal fabrication shops, loading docks, and storage areas. Pollutants from the accumulated material can be transported by storm water to the storm drain system. A clean and orderly work area reduces the possibility of accidental spills caused by mishandling of chemicals and equipment and should reduce safety hazards to personnel.

Description of BMP: Maintain a regular general sweeping and cleaning schedule to reduce buildup of waste materials and minimizes the amount of significant materials exposed to storm water. General cleaning includes dusting and keeping work areas neat and organized.

Floors and ground surfaces will be kept dry using brooms, shovels, vacuum cleaners, or cleaning machines. It is important to perform dry sweeping and dry cleaning (as opposed to hosing down areas as discussed in BMP 004). Garbage and waste materials will be collected and disposed regularly. Particular emphases will be placed on sweeping and cleaning outdoor areas as close as possible to a forecasted rainfall. Any granular absorbent materials used for spill cleanup will be removed and properly disposed before a rainfall.

Application Guidance: Cleanup and sweeping will be performed daily and more often as necessary to remove all loose trash, paint cans, discarded construction materials, sediment, oil, solvents, plastics and other significant materials. Additional clean up and sweeping will be performed before anticipated storm events. Additionally, a regular sweeping schedule will be maintained.

The frequency for implementing this BMP has been provided as general guidance. However, a facility operator may wish to establish a more suitable frequency. This will require SWPPP implementor to make judgements based on facility operations and conditions. To assign a frequency other than what has been suggested (i.e., more or less frequent), the following criteria will be considered and rated either High, Medium, or Low. If many of the criteria are assigned a High rating, the frequency may be increased. Similarly, if many criteria are assigned a Low rating, the frequency may be decreased. The goal of implementing this BMP is to minimize exposure of pollutants to storm water.

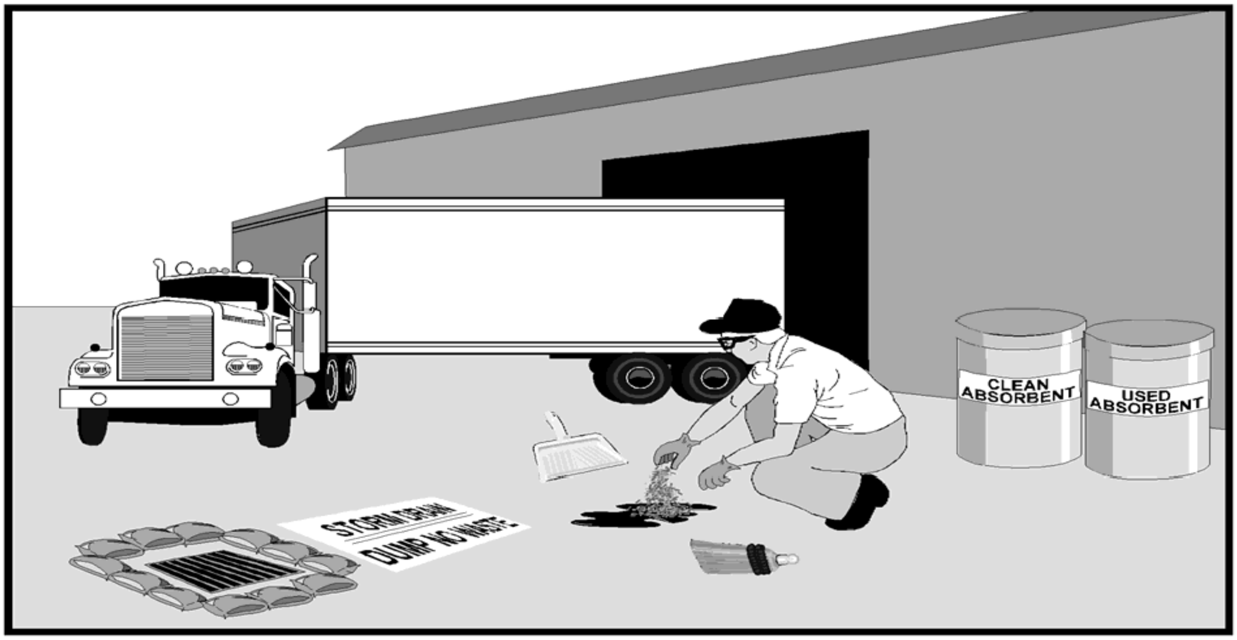
CRITERIA	Rating H=High BMOM=Medium L = Low
Probability of exposure of significant materials to storm water	
Quantity of significant materials potentially exposed	
Toxicity of significant materials potentially exposed	
Frequency of use of significant materials potentially exposed	
Evidence of exposure (e.g., stains on pavement, etching of concrete)	
Proximity of source area to outfall or receiving water	
Sensitivity of receiving water to potentially exposed significant materials (e.g., waters with beneficial uses such as human contact, recreation, significant species habitat, etc.)	

Training: Personnel will be trained to ensure that all waste be managed within guidelines of applicable federal, state, and local regulations. Signs will be posted as reminders.

Effectiveness and Cost: Regular general cleaning is a highly effective, low-cost BMP.

Limitations: None

BMP 006 - CONTROL SPILLS



Description of Potential Pollutant and Source: Spills of significant materials may be exposed to storm water and transported to storm drains and/or receiving waters.

Description of BMP: Follow safety data sheets (SDS) for handling, storage, and cleanup of all significant materials to reduce the potential for spills.

Any spill, large or small, of significant materials will be controlled to prevent pollutants from being transported to storm drains and/or receiving waters. Appropriate spill control material will be kept on site. Smaller spills will be contained using absorbent material such as kitty litter, straw, or sawdust. Drums of absorbent material will be easily accessible and clearly marked, and containers for spent absorbent material will be readily available. Spent absorbent material will be managed appropriately and disposed of in accordance with applicable regulations. Larger spills will be controlled using spill kits, brooms, and other response equipment commensurate with the size of the spill. The methods outlined in the Activity's spill prevention and response plans (BMP 112) for hazardous materials will be followed for spills of any potential storm water pollutants. The date, time, nature and volume of material spilled, and cleanup measures taken will be recorded for all spills and kept as part of the SWPPP.

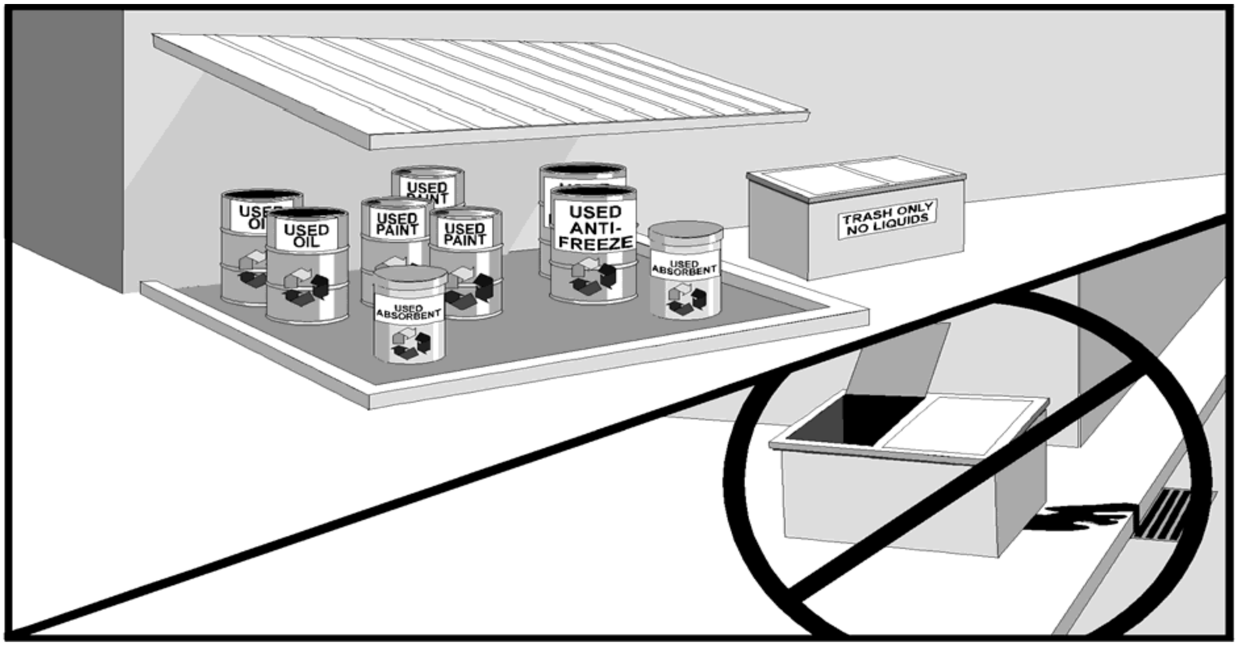
Application Guidance: Controlling spills will be practiced under all working conditions.

Training: Personnel will be trained in spill prevention and response procedures including the use of personal protection equipment (gloves, eye and face protection, etc.). This will include what absorbent or equipment to use, how to use the absorbent or equipment, where to find it, how to dispose of the spent absorbent or other material, and who to notify in the event of a spill.

Effectiveness and Cost: Spill control is a moderately effective, low-cost BMP.

Limitations: None

BMP 016 - STORE WASTE AND RECYCLING MATERIALS IN PROPER CONTAINERS



Description of Potential Pollutant and Source: Dry waste, including items such as scrap metal, floor sweepings, metal chips, and paper goods, can be dispersed by wind or operational error if not stored properly. If a dumpster's lid is not kept closed, animals may carry garbage out of the containers. Uncovered dumpsters also expose waste to storm water, which may leak out of the dumpster and into the storm sewer system.

Description of BMP: Locate waste and recycling drums and containers in centralized areas, using proper labeling (both containers and location) and providing easy access. If possible, the area will have secondary containment (see BMPs 012, 013, and 014). Waste containers will be emptied regularly. Dumpsters will all have lids; lids will be kept closed when not in use. If the dumpster has inadequate capacity and it is not possible to keep the cover closed, the frequency of pick-up will be increased, or the dumpster will be replaced with a model of greater capacity.

Application Guidance: This BMP will be applied to all waste and recycling storage areas.

Training: Personnel will be trained to monitor waste and recycling storage sites to ensure their materials are properly stored and that there are no overflowing containers.

Effectiveness and Cost: This is a moderately effective, low-cost BMP.

Limitations: None

BMP 029 - MAINTAIN EQUIPMENT IN GOOD CONDITION

Description of Potential Pollutant and Source: Equipment may leak fuel, grease, oil, or other potential pollutants due to corrosion, loose fittings, poor welding, and improper or poorly fitted gaskets. Without regular inspection of equipment and facilities, leaking or poorly operating equipment may continue to be used without being repaired.

Description of BMP: Keep equipment in good working condition and inspect regularly for fluid leaks. Equipment which is leaking or in poor working condition will be repaired or replaced.

Application Guidance: Equipment will be inspected daily before use for leaks and maintained in good condition at all times. Equipment which is not frequently used will be inspected monthly. The frequency for implementing this BMP has been provided as general guidance. However, a facility operator may wish to establish a more suitable frequency. This will require SWPPP implementors to make judgements based on facility operations and conditions. To assign a frequency other than what has been suggested (i.e., more or less frequent), the following criteria will be considered and rated either High, Medium, or Low. If many of the criteria are assigned a High rating, the frequency may be increased. Similarly, if many criteria are assigned a Low rating, the frequency may be decreased. The goal of implementing this BMP is to minimize exposure of pollutants to storm water.

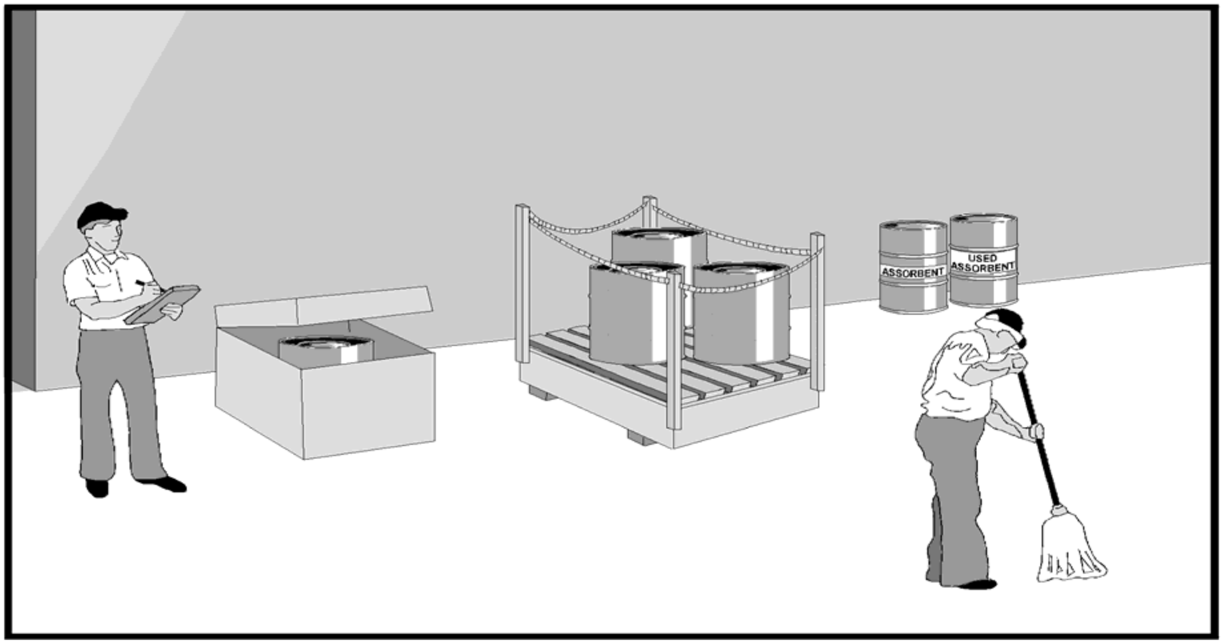
CRITERIA	Rating H=High M=Medium L=Low
Probability of exposure of significant materials to storm water	
Frequency of use of equipment and vehicles	
Intensity of use of equipment	
Old age or poor condition of equipment or systems	
Evidence of exposure (e.g., stains on pavement, etching of concrete)	
Proximity of vehicle/equipment use to outfall or receiving water	
Sensitivity of receiving water to potentially exposed significant materials (e.g., waters with beneficial uses such as human contact, recreation, significant species habitat, etc.)	

Training: Personnel will be trained to regularly inspect for leaks or conditions that could lead to the exposure of significant materials to storm water. Personnel will be trained to routinely inspect equipment before each use. Procedures for notifying the appropriate maintenance personnel if a leak is found will be established.

Effectiveness and Cost: Keeping equipment in good condition is a moderately effective BMP. The cost of repairing or replacing equipment will vary.

Limitations: None

BMP 055 - USE OVERPACK CONTAINERS OR CONTAINMENT PALLETS TO STORE 55-GALLON DRUMS OUTSIDE OF STORAGE AREAS



Description of Potential Pollutant and Source: Chemicals, oils, solvents or liquid materials stored outside in 55-gallon drums may leak. The leaking material can then be exposed to storm water and transported to the storm drain system receiving waters.

Description of BMP: Use overpack containers and containment pallets for 55-gallon drums stored outside. Overpack containers and containment pallets are secondary containers usually constructed of plastic. They are large enough to hold the contents of the containers stored in them if they should break or leak. Using overpack containers or containment pallets minimizes the amount of pollutants reaching surface waters due to leaks. Overpack containers will be protected against damage from vehicles.

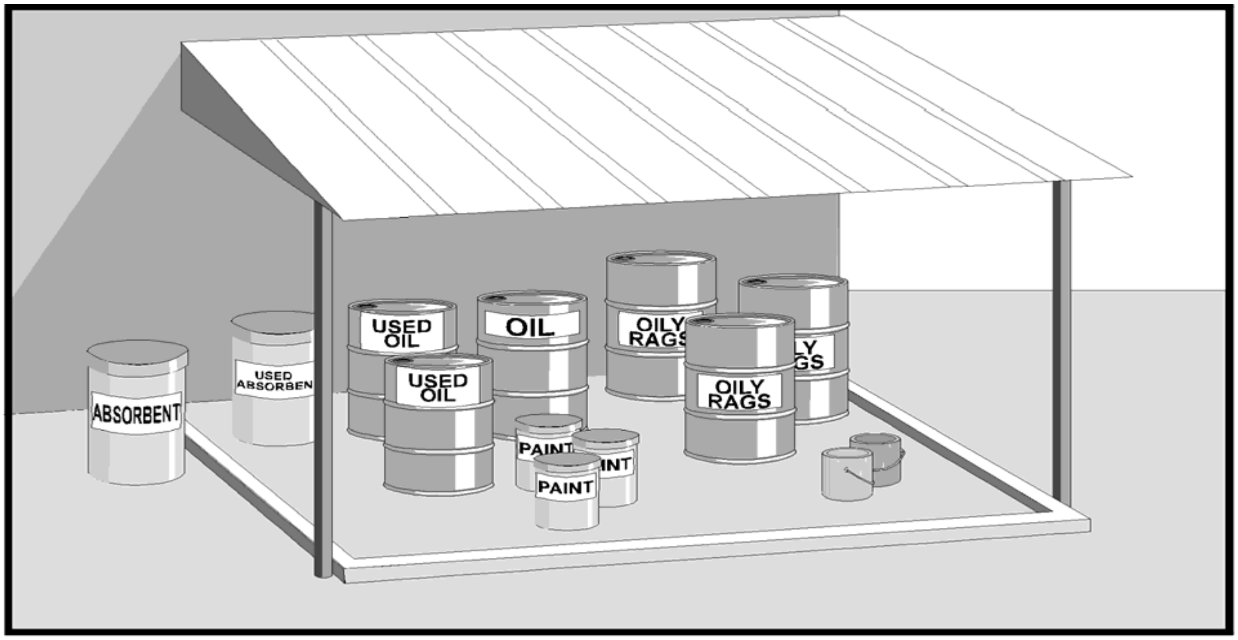
Application Guidance: Overpack containers or containment pallets will be used whenever 55-gallon drums of hazardous materials must be stored outside.

Training: Personnel will be trained to ensure that overpack containers or containment pallets are used.

Effectiveness and Cost: Overpack containers and containment pallets are a highly effective, moderate-cost BMP.

Limitations: Cost could be high if the number of drums needing containment is high.

BMP 061B - STORE LIQUIDS AND SIGNIFICANT MATERIALS WITHIN A BUILDING OR COVERED AREA



Description of Potential Pollutant and Source: Many significant materials may be leaked or spilled during storage, handling, or transport. If significant materials are stored outside, in covered areas, these materials can be exposed to storm water, which can transport the leaked or spilled material into the storm drain system.

Description of BMP: To the extent practical, store significant materials within a building or covered area. The materials will be stored on an impervious surface, such as a concrete pad. Rainfall runoff from the pad will be directed to a storm water treatment facility or contained. Leaks and spills will be cleaned up as soon as possible using rags or dry absorbents (see BMP 006). Used rags and absorbents will be disposed of properly. Any wash water from cleaning the floor will be disposed of in the sanitary sewer (see BMP 042).

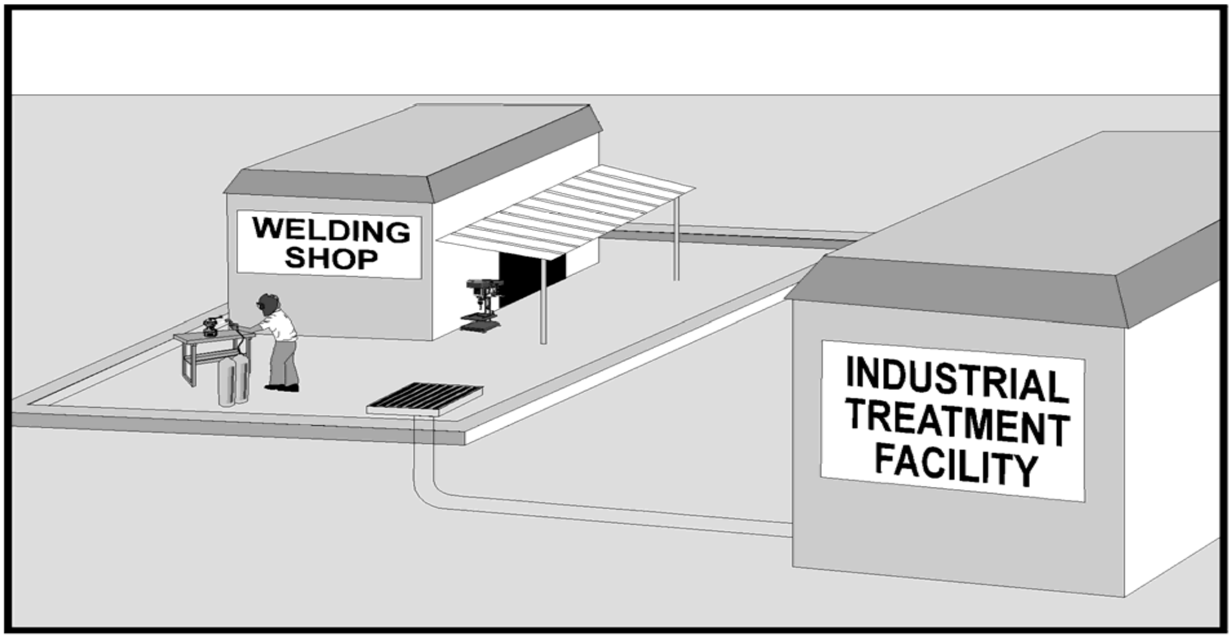
Application Guidance: All significant materials will be stored within a building or covered area.

Training: Personnel will be trained to store significant materials in designated areas.

Effectiveness and Cost: This is a moderately effective BMP. The cost will vary based on whether a building for storing the substances is available.

Limitations: None

BMP 096 - DIVERT DRAINAGE TO TREATMENT FACILITY/SANITARY SEWER



Description of Potential Pollutant and Source: Diverting drainage to treatment facilities prevents significant materials from entering the storm drain system.

Description of BMP: Use pipes, ditches, swales and other types of conveyance systems to divert drainage from industrial areas which may be exposed to significant materials to a wastewater treatment facility or sanitary sewer.

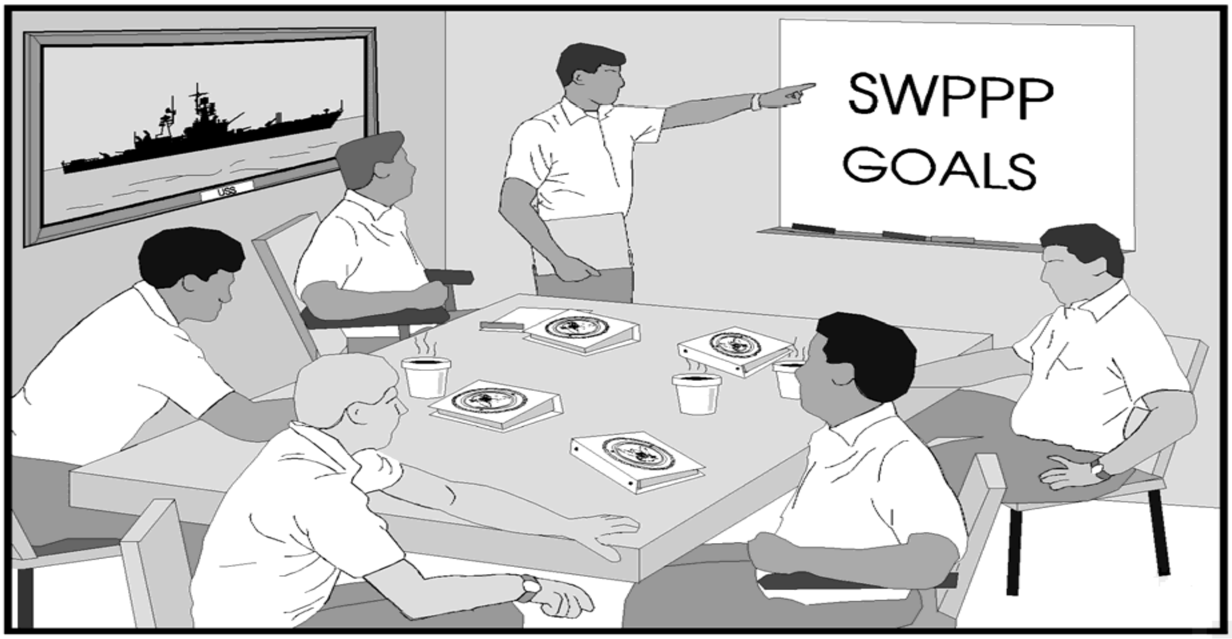
Application Guidance: If source controls cannot be used to keep pollutants from entering the storm water runoff, diverting drainage to treatment facilities/sanitary sewers is the most effective method or reducing pollutants to receiving waters.

Discharge of large quantities of storm water is not practical or allowed by most wastewater treatment facilities. This BMP will only be used for small quantities of highly polluted water. This may include equipment or vehicle wash water, boiler blowdown, or runoff from maintenance areas (with no off-site drainage onto area).

Effectiveness and Cost: Diverting drainage from industrial areas is a highly effective, high-cost BMP. The initial construction cost of a connection to a sanitary sewer may not be high, if a sewer is located nearby. However, the continuing operating cost of the treatment facility which will treat the diverted drainage makes this a high-cost BMP.

Limitations: Permission must be granted by the wastewater treatment facility to divert the drainage to the facility. In addition, certain pollutants in the runoff may not be removed at a traditional treatment facility. This BMP is not feasible if there is a large quantity of runoff that must be controlled.

BMP 113 - CONDUCT PERSONNEL TRAINING REGARDING THE SWPPP



Description of Potential Pollutant and Source: When properly trained, personnel are more capable of preventing spills, responding safely and effectively to an accident when it occurs, and recognizing situations that could lead to storm water contamination.

Description of BMP: Train personnel at all levels of responsibility in the components and goals of the SWPPP.

Application Guidance: Training will be conducted quarterly and at new personnel orientations.

Training: Training will address each component of the SWPPP, including how and why tasks are to be implemented. Topics will include:

- Good housekeeping
- Material management practices
- Spill prevention and response

Effectiveness and Cost: This is a highly effective, moderate-cost BMP.

Limitations: None

APPENDIX B

ROUTINE FACILITY INSPECTION CHECKLIST

Routine Facility Inspection Checklist

Activity Name: ______________________ **Date of Inspection:** ______________________

Inspector(s): ______________________ **Facility Name/Number:** ______________________

Column 1	Column 2	Column 3	Column 4	Column 5	
Source Area	BMP Number and Title	Status: F, P, N, NA[1]	Briefly Describe Effectiveness (Good or Other [describe])	Corrective Measures	
				What	By When

Note 1: F – Fully implemented, P – Partially implemented, N – Not implemented , NA – Not Applicable

APPENDIX C

QUARTERLY VISUAL ASSESSMENT CHECKLIST

Quarterly Visual Assessment Checklist

Facility ID and Location: ____________________

Date: ____________________

Sampler Name (Printed): ____________________ Signature: ____________________

Time of Rainfall Begin: ____________ Time of Rainfall End: ____________

Time of Flow Begin: ____________ Time of Flow End: ____________

Rainfall event more than 72 hours since last event? Yes / No Rainfall Event Total: ____________

Sample: sample in a clean, colorless glass or plastic container, and examined in a well-lit area

On samples collected within the first 30 minutes of an actual discharge from a storm event

Sample Characteristics:

Color: ____________ Floating Solids: ____________

Odor: ____________ Settled Solids: ____________

Clarity: ____________ Suspended Solids: ____________

Oil Sheen: ____________ Foam: ____________

Other Obvious Indicators of Storm Water Pollution

(describe): ____________________

Nature of the discharge (i.e., runoff):

Results of observations of the storm water discharge:

Probable sources of any observed storm water contamination:

If applicable, why it was not possible to take samples within the first 30 minutes:

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

APPENDIX D

CORRECTIVE ACTION LOG

Corrective Action Log

Use this form to document SWPPP corrective actions. This form is to be completed by the Environmental Compliance Coordinator (ECC) or a person designated by ECC and submitted to the MCBH Storm Water Program Manager. The Storm Water Program Manager is responsible for any notification to the State of Hawaii Department of Health (DOH), if required.

A corrective action is defined as an action taken to:

a) Repair, modify, or replace any storm water control used at the site;

b) Clean up and properly dispose of spills, releases, or other deposits; or

c) Remedy a permit violation.

1. Corrective Action Triggers

The following events trigger a corrective action to be taken (this triggering condition is to be documented *within 24 hours* of discovering the occurrence):

a) A required storm water control was never installed, was installed incorrectly, or is not in accordance with the requirements in the SWMP Plan.

b) A member of the **Storm Water Pollution Control Team** becomes aware that the storm water controls installed and being maintained are not effective enough for the discharge to meet applicable water quality standards or applicable requirements in the MCBH SWMP Plan. The facility ECC shall notify the Storm Water Program Manager immediately. The Storm Water Program Manager will notify DOH *by the end of the next work day*.

1.1 Log Notifications:

Date/time Storm Water Program Manager notified by ECC: ________________________

Date/time DOH notified by Storm Water Program Manager: ________________________

1.2 Describe Discharge:

Indicate which one of the following prohibited discharges is occurring or has occurred:

❒ Wastewater from washout of concrete

❒ Wastewater from washout and cleanout of stucco, paint, form release oils, curing compounds, or other construction materials

❒ Fuels, oils, or other pollutants used in vehicle and equipment operation and maintenance

❒ Soaps, solvents, or detergents used in vehicle and equipment washing

❒ Toxic or hazardous substances from a spill or other release

❒ Other, Explain: ____

2. Requirements for Taking Corrective Actions

The ECC shall complete corrective actions in accordance with the deadlines specified below. In all circumstances, site personnel shall *immediately* take all reasonable steps to minimize or prevent the discharge of pollutants until a permanent solution is installed and made operational, including cleaning up any contaminated surfaces so that the material will not discharge in subsequent storm events. *Immediately* means the same day the condition is discovered, unless it is too late in the day, in which initiation of corrective action must begin on the following work day.

Following any of the above triggering events, the ECC shall install a new or modified control and make it operational, or complete the repair, by *no later than 7 calendar days from the time of discovery*. If it is not feasible to complete the installation or repair within 7 calendar days, the ECC shall document and submit to the Storm Water Program Manager, for their agreement, why it is not feasible to complete the installation or repair within the 7-calendar day timeframe and document a schedule for installing the storm water control and making it operational as soon as practicable after the 7-day timeframe.

If the issue is not adequately addressed within 7 calendar days or the agreed upon timeframe, enforcement procedures will be initiated. Unaddressed issues will be escalated through the chain of command. The MCBH Environmental Compliance and Protection Division Director will give the responsible party a formal notice with an appropriate deadline for action. If the problem remains unchanged, the situation will be brought to the attention of the next higher authority. The ultimate penalty for non-compliance of MS4 Permit regulations is eviction or discharge of the responsible party from MCBH. This is placed at the discretion of the Base Commander. See the Enforcement Response Plan in Appendix 3-6 of the SWMP Plan for further information on MCBH's enforcement policies.

3. Corrective Action Report

Within 24 hours of discovering the occurrence of one of the triggering conditions in SWPPP Section 4.1 at the site, the ECC must complete the following:

3.1 Describe the triggering condition:

____
____
____
____

3.2 Record the date/time of the condition identified. How was the condition identified?

____
____
____
____

3.3 Describe the corrective action taken:

____
____
____

Date/time installation or repair was completed:
(or date/time the prohibited discharge ceased) ____

Or describe why it is not feasible to complete installation or repair within 7 calendar days and detail a proposed schedule (if applicable)

____
____
____

4. Resolution of the Corrective Action Trigger

Within 7 calendar days of initiating the Corrective Action Report, the ECC must complete a report of the following:

4.1 Follow-up Actions

Describe any follow-up actions taken to review the design, installation, and maintenance of storm water controls, including the dates such actions occurred:

____
____
____

4.2 Storm Water Control Modifications

Provide a summary of storm water control modifications implemented. Include a schedule of activities required to implement changes and the date the modifications were completed or will be completed:

____
____
____

5. SWPPP Modification Due to Corrective Actions

Where corrective actions result in changes to any of the storm water controls or procedures documented in the SWPPP, modify the SWPPP accordingly *within 7 calendar days* of completing corrective action work.

Are modifications to the SWPPP necessary? ❑ Yes ❑ No

Date modifications to the SWPPP shall be completed _______________

6. Corrective Actions Required by DOH

The facility shall comply with any corrective actions required by DOH as a result of permit violations found during an inspection by DOH or the Environmental Protection Agency (EPA).

Was the Corrective Action triggered by a DOH/EPA inspection?

❑ Yes ❑ No

❑ Date of DOH/EPA Inspection __________________

7. Additional Comments:

____
____

Final

STORM WATER POLLUTION PREVENTION PLAN

Storm Water Management Program Plan

Marine Corps Base Hawaii, Oahu, Hawaii

NPDES Permit No. HI S000007

COMBAT LOGISTICS BATTALION (CLB-3) SUPPORT COMPANY TRANSPORTATION SERVICES (BUILDING 3014)

Prepared by:

Marine Corps Base Hawaii

August 2022

Table of Contents

Tables

Figures

Appendices

List of Acronyms and Abbreviations

BMP	Best Management Practice
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CLB-3	Combat Logistics Battalion 3
CLC-33	Combat Logistics Company 33
CWA	Clean Water Act
CWB	Clean Water Branch
DRMO	Defense Reutilization Marketing Office
DOH	State of Hawaii Department of Health
ECC	Environmental Compliance Coordinator
ECE	Environmental Compliance Evaluation
ECPD	Environmental Compliance and Protection Division
EPA	United States Environmental Protection Agency
FRC	Flatrack Refueling Capability
HAZMAT	Hazardous Material
HAZMIN	Hazardous Material Minimization
HMMWV	High Mobility Multipurpose Wheeled Vehicle
JLTV	Joint Light Tactical Vehicle
LVSR	Logistics Vehicle System Replacement
MCBH	Marine Corps Base Hawaii
MMV	Millennia Military Vehicles
MS4	Municipal Separate Storm Sewer System
MS4 Permit	Marine Corps Base Hawaii's NPDES Permit No. HI S000007
MTVR	Medium Tactical Vehicle Replacements
NPDES	National Pollutant Discharge Elimination System
OWS	Oil/Water Separator
POC	Point of Contact
SAS	Satellite Accumulation Site
SWMP	Storm Water Management Program
SWPPP	Storm Water Pollution Prevention Plan

Certification Statement

MCBH is committed to the prevention of discharges of polluted storm water to navigable waters or the environment and maintains the highest standards for best management practices through periodic review, updating, and implementation of this Storm Water Pollution Prevention Plan (SWPPP).

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information contained therein. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Name: ____________________ Title: ____________________

Signature: ____________________ Date: ____________________

Management Review

Refer to Section 1.2 for more information on required SWPPP updates.

Review Dates	Signature	Amendment Required? (Y/N)
____________	__________________	__________
____________	__________________	__________
____________	__________________	__________
____________	__________________	__________
____________	__________________	__________
____________	__________________	__________

1 Introduction

As part of Federal regulations administered through the Clean Water Act (CWA), the State of Hawaii, Department of Health (DOH) has issued the National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4) Permit No. HI S000007 (referred to herein at the "MS4 Permit") to Marine Corps Base Hawaii (MCBH). The MS4 Permit requires that MCBH provide all existing industrial facilities, identified in MCBH's MS4 Permit application, and any newly identified industrial facilities, submitted to DOH using the "MS4 NPDES Individual Permit – Industrial Storm Water Discharge Notification Form," with a Storm Water Pollution Prevention Plan (SWPPP) for storm water associated with industrial activities.

The purpose of the regulations is to protect water quality by reducing the amount of pollutants in storm water runoff caused by industrial activities.

1.1 SWPPP Implementation

The storm water management controls of this plan will become MCBH procedure for the applicable industrial facility. An up-to-date copy of the SWPPP shall be maintained on site and at the MCBH Environmental Compliance and Protection Division (ECPD). Management staff, maintenance personnel, contractor staff, and other personnel involved in onsite industrial activities, will be knowledgeable of the plan and follow the guidelines set forth in it, in addition to any other pertinent base-wide, state and federal regulations.

Day-to-day implementation of the SWPPP is primarily the responsibility of the current facility Environmental Compliance Coordinator (ECC) or Point of Contact (POC) as identified in Table 2-1. Enforcement of the permit conditions and this SWPPP are ultimately the responsibility of ECPD and additional escalating levels of authority as specified in the Enforcement Response Plan developed by MCBH for its base-wide Storm Water Management Program (SWMP) Plan.

1.2 Updating the SWPPP

This SWPPP will be reviewed as needed to identify necessary changes, at a minimum of every five years. Updates may be required due to current best management practice (BMP) failures, spill events, changes in industrial activities, changes in features, corrective actions, or other necessary changes. Personnel changes to the Storm Water Pollution Control Team (Section 2.1) should be logged in Table 2-1. Storm Water Pollution Control Team Log. ECPD will be responsible for approving revisions to the SWPPP. In the event the plan is modified, a copy of the updated SWPPP will remain at ECPD and will be provided to the applicable facility. Additionally, ECPD shall document and report the SWPPP changes to the DOH, Clean Water Branch (CWB), within thirty days of when the changes arise.

2 Combat Logistics Battalion (CLB-3) Support Company Transportation Services, Building 3014

The Combat Logistics Battalion (CLB-3) Support Company Transportation Services, Building 3014, is located within MCBH, Kaneohe Bay at the southern end of Craig Avenue. The facility compound encompasses approximately 14.25 acres and can be found in grid [redacted] of the MCBH Base Map, see Figure 4-1. The facility-specific map is shown on Figure 4-2.

2.1 Storm Water Pollution Control Team

The Storm Water Pollution Control Team consists of the Storm Water Program Manager, ECC, and the Hazardous Material (HAZMAT) and Hazardous Material Minimization (HAZMIN) team. The Storm Water Program Manager is responsible for the enforcement of the MS4 permit at all industrial sites and provides annual training to the ECC and other personnel. The ECC is the primary unit POC for storm water related items and the day-to-day environmental matters at a specific facility. ECC's are responsible for SWPPP implementation including BMP and facility inspections, storm water assessments/sampling, BMP maintenance, and corrective actions. The safety manager is also available to assist the ECC. The HAZMAT and HAZMIN team shall be contacted if assistance is needed. The role, name, phone number, and start date of individuals on the Storm Water Pollution Control Team is recorded in Table 2-1 below. In the event of personnel turnover, Table 2-1 shall be updated accordingly.

TABLE 2-1. STORM WATER POLLUTION CONTROL TEAM LOG

Role	Name	Phone	Start Date
MCBH Storm Water Program Manager	CIV Whitney Anderson	Office: 808-257-4359	6/6/22
CLB-3 ECC	SSgt Joseph Kennard	Cell: 623-221-5169	7/1/2022
CLC-33 ECC	CWO3 Antonio A Tyler	Cell: 843-539-8387	2/1/2022
HAZMAT/HAZMIN	CIV Tim Cawthon	HAZMAT Center Building 6409 Office: 808-257-9913 HAZMIN Center Building 6407 Office: 808-257-0770	N/A

2.2 Transportation Services Compound Activities

The Transportation Services compound is made up of several buildings and used by two main units, the Combat Logistics Battalion (CLB-3) and Combat Logistics Company (CLC-33). Both units were recently considered CLB-3 and thus do very similar work. The operation's primary function is the repair and maintenance of support vehicles. Spill kits are located in each building and contain SOPs and spill response contact information. Used oil filters are drained into a specialized pan over an oil storage tank. Used oil and lubricants are stored in 55-gallon drums over spill pallets.

CLB-3 primarily utilizes Building 3017 and the Defense Reutilization Marketing Office (DRMO) area. CLC-33 primarily utilizes buildings 3013, 3014, 6039, and 3018. Vehicles stored at the facility include about 9 Joint Light Tactical Vehicles (JLTVs), 2 Flatrack Refueling Capability (FRC) systems, 10 Logistics Vehicle System Replacements (LVSRs), 30 7-ton Medium Tactical Vehicle Replacements (MTVRs) and 3 400-gallon water bulls. Vehicles stored on site have a drip pan and are maintained.

Building 3017 is composed of 4 maintenance bays, hazmat storage locker and administrative offices. There is a long trench drain down the center of the building and the concrete floors slope inward towards the trench drain. The building is surrounded by asphalt parking where support vehicles are stored.

The northwest side of Building 3014 is composed of 4 service bays, a former drive over maintenance bay currently used for storage, and a HAZMAT locker. The southern side of the building was recently renovated but supports similar operations as the northern side. This end of the building houses a battery charging room, a maintenance bay, and offices. Trench drains within the maintenance bays in Building 3014 are connected to an oil/water separator (OWS). Large Conex boxes are permanently stored along the southwest side of Building 3014.

Building 3013 is a two-story building with offices for CLC-33 on the second floor. The eastern end of the first floor is a large maintenance bay used to maintain artillery equipment (Howitzers) and support vehicles such as Millennia Military Vehicles (MMVs). This maintenance bay has a satellite accumulation site (SAS) for used and new oil and lubricants stored within secondary containment. Privately owned vehicles are generally parked in the asphalt lot northeast of Building 3013. To the northwest of Building 3013, general equipment and a few Humvees are stored on asphalt.

Directly west of Building 3013 is a DRMO accumulation area that consists of various old metal equipment, wire, tires, fire extinguishers, air conditioners, and parts stored on the asphalt and exposed to storm water. There is a large DRMO hangar-type tent with the number 6711C3 in this area.

Building 6039 is primarily offices and electronic shops with a warehouse and loading bay on the western end. This loading area receives new parts for vehicles and ships out old parts on the loading ramp on the north side of the warehouse. The warehouse uses a propane forklift and stores gas and lubricants for landscaping equipment in a flammable locker. Larger parts (new engines) are staged outside in weatherproof containers on the ramp. Multiple containers are stored on asphalt to the north of Building 6039.

Building 3018 is a covered storage area to the east of Building 6039. Various parts for CLC-33 are stored in weather-proof containers and wooden crates.

Both CLB-3 and CLC-33 utilize a vehicle wash rack at Building 3015 which flows to an OWS. Both units utilize Log Command contractors for vehicle corrosion control and painting operations. Log Command is based out of Building 3016 which houses a paint booth, flammable lockers, and offices. Log Command also operates an additional paint booth and sandblasting bay in Building 6697. Behind Building 6697, there is a large white tent for storage and tools stored in a Conex box.

Spill kits are located in each building and contain SOPs and spill response contact information. Used oil filters are drained into a specialized pan over an oil storage tank. Used oil is stored in 55-gallon drums over spill pallets.

Storm water at the Transportation Services Compound generally flows in the southern direction entering the MS4 system at grated inlets or directly discharging as sheet flow through the southern fence line. Storm drain inlets within the compound discharge to wetlands via MCBH Outfall 012. Nu'upia Pond and associated wetlands are directly south of the facility. Water tends to pool at the southwestern corner of the property. Figure 4-2 shows the location of the designated storm water sample location (Outfall 01) at a grated inlet between Buildings 3014 and 3013. Two other substantially similar outfalls (Outfall 02 and Outfall 03) at the southern fence line are shown in Figure 4-2.

2.3 Sources of Pollutants

The following is an inventory of potential pollutants associated with the Transportation Services compound:

A. Material Loading and Unloading Areas

Materials that are spilled, leaked, or lost during loading or unloading may collect on vegetated or paved surfaces and be carried away by storm runoff. Loading and unloading of significant materials is conducted at Buildings 3014, 3017, 3013, 6039, 3016, and 6697.

B. On-Site Material Storage and Disposal Practices

Leaks, drips, or spills of materials that are stored or disposed of in areas exposed to rainfall can be carried away by storm water. Significant materials stored in flammable lockers or on spill containment devices at Buildings 3014, 3017, 3013, 6039, 3016, and 6697. Scrap metal, miscellaneous debris, and other equipment is exposed to storm water in the DRMO area west of Building 3013.

C. Outdoor Activities

Many outdoor activities at MCBH, Kaneohe Bay use materials or create wastes that have the potential to pollute storm water runoff. Outdoor activities at the facility include storage of various large vehicles, vehicle washing, and storage of DRMO items.

D. Significant Materials Inventory

The following is a list of significant materials found at the Transportation Services compound:

- Gasoline
- Diesel Fuel
- Hydraulic Fluid
- Lube Oil
- Paints
- Paint Thinner
- Antifreeze
- Brake Fluid

- Grease
- Solvents
- Used Fuel
- Battery Acid
- Used Oil

2.4 Potential Storm Water Pollutants

The following pollutants have been identified as having a reasonable potential to be present in storm water discharges from Transportation Services compound if not properly managed:

- Hydraulic Fluid
- Used Oil

Materials that have *not* been included as a potential storm water pollutant but have been included as part of the significant materials inventory list, are considered to present a negligible risk to storm water quality. This is based on the nature/location of the primary activities performed with these materials and the BMPs that are in place. Material transport (loading/unloading) is not considered to be a significant threat to storm water, due to spill response procedures, training, and spill kit materials available onsite.

2.5 Best Management Practices (BMPs)

Best Management Practices (BMPs) are techniques or methods that aim to manage the quantity and improve the quality of storm water runoff from a facility or other site. Storm water BMPs intend to reduce or eliminate pollution and contaminants collected by runoff before the runoff reaches the MCBH storm water system or sensitive ecosystems such as streams, wetlands, and marine environments. The following is a summary of BMPs currently in place at the Transportation Services compound.

A. Good Housekeeping Practices

In general, Transportation Services compound employs good housekeeping practices throughout its operations. Good housekeeping practices are included in Table 2-2.

B. Preventative Maintenance

Preventive maintenance is important as water pollution control measures may be of little or no use if devices and equipment have not been properly maintained. Facility personnel conduct inspection of facility equipment, vehicles, and storage systems on a regular basis. The preventive maintenance program involves inspections of equipment and storage systems that are exposed to storm water. Inspections of the SAS are conducted on a monthly basis by HAZMIN, with monthly inspection reports submitted to ECPD. Maintenance work is performed under cover, and no maintenance work is performed outdoors.

C. Visual Inspections

Visual inspection provides a valuable subjective assessment of the status of storm water management systems. They are easily performed and allow the opportunity for corrective action, if necessary. Site inspections and documentation requirements are addressed in in Section 3 of this SWPPP. MCBH HAZMIN Center staff perform hazardous material inspections monthly. Annual facility inspections are performed by EPCD as part of the MCBH Environmental Compliance Evaluation (ECE).

D. Spill Prevention and Response

Areas where significant material spill or leakage can occur are identified in Section 2.1 and shown on Figure 4-2. The storm water systems and their accompanying drainage points are also shown on Figure 4-2. Refer to Table 2-2 for BMPs related to spill preventative measures for material handling procedures, storage requirements, and equipment usage.

In the event of a hazardous substance or oil spill, the ECC and ECPD shall be notified immediately (ECPD; 808-630-8246). If the spill cannot be easily addressed using an onsite spill kit and personal protective equipment, call Fed Fire (Military 911). The spill source should be immediately controlled if it is safe to do so by closing valves, switches, and/or turning off power to a device. Then, contain the spill by using sorbent socks or absorbent materials found in a spill kit. After it has been contained, clean up the spilled material in a safe manner using dry methods. All materials should then be properly disposed of.

Drip pans are used under leaking equipment. The locations of spill kits are shown in Figure 4-2.

E. Erosion and Sediment Controls

The majority of the Transportation Services compound is paved and thus does not have a high potential for significant soil erosion that would require erosion and sediment control measures. However, the dirt parking lot behind Building 6039 should be paved or covered with gravel to prevent erosion.

F. Best Management Practices to Minimize Pollutant Contact with Storm Water

Facility personnel receive annual training from ECPD at minimum, as well as an initial training for all new personnel. Training information will include the BMPs that have been developed for the facility and a general overview of the storm water program and its objectives.

Existing BMPs at the Transportation Services compound are shown in Table 2-2 and attached as fact sheets to this SWPPP in Appendix A.

TABLE 2-2. BEST MANAGEMENT PRACTICES

BMP No.	BMP Title	Description
001	Label All Drums, Cans, Containers, Tanks, and Valves	All containers and drums are labeled.
002	Restrict Access to Area and Equipment	The facility is fenced.
006	Control Spills	Spill kits are provided throughout the compound.
007	Place Trash Receptacles at Appropriate Locations	Covered trash bins are located throughout the facility
015	Recycle	Recyclable materials are stored in appropriate containers until it can be transported to the Recycle Center.
016	Store Waste and Recycling Materials in Proper Containers	Waste and recycling containers are located Waste containers will be emptied regularly. Dumpsters should all have lids; lids should be kept closed when not in use.
033	Check Vehicles and Equipment for Leaks	Vehicles and equipment are checked for leaks on a regular basis.
037	Park Vehicles on an Impervious Surface	All vehicles are parked on an impervious surface.
039	Drain All Fluids from Stored or Salvaged Vehicles and Equipment	Fuel and fluids are drained from stored or salvaged equipment.
041	Wash Equipment in Designated Areas	Vehicles and equipment are washed at a designated wash rack at Building 3015.
042	Discharge Wash Water to Sanitary Sewer	The wash down water collects in the OWS and discharges to the sanitary sewer.
044	Use Drip Pans under Leaking Equipment	Drip pans/pallets and bladders, along with absorbent pads, are utilized under leaking equipment.
061B	Store Liquids and Significant Materials within a Building or Covered Area	All significant materials are properly stored undercover and in secondary containment where required.
077	Vacuum Particulate Wastes from Sanding or Painting Operations	Sand blasting and painting occur in dedicated booths that contain waste products.
079	Conduct Indoor Sanding and Painting in an Enclosed Area	Painting and sandblasting occur in enclosed booths in Building 6697 and 3016.

BMP No.	BMP Title	Description
098	Construct Oil/Water Separator	Wash water from the vehicle wash rack flows to an OWS.
113	Conduct Personnel Training Regarding the SWPPP	Personnel are trained regularly (initial orientation and annual refresher).

3 Inspections, Assessments and Monitoring

3.1 Routine Quarterly Site Inspections

The MS4 Permit requires a routine quarterly site inspection by a qualified person with at least one member of the storm water pollution control team participating. At least once each calendar year, the routine inspection must be conducted during a period when a storm water discharge is occurring. The site inspection is an overall evaluation of the effectiveness of the BMPs implemented at that facility. A Routine Facility Inspection Checklist (Appendix B) shall be completed during each routine site inspection and kept onsite with this SWPPP. During normal facility operating hours, inspections must be conducted of areas of the facility including, but not limited to, the following:

- Areas where industrial materials or activities are exposed to storm water;
- Areas identified in the SWPPP and those that are potential pollutant sources;
- Areas where spills and leaks have occurred in the past three years;
- Discharge points; and
- Control measures used to comply with the effluent limits contained in this permit.

3.2 Visual Assessment of Storm Water Discharges

A Quarterly Visual Assessment of storm water discharge is required for all industrial facilities at MCBH. Storm water samples for this visual assessment but must be collected in such a manner that the samples are representative of the storm water discharge from the facility. Therefore, the water sample must be collected at the designated storm water monitoring point (Outfall 01) as shown in Figure 4-2. The Quarterly Visual Assessment checklist (Appendix C) shall be completed by the current facility ECC and kept onsite with this SWPPP.

The visual assessment must be made:

- Of a sample collected in a clean, colorless glass or plastic container, and examined in a well-lit area;
- On samples collected within the first 30 minutes of an actual discharge from a storm event. If it is not possible to collect the sample within the first 30 minutes of discharge, the sample must be collected as soon as practicable after the first 30 minutes and documented why it was not possible to take the sample within the first 30 minutes; and

- For storm events, on discharges that occur at least 72 hours (three days) from the previous discharge.

Whenever the visual assessment shows evidence of storm water pollution, corrective action procedures to remedy the pollutants must be taken and documented. Refer to Section 4 for corrective action procedures.

4 Corrective Actions

A corrective action is defined as any action taken, or required to be taken, to (1) repair, modify, or replace any storm water control used at the site; (2) clean up and dispose of spills, releases, or other deposits found on the site; and (3) remedy a permit violation. Corrective actions should be documented using the Corrective Action Log (Appendix D).

4.1 Immediate Actions

If corrective action is needed, you must immediately take all reasonable steps necessary to minimize or prevent the discharge of pollutants until a permanent solution is installed and made operational, including cleaning up any contaminated surfaces so that the material will not discharge in subsequent storm events. Note: In this context, the term "immediately" requires you to, on the same day a condition requiring corrective action is found, take all reasonable steps to minimize or prevent the discharge of pollutants until a permanent solution is installed and made operational. However, if a problem is identified at a time in the workday when it is too late to initiate corrective action, the initiation of corrective action must begin no later than the following workday. "All reasonable steps" means that the permittee has undertaken initial actions to assess and address the condition causing the corrective action, including, for example, cleaning up any exposed materials that may be discharged in a storm event (e.g., through sweeping, vacuuming) or making arrangements (i.e., scheduling) for a new BMP to be installed at a later date.

4.2 Escalating Actions

If additional actions are necessary beyond those implemented or if the conditions continue to occur, additional corrective actions (e.g., install a new or modified control and make it operational, complete the repair) must be completed before the next storm event if possible, and within 14 calendar days from the time of discovery of the corrective action condition. If it is infeasible to complete the corrective action within 14 calendar days, document why it is infeasible to complete the corrective action within the 14-day timeframe and identify a schedule for completing the work, which must be done as soon as practicable after the 14-day timeframe but no longer than 45 days after discovery. If the completion of corrective action will exceed the 45-day timeframe, the minimum additional time necessary to complete the corrective action can be taken, provided that MCBH ECPD and DOH is notified of your intention to exceed 45 days. Where your corrective actions result in changes to any of the controls or procedures documented in your SWPPP, you must modify your SWPPP accordingly within 14 calendar days of completing corrective action work.

4.3 Corrective Actions for Substantially Identical Outfalls

If the event triggering corrective action is associated with an outfall that had been identified as a "substantially identical outfall", the review must assess the need for corrective action for all related substantially identical outfalls. Any necessary changes to control measures that affect these other outfalls must also be made before the next storm event if possible, or as soon as practicable following that storm event. Any corrective actions must be conducted within the timeframes discussed above.

4.4 Record of Past Spills or Leaks of Hazardous Pollutants

Table 4-1 is used to record significant spills and leaks that have occur or have occurred within three years prior to the preparation or amendment of this SWPPP. Significant spills and leaks include, but are not limited to, releases of oil or hazardous substances in excess of quantities that are reportable under CWA Section 311 (see 40 CFR 110.6 and 40 CFR 117.21) or Section 102 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 USC §9602.

At the time of this SWPPP update, there have been no past spill or leak incidents reported for the Transportation Services compound.

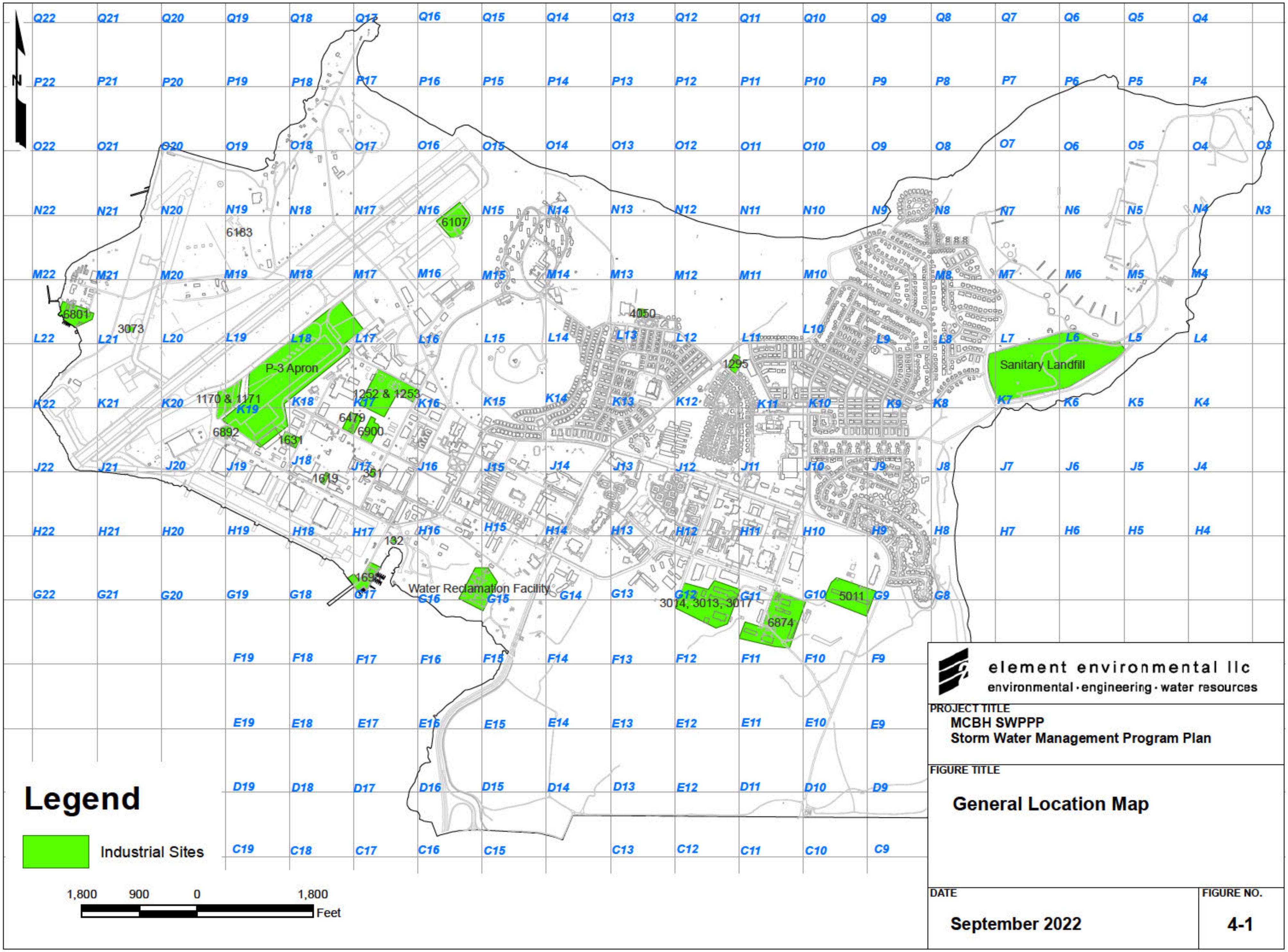
TABLE 4-1. PAST SPILLS OR LEAKS OF HAZARDOUS POLLUTANTS

Date of Incident	Brief Summary of Incident (POC Active at Time of Incident, Pollutant Type, Estimated Quantity, Location of Spill)

4.5 Record of Unauthorized Non-Storm Water Discharges

TABLE 4-2. UNAUTHORIZED NON-STORM WATER DISCHARGE EVALUATION

Date of Evaluation	Brief Summary of Evaluation (Description of the evaluation criteria, outfalls or onsite drainage points that were directly observed, action(s) taken, such as a list of control measures used to eliminate unauthorized discharge)



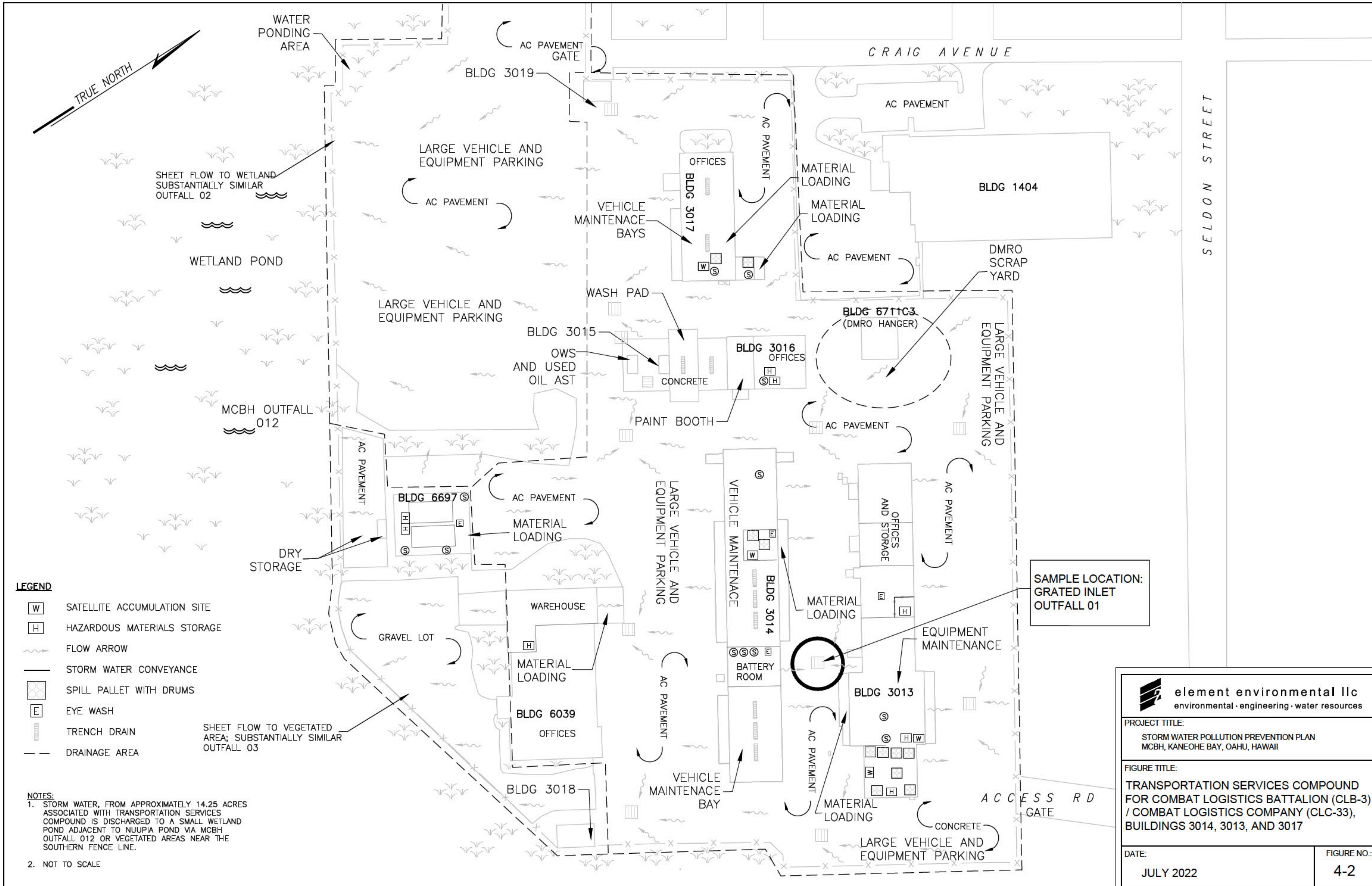
element environmental llc
environmental · engineering · water resources

PROJECT TITLE
MCBH SWPPP
Storm Water Management Program Plan

FIGURE TITLE
General Location Map

DATE
September 2022

FIGURE NO.
4-1

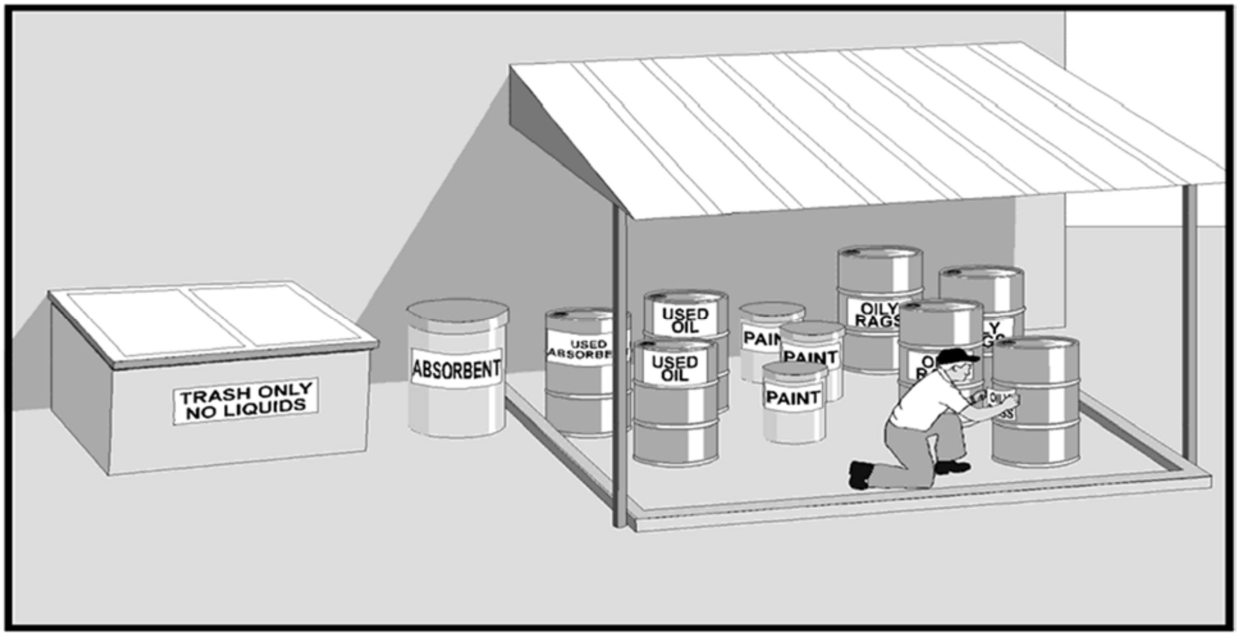


TRUE NORTH
WATER PONDING AREA
AC PAVEMENT GATE
BLDG 3019
CRAIG AVENUE
SELDON STREET
AC PAVEMENT
LARGE VEHICLE AND EQUIPMENT PARKING
SHEET FLOW TO WETLAND SUBSTANTIALLY SIMILAR OUTFALL 02
OFFICES
BLDG 3017
MATERIAL LOADING
MATERIAL LOADING
BLDG 1404
VEHICLE MAINTENACE BAYS
WETLAND POND
DMRO SCRAP YARD
WASH PAD
BLDG 6711C3 (DMRO HANGER)
BLDG 3015
BLDG 3016 OFFICES
OWS AND USED OIL AST
CONCRETE
MCBH OUTFALL 012
PAINT BOOTH
BLDG 6697
MATERIAL LOADING
VEHICLE MAINTENACE
BLDG 3014
OFFICES AND STORAGE
DRY STORAGE
SAMPLE LOCATION: GRATED INLET OUTFALL 01
WAREHOUSE
GRAVEL LOT
EQUIPMENT MAINTENANCE
BATTERY ROOM
BLDG 3013
BLDG 6039 OFFICES
SHEET FLOW TO VEGETATED AREA; SUBSTANTIALLY SIMILAR OUTFALL 03
VEHICLE MAINTENACE BAY
BLDG 3018
ACCESS RD GATE
CONCRETE
LARGE VEHICLE AND EQUIPMENT PARKING
LEGEND
W SATELLITE ACCUMULATION SITE
H HAZARDOUS MATERIALS STORAGE
FLOW ARROW
STORM WATER CONVEYANCE
SPILL PALLET WITH DRUMS
E EYE WASH
TRENCH DRAIN
DRAINAGE AREA
NOTES:
1. STORM WATER, FROM APPROXIMATELY 14.25 ACRES ASSOCIATED WITH TRANSPORTATION SERVICES COMPOUND IS DISCHARGED TO A SMALL WETLAND POND ADJACENT TO NUUPIA POND VIA MCBH OUTFALL 012 OR VEGETATED AREAS NEAR THE SOUTHERN FENCE LINE.
2. NOT TO SCALE
LROBINSON
12/30/2022 4:51:54 AM
FIG 4-2 Bldg 3014 – CLB-3 Transportation.dwg
element environmental llc
environmental · engineering · water resources
PROJECT TITLE:
STORM WATER POLLUTION PREVENTION PLAN
MCBH, KANEOHE BAY, OAHU, HAWAII
FIGURE TITLE:
TRANSPORTATION SERVICES COMPOUND FOR COMBAT LOGISTICS BATTALION (CLB-3) / COMBAT LOGISTICS COMPANY (CLC-33), BUILDINGS 3014, 3013, AND 3017
DATE:
JULY 2022
FIGURE NO.:
4-2

APPENDIX A

SELECTED BMP FACT SHEETS

BMP 001 - LABEL ALL DRUMS, CANS, CONTAINERS, AND TANKS



Description of Potential Pollutant and Source: Drums, cans, and containers can be improperly managed and disposed of due to uncertainty of the container's contents. Tanks which are not labeled may result in improper use of the tank or fuel, which may result in the exposure of significant materials to storm water and/or receiving waters. Similarly, unlabeled valves may be opened without proper precaution due to lack of user information. Storm water quality will be affected if significant materials are improperly disposed to the storm drain and/or receiving waters. Lack of labeling will also make it difficult to quickly identify the type of material released so facility personnel can respond correctly. Labels also identify hazardous materials at the facility and are a good way to request caution in certain areas (e.g., drums indicating flammability).

Description of BMP: Label all drums, valves, pumps, cans, tanks, and containers to reduce the chance of misuse and eventual spills. Labeling ensures that the appropriate procedures, equipment, and storage containers are used. All containers will be labeled as to what is in them.

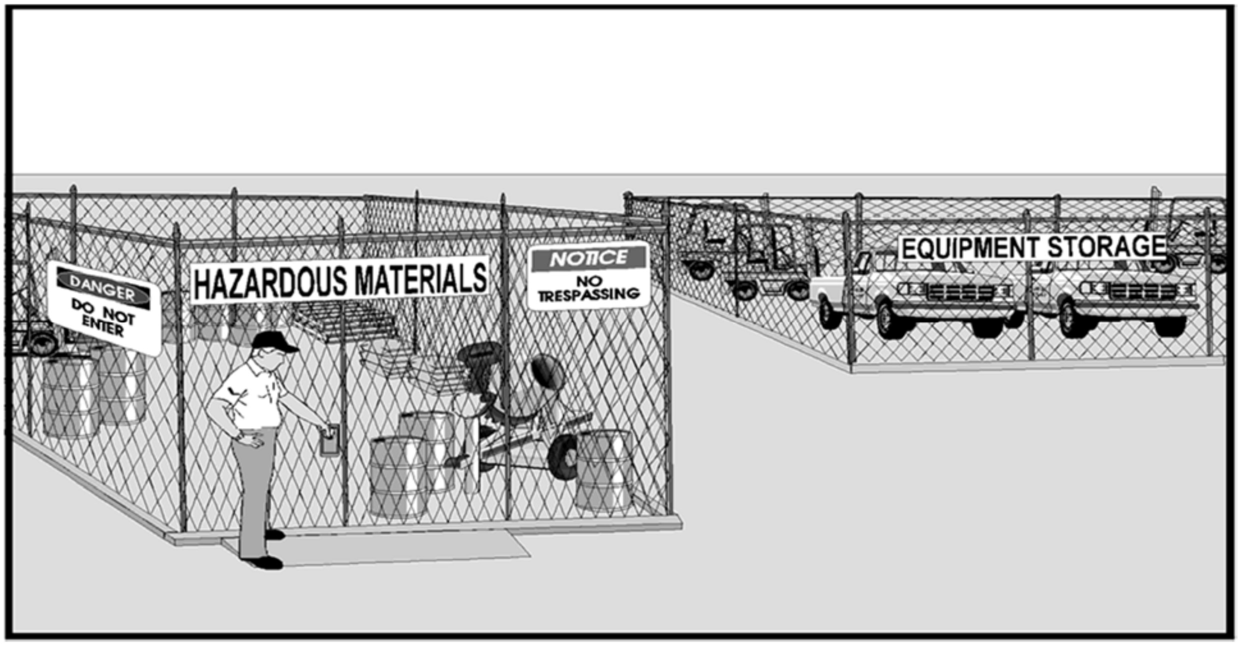
Application Guidance: As needed.

Training: N/A

Effectiveness and Cost: Effectiveness and costs will vary depending on the application.

Limitations: None

BMP 002 - RESTRICT ACCESS TO AREA AND EQUIPMENT



Description of Potential Pollutant and Source: Vandalism of vehicles and facility property may result in the release of significant materials.

Description of BMP: Provide fences and gate areas where vehicles, equipment and materials are stored and are accessible to the public to discourage trespassing. Access to equipment will also be restricted. Only authorized personnel will be allowed to operate equipment. The fences and gates will be properly maintained, and additional security measures including lighting of the area will be implemented if the fencing alone proves insufficient. Where appropriate, security guards or alarms will be used.

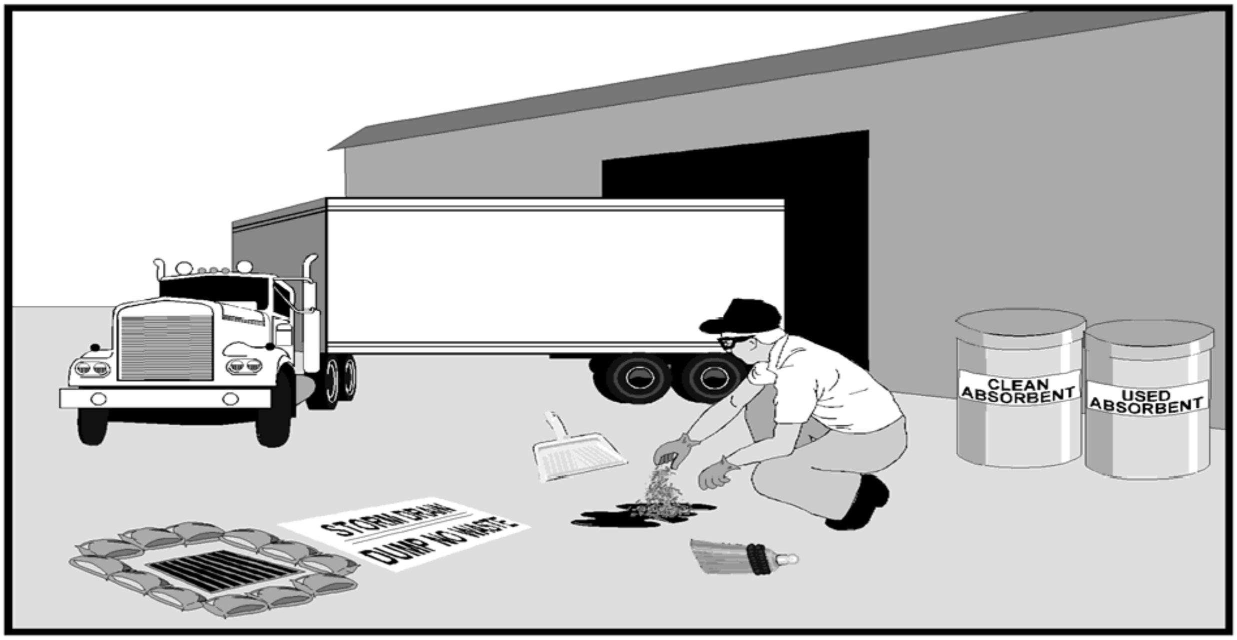
Application Guidance: As needed.

Training: N/A

Effectiveness and Cost: Effectiveness and costs will vary depending on the application.

Limitations: None

BMP 006 - CONTROL SPILLS



Description of Potential Pollutant and Source: Spills of significant materials may be exposed to storm water and transported to storm drains and/or receiving waters.

Description of BMP: Follow safety data sheets (SDS) for handling, storage, and cleanup of all significant materials to reduce the potential for spills.

Any spill, large or small, of significant materials will be controlled to prevent pollutants from being transported to storm drains and/or receiving waters. Appropriate spill control material will be kept on site. Smaller spills will be contained using absorbent material such as kitty litter, straw, or sawdust. Drums of absorbent material will be easily accessible and clearly marked, and containers for spent absorbent material will be readily available. Spent absorbent material will be managed appropriately and disposed of in accordance with applicable regulations. Larger spills will be controlled using spill kits, brooms, and other response equipment commensurate with the size of the spill. The methods outlined in the Activity's spill prevention and response plans (BMP 112) for hazardous materials will be followed for spills of any potential storm water pollutants. The date, time, nature and volume of material spilled, and cleanup measures taken will be recorded for all spills and kept as part of the SWPPP.

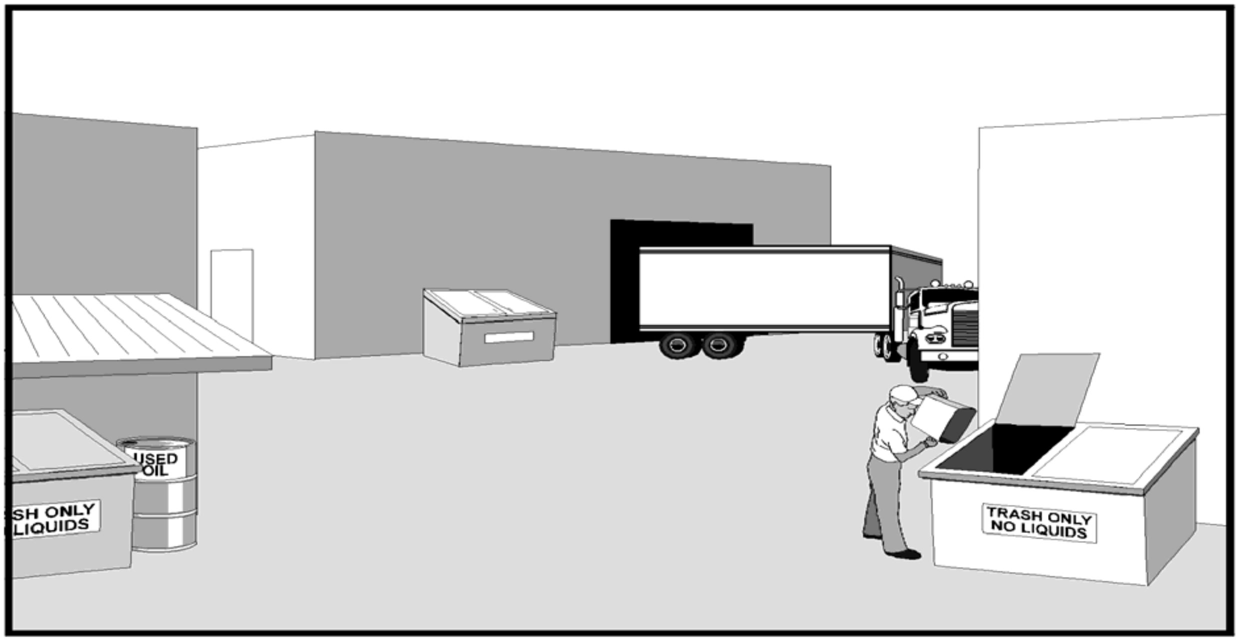
Application Guidance: Controlling spills will be practiced under all working conditions.

Training: Personnel will be trained in spill prevention and response procedures including the use of personal protection equipment (gloves, eye and face protection, etc.). This will include what absorbent or equipment to use, how to use the absorbent or equipment, where to find it, how to dispose of the spent absorbent or other material, and who to notify in the event of a spill.

Effectiveness and Cost: Spill control is a moderately effective, low-cost BMP.

Limitations: None

BMP 007 - PLACE TRASH RECEPTACLES AT APPROPRIATE LOCATIONS



Description of Potential Pollutant and Source: Improperly located or insufficient numbers of trash receptacles will promote poor housekeeping practices. This will increase the opportunity for pollutants from all source areas to reach storm water.

Description of BMP**:** Properly located and sufficient numbers of trash receptacles will promote the proper disposal of waste materials. This reduces the opportunity for pollutants to reach storm water. Trash receptacles will be easily accessible for personnel.

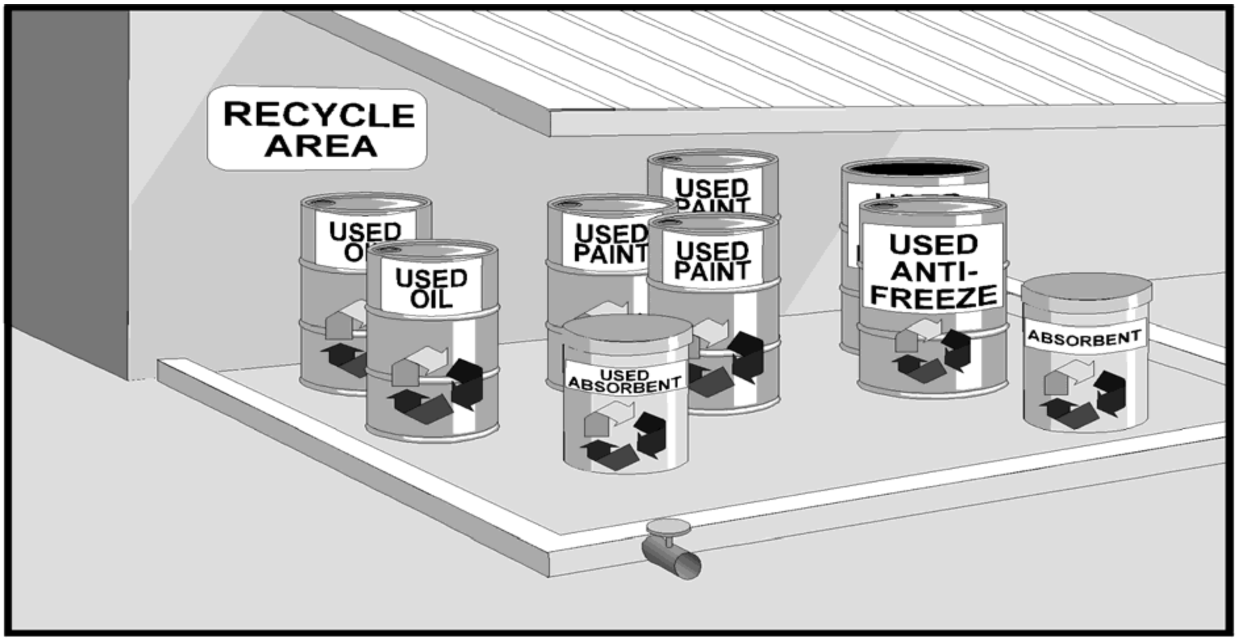
Application Guidelines: Placement of trash receptacles at appropriate locations will always be practiced.

Training: Personnel will be trained as to the location of trash receptacles.

Effectiveness and Cost: Appropriately located trash receptacles are an effective, low-cost BMP.

Limitations: None

BMP 015 – RECYCLE



Description of Potential Pollutant and Source: Many materials, both hazardous and non-hazardous, can be sources of pollutants. Recycling will be employed to reduce the amount of waste material exposed to storm water on the Activity.

Description of BMP: Recycle materials to the fullest extent possible in all situations.

Application Guidance: Recycling collections will be conducted at least weekly for recyclable items such as solvents, oil, scrap metals, wash water and absorbent materials. Separating the recyclable items facilitates recycling.

The frequency for implementing this BMP has been provided as general guidance. However, a facility operator may wish to establish a more suitable frequency. This will require SWPPP implementors to make judgements based on facility operations and conditions. To assign a frequency other than what has been suggested (i.e., more or less frequent), the following criteria will be considered and rated either High, Medium, or Low. If many of the criteria are assigned a High rating, the frequency may be increased. Similarly, if many criteria are assigned a Low rating, the frequency may be decreased. The goal of implementing this BMP is to minimize exposure of pollutants to storm water.

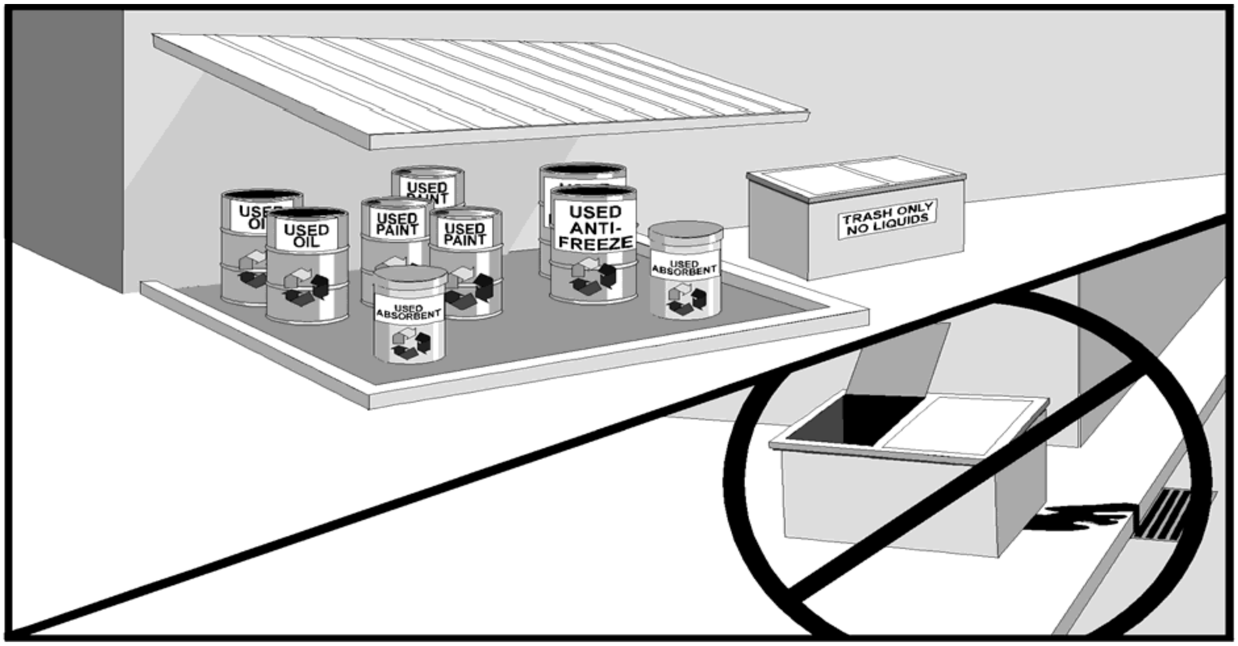
CRITERIA	Rating H=High M=Medium L=Low
Probability of exposure of significant materials to storm water	
Quantity of significant materials potentially exposed	
Toxicity of significant materials potentially exposed	
Frequency of use of significant materials potentially exposed	
Evidence of exposure (e.g., stains on pavement, etching of concrete	
Proximity of source area to outfall or receiving water	
Sensitivity of receiving water to potentially exposed significant materials (e.g., waters with beneficial uses such as human contact, recreation, significant species habitat, etc.)	

Training: Personnel will be trained on proper recycling techniques along with posting and maintenance of signs.

Effectiveness and Cost: Effectiveness and cost will be site specific.

Limitations: Local vendors may not be available to receive certain recyclable materials.

BMP 016 - STORE WASTE AND RECYCLING MATERIALS IN PROPER CONTAINERS



Description of Potential Pollutant and Source: Dry waste, including items such as scrap metal, floor sweepings, metal chips, and paper goods, can be dispersed by wind or operational error if not stored properly. If a dumpster's lid is not kept closed, animals may carry garbage out of the containers. Uncovered dumpsters also expose waste to storm water, which may leak out of the dumpster and into the storm sewer system.

Description of BMP: Locate waste and recycling drums and containers in centralized areas, using proper labeling (both containers and location) and providing easy access. If possible, the area will have secondary containment (see BMPs 012, 013, and 014). Waste containers will be emptied regularly. Dumpsters will all have lids; lids will be kept closed when not in use. If the dumpster has inadequate capacity and it is not possible to keep the cover closed, the frequency of pick-up will be increased, or the dumpster will be replaced with a model of greater capacity.

Application Guidance: This BMP will be applied to all waste and recycling storage areas.

Training: Personnel will be trained to monitor waste and recycling storage sites to ensure their materials are properly stored and that there are no overflowing containers.

Effectiveness and Cost: This is a moderately effective, low-cost BMP.

Limitations: None

BMP 033 - CHECK VEHICLES AND EQUIPMENT FOR LEAKS

Description of Potential Pollutant and Source: Vehicles, aircraft, or equipment entering or stored at a maintenance facility may be leaking a variety of fluids (fuel, oil, antifreeze, freon, etc.). These materials can be exposed to storm water.

Description of BMP: Inspect all vehicles and equipment at the site, whether incoming, parked, stored, or salvaged, for oil and fluid leaks. Drivers of fleet vehicles, such as delivery trucks, will also check under their vehicles each morning for fluid leaks. If leaks are present, drip pans will be placed under the vehicle or equipment. Once the vehicle is removed from the site, the former parking area will be inspected for stains, and these stains will be cleaned using rags or dry solvents.

Application Guidance: Any vehicle or equipment coming in for repairs, painting, or storage will be inspected for leaks. Fleet vehicles will be inspected each morning. Vehicles that are parked, stored, or salvaged will be provided with drip pans, as will tanker rail cars waiting to be unloaded. The frequency for implementing this BMP has been provided as general guidance. However, a facility operator may wish to establish a more suitable frequency. This will require SWPPP implementors to make judgements based on facility operations and conditions. To assign a frequency other than what has been suggested (i.e., more or less frequent), the following criteria will be considered and rated either High, Medium, or Low. If many of the criteria are assigned a High rating, the frequency may be increased. Similarly, if many criteria are assigned a Low rating, the frequency may be decreased. The goal of implementing this BMP is to minimize exposure of pollutants to storm water.

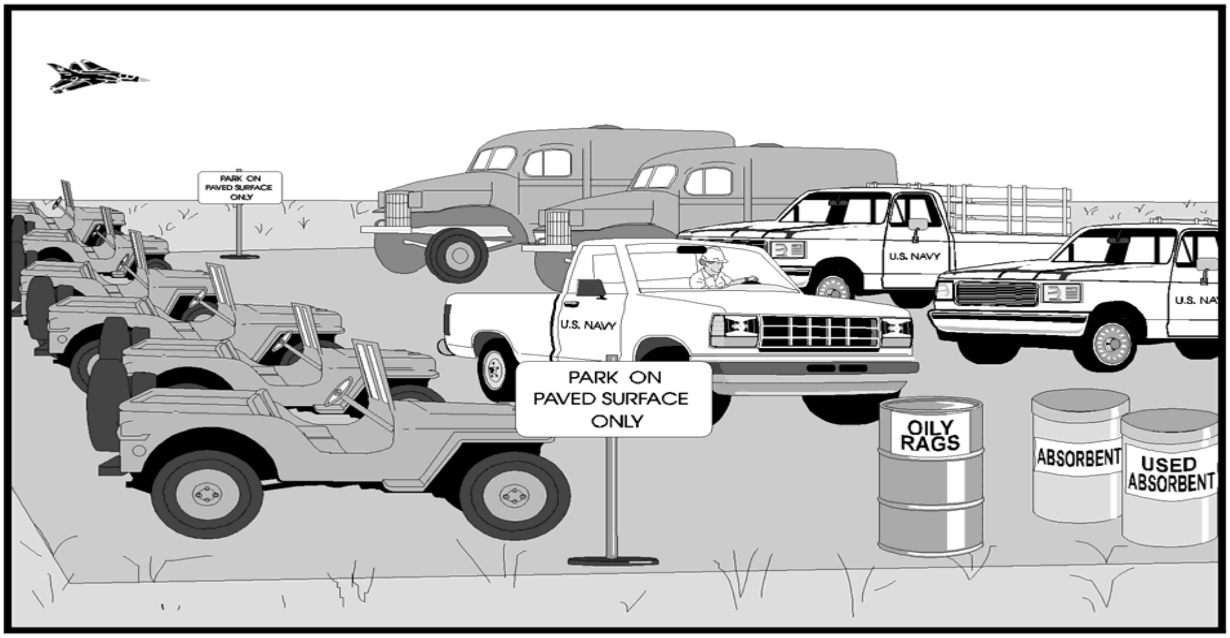
CRITERIA	Rating H=High M=Medium L=Low
Probability of exposure of significant materials to storm water	
Old age or poor condition of equipment and vehicles	
Evidence of exposure (e.g., stains on pavement)	
Proximity of source area to outfall or receiving water	
Sensitivity of receiving water to potentially exposed significant materials (e.g., waters with beneficial uses such as human contact, recreation, significant species habitat, etc.)	

Training: Signs will be posted to remind personnel of proper procedures.

Effectiveness and Cost: Checking for leaks is a moderately effective, low-cost BMP.

Limitations: None

BMP 037 - PARK VEHICLES ON AN IMPERVIOUS SURFACE



Description of Potential Pollutant and Source: Pollutants leaking or spilled onto the ground surface from vehicles can infiltrate into the soil. These pollutants (i.e., oil, fuel, etc.) may then be exposed to storm water and transported to surface water.

Description of BMP: Park vehicles on an impervious surface. For this BMP, an impervious surface is defined as a surface that cannot be readily penetrated by rainfall, such as concrete and asphalt pavement. Leaks and spills will be cleaned from these surfaces.

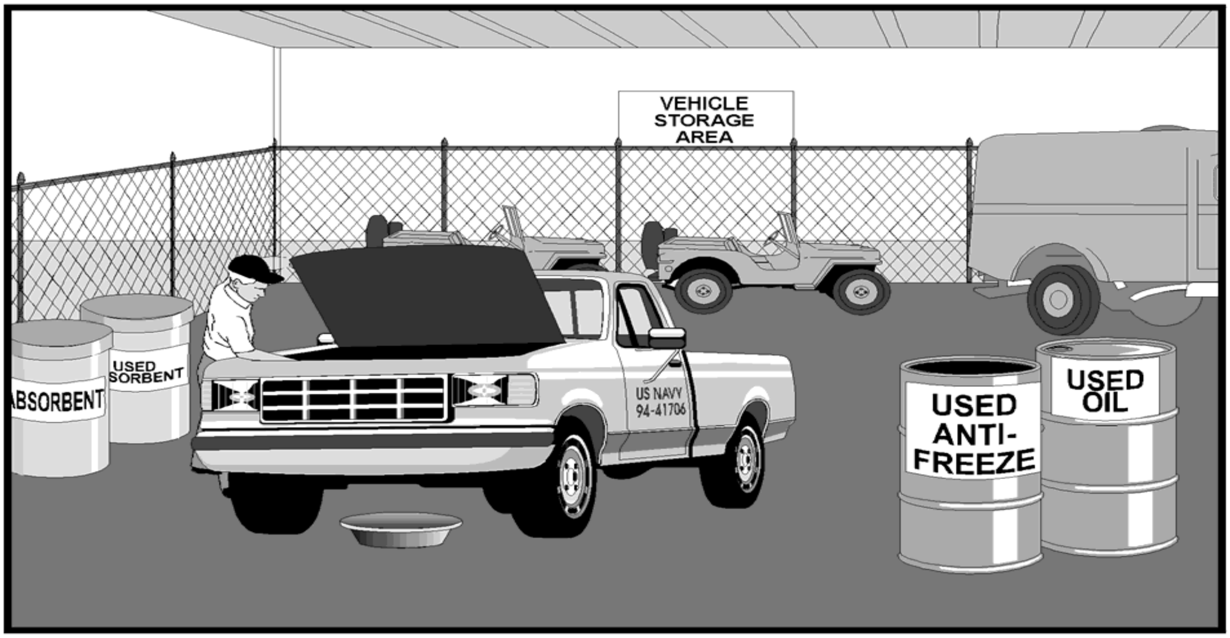
Application Guidance: Vehicles will always be parked on impervious surfaces, especially during the rainy season.

Training: Signs will be posted to remind personnel that all vehicles are to be parked on paved surfaces.

Effectiveness and Cost: Parking vehicles on impervious surfaces is a moderately effective, low-cost BMP.

Limitations: Very large traffic volumes may make implementation of this BMP difficult.

BMP 039 - DRAIN ALL FLUIDS FROM STORED OR SALVAGED VEHICLES AND EQUIPMENT



Description of Potential Pollutant and Source: Vehicles and equipment undergoing long-term storage or salvage often contain a variety of liquids (oil, antifreeze, hydraulic fluid, etc.) that can leak or spill, thereby exposing these materials to storm water.

Description of BMP: Drain, collect, and recycle oil and other fluids from vehicles being stored long term or salvaged (i.e., parts vehicles).

Application Guidance: Vehicles or equipment that are to be stored without use for more than three months will be drained of all fluids. Signs will be posted on these vehicles from which fluids have been drained.

The frequency for implementing this BMP has been provided as general guidance. However, a facility operator may wish to establish a more suitable frequency. This will require SWPPP implementors to make judgements based on facility operations and conditions. To assign a frequency other than what has been suggested (i.e., more or less frequent), the following criteria will be considered and rated either High, Medium, or Low. If many of the criteria are assigned a High rating, the frequency may be increased. Similarly, if many criteria are assigned a Low rating, the frequency may be decreased. The goal of implementing this BMP is to minimize exposure of pollutants to storm water.

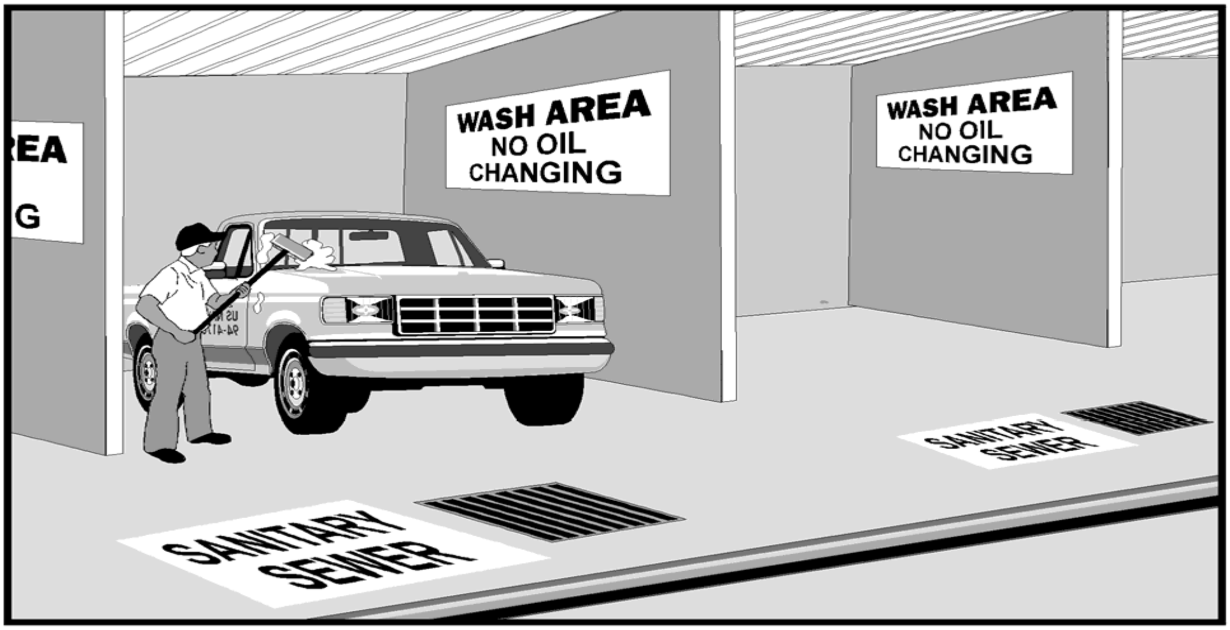
CRITERIA	Rating H=High M=Medium L=Low
Probability of exposure of significant materials to storm water	
Evidence of exposure (e.g., stains on pavement)	
Proximity of source area to outfall or receiving water	
Sensitivity of receiving water to potentially exposed significant materials (e.g., waters with beneficial uses such as human contact, recreation, significant species habitat, etc.)	

Training: Signs will be posted as reminders to personnel.

Effectiveness and Cost: Draining oil and fluids is a moderately effective, low-cost BMP.

Limitations: None

BMP 041 - WASH EQUIPMENT AND VEHICLES IN DESIGNATED AREA



Description of Potential Pollutant and Source: Washing equipment and vehicles outdoors or in areas where wash water flows onto the ground can pollute storm water. It is difficult to control the wastewater from washing operations if it is not done in a designated area.

Description of BMP: Facilities will designate bermed wash areas that contain wash water and prevent contact with storm water. These areas will drain to the sanitary sewer (BMP 042) or to a sump. If a sump is used, wash water will be recycled.

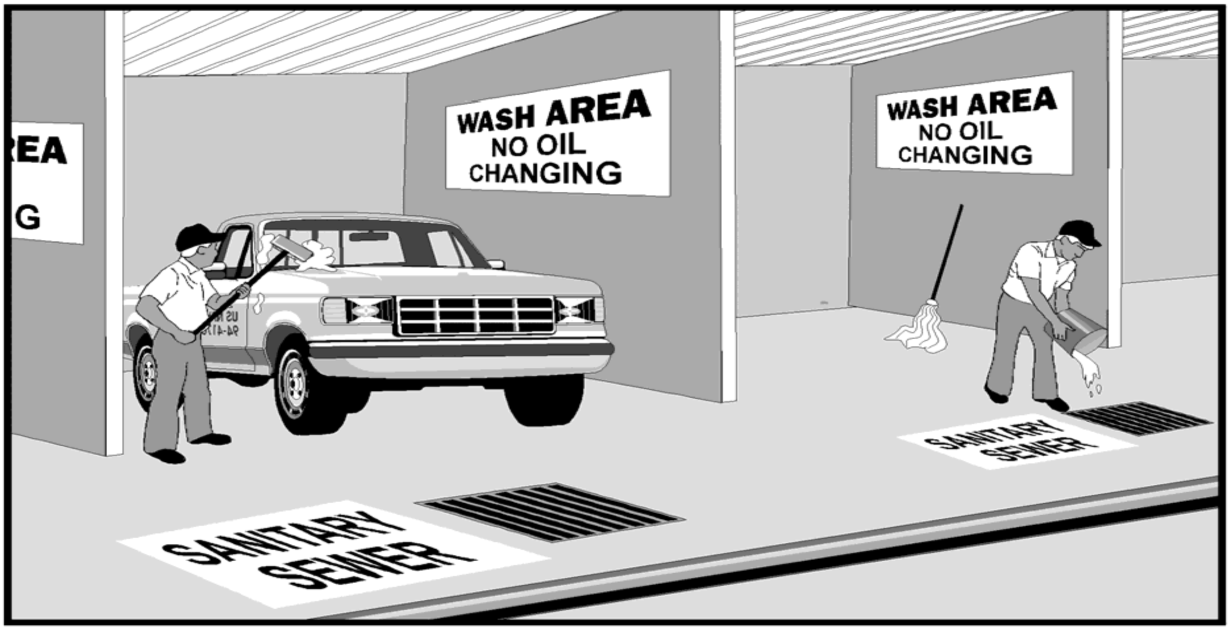
Application Guidance: This practice will be followed wherever vehicles, equipment and aircraft are washed.

Training: N/A

Effectiveness and Cost: This is a highly effective, variable-cost BMP.

Limitations: Pretreatment and monitoring of wash waster discharges to the sanitary sewer may be required. This would greatly increase the cost of this practice. The treatment plant operator will be notified and approval obtained before discharge.

BMP 042 - DISCHARGE WASH WATER TO A SANITARY SEWER



Description of Potential Pollutant and Source: Wash water from vehicle, equipment, and floor cleaning activities often contains such as grease, oil, and gasoline which can be exposed to storm water. Wash water must not be discharged to the storm drain.

Description of BMP: Discharge wash water to a sanitary sewer to ensure that is does not enter a storm drain. (See BMP 041, "Wash Equipment and Vehicles in Designated Areas.") Wash water from mopping floors will also be discharged to the sanitary sewer.

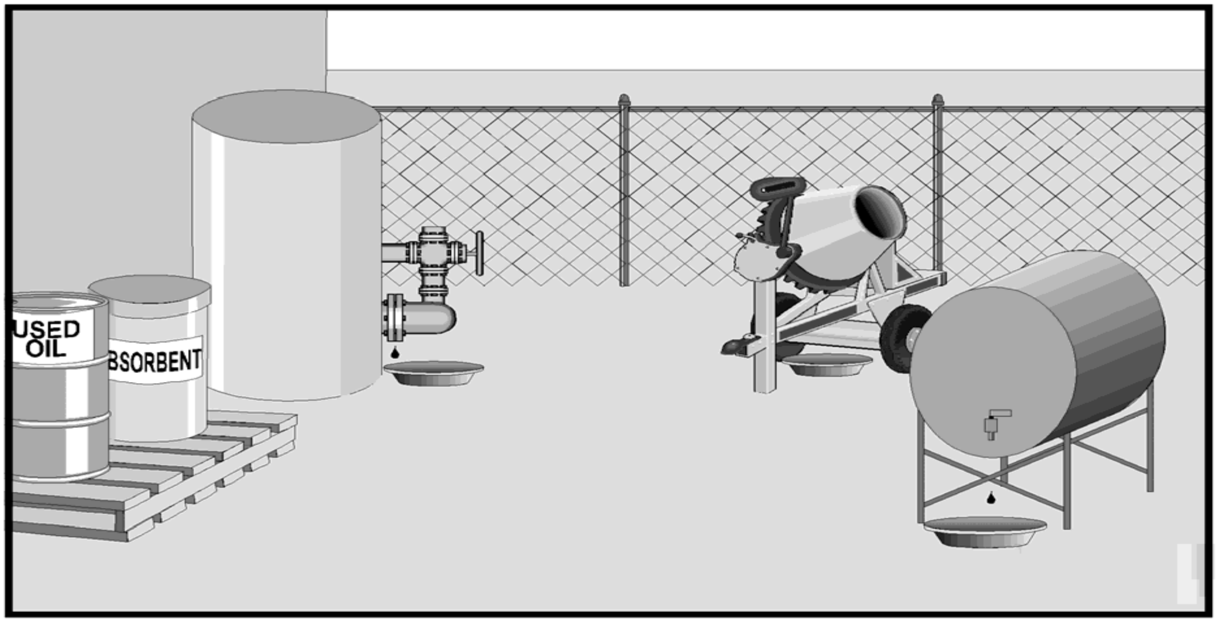
Application Guidance: All wash water from vehicle and equipment cleaning activities will be discharged to a sanitary sewer. In areas where wash water cannot be discharged to a sanitary sewer, wash water will be collected in a dead-end sump, tank, or other device and transported or pumped to the nearest treatment facility for proper disposal.

Training: Personnel will be trained to know where cleaning activities will be performed.

Effectiveness and Cost: Discharging wash water to a sanitary sewer is a highly effective, variable-cost BMP.

Limitations: Pretreatment and monitoring of wash water discharges to the sanitary sewer may be required. This would greatly increase the cost of this practice. The treatment plant operator will be notified and approval obtained before discharge.

BMP 044 - USE DRIP PANS UNDER LEAKING EQUIPMENT



Description of Potential Pollutant and Source: Equipment such as pumps, air conditioners, and boilers may leak fluids. These fluids typically contain pollutants that may be exposed to storm water and transported into the storm sewer system if they are not collected.

Description of BMP: Place drip pans under leaking equipment to collect any leaking fluid., This temporary BMP will be used until the equipment is properly repaired or replaced.

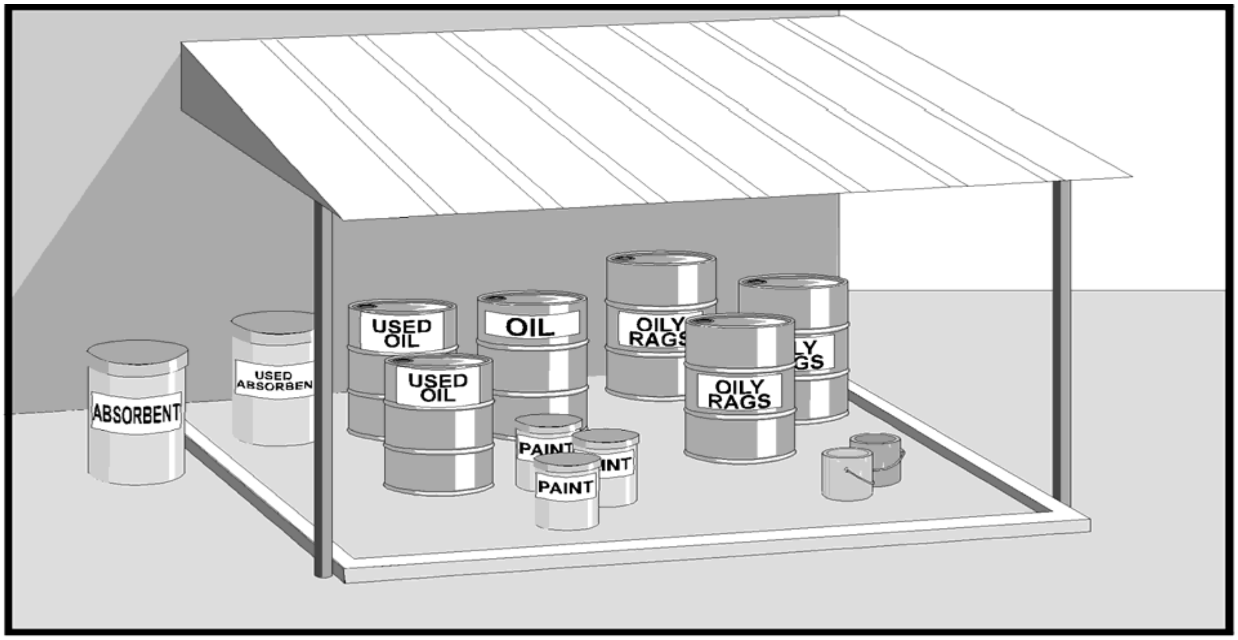
Application Guidance: Any equipment which is leaking fluid will be repaired or replaced. However, until the leak is stopped, a drip pan will be used to collect the fluid.

Training: Personnel will be trained to immediately place a drip pan under leaking equipment and notify the appropriate maintenance personnel. The drip pan will be routinely checked and the collected material disposed properly.

Effectiveness and Cost: This is a highly effective, low-cost BMP

Limitations: None

BMP 061B - STORE LIQUIDS AND SIGNIFICANT MATERIALS WITHIN A BUILDING OR COVERED AREA



<u>Description of Potential Pollutant and Source:</u> Many significant materials may be leaked or spilled during storage, handling, or transport. If significant materials are stored outside, in covered areas, these materials can be exposed to storm water, which can transport the leaked or spilled material into the storm drain system.

<u>Description of BMP:</u> To the extent practical, store significant materials within a building or covered area. The materials will be stored on an impervious surface, such as a concrete pad. Rainfall runoff from the pad will be directed to a storm water treatment facility or contained. Leaks and spills will be cleaned up as soon as possible using rags or dry absorbents (see BMP 006). Used rags and absorbents will be disposed of properly. Any wash water from cleaning the floor will be disposed of in the sanitary sewer (see BMP 042).

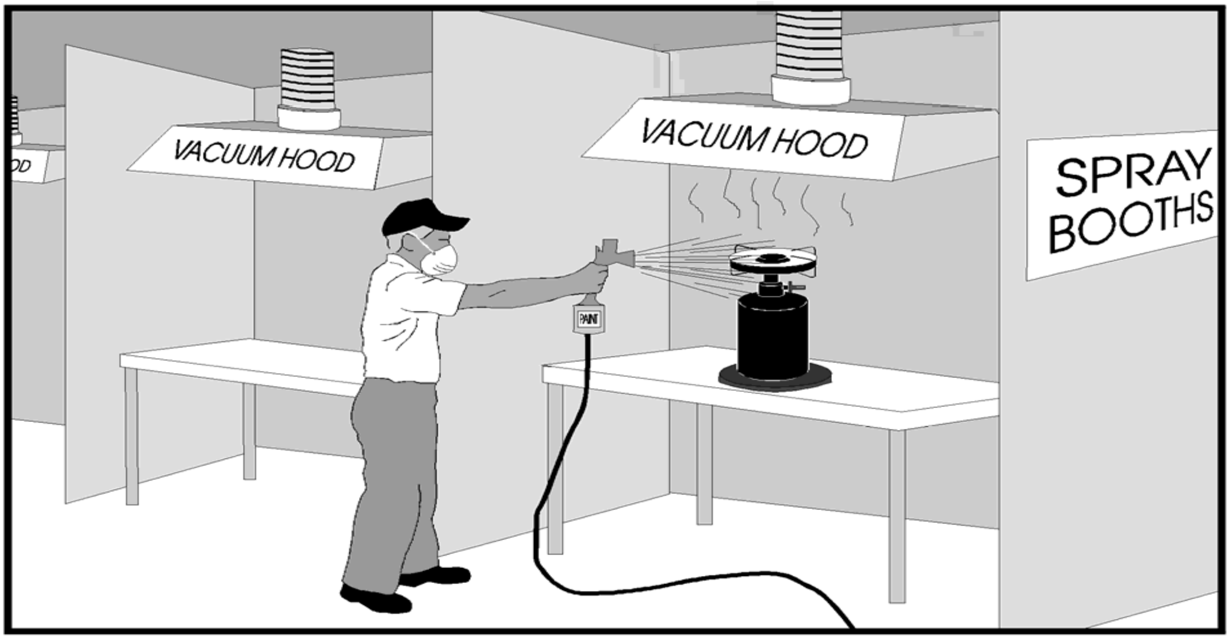
<u>Application Guidance:</u> All significant materials will be stored within a building or covered area.

<u>Training:</u> Personnel will be trained to store significant materials in designated areas.

<u>Effectiveness and Cost:</u> This is a moderately effective BMP. The cost will vary based on whether a building for storing the substances is available.

<u>Limitations:</u> None

BMP 077 - VACUUM PARTICULATE WASTES FROM SANDING OR PAINTING OPERATIONS



Description of Potential Pollutant and Source: Sanding, in preparation for painting, and painting itself creates wastes that may become exposed to storm water and transported to storm drains and/or receiving waters.

Description of BMP: Contain paint-related wastes by performing painting and sanding activities in facilities equipped with a vacuum and filters.

Application Guidance: This practice will be used in all sanding and painting operations.

Training: Personnel will be instructed in procedures for proper operation of vacuum and filters.

Effectiveness and Cost: Performing sanding and painting operations under vacuum is a highly effective, usually moderate-cost BMP. However, costs for large-scale sanding and painting activities (e.g., ships and large equipment) could be high.

Limitations: The size of some operations may make implementation of this practice difficult.

BMP 079 - CONDUCT INDOOR SANDING AND PAINTING IN AN ENCLOSED AREA

Description of Potential Pollutant and Source: Paint, sand, glass, metal or stone particles from painting, sanding and sandblasting operations can become exposed to storm water if not properly contained. These materials may then be transported to storm drains and/or receiving waters.

Description of BMP: Conduct painting, sanding, and sandblasting in an enclosed area to prevent contaminated particles from being exposed to storm water. Wastes from these operations will be disposed of appropriately.

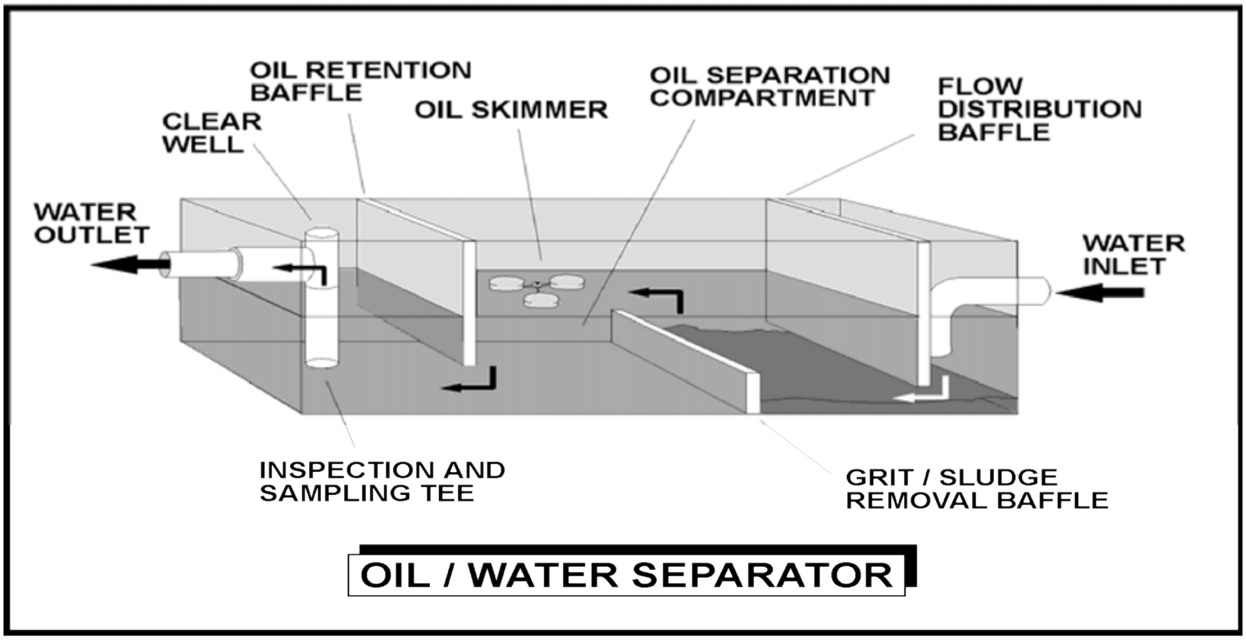
Application Guidance: If possible, all painting, sanding and sandblasting activities will be performed indoors and preferably in an enclosed covered area.

Training: Signs will also be posted to remind personnel about proper locations.

Effectiveness and Cost: Conducting painting, sanding, and sandblasting in an enclosed area is an effective, variable-cost BMP.

Limitations: The size of some activities may make implementation of this BMP difficult.

BMP 098 - CONSTRUCT OIL/WATER SEPARATOR



Description of Potential Pollutants and Source: Oil/water separators are designed to remove petroleum compounds and grease from storm water. Separators will also remove floatable debris and settleable solids.

Description of BMP: Construct oil/water separators. Oil/water separators are underground vaults where storm water is piped in and out of the separator. Oil/water separators come in many configurations. A common configuration is the three-chamber oil/water separator. The first chamber is the sedimentation chamber that allows for sedimentation of coarse materials and screening of debris. The second chamber provides separation of oil, grease and gasoline. The third chamber is provided to prevent any possibility of a surcharge pressure from occurring and as a safety relief for the structure if a blockage occurs.

Application Guidance: Oil/water separators are applicable to situations where the concentrations of oil-and-grease-related compounds will be usually high and source control cannot provide effective control. This generally occurs at equipment maintenance and washing facilities, gas stations and loading areas. Separators may also be used in areas heavily used by mobile equipment such as loading wharfs at marine ports.

Operation and Maintenance: The degree and frequency of maintenance significantly affects the performance of the oil/water separator. Cleaning the oil/water separator will prevent the accumulated debris and oil to be discharged from the structure during intense storms.

Oil/water separators will be checked monthly during the wet season and will be cleaned at least four times a year. They will always be cleaned in October, before the start of the wet season. The accumulated oil will be properly disposed.
The frequency for implementing this BMP has been provided as general guidance. However, a facility operator may wish to establish a more suitable frequency. This will require SWPPP implementors to make judgements based on facility operations and conditions. To assign a frequency other than what has been suggested (i.e., more or less frequent), the following criteria will be considered and rated either High, Medium or Low. If many of the criteria are assigned a High rating, the frequency may be

increased. Similarly, if many criteria are assigned a Low rating, The frequency may be decreased. The goal of implementing this BMP is to minimize exposure of pollutants to storm water.

CRITERIA	Rating H=High M=Medium L=Low
Probability of exposure of significant materials to storm water in area draining to oil/water separator	
Quantity of significant materials potentially exposed in area draining to oil/water separator	
Frequency of use of significant materials potentially exposed in area draining to oil/water separator	
Evidence of exposure (e.g., stains on pavement, etching of concrete) in area draining to oil/water separator	
Proximity of source are to outfall	
Sensitivity of receiving water to potentially exposed significant material (e.g., waters with beneficial uses such as human contact, recreation, significant species habitat, etc.)	

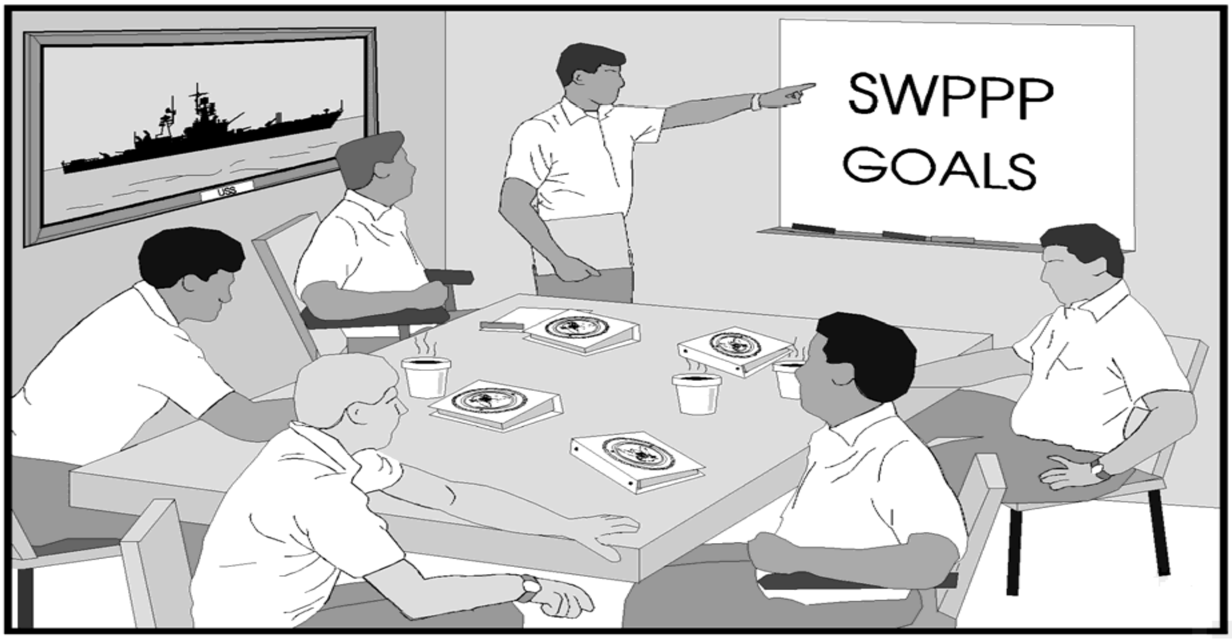
Effectiveness and Cost: This is a moderately effective, high-cost BMP.

Limitations: Oil/water separators are less effective when storm water runoff has high sediment concentrations or detergent levels which disperse oil.

Oil/water separators are only effective for highly pervious drainage areas. Oil/water separators cannot effectively treat large volumes of runoff. The maximum drainage area to oil/water separators is typically one acre.

The sediment removed during maintenance will be tested. If it is a hazardous waste, it will be disposed of accordingly.

BMP 113 - CONDUCT PERSONNEL TRAINING REGARDING THE SWPPP



Description of Potential Pollutant and Source: When properly trained, personnel are more capable of preventing spills, responding safely and effectively to an accident when it occurs, and recognizing situations that could lead to storm water contamination.

Description of BMP: Train personnel at all levels of responsibility in the components and goals of the SWPPP.

Application Guidance: Training will be conducted quarterly and at new personnel orientations.

Training: Training will address each component of the SWPPP, including how and why tasks are to be implemented. Topics will include:

- Good housekeeping
- Material management practices
- Spill prevention and response

Effectiveness and Cost: This is a highly effective, moderate-cost BMP.

Limitations: None

APPENDIX B

ROUTINE FACILITY INSPECTION CHECKLIST

Routine Facility Inspection Checklist

Activity Name: ____________________ **Date of Inspection:** ____________________

Inspector(s): ____________________ **Facility Name/Number:** ____________________

Column 1	Column 2	Column 3	Column 4	Column 5	
Source Area	BMP Number and Title	Status: F, P, N, NA[1]	Briefly Describe Effectiveness (Good or Other [describe])	Corrective Measures	
				What	By When

Note 1: F – Fully implemented, P – Partially implemented, N – Not implemented , NA – Not Applicable

APPENDIX C

QUARTERLY VISUAL ASSESSMENT CHECKLIST

Quarterly Visual Assessment Checklist

Facility ID and Location: ____________________

Date: ____________________

Sampler Name (Printed): ____________________

Signature: ____________________

Time of Rainfall Begin: ____________ Time of Rainfall End: ____________

Time of Flow Begin: ____________ Time of Flow End: ____________

Rainfall event more than 72 hours since last event? Yes / No

Rainfall Event Total: ____________

Sample: sample in a clean, colorless glass or plastic container, and examined in a well-lit area

On samples collected within the first 30 minutes of an actual discharge from a storm event

Sample Characteristics:

Color: ____________ Floating Solids: ____________

Odor: ____________ Settled Solids: ____________

Clarity: ____________ Suspended Solids: ____________

Oil Sheen: ____________ Foam: ____________

Other Obvious Indicators of Storm Water Pollution

(describe): ____________________

Nature of the discharge (i.e., runoff):

Results of observations of the storm water discharge:

Probable sources of any observed storm water contamination:

If applicable, why it was not possible to take samples within the first 30 minutes:

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

APPENDIX D

CORRECTIVE ACTION LOG

Corrective Action Log

Use this form to document SWPPP corrective actions. This form is to be completed by the Environmental Compliance Coordinator (ECC) or a person designated by ECC and submitted to the MCBH Storm Water Program Manager. The Storm Water Program Manager is responsible for any notification to the State of Hawaii Department of Health (DOH), if required.

A corrective action is defined as an action taken to:

- **a) Repair, modify, or replace any storm water control used at the site;**
- **b) Clean up and properly dispose of spills, releases, or other deposits; or**
- **c) Remedy a permit violation.**

1. Corrective Action Triggers

The following events trigger a corrective action to be taken (this triggering condition is to be documented *within 24 hours* of discovering the occurrence):

- a) A required storm water control was never installed, was installed incorrectly, or is not in accordance with the requirements in the SWMP Plan.
- b) A member of the **Storm Water Pollution Control Team** becomes aware that the storm water controls installed and being maintained are not effective enough for the discharge to meet applicable water quality standards or applicable requirements in the MCBH SWMP Plan. The facility ECC shall notify the Storm Water Program Manager immediately. The Storm Water Program Manager will notify DOH *by the end of the next work day*.

1.1 Log Notifications:

Date/time Storm Water Program Manager notified by ECC: ________________________

Date/time DOH notified by Storm Water Program Manager: ________________________

1.2 Describe Discharge:

Indicate which one of the following prohibited discharges is occurring or has occurred:

- ❐ Wastewater from washout of concrete
- ❐ Wastewater from washout and cleanout of stucco, paint, form release oils, curing compounds, or other construction materials
- ❐ Fuels, oils, or other pollutants used in vehicle and equipment operation and maintenance
- ❐ Soaps, solvents, or detergents used in vehicle and equipment washing
- ❐ Toxic or hazardous substances from a spill or other release
- ❐ Other, Explain: ____

2. Requirements for Taking Corrective Actions

The ECC shall complete corrective actions in accordance with the deadlines specified below. In all circumstances, site personnel shall *immediately* take all reasonable steps to minimize or prevent the discharge of pollutants until a permanent solution is installed and made operational, including cleaning up any contaminated surfaces so that the material will not discharge in subsequent storm events. *Immediately* means the same day the condition is discovered, unless it is too late in the day, in which initiation of corrective action must begin on the following work day.

Following any of the above triggering events, the ECC shall install a new or modified control and make it operational, or complete the repair, by *no later than 7 calendar days from the time of discovery*. If it is not feasible to complete the installation or repair within 7 calendar days, the ECC shall document and submit to the Storm Water Program Manager, for their agreement, why it is not feasible to complete the installation or repair within the 7-calendar day timeframe and document a schedule for installing the storm water control and making it operational as soon as practicable after the 7-day timeframe.

If the issue is not adequately addressed within 7 calendar days or the agreed upon timeframe, enforcement procedures will be initiated. Unaddressed issues will be escalated through the chain of command. The MCBH Environmental Compliance and Protection Division Director will give the responsible party a formal notice with an appropriate deadline for action. If the problem remains unchanged, the situation will be brought to the attention of the next higher authority. The ultimate penalty for non-compliance of MS4 Permit regulations is eviction or discharge of the responsible party from MCBH. This is placed at the discretion of the Base Commander. See the Enforcement Response Plan in Appendix 3-6 of the SWMP Plan for further information on MCBH's enforcement policies.

3. Corrective Action Report

Within 24 hours of discovering the occurrence of one of the triggering conditions in SWPPP Section 4.1 at the site, the ECC must complete the following:

3.1 Describe the triggering condition:

____
____
____
____

3.2 Record the date/time of the condition identified. How was the condition identified?

____
____
____
____

3.3 Describe the corrective action taken:

____
____
____

Date/time installation or repair was completed:
(or date/time the prohibited discharge ceased) ____

Or describe why it is not feasible to complete installation or repair within 7 calendar days and detail a proposed schedule (if applicable)

____
____
____

4. Resolution of the Corrective Action Trigger

Within 7 calendar days of initiating the Corrective Action Report, the ECC must complete a report of the following:

4.1 Follow-up Actions

Describe any follow-up actions taken to review the design, installation, and maintenance of storm water controls, including the dates such actions occurred:

____
____
____

4.2 Storm Water Control Modifications

Provide a summary of storm water control modifications implemented. Include a schedule of activities required to implement changes and the date the modifications were completed or will be completed:

____
____
____

5. SWPPP Modification Due to Corrective Actions

Where corrective actions result in changes to any of the storm water controls or procedures documented in the SWPPP, modify the SWPPP accordingly *within 7 calendar days* of completing corrective action work.

Are modifications to the SWPPP necessary? ❑ Yes ❑ No

Date modifications to the SWPPP shall be completed _______________

6. Corrective Actions Required by DOH

The facility shall comply with any corrective actions required by DOH as a result of permit violations found during an inspection by DOH or the Environmental Protection Agency (EPA).

Was the Corrective Action triggered by a DOH/EPA inspection?

❑ Yes ❑ No

❑ Date of DOH/EPA Inspection __________________

7. Additional Comments:

____
____

Final

STORM WATER POLLUTION PREVENTION PLAN

Storm Water Management Program Plan

Marine Corps Base Hawaii, Oahu, Hawaii

NPDES Permit No. HI S000007

12th MARINE MOTOR TRANSPORT (BUILDING 5011)

Prepared by:

Marine Corps Base Hawaii

July 2022

Table of Contents

Tables

Figures

Appendices

List of Acronyms and Abbreviations

BMP	Best Management Practice
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CWA	Clean Water Act
CWB	Clean Water Branch
DRMO	Defense Reutilization Marketing Office
DOH	State of Hawaii Department of Health
ECC	Environmental Compliance Coordinator
ECE	Environmental Compliance Evaluation
ECPD	Environmental Compliance and Protection Division
EPA	United States Environmental Protection Agency
HAZMAT	Hazardous Material
HAZMIN	Hazardous Material Minimization
HMMWV	High Mobility Multipurpose Wheeled Vehicle
JLTV	Joint Light Tactical Vehicle
JP-8	Jet Propellant 8
LVSR	Logistics Vehicle System Replacement
MCBH	Marine Corps Base Hawaii
MMV	Millennia Military Vehicles
MS4	Municipal Separate Storm Sewer System
MS4 Permit	Marine Corps Base Hawaii's NPDES Permit No. HI S000007
MTVR	Medium Tactical Vehicle Replacements
NPDES	National Pollutant Discharge Elimination System
OWS	Oil/Water Separator
POC	Point of Contact
SAS	Satellite Accumulation Site
SWMP	Storm Water Management Program
SWPPP	Storm Water Pollution Prevention Plan

Certification Statement

MCBH is committed to the prevention of discharges of polluted stormwater to navigable waters or the environment and maintains the highest standards for best management practices through periodic review, updating, and implementation of this Stormwater Pollution Prevention Plan (SWPPP).

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information contained therein. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Name: ______________________________ Title: ______________________________

Signature: ____________________________ Date: ______________________________

Management Review

Refer to Section 1.2 for more information on required SWPPP updates.

Review Dates	Signature	Amendment Required? (Y/N)
____________	__________________	__________
____________	__________________	_________
____________	__________________	_________
____________	__________________	_________
____________	__________________	_________
____________	__________________	_________

1 Introduction

As part of Federal regulations administered through the Clean Water Act (CWA), the State of Hawaii, Department of Health (DOH) has issued the National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4) Permit No. HI S000007 (referred to herein at the “MS4 Permit”) to Marine Corps Base Hawaii (MCBH). The MS4 Permit requires that MCBH provide all existing industrial facilities, identified in MCBH’s MS4 Permit application, and any newly identified industrial facilities, submitted to DOH using the “MS4 NPDES Individual Permit – Industrial Storm Water Discharge Notification Form,” with a Storm Water Pollution Prevention Plan (SWPPP) for storm water associated with industrial activities.

The purpose of the regulations is to protect water quality by reducing the amount of pollutants in storm water runoff caused by industrial activities.

1.1 SWPPP Implementation

The storm water management controls of this plan will become MCBH procedure for the applicable industrial facility. An up-to-date copy of the SWPPP shall be maintained on site and at the MCBH Environmental Compliance and Protection Division (ECPD). Management staff, maintenance personnel, contractor staff, and other personnel involved in onsite industrial activities, will be knowledgeable of the plan and follow the guidelines set forth in it, in addition to any other pertinent base-wide, state and federal regulations.

Day-to-day implementation of the SWPPP is primarily the responsibility of the current facility Environmental Compliance Coordinator (ECC) or Point of Contact (POC) as identified in Table 2-1. Enforcement of the permit conditions and this SWPPP are ultimately the responsibility of ECPD and additional escalating levels of authority as specified in the Enforcement Response Plan developed by MCBH for its base-wide Storm Water Management Program (SWMP) Plan.

1.2 Updating the SWPPP

This SWPPP will be reviewed as needed to identify necessary changes, at a minimum of every five years. Updates may be required due to current best management practice (BMP) failures, spill events, changes in industrial activities, changes in features, corrective actions, or other necessary changes. Personnel changes to the Storm Water Pollution Control Team (Section 2.1) should be logged in Table 2-1. Storm Water Pollution Control Team Log. ECPD will be responsible for approving revisions to the SWPPP. In the event the plan is modified, a copy of the updated SWPPP will remain at ECPD and will be provided to the applicable facility. Additionally, ECPD shall document and report the SWPPP changes to the DOH, Clean Water Branch (CWB), within thirty days of when the changes arise.

2 12th Marine Motor Transport, Building 5011

The 1st Battalion, 12th Marine Regiment Motor Transport (12th Marine Motor T), Building 5011, is located within MCBH, Kaneohe Bay on Mokapu Road. The facility compound encompasses approximately 7.2 acres and can be found in grid [redacted] of the MCBH Base Map, see Figure 4-1. The facility-specific map is shown on Figure 4-2.

2.1 Storm Water Pollution Control Team

The Storm Water Pollution Control Team consists of the Storm Water Program Manager, ECC, and the Hazardous Material (HAZMAT) and Hazardous Material Minimization (HAZMIN) team. The Storm Water Program Manager is responsible for the enforcement of the MS4 permit at all industrial sites and provides annual training to the ECC and other personnel. The ECC is the primary unit POC for storm water related items and the day-to-day environmental matters at a specific facility. ECC's are responsible for SWPPP implementation including BMP and facility inspections, storm water assessments/sampling, BMP maintenance, and corrective actions. The safety manager is also available to assist the ECC. The HAZMAT and HAZMIN team shall be contacted if assistance is needed. The role, name, phone number, and start date of individuals on the Storm Water Pollution Control Team is recorded in Table 2-1 below. In the event of personnel turnover, Table 2-1 shall be updated accordingly.

TABLE 2-1. STORM WATER POLLUTION CONTROL TEAM LOG

Role	Name	Phone	Start Date
MCBH Storm Water Program Manager	CIV Whitney Anderson	Office: 808-257-4359	6/6/22
ECC	SSgt Brandon Leasau	Office: 808-257-1581 Cell: 760-583-1339	6/30/22
HAZMAT/HAZMIN	CIV Tim Cawthon	HAZMAT Center Building 6409 Office: 808-257-9913 HAZMIN Center Building 6407 Office: 808-257-0770	N/A

2.2 12th Motor T Facility Activities

The 12th Marine Motor T Facility is made up of many buildings and used by two main units, Bravo Battery and Headquarters Battery. Both units use the same maintenance and storage facilities but park their respective vehicles in different places within the compound. The operation's primary function is the maintenance and storage of support vehicles and heavy artillery. Vehicles stored at the facility are fueled offsite (with JP-8) and include about 40 Joint Light Tactical Vehicles (JLTVs), 4 Logistics Vehicle System Replacements (LVSRs), 30 7-ton Medium Tactical Vehicle Replacements (MTVRs), 30 High Mobility Multipurpose Wheeled Vehicles (HMMWVs), and 30 trailers. Headquarters Battery parks their vehicles in the northern asphalt lot while Bravo Battery parks their equipment in the southern asphalt lot. The facility also stores and maintains portable generators and several Howitzers. Refer to Figure 4-2 for the location of facility buildings and other relevant features of the compound.

Building 5011 houses administration offices and tool storage on the eastern end and vehicle maintenance bays on the western side. Flammable lockers and spill kits are located in the maintenance bays. The eastern end of Building 5001 functions as a satellite accumulation site (SAS) for hazardous materials and battery storage. Drums of oil, transmission fluid, used dry sweep absorbent, and waste fuel are stored on spill pallets. Excess spill kits and spill kit materials are also stored in this area. The western side of Building 5001 serves as a maintenance area for vehicles. Building 5000 is empty and there are no known plans for future use. All three of these buildings (5011, 5001, and 5000) have concrete floors and are equipped with trench drains that span northern and southern sides located inside of the rollup bay doors. The trench drains ultimately flow to an oil/water separator (OWS) at the northeastern corner of the compound.

Three identical hangars (Buildings 6733R, 6734R, and 6735R) are located along the southern side of the compounds asphalt lot. All hangars have spill kits, a tool locker, and at least one flammable locker that contains lubricants, grease, and other supplies. The western hangar (Building 6733R) stores Howitzers and related equipment. The central hangar (Building 6734R) is generally used for the maintenance of air conditioning units and portable generators. There are three flammable lockers, an SAS, and multiple spill kits along the southern wall of this central hangar. The SAS in Building 6734R is contained by a Rigid-Lock Quick Berm that stores hydraulic fluid, oil, and small fuel cans on spill pallets. The eastern hangar (Building 6735R) serves as dry storage for vehicles and artillery. An office trailer is also located near Building 6735R at the southeastern corner of the compound.

Along the northern fence line, a large HAZMAT containment locker serves as an additional SAS. The locker stores lubricants, parts washing solvent, fuel cans, and drums of engine oil. A large concrete wash pad is located to the east of the HAZMAT locker. The wash water supplied by several hose bibs flows to a large trench drain at the northern side of the pad. The trench drains flow to an OWS located just east of the wash pad. No detergents are used at the wash pad. Buildings 5008 and 5009, located along the northern fence line, are used for miscellaneous dry storage. At the northwestern corner of the compound, various scrap materials and used tires are stored for disposal by the DRMO (Defense Reutilization Marketing Office).

Storm water at the 12th Marine T generally flows in two directions at the facility. Buildings 5011, 5001, and 5000 are at the highest point of the facility. Storm water generally flows north and south of these buildings as sheet flow on the asphalt lots. There are no storm water conveyance features or drain inlets on or near the facility. Storm water in the southern half of the compound either ponds on the asphalt or flows to the perimeter of the facility to grassy areas for infiltration. Storm water in the northern half of the compound flows north to grassy areas and the wash pad trench drain. In a larger storm event, it is possible that some runoff may discharge down the asphalt driveway through the northeastern corner gate. The closest water body to the facility is Kaluapuhi Pond about 900 feet to the southeast through dense vegetation. Figure 4-2 shows the location of the designated storm water sample location (Outfall 01) in front of Building 6734R. One other substantially similar outfall (Outfall 02) is identified at the northeastern corner gate.

During initial site visit, the ECC mentioned that the 12th Marine Motor T would be moving out of the current facility during spring of 2023. The future of the 1st Battalion, 12th Marine Regiment Motor Transport and the facility itself was unknown.

2.3 Sources of Pollutants

The following is an inventory of potential pollutants associated with the 12th Marine Motor T compound:

A. Material Loading and Unloading Areas

Materials that are spilled, leaked, or lost during loading or unloading may collect on vegetated or paved surfaces and be carried away by storm runoff. Loading and unloading of significant materials is conducted at Buildings 5011, 5001, 6734R, and the HAZMAT locker along the north fence line.

B. On-Site Material Storage and Disposal Practices

Leaks, drips, or spills of materials that are stored or disposed of in areas exposed to rainfall can be carried away by storm water. Significant materials stored in flammable lockers or on spill containment devices at Buildings 5011, 5001, 6733R, 6734R, 6735R, and the HAZMAT locker along the northern fence. Scrap items and used tires are exposed to storm water in the DRMO area near Building 5008.

C. Outdoor Activities

Many outdoor activities at MCBH, Kaneohe Bay use materials or create wastes that have the potential to pollute storm water runoff. Outdoor activities at the facility include storage of various large vehicles, vehicle washing, and storage of DRMO items.

D. Significant Materials Inventory

The following is a list of significant materials found at the 12th Marine Motor T compound:

- Jet Fuel
- Hydraulic Fluid
- Lube Oil
- Grease
- Solvents
- Transmission Fluid
- Antifreeze
- Brake Fluid
- Used Oil

2.4 Potential Storm Water Pollutants

The following pollutants have been identified as having a reasonable potential to be present in storm water discharges from the 12th Marine Motor T compound if not properly managed:

- Hydraulic Fluid
- Used Oil

Materials that have *not* been included as a potential storm water pollutant but have been included as part of the significant materials inventory list, are considered to present a negligible risk to storm water quality. This is based on the nature/location of the primary activities performed with these materials and the BMPs that are in place. Material transport (loading/unloading) is not considered to be a significant threat to storm water, due to spill response procedures, training, and spill kit materials available onsite.

2.5 Best Management Practices (BMPs)

Best Management Practices (BMPs) are techniques or methods that aim to manage the quantity and improve the quality of storm water runoff from a facility or other site. Storm water BMPs intend to reduce or eliminate pollution and contaminants collected by runoff before the runoff reaches the MCBH storm water system or sensitive ecosystems such as streams, wetlands, and marine environments. The following is a summary of BMPs currently in place at the 12th Marine Motor T compound.

A. Good Housekeeping Practices

In general, the 12th Marine Motor T compound employs good housekeeping practices throughout its operations. Good housekeeping practices are included in Table 2-2.

B. Preventative Maintenance

Preventive maintenance is important as water pollution control measures may be of little or no use if devices and equipment have not been properly maintained. Facility personnel conduct inspection of facility equipment, vehicles, and storage systems on a regular basis. The preventive maintenance program involves inspections of equipment and storage systems that are exposed to storm water. Inspections of the SAS are conducted on a monthly basis by HAZMIN, with monthly inspection reports submitted to ECPD. Maintenance work is performed under cover, and no maintenance work is performed outdoors.

C. Visual Inspections

Visual inspection provides a valuable subjective assessment of the status of storm water management systems. They are easily performed and allow the opportunity for corrective action, if necessary. Site inspections and documentation requirements are addressed in in Section 3 of this SWPPP. MCBH HAZMIN Center staff perform hazardous material inspections monthly. Annual facility inspections are performed by EPCD as part of the MCBH Environmental Compliance Evaluation (ECE).

D. Spill Prevention and Response

Areas where significant material spill or leakage can occur are identified in Section 2.1 and shown on Figure 4-2. The storm water flow patterns and outfalls are also shown on Figure 4-2.

Refer to Table 2-2 for BMPs related to spill preventative measures for material handling procedures, storage requirements, and equipment usage.

In the event of a hazardous substance or oil spill, the ECC and ECPD shall be notified immediately (ECPD; 808-630-8246). If the spill cannot be easily addressed using an onsite spill kit and personal protective equipment, call Fed Fire (Military 911). The spill source should be immediately controlled if it is safe to do so by closing valves, switches, and/or turning off power to a device. Then, contain the spill by using sorbent socks or absorbent materials found in a spill kit. After it has been contained, clean up the spilled material in a safe manner using dry methods. All materials should then be properly disposed of.

Drip pans are used under leaking equipment. The locations of spill kits are shown in Figure 4-2.

E. Erosion and Sediment Controls

The majority of the 12th Marine Motor T compound is paved and thus does not have a high potential for significant soil erosion that would require erosion and sediment control measures. However, the dirt parking lot behind Building 6039 should be paved or covered with gravel to prevent erosion.

F. Best Management Practices to Minimize Pollutant Contact with Storm Water

Facility personnel receive annual training from ECPD at minimum, as well as an initial training for all new personnel. Training information will include the BMPs that have been developed for the facility and a general overview of the storm water program and its objectives.

Existing BMPs at the 12th Marine Motor T compound are shown in Table 2-2 and attached as fact sheets to this SWPPP in Appendix A.

TABLE 2-2 BEST MANAGEMENT PRACTICES

BMP No.	BMP Title	Description
001	Label All Drums, Cans, Containers, Tanks, and Valves	All containers and drums are labeled.
002	Restrict Access to Area and Equipment	The facility is fenced.
006	Control Spills	Spill kits are provided throughout the compound.
007	Place Trash Receptacles at Appropriate Locations	Covered trash bins are located throughout the facility
015	Recycle	Recyclable materials are stored in appropriate containers until it can be transported to the Recycle Center.
016	Store Waste and Recycling Materials in Proper Containers	Waste and recycling containers are located Waste containers will be emptied regularly. Dumpsters should all have lids; lids should be kept closed when not in use.
033	Check Vehicles and Equipment for Leaks	Vehicles and equipment are checked for leaks on a regular basis.
037	Park Vehicles on an Impervious Surface	All vehicles are parked on an impervious surface.
039	Drain All Fluids from Stored or Salvaged Vehicles and Equipment	Fuel and fluids are drained from stored or salvaged equipment.
041	Wash Equipment in Designated Areas	Vehicles and equipment are washed at a designated wash pad.
042	Discharge Wash Water to Sanitary Sewer	The wash down water collects in the OWS and discharges to the sanitary sewer.
044	Use Drip Pans under Leaking Equipment	Drip pans/pallets and bladders, along with absorbent pads, are utilized under leaking equipment.
061B	Store Liquids and Significant Materials within a Building or Covered Area	All significant materials are properly stored undercover and in secondary containment where required.
098	Construct Oil/Water Separator	Wash water from the vehicle wash rack flows to an OWS.
113	Conduct Personnel Training Regarding the SWPPP	Personnel are trained regularly (initial orientation and annual refresher).

3 Inspections, Assessments and Monitoring

3.1 Routine Quarterly Site Inspections

The MS4 Permit requires a routine quarterly site inspection by a qualified person with at least one member of the storm water pollution control team participating. At least once each calendar year, the routine inspection must be conducted during a period when a storm water discharge is occurring. The site inspection is an overall evaluation of the effectiveness of the BMPs implemented at that facility. A Routine Facility Inspection Checklist (Appendix B) shall be completed during each routine site inspection and kept onsite with this SWPPP. During normal facility operating hours, inspections must be conducted of areas of the facility including, but not limited to, the following:

- Areas where industrial materials or activities are exposed to storm water;
- Areas identified in the SWPPP and those that are potential pollutant sources;
- Areas where spills and leaks have occurred in the past three years;
- Discharge points; and
- Control measures used to comply with the effluent limits contained in this permit.

3.2 Visual Assessment of Storm Water Discharges

A Quarterly Visual Assessment of storm water discharge is required for all industrial facilities at MCBH. Storm water samples for this visual assessment but must be collected in such a manner that the samples are representative of the storm water discharge from the facility. Therefore, the water sample must be collected at the designated storm water monitoring point (Outfall 01) as shown in Figure 4-2.

The Quarterly Visual Assessment checklist (Appendix C) shall be completed by the current facility ECC and kept onsite with this SWPPP.

The visual assessment must be made:

- Of a sample collected in a clean, colorless glass or plastic container, and examined in a well-lit area;
- On samples collected within the first 30 minutes of an actual discharge from a storm event. If it is not possible to collect the sample within the first 30 minutes of discharge, the sample must be collected as soon as practicable after the first 30 minutes and documented why it was not possible to take the sample within the first 30 minutes; and
- For storm events, on discharges that occur at least 72 hours (three days) from the previous discharge.

Whenever the visual assessment shows evidence of storm water pollution, corrective action procedures to remedy the pollutants must be taken and documented. Refer to Section 4 for corrective action procedures.

4 Corrective Actions

A corrective action is defined as any action taken, or required to be taken, to (1) repair, modify, or replace any stormwater control used at the site; (2) clean up and dispose of spills, releases, or other deposits found on the site; and (3) remedy a permit violation. Corrective actions should be documented using the Corrective Action Log (Appendix D).

4.1 Immediate Actions

If corrective action is needed, you must immediately take all reasonable steps necessary to minimize or prevent the discharge of pollutants until a permanent solution is installed and made operational, including cleaning up any contaminated surfaces so that the material will not discharge in subsequent storm events. Note: In this context, the term "immediately" requires you to, on the same day a condition requiring corrective action is found, take all reasonable steps to minimize or prevent the discharge of pollutants until a permanent solution is installed and made operational. However, if a problem is identified at a time in the workday when it is too late to initiate corrective action, the initiation of corrective action must begin no later than the following workday. "All reasonable steps" means that the permittee has undertaken initial actions to assess and address the condition causing the corrective action, including, for example, cleaning up any exposed materials that may be discharged in a storm event (e.g., through sweeping, vacuuming) or making arrangements (i.e., scheduling) for a new BMP to be installed at a later date.

4.2 Escalating Actions

If additional actions are necessary beyond those implemented or if the conditions continue to occur, additional corrective actions (e.g., install a new or modified control and make it operational, complete the repair) must be completed before the next storm event if possible, and within 14 calendar days from the time of discovery of the corrective action condition. If it is infeasible to complete the corrective action within 14 calendar days, document why it is infeasible to complete the corrective action within the 14-day timeframe and identify a schedule for completing the work, which must be done as soon as practicable after the 14-day timeframe but no longer than 45 days after discovery. If the completion of corrective action will exceed the 45-day timeframe, the minimum additional time necessary to complete the corrective action can be taken, provided that MCBH ECPD and DOH is notified of your intention to exceed 45 days. Where your corrective actions result in changes to any of the controls or procedures documented in your SWPPP, you must modify your SWPPP accordingly within 14 calendar days of completing corrective action work.

4.3 Corrective Actions for Substantially Identical Outfalls

If the event triggering corrective action is associated with an outfall that had been identified as a "substantially identical outfall", the review must assess the need for corrective action for all related substantially identical outfalls. Any necessary changes to control measures that affect these other outfalls must also be made before the next storm event if possible, or as soon as practicable following that storm event. Any corrective actions must be conducted within the timeframes discussed above.

4.4 Record of Past Spills or Leaks of Hazardous Pollutants

Table 4-1 is used to record significant spills and leaks that have occur or have occurred within three years prior to the preparation or amendment of this SWPPP. Significant spills and leaks include, but are not limited to, releases of oil or hazardous substances in excess of quantities that are reportable under CWA Section 311 (see 40 CFR 110.6 and 40 CFR 117.21) or Section 102 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 USC §9602.

At the time of this SWPPP update, there have been no past spill or leak incidents reported for the 12th Marine Motor T compound.

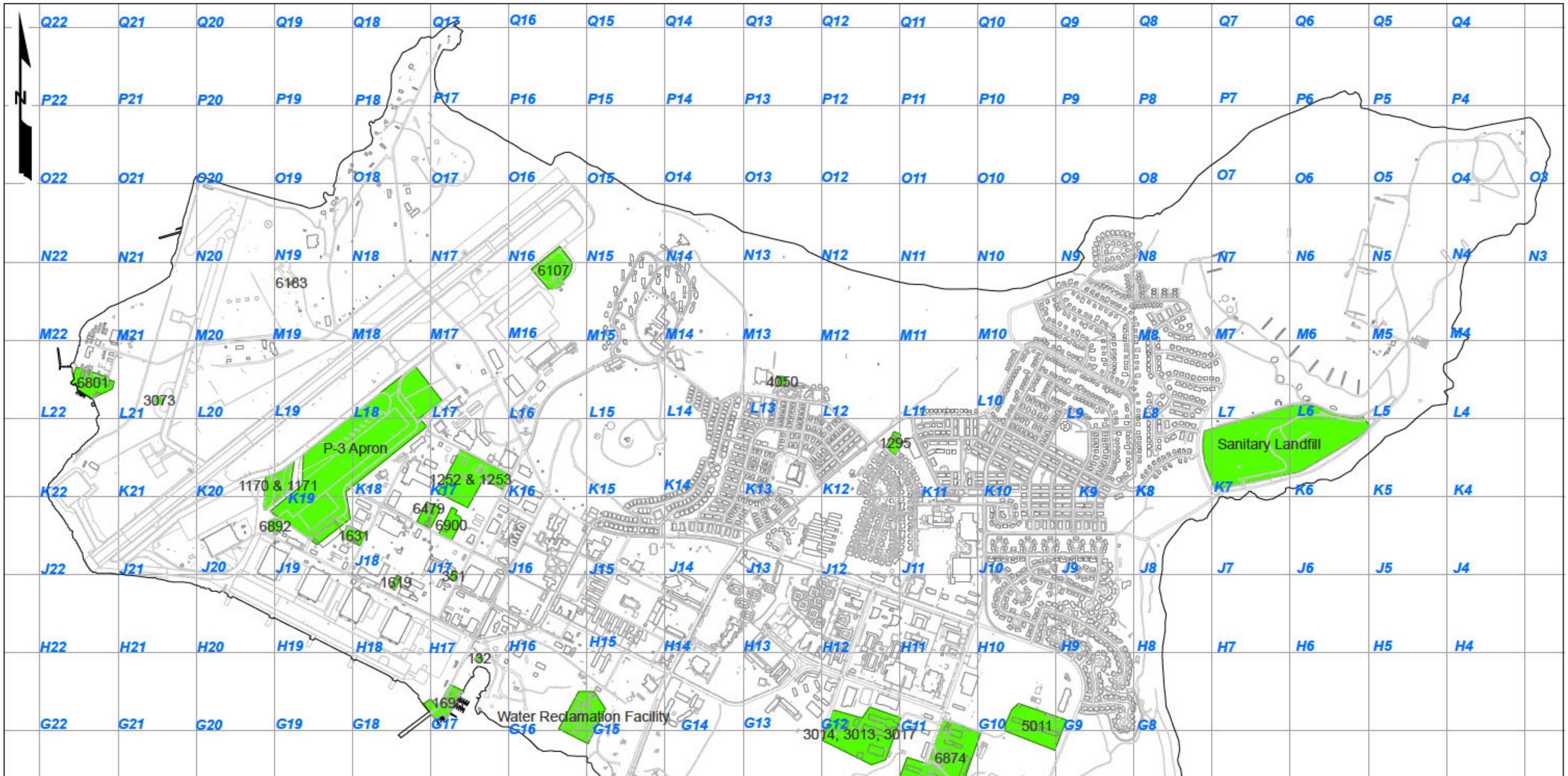
TABLE 4-1. PAST SPILLS OR LEAKS OF HAZARDOUS POLLUTANTS

Date of Incident	Brief Summary of Incident (POC Active at Time of Incident, Pollutant Type, Estimated Quantity, Location of Spill)

4.5 Record of Unauthorized Non-Storm Water Discharges

TABLE 4-2. UNAUTHORIZED NON-STORM WATER DISCHARGE EVALUATION

Date of Evaluation	Brief Summary of Evaluation (Description of the evaluation criteria, outfalls or onsite drainage points that were directly observed, action(s) taken, such as a list of control measures used to eliminate unauthorized discharge)



Legend

Industial Sites

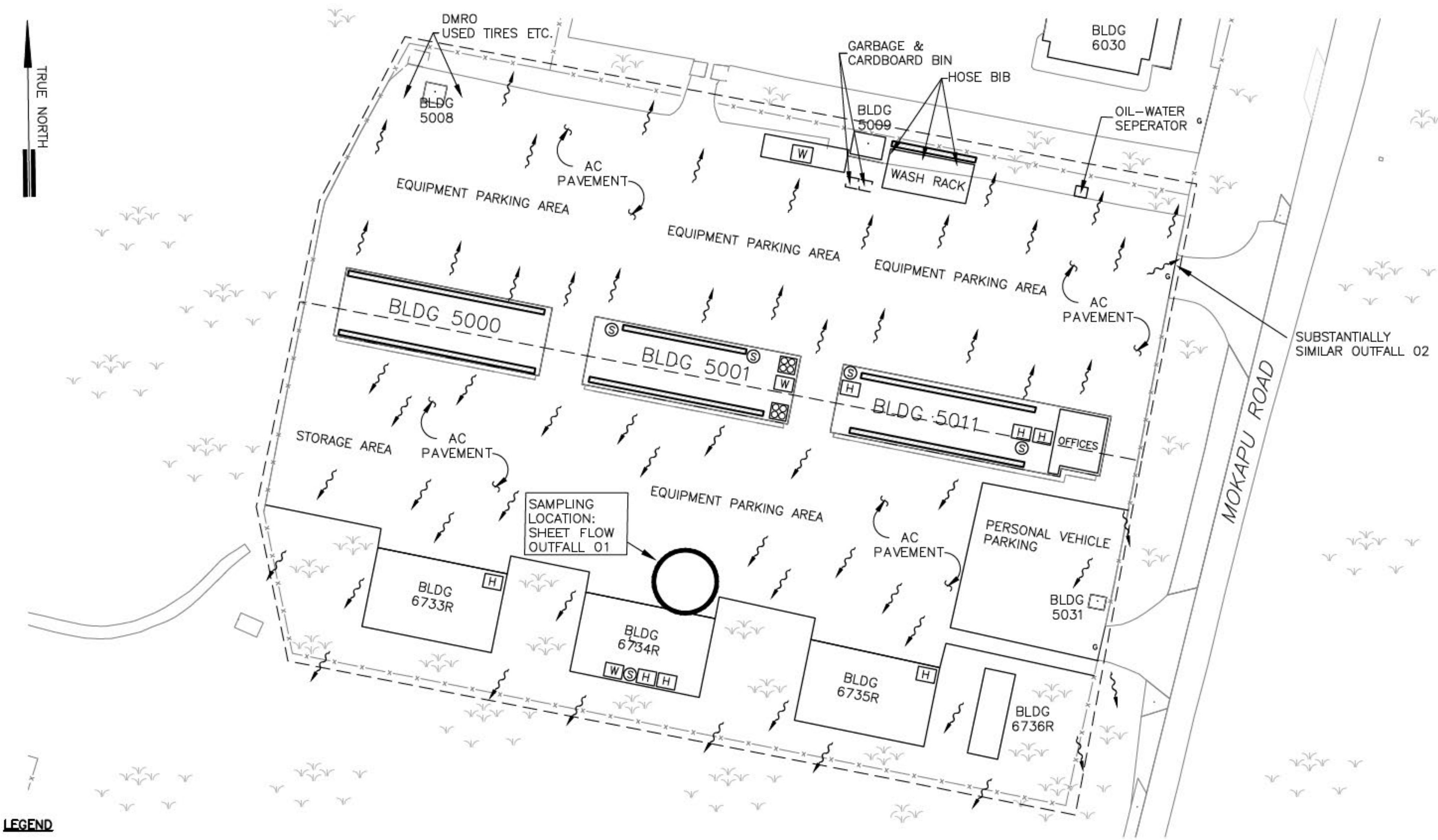
1,800 900 0 1,800 Feet

element environmental llc
environmental · engineering · water resources

PROJECT TITLE
MCBH SWPPP
Storm Water Management Program Plan

FIGURE TITLE
General Location Map

DATE	FIGURE NO.
September 2022	**4-1**



LEGEND

- W — SATELLITE ACCUMULATION SITE
- H — HAZARDOUS MATERIALS STORAGE
- S — SPILL KIT
- STORM DRAIN INLET
- SPILL PALLET WITH DRUMS
- FLOW ARROW
- DRAINAGE AREA BOUNDARY

NOTES:

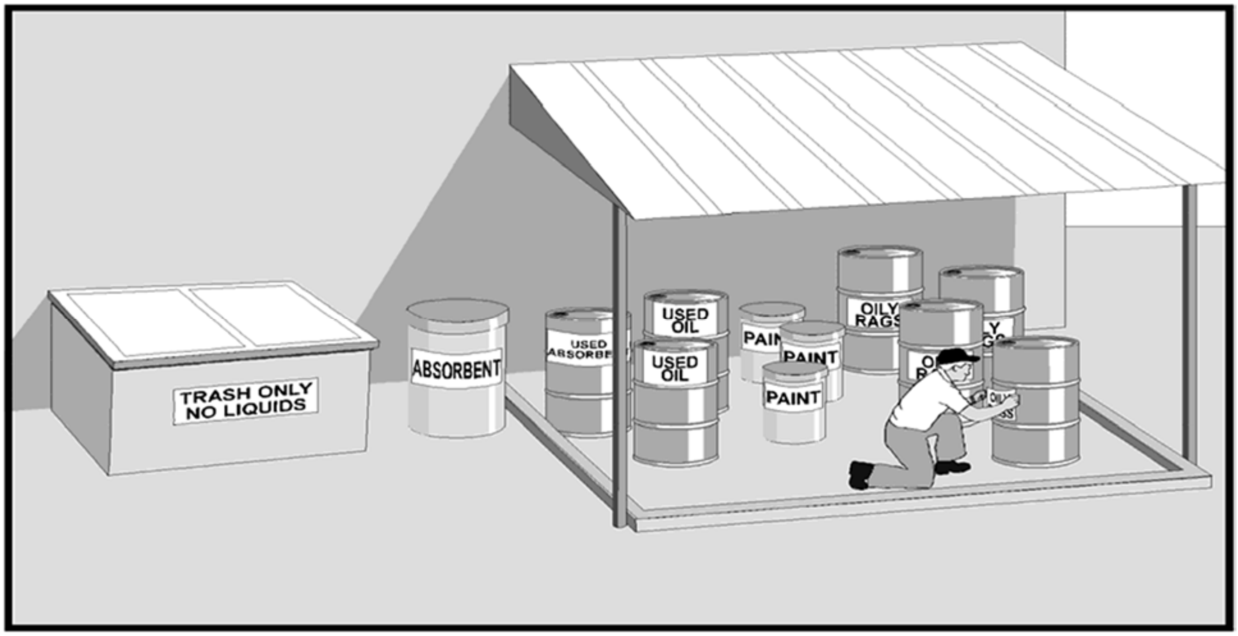
1. STORM WATER, FROM APPROXIMATELY 7.2 ACRES ASSOCIATED WITH 12TH MARINE MOTOR TRANSPORT FACILITY DISCHARGES TO FLAT GRASSY AREAS THAT SURROUND THE FACILITY. THE NEAREST WATERBODY, KALUAPUHI POND, IS APPROXIMATELY 900 FT TO THE SOUTHEAST.
2. NOT TO SCALE

DATE:	PROJECT TITLE:	
JULY 2022	STORM WATER POLLUTION PREVENTION PLAN MCBH, KANEOHE BAY, OAHU, HAWAII	
FIGURE TITLE:		FIGURE NO.:
12th MOTOR TRANSPORT (BUILDING 5011)		4-2

APPENDIX A

SELECTED BMP FACT SHEETS

BMP 001 - LABEL ALL DRUMS, CANS, CONTAINERS, AND TANKS



Description of Potential Pollutant and Source: Drums, cans, and containers can be improperly managed and disposed of due to uncertainty of the container's contents. Tanks which are not labeled may result in improper use of the tank or fuel, which may result in the exposure of significant materials to storm water and/or receiving waters. Similarly, unlabeled valves may be opened without proper precaution due to lack of user information. Storm water quality will be affected if significant materials are improperly disposed to the storm drain and/or receiving waters. Lack of labeling will also make it difficult to quickly identify the type of material released so facility personnel can respond correctly. Labels also identify hazardous materials at the facility and are a good way to request caution in certain areas (e.g., drums indicating flammability).

Description of BMP: Label all drums, valves, pumps, cans, tanks, and containers to reduce the chance of misuse and eventual spills. Labeling ensures that the appropriate procedures, equipment, and storage containers are used. All containers will be labeled as to what is in them.

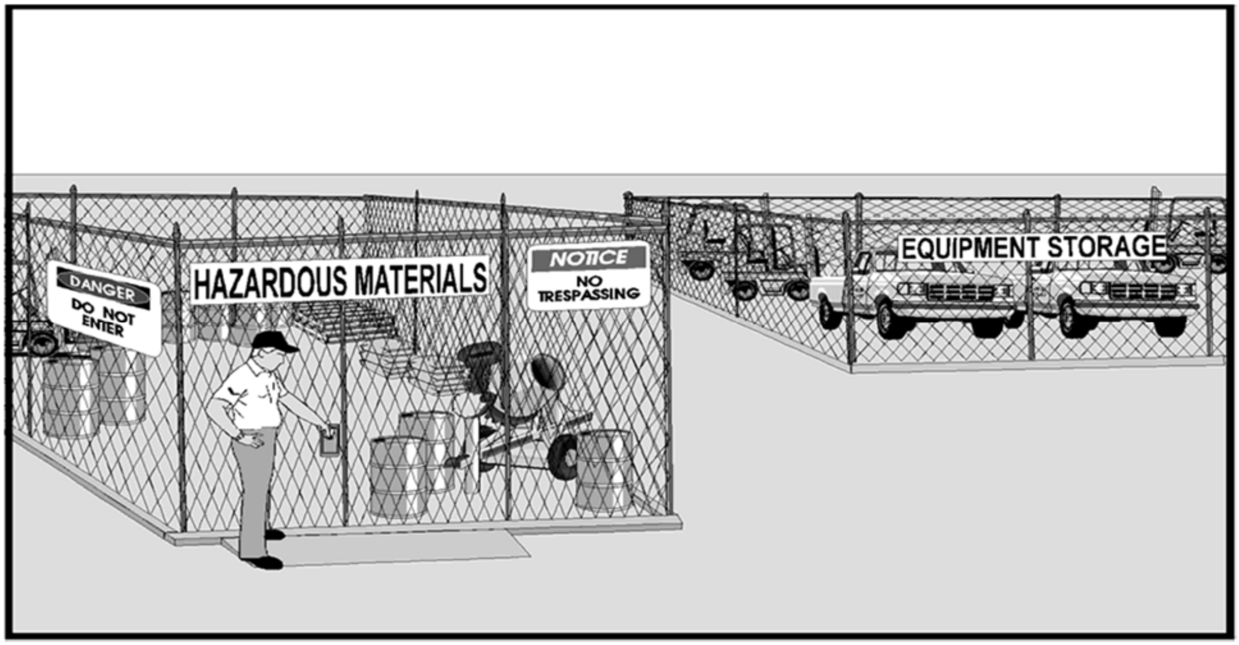
Application Guidance: As needed.

Training: N/A

Effectiveness and Cost: Effectiveness and costs will vary depending on the application.

Limitations: None

BMP 002 - RESTRICT ACCESS TO AREA AND EQUIPMENT



Description of Potential Pollutant and Source: Vandalism of vehicles and facility property may result in the release of significant materials.

Description of BMP: Provide fences and gate areas where vehicles, equipment and materials are stored and are accessible to the public to discourage trespassing. Access to equipment will also be restricted. Only authorized personnel will be allowed to operate equipment. The fences and gates will be properly maintained, and additional security measures including lighting of the area will be implemented if the fencing alone proves insufficient. Where appropriate, security guards or alarms will be used.

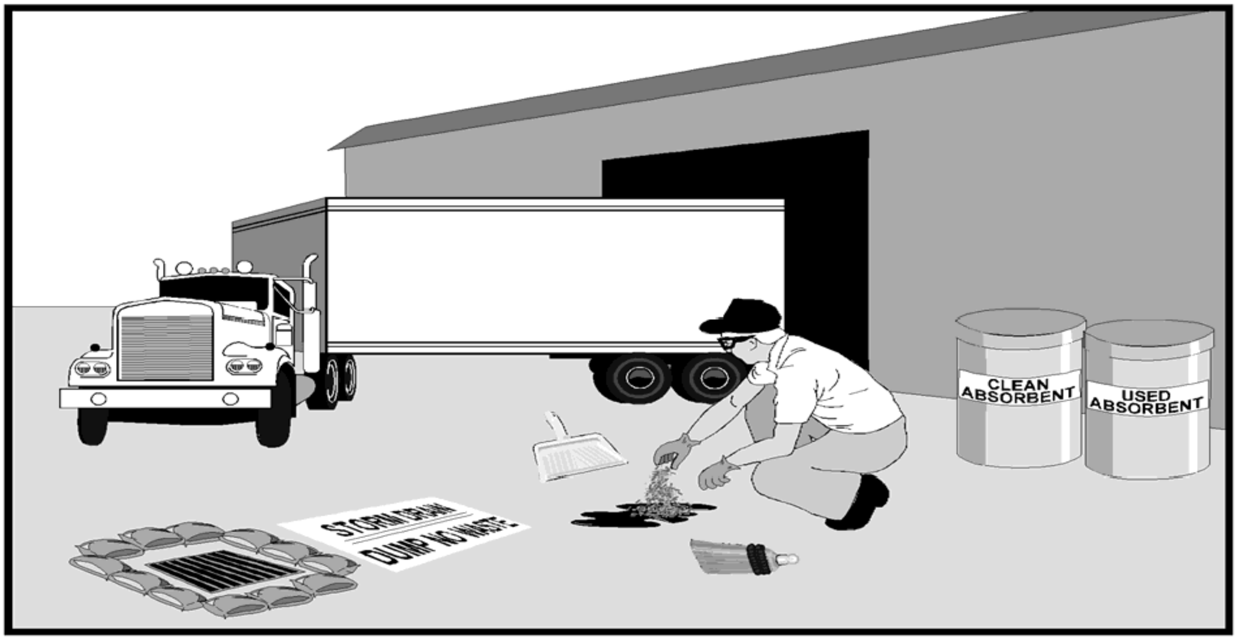
Application Guidance: As needed.

Training: N/A

Effectiveness and Cost: Effectiveness and costs will vary depending on the application.

Limitations: None

BMP 006 - CONTROL SPILLS



Description of Potential Pollutant and Source: Spills of significant materials may be exposed to storm water and transported to storm drains and/or receiving waters.

Description of BMP: Follow safety data sheets (SDS) for handling, storage, and cleanup of all significant materials to reduce the potential for spills.

Any spill, large or small, of significant materials will be controlled to prevent pollutants from being transported to storm drains and/or receiving waters. Appropriate spill control material will be kept on site. Smaller spills will be contained using absorbent material such as kitty litter, straw, or sawdust. Drums of absorbent material will be easily accessible and clearly marked, and containers for spent absorbent material will be readily available. Spent absorbent material will be managed appropriately and disposed of in accordance with applicable regulations. Larger spills will be controlled using spill kits, brooms, and other response equipment commensurate with the size of the spill. The methods outlined in the Activity's spill prevention and response plans (BMP 112) for hazardous materials will be followed for spills of any potential storm water pollutants. The date, time, nature and volume of material spilled, and cleanup measures taken will be recorded for all spills and kept as part of the SWPPP.

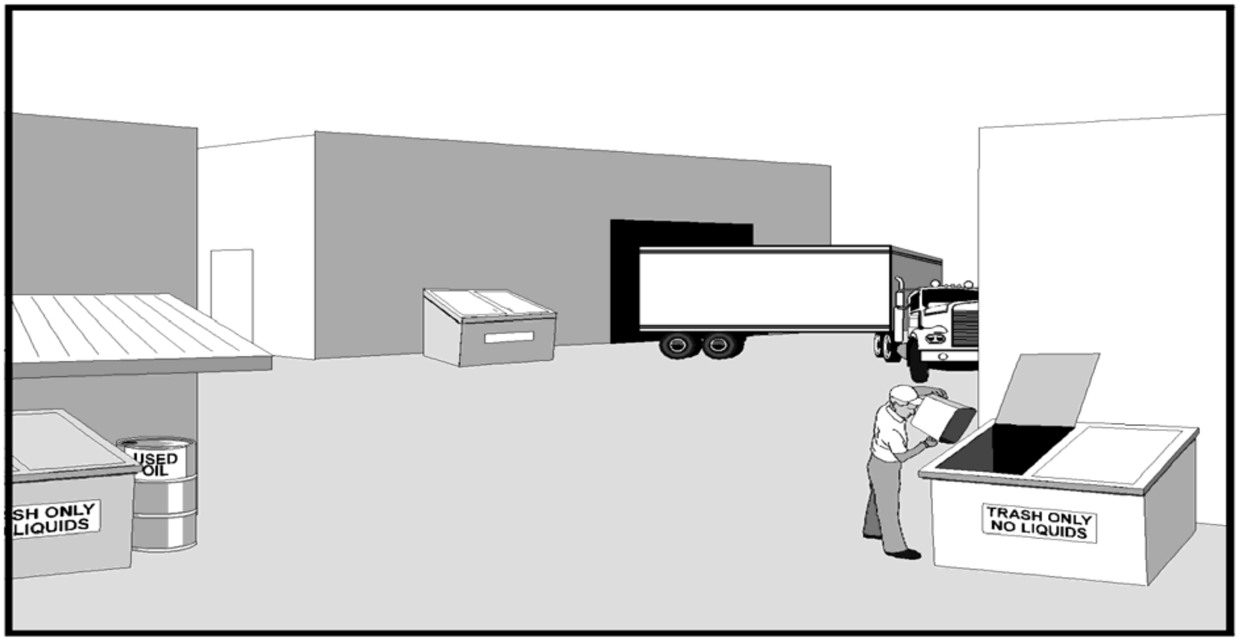
Application Guidance: Controlling spills will be practiced under all working conditions.

Training: Personnel will be trained in spill prevention and response procedures including the use of personal protection equipment (gloves, eye and face protection, etc.). This will include what absorbent or equipment to use, how to use the absorbent or equipment, where to find it, how to dispose of the spent absorbent or other material, and who to notify in the event of a spill.

Effectiveness and Cost: Spill control is a moderately effective, low-cost BMP.

Limitations: None

BMP 007 - PLACE TRASH RECEPTACLES AT APPROPRIATE LOCATIONS



Description of Potential Pollutant and Source: Improperly located or insufficient numbers of trash receptacles will promote poor housekeeping practices. This will increase the opportunity for pollutants from all source areas to reach storm water.

Description of BMP: Properly located and sufficient numbers of trash receptacles will promote the proper disposal of waste materials. This reduces the opportunity for pollutants to reach storm water. Trash receptacles will be easily accessible for personnel.

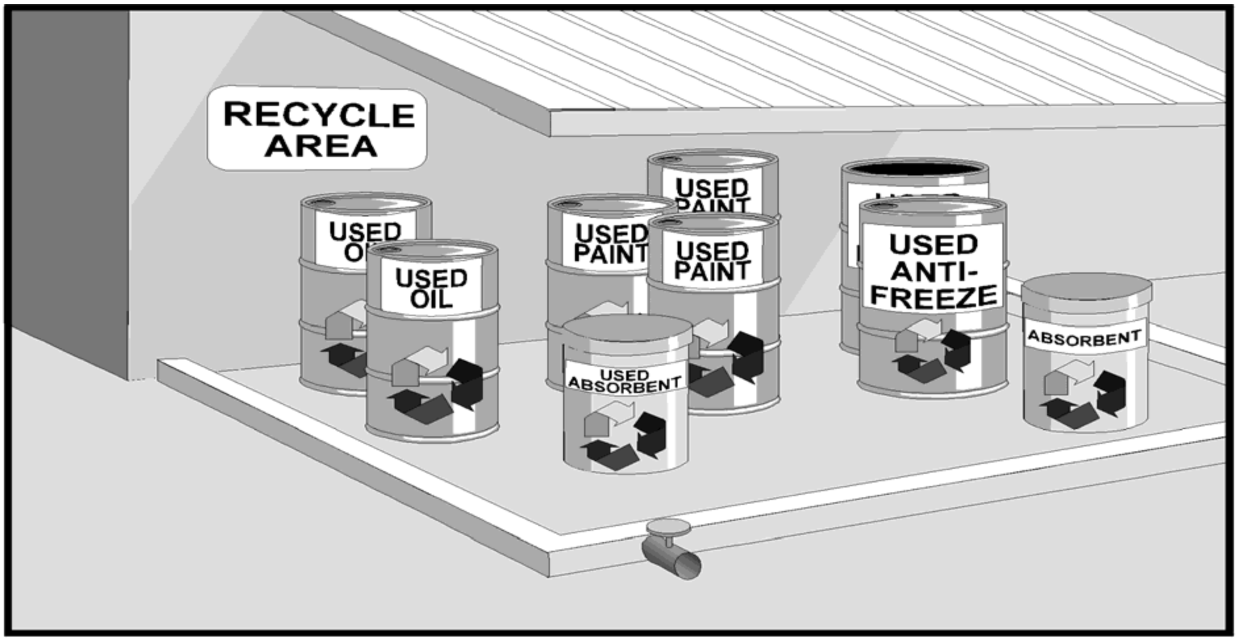
Application Guidelines: Placement of trash receptacles at appropriate locations will always be practiced.

Training: Personnel will be trained as to the location of trash receptacles.

Effectiveness and Cost: Appropriately located trash receptacles are an effective, low-cost BMP.

Limitations: None

BMP 015 – RECYCLE



Description of Potential Pollutant and Source: Many materials, both hazardous and non-hazardous, can be sources of pollutants. Recycling will be employed to reduce the amount of waste material exposed to storm water on the Activity.

Description of BMP: Recycle materials to the fullest extent possible in all situations.

Application Guidance: Recycling collections will be conducted at least weekly for recyclable items such as solvents, oil, scrap metals, wash water and absorbent materials. Separating the recyclable items facilitates recycling.

The frequency for implementing this BMP has been provided as general guidance. However, a facility operator may wish to establish a more suitable frequency. This will require SWPPP implementors to make judgements based on facility operations and conditions. To assign a frequency other than what has been suggested (i.e., more or less frequent), the following criteria will be considered and rated either High, Medium, or Low. If many of the criteria are assigned a High rating, the frequency may be increased. Similarly, if many criteria are assigned a Low rating, the frequency may be decreased. The goal of implementing this BMP is to minimize exposure of pollutants to storm water.

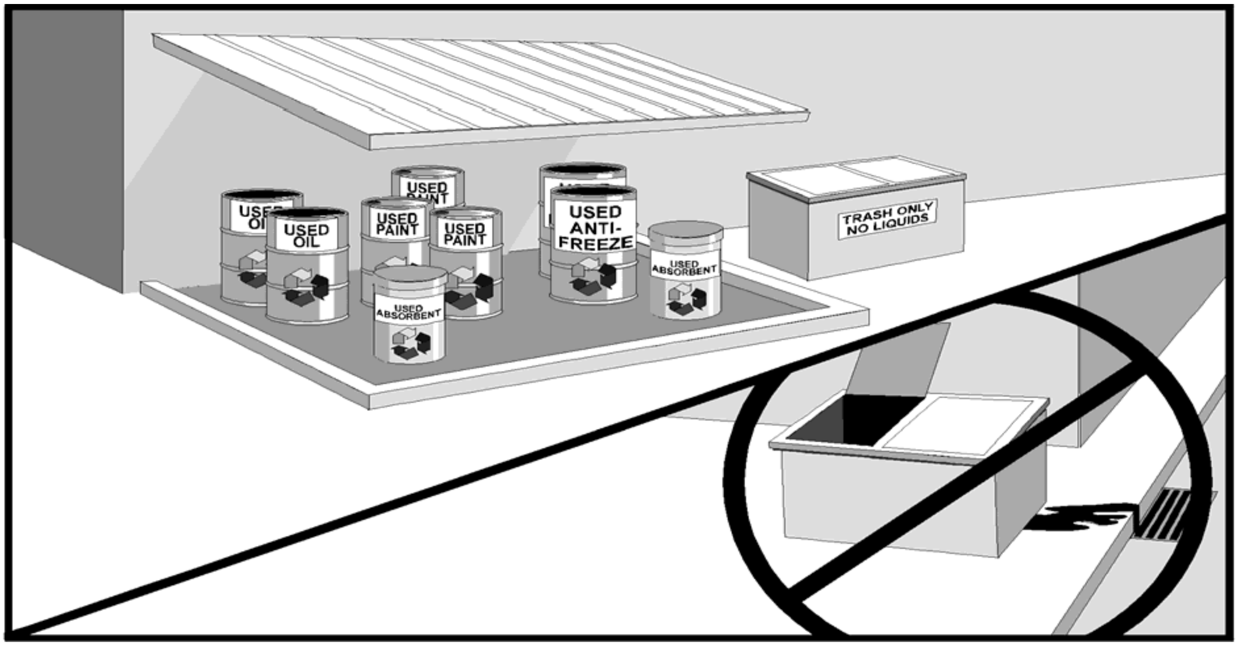
CRITERIA	Rating H=High M=Medium L=Low
Probability of exposure of significant materials to storm water	
Quantity of significant materials potentially exposed	
Toxicity of significant materials potentially exposed	
Frequency of use of significant materials potentially exposed	
Evidence of exposure (e.g., stains on pavement, etching of concrete	
Proximity of source area to outfall or receiving water	
Sensitivity of receiving water to potentially exposed significant materials (e.g., waters with beneficial uses such as human contact, recreation, significant species habitat, etc.)	

Training: Personnel will be trained on proper recycling techniques along with posting and maintenance of signs.

Effectiveness and Cost: Effectiveness and cost will be site specific.

Limitations: Local vendors may not be available to receive certain recyclable materials.

BMP 016 - STORE WASTE AND RECYCLING MATERIALS IN PROPER CONTAINERS



Description of Potential Pollutant and Source: Dry waste, including items such as scrap metal, floor sweepings, metal chips, and paper goods, can be dispersed by wind or operational error if not stored properly. If a dumpster's lid is not kept closed, animals may carry garbage out of the containers. Uncovered dumpsters also expose waste to storm water, which may leak out of the dumpster and into the storm sewer system.

Description of BMP: Locate waste and recycling drums and containers in centralized areas, using proper labeling (both containers and location) and providing easy access. If possible, the area will have secondary containment (see BMPs 012, 013, and 014). Waste containers will be emptied regularly. Dumpsters will all have lids; lids will be kept closed when not in use. If the dumpster has inadequate capacity and it is not possible to keep the cover closed, the frequency of pick-up will be increased, or the dumpster will be replaced with a model of greater capacity.

Application Guidance: This BMP will be applied to all waste and recycling storage areas.

Training: Personnel will be trained to monitor waste and recycling storage sites to ensure their materials are properly stored and that there are no overflowing containers.

Effectiveness and Cost: This is a moderately effective, low-cost BMP.

Limitations: None

BMP 033 - CHECK VEHICLES AND EQUIPMENT FOR LEAKS

Description of Potential Pollutant and Source: Vehicles, aircraft, or equipment entering or stored at a maintenance facility may be leaking a variety of fluids (fuel, oil, antifreeze, freon, etc.). These materials can be exposed to storm water.

Description of BMP: Inspect all vehicles and equipment at the site, whether incoming, parked, stored, or salvaged, for oil and fluid leaks. Drivers of fleet vehicles, such as delivery trucks, will also check under their vehicles each morning for fluid leaks. If leaks are present, drip pans will be placed under the vehicle or equipment. Once the vehicle is removed from the site, the former parking area will be inspected for stains, and these stains will be cleaned using rags or dry solvents.

Application Guidance: Any vehicle or equipment coming in for repairs, painting, or storage will be inspected for leaks. Fleet vehicles will be inspected each morning. Vehicles that are parked, stored, or salvaged will be provided with drip pans, as will tanker rail cars waiting to be unloaded. The frequency for implementing this BMP has been provided as general guidance. However, a facility operator may wish to establish a more suitable frequency. This will require SWPPP implementors to make judgements based on facility operations and conditions. To assign a frequency other than what has been suggested (i.e., more or less frequent), the following criteria will be considered and rated either High, Medium, or Low. If many of the criteria are assigned a High rating, the frequency may be increased. Similarly, if many criteria are assigned a Low rating, the frequency may be decreased. The goal of implementing this BMP is to minimize exposure of pollutants to storm water.

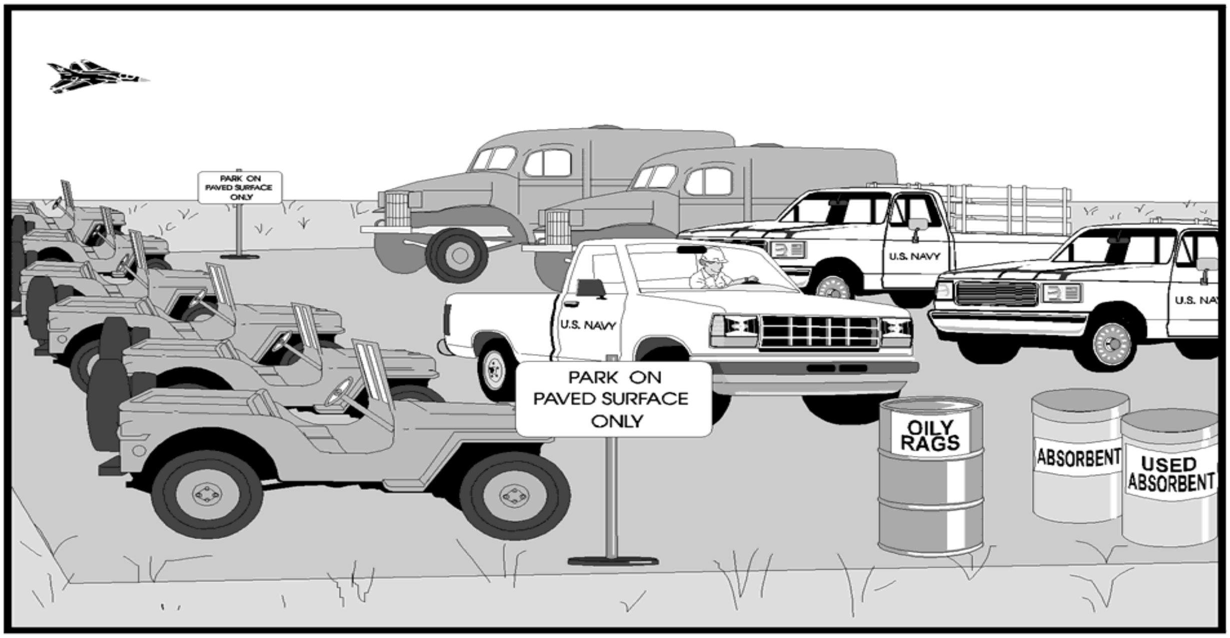
CRITERIA	Rating H=High M=Medium L=Low
Probability of exposure of significant materials to storm water	
Old age or poor condition of equipment and vehicles	
Evidence of exposure (e.g., stains on pavement)	
Proximity of source area to outfall or receiving water	
Sensitivity of receiving water to potentially exposed significant materials (e.g., waters with beneficial uses such as human contact, recreation, significant species habitat, etc.)	

Training: Signs will be posted to remind personnel of proper procedures.

Effectiveness and Cost: Checking for leaks is a moderately effective, low-cost BMP.

Limitations: None

BMP 037 - PARK VEHICLES ON AN IMPERVIOUS SURFACE



Description of Potential Pollutant and Source: Pollutants leaking or spilled onto the ground surface from vehicles can infiltrate into the soil. These pollutants (i.e., oil, fuel, etc.) may then be exposed to storm water and transported to surface water.

Description of BMP: Park vehicles on an impervious surface. For this BMP, an impervious surface is defined as a surface that cannot be readily penetrated by rainfall, such as concrete and asphalt pavement. Leaks and spills will be cleaned from these surfaces.

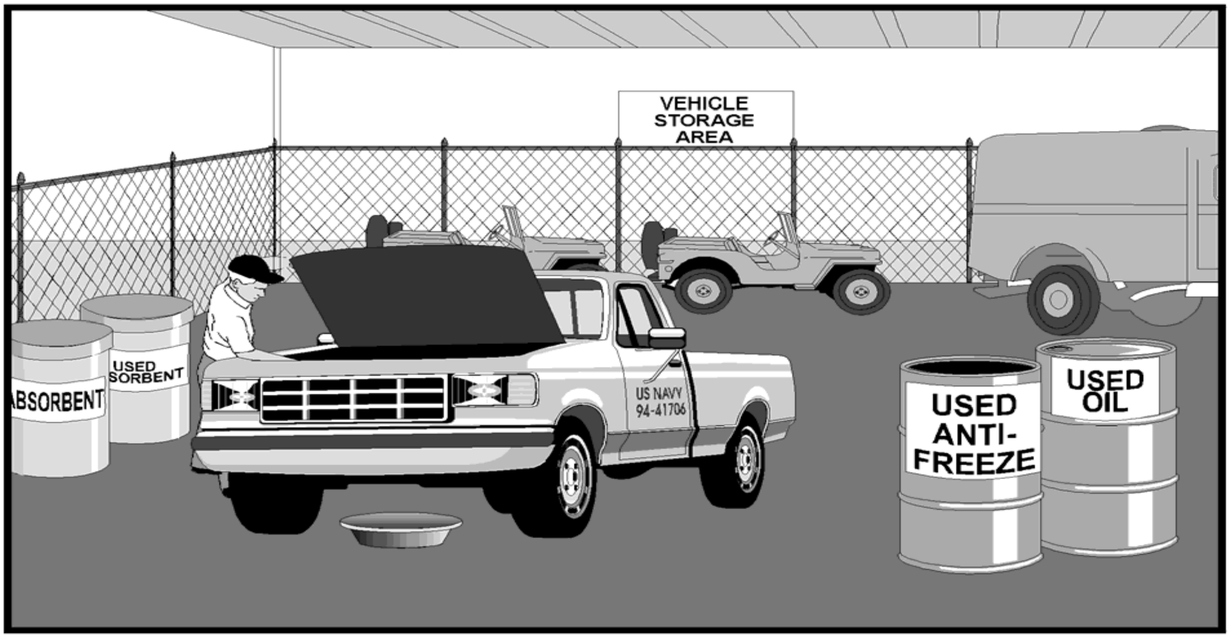
Application Guidance: Vehicles will always be parked on impervious surfaces, especially during the rainy season.

Training: Signs will be posted to remind personnel that all vehicles are to be parked on paved surfaces.

Effectiveness and Cost: Parking vehicles on impervious surfaces is a moderately effective, low-cost BMP.

Limitations: Very large traffic volumes may make implementation of this BMP difficult.

BMP 039 - DRAIN ALL FLUIDS FROM STORED OR SALVAGED VEHICLES AND EQUIPMENT



Description of Potential Pollutant and Source: Vehicles and equipment undergoing long-term storage or salvage often contain a variety of liquids (oil, antifreeze, hydraulic fluid, etc.) that can leak or spill, thereby exposing these materials to storm water.

Description of BMP: Drain, collect, and recycle oil and other fluids from vehicles being stored long term or salvaged (i.e., parts vehicles).

Application Guidance: Vehicles or equipment that are to be stored without use for more than three months will be drained of all fluids. Signs will be posted on these vehicles from which fluids have been drained.

The frequency for implementing this BMP has been provided as general guidance. However, a facility operator may wish to establish a more suitable frequency. This will require SWPPP implementors to make judgements based on facility operations and conditions. To assign a frequency other than what has been suggested (i.e., more or less frequent), the following criteria will be considered and rated either High, Medium, or Low. If many of the criteria are assigned a High rating, the frequency may be increased. Similarly, if many criteria are assigned a Low rating, the frequency may be decreased. The goal of implementing this BMP is to minimize exposure of pollutants to storm water.

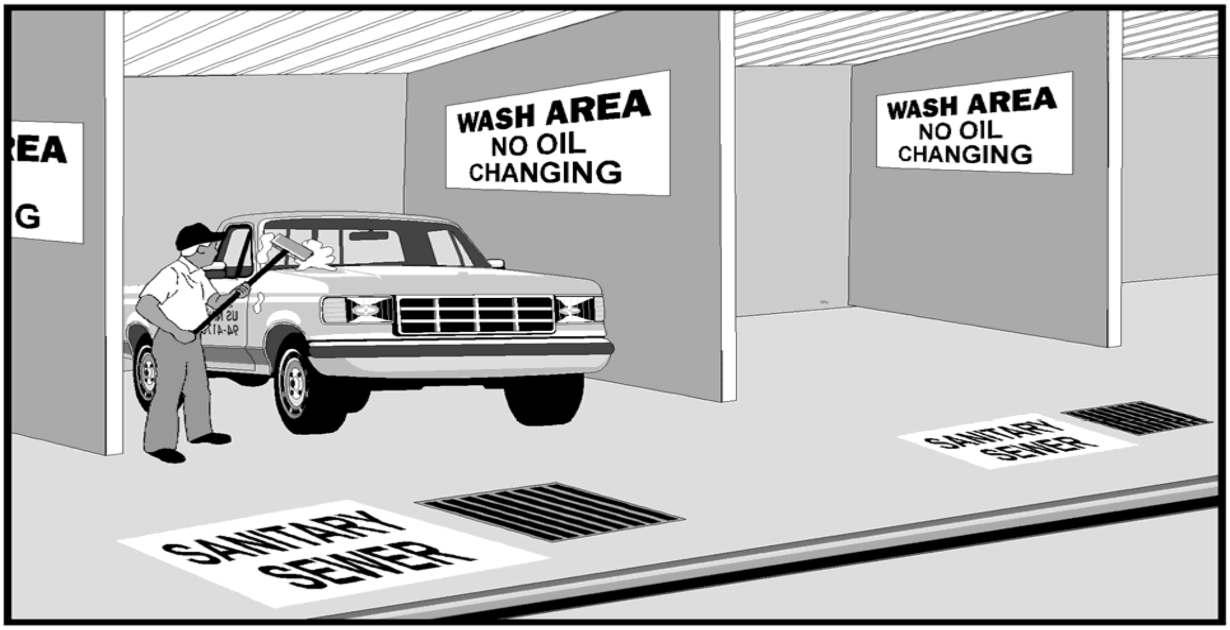
CRITERIA	Rating H=High M=Medium L=Low
Probability of exposure of significant materials to storm water	
Evidence of exposure (e.g., stains on pavement)	
Proximity of source area to outfall or receiving water	
Sensitivity of receiving water to potentially exposed significant materials (e.g., waters with beneficial uses such as human contact, recreation, significant species habitat, etc.)	

Training: Signs will be posted as reminders to personnel.

Effectiveness and Cost: Draining oil and fluids is a moderately effective, low-cost BMP.

Limitations: None

BMP 041 - WASH EQUIPMENT AND VEHICLES IN DESIGNATED AREA



Description of Potential Pollutant and Source: Washing equipment and vehicles outdoors or in areas where wash water flows onto the ground can pollute storm water. It is difficult to control the wastewater from washing operations if it is not done in a designated area.

Description of BMP: Facilities will designate bermed wash areas that contain wash water and prevent contact with storm water. These areas will drain to the sanitary sewer (BMP 042) or to a sump. If a sump is used, wash water will be recycled.

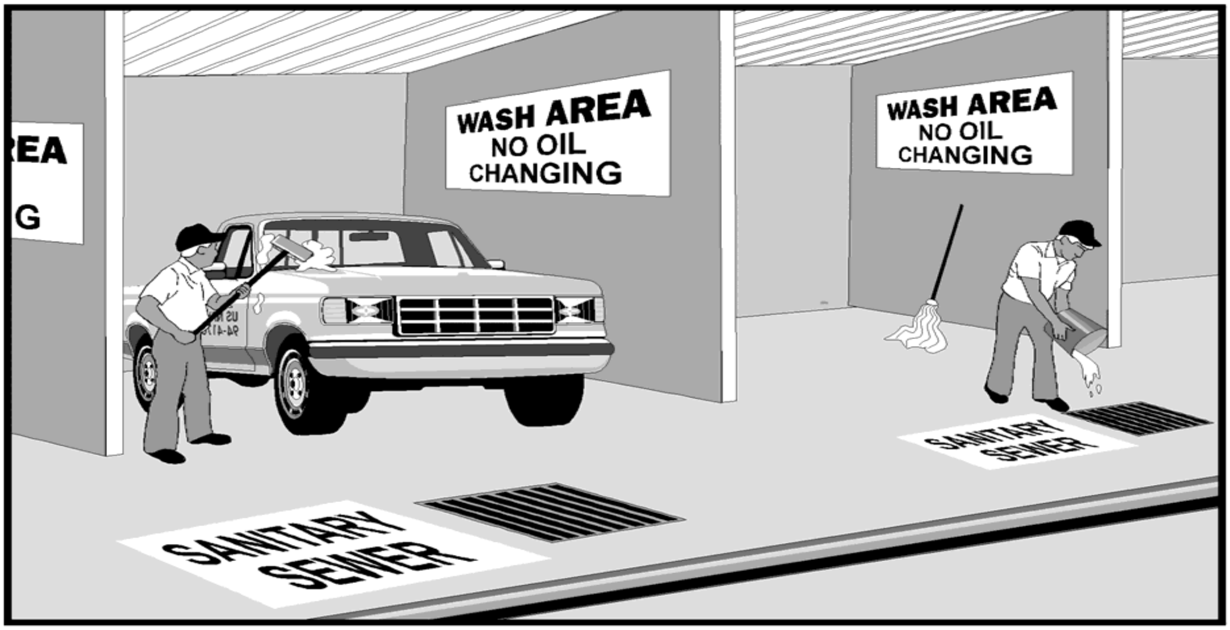
Application Guidance: This practice will be followed wherever vehicles, equipment and aircraft are washed.

Training: N/A

Effectiveness and Cost: This is a highly effective, variable-cost BMP.

Limitations: Pretreatment and monitoring of wash waster discharges to the sanitary sewer may be required. This would greatly increase the cost of this practice. The treatment plant operator will be notified and approval obtained before discharge.

BMP 042 - DISCHARGE WASH WATER TO A SANITARY SEWER



Description of Potential Pollutant and Source: Wash water from vehicle, equipment, and floor cleaning activities often contains such as grease, oil, and gasoline which can be exposed to storm water. Wash water must not be discharged to the storm drain.

Description of BMP: Discharge wash water to a sanitary sewer to ensure that is does not enter a storm drain. (See BMP 041, "Wash Equipment and Vehicles in Designated Areas.") Wash water from mopping floors will also be discharged to the sanitary sewer.

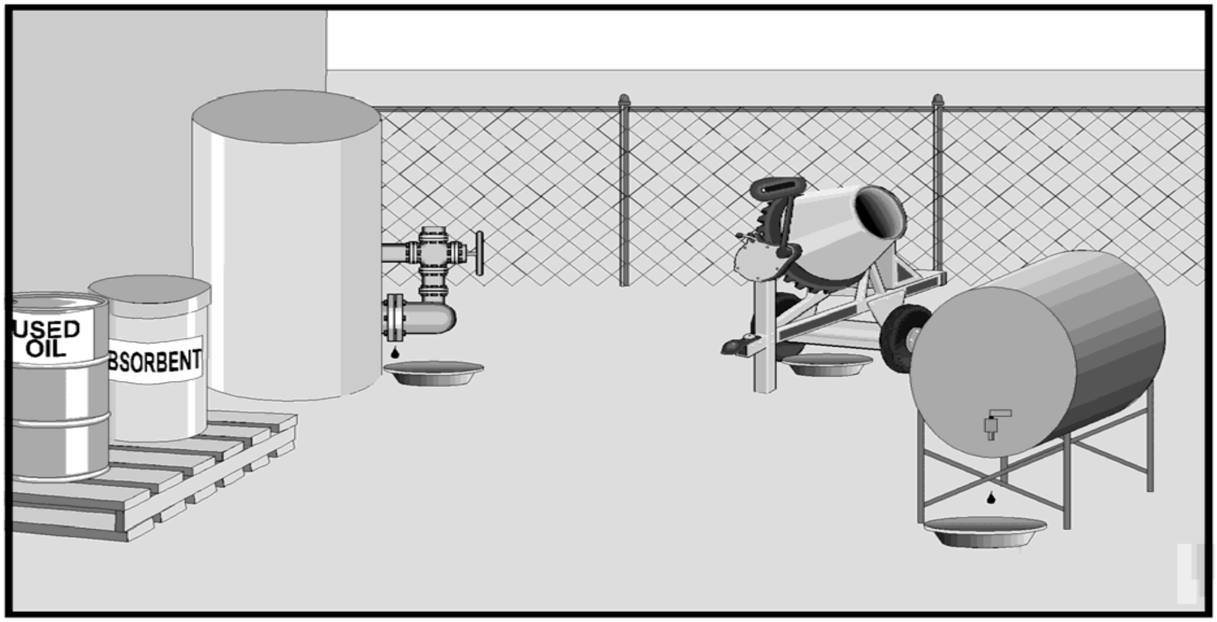
Application Guidance: All wash water from vehicle and equipment cleaning activities will be discharged to a sanitary sewer. In areas where wash water cannot be discharged to a sanitary sewer, wash water will be collected in a dead-end sump, tank, or other device and transported or pumped to the nearest treatment facility for proper disposal.

Training: Personnel will be trained to know where cleaning activities will be performed.

Effectiveness and Cost: Discharging wash water to a sanitary sewer is a highly effective, variable-cost BMP.

Limitations: Pretreatment and monitoring of wash water discharges to the sanitary sewer may be required. This would greatly increase the cost of this practice. The treatment plant operator will be notified and approval obtained before discharge.

BMP 044 - USE DRIP PANS UNDER LEAKING EQUIPMENT



Description of Potential Pollutant and Source: Equipment such as pumps, air conditioners, and boilers may leak fluids. These fluids typically contain pollutants that may be exposed to storm water and transported into the storm sewer system if they are not collected.

Description of BMP: Place drip pans under leaking equipment to collect any leaking fluid., This temporary BMP will be used until the equipment is properly repaired or replaced.

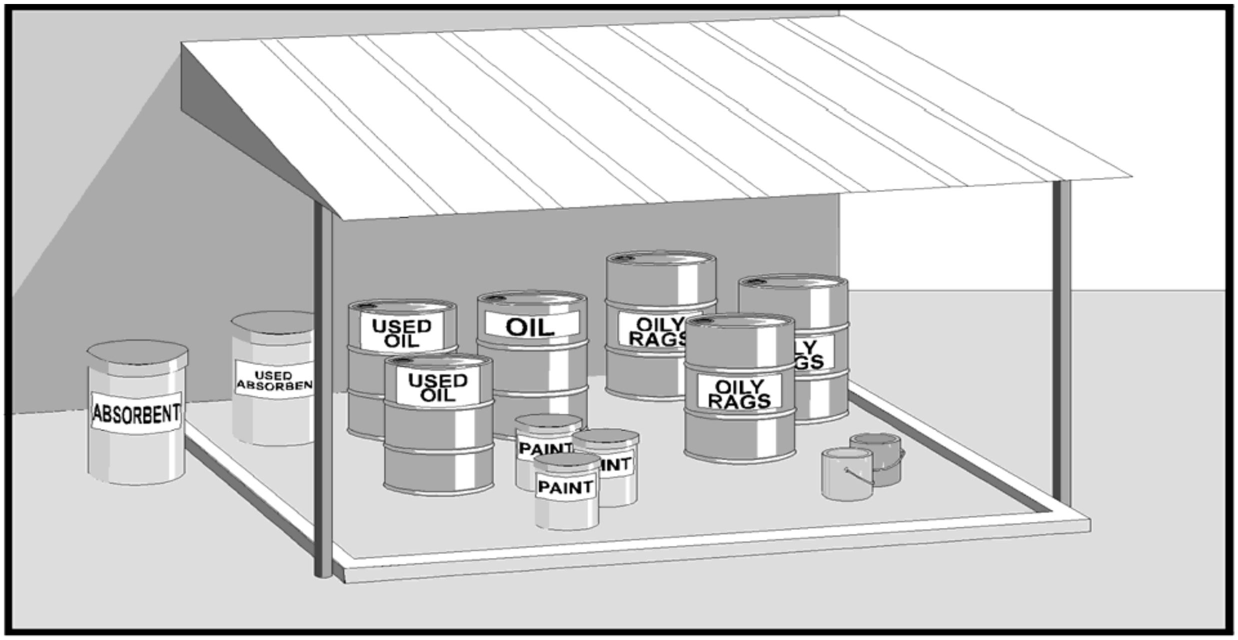
Application Guidance: Any equipment which is leaking fluid will be repaired or replaced. However, until the leak is stopped, a drip pan will be used to collect the fluid.

Training: Personnel will be trained to immediately place a drip pan under leaking equipment and notify the appropriate maintenance personnel. The drip pan will be routinely checked and the collected material disposed properly.

Effectiveness and Cost: This is a highly effective, low-cost BMP

Limitations: None

BMP 061B - STORE LIQUIDS AND SIGNIFICANT MATERIALS WITHIN A BUILDING OR COVERED AREA



Description of Potential Pollutant and Source: Many significant materials may be leaked or spilled during storage, handling, or transport. If significant materials are stored outside, in covered areas, these materials can be exposed to storm water, which can transport the leaked or spilled material into the storm drain system.

Description of BMP: To the extent practical, store significant materials within a building or covered area. The materials will be stored on an impervious surface, such as a concrete pad. Rainfall runoff from the pad will be directed to a storm water treatment facility or contained. Leaks and spills will be cleaned up as soon as possible using rags or dry absorbents (see BMP 006). Used rags and absorbents will be disposed of properly. Any wash water from cleaning the floor will be disposed of in the sanitary sewer (see BMP 042).

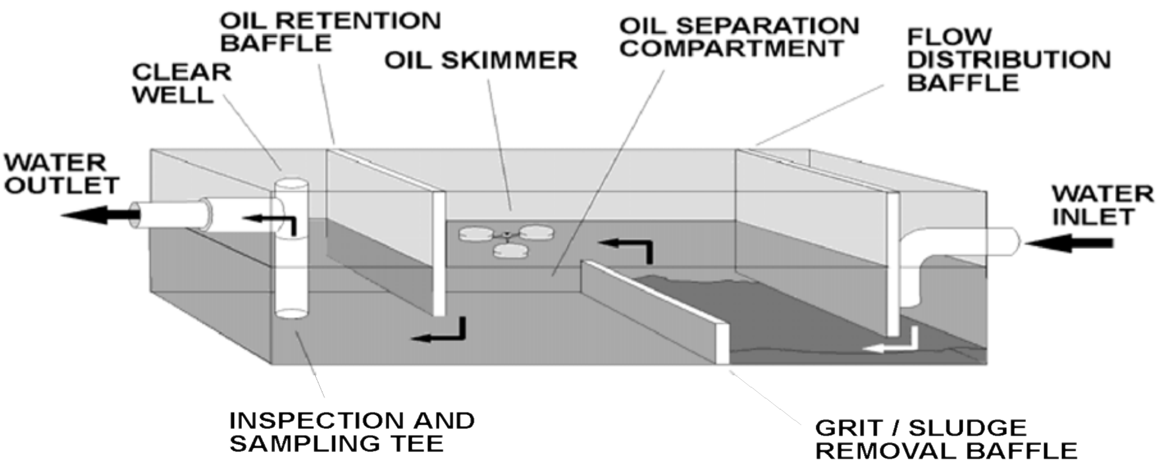
Application Guidance: All significant materials will be stored within a building or covered area.

Training: Personnel will be trained to store significant materials in designated areas.

Effectiveness and Cost: This is a moderately effective BMP. The cost will vary based on whether a building for storing the substances is available.

Limitations: None

BMP 098 - CONSTRUCT OIL/WATER SEPARATOR



Description of Potential Pollutants and Source: Oil/water separators are designed to remove petroleum compounds and grease from storm water. Separators will also remove floatable debris and settleable solids.

Description of BMP: Construct oil/water separators. Oil/water separators are underground vaults where storm water is piped in and out of the separator. Oil/water separators come in many configurations. A common configuration is the three-chamber oil/water separator. The first chamber is the sedimentation chamber that allows for sedimentation of coarse materials and screening of debris. The second chamber provides separation of oil, grease and gasoline. The third chamber is provided to prevent any possibility of a surcharge pressure from occurring and as a safety relief for the structure if a blockage occurs.

Application Guidance: Oil/water separators are applicable to situations where the concentrations of oil-and-grease-related compounds will be usually high and source control cannot provide effective control. This generally occurs at equipment maintenance and washing facilities, gas stations and loading areas. Separators may also be used in areas heavily used by mobile equipment such as loading wharfs at marine ports.

Operation and Maintenance: The degree and frequency of maintenance significantly affects the performance of the oil/water separator. Cleaning the oil/water separator will prevent the accumulated debris and oil to be discharged from the structure during intense storms.

Oil/water separators will be checked monthly during the wet season and will be cleaned at least four times a year. They will always be cleaned in October, before the start of the wet season. The accumulated oil will be properly disposed.

The frequency for implementing this BMP has been provided as general guidance. However, a facility operator may wish to establish a more suitable frequency. This will require SWPPP implementors to make judgements based on facility operations and conditions. To assign a frequency other than what has been suggested (i.e., more or less frequent), the following criteria will be considered and rated either High, Medium or Low. If many of the criteria are assigned a High rating, the frequency may be

increased. Similarly, if many criteria are assigned a Low rating, The frequency may be decreased. The goal of implementing this BMP is to minimize exposure of pollutants to storm water.

CRITERIA	Rating H=High M=Medium L=Low
Probability of exposure of significant materials to storm water in area draining to oil/water separator	
Quantity of significant materials potentially exposed in area draining to oil/water separator	
Frequency of use of significant materials potentially exposed in area draining to oil/water separator	
Evidence of exposure (e.g., stains on pavement, etching of concrete) in area draining to oil/water separator	
Proximity of source are to outfall	
Sensitivity of receiving water to potentially exposed significant material (e.g., waters with beneficial uses such as human contact, recreation, significant species habitat, etc.)	

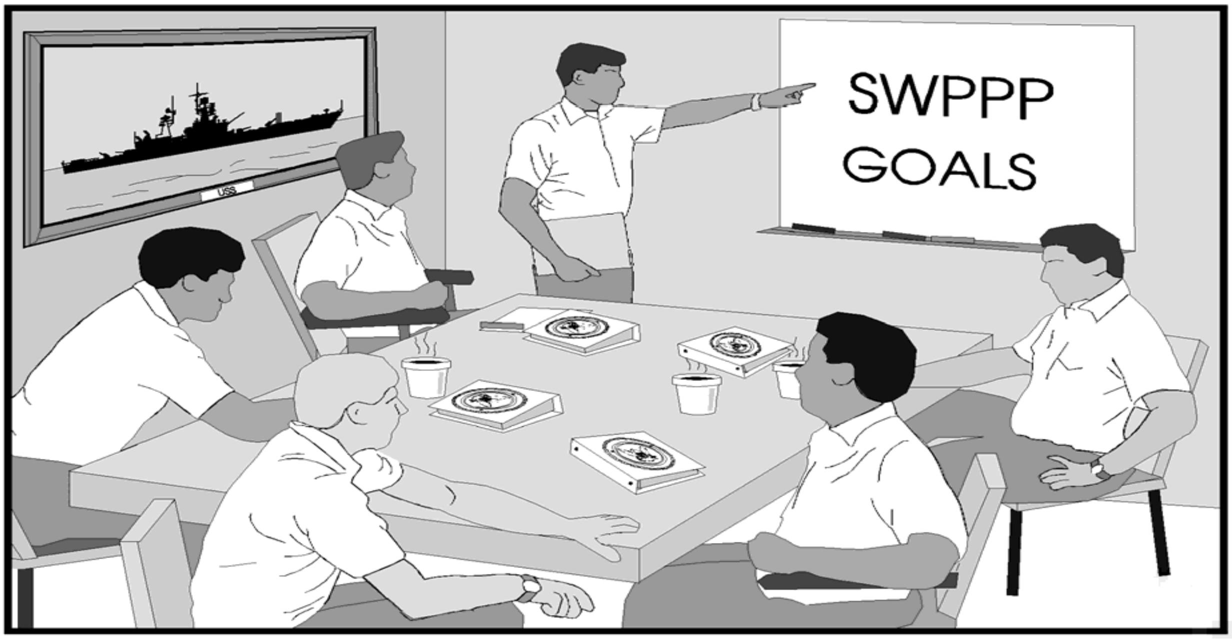
Effectiveness and Cost: This is a moderately effective, high-cost BMP.

Limitations: Oil/water separators are less effective when storm water runoff has high sediment concentrations or detergent levels which disperse oil.

Oil/water separators are only effective for highly pervious drainage areas. Oil/water separators cannot effectively treat large volumes of runoff. The maximum drainage area to oil/water separators is typically one acre.

The sediment removed during maintenance will be tested. If it is a hazardous waste, it will be disposed of accordingly.

BMP 113 - CONDUCT PERSONNEL TRAINING REGARDING THE SWPPP



Description of Potential Pollutant and Source: When properly trained, personnel are more capable of preventing spills, responding safely and effectively to an accident when it occurs, and recognizing situations that could lead to storm water contamination.

Description of BMP: Train personnel at all levels of responsibility in the components and goals of the SWPPP.

Application Guidance: Training will be conducted quarterly and at new personnel orientations.

Training: Training will address each component of the SWPPP, including how and why tasks are to be implemented. Topics will include:

- Good housekeeping
- Material management practices
- Spill prevention and response

Effectiveness and Cost: This is a highly effective, moderate-cost BMP.

Limitations: None

APPENDIX B

ROUTINE FACILITY INSPECTION CHECKLIST

Routine Facility Inspection Checklist

Activity Name: ______________________ **Date of Inspection:** ______________________

Inspector(s): ______________________ **Facility Name/Number:** ______________________

Column 1	Column 2	Column 3	Column 4	Column 5	
Source Area	BMP Number and Title	Status: F, P, N, NA[1]	Briefly Describe Effectiveness (Good or Other [describe])	Corrective Measures	
				What	By When

Note 1: F – Fully implemented, P – Partially implemented, N – Not implemented , NA – Not Applicable

APPENDIX C

QUARTERLY VISUAL ASSESSMENT CHECKLIST

Quarterly Visual Assessment Checklist

Facility ID and Location: ______________________

Date: ____________________

Sampler Name (Printed): Signature:

______________________________________ ____

Time of Rainfall Begin: _________________ Time of Rainfall End: ____________________

Time of Flow Begin: _________________ Time of Flow End: ____________________

Rainfall event more than 72 hours since last event? Rainfall Event Total: ____________________

Yes / No

Sample: sample in a clean, colorless glass or plastic container, and examined in a well-lit area

On samples collected within the first 30 minutes of an actual discharge from a storm event

Sample Characteristics:

Color: ____________________ Floating Solids: _____________________________

Odor: ____________________ Settled Solids: _____________________________

Clarity: ____________________ Suspended Solids: _____________________________

Oil Sheen: ____________________ Foam: _____________________________

Other Obvious Indicators of Storm Water Pollution

(describe): ____

Nature of the discharge (i.e., runoff):

Results of observations of the storm water discharge:

Probable sources of any observed storm water contamination:

If applicable, why it was not possible to take samples within the first 30 minutes:

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

APPENDIX D

CORRECTIVE ACTION LOG

Corrective Action Log

Use this form to document SWPPP corrective actions. This form is to be completed by the Environmental Compliance Coordinator (ECC) or a person designated by ECC and submitted to the MCBH Storm Water Program Manager. The Storm Water Program Manager is responsible for any notification to the State of Hawaii Department of Health (DOH), if required.

A corrective action is defined as an action taken to:

a) **Repair, modify, or replace any storm water control used at the site;**
b) **Clean up and properly dispose of spills, releases, or other deposits; or**
c) **Remedy a permit violation.**

1. Corrective Action Triggers

The following events trigger a corrective action to be taken (this triggering condition is to be documented *within 24 hours* of discovering the occurrence):

a) A required storm water control was never installed, was installed incorrectly, or is not in accordance with the requirements in the SWMP Plan.
b) A member of the **Storm Water Pollution Control Team** becomes aware that the storm water controls installed and being maintained are not effective enough for the discharge to meet applicable water quality standards or applicable requirements in the MCBH SWMP Plan. The facility ECC shall notify the Storm Water Program Manager immediately. The Storm Water Program Manager will notify DOH *by the end of the next work day*.

1.1 Log Notifications:

Date/time Storm Water Program Manager notified by ECC: ________________________

Date/time DOH notified by Storm Water Program Manager: ________________________

1.2 Describe Discharge:

Indicate which one of the following prohibited discharges is occurring or has occurred:

- ❒ Wastewater from washout of concrete
- ❒ Wastewater from washout and cleanout of stucco, paint, form release oils, curing compounds, or other construction materials
- ❒ Fuels, oils, or other pollutants used in vehicle and equipment operation and maintenance
- ❒ Soaps, solvents, or detergents used in vehicle and equipment washing
- ❒ Toxic or hazardous substances from a spill or other release
- ❒ Other, Explain: ____

2. Requirements for Taking Corrective Actions

The ECC shall complete corrective actions in accordance with the deadlines specified below. In all circumstances, site personnel shall *immediately* take all reasonable steps to minimize or prevent the discharge of pollutants until a permanent solution is installed and made operational, including cleaning up any contaminated surfaces so that the material will not discharge in subsequent storm events. *Immediately* means the same day the condition is discovered, unless it is too late in the day, in which initiation of corrective action must begin on the following work day.

Following any of the above triggering events, the ECC shall install a new or modified control and make it operational, or complete the repair, by *no later than 7 calendar days from the time of discovery*. If it is not feasible to complete the installation or repair within 7 calendar days, the ECC shall document and submit to the Storm Water Program Manager, for their agreement, why it is not feasible to complete the installation or repair within the 7-calendar day timeframe and document a schedule for installing the storm water control and making it operational as soon as practicable after the 7-day timeframe.

If the issue is not adequately addressed within 7 calendar days or the agreed upon timeframe, enforcement procedures will be initiated. Unaddressed issues will be escalated through the chain of command. The MCBH Environmental Compliance and Protection Division Director will give the responsible party a formal notice with an appropriate deadline for action. If the problem remains unchanged, the situation will be brought to the attention of the next higher authority. The ultimate penalty for non-compliance of MS4 Permit regulations is eviction or discharge of the responsible party from MCBH. This is placed at the discretion of the Base Commander. See the Enforcement Response Plan in Appendix 3-6 of the SWMP Plan for further information on MCBH's enforcement policies.

3. Corrective Action Report

Within 24 hours of discovering the occurrence of one of the triggering conditions in SWPPP Section 4.1 at the site, the ECC must complete the following:

3.1 Describe the triggering condition:

____
____
____
____

3.2 Record the date/time of the condition identified. How was the condition identified?

____
____
____
____

3.3 Describe the corrective action taken:

____
____
____

Date/time installation or repair was completed:
(or date/time the prohibited discharge ceased) ____

Or describe why it is not feasible to complete installation or repair within 7 calendar days and detail a proposed schedule (if applicable)

____
____
____

4. Resolution of the Corrective Action Trigger

Within 7 calendar days of initiating the Corrective Action Report, the ECC must complete a report of the following:

4.1 Follow-up Actions

Describe any follow-up actions taken to review the design, installation, and maintenance of storm water controls, including the dates such actions occurred:

____
____
____

4.2 Storm Water Control Modifications

Provide a summary of storm water control modifications implemented. Include a schedule of activities required to implement changes and the date the modifications were completed or will be completed:

____
____
____

5. SWPPP Modification Due to Corrective Actions

Where corrective actions result in changes to any of the storm water controls or procedures documented in the SWPPP, modify the SWPPP accordingly *within 7 calendar days* of completing corrective action work.

Are modifications to the SWPPP necessary? ❑ Yes ❑ No

Date modifications to the SWPPP shall be completed _______________

6. Corrective Actions Required by DOH

The facility shall comply with any corrective actions required by DOH as a result of permit violations found during an inspection by DOH or the Environmental Protection Agency (EPA).

Was the Corrective Action triggered by a DOH/EPA inspection?

❑ Yes ❑ No

❑ Date of DOH/EPA Inspection __________________

7. Additional Comments:

____
____

Final

STORM WATER POLLUTION PREVENTION PLAN

Storm Water Management Program Plan

Marine Corps Base Hawaii, Oahu, Hawaii

NPDES Permit No. HI S000007

HELICOPTER WASH (FACILITY 3073)

Prepared by:

Marine Corps Base Hawaii

August 2022

Table of Contents

Tables

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List of Acronyms and Abbreviations

AST	Aboveground Storage Tank
BMP	Best Management Practice
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CWA	Clean Water Act
CWB	Clean Water Branch
DOH	State of Hawaii Department of Health
ECC	Environmental Compliance Coordinator
ECE	Environmental Compliance Evaluation
ECPD	Environmental Compliance and Protection Division
EPA	United States Environmental Protection Agency
HAZMAT	Hazardous Material
HAZMIN	Hazardous Material Minimization
MCBH	Marine Corps Base Hawaii
MS4	Municipal Separate Storm Sewer System
MS4 Permit	Marine Corps Base Hawaii's NPDES Permit No. HI S000007
NPDES	National Pollutant Discharge Elimination System
OWS	Oil/Water Separator
POC	Point of Contact
SAS	Satellite Accumulation Site
SWMP	Storm Water Management Program
SWPPP	Storm Water Pollution Prevention Plan

Certification Statement

MCBH is committed to the prevention of discharges of polluted stormwater to navigable waters or the environment and maintains the highest standards for best management practices through periodic review, updating, and implementation of this Stormwater Pollution Prevention Plan (SWPPP).

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information contained therein. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Name: ______________________ Title: ______________________

Signature: ______________________ Date: ______________________

Management Review

Refer to Section 1.2 for more information on required SWPPP updates.

Review Dates	Signature	Amendment Required? (Y/N)
____________	__________________	__________
____________	__________________	_________
____________	__________________	_________
____________	__________________	_________
____________	__________________	_________
____________	__________________	_________

1 Introduction

As part of Federal regulations administered through the Clean Water Act (CWA), the State of Hawaii, Department of Health (DOH) has issued the National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4) Permit No. HI S000007 (referred to herein at the "MS4 Permit") to Marine Corps Base Hawaii (MCBH). The MS4 Permit requires that MCBH provide all existing industrial facilities, identified in MCBH's MS4 Permit application, and any newly identified industrial facilities, submitted to DOH using the "MS4 NPDES Individual Permit – Industrial Storm Water Discharge Notification Form," with a Storm Water Pollution Prevention Plan (SWPPP) for storm water associated with industrial activities.

The purpose of the regulations is to protect water quality by reducing the amount of pollutants in storm water runoff caused by industrial activities.

1.1 SWPPP Implementation

The storm water management controls of this plan will become MCBH procedure for the applicable industrial facility. An up-to-date copy of the SWPPP shall be maintained on site and at the MCBH Environmental Compliance and Protection Division (ECPD). Management staff, maintenance personnel, contractor staff, and other personnel involved in onsite industrial activities, will be knowledgeable of the plan and follow the guidelines set forth in it, in addition to any other pertinent base-wide, state and federal regulations.

Day-to-day implementation of the SWPPP is primarily the responsibility of the current facility Environmental Compliance Coordinator (ECC) or Point of Contact (POC) as identified in Table 2-1. Enforcement of the permit conditions and this SWPPP are ultimately the responsibility of ECPD and additional escalating levels of authority as specified in the Enforcement Response Plan developed by MCBH for its base-wide Storm Water Management Program (SWMP) Plan.

1.2 Updating the SWPPP

This SWPPP will be reviewed as needed to identify necessary changes, at a minimum of every five years. Updates may be required due to current best management practice (BMP) failures, spill events, changes in industrial activities, changes in features, corrective actions, or other necessary changes. Personnel changes to the Storm Water Pollution Control Team (Section 2.1) should be logged in Table 2-1. Storm Water Pollution Control Team Log. ECPD will be responsible for approving revisions to the SWPPP. In the event the plan is modified, a copy of the updated SWPPP will remain at ECPD and will be provided to the applicable facility. Additionally, ECPD shall document and report the SWPPP changes to the DOH, Clean Water Branch (CWB), within thirty days of when the changes arise.

2 Helicopter Wash, Facility 3073

The Helicopter Wash, Facility 3073 is located in the Westfield Runway area of MCBH about 400 ft. southeast of the Sumner Road and Perimeter Road intersection. The Helicopter Wash Facility encompasses approximately three acres and can be found in grid [redacted] of the MCBH Base Map, see Figure 4-1. The facility-specific map is shown on Figure 4-2.

2.1 Storm Water Pollution Control Team

The Storm Water Pollution Control Team consists of the Storm Water Program Manager, ECC, and the Hazardous Material (HAZMAT) and Hazardous Material Minimization (HAZMIN) team. The Storm Water Program Manager is responsible for the enforcement of the MS4 permit at all industrial sites and provides annual training to the ECC and other personnel. The ECC is the primary unit POC for storm water related items and the day-to-day environmental matters at a specific facility. ECC's are responsible for SWPPP implementation including BMP and facility inspections, storm water assessments/sampling, BMP maintenance, and corrective actions. The HAZMAT and HAZMIN team shall be contacted if assistance is needed. The role, name, phone number, and start date of individuals on the Storm Water Pollution Control Team is recorded in Table 2-1 below. In the event of personnel turnover, Table 2-1 shall be updated accordingly.

TABLE 2-1. Storm Water Pollution Control Team Log

Role	Name	Phone	Start Date
MCBH Storm Water Program Manager	CIV Whitney Anderson	Office: 808-257-4359	6/6/22
ECC	SSgt Michael Hinrichs	Office: 808-257-7066 Cell: 760-576-9694	2/1/2020
HAZMAT/HAZMIN	CIV Tim Cawthon	HAZMAT Center Building 6409 Office: 808-257-9913 HAZMIN Center Building 6407 Office: 808-257-0770	N/A

2.2 Helicopter Wash, Facility 3073 Activities

The Helicopter Wash, Facility 3073 is an automated freshwater rinse designed to remove salt spray from various helicopters. Helicopters initiate the wash by activating a sensor pad just to the north of the wash pad. After a one-minute delay, the wash pad spray nozzles begin to spray water into the air above the wash pad. The helicopter idles at the center of the pad, with its rotors still moving during the wash. The wash cycle lasts only a few minutes. No detergents are used.

Water is supplied by a 2500-gallon tank located to the west of the wash pad. Most of the wash water returns to the wash pad and flows into a trench drain connected to an oil/water separator (OWS) and sanitary sewer. The OWS is inspected weekly by the ECC. Some of the water sprayed from the pad does not contact the helicopter and may be carried outside of the pad boundary by the wind.

The wash pad itself is contained on all sides by a concrete curb or rollover-berm. Storm water landing within the pad will flow into the center trench drain and enter the OWS. The area surrounding the pad is level asphalt concrete pavement and gravel. Storm water falling on this area will evaporate or infiltrate through the weathered porous asphalt. In the event of an extremely large rain event, runoff from the wash pad may flow over the southern rollover-berm and sheet flow down the paved ramp toward the water tank. See Figure 4-2 for the storm water sample point located near the southern ramp.

2.3 Sources of Pollutants

The following is an inventory of potential pollutants associated with Helicopter Wash Facility, Facility 3073:

A. Material Loading and Unloading Areas

Materials that are spilled, leaked, or lost during loading or unloading may collect on vegetated or paved surfaces and be carried away by storm runoff. Removal of oil from the OWS occurs regularly.

B. On-Site Material Storage and Disposal Practices

Significant materials are not onsite. However, there is an OWS that is serviced regularly.

C. Outdoor Activities

Outdoor activities at the Helicopter Wash Facility include rinsing of helicopters with water. No detergents are used.

D. Significant Materials Inventory

The following significant materials are located at the Helicopter Wash Facility:

- Waste Oils

2.4 Potential Storm Water Pollutants

No pollutants have been identified as having a reasonable potential to be present in storm water discharges from the Helicopter Wash Facility.

2.5 Best Management Practices (BMPs)

Best Management Practices (BMPs) are techniques or methods that aim to manage the quantity and improve the quality of storm water runoff from a facility or other site. Storm water BMPs intend to reduce or eliminate pollution and contaminants collected by runoff before the runoff reaches the MCBH storm water system or sensitive ecosystems such as streams, wetlands, and marine environments. The following is a summary of BMPs currently in place at the Helicopter Wash Facility, Facility 3073.

A. Good Housekeeping Practices

In general, Helicopter Wash Facility, Facility 3073 employs good housekeeping practices throughout its operations. Good housekeeping practices for Helicopter Wash, Facility 3073 are included in Table 2-2.

B. Preventative Maintenance

Preventive maintenance is important as water pollution control measures may be of little or no use if devices and equipment have not been properly maintained. Facility personnel conduct inspection of facility equipment and storage systems on a regular basis. The preventive maintenance program involves inspections of equipment and storage systems that are exposed to storm water. Inspections of the OWS are conducted weekly by the ECC.

C. Visual Inspections

Visual inspection provides a valuable subjective assessment of the status of storm water management systems. They are easily performed and allow the opportunity for corrective action, if necessary. Site inspections and documentation requirements are addressed in in Section 3 of this SWPPP. MCBH HAZMIN Center staff perform hazardous material inspections monthly. Annual facility inspections are performed by EPCD as part of the MCBH Environmental Compliance Evaluation (ECE). Inspections of the OWS are conducted weekly by the ECC.

D. Spill Prevention and Response

Areas where significant material spill or leakage can occur are identified in Section 2.1 and shown on Figure 4-2. The storm water systems and their accompanying drainage points are also shown on Figure 4-2. Refer to Table 2-2 for BMPs related to spill preventative measures for material handling procedures, storage requirements, and equipment usage.

In the event of a hazardous substance or oil spill, the ECC and ECPD shall be notified immediately (ECPD; 808-630-8246). If the spill cannot be easily addressed using an onsite spill kit and personal protective equipment, call Fed Fire (Military 911). The spill source should be immediately controlled if it is safe to do so by closing valves, switches, and/or turning off power to a device. Then, contain the spill by using sorbent socks or absorbent materials found in a spill kit. After it has been contained, clean up the spilled material in a safe manner using dry methods. All materials should then be properly disposed of.

E. Erosion and Sediment Controls

No areas at the Helicopter Wash Facility have been identified as having high potential for significant soil erosion that would require erosion and sediment control measures.

F. Best Management Practices to Minimize Pollutant Contact with Storm Water

Facility personnel receive annual training from ECPD at minimum, as well as an initial training for all new personnel. Training information will include the BMPs that have been developed for the facility and a general overview of the storm water program and its objectives. Existing BMPs at the Helicopter Wash Facility are shown in Table 2-2 and attached as fact sheets to this SWPPP in Appendix A.

TABLE 2-2. BEST MANAGEMENT PRACTICES

BMP No.	BMP Title	Description
006	Control Spills	Any spill of significant materials is controlled immediately to prevent pollutant from being transported to receiving water.
012	Construct Berm or Dike Around Critical Areas	The Helicopter Wash pad is located within a containment berm.
033	Check Vehicles and Equipment for Leaks	The OWS and tank and piping are checked for leaks on a regular basis.
071	Keep Tanks, Piping, and Valves in Good Condition	Tanks, pumps, seals, piping and valves are visually inspected for signs of structural integrity and/or leaks.
098	Construct Oil/Water Separator	Storm water and wash water flows to the OWS and the sanitary sewer system.
113	Conduct Personnel Training Regarding the SWPPP	Personnel are trained regularly (initial orientation and annual refresher.

3 Inspections, Assessments and Monitoring

3.1 Routine Quarterly Site Inspections

The MS4 Permit requires a routine quarterly site inspection by a qualified person with at least one member of the storm water pollution control team participating. At least once each calendar year, the routine inspection must be conducted during a period when a storm water discharge is occurring. The site inspection is an overall evaluation of the effectiveness of the BMPs implemented at that facility. A Routine Facility Inspection Checklist (Appendix B) shall be completed during each routine site inspection and kept onsite with this SWPPP. During normal facility operating hours, inspections must be conducted of areas of the facility including, but not limited to, the following:

- Areas where industrial materials or activities are exposed to storm water;
- Areas identified in the SWPPP and those that are potential pollutant sources;
- Areas where spills and leaks have occurred in the past three years;
- Discharge points; and
- Control measures used to comply with the effluent limits contained in this permit.

3.2 Visual Assessment of Storm Water Discharges

A Quarterly Visual Assessment of storm water discharge is required for all industrial facilities at MCBH. Storm water samples for this visual assessment but must be collected in such a manner that the samples are representative of the storm water discharge from the facility. Therefore, the water sample must be collected at the designated storm water monitoring point (Outfall 01) as shown in Figure 4-2. The Quarterly Visual Assessment checklist (Appendix C) shall be completed by the current facility ECC and kept onsite with this SWPPP.

The visual assessment must be made:

- Of a sample collected in a clean, colorless glass or plastic container, and examined in a well-lit area;
- On samples collected within the first 30 minutes of an actual discharge from a storm event. If it is not possible to collect the sample within the first 30 minutes of discharge, the sample must be collected as soon as practicable after the first 30 minutes and documented why it was not possible to take the sample within the first 30 minutes; and
- For storm events, on discharges that occur at least 72 hours (three days) from the previous discharge.

Whenever the visual assessment shows evidence of storm water pollution, corrective action procedures to remedy the pollutants must be taken and documented. Refer to Section 4 for corrective action procedures.

4 Corrective Actions

A corrective action is defined as any action taken, or required to be taken, to (1) repair, modify, or replace any stormwater control used at the site; (2) clean up and dispose of spills, releases, or other deposits found on the site; and (3) remedy a permit violation. Corrective actions should be documented using the Corrective Action Log (Appendix D).

4.1 Immediate Actions

If corrective action is needed, you must immediately take all reasonable steps necessary to minimize or prevent the discharge of pollutants until a permanent solution is installed and made operational, including cleaning up any contaminated surfaces so that the material will not discharge in subsequent storm events. Note: In this context, the term "immediately" requires you to, on the same day a condition requiring corrective action is found, take all reasonable steps to minimize or prevent the discharge of pollutants until a permanent solution is installed and made operational. However, if a problem is identified at a time in the workday when it is too late to initiate corrective action, the initiation of corrective action must begin no later than the following workday. "All reasonable steps" means that the permittee has undertaken initial actions to assess and address the condition causing the corrective action, including, for example, cleaning up any exposed materials that may be discharged in a storm event (e.g., through sweeping, vacuuming) or making arrangements (i.e., scheduling) for a new BMP to be installed at a later date.

4.2 Escalating Actions

If additional actions are necessary beyond those implemented or if the conditions continue to occur, additional corrective actions (e.g., install a new or modified control and make it operational, complete the repair) must be completed before the next storm event if possible, and within 14 calendar days from the time of discovery of the corrective action condition. If it is infeasible to complete the corrective action within 14 calendar days, document why it is infeasible to complete the corrective action within the 14-day timeframe and identify a schedule for completing the work, which must be done as soon as practicable after the 14-day timeframe but no longer than 45 days after discovery. If the completion of corrective action will exceed the 45-day timeframe, the minimum additional time necessary to complete the corrective action can be taken, provided that MCBH ECPD and DOH is notified of your intention to exceed 45 days. Where your corrective actions result in changes to any of the controls or procedures documented in your SWPPP, you must modify your SWPPP accordingly within 14 calendar days of completing corrective action work.

4.3 Corrective Actions for Substantially Identical Outfalls

If the event triggering corrective action is associated with an outfall that had been identified as a "substantially identical outfall", the review must assess the need for corrective action for all related substantially identical outfalls. Any necessary changes to control measures that affect these other outfalls must also be made before the next storm event if possible, or as soon as practicable following that storm event. Any corrective actions must be conducted within the timeframes discussed above.

4.4 Record of Past Spills or Leaks of Hazardous Pollutants

Table 4-1 is used to record significant spills and leaks that have occur or have occurred within three years prior to the preparation or amendment of this SWPPP. Significant spills and leaks include, but are not limited to, releases of oil or hazardous substances in excess of quantities that are reportable under CWA Section 311 (see 40 CFR 110.6 and 40 CFR 117.21) or Section 102 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 USC §9602.

At the time of this SWPPP update, there have been no past spill or leak incidents reported for the Helicopter Wash Facility.

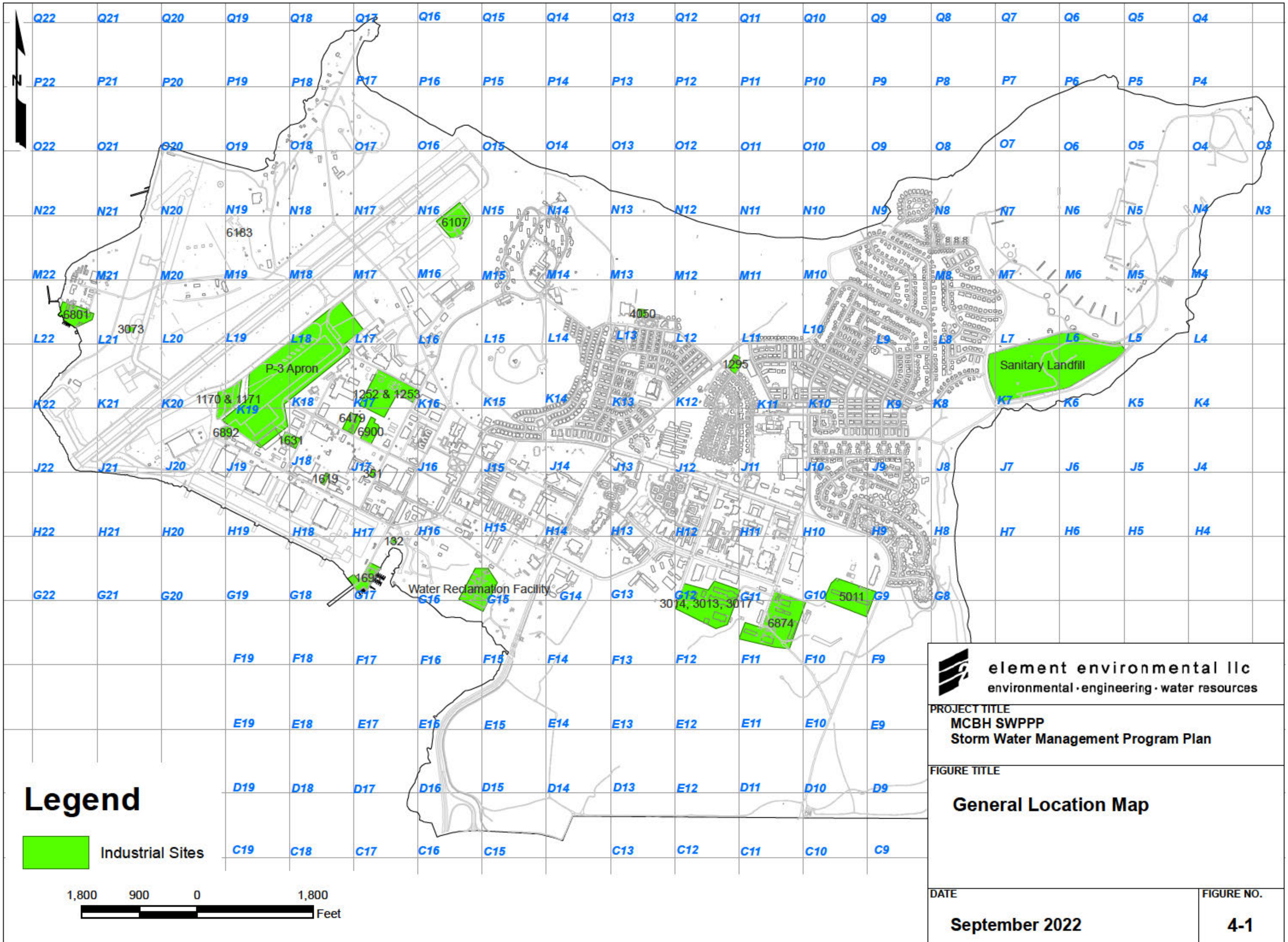
TABLE 4-1. PAST SPILLS OR LEAKS OF HAZARDOUS POLLUTANTS

Date of Incident	Brief Summary of Incident (POC Active at Time of Incident, Pollutant Type, Estimated Quantity, Location of Spill)

4.5 Record of Unauthorized Non-Storm Water Discharges

TABLE 4-2. UNAUTHORIZED NON-STORM WATER DISCHARGE EVALUATION

Date of Evaluation	Brief Summary of Evaluation (Description of the evaluation criteria, outfalls or onsite drainage points that were directly observed, action(s) taken, such as a list of control measures used to eliminate unauthorized discharge)

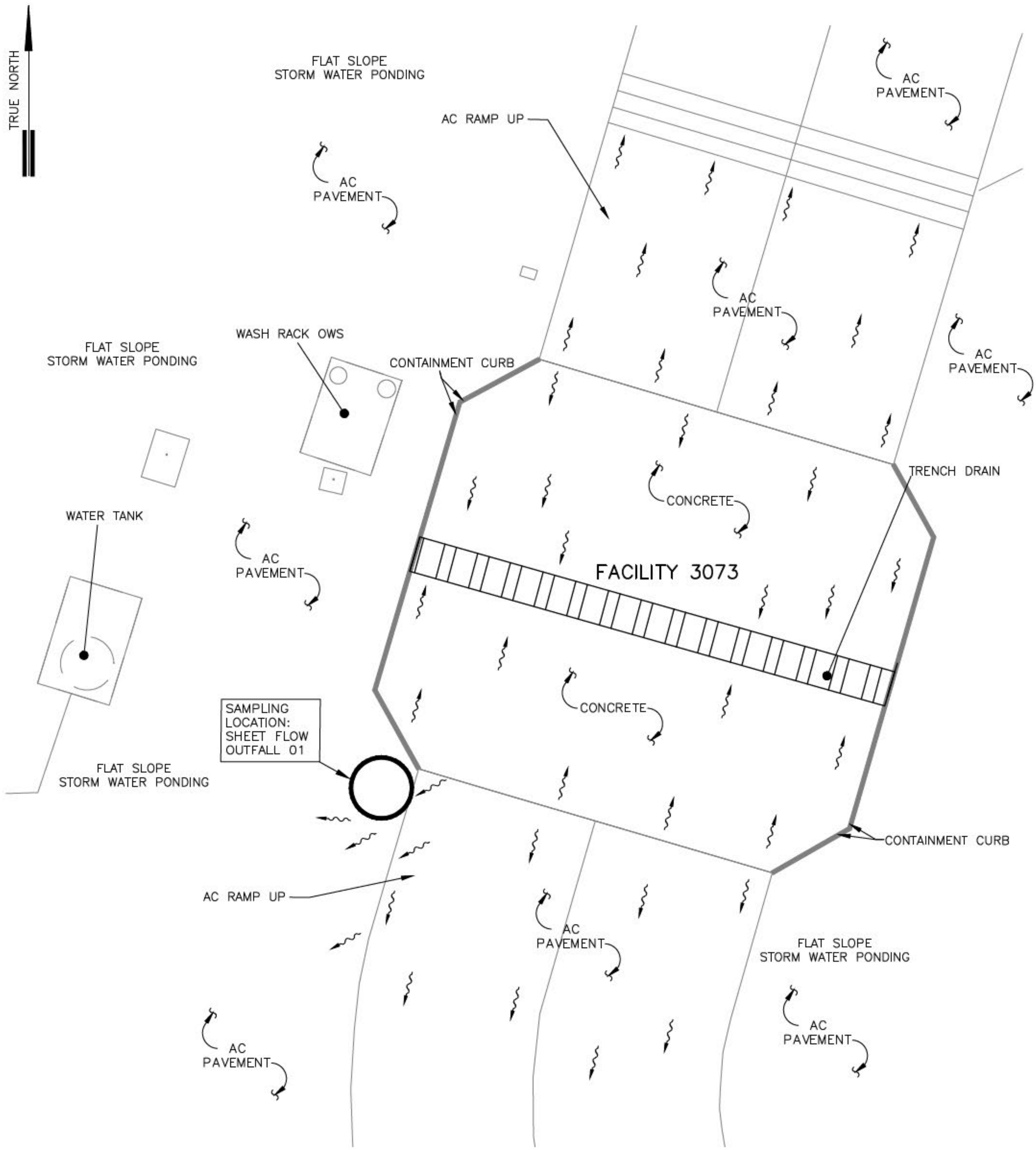


element environmental llc
environmental · engineering · water resources

PROJECT TITLE
MCBH SWPPP
Storm Water Management Program Plan

FIGURE TITLE
General Location Map

DATE	FIGURE NO.
September 2022	4-1



LEGEND

FLOW ARROW

NOTES:

1. STORM WATER, FROM APPROXIMATELY 3.0 ACRES ASSOCIATED WITH THE HELICOPTER WASH FACILITY, DISCHARGES TO A FLAT PAVED AREA AS SHEET FLOW.
2. NOT TO SCALE

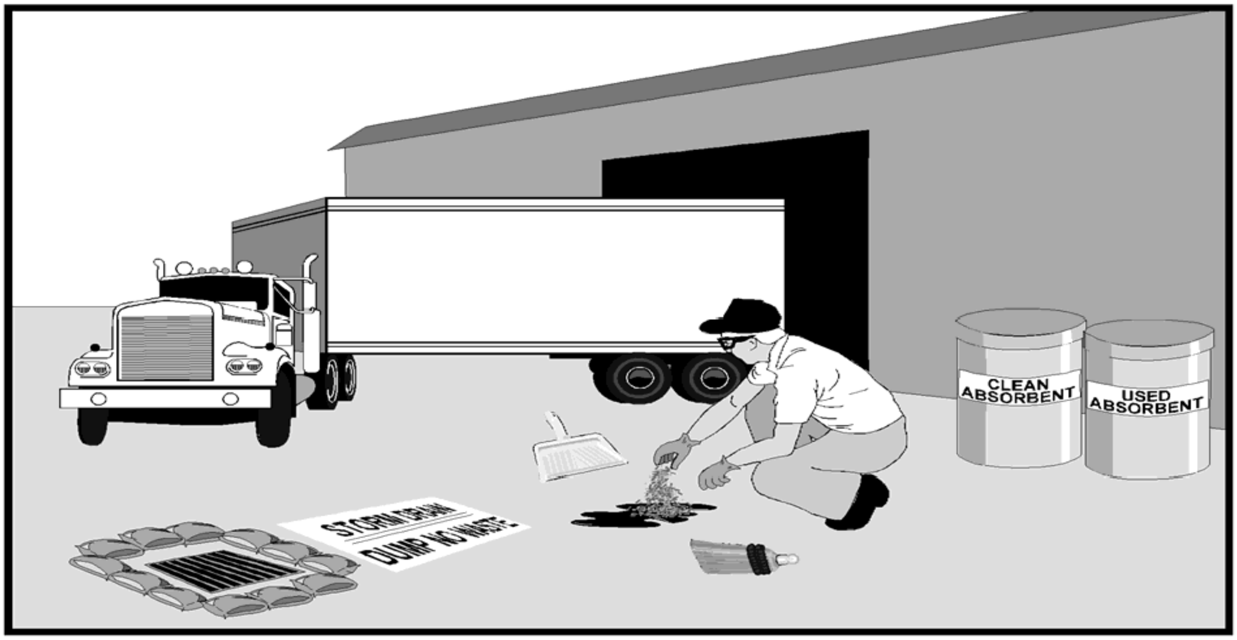
DATE:	PROJECT TITLE:	
JULY 2022	STORM WATER POLLUTION PREVENTION PLAN MCBH, KANEOHE BAY, OAHU, HAWAII	
FIGURE TITLE:		FIGURE NO.:
HELICOPTER WASH (FACILITY 3073)		4-2

DAMATO
7/28/2022 12:01:49 PM
FIG 4-2 Bldg 3073 – Helicopter Wash Facility.dwg

APPENDIX A

SELECTED BMP FACT SHEETS

BMP 006 - CONTROL SPILLS



Description of Potential Pollutant and Source: Spills of significant materials may be exposed to storm water and transported to storm drains and/or receiving waters.

Description of BMP: Follow safety data sheets (SDS) for handling, storage, and cleanup of all significant materials to reduce the potential for spills.

Any spill, large or small, of significant materials will be controlled to prevent pollutants from being transported to storm drains and/or receiving waters. Appropriate spill control material will be kept on site. Smaller spills will be contained using absorbent material such as kitty litter, straw, or sawdust. Drums of absorbent material will be easily accessible and clearly marked, and containers for spent absorbent material will be readily available. Spent absorbent material will be managed appropriately and disposed of in accordance with applicable regulations. Larger spills will be controlled using spill kits, brooms, and other response equipment commensurate with the size of the spill. The methods outlined in the Activity's spill prevention and response plans (BMP 112) for hazardous materials will be followed for spills of any potential storm water pollutants. The date, time, nature and volume of material spilled, and cleanup measures taken will be recorded for all spills and kept as part of the SWPPP.

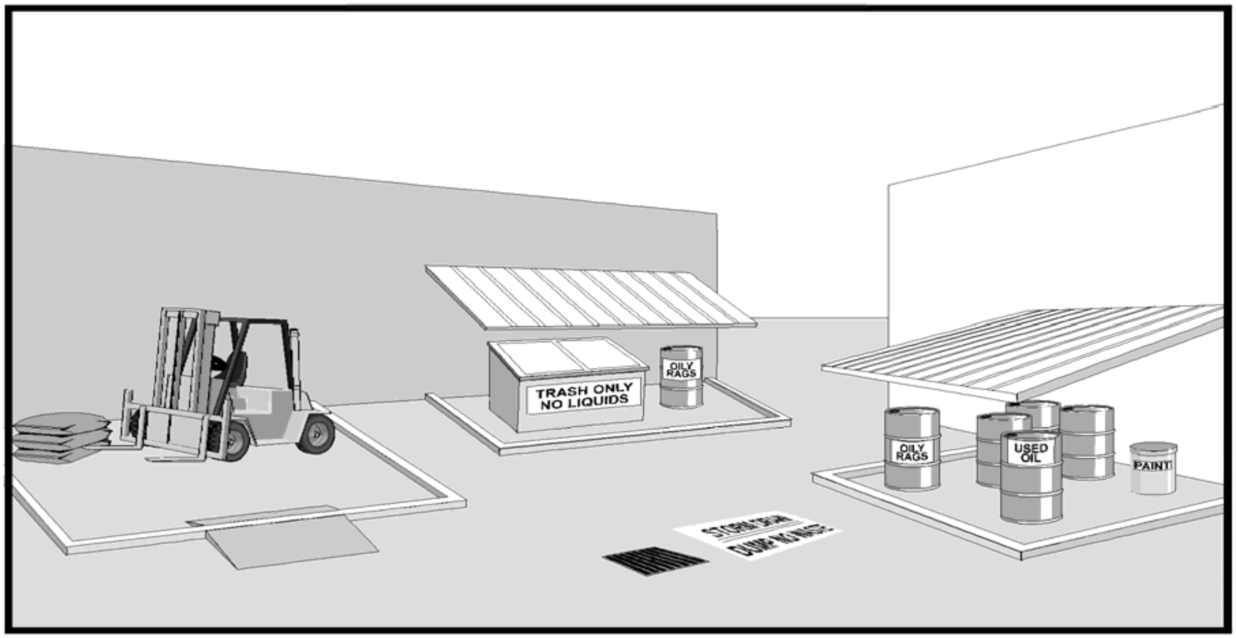
Application Guidance: Controlling spills will be practiced under all working conditions.

Training: Personnel will be trained in spill prevention and response procedures including the use of personal protection equipment (gloves, eye and face protection, etc.). This will include what absorbent or equipment to use, how to use the absorbent or equipment, where to find it, how to dispose of the spent absorbent or other material, and who to notify in the event of a spill.

Effectiveness and Cost: Spill control is a moderately effective, low-cost BMP.

Limitations: None

BMP 012 - CONSTRUCT BERM OR DIKE AROUND CRITICAL AREAS



Description of Potential Pollutant and Source: Critical areas are source areas that have a high likelihood for the release of pollutants. This includes material handling areas, material storage areas, and equipment repair and maintenance areas. As a result of spills and leaks or exposure to storm water, pollutants can flow from critical areas into the storm water system. In addition, small spills and leaks can accumulate on the surface area and be washed away by storm water.

Description of BMP: Construct a raised berm or dike around critical areas. This will provide secondary containment and prevent any spills or leaks from leaving the area. This secondary containment will also be provided where mobile tankers containing fuel are customarily stationed. Construct a ramp to allow vehicle access into the area. (Note: double walled tanks do not require this BMP. Also, 40 CFR 112.7 requires bulk petroleum storage tanks be provided with secondary containment.) A drain valve will be installed and procedures to drain storm water from the bermed area will be posted (see BMP 014).

Application Guidance: Install as needed.

Training: N/A

Effectiveness and Cost: This is a highly effective BMP. The cost will vary depending on the size of the fueling operation.

Limitations: The size of some tank and fueling operations areas could make this BMP relatively expensive.

BMP 033 - CHECK VEHICLES AND EQUIPMENT FOR LEAKS

Description of Potential Pollutant and Source: Vehicles, aircraft, or equipment entering or stored at a maintenance facility may be leaking a variety of fluids (fuel, oil, antifreeze, freon, etc.). These materials can be exposed to storm water.

Description of BMP: Inspect all vehicles and equipment at the site, whether incoming, parked, stored, or salvaged, for oil and fluid leaks. Drivers of fleet vehicles, such as delivery trucks, will also check under their vehicles each morning for fluid leaks. If leaks are present, drip pans will be placed under the vehicle or equipment. Once the vehicle is removed from the site, the former parking area will be inspected for stains, and these stains will be cleaned using rags or dry solvents.

Application Guidance: Any vehicle or equipment coming in for repairs, painting, or storage will be inspected for leaks. Fleet vehicles will be inspected each morning. Vehicles that are parked, stored, or salvaged will be provided with drip pans, as will tanker rail cars waiting to be unloaded. The frequency for implementing this BMP has been provided as general guidance. However, a facility operator may wish to establish a more suitable frequency. This will require SWPPP implementors to make judgements based on facility operations and conditions. To assign a frequency other than what has been suggested (i.e., more or less frequent), the following criteria will be considered and rated either High, Medium, or Low. If many of the criteria are assigned a High rating, the frequency may be increased. Similarly, if many criteria are assigned a Low rating, the frequency may be decreased. The goal of implementing this BMP is to minimize exposure of pollutants to storm water.

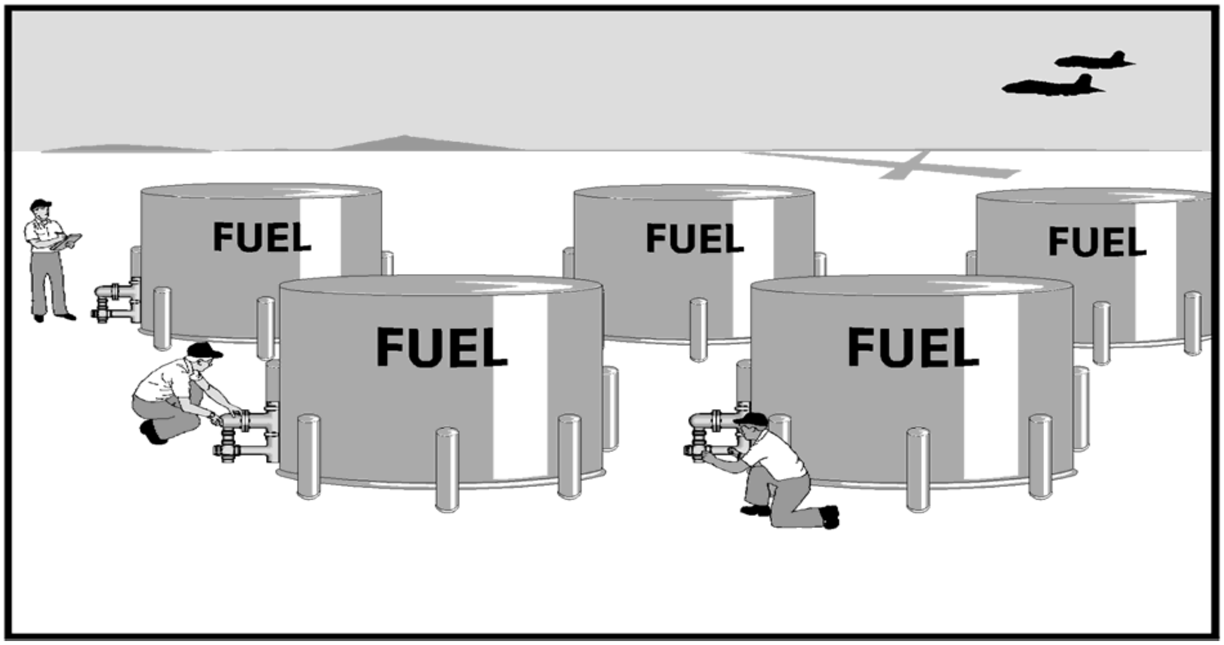
CRITERIA	Rating H=High M=Medium L=Low
Probability of exposure of significant materials to storm water	
Old age or poor condition of equipment and vehicles	
Evidence of exposure (e.g., stains on pavement)	
Proximity of source area to outfall or receiving water	
Sensitivity of receiving water to potentially exposed significant materials (e.g., waters with beneficial uses such as human contact, recreation, significant species habitat, etc.)	

<u>Training:</u> Signs will be posted to remind personnel of proper procedures.

<u>Effectiveness and Cost:</u> Checking for leaks is a moderately effective, low-cost BMP.

<u>Limitations:</u> None

BMP 071- KEEP TANKS, PIPING, AND VALVES IN GOOD CONDITION



Description of Potential Pollutant and Source: Tanks, piping, and valves may leak fuel or other significant materials due to corrosion, loose fittings, poor welding, or improperly or poorly fitted gaskets. This can expose these materials to storm water, which can transport them to storm drains and/or receiving waters.

Description of BMP: Keep tanks, piping, and valves in good working condition. Tanks, piping, or valves which are leaking will be repaired or replaced.

Application Guidance: Tanks, piping, and valves will be inspected monthly and kept in good condition at all times. If applicable, preventive maintenance will be performed.

The frequency for implementing this BMP has been provided as general guidance. However, a facility operator may wish to establish a more suitable frequency. This will require SWPPP implementors to make judgements based on facility operations and conditions. To assign a frequency other than what has been suggested (i.e., more or less frequent), the following criteria will be considered and rated either High, Medium, or Low. If many of the criteria are assigned a High rating, the frequency may be increased. Similarly, if many criteria are assigned a Low rating, the frequency may be decreased. The goal of implementing this BMP is to minimize exposure of pollutants to storm water.

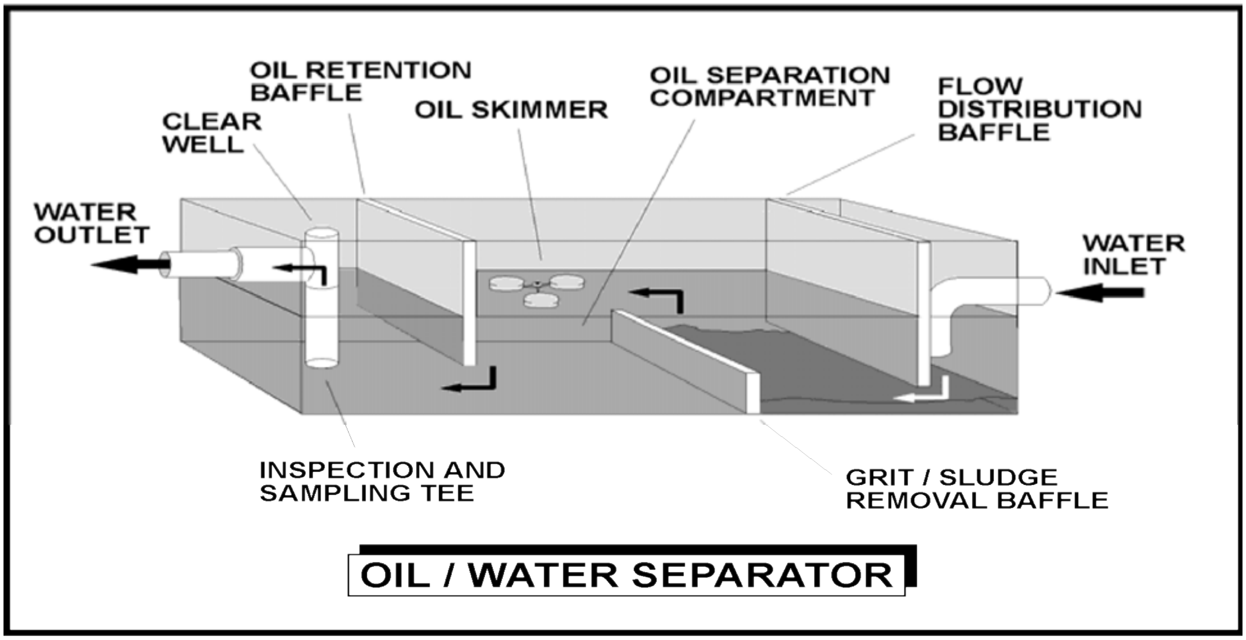
CRITERIA	Rating H=High M=Medium L=Low
Probability of exposure of significant materials to storm water	
Quantity of significant materials potentially exposed	
Toxicity of significant materials potentially exposed	
Frequency of use of tanks, piping, and valves	
Intensity of use of tanks, piping, and valves	
Old age or poor condition of tanks, piping, and valves	
Evidence of exposure (e.g., stains on ground surface)	
Proximity of source area to outfall or receiving water	
Sensitivity of receiving water to potentially exposed significant materials (e.g., waters with beneficial uses such as human contact, recreation, significant species habitat, etc.)	

Training: Personnel will be trained to regularly inspect for leaks or conditions that could lead to the discharge of chemicals, or storm water contact with waste materials. Personnel will be trained to routinely inspect equipment before each use. Tanks, piping, and valves which are not frequently used, will be inspected weekly. Procedures for notifying the appropriate maintenance personnel if a leak is found, will be established.

Effectiveness and Cost: Keeping tanks, piping, and valves in good condition is a highly effective BMP. The cost of repairing or replacing piping and valves is typically low. The cost of repairing or replacing tanks will vary based on the size of the tank and its present condition.

Limitations: None

BMP 098 - CONSTRUCT OIL/WATER SEPARATOR



Description of Potential Pollutants and Source: Oil/water separators are designed to remove petroleum compounds and grease from storm water. Separators will also remove floatable debris and settleable solids.

Description of BMP: Construct oil/water separators. Oil/water separators are underground vaults where storm water is piped in and out of the separator. Oil/water separators come in many configurations. A common configuration is the three-chamber oil/water separator. The first chamber is the sedimentation chamber that allows for sedimentation of coarse materials and screening of debris. The second chamber provides separation of oil, grease and gasoline. The third chamber is provided to prevent any possibility of a surcharge pressure from occurring and as a safety relief for the structure if a blockage occurs.

Application Guidance: Oil/water separators are applicable to situations where the concentrations of oil-and-grease-related compounds will be usually high and source control cannot provide effective control. This generally occurs at equipment maintenance and washing facilities, gas stations and loading areas. Separators may also be used in areas heavily used by mobile equipment such as loading wharfs at marine ports.

Operation and Maintenance: The degree and frequency of maintenance significantly affects the performance of the oil/water separator. Cleaning the oil/water separator will prevent the accumulated debris and oil to be discharged from the structure during intense storms.

Oil/water separators will be checked monthly during the wet season and will be cleaned at least four times a year. They will always be cleaned in October, before the start of the wet season. The accumulated oil will be properly disposed.
The frequency for implementing this BMP has been provided as general guidance. However, a facility operator may wish to establish a more suitable frequency. This will require SWPPP implementors to make judgements based on facility operations and conditions. To assign a frequency other than what has been suggested (i.e., more or less frequent), the following criteria will be considered and rated either High, Medium or Low. If many of the criteria are assigned a High rating, the frequency may be

increased. Similarly, if many criteria are assigned a Low rating, The frequency may be decreased. The goal of implementing this BMP is to minimize exposure of pollutants to storm water.

CRITERIA	Rating H=High M=Medium L=Low
Probability of exposure of significant materials to storm water in area draining to oil/water separator	
Quantity of significant materials potentially exposed in area draining to oil/water separator	
Frequency of use of significant materials potentially exposed in area draining to oil/water separator	
Evidence of exposure (e.g., stains on pavement, etching of concrete) in area draining to oil/water separator	
Proximity of source are to outfall	
Sensitivity of receiving water to potentially exposed significant material (e.g., waters with beneficial uses such as human contact, recreation, significant species habitat, etc.)	

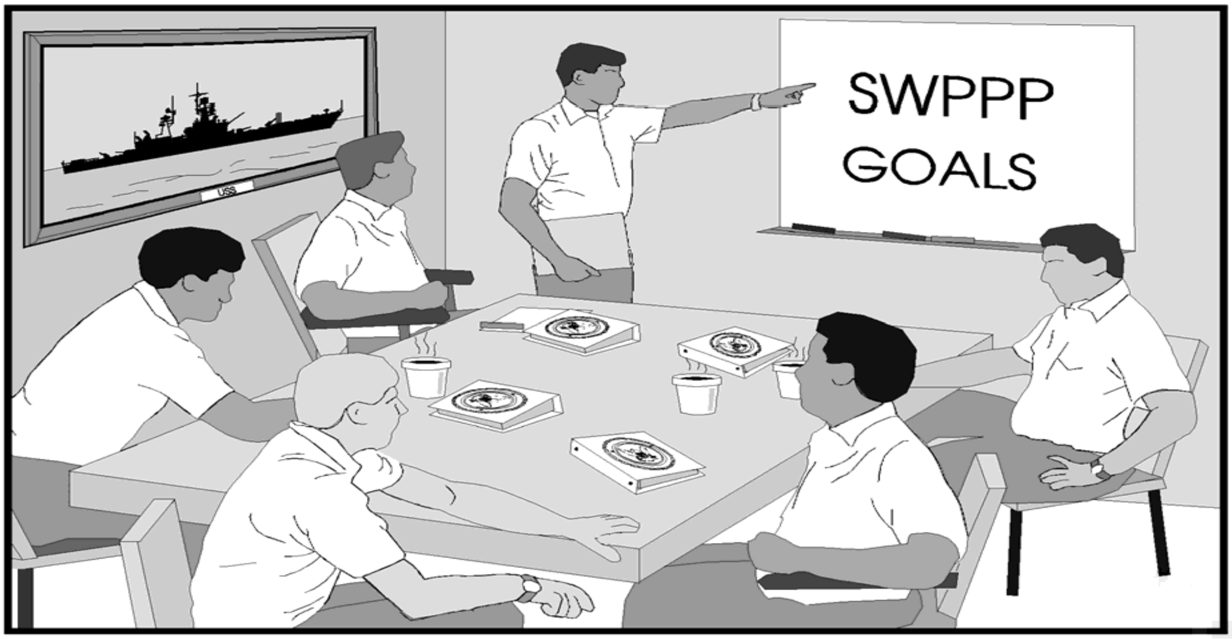
<u>Effectiveness and Cost:</u> This is a moderately effective, high-cost BMP.

<u>Limitations:</u> Oil/water separators are less effective when storm water runoff has high sediment concentrations or detergent levels which disperse oil.

Oil/water separators are only effective for highly pervious drainage areas. Oil/water separators cannot effectively treat large volumes of runoff. The maximum drainage area to oil/water separators is typically one acre.

The sediment removed during maintenance will be tested. If it is a hazardous waste, it will be disposed of accordingly.

BMP 113 - CONDUCT PERSONNEL TRAINING REGARDING THE SWPPP



Description of Potential Pollutant and Source: When properly trained, personnel are more capable of preventing spills, responding safely and effectively to an accident when it occurs, and recognizing situations that could lead to storm water contamination.

Description of BMP: Train personnel at all levels of responsibility in the components and goals of the SWPPP.

Application Guidance: Training will be conducted quarterly and at new personnel orientations.

Training: Training will address each component of the SWPPP, including how and why tasks are to be implemented. Topics will include:

- Good housekeeping
- Material management practices
- Spill prevention and response

Effectiveness and Cost: This is a highly effective, moderate-cost BMP.

Limitations: None

APPENDIX B

ROUTINE FACILITY INSPECTION CHECKLIST

Routine Facility Inspection Checklist

Activity Name: ______________________ **Date of Inspection:** ______________________

Inspector(s): ______________________ **Facility Name/Number:** ______________________

Column 1	Column 2	Column 3	Column 4	Column 5	
Source Area	BMP Number and Title	Status: F, P, N, NA[1]	Briefly Describe Effectiveness (Good or Other [describe])	Corrective Measures	
				What	By When

Note 1: F – Fully implemented, P – Partially implemented, N – Not implemented , NA – Not Applicable

APPENDIX C

QUARTERLY VISUAL ASSESSMENT CHECKLIST

Quarterly Visual Assessment Checklist

Facility ID and Location: ______________________

Date: ____________________

Sampler Name (Printed): ______________________________________ Signature: ____

Time of Rainfall Begin: ________________ Time of Rainfall End: ____________________

Time of Flow Begin: ________________ Time of Flow End: ____________________

Rainfall event more than 72 hours since last event? Yes / No Rainfall Event Total: ____________________

Sample: sample in a clean, colorless glass or plastic container, and examined in a well-lit area

On samples collected within the first 30 minutes of an actual discharge from a storm event

Sample Characteristics:

Color: ____________________ Floating Solids: _____________________________

Odor: ____________________ Settled Solids: _____________________________

Clarity: ____________________ Suspended Solids: _____________________________

Oil Sheen: ____________________ Foam: _____________________________

Other Obvious Indicators of Storm Water Pollution

(describe): ____

Nature of the discharge (i.e., runoff):

Results of observations of the storm water discharge:

Probable sources of any observed storm water contamination:

If applicable, why it was not possible to take samples within the first 30 minutes:

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

APPENDIX D

CORRECTIVE ACTION LOG

Corrective Action Log

Use this form to document SWPPP corrective actions. This form is to be completed by the Environmental Compliance Coordinator (ECC) or a person designated by ECC and submitted to the MCBH Storm Water Program Manager. The Storm Water Program Manager is responsible for any notification to the State of Hawaii Department of Health (DOH), if required.

A corrective action is defined as an action taken to:

- **a) Repair, modify, or replace any storm water control used at the site;**
- **b) Clean up and properly dispose of spills, releases, or other deposits; or**
- **c) Remedy a permit violation.**

1. Corrective Action Triggers

The following events trigger a corrective action to be taken (this triggering condition is to be documented *within 24 hours* of discovering the occurrence):

- a) A required storm water control was never installed, was installed incorrectly, or is not in accordance with the requirements in the SWMP Plan.
- b) A member of the **Storm Water Pollution Control Team** becomes aware that the storm water controls installed and being maintained are not effective enough for the discharge to meet applicable water quality standards or applicable requirements in the MCBH SWMP Plan. The facility ECC shall notify the Storm Water Program Manager immediately. The Storm Water Program Manager will notify DOH *by the end of the next work day*.

1.1 Log Notifications:

Date/time Storm Water Program Manager notified by ECC: ________________________

Date/time DOH notified by Storm Water Program Manager: ________________________

1.2 Describe Discharge:

Indicate which one of the following prohibited discharges is occurring or has occurred:

- ❒ Wastewater from washout of concrete
- ❒ Wastewater from washout and cleanout of stucco, paint, form release oils, curing compounds, or other construction materials
- ❒ Fuels, oils, or other pollutants used in vehicle and equipment operation and maintenance
- ❒ Soaps, solvents, or detergents used in vehicle and equipment washing
- ❒ Toxic or hazardous substances from a spill or other release
- ❒ Other, Explain: ____

2. Requirements for Taking Corrective Actions

The ECC shall complete corrective actions in accordance with the deadlines specified below. In all circumstances, site personnel shall *immediately* take all reasonable steps to minimize or prevent the discharge of pollutants until a permanent solution is installed and made operational, including cleaning up any contaminated surfaces so that the material will not discharge in subsequent storm events. *Immediately* means the same day the condition is discovered, unless it is too late in the day, in which initiation of corrective action must begin on the following work day.

Following any of the above triggering events, the ECC shall install a new or modified control and make it operational, or complete the repair, by *no later than 7 calendar days from the time of discovery*. If it is not feasible to complete the installation or repair within 7 calendar days, the ECC shall document and submit to the Storm Water Program Manager, for their agreement, why it is not feasible to complete the installation or repair within the 7-calendar day timeframe and document a schedule for installing the storm water control and making it operational as soon as practicable after the 7-day timeframe.

If the issue is not adequately addressed within 7 calendar days or the agreed upon timeframe, enforcement procedures will be initiated. Unaddressed issues will be escalated through the chain of command. The MCBH Environmental Compliance and Protection Division Director will give the responsible party a formal notice with an appropriate deadline for action. If the problem remains unchanged, the situation will be brought to the attention of the next higher authority. The ultimate penalty for non-compliance of MS4 Permit regulations is eviction or discharge of the responsible party from MCBH. This is placed at the discretion of the Base Commander. See the Enforcement Response Plan in Appendix 3-6 of the SWMP Plan for further information on MCBH's enforcement policies.

3. Corrective Action Report

Within 24 hours of discovering the occurrence of one of the triggering conditions in SWPPP Section 4.1 at the site, the ECC must complete the following:

3.1 Describe the triggering condition:

____
____
____
____

3.2 Record the date/time of the condition identified. How was the condition identified?

____
____
____
____

3.3 Describe the corrective action taken:

____
____
____

Date/time installation or repair was completed:
(or date/time the prohibited discharge ceased) ____

Or describe why it is not feasible to complete installation or repair within 7 calendar days and detail a proposed schedule (if applicable)

____
____
____

4. Resolution of the Corrective Action Trigger

Within 7 calendar days of initiating the Corrective Action Report, the ECC must complete a report of the following:

4.1 Follow-up Actions

Describe any follow-up actions taken to review the design, installation, and maintenance of storm water controls, including the dates such actions occurred:

____
____
____

4.2 Storm Water Control Modifications

Provide a summary of storm water control modifications implemented. Include a schedule of activities required to implement changes and the date the modifications were completed or will be completed:

____
____
____

5. SWPPP Modification Due to Corrective Actions

Where corrective actions result in changes to any of the storm water controls or procedures documented in the SWPPP, modify the SWPPP accordingly *within 7 calendar days* of completing corrective action work.

Are modifications to the SWPPP necessary? ❑ Yes ❑ No

Date modifications to the SWPPP shall be completed _______________

6. Corrective Actions Required by DOH

The facility shall comply with any corrective actions required by DOH as a result of permit violations found during an inspection by DOH or the Environmental Protection Agency (EPA).

Was the Corrective Action triggered by a DOH/EPA inspection?

❑ Yes ❑ No

❑ Date of DOH/EPA Inspection __________________

7. Additional Comments:

____
____

Final

STORM WATER POLLUTION PREVENTION PLAN

Storm Water Management Program Plan

Marine Corps Base Hawaii, Oahu, Hawaii

NPDES Permit No. HI S000007

AIRCRAFT WASH FACILITY (FACILITY 6892)

Prepared by:

Marine Corps Base Hawaii

August 2022

Table of Contents

Tables

Figures

Appendices

List of Acronyms and Abbreviations

AST	Aboveground Storage Tank
BMP	Best Management Practice
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CWA	Clean Water Act
CWB	Clean Water Branch
DOH	State of Hawaii Department of Health
ECC	Environmental Compliance Coordinator
ECE	Environmental Compliance Evaluation
ECPD	Environmental Compliance and Protection Division
EPA	United States Environmental Protection Agency
HAZMAT	Hazardous Material
HAZMIN	Hazardous Material Minimization
MCBH	Marine Corps Base Hawaii
MS4	Municipal Separate Storm Sewer System
MS4 Permit	Marine Corps Base Hawaii's NPDES Permit No. HI S000007
NPDES	National Pollutant Discharge Elimination System
OWS	Oil/Water Separator
POC	Point of Contact
SWMP	Storm Water Management Program
SWPPP	Storm Water Pollution Prevention Plan

Certification Statement

MCBH is committed to the prevention of discharges of polluted stormwater to navigable waters or the environment and maintains the highest standards for best management practices through periodic review, updating, and implementation of this Stormwater Pollution Prevention Plan (SWPPP).

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information contained therein. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Name: ______________________ Title: ______________________

Signature: ______________________ Date: ______________________

Management Review

Refer to Section 1.2 for more information on required SWPPP updates.

Review Dates	Signature	Amendment Required? (Y/N)
____________	__________________	__________
____________	__________________	_________
____________	__________________	_________
____________	__________________	_________
____________	__________________	_________
____________	__________________	_________

1 Introduction

As part of Federal regulations administered through the Clean Water Act (CWA), the State of Hawaii, Department of Health (DOH) has issued the National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4) Permit No. HI S000007 (referred to herein at the "MS4 Permit") to Marine Corps Base Hawaii (MCBH). The MS4 Permit requires that MCBH provide all existing industrial facilities, identified in MCBH's MS4 Permit application, and any newly identified industrial facilities, submitted to DOH using the "MS4 NPDES Individual Permit – Industrial Storm Water Discharge Notification Form," with a Storm Water Pollution Prevention Plan (SWPPP) for storm water associated with industrial activities.

The purpose of the regulations is to protect water quality by reducing the amount of pollutants in storm water runoff caused by industrial activities.

1.1 SWPPP Implementation

The storm water management controls of this plan will become MCBH procedure for the applicable industrial facility. An up-to-date copy of the SWPPP shall be maintained on site and at the MCBH Environmental Compliance and Protection Division (ECPD). Management staff, maintenance personnel, contractor staff, and other personnel involved in onsite industrial activities, will be knowledgeable of the plan and follow the guidelines set forth in it, in addition to any other pertinent base-wide, state and federal regulations.

Day-to-day implementation of the SWPPP is primarily the responsibility of the current facility Environmental Compliance Coordinator (ECC) or Point of Contact (POC) as identified in Table 2-1. Enforcement of the permit conditions and this SWPPP are ultimately the responsibility of ECPD and additional escalating levels of authority as specified in the Enforcement Response Plan developed by MCBH for its base-wide Storm Water Management Program (SWMP) Plan.

1.2 Updating the SWPPP

This SWPPP will be reviewed as needed to identify necessary changes, at a minimum of every five years. Updates may be required due to current best management practice (BMP) failures, spill events, changes in industrial activities, changes in features, corrective actions, or other necessary changes. Personnel changes to the Storm Water Pollution Control Team (Section 2.1) should be logged in Table 2-1. Storm Water Pollution Control Team Log. ECPD will be responsible for approving revisions to the SWPPP. In the event the plan is modified, a copy of the updated SWPPP will remain at ECPD and will be provided to the applicable facility. Additionally, ECPD shall document and report the SWPPP changes to the DOH, Clean Water Branch (CWB), within thirty days of when the changes arise.

2 Aircraft Wash Facility 6892

The Aircraft Wash Facility 6892 is located within MCBH, Kaneohe Bay at the intersection of Taxiway T and 1st Street. The facility encompasses approximately 1.0 acres and can be found in grid [redacted] and [redacted] of the MCBH Base Map, see Figure 4-1. The facility-specific map is shown on Figure 4-2.

2.1 Storm Water Pollution Control Team

The Storm Water Pollution Control Team consists of the Storm Water Program Manager, ECC, and the Hazardous Material (HAZMAT) and Hazardous Material Minimization (HAZMIN) team. The Storm Water Program Manager is responsible for the enforcement of the MS4 permit at all industrial sites and provides annual training to the ECC and other personnel. The ECC is the primary unit POC for storm water related items and the day-to-day environmental matters at a specific facility. ECC's are responsible for SWPPP implementation including BMP and facility inspections, storm water assessments/sampling, BMP maintenance, and corrective actions. The HAZMAT and HAZMIN team shall be contacted if assistance is needed. The role, name, phone number, and start date of individuals on the Storm Water Pollution Control Team is recorded in Table 2-1 below. In the event of personnel turnover, Table 2-1 shall be updated accordingly.

TABLE 2-1. STORM WATER POLLUTION CONTROL TEAM LOG

Role	Name	Phone	Start Date
MCBH Storm Water Program Manager	CIV Whitney Anderson	Office: 808-257-4359	6/6/22
ECC	SSgt Michael Hinrichs	Office: 808-257-7066 Cell: 760-576-9694	2/1/2020
HAZMAT/HAZMIN	CIV Tim Cawthon	HAZMAT Center Building 6409 Office: 808-257-9913 HAZMIN Center Building 6407 Office: 808-257-0770	N/A

2.2 Aircraft Wash Facility 6892 Activities

The Aircraft Wash Facility is used to wash aircraft after returning from missions. The facility was recently constructed at the southern end of the Aircraft Parking Apron. The outdoor facility is comprised of a concrete pad with containment curbing, drain inlet, various piping, and spray nozzles. Building 6891 contains water and detergent pumping systems. Hose systems that deliver both fresh water and detergent are available on both sides the wash pad. At the time of inspection, the water and detergent pumps in Building 6891 were not operational and a hose bib was used to rinse aircraft.

The concrete pad is gently sloped toward the center where a single grated inlet collects all wash water. The wash water then flows directly to the sanitary sewer. There is no known oil/water separator (OWS) at this facility. The wash pad is surrounded by grass. Storm water that falls near Building 6891 sheet flows south to a storm drain inlet, located to the south of the wash pad. The grated inlet is slightly raised above the ground to accept overflow water that does not infiltrate. This drain inlet is the designated storm water sample location (Outfall 01). Runoff from the southeastern side of the small parking lot next to Building 6891 flows to a drain inlet (substantially similar Outfall 02) in a grassed area near First Street. Storm water then flows from these inlets to the MCBH Outfall 018 which discharges into Kaneohe Bay. Refer to Figure 4-2 for the location of storm water sample location and other relevant features.

2.3 Sources of Pollutants

The following is an inventory of potential pollutants associated with Aircraft Wash Facility 6892:

A. Material Loading and Unloading Areas

Materials that are spilled, leaked, or lost during loading or unloading may collect on vegetated or paved surfaces and be carried away by storm runoff. Materials such as detergents are loaded near the bay door on the south side of Building 6891.

B. On-Site Material Storage and Disposal Practices

Significant materials such as detergents are stored in Building 6892.

C. Outdoor Activities

Outdoor activities at the Aircraft Wash Facility include washing aircraft with water and detergents.

D. Significant Materials Inventory

The following significant materials are located at the Aircraft Wash Facility:

- Waste Oils
- Detergents

2.4 Potential Storm Water Pollutants

No pollutants have been identified as having a reasonable potential to be present in storm water discharges from the Aircraft Wash Facility.

2.5 Best Management Practices (BMPs)

Best Management Practices (BMPs) are techniques or methods that aim to manage the quantity and improve the quality of storm water runoff from a facility or other site. Storm water BMPs intend to reduce or eliminate pollution and contaminants collected by runoff before the runoff reaches the MCBH storm water system or sensitive ecosystems such as streams, wetlands, and marine environments. The following is a summary of BMPs currently in place at the Aircraft Wash Facility:

A. Good Housekeeping Practices

In general, Aircraft Wash Facility employs good housekeeping practices throughout its operations. Good housekeeping practices for Aircraft Wash Facility are included in

Table 2-2.

B. Preventative Maintenance

Preventive maintenance is important as water pollution control measures may be of little or no use if devices and equipment have not been properly maintained. Facility personnel conduct inspection of facility equipment and storage systems on a regular basis. The preventive maintenance program involves inspections of equipment and storage systems that are exposed to storm water.

C. Visual Inspections

Visual inspection provides a valuable subjective assessment of the status of storm water management systems. They are easily performed and allow the opportunity for corrective action, if necessary. Site inspections and documentation requirements are addressed in in Section 3 of this SWPPP. MCBH HAZMIN Center staff perform hazardous material inspections monthly. Annual facility inspections are performed by EPCD as part of the MCBH Environmental Compliance Evaluation (ECE). Inspections of the OWS are conducted weekly by the ECC.

D. Spill Prevention and Response

Areas where significant material spill or leakage can occur are identified in Section 2.1 and shown on Figure 4-2. The storm water systems and their accompanying drainage points are also shown on Figure 4-2. Refer to Table 2-2 for BMPs related to spill preventative measures for material handling procedures, storage requirements, and equipment usage.

In the event of a hazardous substance or oil spill, the ECC and ECPD shall be notified immediately (ECPD; 808-630-8246). If the spill cannot be easily addressed using an onsite spill kit and personal protective equipment, call Fed Fire (Military 911). The spill source should be immediately controlled if it is safe to do so by closing valves, switches, and/or turning off power to a device. Then, contain the spill by using sorbent socks or absorbent materials found in a spill kit. After it has been contained, clean up the spilled material in a safe manner using dry methods. All materials should then be properly disposed of.

E. Erosion and Sediment Controls

No areas at the Aircraft Wash Facility have been identified as having high potential for significant soil erosion that would require erosion and sediment control measures.

F. Best Management Practices to Minimize Pollutant Contact with Storm Water

Facility personnel receive annual training from ECPD at minimum, as well as an initial training for all new personnel. Training information will include the BMPs that have been developed for the facility and a general overview of the storm water program and its objectives. Existing BMPs at the Aircraft Wash Facility are shown in Table 2-2 and attached as fact sheets to this SWPPP in Appendix A.

TABLE 2-2. BEST MANAGEMENT PRACTICES

BMP No.	BMP Title	Description
006	Control Spills	Any spill of significant materials is controlled immediately to prevent pollutant from being transported to receiving water.
012	Construct Berm or Dike Around Critical Areas	The Aircraft Wash Facility wash pad is located within a containment berm.
033	Check Vehicles and Equipment for Leaks	Equipment and piping are checked for leaks on a regular basis.
071	Keep Tanks, Piping, and Valves in Good Condition	Tanks, pumps, seals, piping and valves are visually inspected for signs of structural integrity and/or leaks.
113	Conduct Personnel Training Regarding the SWPPP	Personnel are trained regularly (initial orientation and annual refresher).

3 Inspections, Assessments and Monitoring

3.1 Routine Quarterly Site Inspections

The MS4 Permit requires a routine quarterly site inspection by a qualified person with at least one member of the storm water pollution control team participating. At least once each calendar year, the routine inspection must be conducted during a period when a storm water discharge is occurring. The site inspection is an overall evaluation of the effectiveness of the BMPs implemented at that facility. A Routine Facility Inspection Checklist (Appendix B) shall be completed during each routine site inspection and kept onsite with this SWPPP. During normal facility operating hours, inspections must be conducted of areas of the facility including, but not limited to, the following:

- Areas where industrial materials or activities are exposed to storm water;
- Areas identified in the SWPPP and those that are potential pollutant sources;
- Areas where spills and leaks have occurred in the past three years;

• Discharge points; and
• Control measures used to comply with the effluent limits contained in this permit.

3.2 Visual Assessment of Storm Water Discharges

A Quarterly Visual Assessment of storm water discharge is required for all industrial facilities at MCBH. Storm water samples for this visual assessment but must be collected in such a manner that the samples are representative of the storm water discharge from the facility. Therefore, the water sample must be collected at the designated storm water monitoring point (Outfall 01) as shown in Figure 4-2. The Quarterly Visual Assessment checklist (Appendix C) shall be completed by the current facility ECC and kept onsite with this SWPPP.

The visual assessment must be made:

- Of a sample collected in a clean, colorless glass or plastic container, and examined in a well-lit area;
- On samples collected within the first 30 minutes of an actual discharge from a storm event. If it is not possible to collect the sample within the first 30 minutes of discharge, the sample must be collected as soon as practicable after the first 30 minutes and documented why it was not possible to take the sample within the first 30 minutes; and
- For storm events, on discharges that occur at least 72 hours (three days) from the previous discharge.

Whenever the visual assessment shows evidence of storm water pollution, corrective action procedures to remedy the pollutants must be taken and documented. Refer to Section 4 for corrective action procedures.

4 Corrective Actions

A corrective action is defined as any action taken, or required to be taken, to (1) repair, modify, or replace any stormwater control used at the site; (2) clean up and dispose of spills, releases, or other deposits found on the site; and (3) remedy a permit violation. Corrective actions should be documented using the Corrective Action Log (Appendix D).

4.1 Immediate Actions

If corrective action is needed, you must immediately take all reasonable steps necessary to minimize or prevent the discharge of pollutants until a permanent solution is installed and made operational, including cleaning up any contaminated surfaces so that the material will not discharge in subsequent storm events. Note: In this context, the term "immediately" requires you to, on the same day a condition requiring corrective action is found, take all reasonable steps to minimize or prevent the discharge of pollutants until a permanent solution is installed and made operational. However, if a problem is identified at a time in the workday when it is too late to initiate corrective action, the initiation of corrective action must begin no later than the following workday. "All reasonable steps" means that the permittee has undertaken initial actions to assess and address the condition causing the corrective action, including, for example, cleaning up any exposed materials that may be discharged in a storm event (e.g., through sweeping, vacuuming) or making arrangements (i.e., scheduling) for a new BMP to be installed at a later date.

4.2 Escalating Actions

If additional actions are necessary beyond those implemented or if the conditions continue to occur, additional corrective actions (e.g., install a new or modified control and make it operational, complete the repair) must be completed before the next storm event if possible, and within 14 calendar days from the time of discovery of the corrective action condition. If it is infeasible to complete the corrective action within 14 calendar days, document why it is infeasible to complete the corrective action within the 14-day timeframe and identify a schedule for completing the work, which must be done as soon as practicable after the 14-day timeframe but no longer than 45 days after discovery. If the completion of corrective action will exceed the 45-day timeframe, the minimum additional time necessary to complete the corrective action can be taken, provided that MCBH ECPD and DOH is notified of your intention to exceed 45 days. Where your corrective actions result in changes to any of the controls or procedures documented in your SWPPP, you must modify your SWPPP accordingly within 14 calendar days of completing corrective action work.

4.3 Corrective Actions for Substantially Identical Outfalls

If the event triggering corrective action is associated with an outfall that had been identified as a "substantially identical outfall", the review must assess the need for corrective action for all related substantially identical outfalls. Any necessary changes to control measures that affect these other outfalls must also be made before the next storm event if possible, or as soon as practicable following that storm event. Any corrective actions must be conducted within the timeframes discussed above.

4.4 Record of Past Spills or Leaks of Hazardous Pollutants

Table 4-1 is used to record significant spills and leaks that have occur or have occurred within three years prior to the preparation or amendment of this SWPPP. Significant spills and leaks include, but are not limited to, releases of oil or hazardous substances in excess of quantities that are reportable under CWA Section 311 (see 40 CFR 110.6 and 40 CFR 117.21) or Section 102 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 USC §9602.

At the time of this SWPPP update, there have been no past spill or leak incidents reported for the Aircraft Wash Facility.

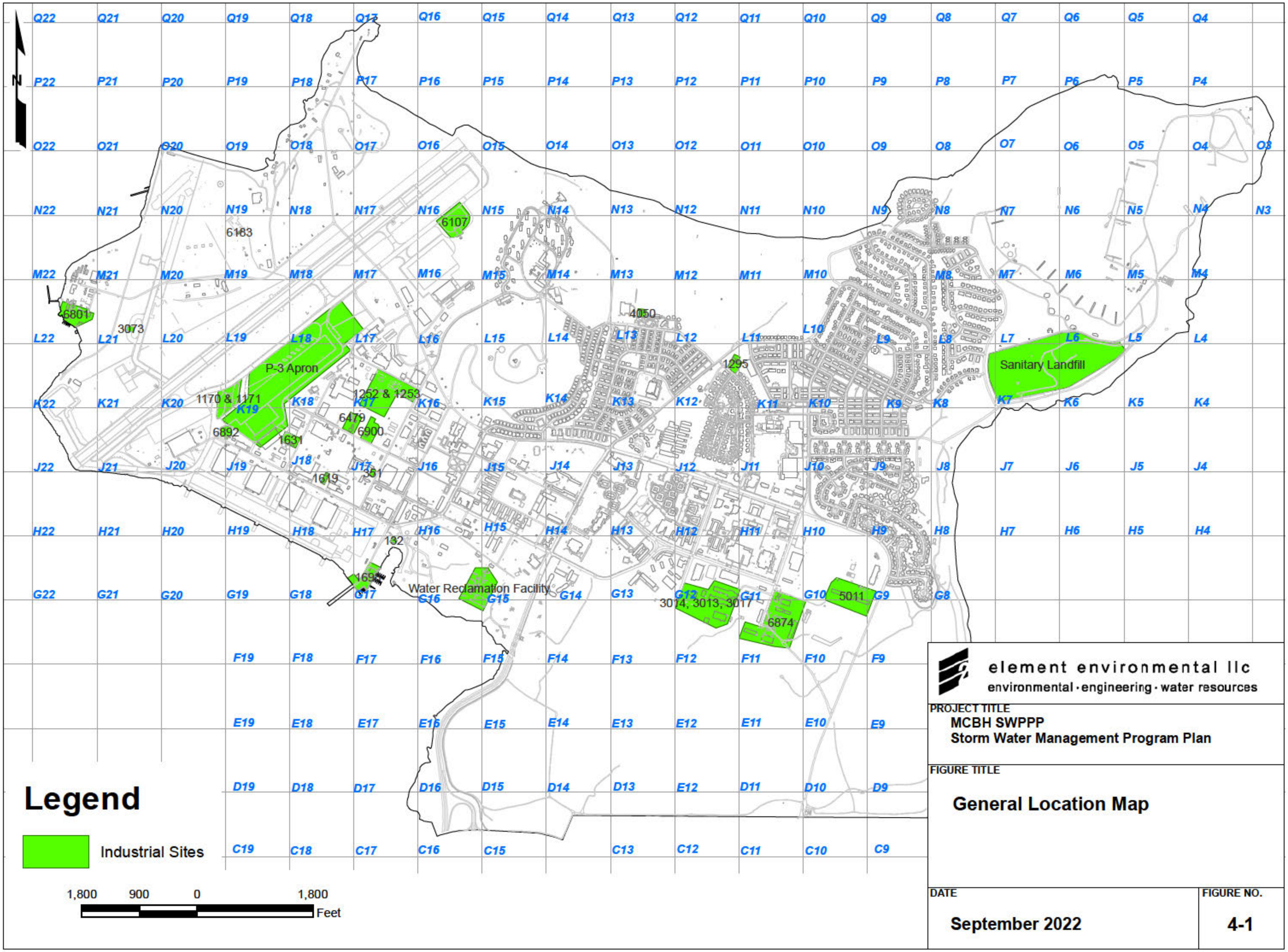
TABLE 4-1. PAST SPILLS OR LEAKS OF HAZARDOUS POLLUTANTS

Date of Incident	Brief Summary of Incident (POC Active at Time of Incident, Pollutant Type, Estimated Quantity, Location of Spill)

4.5 Record of Unauthorized Non-Storm Water Discharges

TABLE 4-2. UNAUTHORIZED NON-STORM WATER DISCHARGE EVALUATION

Date of Evaluation	Brief Summary of Evaluation (Description of the evaluation criteria, outfalls or onsite drainage points that were directly observed, action(s) taken, such as a list of control measures used to eliminate unauthorized discharge)



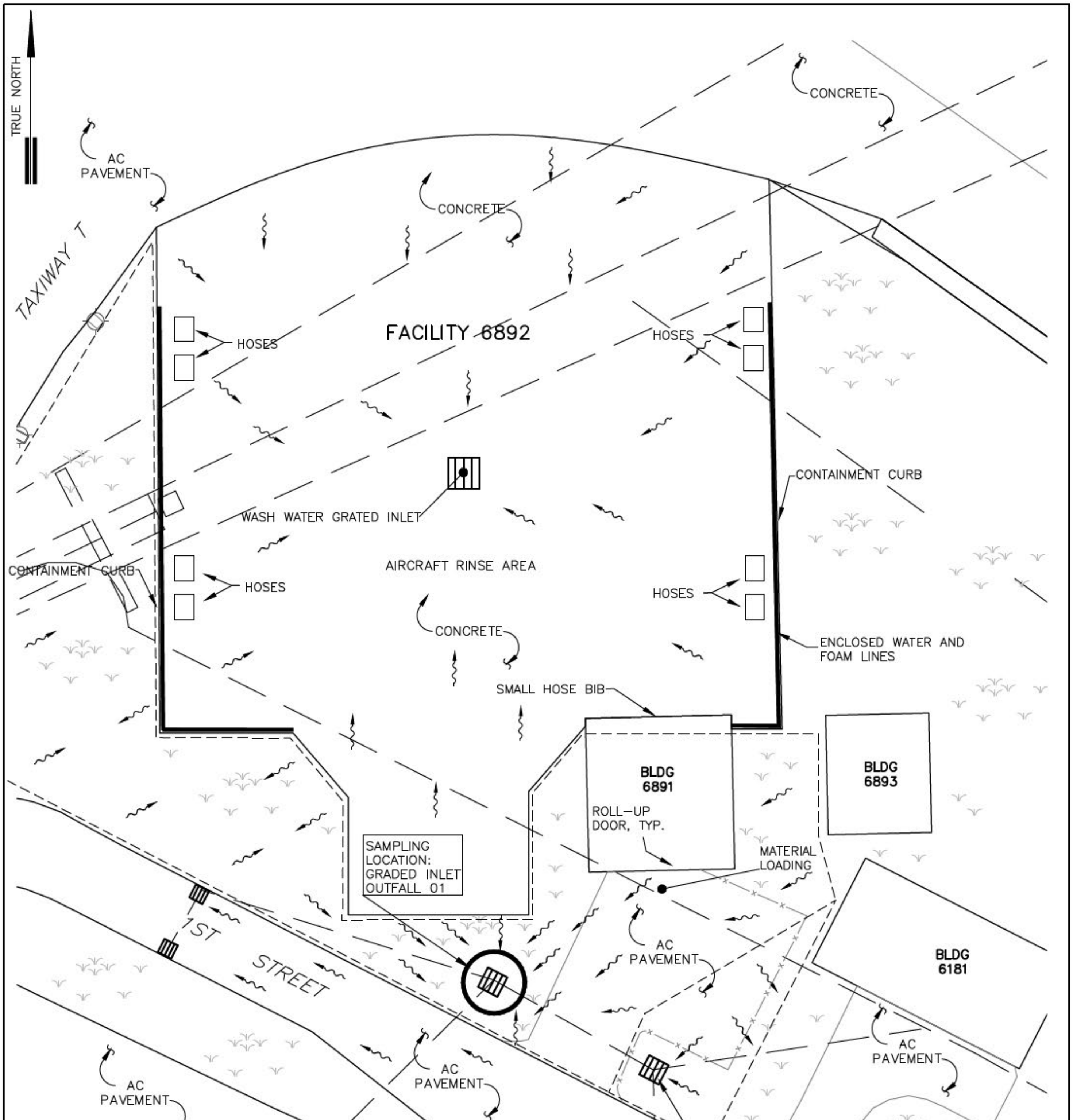
element environmental llc
environmental · engineering · water resources

PROJECT TITLE
MCBH SWPPP
Storm Water Management Program Plan

FIGURE TITLE
General Location Map

DATE
September 2022

FIGURE NO.
4-1



LEGEND

FLOW ARROW

STORM WATER DRAIN INLET

STORM WATER CONVEYANCE

DRAINAGE AREA BOUNDARY

NOTES:

1. STORM WATER, FROM APPROXIMATELY 1.0 ACRES ASSOCIATED WITH THE AIRCRAFT WASH FACILITY 6892, DISCHARGES A DRAIN INLET THAT FLOW TO KANEOHE BAY VIA MCBH OUTFALL 018.
2. NOT TO SCALE
3. STORM WATER CONVEYANCE PIPE LOCATIONS ARE APPROXIMATE

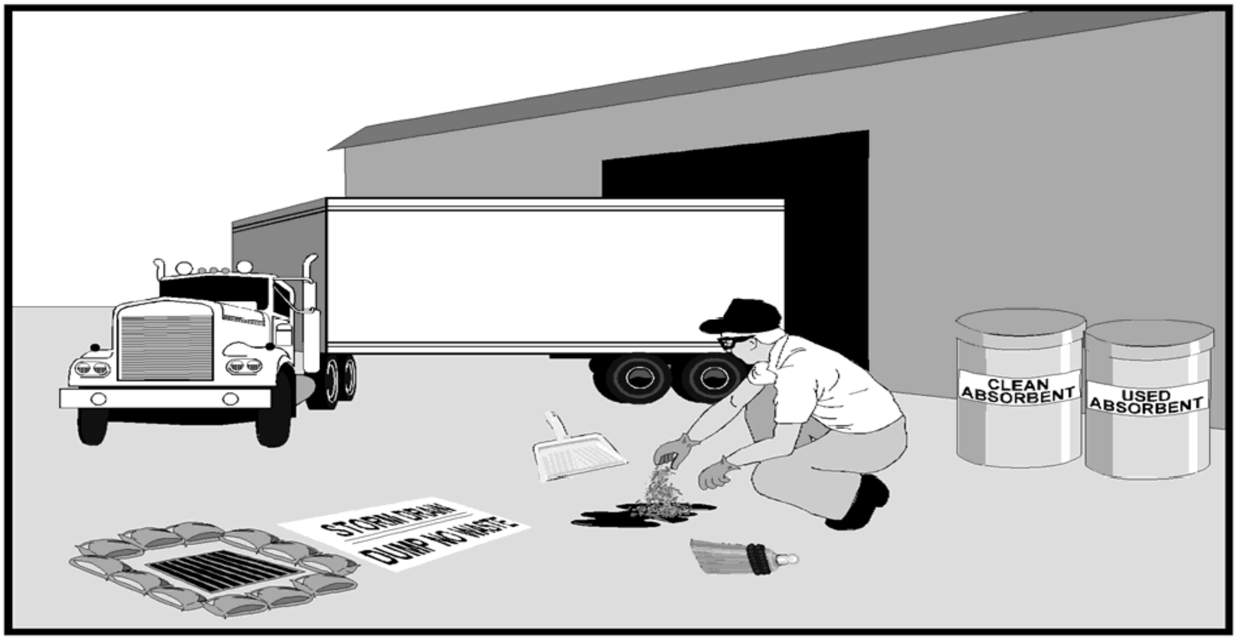
DATE:	PROJECT TITLE:	
JULY 2022	STORM WATER POLLUTION PREVENTION PLAN MCBH, KANEOHE BAY, OAHU, HAWAII	
FIGURE TITLE: AIRCRAFT WASH (FACILITY 6892)		FIGURE NO.: 4-2

DAMATO
8/9/2022 11:14:56 AM
Fig 4-2 6892 - Aircraft Wash Facility.dwg

APPENDIX A

SELECTED BMP FACT SHEETS

BMP 006 - CONTROL SPILLS



Description of Potential Pollutant and Source: Spills of significant materials may be exposed to storm water and transported to storm drains and/or receiving waters.

Description of BMP: Follow safety data sheets (SDS) for handling, storage, and cleanup of all significant materials to reduce the potential for spills.

Any spill, large or small, of significant materials will be controlled to prevent pollutants from being transported to storm drains and/or receiving waters. Appropriate spill control material will be kept on site. Smaller spills will be contained using absorbent material such as kitty litter, straw, or sawdust. Drums of absorbent material will be easily accessible and clearly marked, and containers for spent absorbent material will be readily available. Spent absorbent material will be managed appropriately and disposed of in accordance with applicable regulations. Larger spills will be controlled using spill kits, brooms, and other response equipment commensurate with the size of the spill. The methods outlined in the Activity's spill prevention and response plans (BMP 112) for hazardous materials will be followed for spills of any potential storm water pollutants. The date, time, nature and volume of material spilled, and cleanup measures taken will be recorded for all spills and kept as part of the SWPPP.

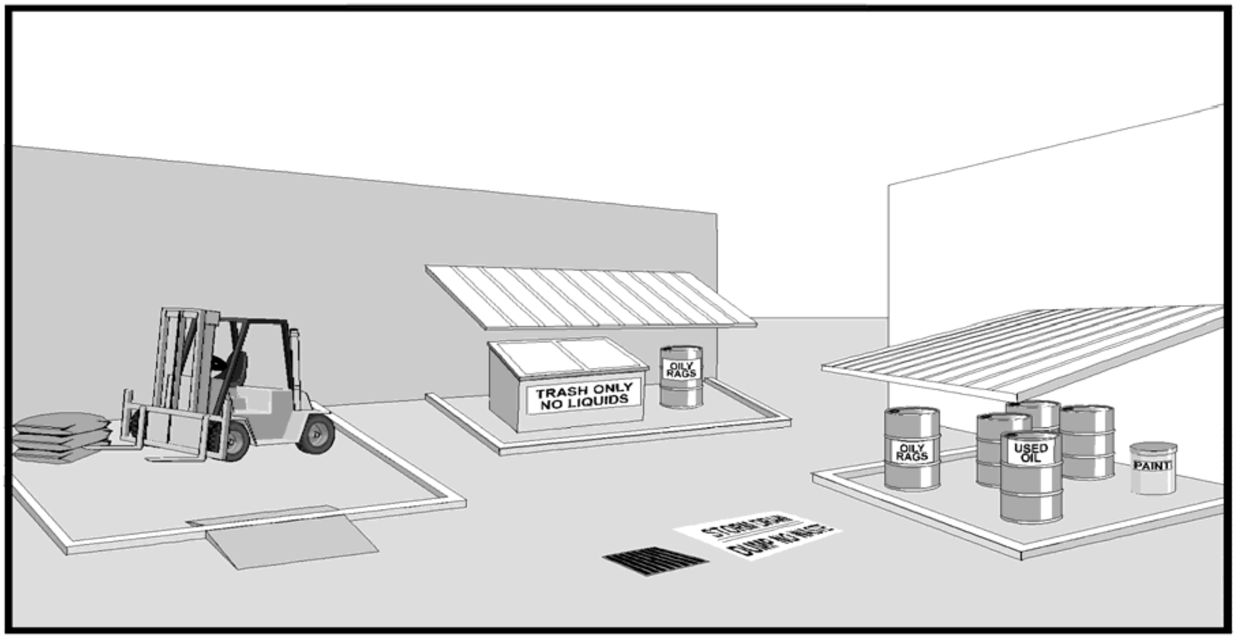
Application Guidance: Controlling spills will be practiced under all working conditions.

Training: Personnel will be trained in spill prevention and response procedures including the use of personal protection equipment (gloves, eye and face protection, etc.). This will include what absorbent or equipment to use, how to use the absorbent or equipment, where to find it, how to dispose of the spent absorbent or other material, and who to notify in the event of a spill.

Effectiveness and Cost: Spill control is a moderately effective, low-cost BMP.

Limitations: None

BMP 012 - CONSTRUCT BERM OR DIKE AROUND CRITICAL AREAS



Description of Potential Pollutant and Source: Critical areas are source areas that have a high likelihood for the release of pollutants. This includes material handling areas, material storage areas, and equipment repair and maintenance areas. As a result of spills and leaks or exposure to storm water, pollutants can flow from critical areas into the storm water system. In addition, small spills and leaks can accumulate on the surface area and be washed away by storm water.

Description of BMP: Construct a raised berm or dike around critical areas. This will provide secondary containment and prevent any spills or leaks from leaving the area. This secondary containment will also be provided where mobile tankers containing fuel are customarily stationed. Construct a ramp to allow vehicle access into the area. (Note: double walled tanks do not require this BMP. Also, 40 CFR 112.7 requires bulk petroleum storage tanks be provided with secondary containment.) A drain valve will be installed and procedures to drain storm water from the bermed area will be posted (see BMP 014).

Application Guidance: Install as needed.

Training: N/A

Effectiveness and Cost: This is a highly effective BMP. The cost will vary depending on the size of the fueling operation.

Limitations: The size of some tank and fueling operations areas could make this BMP relatively expensive.

BMP 033 - CHECK VEHICLES AND EQUIPMENT FOR LEAKS

Description of Potential Pollutant and Source: Vehicles, aircraft, or equipment entering or stored at a maintenance facility may be leaking a variety of fluids (fuel, oil, antifreeze, freon, etc.). These materials can be exposed to storm water.

Description of BMP: Inspect all vehicles and equipment at the site, whether incoming, parked, stored, or salvaged, for oil and fluid leaks. Drivers of fleet vehicles, such as delivery trucks, will also check under their vehicles each morning for fluid leaks. If leaks are present, drip pans will be placed under the vehicle or equipment. Once the vehicle is removed from the site, the former parking area will be inspected for stains, and these stains will be cleaned using rags or dry solvents.

Application Guidance: Any vehicle or equipment coming in for repairs, painting, or storage will be inspected for leaks. Fleet vehicles will be inspected each morning. Vehicles that are parked, stored, or salvaged will be provided with drip pans, as will tanker rail cars waiting to be unloaded. The frequency for implementing this BMP has been provided as general guidance. However, a facility operator may wish to establish a more suitable frequency. This will require SWPPP implementors to make judgements based on facility operations and conditions. To assign a frequency other than what has been suggested (i.e., more or less frequent), the following criteria will be considered and rated either High, Medium, or Low. If many of the criteria are assigned a High rating, the frequency may be increased. Similarly, if many criteria are assigned a Low rating, the frequency may be decreased. The goal of implementing this BMP is to minimize exposure of pollutants to storm water.

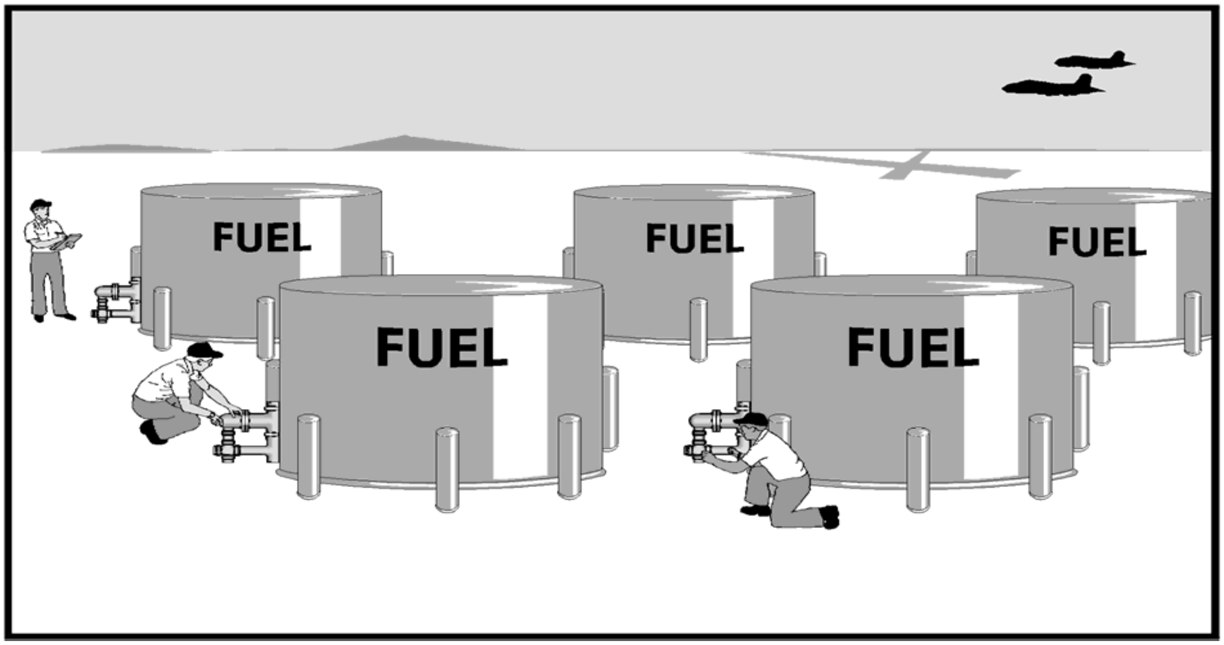
CRITERIA	Rating H=High M=Medium L=Low
Probability of exposure of significant materials to storm water	
Old age or poor condition of equipment and vehicles	
Evidence of exposure (e.g., stains on pavement)	
Proximity of source area to outfall or receiving water	
Sensitivity of receiving water to potentially exposed significant materials (e.g., waters with beneficial uses such as human contact, recreation, significant species habitat, etc.)	

Training: Signs will be posted to remind personnel of proper procedures.

Effectiveness and Cost: Checking for leaks is a moderately effective, low-cost BMP.

Limitations: None

BMP 071- KEEP TANKS, PIPING, AND VALVES IN GOOD CONDITION



Description of Potential Pollutant and Source: Tanks, piping, and valves may leak fuel or other significant materials due to corrosion, loose fittings, poor welding, or improperly or poorly fitted gaskets. This can expose these materials to storm water, which can transport them to storm drains and/or receiving waters.

Description of BMP: Keep tanks, piping, and valves in good working condition. Tanks, piping, or valves which are leaking will be repaired or replaced.

Application Guidance: Tanks, piping, and valves will be inspected monthly and kept in good condition at all times. If applicable, preventive maintenance will be performed.

The frequency for implementing this BMP has been provided as general guidance. However, a facility operator may wish to establish a more suitable frequency. This will require SWPPP implementors to make judgements based on facility operations and conditions. To assign a frequency other than what has been suggested (i.e., more or less frequent), the following criteria will be considered and rated either High, Medium, or Low. If many of the criteria are assigned a High rating, the frequency may be increased. Similarly, if many criteria are assigned a Low rating, the frequency may be decreased. The goal of implementing this BMP is to minimize exposure of pollutants to storm water.

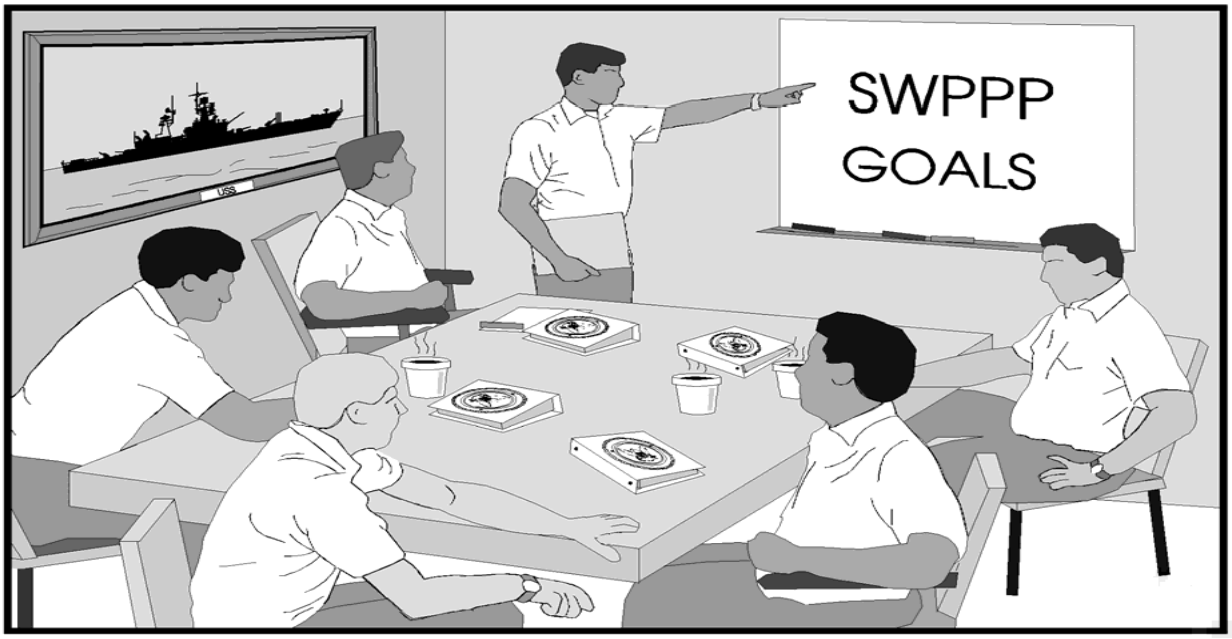
CRITERIA	Rating H=High M=Medium L=Low
Probability of exposure of significant materials to storm water	
Quantity of significant materials potentially exposed	
Toxicity of significant materials potentially exposed	
Frequency of use of tanks, piping, and valves	
Intensity of use of tanks, piping, and valves	
Old age or poor condition of tanks, piping, and valves	
Evidence of exposure (e.g., stains on ground surface)	
Proximity of source area to outfall or receiving water	
Sensitivity of receiving water to potentially exposed significant materials (e.g., waters with beneficial uses such as human contact, recreation, significant species habitat, etc.)	

Training: Personnel will be trained to regularly inspect for leaks or conditions that could lead to the discharge of chemicals, or storm water contact with waste materials. Personnel will be trained to routinely inspect equipment before each use. Tanks, piping, and valves which are not frequently used, will be inspected weekly. Procedures for notifying the appropriate maintenance personnel if a leak is found, will be established.

Effectiveness and Cost: Keeping tanks, piping, and valves in good condition is a highly effective BMP. The cost of repairing or replacing piping and valves is typically low. The cost of repairing or replacing tanks will vary based on the size of the tank and its present condition.

Limitations: None

BMP 113 - CONDUCT PERSONNEL TRAINING REGARDING THE SWPPP



Description of Potential Pollutant and Source: When properly trained, personnel are more capable of preventing spills, responding safely and effectively to an accident when it occurs, and recognizing situations that could lead to storm water contamination.

Description of BMP: Train personnel at all levels of responsibility in the components and goals of the SWPPP.

Application Guidance: Training will be conducted quarterly and at new personnel orientations.

Training: Training will address each component of the SWPPP, including how and why tasks are to be implemented. Topics will include:

- Good housekeeping
- Material management practices
- Spill prevention and response

Effectiveness and Cost: This is a highly effective, moderate-cost BMP.

Limitations: None

APPENDIX B

ROUTINE FACILITY INSPECTION CHECKLIST

Routine Facility Inspection Checklist

Activity Name: ______________________ **Date of Inspection:** ______________________

Inspector(s): ______________________ **Facility Name/Number:** ______________________

Column 1	Column 2	Column 3	Column 4	Column 5	
Source Area	BMP Number and Title	Status: F, P, N, NA[1]	Briefly Describe Effectiveness (Good or Other [describe])	Corrective Measures	
				What	By When

Note 1: F – Fully implemented, P – Partially implemented, N – Not implemented , NA – Not Applicable

APPENDIX C

QUARTERLY VISUAL ASSESSMENT CHECKLIST

Quarterly Visual Assessment Checklist

Facility ID and Location: ______________________

Date: ____________________

Sampler Name (Printed): ______________________________________

Signature: ____

Time of Rainfall Begin: _______________ Time of Rainfall End: ____________________

Time of Flow Begin: _______________ Time of Flow End: ____________________

Rainfall event more than 72 hours since last event? Yes / No

Rainfall Event Total: ____________________

Sample: sample in a clean, colorless glass or plastic container, and examined in a well-lit area

On samples collected within the first 30 minutes of an actual discharge from a storm event

Sample Characteristics:

Color: ____________________ Floating Solids: ____________________________

Odor: ____________________ Settled Solids: ____________________________

Clarity: ____________________ Suspended Solids: ____________________________

Oil Sheen: ____________________ Foam: ____________________________

Other Obvious Indicators of Storm Water Pollution

(describe): ____

Nature of the discharge (i.e., runoff):

Results of observations of the storm water discharge:

Probable sources of any observed storm water contamination:

If applicable, why it was not possible to take samples within the first 30 minutes:

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

APPENDIX D

CORRECTIVE ACTION LOG

Corrective Action Log

Use this form to document SWPPP corrective actions. This form is to be completed by the Environmental Compliance Coordinator (ECC) or a person designated by ECC and submitted to the MCBH Storm Water Program Manager. The Storm Water Program Manager is responsible for any notification to the State of Hawaii Department of Health (DOH), if required.

A corrective action is defined as an action taken to:

- **a) Repair, modify, or replace any storm water control used at the site;**
- **b) Clean up and properly dispose of spills, releases, or other deposits; or**
- **c) Remedy a permit violation.**

1. Corrective Action Triggers

The following events trigger a corrective action to be taken (this triggering condition is to be documented *within 24 hours* of discovering the occurrence):

- a) A required storm water control was never installed, was installed incorrectly, or is not in accordance with the requirements in the SWMP Plan.
- b) A member of the **Storm Water Pollution Control Team** becomes aware that the storm water controls installed and being maintained are not effective enough for the discharge to meet applicable water quality standards or applicable requirements in the MCBH SWMP Plan. The facility ECC shall notify the Storm Water Program Manager immediately. The Storm Water Program Manager will notify DOH *by the end of the next work day*.

1.1 Log Notifications:

Date/time Storm Water Program Manager notified by ECC: ________________________

Date/time DOH notified by Storm Water Program Manager: ________________________

1.2 Describe Discharge:

Indicate which one of the following prohibited discharges is occurring or has occurred:

- ❒ Wastewater from washout of concrete
- ❒ Wastewater from washout and cleanout of stucco, paint, form release oils, curing compounds, or other construction materials
- ❒ Fuels, oils, or other pollutants used in vehicle and equipment operation and maintenance
- ❒ Soaps, solvents, or detergents used in vehicle and equipment washing
- ❒ Toxic or hazardous substances from a spill or other release
- ❒ Other, Explain: ____

2. Requirements for Taking Corrective Actions

The ECC shall complete corrective actions in accordance with the deadlines specified below. In all circumstances, site personnel shall *immediately* take all reasonable steps to minimize or prevent the discharge of pollutants until a permanent solution is installed and made operational, including cleaning up any contaminated surfaces so that the material will not discharge in subsequent storm events. *Immediately* means the same day the condition is discovered, unless it is too late in the day, in which initiation of corrective action must begin on the following work day.

Following any of the above triggering events, the ECC shall install a new or modified control and make it operational, or complete the repair, by *no later than 7 calendar days from the time of discovery*. If it is not feasible to complete the installation or repair within 7 calendar days, the ECC shall document and submit to the Storm Water Program Manager, for their agreement, why it is not feasible to complete the installation or repair within the 7-calendar day timeframe and document a schedule for installing the storm water control and making it operational as soon as practicable after the 7-day timeframe.

If the issue is not adequately addressed within 7 calendar days or the agreed upon timeframe, enforcement procedures will be initiated. Unaddressed issues will be escalated through the chain of command. The MCBH Environmental Compliance and Protection Division Director will give the responsible party a formal notice with an appropriate deadline for action. If the problem remains unchanged, the situation will be brought to the attention of the next higher authority. The ultimate penalty for non-compliance of MS4 Permit regulations is eviction or discharge of the responsible party from MCBH. This is placed at the discretion of the Base Commander. See the Enforcement Response Plan in Appendix 3-6 of the SWMP Plan for further information on MCBH's enforcement policies.

3. Corrective Action Report

Within 24 hours of discovering the occurrence of one of the triggering conditions in SWPPP Section 4.1 at the site, the ECC must complete the following:

3.1 Describe the triggering condition:

____
____
____
____

3.2 Record the date/time of the condition identified. How was the condition identified?

____
____
____
____

3.3 Describe the corrective action taken:

____
____
____

Date/time installation or repair was completed:
(or date/time the prohibited discharge ceased) ____

Or describe why it is not feasible to complete installation or repair within 7 calendar days and detail a proposed schedule (if applicable)

____
____
____

4. Resolution of the Corrective Action Trigger

Within 7 calendar days of initiating the Corrective Action Report, the ECC must complete a report of the following:

4.1 Follow-up Actions

Describe any follow-up actions taken to review the design, installation, and maintenance of storm water controls, including the dates such actions occurred:

____
____
____

4.2 Storm Water Control Modifications

Provide a summary of storm water control modifications implemented. Include a schedule of activities required to implement changes and the date the modifications were completed or will be completed:

____
____
____

5. SWPPP Modification Due to Corrective Actions

Where corrective actions result in changes to any of the storm water controls or procedures documented in the SWPPP, modify the SWPPP accordingly *within 7 calendar days* of completing corrective action work.

Are modifications to the SWPPP necessary? ❑ Yes ❑ No

Date modifications to the SWPPP shall be completed _______________

6. Corrective Actions Required by DOH

The facility shall comply with any corrective actions required by DOH as a result of permit violations found during an inspection by DOH or the Environmental Protection Agency (EPA).

Was the Corrective Action triggered by a DOH/EPA inspection?

❑ Yes ❑ No

❑ Date of DOH/EPA Inspection __________________

7. Additional Comments:

____
____

Final

STORM WATER POLLUTION PREVENTION PLAN

Storm Water Management Program Plan

Marine Corps Base Hawaii, Oahu, Hawaii

NPDES Permit No. HI S000007

GOLF CART BARN (BUILDING 4050)

Prepared by:

Marine Corps Base Hawaii

August 2022

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Tables

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List of Acronyms and Abbreviations

BMP	Best Management Practice
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CWA	Clean Water Act
CWB	Clean Water Branch
DOH	State of Hawaii Department of Health
ECC	Environmental Compliance Coordinator
ECE	Environmental Compliance Evaluation
ECPD	Environmental Compliance and Protection Division
EPA	United States Environmental Protection Agency
HAZMAT	Hazardous Material
HAZMIN	Hazardous Material Minimization
MCBH	Marine Corps Base Hawaii
MS4	Municipal Separate Storm Sewer System
MS4 Permit	Marine Corps Base Hawaii's NPDES Permit No. HI S000007
NPDES	National Pollutant Discharge Elimination System
POC	Point of Contact
SWMP	Storm Water Management Program
SWPPP	Storm Water Pollution Prevention Plan

Certification Statement

MCBH is committed to the prevention of discharges of polluted stormwater to navigable waters or the environment and maintains the highest standards for best management practices through periodic review, updating, and implementation of this Stormwater Pollution Prevention Plan (SWPPP).

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information contained therein. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Name: ______________________ Title: ______________________

Signature: ______________________ Date: ______________________

Management Review

Refer to Section 1.2 for more information on required SWPPP updates.

Review Dates	Signature	Amendment Required? (Y/N)
____________	__________________	__________
____________	__________________	_________
____________	__________________	_________
____________	__________________	_________
____________	__________________	_________
____________	__________________	_________

1 Introduction

As part of Federal regulations administered through the Clean Water Act (CWA), the State of Hawaii, Department of Health (DOH) has issued the National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4) Permit No. HI S000007 (referred to herein at the "MS4 Permit") to Marine Corps Base Hawaii (MCBH). The MS4 Permit requires that MCBH provide all existing industrial facilities, identified in MCBH's MS4 Permit application, and any newly identified industrial facilities, submitted to DOH using the "MS4 NPDES Individual Permit – Industrial Storm Water Discharge Notification Form," with a Storm Water Pollution Prevention Plan (SWPPP) for storm water associated with industrial activities.

The purpose of the regulations is to protect water quality by reducing the amount of pollutants in storm water runoff caused by industrial activities.

1.1 SWPPP Implementation

The storm water management controls of this plan will become MCBH procedure for the applicable industrial facility. An up-to-date copy of the SWPPP shall be maintained on site and at the MCBH Environmental Compliance and Protection Division (ECPD). Management staff, maintenance personnel, contractor staff, and other personnel involved in onsite industrial activities, will be knowledgeable of the plan and follow the guidelines set forth in it, in addition to any other pertinent base-wide, state and federal regulations.

Day-to-day implementation of the SWPPP is primarily the responsibility of the current facility Environmental Compliance Coordinator (ECC) or Point of Contact (POC) as identified in Table 2-1. Enforcement of the permit conditions and this SWPPP are ultimately the responsibility of ECPD and additional escalating levels of authority as specified in the Enforcement Response Plan developed by MCBH for its base-wide Storm Water Management Program (SWMP) Plan.

1.2 Updating the SWPPP

This SWPPP will be reviewed as needed to identify necessary changes, at a minimum of every five years. Updates may be required due to current best management practice (BMP) failures, spill events, changes in industrial activities, changes in features, corrective actions, or other necessary changes. Personnel changes to the Storm Water Pollution Control Team (Section 2.1) should be logged in Table 2-1. Storm Water Pollution Control Team Log. ECPD will be responsible for approving revisions to the SWPPP. In the event the plan is modified, a copy of the updated SWPPP will remain at ECPD and will be provided to the applicable facility. Additionally, ECPD shall document and report the SWPPP changes to the DOH, Clean Water Branch (CWB), within thirty days of when the changes arise.

2 Golf Cart Barn, Building 4050

The Golf Cart Barn, Building 4050, is located within MCBH, Kaneohe Bay on Manning Street between the Golf Pro Shop (Building 3088) and the Klipper Villas. The Golf Cart Barn encompasses approximately 0.4 acres and can be found in grid [redacted] of the MCBH Base Map, see Figure 4-1. The facility-specific map is shown on Figure 4-2.

2.1 Storm Water Pollution Control Team

The Storm Water Pollution Control Team consists of the Storm Water Program Manager, ECC, and the Hazardous Material (HAZMAT) and Hazardous Material Minimization (HAZMIN) team. The Storm Water Program Manager is responsible for the enforcement of the MS4 permit at all industrial sites and provides annual training to the ECC and other personnel. The ECC is the primary unit POC for storm water related items and the day-to-day environmental matters at a specific facility. ECC's are responsible for SWPPP implementation including BMP and facility inspections, storm water assessments/sampling, BMP maintenance, and corrective actions. The HAZMAT and HAZMIN team shall be contacted if assistance is needed. The role, name, phone number, and start date of individuals on the Storm Water Pollution Control Team is recorded in Table 2-1 below. In the event of personnel turnover, Table 2-1 shall be updated accordingly.

TABLE 2-1. STORM WATER POLLUTION CONTROL TEAM LOG

Role	Name	Phone	Start Date
MCBH Storm Water Program Manager	CIV Whitney Anderson	Office: 808-257-4359	6/6/22
ECC	CIV Kevin T. Kashiwai	Office: 808-254-2107	
HAZMAT/HAZMIN	CIV Tim Cawthon	HAZMAT Center Building 6409 Office: 808-257-9913 HAZMIN Center Building 6407 Office: 808-257-0770	N/A

2.2 Golf Cart Barn, Building 4050 Facility Activities

The Golf Cart Barn, Building 4050, is responsible for the maintenance, charging, and storage of golf carts and related equipment. The facility charges and maintains 100 battery powered golf carts, 8 battery powered golf boards, and 2 battery powered carryall carts. In addition, the facility uses two gasoline powered vehicles: a golf ball picker and a small beverage cart.

General maintenance and fueling to facility vehicles are completed under cover within Building 4050. Gasoline, oil, grease, and paints are stored indoors in flammable lockers along the northern wall of Building 4050. Two universal waste drums for aerosol containers and scrap metal are located in the center of the building. An office, tool/parts room, golf club storage, and air compressor room are located at the southern end of Building 4050. At the southeastern corner of the facility, batteries are stored on a spill pallet within a plastic shed.

After use, golf carts are towed or driven to the east side of Building 4050. Trash is removed and the carts before they are sprayed down with fresh water from a hose bib. The wash water flows through a biosock and then discharges from the site at Outfall 01 under the fence and into a grassy swale that leads to a vegetated infiltration basin located north of the Klipper Villas.

Storm water falling on the western and northern side of the facility flows to a grated storm inlet (substantially similar Outfall 02) in the grass near the northwestern corner of the facility. Along the south side of the facility, storm water will infiltrate into the grassy area along the southern fence. Refer to Figure 4-2 for the location of the storm water sampling point (Outfall 01) and other relevant features.

2.3 Sources of Pollutants

The following is an inventory of potential pollutants associated with the Golf Cart Barn, Building 4050:

A. Good Housekeeping Practices

In general, the Golf Cart Barn employs good housekeeping practices throughout its operations. Good housekeeping practices are included in Table 2-2.

B. Material Loading and Unloading Areas

Materials that are spilled, leaked, or lost during loading or unloading may collect on vegetated or paved surfaces and be carried away by storm runoff. Materials are loaded and unloaded at the bay doors of Building 4050 and the front of the plastic shed.

C. On-Site Material Storage and Disposal Practices

Leaks, drips, or spills of materials that are stored or disposed of in areas exposed to rainfall can be carried away by storm water. Significant materials are stored in Building 4050 in flammable lockers and lead acid batteries are stored on a spill pallet in the plastic shed.

D. Outdoor Activities

Many outdoor activities at MCBH, Kaneohe Bay use materials or create wastes that have the potential to pollute storm water runoff. Outdoor activities at the Golf Cart Barn include the loading of materials and washing of vehicles.

E. Significant Materials Inventory

The following is a list of significant materials found at the Golf Cart Barn:

- Gasoline
- Motor Oil
- Grease
- Battery Acid
- Metals (scrap)
- Paints

2.4 Potential Storm Water Pollutants

The following pollutants have been identified as having a reasonable potential to be present in storm water discharges from the Golf Cart Barn, Building 4050 if not properly managed:

- Cart Wash Water

Materials that have *not* been included as a potential storm water pollutant but have been included as part of the significant materials inventory list, are considered to present a negligible risk to storm water quality. This is based on the nature/location of the primary activities performed with these materials and the BMPs that are in place. Material transport (loading/unloading) is not considered to be a significant threat to storm water, due to spill response procedures, training, and spill kit materials available onsite.

2.5 Best Management Practices (BMPs)

Best Management Practices (BMPs) are techniques or methods that aim to manage the quantity and improve the quality of storm water runoff from a facility or other site. Storm water BMPs intend to reduce or eliminate pollution and contaminants collected by runoff before the runoff reaches the MCBH storm water system or sensitive ecosystems such as streams, wetlands, and marine environments. The following is a summary of BMPs currently in place at the Golf Cart Barn, Building 4050.

A. Good Housekeeping Practices

In general, the Golf Cart Barn, Building 4050 employs good housekeeping practices throughout its operations. Good housekeeping practices for the Golf Cart Barn, Building 4050 are included in Table 2-2. Filled drums universal waste and used batteries are turned into HAZMIN Facility.

B. Preventative Maintenance

Preventive maintenance is important as water pollution control measures may be of little or no use if devices and equipment have not been properly maintained. Facility personnel conduct inspection of facility equipment and storage systems on a regular basis. The preventive maintenance program involves inspections of equipment and storage systems that are exposed to storm water. Maintenance work is performed under cover, and no maintenance work is performed outdoors.

C. Visual Inspections

Visual inspection provides a valuable subjective assessment of the status of storm water management systems. They are easily performed and allow the opportunity for corrective action, if necessary. Site inspections and documentation requirements are addressed in in Section 3 of this SWPPP. MCBH HAZMIN Center staff perform hazardous material inspections monthly. Annual facility inspections are performed by EPCD as part of the MCBH Environmental Compliance Evaluation (ECE).

D. Spill Prevention and Response

Areas where significant material spill or leakage can occur are identified in Section 2.1 and shown on Figure 4-2. The storm water systems and their accompanying drainage points are also shown on Figure 4-2. Refer to Table 2-2 for BMPs related to spill preventative measures for material handling procedures, storage requirements, and equipment usage.

In the event of a hazardous substance or oil spill, the ECC and ECPD shall be notified immediately (ECPD; 808-630-8246). If the spill cannot be easily addressed using an onsite spill kit and personal protective equipment, call Fed Fire (Military 911). The spill source should be immediately controlled if it is safe to do so by closing valves, switches, and/or turning off power to a device. Then, contain the spill by using sorbent socks or absorbent materials found in a spill kit. After it has been contained, clean up the spilled material in a safe manner using dry methods. All materials should then be properly disposed of.

E. Erosion and Sediment Controls

No areas at the Golf Cart Barn have been identified as having high potential for significant soil erosion that would require erosion and sediment control measures.

F. Best Management Practices to Minimize Pollutant Contact with Storm Water

Facility personnel receive annual training from ECPD at minimum, as well as an initial training for all new personnel. Training information will include the BMPs that have been developed for the facility and a general overview of the storm water program and its objectives.

Existing BMPs at the Golf Cart Barn are shown in Table 2-2 and attached as fact sheets to this SWPPP in Appendix A.

TABLE 2-2. BEST MANAGEMENT PRACTICES

BMP No.	BMP Title	Description
001	Label All Drums, Cans, Containers, Tanks, and Valves	All containers and drums are labeled.
004	Avoid Hosing Down the Site	Sweeping with a push broom is performed as needed.
006	Control Spills	Any spill of significant materials is controlled immediately to prevent pollutant from being transported to receiving water.
007	Place Trash Receptacles at Appropriate Locations	Multiple trash bins are located at the facility
015	Recycle	Recyclable materials are stored in appropriate containers until it can be transported to the Recycle Center or HAZMIN.
033	Check Vehicles and Equipment for Leaks	Vehicles and equipment are checked for leaks on a regular basis.
061B	Store Liquids and Significant Materials within a Building or Covered Area	All significant materials are properly stored undercover and in flammable lockers / secondary containment where required.
066	Eliminate Topping Off Tanks	Gas vehicle tanks are not topped off.
113	Conduct Personnel Training Regarding the SWPPP	Personnel are trained regularly (initial orientation and annual refresher).
143	Straw Bales/Biofilter Bags	A biosock is used to filter wash water and storm water discharging from the east side of the facility.

3 Inspections, Assessments and Monitoring

3.1 Routine Quarterly Site Inspections

The MS4 Permit requires a routine quarterly site inspection by a qualified person with at least one member of the storm water pollution control team participating. At least once each calendar year, the routine inspection must be conducted during a period when a storm water discharge is occurring. The site inspection is an overall evaluation of the effectiveness of the BMPs implemented at that facility. A Routine Facility Inspection Checklist (Appendix B) shall be completed during each routine site inspection and kept onsite with this SWPPP. During normal facility operating hours, inspections must be conducted of areas of the facility including, but not limited to, the following:

- Areas where industrial materials or activities are exposed to storm water;
- Areas identified in the SWPPP and those that are potential pollutant sources;
- Areas where spills and leaks have occurred in the past three years;
- Discharge points; and
- Control measures used to comply with the effluent limits contained in this permit.

3.2 Visual Assessment of Storm Water Discharges

A Quarterly Visual Assessment of storm water discharge is required for all industrial facilities at MCBH. Storm water samples for this visual assessment but must be collected in such a manner that the samples are representative of the storm water discharge from the facility. Therefore, the water sample must be collected at the designated storm water monitoring point (Outfall 01) as shown in Figure 4-2. The Quarterly Visual Assessment checklist (Appendix C) shall be completed by the current facility ECC and kept onsite with this SWPPP.

The visual assessment must be made:

- Of a sample collected in a clean, colorless glass or plastic container, and examined in a well-lit area;
- On samples collected within the first 30 minutes of an actual discharge from a storm event. If it is not possible to collect the sample within the first 30 minutes of discharge, the sample must be collected as soon as practicable after the first 30 minutes and documented why it was not possible to take the sample within the first 30 minutes; and
- For storm events, on discharges that occur at least 72 hours (three days) from the previous discharge.

Whenever the visual assessment shows evidence of storm water pollution, corrective action procedures to remedy the pollutants must be taken and documented. Refer to Section 4 for corrective action procedures.

4 Corrective Actions

A corrective action is defined as any action taken, or required to be taken, to (1) repair, modify, or replace any stormwater control used at the site; (2) clean up and dispose of spills, releases, or other deposits found on the site; and (3) remedy a permit violation. Corrective actions should be documented using the Corrective Action Log (Appendix D).

4.1 Immediate Actions

If corrective action is needed, you must immediately take all reasonable steps necessary to minimize or prevent the discharge of pollutants until a permanent solution is installed and made operational, including cleaning up any contaminated surfaces so that the material will not discharge in subsequent storm events. Note: In this context, the term "immediately" requires you to, on the same day a condition requiring corrective action is found, take all reasonable steps to minimize or prevent the discharge of pollutants until a permanent solution is installed and made operational. However, if a problem is identified at a time in the workday when it is too late to initiate corrective action, the initiation of corrective action must begin no later than the following workday. "All reasonable steps" means that the permittee has undertaken initial actions to assess and address the condition causing the corrective action, including, for example, cleaning up any exposed materials that may be discharged in a storm event (e.g., through sweeping, vacuuming) or making arrangements (i.e., scheduling) for a new BMP to be installed at a later date.

4.2 Escalating Actions

If additional actions are necessary beyond those implemented or if the conditions continue to occur, additional corrective actions (e.g., install a new or modified control and make it operational, complete the repair) must be completed before the next storm event if possible, and within 14 calendar days from the time of discovery of the corrective action condition. If it is infeasible to complete the corrective action within 14 calendar days, document why it is infeasible to complete the corrective action within the 14-day timeframe and identify a schedule for completing the work, which must be done as soon as practicable after the 14-day timeframe but no longer than 45 days after discovery. If the completion of corrective action will exceed the 45-day timeframe, the minimum additional time necessary to complete the corrective action can be taken, provided that MCBH ECPD and DOH is notified of your intention to exceed 45 days. Where your corrective actions result in changes to any of the controls or procedures documented in your SWPPP, you must modify your SWPPP accordingly within 14 calendar days of completing corrective action work.

4.3 Corrective Actions for Substantially Identical Outfalls

If the event triggering corrective action is associated with an outfall that had been identified as a "substantially identical outfall", the review must assess the need for corrective action for all related substantially identical outfalls. Any necessary changes to control measures that affect these other outfalls must also be made before the next storm event if possible, or as soon as practicable following that storm event. Any corrective actions must be conducted within the timeframes discussed above.

4.4 Record of Past Spills or Leaks of Hazardous Pollutants

Table 4-1 is used to record significant spills and leaks that have occur or have occurred within three years prior to the preparation or amendment of this SWPPP. Significant spills and leaks include, but are not limited to, releases of oil or hazardous substances in excess of quantities that are reportable under CWA Section 311 (see 40 CFR 110.6 and 40 CFR 117.21) or Section 102 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 USC §9602.

At the time of this SWPPP update, there have been no past spill or leak incidents reported for the Golf Cart Barn.

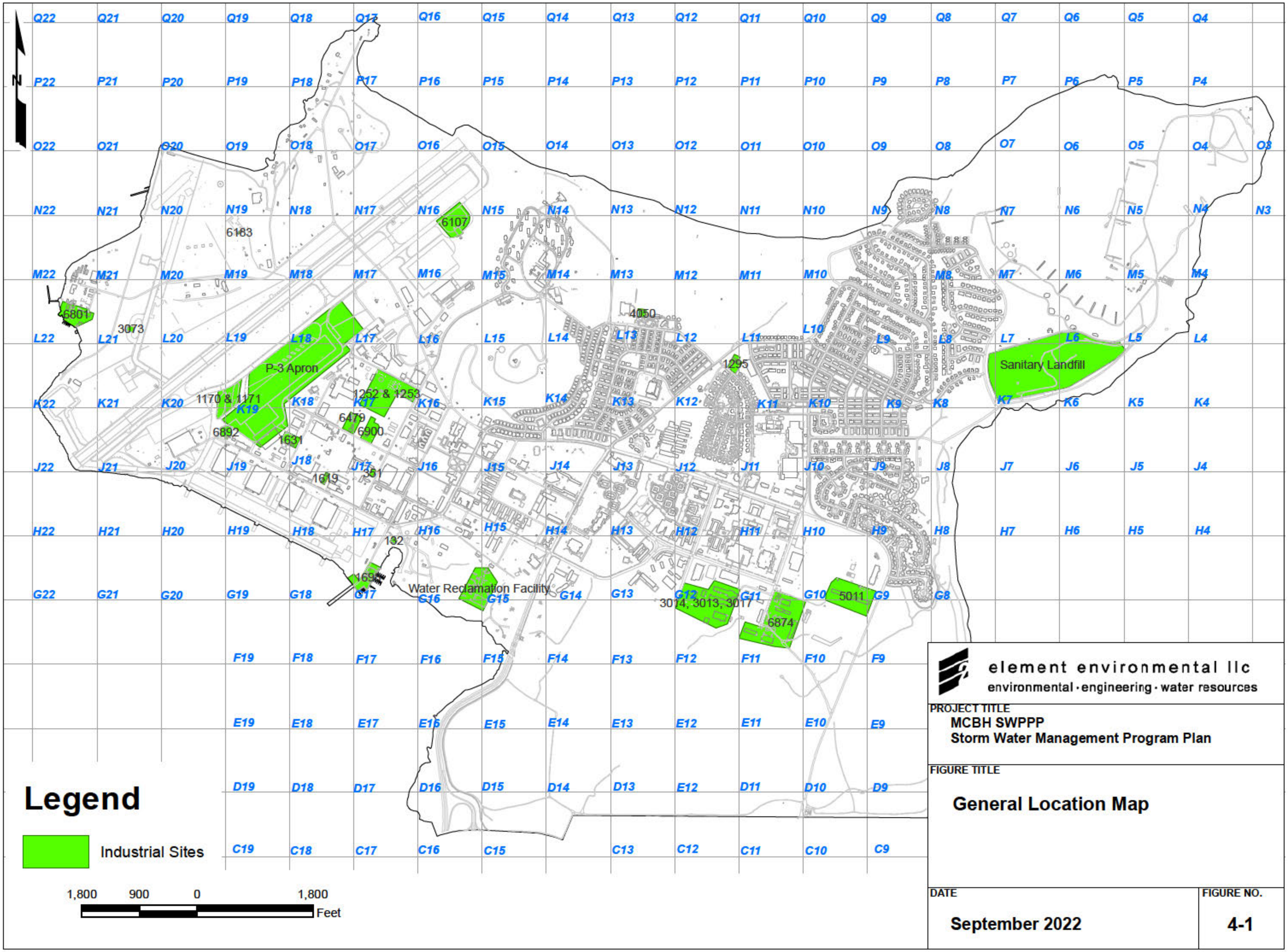
TABLE 4-1. PAST SPILLS OR LEAKS OF HAZARDOUS POLLUTANTS

Date of Incident	Brief Summary of Incident (POC Active at Time of Incident, Pollutant Type, Estimated Quantity, Location of Spill)

4.5 Record of Unauthorized Non-Storm Water Discharges

TABLE 4-2. UNAUTHORIZED NON-STORM WATER DISCHARGE EVALUATION

Date of Evaluation	Brief Summary of Evaluation (Description of the evaluation criteria, outfalls or onsite drainage points that were directly observed, action(s) taken, such as a list of control measures used to eliminate unauthorized discharge)

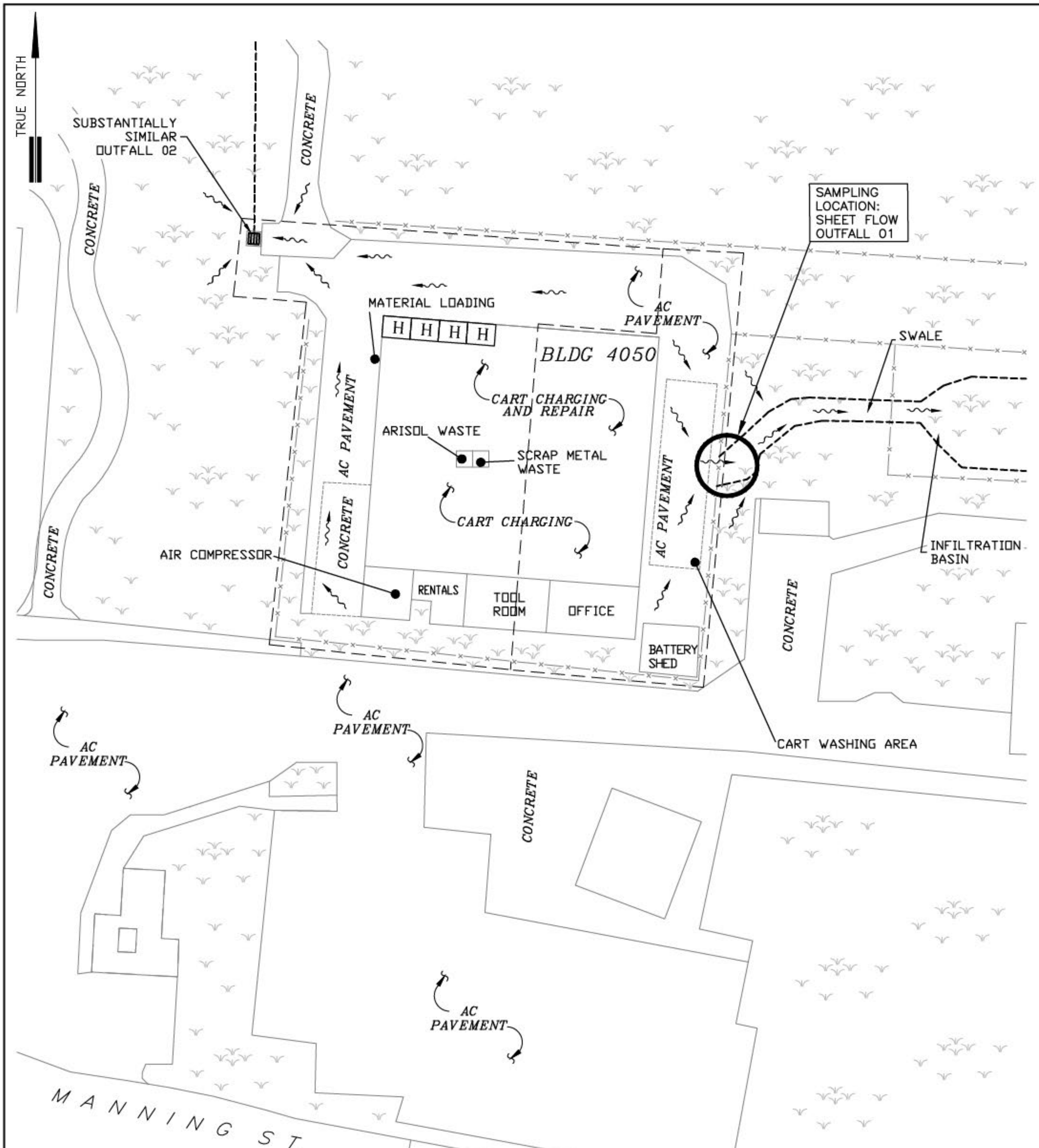


element environmental llc
environmental · engineering · water resources

PROJECT TITLE
MCBH SWPPP
Storm Water Management Program Plan

FIGURE TITLE
General Location Map

DATE	FIGURE NO.
September 2022	**4-1**



LEGEND

- H — HAZARDOUS MATERIALS LOCKER
- STORM DRAIN INLET
- STORM WATER CONVEYANCE
- FLOW ARROW
- DRAINAGE AREA BOUNDARY

NOTES:

1. STORM WATER, FROM APPROXIMATELY 0.4 ACRES ASSOCIATED WITH BUILDING 4050, DISCHARGES TO THE KIPPER GOLF COURSE PONDS VIA SURFACE RUNOFF AND THE MS4.
2. NOT TO SCALE

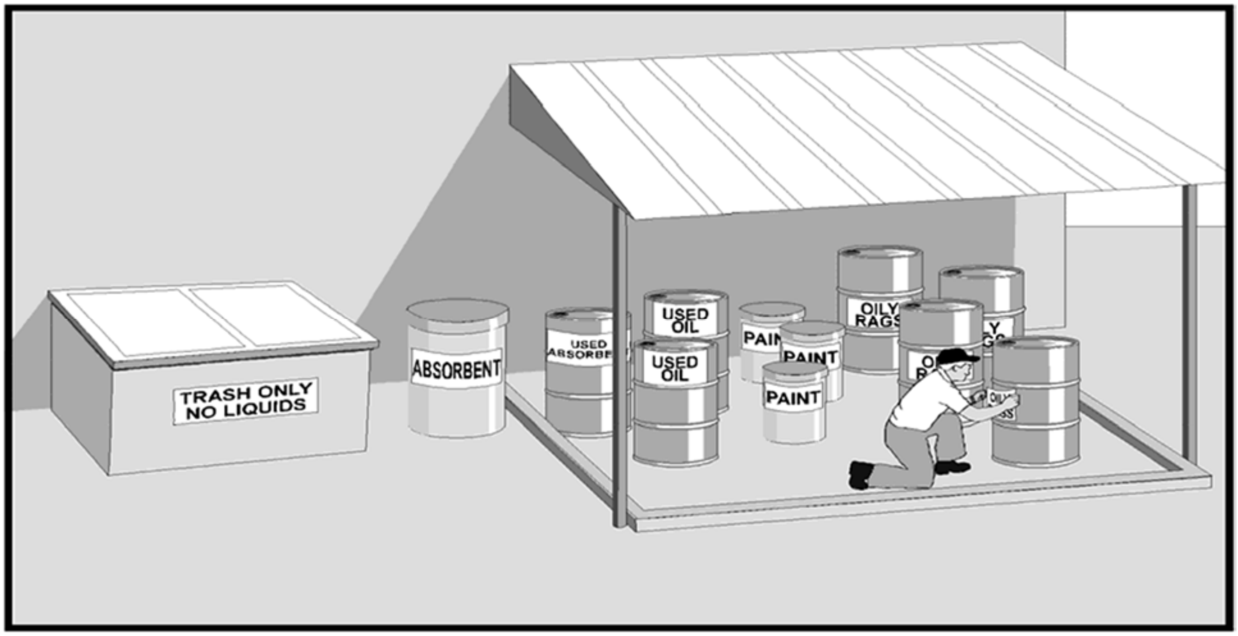
DATE:	PROJECT TITLE:	
JULY 2022	STORM WATER POLLUTION PREVENTION PLAN MCBH, KANEOHE BAY, OAHU, HAWAII	
FIGURE TITLE:		FIGURE NO.:
GOLF CART BARN (BUILDING 4050)		4-2

8/8/2022 11:41:23 AM
FIG 4-2 BLDG 4050 GOLF CART BARN.dwg

APPENDIX A

SELECTED BMP FACT SHEETS

BMP 001 - LABEL ALL DRUMS, CANS, CONTAINERS, AND TANKS



Description of Potential Pollutant and Source: Drums, cans, and containers can be improperly managed and disposed of due to uncertainty of the container's contents. Tanks which are not labeled may result in improper use of the tank or fuel, which may result in the exposure of significant materials to storm water and/or receiving waters. Similarly, unlabeled valves may be opened without proper precaution due to lack of user information. Storm water quality will be affected if significant materials are improperly disposed to the storm drain and/or receiving waters. Lack of labeling will also make it difficult to quickly identify the type of material released so facility personnel can respond correctly. Labels also identify hazardous materials at the facility and are a good way to request caution in certain areas (e.g., drums indicating flammability).

Description of BMP: Label all drums, valves, pumps, cans, tanks, and containers to reduce the chance of misuse and eventual spills. Labeling ensures that the appropriate procedures, equipment, and storage containers are used. All containers will be labeled as to what is in them.

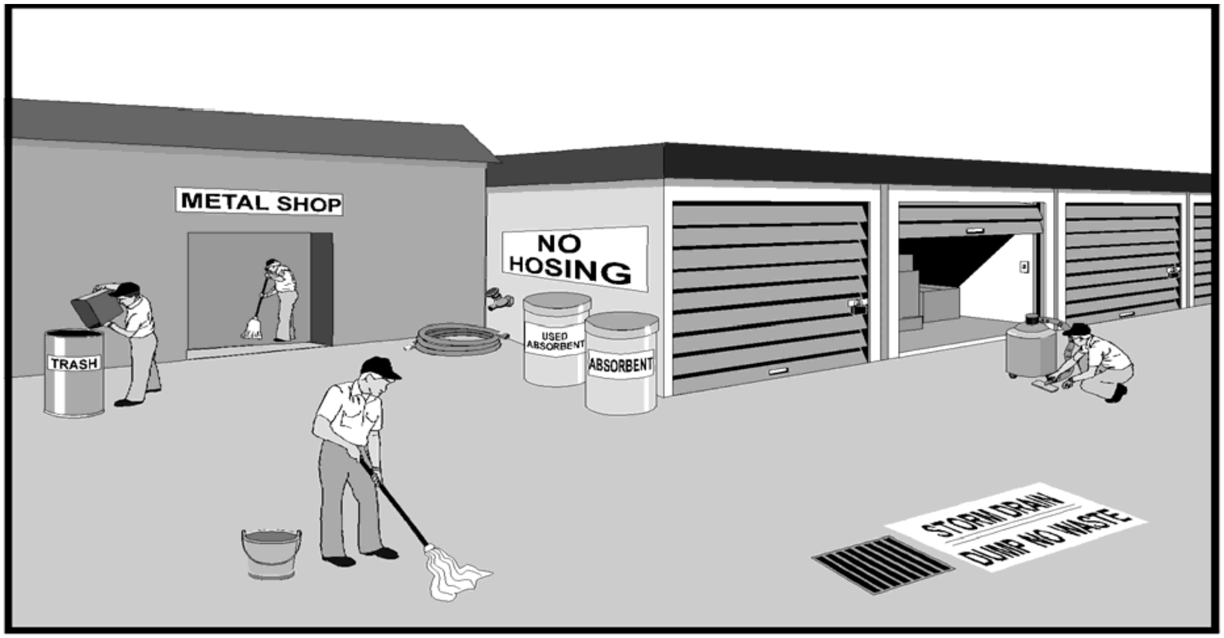
Application Guidance: As needed.

Training: N/A

Effectiveness and Cost: Effectiveness and costs will vary depending on the application.

Limitations: None

BMP 004 - AVOID HOSING DOWN THE SITE



Description of Potential Pollutant and Source: Cleaning work sites by hosing down causes wash water to transport pollutants to the storm drain where it can be exposed to storm water.

Description of BMP: Use dry methods to clean work sites. Dry methods include sweeping or using damp rags or mops. If possible or practical, hoses will be removed. If hosing down is unavoidable, the downstream drain will be temporarily plugged as described in the following BMPs:

- BMP 023 - Place portable Rubber Mats Over Storm Drain Inlets
- BMP 024 - Insert Filter in Catch Basin
- BMP 025 - Place Absorbent Blankets in Catch Basin

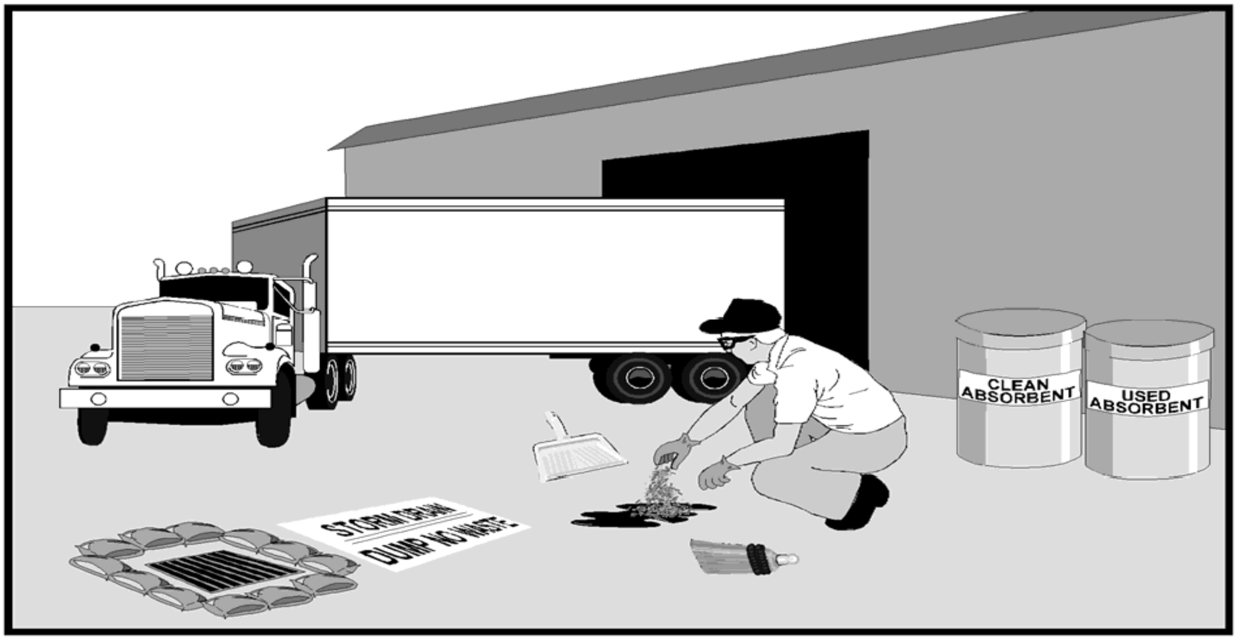
Application Guidance: Methods of dry cleaning will be used whenever possible at all workstations, loading/unloading sites, storage areas, and parking lots.

Training: New personnel will be notified of the policy and signs will be posted. If possible or practical, hoses will be removed.

Effectiveness and Cost: Eliminating hosing down is a highly effective, low-cost BMP.

Limitations: None

BMP 006 - CONTROL SPILLS



Description of Potential Pollutant and Source: Spills of significant materials may be exposed to storm water and transported to storm drains and/or receiving waters.

Description of BMP: Follow safety data sheets (SDS) for handling, storage, and cleanup of all significant materials to reduce the potential for spills.

Any spill, large or small, of significant materials will be controlled to prevent pollutants from being transported to storm drains and/or receiving waters. Appropriate spill control material will be kept on site. Smaller spills will be contained using absorbent material such as kitty litter, straw, or sawdust. Drums of absorbent material will be easily accessible and clearly marked, and containers for spent absorbent material will be readily available. Spent absorbent material will be managed appropriately and disposed of in accordance with applicable regulations. Larger spills will be controlled using spill kits, brooms, and other response equipment commensurate with the size of the spill. The methods outlined in the Activity's spill prevention and response plans (BMP 112) for hazardous materials will be followed for spills of any potential storm water pollutants. The date, time, nature and volume of material spilled, and cleanup measures taken will be recorded for all spills and kept as part of the SWPPP.

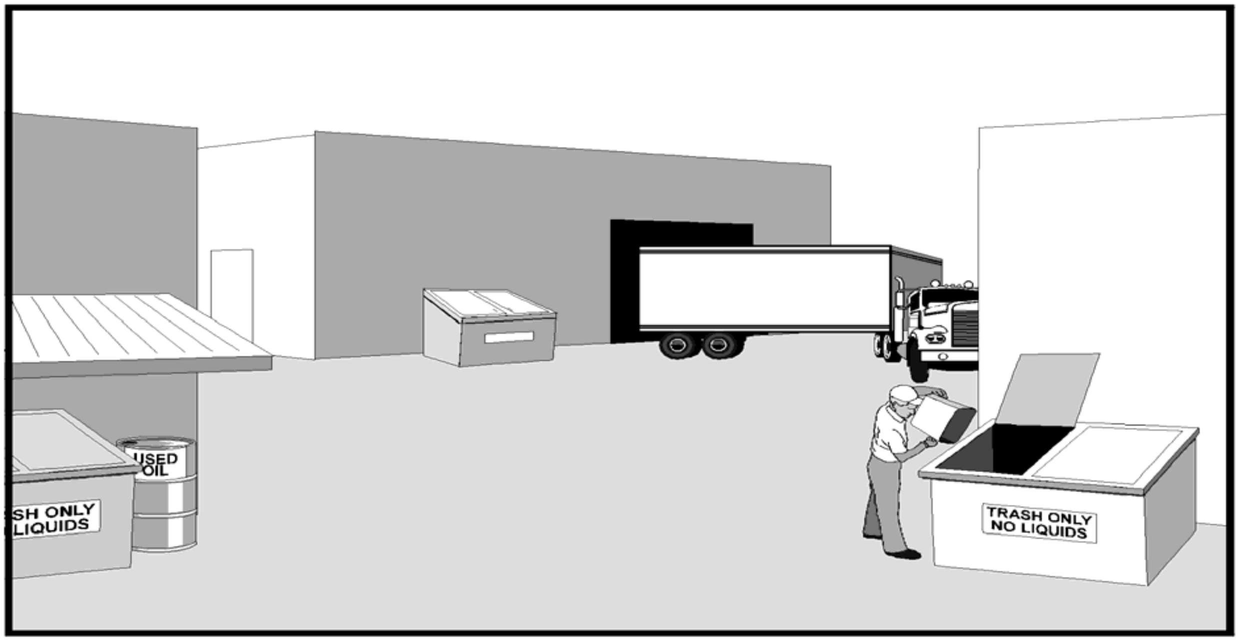
Application Guidance: Controlling spills will be practiced under all working conditions.

Training: Personnel will be trained in spill prevention and response procedures including the use of personal protection equipment (gloves, eye and face protection, etc.). This will include what absorbent or equipment to use, how to use the absorbent or equipment, where to find it, how to dispose of the spent absorbent or other material, and who to notify in the event of a spill.

Effectiveness and Cost: Spill control is a moderately effective, low-cost BMP.

Limitations: None

BMP 007 - PLACE TRASH RECEPTACLES AT APPROPRIATE LOCATIONS



Description of Potential Pollutant and Source: Improperly located or insufficient numbers of trash receptacles will promote poor housekeeping practices. This will increase the opportunity for pollutants from all source areas to reach storm water.

Description of BMP: Properly located and sufficient numbers of trash receptacles will promote the proper disposal of waste materials. This reduces the opportunity for pollutants to reach storm water. Trash receptacles will be easily accessible for personnel.

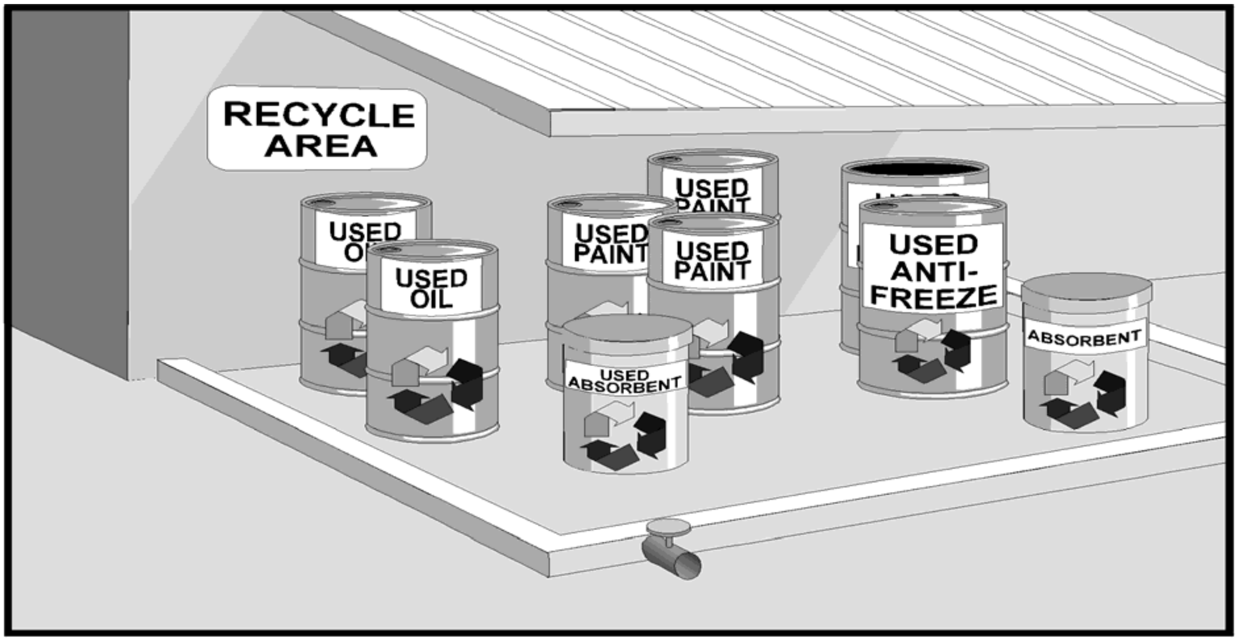
Application Guidelines: Placement of trash receptacles at appropriate locations will always be practiced.

Training: Personnel will be trained as to the location of trash receptacles.

Effectiveness and Cost: Appropriately located trash receptacles are an effective, low-cost BMP.

Limitations: None

BMP 015 – RECYCLE



Description of Potential Pollutant and Source: Many materials, both hazardous and non-hazardous, can be sources of pollutants. Recycling will be employed to reduce the amount of waste material exposed to storm water on the Activity.

Description of BMP: Recycle materials to the fullest extent possible in all situations.

Application Guidance: Recycling collections will be conducted at least weekly for recyclable items such as solvents, oil, scrap metals, wash water and absorbent materials. Separating the recyclable items facilitates recycling.

The frequency for implementing this BMP has been provided as general guidance. However, a facility operator may wish to establish a more suitable frequency. This will require SWPPP implementors to make judgements based on facility operations and conditions. To assign a frequency other than what has been suggested (i.e., more or less frequent), the following criteria will be considered and rated either High, Medium, or Low. If many of the criteria are assigned a High rating, the frequency may be increased. Similarly, if many criteria are assigned a Low rating, the frequency may be decreased. The goal of implementing this BMP is to minimize exposure of pollutants to storm water.

CRITERIA	Rating H=High M=Medium L=Low
Probability of exposure of significant materials to storm water	
Quantity of significant materials potentially exposed	
Toxicity of significant materials potentially exposed	
Frequency of use of significant materials potentially exposed	
Evidence of exposure (e.g., stains on pavement, etching of concrete	
Proximity of source area to outfall or receiving water	
Sensitivity of receiving water to potentially exposed significant materials (e.g., waters with beneficial uses such as human contact, recreation, significant species habitat, etc.)	

Training: Personnel will be trained on proper recycling techniques along with posting and maintenance of signs.

Effectiveness and Cost: Effectiveness and cost will be site specific.

Limitations: Local vendors may not be available to receive certain recyclable materials.

BMP 033 - CHECK VEHICLES AND EQUIPMENT FOR LEAKS

Description of Potential Pollutant and Source: Vehicles, aircraft, or equipment entering or stored at a maintenance facility may be leaking a variety of fluids (fuel, oil, antifreeze, freon, etc.). These materials can be exposed to storm water.

Description of BMP: Inspect all vehicles and equipment at the site, whether incoming, parked, stored, or salvaged, for oil and fluid leaks. Drivers of fleet vehicles, such as delivery trucks, will also check under their vehicles each morning for fluid leaks. If leaks are present, drip pans will be placed under the vehicle or equipment. Once the vehicle is removed from the site, the former parking area will be inspected for stains, and these stains will be cleaned using rags or dry solvents.

Application Guidance: Any vehicle or equipment coming in for repairs, painting, or storage will be inspected for leaks. Fleet vehicles will be inspected each morning. Vehicles that are parked, stored, or salvaged will be provided with drip pans, as will tanker rail cars waiting to be unloaded. The frequency for implementing this BMP has been provided as general guidance. However, a facility operator may wish to establish a more suitable frequency. This will require SWPPP implementors to make judgements based on facility operations and conditions. To assign a frequency other than what has been suggested (i.e., more or less frequent), the following criteria will be considered and rated either High, Medium, or Low. If many of the criteria are assigned a High rating, the frequency may be increased. Similarly, if many criteria are assigned a Low rating, the frequency may be decreased. The goal of implementing this BMP is to minimize exposure of pollutants to storm water.

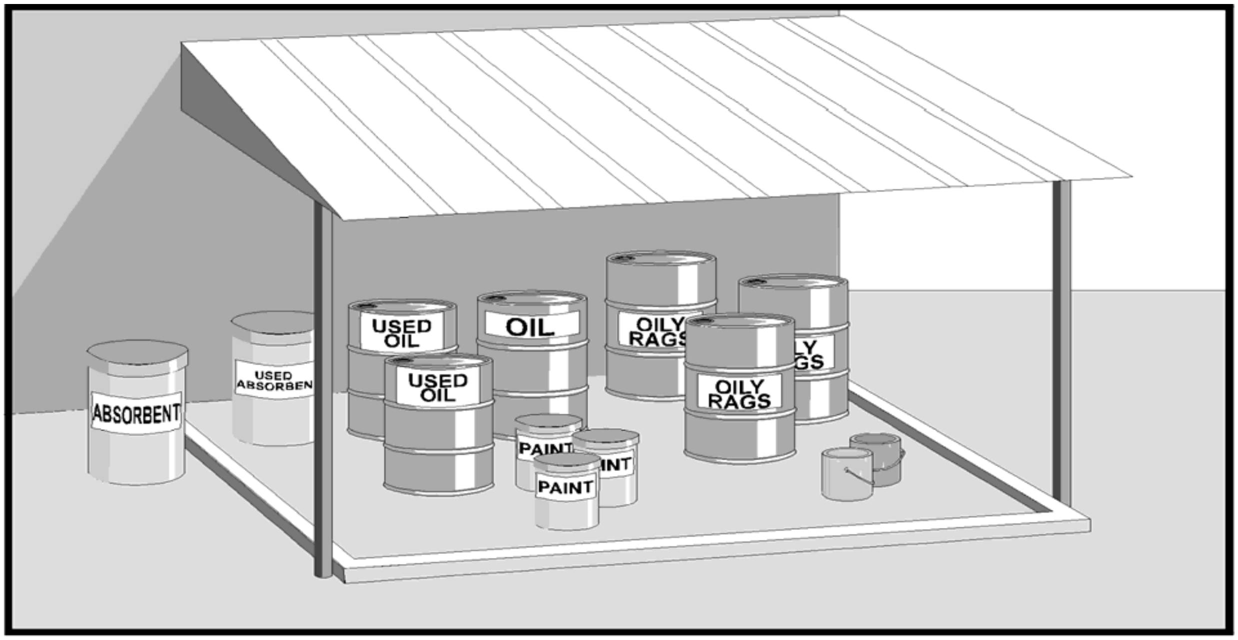
CRITERIA	Rating H=High M=Medium L=Low
Probability of exposure of significant materials to storm water	
Old age or poor condition of equipment and vehicles	
Evidence of exposure (e.g., stains on pavement)	
Proximity of source area to outfall or receiving water	
Sensitivity of receiving water to potentially exposed significant materials (e.g., waters with beneficial uses such as human contact, recreation, significant species habitat, etc.)	

Training: Signs will be posted to remind personnel of proper procedures.

Effectiveness and Cost: Checking for leaks is a moderately effective, low-cost BMP.

Limitations: None

BMP 061B - STORE LIQUIDS AND SIGNIFICANT MATERIALS WITHIN A BUILDING OR COVERED AREA



Description of Potential Pollutant and Source: Many significant materials may be leaked or spilled during storage, handling, or transport. If significant materials are stored outside, in covered areas, these materials can be exposed to storm water, which can transport the leaked or spilled material into the storm drain system.

Description of BMP: To the extent practical, store significant materials within a building or covered area. The materials will be stored on an impervious surface, such as a concrete pad. Rainfall runoff from the pad will be directed to a storm water treatment facility or contained. Leaks and spills will be cleaned up as soon as possible using rags or dry absorbents (see BMP 006). Used rags and absorbents will be disposed of properly. Any wash water from cleaning the floor will be disposed of in the sanitary sewer (see BMP 042).

Application Guidance: All significant materials will be stored within a building or covered area.

Training: Personnel will be trained to store significant materials in designated areas.

Effectiveness and Cost: This is a moderately effective BMP. The cost will vary based on whether a building for storing the substances is available.

Limitations: None

BMP 066 - ELIMINATE TOPPING OFF TANKS

Description of Potential Pollutant and Source: Trying to completely fill tanks after the pumps automatically shut off, or "topping off," often results in fuel spills and exposure of significant materials to storm water.

Description of BMP: Eliminate "topping off" fuel tanks. A policy will be developed to discourage "topping off" tanks. The policy will include incentives, posting signs stating the policy, or penalties.

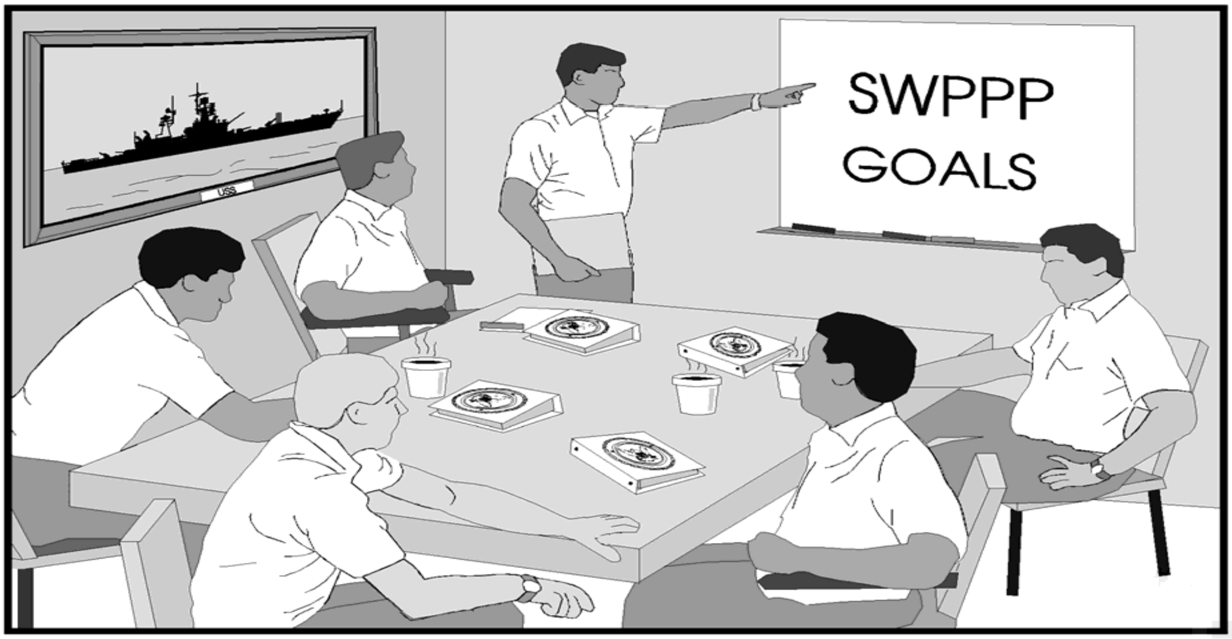
Application Guidance: This BMP will be applied to all fuel or liquid handling operations.

Training: New personnel will be informed of policy and signs should be posted as a reminder.

Effectiveness and Cost: Eliminating "topping off" is a highly effective, low-cost BMP.

Limitations: None

BMP 113 - CONDUCT PERSONNEL TRAINING REGARDING THE SWPPP



Description of Potential Pollutant and Source: When properly trained, personnel are more capable of preventing spills, responding safely and effectively to an accident when it occurs, and recognizing situations that could lead to storm water contamination.

Description of BMP: Train personnel at all levels of responsibility in the components and goals of the SWPPP.

Application Guidance: Training will be conducted quarterly and at new personnel orientations.

Training: Training will address each component of the SWPPP, including how and why tasks are to be implemented. Topics will include:

- Good housekeeping
- Material management practices
- Spill prevention and response

Effectiveness and Cost: This is a highly effective, moderate-cost BMP.

Limitations: None

BMP #143 - STRAW BALES/BIOFILTER BAGS

Description: Temporary sediment barriers, consisting of a row of entrenched or anchored straw bales and/or biofilter bags, reduce the transport of sediment from a construction site by providing a temporary physical barrier to sediment and reducing runoff velocities. The barriers can be placed in various combinations to construct the required structure, as shown on the attached figures. They may also be used as a barrier to divert or direct small amounts of runoff around active work areas or to a slope drain, sediment trap or other filtration/sedimentation BMP. Both biofilter bags (plastic mesh bags filled with wood chips) and straw bales are temporary measures. They have a limited life span and must be regularly inspected and replaced when damaged.

Targeted Pollutants

- ● Sediment
- ○ Phosphorus
- ○ Trace metals
- ○ Bacteria
- ○ Petroleum hydrocarbons

Physical Limits

Drainage area	1 ac/400ft bales
Max slope	2% for bales; 10% for biobags
Min bedrock depth	2 ft
Min water table	2 ft
SCS soil type	ABCD
Freeze/Thaw	fair
Drainage/Flood control	no

Applications: The barriers are effective at storm drain inlets, across minor swales and ditches, as diversion dikes and berms, along property lines, and for other applications where the need for a barrier is temporary and structural strength is not required. For instance:

- At the toe of embankment slopes
- At the outlet of slope drains
- As filter cores for log check dams
- In front of silt fences
- To protect inlets along paved streets

Limitations: These types of barriers are only suitable where flow rates are low (475 gal/min (30 liters per second) or less). They require regular inspections and repair, and periodic replacement (about 3 months maximum usefulness).

Do not use straw bale barriers for drainage areas greater than 1 acre (0.5 hectare). Straw bale barriers often prove ineffective at erosion control if poorly installed and maintained. Even when properly installed, temporary barriers are not usually as effective as silt fences (see BMP #144) or gravel berms see BMP# 151). Straw bales used in conjunction with either of these controls may improve effectiveness and durability. Certified weed-free straw bales must be used instead of hay bales.

Design Parameters

Constructed Slope	Percent Slope	Slope Length Feet
2:1	50	25
2.5:1	40	50
3:1	33	75
3.5:1	30	100
4:1	25	125

Where slope gradient changes through the drainage area, steepness refers to the steepest slope section contributing to the straw bale dike.

The practice may also be used for a single-family lot if the slope is less than 15 percent. The contributing drainage area in this instance shall be less than one acre and the length of slope above the dike shall be less than 200 feet.

Concentrated flows: No greater than 475 gal/min (30 liters) per second. Useful life: 3 months maximum, depending on site conditions.

Buffer zone: An undisturbed buffer zone of 3 to 6.5 ft (1-2 meters) is necessary between the barriers and surface waters to allow safe removal of the barrier and of accumulated sediments.

Embedding: The barrier must be embedded to a minimum depth of 6 in (150 mm) and backfilled for the entire length of the barrier. Each bale or bag should be securely anchored with two stakes 2 in X 2 in X 3 ft (50 mm x 50 mm x 1 meter) or steel drift pins driven at least 20 in (500 mm) into the ground.

Construction Guidelines

Barriers used for sediment control at the toe of slopes must be in place prior to disturbing the slope. Install the bales a short distance away from the toe of the slope to increase the effective area but outside of any ditch channel.

Place the barriers in a single row lengthwise on the contour for sheet flow applications, or perpendicular to the contour in concentrated flow applications. When flows are expected to be high enough to surpass the infiltration capacity of the devices, the center (low point) bales shall be wrapped in filter fabric with a 3 ft (1 meter) tail stapled securely and extending from the down gradient side of the barrier to prevent scouring. The ends of the adjacent barriers must tightly abut one another.

Any gaps between barriers should be filled with tightly wedged straw. For concentrated flow applications, extend the end of the barrier so that the bottoms of the end units are at a higher elevation than the top of the lowest middle unit to assure that sediment laden water flows through or over the barrier instead of around the ends.

Maintenance: Perform one inspection during the first runoff producing event after the installation of the barriers to assure proper functioning. No more than one foot depth of sediment should be allowed to accumulate behind either bales or biofilter bags. Damaged barriers, undercutting, or end runs must be repaired immediately. Bales should be replaced as needed due to disintegration or rotting.

If approved, straw bales or biofilter bags may be used after project completion as mulch. Temporary sediment barriers should be removed within 30 days of final stabilization of the site. If rebar is used it must be removed.

APPENDIX B

ROUTINE FACILITY INSPECTION CHECKLIST

Routine Facility Inspection Checklist

Activity Name: ______________________ **Date of Inspection:** ______________________

Inspector(s): ______________________ **Facility Name/Number:** ______________________

Column 1	Column 2	Column 3	Column 4	Column 5	
Source Area	BMP Number and Title	Status: F, P, N, NA[1]	Briefly Describe Effectiveness (Good or Other [describe])	Corrective Measures	
				What	By When

Note 1: F – Fully implemented, P – Partially implemented, N – Not implemented , NA – Not Applicable

APPENDIX C

QUARTERLY VISUAL ASSESSMENT CHECKLIST

Quarterly Visual Assessment Checklist

Facility ID and Location: ______________________

Date: ____________________

Sampler Name (Printed): ______________________________________

Signature: ______________________________________

Time of Rainfall Begin: _________________

Time of Rainfall End: ____________________

Time of Flow Begin: _________________

Time of Flow End: ____________________

Rainfall event more than 72 hours since last event?
Yes / No

Rainfall Event Total: ____________________

Sample: sample in a clean, colorless glass or plastic container, and examined in a well-lit area

On samples collected within the first 30 minutes of an actual discharge from a storm event

Sample Characteristics:

Color: ____________________ Floating Solids: ____________________

Odor: ____________________ Settled Solids: ____________________

Clarity: ____________________ Suspended Solids: ____________________

Oil Sheen: ____________________ Foam: ____________________

Other Obvious Indicators of Storm Water Pollution

(describe): ____

Nature of the discharge (i.e., runoff):

Results of observations of the storm water discharge:

Probable sources of any observed storm water contamination:

If applicable, why it was not possible to take samples within the first 30 minutes:

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

APPENDIX D

CORRECTIVE ACTION LOG

Corrective Action Log

Use this form to document SWPPP corrective actions. This form is to be completed by the Environmental Compliance Coordinator (ECC) or a person designated by ECC and submitted to the MCBH Storm Water Program Manager. The Storm Water Program Manager is responsible for any notification to the State of Hawaii Department of Health (DOH), if required.

A corrective action is defined as an action taken to:

a) **Repair, modify, or replace any storm water control used at the site;**
b) **Clean up and properly dispose of spills, releases, or other deposits; or**
c) **Remedy a permit violation.**

1. Corrective Action Triggers

The following events trigger a corrective action to be taken (this triggering condition is to be documented *within 24 hours* of discovering the occurrence):

a) A required storm water control was never installed, was installed incorrectly, or is not in accordance with the requirements in the SWMP Plan.
b) A member of the **Storm Water Pollution Control Team** becomes aware that the storm water controls installed and being maintained are not effective enough for the discharge to meet applicable water quality standards or applicable requirements in the MCBH SWMP Plan. The facility ECC shall notify the Storm Water Program Manager immediately. The Storm Water Program Manager will notify DOH *by the end of the next work day*.

1.1 Log Notifications:

Date/time Storm Water Program Manager notified by ECC: ________________________

Date/time DOH notified by Storm Water Program Manager: ________________________

1.2 Describe Discharge:

Indicate which one of the following prohibited discharges is occurring or has occurred:

- ❒ Wastewater from washout of concrete
- ❒ Wastewater from washout and cleanout of stucco, paint, form release oils, curing compounds, or other construction materials
- ❒ Fuels, oils, or other pollutants used in vehicle and equipment operation and maintenance
- ❒ Soaps, solvents, or detergents used in vehicle and equipment washing
- ❒ Toxic or hazardous substances from a spill or other release
- ❒ Other, Explain: ____

2. Requirements for Taking Corrective Actions

The ECC shall complete corrective actions in accordance with the deadlines specified below. In all circumstances, site personnel shall *immediately* take all reasonable steps to minimize or prevent the discharge of pollutants until a permanent solution is installed and made operational, including cleaning up any contaminated surfaces so that the material will not discharge in subsequent storm events. *Immediately* means the same day the condition is discovered, unless it is too late in the day, in which initiation of corrective action must begin on the following work day.

Following any of the above triggering events, the ECC shall install a new or modified control and make it operational, or complete the repair, by *no later than 7 calendar days from the time of discovery*. If it is not feasible to complete the installation or repair within 7 calendar days, the ECC shall document and submit to the Storm Water Program Manager, for their agreement, why it is not feasible to complete the installation or repair within the 7-calendar day timeframe and document a schedule for installing the storm water control and making it operational as soon as practicable after the 7-day timeframe.

If the issue is not adequately addressed within 7 calendar days or the agreed upon timeframe, enforcement procedures will be initiated. Unaddressed issues will be escalated through the chain of command. The MCBH Environmental Compliance and Protection Division Director will give the responsible party a formal notice with an appropriate deadline for action. If the problem remains unchanged, the situation will be brought to the attention of the next higher authority. The ultimate penalty for non-compliance of MS4 Permit regulations is eviction or discharge of the responsible party from MCBH. This is placed at the discretion of the Base Commander. See the Enforcement Response Plan in Appendix 3-6 of the SWMP Plan for further information on MCBH's enforcement policies.

3. Corrective Action Report

Within 24 hours of discovering the occurrence of one of the triggering conditions in SWPPP Section 4.1 at the site, the ECC must complete the following:

3.1 Describe the triggering condition:

____
____
____
____

3.2 Record the date/time of the condition identified. How was the condition identified?

____
____
____
____

3.3 Describe the corrective action taken:

____
____
____

Date/time installation or repair was completed:
(or date/time the prohibited discharge ceased) ______________________________________

Or describe why it is not feasible to complete installation or repair within 7 calendar days and detail a proposed schedule (if applicable)

____
____
____

4. Resolution of the Corrective Action Trigger

Within 7 calendar days of initiating the Corrective Action Report, the ECC must complete a report of the following:

4.1 Follow-up Actions

Describe any follow-up actions taken to review the design, installation, and maintenance of storm water controls, including the dates such actions occurred:

____
____
____

4.2 Storm Water Control Modifications

Provide a summary of storm water control modifications implemented. Include a schedule of activities required to implement changes and the date the modifications were completed or will be completed:

____
____
____

5. SWPPP Modification Due to Corrective Actions

Where corrective actions result in changes to any of the storm water controls or procedures documented in the SWPPP, modify the SWPPP accordingly *within 7 calendar days* of completing corrective action work.

Are modifications to the SWPPP necessary? ❑ Yes ❑ No

Date modifications to the SWPPP shall be completed _______________

6. Corrective Actions Required by DOH

The facility shall comply with any corrective actions required by DOH as a result of permit violations found during an inspection by DOH or the Environmental Protection Agency (EPA).

Was the Corrective Action triggered by a DOH/EPA inspection?

❑ Yes ❑ No

❑ Date of DOH/EPA Inspection __________________

7. Additional Comments:

____
____

Final

STORM WATER POLLUTION PREVENTION PLAN

Storm Water Management Program Plan

Marine Corps Base Hawaii, Oahu, Hawaii

NPDES Permit No. HI S000007

GOLF COURSE MAINTENANCE SHOP (BUILDING 1295)

Prepared by:

Marine Corps Base Hawaii

August 2022

Table of Contents

Tables

Figures

Appendices

List of Acronyms and Abbreviations

AST	Aboveground Storage Tank
BMP	Best Management Practice
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CWA	Clean Water Act
CWB	Clean Water Branch
DOH	State of Hawaii Department of Health
ECC	Environmental Compliance Coordinator
ECE	Environmental Compliance Evaluation
ECPD	Environmental Compliance and Protection Division
EPA	United States Environmental Protection Agency
HAZMAT	Hazardous Material
HAZMIN	Hazardous Material Minimization
MCBH	Marine Corps Base Hawaii
MS4	Municipal Separate Storm Sewer System
MS4 Permit	Marine Corps Base Hawaii's NPDES Permit No. HI S000007
NPDES	National Pollutant Discharge Elimination System
POC	Point of Contact
SAS	Satellite Accumulation Site
SWMP	Storm Water Management Program
SWPPP	Storm Water Pollution Prevention Plan

Certification Statement

MCBH is committed to the prevention of discharges of polluted stormwater to navigable waters or the environment and maintains the highest standards for best management practices through periodic review, updating, and implementation of this Stormwater Pollution Prevention Plan (SWPPP).

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information contained therein. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Name: ________________________ Title: ________________________

Signature: ________________________ Date: ________________________

Management Review

Refer to Section 1.2 for more information on required SWPPP updates.

Review Dates	Signature	Amendment Required? (Y/N)
____________	__________________	__________
____________	__________________	_________
____________	__________________	_________
____________	__________________	_________
____________	__________________	_________
____________	__________________	_________

1 Introduction

As part of Federal regulations administered through the Clean Water Act (CWA), the State of Hawaii, Department of Health (DOH) has issued the National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4) Permit No. HI S000007 (referred to herein at the "MS4 Permit") to Marine Corps Base Hawaii (MCBH). The MS4 Permit requires that MCBH provide all existing industrial facilities, identified in MCBH's MS4 Permit application, and any newly identified industrial facilities, submitted to DOH using the "MS4 NPDES Individual Permit – Industrial Storm Water Discharge Notification Form," with a Storm Water Pollution Prevention Plan (SWPPP) for storm water associated with industrial activities.

The purpose of the regulations is to protect water quality by reducing the amount of pollutants in storm water runoff caused by industrial activities.

1.1 SWPPP Implementation

The storm water management controls of this plan will become MCBH procedure for the applicable industrial facility. An up-to-date copy of the SWPPP shall be maintained on site and at the MCBH Environmental Compliance and Protection Division (ECPD). Management staff, maintenance personnel, contractor staff, and other personnel involved in onsite industrial activities, will be knowledgeable of the plan and follow the guidelines set forth in it, in addition to any other pertinent base-wide, state and federal regulations.

Day-to-day implementation of the SWPPP is primarily the responsibility of the current facility Environmental Compliance Coordinator (ECC) or Point of Contact (POC) as identified in Table 2-1. Enforcement of the permit conditions and this SWPPP are ultimately the responsibility of ECPD and additional escalating levels of authority as specified in the Enforcement Response Plan developed by MCBH for its base-wide Storm Water Management Program (SWMP) Plan.

1.2 Updating the SWPPP

This SWPPP will be reviewed as needed to identify necessary changes, at a minimum of every five years. Updates may be required due to current best management practice (BMP) failures, spill events, changes in industrial activities, changes in features, corrective actions, or other necessary changes. Personnel changes to the Storm Water Pollution Control Team (Section 2.1) should be logged in Table 2-1. Storm Water Pollution Control Team Log. ECPD will be responsible for approving revisions to the SWPPP. In the event the plan is modified, a copy of the updated SWPPP will remain at ECPD and will be provided to the applicable facility. Additionally, ECPD shall document and report the SWPPP changes to the DOH, Clean Water Branch (CWB), within thirty days of when the changes arise.

2 Golf Course Maintenance Shop, Building 1295

The Golf Course Maintenance Shop, Building 1295, is located within MCBH, Kaneohe Bay at the southeast corner of the intersection of Lawrence Road and Cushman Avenue. The facility also includes a pesticide and chemical storage area, Building 4004. The Golf Course Maintenance Shop encompasses approximately 0.9 acres and can be found in grid [redacted] of the MCBH Base Map, see Figure 4-1. The facility-specific map is shown on Figure 4-2. The Golf Course Maintenance Shop complex is paved and bounded by a chain-linked fence.

2.1 Storm Water Pollution Control Team

The Storm Water Pollution Control Team consists of the Storm Water Program Manager, ECC, and the Hazardous Material (HAZMAT) and Hazardous Material Minimization (HAZMIN) team. The Storm Water Program Manager is responsible for the enforcement of the MS4 permit at all industrial sites and provides annual training to the ECC and other personnel. The ECC is the primary unit POC for storm water related items and the day-to-day environmental matters at a specific facility. ECC's are responsible for SWPPP implementation including BMP and facility inspections, storm water assessments/sampling, BMP maintenance, and corrective actions. The HAZMAT and HAZMIN team shall be contacted if assistance is needed. The role, name, phone number, and start date of individuals on the Storm Water Pollution Control Team is recorded in Table 2-1 below. In the event of personnel turnover, Table 2-1 shall be updated accordingly.

TABLE 2-1. STORM WATER POLLUTION CONTROL TEAM LOG

Role	Name	Phone	Start Date
MCBH Storm Water Program Manager	CIV Whitney Anderson	Office: 808-257-4359	6/6/22
ECC	CIV Ryan Wood	Office: 808-254-2629 Cell: 808-478-7395	
HAZMAT/HAZMIN	CIV Tim Cawthon	HAZMAT Center Building 6409 Office: 808-257-9913 HAZMIN Center Building 6407 Office: 808-257-0770	N/A

2.2 Golf Course Maintenance Shop, Building 1295 Facility Activities

The Golf Course Maintenance Shop, Building 1295, is responsible for the maintenance and storage of landscaping equipment used for the Kaneohe Klipper Golf Course at MCBH. The southern end of the Building 1295 houses a small manager's office next to a small maintenance bay with tools, parts, and flammable lockers. Adjacent to this small bay is a large tent along the exterior of the southeast wall. Maintenance activities are performed under this tent and large containment clamshells store used oil and lubricants. Next to the tent is an exposed miscellaneous storage area for tires, pipes, and a general waste dumpster. One propane-powered forklift is used onsite and stored under cover.

The majority of Building 1295 is an open storage barn for lawn mowers, pumps, fuel storage (in flammable lockers), and other tools in addition to a breakroom. There is a battery charging area and used batteries are stored over a containment pallet. In this battery area, a hand sink drains through the western wall to the grass outside next to the storm water swale. It is recommended that this sink be removed or connected to the sanitary sewer.

The bay doors of Building 1295 are partially contained by old 2" concrete berms that need repair. Water from significant rain events tends to run into the building causing flooding. There are no active drains indoors in Building 1295 to remove the storm water. There is a concrete pad to the north of building 1295 where old/damaged equipment is stored. Stormwater falling on this area discharges under the fence on the east side of this concrete pad towards the stormwater swale in the grass below.

Building 4004 is chemical storage facility located to the east of Building 1295. Fertilizers and pesticides are stored in a gated and covered room with concrete berms to contain any spills. There are no active drains in this building. Building 4004 also contains a small office, laundry room, bathroom, and storage bay.

Behind Building 4004 to the north, a fuel aboveground storage tank (AST) is located within a concrete containment pad. The single AST holds [redacted] gallons of gasoline and [redacted] gallons of diesel. Fueling is done on the pad and in all facility locations using small 5-gallon fuel cans. The concrete berm is not currently functional as there is an open hole with an old pipe that drains the area to the ground at its western end.

An asphalt pavement and large gravel parking area are located to the east of both buildings. This area is used for large equipment and personal vehicle parking.

There are no storm drain inlets within or near the boundary of the facility. Storm water that falls on the majority of the Golf Course Maintenance Stop site generally flows southwests and exits along the asphalt drive through the main gate of the facility to Cushman Ave (substantially similar Outfall 01). Storm water flowing from the northern part of the site discharges under the fence (substantially similar Outfall 02) toward a vegetated swale that ultimately discharges to Halekou Pond. See Figure 4-2 for the location of the designated storm water sampling point near the main gate and other site features.

2.3 Sources of Pollutants

The following is an inventory of potential pollutants associated with Golf Course Maintenance Shop, Building 1295:

A. Material Loading and Unloading Areas

Materials that are spilled, leaked, or lost during loading or unloading may collect on vegetated or paved surfaces and be carried away by storm runoff. Materials are loaded and unloaded at the bay doors of Building 1295 and the front of Building 4004. The AST is also serviced within the containment pad.

B. On-Site Material Storage and Disposal Practices

Leaks, drips, or spills of materials that are stored or disposed of in areas exposed to rainfall can be carried away by storm water. Significant materials are stored in Building 1295 in flammable materials storage lockers, secondary containment, and on shelves within a constructed berm at Building 4004. The AST stores fuel within a containment pad.

C. Outdoor Activities

Many outdoor activities at MCBH, Kaneohe Bay use materials or create wastes that have the potential to pollute storm water runoff. Outdoor activities at the Golf Course Maintenance Shop include loading and unloading materials, vehicle and equipment parking, and salvage/storage scrap, equipment maintenance (under tent), and fueling.

D. Significant Materials Inventory

The following is a list of significant materials found at the Golf Course Maintenance Shop:

- Gasoline
- Diesel
- Lube Oil
- Grease
- Paints
- Hydraulic Oil
- Transmission Oil
- Battery Acid
- Solvents
- Adhesive
- Sealant
- Metals (scrap)
- Pesticides
- Fertilizers

2.4 Potential Storm Water Pollutants

The following pollutants have been identified as having a reasonable potential to be present in storm water discharges from Golf Course Maintenance Shop, Building 1295 if not properly managed:

- Gasoline
- Diesel
- Metals (scrap)
- Pesticides
- Fertilizers

Materials that have *__not__* been included as a potential storm water pollutant but have been included as part of the significant materials inventory list, are considered to present a negligible risk to storm water quality. This is based on the nature/location of the primary activities performed with these materials and the BMPs that are in place. Material transport (loading/unloading) is not considered to be a significant threat to storm water, due to spill response procedures, training, and spill kit materials available onsite.

2.5 Best Management Practices (BMPs)

Best Management Practices (BMPs) are techniques or methods that aim to manage the quantity and improve the quality of storm water runoff from a facility or other site. Storm water BMPs intend to reduce or eliminate pollution and contaminants collected by runoff before the runoff reaches the MCBH storm water system or sensitive ecosystems such as streams, wetlands, and marine environments. The following is a summary of BMPs currently in place at the Golf Course Maintenance Shop, Building 1295.

A. Good Housekeeping Practices

In general, Golf Course Maintenance Shop, Building 1295 employs good housekeeping practices throughout its operations. Good housekeeping practices for Golf Course Maintenance Shop, Building 1295 are included in Table 2-2. Filled drums of crushed oil filters, batteries, and waste oil are turned into HAZMIN Facility. Salvaged equipment are drained of all fluids prior to storage.

B. Preventative Maintenance

Preventive maintenance is important as water pollution control measures may be of little or no use if devices and equipment have not been properly maintained. Facility personnel conduct inspection of facility equipment and storage systems on a regular basis. The preventive maintenance program involves inspections of equipment and storage systems that are exposed to storm water. Inspections of the satellite accumulation site (SAS) are conducted on a monthly basis by HAZMIN, with monthly inspection reports submitted to ECPD. Maintenance work is performed under cover, and no maintenance work is performed outdoors.

C. Visual Inspections

Visual inspection provides a valuable subjective assessment of the status of storm water management systems. They are easily performed and allow the opportunity for corrective action, if necessary. Site inspections and documentation requirements are addressed in in Section 3 of this SWPPP. MCBH HAZMIN Center staff perform hazardous material inspections monthly. Annual facility inspections are performed by EPCD as part of the MCBH Environmental Compliance Evaluation (ECE).

D. Spill Prevention and Response

Areas where significant material spill or leakage can occur are identified in Section 2.1 and shown on Figure 4-2 The storm water systems and their accompanying drainage points are also shown on Figure 4-2. Refer to Table 2-2 for BMPs related to spill preventative measures for material handling procedures, storage requirements, and equipment usage.

In the event of a hazardous substance or oil spill, the ECC and ECPD shall be notified immediately (ECPD; 808-630-8246). If the spill cannot be easily addressed using an onsite spill kit and personal protective equipment, call Fed Fire (Military 911). The spill source should be immediately controlled if it is safe to do so by closing valves, switches, and/or turning off power to a device. Then, contain the spill by using sorbent socks or absorbent materials found in a spill kit. After it has been contained, clean up the spilled material in a safe manner using dry methods. All materials should then be properly disposed of.

The locations of spill kits are shown in Figure 4-2.

E. Erosion and Sediment Controls

No areas at the Golf Course Maintenance Shop have been identified as having high potential for significant soil erosion that would require erosion and sediment control measures.

F. Best Management Practices to Minimize Pollutant Contact with Storm Water

Facility personnel receive annual training from ECPD at minimum, as well as an initial training for all new personnel. Training information will include the BMPs that have been developed for the facility and a general overview of the storm water program and its objectives.

Existing BMPs at the Golf Course Maintenance Shop are shown in Table 2-2 and attached as fact sheets to this SWPPP in Appendix A.

TABLE 2-2. BEST MANAGEMENT PRACTICES

BMP No.	BMP Title	Description
001	Label All Drums, Cans, Containers, Tanks, and Valves	All containers and drums are labeled.
002	Restrict Access to Area and Equipment	Area is completely enclosed by chain-linked fencing.
004	Avoid Hosing Down the Site	Sweeping with a push broom is performed as needed.
006	Control Spills	Any spill of significant materials is controlled immediately to prevent pollutant from being transported to receiving water. A spill kit is stored onsite.
007	Place Trash Receptacles at Appropriate Locations	Covered trash bins are located at the facility
012	Construct Berm or Dike Around Critical Areas	Pesticides and Fertilizers are stored within a containment room. Old/broken berms at the bay doors of Building 1295 should be repaired or replaced.
015	Recycle	Recyclable materials are stored in appropriate containers until it can be transported to the Recycle Center.
016	Store Waste and Recycling Materials in Proper Containers	Waste and recycling containers are located Waste containers will be emptied regularly. Dumpsters should all have lids; lids should be kept closed when not in use.
018	Provide Roof to Cover Source Area	A tent is used to provide cover over the outdoor maintenance area.

BMP No.	BMP Title	Description
033	Check Vehicles and Equipment for Leaks	Vehicles and equipment are checked for leaks on a regular basis.
061B	Store Liquids and Significant Materials within a Building or Covered Area	All significant materials are properly stored undercover and in secondary containment where required.
071	Keep Tanks, Piping, and Valves in Good Condition	Tanks, pumps, seals, piping and valves are visually inspected for signs of structural integrity and/or leaks.
113	Conduct Personnel Training Regarding the SWPPP	Personnel are trained regularly (initial orientation and annual refresher).
115	Store Containers Inside Secondary Containment	The AST is stored inside a secondary containment pad. The discharge pipe for the containment pad should be fitted with a valve and kept closed. Significant materials are stored in hazardous materials lockers, on spill containment pallets, or within a containment room.

3 Inspections, Assessments and Monitoring

3.1 Routine Quarterly Site Inspections

The MS4 Permit requires a routine quarterly site inspection by a qualified person with at least one member of the storm water pollution control team participating. At least once each calendar year, the routine inspection must be conducted during a period when a storm water discharge is occurring. The site inspection is an overall evaluation of the effectiveness of the BMPs implemented at that facility. A Routine Facility Inspection Checklist (Appendix B) shall be completed during each routine site inspection and kept onsite with this SWPPP. During normal facility operating hours, inspections must be conducted of areas of the facility including, but not limited to, the following:

- Areas where industrial materials or activities are exposed to storm water;
- Areas identified in the SWPPP and those that are potential pollutant sources;
- Areas where spills and leaks have occurred in the past three years;
- Discharge points; and
- Control measures used to comply with the effluent limits contained in this permit.

3.2 Visual Assessment of Storm Water Discharges

A Quarterly Visual Assessment of storm water discharge is required for all industrial facilities at MCBH. Storm water samples for this visual assessment but must be collected in such a manner that the samples are representative of the storm water discharge from the facility. Therefore, the water sample must be collected at the designated storm water monitoring point (Outfall 01) as shown in Figure 4-2. The Quarterly Visual Assessment checklist (Appendix C) shall be completed by the current facility ECC and kept onsite with this SWPPP. Refer to Figure 4-2 for the location of substantially similar outfalls and other relevant site features.

The visual assessment must be made:

- Of a sample collected in a clean, colorless glass or plastic container, and examined in a well-lit area;
- On samples collected within the first 30 minutes of an actual discharge from a storm event. If it is not possible to collect the sample within the first 30 minutes of discharge, the sample must be collected as soon as practicable after the first 30 minutes and documented why it was not possible to take the sample within the first 30 minutes; and
- For storm events, on discharges that occur at least 72 hours (three days) from the previous discharge.

Whenever the visual assessment shows evidence of storm water pollution, corrective action procedures to remedy the pollutants must be taken and documented. Refer to Section 4 for corrective action procedures.

4 Corrective Actions

A corrective action is defined as any action taken, or required to be taken, to (1) repair, modify, or replace any stormwater control used at the site; (2) clean up and dispose of spills, releases, or other deposits found on the site; and (3) remedy a permit violation. Corrective actions should be documented using the Corrective Action Log (Appendix D).

4.1 Immediate Actions

If corrective action is needed, you must immediately take all reasonable steps necessary to minimize or prevent the discharge of pollutants until a permanent solution is installed and made operational, including cleaning up any contaminated surfaces so that the material will not discharge in subsequent storm events. Note: In this context, the term "immediately" requires you to, on the same day a condition requiring corrective action is found, take all reasonable steps to minimize or prevent the discharge of pollutants until a permanent solution is installed and made operational. However, if a problem is identified at a time in the workday when it is too late to initiate corrective action, the initiation of corrective action must begin no later than the following workday. "All reasonable steps" means that the permittee has undertaken initial actions to assess and address the condition causing the corrective action, including, for example, cleaning up any exposed materials that may be discharged in a storm event (e.g., through sweeping, vacuuming) or making arrangements (i.e., scheduling) for a new BMP to be installed at a later date.

4.2 Escalating Actions

If additional actions are necessary beyond those implemented or if the conditions continue to occur, additional corrective actions (e.g., install a new or modified control and make it operational, complete the repair) must be completed before the next storm event if possible, and within 14 calendar days from the time of discovery of the corrective action condition. If it is infeasible to complete the corrective action within 14 calendar days, document why it is infeasible to complete the corrective action within the 14-day timeframe and identify a schedule for completing the work, which must be done as soon as practicable after the 14-day timeframe but no longer than 45 days after discovery. If the completion of corrective action will exceed the 45-day timeframe, the minimum additional time necessary to complete the corrective action can be taken, provided that MCBH ECPD and DOH is notified of your intention to exceed 45 days. Where your corrective actions result in changes to any of the controls or procedures documented in your SWPPP, you must modify your SWPPP accordingly within 14 calendar days of completing corrective action work.

4.3 Corrective Actions for Substantially Identical Outfalls

If the event triggering corrective action is associated with an outfall that had been identified as a "substantially identical outfall", the review must assess the need for corrective action for all related substantially identical outfalls. Any necessary changes to control measures that affect these other outfalls must also be made before the next storm event if possible, or as soon as practicable following that storm event. Any corrective actions must be conducted within the timeframes discussed above.

4.4 Record of Past Spills or Leaks of Hazardous Pollutants

Table 4-1 is used to record significant spills and leaks that have occur or have occurred within three years prior to the preparation or amendment of this SWPPP. Significant spills and leaks include, but are not limited to, releases of oil or hazardous substances in excess of quantities that are reportable under CWA Section 311 (see 40 CFR 110.6 and 40 CFR 117.21) or Section 102 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 USC §9602.

At the time of this SWPPP update, there have been no past spill or leak incidents reported for the Golf Course Maintenance Shop.

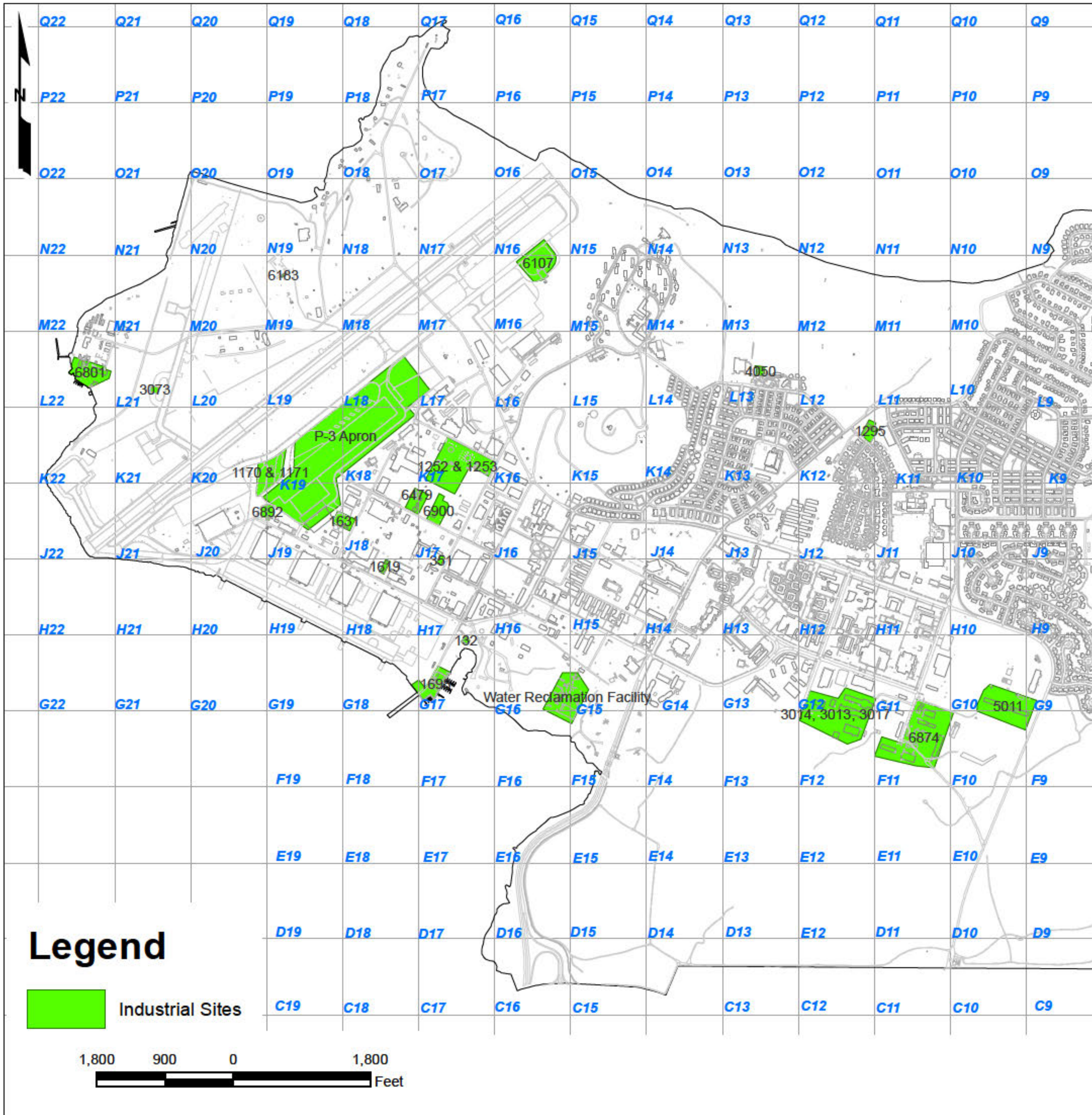
TABLE 4-1. PAST SPILLS OR LEAKS OF HAZARDOUS POLLUTANTS

Date of Incident	Brief Summary of Incident (POC Active at Time of Incident, Pollutant Type, Estimated Quantity, Location of Spill)

4.5 Record of Unauthorized Non-Storm Water Discharges

TABLE 4-2. UNAUTHORIZED NON-STORM WATER DISCHARGE EVALUATION

Date of Evaluation	Brief Summary of Evaluation (Description of the evaluation criteria, outfalls or onsite drainage points that were directly observed, action(s) taken, such as a list of control measures used to eliminate unauthorized discharge)



element environmental llc

environmental · engineering · water resources

PROJECT TITLE

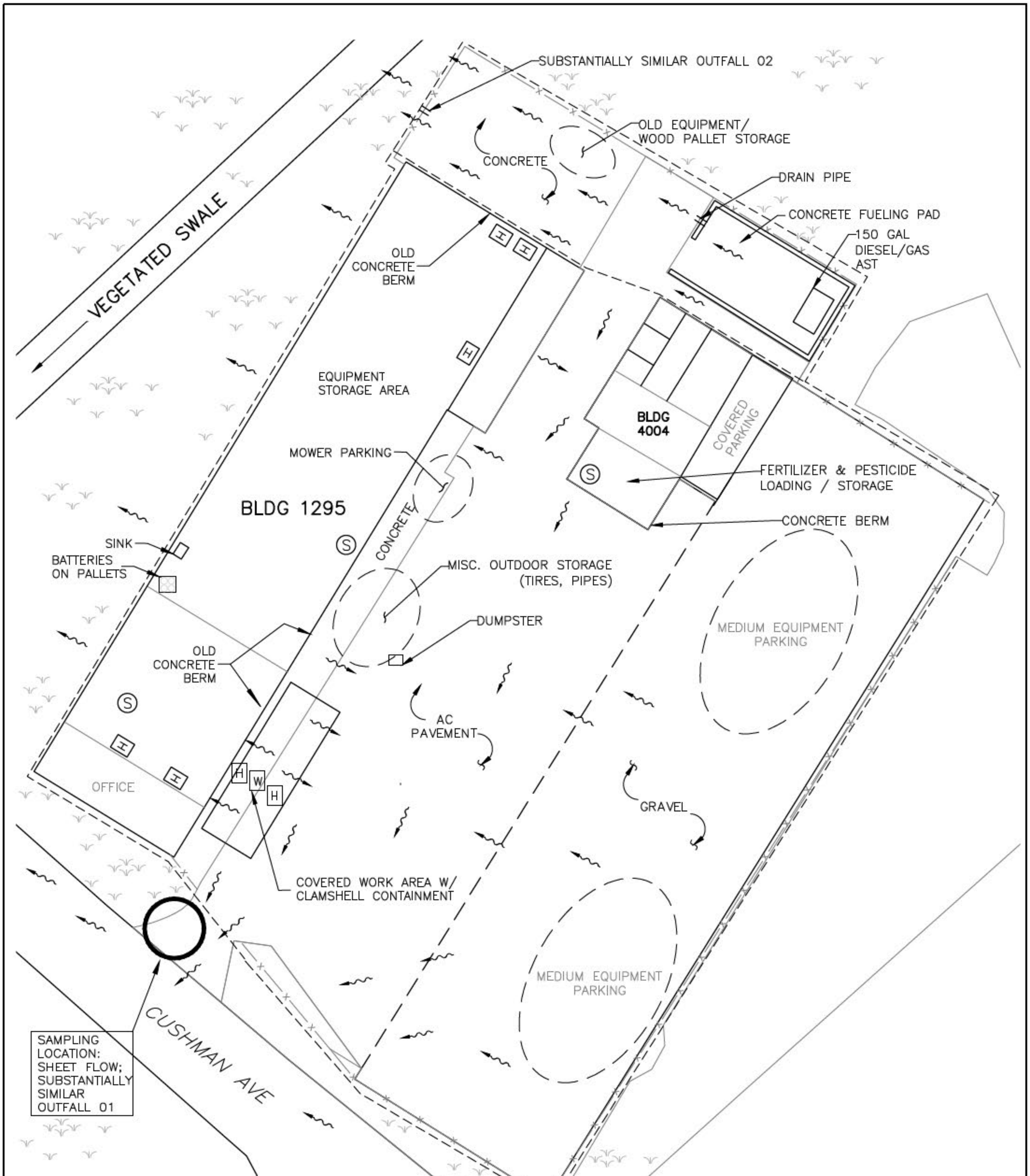
MCBH SWPPP
Storm Water Management Program Plan

FIGURE TITLE

General Location Map

DATE	FIGURE NO.
September 2022	4-1

TRUE NORTH



LEGEND

W SATELLITE ACCUMULATION SITE

H HAZARDOUS MATERIALS STORAGE

FLOW ARROW

DRAINAGE AREA BOUNDARY

NOTES:

1. STORM WATER, FROM APPROXIMATELY 0.9 ACRES, IS ASSOCIATED WITH THE GOLF COURSE MAINTENANCE SHOP.
2. NOT TO SCALE

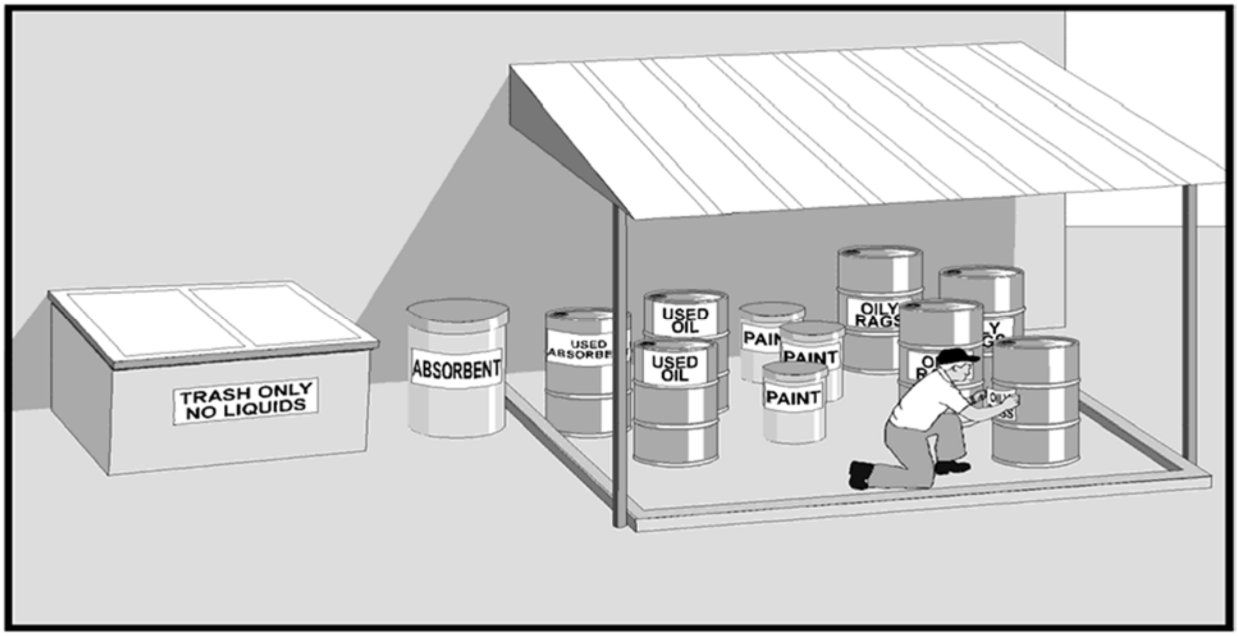
DATE:	PROJECT TITLE:	
JULY 2022	STORM WATER POLLUTION PREVENTION PLAN MCBH, KANEOHE BAY, OAHU, HAWAII	
FIGURE TITLE: GOLF COURSE MAINTENANCE SHED (FACILITY 1295)		FIGURE NO.: 4-2

DAMATO
7/27/2022 1:44:42 PM
FIG 4-2 Bldg 1295 – Golf Course Maintenance.dwg

APPENDIX A

SELECTED BMP FACT SHEETS

BMP 001 - LABEL ALL DRUMS, CANS, CONTAINERS, AND TANKS



Description of Potential Pollutant and Source: Drums, cans, and containers can be improperly managed and disposed of due to uncertainty of the container's contents. Tanks which are not labeled may result in improper use of the tank or fuel, which may result in the exposure of significant materials to storm water and/or receiving waters. Similarly, unlabeled valves may be opened without proper precaution due to lack of user information. Storm water quality will be affected if significant materials are improperly disposed to the storm drain and/or receiving waters. Lack of labeling will also make it difficult to quickly identify the type of material released so facility personnel can respond correctly. Labels also identify hazardous materials at the facility and are a good way to request caution in certain areas (e.g., drums indicating flammability).

Description of BMP: Label all drums, valves, pumps, cans, tanks, and containers to reduce the chance of misuse and eventual spills. Labeling ensures that the appropriate procedures, equipment, and storage containers are used. All containers will be labeled as to what is in them.

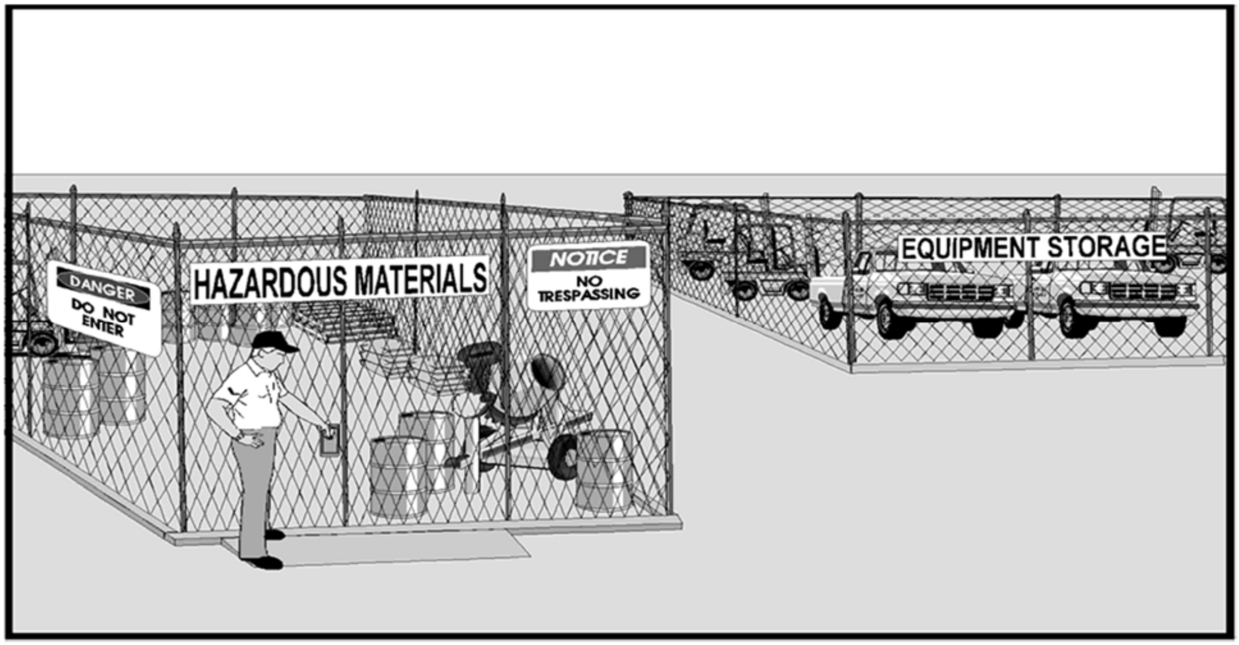
Application Guidance: As needed.

Training: N/A

Effectiveness and Cost: Effectiveness and costs will vary depending on the application.

Limitations: None

BMP 002 - RESTRICT ACCESS TO AREA AND EQUIPMENT



Description of Potential Pollutant and Source: Vandalism of vehicles and facility property may result in the release of significant materials.

Description of BMP: Provide fences and gate areas where vehicles, equipment and materials are stored and are accessible to the public to discourage trespassing. Access to equipment will also be restricted. Only authorized personnel will be allowed to operate equipment. The fences and gates will be properly maintained, and additional security measures including lighting of the area will be implemented if the fencing alone proves insufficient. Where appropriate, security guards or alarms will be used.

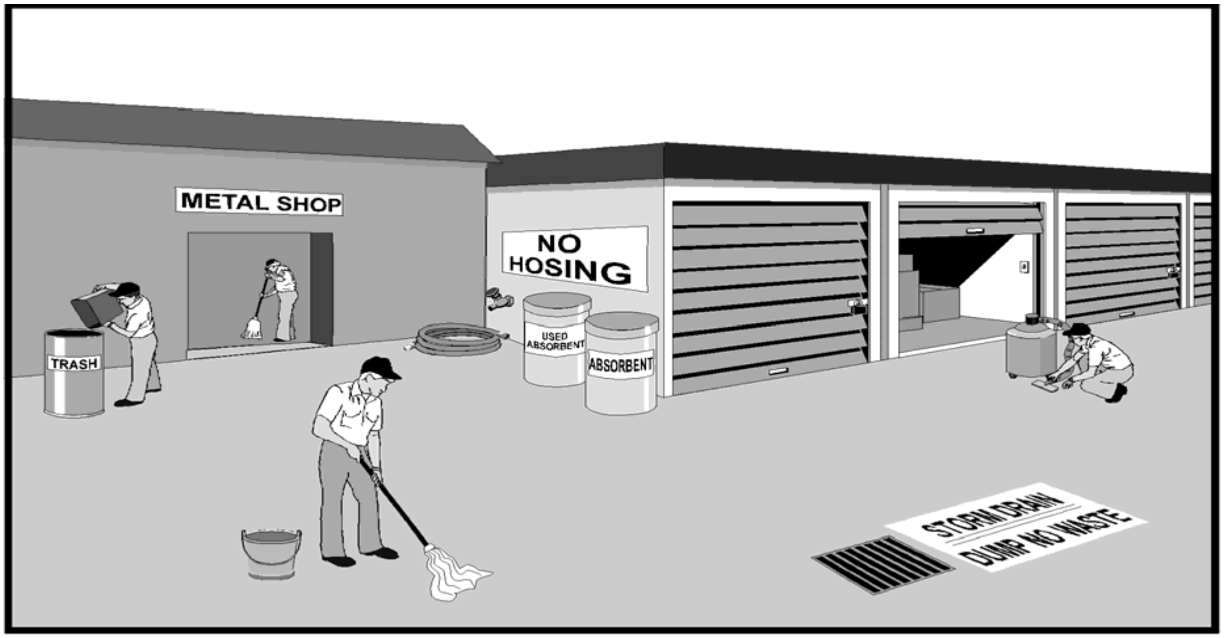
Application Guidance: As needed.

Training: N/A

Effectiveness and Cost: Effectiveness and costs will vary depending on the application.

Limitations: None

BMP 004 - AVOID HOSING DOWN THE SITE



Description of Potential Pollutant and Source: Cleaning work sites by hosing down causes wash water to transport pollutants to the storm drain where it can be exposed to storm water.

Description of BMP: Use dry methods to clean work sites. Dry methods include sweeping or using damp rags or mops. If possible or practical, hoses will be removed. If hosing down is unavoidable, the downstream drain will be temporarily plugged as described in the following BMPs:

- BMP 023 - Place portable Rubber Mats Over Storm Drain Inlets
- BMP 024 - Insert Filter in Catch Basin
- BMP 025 - Place Absorbent Blankets in Catch Basin

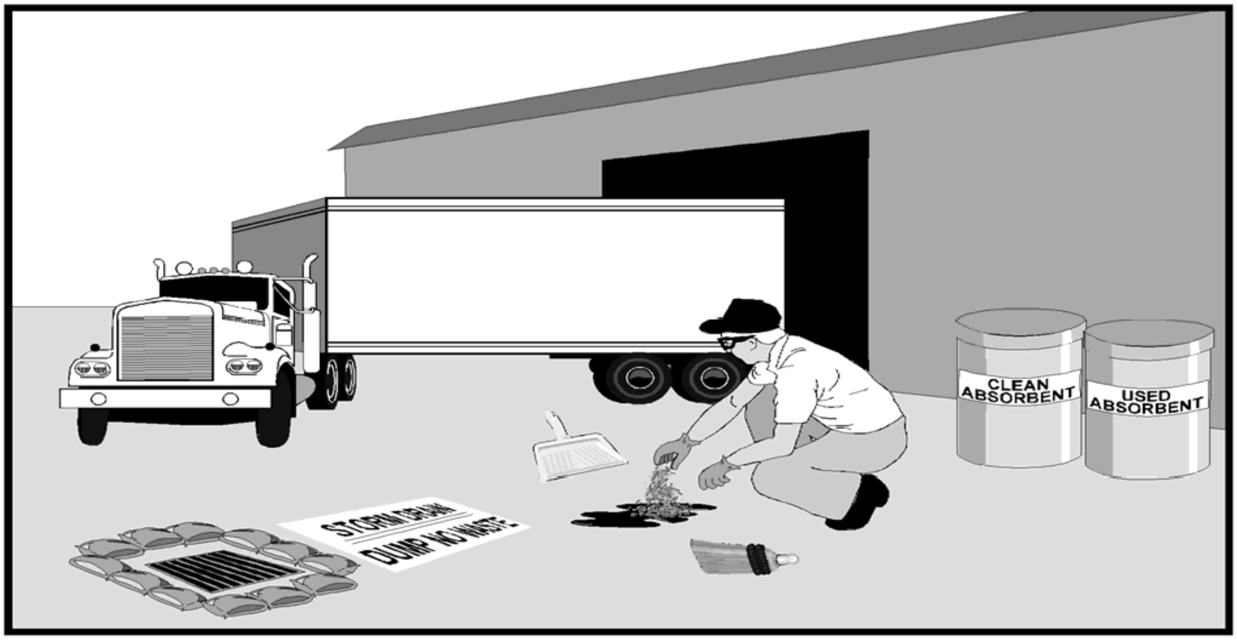
Application Guidance: Methods of dry cleaning will be used whenever possible at all workstations, loading/unloading sites, storage areas, and parking lots.

Training: New personnel will be notified of the policy and signs will be posted. If possible or practical, hoses will be removed.

Effectiveness and Cost: Eliminating hosing down is a highly effective, low-cost BMP.

Limitations: None

BMP 006 - CONTROL SPILLS



Description of Potential Pollutant and Source: Spills of significant materials may be exposed to storm water and transported to storm drains and/or receiving waters.

Description of BMP: Follow safety data sheets (SDS) for handling, storage, and cleanup of all significant materials to reduce the potential for spills.

Any spill, large or small, of significant materials will be controlled to prevent pollutants from being transported to storm drains and/or receiving waters. Appropriate spill control material will be kept on site. Smaller spills will be contained using absorbent material such as kitty litter, straw, or sawdust. Drums of absorbent material will be easily accessible and clearly marked, and containers for spent absorbent material will be readily available. Spent absorbent material will be managed appropriately and disposed of in accordance with applicable regulations. Larger spills will be controlled using spill kits, brooms, and other response equipment commensurate with the size of the spill. The methods outlined in the Activity's spill prevention and response plans (BMP 112) for hazardous materials will be followed for spills of any potential storm water pollutants. The date, time, nature and volume of material spilled, and cleanup measures taken will be recorded for all spills and kept as part of the SWPPP.

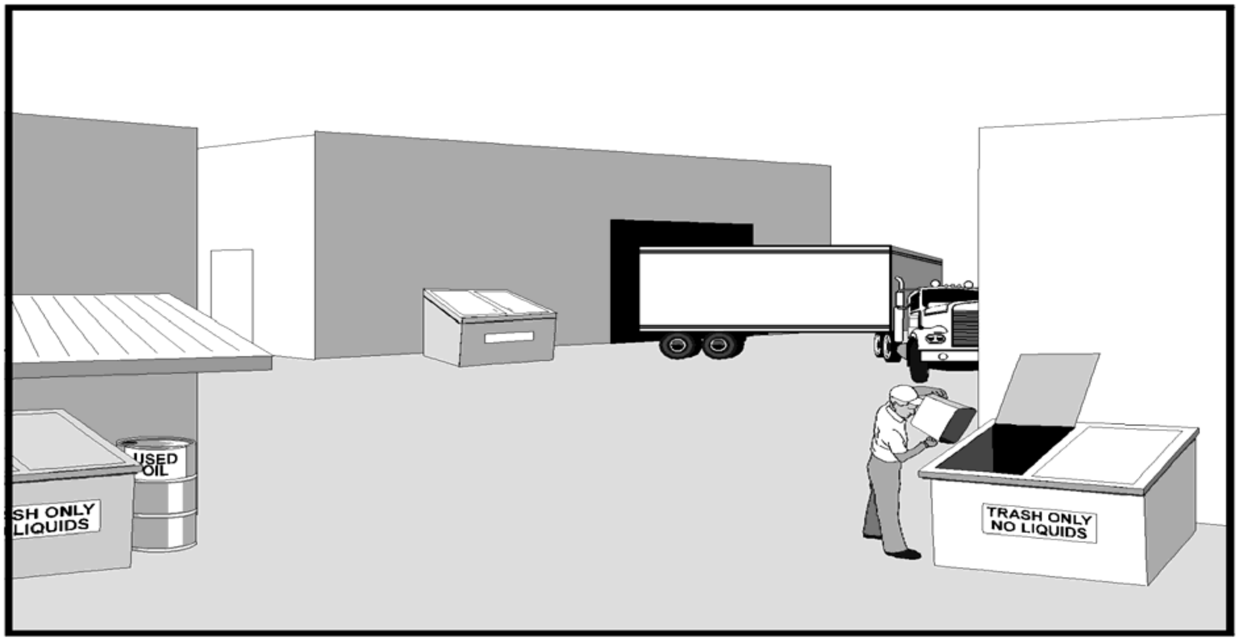
Application Guidance: Controlling spills will be practiced under all working conditions.

Training: Personnel will be trained in spill prevention and response procedures including the use of personal protection equipment (gloves, eye and face protection, etc.). This will include what absorbent or equipment to use, how to use the absorbent or equipment, where to find it, how to dispose of the spent absorbent or other material, and who to notify in the event of a spill.

Effectiveness and Cost: Spill control is a moderately effective, low-cost BMP.

Limitations: None

BMP 007 - PLACE TRASH RECEPTACLES AT APPROPRIATE LOCATIONS



Description of Potential Pollutant and Source: Improperly located or insufficient numbers of trash receptacles will promote poor housekeeping practices. This will increase the opportunity for pollutants from all source areas to reach storm water.

Description of BMP: Properly located and sufficient numbers of trash receptacles will promote the proper disposal of waste materials. This reduces the opportunity for pollutants to reach storm water. Trash receptacles will be easily accessible for personnel.

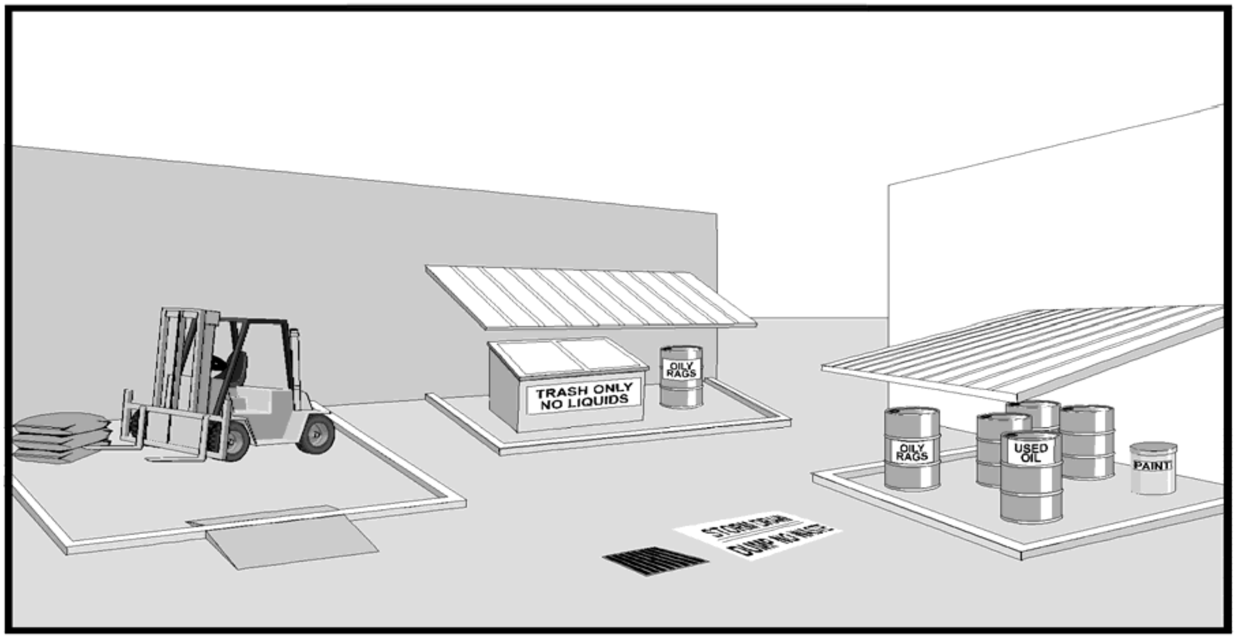
Application Guidelines: Placement of trash receptacles at appropriate locations will always be practiced.

Training: Personnel will be trained as to the location of trash receptacles.

Effectiveness and Cost: Appropriately located trash receptacles are an effective, low-cost BMP.

Limitations: None

BMP 012 - CONSTRUCT BERM OR DIKE AROUND CRITICAL AREAS



Description of Potential Pollutant and Source: Critical areas are source areas that have a high likelihood for the release of pollutants. This includes material handling areas, material storage areas, and equipment repair and maintenance areas. As a result of spills and leaks or exposure to storm water, pollutants can flow from critical areas into the storm water system. In addition, small spills and leaks can accumulate on the surface area and be washed away by storm water.

Description of BMP: Construct a raised berm or dike around critical areas. This will provide secondary containment and prevent any spills or leaks from leaving the area. This secondary containment will also be provided where mobile tankers containing fuel are customarily stationed. Construct a ramp to allow vehicle access into the area. (Note: double walled tanks do not require this BMP. Also, 40 CFR 112.7 requires bulk petroleum storage tanks be provided with secondary containment.) A drain valve will be installed and procedures to drain storm water from the bermed area will be posted (see BMP 014).

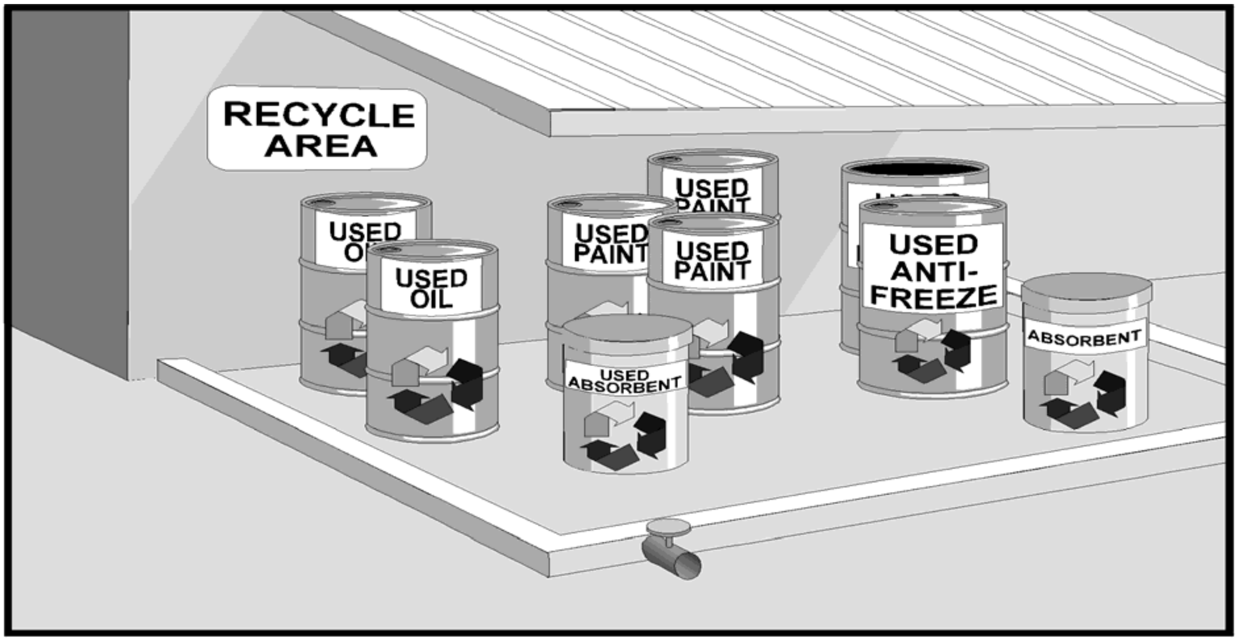
Application Guidance: Install as needed.

Training: N/A

Effectiveness and Cost: This is a highly effective BMP. The cost will vary depending on the size of the fueling operation.

Limitations: The size of some tank and fueling operations areas could make this BMP relatively expensive.

BMP 015 – RECYCLE



Description of Potential Pollutant and Source: Many materials, both hazardous and non-hazardous, can be sources of pollutants. Recycling will be employed to reduce the amount of waste material exposed to storm water on the Activity.

Description of BMP: Recycle materials to the fullest extent possible in all situations.

Application Guidance: Recycling collections will be conducted at least weekly for recyclable items such as solvents, oil, scrap metals, wash water and absorbent materials. Separating the recyclable items facilitates recycling.

The frequency for implementing this BMP has been provided as general guidance. However, a facility operator may wish to establish a more suitable frequency. This will require SWPPP implementors to make judgements based on facility operations and conditions. To assign a frequency other than what has been suggested (i.e., more or less frequent), the following criteria will be considered and rated either High, Medium, or Low. If many of the criteria are assigned a High rating, the frequency may be increased. Similarly, if many criteria are assigned a Low rating, the frequency may be decreased. The goal of implementing this BMP is to minimize exposure of pollutants to storm water.

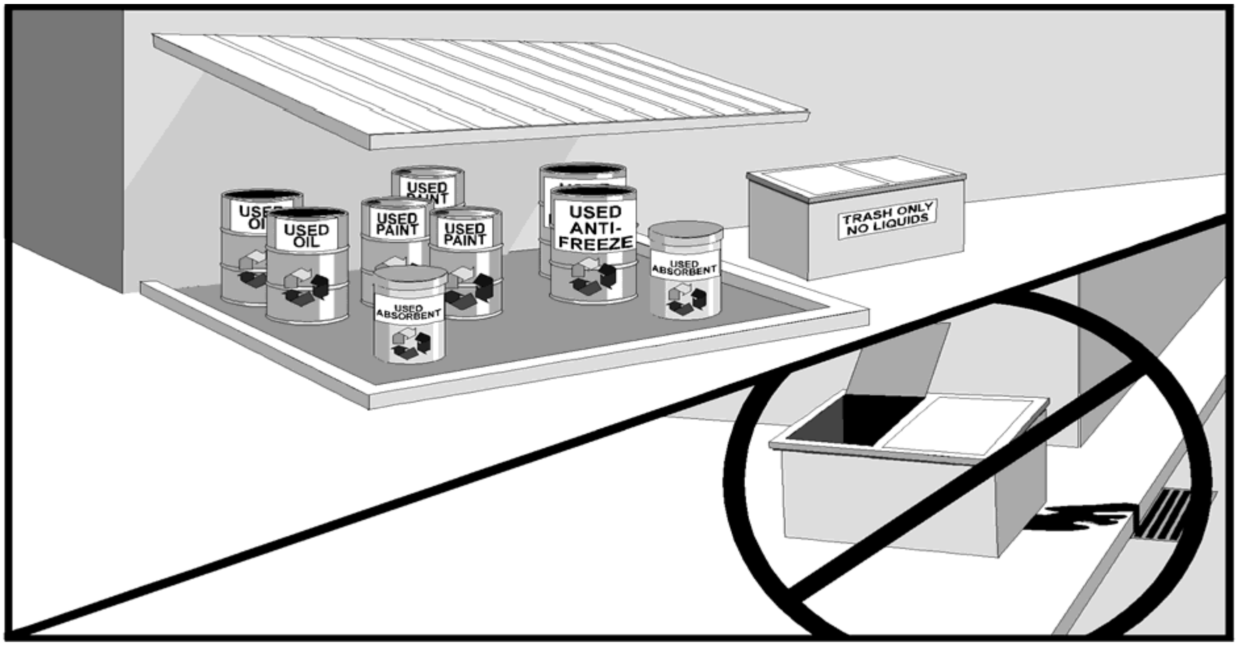
CRITERIA	Rating H=High M=Medium L=Low
Probability of exposure of significant materials to storm water	
Quantity of significant materials potentially exposed	
Toxicity of significant materials potentially exposed	
Frequency of use of significant materials potentially exposed	
Evidence of exposure (e.g., stains on pavement, etching of concrete	
Proximity of source area to outfall or receiving water	
Sensitivity of receiving water to potentially exposed significant materials (e.g., waters with beneficial uses such as human contact, recreation, significant species habitat, etc.)	

Training: Personnel will be trained on proper recycling techniques along with posting and maintenance of signs.

Effectiveness and Cost: Effectiveness and cost will be site specific.

Limitations: Local vendors may not be available to receive certain recyclable materials.

BMP 016 - STORE WASTE AND RECYCLING MATERIALS IN PROPER CONTAINERS



Description of Potential Pollutant and Source: Dry waste, including items such as scrap metal, floor sweepings, metal chips, and paper goods, can be dispersed by wind or operational error if not stored properly. If a dumpster's lid is not kept closed, animals may carry garbage out of the containers. Uncovered dumpsters also expose waste to storm water, which may leak out of the dumpster and into the storm sewer system.

Description of BMP: Locate waste and recycling drums and containers in centralized areas, using proper labeling (both containers and location) and providing easy access. If possible, the area will have secondary containment (see BMPs 012, 013, and 014). Waste containers will be emptied regularly. Dumpsters will all have lids; lids will be kept closed when not in use. If the dumpster has inadequate capacity and it is not possible to keep the cover closed, the frequency of pick-up will be increased, or the dumpster will be replaced with a model of greater capacity.

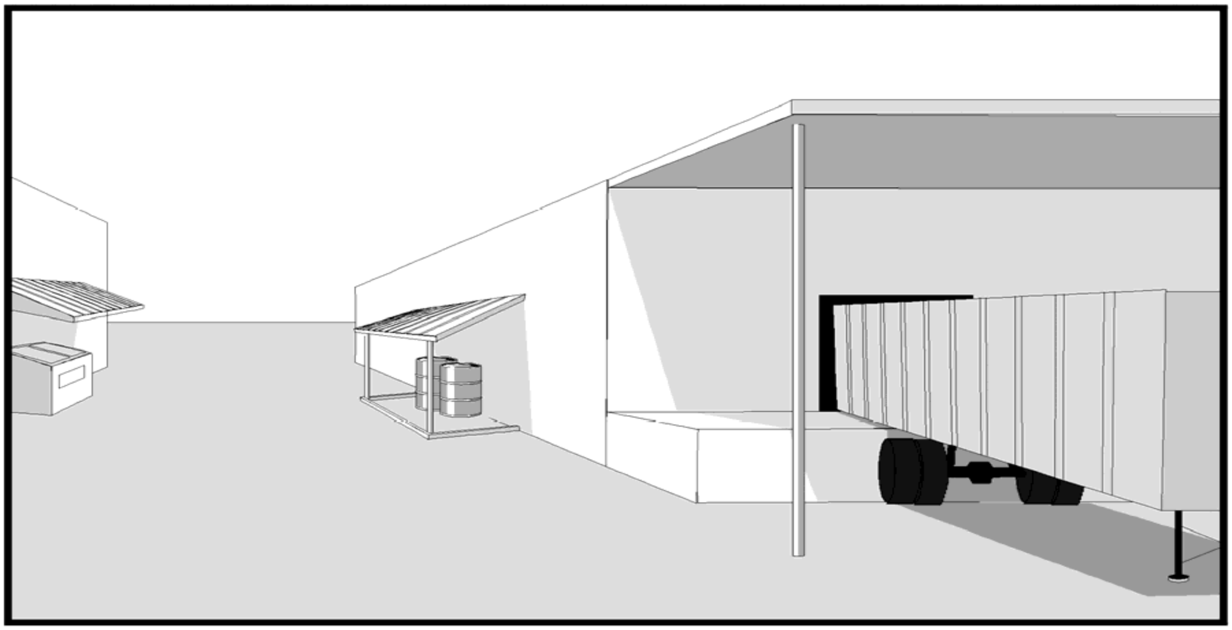
Application Guidance: This BMP will be applied to all waste and recycling storage areas.

Training: Personnel will be trained to monitor waste and recycling storage sites to ensure their materials are properly stored and that there are no overflowing containers.

Effectiveness and Cost: This is a moderately effective, low-cost BMP.

Limitations: None

BMP 018 - PROVIDE ROOF TO COVER SOURCE AREA



Description of Potential Pollutant and Source: Spills, leaks and outdoor storage of materials can result in the exposure of significant materials to storm water.

Description of BMP: Construct roofs over areas with significant materials to minimize contact with storm water. Roofs are effective covering for fuel transfer areas, material loading/unloading areas, equipment maintenance, metal fabrication, hazardous waste storage, and materials storage areas.

Application Guidance: Install as needed.

Training: N/A

Effectiveness and Cost: Roofs are an effective, variable-cost BMP. Cost can be high for large areas.

Limitations: The height of the equipment or the size of the area may make this BMP infeasible.

BMP 033 - CHECK VEHICLES AND EQUIPMENT FOR LEAKS

Description of Potential Pollutant and Source: Vehicles, aircraft, or equipment entering or stored at a maintenance facility may be leaking a variety of fluids (fuel, oil, antifreeze, freon, etc.). These materials can be exposed to storm water.

Description of BMP: Inspect all vehicles and equipment at the site, whether incoming, parked, stored, or salvaged, for oil and fluid leaks. Drivers of fleet vehicles, such as delivery trucks, will also check under their vehicles each morning for fluid leaks. If leaks are present, drip pans will be placed under the vehicle or equipment. Once the vehicle is removed from the site, the former parking area will be inspected for stains, and these stains will be cleaned using rags or dry solvents.

Application Guidance: Any vehicle or equipment coming in for repairs, painting, or storage will be inspected for leaks. Fleet vehicles will be inspected each morning. Vehicles that are parked, stored, or salvaged will be provided with drip pans, as will tanker rail cars waiting to be unloaded. The frequency for implementing this BMP has been provided as general guidance. However, a facility operator may wish to establish a more suitable frequency. This will require SWPPP implementors to make judgements based on facility operations and conditions. To assign a frequency other than what has been suggested (i.e., more or less frequent), the following criteria will be considered and rated either High, Medium, or Low. If many of the criteria are assigned a High rating, the frequency may be increased. Similarly, if many criteria are assigned a Low rating, the frequency may be decreased. The goal of implementing this BMP is to minimize exposure of pollutants to storm water.

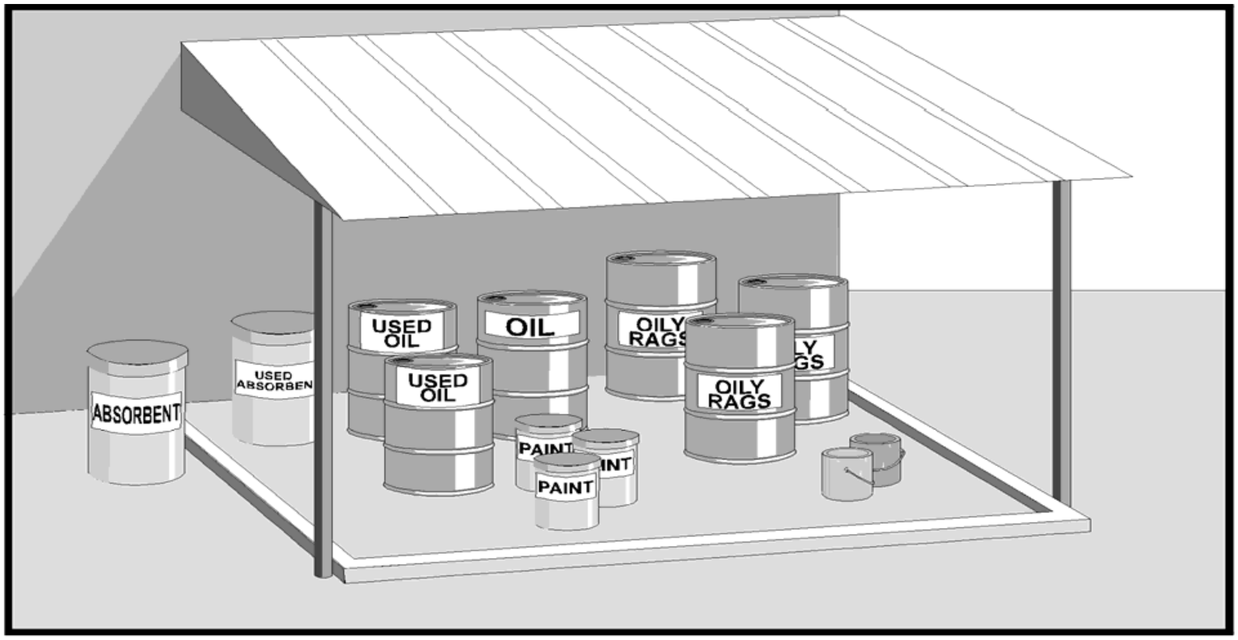
CRITERIA	Rating H=High M=Medium L=Low
Probability of exposure of significant materials to storm water	
Old age or poor condition of equipment and vehicles	
Evidence of exposure (e.g., stains on pavement)	
Proximity of source area to outfall or receiving water	
Sensitivity of receiving water to potentially exposed significant materials (e.g., waters with beneficial uses such as human contact, recreation, significant species habitat, etc.)	

<u>Training:</u> Signs will be posted to remind personnel of proper procedures.

<u>Effectiveness and Cost:</u> Checking for leaks is a moderately effective, low-cost BMP.

<u>Limitations:</u> None

BMP 061B - STORE LIQUIDS AND SIGNIFICANT MATERIALS WITHIN A BUILDING OR COVERED AREA



Description of Potential Pollutant and Source: Many significant materials may be leaked or spilled during storage, handling, or transport. If significant materials are stored outside, in covered areas, these materials can be exposed to storm water, which can transport the leaked or spilled material into the storm drain system.

Description of BMP: To the extent practical, store significant materials within a building or covered area. The materials will be stored on an impervious surface, such as a concrete pad. Rainfall runoff from the pad will be directed to a storm water treatment facility or contained. Leaks and spills will be cleaned up as soon as possible using rags or dry absorbents (see BMP 006). Used rags and absorbents will be disposed of properly. Any wash water from cleaning the floor will be disposed of in the sanitary sewer (see BMP 042).

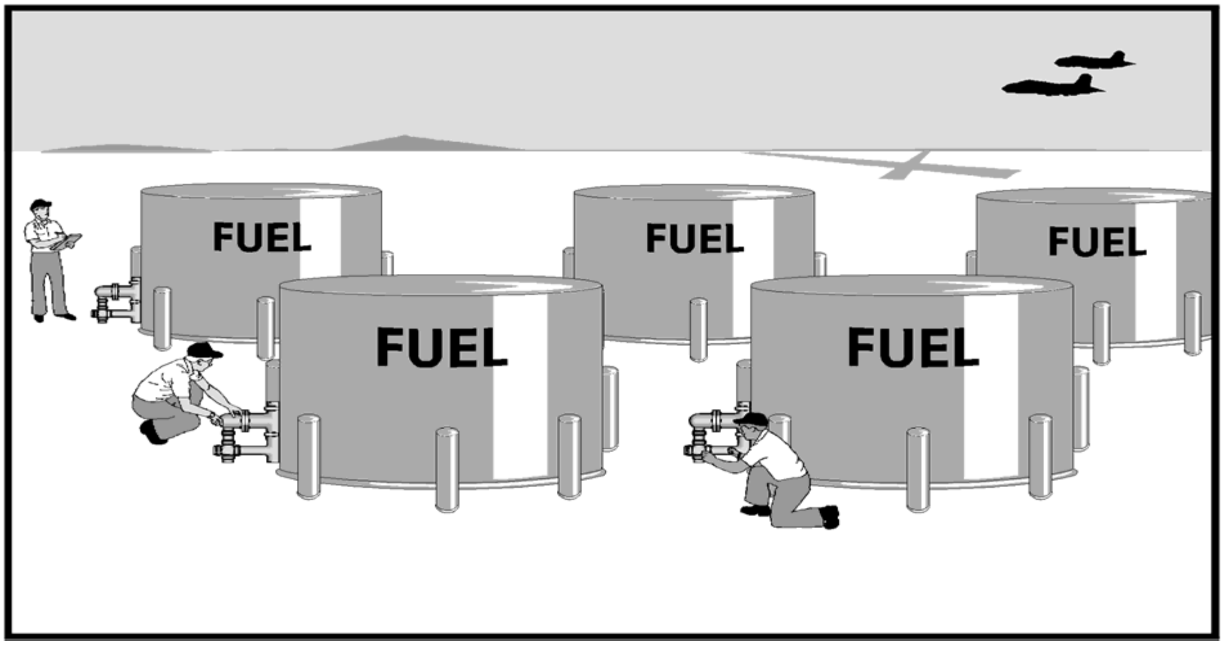
Application Guidance: All significant materials will be stored within a building or covered area.

Training: Personnel will be trained to store significant materials in designated areas.

Effectiveness and Cost: This is a moderately effective BMP. The cost will vary based on whether a building for storing the substances is available.

Limitations: None

BMP 071- KEEP TANKS, PIPING, AND VALVES IN GOOD CONDITION



Description of Potential Pollutant and Source: Tanks, piping, and valves may leak fuel or other significant materials due to corrosion, loose fittings, poor welding, or improperly or poorly fitted gaskets. This can expose these materials to storm water, which can transport them to storm drains and/or receiving waters.

Description of BMP: Keep tanks, piping, and valves in good working condition. Tanks, piping, or valves which are leaking will be repaired or replaced.

Application Guidance: Tanks, piping, and valves will be inspected monthly and kept in good condition at all times. If applicable, preventive maintenance will be performed.

The frequency for implementing this BMP has been provided as general guidance. However, a facility operator may wish to establish a more suitable frequency. This will require SWPPP implementors to make judgements based on facility operations and conditions. To assign a frequency other than what has been suggested (i.e., more or less frequent), the following criteria will be considered and rated either High, Medium, or Low. If many of the criteria are assigned a High rating, the frequency may be increased. Similarly, if many criteria are assigned a Low rating, the frequency may be decreased. The goal of implementing this BMP is to minimize exposure of pollutants to storm water.

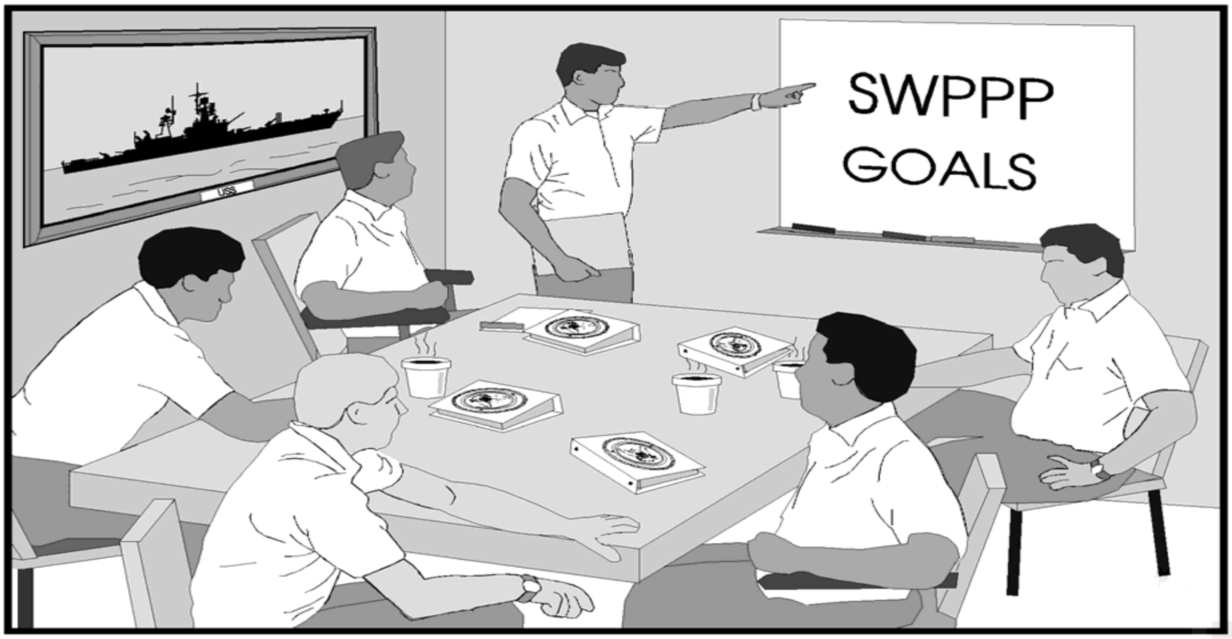
CRITERIA	Rating H=High M=Medium L=Low
Probability of exposure of significant materials to storm water	
Quantity of significant materials potentially exposed	
Toxicity of significant materials potentially exposed	
Frequency of use of tanks, piping, and valves	
Intensity of use of tanks, piping, and valves	
Old age or poor condition of tanks, piping, and valves	
Evidence of exposure (e.g., stains on ground surface)	
Proximity of source area to outfall or receiving water	
Sensitivity of receiving water to potentially exposed significant materials (e.g., waters with beneficial uses such as human contact, recreation, significant species habitat, etc.)	

Training: Personnel will be trained to regularly inspect for leaks or conditions that could lead to the discharge of chemicals, or storm water contact with waste materials. Personnel will be trained to routinely inspect equipment before each use. Tanks, piping, and valves which are not frequently used, will be inspected weekly. Procedures for notifying the appropriate maintenance personnel if a leak is found, will be established.

Effectiveness and Cost: Keeping tanks, piping, and valves in good condition is a highly effective BMP. The cost of repairing or replacing piping and valves is typically low. The cost of repairing or replacing tanks will vary based on the size of the tank and its present condition.

Limitations: None

BMP 113 - CONDUCT PERSONNEL TRAINING REGARDING THE SWPPP



Description of Potential Pollutant and Source: When properly trained, personnel are more capable of preventing spills, responding safely and effectively to an accident when it occurs, and recognizing situations that could lead to storm water contamination.

Description of BMP: Train personnel at all levels of responsibility in the components and goals of the SWPPP.

Application Guidance: Training will be conducted quarterly and at new personnel orientations.

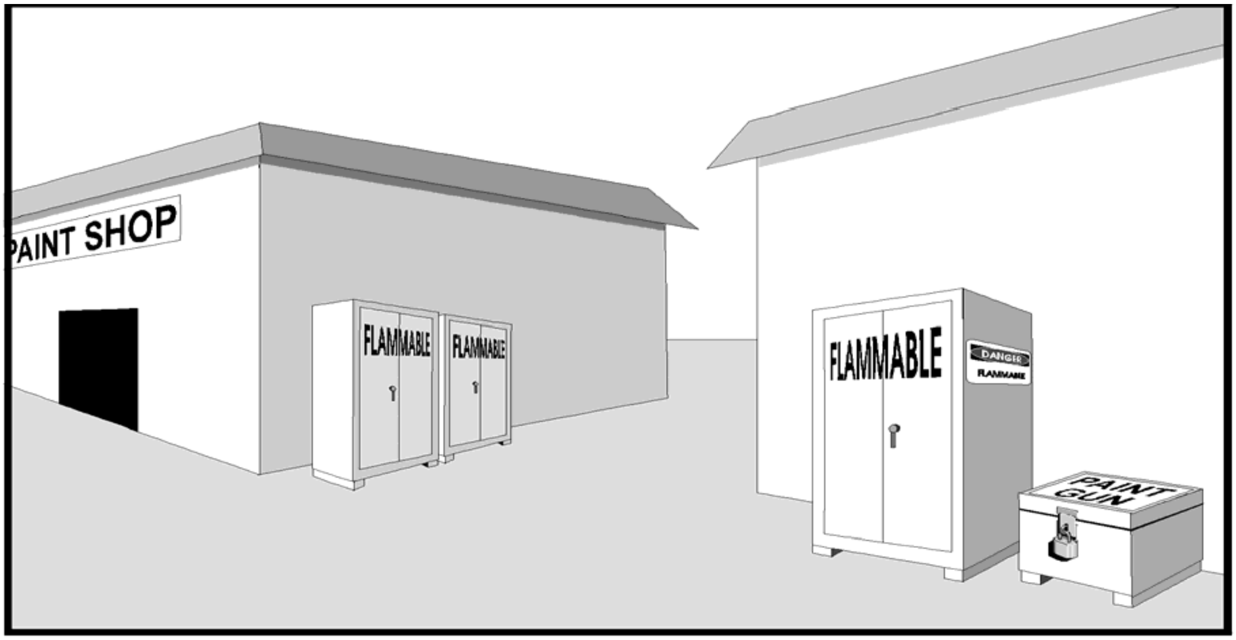
Training: Training will address each component of the SWPPP, including how and why tasks are to be implemented. Topics will include:

- Good housekeeping
- Material management practices
- Spill prevention and response

Effectiveness and Cost: This is a highly effective, moderate-cost BMP.

Limitations: None

BMP 115 - STORE CONTAINERS INSIDE SECONDARY CONTAINMENT



Description of Potential Pollutant and Source: Improper storage of containers of significant materials can result in the release of materials and chemicals that can cause storm water runoff pollution. Secondary containment can prevent storm water runoff pollution.

Description of BMP: Provide secondary containers for significant materials. Containers of significant materials will be stored inside secondary containment cabinets appropriate to the size and quantity of the substances stored. Cabinets will have covered shelves and provide secondary containment for spills of the substances that spill inside the cabinets. In many instances the cabinets will be locked to restrict access to the substances. Metal lockers typically used to store flammable substances are usually appropriate for preventing contact between significant materials and storm water.

The secondary containment will be placed away from vehicle traffic routes to reduce the potential for mechanical impact and accidental spills. A manifest list of the materials stored inside the locker will be posted on or inside the locker.

Application Guidance: Containers will always be properly stored.

Training: Personnel will be trained in preventing substances stored outside from entering the storm water and storing substance effectively.

Effectiveness and Cost: This is a moderately effective, low-cost BMP.

Limitations: None

APPENDIX B

ROUTINE FACILITY INSPECTION CHECKLIST

Routine Facility Inspection Checklist

Activity Name: ______________________ **Date of Inspection:** ______________________

Inspector(s): ______________________ **Facility Name/Number:** ______________________

Column 1	Column 2	Column 3	Column 4	Column 5	
Source Area	BMP Number and Title	Status: F, P, N, NA[1]	Briefly Describe Effectiveness (Good or Other [describe])	Corrective Measures	
				What	By When

Note 1: F – Fully implemented, P – Partially implemented, N – Not implemented , NA – Not Applicable

APPENDIX C

QUARTERLY VISUAL ASSESSMENT CHECKLIST

Quarterly Visual Assessment Checklist

Facility ID and Location: ______________________

Date: ____________________

Sampler Name (Printed): ______________________________________

Signature: ____

Time of Rainfall Begin: _________________ Time of Rainfall End: ____________________

Time of Flow Begin: _________________ Time of Flow End: ____________________

Rainfall event more than 72 hours since last event? Yes / No

Rainfall Event Total: ____________________

Sample: sample in a clean, colorless glass or plastic container, and examined in a well-lit area

On samples collected within the first 30 minutes of an actual discharge from a storm event

Sample Characteristics:

Color: ____________________ Floating Solids: _____________________________

Odor: ____________________ Settled Solids: _____________________________

Clarity: ____________________ Suspended Solids: _____________________________

Oil Sheen: ____________________ Foam: _____________________________

Other Obvious Indicators of Storm Water Pollution

(describe): ____

Nature of the discharge (i.e., runoff):

Results of observations of the storm water discharge:

Probable sources of any observed storm water contamination:

If applicable, why it was not possible to take samples within the first 30 minutes:

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

APPENDIX D

CORRECTIVE ACTION LOG

Corrective Action Log

Use this form to document SWPPP corrective actions. This form is to be completed by the Environmental Compliance Coordinator (ECC) or a person designated by ECC and submitted to the MCBH Storm Water Program Manager. The Storm Water Program Manager is responsible for any notification to the State of Hawaii Department of Health (DOH), if required.

A corrective action is defined as an action taken to:

- **a) Repair, modify, or replace any storm water control used at the site;**
- **b) Clean up and properly dispose of spills, releases, or other deposits; or**
- **c) Remedy a permit violation.**

1. Corrective Action Triggers

The following events trigger a corrective action to be taken (this triggering condition is to be documented *within 24 hours* of discovering the occurrence):

- a) A required storm water control was never installed, was installed incorrectly, or is not in accordance with the requirements in the SWMP Plan.
- b) A member of the **Storm Water Pollution Control Team** becomes aware that the storm water controls installed and being maintained are not effective enough for the discharge to meet applicable water quality standards or applicable requirements in the MCBH SWMP Plan. The facility ECC shall notify the Storm Water Program Manager immediately. The Storm Water Program Manager will notify DOH *by the end of the next work day*.

1.1 Log Notifications:

Date/time Storm Water Program Manager notified by ECC: ________________________

Date/time DOH notified by Storm Water Program Manager: ________________________

1.2 Describe Discharge:

Indicate which one of the following prohibited discharges is occurring or has occurred:

- ❒ Wastewater from washout of concrete
- ❒ Wastewater from washout and cleanout of stucco, paint, form release oils, curing compounds, or other construction materials
- ❒ Fuels, oils, or other pollutants used in vehicle and equipment operation and maintenance
- ❒ Soaps, solvents, or detergents used in vehicle and equipment washing
- ❒ Toxic or hazardous substances from a spill or other release
- ❒ Other, Explain: ____

2. Requirements for Taking Corrective Actions

The ECC shall complete corrective actions in accordance with the deadlines specified below. In all circumstances, site personnel shall *immediately* take all reasonable steps to minimize or prevent the discharge of pollutants until a permanent solution is installed and made operational, including cleaning up any contaminated surfaces so that the material will not discharge in subsequent storm events. *Immediately* means the same day the condition is discovered, unless it is too late in the day, in which initiation of corrective action must begin on the following work day.

Following any of the above triggering events, the ECC shall install a new or modified control and make it operational, or complete the repair, by *no later than 7 calendar days from the time of discovery*. If it is not feasible to complete the installation or repair within 7 calendar days, the ECC shall document and submit to the Storm Water Program Manager, for their agreement, why it is not feasible to complete the installation or repair within the 7-calendar day timeframe and document a schedule for installing the storm water control and making it operational as soon as practicable after the 7-day timeframe.

If the issue is not adequately addressed within 7 calendar days or the agreed upon timeframe, enforcement procedures will be initiated. Unaddressed issues will be escalated through the chain of command. The MCBH Environmental Compliance and Protection Division Director will give the responsible party a formal notice with an appropriate deadline for action. If the problem remains unchanged, the situation will be brought to the attention of the next higher authority. The ultimate penalty for non-compliance of MS4 Permit regulations is eviction or discharge of the responsible party from MCBH. This is placed at the discretion of the Base Commander. See the Enforcement Response Plan in Appendix 3-6 of the SWMP Plan for further information on MCBH's enforcement policies.

3. Corrective Action Report

Within 24 hours of discovering the occurrence of one of the triggering conditions in SWPPP Section 4.1 at the site, the ECC must complete the following:

3.1 Describe the triggering condition:

____
____
____
____

3.2 Record the date/time of the condition identified. How was the condition identified?

____
____
____
____

3.3 Describe the corrective action taken:

____
____
____

Date/time installation or repair was completed:
(or date/time the prohibited discharge ceased) ____

Or describe why it is not feasible to complete installation or repair within 7 calendar days and detail a proposed schedule (if applicable)

____
____
____

4. Resolution of the Corrective Action Trigger

Within 7 calendar days of initiating the Corrective Action Report, the ECC must complete a report of the following:

4.1 Follow-up Actions

Describe any follow-up actions taken to review the design, installation, and maintenance of storm water controls, including the dates such actions occurred:

____
____
____

4.2 Storm Water Control Modifications

Provide a summary of storm water control modifications implemented. Include a schedule of activities required to implement changes and the date the modifications were completed or will be completed:

____
____
____

5. SWPPP Modification Due to Corrective Actions

Where corrective actions result in changes to any of the storm water controls or procedures documented in the SWPPP, modify the SWPPP accordingly *within 7 calendar days* of completing corrective action work.

Are modifications to the SWPPP necessary? ❑ Yes ❑ No

Date modifications to the SWPPP shall be completed _______________

6. Corrective Actions Required by DOH

The facility shall comply with any corrective actions required by DOH as a result of permit violations found during an inspection by DOH or the Environmental Protection Agency (EPA).

Was the Corrective Action triggered by a DOH/EPA inspection?

❑ Yes ❑ No

❑ Date of DOH/EPA Inspection __________________

7. Additional Comments:

____
____

APPENDIX 11-3

Maintenance Activities Best Management Practice Field Manual

FINAL

MAINTENANCE ACTIVITIES BMP FIELD MANUAL

Storm Water Management Program Plan

Marine Corps Base Hawaii

NPDES Permit No. HI S000007

Prepared by:

Marine Corps Base Hawaii

September 2022

Table of Contents

List of Acronyms and Abbreviations

BAT	Best Available Technology
BCT	Best Conventional Technology
BMP	Best Management Practice
CO	Commanding Officer
CFR	Code of Federal Regulations
CWA	Clean Water Act
CWB	State of Hawaii Department of Health, Clean Water Branch
DLNR	State of Hawaii Department of Land and Natural Resources
DOE	Department of Education
DOH	State of Hawaii Department of Health
ECC	Environmental Compliance Coordinator
ECPD	Environmental Compliance and Protection Division
EPA	Environmental Protection Agency
HAR	Hawaii Administrative Rules
HEER	State of Hawaii Department of Health, Hazard Evaluation and Emergency Response
LBP	Lead-Based Paint
MCBH	Marine Corps Base Hawaii
MCCS	Marine Corps Community Services
MCD	Facilities Engineering Maintenance Control Division
MEP	Maximum Extent Practicable
MRO	Facilities Engineering Maintenance Repair Operations
MS4	Municipal Separate Storm Sewer System
NRCS	United States Department of Agriculture, Natural Resource Conservation Service
NGPC	Notice of General Permit Coverage
NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System
NRC	U.S. Coast Guard National Response Center
OMC	Ohana Military Communities
OSHA	Occupational Safety and Health Administration
PM	Project Manager

PPE	Personal Protective Equipment
PPV	Public-Private Venture
SDS	Safety Data Sheet
SHWB	State of Hawaii Department of Health, Solid and Hazardous Waste Branch
SM	Site Management
SPCC	Spill Prevention Control Countermeasures
SWMP	Storm Water Management Plan
SWPPP	Storm Water Pollution Prevention Plan
USACE	United States Army Corps of Engineers

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1 Introduction

1.1 Purpose and Scope

The purpose of this *Maintenance Activities Best Management Practice (BMP) Field Manual* is to provide guidance on common maintenance procedures and BMP selection to reduce or eliminate the discharge of pollutants to State waters to the Maximum Extent Practicable (MEP). While this manual does not constitute an exhaustive list of all BMPs available, it does provide guidance suitable for use by a wide range of individuals at Marine Corps Base Hawaii (MCBH). Each user of the manual is responsible for working within their capabilities obtained through training and experience, and for seeking the advice and consultation of appropriate experts at all times. The target audience for this manual includes: all MCBH maintenance staff, specifically the Facilities Engineering Maintenance Control Division (MCD) and Maintenance Repair Operations (MRO), regulatory agencies (including permit staff and enforcement staff), and general public with an interest in storm water pollution control.

As of the effective date, September 1, 2021, MCBH is required to comply with the conditions of the National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4) Permit No. HIS000007. In accordance with Part D.1.d.(1) of the MS4 Permit, MCBH is required to develop and implement a Construction BMP Field Manual to establish BMP policy for construction projects. The Maintenance Activities BMP Field Manual is a key element of the Maintenance Activities BMPs Program to protect and restore the water quality of the surrounding surface waters. Refer to Chapter 9 of the Storm Water Management Program (SWMP) Plan for additional information on Maintenance Activities BMPs. Refer to Chapters 6 through 8 of the SWMP Plan for the objectives of MCBH's Base-wide Pollution Prevention and Good Housekeeping Program (Pollution Prevention Program).

1.2 Water Quality Impacts Related to Maintenance Activities

Common maintenance activities such as landscaping, painting, vehicle washing, and repair have the potential to impact the quality of water that surround MCBH. Oil, detergents, paints, lubricants, fertilizers, pesticides, and even green waste such as grass clippings are considered pollutants when found in State waters and estuaries. Selection of the appropriate BMPs can reduce the potential of these common activities to impact sensitive water resources.

1.3 Maintenance Activities and BMP Selection

Selection and implementation of BMPs is based on the pollution risks associated with specific activities. BMPs should be implemented to the MEP which includes addressing projects, regardless of size, that have the potential to impact water quality. Routine maintenance projects are scheduled, or cyclical projects performed, to preserve the life of a system; to restore the original function or delay the deterioration of an existing asset without substantially increasing is structural capacity; or to maintain the original line and grade, hydraulic capacity or original purpose of a facility, system, or asset, in which land disturbance does not go beyond the original footprint of the previous structure. This field manual contains BMPs for the most common activities performed in the field which include:

- Pavement and maintenance and cleaning
- Drainage system and utility maintenance
- Street cleaning
- Debris and trash removal
- Landscape maintenance
- Exterior maintenance on buildings
- Painting
- Spill clean up

Section 3 covers the general BMPs detailed in this manual. Table 6-1 lists the selected BMP Fact Sheets that can be found in Appendix A. These fact sheets include detailed implementation, operation, and maintenance information.

2 Maintenance Activities Program Organization

As a military installation, MCBH has several agencies that are responsible for the implementation of maintenance BMPs. In general, MCD and MRO are responsible for the general maintenance projects for all facilities within MCBH with the exception of Mokapu Elementary School, Public-Private Venture (PPV) Housing, and commercial tenants managed by Marine Corps Community Services (MCCS). Figure 2-1 shows the agencies responsible for overseeing that all Maintenance Activities Program requirements are met. The grey boxes indicate the agency responsible for implementation of BMPs at the facilities.

The MCBH Environmental Compliance and Protection Division (ECPD) is responsible for general oversight of the Maintenance Activities Program. This includes revising maintenance activity BMPs or policies, as needed, to meet program requirements and to facilitate program implementation.

2.1 Pollution Prevention Program

A crucial component of MCBH's SWMP Plan is its Base-wide Pollution Prevention Program. Generally, this is a multi-faceted maintenance program aimed at reducing pollutants from all MCBH-owned property to the MEP. MCBH-owned property includes facilities, roads, parking lots, maintenance facilities, and its MS4. MCBH's Pollution Prevention Program is separated into four main components including:

1. Debris Control Best Management Practices (BMPs) Program Plan (Chapter 6);
2. Chemical Applications BMPs Program Plan (Chapter 7);
3. Erosion Control BMPs Program Plan (Chapter 8); and
4. Maintenance Activities BMPs Program Plan (Chapter 9).

Each of these components is described in detail in individual chapters as noted above. This field manual focuses on information related to the MCBH SWMP Plan Chapter 9, Maintenance Activities BMPs.

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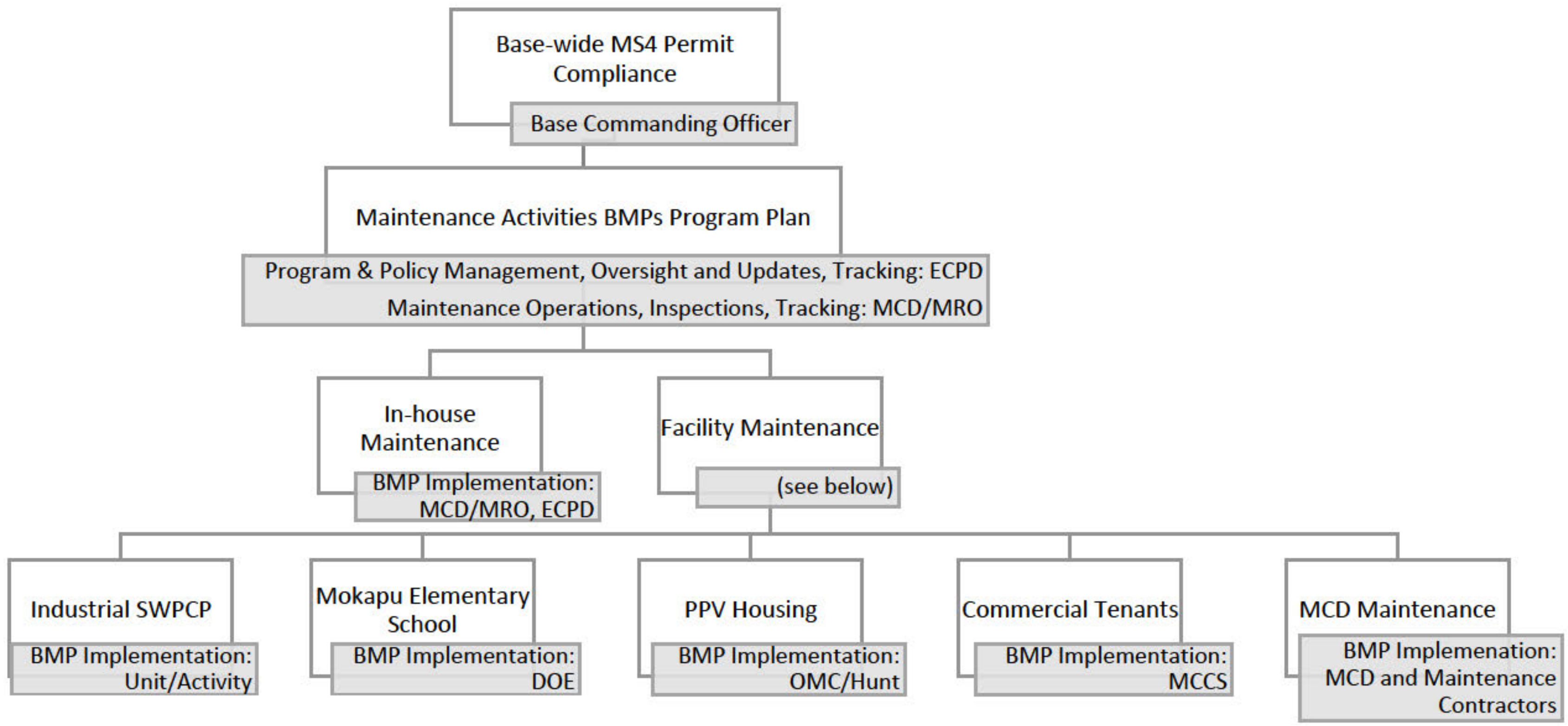

Figure 2-1 Maintenance Activities Program Organizational Chart

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3 BMPs for General Maintenance Activities

By using proper management techniques and practices, it is possible to improve control of the identified potential sources of pollutants and reduce the number of spills/releases to the stormwater system. BMPs and evaluation checklists are in Appendix A. The BMPs have been adapted from the Honolulu International Airport *Storm Water Management Program Plan* and the MCBH 2016 *Storm Water Management Plan, Appendix 11-3 Best Management Practices Fact Sheets*.

This section focuses on the common and universal BMPs related to Good Housekeeping, Street Sweeping, Chemical Applications, Vehicle / Equipment Activities, Material Handling, Waste Management, Inlet protection, Painting, and Spill Prevention. Additional BMPs and information can be found in Appendix A. Continued inspections and maintenance of BMPs are essential to maximizing the effectiveness of the device, application, or procedure.

3.1 Good Housekeeping Practices

Description

Daily maintenance activities require the use of materials and products that may be potential contaminants in storm water. Good housekeeping practices are intended to maintain a clean, safe, and orderly working environment where these materials are used or stored. Implementing the good housekeeping BMPs will reduce the amount of pollutants entering the storm water system.

Limitations

There are no major limitations to the implementation of this BMP.

1	Do not overfill trash dumpsters or leave trash outside of containers. Ensure that materials put into dumpsters will not leak out of dumpsters and commingle with storm water runoff. Use leak-proof dumpsters and keep covered when not in use.
2	Remove and properly dispose of debris from all areas daily.
3	Use appropriate clean up tools in the facility such as a broom for dry sweeping. Do not hose down facility floors with water or use a blower to remove clean up materials. Dry sweep or vacuum all areas to prevent tracking of materials.
4	Maintain ample spill clean-up supplies and keep them in proper physical condition.
5	Use absorbent materials to contain any non-hazardous spills. Promptly clean spills with rags or absorbent material, and properly dispose of cleaning materials. Put spent rags or absorbent material in a durable container until disposal can be facilitated. Disposal of hazardous spilled material should be in accordance with the Solid Waste Storage and Disposal BMP.
6	Inspect storm drain inlets regularly for illicit discharge such as sediment runoff or debris accumulation. Clean and remove debris as necessary.
7	Identify storm drains and waterways in each work area and prevent non-storm water discharges into the storm drainage system.
8	Conduct employee training on all best management practices regularly.

3.2 Street Sweeping Operations

Description

Street, runway, and taxiway sweeping is performed to remove litter and debris from the vehicle and aircraft travelways in order to prevent discharge of potential pollutants into the storm water drainage system, improve safety, and improve aesthetics.

Limitations

Applying BMP will be controlled by weather, air and surface traffic, controlled area access, and maintenance worker safety considerations.

1	Inspect and sweep applicable areas of MCBH regularly. When inspections or complaints indicate, sweep more frequently.
2	Properly maintain sweepers. Adjust broom heights frequently to maximize efficiency of sweeping operations.
3	Properly transport, store, and dispose of sweeper wastes when sweeper is full and when day of sweeping completed. Empty sweepers in designated area to capture solid material and minimize wind-blown materials.
4	Clean sweepers with clean water only in a contained area where water is properly treated and disposed of, such as the airport wash racks.
5	Keep logs of locations swept, tonnage of material swept, and disposal method of debris.

3.3 Fertilizer and Pesticide Applications

Description

Fertilizer and pesticide application may be conducted by tenant facility personnel or a hired contractor to maintain landscaping or to eliminate pests at their facility. Improper use of pesticides and fertilizers can lead to the presence of chemicals in stormwater. Pesticides are defined as chemicals used to kill pest animals or plants. They are typically used to control the growth of weeds or other undesirable vegetation. Occasionally, insecticides or rodenticides are used to control an infestation of insects or to prevent the spread of diseases (i.e., mosquito or rodent control).

Limitations

Fertilizer, pesticide, and herbicide application should not be conducted during inclement weather or applied within six feet of a waterway or on slopes greater than a three to one ratio.

1	Store fertilizers and pesticides in accordance with the Container and Material Storage BMPs in this Manual to minimize potential contact with stormwater runoff.
2	Periodically check the condition of containers. Look for leaking or corroded containers, crystallization on covers or bases of containers, or discolored labels. Dispose waste containers properly in accordance with the BMPs outlined in the Solid Waste Storage and Disposal section of this Manual.
3	Use fertilizers and pesticides only where needed in amounts or rates per the manufacturer’s recommendations; DO NOT over apply. Calibrate equipment regularly for proper application and loading rates.
4	Use natural or organic alternatives, if possible.
5	Ensure that any application is a minimum of six feet away from the MS4, drainage system, and State waters.
6	DO NOT apply fertilizers or pesticides before or during rainfall or high winds or on slopes greater than a three to one ratio.
7	Transfer or mix fertilizers and pesticides above an impervious surface or container; clean up spills immediately.
8	Follow all rules and laws, refer to the Hawaii Department of Agriculture, Plant Industry Division, Pesticide Branch for more information on the following: HRS, Administrative Rules, Chapter 66; HRS, Hawaii Pesticide Law, Chapter 149A; Senate Bill 3095; and Act 45 (2018).
9	Conduct employee training, as described under the Good Housekeeping Practices section of this Manual, at a minimum annually, or as required.
10	Consult the Pesticide Program Manager at ECPD for pesticide applications questions and approvals.

3.4 Storm Drain Inlet Protection

Description
Devices of various designs which detain sediment-laden runoff and allow the sediment to settle out of the water prior to discharge into a storm drain inlet or catch basin.

Limitations
- Inlet protection must not create a potential hazard to traffic and pedestrians.
- Drainage area shall not exceed 1 acre.
- Runoff may bypass protected inlets on slopes.
- Ponding will occur at a protected inlet, with possible short-term flooding.
- Straw bales are NOT effective for inlet protection.

1	Protect every storm drain inlet potentially receiving sediment-laden runoff, either by covering the inlet or promoting sedimentation upstream of the inlet.
2	Five types of inlet protection are presented below; however, other effective methods and proprietary devices exist and may be selected: • Filter Fabric Fence: Appropriate for drainage basins less than one acre with less than a 5 percent slope. • Block and Gravel Filter: Appropriate for flows greater than 0.5 cfs. • Gravel and Wire Mesh Filter: Used on curb or drop inlets where construction equipment may drive over the inlet. • Sand Bag Barrier: Used to create a small sediment trap upstream of inlets on sloped, paved streets. • Excavated Drop Inlet Sediment Trap: An excavated area around the inlet to trap sediment. Use only for drainage areas smaller than one acre unless a sediment trap first intercepts the runoff.
3	Select the appropriate type of inlet protection as identified above and design as referred to or as described herein. • Filter Fabric: Must be of sufficient strength and permeability to allow stormwater to pass through and retain sediment. Must be anchored such that the fabric will not fall into the drain when the grate is removed for maintenance.
4	Install inlet protection per manufacturer’s recommended procedures and instructions.
5	Provide area around the inlet for water to pond without flooding structures and property.
6	Inspect inlet protection devices prior to an anticipated rainfall event, after the rainfall event, and regularly at the end of each workweek. During extended rainfall events inspect inlet protection devices daily.
7	Remove sediment after each rainfall event or once the containment device is ½ full of sediment.
8	Check for storm drain labels (i.e., "no dumping", "drains to ocean")

3.5 Vehicle and Equipment Maintenance and Repair

Description

Routine maintenance of vehicles and equipment must be done to maintain their proper operation. The maintenance and repair activities conducted may include fluids removal, engine and parts cleaning, or tire repair and replacement. These activities represent a potentially significant source of contaminants due to the harmful materials and waste generated. This BMP is designed to prevent or reduce the impact of contaminates from maintenance and repair on the storm water system.

Limitations

There are no major limitations to the implementation of this BMP.

1	Maintain vehicles and equipment used at the facility in good operating condition.
2	Perform vehicles and equipment maintenance and repair activities in designated areas. When possible indoor or covered areas away from storm water runoff or on the painted area outside the maintenance shop.
3	Inspect damaged vehicles and equipment for fluid leaks and repair as soon as possible. Use drip pans as necessary and empty when full.
4	Remove fluids and batteries from damaged equipment and equipment no longer in use before storage. Store under cover, if possible, until repair or disposal.
5	Transfer removed vehicle fluids to designated storage container as soon as possible.
6	Use drip pans, tarps, or any other drainage control whenever removing fluids to capture any releases of oil, fluids, and solvent.
7	When not in use, store drums/containers of liquid material or waste indoors or under cover and within secondary containment pallets.
8	Designate areas in service bays for parts cleaning. Allow parts to drain over solvent tank or drip pan. Do not wash or rinse parts outdoors and do not allow solvent to drip or spill onto the floor.
9	Use appropriate clean up materials in the facility. Do not hose down with water or use a blower to remove clean up materials. Dry sweep or vacuum all areas.
10	Maintain well stocked spill kits throughout the facility, especially in maintenance areas to protect discharge to receiving waters and storm drain inlets in the event of spill.
11	Conduct employee training annually and as required.

3.6 Vehicle and Equipment Washing

Description

Periodic washing of vehicles and equipment may be performed at approved wash pads that discharges to an oil/water separator (OWS). Wash water may contain oils, greases, heavy metals, sediments, and other pollutants that can pose a threat to storm drain system and receiving water bodies. This BMP is intended to reduce the impact of these activities on storm water runoff.

Limitations

None.

1	Wash vehicles and equipment in designated washing areas using minimal water. Use approved biodegradable detergents.
2	Ensure the designated wash racks or wash areas of the facility are inside a building or on an impervious area where wash water can be contained and directed to an OWS that drains to the sewer system, wells, or retention pond. Obtain all applicable permits.
3	Follow posted directions for wash rack or wash area use.
4	See Solid Waste Storage and Disposal BMP for OWS maintenance.
5	Where applicable, sponge wash vehicles, or equipment with a bucket of water to eliminate excess wash water. Clean up any water on the ground or the floor using absorbent materials or a wet/dry vacuum immediately after washing.
6	Washing of personal vehicles are prohibited.
7	Conduct employee training annually and as required.

3.7 Vehicle and Equipment Fueling

Description

During fueling of vehicles and equipment, there is the potential for leaked or spilled fuel to contaminate storm water. The procedures outlined in this BMP are intended to prevent fuel spills and leaks and reduce their impact on storm water.

Limitations

There are no major limitations to the implementation of this BMP.

1	Perform fueling of aircraft, vehicles, and equipment in designated areas, away from storm drain inlets, drainage channels, or receiving waters.
2	Maintain an ample supply of spill cleanup materials and spill control equipment near fueling areas to protect discharge to storm drain inlets and receiving waters, in the event of a spill. Equip fuel trucks and mobile tanks with spill cleanup materials.
3	No topping off or no unattended fueling.
4	Post proper fueling and cleanup instructions in fueling areas.
5	Do not hose off fueling area. Use absorbents.
6	Inspect storage tanks, hoses and dispensing nozzles daily for cracks and leaks. If any defects are noticed, replace defective parts immediately or remove from service until repaired.
7	Check for proper operation of automatic shut off controls on fuel dispensing nozzles. Repair as needed.
8	Test, monitor, and maintain fuel storage tanks as required by all applicable federal, state and local laws.
9	Use absorbents materials to contain any spills. Promptly clean spills with rags or absorbent material, and properly dispose of cleaning materials. Put spent rags or absorbent material in a durable container until disposal can be facilitated. For larger spills, contact spill response personnel immediately. See Spill Prevention and Response BMP.
10	Train oil and hazardous material handling personnel annually and as required.

3.8 Material Storage

Description

A variety of products and materials that may adversely affect water quality are stored at the Maintenance Facility. This BMP is intended to reduce the potential for the contamination of storm water by minimizing exposure of such products and materials to storm water.

Limitations

There are no major limitations to the implementation of this BMP.

1	Store materials in their original or appropriate containers as recommended by the manufacturer. Store small containers of flammable materials within flammable storage lockers.
2	Ensure that all containers are closed, secured to prevent movement, fastened, stored neatly, and properly labeled.
3	Maintain accurate inventory of stored supplies. Periodically review inventory and properly dispose of materials that are expired or no longer used. Only purchase and store required quantities of hazardous materials.
4	Store materials and containers indoors or in covered areas. Containers holding liquid materials should also be within secondary containment.
5	Identify, list and inventory all chemical substances present in the facility. Compile Material Safety Data Sheets (MSDS) for all chemical substances. Have MSDS data readily accessible for facility employees.
6	Cover containers and materials with a plastic wrap or tarp when storing them outdoors temporarily (24 hours or less). Do not store materials outdoors that may leach pollutants into the storm water or come in contact with storm water runoff.
7	Ensure that aggregate piles are contained by CMU walls, berms, or other device to prevent the material from being carried away in the storm water runoff.
8	Maintain an ample supply of spill clean-up materials near storage areas.
9	Use absorbent materials to contain any spills. Promptly clean spills with rags or absorbent material, and properly dispose of cleaning materials. Put spent rags or absorbent material in a durable container until disposal can be facilitated. For larger spills, contact spill response personnel immediately. See Spill Response BMP.
10	Sweep or vacuum up spilled materials immediately.
11	Inspect material storage and equipment parking areas daily. Look for leaking or corroded containers, chemical discoloration, or other changes in the containers or contents that may indicate a potentially hazardous condition or chemical deterioration.
12	Conduct employee training regularly.

3.9 Material Handling and Use

Description

Prevent or reduce the discharge of pollutants to storm water from material handling by minimizing hazardous material use on site and training employees in the proper handling and use of materials. The loading and unloading of materials usually takes place outside; therefore, materials spilled, leaked, or lost during the process may collect in the soil or on other surfaces and have the potential to be carried away by storm water runoff. Additionally, paint, chemical, and carpentry applications may impact the environment.

Limitations

There are no major limitations to the implementation of this BMP.

1	Use materials only where and when needed to complete the work.
2	Minimize use of hazardous materials on-site. Use less hazardous, alternative materials where possible.
3	Follow manufacturer's instructions regarding uses, protective equipment, ventilation, flammability, and mixing of chemicals.
4	Limit exposure of material to rainfall whenever possible, such as only loading or unloading during dry weather or conducting the loading or unloading indoors or under cover. Avoid placing the loading area near storm drains or cover storm drains during loading or unloading operations.
5	Conduct regular dry sweeping of the loading or unloading areas.
6	Application of fertilizers, herbicides, or pesticides: • Do not over apply. • Prepare only the amount needed. • Follow the recommended usage instructions. • Except on steep slopes, till fertilizer into the soil rather than surface spreading or spraying it. • Apply surface dressings in several smaller applications, as opposed to one large application to allow time for infiltration and to avoid excess material being carried off-site by runoff. • Do not apply these chemicals just before it rains or in high winds. • Log material use for reporting purposes (see attached log sheets).
7	Carpentry Operations: • Use tools that have a vacuum or filter system to reduce airborne saw dust, whenever possible. • Sweep the area frequently to prevent saw dust from leaving the shop. • Dispose of saw dust sweepings in a covered waste bin.

Material Handling and Use (continued)

8	Painting Operations: • Conduct painting indoors or in the paint booth whenever possible. If painting must be done outdoors, such as to test striping, ensure that it is not raining. Note: if it begins to rain before the paint has dried, contain the area and clean it up according to the Spill Response BMP. • Ensure that paints are stored in sound containers to prevent leaks. • Use tarps or other containment devices to prevent paint drips from impacting the storm drains or surface waters. • Clean brushes and materials using a containment system such as solvent washer, bucket, or sink connected to the sanitary sewer. Note: never clean painting materials into the storm drain system. • Properly segregate and label waste paints for disposal according to the Solid Waste BMP. Note: oil-based paints are hazardous wastes.
9	Conduct employee training annually and as required.

3.10 Painting Operations

Description

Prevent or reduce the discharge of pollutants to stormwater from structure repair/ construction and painting by enclosing, covering or providing secondary containment around material storage areas, using good housekeeping practices, using less hazardous alternative products, and training employees.

Limitations

Less hazardous alternative products may not be available, suitable, or effective in every case.

1	Keep the work site clean and orderly.
2	Buy recycled or less hazardous products to the maximum extent practicable.
3	Conduct painting operations consistent with the state and federal safety (Occupational Safety and Health Administration), air quality regulations, and MCBH's air permit.
4	Properly store paints, epoxy compounds, solvents, and other liquid chemicals in water-tight containers with closed lids or covers. All liquids, except for water, must be stored under cover and in proper secondary containment. Containers must be well-labeled. It is recommended to store materials in their original containers.
5	Properly store powder chemicals and materials, such as cement, in sealed container or bags that are well-labeled. Cover and immediately repair or replace damaged containers. It is recommended to store materials in their original containers.
6	Properly store and dispose waste materials generated from the activity.
7	Enclose or cover painting operations to avoid drift.
8	Use application equipment that minimizes overspray.
9	Clean up spills immediately. Keep ample supply of cleanup material onsite at designated locations. Do not clean surfaces or spill by hosing the area down. Eliminate the source of the spill to prevent discharge or a furtherance of an ongoing discharge.
10	Use a drop cloth to collect residue from scraping or sand blasting operations and dispose of the residue properly.
11	Paint chips containing lead or tributyltin are considered a hazardous waste.
12	Remove as much paint from the brushes on painted surface. Clean painting equipment in a sink that is connected to the sanitary sewer, if possible. If not, direct all wash water into a leak-proof container or leak-pit pit. The container or pit must be designed so that no overflows can occur due to inadequate sizing or precipitation. Properly dispose of wash water.
13	Designate and locate onsite wash area a minimum of 50 feet away, or as far as practicable, from storm drain inlets, open drainage facilities, or water bodies.
14	Mix paints in a covered, contained area whenever possible, in case of a spill.

15	Recycle/dispose according to applicable laws and regulations residual paints, solvent, lumber and other materials to the maximum extent practicable.
16	Dispose containers only after all of the product has been used.
17	Make sure that nearby storm drains are well marked to minimize the chance of inadvertent disposal of residual paints and other liquids.
18	Ensure that employees doing the work are properly trained.
19	Dispose of sand blasted material properly. Chips and dust from marine paints or paints containing lead are to be disposed of as hazardous waste. Paint chips and dust from non-
20	Retain a complete set of SDS onsite at a designed location for easy access.
21	Maintain an inventory tracking software for all applications, as required by the air permit.

3.11 Waste Storage and Disposal

Description

The chemicals used at MCBH may ultimately require waste management. The improper handling of solid wastes can allow contaminants to enter the storm water runoff. The discharge of these pollutants can be prevented and reduced by tracking solid waste storage, handling, and disposal as well as reducing the waste generation through reuse and recycling.

The solid waste generated may include, but not be limited to, oil-based paints, solvents, thinners, petroleum products, acid from batteries, anti-freeze, and other compounds. Some of these wastes should be managed as hazardous waste, universal waste, and/or used oil as required by state and federal regulations. Hazardous waste generators are responsible for making a hazardous waste determination and to dispose of the waste properly. Universal waste includes batteries, some pesticides, mercury containing equipment (mercury thermostats), and bulbs (lamps).

The procedures outlined in this BMP are intended to prevent or reduce the discharge of pollutants to storm water and to the land from waste through proper solid waste storage and disposal and training of employees and subcontractors.

Limitations

All hazardous waste that can or cannot be reused or recycled must be disposed of by a certified hazardous waste hauler.

1	Use the entire product before disposing of the container. Minimize use of hazardous materials on-site. Use less hazardous, alternative materials where possible.
2	Do not remove the original product label; it contains important safety and disposal information.
3	Inspect containers regularly and transfer waste from damaged containers into containers that are intact.
4	Identify, list and inventory all chemical substances present in the facility. Compile Material Safety Data Sheets (MSDS) for all chemical substances. Have MSDS data readily accessible for facility employees
5	Only purchase and store required quantities of hazardous materials.
6	Do not clean out brushes or rinse paint containers into the dirt, street, gutter, storm drain, or stream. “Paint out” brushes as much as possible. Water-based paints should be dried and disposed of in a landfill. Dispose of excess oil-based paints and sludge as hazardous waste.
7	Ensure that hazardous waste or chemicals (acids, pesticides, additives, curing compounds) are not disposed of in dumpsters designated for dry construction debris.

Solid Waste Storage and Disposal (Continued)

8	Designate an indoor or covered hazardous waste collection area.
9	Hazardous wastes should be stored in secure, covered containers, and protected from damage. Place hazardous waste containers in secondary containment.
10	Label hazardous waste containers clearly with the words "Hazardous Waste" and the date when the hazardous waste accumulation began.
11	Do not mix waste, this can cause chemical reactions, make recycling impossible, and complicate disposal.
12	Arrange for regular hazardous waste collection before containers reach capacity.
13	Ensure that hazardous wastes are collected, removed, and disposed of only at authorized disposal sites by an approved hazardous waste hauler. Maintain disposal manifests for a minimum on three years.
14	Recycle any useful waste such as used oil, spent solvents, spent lead acid batteries, scrap metal, and used oil filters, etc. Filter and re-use thinners and solvents.
15	If the facility generates used oil, at a minimum, the facility shall store used oil in appropriate containers, label containers clearly with the words "Used Oil", and provide secondary containment.
14	If the facility generates Universal Waste, at a minimum, the facility shall store universal waste in appropriate containers, label containers clearly with the words "Universal Waste" followed by "lamps, batteries, etc.", and mark with the accumulation start date. Dispose of the Universal Waste within a year of the accumulation start date.
17	Place spill cleanup materials where it will be readily accessible.
18	If containers do spill, clean up immediately – follow procedures in Spill Prevention and Response BMP.
19	At minimum, OWSs must be inspected annually and cleaned to remove accumulated oil, grease, floating debris, and sediment in order to maintain solids and petroleum removal efficiency. Maintain an inspection and maintenance log.
20	Conduct employee training annually and as required.
21	Consult the ECPD Solid Waste Program Manager for further questions and approvals.

3.12 Spill Prevention and Response Practices

Description

In the event of a hazardous substance or oil spill, the Environmental Compliance Coordinator (ECC) and ECPD shall be notified immediately (ECPD: 808-630-8246). If the spill cannot be easily addressed using an onsite spill kit and personal protective equipment, call Fed Fire (Military 911). The spill source should be immediately controlled if it is safe to do so by closing valves, switches, and/or turning off power to a device. Then, contain the spill by using sorbent socks or absorbent materials found in a spill kit. After it has been contained, clean up the spilled material in a safe manner using dry methods. All materials should then be properly disposed of.

Limitations

A spill response contractor may need to be retained to respond to large or hazardous spills.

6 Steps to Clean Up an Oil Spill

1	**SAFETY First.** Let someone in command know what's happened. You are going to need HELP Identify the Physical and Chemical Hazards: use the SOS (Safety Data Sheet) Use the Proper (Level D) PPE Gloves, Eye Protection and Splash Guard (apron)
2	**NOTIFY Environmental and the proper Authorities.** Let your supervisor or ECC know Your Supervisor or the ECC may call Emergency Dispatch Fed Fire (Military 911) IMMEDIATELY Call Base ENVIRONMENTAL (808) 630-8246 Rusty or Dave Carter "DC" (808) 349-7300 for ALL spills - even one drop
3	**CONTROL the Source.** Close Valves, Close Switches, Turn Off the Power, Right the Container, Plug the Hole
4	**CONTAIN the Spilled Material.** Cover affected storm drain with appropriately sized "storm drain mat". Use sorbent socks and oil dry to contain the spill and keep it from spreading Use sorbent socks, oil dry or oil sponge to protect the drains Use oil boom for containment if it gets into the water
5	**CLEAN-UP the Spilled Material**. Use sorbent material (pads, rolls or pillows) or adsorball (clay) to soak up the product Use non sparking shovels or brooms and dust pans to pick up the oil dry
6	**DISPOSE (properly) of the Cleanup Materials** Put the sorbent material into clear 6 mil plastic bags. Use clear bags so HAZWASTE can see what's in them (no liquids in the bag) Schedule for HAZWASTE for pick up sorbents and liquids

IMMEDIATELY call ENVIRONMENTAL at (808) 630-8246 RUSTY

or DC (Dave Carter - Damage Control) at (808) 257-3088

Submit a written SPILL REPORT to roger.nall@usmc.mil

4 References

Marine Corps Base Hawaii, *Small Municipal Separate Storm Sewer System (Small MS4) and Industrial Facilities, NPDES Permit No. HIS000007*, 2021

Marine Corps Base Hawaii, *Storm Water Management Plan, Appendix 11-3 Best Management Practices Fact Sheets*, 2016.

State of Hawaii Department of Transportation, Airports Division, *Construction Activities BMP Field Manual*, 2019.

State of Hawaii Department of Transportation, Airports Division, *Best Management Practice Field Manual for Operations at State of Hawaii Airports*, 2022.

5 Disclaimer

The information presented in this MCBH Maintenance Activities BMP Field Manual was adopted from available and most recent sources that have locally acceptable BMPs and stormwater runoff control measures. This manual has been prepared as a reference guideline, however, due to site-specific conditions, the selection of the BMPs must be used in conjunction with the best professional judgment and sound engineering principles to assure proper function and performance of the BMPs contained herein. The author does not guarantee the accuracy or completeness of this document and will not assume any liability or responsibility for the use of, or for any damages resulting from the use of any information contained herein. The detail and the wording in this manual will not necessarily result in compliance with NPDES permit requirements or other requirements specific to the user’s site or construction contract. Application of BMPs should comply with applicable federal, state, and county regulations.

6 Selected BMP Fact Sheets

Table 6-1 Selected BMP Fact Sheets

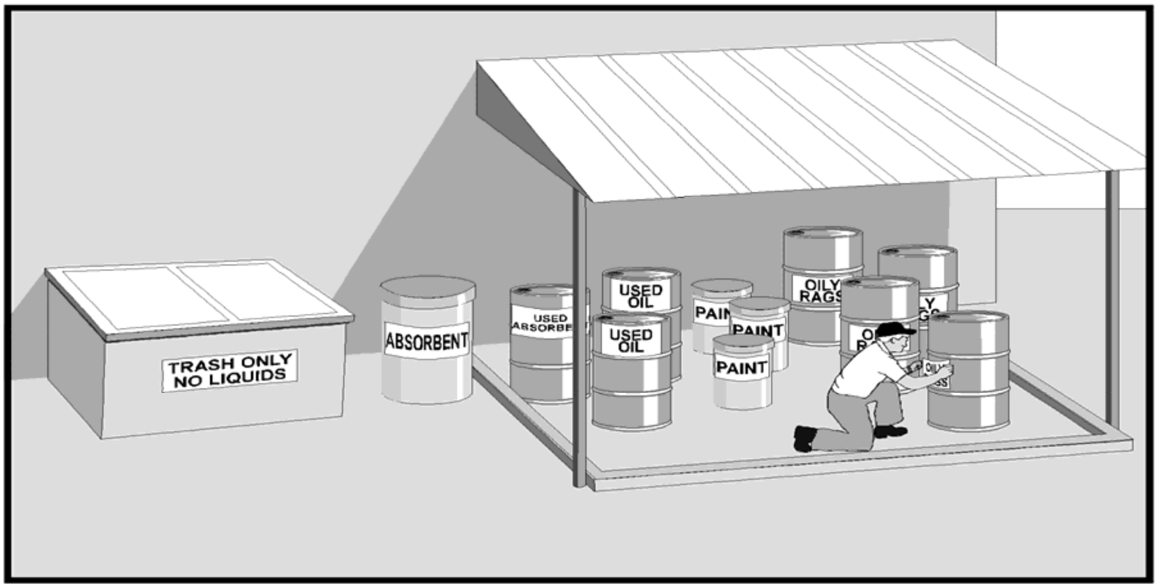
BMP No.	BMP Title
001	Label All Drums, Cans, Containers, Tanks, and Valves
002	Restrict Access to Area and Equipment
003	Perform Regular Cleaning
004	Avoid Hosing Down the Site
005	Perform Regular Pavement Sweeping
006	Control Spills
007	Place Trash Receptacles at Appropriate Locations
008	Train Employees to Properly Dispose of Wastes
009	Permanently Seal Floor Drains that Discharge to the Storm Drain System
010	Confirm that No Industrial Sinks are Connected to the Storm Drain System
011	Construct Berm or Dike Around Critical Areas
012	Pave Bermed Areas
013	Provide Valve for Outlet Pipe in Containment Area
014	Recycle
015	Store Waste and Recycling Materials in Proper Containers
016	Limit Significant Materials Inventory
017	Provide Roof to Cover Source Area
018	Control Roof Downspout Discharge
019	Minimize Storm Water Run-On from Adjacent Facilities and Properties
020	Reduce Waste
021	Repair Leaky Roofs
022	Permanently Seal Drains Within Critical Areas that Discharge to the Storm Drain
023	Place Portable Rubber Mats over Storm Drain Inlets
024	Insert Filter in Catch Basin
025	Place Absorbent Blankets in Catch Basin
026	Routinely Clean Catch Basins
027	Stencil Signs on Storm Drain Inlets
028	Keep Equipment and Vehicles Clean
029	Maintain Equipment in Good Condition
030	Implement Qualifying Tests for Equipment and Vehicle Operators
031	Conduct Refresher Courses in Operating and Safety Procedures
032	Dispose of Obsolete Equipment, Inoperable Vehicles, and Surplus Materials
033	Check Vehicles and Equipment for Leaks
034	Park Vehicles or Equipment Indoors or under a Roof
035	Park Vehicles on an Impervious Surface
036	Designate Special Areas for Draining or Replacing Fluids
037	Drain All Fluids from Stored or Salvaged Vehicles and Equipment
038	Completely Drain Oil Filters Before Disposal
039	Wash Equipment and Vehicles in Designated Area
040	Discharge Wash Water to a Sanitary Sewer
041	Recycle Pressure Wash Solvents
042	Use Drip Pans under Leaking Equipment

BMP No.	BMP Title
043	Designate Areas for Washing Non- Vehicular Air Filters and Other Greasy Equipment
044	Conduct Maintenance within a Building or Covered Area
045	Reduce the Amount of Liquid Cleaning Agents Used
046	Centralize Liquid Solvent Cleaning to One Location
047	Substitute Non-Toxic or Less-Toxic Cleaning Solvents
048	Use Solvents Efficiently
049	Use Outside Contractor for Handling Used Solvents and Other Significant Materials
050	Properly Store Containers
051	Use Overpack Containers or Containment Pallets to Store 55 Gallon Drums or containers Outside of Storage Areas
052	Use "Doghouse" Design for Outdoor Storage of Small Liquid Containers
053	Do Not Store Used Parts or Containers Directly on Ground
054	Do Not Allow Open Flames Near Flammable Material
055	Use Door Skirt or Seal
056	Employ Proper Handling Procedures to Transport Materials and Waste
057	Store Liquids and Significant Materials within a Building or Covered Area
058	Provide Overfill Protection
059	Monitor Major Fueling Operations
060	Provide Absorbent Booms in Unbermed Fueling Areas
061	Eliminate Topping off Tanks
062	Install Leak Detection System
063	Designate Areas for Fueling from Mobile Fuel Tankers
064	Restrict Access to Tanks
065	Lock Fuel Tanks When Not in Use or on Standby
066	Keep Tanks, Piping, and Valves in Good Condition
067	Protect Tanks from Being Damaged by Vehicles
068	Protect Fill Pipe from Being Damaged by Vehicles
069	Provide Protection for Permanent Aboveground Tanks from Discharge of Firearms
070	Enclose Outdoor Sanding and Painting Operations and Use Tarps to Contain and Collect Solid Wastes
071	Vacuum Particulate Wastes from Sanding or Painting Operations
072	Conduct Indoor Sanding and Painting in an Enclosed Area
073	Avoid Sanding or Painting in Windy Weather
074	Use Efficient Painting Equipment
075	Do Not Empty Toilet Tanks During Transit or in the Port
076	Do Not Discharge Bilge Water in Harbor
077	Do Not Discharge Bilge Water in Harbor
078	Use Oil Containment Booms
079	Properly Dispose of Sediment Generated by Cleaning Sanitary Sewer Lines
080	Eliminate Treated Wood Products or Use Wood Treated with Less-Toxic Chemicals
081	Establish Integrated Pest Control
082	Conduct Pesticide Operations under the Supervision of Licensed Applicator
083	Divert Drainage to Treatment Facility/Sanitary Sewer
084	Divert Drainage to a Low-Flow Sump
085	Construct Oil/Water Separator
086	Deleted
087	Deleted
088	Deleted

BMP No.	BMP Title
089	Deleted
090	Deleted
091	Deleted
092	Deleted
093	Deleted
094	Deleted
095	Deleted
096	Construct Concrete Grid Pavement
097	Regularly Inspect and Maintain Storm Water Conveyance System
098	Regularly Inspect and Test Equipment
099	Prepare Appropriate Spill Prevention and Response Plans
100	Conduct Personnel Training Regarding the SWPPP
101	Store Containers Inside Secondary Containment
102	Control Dust and Particulates
103	Do Not Pour or Deposit Waste into Storm Drains
104	Routinely Report Any Observed Non- Storm Water Discharges
105	Deleted
106	Deleted
107	Deleted
108	Deleted
109	Deleted
110	Timing of Construction
111	Staging Areas
112	Preservation of Existing Vegetation
113	Clearing Limits
114	Stabilization of Construction Entrance and Roads
115	Erosion Prevention on Temporary and Private Roads
116	Dust Control
117	Cover for Materials and Equipment
118	Spill Prevention and Control
119	Vehicle/Equipment Washing and Maintenance
120	Waste Management
121	Mulching
122	Hydromulching
123	Geotextile
124	Matting
125	Pipe Slope Drain
126	Slope Roughening
127	Gradient Terracing
128	Retaining Walls
129	Gabions
130	Riprap Slope and Outlet Protection
131	Inlet Protection
132	Check Dams
133	Temporary Stream Crossing
134	Straw Bales/Biofilter Bags
135	Silt Fence

BMP No.	BMP Title
136	Vegetative Buffer Strip
137	Sedimentation Trap (Basin)
138	Portable Sediment Tank
139	Temporary Swale
140	Earth Dike
141	Perimeter Dike/Swale
142	Temporary Berms (Sandbags)
143	Temporary Storm Drain Diversion
144	Topsoiling
145	Seeding
146	Sodding
147	Planting

BMP 001 - LABEL ALL DRUMS, CANS, CONTAINERS, AND TANKS



Description of Potential Pollutant and Source: Drums, cans, and containers can be improperly managed and disposed of due to uncertainty of the container's contents. Tanks which are not labeled may result in improper use of the tank or fuel, which may result in the exposure of significant materials to storm water and/or receiving waters. Similarly, unlabeled valves may be opened without proper precaution due to lack of user information. Storm water quality will be affected if significant materials are improperly disposed to the storm drain and/or receiving waters. Lack of labeling will also make it difficult to quickly identify the type of material released so facility personnel can respond correctly. Labels also identify hazardous materials at the facility and are a good way to request caution in certain areas (e.g., drums indicating flammability).

Description of BMP: Label all drums, valves, pumps, cans, tanks, and containers to reduce the chance of misuse and eventual spills. Labeling ensures that the appropriate procedures, equipment, and storage containers are used. All containers will be labeled as to what is in them.

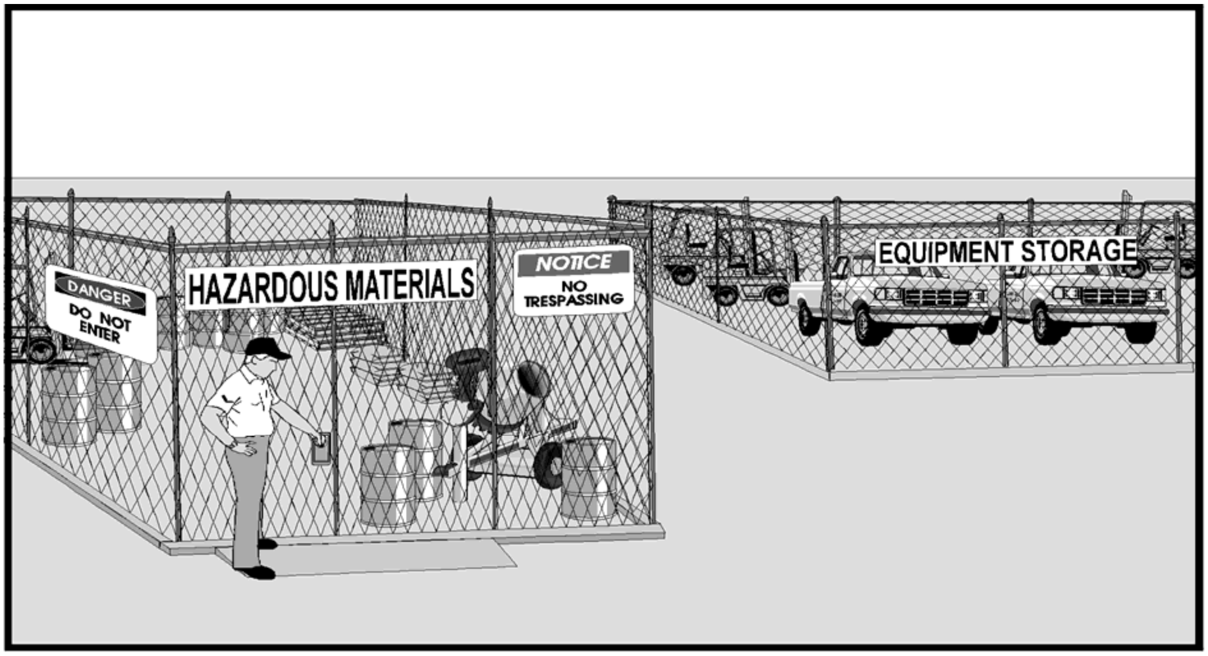
Application Guidance: As needed.

Training: N/A

Effectiveness and Cost: Effectiveness and costs will vary depending on the application.

Limitations: None

BMP 002 - RESTRICT ACCESS TO AREA AND EQUIPMENT



Description of Potential Pollutant and Source: Vandalism of vehicles and facility property may result in the release of significant materials.

Description of BMP: Provide fences and gate areas where vehicles, equipment and materials are stored and are accessible to the public to discourage trespassing. Access to equipment will also be restricted. Only authorized personnel will be allowed to operate equipment. The fences and gates will be properly maintained, and additional security measures including lighting of the area will be implemented if the fencing alone proves insufficient. Where appropriate, security guards or alarms will be used.

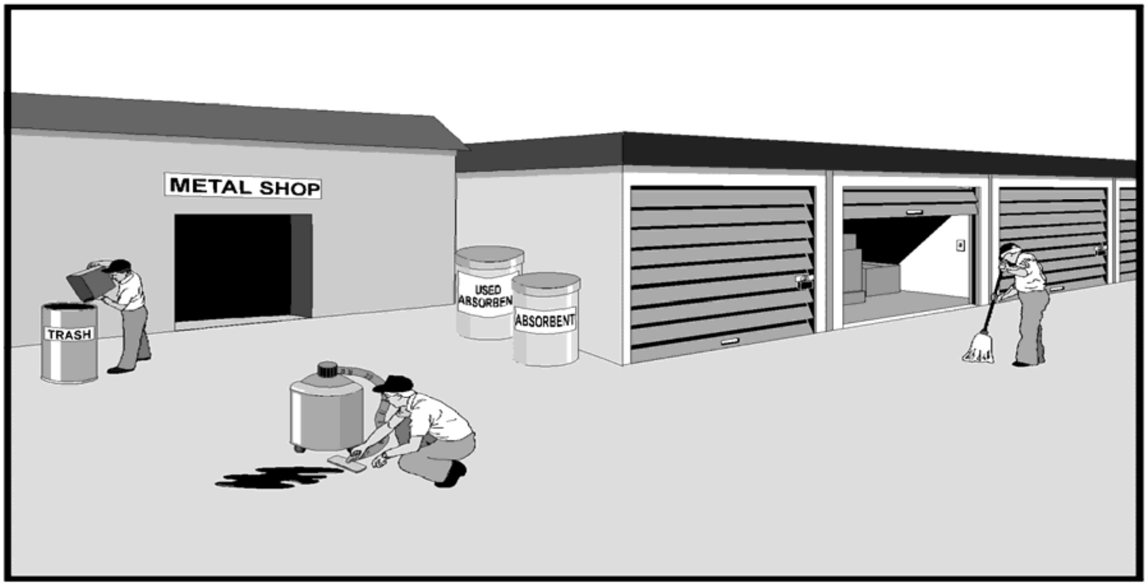
Application Guidance: As needed.

Training: N/A

Effectiveness and Cost: Effectiveness and costs will vary depending on the application.

Limitations: None

BMP 003 - PERFORM REGULAR CLEANING



Description of Potential Pollutant and Source: Dirt, surplus materials, and spilled or dropped materials are often allowed to accumulate in areas such as maintenance shops, manufacturing facilities, metal fabrication shops, loading docks, and storage areas. Pollutants from the accumulated material can be transported by storm water to the storm drain system. A clean and orderly work area reduces the possibility of accidental spills caused by mishandling of chemicals and equipment and should reduce safety hazards to personnel.

Description of BMP: Maintain a regular general sweeping and cleaning schedule to reduce buildup of waste materials and minimizes the amount of significant materials exposed to storm water. General cleaning includes dusting and keeping work areas neat and organized.

Floors and ground surfaces will be kept dry using brooms, shovels, vacuum cleaners, or cleaning machines. It is important to perform dry sweeping and dry cleaning (as opposed to hosing down areas as discussed in BMP 004). Garbage and waste materials will be collected and disposed regularly. Particular emphases will be placed on sweeping and cleaning outdoor areas as close as possible to a forecasted rainfall. Any granular absorbent materials used for spill cleanup will be removed and properly disposed before a rainfall.

Application Guidance: Cleanup and sweeping will be performed daily and more often as necessary to remove all loose trash, paint cans, discarded construction materials, sediment, oil, solvents, plastics and other significant materials. Additional clean up and sweeping will be performed before anticipated storm events. Additionally, a regular sweeping schedule will be maintained.

The frequency for implementing this BMP has been provided as general guidance. However, a facility operator may wish to establish a more suitable frequency. This will require SWPCP implementor to make judgements based on facility operations and conditions. To assign a frequency other than what has been suggested (i.e., more or less frequent), the following criteria will be considered and rated either High, Medium, or Low. If many of the criteria are assigned a High rating, the frequency may be increased. Similarly, if many criteria are assigned a Low rating, the frequency may be decreased. The goal of implementing this BMP is to minimize exposure of pollutants to storm water.

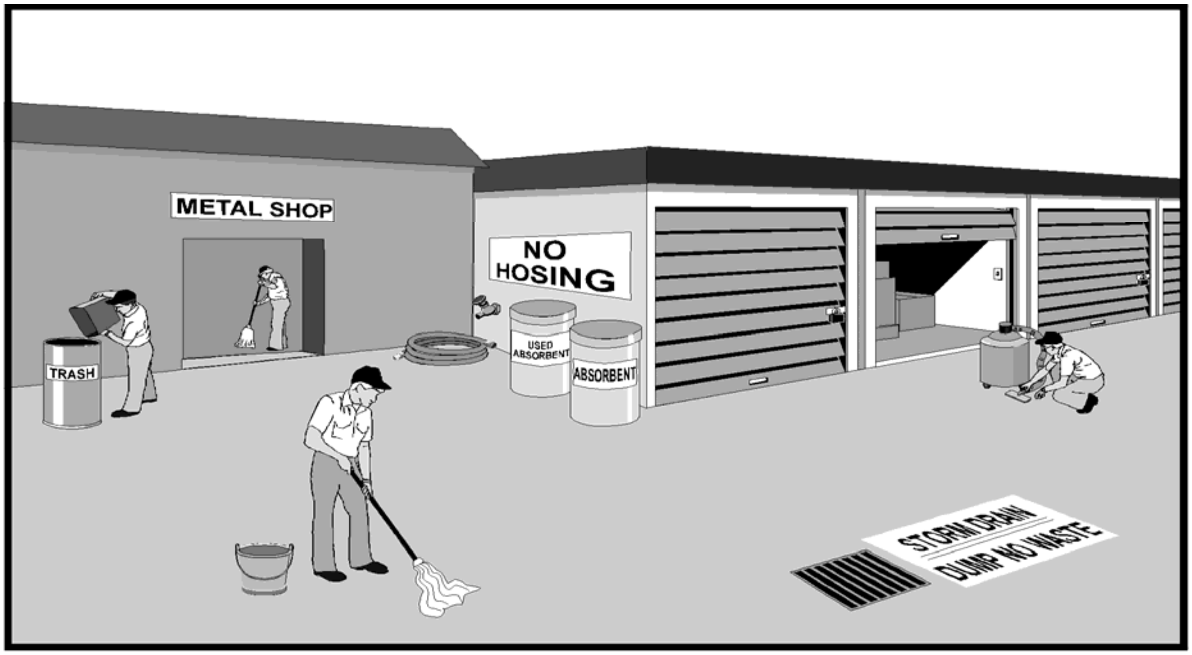
CRITERIA	Rating H=High M=Medium
Probability of exposure of significant materials to storm water	
Quantity of significant materials potentially exposed	
Toxicity of significant materials potentially exposed	
Frequency of use of significant materials potentially exposed	
Evidence of exposure (e.g., stains on pavement, etching of concrete)	
Proximity of source area to outfall or receiving water	
Sensitivity of receiving water to potentially exposed significant materials (e.g., waters with beneficial uses such as human contact, recreation, significant species habitat, etc.)	

Training: Personnel will be trained to ensure that all waste be managed within guidelines of applicable federal, state, and local regulations. Signs will be posted as reminders.

Effectiveness and Cost: Regular general cleaning is a highly effective, low-cost BMP.

Limitations: None

BMP 004 - AVOID HOSING DOWN THE SITE



Description of Potential Pollutant and Source: Cleaning work sites by hosing down causes wash water to transport pollutants to the storm drain where it can be exposed to storm water.

Description of BMP: Use dry methods to clean work sites. Dry methods include sweeping or using damp rags or mops. If possible or practical, hoses will be removed. If hosing down is unavoidable, the downstream drain will be temporarily plugged as described in the following BMPs:

- BMP 032 - Place portable Rubber Mats Over Storm Drain Inlets
- BMP 024 - Insert Filter in Catch Basin
- BMP 025 - Place Absorbent Blankets in Catch Basin

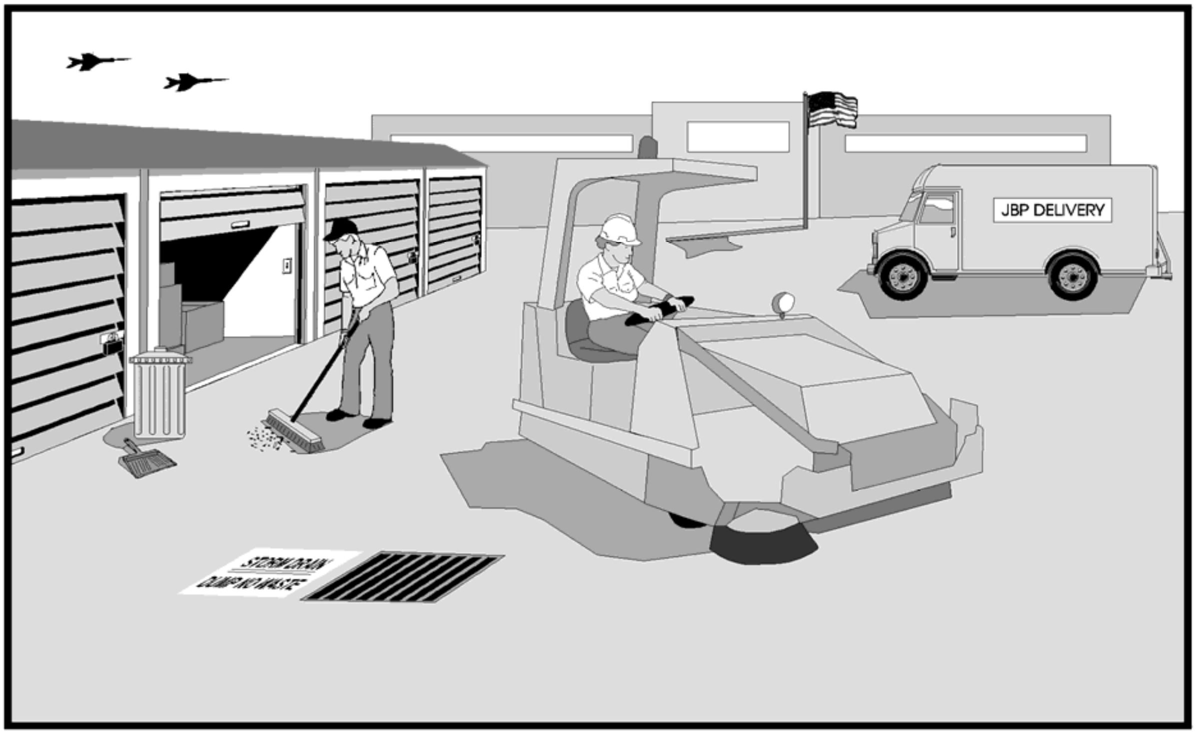
Application Guidance: Methods of dry cleaning will be used whenever possible at all work stations, loading/unloading sites, storage areas, and parking lots.

Training: New personnel will be notified of the policy and signs will be posted. If possible or practical, hoses will be removed.

Effectiveness and Cost: Eliminating hosing down is a highly effective, low-cost BMP.

Limitations: None

BMP 005- PERFORM REGULAR PAVEMENT SWEEPING



Description of Potential Pollutant and Source: Trash, litter and particulate matter typically accumulate on paved surfaces. These materials are then transported during storm events into the storm water system or directly into receiving waters (e.g., from piers).

Description of BMP: Dry sweep paved areas regularly to prevent pollutants and debris from entering storm drains.

Application Guidance: Dry sweeping of paved areas will be performed semi-monthly. Particular emphasis will be placed on sweeping the paved areas prior to the wet season and frequently during the wet season.

The frequency for implementing this BMP has been provided as general guidance. However, a facility operator may wish to establish a more suitable frequency. This will require SWPCP implementors to make judgements based on facility operations and conditions. To assign a frequency other than what has been suggested (i.e., more or less frequent), the following criteria will be considered and rated either High, Medium, or Low. If many of the criteria are assigned a High rating, the frequency may be increased. Similarly, if many criteria are assigned a Low rating, the frequency may be decreased. The goal of implementing this BMP is to minimize exposure of pollutants to storm water.

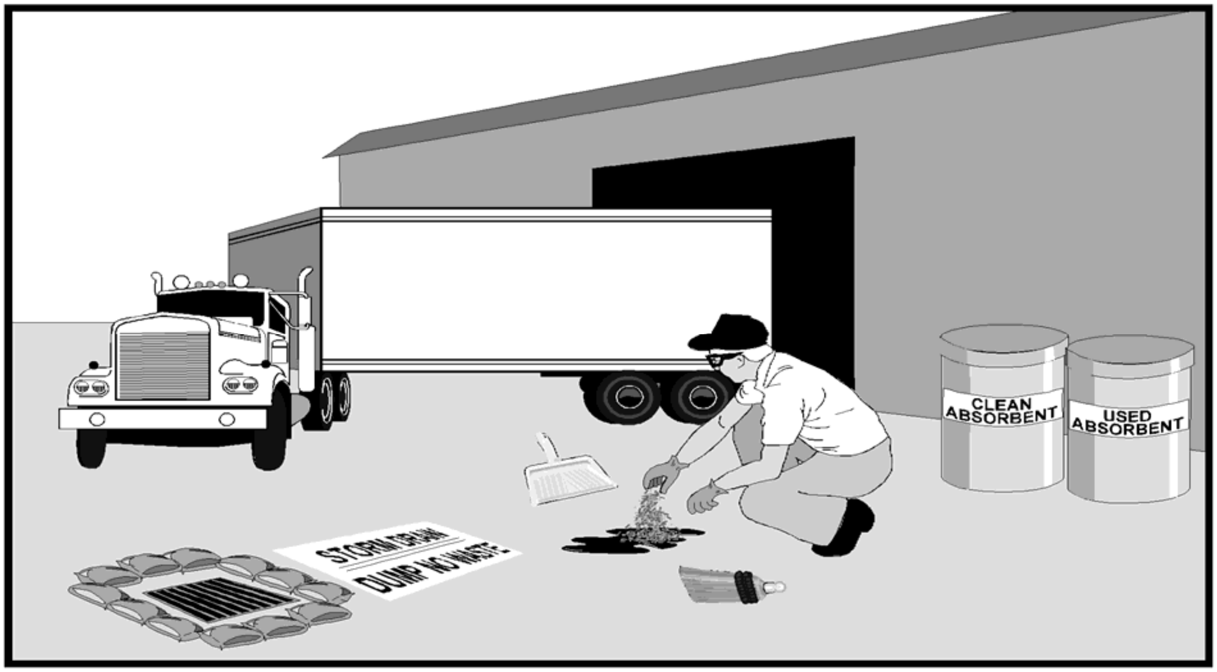
CRITERIA	Rating H=High M=Medium L=Low
Probability of exposure of significant materials to storm water	
Quantity of significant materials potentially exposed	
Toxicity of significant materials potentially exposed	
Frequency of use of significant materials potentially exposed	
Evidence of exposure (e.g., stains on pavement, etching of concrete)	
Proximity of source area to outfall or receiving water	
Sensitivity of receiving water to potentially exposed significant materials (e.g., waters with beneficial uses such as human contact, recreation, significant species habitat, etc.)	

Training: Personnel will be trained to use a small vacuum sweeper, if available, instead of a mechanical brush sweeper since the vacuum is more effective at removing fine particulate matter.

Effectiveness and Cost: Dry sweeping is a moderately effective, high-cost BMP, especially if a vacuum sweeper must be purchased.

Limitations: Layout of the site, amount of paved surface area, and the availability of funds for purchase of equipment may limit the use of this practice.

BMP 006 - CONTROL SPILLS



Description of Potential Pollutant and Source: Spills of significant materials may be exposed to storm water and transported to storm drains and/or receiving waters.

Description of BMP: Follow material safety data sheets (MSDS) for handling, storage, and cleanup of all significant materials to reduce the potential for spills.

Any spill, large or small, of significant materials will be controlled to prevent pollutants from being transported to storm drains and/or receiving waters. Appropriate spill control material will be kept on site. Smaller spills will be contained using absorbent material such as kitty litter, straw, or sawdust. Drums of absorbent material will be easily accessible and clearly marked, and containers for spent absorbent material will be readily available. Spent absorbent material will be managed appropriately and disposed of in accordance with applicable regulations. Larger spills will be controlled using spill kits, brooms, and other response equipment commensurate with the size of the spill. The methods outlined in the Activity's spill prevention and response plans (BMP 112) for hazardous materials will be followed for spills of any potential storm water pollutants. The date, time, nature and volume of material spilled, and cleanup measures taken will be recorded for all spills and kept as part of the SWPCP.

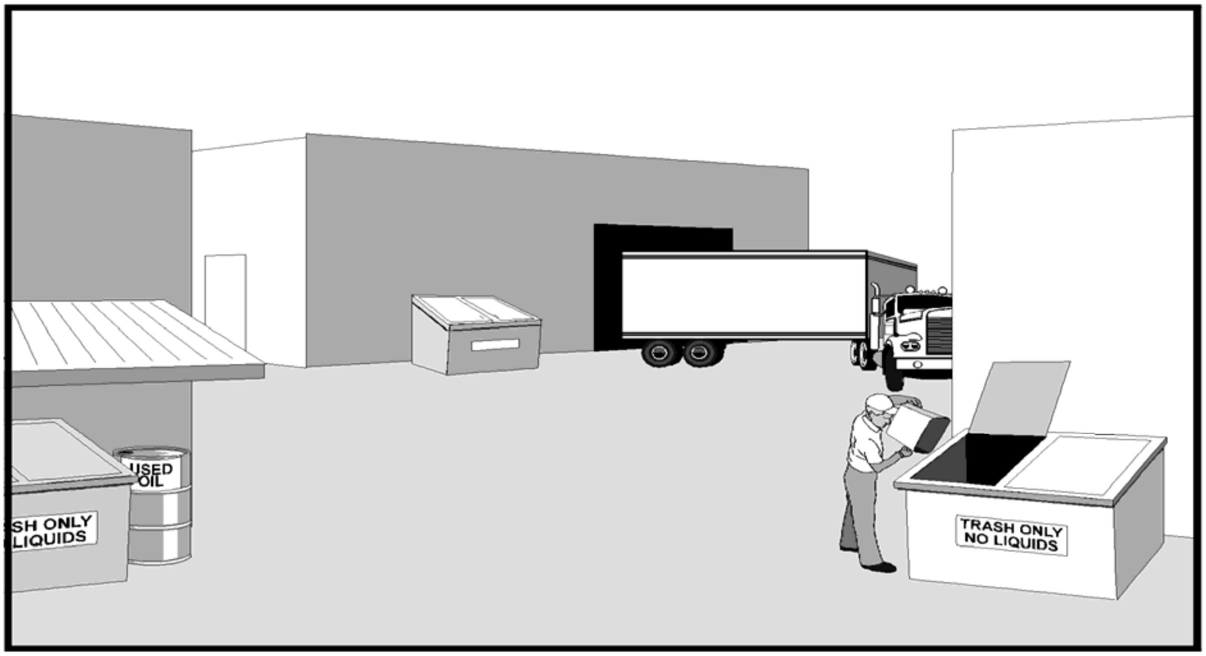
Application Guidance: Controlling spills will be practiced under all working conditions.

Training: Personnel will be trained in spill prevention and response procedures including the use of personal protection equipment (gloves, eye and face protection, etc.). This will include what absorbent or equipment to use, how to use the absorbent or equipment, where to find it, how to dispose of the spent absorbent or other material, and who to notify in the event of a spill.

Effectiveness and Cost: Spill control is a moderately effective, low-cost BMP.

Limitations: None

BMP 007 - PLACE TRASH RECEPTACLES AT APPROPRIATE LOCATIONS



Description of Potential Pollutant and Source: Improperly located or insufficient numbers of trash receptacles will promote poor housekeeping practices. This will increase the opportunity for pollutants from all source areas to reach storm water.

Description of BMP**:** Properly located and sufficient numbers of trash receptacles will promote the proper disposal of waste materials. This reduces the opportunity for pollutants to reach storm water. Trash receptacles will be easily accessible for personnel.

Application Guidelines: Placement of trash receptacles at appropriate locations will always be practiced.

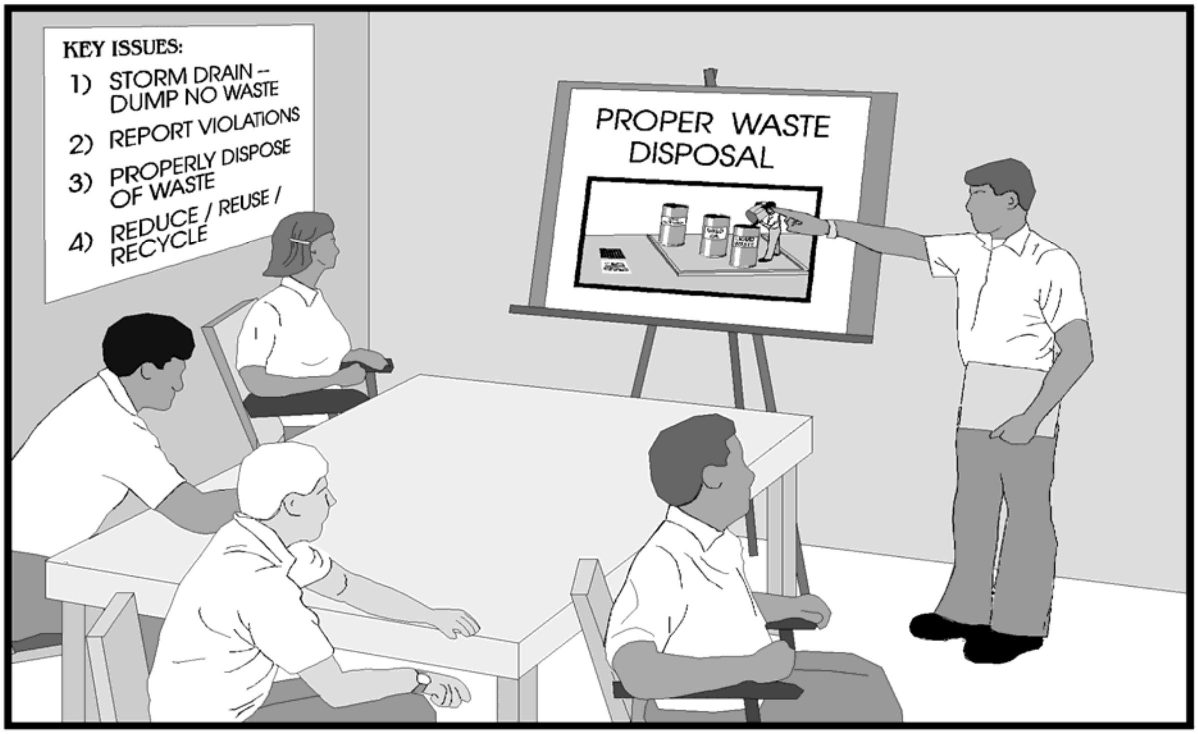
Training: Personnel will be trained as to the location of trash receptacles.

Effectiveness and Cost: Appropriately located trash receptacles are an effective, low-cost BMP.

Limitations: None

PLACEHOLDER

BMP 009 - TRAIN EMPLOYEES TO PROPERLY DISPOSE OF WASTES



Description of Potential Pollutant and Source: Waste poured or deposited into storm drains contains pollutants which will enter the storm drain system and receiving waters without treatment.

Description of BMP: Train employees on proper waste disposal and recycling procedures. Refer also to BMP 118, "Routinely Report Any Observed Non-Storm Water Discharges," and BMP 027, "Stencil Signs on Storm Drain Inlets."

Application Guidance: Training will be performed for all new personnel and semi-annually for all personnel.

The frequency for implementing this BMP has been provided as general guidance. However, a facility operator may wish to establish a more suitable frequency. This will require SWPCP implementors to make judgements based on facility operations and conditions. To assign a frequency other than what has been suggested (i.e., more or less frequent), the following criteria will be considered and rated either High, Medium, or Low. If many of the criteria are assigned a High rating, the frequency may be increased. Similarly, if many criteria are assigned a Low rating, the frequency may be decreased. The goal of implementing this BMP is to minimize exposure of pollutants to storm water.

CRITERIA	Rating H=High M=Medium L=Low
Probability of exposure of significant materials to storm water	
Quantity of significant materials potentially exposed	
Toxicity of significant materials potentially exposed	
Frequency of use of significant materials potentially exposed	
Evidence of exposure (e.g., stains on pavement, etching of concrete)	
Proximity of source area to outfall or receiving water	
Sensitivity of receiving water to potentially exposed significant materials (e.g., waters with beneficial uses such as human contact, recreation, significant species habitat, etc.)	
Frequency of personnel turnover	

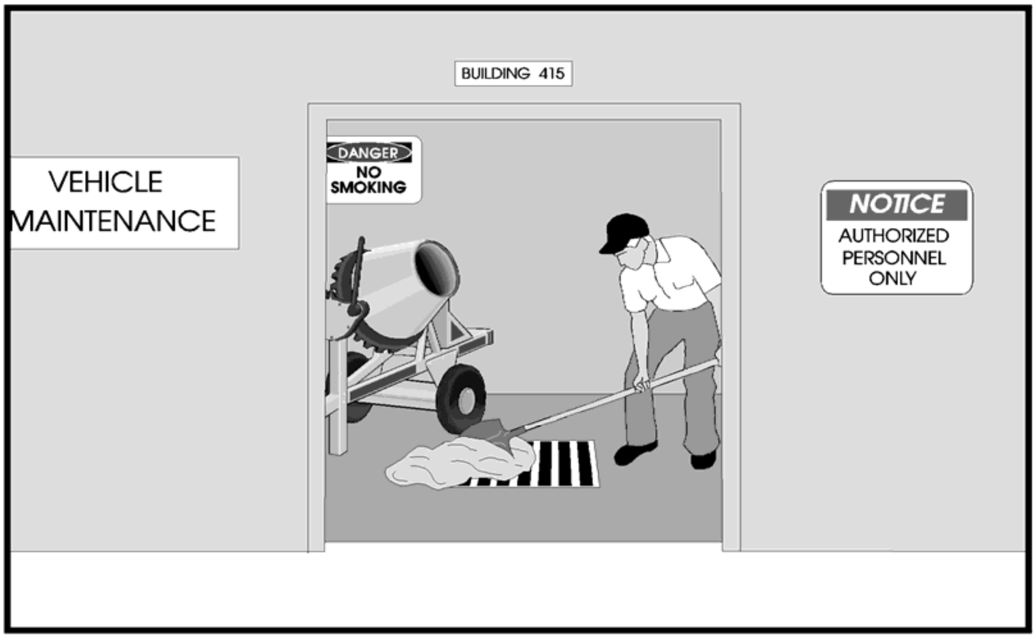
Training: Training will include the following:

- Train personnel at all levels not to pour or deposit wastes into storm drains or storm drain connections.
- Train personnel to properly dispose or recycle materials.
- Train personnel at all levels to report any observable non-storm water discharges.

Effectiveness and Cost: This is a highly effective, low-cost BMP.

Limitations: None

BMP 010 - PERMANENTLY SEAL FLOOR DRAINS THAT DISCHARGE TO THE STORM DRAIN SYSTEM



Description of Potential Pollutant and Source: Floor drains that are connected to the storm drain system provide a pathway for spilled or leaked material to enter the system.

Description of BMP: Permanently seal floor drains inside buildings (whenever this would not adversely affect safety or structural integrity) to prevent accidental illegal dumping of pollutants into the storm water system.

Application Guidance: N/A

Training: N/A

Effectiveness and Cost: This is a highly effective, low-cost BMP.

Limitations: None

BMP 011 - CONFIRM THAT NO INDUSTRIAL SINKS ARE CONNECTED TO THE STORM DRAIN SYSTEM

Description of Potential Pollutant and Source: Industrial sinks and floor drains connected to the storm drain system can introduce pollutants directly to the storm drain system and receiving waters without treatment.

Description of BMP: Connect sinks and floor drains in industrial areas to a sanitary sewer or other disposal location. "As-builts," piping diagrams, and building or site plans will be inspected to verify that the sinks and floor drains are not connected to the storm drain system, especially in casually constructed shop areas. Additional reconnaissance may be performed to look for plumbing changes not shown on available plans. If an illicit connection to the storm drain system is suspected, additional testing will be performed.

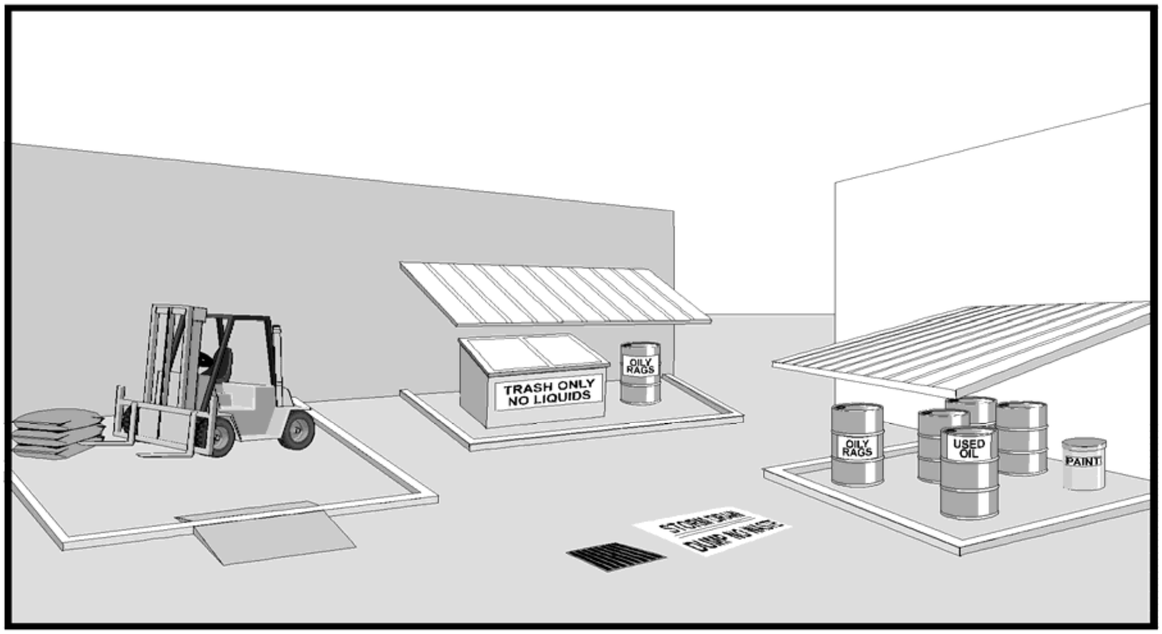
Application Guidance: N/A

Training: N/A

Effectiveness and Cost: This is a highly effective, low- to moderate-cost BMP.

Limitations: None

BMP 012 - CONSTRUCT BERM OR DIKE AROUND CRITICAL AREAS



Description of Potential Pollutant and Source: Critical areas are source areas that have a high likelihood for the release of pollutants. This includes material handling areas, material storage areas, and equipment repair and maintenance areas. As a result of spills and leaks or exposure to storm water, pollutants can flow from critical areas into the storm water system. In addition, small spills and leaks can accumulate on the surface area and be washed away by storm water.

Description of BMP: Construct a raised berm or dike around critical areas. This will provide secondary containment and prevent any spills or leaks from leaving the area. This secondary containment will also be provided where mobile tankers containing fuel are customarily stationed. Construct a ramp to allow vehicle access into the area. (Note: double walled tanks do not require this BMP. Also, 40 CFR 112.7 requires bulk petroleum storage tanks be provided with secondary containment.) A drain valve will be installed and procedures to drain storm water from the bermed area will be posted (see BMP 014).

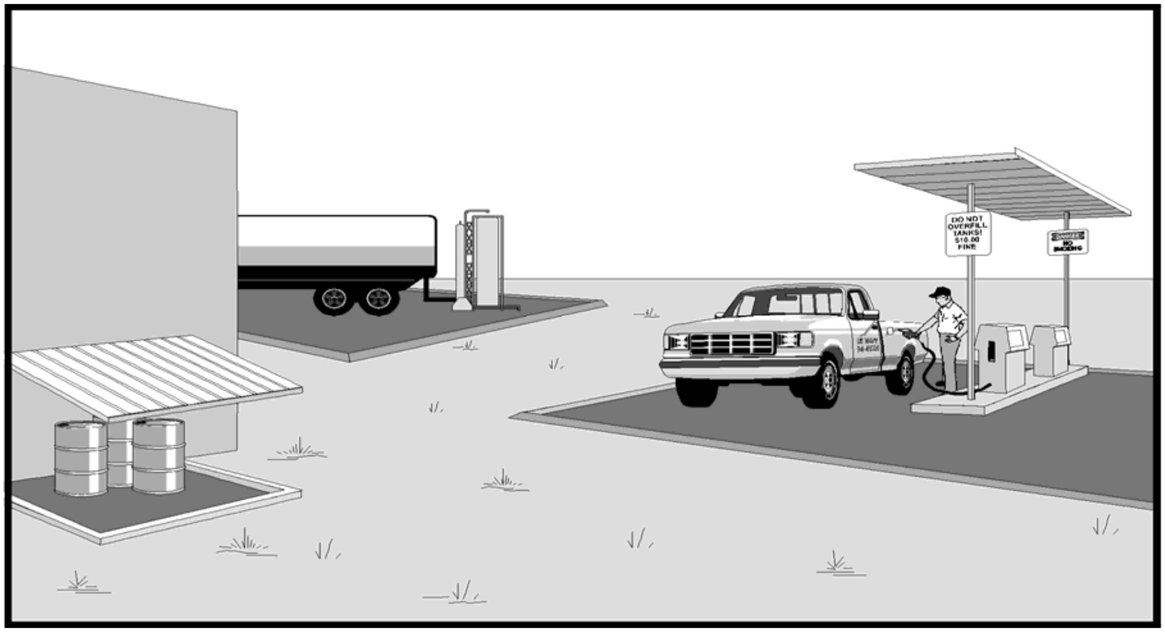
Application Guidance: Install as needed.

Training: N/A

Effectiveness and Cost: This is a highly effective BMP. The cost will vary depending on the size of the fueling operation.

Limitations: The size of some tank and fueling operations areas could make this BMP relatively expensive.

BMP 013 - PAVE BERMED AREAS



Description of Potential Pollutant and Source: Critical areas are source areas that have a high likelihood for the release of pollutants. This includes material handling areas, material storage areas, and equipment repair and maintenance areas. Material which has leaked or spilled on the ground surface may infiltrate into the soil and then be transported to storm drains by storm water.

Description of BMP: Pave bermed areas. (See BMP 012, "Construct Berm or Dike Around Critical Area."). The area within the berm will be sufficiently impervious to prevent infiltration of the material in the event of a spill. The impervious material will be concrete, asphalt concrete, or other impervious paving material. The lining material will also be clay, plastic or another impervious material. A storm drain must not be located within the impervious area. (Note: 40 CFR 112.7 requires bulk petroleum storage tanks be provided with secondary containment.)

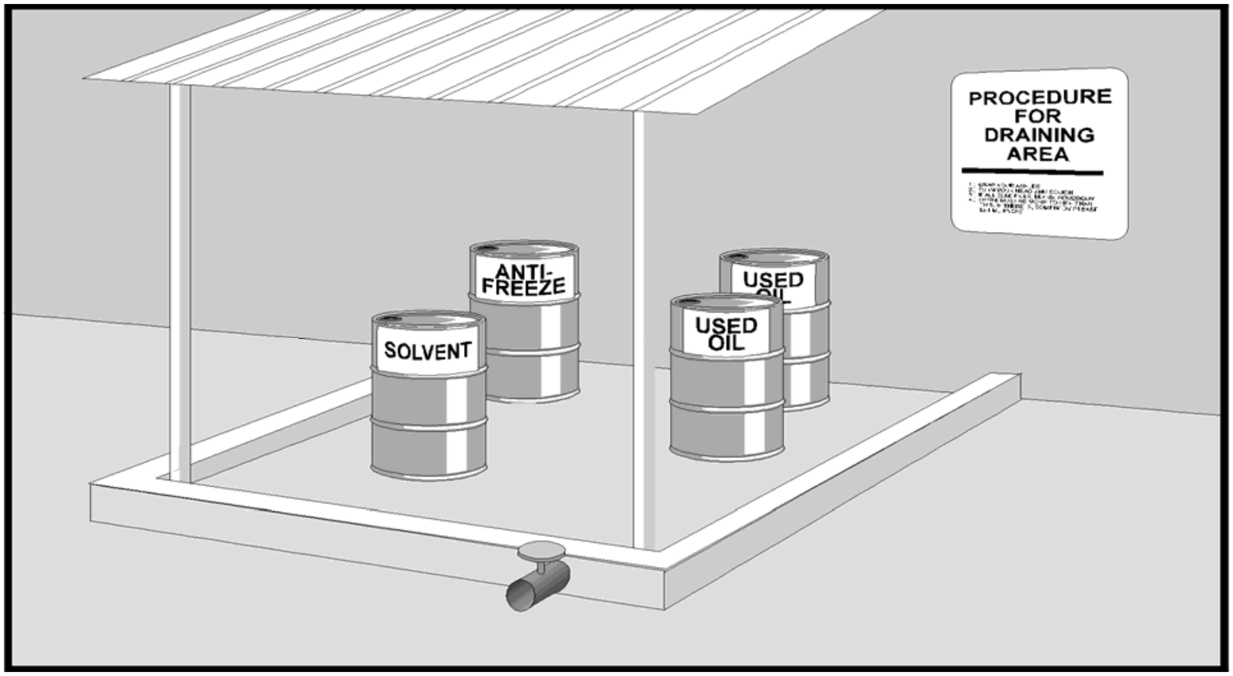
Application Guidance: Install as needed.

Training: N/A

Effectiveness and Cost: This is an effective BMP. Costs will vary based on the size of the area.

Limitations: The size of some tank and fueling operations areas could make this BMP expensive.

BMP 014 - PROVIDE VALVE FOR OUTLET PIPE IN CONTAINMENT AREA



Description of Potential Pollutant and Source: Spilled or leaked material may be discharged from containment areas through open outlet pipe valves or by overflowing.

Description of BMP: Install outlet pipe valves and keep closed. During storm events, containment areas will be drained following guidelines specifically developed for that area. Storm water accumulated in containment areas may be released to the storm drain system after the water quality has been evaluated based on the types of materials stored in the containment area and/or after laboratory analyses. If sheening, discoloration, odor, or evidence of spills is observed, the water will not be discharged to the storm drain system prior to treatment or further evaluation.

In containment areas where oils are stored, skimming spilled oil off the water using absorbents will be adequate treatment prior to discharge to storm drain system. However, the water will either be pumped out and stored pending chemical analytical results or properly disposed.

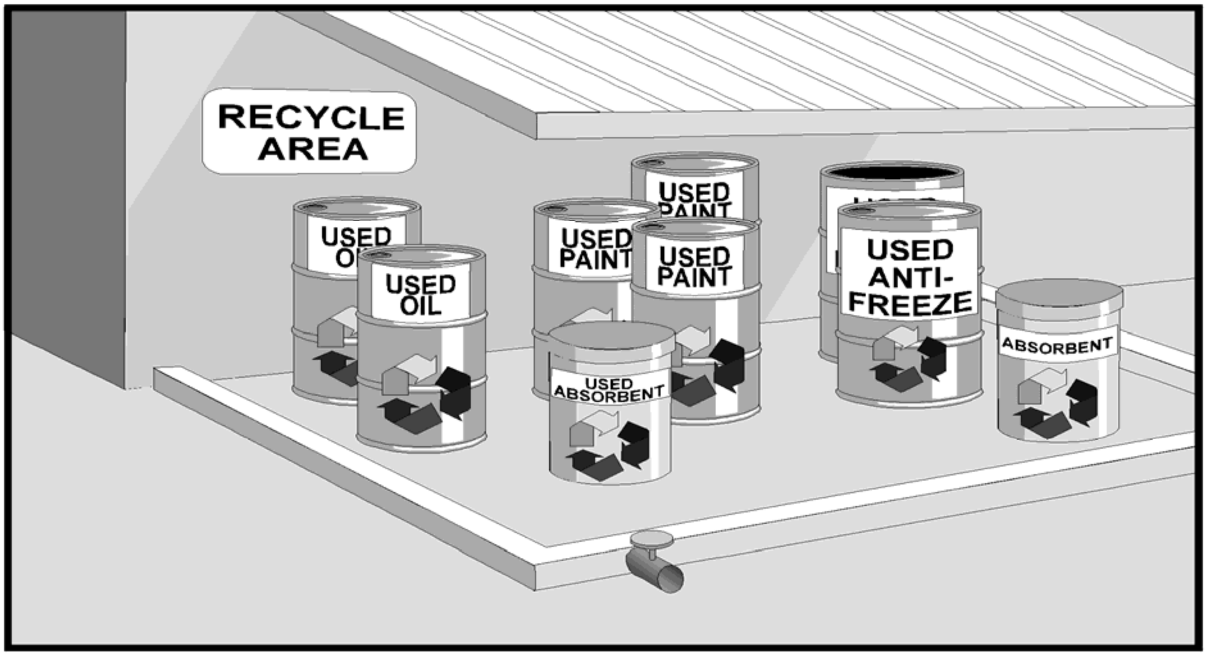
Application Guidance: The accumulated storm water will be released or removed at least every 24 hours during storm events.

Training: Personnel will be trained to drain containment areas according to the procedures developed for each containment area. Personnel will also be trained in the proper method of disposing materials that have been contained in the area after a spill.

Effectiveness and Cost: This is an effective, low to moderate-cost BMP.

Limitations: None

BMP 015 – RECYCLE



Description of Potential Pollutant and Source: Many materials, both hazardous and non-hazardous, can be sources of pollutants. Recycling will be employed to reduce the amount of waste material exposed to storm water on the Activity.

Description of BMP: Recycle materials to the fullest extent possible in all situations.

Application Guidance: Recycling collections will be conducted at least weekly for recyclable items such as solvents, oil, scrap metals, wash water and absorbent materials. Separating the recyclable items facilitates recycling.

The frequency for implementing this BMP has been provided as general guidance. However, a facility operator may wish to establish a more suitable frequency. This will require SWPCP implementors to make judgements based on facility operations and conditions. To assign a frequency other than what has been suggested (i.e., more or less frequent), the following criteria will be considered and rated either High, Medium, or Low. If many of the criteria are assigned a High rating, the frequency may be increased. Similarly, if many criteria are assigned a Low rating, the frequency may be decreased. The goal of implementing this BMP is to minimize exposure of pollutants to storm water.

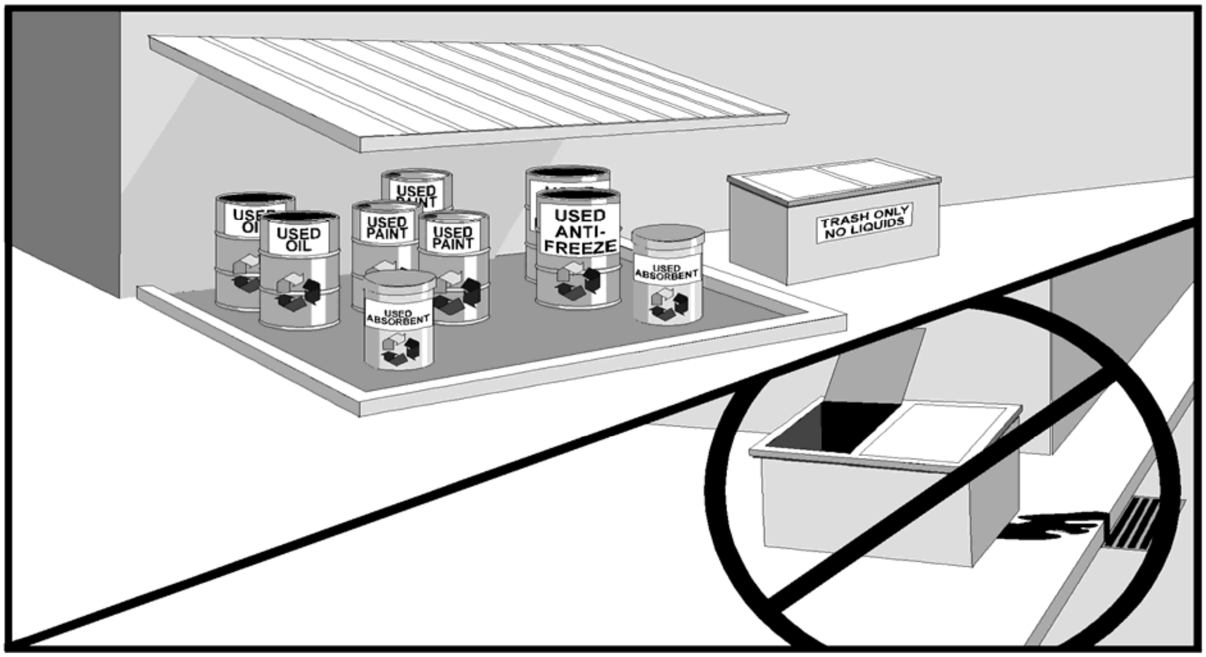
CRITERIA	Rating H=High M=Medium L=Low
Probability of exposure of significant materials to storm water	
Quantity of significant materials potentially exposed	
Toxicity of significant materials potentially exposed	
Frequency of use of significant materials potentially exposed	
Evidence of exposure (e.g., stains on pavement, etching of concrete	
Proximity of source area to outfall or receiving water	
Sensitivity of receiving water to potentially exposed significant materials (e.g., waters with beneficial uses such as human contact, recreation, significant species habitat, etc.)	

Training: Personnel will be trained on proper recycling techniques along with posting and maintenance of signs.

Effectiveness and Cost: Effectiveness and cost will be site specific.

Limitations: Local vendors may not be available to receive certain recyclable materials.

BMP 016 - STORE WASTE AND RECYCLING MATERIALS IN PROPER CONTAINERS



Description of Potential Pollutant and Source: Dry waste, including items such as scrap metal, floor sweepings, metal chips, and paper goods, can be dispersed by wind or operational error if not stored properly. If a dumpster's lid is not kept closed, animals may carry garbage out of the containers. Uncovered dumpsters also expose waste to storm water, which may leak out of the dumpster and into the storm sewer system.

Description of BMP: Locate waste and recycling drums and containers in centralized areas, using proper labeling (both containers and location) and providing easy access. If possible, the area will have secondary containment (see BMPs 012, 013, and 014). Waste containers will be emptied regularly. Dumpsters will all have lids; lids will be kept closed when not in use. If the dumpster has inadequate capacity and it is not possible to keep the cover closed, the frequency of pick-up will be increased, or the dumpster will be replaced with a model of greater capacity.

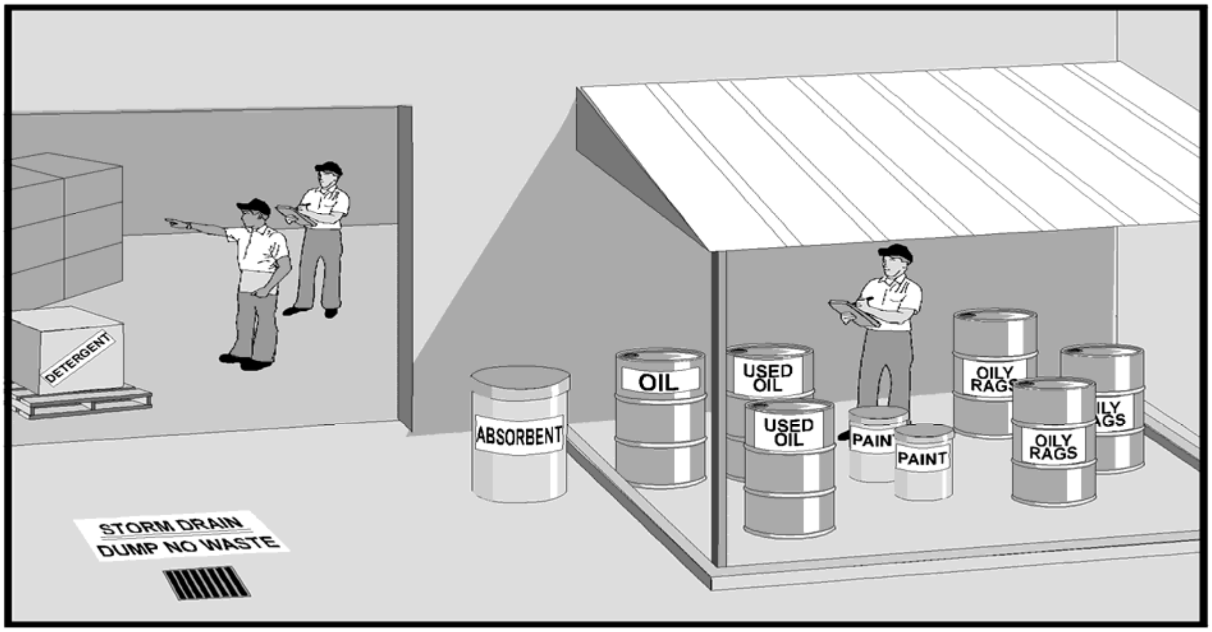
Application Guidance: This BMP will be applied to all waste and recycling storage areas.

Training: Personnel will be trained to monitor waste and recycling storage sites to ensure their materials are properly stored and that there are no overflowing containers.

Effectiveness and Cost: This is a moderately effective, low-cost BMP.

Limitations: None

BMP 017 - LIMIT SIGNIFICANT MATERIALS INVENTORY



Description of Potential Pollutant and Source: Reducing the amount of significant materials reduces the potential for the material to enter the storm drain system.

Description of BMP: Control inventory control to prevent excess storage of unnecessary or infrequently used significant materials.

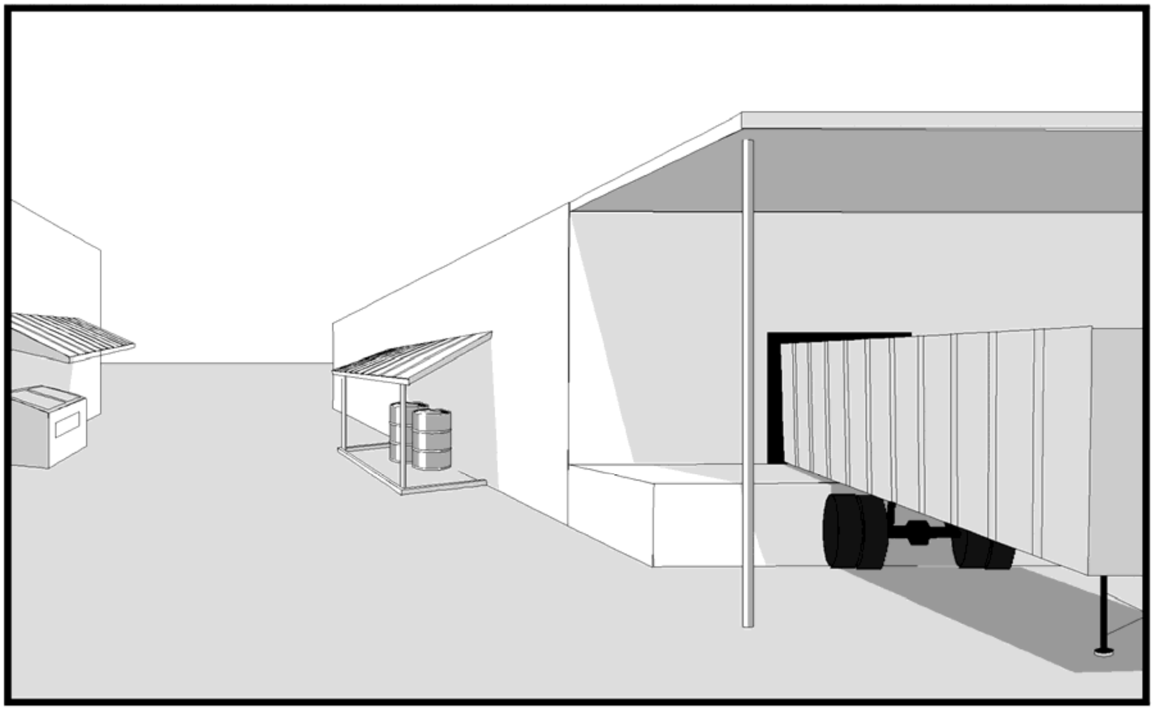
Application Guidance: This BMP will be used m all cases where significant materials are stored.

Training: Procurement officers and warehouse managers will be trained to accurately estimate delivery schedules and user's needs.

Effectiveness and Cost: This is a moderately effective, low-cost BMP.

Limitations: None

BMP 018 - PROVIDE ROOF TO COVER SOURCE AREA



Description of Potential Pollutant and Source: Spills, leaks and outdoor storage of materials can result in the exposure of significant materials to storm water.

Description of BMP: Construct roofs over areas with significant materials to minimize contact with storm water. Roofs are effective covering for fuel transfer areas, material loading/unloading areas, equipment maintenance, metal fabrication, hazardous waste storage, and materials storage areas.

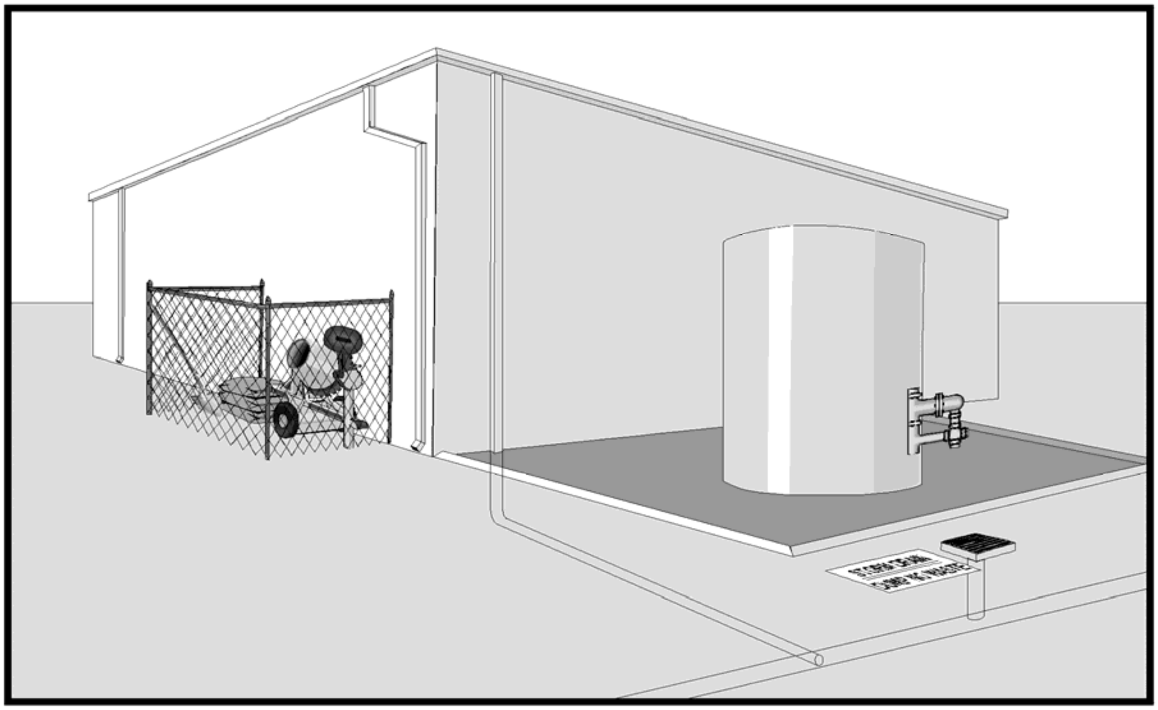
Application Guidance: Install as needed.

Training: N/A

Effectiveness and Cost: Roofs are an effective, variable-cost BMP. Cost can be high for large areas.

Limitations: The height of the equipment or the size of the area may make this BMP infeasible.

BMP 019 - CONTROL ROOF DOWNSPOUT DISCHARGE



Description of Potential Pollutant and Source: Storm water collected on roofs and directed through downspouts to industrial areas can transport pollutants to the storm drain system.

Description of BMP: Control roof runoff in areas where roof downspout discharges flow over areas of high pollutant use or storage, such as areas used for fueling, metal fabricating, lead tool and dye storage, or hazardous waste storage. Roof downspouts will be re-directed to non-industrial areas or connected directly to the storm drain system.

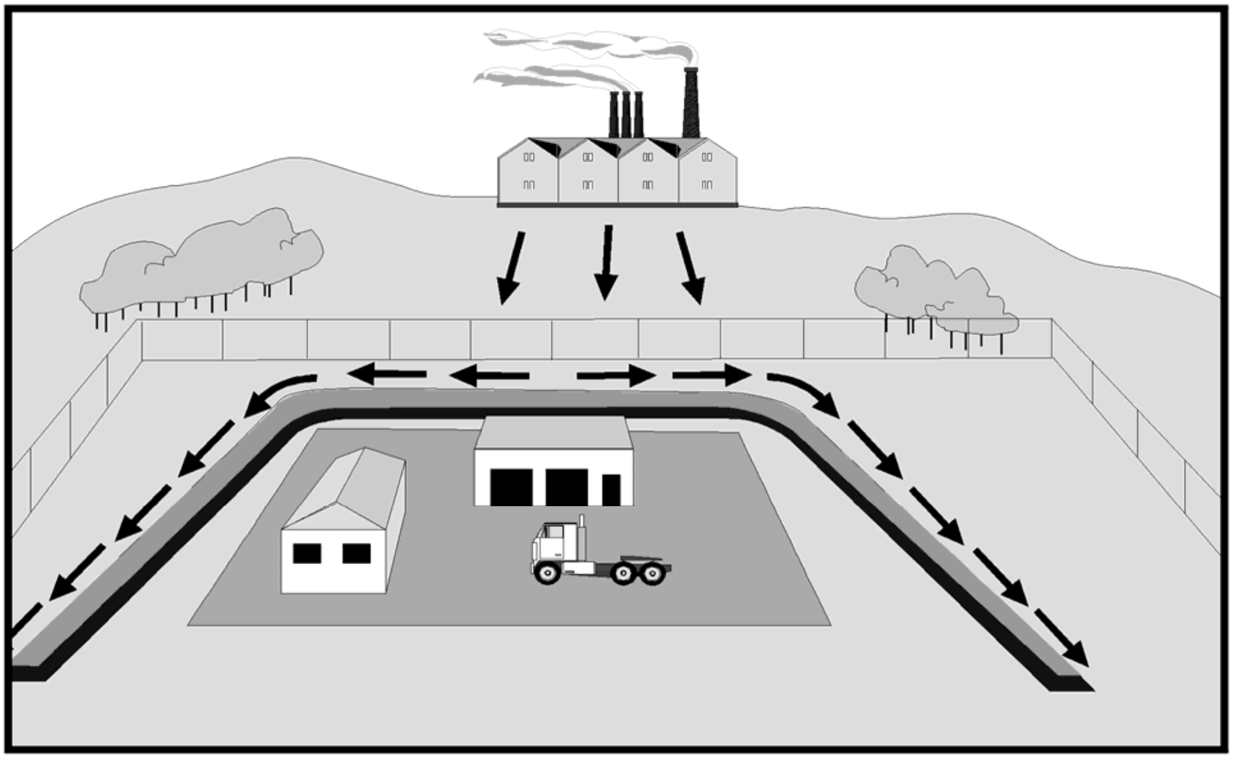
Application Guidance: This BMP will be applied whenever storm water collected on roofs discharges to areas polluted with significant materials.

Training: N/A

Effectiveness and Cost: This BMP can eliminate concentrated roof runoff from flowing through pollutant source areas. Costs vary depending on whether an underground storm drain connection has to be made.

Limitations: None

BMP 020- MINIMIZE STORM WATER RUN-ON FROM ADJACENT FACILITIES AND PROPERTIES



Description of Potential Pollutant and Source: Significant run-on from other facilities or adjacent properties can result in either increased pollutant exposure to storm water on site (from the increased volume of water movement) or in increased transport of off-site pollutants onto the facility.

Description of BMP: Control run-on by berming or using diversion ditches to direct flow away from or around the site. Alternatively, run-on will be slowed by use of vegetated strips, grassed swales, or infiltration basins or trenches.

Application Guidance: The BMP will be used whenever a significant volume of off-site drainage flows into an area where possible pollutants are present. This BMP will also be used where run-on may be polluted.

Training: None

Effectiveness and Cost: The BMP can be very effective for flows of low to moderate volume. Cost varies, depending on site area, but could be high.

Limitations: Vehicle and pedestrian safety, and travel can limit the implementation of this BMP, also, diversion channels may not be compatible with existing drainage systems.

BMP 021 - REDUCE WASTE

Description of Potential Pollutant and Source: Reducing the amount of waste produced at a site reduces the amount of significant materials potentially exposed to storm water.

Description of BMP: Reduce waste to minimize or eliminate the discharge of pollutants to storm water. Methods to reduce waste include, but are not limited to, substituting or eliminating raw materials, modifying existing processes or equipment, planning and sequencing production, tracking waste generation, listing amounts of materials disposed, and separating wastes. Personnel will be trained to: use only the amount needed; buy the least toxic products; use solvents more than once; provide good inventory control; do not overbuy; and purchase long-lasting products.

Application Guidance: These methods will be implemented under most working conditions.

Training: None

Effectiveness and Cost: Effectiveness and cost will vary depending on the facility.

Limitations: None

BMP 021A - REPAIR LEAKY ROOFS

Description of Potential Pollutant and Source: Hazardous substances, parts, equipment, vehicles, and materials are often stored indoors or in covered areas. During storage, significant materials such as oil, grease, and solvents may leak or spill onto the floor, ground, or pavement. If storm water enters these areas through leaky roofs, the pollutants may be washed into the storm drain system.

Description of BMP**:** Repair leaky roofs as required for each building. Alternatively, the stored materials will be moved to another covered area.

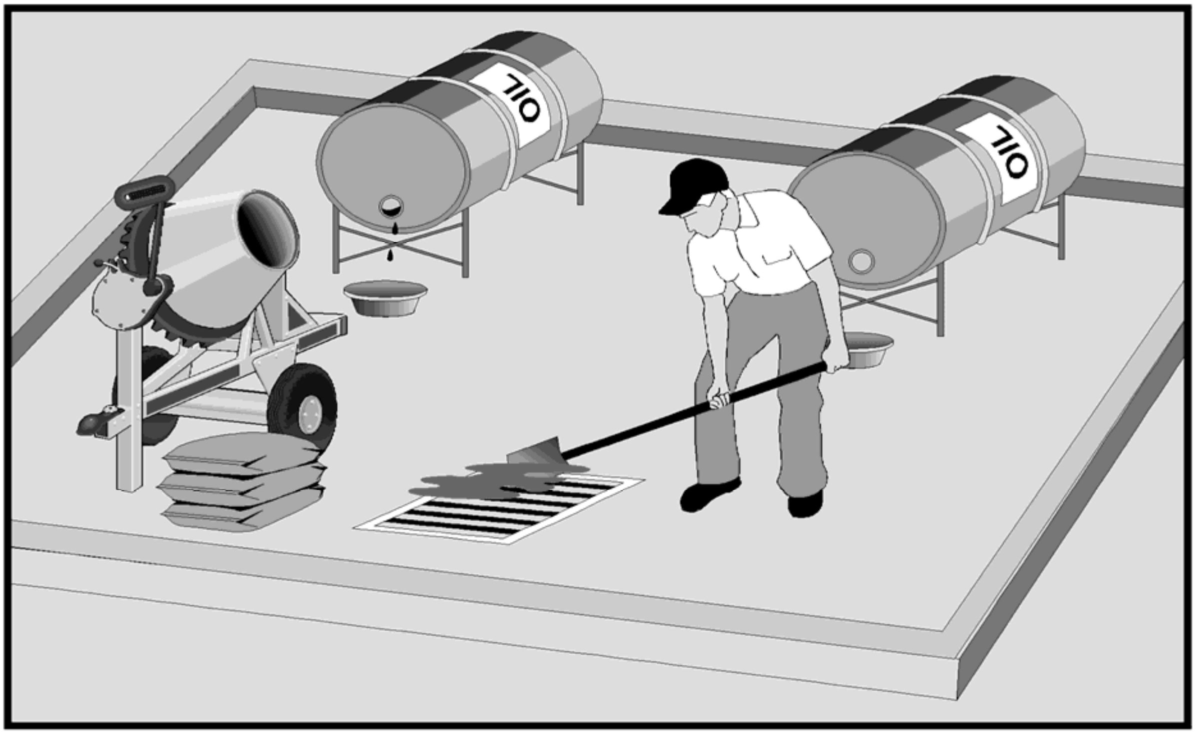
Application Guidance: Leaky roofs will be repaired wherever there 1s a potential for the exposure of significant materials to storm water.

Training: Personnel will be trained to notify their supervisors when leaks are observed in roofs.

Effectiveness and Cost: The BMP is moderately effective. The cost is dependent on the extent of repairs.

Limitations: None

BMP 022 - PERMANENTLY SEAL DRAINS WITHIN CRITICAL AREAS THAT DISCHARGE TO THE STORM DRAIN



Description of Potential Pollutant and Source: Certain activities may result in spills. The spilled material may flow or be washed into nearby storm drains, receiving waters, or surfaces resulting in exposure to storm water.

Description of BMP: Seal drains within the critical areas that discharge to the storm drain to prevent significant materials from being washed into the storm drain system. Critical areas are those that have a high likelihood to release pollutants, including material handling areas, material storage areas, and equipment repair and maintenance areas.

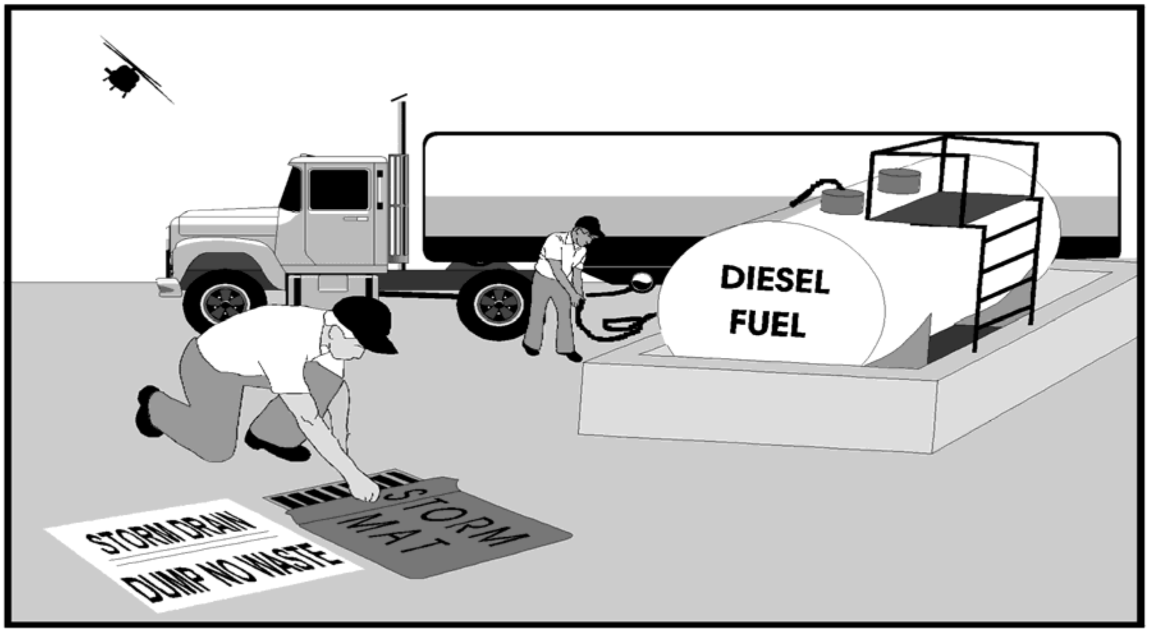
Application Guidance: This BMP will be applied to storm drain inlets in all critical areas as needed.

Training: N/A

Effectiveness and Cost: This is a highly effective, low-cost BMP.

Limitations: If the area draining to the storm drain inlet is large and the inlet is at a low point, this is not a practical BMP. Under the circumstances, implementation of this BMP will result in ponding. In this case, use BMP 023, "Place Portable Rubber Mats over Storm Drain Inlets."

BMP 023 - PLACE PORTABLE RUBBER MATS OVER STORM DRAIN INLETS



Description of Potential Pollutant and Source: Spills are more likely to occur during certain operations, such as materials transfer. If these operations occur near a storm drain, the material may be discharged into the storm drain system.

Description of BMP: If operations which are likely to spill significant materials occur near a storm drain, place a rubber portable mat over the storm drain during the operation. If a spill occurs during the operation, the mat will prevent the pollutant from entering the storm drain system. The spilled material can be properly cleaned up and disposed of before removal of the rubber mat.

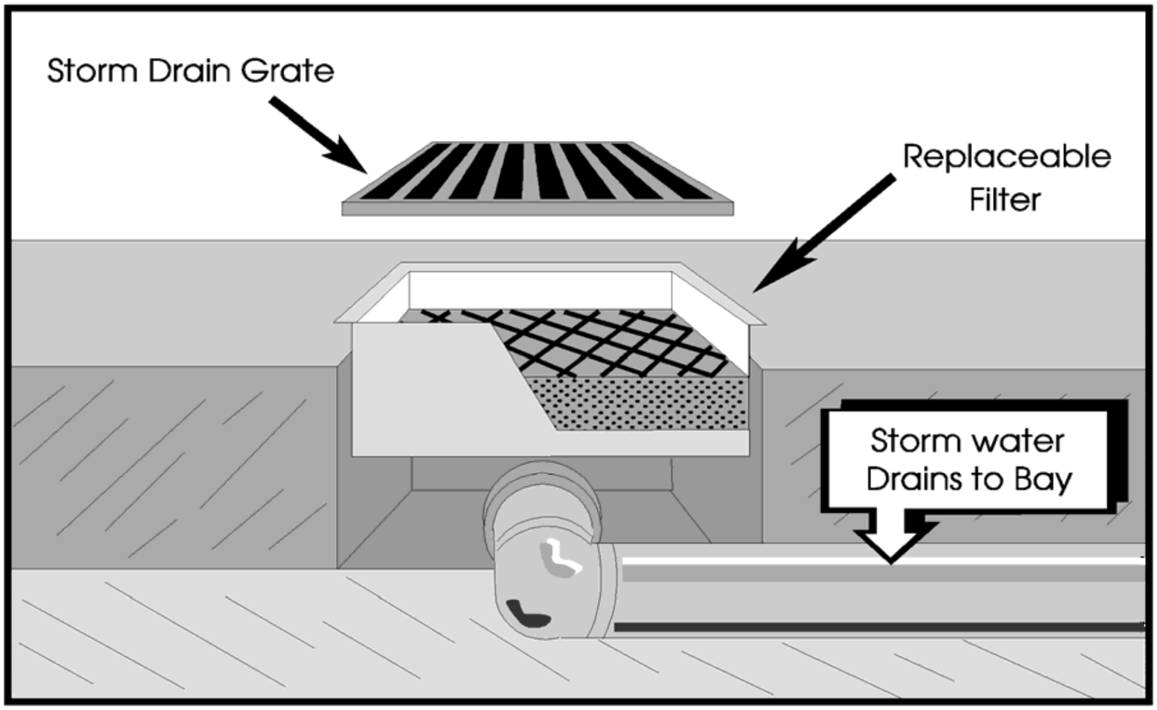
Application Guidance: Portable rubber mats will be placed over the storm drain for the duration of any operation which is likely to discharge pollutants into the storm drain.

Training: Personnel will be trained regarding the use of the portable mat. In addition, personnel will be trained in proper cleanup and disposal of any spilled material.

Effectiveness and Cost: This is a highly effective, low-cost BMP.

Limitations: This BMP works best on flat storm drain inlets.

BMP 024 - INSERT FILTER IN CATCH BASIN



Description of Potential Pollutant and Source: Sediments, oil, and other pollutants generated from industrial activities can pollute storm water.

Description of BMP: Use catch basin filters of sand and organic material to trap sediments, oil, and other storm water contaminants. The filters are designed to be easily retrofitted into existing catch basins by suspending the device inside catch basins. Filters will be replaced regularly according to manufacturer's recommendations.

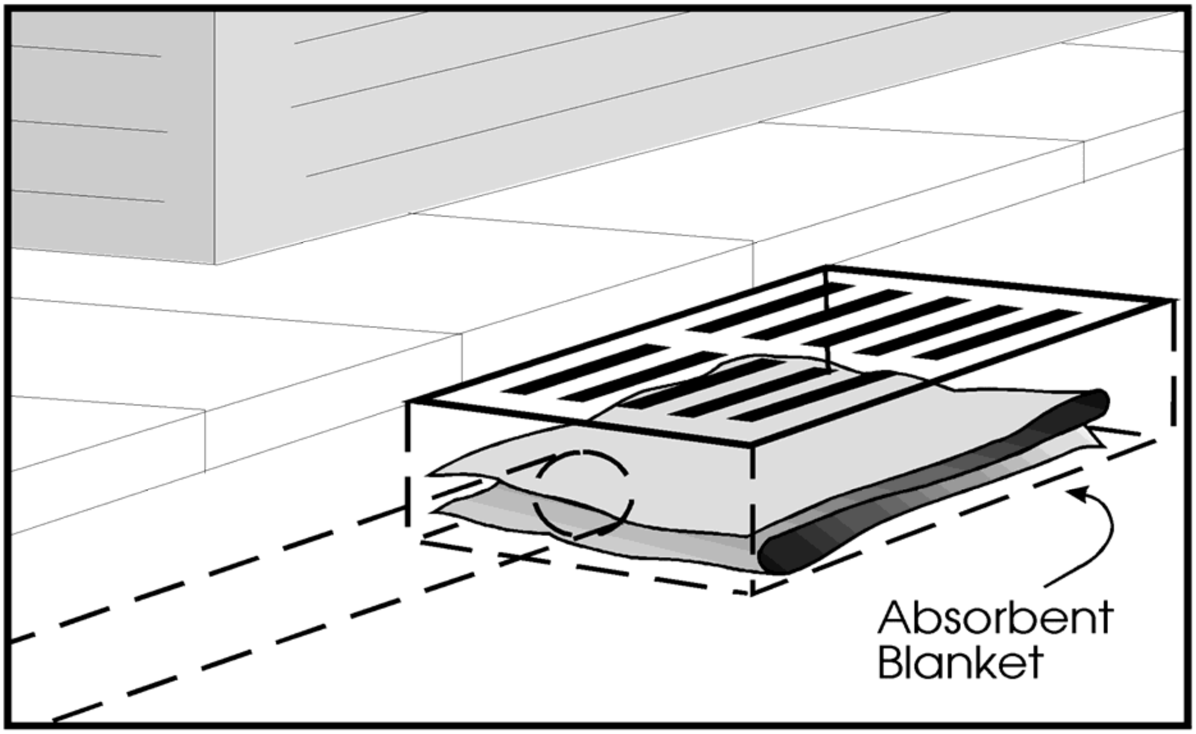
Application Guidance: This BMP will be used in areas where high concentrations of pollutants enter a storm drain catch basin.

Training: None

Effectiveness and Cost: Catch basin filters appear to be a moderately effective, moderate-cost BMP.

Limitations: This BMP should only be used where storm water with high concentrations of pollutants drains into a storm drain inlet.

BMP 025 - PLACE ABSORBENT BLANKETS IN CATCH BASIN



Description of Potential Pollutant and Source: Oil and grease from maintenance activities can be discharged into the storm drain system.

Description of BMP: Place oil and grease absorbing blankets in catch basins and inlets. This BMP will be used in areas where high concentrations of oil and grease are exposed to storm water which can enter a storm drain catch basin or inlet.

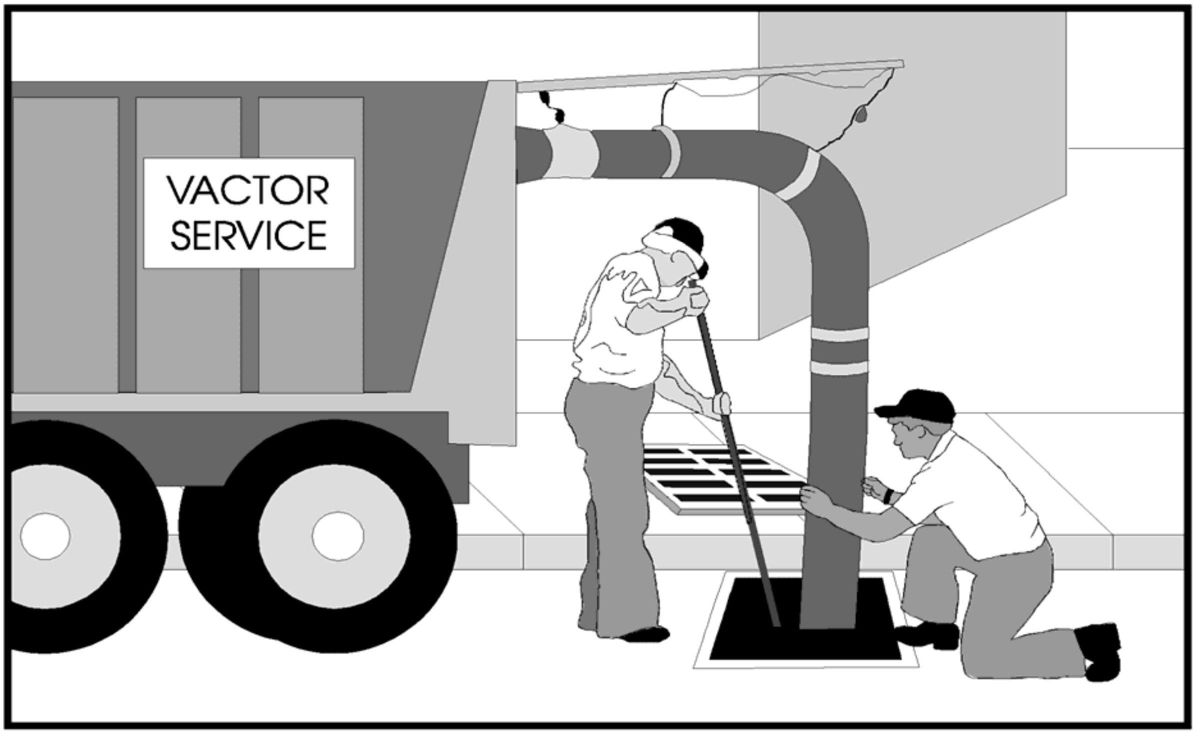
Application Guidance: The blankets will be changed semi-annually (or as needed) to ensure their continued effectiveness.

Training: Personnel will be trained to inspect the blankets monthly and replace them semi-annually or as needed.

Effectiveness and Cost: The blankets are an effective measure to reduce concentrations of hydrocarbons in storm water. The cost is moderate.

Limitations: This BMP can only be used when storm water with high concentrations of oil and grease drains into a storm drain catch basin or inlet.

BMP 026 - ROUTINELY CLEAN CATCH BASINS



Description of Potential Pollutant and Source: Depending on their design, catch basins can accumulate sediment, trash, and debris. If the accumulated pollutants are not removed, they may be resuspended by storm water.

Description of BMP: Clean catch basins routinely to prevent clogging and to remove accumulated pollutants. The accumulated sediment will be tested to determine if it is a hazardous waste and then properly disposed. If the sediment is not a hazardous waste, it may be disposed in a landfill.

Application Guidance: Catch basins will be cleaned at least quarterly. One of these cleanings will be just before the rainy season.

The frequency for implementing this BMP has been provided as general guidance. However, a facility operator may wish to establish a more suitable frequency. This will require SWPCP implementors to make judgements based on facility operations and conditions. To assign a frequency other than what has been suggested (i.e., more or less frequent), the following criteria will be considered and rated either High, Medium, or Low. If many of the criteria are assigned a High rating, the frequency may be increased. Similarly, if many criteria are assigned a Low rating, the frequency may be decreased. The goal of implementing this BMP is to minimize exposure of pollutants to storm water.

CRITERIA	Rating H=High M=Medium L=Low
Probability of exposure of significant materials to storm water in area draining to catch basin	
Quantity of significant materials potentially exposed in area draining to catch basin	
Frequency of use of significant materials potentially exposed in area draining to catch basin	
Evidence of exposure (e.g., stains on pavement, evidence of significant material in drainage system)	
Proximity of source area to outfall or receiving water	
Sensitivity of receiving water to potentially exposed significant materials (e.g., waters with beneficial uses such as human contact, recreation, significant species habitat, etc.)	

Training: Personnel will be trained in the proper testing, removal, and disposal of the sediment, or a qualified contractor will be used to perform these services.

Effectiveness and Cost: This is a moderately effective, low-cost BMP.

Limitations: The accumulated sediments may be a hazardous waste.

BMP 027 - STENCIL SIGNS ON STORM DRAIN INLETS

Description of Potential Pollutant and Source: Storm drain inlets generally discharge to storm drains or directly into receiving waters (i.e., rivers, oceans, lakes). Some storm drain inlets lead to water quality facilities, such as oil/water separators. However, such facilities are typically only 40 to 80 percent effective in reducing pollutant concentrations and may not be effective in treating storm flows. Therefore, material, such as used oil, solvents, and solid waste, that enters the storm drains may be exposed to storm water.

Description of BMP: Clearly mark storm drain inlets to warn against illegal dumping.

Application Guidance: All storm drain inlets will be properly labeled.

Training: None

Effectiveness and Cost:

Limitations: None

BMP 028 - KEEP EQUIPMENT AND VEHICLES CLEAN

Description of Potential Pollutant and Source: Through usage, equipment and vehicles accumulate oil and grease. During rain events, these pollutants are exposed to storm water and transported into the receiving waters.

Description of BMP: Clean equipment and vehicles regularly using either dry or wet methods to reduce the amount of pollutants exposed to rainfall. Dry methods of cleaning are further explained in BMP 003, "Perform Regular Cleaning." Wet methods are further described in BMP 049, "Centralize Liquid Solvent Cleaning to One Location," and BMP 041, "Wash Equipment and Vehicles in Designated Areas."

Application Guidance: All vehicles and equipment exposed to storm water will be washed monthly and as needed to be kept clean. The frequency for implementing this BMP has been provided as general guidance. However, a facility operator may wish to establish a more suitable frequency. This will require SWPCP implementors to make judgements based on facility operations and conditions. To assign a frequency other than what has been suggested (i.e., more or less frequent), the following criteria will be considered and rated either High, Medium, or Low. If many of the criteria are assigned a High rating, the frequency may be increased. Similarly, if many criteria are assigned a Low rating, the frequency may be decreased. The goal of implementing this BMP is to minimize exposure of pollutants to storm water.

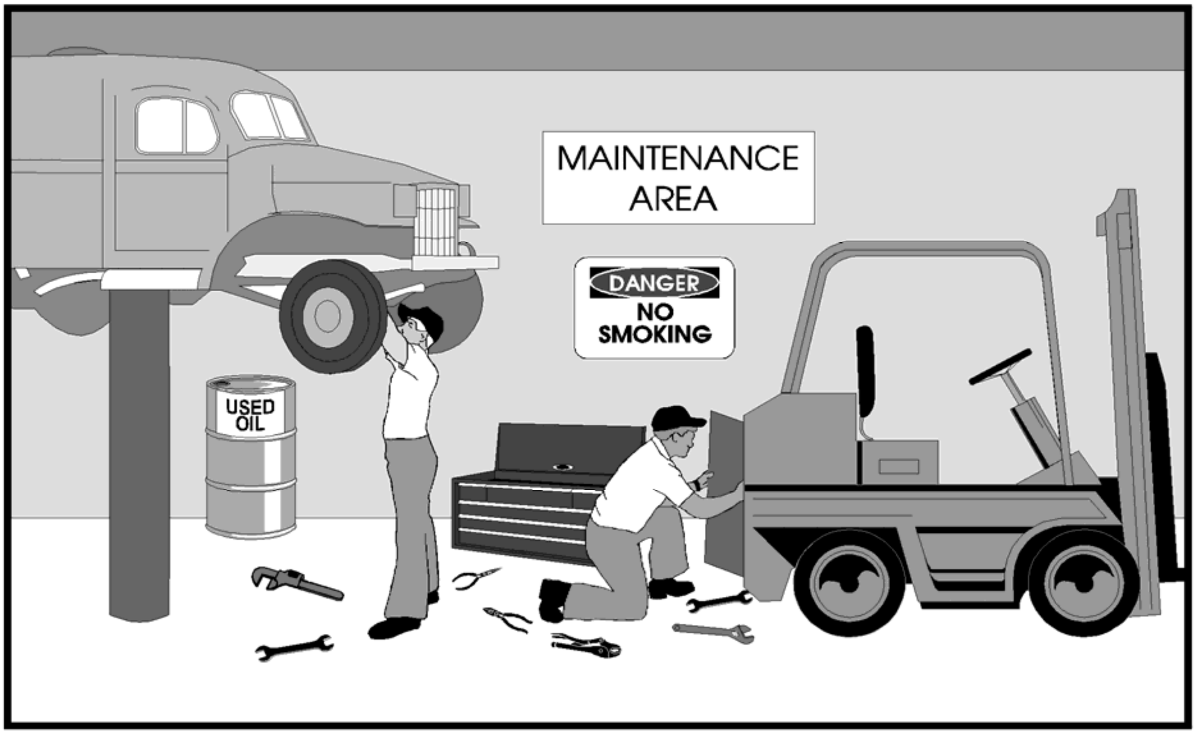
CRITERIA	Rating H=High M=Medium L=Low
Probability of exposure of significant materials to storm water	
Frequency of use of equipment and vehicles	
Proximity of vehicle/equipment use to outfall or receiving water	
Sensitivity of receiving water to potentially exposed significant materials (e.g., waters with beneficial uses such as human contact, recreation, significant species habitat, etc.)	

Training: Personnel will be instructed on how often to clean and wash vehicles or equipment.

Effectiveness and Cost: Keeping equipment and vehicles clean is a highly effective, low-cost BMP.

Limitations: None

BMP 029 - MAINTAIN EQUIPMENT IN GOOD CONDITION



Description of Potential Pollutant and Source: Equipment may leak fuel, grease, oil, or other potential pollutants due to corrosion, loose fittings, poor welding, and improper or poorly fitted gaskets. Without regular inspection of equipment and facilities, leaking or poorly operating equipment may continue to be used without being repaired.

Description of BMP: Keep equipment in good working condition and inspect regularly for fluid leaks. Equipment which is leaking or in poor working condition will be repaired or replaced.

Application Guidance: Equipment will be inspected daily before use for leaks and maintained in good condition at all times. Equipment which is not frequently used will be inspected monthly. The frequency for implementing this BMP has been provided as general guidance. However, a facility operator may wish to establish a more suitable frequency. This will require SWPCP implementors to make judgements based on facility operations and conditions. To assign a frequency other than what has been suggested (i.e., more or less frequent), the following criteria will be considered and rated either High, Medium, or Low. If many of the criteria are assigned a High rating, the frequency may be increased. Similarly, if many criteria are assigned a Low rating, the frequency may be decreased. The goal of implementing this BMP is to minimize exposure of pollutants to storm water.

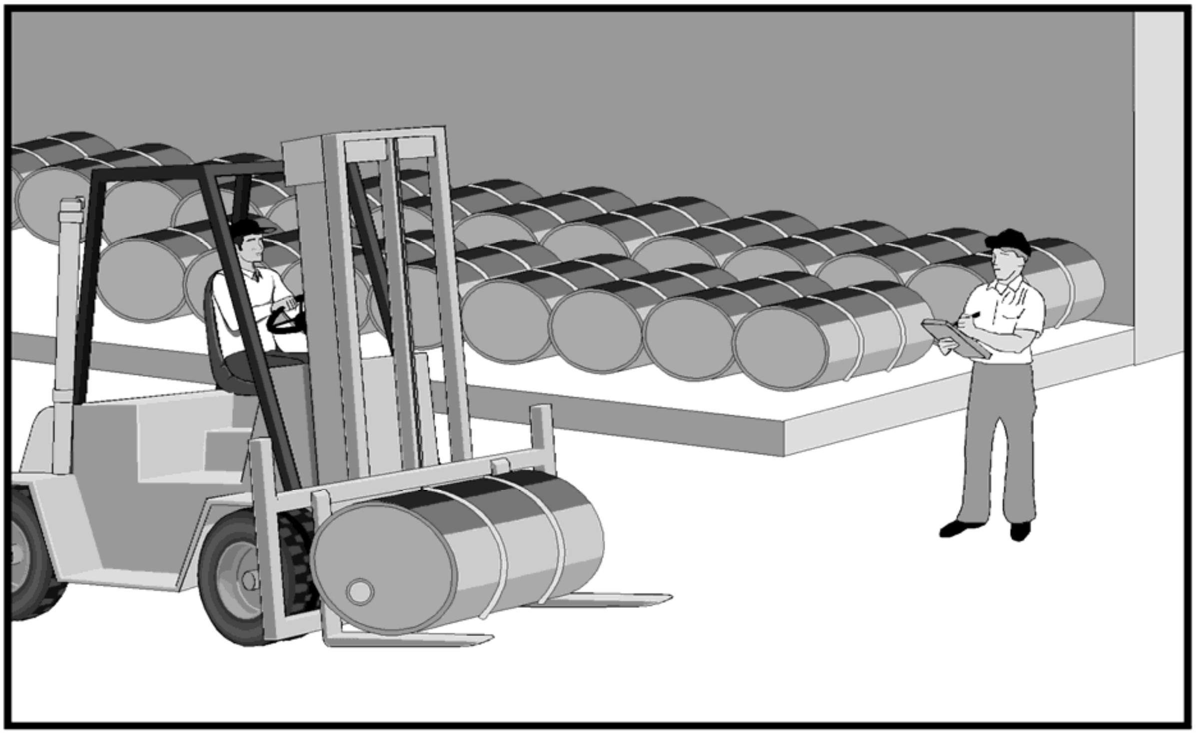
CRITERIA	Rating H=High M=Medium L=Low
Probability of exposure of significant materials to storm water	
Frequency of use of equipment and vehicles	
Intensity of use of equipment	
Old age or poor condition of equipment or systems	
Evidence of exposure (e.g., stains on pavement, etching of concrete)	
Proximity of vehicle/equipment use to outfall or receiving water	
Sensitivity of receiving water to potentially exposed significant materials (e.g., waters with beneficial uses such as human contact, recreation, significant species habitat, etc.)	

Training: Personnel will be trained to regularly inspect for leaks or conditions that could lead to the exposure of significant materials to storm water. Personnel will be trained to routinely inspect equipment before each use. Procedures for notifying the appropriate maintenance personnel if a leak is found will be established.

Effectiveness and Cost: Keeping equipment in good condition is a moderately effective BMP. The cost of repairing or replacing equipment will vary.

Limitations: None

BMP 030 - IMPLEMENT QUALIFYING TESTS FOR EQUIPMENT AND VEHICLE OPERATORS



Description of Potential Pollutant and Source: Through misuse or unfamiliarity with operating procedures, accidents may occur that result in leaks or spills that may expose significant materials to storm water.

Description of BMP: Implement qualifying tests for personnel operating equipment or vehicles to reduce the chances of leaks and spills caused by accidents.

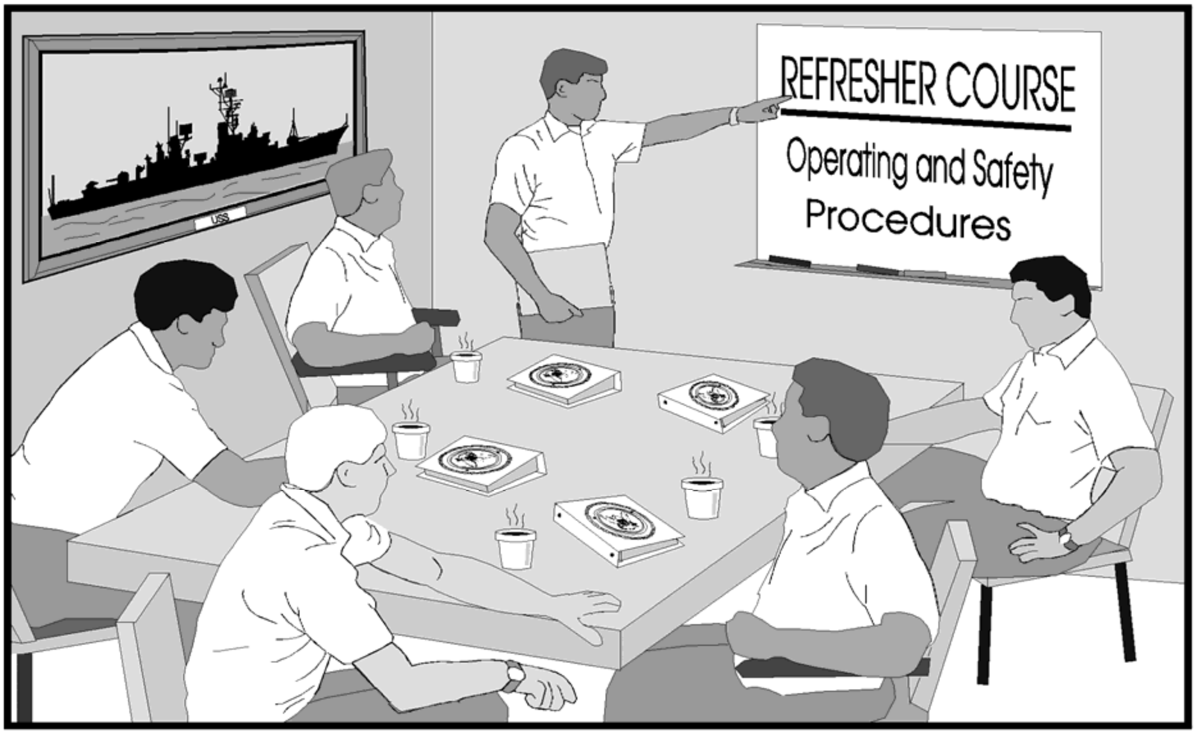
Application Guidance: Qualifying tests will always be used where equipment or vehicles are used.

Training: Personnel will be trained in safe operating procedures, basic maintenance, and spill response procedures associated with the particular equipment or vehicle.

Effectiveness and Cost: Qualifying tests are an effective, variable-cost BMP.

Limitations: None

BMP 031 - CONDUCT REFRESHER COURSES IN OPERATING AND SAFETY PROCEDURES



Description of Potential Pollutant and Source: Through time, personnel may forget certain correct operating and safety procedures, which may result in storm water pollution. Also, personnel need to be informed of new procedures and policies regarding equipment operation.

Description of BMP: Require personnel to have training and refresher courses in operating and safety procedures. This will help to reduce spills and accidents caused by negligence.

Application Guidance: Training and refresher courses will be conducted semi-annually.

The frequency for implementing this BMP has been provided as general guidance. However, a facility operator may wish to establish a more suitable frequency. This will require SWPCP implementors to make judgements based on facility operations and conditions. To assign a frequency other than what has been suggested (i.e., more or less frequent), the following criteria will be considered and rated either High, Medium, or Low. If many of the criteria are assigned a High rating, the frequency may be increased. Similarly, if many criteria are assigned a Low rating, the frequency may be decreased. The goal of implementing this BMP is to minimize exposure of pollutants to storm water.

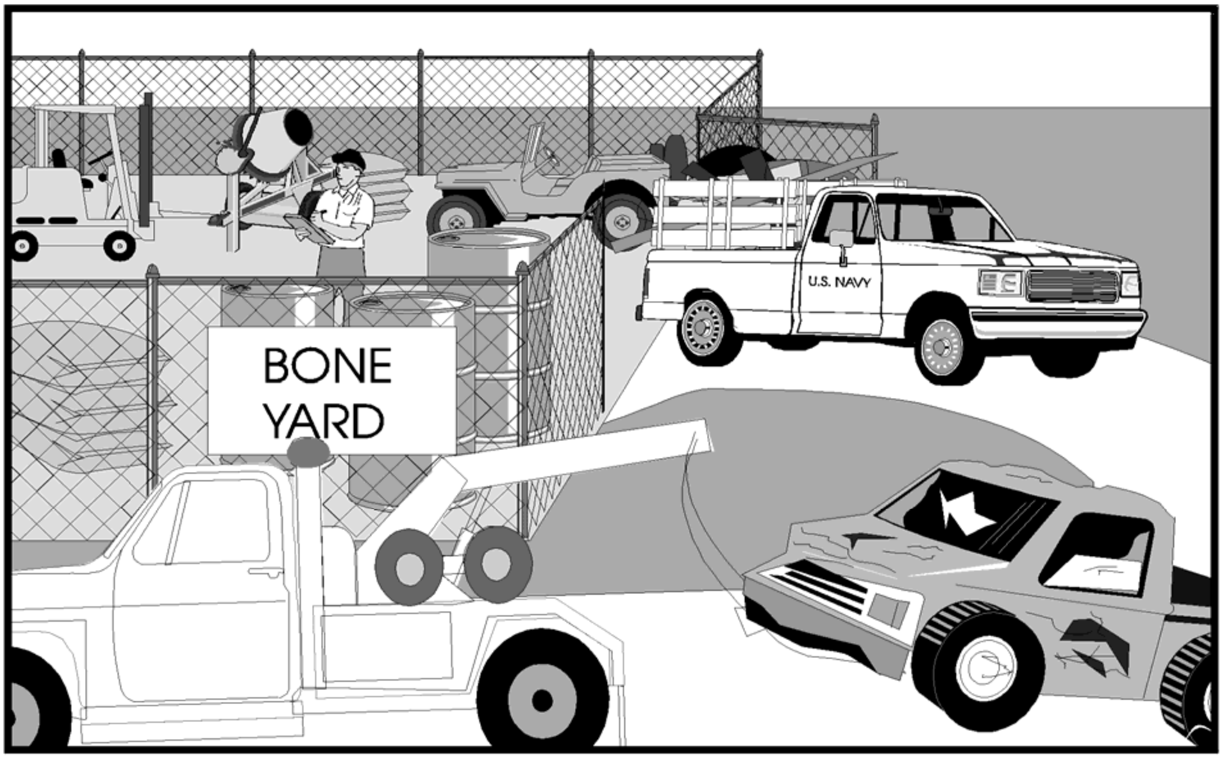
CRITERIA	Rating H=High M=Medium L=Low
Probability of exposure of significant materials to storm water	
Quantity of significant materials potentially exposed	
Toxicity of significant materials potentially exposed	
Frequency of use of significant materials potentially exposed	
Frequency of use of equipment	
Intensity of use of equipment	
Old age or poor condition of equipment and systems	
Evidence of exposure (e.g., stains on pavement, etching of concrete)	
Proximity of source area to outfall or receiving water	
Sensitivity of receiving water to potentially exposed significant materials (e.g., waters with beneficial uses such as human contact, recreation, significant species habitat, etc.)	
Frequency of personnel turnover	

Training: Instructors will be trained. A course will be prepared that covers both equipment manufacturers' recommendations for safety and operations as well as facility procedures and policies regarding equipment operation.

Effectiveness and Cost: Training is a highly effective, moderate-cost BMP.

Limitations: Cost and logistics could be a problem in implementing this practice.

BMP 032 - DISPOSE OF OBSOLETE EQUIPMENT, INOPERABLE VEHICLES, AND SURPLUS MATERIALS



Description of Potential Pollutant and Source: Obsolete equipment, inoperable vehicles, and surplus materials are often stored in areas not subject to routine inspection. These materials often leak a variety of fluids which can be exposed to storm water.

Description of BMP: Dispose of obsolete equipment, inoperable vehicles, and surplus materials at proper sites to reduce the chances of pollutants reaching storm water.

Application Guidance: This practice will be implemented quarterly.

The frequency for implementing this BMP has been provided as general guidance. However, a facility operator may wish to establish a more suitable frequency. This will require SWPCP implementors to make judgements based on facility operations and conditions. To assign a frequency other than what has been suggested (i.e., more or less frequent), the following criteria will be considered and rated either High, Medium, or Low. If many of the criteria are assigned a High rating, the frequency may be increased. Similarly, if many criteria are assigned a Low rating, the frequency may be decreased. The goal of implementing this BMP is to minimize exposure of pollutants to storm water.

CRITERIA	Rating H=High M=Medium L=Low
Probability of exposure of significant materials to storm water	
Quantity of significant materials potentially exposed	
Toxicity of significant materials potentially exposed	
Evidence of exposure (e.g., stains on pavement, evidence of significant materials in drainage system) Proximity of source area to outfall or receiving water	
Sensitivity of receiving water to potentially exposed significant materials (e.g., waters with beneficial uses such as human contact, recreation, significant species habitat, etc.)	

Training: N/A

Effectiveness and Cost: Disposing of unused equipment and supplies is a highly effective, moderate-cost BMP.

Limitations: None

BMP 033 - CHECK VEHICLES AND EQUIPMENT FOR LEAKS

Description of Potential Pollutant and Source: Vehicles, aircraft, or equipment entering or stored at a maintenance facility may be leaking a variety of fluids (fuel, oil, antifreeze, freon, etc.). These materials can be exposed to storm water.

Description of BMP: Inspect all vehicles and equipment at the site, whether incoming, parked, stored, or salvaged, for oil and fluid leaks. Drivers of fleet vehicles, such as delivery trucks, will also check under their vehicles each morning for fluid leaks. If leaks are present, drip pans will be placed under the vehicle or equipment. Once the vehicle is removed from the site, the former parking area will be inspected for stains, and these stains will be cleaned using rags or dry solvents.

Application Guidance: Any vehicle or equipment coming in for repairs, painting, or storage will be inspected for leaks. Fleet vehicles will be inspected each morning. Vehicles that are parked, stored, or salvaged will be provided with drip pans, as will tanker rail cars waiting to be unloaded. The frequency for implementing this BMP has been provided as general guidance. However, a facility operator may wish to establish a more suitable frequency. This will require SWPCP implementors to make judgements based on facility operations and conditions. To assign a frequency other than what has been suggested (i.e., more or less frequent), the following criteria will be considered and rated either High, Medium, or Low. If many of the criteria are assigned a High rating, the frequency may be increased. Similarly, if many criteria are assigned a Low rating, the frequency may be decreased. The goal of implementing this BMP is to minimize exposure of pollutants to storm water.

CRITERIA	Rating H=High M=Medium L=Low
Probability of exposure of significant materials to storm water	
Old age or poor condition of equipment and vehicles	
Evidence of exposure (e.g., stains on pavement)	
Proximity of source area to outfall or receiving water	
Sensitivity of receiving water to potentially exposed significant materials (e.g., waters with beneficial uses such as human contact, recreation, significant species habitat, etc.)	

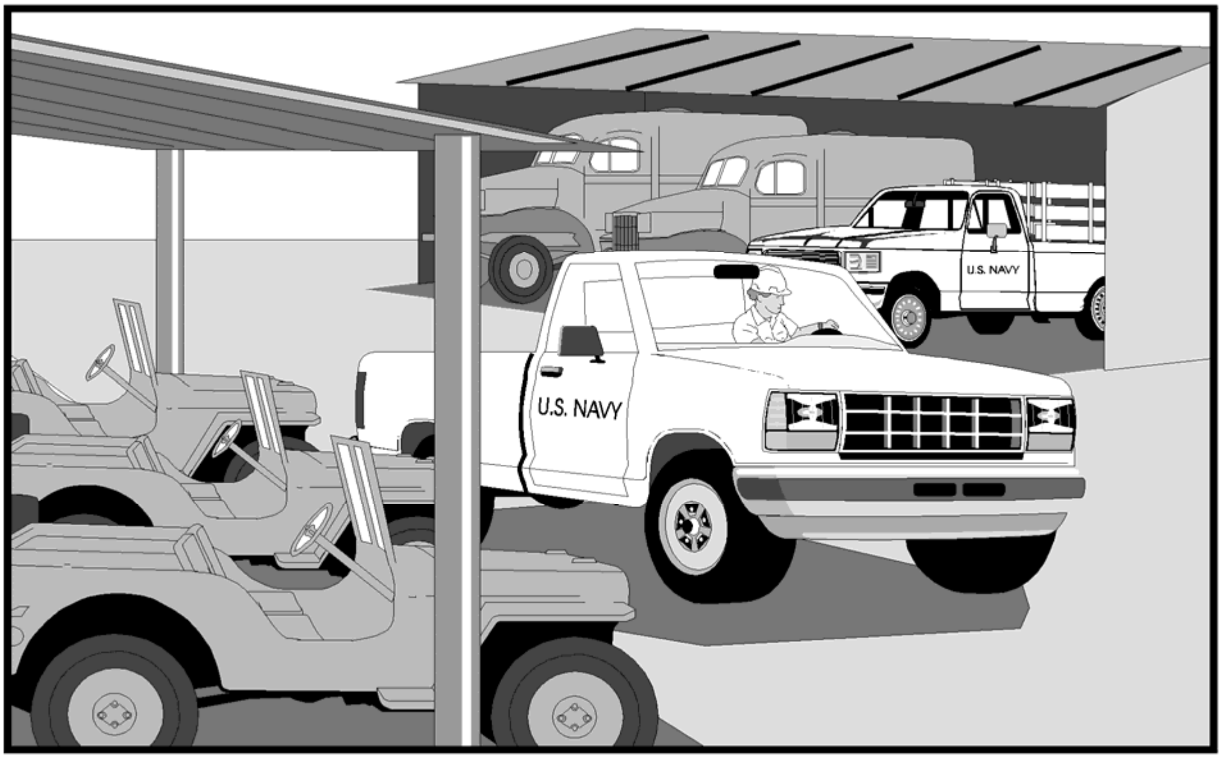
<u>Training:</u> Signs will be posted to remind personnel of proper procedures.

<u>Effectiveness and Cost:</u> Checking for leaks is a moderately effective, low-cost BMP.

<u>Limitations:</u> None

PLACEHOLDER

BMP 036 - PARK VEHICLE OR EQUIPMENT INDOORS OR UNDER A ROOF



Description of Potential Pollutant and Source: Vehicles and equipment often leak or may be covered with oil and grease. If exposed to storm water, these pollutants can enter the storm drain system receiving waters.

Description of BMP: Park vehicles and equipment indoors or under a roof to eliminate or reduce the exposure of significant materials to storm water.

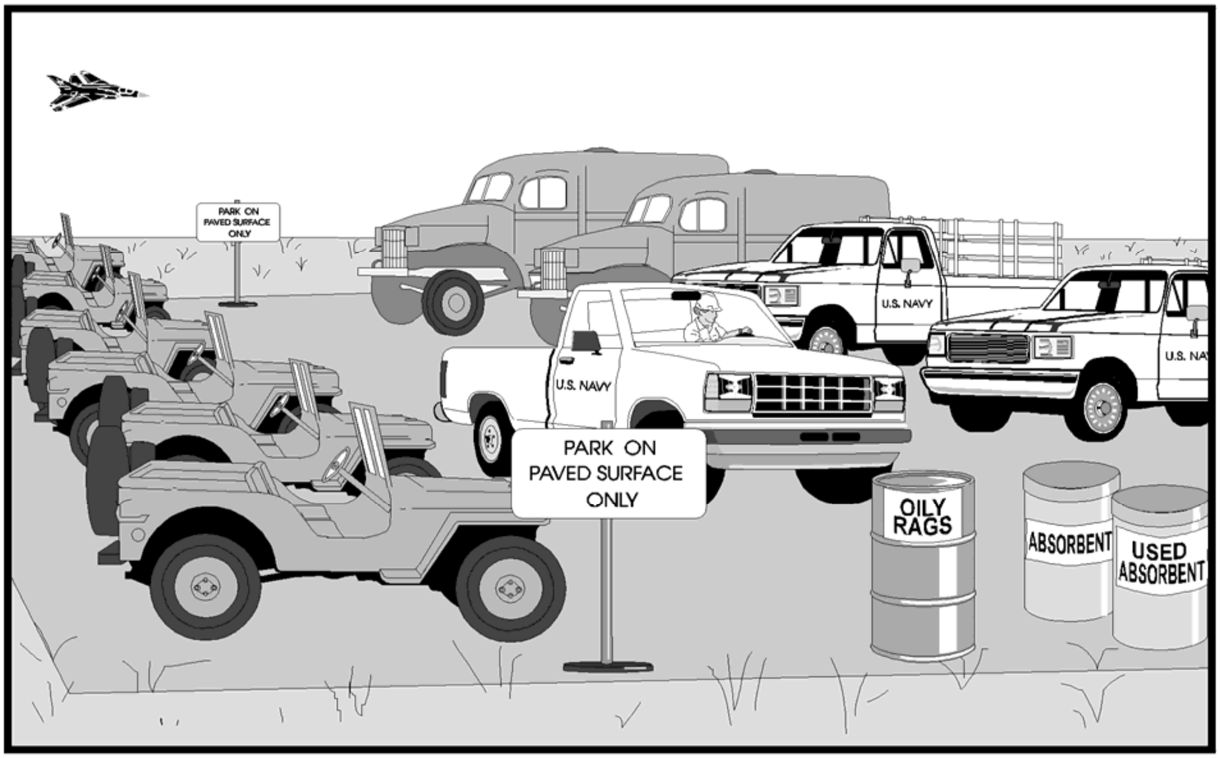
Application Guidance: When available, all vehicles and equipment will be parked indoors or under a roof.

Training: Personnel will be notified of any altered parking locations.

Effectiveness and Cost: Parking vehicles indoors or under cover is a highly effective, low-cost BMP if existing cover is available.

Limitations: The amount of indoor or covered parking available, size of vehicles or equipment and construction costs if cover must be constructed may restrict the use of this practice.

BMP 037 - PARK VEHICLES ON AN IMPERVIOUS SURFACE



Description of Potential Pollutant and Source: Pollutants leaking or spilled onto the ground surface from vehicles can infiltrate into the soil. These pollutants (i.e., oil, fuel, etc.) may then be exposed to storm water and transported to surface water.

Description of BMP: Park vehicles on an impervious surface. For this BMP, an impervious surface is defined as a surface that cannot be readily penetrated by rainfall, such as concrete and asphalt pavement. Leaks and spills will be cleaned from these surfaces.

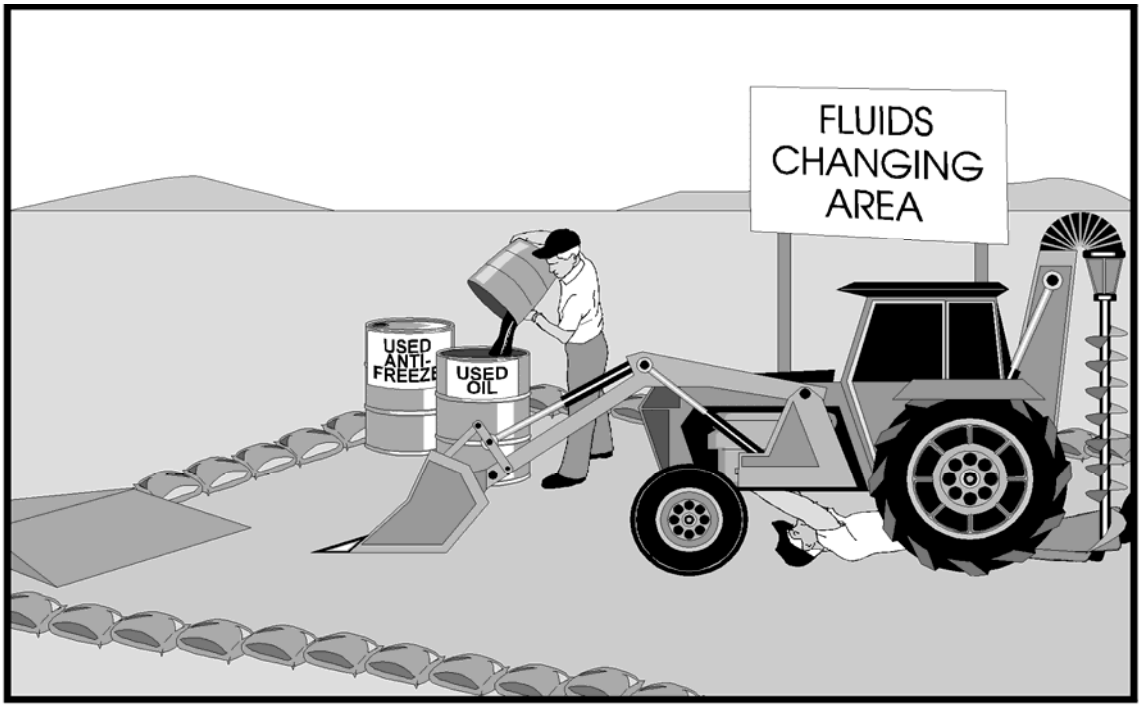
Application Guidance: Vehicles will always be parked on impervious surfaces, especially during the rainy season.

Training: Signs will be posted to remind personnel that all vehicles are to be parked on paved surfaces.

Effectiveness and Cost: Parking vehicles on impervious surfaces is a moderately effective, low-cost BMP.

Limitations: Very large traffic volumes may make implementation of this BMP difficult.

BMP 038 - DESIGNATE SPECIAL AREAS FOR DRAINING OR REPLACING FLUIDS, FLUIDS CHANGING AREA



Description of Potential Pollutant and Source: Draining and replacing motor oil, coolants, and other fluids in uncontrolled areas of the facility can potentially result in improper handling and disposal of waste and accidental spillage in an unprotected area. These materials can then be exposed to storm water.

Description of BMP: Drain and replace motor oil, coolants, and other fluids at designed maintenance facilities to reduce the potential for improper handling activities. If this is not possible, special areas will be designated for these activities. Consideration will be given to placing these areas indoors or using bermed concrete pads if outdoors.

Application Guidance: This procedure will be followed whenever vehicle or equipment maintenance is being performed.

Training: Personnel will be instructed that vehicle maintenance will only be performed at designated areas.

Effectiveness and Cost: Using designated special areas for draining fluids is an effective, low-cost BMP.

Limitations: Existing facilities may be inadequate; construction cost may be prohibitive.

BMP 039 - DRAIN ALL FLUIDS FROM STORED OR SALVAGED VEHICLES AND EQUIPMENT

Description of Potential Pollutant and Source: Vehicles and equipment undergoing long-term storage or salvage often contain a variety of liquids (oil, antifreeze, hydraulic fluid, etc.) that can leak or spill, thereby exposing these materials to storm water.

Description of BMP: Drain, collect, and recycle oil and other fluids from vehicles being stored long term or salvaged (i.e., parts vehicles).

Application Guidance: Vehicles or equipment that are to be stored without use for more than three months will be drained of all fluids. Signs will be posted on these vehicles from which fluids have been drained.

The frequency for implementing this BMP has been provided as general guidance. However, a facility operator may wish to establish a more suitable frequency. This will require SWPCP implementors to make judgements based on facility operations and conditions. To assign a frequency other than what has been suggested (i.e., more or less frequent), the following criteria will be considered and rated either High, Medium, or Low. If many of the criteria are assigned a High rating, the frequency may be increased. Similarly, if many criteria are assigned a Low rating, the frequency may be decreased. The goal of implementing this BMP is to minimize exposure of pollutants to storm water.

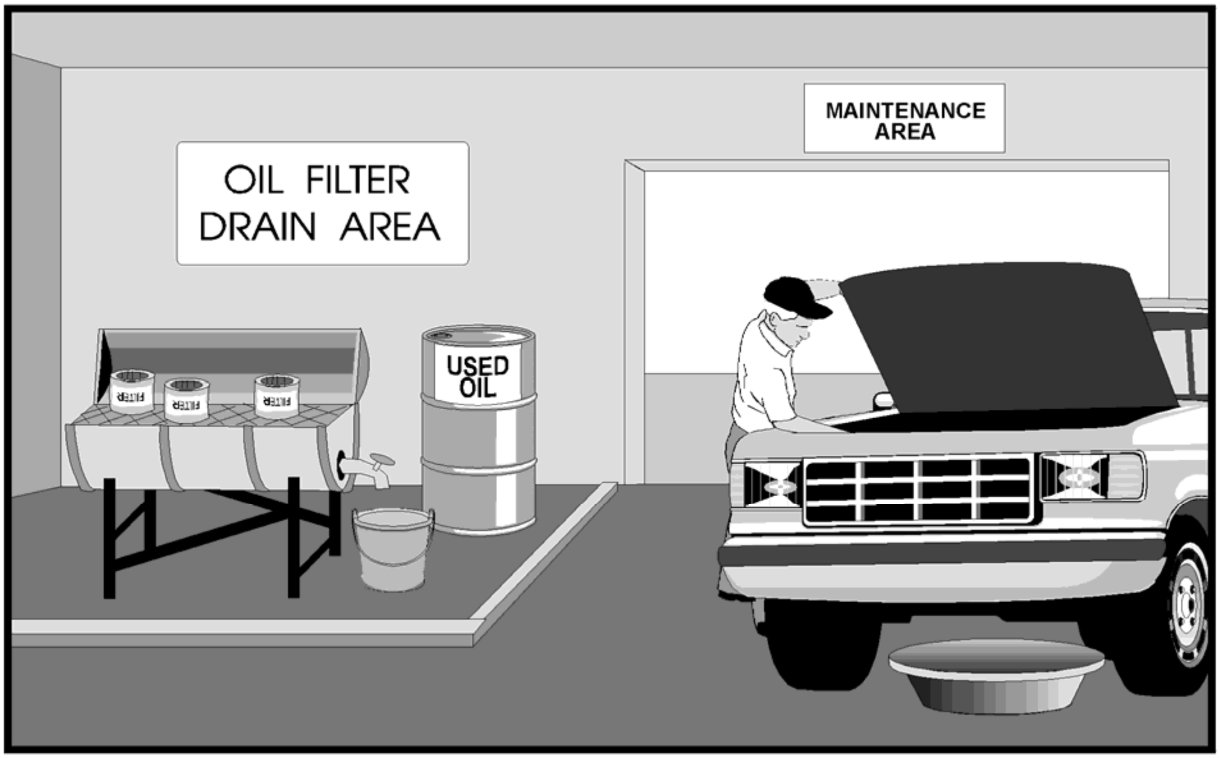
CRITERIA	Rating H=High M=Medium L=Low
Probability of exposure of significant materials to storm water	
Evidence of exposure (e.g., stains on pavement)	
Proximity of source area to outfall or receiving water	
Sensitivity of receiving water to potentially exposed significant materials (e.g., waters with beneficial uses such as human contact, recreation, significant species habitat, etc.)	

Training: Signs will be posted as reminders to personnel.

Effectiveness and Cost: Draining oil and fluids is a moderately effective, low-cost BMP.

Limitations: None

BMP 040 - COMPLETELY DRAIN OIL FILTERS BEFORE DISPOSAL



Description of Potential Pollutant and Source: Oil filters are disposed in trash containers can leak significant materials which can be exposed to storm water.

Description of BMP: Completely drain filters into collection drums before recycling or disposal.

Application Guidance: All filters will be completely drained after being changed.

Training: Signs will be posted to remind personnel of requirement to completely drain oil filters before disposal.

Effectiveness and Cost: Completely draining filters is a moderately effective, low-cost BMP.

Limitations: None

BMP 041 - WASH EQUIPMENT AND VEHICLES IN DESIGNATED AREA

Description of Potential Pollutant and Source: Washing equipment and vehicles outdoors or in areas where wash water flows onto the ground can pollute storm water. It is difficult to control the wastewater from washing operations if it is not done in a designated area.

Description of BMP: Facilities will designate bermed wash areas that contain wash water and prevent contact with storm water. These areas will drain to the sanitary sewer (BMP 042) or to a sump. If a sump is used, wash water will be recycled.

Application Guidance: This practice will be followed wherever vehicles, equipment and aircraft are washed.

Training: N/A

Effectiveness and Cost: This is a highly effective, variable-cost BMP.

Limitations: Pretreatment and monitoring of wash waster discharges to the sanitary sewer may be required. This would greatly increase the cost of this practice. The treatment plant operator will be notified and approval obtained before discharge.

BMP 042 - DISCHARGE WASH WATER TO A SANITARY SEWER

Description of Potential Pollutant and Source: Wash water from vehicle, equipment, and floor cleaning activities often contains such as grease, oil, and gasoline which can be exposed to storm water. Wash water must not be discharged to the storm drain.

Description of BMP: Discharge wash water to a sanitary sewer to ensure that is does not enter a storm drain. (See BMP 041, "Wash Equipment and Vehicles in Designated Areas.") Wash water from mopping floors will also be discharged to the sanitary sewer.

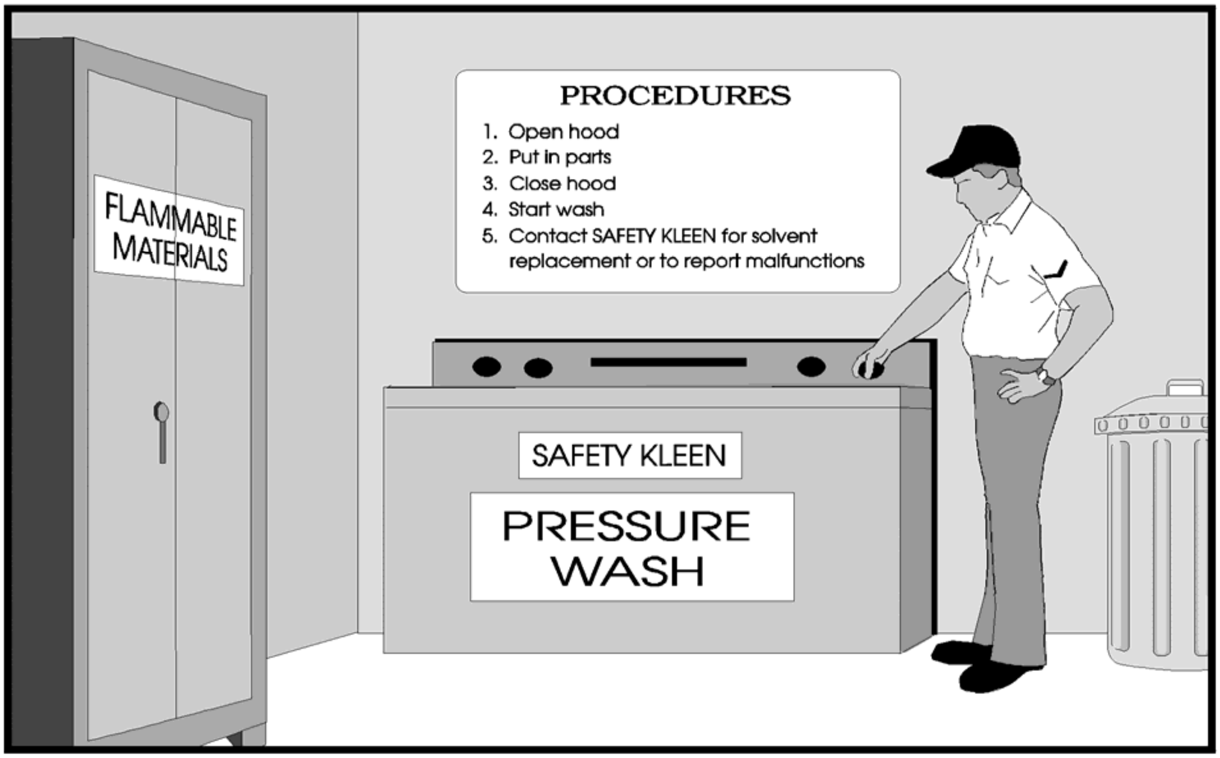
Application Guidance: All wash water from vehicle and equipment cleaning activities will be discharged to a sanitary sewer. In areas where wash water cannot be discharged to a sanitary sewer, wash water will be collected in a dead-end sump, tank, or other device and transported or pumped to the nearest treatment facility for proper disposal.

Training: Personnel will be trained to know where cleaning activities will be performed.

Effectiveness and Cost: Discharging wash water to a sanitary sewer is a highly effective, variable-cost BMP.

Limitations: Pretreatment and monitoring of wash water discharges to the sanitary sewer may be required. This would greatly increase the cost of this practice. The treatment plant operator will be notified and approval obtained before discharge.

BMP 043 - RECYCLE PRESSURE WASH SOLVENTS



Description of Potential Pollutant and Source: Pressure wash wastes from cleaning ships, vehicles, and equipment can contain dirt, oils, grease, and paint particles.

Description of BMP: Recycle pressure wash wastes by using a closed loop system or a "zero discharge system."

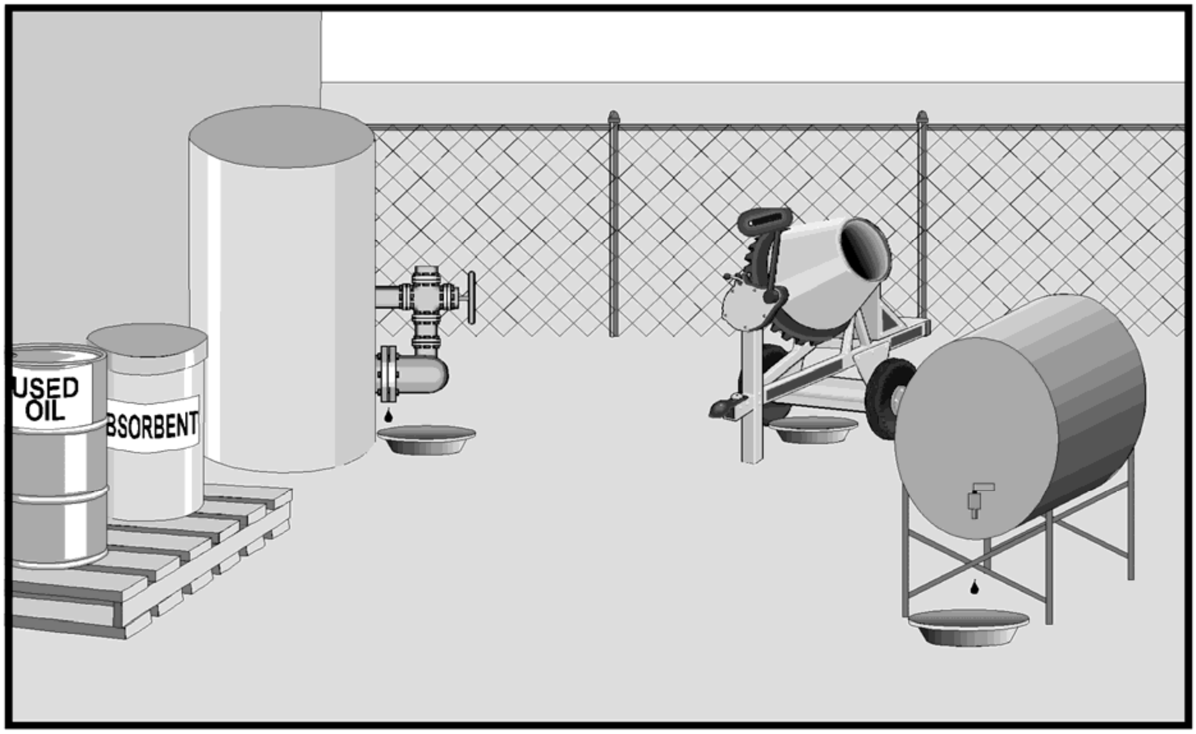
Application Guidance: Pressure wash wastes will be recycled whenever practical.

Training: Personnel will be trained in the proper use of pressure wash systems.

Effectiveness and Cost: This is a highly effective, variable-cost BMP. The cost can vary based on the availability of a local wastewater treatment facility and hauling and disposal costs. Also, the size of the pressure wash facility will affect the cost.

Limitations: None

BMP 044 - USE DRIP PANS UNDER LEAKING EQUIPMENT



Description of Potential Pollutant and Source: Equipment such as pumps, air conditioners, and boilers may leak fluids. These fluids typically contain pollutants that may be exposed to storm water and transported into the storm sewer system if they are not collected.

Description of BMP: Place drip pans under leaking equipment to collect any leaking fluid., This temporary BMP will be used until the equipment is properly repaired or replaced.

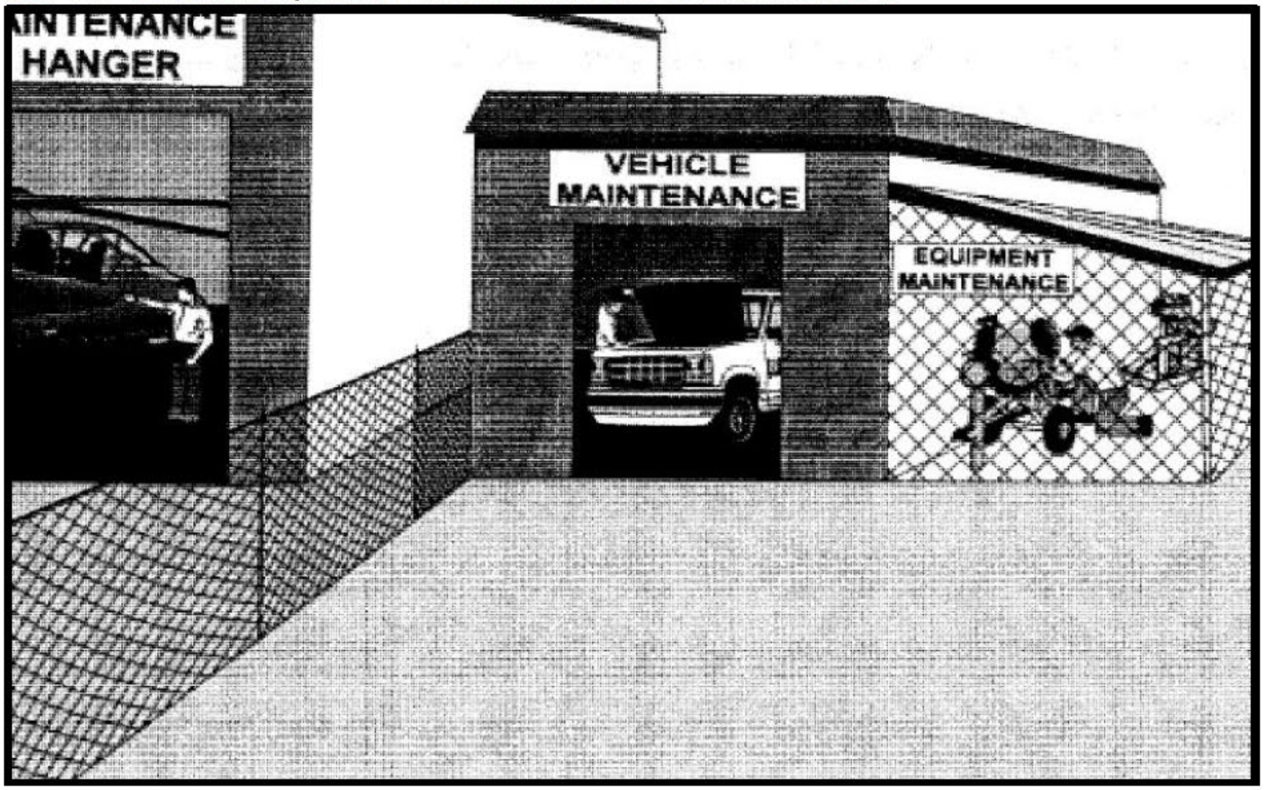
Application Guidance: Any equipment which is leaking fluid will be repaired or replaced. However, until the leak is stopped, a drip pan will be used to collect the fluid.

Training: Personnel will be trained to immediately place a drip pan under leaking equipment and notify the appropriate maintenance personnel. The drip pan will be routinely checked and the collected material disposed properly.

Effectiveness and Cost: This is a highly effective, low-cost BMP

Limitations: None

BMP 045 - PERFORM EQIDPMENT MAINTENANCE AT DESIGNATED AREAS



Description of Potential Pollutant and Source: Equipment maintenance can produce oil, grease, and other materials. These materials contain pollutants that can be exposed to storm water when the maintenance is not performed in designated areas.

Description of BMP: Perform maintenance of equipment only in designated areas. This includes the maintenance of small equipment, such as sandblasters and paint sprayers, as well as large equipment such as construction equipment, tanks, aircraft, and boats. Vehicle repair will only occur at vehicle repair and maintenance facilities.

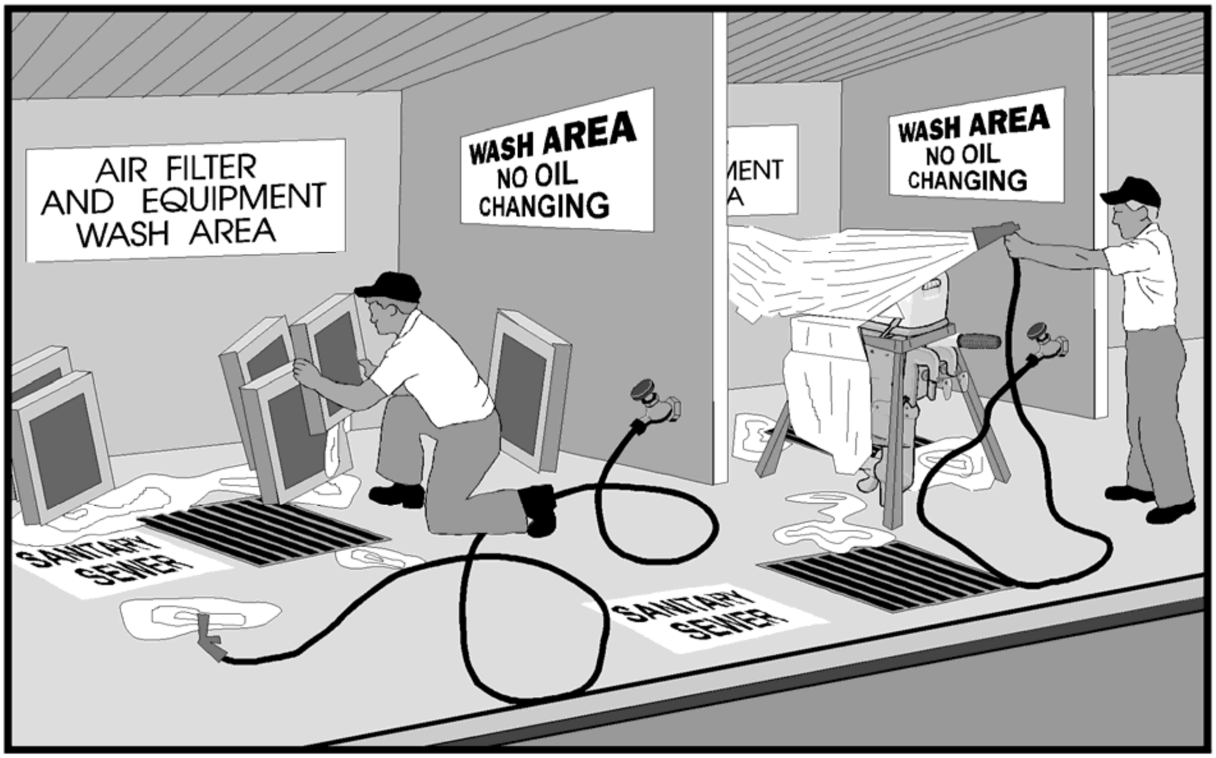
Application Guidance: Whenever possible, all maintenance, including cleaning of equipment will be performed at designated areas.

Training: Personnel will be trained to perform maintenance only in designated areas. Personnel will be informed as to where these areas are located.

Effectiveness and Cost: This is an effective, low-cost BMP.

Limitations: It may not be possible to transport some large equipment to the designated maintenance area. Also, there may not be a designated maintenance area near the broken equipment.

BMP 046 - DESIGNATE AREAS FOR WASHING NON-VEHICULAR AIR FILTERS AND OTHER GREASY EQUIPMENT



Description of Potential Pollutant and Source: Non-vehicular air filters, such as those used in large kitchens, and other equipment accumulate a large amount of grease. Current maintenance may involve cleaning the filters in an area where the oil can be exposed to storm water and enter the storm drain system.

Description of BMP: Clean air filters (from mess hall cooking grills or other facilities where air filters can contain significant amounts of grease and soot) in an area where wash water and grease are contained in a sump or discharged through an oil/water separator to sanitary sewer lines.

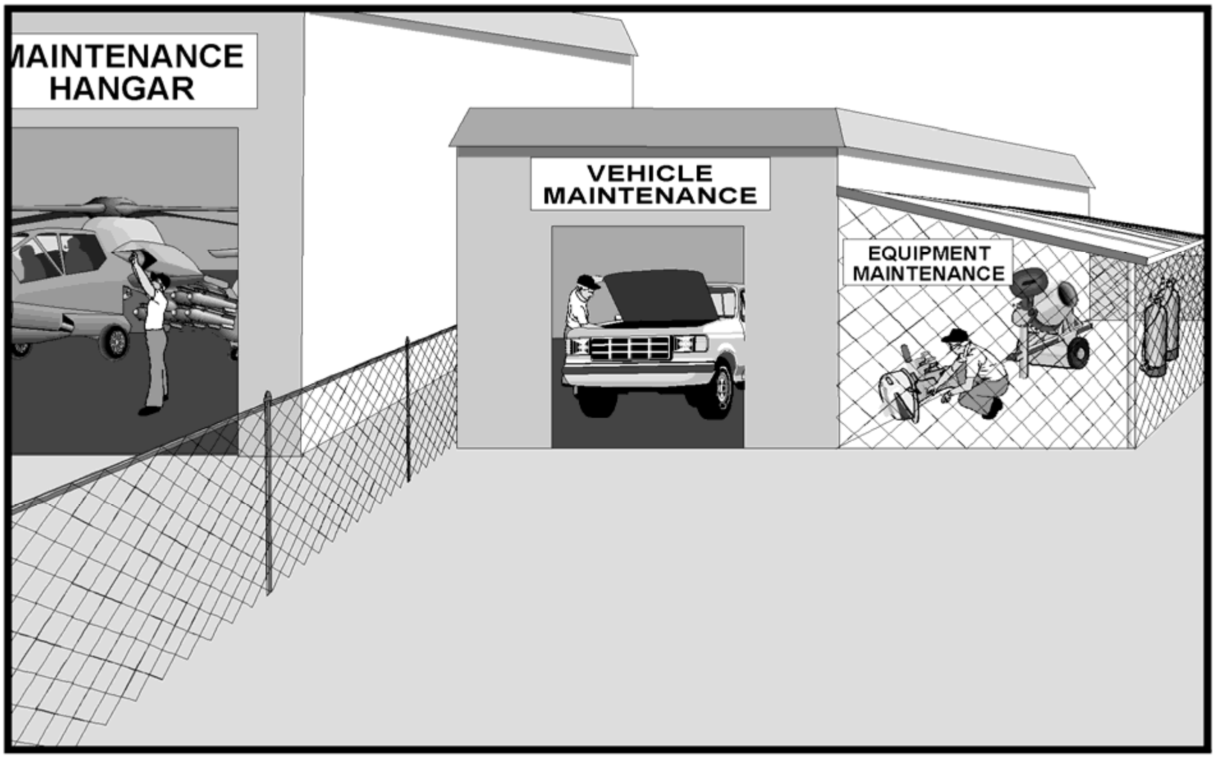
Application Guidance: This practice will be followed whenever greasy filters and other greasy equipment are cleaned.

Training: Personnel will be instructed to clean the air filters and other greasy equipment in areas where the wash water will be discharged through an oil/water separator to a sanitary sewer. A sign will be posted notifying the user where to clean the filter.

Effectiveness and Cost: Cleaning filters in a controlled area is a highly effective, low-cost BMP

Limitations: None

BMP 047 - CONDUCT MAINTENANCE WITHIN A BUILDING OR COVERED AREA



Description of Potential Pollutant and Source: Many pollutants such as oil, grease, or solvents may be leaked or spilled during maintenance activities. If maintenance is performed outside, in an uncovered area, storm water may transport the leaked and spilled material into the storm drain system.

Description of BMP: To the extent practical, conduct maintenance within a building or covered area. This includes performing aircraft/helicopter maintenance in hangars and vehicle maintenance in garages. If maintenance, including fluid top-offs, is performed outdoors, it will be conducted on an impervious surface, such as a concrete pad (see BMP 037). Rainfall runoff from the pad will be directed to a storm water treatment facility. Leaks and spills will be cleaned up as soon as possible using rags or dry absorbents (see BMP 006). Used rags and absorbent will be disposed properly. The garage floor will be cleaned regularly and all wash water from cleaning the floor will be disposed in the sanitary sewer (see BMP 042).

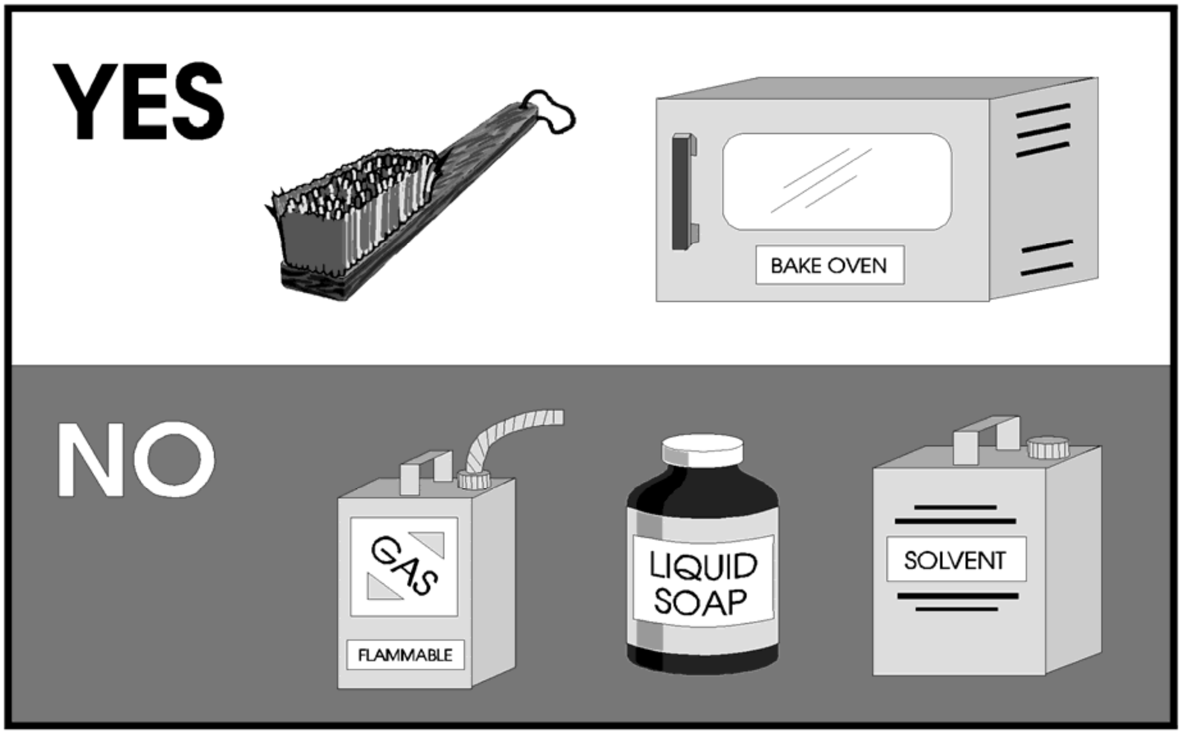
Application Guidance: All maintenance will be conducted within a building or covered area, if possible. If not possible, the maintenance will be done on an impervious surface.

Training: Personnel will be trained to perform all maintenance, including fluid top-offs, only in the designated area. Personnel will be trained in keeping the maintenance area clean.

Effectiveness and Cost: This is a moderately effective BMP. The cost will vary depending upon the availability of a building in which to perform all maintenance.

Limitations: This BMP may not be possible for the maintenance of large equipment and vehicles.

BMP 048 - REDUCE THE AMOUNT OF LIQUID CLEANING AGENTS USED



Description of Potential Pollutant and Source: Liquid cleaners (i.e., soaps, detergents, solvents, gasoline, etc.) are significant materials which must not be exposed to storm water

Description of BMP: Use methods other than liquid cleaning agents to reduce the amount of waste produced and the potential for spills of cleaning liquids. Alternative cleaning methods include scraping parts with a wire brush or using a bake oven.

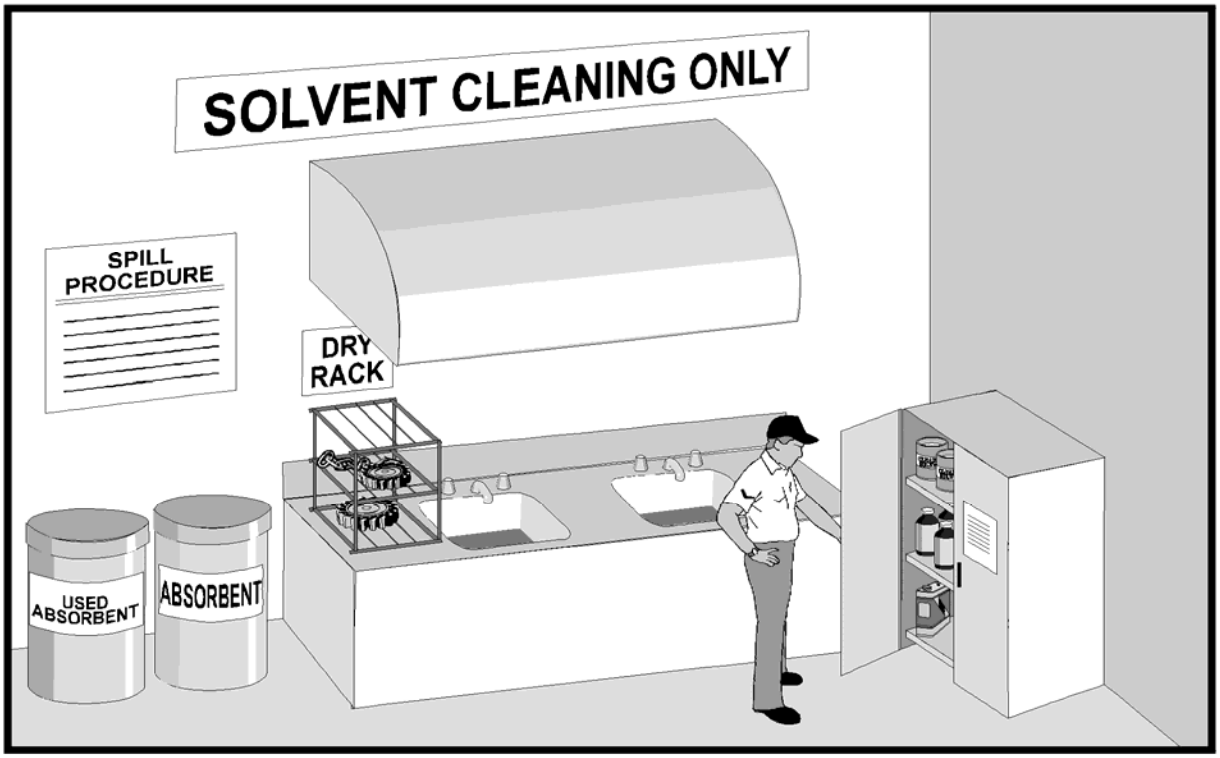
Application Guidance: Substitute cleaning methods will be used in all maintenance operations. These include: vehicle, equipment, aircraft and ship maintenance; metal work; and painting.

Training: Personnel will be trained in selected alternative methods of cleaning. Signs will be posted as reminders.

Effectiveness and Cost: Effectiveness and cost of non-liquid cleaning procedures will be site specific.

Limitations: Substitute cleaning methods may not be adequate for some operations.

BMP 049 - CENTRALIZE LIQUID SOLVENT CLEANING TO ONE LOCATION



Description of Potential Pollutant and Source: Widespread use of liquid solvents to clean parts results in a potential for spills, illegal dumping, and improper use of the solvent.

Description of BMP: If cleaning parts with liquid solvents is unavoidable, conduct cleaning operations in central locations. This practice will reduce the number of personnel using the solvents, promote proper use and disposal, and minimize the potential for spills (assuming that the central locations are properly operated and maintained). Drip pans, drain boards and drying racks will be located adjacent to and oriented such that excess solvent is directed back into a sink or holding tank for recycling. All storage containers will be clearly labeled.

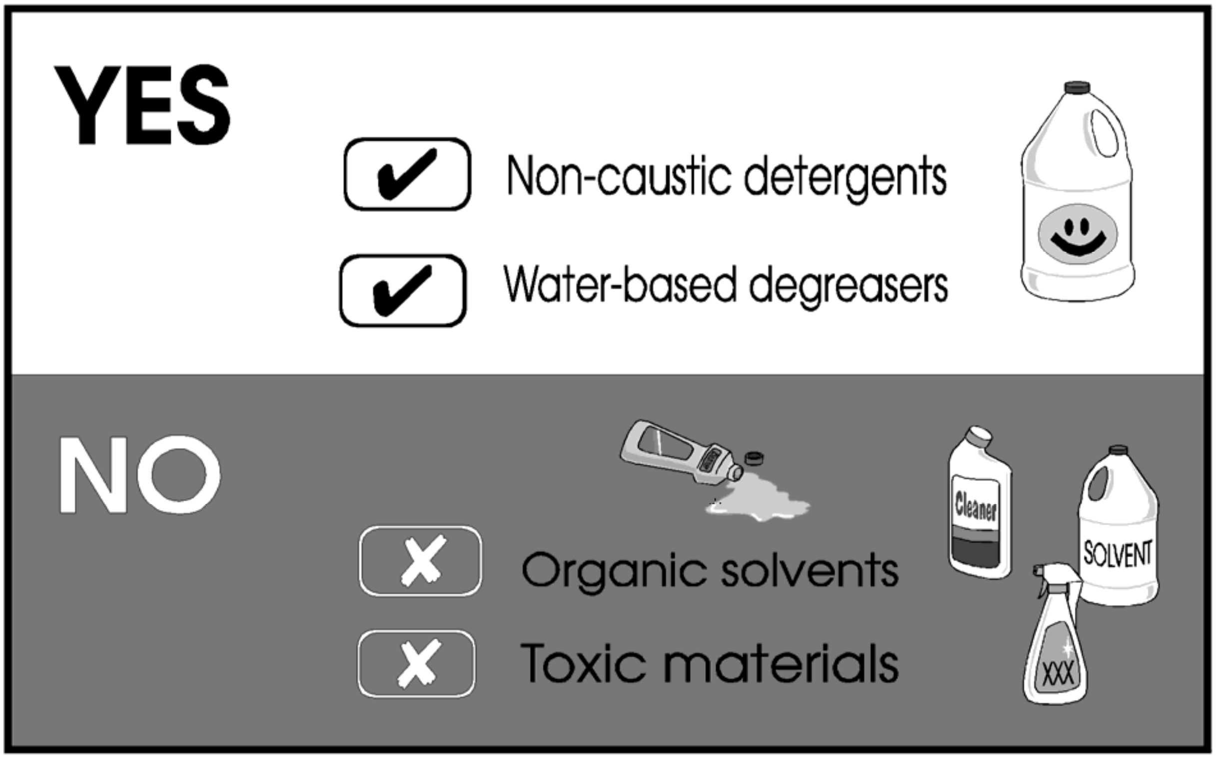
Application Guidance: Central cleaning locations will be used whenever parts are cleaned with liquid solvents in maintenance and salvage operations.

Training: Personnel will be notified of the locations of the cleaning stations. Personnel will be trained in proper procedures, such as removing dipped parts slowly as to avoid spill, and how to recycle used solvent.

Effectiveness and Cost: Central cleaning stations are a moderately effective, moderate-cost BMP.

Limitations: The size of the parts being cleaned may preclude having operations centralized.

BMP 050 - SUBSTITUTE NON-TOXIC OR LESS-TOXIC CLEANING SOLVENTS



Description of Potential Pollutant and Source: Organic solvents, typically used for cleaning equipment and parts, are considered a major pollutant in storm water. Exposure of these materials to storm water can be minimized by using less-toxic substitutes.

Description of BMP: Substitute non-toxic or less-toxic materials to reduce the impact of storm water pollutants. This includes using non-caustic detergents for parts cleaning, detergent or water-based degreasers in place of organic degreasers, replacing chlorinated solvents with non-chlorinated solvents, and using phosphate-free detergents. However, even non-toxic materials are considered storm water pollutants and must be managed properly.

Application Guidance: Less-toxic materials will be substituted whenever possible.

Training: The procurement office will be trained regarding the constituents of cleaning materials and alternative materials. Personnel will be trained to know the differences between new and previously used materials.

Effectiveness and Cost: Effectiveness and cost will vary depending on site conditions.

Limitations: There may be no adequate alternative cleaning solvent available at a reasonable cost.

BMP 051 - USE SOLVENTS EFFICIENTLY

Description of Potential Pollutant and Source: Many repair and maintenance operations use a wide variety of solvents. Spills and leaks of solvents can occur, exposing these materials to storm water. By using these materials efficiently, the potential for exposure can be reduced.

Description of BMP: Reuse solvents or use solvents sparingly to reduce the risk of spills and leaks. Pre-soaking parts in "dirty" solvent before placing in fresh solvent reduces the volume of solvent used.

Application Guidance: This practice will be followed as often as is practical.

Training: Personnel will be trained in efficient use of solvents.

Effectiveness and Cost: Efficient use of solvents is a moderately effective, low-cost BMP.

Limitations: None

BMP 052 - USE OUTSIDE CONTRACTOR FOR HANDLING USED SOLVENTS AND OTHER SIGNIFICANT MATERIALS

Description of Potential Pollutant and Source: Improper storage, handling, and disposal of solvents, oils, paint thinners, and other toxic chemicals can occur with untrained personnel. This can result in exposure of these materials to storm water. Use of contractors specializing in handling these materials can minimize this exposure.

Description of BMP: Use private contractors to handle the disposal and replenishing of solvents, used oil, and other significant materials used in industrial or maintenance operations.

Application Guidance: Private contractors will be used for disposing and replenishing significant materials continually.

The frequency for implementing this BMP has been provided as general guidance. However, a facility operator may wish to establish a more suitable frequency. This will require SWPCP implementors to make judgements based on facility operations and conditions. To assign a frequency other than what has been suggested (i.e., more or less frequent), the following criteria will be considered and rated either High, Medium, or Low. If many of the criteria are assigned a High rating, the frequency may be increased. Similarly, if many criteria are assigned a Low rating, the frequency may be decreased. The goal of implementing this BMP is to minimize exposure of pollutants to storm water.

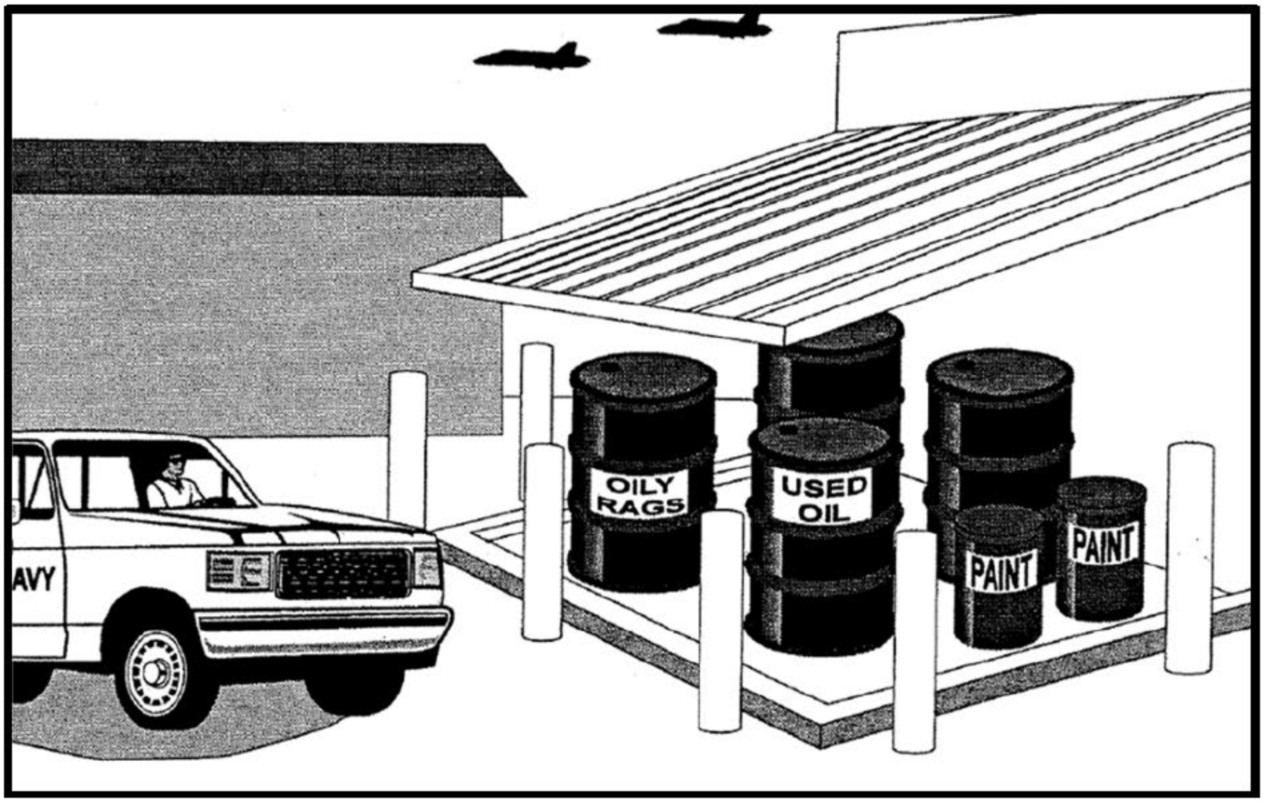
CRITERIA	Rating H=High M=Medium L=Low
Probability of exposure of significant materials to storm water	
Quantity of significant materials potentially exposed	
Toxicity of significant materials potentially exposed	
Frequency of use of significant materials potentially exposed	
Evidence of exposure (e.g., stains on pavement, etching of concrete)	
Proximity of source area to outfall or receiving water	
Sensitivity of receiving water to potentially exposed significant materials (e.g., waters with beneficial uses such as human contact, recreation, significant species habitat, etc.)	

Training: Personnel will be trained to contact the private contractors when services are needed and prepare the proper manifests (records of transportation).

Effectiveness and Cost: This is a moderately effective, moderate-cost BMP.

Limitations: Availability of private contractors may be a limitation. Quantities of materials/waste will also limit the application of this BMP.

BMP 053 - PROTECT STORAGE CONTAINERS FROM BEING DAMAGED BY VEHICLES



Description of Potential Pollutant and Source: If a container is damaged by a vehicle, the contents may leak, exposing the material to storm water.

Description of BMP: Protect storage containers against damage by vehicles. Bollards or traffic barriers may be used if the container location is accessible to vehicles. Fences and curbs may also be used to protect the containers.

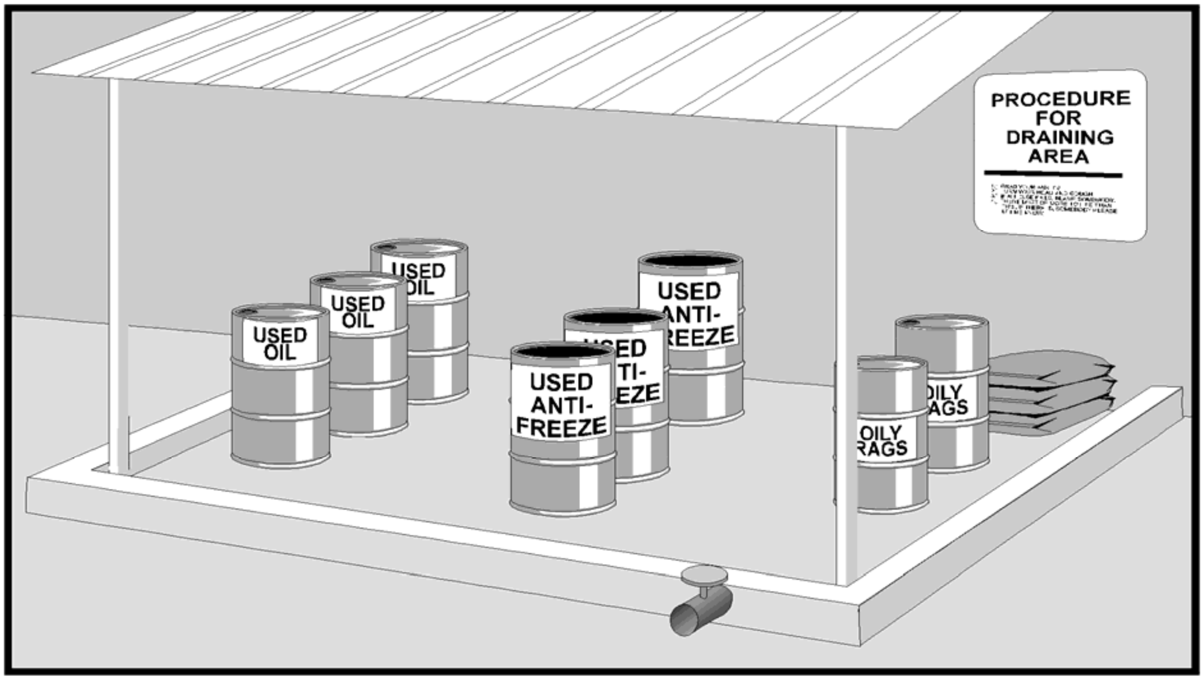
Application Guidance: Containers will be guarded against damage by vehicles.

Training: N/A

Effectiveness and Cost: This is an effective, low-cost BMP.

Limitations: None

BMP 054 - PROPERLY STORE CONTAINERS



Description of Potential Pollutant and Source: Improper storage of containers can result in the exposure of significant materials to storm water.

Description of BMP: Store containers will be properly. This includes the following:

- Providing adequate aisle space (typically 3 feet) to facilitate material transfer and easy access for inspections.
- Storing containers, drums, and bags away from vehicle traffic routes to reduce the potential for mechanical impact and accidental spills. Do not store bags that are easily punctured near high-traffic areas where they may be hit by moving equipment or personnel. Stacking containers according to manufacturer's instructions to avoid damaging the containers from improper weight distribution.
- Storing liquid containers in a bermed area.

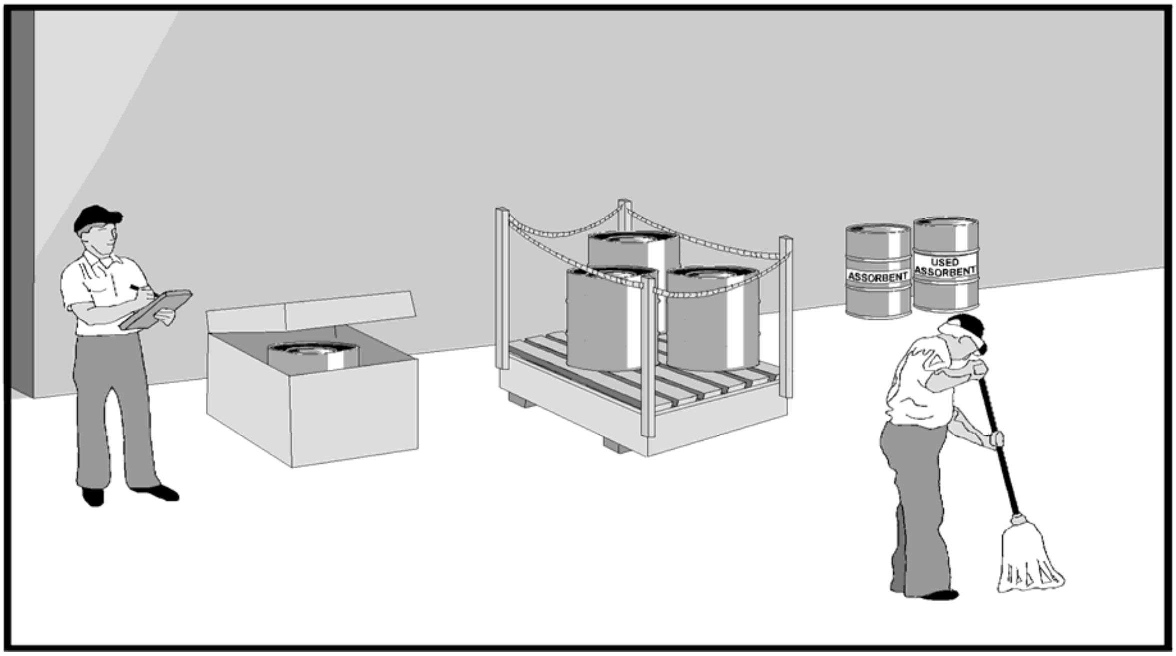
Application Guidance: Containers will be properly stored.

Training: Training on the proper storage of materials will be provided periodically to the appropriate personnel.

Effectiveness and Cost: This is a moderately effective, low-cost BMP.

Limitations: None

BMP 055 - USE OVERPACK CONTAINERS OR CONTAINMENT PALLETS TO STORE 55-GALLON DRUMS OUTSIDE OF STORAGE AREAS



Description of Potential Pollutant and Source: Chemicals, oils, solvents or liquid materials stored outside in 55-gallon drums may leak. The leaking material can then be exposed to storm water and transported to the storm drain system receiving waters.

Description of BMP: Use overpack containers and containment pallets for 55-gallon drums stored outside. Overpack containers and containment pallets are secondary containers usually constructed of plastic. They are large enough to hold the contents of the containers stored in them if they should break or leak. Using overpack containers or containment pallets minimizes the amount of pollutants reaching surface waters due to leaks. Overpack containers will be protected against damage from vehicles.

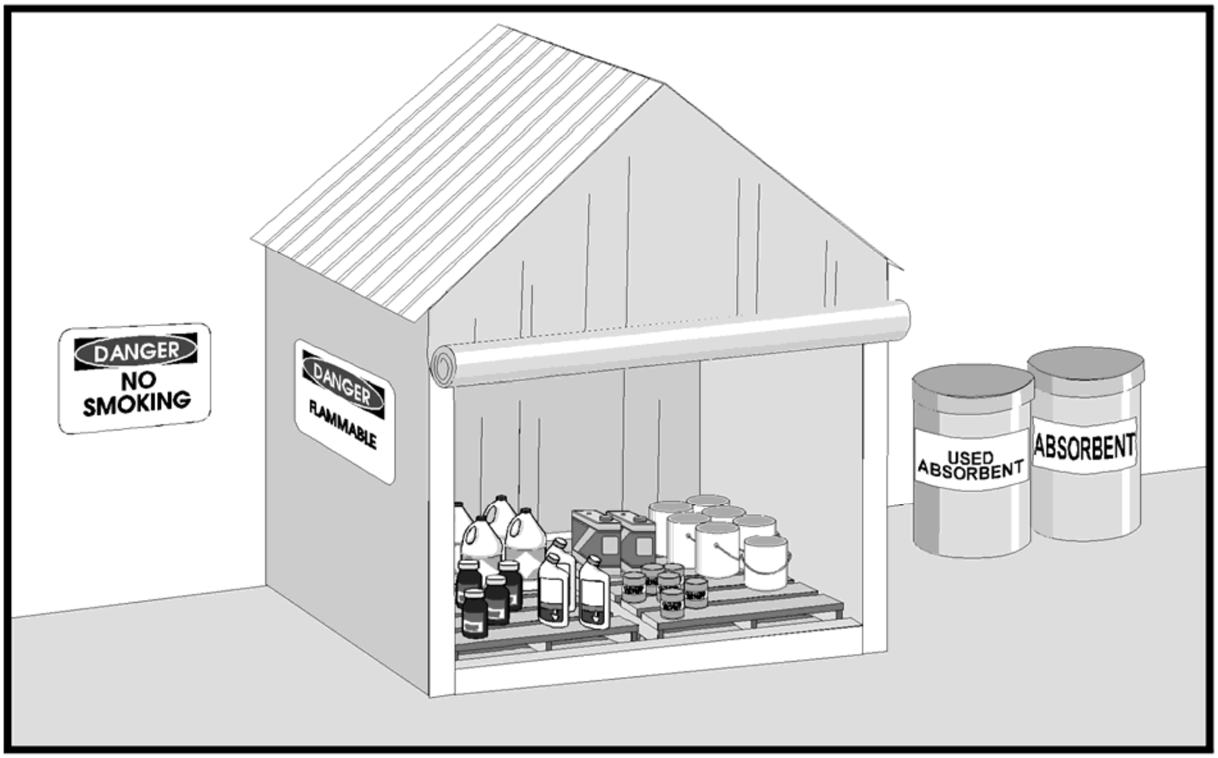
Application Guidance: Overpack containers or containment pallets will be used whenever 55-gallon drums of hazardous materials must be stored outside.

Training: Personnel will be trained to ensure that overpack containers or containment pallets are used.

Effectiveness and Cost: Overpack containers and containment pallets are a highly effective, moderate-cost BMP.

Limitations: Cost could be high if the number of drums needing containment is high.

BMP 056 - USE "DOGHOUSE" DESIGN FOR OUTDOOR STORAGE OF SMALL LIQUID CONTAINERS



Description of Potential Pollutant and Source: Small containers of liquid materials (i.e., paints, solvents, antifreeze, etc.) are often stacked or stored outside. Leaks and spills from these containers can be exposed to storm water and be transported to the storm drain or receiving waters.

Description of BMP: Store small containers of liquid properly. Containers can either be stored inside buildings or in "doghouses." The roof and flooring of a doghouse design prevents direct contact of significant materials with storm water. A doghouse design is a term used to describe a storage shed that has two solid structural walls, a roof, and two canvas walls. The structural walls support the structure, while the canvas walls provide easy access to the liquid containers in the shed. Secondary containment, such as berms and curbs, will also be used for this type of structure to contain any leaks or spills that may occur. A doghouse design has two benefits:

1. Protection of liquid containers from direct contact with rainfall
2. Storage of numerous containers in a centralized location without occupying too much space

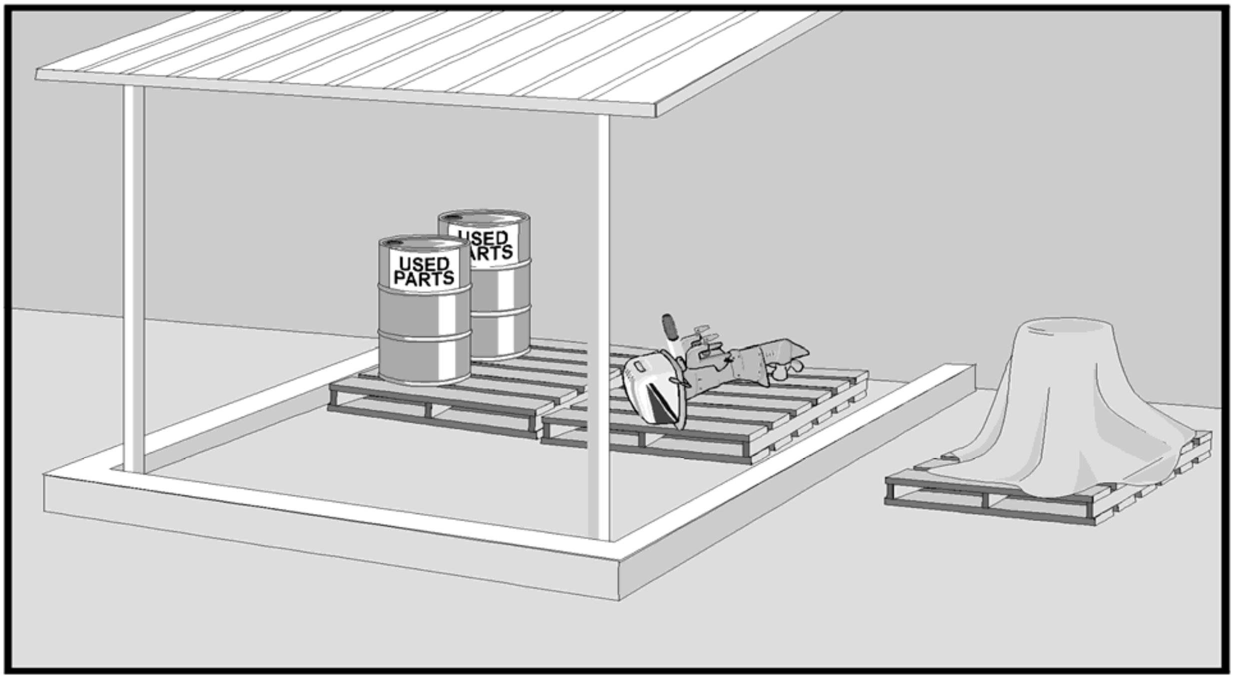
Application Guidance: Liquid containers kept outdoors will be covered at all times.

Training: N/A

Effectiveness and Cost: This is a moderately effective, moderate-cost BMP.

Limitations: Storage sheds often must meet building and fire code requirements. Construction plans should be prepared in consultation with the Federal Fire Department.

BMP 057 - DO NOT STORE USED PARTS OR CONTAINERS DIRECTLY ON GROUND



Description of Potential Pollutant and Source: Used parts are often covered with oil, grease, and other potential pollutants. Containers, such as 55-gallon drums and flammable materials storage lockers, may develop leaks and spill potential pollutants onto the ground or pavement. If the used parts or containers are stored directly on the pavement or ground, significant materials can be exposed to storm water which can transport the pollutants into the storm drain system or receiving waters.

Description of BMP: Do not store used parts and containers directly on the pavement or the ground. If possible, used parts and containers will be stored indoors. If outdoor storage is necessary, smaller parts will be placed inside a leak-proof, covered container, such as a labeled 55-gallon drum, and placed on a wooden pallet. Larger parts will be placed on wooden pallets or waterproof tarpaulins and covered with secure tarpaulins. Containers will be placed on wooden pallets to prevent the bottoms from rusting and to facilitate spill and leak detection. Placing used parts and containers in roofed, bermed storage areas is also acceptable.

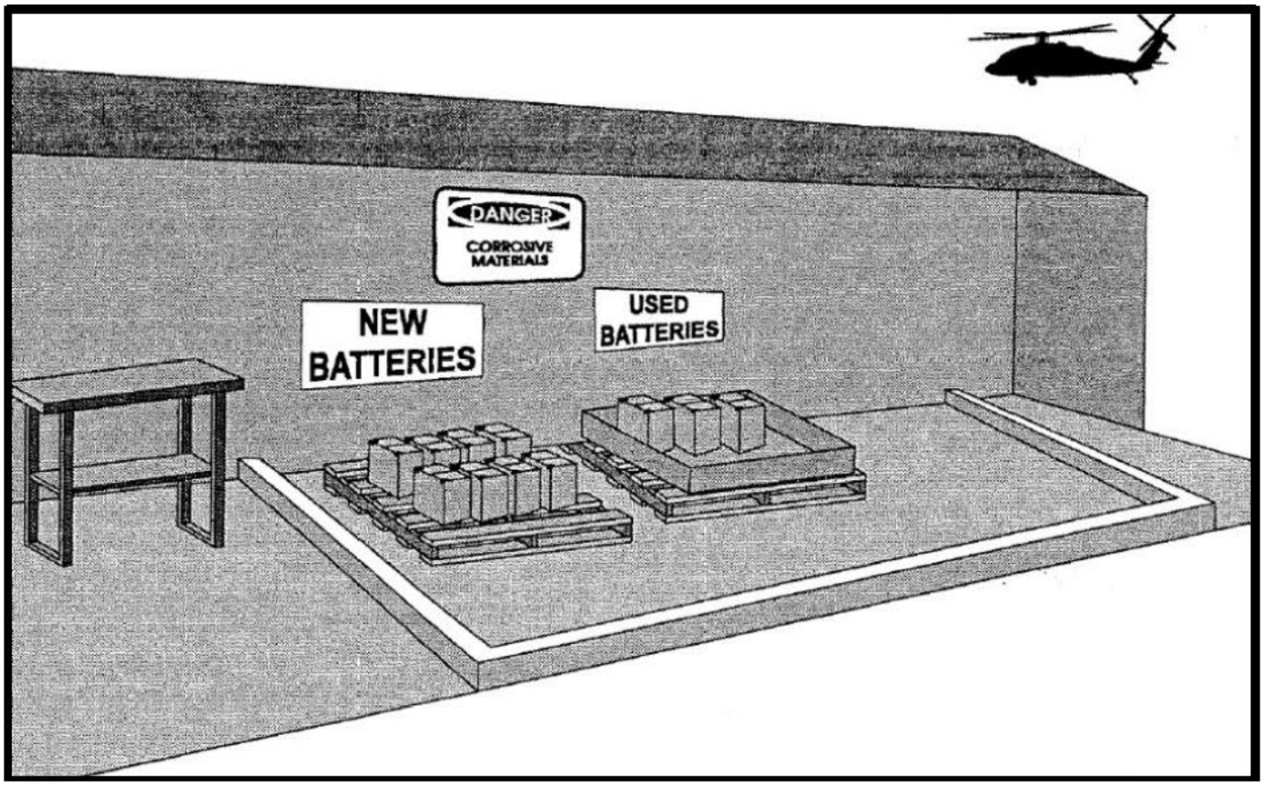
Application Guidance: Proper storage will be provided for used parts and containers.

Training: Personnel will be trained to never store used parts or containers directly on the ground or pavement.

Effectiveness and Cost: This is a moderately effective, low-cost BMP.

Limitations: None

BMP 058 - STORE BATTERIES IN A SECONDARY CONTAINER



Description of Potential Pollutant and Source: Lead-acid batteries can leak battery acid that can become exposed to storm water. These materials can be transported to the storm drain or receiving waters.

Description of BMP: Store all batteries on pallets in a bermed area. Used and cracked batteries will be stored in secondary containers. Storing the batteries on pallets allows the operator to visually detect leaks.

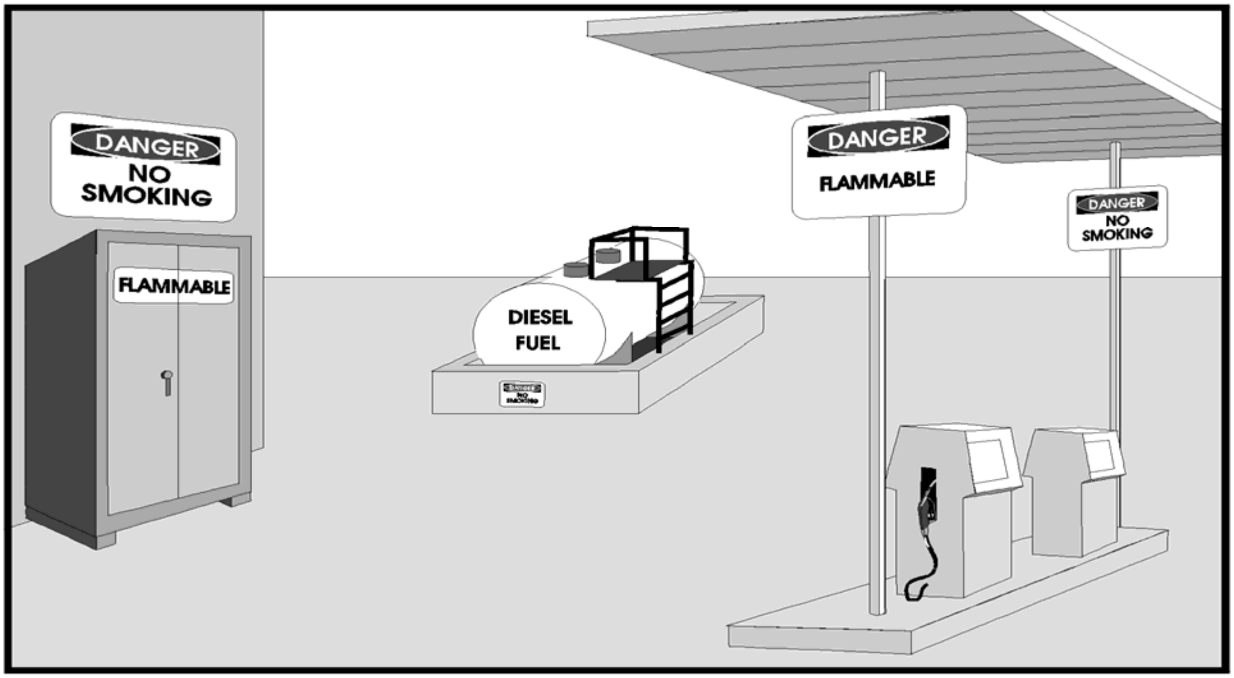
Application Guidance: This practice will be adopted in all vehicle maintenance areas or areas where batteries are stored. Dropped batteries will be treated as cracked.

Training: Signs will be posted as reminders.

Effectiveness and Cost: Secondary containers for cracked batteries is a highly effective, low-cost BMP.

Limitations: Adequacy of storage space in bermed areas; cost of constructing concrete, bermed storage area.

BMP 059 - DO NOT ALLOW OPEN FLAMES NEAR FLAMMABLE MATERIAL



Description of Potential Pollutant and Source: Water or other material used to extinguish a fire often is washed into the storm drain system. This material could contain pollutants from the item on fire. In addition, an area that has been destroyed by a fire is likely to discharge contaminants into the storm drain system. These materials can be exposed to storm water and transported to receiving waters.

Description of BMP: Do not permit open flames of any kind within 50 feet of flammable material. Many paints are flammable. Smoking will be forbidden within flammable material areas, and only spark-proof tools will be used. Signs will be posted indicating flammables and no smoking. (Note: 29 CFR 1910.106 requires this BMP for areas where flammables are stored).

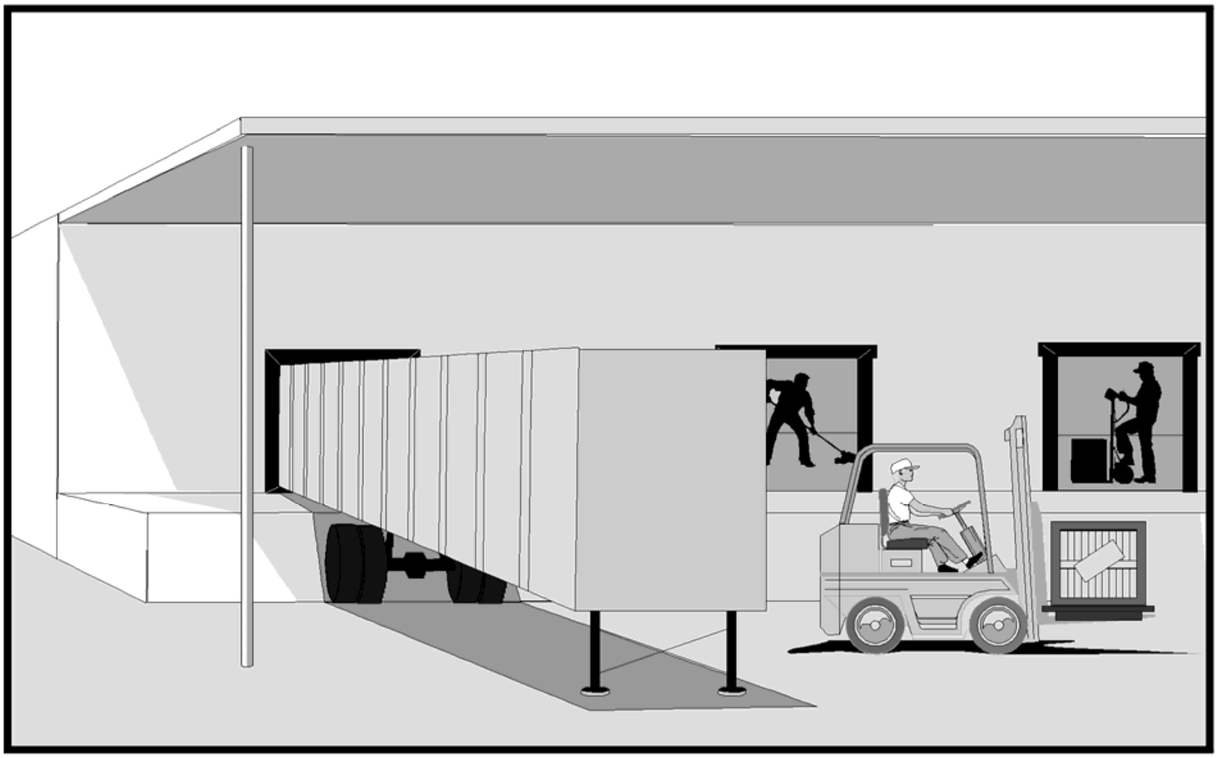
Application Guidance: No open flames or smoking will be allowed near flammable materials that are stored or that are being used. Only spark-proof tools will be used.

Training: Personnel will be trained to routinely check the label on materials to determine if they are flammable. Flammable materials will be properly stored and used.

Effectiveness and Cost: This is an effective, low-cost BMP.

Limitations: None

BMP 060 - USE DOOR SKIRT OR SEAL



Description of Potential Pollutant and Source: Spills often occur during loading and unloading of liquid wastes and other significant materials from trucks and trailers. These materials can be exposed to storm water and transported to the storm drain system and/or receiving waters.

Description of BMP: Use door skirts or seals during loading and unloading. A door skirt is a rubber or plastic strip that encloses a trailer end during loading operations. Existing docking facilities will be retrofitted with door skirts or seals where appropriate.

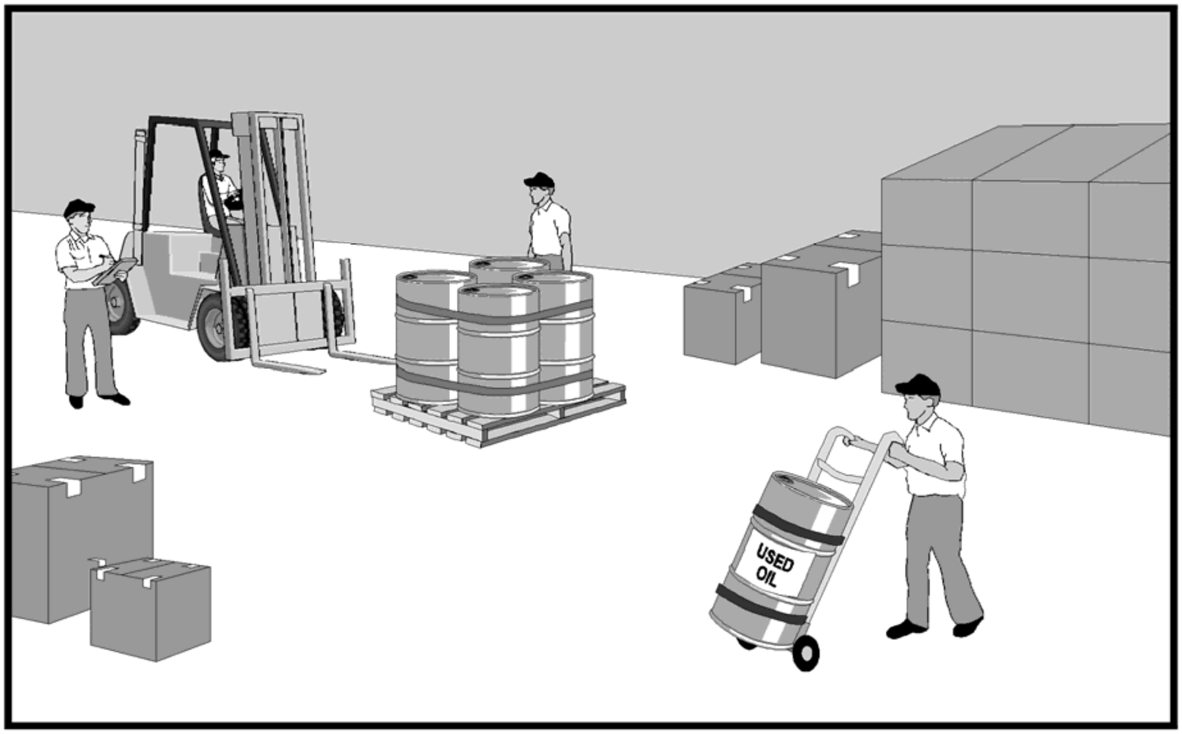
Application Guidance: A door skirt or seal will be installed at docking facilities as appropriate.

Training: N/A

Effectiveness and Cost: The door skirt is a moderately effective, low-cost BMP.

Limitations: None

BMP 061 – EMPTY PROPER HANDLING PROCEEDURES TO TRANSPORT MATERIALS



Description of Potential Pollutant and Source: Materials and waste are usually transported using forklifts, trailers, trucks, etc. If these loads are not properly secured or are handled incorrectly, drums can be ruptured and spills can occur. This can expose the materials to storm water, which can transport them to the storm drain system and/or receiving waters.

Description of BMP: Move drums by using a barrel cart or by placing the drum on a pallet and moving it with a forklift. As a minimum, two persons will assist the forklift operator when transferring a drum to or from a pallet. When multiple drums are stacked on a single pallet, the drums will be secured together with metallic strapping to reduce the potential for spillage due to weight shift. Mechanical puncture of a drum with the tines (i.e., the prongs) of the forklift will be avoided.

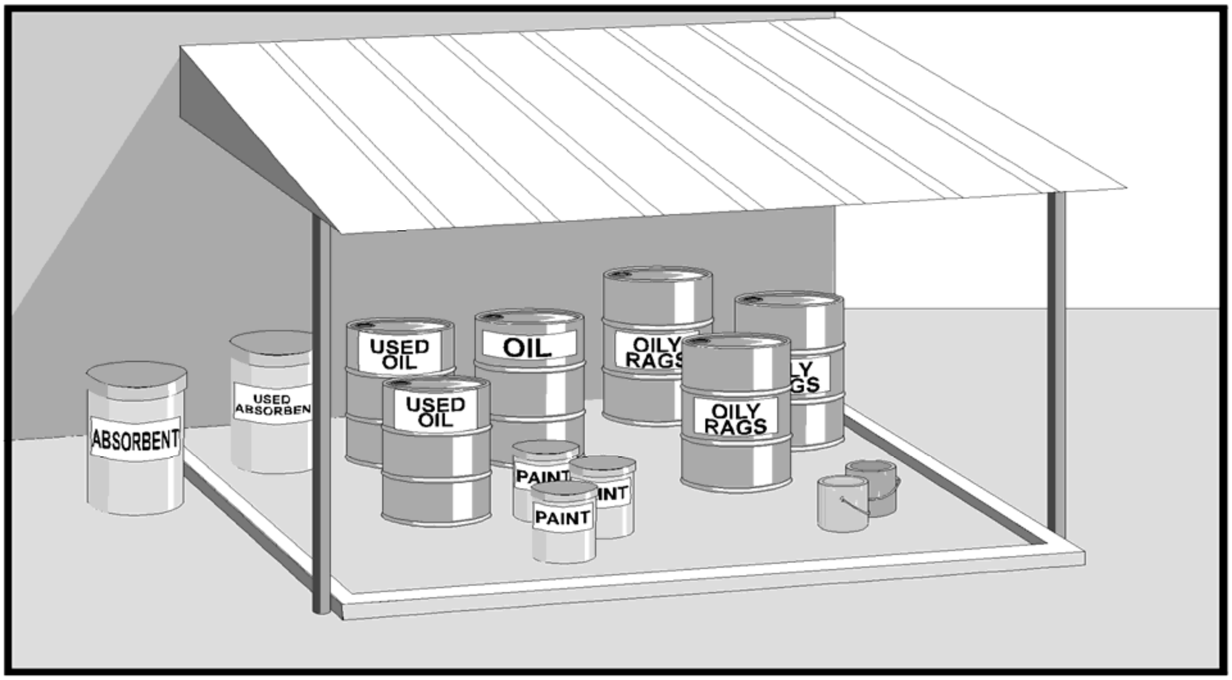
Application Guidance: Significant materials and wastes will be transported according to federal, state, and local regulations at all times.

Training: Personnel will be trained in hazardous material/waste spill prevention procedures.

Effectiveness and Cost: This practice is highly effective, moderate-cost BMP.

Limitations: None

BMP 061B - STORE LIQUIDS AND SIGNIFICANT MATERIALS WITHIN A BUILDING OR COVERED AREA



Description of Potential Pollutant and Source: Many significant materials may be leaked or spilled during storage, handling, or transport. If significant materials are stored outside, in covered areas, these materials can be exposed to storm water, which can transport the leaked or spilled material into the storm drain system.

Description of BMP: To the extent practical, store significant materials within a building or covered area. The materials will be stored on an impervious surface, such as a concrete pad. Rainfall runoff from the pad will be directed to a storm water treatment facility or contained. Leaks and spills will be cleaned up as soon as possible using rags or dry absorbents (see BMP 006). Used rags and absorbents will be disposed of properly. Any wash water from cleaning the floor will be disposed of in the sanitary sewer (see BMP 042).

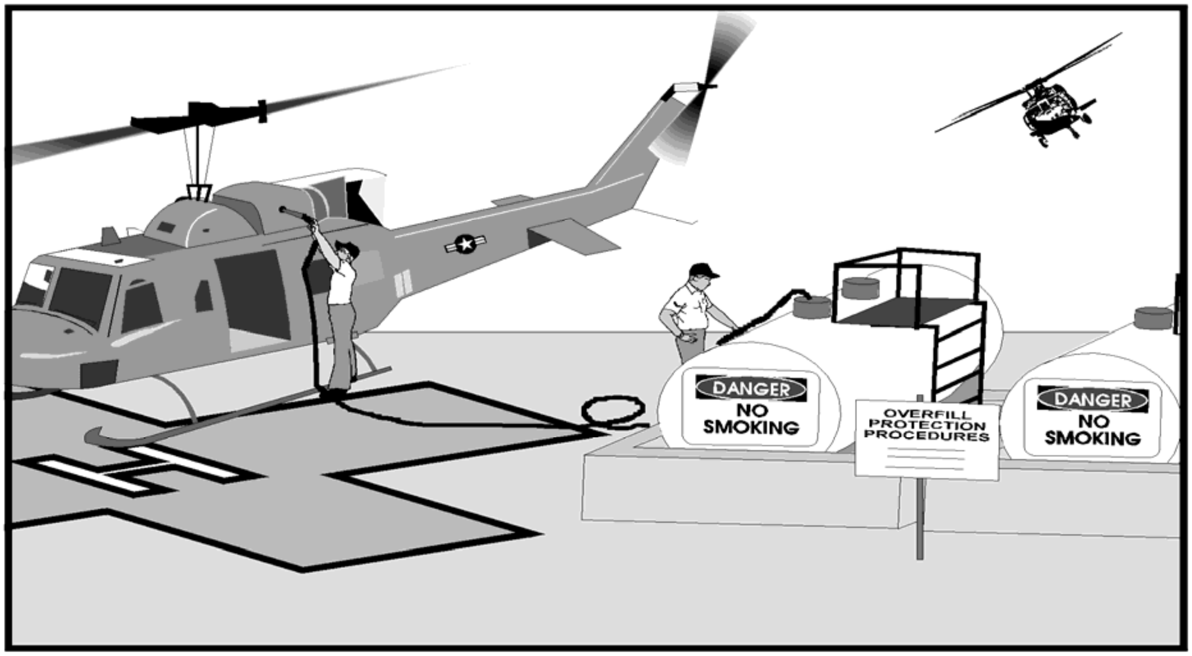
Application Guidance: All significant materials will be stored within a building or covered area.

Training: Personnel will be trained to store significant materials in designated areas.

Effectiveness and Cost: This is a moderately effective BMP. The cost will vary based on whether a building for storing the substances is available.

Limitations: None

BMP 062 - PROVIDE OVERFILL PROTECTION



Description of Potential Pollutant and Source: Overflows during fueling or transfer of fuels or liquids to the storage tanks can expose significant materials to storm water, which can transport them to the storm drain system and/or receiving waters.

Description of BMP: Control overflows by installing overfill prevention equipment that automatically shuts off flow, restricts flow, or sounds an alarm when the tank is almost full. Existing tanks will be retrofitted with this equipment.

Application Guidance: Overfill protection will be used during any fuel or liquid handling operation. This includes vehicles, equipment, aircraft and ships. Overfill protection will be included in initial construction and retrofitting of existing installations.

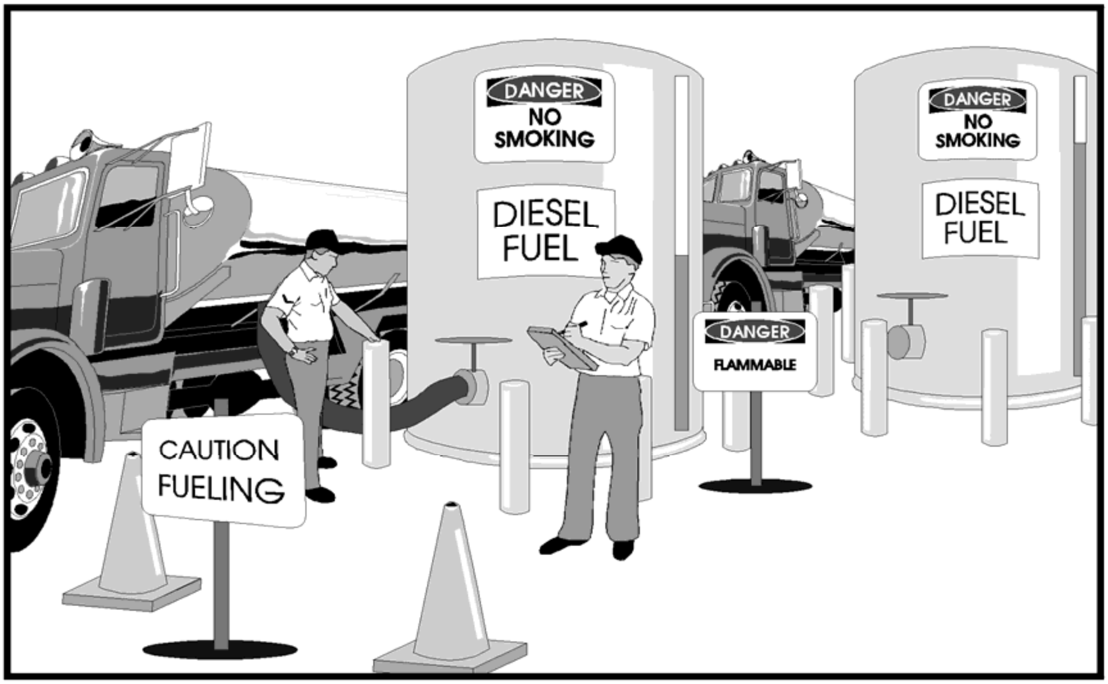
Training: Personnel will be trained in the use of the overfill protection devices at their facilities. Overfill protection procedures will be posted in fueling areas and other liquid material transfer areas.

Effectiveness and Cost: Overfill protection is a highly effective, low-cost BMP.

Limitations: None

PLACEHOLDE

BMP 064 - MONITOR MAJOR FUELING OPERATIONS



Description of Potential Pollutant and Source: Overflows during fueling or transfer of fuels or liquids to the storage tanks can expose significant materials to storm water. These materials can then be transported to the storm drain or receiving waters.

Description of BMP: Monitor fuel transfer operations carefully to reduce overfilling. A policy mandating second party monitoring of fuel transfers will be adopted.

Application Guidance: Fuel transfer operations will be observed during all high-volume transfers. High-volume transfers typically involve a fuel tanker truck.

Training: Personnel will be trained in appropriate emergency spill response actions and proper fueling procedures. Fueling procedures will include the following items: Determine that sufficient space is available in the storage tank or drum to receive the entire trailer compartment's capacity by gauging the tank or drum immediately before discharging additional product into the storage tank. Gauging can be accomplished by using stick readings, sight gauges, or sensor readouts.

- Ensure that the tank trailer is accurately spotted at the proper unloading spot.
- Ensure that the tank trailer brakes are set; the driver remains with the vehicle and observes the transfer lines during the entire unloading procedure.
- Place caution signs in the proximity of the tank trailer to give necessary warning to approaching vehicles and personnel. These signs must remain posted until after the tank trailer is unloaded and disconnected from the discharge connection.
- Ensure that no open flames of any kind are permitted within 100 feet of the tank trailer. Smoking is strictly forbidden within this area. Only spark-proof tools are to be used (see BMP 059).
- Limit performance of unloading operations only to reliable persons properly instructed and made responsible for careful compliance with applicable regulations (see BMP 031).
- Attach ground strap at the facility to bumper of tank trailer unless the transfer hose provides the

proper ground, once the products in the tank and trailer and compartments have been verified as being the same.

- Ensure that the facility storage tank is vented before connecting the unloading line unless unloading uses a vapor recovery system. Connect vapor recovery system(s) if applicable.
- Attach unloading line to the proper connection on the outlet leg of the tank truck.
- Open bottom outlet valve and proper valves in the unloading lines.
- Start product unloading, checking to ensure that there is no leakage at any of the connections. Should leakage appear, immediately stop the unloading process by closing the necessary outlet valves. The driver must continuously observe the connections to ensure that they are secure throughout the fluid transfer process.
- After liquid has been removed, close all valves, disconnect facility unloading from tank trailer, replace cap to outlet, and tighten all other closures.
- Gauge the tank after delivery to ensure that the product amount delivered agrees with the manifest or bill of lading. Be certain that any discrepancies noted at the time of delivery are noted on the manifest or bill of lading and are initialed by the driver.
- Remove all portable signs and release the tank trailer.

Effectiveness and Cost: Observing major fueling operations is a moderately effective, low-cost BMP.

Limitations: None

BMP 065 - PROVIDE ABSORBENT BOOMS IN UNBERMED FUELING AREAS

Description of Potential Pollutant and Source: Spills during major fueling operations may expose potential pollutants to storm water. These materials can be transported to the storm drain system and/or receiving waters.

Description of BMP: Provide absorbent booms at fueling areas which are not bermed. The absorbent booms are portable and are used if a spill occurs during the fueling operations.

Application Guidance: Absorbent booms will be kept at all fueling areas.

Training: Personnel will be trained regarding the proper use and placement of the absorbent booms to contain spills. This information will be obtained from the manufacturer of the absorbent booms.

Effectiveness and Cost: This is a moderately effective BMP. The cost will vary based on the size of the fueling area.

Limitations: None

BMP 066 - ELIMINATE TOPPING OFF TANKS

Description of Potential Pollutant and Source: Trying to completely fill tanks after the pumps automatically shut off, or "topping off," often results in fuel spills and exposure of significant materials to storm water.

Description of BMP: Eliminate "topping off" fuel tanks. A policy will be developed to discourage "topping off" tanks. The policy will include incentives, posting signs stating the policy, or penalties.

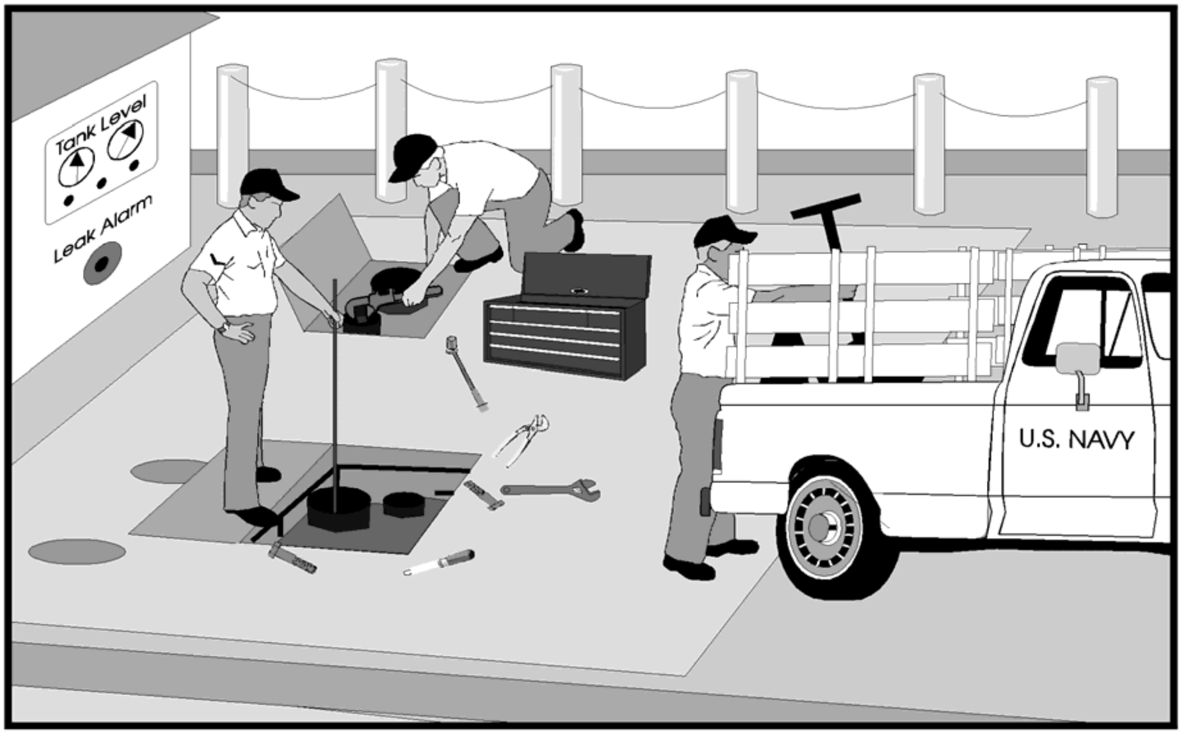
Application Guidance: This BMP will be applied to all fuel or liquid handling operations.

Training: New personnel will be informed of policy and signs should be posted as a reminder.

Effectiveness and Cost: Eliminating "topping off" is a highly effective, low-cost BMP.

Limitations: None

BMP 067 - INSTALL LEAK DETECTION SYSTEM



Description of Potential Pollutant and Source: An underground storage tank may leak fuel which may subsequently become exposed to storm water. These materials can be transported to storm drains and/or receiving waters.

Description of BMP: A leak detection system will be installed on USTs. There are numerous methods of leak detection systems. The more effective and costly methods include tank automatic gaging, vapor monitoring, groundwater monitoring, and interstitial monitoring. A low-cost, but less effective leak detection method involves using inventory control to keep track of the amount of fuel dispensed into the tank versus the amount pumped out.

Application Guidance: Tanks will be monitored for leaks every 30 days. The frequency for implementing this BMP has been provided as general guidance. However, a facility operator may wish to establish a more suitable frequency. This will require SWPCP implementors to make judgements based on facility operations and conditions. To assign a frequency other than what has been suggested (i.e., more or less frequent), the following criteria will be considered and rated either High, Medium, or Low. If many of the criteria are assigned a High rating, the frequency may be increased. Similarly, if many criteria are assigned a Low rating, the frequency may be decreased. The goal of implementing this BMP is to minimize exposure of pollutants to storm water.

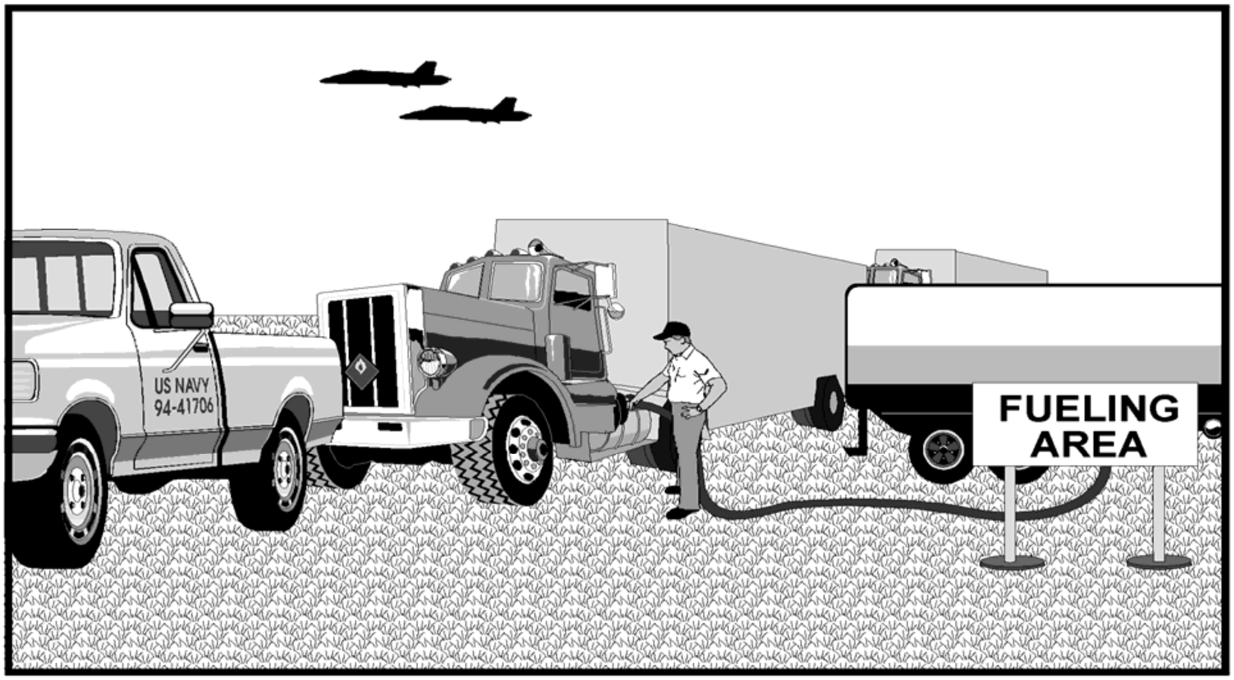
CRITERIA	Rating H=High M=Medium L=Low
Probability of exposure of significant materials to storm water	
Quantity of significant materials potentially exposed	
Toxicity of significant materials potentially exposed	
Frequency of use of tank	
Old age or poor condition of tank	
Evidence of exposure (e.g., stains on ground surface)	
Proximity of source area to outfall or receiving water	
Sensitivity of receiving water to potentially exposed significant materials (e.g., waters with beneficial uses such as human contact, recreation, significant species habitat, etc.)	
Probability of exposure of significant materials to storm water	

Training: Designated personnel will be trained on the operation and maintenance of the leak detection system in use at their facilities.

Effectiveness and Cost: The effectiveness and cost of the leak detection system depends on the method used. Inventory control is a less effective, low-cost BMP. The other methods are highly effective and have higher costs.

Limitations: For previously installed tanks, inventory control may be the most economically feasible option.

BMP 068 - DESIGNATE AREAS FOR FUELING FROM MOBILE FUEL TANKERS



Description of Potential Pollutant and Source: Overflows during fueling can expose significant materials to storm water. These materials can be transported to the storm drain and/or receiving waters.

Description of BMP: Designate areas for fueling to reduce the chances of fuel spills reaching storm water. Minimize the use of mobile fuel tankers. Most vehicles, with the exception of tracked vehicles such as tanks and bulldozers, should be able to travel to designated areas with minimal lost time.

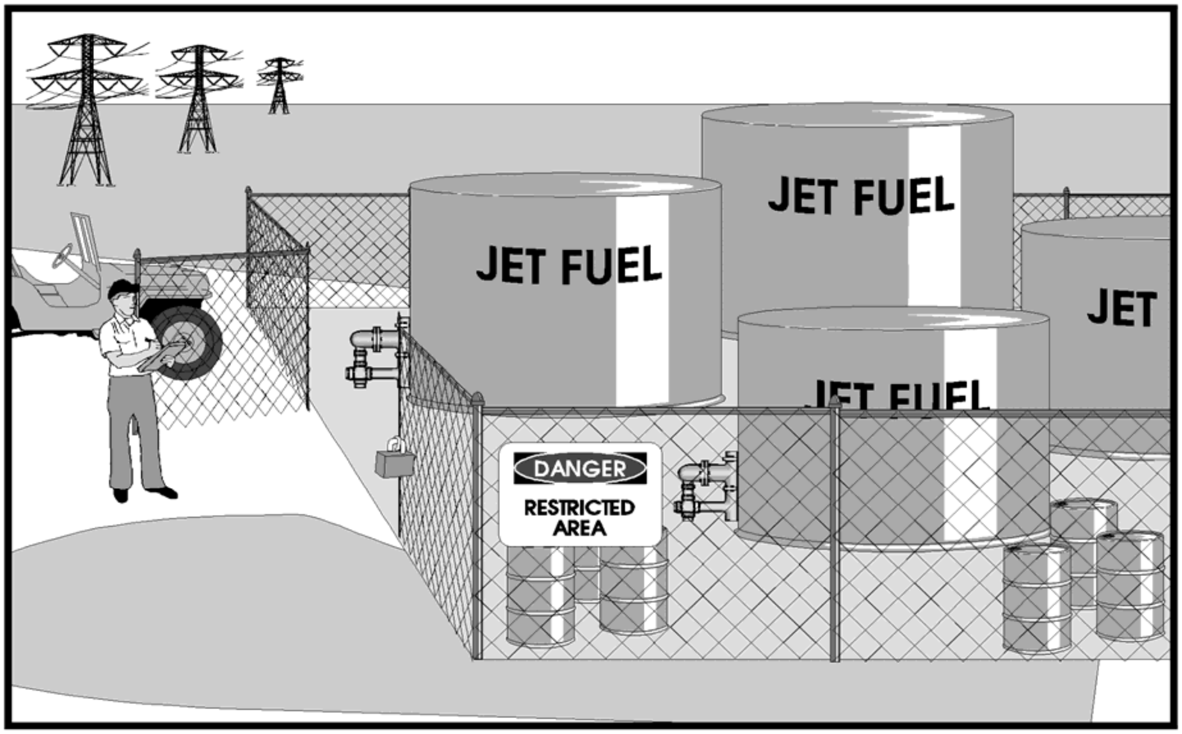
Application Guidance: Fueling areas will be designated whenever a large number of mobile equipment are being used.

Training: Personnel will be notified of the locations of designated fueling areas.

Effectiveness and Cost: Designated fueling areas are a highly effective, low-cost BMP.

Limitations: None

BMP 069 - RESTRICT ACCESS TO TANKS



Description of Potential Pollutant and Source: Improper use or vandalism of fuel tanks may result in discharge of fuel to the ground. This fuel may then be exposed to storm water and transported to the storm drain and/or receiving waters.

Description of BMP: Restrict access to fuel tanks and valves to properly trained personnel. The area can be restricted by a locked gate. This BMP is recommended for fuel tank farms.

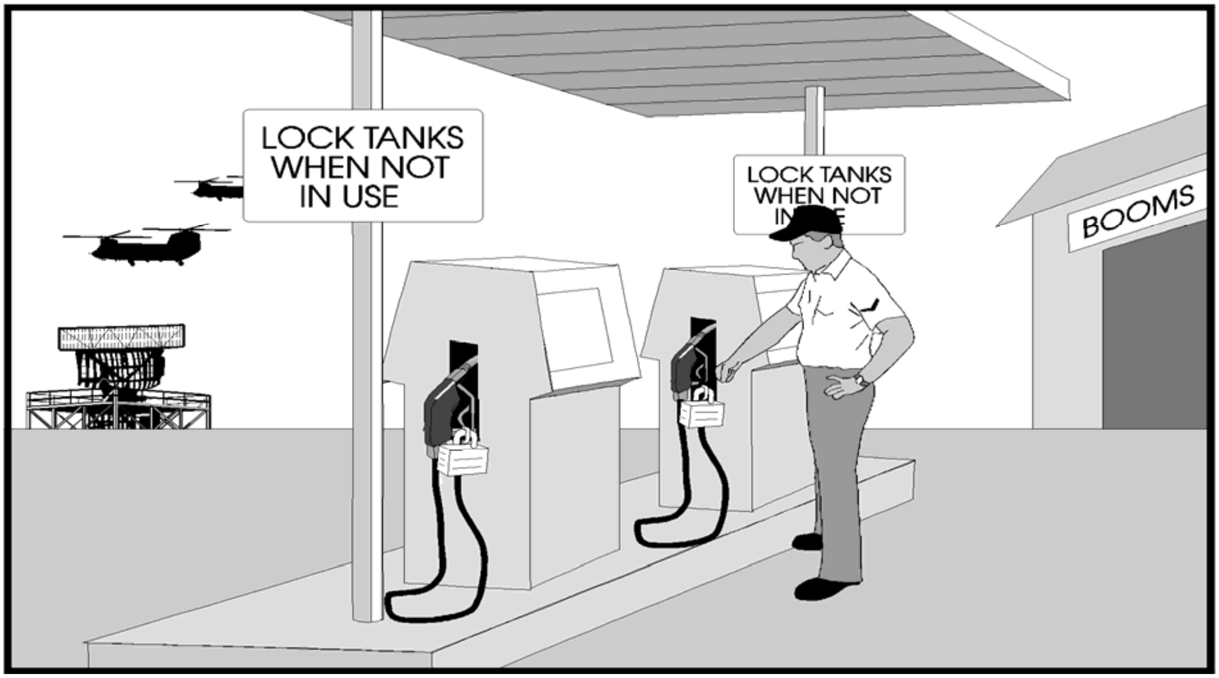
Application Guidance: Access to valves will be restricted at all times to properly trained personnel.

Training: Personnel who use fuel tanks will be trained in the proper operation of the system. Non-trained personnel who need fuel will be informed how to contact trained personnel for fuel dispensing.

Effectiveness and Cost: This is an effective, low-cost BMP.

Limitations: The placement of some tanks may make it difficult to restrict access them.

BMP 070 - LOCK FUEL TANKS WHEN NOT IN USE OR ON STANDBY



Description of Potential Pollutant and Source: Unauthorized use of fuel tanks increases the possibility of accidental fuel spills and exposure to storm water. Unauthorized use after normal hours of operation could potentially result in a large spill of fuel.

Description of BMP: Lock fuel tank valves and fill pipes when idle to ensure that accidental user error does not occur.

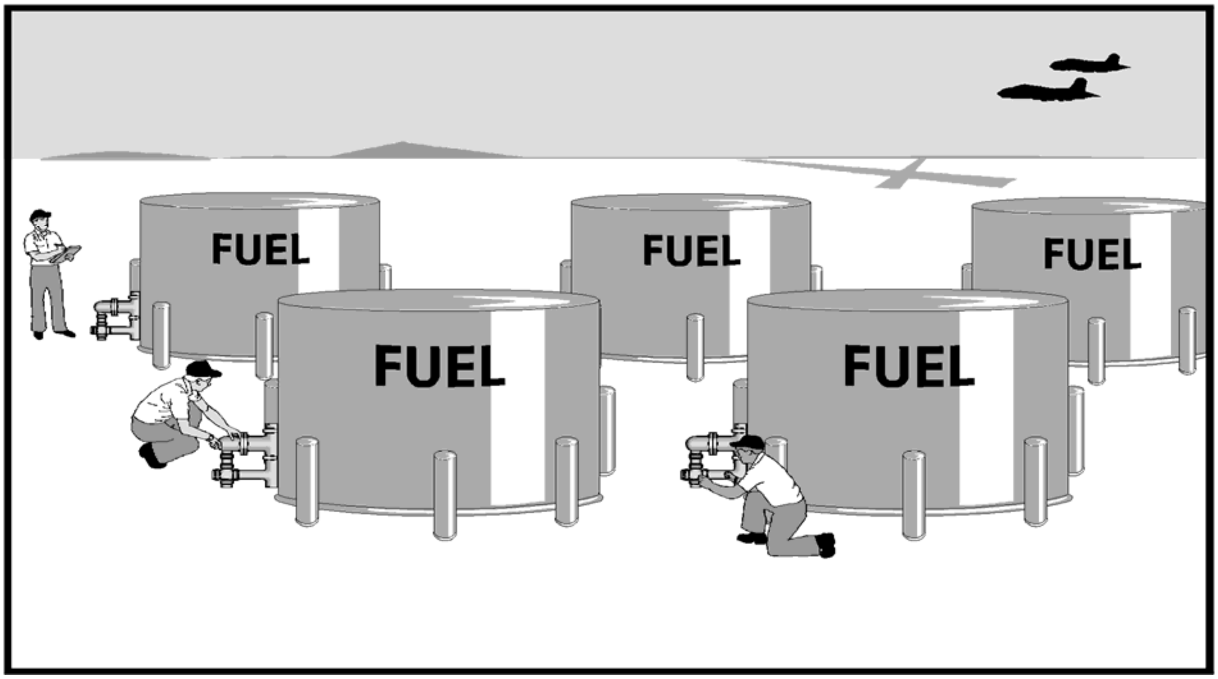
Application Guidance: Idle fuel tanks will be locked at all times.

Training: Personnel operating fuel tanks will be trained to know when tanks should be locked. Tanks which are frequently used will be locked at the end of the normal operating day.

Effectiveness and Cost: Locking tank valves is a highly effective, low-cost BMP.

Limitations: None

BMP 071- KEEP TANKS, PIPING, AND VALVES IN GOOD CONDITION



Description of Potential Pollutant and Source: Tanks, piping, and valves may leak fuel or other significant materials due to corrosion, loose fittings, poor welding, or improperly or poorly fitted gaskets. This can expose these materials to storm water, which can transport them to storm drains and/or receiving waters.

Description of BMP: Keep tanks, piping, and valves in good working condition. Tanks, piping, or valves which are leaking will be repaired or replaced.

Application Guidance: Tanks, piping, and valves will be inspected monthly and kept in good condition at all times. If applicable, preventive maintenance will be performed.

The frequency for implementing this BMP has been provided as general guidance. However, a facility operator may wish to establish a more suitable frequency. This will require SWPCP implementors to make judgements based on facility operations and conditions. To assign a frequency other than what has been suggested (i.e., more or less frequent), the following criteria will be considered and rated either High, Medium, or Low. If many of the criteria are assigned a High rating, the frequency may be increased. Similarly, if many criteria are assigned a Low rating, the frequency may be decreased. The goal of implementing this BMP is to minimize exposure of pollutants to storm water.

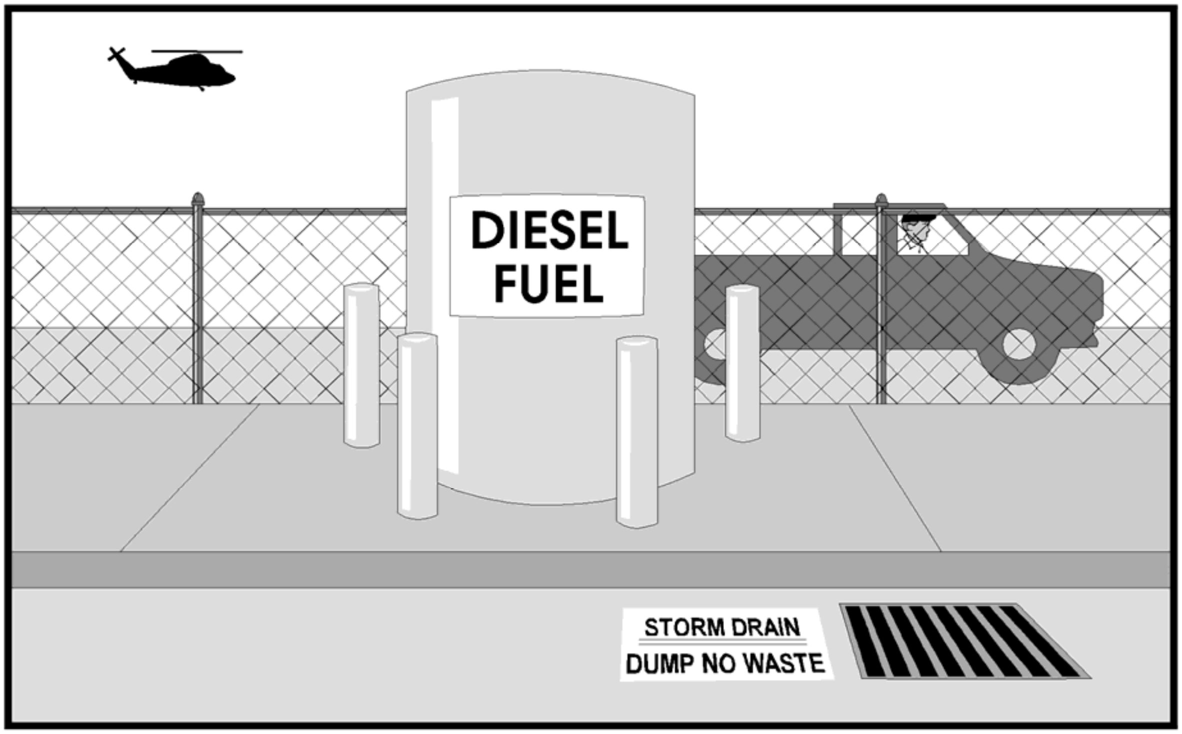
CRITERIA	Rating H=High M=Medium L=Low
Probability of exposure of significant materials to storm water	
Quantity of significant materials potentially exposed	
Toxicity of significant materials potentially exposed	
Frequency of use of tanks, piping, and valves	
Intensity of use of tanks, piping, and valves	
Old age or poor condition of tanks, piping, and valves	
Evidence of exposure (e.g., stains on ground surface)	
Proximity of source area to outfall or receiving water	
Sensitivity of receiving water to potentially exposed significant materials (e.g., waters with beneficial uses such as human contact, recreation, significant species habitat, etc.)	

Training: Personnel will be trained to regularly inspect for leaks or conditions that could lead to the discharge of chemicals, or storm water contact with waste materials. Personnel will be trained to routinely inspect equipment before each use. Tanks, piping, and valves which are not frequently used, will be inspected weekly. Procedures for notifying the appropriate maintenance personnel if a leak is found, will be established.

Effectiveness and Cost: Keeping tanks, piping, and valves in good condition is a highly effective BMP. The cost of repairing or replacing piping and valves is typically low. The cost of repairing or replacing tanks will vary based on the size of the tank and its present condition.

Limitations: None

BMP 072 - PROTECT TANKS FROM BEING DAMAGED BY VEHICLES



Description of Potential Pollutant and Source: If a tank is damaged by a vehicle, fuel, or other significant materials may be leaked from the tank and become exposed to storm water. The materials can then be transported to the storm drain and/or receiving waters.

Description of BMP: Protect tanks from being damaged by vehicles. Bollards or traffic barriers may be used if the tank location is accessible to vehicles. Fences and curbs may also protect the tanks.

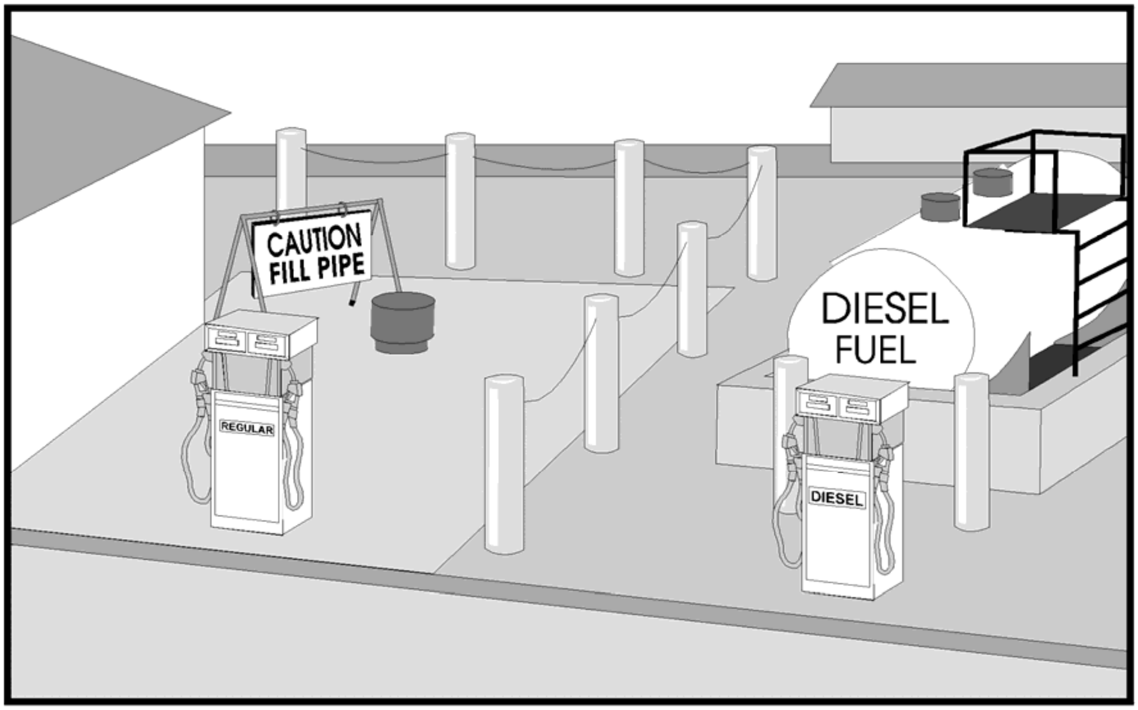
Application Guidance: Tanks will be guarded from being damaged by vehicles.

Training: N/A

Effectiveness and Cost: This is an effective, low-cost BMP.

Limitations: None

BMP 073 - PROTECT FILL PIPE FROM BEING DAMAGED BY VEHICLES



Description of Potential Pollutant and Source: If a fill pipe is damaged by a vehicle, fuel may leak from the tank and become exposed to storm water. These materials or other significant materials can then be transported to the storm drain and/or receiving waters.

Description of BMP: Protect fill pipes from being damaged by vehicles. Bollards or traffic barriers will be used if the tank location is accessible to vehicles.

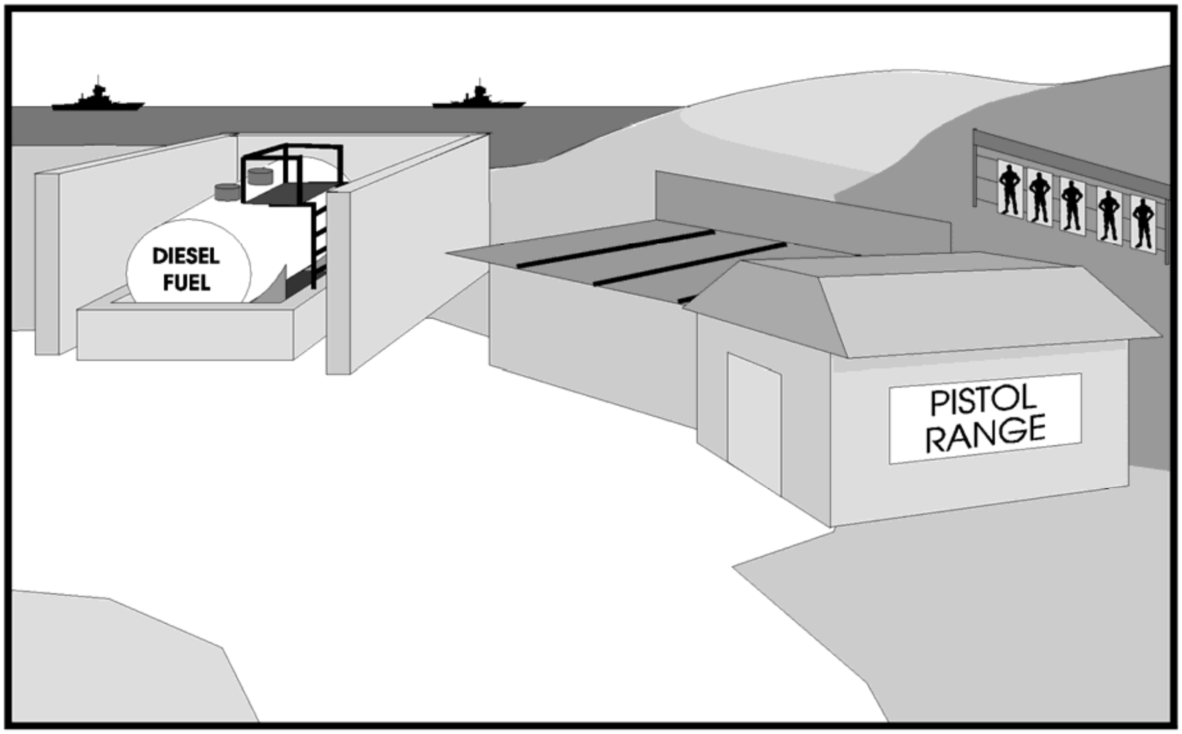
Application Guidance: Fill pipes will be guarded from damage by vehicles.

Training: N/A

Effectiveness and Cost: This is an effective, low-cost BMP.

Limitations: None

BMP 074 - PROVIDE PROTECTION FOR PERMANENT ABOVEGROUND TANKS FROM DISCHARGE OF FIREARMS



Description of Potential Pollutant and Source: Stray munitions may penetrate aboveground storage tanks, causing spills and leaks of fuel or other significant materials. These materials can be exposed to storm water and transported to the storm drain and/or receiving waters.

Description of BMP: Use concrete barriers to protect tanks when aboveground storage tanks are located in areas where firearms are discharged. The concrete will protect against damage from stray fire.

Application Guidance: This practice will be followed wherever there is any chance of firearms being discharged in the vicinity of aboveground storage tanks.

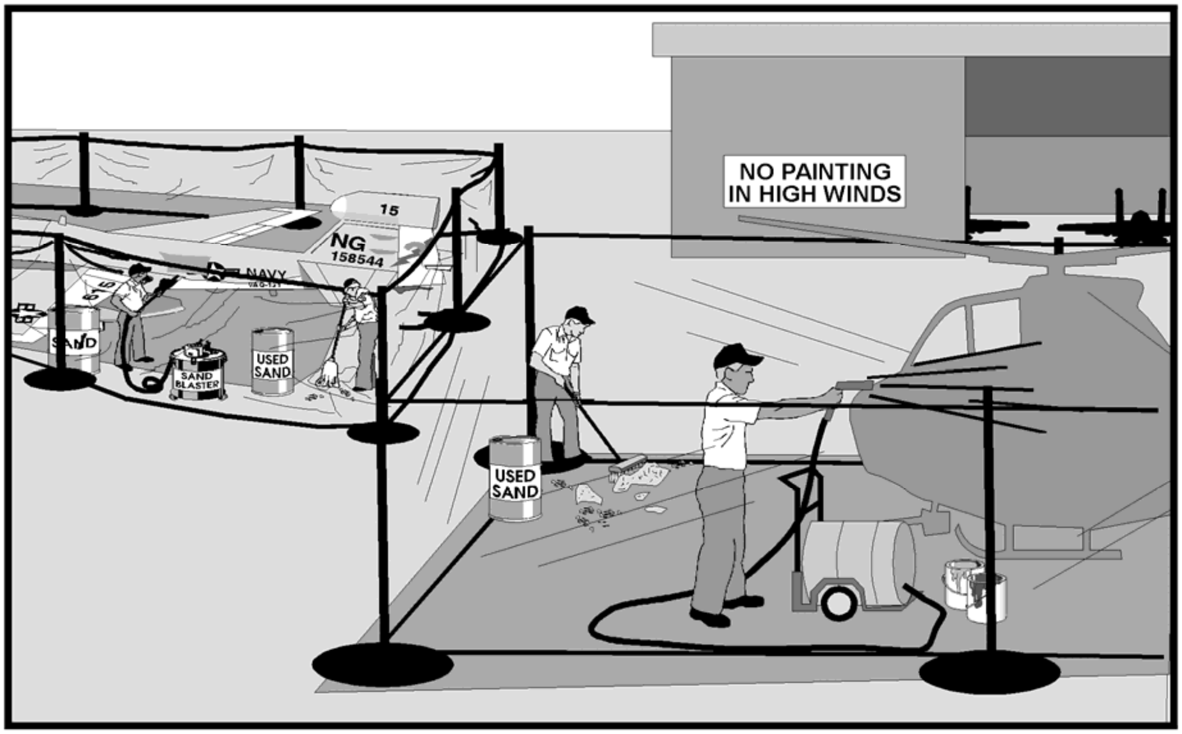
Training: N/A

Effectiveness and Cost: Concrete encapsulation is a highly effective, moderate-cost BMP.

Limitations: N/A

PLACEHOLDER

BMP 076 - ENCLOSE OUTDOOR SANDING AND PAINTING OPERATIONS AND USE TARPS TO CONTAIN AND COLLECT SOLID WASTES



Description of Potential Pollutant and Source: Sanding, in preparation for painting, and painting itself creates wastes including glass, metal, stone and other wastes that may become exposed to storm water if not properly collected and disposed. These materials can then be transported to storm drains and/or receiving waters.

Description of BMP: Contain paint-related wastes by covering all sanding and painting activities with tarps or plastic sheeting and by placing a tarp under and/or around all sanding and painting operations. These wastes will be collected in labeled drums and disposed of appropriately.

Application Guidance: This practice will be used in all sanding and painting operations performed outside of sanding or painting booths.

Training: Personnel will be instructed in procedures for the containment, collection and disposal for the control of particulates from sanding and painting; tarps will be monitored for holes. The waste will be recycled or disposed in a landfill if it is not a hazardous waste. Signs will be posted where sandblasting activities take place to remind personnel about proper disposal practices.

Effectiveness and Cost: Containment, collection and disposal of sandblasting wastes is a highly effective, usually moderate-cost BMP. However, costs for large-scale painting and sanding activities (e.g., ships and large equipment) could be high.

Limitations: The size of some operations may make implementation of this practice difficult.

BMP 077 - VACUUM PARTICULATE WASTES FROM SANDING OR PAINTING OPERATIONS

Description of Potential Pollutant and Source: Sanding, in preparation for painting, and painting itself creates wastes that may become exposed to storm water and transported to storm drains and/or receiving waters.

Description of BMP: Contain paint-related wastes by performing painting and sanding activities in facilities equipped with a vacuum and filters.

Application Guidance: This practice will be used in all sanding and painting operations.

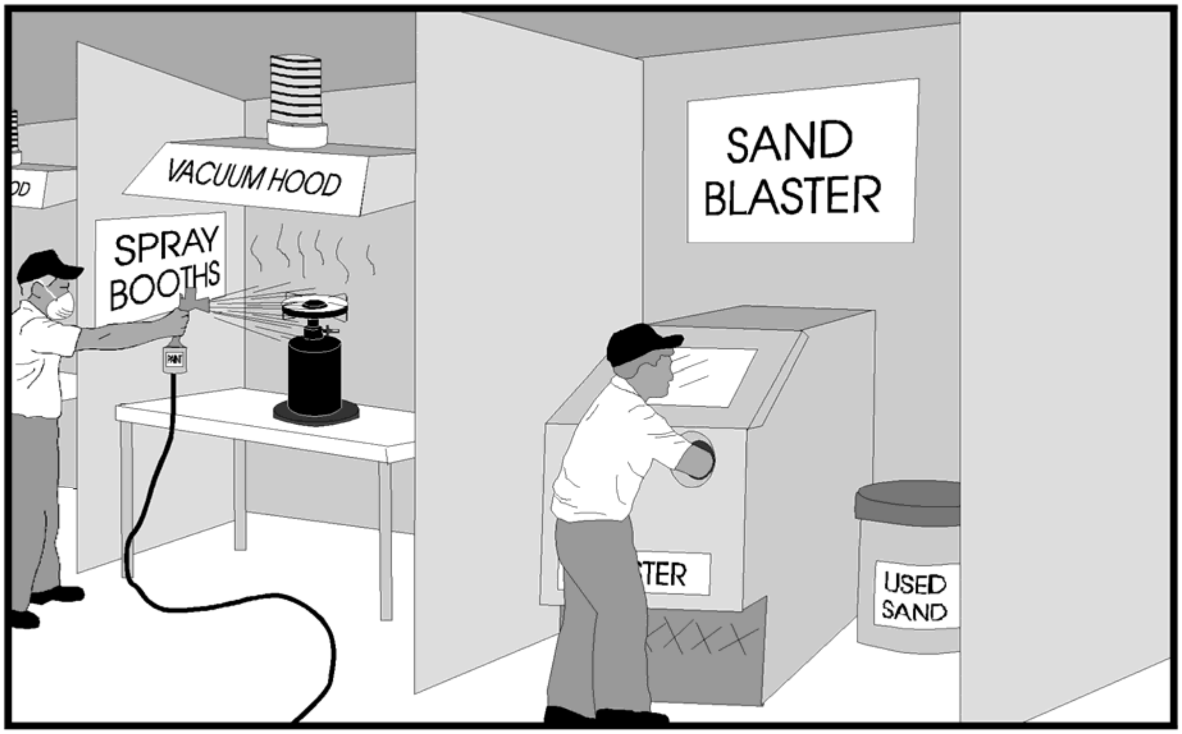
Training: Personnel will be instructed in procedures for proper operation of vacuum and filters.

Effectiveness and Cost: Performing sanding and painting operations under vacuum is a highly effective, usually moderate-cost BMP. However, costs for large-scale sanding and painting activities (e.g., ships and large equipment) could be high.

Limitations: The size of some operations may make implementation of this practice difficult.

PLACEHOLDER

BMP 079 - CONDUCT INDOOR SANDING AND PAINTING IN AN ENCLOSED AREA



Description of Potential Pollutant and Source: Paint, sand, glass, metal or stone particles from painting, sanding and sandblasting operations can become exposed to storm water if not properly contained. These materials may then be transported to storm drains and/or receiving waters.

Description of BMP: Conduct painting, sanding, and sandblasting in an enclosed area to prevent contaminated particles from being exposed to storm water. Wastes from these operations will be disposed of appropriately.

Application Guidance: If possible, all painting, sanding and sandblasting activities will be performed indoors and preferably in an enclosed covered area.

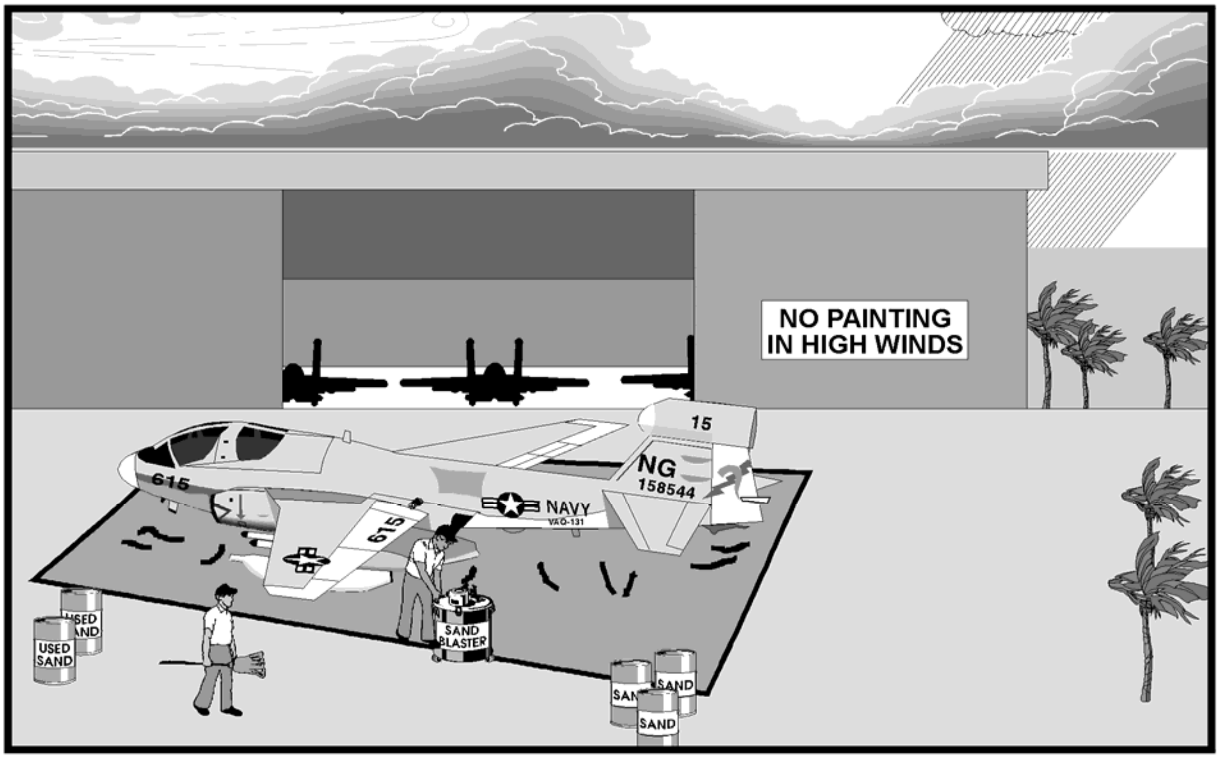
Training: Signs will also be posted to remind personnel about proper locations.

Effectiveness and Cost: Conducting painting, sanding, and sandblasting in an enclosed area is an effective, variable-cost BMP.

Limitations: The size of some activities may make implementation of this BMP difficult.

PLACEHOLDER

BMP 081- AVOID SANDING OR PAINTING IN WINDY WEATHER



Description of Potential Pollutant and Source: Sanding or painting in windy weather will cause dispersal of particulates which can expose them to storm water. These materials can then be transported to storm drains and/or receiving waters.

Description of BMP: If sanding or painting cannot be performed in an enclosed, covered area, avoid performing either operation in windy weather.

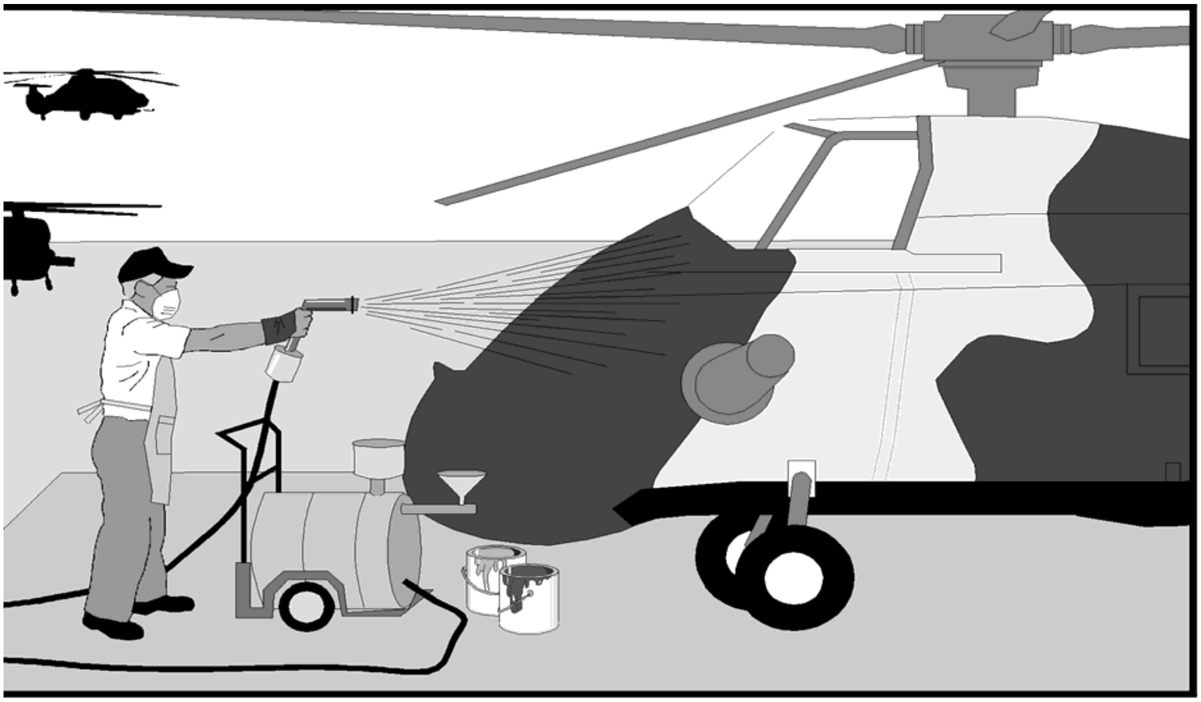
Application Guidance: This practice will be followed at all times.

Training: Personnel will be given instruction as to when it is too windy to perform sanding or painting. This information may be obtained from the equipment manufacturer.

Effectiveness and Cost: Avoiding windy weather is a moderately effective, low-cost BMP.

Limitations: May cause inconvenience.

BMP 082 - USE EFFICIENT PAINTING EQUIPMENT



Description of Potential Pollutant and Source: Traditional painting methods often result in loss of particulate matter to air and ground (paint chips, paint spray) and exposure to storm water. These materials can then be transported to storm drains and/or receiving waters.

Description of BMP: Use efficient painting equipment to reduce the amount of solid pollutants that can reach storm water. Highly efficient painting equipment is now available that reduces over spraying. More efficient equipment includes electrostatic spray guns, air-atomized spray guns, high volume/low pressure spray guns and gravity feed spray guns.

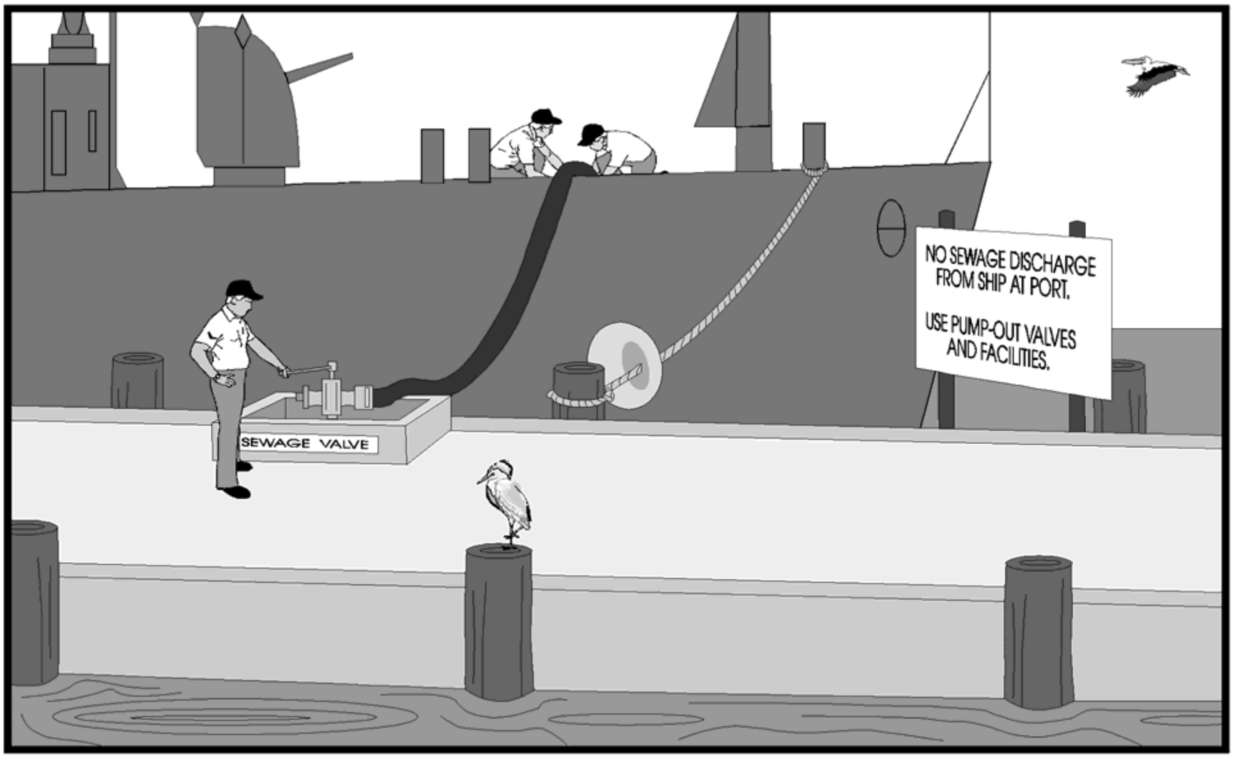
Application Guidance: All spray-painting equipment will be replaced with more efficient equipment when economically feasible.

Training: Personnel will be trained on new equipment. A qualification test may be appropriate.

Effectiveness and Cost: New spray equipment is a moderately effective, variable-cost BMP.

Limitations: Cost may be high to retrofit/replace existing equipment.

BMP 083 - DO NOT EMPTY TOILET TANKS DURING TRANSIT OR IN THE PORT



Description of Potential Pollutant and Source: Toilet holding tanks in trains, aircraft, boats and ships are often emptied directly to the environment during transport or at the port, resulting in potential viral and bacterial contamination of storm water.

Description of BMP: Do not empty toilet holding tanks during transit or into storm drains at the port. Sanitary sewage from ships or boats can be disposed using pump-out stations, portable on-site pump-outs, or commercial mobile pump-out facilities.

Application Guidance: This practice will be implemented for all aircraft, rail cars, boats and ships.

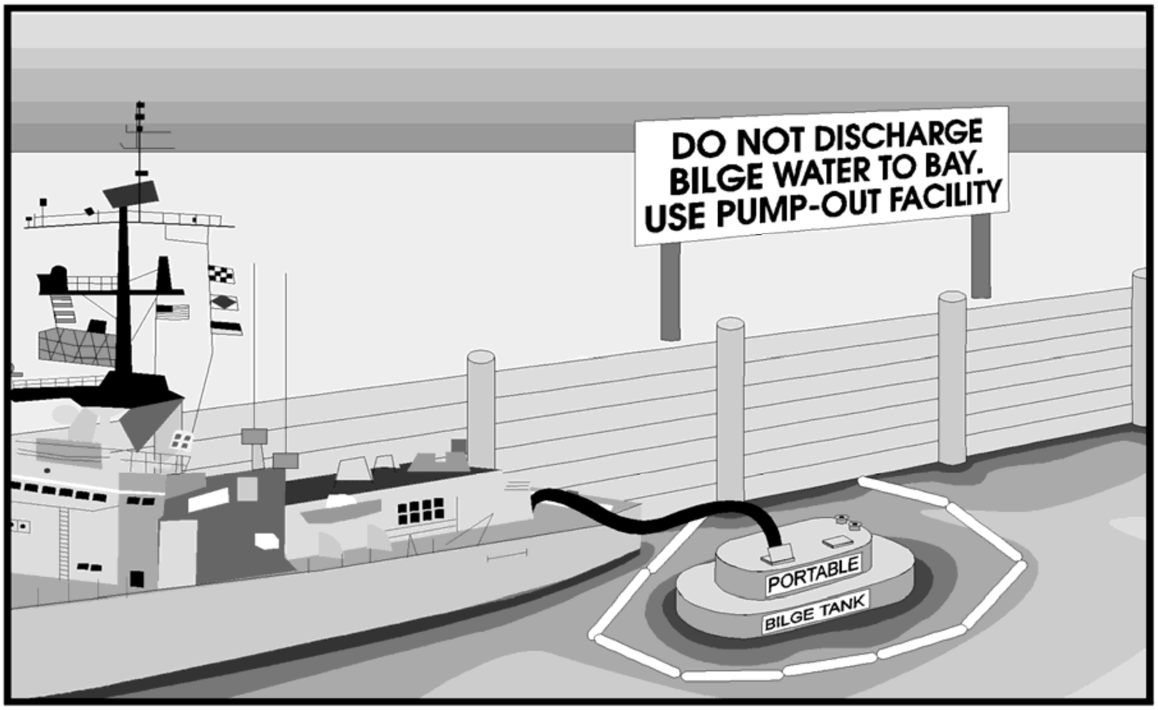
Training: Signs will be posted as reminders.

Effectiveness and Cost: This is a highly effective, low-cost BMP.

Limitations: None

PLACEHOLDER

BMP 085 - DO NOT DISCHARGE BILGE WATER IN HARBOR



Description of Potential Pollutant and Source: Bilge water (sump water collected in the ship bottom) can contain a variety of pollutants, especially oil and grease. Water from throughout the ship, including the engine room, collects in the bilge.

Description of BMP: Eliminate the discharge of bilge water in harbors to reduce the chances of oil and fuel reaching storm water. This wastewater will be pumped to wastewater treatment facilities whenever this service is available.

Application Guidance: This practice will follow for all watercraft.

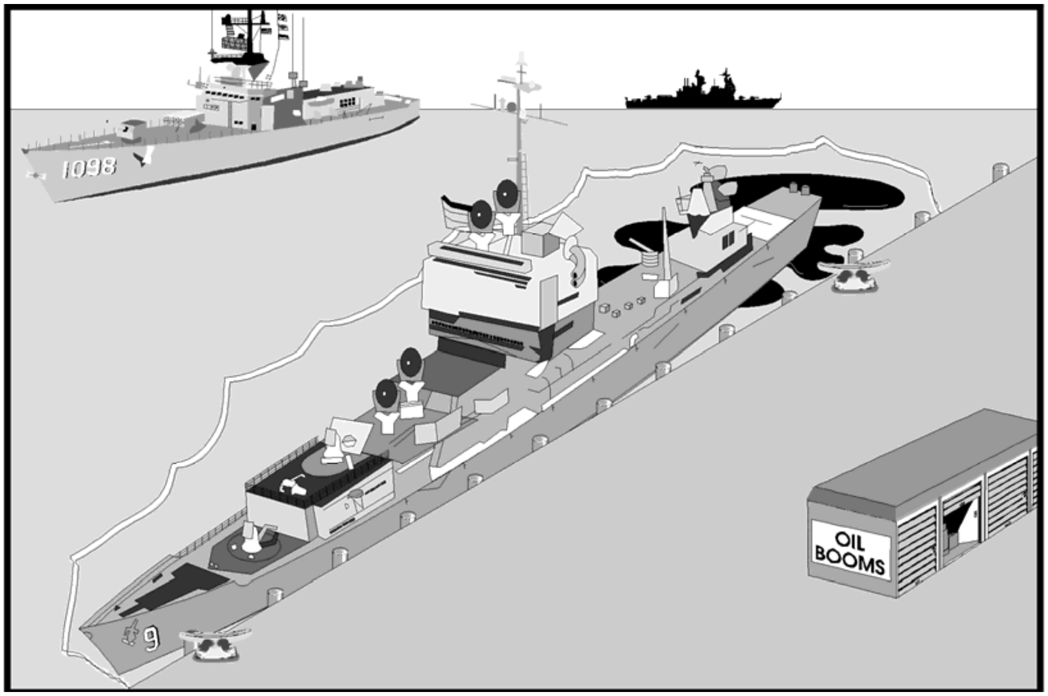
Training: Signs will be posted as reminders.

Effectiveness and Cost: This is a highly effective, variable-cost BMP.

Limitations: Sometimes discharge of bilge water in the harbor may be necessary for proper use of the ship.

PLACEHOLDER

BMP 087 - USE OIL CONTAINMENT BOOMS



Description of Potential Pollutant and Source: Maintenance of ships occurs in wet dock; maintenance may include painting, refueling and scrubbing, all of which generate potential pollutants which may become exposed to storm water and transported to receiving waters.

Description of BMP: Use oil containment booms to contain hydrocarbons that may be exposed to storm water during a ship's stay at a shipyard. Booms enable efficient cleanup of hydrocarbons. An oil containment boom is a barrier composed of a chain of floatable logs, which repel water and absorb oil and fuel.

Application Guidance: Oil containment booms will be place around ships under repair, prior to storms, while they are berthed at the shipyard.

Training: Personnel who deploy the booms will be properly trained in the use of oil containment berms.

Effectiveness and Cost: Oil containment booms are a moderately effective, moderate-cost BMP.

Limitations: None

PLACEHOLDER

BMP 092 - PROPERLY DISPOSE OF SEDIMENT GENERATED BY CLEANING SANITARY SEWER LINES

Description of Potential Pollutant and Source: The cleaning of sewer lines and manholes generates sediments. These sediments contain both inorganic and organic materials, are odorous, and are contaminated with microorganisms and heavy metals which, if improperly managed, can becomes exposed to storm water. These materials can then be transported to storm drains and/or receiving waters.

Description of BMP: Dispose of sediments generated during the cleaning of sewer lines and manholes properly. This will often require disposal in permitted landfills.

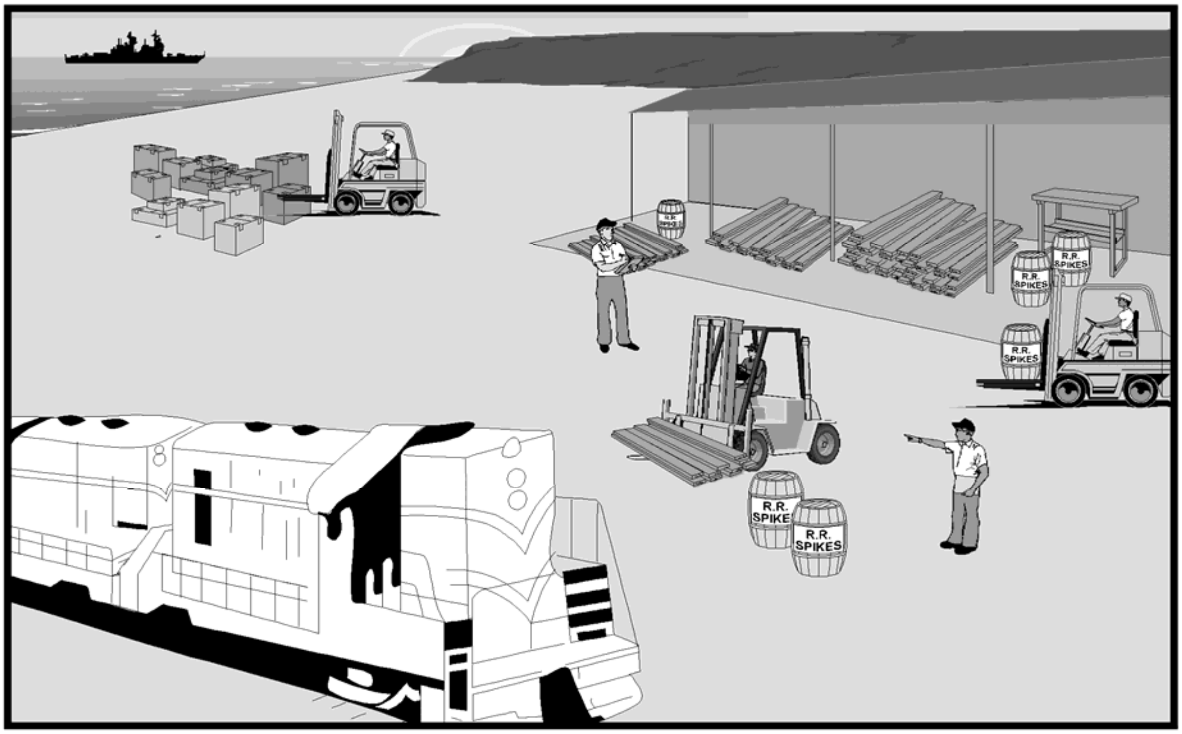
Application Guidance: This BMP will be used whenever cleaning the sewer line.

Training: Personnel will be trained regarding the proper disposal of the sediments.

Effectiveness and Cost: Properly disposing of sediments is a moderately effective, low-cost BMP.

Limitations: None

BMP 093 - ELIMINATE TREATED WOOD PRODUCTS OR USE WOOD TREATED WITH LESS-TOXIC CHEMICALS



<u>Description of Potential Pollutant and Source:</u> Wood products intended for outdoor use are generally coated with toxic chemicals such as creosote or pentachlorophenol, which can leach out of the wood and become exposed to storm water. These materials can then be transported to storm drains and/or receiving waters.

<u>Description of BMP:</u> Substitute, where feasible, alternate materials for wood products that are preserved with creosote or pentachlorophenol to the extent feasible.

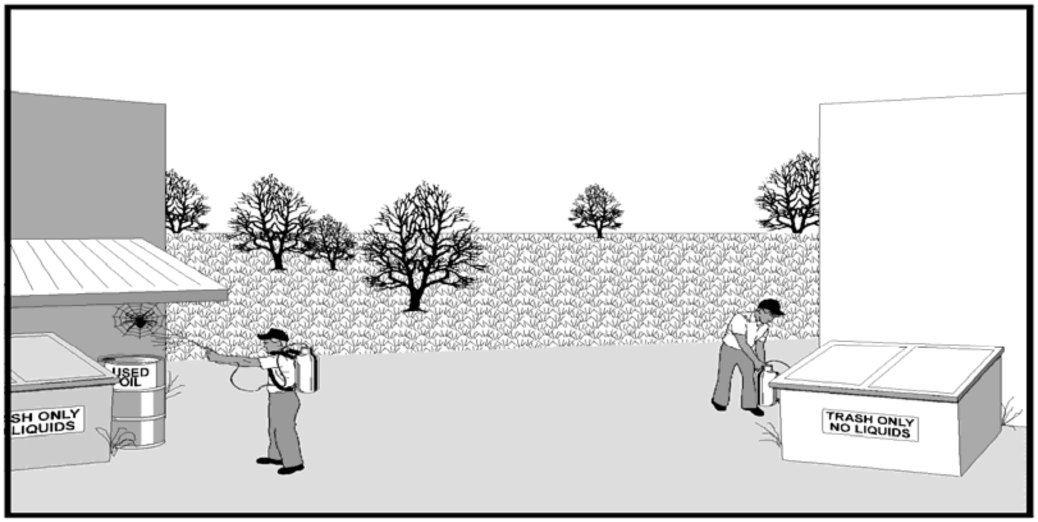
<u>Application Guidance:</u> This practice will be used when installing or replacing piers, railroad ties or utility poles, and other facilities using treated wood products.

<u>Training:</u> N/A

<u>Effectiveness and Cost:</u> This a moderately effective, variable-cost BMP.

<u>Limitations:</u> Cost may be prohibitive and acceptable alternatives may not be available.

BMP 094 - ESTABLISH INTEGRATED PEST CONTROL



Description of Potential Pollutant and Source: Pesticides and herbicides may be spilled, over-applied, and/or incorrectly applied, resulting in exposure of storm water. These materials can then be transported to the storm drain and/or receiving water.

Description of BMP: Establish integrated pest management control. This involves eliminating excessive pesticide use by proper application procedures and/or the use of alternatives. This reduces the amount of pesticides which can potentially enter the storm water. Pesticides include insecticides, herbicides, fungicides and rodenticides.

The use of pesticides for insect and weed control will be minimized by the following:

- Mechanical removal of weeds, eggs, larvae, cocoons and insects
- Habitat changes to minimize pest insect breeding
- Timing of application to the most vulnerable phase of the pest insect breeding
- Concentration of effort on the most affected areas
- Use of natural predators and pathogens specific to pests
- Use of degradable and non-carcinogenic pesticides

Additionally, no pesticides will be applied within three days prior to any predicted rain event. During the wet season, pesticide application will be kept to a minimum.

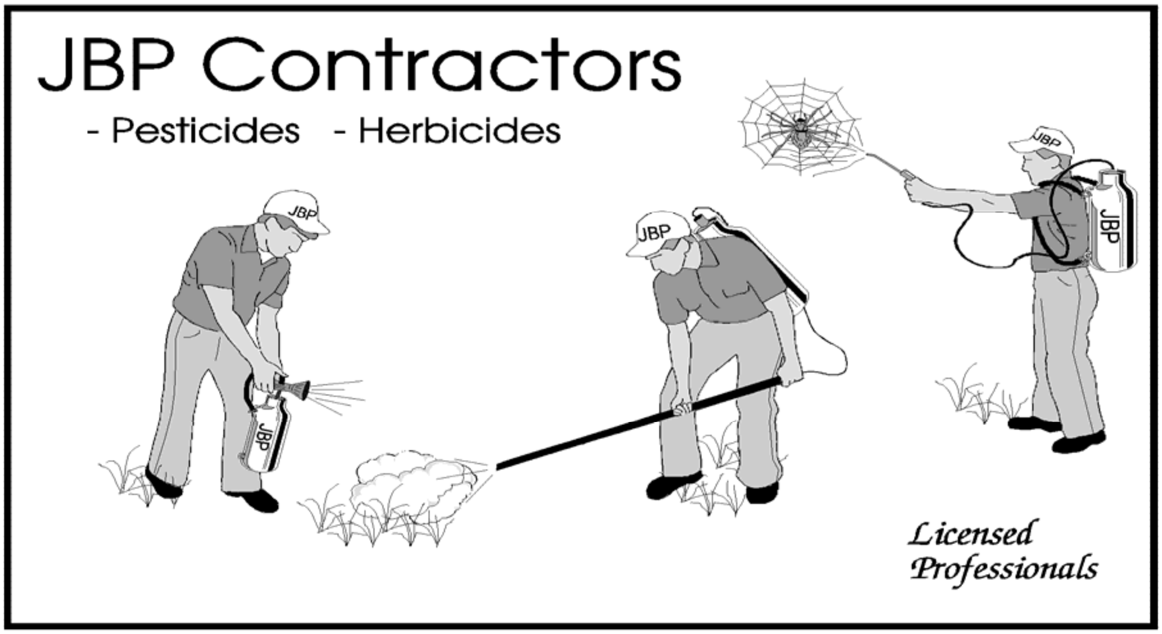
Application Guidance: Injury and tolerance levels will be used to determine if the pest problem is serious enough to justify some kind of treatment. Whenever pest control is necessary, an integrated management plan will be developed.

Training: All persons applying pesticides will be required to understand the pertinent provisions of the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA) and state laws and regulations and be certified, if required.

Effectiveness and Cost: Effectiveness and cost will depend on whether natural or pesticide controls are used. This BMP can be highly effective and low cost when properly developed.

Limitations: None

BMP 095 - CONDUCT PESTICIDE OPERATIONS UNDER THE SUPERVISION OF LICENSED APPLICATOR



Description of Potential Pollutant and Source: Pesticides and herbicides may be spilled, over applied, or incorrectly applied, which would result in their exposure to storm water. These materials can then be transported to the storm drain and/or receiving waters.

Description of BMP: Use a licensed pesticide handler to conduct or supervise all activities related to pesticide handling.

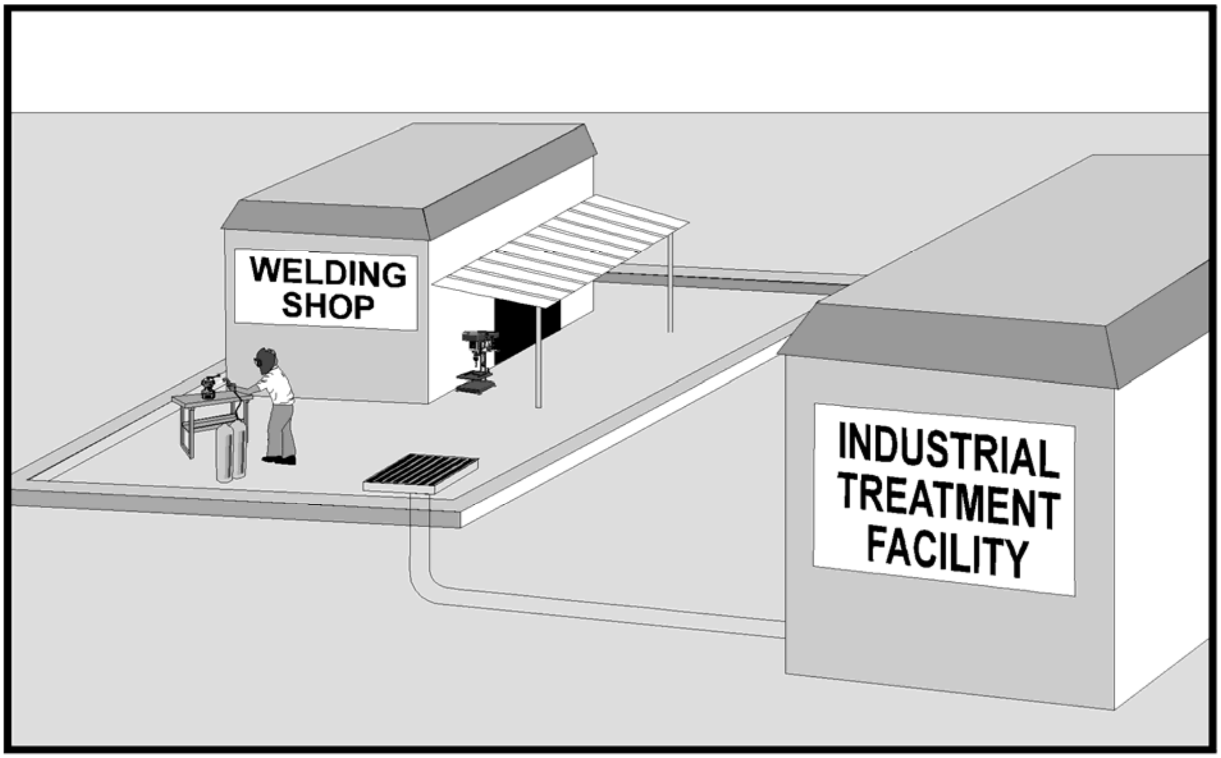
Application Guidance: This BMP will be applied whenever pesticides are used or stored.

Training: Personnel will be trained and certified in the application, mixing, and storage of pesticides.

Effectiveness and Cost: This is a moderately effective, moderate-cost BMP.

Limitations: None

BMP 096 - DIVERT DRAINAGE TO TREATMENT FACILITY/SANITARY SEWER



Description of Potential Pollutant and Source: Diverting drainage to treatment facilities prevents significant materials from entering the storm drain system.

Description of BMP: Use pipes, ditches, swales and other types of conveyance systems to divert drainage from industrial areas which may be exposed to significant materials to a wastewater treatment facility or sanitary sewer.

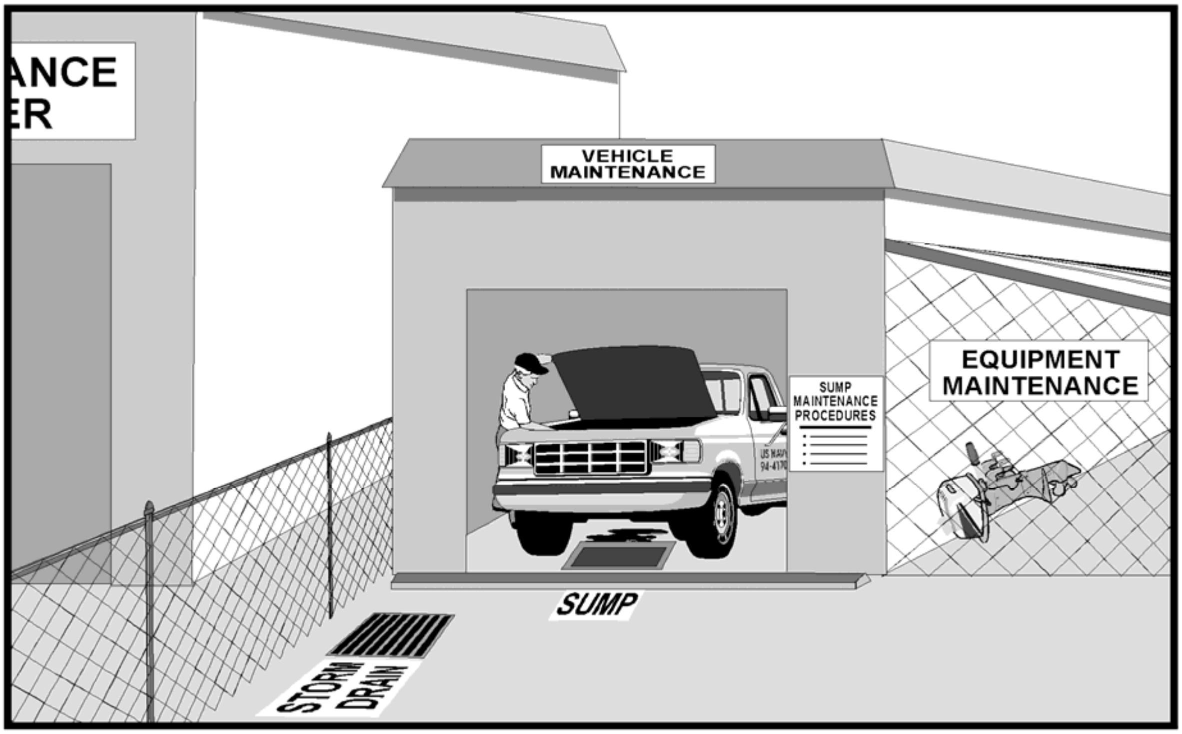
Application Guidance: If source controls cannot be used to keep pollutants from entering the storm water runoff, diverting drainage to treatment facilities/sanitary sewers is the most effective method or reducing pollutants to receiving waters.

Discharge of large quantities of storm water is not practical or allowed by most wastewater treatment facilities. This BMP will only be used for small quantities of highly polluted water. This may include equipment or vehicle wash water, boiler blowdown, or runoff from maintenance areas (with no off-site drainage onto area).

Effectiveness and Cost: Diverting drainage from industrial areas is a highly effective, high-cost BMP. The initial construction cost of a connection to a sanitary sewer may not be high, if a sewer is located nearby. However, the continuing operating cost of the treatment facility which will treat the diverted drainage makes this a high-cost BMP.

Limitations: Permission must be granted by the wastewater treatment facility to divert the drainage to the facility. In addition, certain pollutants in the runoff may not be removed at a traditional treatment facility. This BMP is not feasible if there is a large quantity of runoff that must be controlled.

BMP 097- DIVERT DRAINAGE TO A LOW-FLOW SUMP



Description of Potential Pollutants and Source: Often spills flow directly into the storm drain system. Once the spilled material combines with the runoff in the storm drain, the pollutant concentrations can only be reduced with a structural control such an oil/water separator, wet pond or filtration basin.

Description of BMP: Divert drainage to a low-flow sump to collect small spills and prevent the spilled material from discharging into the rest of the storm drain system.

Application Guidance: Low-flow sumps will be used in areas where discharge into the storm drain system and spills are likely to occur. This may occur at refueling locations, material loading/unloading areas, and maintenance areas.

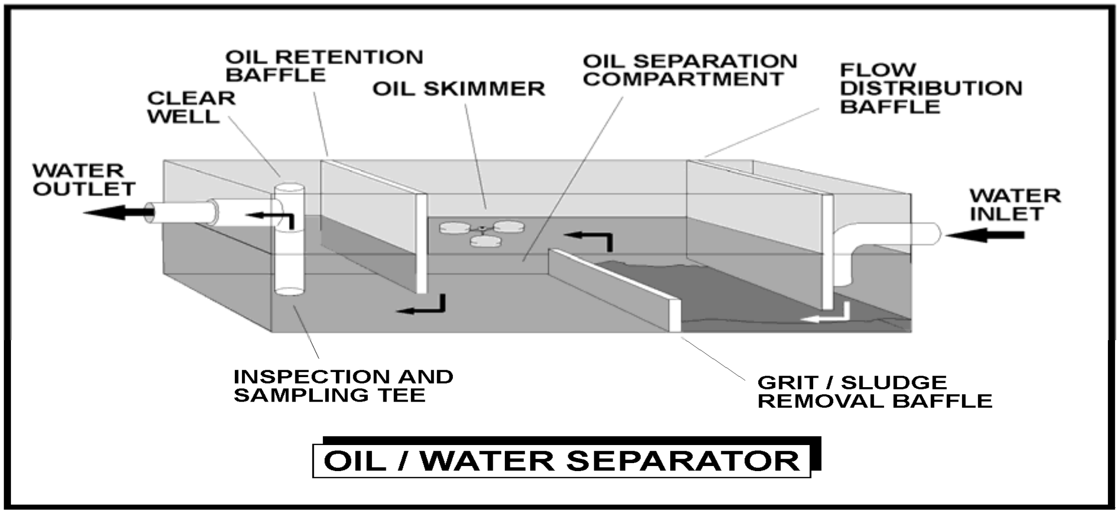
Operation and Maintenance: Low-flow sumps will be cleaned at least four times a year and after any major spill. Materials trapped in the sump will be properly disposed. The frequency of implementation of this BMP has been suggested as general guidance. However, a facility operator may wish to establish a frequency more suitable to the facility. This will require a level of judgement on behalf of the SWPCP implementors. To assign a frequency other than what has been suggested (i.e., more or less frequent), the following criteria should be considered and rated either High, Medium or Low. If many of the criteria are assigned a High rating, consider increasing the frequency. Similarly, if many criteria are assigned a Low rating consider decreasing the frequency. However, it is essential to remember that the goal of this BMP is minimize exposure of pollutants to storm water.

CRITERIA	RATING H=High M=Medium L=Low
Probability of exposure/spills of significant materials to storm water	
Quantity of significant materials potentially exposed	
Frequency of use of significant materials potentially exposed	
Frequency of use of fueling pumps, loading/unloading areas, or maintenance areas	
Old age of poor condition of sump and pump	
Evidence of exposure (e.g., stains on pavement, etching of concrete, evidence of significant materials in drainage system)	
Proximity of source area to outfall or receiving water	
Sensitivity of receiving water to potentially exposed significant materials (e.g., waters with beneficial uses such as human contact, recreation, significant species habitat, etc.)	

Effectiveness and Cost: This BMP is highly effective for small leaks and spills. It is not effective for large spills or leaks. This is a moderate-cost BMP.

Limitations: The sediment removed during maintenance must be tested and may be a hazardous waste and must be disposed of properly.

BMP 098 - CONSTRUCT OIL/WATER SEPARATOR



Description of Potential Pollutants and Source: Oil/water separators are designed to remove petroleum compounds and grease from storm water. Separators will also remove floatable debris and settleable solids.

Description of BMP: Construct oil/water separators. Oil/water separators are underground vaults where storm water is piped in and out of the separator. Oil/water separators come in many configurations. A common configuration is the tree-chamber oil/water separator. The first chamber is the sedimentation chamber that allows for sedimentation of coarse materials and screening of debris. The second chamber provides separation of oil, grease and gasoline. The third chamber is provided to prevent any possibility of a surcharge pressure from occurring and as a safety relief for the structure if a blockage occurs.

Application Guidance: Oil/water separators are applicable to situations where the concentrations of oil-and-grease-related compounds will be usually high and source control cannot provide effective control. This generally occurs at equipment maintenance and washing facilities, gas stations and loading areas. Separators may also be used in areas heavily used by mobile equipment such as loading wharfs at marine ports.

Operation and Maintenance: The degree and frequency of maintenance significantly affects the performance of the oil/water separator. Cleaning the oil/water separator will prevent the accumulated debris and oil to be discharged from the structure during intense storms.

Oil/water separators will be checked monthly during the wet season and will be cleaned at least four times a year. They will always be cleaned in October, before the start of the wet season. The accumulated oil will be properly disposed.

The frequency for implementing this BMP has been provided as general guidance. However, a facility operator may wish to establish a more suitable frequency. This will require SWPCP implementors to make judgements based on facility operations and conditions. To assign a frequency other than what has been suggested (i.e., more or less frequent), the following criteria will be considered and rated either High, Medium or Low. If many of the criteria are assigned a High rating, the frequency may be increased. Similarly, if many criteria are assigned a Low rating, The frequency may be decreased. The goal of implementing this BMP is to minimize exposure of pollutants to storm water.

CRITERIA	RATING H=High M=Medium L=Low
Probability of exposure of significant materials to storm water in area draining to oil/water separator	
Quantity of significant materials potentially exposed in area draining to oil/water separator	
Frequency of use of significant materials potentially exposed in area draining to oil/water separator	
Evidence of exposure (e.g., stains on pavement, etching of concrete) in area draining to oil/water separator	
Proximity of source are to outfall or receiving- water	
Sensitivity of receiving water to potentially exposed significant material (e.g., waters with beneficial uses such as human contact, recreation, significant species habitat, etc.)	

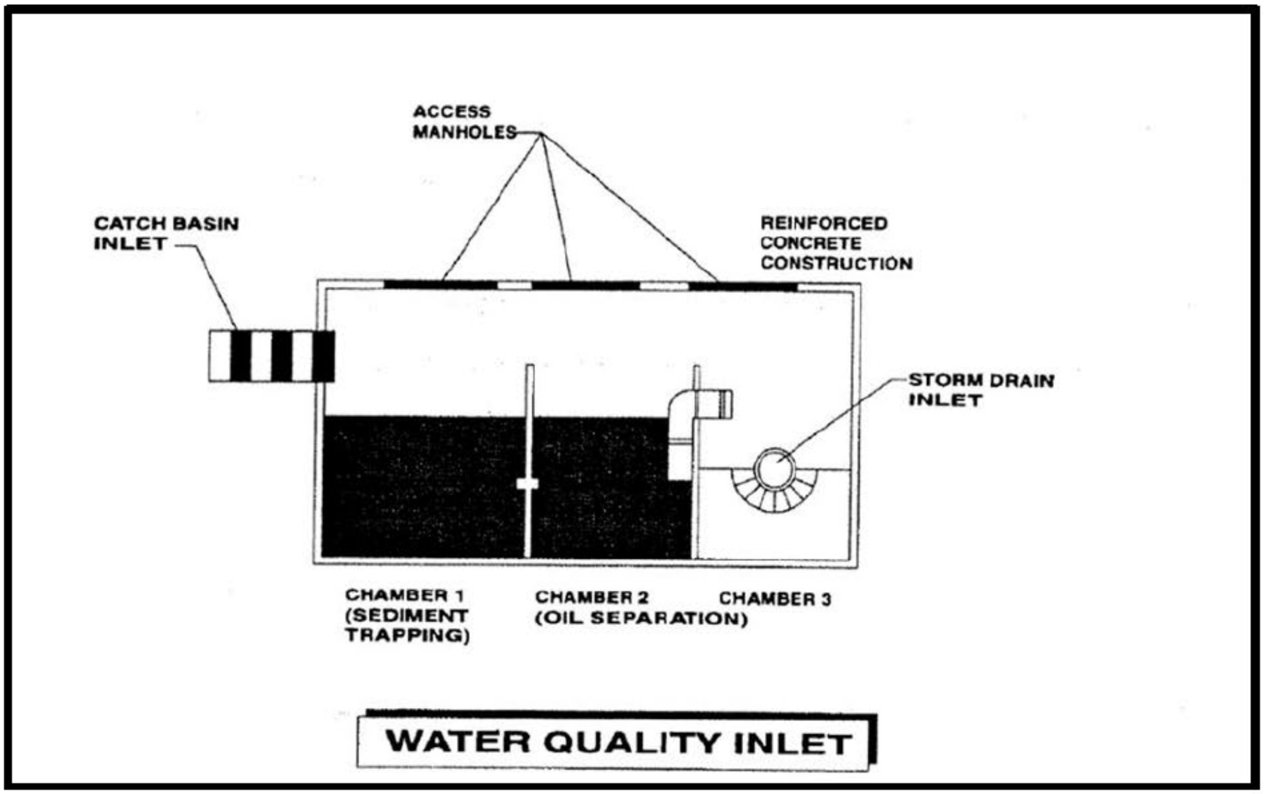
Effectiveness and Cost: This is a moderately effective, high-cost BMP.

Limitations: Oil/water separators are less effective when storm water runoff has high sediment concentrations or detergent levels which disperse oil.

Oil/water separators are only effective for highly pervious drainage areas. Oil/water separators cannot effectively treat large volumes of runoff. The maximum drainage area to oil/water separators is typically one acre.

The sediment removed during maintenance will be tested. If it is a hazardous waste, it will be disposed of accordingly.

BMP 099 - CONSTRUCT WATER QUALITY INLET-CATCH BASIN



Description of Potential Pollutant and Source: Water quality inlet-catch basins provide some removal of settleable solids.

Description of BMP: Construct water quality inlet-catch basins. These are storm drain inlet structures equipped with a small sedimentation basin or grit chamber with a capacity usually ranging from 0.5 to 1.5 cubic yards.

Application Guidance: Water quality inlet-catch basins will be used to remove large particles from storm water in highly impervious areas that have limited space for other storm water management practices. However, when space and costs allow, an oil/water separator will be used instead.

Operation and Maintenance: Accumulated sediment at the bottom of a water quality inlet-catch basin will be removed, or else it can be re-suspended during a storm and actually increase the pollutant load from an individual storm. Water quality inlet-catch basins will be cleaned at least four times a year. One of the cleanings will be just prior to the rainy season.

The frequency for implementing of the BMP has been provided as general guidance. However, a facility operator may wish to establish a more suitable frequency. This will require SWPCP implementors to make judgements based on facility operations and conditions. To assign frequencies other that what has been suggested (i.e., more or less frequent), the following criteria will be considered and rated either High, Medium or Low. If many of the criteria are assigned a High rating, the frequency may be increased. Similarly, if many criteria are assigned a Low rating, the frequency may be decreased. The goal of implementing this BMP is minimize exposure of pollutants to storm water.

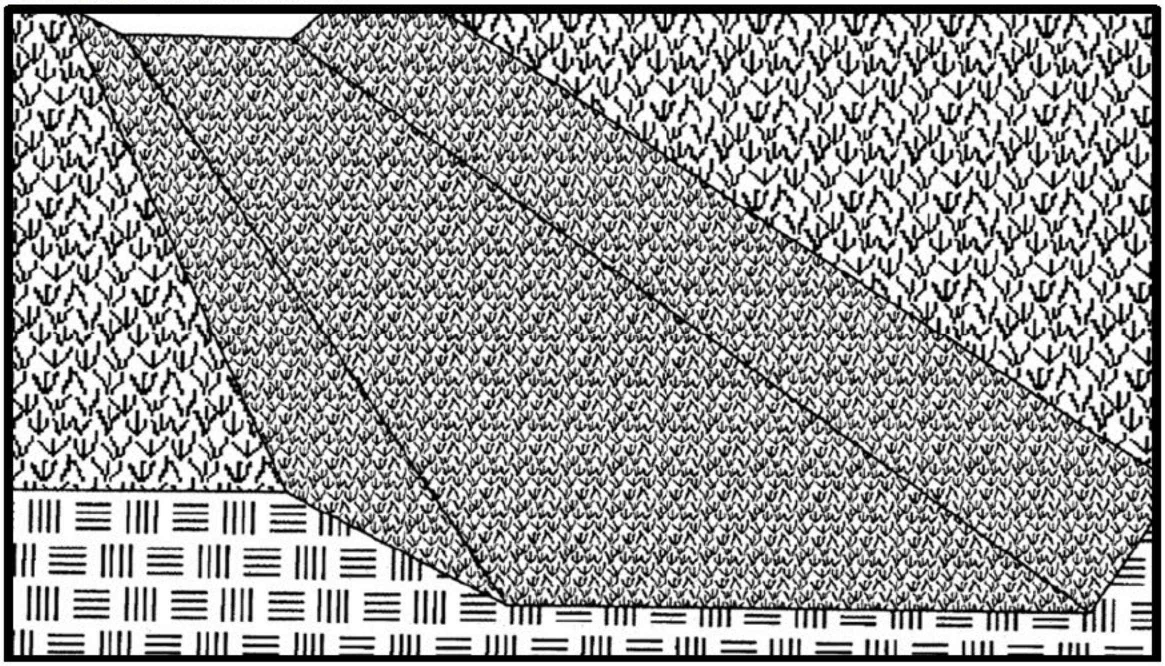
CRITERIA	RATING H=High M=Medium L=Low
Probability of exposure of significant materials to storm water in area draining to water quality inlet	
Quantity of significant materials potentially exposed in area draining to water quality inlet	
Frequency of use of significant materials potentially exposed in area draining to water quality inlet	
Evidence of exposure (e.g., stains on pavement, etching of concrete) in area draining to water quality inlet	
Proximity of source area to outfall or receiving water	
Sensitivity of receiving water to potentially exposed significant materials (e.g., waters with beneficial uses such as human contact, recreation, significant species habitat, etc.)	

Effectiveness and Cost: Water quality inlet-catch basins are somewhat effective in trapping large particles and debris but ineffective in the removal of other pollutants. The average cost of water quality inlet-catch basins are similar to those for standard pre-cast inlets.

Limitations: Water quality inlet-catch basins must be frequently cleaned out in order to provide any pollutant removal. Water quality inlet-catch basins provide little pollutant removal.

The sediment removed during maintenance will be tested. If it is a hazardous waste, it will be properly disposed.

BMP 100 - USE GRASSED SWALES



Description of Potential Pollutant and Source: While concrete storm drains are highly efficient in transporting storm water, they also transport pollutants. However, when grassed swales are used to transport storm water the vegetation helps remove pollutants (by trapping particulates), slows flow velocities, and enhances infiltration,

Description of BMP: Use grassed swales. These are vegetated channels which have a small gradient. To effectively remove pollutants, the swales will have relatively small slope, adequate length, and be planted with erosion-resistant vegetation.

Application Guidance: Swales will replace curb and butter and storm sewer systems where the topography and volume of flow are appropriate and where the vegetation can be maintained. Swales are not feasible on steep slopes or very flat areas.

Operation and Maintenance: Maintenance requirements are basically the same as normal lawn activities such as mowing, watering, spot reseeding, and weed control. However, maintenance of swales can cause water quality problems by mowing too close to the ground or by excessive application of fertilizers.

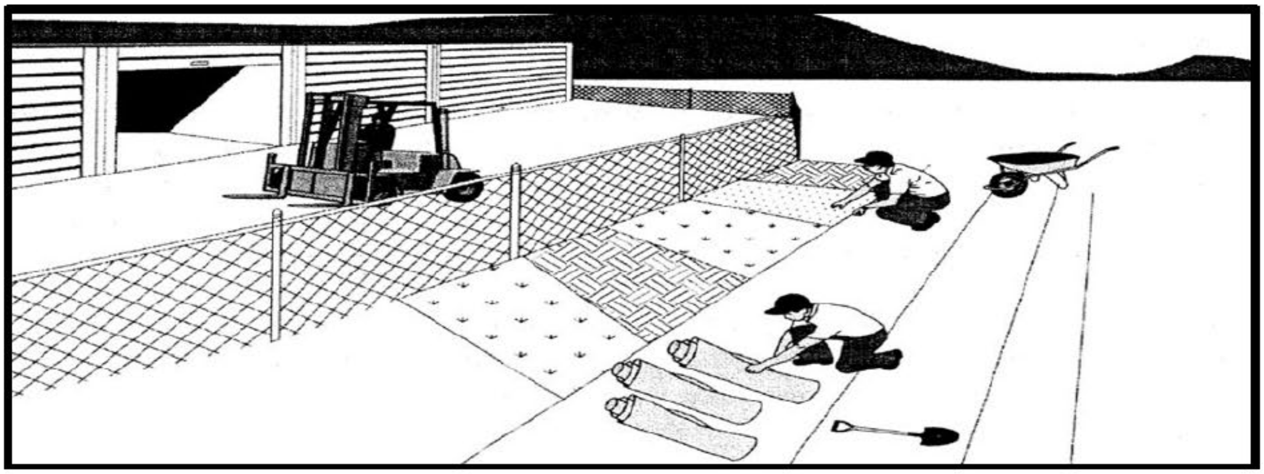
Effectiveness and Cost: Because swales do not have high pollutant removal rates, they are typically used as part of a storm water management system. Properly designed and functioning grassed swales provide some pollutant removal; however, the removal rates are low. In general, swales are not effective in removing soluble pollutants.

Grassed swales are moderately expensive.V

Limitations: This BMP should not be used by itself because pollutant removal rates are low. Grassed swales typically cannot be used on highly impervious sites. Grassed swales are not effective on steep slopes or for short distances.

This BMP may be limited to areas with a constant source of water, depending on the type of vegetation planted.

BMP 101 - PROVIDE VEGETATIVE FILTER STRIPS



Description of Potential Pollutant and Source: Vegetative filter strips are typically located adjacent to a waterway, pollution source area, or property line.

Description of BMP: Provide vegetative filter strips. These are strips of vegetation designed to remove particulates from overland sheet flow. They may be grassed (seeded or sodded), or meadow, or other woodier vegetation. Runoff must be evenly distributed across the filter strip. If the water concentrates and forms a channel, the filter strip will not perform properly. Level spreading devices are often used to distribute the runoff evenly across the strip. A vegetative filter strip is typically twenty-five to three hundred feet long in the direction of flow.

Application Guidance: Vegetative filter strips will be used in areas with low to moderate pollutant concentrations in the runoff. Vegetative filter strips will not be used if the runoff is concentrated, such as in a swale or pipe.

Operation and Maintenance: Maintenance requirements for vegetative filter strips are low. the strips will be inspected frequently the first few months after construction and then annually to make sure a dense, vigorous vegetation is established and the flow does not concentrate.

If natural vegetative succession is allowed to proceed, little other maintenance is required. Natural succession typically enhances pollutant removal and includes the transformation of grass to meadow to second growth forest. Short strips are typically maintained as lawns and must be mowed two to three times a year to suppress weeds and to interrupt natural succession. Accumulated sediment must periodically be removed near the top the strip.

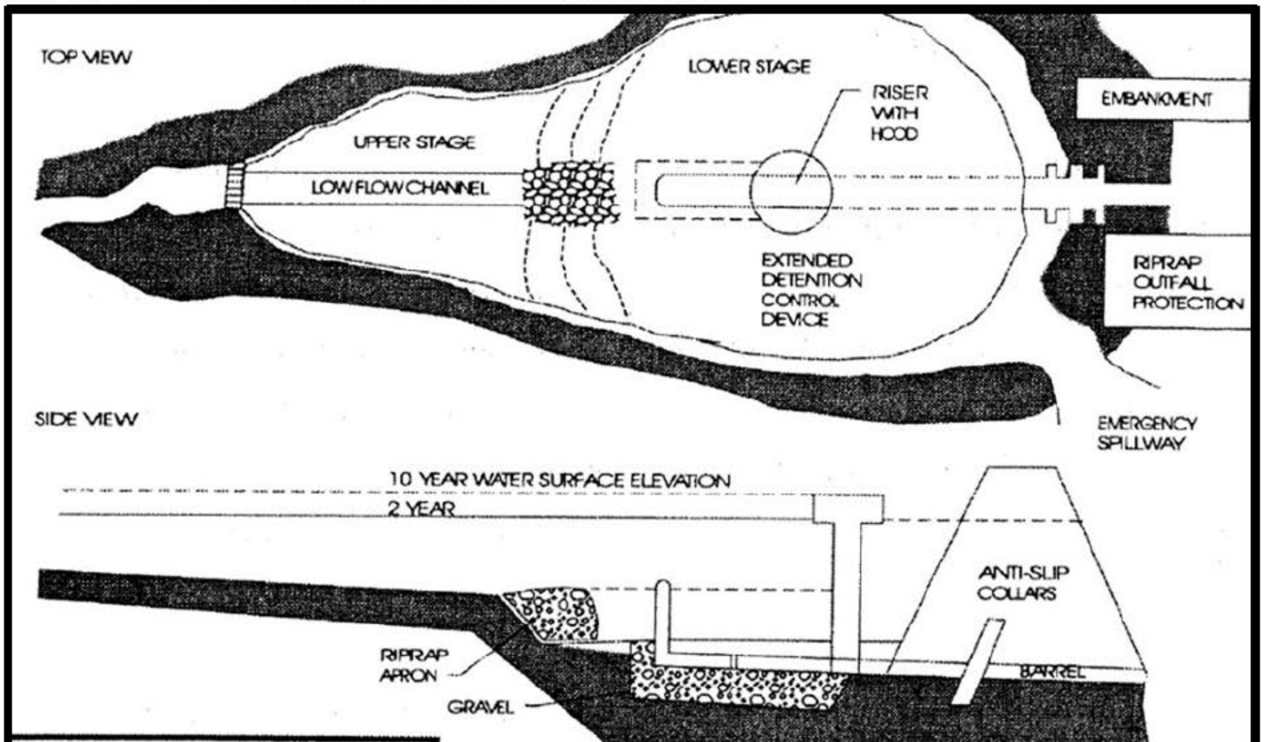
Effectiveness and Cost: Properly designed and functioning vegetative filter strips effectively remove particulates such as sediment, organic matter and may trace metals. Removal of soluble pollutants is not very effective. Forested filter strips appear to be more effective than grassed strips, but a longer length is required for optimal removal rates.

The cost of vegetative filter strips is dependent on the type of vegetation. If the natural vegetation is maintained, the cost is moderate.

Limitations: Vegetative filter strips should not be used if the storm water runoff concentrates. They may not be feasible in areas with limited space.

This BMP may be limited to areas with a constant source of water, depending on the type of vegetation planted.

BMP 102 - CONSTRUCT EXTENDED-DETENTION DRY PONDS



EXTENDED DETENTION DRY POND

Description of Potential Pollutant and Source: Extended-detention dry ponds may be appropriate for large sites (over approximately five acres) where sources of pollution are dispersed and cannot be adequately controlled by source control BMPs.

Description of BMP: Construct extended-detention dry ponds. These are basins typically composed of stages: an upper stage which remains dry except for larger storms and a lower stage which is designed for typical storms. The pond's outlet structure is typically sized for water to be detained at least twelve hours, but fully drained within seventy-two hours.

Application Guidance: There must be an undeveloped area available to construct an extended-detention dry pond. At the proposed pond location, there will not be shallow (less than approximately two feet) groundwater or rock. If the soils are permeable, an infiltration basin will be constructed instead.

Extended-detention dry ponds are a practical means of retrofitting dry ponds to obtain water quality benefits. Until recently, dry ponds were often built to provide flood control, but they did not provide water quality benefits.

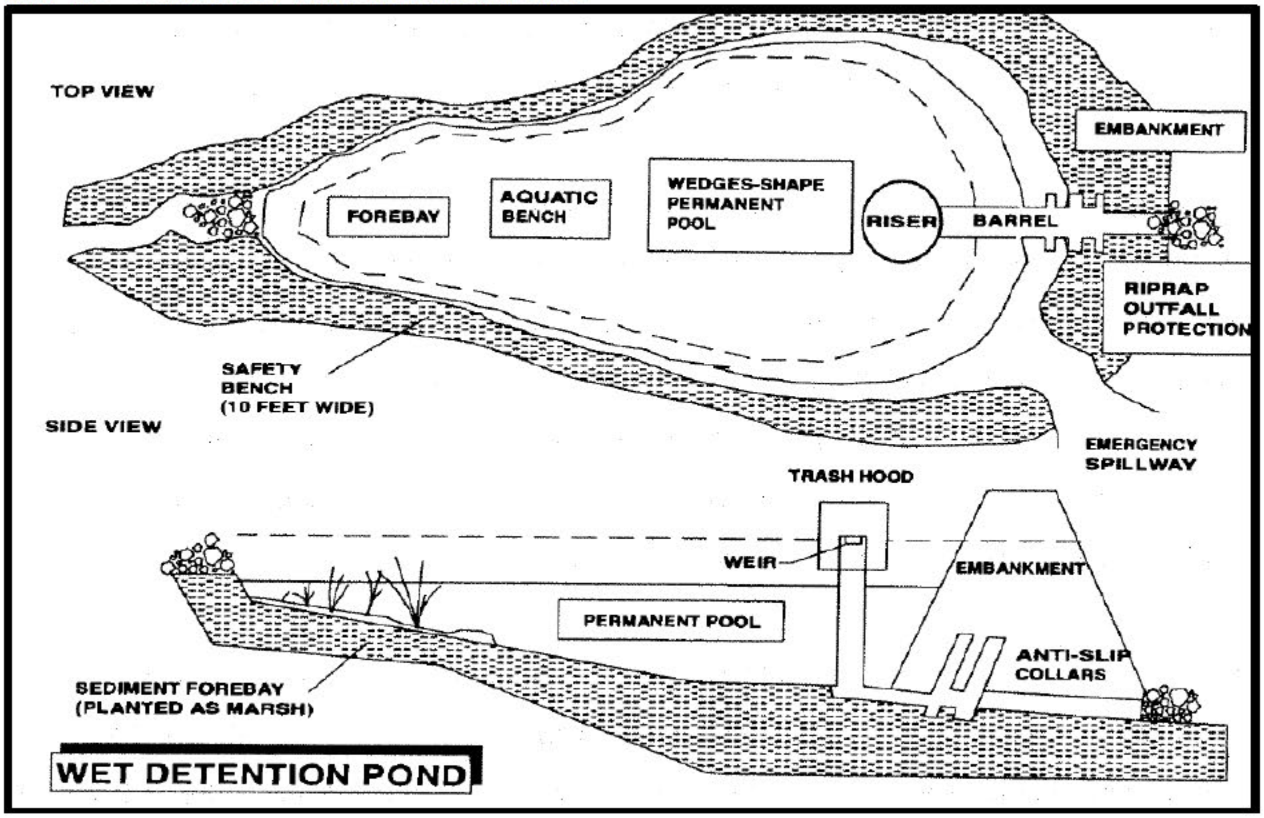
Operation and Maintenance: Routine maintenance includes mowing, debris/litter removal, inlet and outlet maintenance and inspection. In addition, nuisance control may be necessary for odors and mosquito problems that are caused by occasional standing water and soggy conditions within the lower stage of an extended detention pond. Non-routine maintenance includes sediment removal. Sediment removal for extended-detention dry ponds is typically recommended every five to ten years with more frequent spot removals around the outlet control device. The sediment removed during maintenance must be tested; if it is a hazardous waste, it must be properly disposed.

Effectiveness and Cost: The pollutant removal rates for suspended pollutants is moderate. The removal rates for soluble pollutants are low.

This is a relatively high-cost BMP. The cost of these ponds is directly related to the area draining to it. In addition, if the bedrock layer is close to the surface, high excavation costs may make extended-detention dry ponds impractical.

Limitations: Extended-detention dry ponds can breed mosquitoes and create undesirable odors if not adequately maintained. Space constraints often limit the use of extended dry ponds.

BMP 103 - CONSTRUCT WET DETENTION PONDS



Description of Potential Pollutant and Source: Wet detention ponds may be appropriate for large sites (over approximately ten acres) where sources of pollution are dispersed and cannot be adequately controlled by source control BMPs.

Description of BMP: Construct wet detention ponds. These are basins designed to maintain a permanent pool of water and temporarily store storm water runoff until it is released from the structure at flow rates less than predevelopment rates. Wet ponds may include extended detention which stores storm water for an extended period of time.

Application Guidance: There must be an undeveloped area available to construct a wet detention pond. Wet ponds typically require more than twice as much space as extended-detention dry ponds. Wet ponds will only be used in areas with a constant base flow of water or where an alternative source of water is available such as an irrigation water line. Pond liners are required if the native soils are permeable or if there is fractured bedrock. If the bedrock layer is close to the surface, high excavation costs may make the wet pond impractical. Wet ponds are not typically used in heavily urbanized areas because of space constraints.

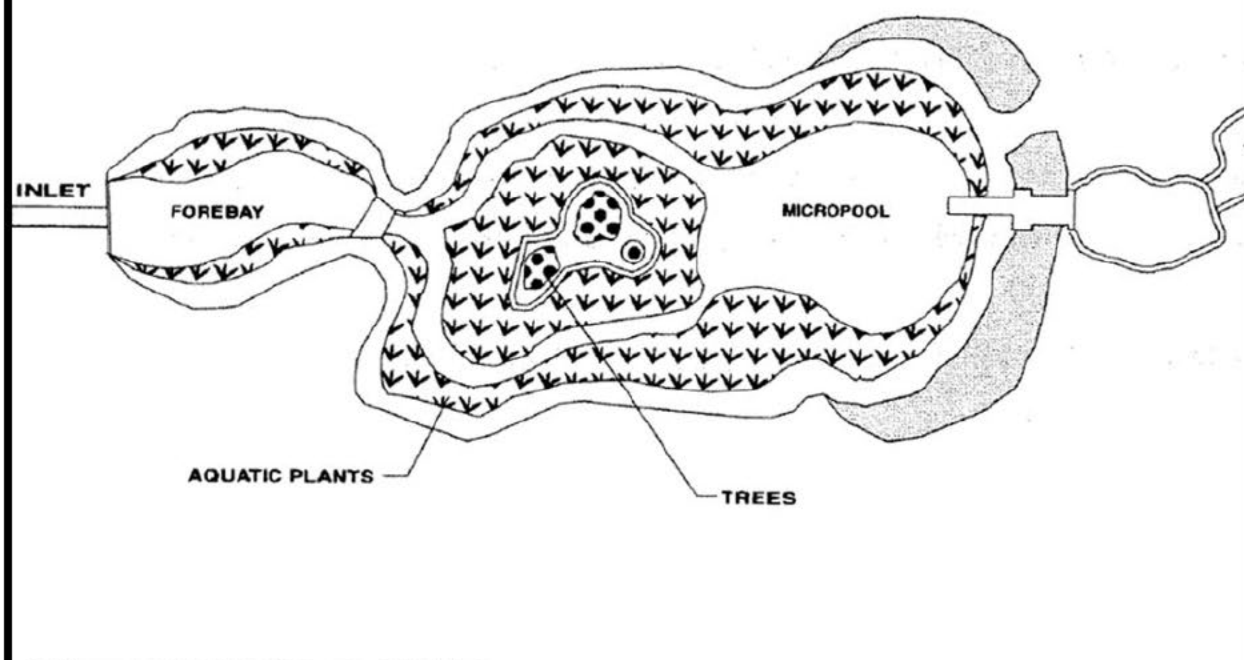
Operation and Maintenance: Wet ponds require routine maintenance, similar to extended-detention dry ponds. These ponds can be expected to lose approximately one percent of their runoff storage capacity per year due to sediment accumulation. The sediments accumulate out of sight, under the permanent pool. Wet ponds require less frequent sediment removal compared to extended-detention dry ponds. The recommended sediment clean-out cycle is about every ten to twenty years. The sediment removed during maintenance must be tested; if it is a hazardous waste, it must be properly disposed.

Effectiveness and Cost: Wet Pond pollutant removal efficiency depends on its shape and size. The larger the wet pond is, the greater the removal efficiency. This is a high-cost BMP. The cost of wet ponds is directly related to the area draining to it. In addition, if the bedrock layer is close to the surface, the cost may increase exponentially.

Limitations: If poorly located, a wet pond can cause sediment and groundwater contamination, have poor water quality, and support degraded habitat. Wet ponds require large areas of land which limits their use in densely urbanized areas with expensive land. A base flow or supplemental water source is needed to maintain a wet pond's water level.

If wetlands are established as a result of the wet pond construction, the maintenance of the pond may be restricted by wetland regulations.

BMP 104 - PROVIDE CONSTRUCTED WETLANDS



CONSTRUCTED WETLANDS

Description of Potential Pollutant and Source: Constructed wetlands may be appropriate for large sites (over approximately five acres) where sources of pollution are dispersed and cannot be adequately controlled by source control BMPs.

Description of BMP: Provide constructed wetlands. These are newly created shallow marsh wetlands that are specifically designed to provide urban runoff control.

Application Guidance: Constructed wetlands are typically used for drainage areas greater that five areas. there must be a large undeveloped area available to construct wetlands. Wetlands typically require one percent of the total drainage area and require more space than any other BMP.

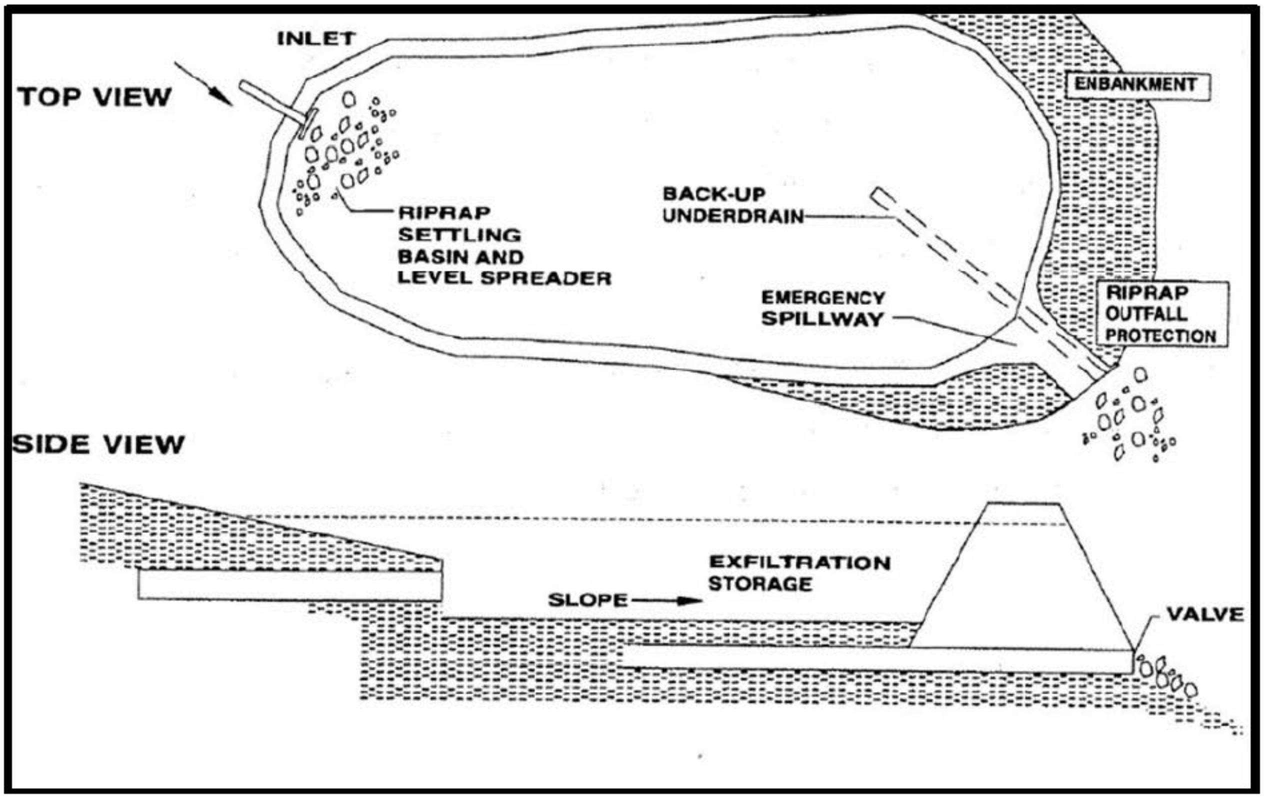
Operation and Maintenance: Constructed wetlands require maintenance similar to that required by wet ponds (see BMP 103). In addition, wetland vegetation should be harvested annually to provide nutrient removal and prevent flushing of dead vegetation from the wetland during the die-down season.

Effectiveness and Cost: This is an effective, high-cost BMP.

Limitations: Storm water wetlands require considerable space which limits their use in densely urbanized areas with expensive land. A base flow is needed to maintain water levels.

The maintenance of wetlands may be restricted by wetland regulations.

BMP 105- CONSTRUCT INFILTRATION BASINS



Description of Potential Pollutant and Source: Infiltration basins may be appropriate for large sites (over approximately five acres) where sources of pollution are dispersed and cannot be adequately controlled by source control BMPs.

Description of BMP: Construct infiltration basins. Infiltration basins temporarily store runoff while it percolates into the soil through the basins' bottom and sides. Infiltration basins are designed to drain within seventy-two hours and, therefore, are generally dry. Infiltration basins must be designed to trap coarse sediment before it enters the basin proper and clogs the surface soil pores on the basin floor.

Application Guidance: In-line infiltration basins are typically used for drainage areas of five to fifty acres. There will be at least four feet of permeable soil between the bottom of the basin and bedrock or high-water table. There must be a low potential for long-term erosion in the watershed. There must be an open space available to construct an infiltration basin.

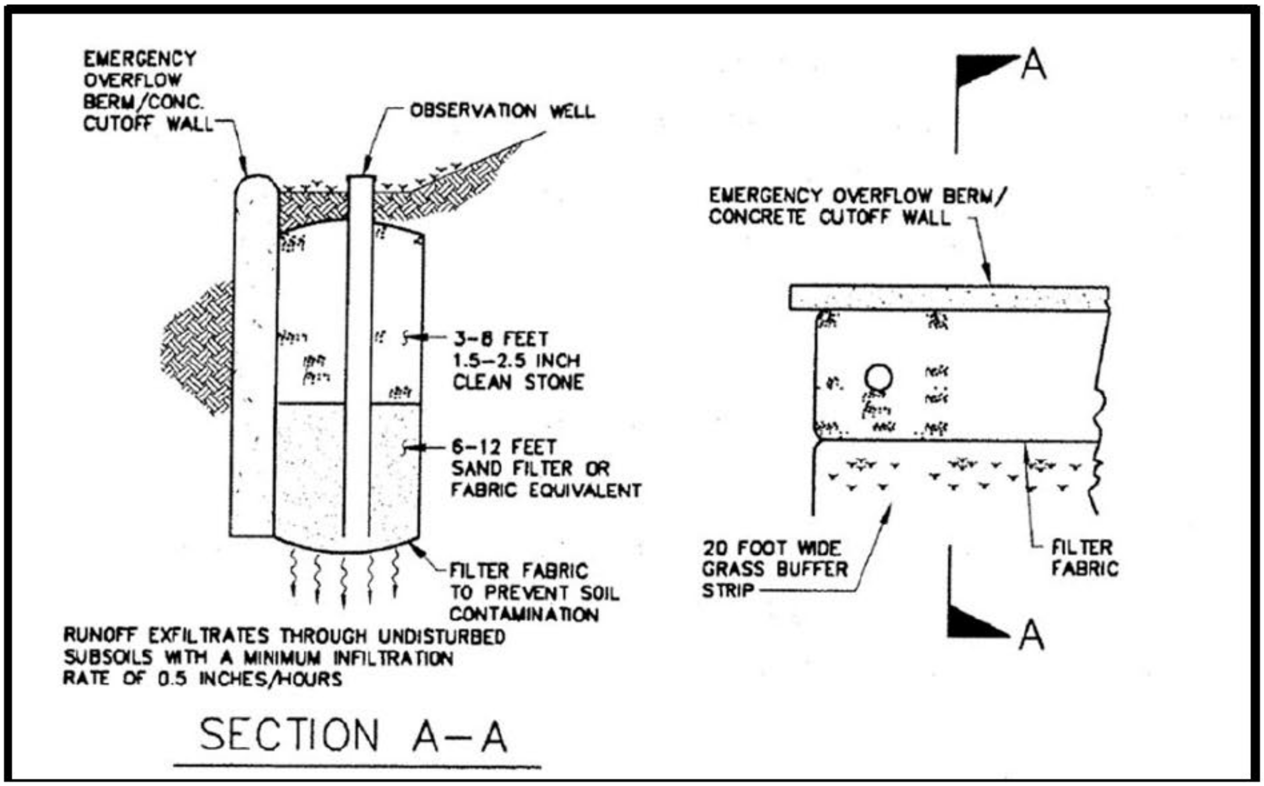
Operation and Maintenance: Routine maintenance requirements include inspecting the basin after every major storm for the first few months after construction and semi-annually thereafter (prior to and following the wet season), mowing frequently enough to prevent woody growth, removing litter and debris, and re-vegetating eroded areas. Accumulated sediment should be removed periodically. The sediment removed during maintenance must be tested; if it is a hazardous waste, it must be properly disposed.

Effectiveness and Cost: Infiltration basins effectively remove soluble and fine-particle pollutants in captured water and the coarse-grained pollutants should be removed before entering the basin proper to keep it from clogging. Actual removal rates in soil will depend on the solubility and chemistry of the pollutant.

This is a high-cost BMP. The cost of infiltration basins is directly related to the size of the area draining to it.

Limitations: Infiltration basins can cause groundwater contamination, have fairly high failure rates, and can breed mosquito and create undesirable odors if not adequately maintained. Infiltration basins cannot be used while construction is underway in the watershed. Infiltration basins should not be used in sandy soils located adjacent to water bodies.

BMP 106 - CONSTRUCT INFILTRATION TRENCHES



Description of Potential Pollutant and Source: Infiltration trenches may be appropriate for sites where sources of pollution are dispersed and cannot be adequately controlled by source control BMPs.

Description of BMP: Construct infiltration trenches. These are shallow excavated holes or ditches that have been backfilled with stone to form an underground reservoir. Runoff is temporarily stored in the trench as it percolates into the soil through the trench's bottom and sides. Infiltration trenches should drain within seventy-two hours. Infiltration trench systems must be designed to trap coarse sediment before it enters the trench proper and close the soil pores.

Application Guidance: Infiltration trenches are typically used for drainage areas of less than five acres. There must be at least four feet of permeable soil between the bottom of the trench and bedrock or high-water table. There must be a low potential for long-term erosion in the watershed.

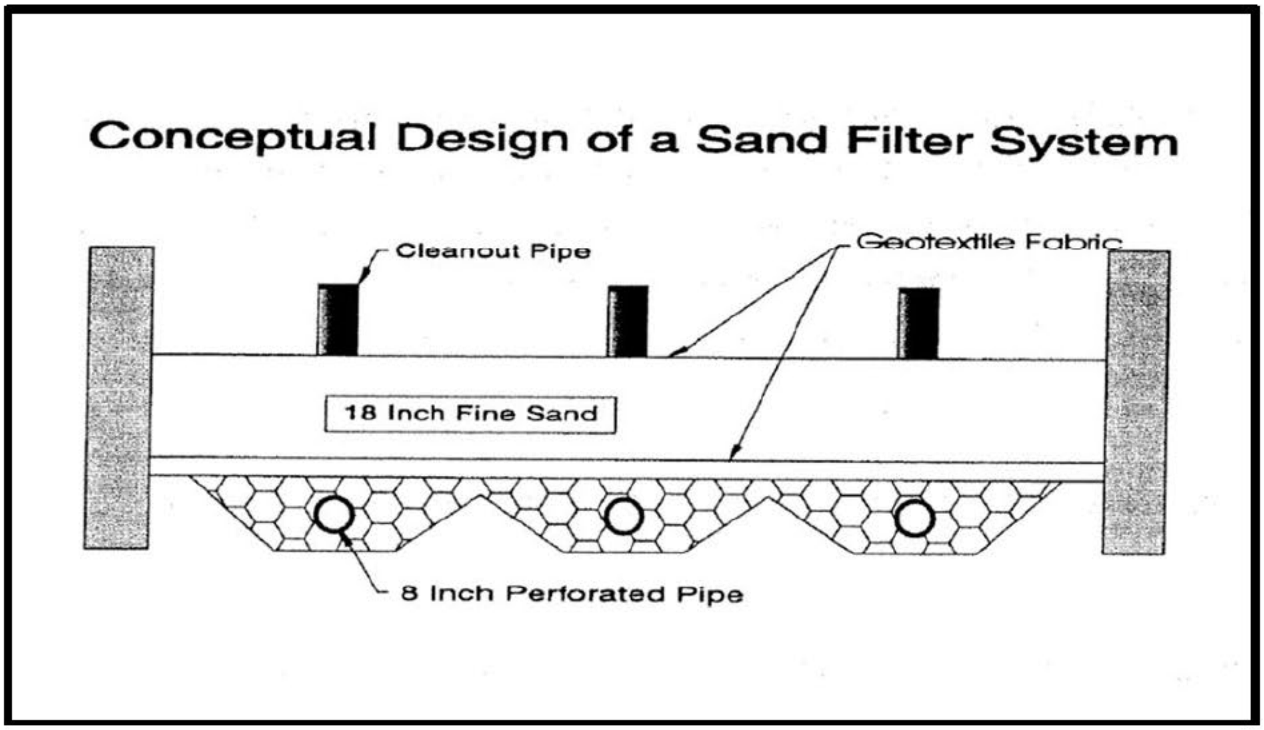
Operation and Maintenance: Routine maintenance requirements include inspecting the basin after every major storm for the first few months after construction and annually thereafter, mowing the filter strips frequently enough to prevent woody growth and removal of sediment form the pretreatment device. Despite careful design, construction, and maintenance, trenches eventually clog.

Effectiveness and Cost: Infiltration trenches have approximately the same pollutant removal effectiveness as infiltration basins. Infiltration basins effectively remove soluble and fine particle pollutants in captured water. Coarse grained pollutants should be removed before entering the trench proper to keep it from clogging. Actual removal rates in soil will depend on the solubility and chemistry of the pollutant.

This is a high-cost BMP. The cost of infiltration trenches is directly related to storage volume. As the storage volume increases, cost per unit volume decreases.

Limitations: Infiltration trenches can cause groundwater contamination and have fairly high failure rates. Because infiltration trenches are not as visible as other BMPs, they are less likely to be maintained. Infiltration trenches cannot be used while construction is underway in the watershed. Infiltration trenches should not be used in sandy soils located adjacent to water bodies.

BMP 107 - CONSTRUCT FILTRATION BASINS



Description of Potential Pollutant and Source: Filtration basins may be appropriate for large sites (over three acres) where sources of pollution are dispersed and cannot be adequately controlled by source control BMPs.

Description of BMP: Construct filtration basins. The basins are lined with a filter media (such as sand and gravel). Storm water runoff drains through the filter media and into perforated pipes that are located in the filter media. Detention time is typically four to six hours. The runoff typically requires some form of preliminary treatment such as sedimentation. Hence, sediment trapping structures (such as a forebay) are required for sedimentation to prevent premature clogging of the filter media.

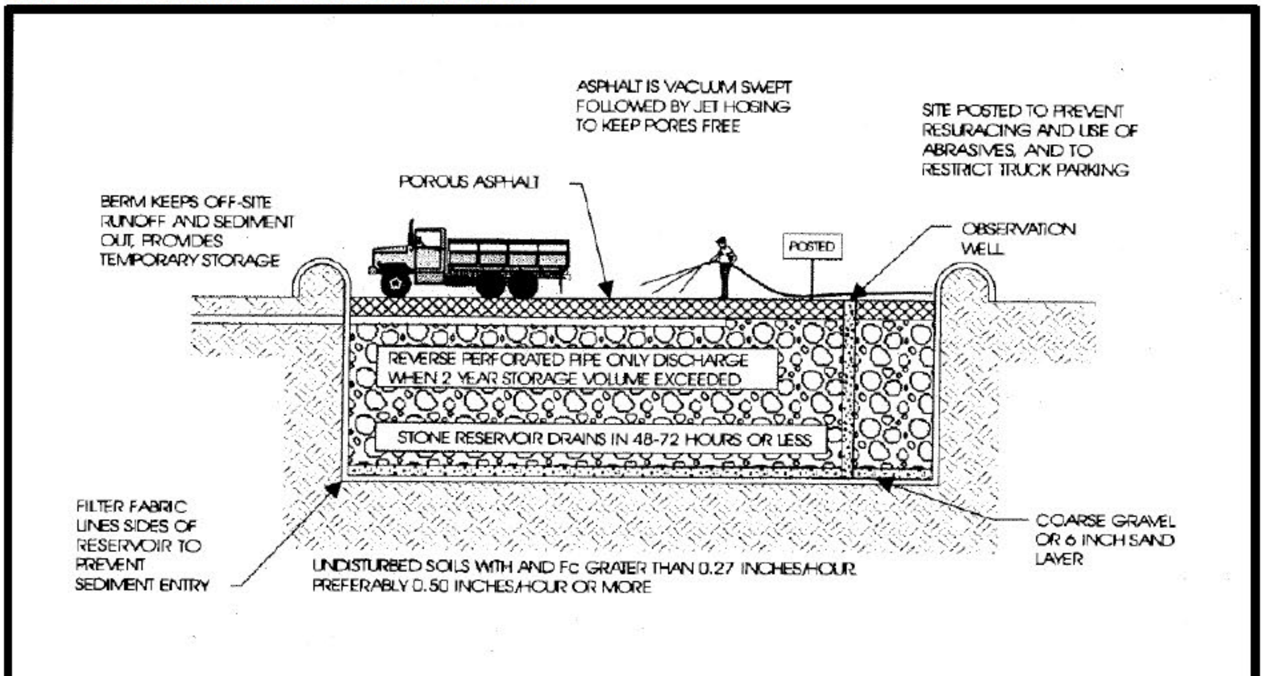
Application Guidance: Filtration basins have been used for drainage areas of three to eighty acres. Filtration basins may be used on sites with impermeable soils since the runoff filter through specially placed filter media, not native soils. Filtration basins can be used where unavailability of water prevents the use of wet ponds, wetlands, or biofilters. There must be an open space available to construct a filtration basin.

Operation and Maintenance: Maintenance requirements include inspecting the basin after every major storm for the first few months after construction and annually thereafter, removing litter and debris and re-vegetating eroded areas. In addition, the accumulated sediment should be periodically removed and the filter media with sediment depositions removed and replaced. The sediment removed during maintenance must be tested; if it is a hazardous waste, it must be properly disposed.

Effectiveness and Cost: This practice has a relatively moderate pollutant removal rate and high cost.

Limitations: Do not use filtration basins while construction is underway in the watershed.

BMP 108 - CONSTRUCT POROUS PAVEMENT



POROUS PAVEMENT

<u>Description of BMP:</u> Construct porous pavement. Some porous pavement has a layer of porous top course covering an additional layer of gravel. A crushed rock-filled groundwater recharge bed is typically installed beneath these top layers. Runoff infiltrates through the porous asphalt layer and into the underground recharge bed. The runoff then exfiltrates from the recharge bed into the underlying soils or into a perforated pipe system. Other types of porous pavement include a geocomposite backfilled with soil and planted with grass. The geocomposite overlies a crushed rock recharge bed.

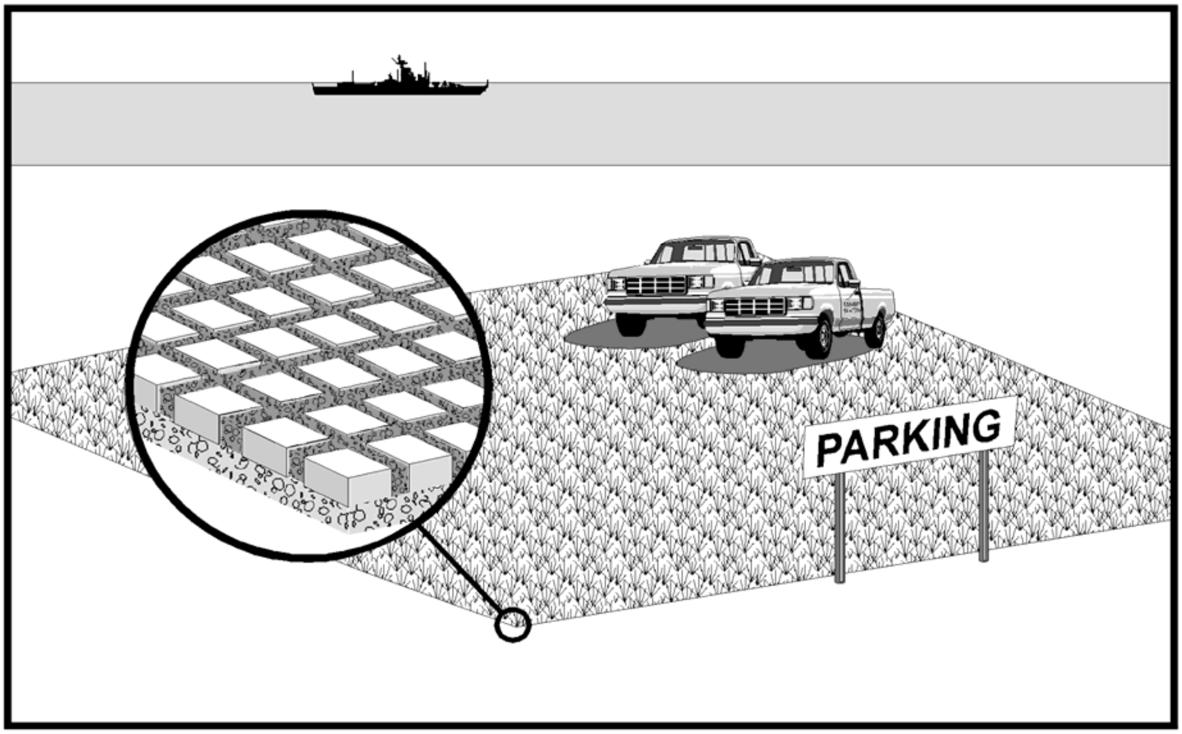
<u>Application Guidance:</u> Porous pavement can be used in parking areas which do not serve a high volume of traffic or heavy traffic. Porous pavement is only used to treat runoff from parking lots or other small areas.

<u>Operation and Maintenance:</u> Routine maintenance of porous pavement includes having the surface vacuum swept followed by high pressure jet hosing at least four times per year to keep the asphalt pores open. In addition, the site should be inspected after every major storm event replaced using conventional asphalt if the replaced area does not exceed ten percent of the total area. Spot clogging can be treated by drilling holes into the asphalt layer. However, if the facility becomes completely clogged it must be completely replaced.

<u>Effectiveness and Cost:</u> Porous pavement provides moderately effective pollutant removal. However, the life span can be shortened due to clogging of the surface from sediment. The use of porous pavement as a retrofit at an existing facility would require the removal of the existing pavement and its replacement with porous pavement. This would be a higher cost application than in new construction.

<u>Limitations:</u> Porous pavement is appropriate for areas that do not have high-volume traffic, such as parking lots. Porous pavement must be maintained to prevent clogging of the surface.

BMP 109 - CONSTRUCT CONCRETE GRID PAVEMENT



Description of Potential Pollutant and Source: Concrete grid pavement can be used to treat rainfall runoff from parking areas with low-volume traffic.

Description of BMP: Construct concrete grid pavement. This type of pavement consists of concrete blocks with regularly interspersed void areas which are filled with pervious materials such as gravel, sand or grass. The blocks are typically placed on a sand and gravel base and designed to provide a load-bearing surface that is adequate to support vehicles, while allowing infiltration of surface water into the underlying soil.

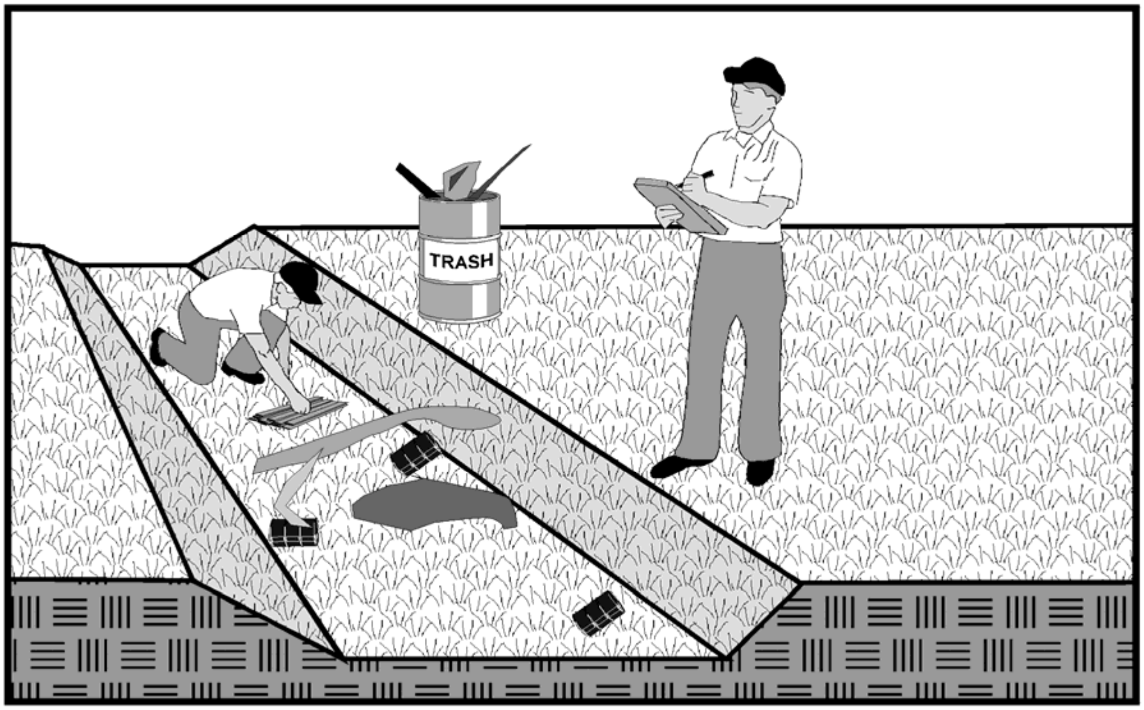
Application Guidance: Concrete grid pavement can be used in areas with low traffic volume. Suggested uses are low volume parking spaces, multi-use open space, fire lanes, and stream banks/lakeside erosion protection. Concrete grid pavement is only used to treat the runoff from the rainfall falling directly on it.

Operation and Maintenance: Concrete grid pavement offers an alternative means to providing a load-bearing surface without greatly increasing the impervious areas. Like all infiltration practices, they require maintenance to prevent clogging of the system. In addition, concrete grid pavement with grass requires additional "normal" grass maintenance, such as mowing, watering, and fertilizing. Extra care should be taken when applying fertilizers and pesticides that may have an adverse effect on concrete products.

Effectiveness and Cost: Concrete grid pavements provide moderately effective removal of fine particle pollutants. This is a relatively high-cost BMP.

Limitations: Concrete grid pavement can cause groundwater contamination and is not suitable for areas with high-volume traffic.

BMP 110 - REGULARLY INSPECT AND MAINTAIN STORM WATER CONVEYANCE SYSTEMS



Description of Potential Pollutant and Source: Over time, storm water conveyance systems may fill up with sediments and clog. Also, drainage swales may erode and be a source of sediment pollution to storm water.

Description of BMP: Inspect and maintain storm water conveyance systems on a regular basis. This will include inspection of drainage swales and outfall pipes to ensure that the area is not eroding.

Other storm water conveyance systems, such as oil/water separators, catch basins, and detention ponds, will be inspected and properly maintained.

Application Guidance: Storm water conveyance systems will be inspected monthly. The frequency for implementing of the BMP has been provided as general guidance. However, a facility operator may wish to establish a more suitable frequency. This will require SWPCP implementors to make judgements based on facility operations and conditions. To assign a frequency other than what has been suggested (i.e., more or less frequent), the following criteria will be considered and rated either High, Medium or Low. If many of the criteria are assigned a High rating, the frequency may be increased. Similarly, if many criteria are assigned a Low rating, the frequency may be decreased. The goal of implementing this BMP is to minimize exposure of pollutants to storm water.

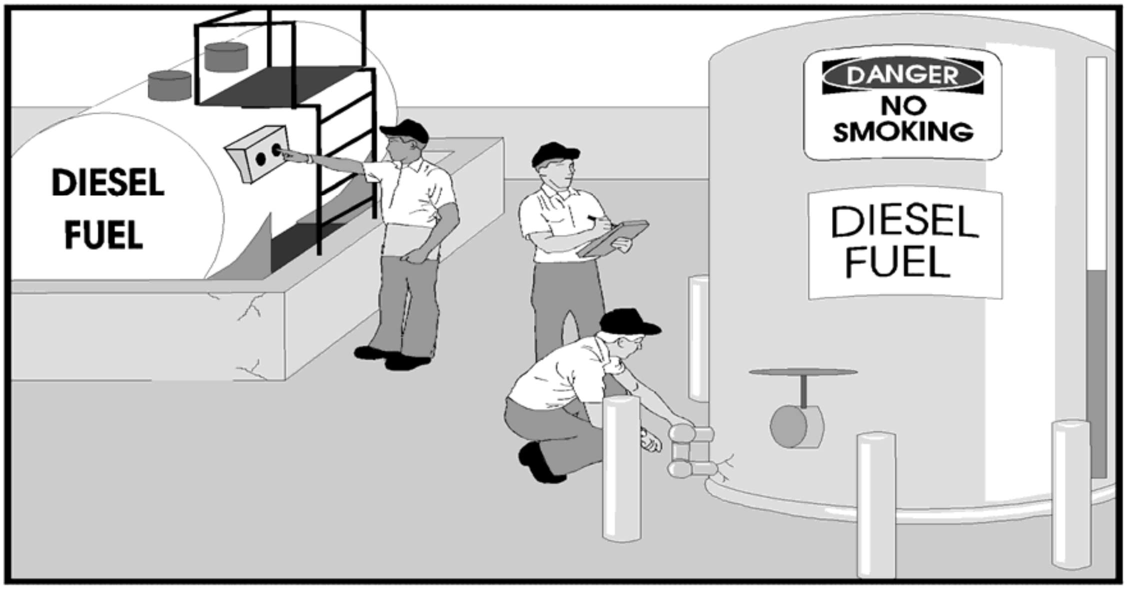
CRITERIA	RATING H=High M=Meum L=Low
Probability of exposure of significant materials to storm water in area draining to storm water conveyance system	
Quantity of significant materials potentially exposed in area draining to storm water conveyance system	
Toxicity of significant materials potentiality exposed in area draining to storm water conveyance system	
Frequency of use of significant materials potentially exposed in area draining to storm water conveyance system	
Evident of exposure (e.g., stains on pavement, evidence of significant materials in drainage system)	
Proximity of source area to outfall or receiving water	
Sensitivity of receiving water to potentially exposed significant materials (e.g., waters with beneficial uses such as human contact, recreation, significant species habitat, etc.)	

Training: The Storm Water Pollution Prevention Personnel will assign personnel responsible for inspections. Personnel will be provided a copy of a site plan showing the location of all storm water conveyance systems which need to be inspected.

Effectiveness and Cost: This is a moderately effective, low-cost BMP.

Limitations: None

BMP 111 - REGULARLY INSPECT AND TEST EQIDPMENT



Description of Potential Pollutant and Source: Regular inspection and testing of equipment will prevent breakdowns and failures, which can result in the exposure of significant materials to storm water.

Description of BMP: Regularly inspect and test equipment. Inspections will uncover conditions such as cracks or slow leaks which could cause breakdowns or failures that result in discharges of chemicals to storm sewers or surface waters.

The following is a list of some of the equipment that will be included in the inspection and testing program:

- Aboveground storage tanks
- Machinery
- Material storage areas
- Pressure release valves
- Process and material handling equipment
- Pumps and piping
- Sumps
- Wastewater treatment plants

Application Guidance: Equipment will be inspected and tested monthly.

The frequency for implementing of the BMP has been provided as general guidance. However, a facility operator may wish to establish a more suitable frequency. This will require SWPCP implementors to make judgements based on facility operations and conditions. To assign a frequency other than what has been suggested (i.e., more or less frequent) the following criteria will be considered and rated either High, Medium or Low. If many of the criteria are assigned a High rating, the frequency may be increased. Similarly, if many criteria are assigned a Low rating, the frequency may be decreased. However, the goal of implementing the BMP will be to minimize exposure of pollutants to storm water.

CRITERIA	RATING H=High M=Medium L=Low
Probability of exposure of significant materials to storm water	
Frequency of use of equipment	
Intensity of use of equipment	
Old age or poor condition of equipment and systems	
Evidence of exposure (e.g., stains on pavement, etching of concrete)	
Proximity of source area to outfall or receiving water	
Sensitivity of receiving water to potentially exposed significant materials (e.g., waters with beneficial uses such as human contact, recreation, significant species habitat, etc.)	

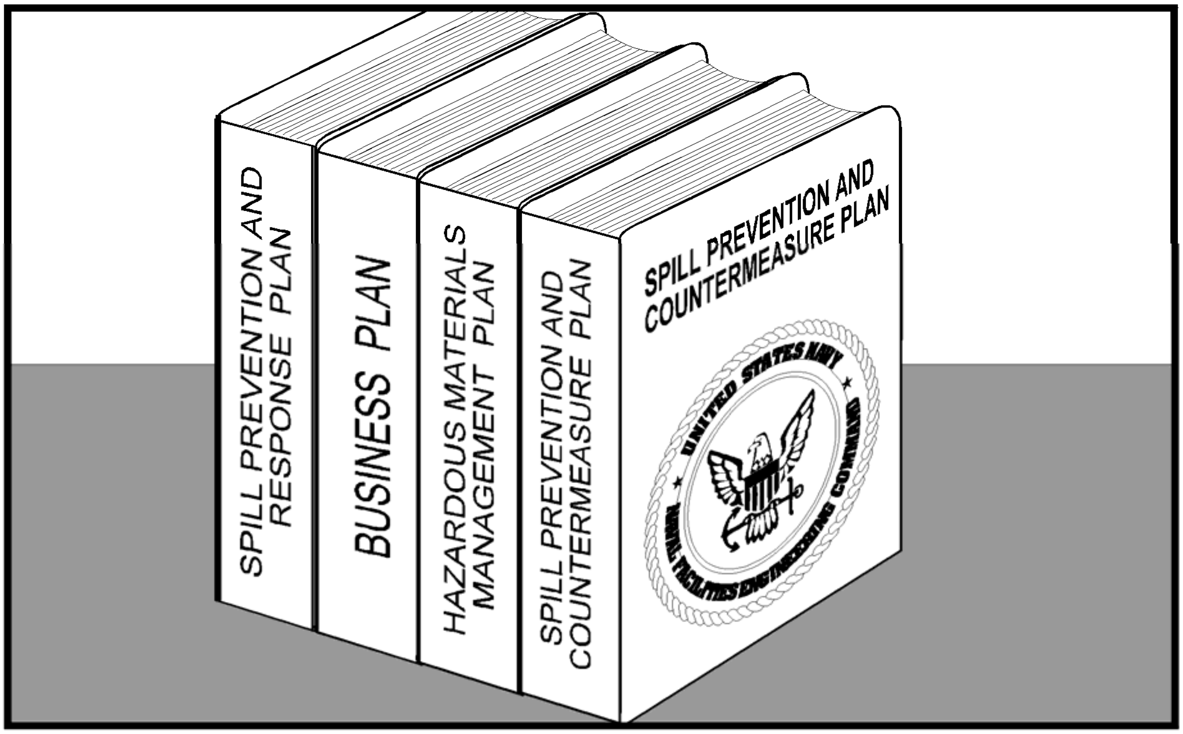
<u>Training:</u> An effective preventive maintenance program will include the following:

- Identification of equipment, systems, and facility areas that will be inspected.
- Schedules for periodic inspections or tests of these equipment and systems.
- Appropriate and timely adjustment, repair, or replacement of equipment and systems.
- Maintenance of complete records on inspections, equipment and system.

<u>Effectiveness and Cost:</u> This is a highly effective, low-cost BMP.

<u>Limitations:</u> None

BMP 112- PREPARE APPROPRIATE SPILL PREVENTION AND RESPONSE PLANS



Description of Potential Pollutant and Source: Spills of significant materials may be exposed to storm water and transported to storm drains and/or receiving waters.

Description of BMP: Prepare the appropriate plans to comply with all local, state and federal regulations related to spill prevention and response. The plans may include a Spill Prevention, Control, and Countermeasure (SPCC) Plan, Business Plan, Hazardous Materials Management Plan, and others. The plans will cover all industrial activities involving material handling and storage. 40 CFR 300 requires that sites which store or dispense petroleum products have an SPCC plan.

The plans address actions that will be taken in the event of a spill of hazardous materials. The plans will include the location of necessary equipment (e.g., absorbent material, fire extinguishers), and internal and external reporting procedures including the names and phone numbers of the appropriate people to notify in the event of a spill. In addition, the plans will describe specific material handling procedures and storage requirements.

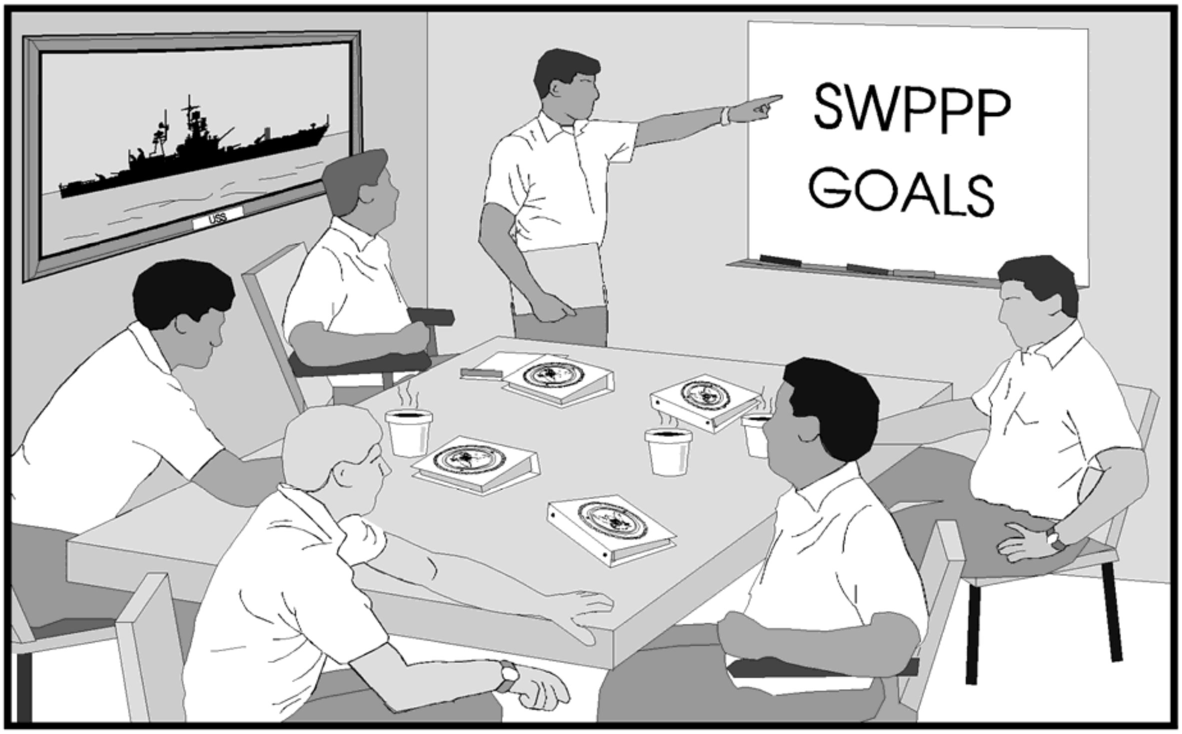
Application Guidance: N/A

Training: Personnel will be trained in the appropriate procedures for all spill prevention and response.

Effectiveness and Cost: This is an effective, low-cost BMP.

Limitations: None

BMP 113 - CONDUCT PERSONNEL TRAINING REGARDING THE SWPCP



Description of Potential Pollutant and Source: When properly trained, personnel are more capable of preventing spills, responding safely and effectively to an accident when it occurs, and recognizing situations that could lead to storm water contamination.

Description of BMP: Train personnel at all levels of responsibility in the components and goals of the SWPCP.

Application Guidance: Training will be conducted quarterly and at new personnel orientations.

Training: Training will address each component of the SWPCP, including how and why tasks are to be implemented. Topics will include:

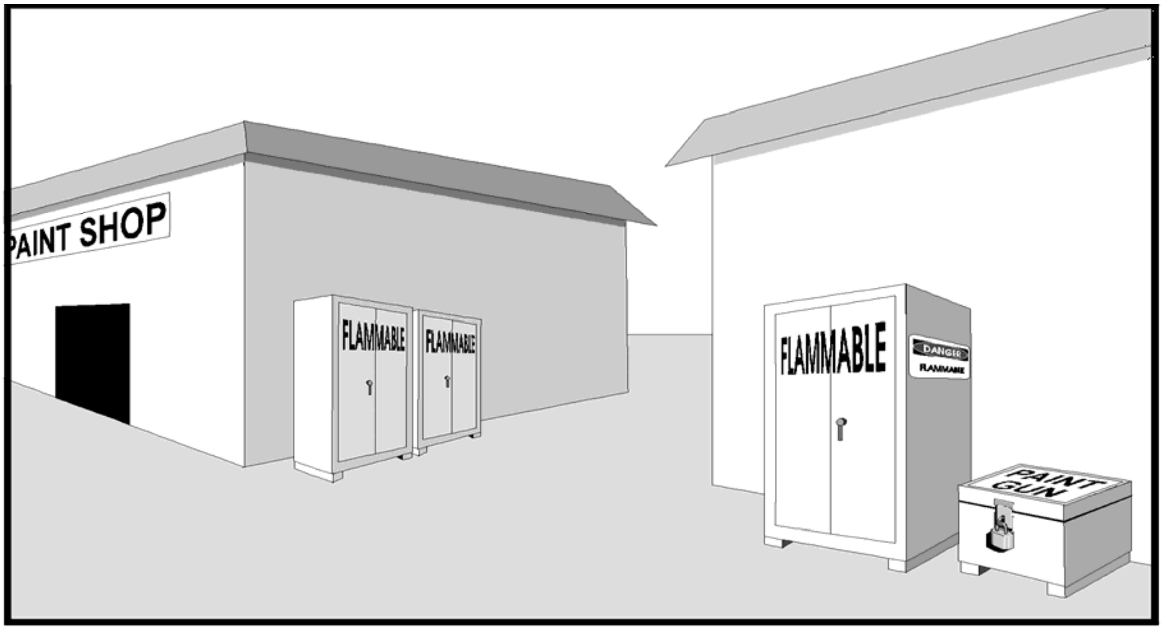
- Good housekeeping
- Material management practices Spill prevention and response

Effectiveness and Cost: This is a highly effective, moderate-cost BMP.

Limitations: None

PLACEHOLDER

BMP 115 - STORE CONTAINERS INSIDE SECONDARY CONTAINMENT



Description of Potential Pollutant and Source: Improper storage of containers of significant materials can result in the release of materials and chemicals that can cause storm water runoff pollution. Secondary containment can prevent storm water runoff pollution.

Description of BMP: Provide secondary containers for significant materials. Containers of significant materials will be stored inside secondary containment cabinets appropriate to the size and quantity of the substances stored. Cabinets will have covered shelves and provide secondary containment for spills of the substances that spill inside the cabinets. In many instances the cabinets will be locked to restrict access to the substances. Metal lockers typically used to store flammable substances are usually appropriate for preventing contact between significant materials and storm water.

The secondary containment will be placed away from vehicle traffic routes to reduce the potential for mechanical impact and accidental spills. A manifest list of the materials stored inside the locker will be posted on or inside the locker.

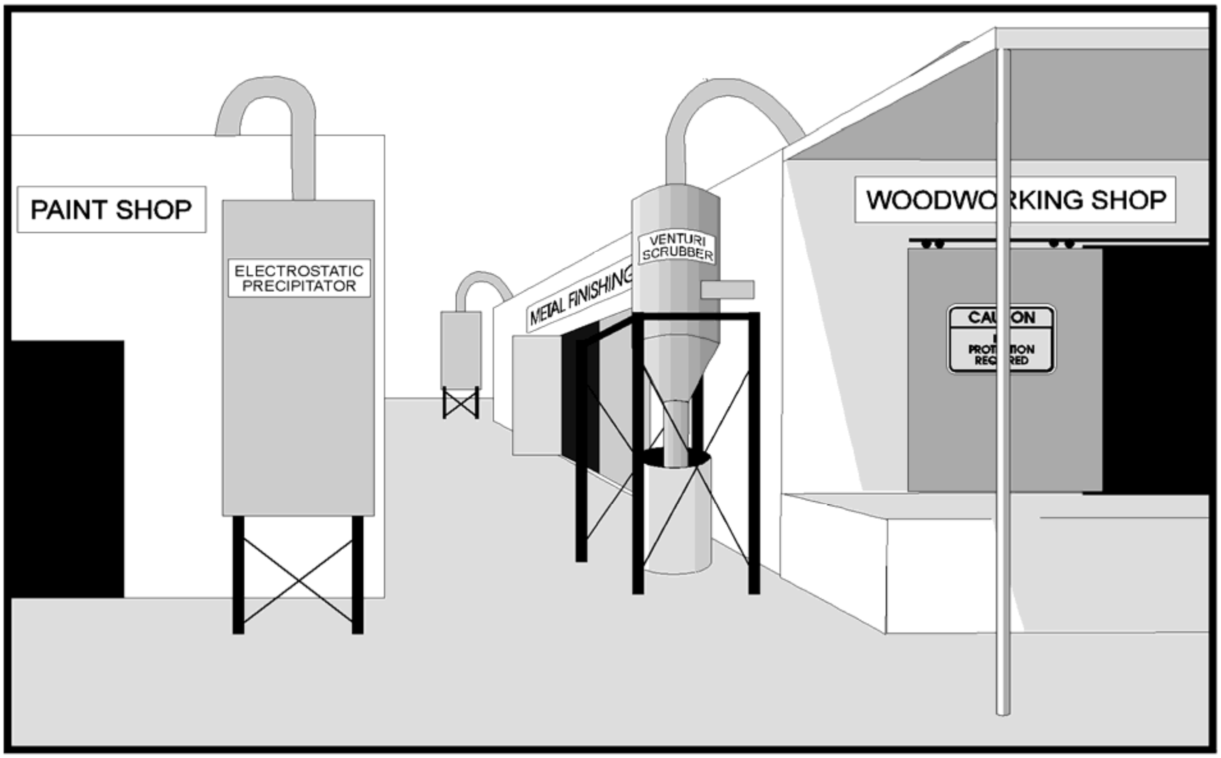
Application Guidance: Containers will always be properly stored.

Training: Personnel will be trained in preventing substances stored outside from entering the storm water and storing substance effectively.

Effectiveness and Cost: This is a moderately effective, low-cost BMP.

Limitations: None

BMP 116- CONTROL DUST AND PARTICULATES



Description of Potential Pollutant and Source: Many indoor and outdoor industrial processes can generate significant quantities of dust and particulates. These materials contain pollutants that can be exposed to storm water if uncontrolled. Examples of industrial processes which generate significant quantities of dust and particulates include metal finishing, painting, sanding, grinding, sawing, milling, sandblasting, welding and cement manufacture.

Description of BMP: Control dust and particulates. The emission of dust and particulates from indoor and outdoor industrial processes will be controlled. Control measures include the use of filters, baghouses, electrostatic precipitators, cyclone concentrators, waterwalls and other measures.

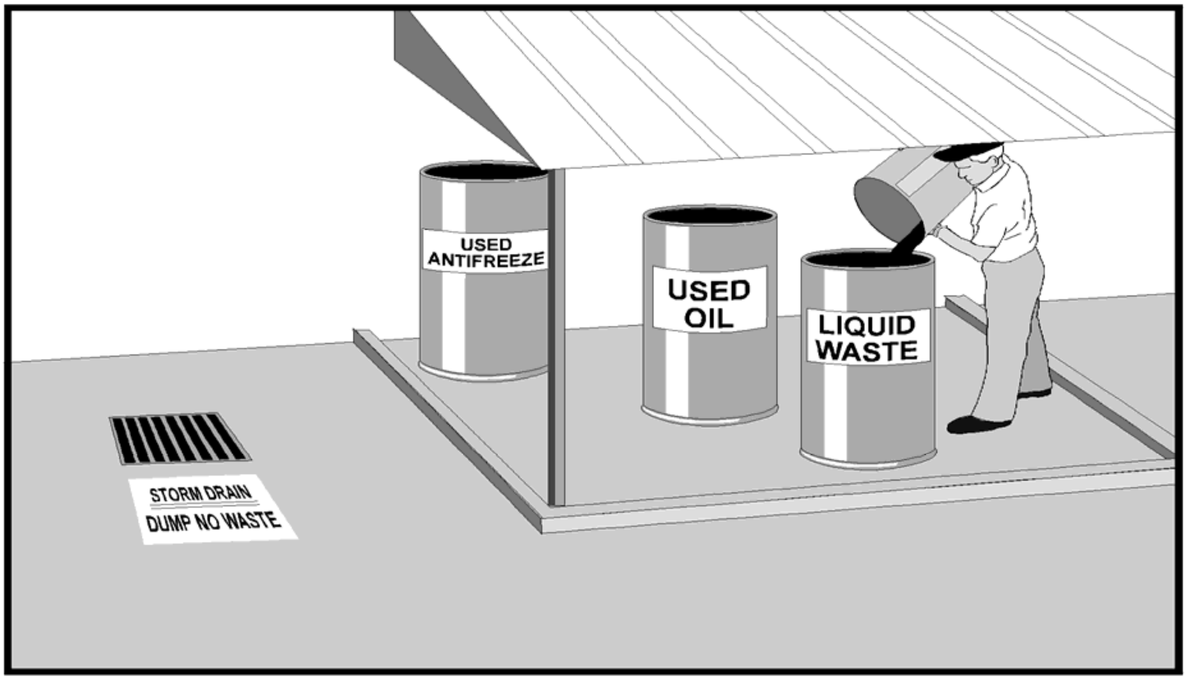
Application Guidance: All industrial processes which generate dust and particulates will be fitted with dust control devices.

Training: Personnel will be trained to properly use and maintain dust and particulate control equipment.

Effectiveness and Cost: This is an effective, moderate-cost BMP.

Limitations: It may not be possible to control outdoor processes.

BMP 117 - DO NOT POUR OR DEPOSIT WASTE INTO STORM DRAINS



Description of Potential Pollutant and Source: Waste poured or deposited into storm drains contains pollutants that can enter the storm drain system and receiving waters without treatment.

Description of BMP: Do not pour or deposit waste into storm drains or storm drain connections. All wastes will be disposed properly or recycled. Refer also to BMP 027, "Stencil Signs On Storm Drain Inlets."

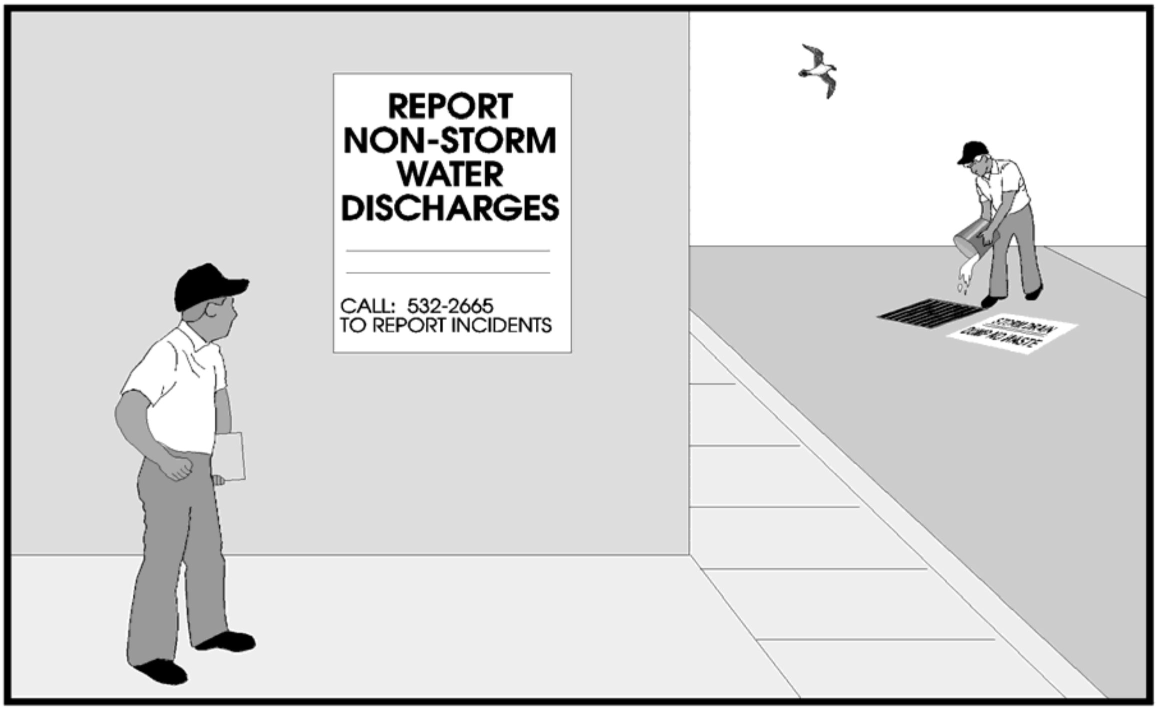
Application Guidance: Wastes will always be properly disposed.

Training: Personnel will be trained in proper disposal procedures. Signs will be posted at storm drain inlets.

Effectiveness and Cost: This is a highly effective, low-cost BMP.

Limitations: None

BMP 118 – ROUTINELY REPORT ANY OBSERVED NON-STORM WATER DISCHARGES



Description of Potential Pollutant and Source: Unknown significant materials may be present in non-storm water discharges resulting from improper disposal of wastes or illicit connections to the storm drain system. These non-storm water discharges drain to receiving waters without treatment.

Description of BMP: Develop adequate routine reporting procedures and make them available to all personnel who may observe either an act of illegal dumping or an unexplained non-storm water discharge. Information regarding reporting procedures will be posted in all industrial facilities. A member of the pollution prevention team will be designated to respond to reports.

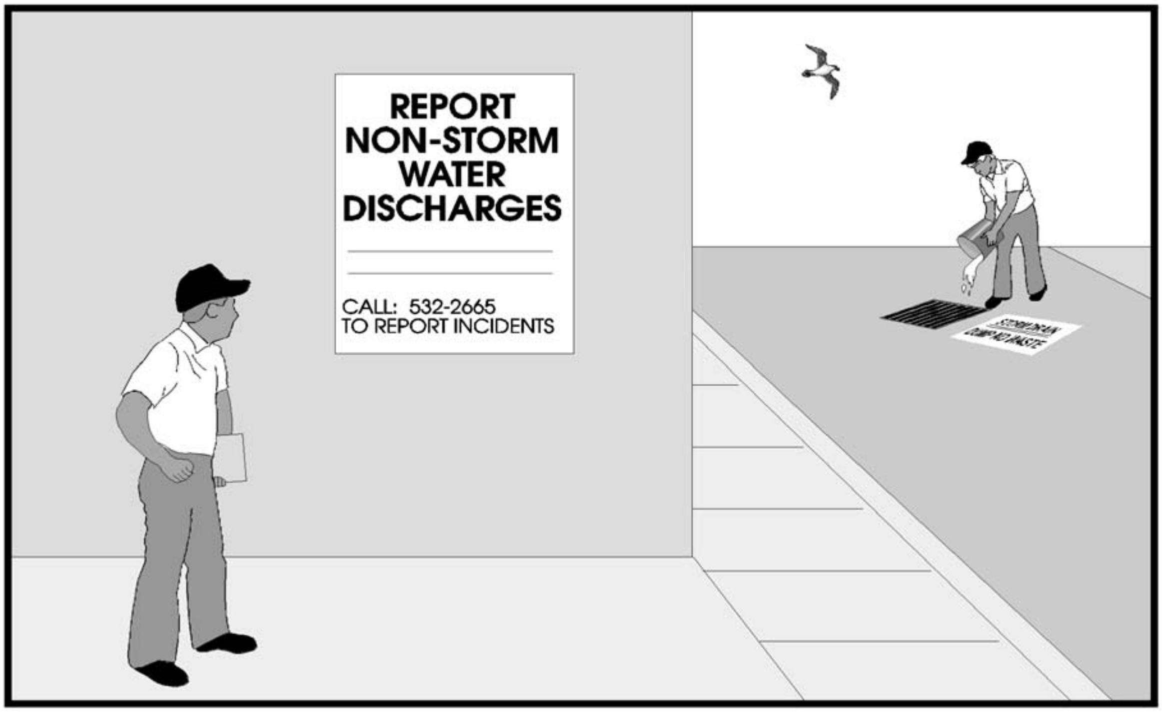
Application Guidance: Reporting forms will be made available at all times.

Training: Training will be performed as part of BMP 009 training.

Effectiveness and Cost: This is an effective BMP, and the costs are low.

Limitations: None

BMP 104 - Routinely Report Any Observed Non-Storm Water Discharges



Description of Potential Pollutant and Source: Unknown significant materials may be present in non-storm water discharges resulting from improper disposal of wastes or illicit connections to the storm drain system. These non-storm water discharges drain to receiving waters without treatment.

Description of BMP: Adequate routine reporting procedures will be developed and made available to all personnel who may observe either an act of illegal dumping or an unexplained non-storm water discharge. Information regarding reporting procedures will be posted in all industrial facilities. A member of the pollution prevention team will be designated to respond to reports.

Application Guidance: Reporting forms will be made available at all times.

Training: Training will be performed as part of BMP 008 training.

Effectiveness and Cost: This is an effective BMP, and the costs are low.

Limitations: None

BMP #110 - Timing of Construction

DESCRIPTION

Schedule and sequence construction work and erosion control applications so that they occur under optimal conditions--that is, during periods when the potential for erosion is lowest. Proper timing will minimize erosion and also maximize the effectiveness of control methods.

Targeted Pollutants

- Sediment
- Nutrients
- Trace metals
- Bacteria
- Petroleum hydrocarbons

Physical Limits

Drainage area	unlimited
Max slope	unlimited
Min bedrock depth	N/A
Min water table	N/A
SCS soil type	ABCD
Freeze/Thaw	Good
Drainage/flood control	no

APPLICATIONS

This measure applies to almost any ground-disturbing activity, but it is especially relevant to large construction projects and any areas where work activities can be planned to coincide with periods of low erosion potential, such as during dry weather.

When construction during the wet season is unavoidable, use other BMPs described in this Catalog to control erosion, such as any of the slope protection techniques.

LIMITATIONS

None.

DESIGN PARAMETERS

- Construction work involving soil disturbance or exposure should be scheduled during seasonal low-runoff periods under favorable soil moisture conditions whenever possible.
- Erosion controls should be installed in stages to protect completed work and minimize exposed soils.
- Sediment collection systems should be installed prior to activities expected to produce sediment.
- Slope stabilization measures should be initiated within 14 calendar days after construction activities in that portion of the site where earthmoving activities have temporarily or permanently ceased.
- Consider site characteristics and permit conditions when deciding what kind of erosion control devices to incorporate into a construction project. Select measures that can be installed without disrupting critical timing or sequencing of other construction or erosion control activities.

- Identify the locations and dimensions for all erosion control and storm water management measures as clearly as possible on the site plans. This will help ensure effectiveness and proper timing of installation or implementation.

CONSTRUCTION GUIDELINES

Develop a scheduling/sequencing plan that addresses the following timing considerations. If using a Critical Path Method (CPM) for scheduling, incorporate the erosion control and storm water management practices into the CPM.

- Work activities that leave a site most susceptible to erosion should be scheduled for periods when the potential for erosion is lowest.
- Allow time to install sediment collection systems, drainage systems, and runoff diversion devices before beginning ground-disturbing work in a given area.
- Plan to install and maintain effective soil stabilization measures as work progresses, not just at the completion of all construction.
- Conduct work in units or stages so that some portions of the project site are final-graded and ready for seeding each time an approved season of seeding arrives. (See BMP # 111-Staging Areas).

MAINTENANCE

- Continually monitor site conditions and progress of work. Update the project work schedule to maintain appropriate timing and sequencing of construction and control applications.

BMP #111 - Staging Areas

DESCRIPTION

Targeted Pollutants

- Sediment
- Phosphorus
- Trace metals
- Bacteria
- Petroleum hydrocarbons

Physical Limits

Drainage area	unlimited
Max slope	15 %
Min bedrock depth	NA
Min water table	NA
SCS soil type	ABCD
Freeze/Thaw	good
Drainage/Flood control	yes

This BMP includes measures for collecting runoff from a staging area, materials storage site, or industrial activity area or for diverting water flow away from such areas so that pollutants do not mix with clean stormwater runoff. Various flow diversion structures, called stormwater conveyances, can be used to contain runoff on site, to channel it around the industrial area, or to carry pollutant-laden water directly to a treatment device or facility. Several options are available:

Stormwater Conveyances: This term includes many kinds of channels, gutters, drains, and sewers. Stormwater conveyances can be either temporary or permanent. They are constructed or lined with many different materials, including concrete, clay tiles, asphalt, plastics, metals, riprap, compacted soils, and vegetation. The type of material used depends on the use of the conveyance.

Dikes or Berms: Diversion dikes or berms are ridges built to block runoff from passing beyond a certain point. Temporary dikes are usually made with compacted soil. More permanent ones are constructed out of concrete, asphalt, or other durable materials.

Graded Areas and Pavement: Land surfaces can be graded, or graded and paved, so that stormwater runoff is directed away from construction activity areas. The slope of the grade allows the runoff to flow, but keeps it from washing over areas that may be contaminated with pollutants. Like conveyances and dikes, grading can prevent runoff from entering construction areas and becoming contaminated with pollutants from these areas. Grading can be a permanent or temporary control measure.

APPLICATIONS

Stormwater Conveyances: Stormwater conveyances can be used for two different purposes. The first is to keep uncontaminated stormwater from getting into areas of a construction site where it may become contaminated. This can be accomplished by collecting the stormwater in a conveyance and directing the flow away from those areas. Secondly, conveyances can be used to collect stormwater downhill from construction areas and keep it separate from runoff that has not been in contact with those areas. When potentially contaminated stormwater is collected in a conveyance like this, it can be directed to a treatment device or another facility on the site if desired.

Other beneficial aspects of stormwater conveyances include:

- Prevention of temporary flooding at industrial sites.

- Low maintenance.
- Erosion-resistant conveyance of stormwater runoff.
- Long-term control of stormwater flows.

Dikes or Berms: Diversion dikes are used to prevent the flow of stormwater runoff onto construction or staging/storage areas. Limiting the flow across these areas reduces the volume of stormwater that may carry pollutants from the area and which may require treatment. This method is suitable for sites where significant volumes of stormwater runoff tend to flow onto active materials handling or equipment staging sites and other construction areas. Typically, dikes are built on slopes just uphill from an active construction area together with some sort of a conveyance, such as a swale. The conveyance is necessary to keep the water away from the dike so that the water will not pool and seep through the dike. See BMP #140-Earth Dike.

Some advantages of diversion dikes are that they:

- Effectively limit stormwater flows over industrial site areas.
- Can be installed at any time.
- Are economical, temporary structures when built from soil on site.
- Can be converted from temporary to permanent at any time.

Graded Areas and Pavement: Grading is appropriate for any construction site where outdoor activities may pollute stormwater runoff--parking lots or outdoor storage areas, for example. Grading is often used in conjunction with coverings, buffer zones, and other practices to reduce the runoff velocity, increase infiltration of uncontaminated runoff, or direct pollutant-laden runoff to stormwater treatment facilities. Grading and paving are relatively inexpensive and easy to implement.

LIMITATIONS

Stormwater Conveyances

- Once the stormwater is concentrated in conveyances, it must be routed through stabilized structures all the way to its discharge to a receiving water or other stormwater BMP.
- May increase flow rates.
- May be impractical if there are space limitations.
- May be expensive to install, especially for small facilities or after a site has already been constructed.

Dikes and Berms

- Are not suitable for large drainage areas unless there is a gentle slope.
- May require maintenance after heavy rains.

Graded Areas and Pavement

- May be uneconomical to regrade and resurface large areas.
- May not be effective during heavy precipitation.

DESIGN PARAMETERS

Stormwater Conveyances: In planning for stormwater conveyances, consider the amount and speed of the typical stormwater runoff. Also, consider the stormwater drainage patterns, so that channels may be located to collect the most flow and can be built to handle the amount of water they will receive. When deciding on the type of material for the conveyance, consider the resistance of the material, its durability, and its compatibility with any pollutants it may carry.

Conveyance systems are most easily installed when a facility is first being constructed. Where possible, use existing grades to decrease costs. Grades should be positive to allow for the continued movement of the runoff through the conveyance system; however, grades should not create an increase in velocity that causes an increase in erosion. Consider the materials used for lining the conveyance and the types of outlet controls provided.

Dikes and Berms: In planning for the installation of dikes, consider the slope of the drainage area, the height of the dike, the amount of runoff it will need to divert, and the type of conveyance that will be used with the dike. Steeper slopes result in higher volumes of runoff and higher velocities which the dike must be capable of handling. Remember that dikes are limited in their ability to manage large volumes of runoff. See BMPs #140-Earth Dike for additional parameters.

Graded Areas and Pavement: When designing graded and paved areas, be sure to consider both control and containment of runoff flows. The grading should control the uncontaminated flow by diverting it around areas that may have pollutants. The grading should also contain the contaminated flows or divert them to treatment facilities.

CONSTRUCTION GUIDELINES

Stormwater Conveyances: Specific construction methods apply to the type of conveyance being used.

Dikes and Berms: Ideally, dikes are installed before construction activity begins. However, dikes can be easily constructed at any time. Temporary dikes (usually made of dirt) generally only last for 18 months or less, but they can be made into permanent structures by stabilizing them with vegetation. Slope protection such as vegetation is crucial for preventing the erosion of the dike.

Graded Areas and Pavement: Staging/storage areas should be designated prior to the start of construction.

MAINTENANCE

It is best to inspect stormwater conveyances within 24 hours of a rainstorm and remove debris promptly. Make daily inspections during periods of prolonged rainfall, since heavy storms may clog or damage the conveyances. It is important to repair damage to these structures as soon as possible.

Dikes should be inspected regularly for damage. This is especially important after storm events since a heavy rain may wash parts of a temporary dike away. Any necessary repairs should be made immediately to make sure the structure continues to function effectively.

Inspect unpaved, graded areas to check for gullies and other signs of erosion. Inspect paving regularly for cracks that may allow contaminants to seep into the ground. Also, check to make sure that the drains receiving the discharge from the paved area remain free of clogged sediment or other debris so that the water does not back up into areas where pollutants may be.

BMP #112 - Preservation of Existing Vegetation

DESCRIPTION

Protect existing vegetation (including trees, grasses, and other plants) by preventing disturbance or damage to specified areas of a construction site or right-of-way. Preserving natural vegetation provides buffer zones and stabilized areas which help control erosion, protect water quality, and enhance aesthetic benefits. This practice minimizes the amount of bare soil exposed to erosive forces.

Targeted Pollutants

- ● Sediment
- ○ Phosphorus
- ○ Trace metals
- ○ Bacteria
- ○ Petroleum hydrocarbons

Physical Limits

Drainage area unlimited

Max slope unlimited

Min bedrock depth N/A

Min water table N/A

SCS soil type ABCD

Freeze/Thaw good

Drainage/Flood control no

APPLICATIONS

This technique is applicable to all types of sites. Areas where preserving vegetation can be particularly beneficial are floodplains, wetlands, stream banks, steep slopes, and other areas where other structural erosion controls would be difficult to establish, install, or maintain. Compared to newly planted or seeded areas, preserving natural vegetation has many advantages:

- It can handle higher quantities of storm water runoff than newly seeded areas.
- It does not require time to establish (it is effective immediately).
- It has greater filtering capacity because the vegetation and root structure are usually denser in preserved natural vegetation than in newly seeded or base areas.
- It usually requires less maintenance, watering, and chemical application (e.g., fertilizer, pesticides) than planting new vegetation.

It also:

- Enhances aesthetics.
- Provides areas for infiltration, thus reducing the quantity and velocity of storm water runoff.
- Allows areas where wildlife can remain undisturbed.
- Provides noise buffers and screens for on-site operations.

LIMITATIONS

Preservation of natural vegetation may be impractical in some situations because:

- It may constrict the area available for construction activities.

- It may not be cost-effective in areas with high land values.

DESIGN PARAMETERS

- Successful preservation of vegetation requires good planning and site management to minimize the impact of construction activities on existing vegetation. The areas to be preserved should be identified in the plans and clearly marked in the field before any site disturbance begins. Clearly

  mark all trees to be preserved, and protect against ground disturbance within the dripline of each marked tree as shown on the attached figure. The dripline marks the edge of the tree's foliage where drips from rainfall would drop. Most of the tree's roots lie within the dripline and are vulnerable to damage.

- Preserving natural vegetation may affect some aspects of staging, work sequencing, and construction cost. In addition, control measures may be needed around the perimeter of the preserved area to maintain adequate water flow and drainage and to prevent damage from excessive erosion or sedimentation. Be sure to consider these and related factors when preparing the project site plan and project cost estimates.
- Consider the use of design exceptions to enable preservation of natural vegetation in certain areas where it would typically be removed and where its preservation would not pose safety problems.

CONSTRUCTION GUIDELINES

- Check the project plans for areas designated for preservation of natural vegetation. Keep all construction equipment, materials, and waste out of the designated areas.
- Do not modify existing drainage patterns through or into any preservation area unless specifically directed by the plans or approved by the local permitting authority.
- Perform maintenance activities as needed to ensure that the vegetation remains healthy and able to aid in erosion control and sediment collection.

MAINTENANCE

Inspect at regular intervals to make sure the preserved vegetated areas remain undisturbed and are not being overwhelmed by sediment. Implement maintenance or restorative actions as needed. Proper maintenance is important to ensure healthy vegetation that can control erosion. Different species, soil types, and climatic conditions will require different maintenance activities such as mowing. Maintenance should be performed regularly, especially during construction.

BMP #113 - Clearing Limits

DESCRIPTION

Minimize the total amount of bare soil exposed to erosive forces by (1) controlling the amount of ground that is cleared and grubbed at one time in preparation for construction, and (2) limiting the amount of time that bare ground may remain exposed before slope protection or stabilization measures are put into place. This measure, in conjunction with appropriate timing (avoiding the rainy season) , can reduce erosion and sedimentation.

Targeted Pollutants

- ● Sediment
- ○ Phosphorus
- ○ Trace metals
- ○ Bacteria
- ○ Petroleum hydrocarbons

Physical Limits

Drainage area	unlimited
Max slope	unlimited
Min bedrock depth	N/A
Min water table	N/A
SCS soil type	ABCD
Freeze/Thaw	good
Drainage/Flood control	no

APPLICATIONS

Any areas where vegetation must be removed to facilitate construction. This practice should be a design consideration of all projects. It may be necessary to carefully coordinate land clearing, grading, and erosion control measures--see BMP #110-Timing of Construction.

LIMITATIONS

None.

DESIGN PARAMETERS

- Evaluate the erosion potential of the project site (based on slope, soil type, intended season of work, use of heavy equipment).
- Based on the above analysis, establish the maximum allowable area that may be exposed at one time. The project site plan should clearly specify the maximum allowable exposure area.
- Initiate slope protection and reclamation as work progresses to help minimize the amount of disturbed soil.
- In all cases, stabilization measures should be initiated within 14 days after ceasing work in a given area or as soon as practicable during seasonally arid periods.

CONSTRUCTION GUIDELINES

- Do not disturb any areas that are not actually needed for the specified construction or related staging activities. See BMP #112-Preservation of Existing Vegetation.

- Conduct work in units or stages so that construction and stabilization take place promptly after clearing and grubbing and as much of the site as possible is ready for seeding each time the specified seeding season arrives.

- Implement soil stabilization measures concurrently with the progress of clearing and grading work to minimize the length of time that bare ground lies exposed to erosion.

- At the approach of a designated seeding season, be prepared to seed all portions of the project that are ready for seeding (as required).

MAINTENANCE

Conduct periodic inspections to check for unnecessary ground disturbance. Also check for clearing and grubbing beyond the contractor's capability and progress in keeping grading and pollution control measures current (in accordance with accepted work schedule).

BMP #114 - Stabilization of Construction Entrance and Roads

DESCRIPTION

A temporary sediment removal device--normally a pad of crushed rock or stone-can be installed at the approach from a construction site to a public roadway, to stabilize the road. This BMP is used to limit sediment tracking from vehicles and equipment leaving the construction site onto public rights-of-way and streets.

APPLICATIONS

A stabilized construction entrance (SCE) is appropriate in the following locations:

- Wherever vehicles are entering or leaving a construction site to or from a public right-of-way, street, alley, sidewalk or parking area.
- At any unpaved entrance/exit location where there is risk of transporting mud or sediment onto paved roads.

LIMITATIONS

This control measure is not necessarily needed for temporary roads within the construction site (see BMP #115-Erosion Prevention on Temporary Roads).

Targeted Pollutants

- Sediment
- Phosphorus
- Trace metals
- Bacteria
- Petroleum hydrocarbons

Physical Limits

Drainage area	unlimited
Max slope	15 %
Min bedrock depth	3 feet
Min water table	NA
SCS soil type	ABCD
Freeze/Thaw	good
Drainage/Flood control	no

DESIGN PARAMETERS

Width: The width should be at least 10 ft (3 meters) but not less than the full width of points where ingress or egress occurs. At sites where traffic volume is high, the entrance should be wide enough for two vehicles to pass safely. Flare the entrance where it meets the existing road to provide a turning radius.

Length: The minimum length should be 50 ft (15 meters) except on a single residence lot where a 30 ft minimum would apply.

Depth: Total depth of rock should be at least 6 inches (385 mm).

Aggregate: Fractured stone 2 to 8 in (50 to 200 mm) in diameter (for the base layer) and crushed stone 2 in (50 mm) in diameter or, reclaimed or recycled concrete equilavent.

Geotextile (filter fabric): Most installations will include geotextile (filter fabric) with the properties listed in the table below, to be placed over the entire area to be covered with aggregate. Work on single residential lots will generally not need geotextile unless there's potential for excessive erosion, a high water table or other risk factor.

Stabilization of Construction Entrance/Roads/Driveways

The geotextile shall be a woven or nonwoven fabric consisting only of continuous chain polymeric filaments or yarns of polyester. The geotextile shall be inert to commonly encountered chemicals, hydro-carbons, mildew, rot resistant, and conform to the properties of the following table:

Geotextile Properties	Light Duty[1] Roads Grade Subgrade	Heavy Duty[2] Haul Roads Rough Graded	Test Method
Grab Tensile Strength (lbs)	200	220	ASTM D1682
Elongation at Failure (%)	50	60	ASTM D1682
Mullen Brust Strength (lbs)	190	430	ASTM D3786
Puncture Strength (lbs)	40	125	ASTM D751 modified
Equivalent Opening Size	40-80	40-80	US Std Sieve CW-02215
Aggregate Depth (in)	6	10	--

[1]Light Duty Road: Are sites that have been graded to subgrade and where most travel would be single axle vehicles and an occasional multi-axle truck. Trevira Spunbond 1115, Mirafi 100X, Typar 3401, or equivalent.

[2]Heavy Duty Road: Are sites with only rough grading, and where most ravel would be multi-axle vehicles. Trevira Spunbond 1135, Miraft 600X, or equivalent.

[3]Geotextiles not meeting these specifications may be used only when design procedure and supporting documentation are supplied to determine aggregate depth and fabric strength.

Drainage: Runoff from a stabilized construction entrance should drain to a sediment trap or a sediment basin. Piping of surface water under the entrance shall be provided as needed. If piping is impossible, install a mountable berm with 5:1 slopes.

Dust Control: Dust control should be provided at all times (see BMP #116-Dust Control).

CONSTRUCTION GUIDELINES

- Clear all vegetation, roots, and all other obstructions in preparation for grading.
- Prior to placing geotextile (filter fabric), make sure that the entrance is properly graded and compacted.
- To reduce maintenance and loss of aggregate, place geotextile over the existing ground before placing the stone for the entrance.
- Place a 1 ft (300 mm) layer of fractured stone over the entire width and length of the entrance.
- Place a 4 in layer of 2 in (100 mm layer of 50 mm) crushed stone over the base layer.

MAINTENANCE

The entrance must be maintained in a condition which will prevent tracking or flow of mud onto public rights-of-way. This may require periodic top dressing with additional 2 in (50mm) stone (as conditions demand) and repair or clean-out of any structures used to trap sediment.

All materials spilled, dropped, washed, or tracked from vehicles onto roadways or into storm drains must be removed immediately. When necessary, vehicle wheels must be cleaned to remove sediment prior to entrance onto public rights-of-way. When washing is required, it shall be done on an area stabilized with aggregate which drains into an approved sediment trap.

Trapped sediment shall be removed from the site or stabilized on site and prevented from entering storm drains, ditches or watercourses. Disturbed soil areas resulting from removal shall be permanently stabilized.

The stabilized construction entrance may be removed after final site stabilization is achieved or after the temporary BMPs are no longer needed.

BMP #115 - Erosion Prevention on Temporary and Private Roads

DESCRIPTION

Any of several measures can be used to control erosion and sedimentation originating with haul roads, detours, access roads, and other unpaved or temporary roadbeds associated with a construction project. Possible measures include :

Road Placement: Place temporary roads as far as possible away from streams, surface waters or wetlands .

Open-Top Box Culvert: A wooden culvert installed across the road grade to convey surface runoff and roadside ditch flows to the downslope side. Open-top box culverts are useful for collecting surface runoff and ditch flows and channeling this water across the road without eroding the drainage system or road surface.

Waterbar (or Cross Ditch): A cut and berm built at a downward angle across the roadway, extending from the cutbank to the opposite fill shoulder. Waterbars reduce erosion by diverting storm water runoff from the road surface and directing it to a safe discharge area.

Road Sloping: Constructing the road with an outward slope of 1 to 2 percent from the cut slope to the fill slope. Sloped roads are designed to divert surface water off the entire road surface so that water does not concentrate in any specific location.

Rolling Dip: Constructing the road with shallow, outward-sloping dips or undulations to collect surface runoff and convey it away from the road surface.

Targeted Pollutants
● Sediment
◒ Phosphorus
◒ Trace metals
○ Bacteria
◒ Petroleum hydrocarbons

Physical Limits	
Drainage area	unlimited
Max slope	15%
Min bedrock depth	3 ft
Min water table	N/A
SCS soil type	ABCD
Freeze/Thaw	good
Drainage/Flood control	no

Level Spreader: A drainage outlet constructed by cutting a shallow trench at zero grade across a slope to disperse concentrated runoff. Level spreaders convert concentrated flow into sheet flow for discharge at nonerosive velocities onto areas stabilized by vegetation. By reducing runoff velocity, they help reduce erosion, enable sediment to settle out, and enhance infiltration.

APPLICATIONS

Open-Top Box Culvert: Used, as a substitute for pipe culverts, for cross drainage on lightly used, unpaved roads on steep grades (greater than 6 percent).

Waterbar: Used as a temporary or permanent drainage facility on light-use, low-maintenance, unpaved roads. Waterbars should be placed above grade changes to prevent water from flowing down steeper portions of roads or skid trails. Bars may also be placed above intersections of roads, skid trails, or landings to protect these disturbed areas.

Road Sloping: Used as a drainage measure on temporary or low-traffic haul roads where erosion of the roadbed and fill slope is unlikely due to low runoff volume or intensity.

Rolling Dip: Used as a runoff diversion measure to prevent erosion of the road surface. Rolling dips are effective on long inclines to keep storm water from flowing directly down the road, where it may cause gullying and other damage to the road surface and grade.

Level Spreader: Useful where concentrated runoff from bare ground or other unstabilized areas can be diverted onto stabilized areas under sheet flow conditions. Level spreaders are often placed at the outlets of diversion dikes or runoff interception trenches to control runoff, dissipate water velocity, and disperse the water over a broad surface area. Level spreaders are relatively inexpensive to install. They may be used on slopes of 3:1 or flatter.

LIMITATIONS

Open-Top Box Culvert: Generally, box culverts are not required on grades of 6 percent or less and are ineffective under continuous or recurrent use where cleaning is sporadic.

Waterbar: Suitable only for light-use, low-maintenance, unpaved roads.

Road Sloping: Suitable only for low-traffic haul roads where runoff volume and intensity are low.

Rolling Dip: Not suitable on road grades steeper than 5 percent.

Level Spreader: Level spreaders are not recommended for use in most situations. They are not suitable on slopes steeper than 3:1 or where the soils are easily erodible. They should be constructed only on natural soils, not on fill material. Level spreaders cannot handle large quantities of sediment-laden storm water. If altered by erosion or other disturbance, they may "short circuit" and actually concentrate flows into small streams instead of spreading the flows into sheet flow.

DESIGN PARAMETERS

Open-Top Box Culvert: Box culverts can be built from logs; lumber; discarded guardrail; or commercial, corrugated steel. They are installed at a skewed angle downgrade across the roadway, with the discharge end extending 6 to 12 in (150 to 300 mm) beyond the surface of the roadbed.

Spacing between culverts should be in accordance with recommended cross drainage spacing in Table 1. Where recommended spacing is less than 33 ft (10 meters), the road should be paved with gravel or crushed rock.

Waterbar: Waterbars are generally constructed using a blade-equipped tractor or by hand. The size of the waterbar depends on the amount of precipitation in the area, the soil erodibility, and anticipated traffic.

- The waterbar should extend from the cutbank side of the road completely across to the fillslope side.
- Cut dimensions: Up to 16 in (400 mm) deep across road, 8 to 16 in (200 to 400 mm) deep at outlet, 3 to 4 ft (1.0 to 1.2 meters) wide.
- Berm dimensions and orientation: 1 to 2 ft (300 to 600 mm) high 5 in (150 mm) minimum height, skewed at angle of 30^o to 40^o across road.
- Spacing between bars: Use Table 1, for recommended cross drain spacing on low to relatively moderately steep topography.
- Discharge: Runoff should not be directed onto fill material without proper energy dissipation and drainage away from the fill.

Road Sloping:

- The slope should be approximately 1 to 2 percent from the cut slope outward to the fill slope.
- Berms on the outside of the road should be limited or removed to allow water to flow off the road surface.
- Provide sediment collection or erosion-control measures at the toe of the fill slope to prevent excessive erosion and sediment transport.

Rolling Dip: (applies to roads greater that 150 ft long only)

- The dip should be approximately 1 ft (0.3 meter) below the surface plane of the road. The upgrade approach to the bottom of the dip should be approximately 66 ft (20 meters) long. The downgrade approach to the bottom of the dip should be approximately 23 ft (7 meters) long.
- Align the dip across the road at nearly a 90-degree angle and slope it outward approximately 5 percent.

Table 1. Recommended Cross Drain Spacing (Source: ITD, 1994)

Road Grade (percent)	Spacing Between Open-Top Culverts, feet (meters)
2 to 5	300 to 500 (90 to 150)
6 to 10	200 to 300 (60 to 90)
11 to 15	100 to 200 (30 to 60)
16 to 20	<100 (<30)

CONSTRUCTION GUIDELINES

Open-Top Box Culvert: Construct a box-like frame (three-sided, open-topped) of logs; lumber; discarded guardrail; or commercial, corrugated steel. Install it flush with the road surface, skewed at an angle downgrade across the roadway. Set the inflow end at the same grade as the side ditches on the road and extend it into the cut bank. The discharge end should extend 6 to 12 in (150 to 300 mm) beyond the surface of the roadbed and should be directed onto vegetated ground or riprap or into another erosion-control structure such as a sediment trap or catch basin.

Waterbar: Cut each waterbar into solid soil to a minimum depth of 6 in (150 mm) next to the cutbank and 8 in (200 mm) at the road shoulder, with an adverse grade on the downroad or downgrade side of the waterbar. Build a continuous, firm berm of soil, at least 6 in (150 mm) above normal grade, parallel to the waterbar cut on its downhill side. Include a bank tie-in point, cut 6 to 12 in (150 to 300 mm) into the roadbed. For added stability, the bar may be compacted with a nonerosive fill material. The completed waterbar must extend across the full roadway width, aligned at an angle of 30^o to 40^o relative to the roadway. A dissipation or filter device (such as riprap or silt fence) may be needed below the waterbar to control erosion and trap sediment.

Road Sloping: Road sloping is built into the road during construction. Install erosion- and sediment-control measures downslope before completing the finish grade of the sloped road. Then construct the outward slope of 1 to 2 percent, as specified in the contract plans.

Rolling Dip: Rolling dips are built into the road, during construction, following the natural contours of the land. Install erosion and sediment measures at the low point of the dip (drainage outfall to fillslope) before final grading to direct storm water discharge from the dip. Construct the dip according to the specifications shown in the contract plans. If not specified, make the dip 1 ft (300 mm) deep, with a 23 ft (7-meter)-long approach on the downgrade side and a 66 ft (20-meter)-long approach on the upgrade side.

MAINTENANCE

Inspect all devices regularly according to provisions of the contract or project site plan. Make repairs promptly to avoid progressive damage. Remove accumulated sediments as necessary to ensure proper functioning.

Open-Top Box Culvert: Clean and repair the culverts on a regular basis. Remove sediments and other debris which may block drainage flow or decrease structural efficiency.

Waterbar: Properly constructed bars should require little or no maintenance. However, all waterbars need to be open at the lower end so water can easily flow away from the roadway. Hand shovel work may be necessary following high runoff periods or severe storms to ensure unrestricted flow.

Road Sloping: Minor regrading may be required to maintain slope angle.

Rolling Dip: Outflows should be kept free of debris to prevent ponding.

BMP #116 - Dust Control

DESCRIPTION

This fact sheet describes products or measures used for reducing or preventing wind erosion by protecting the soil surface, roughening the surface reducing the surface wind velocity. Several dust control treatments are described below. Other methods are also available .

Targeted Pollutants

- Sediment
- Phosphorus
- Trace metals
- Bacteria
- Petroleum hydrocarbons

Physical Limits

Drainage area N/A

Max slope 5%

Min bedrock depth N/A

Min water table N/A

SCS soil type N/A

Freeze/Thaw N/A

Drainage/Flood control no

Vegetative Cover: For disturbed areas not subject to traffic, vegetation provides the most practical method of dust control (see BMP #145-Seeding and BMP #146-Sodding).

Mulch (including gravel mulch): When properly applied, mulch offers a fast, effective means of controlling dust (see BMP#121-Mulching).

Spray-On Adhesive: Asphalt emulsions, latex emulsions, or resin in water can be sprayed onto mineral soil to prevent their blowing away (see BMP #122-Hydromulching).

Sprinkling: The site may be sprinkled with water until the surface is wet. Sprinkling is especially effective for dust control on haul roads and other traffic routes.

Stone: Stone or gravel used to stabilize construction roads and disturbed soils can also be effective for dust control and reduce soil losses from those areas by up to 80 percent.

Surface Roughening: Tilling or discing the surface of disturbed soils to produce a rough surface or ridges which when perpendicular to prevailing winds can reduce soil losses due to wind by 80 percent (see BMP #126-Slope Roughening).

Barriers: A board fence, wind fence, sediment fence, or similar barrier can control air currents and blowing soil. All of these fences are normally constructed of wood. Perennial grass and stands of existing trees may also serve as wind barriers. Barriers prevent erosion by obstructing the wind near the ground and preventing the soil from blowing off-site.

APPLICATIONS

The above measures for dust control should be used when open dry areas of soil are anticipated on the site. Clearing and grading activities create the opportunity for large amounts of dust to be blown. Therefore, one or several dust control measures should be considered prior to clearing and grading. In many cases, water erosion control measures incorporated into the project will indirectly prevent wind erosion.

As a standard practice, any exposed area should be stabilized using vegetation to prevent both wind and water erosion. When rainfall is insufficient to establish vegetative cover, mulching is an effective way of conserving moisture, preventing surface crusting, reducing runoff and erosion, and helping to establish vegetation. It is a critical treatment on sites with erosive slopes.

LIMITATIONS

Vegetative measures may not be practical during dry periods unless a reliable supply of establishment water is available. Other methods should be stipulated in the project contract to ensure that dust control is not overlooked.

Barriers (such as walls or fences) can be part of the long-term dust control strategy in arid and semiarid areas, but they are not a substitute for permanent stabilization.

DESIGN PARAMETERS

Dust Prevention: The best method of controlling dust is to prevent dust production. This can best be accomplished by limiting the amount of bare soil exposed at one time. In project design, identify all areas where ground disturbance will not be allowed. Design and locate haul roads, detours, and staging areas to avoid unnecessary exposure of bare ground and avoid using areas that are the most susceptible to wind erosion.

In the stormwater site plan, specify staging or work sequencing techniques that minimize the risk of wind erosion from bare soil. In most cases, this will require a change from traditional construction techniques that allow large areas to be disturbed at the outset of construction and to remain exposed for long periods of time.

Vegetative Cover: Follow recommended seeding and planting specifications. If site conditions are favorable, use an extended seeding season to ensure that seeding becomes established over as much of the project as possible before winter shutdown or substantial completion. Specify the use of establishment water to accelerate vegetative stabilization if other means of long-term slope protection are not feasible.

Mulch: Apply according to the design parameter for BMP #121.

Sprinkling: Apply at a rate of 3.2 gallons per acre (35 liters per hectare) so that the soil is wet but not saturated or muddy and so that air quality requirements are maintained.

Stone: At ingress/egress to public highways, apply as indicated in BMP #114-Stabilization of Construction Entrance. For detours, haul roads, or temporary traffic routes through the construction site, provide a 2.4 in (60 mm) minimum thick layer of fractured stone 1 to 2 in (25 to 50) mm in diameter. Also see BMP#115-Erosion Prevention on Temporary Roads.

Surface Roughening: Tilling or discing should leave 6 in (150 mm) (minimum) furrows, preferably perpendicular to the prevailing wind direction, to gain the greatest reduction in wind erosion. If the surface cannot be furrowed perpendicular to the prevailing wind direction, roughening the surface by using a ripper/scarifier (grader) or a ripper (cat) will produce the desired result of a 6 in (150mm) irregular surface.

Barriers: A wind barrier generally protects soil downwind for a distance of 10 times the height of the barrier. If additional protection is needed, use other methods in conjunction with the barrier.

CONSTRUCTION GUIDELINES

Site Assessment: Assess the potential problem of wind erosion and dust generation at the project site. Consider the soil type, prevailing wind direction, and the effect of other prescribed erosion control measures.

Use Preventive Strategies Wherever Possible:

- Minimize amount of bare ground exposed at one time.
- Minimize amount of ground disturbance occurring when wind erosion is highest.

Implement Dust Control Measures as Needed:

- Provide stabilized roadway to minimize amount of dust generated by construction vehicles and highway traffic (gravel, pave or moisten the bare areas of the highway or detour route).
- Apply protective materials to exposed areas (e.g., stone, mulch, adhesive/ emulsions).
- Install barriers to prevent dust from blowing off site.
- Establish vegetation at the earliest possible opportunity (using establishment water if necessary to ensure viability).
- Keep haul roads, detours, and other bare areas moist by sprinkling them with water.

MAINTENANCE

Dust control requires constant attention--it is not a one-time or once-in-awhile activity. Dust control sprinkling may have to be done several times a day during hot, dry weather.

Areas protected by mulch, adhesive emulsions, or barriers need to be checked at regular intervals according to the inspection schedule set forth in the stormwater plan. Remove sediments that accumulate behind any sediment fence or barrier when the accumulation reaches one half the height of the barrier. Dispose of the sediments only in an approved location (not in wetlands or where they will contribute to pollution at the disposal site).

Apply chemical controls (emulsions and resins) at the manufacturer's specified rates and in accordance with all federal, state, and local regulations governing their use. Chemical products must be stored, handled, and disposed of in accordance with all applicable regulations and department policies.

BMP #117 - Cover for Materials and Equipment

DESCRIPTION

This BMP includes partial or total physical enclosure of materials, equipment, process operations, or activities. Covering prevents stormwater from coming into contact with potential pollutants and reduces material loss from wind blowing. Tarpaulins, plastic sheeting, roofs, buildings, and other enclosures are examples of covering that are effective in preventing stormwater pollution. Covering can be temporary or permanent.

Targeted Pollutants

● Sediment

○ Phosphorus

● Trace metals

○ Bacteria

● Petroleum hydrocarbons

Physical Limits

Drainage area N/A

Max slope N/A

Min bedrock depth N/A

Min water table N/A

SCS soil type N/A

Freeze/Thaw N/A

Drainage/Flood control no

APPLICATIONS

Covering is a simple, effective, and usually inexpensive way of reducing or preventing pollution. It is appropriate for outdoor material storage piles, such as stockpiles of dry materials, topsoil, spoils piles, gravel, sand, compost, sawdust, wood chips, and building materials. It is also effective where containers of liquids or solids are stored or transferred. Although it may be too expensive to cover or enclose all construction activities, the high-risk parts of a site can often be separated and covered. For example, chemical preparation areas, vehicle maintenance and washing areas, storage areas for chemically treated products and toxic wastes (e.g., used oils).

LIMITATIONS

- Covering alone may not protect exposed materials from contact with stormwater runoff/run-on.
- Requires frequent inspections. Consider curbing or an elevated platform to prevent pollution from run-on water.

DESIGN PARAMETERS

In selecting an appropriate covering, evaluate the strength and longevity of the covering, as well as its compatibility with the materials or items being enclosed. Cost, aesthetics, weather conditions, drainage patterns, and size of the stockpiles or storage area are other factors affecting the choice of covering.

- In designing a covering for materials, remember to provide adequate access for loading, handling, and transfer. Cost considerations may justify a less-than-optimum access arrangement in some cases. For instance, tarpaulins and plastic sheeting have to be removed or rearranged to allow continued access as materials are depleted, but they are less expensive than a permanent structure such as a roof or shed.
- Climate or weather conditions also influence the choice or design of a covering. Tarpaulins and sheeting may be difficult to keep secured in extremely windy areas.
- Where a permanent structure is indicated for a particular area or activity, consider building a roof instead of a complete enclosure. This will reduce costs and may also eliminate the need for ventilation and lighting systems that could be needed in a building.
- Consider the nature of the materials being enclosed, especially if they pose environmental or safety dangers. Materials that are biological, flammable, explosive, or chemically reactive require special ventilation and temperature control measures.
- Covering alone may not protect exposed materials from stormwater contact. Where stormwater runon is a potential problem, place the material on an elevated, impermeable surface or build curbing around the outside of the materials to prevent poluution of stormwater from adjacent areas.

CONSTRUCTION GUIDELINES

Tarpaulins and Plastic Sheeting: Obtain enough fabric or sheeting to cover the indicated volume or area. Anchor the edges of the covering with stakes, tie-down ropes, large rocks, tires, or other readily available, heavy objects. Maintain an overlap of one meter along the border of separate sheets and securely anchor the overlap area so that it does not separate (through wind or other causes), allowing water to leak into the protected materials.

Roofs, Sheds, and Buildings: Construct according to plans or drawings in accordance with existing building codes and departmental standards for such construction.

MAINTENANCE

Frequently inspect coverings for damage and general wear. Repair or replace them immediately, as needed.

BMP #118 - Spill Prevention and Control

DESCRIPTION

This fact sheet describes methods of minimizing exposure of pollutants to storm water runoff by enclosing any drips, overflows, leaks, and other liquid material releases or by isolating pollutant spills from stormwater runoff.

Targeted Pollutants

- ○ Sediment
- ○ Phosphorus
- ◒ Trace metals
- ○ Bacteria
- ◒ Petroleum hydrocarbons

Physical Limits

Drainage area <u>N/A</u>

Max slope <u>N/A</u>

Min bedrock depth <u>N/A</u>

Min water table <u>N/A</u>

SCS soil type <u>N/A</u>

Freeze/Thaw <u>N/A</u>

Drainage/Flood control <u>no</u>

There are numerous spill containment methods, ranging from large structural barriers to simple, small drip pans. The benefits vary based on cost, maintenance requirements, and the size of spill control. Three possible options are discussed below:

<u>Containment Diking</u>: Temporary or permanent earth berms, concrete berms, or retaining walls designed to hold spills. Diking is one of the best protective measures against stormwater pollution because it surrounds the area of concern and holds the spill, keeping spill materials separated from the storm water outside of the diked area. Diking is one of the most common types of spill containment. Also see BMP #140-Earth Dike and BMP #142-Temporary Berms.

<u>Curbing</u>: Like containment diking, curbing is a barrier that surrounds an area of concern. It prevents spills or leaks from being released to the environment by routing runoff to treatment or control areas. The terms "curbing" and "diking" are sometimes used interchangeably, but curbing is usually small scale and cannot contain large spills like diking can.

As with diking, common materials for curbing include earth, concrete, synthetic materials, metal, or other impenetrable materials. Asphalt is also a common material used in curbing.

<u>Drip Pans</u>: Pans used to contain very small volumes of leaks, drips, and spills. Drip pans can be depressions in concrete, asphalt, or other impenetrable materials, or they can be made of metals, plastic, or any material that does not react with the dripped chemicals. Empty or discarded containers may be used as drip pans. Catch drips so that the materials or chemicals can be cleaned up easily or recycled before they can contact stormwater. Drip pans can be a temporary or permanent measure.

APPLICATIONS

<u>Containment Diking</u>: Diking can be used at any construction site, but it is most commonly used for controlling large spills or releases from liquid storage areas and liquid transfer areas. It is an effective containment method around tank truck loading and unloading areas. Proper diking contains spills, leaks, and other releases and prevents them from flowing into runoff conveyances, nearby streams, or infiltration

into groundwater. It also allows for proper disposal and/or recycling of materials captured within the dike.

Curbing: Curbing is usually small scale; it cannot contain large spills like diking can. However, many facilities use curbing to contain small areas used for handling and transferring liquid materials.

Curbing is already a common practice. It is inexpensive, easy to install, and provides excellent control of run on. As with diking, materials spilled within a curbed area can be collected for proper disposal and/or recycling.

Drip Pans: Drip pans can be used at any site where valves and piping are present and the potential for small-volume leakage and dripping exist. Although leaks and drips should be repaired and eliminated as part of preventive maintenance programs, drip pans can provide a temporary solution where repair or replacement must be delayed. In addition, drip pans can be an added safeguard when they are positioned beneath areas where leaks and drips may occur.

Drip pans are inexpensive, easy to install, and simple to operate. They allow for reuse or recycling of the collected material.

LIMITATIONS

Containment Diking:

- May be too expensive for some smaller facilities.
- Requires maintenance.
- Could collect polluted stormwater, with possibe infiltration to ground water.

Curbing:

- Not effective for holding large spills.
- May require more maintenance than diking.

Drip Pans:

- Suitable only for small volumes.
- Must be inspected and cleaned frequently.
- Must be secured during poor weather conditions.
- Requires that personnel are trained in proper disposal methods so that contents are not disposed of improperly.

DESIGN PARAMETERS

Containment Diking:

- Size: For tank truck loading and unloading operations, the diked area should be capable of holding an amount equal to any single tank truck compartment.
- Materials: Materials used to construct the dike should be strong enough to safely hold spilled materials. The materials used usually depend on what is available on site and the substance to be contained. Dikes may be made of earth (i.e., soil or clay), concrete, synthetic materials (liners), metal, or other impervious materials. Containment dikes may need to be designed with impervious materials to prevent leaking or pollution of stormwater, surface water, and ground water supplies.
-
- In general, strong acids and bases may react with metal containers, concrete, and some plastics. So where spills may consist of these substances, other alternatives should be considered. Some of the more reactive organic chemicals may also need to be contained with special liners. If uncertain about the suitability of certain dike construction materials, refer to the *Material Safety Data Sheet* (MSDS) for the chemical being contained.

Curbing: When using curbing for runoff control, protect the berm by limiting traffic and installing reinforced berms in areas of concern.

Materials spilled within a curbed area can be tracked outside of that area when personnel and equipment leave the area. This tracking can be minimized by grading within the curbing to direct the spilled materials to a downslope side of the curbed area. This will keep the materials away from personnel and equipment that pass through the area. It will also allow the materials to accumulate in one area, making cleanup much easier.

Manual or mechanical methods, such as those provided by sump systems, can be used to remove accumulated material from a curbed area.

Drip Pans: When using drip pans, consider local weather conditions, the location of the drip pans, materials used for the drip pans, and how the pans will be cleaned.

The location of the drip pan is important. Because drip pans must be inspected and cleaned frequently, they must be easy to reach and remove. Take special care to avoid placing drip pans in precarious positions such as next to walkways or on an uneven surface. Drip pans in these locations are easily overturned and may present a safety or environmental hazard.

Weather is also an important factor. Heavy winds and rainfall can move or damage drip pans because the pans are small and lightweight. To prevent this, secure the pans by installing or anchoring them. Drip pans may be placed on platforms or behind wind blocks or may be tied down.

MAINTENANCE

Containment Diking: Inspect containment dikes during or after significant storms or spills to check for washouts or overflows. In addition, regular testing to ensure that dikes are capable of holding spills is recommended. Soil dikes may need to be inspected on a more frequent basis.

Changes in vegetation, inability of the structure to retain stormwater dike erosion, or soggy areas indicate problems with the dike's structure. Damaged areas should be patched and stabilized immediately, where necessary. Earthen dikes may require special maintenance of vegetation, such as mowing and irrigation.

When evaluating the performance of the containment system, pay special attention to the overflow system, since it is often the source of uncontrolled leaks. If overflow systems do not exist, accumulated stormwater should be released periodically. Polluted stormwater should be treated prior to release. Mechanical parts (such as pumps) or manual systems (slide gates, stopcock valves) may require regular cleaning and maintenance.

Curbing: Since curbing is sized to contain small spill volumes, frequent maintenance is needed to prevent overflow of any spilled materials. Inspect all curbed areas regularly and clean clogging debris. Repair the curb by patching or replacing it as needed to ensure effective functioning. Inspections should be conducted before forecasted rainfall events and immediately after storm events. If spilled or leaked materials are observed, cleanup should start immediately to allow space for future spills. In addition, prompt cleanup of spilled materials will prevent dilution by rainwater, which can adversely affect recycling opportunities.

Drip Pans: For drip pans to be effective, site operators must pay attention to the pans and empty them when they are nearly full. Because of their small holding capacities, drip pans will easily overflow if not emptied. Also, recycling efforts can be affected if stormwater accumulates in drip pans and dilutes the spilled material. It is important to have clearly specified and easily followed practices of reuse/recycle and/or disposal, especially the disposal of hazardous materials. Consider dumping the drip pan contents into a nearby larger-volume storage container and periodically recycling the contents of the storage container.

Frequent inspection of the drip pans is necessary due to the possibility of leaks in the pan itself. Also check for random leaking of piping or valves and for irregular, slow drips that may increase in volume. Conduct inspections before forecasted rainfall events to remove accumulated materials. Empty accumulations immediately after each storm event.

BMP #119 - Vehichle/Equipment Washing and Maintenance

DESCRIPTION

A typical system is a lined, depressed area that collects the water used in washing off the trucks, cars, or other construction vehicles/machinery, and drains it into a collection or treatment system.

Targeted Pollutants

●	Sediment
●	Phosphorus
●	Trace metals
○	Bacteria
●	Petroleum hydrocarbons

Physical Limits

Drainage area	N/A
Max slope	5%
Min bedrock depth	N/A
Min water table	N/A
SCS soil type	N/A
Freeze/Thaw	N/A
Drainage/Flood control	no

APPLICATIONS

A wash down area is used on projects where the soil is silty or heavy in clay, and has the likelihood of transporting dirt and mud offsite. Projects that will take place over the course of the rainy season, and areas where water is expected to be encountered (high ground water table) in the normal course of the project should be considered as candidates.

LIMITATIONS

Washing vehicles generates liquid, semi-solid and solid wastes. These wastes must be contained on-site or treated to prevent pollution of surface and ground water.

Off-site: Treatment is required for all discharges to waters of the State since it could be contaminated with degreasers, hydrofluoric acid, hydrochloric acid, nitric acid, phosphoric acid, oil, hydraulic fluids, lubrication, and engine cleaning solvents. Waters of the State are all surface waters (canals, rivers, ponds, streams and lakes), and all ground water.

Contact the local permitting authority to determine proper disposal methods.

On-site: If wash water discharge to a sediment pond is the system of choice, sufficient acreage is required for the operation.

DESIGN PARAMETERS

Detergents used for vehicle washing should not contain phosphates. Phosphates are a plant nutrient that can cause excessive growth of aquatic plants when discharged into a stream or lake.

A stabilized construction entrance and road (BMP #114), to reduce off-site tracking of mud, dirt and rocks, should be installed at the vehicle wash/maintenance area. Washing and maintenance should be conducted in disturbed areas (staging area), but not in a cut or fill area until grading has been performed, and not where there will be a high volume of construction traffic. Highly erodible soils or frequently wet areas should be avoided.

Off-site discharge options:

- Lagoon: Pond-like structure that works on the principle of evaporation, is easy to install and requires low maintenance. There is a need to be aware of safety issues (fencing the area from the public).
- Land application system: Large land area is required. This alternative is the lowest in out-of-pocket cost.
- Filtering and recycling of wash water: A good option for conservation measures. Initially, expense would be high. Monitoring of the operation would be more intensive.
- Municipal waste water treatment plant: This option is available only in areas where a municipal waste water treatment plant exists and the operation is capable of handling the load. This is the best option for limiting liability for larger construction projects.

CONSTRUCTION GUIDELINES

Designate an area that can be graded and bermed. The design should collect waste water for evaporation or direct it to an off-site containment or treatment system. A lined pond should be used where pollutants such as oil, grease, fuels, etc., may reach the high ground water table.

MAINTENANCE

Check system for integrity. Are the controls working as designed? Clean up sediments that have been tracked by vehicles onto nearby roadways.

BMP #120 - Waste Management

DESCRIPTION

This BMP entails meeting the regulatory requirements of hazardous waste management which includes hazardous waste determination; acquiring an EPA identification number; accumulation; record keeping reporting; and transportation manifesting. Good housekeeping will minimize the contribution of pollutants to stormwater discharges by handling and storing hazardous materials onsite in a clean and orderly manner.

Targeted Pollutants

- Sediment
- Phosphorus
- Trace metals
- Bacteria
- Petroleum hydrocarbons

Physical Limits

Drainage area N/A

Max slope N/A

Min bedrock depth N/A

Min water table N/A

SCS soil type N/A

Freeze/Thaw N/A

Drainage/Flood control no

APPLICATIONS

Compliance with applicable regulations will protect human health and the environment from hazardous waste generated by construction activities, reduce liability, and prevent unnecessary interruptions to schedules (i.e., project shut down due to environmental investigations/enforcement actions). The first step in preventing pollution of stormwater runoff is to maintain a clean and orderly work environment. This will reduce the possibility of accidental spills. Common sense is the simplest, inexpensive method to utilize. Improving the operation and maintenance of industrial machinery; material storage practices; material inventory controls; routine and regular clean-up; maintaining well organized work areas; and educational programs for employees regarding these practices will assist in reaching these goals.

LIMITATIONS

Carelessness and poor judgment often result in problems associated with the disposal of hazardous materials. Not being fully aware of all the hazards at the site could increase the potential for mishandling of such wastes, resulting in stormwater contamination.

DESIGN PARAMETERS

Select a designated waste collection area on-site. Secure an adequate number of containers with lids or covers. If possible provide a covered area or spill containment pallets. Arrange for waste collection before containers overflow (additional containers and more frequent pick-ups will be needed during the demolition phase). Provide immediate cleanup in case of a spill. Assure waste is transported and disposed of at an approved facility. A liner, concrete pad, berm, etc., should be utilized to keep waste separated and contain accidental spills, so they do not pollute stormwater runoff. Provide labels and signs for the area to educate contractors about proper storage and handling, and to comply with regulatory requirements.

CONSTRUCTION GUIDELINES

The best way to avoid polluting runoff from outside material storage areas is to prevent stormwater run-on or rain from coming in contact with the materials. Methods that can be utilized to accomplish this are

- Identifying, controlling, and enforcing storage and disposal/stockpile areas
- Providing a barrier such as a liner, concrete pad or berm
- Protecting the storage area by:
- storing the material indoors
- covering the area with a roof
- covering the material with a temporary covering
- Engineering safeguards such as:
- overflow protection devices
- protective guards around tanks, storage area, etc.

MAINTENANCE

- Regularly pick up and dispose of all garbage and waste material.
- Make sure equipment is working properly.
- Routinely inspect for leak or conditions that could lead to discharges of chemicals or contact of stormwater:
- external corrosion and structural failure
- installation problems
- evidence of spills or overfills
- Locate storage areas away from direct traffic routes.
- Stack according to directions to avoid damage due to improper weight distribution.
- Store likes together, separate incompatible wastes.
- Assign hazardous material inventory to a limited number of people.
- Keep up-to-date inventory of all hazardous materials and wastes.

- Identify all chemical substances present at the work site.
- Label all containers with name, hazards, handling, and first aid information.
- Mark those that require special instructions.
- Cleanup of liquid or dry material spills.
- Provide initial and annual training for employees on the hazards and the proper handling procedures.
- Do not mix products together unless specifically recommended.
- Use all the product before disposing of container.
- Do not remove original product label from container until container has been completely emptied.

BMP #121 - Mulching

DESCRIPTION

Mulching is a temporary soil stabilization or erosion control practice where materials such as straw, grass, grass hay, compost, wood chips or wood fibers are placed on or incorporated into the soil surface. In addition to stabilizing soils, mulching can reduce the speed of stormwater runoff over an area. When used together with seeding or planting, mulching can aid in plant growth by holding the seed, fertilizers, and topsoil in place, by helping to retain moisture, and by insulating against extreme temperatures.

Mulching protects the soil surface from splash erosion. It retards runoff, traps sediment, and creates more favorable conditions to assist germination and the early development of plants. Common natural and synthetic (stabilizers) mulches suitable for use at construction sites include:

Vegetative materials: wheat straw, rye straw, barley straw, grass hay

Wood products: wood cellulose fibers, wood chips, bark, sawdust

Other organic materials: leaves, peat, manure, compost

Rock products: gravel, slag, crushed stone

Fabricated mulch: jute, burlap, coconut (coir), excelsior, Kraft paper string

Synthetic mulch: asphalt, vinyl, plastics, latex, rubber, adhesives or "tackifiers".

Targeted Pollutants

- Sediment
- Phosphorus
- Trace metals
- Bacteria
- Petroleum hydrocarbons

Physical Limits

Drainage area	2 ac
Max slope	50%
Min bedrock depth	N/A
Min water table	N/A
SCS soil type	ABCD
Freeze/Thaw	fair
Drainage/Flood control	no

APPLICATIONS

Mulch is an immediate, effective, and inexpensive means of controlling dust and erosion and aiding revegetation of construction sites. It provides immediate protection to soils that are exposed and that are subject to heavy erosion; it retains moisture (which may minimize the need for watering); and it requires no removal because of natural deterioration of most mulching materials.

Mulching is often used alone in areas where temporary seeding cannot be used because of the season or climate. It may be used in conjunction with other treatments for increased effectiveness. Use of mulch may or may not require a binder, netting, or tacking agent to hold the mulch in place. On steep slopes and critical areas such as waterways, mulch matting is used with netting or anchoring to hold it in place.

- To aid in establishing vegetation, mulch seeded and planted areas where slopes are steeper then 2:1, where runoff is flowing across the area, or when seedlings need protection from bad weather. If the mulching effect is to be maintained longer than three months, the preferred mulch is vegetative material. Wheat straw is the most preferred vegetative material, followed by rye straw, barley straw, or grass hay.

- Wood chips are suitable for areas that will not be closely mowed and around ornamental plantings. Chips decompose slowly and do not require tacking, but they must be treated with nitrogen to prevent nutrient deficiency. Wood chips can be very inexpensive if they are obtained from trees cleared on the site. Chips should not be used on slopes greater than six percent because they tend to wash down slopes.

- Bark mulch is suitable for areas planted to grasses that will not be closely mowed. The bark may be applied mechanically or by hand.

- Crushed stone and gravel mulches are appropriate for dust control and soil protection on low-use dirt roads, driveways, and other areas of light vehicular activity within the construction site.

LIMITATIONS

Disadvantages of mulch include the following:

- It may delay germination of some seeds because cover reduces the soil surface temperature.

- Mulch can be easily blown or washed away by runoff if not secured or incorporated. Lightweight mulch, such as straw requires matting, crimping, or other methods to hold it in place.

- Some mulch materials, such as wood chips, may absorb nutrients necessary for plant growth.

- Straw mulch provides organic matter as it breaks down and is incorporated into the soil. If applications are too heavy, however, soil nutrient levels (especially nitrogen) may decline during the period of decomposition. Therefore, prescribed application rates of both the straw mulch and the specified fertilizer should be strictly followed. The use of a fertilizer low in phosphorus is recommended.

- Synthetic spray-on materials are not recommended except for temporary dust/erosion control or for steep, rocky slopes where other mulches and mechanical methods cannot be effectively applied. The synthetic mulches may create impervious surfaces and can have adverse effects on water quality.

- Avoid applying mulch as the only control on long slopes. Break up concentrated flows on these slopes with other BMPs, such as BMP #127-Gradient Terracing, or BMP #132-Check Dams.

DESIGN PARAMETERS

GUIDE TO MULCH MATERIALS, RATES, AND USES				
Mulch Material	**Quality Standards**	**Application Rate** **1100 ft^2 (per 100 m^2)**	**Depth and Coverage**	**Remarks**
Gravel, slag,	Washed, 3/4 to 11/2 in (20	280 ft^3 (8 m^3) (or more to ensure	2.75 to 3.1 in (70 to 80	Excellent mulch for short slopes

or crushed stone	to 40 mm) diameter with at least 30% of it larger than 3/4 in (20 mm) diameter.	90% coverage at 2.5 tons/1100 ft^2(2 3 metric tons/100 m^2).	mm uniform covering.	around woody plants and ornamentals. Use where subject to foot traffic. Approximately 42.5 lb/ft (660 $kg/m^{3)}$.
Hay or straw	Air dried, free of unwanted seeds and coarse material. Fibers should not be chopped or ground to reduce fiber length. Minimum fiber length - 8 in (200 mm).	88 TO 110 lb (40 to 50 kg) (2 to 3 bales).	50 to 80 mm to form a uniform mat through which 20 to 40% of the original ground surface can be seen.	Use where the mulching effect is to be maintained for >3 months. Subject to blowing unless kept moist, punched, or tacked down. Most common and widely used mulching material. Can be used in critical erosion areas.
Wood fiber cellulose	Dyed material should not contain any growth inhibiting factors.	22 to 33 lb (10 to 15 kg)		If used on critical areas, double the normal application rate. Apply with hydromulch. No tie-down required. Packaged in 110 lb (50 kg) bags.
Wood chips	Do not use kiln-dried or air-dried material. Chip size 1/2 x 1 1/2 in (15 x 40 mm) diameter and 1/10 to 1/2 in (3 to 15 mm thick.		2.75 to 3 1 in (70 to 80 mm) uniform depth	Applying at over the specified thickness may markedly reduce soil nutrients for a long time. Increase fertilizer 25 percent with wood chip mulch on revegetation sites.
Compost	Odorless or earthy smell	5.3 to 53 ft^3 (0.15 to 1 $5m^3$)	2 to 3.1 in (50 to 80 mm) uniform depth	Inexpensive, but may not be available in some areas.

Stone and gravel:

- After the gravel or stone is applied, construction traffic may move over it. Areas which become compacted or depressed should be remulched to the same level as the remaining area to prevent flows from the site from becoming channelized into these depressions.
- Upon completion of activities on the site, the gravel or stone mulch may be left in place during revegetation operations.
- When used for driveways or dirt roads, a filter blanket should be placed under the gravel.

Straw:

- Straw mulch forms a loose layer when applied over a loose soil surface. To protect the mulch from wind drifting and water damage, it should be stabilized by covering it with netting, such as jute, or by spraying it with a tacking agent. See construction guidelines for more information.
- Straw mulch should cover the entire seeded area or exposed slope. The mulch should extend into existing vegetation or stabilized areas on all sides to prevent wind or water damage which may start at the edges of the mulched area
- The straw fibers should be applied to form a uniform cover of loose straw through which 20 percent or less of the original ground surface can be seen. No large clumps of unscattered straw should exist after application.

- On small slopes, straw mulch should be applied by hand broadcasting to a uniform depth of 2 to 3.1 in (50 to 80 mm). On larger slopes, straw can be blown onto the slope to achieve a uniform cover of 2 to 3.1 in (50 to 80 mm).

Wood chips:

- Due to bacterial action during decomposition, nutrient concentrations in the soil may be depressed under a layer of wood chips. Because of this, applications should not exceed the specified thickness which would cause a marked decline in some soil nutrients for longer periods.

- When using wood chips to mulch revegetation projects, the specified application of fertilizer should be increased approximately 25 percent to replenish soil nutrients lost due to breakdown of wood chips.

Effectiveness of mulches:

- Crushed stone and gravel mulches retain their effectiveness indefinitely if properly applied and protected from compacting traffic. Sediment generation reduction is estimated at 70 to 90 percent, and nutrient generation reduction at 50 to 70 percent.

- Straw mulches react similarly to hydromulches, as they break down fairly rapidly. However, straw is twice as effective and at about half the cost of hydromulches. Sediment reduction by straw mulch without vegetation is 90 to 95 percent for a few months. It drops to 70 to 90 percent in 6 months, and further to 40 to 60 percent in 2 years, and 10 to 30 percent after that. Nutrient reductions are estimated at 60 to 80 percent for a few months, 50 to 70 percent in 6 months, 20 to 50 percent up to 2 years, and 0 to 10 percent beyond 2 years.

- Wood chips deteriorate more slowly than wood fiber and therefore retain their effectiveness longer. Sediment reductions of 90 to 95 percent can be expected for a year, 80 to 90 percent up to 2 years, and 50 to 60 percent beyond 2 years. Nutrient reductions of 60 to 80 percent, 50 to 70 percent, and 30 to 50 percent are estimated for the same period.

CONSTRUCTION GUIDELINES

Seeding (temporary or permanent) can take place prior to or concurrent with mulching. Other surface runoff control measures should be installed prior to seeding and mulching. If seeding is prior to mulching, mulches must be applied to seeded areas immediately after seeding. Mulches should not be applied when free surface water is present, but may be applied to damp ground. The choice of materials for mulching will be based on the type of soil to be protected, site conditions, season, and economics.

Straw mulch: The straw must be stabilized to prevent it from being damaged by water or wind (blown away). Use one of the following methods:

- Hand punching can be used on small sites, sites with rock and stone on the surface, sites with slopes which are steeper than 3:1, or sites which have been wattled. Take care not to damage wattling or planted vegetation. Use a spade or shovel to punch the straw into the slope until all areas have straw standing perpendicularly to the slope and embedded at least 4 in (100 mm) into the slope. The bunches of straw should resemble the tufts of a toothbrush.

- Roller punching can be used on large, gently sloping sites without significant outcroppings of rock and stone. Roller punching should not be used on sites which have been wattled (unless there is adequate space between lines of wattling) or on planted sites. A roller equipped with straight studs not less than 6 in (150 mm long), from 4 to 6 in (100 to 150 mm) wide, and approximately 3/4 in (20 mm) thick, will best accomplish the desired effect. Studs should stand approximately 8 in (200 mm) apart and should be staggered. All corners should be rounded to prevent withdrawing the straw from the soil. Vegetative planting may be conducted following roller punching.

- Crimper punching involves specially designed straw-crimping rollers. These are suitable for use wherever roller punching can be used. The crimpers consist of serrated disk blades, set 4 to 8 in (100 to 200 mm) apart, which force straw mulch into the soil. Crimping should be done in two directions with the final pass conducted across the slope rather than up and down it.

- Tacking agents may be used on any type of site, but are best used only on very stony or rocky soils or small, steep slopes. Apply 28.5 ft^3/ac (2.0 cubic meters per hectare) of the tacking agent or its equivalent over the straw mulch. Agents which are neutral or nearly neutral in color and of demonstrated effectiveness for the soils and climate of the application area are acceptable.

- Matting may be used on large, steep areas which cannot be punched with a roller. Jute or wood excelsior on plastic netting shall be applied over unpunched straw according to BMP #124-Matting.

MAINTENANCE

Inspect all mulched areas periodically (according to the inspection interval prescribed in the project site stormwater plan and after runoff-producing storm events. Repair damaged areas of the mulch immediately. Reseed or replant such areas, if necessary, before replacing the mulch cover.

Straw mulch and other organic products do not have to be removed when the vegetation becomes established.

BMP #122 - Hydromulching

DESCRIPTION

Hydraulic mulching is a process where wood fiber mulch, processed grass, hay or straw mulch are applied with a tacking agent in a slurry with water to provide temporary stabilization of bare slopes or other bare areas. This mulching method provides uniform, economical slope protection. It may be combined with hydroseeding as a revegetation method (see BMP #145-Seeding).

Targeted Pollutants

- ● Sediment
- ◐ Phosphorus
- ○ Trace metals
- ○ Bacteria
- ○ Petroleum hydrocarbons

Physical Limits

Drainage area	2 ac
Max slope	15 %
Min bedrock depth	N/A
Min water table	N/A
SCS soil type	ABCD
Freeze/Thaw	fair
Drainage/Flood control	no

APPLICATIONS

Hydraulic mulching is an effective way to increase water retention (thereby reducing erosion) for six months or up to one year. Beyond one year, the effectiveness drops off.

Hydraulic mulching can be applied to areas that are within about 200 feet (60 meters) of a road or that can otherwise be reached by truck. Small roadside slopes and large, relatively flat areas are well adapted to this method. When adequate moisture exists, the slurry can be combined with seed and fertilizer to initiate stabilization and revegetation in a single application (see BMP #112-Preservation of Existing Vegetation). The mulch usually lasts about a year. The growing vegetation is needed to provide continued stabilization.

LIMITATIONS

- Loses effectiveness after one year.
- Only suited for physically stable slopes (at natural angle of repose, or less).
- Avoid hyrdraulic mulching on long uninterrupted slopes. Break up concentrated flows with other BMPs, such as BMP #127-Gradient Terracing or BMP #132-Check Dams.

DESIGN PARAMETERS

Effectiveness: Hydraulic mulching initially reduces sediment generation by 70 to 80 percent as compared to sediment production off bare slopes. Within two years, the breakdown of wood fiber will have reduced its effectiveness to 40 to 60 percent. Beyond that time, only 10 to 30 percent effectiveness can be expected, and the mulch should be replaced. Nutrient generation is typically reduced 50 to 70 percent for six months, 20 to 50 percent up to two years, and 0 to 10 percent beyond two years.

Equipment: The hydraulic mulching machine should be equipped with a gear-driven pump and a paddle agitator. Agitation by recirculation from the pump is not acceptable. Agitation must be sufficient to produce a homogeneous slurry of tacking agent and mulch (and seed fertilizer, if used).

Application rates: Apply the water at a minimum rate of 3000 gallons per acre (28 cubic meters per hectare). Tacking agent should be applied at 28.5 ft^3 (2.0 m^3) of wet ingredients per acre (hectare) or 90 kilograms of dry ingredients per hectare.

When seeding is combined with hydraulic mulching, be sure to include an appropriate specified formulation at the specified rate. Legume seeds should be pellet inoculated with the appropriate bacteria. Inoculation rates should be four times that required for dry seeding.

CONSTRUCTION GUIDELINES

- The time allowed between placement of seed in the hydraulic mulcher and the emptying of the hydraulic mulcher tank should not exceed 30 minutes.
- Wood fiber may be dyed to aid in uniform placement. Dye should not stain concrete or painted surfaces nor injure plant or animal life when applied at the manufacturer's recommended rate.
- Application of the slurry should proceed until a uniform cover is achieved.
- The applicator should not be directed at one location for too long a period of time or the applied water will cause erosion.

MAINTENANCE

Hydraulically-mulched slopes should be inspected periodically for damage due to wind, water, or human disturbance. Repair all damaged areas immediately using hydraulic mulching at the original specifications or straw mulch.

BMP #123 - Geotextile

DESCRIPTION

Targeted Pollutants

- ● Sediment
- ○ Phosphorus
- ○ Trace metals
- ○ Bacteria
- ○ Petroleum hydrocarbons

Physical Limits

- Drainage area 100 ac
- Max slope 100%
- Min bedrock depth N/A
- Min water table N/A
- SCS soil type ABCD
- Freeze/Thaw good
- Drainage/Flood control no

Geotextiles are porous fabrics known in the construction industry as filter fabrics, road rugs, synthetic fabrics, construction fabrics, or simply fabrics. Geotextiles are manufactured by weaving or bonding fibers made from synthetic materials such as polypropylene, polyester, polyethylene, nylon, polyvinyl chloride, glass, and various mixtures of these materials.

The material is applied from a roll and anchored into place to provide a continuous sheet over the exposed slope or surface. This sheeting reduces raindrop impact and surface erosion on disturbed soils. It can also protect new vegetation and aid in growth and establishment of vegetation by retarding evaporation of soil moisture. They can also be used on benched slopes.

Geotextiles are used for a variety of purposes as separators or reinforcement, for filtration and drainage, and for erosion control on slopes or stream banks.

Matting or netting made of biodegradable materials (such as jute, wood fiber, straw, coconut, paper, or cotton) can be used for many of these same purposes, but is not as durable. These products are discussed separately under BMP #124-Matting.

APPLICATIONS

Geotextiles are an effective tool to prevent surface erosion and promote rapid establishment of a permanent (or temporary) vegetative cover. The two main applications are for slope protection and as a flexible channel lining. For slope protection applications, the fabrics are useful in preventing the loss of top soil, thereby reducing surface erosion and promoting establishment of vegetative cover. They should be given serious consideration where slope, high flows, or other factors prevent use of organic matting.

Used alone, geotextiles can function as erosion control matting to stabilize channels and swales or to protect recently-planted seedlings until they become established. They may be placed in ditches or along stream banks to protect new plantings if more elaborate measures such as riprap or rock revetments are not appropriate. The purpose of this application is to protect the integrity of the ditch or stream while permanent vegetative cover becomes established.

Geotextiles are also used as separators. An example of such a use is geotextile as a separator between riprap and soil. This "sandwiching" prevents the soil from being eroded from beneath the riprap.

The primary advantages of geotextiles are:

- Relatively low cost for many applications.

- Ease and convenience for many applications.
- Quick and effective protection against erosion problems.
- Design methodologies are available for many uses.
- A wide variety of geotextile products is available to match specific needs.
- Synthetic geotextiles may be removed and reused if economically feasible.
- Better resistance to high flow situations than organic matting.

LIMITATIONS

- Effectiveness may be reduced drastically if the fabric is not properly selected, designed, or installed.
- Many synthetic geotextiles are sensitive to light and must be protected prior to installation.
- Geotextiles that are not biodegradable should not be used where their presence or appearance is aesthetically unacceptable.
- Should not be placed on 1:1 (50%) slopes if they are to be covered with overlying material.

DESIGN PARAMETERS

Maximum slope steepness: Products are available for up to 1:1 steepness.

Durability/decomposition: Some synthetic geotextiles persist a very long time and should be considered a permanent measure. Others remain effective for less than a year. Those types designed to assist in establishment of vegetation will eventually photodegrade or decompose. If a short-term, degradable product is needed, see BMP #124-Matting.

Materials: In determining how much fabric is needed, allow for an overlap of 4 in (100 mm) on both sides of each roll and 3 ft (1 m) at the ends of rolls. Also, the fabric should extend beyond the edge of the exposed area at least 1 ft (300 mm) at the sides and 3 feet (1 m) at the top and bottom. Staples should be of 1/10 in (3 mm) diameter (or heavier) steel wire. Allow for a spacing of approximately 5 ft (1.5 m) apart along the sides and center of each roll and not more than 1 ft (300 mm) apart along upper end of a roll or at the overlap of two rolls.

CONSTRUCTION GUIDELINES

- The soil must be reasonably smooth. Fill and compact any rills and gullies. Remove protruding rocks and other obstructions.
- Apply the individual rolls up and down the slope, from the top to the bottom--never along the contour.

- Overlap the sides of rolls at least 4 in (100 mm), and make sure there is at least a 3 ft (1 m) overlap when an uphill roll joins to a downhill roll. The uphill roll should overlie the downhill roll.
- Extend the fabric beyond the edge of the mulched or seeded area at least 300 mm at the sides and 3 ft (1 m) at the top and bottom of the area. If existing vegetation or structures mark the boundaries of the area, the fabric should continue into the stable vegetated area or to the edge of the structure.
- At the top of the area, bury the end of each roll in a trench at least 8 in (200 mm) deep. The trench should then be backfilled and tamped.
- Staples should be driven perpendicularly into the slope face. Place them approximately 5 ft (1.5 m) apart down the sides and center of the roll, and not more than 1 ft (300 mm) apart at the upper end of a roll or at the end overlap of two rolls.
- Be sure the fabric makes uniform contact with the slope face underneath. No "bridging" of rills or gullies should be allowed.

MAINTENANCE

Inspect weekly or monthly and within 24 hours after each runoff-producing storm. To assure proper functioning, complete one inspection during the first runoff-producing event after installation. If fabric sheeting is damaged or missing, replace it immediately to restore full protection. Also inspect to ensure that channelization and erosion is not occurring underneath fabric (sediment outwash is the most visible sign of this.)

Products used for temporary control may be removed and reused, if this can be done without leaving the area susceptible to erosion.

BMP #124 - Matting

DESCRIPTION

A porous net or fibrous sheet that is laid over the ground surface for slope stabilization and erosion control, or to hold a mulch in place and protect it against wind or water damage. Matting and netting are sometimes classified as geotextiles (see BMP #123), but in this catalog, matting is considered to be materials made from biodegradable materials including straw, coconut (coir), jute, wood fiber (excelsior), paper, and cotton. Some of these organic materials may be held in place by plastic netting.

Targeted Pollutants

●	Sediment
○	Phosphorus
○	Trace metals
○	Bacteria
○	Petroleum hydrocarbons

Physical Limits

Drainage area	100 ac
Max slope	100%
Min bedrock depth	2 ft
Min water table	N/A
SCS soil type	ABCD
Freeze/Thaw	good
Drainage/Flood control	no

APPLICATIONS

A wide variety of matting materials may be used for erosion control. Most are of two main types: woven—such as jute, or bonded to plastic—such as excelsior. Application examples for these two types are listed below.

Jute matting: Jute matting or netting is available as a heavy fiber net which is generally purchased in rolls and is stapled/anchored to slopes to provide a uniform covering. This covering protects mulches, provides additional water-holding capacity, and aids in moderating environmental fluctuations near the ground surface (as does a mulch).

Jute matting can be applied over straw, grass hay, wood fiber, or manure mulches when wind or water damage would occur without a protective net. Matting is the best single method for protecting the integrity of a mulched area. It may be applied alone as an alternative to straw or wood fiber mulches on flat sites for dust control and seed germination enhancement, but should not be applied alone where runoff quantities are significant.

Wood fiber (Excelsior) matting: Wood fiber matting is made by bonding wood excelsior fibers to a paper or plastic reinforcing net. The matting is generally purchased in rolls and stapled to slopes to provide a uniform covering which can protect mulches, provide enhanced water-holding capacity, and aid in moderating environmental fluctuations near the ground surface.

Matting can be useful in the following circumstances:

- Construction sites becoming temporarily inactive (inactive period greater than two weeks and less than one year).
- Graded areas receiving permanent revegetation treatment by seeding.
- Bare areas receiving permanent revegetation treatment by seeding.

Plastic netting: Plastic netting (photo/biodegradable) is a monolithic plastic clothlike material. It is used primarily to hold straw and other materials in place. Plastic netting is more durable than jute or wood fiber matting. It is much easier to handle and requires less labor, but has no mulch capabilities itself. Plastic netting alone provides no soil stabilization or erosion control. It is best used to hold down mulches until vegetation becomes established.

LIMITATIONS

- Should not be used where overland water flow will exceed 6.5 ft/s (2 m/s). Because of the following characteristics of plastic netting and wood fiber matting, jute matting, straw or straw coconut matting are preferred.
- Plastic netting does not function as a mulch (as does jute matting) since it does not absorb water. When plastic netting is used to anchor straw mulch, it increases the effectiveness of the mulch, but does not provide direct control of erosion and sedimentation or nutrient generation. Straw mulch rates should be increased 25 percent when plastic netting is used instead of jute or straw.
- Wood fiber matting is more difficult to put in place than jute, and is less predictable in controlling erosion. Properly applied, it can be as effective as jute matting at sediment and nutrient reduction. However, it is often 10 to 20 percent less effective.

DESIGN PARAMETERS

- Jute matting should be fiber cloth of a uniform plain weave, undyed and unbleached single jute yarn, 3 to 4 ft (1.0 to 1.2 m) wide and weighing an average 0.4 lb per linear foot (600 grams per linear meter) of cloth with a tolerance of plus or minus 5 percent. It should have approximately 78 warp ends per width of cloth and 45 weft ends per linear meter of cloth. The yarn shall be of a loosely twisted construction having an average twist of not less than 6.3 turns per 4 in (100 mm) and should not vary in thickness by more than half of its normal diameter.
- Wood fiber matting should consist of machine-produced mats of curled wood excelsior, of which 80 percent have a 8 in (200 mm) or longer fiber length. It should be of consistent thickness with the fiber evenly distributed over the entire area of the blanket (backing). The top side of each blanket should be covered with a 1 x 3 in (25 x 75 mm) weave of twisted Kraft paper or biodegradable plastic mesh that has a high wet strength. Blankets should be fire and smolder resistant and contain no chemical additives. Blankets shall be in rolls 3 to 4 ft (1.0 to 1.2 m) wide and 130 to 200 ft (40 to 60 m) long.
- Plastic netting with mesh opening from 1/10 x 1/10 in (3 x 3 mm) to 1/5 x 1/5 in (6 x 6 mm) should be applied over straw mulch similarly to the method specified below for jute matting.

Effectiveness: Jute matting acts similarly to straw mulch or hydromulch. Sediment reduction is typically 70 to 90 percent for up to 6 months, 40 to 60 percent for up to 2 years, and 10 to 30 percent beyond 2 years. Nutrient reduction is estimated at 50 to 70 percent for 6 months, 20 to 50 percent for up to 2 years, and 0 to 10 percent beyond 2 years.

Due to the difficulty of proper application, wood excelsior matting has a more variable effectiveness than straw, jute, or hydromulch. Properly applied, it can be as effective. Sediment reduction should range from 50 to 90 percent, 20 to 60 percent, and 0 to 30 percent in 6 months, 2 years, and beyond 2 years, respectively. Nutrient reductions for the same time periods are estimated to be 30 to 70 percent, 10 to 50 percent, and 0 to 10 percent.

CONSTRUCTION GUIDELINES

The following guidelines apply to all matting and netting installations.

- The soil must be reasonably smooth. Fill and compact any gullies and rills. Rocks, vegetation or other obstructions which rise above the level of the soil should be removed.
- After site preparation and seeding (if any), the rolls of netting or matting should be rolled onto the surface from the top of the slope to the bottom of the slope. It is preferred that rolls are not constructed in a horizontal direction across the slope face. The rolling should follow water flow direction.
- At the top of the area, bury the end of each roll in a trench at least 8 in (200 mm) deep. The trench should then be backfilled and tamped.
- Overlap the sides of rolls at least 4in (100 mm), and make sure that there is at least a one-meter overlap when an uphill roll joins to a downhill roll. The uphill roll should overlie the downhill roll.
- Extend the matting beyond the edge of the mulched or seeded area at least 1 ft (300 mm) at the sides and one meter at the top and bottom of the area. If existing vegetation or structures mark the boundaries of the area, the matting should continue into the stable vegetated area or to the edge of the structure.
- Staples should be driven perpendicularly into the slope face. Place them approximately 3 ft (1.0 m) apart down the sides and center of the roll, and not more than 1 ft (300 mm) apart at the upper end of a roll or at the end overlap of two rolls.
- Staples should be of heavy gauge wire 7/100 in (2 mm in diameter or greater), bent into a "U" shape, with legs at least 6 in (150 mm) long, and a 1 in (25 mm) crown. Use longer staples and greater frequency in loose or sandy soil.
- Be sure the matting makes uniform contact with the slope face underneath. No "bridging" of rills or gullies should be allowed.
- If wood fiber matting is to be applied without other mulches, the minimum thickness of mat should be 1.5 (40 mm). If the mat is to be applied over other mulches, the minimum mat thickness shall be 0.6 (15 mm).

MAINTENANCE

Inspect at regular intervals and after each runoff-producing storm event. Make repairs as necessary to restore complete coverage and full effectiveness of the matting or netting.

BMP #125 - Pipe Slope Drain

DESCRIPTION

A pipe slope drain is a device used to carry concentrated runoff from the top to the bottom of a slope that has already been damaged by erosion or is at high risk for erosion. It may be used to convey runoff from offsite around a disturbed portion of the site. It may also be used to drain saturated slopes that have the potential for soil slides. Pipe slope drains can be either temporary or permanent, depending on the method of installation and the material used.

Pipe slope drains are made of flexible tubing or rigid pipe with a prefabricated entrance section. Other temporary slope drains may use plastic sheeting, stone gutters, fiber mats, riprap, concrete or asphalt ditches, or half-round pipe. Outlet protection such as riprap must be provided for velocity dissipation at the drain outlet.

Targeted Pollutants

- ● Sediment
- ○ Phosphorus
- ○ Trace metals
- ○ Bacteria
- ◒ Petroleum hydrocarbons

Physical Limits

Drainage area	5 ac
Max slope	50%
Min bedrock depth	2 ft
Min water table	5 ft
SCS soil type	ABCD
Freeze/Thaw	good
Drainage/Flood control	yes

APPLICATIONS

Pipe slope drains are used whenever it is necessary to convey water down a slope without causing erosion. They are especially effective before a slope has been stabilized or before permanent drainage structures are ready for use. Pipe slope drains may be used with other devices, including sediment traps (BMP #137), and vegetative buffer strips (BMP #136).

Temporary pipe slope drains, usually flexible tubing or conduit, may be installed prior to the construction of permanent drainage structures. Permanent slope drains may be placed on or beneath the ground surface; pipes, sectional downdrains, paved chutes, or clay tiles may be used.

Pipe slope drains are appropriate in the following general locations:

- On cut or fill slopes before permanent storm water drainage structures have been installed.
- Where earth dikes or other diversion measures have been used to concentrate flows.
- On any slope where concentrated runoff crossing the face of the slope may cause gullies, channel erosion, or saturation of slide-prone soils.
- As an outlet for a natural drainageway.

The drainage area may be up to 10 acres (4 hectares).

LIMITATIONS

Not suitable for drainage areas greater than 10 acres (4 hectares).

DESIGN PARAMETERS

Pipe sizing: Typical relationships between area and pipe diameter are shown below:

RELATIONSHIP BETWEEN AREA AND PIPE DIAMETER	
Maximum Drainage Area acres (hectares)	Pipe Diameter in (millimeters)
0.5 acres (0.2)	12 in (300)
1.5 acres (0.6)	18 in (450)
2.5 acres (1.0) 3.5 acres (1.4) 5.0 acres (2.0)	21 in (525) 24 in (600) 30 in (750)

Spacing: For a two-lane highway construction project, experience has shown that temporary slope drains should be spaced at a longitudinal interval of 500 ft (150 meters) on a 2 percent grade, 200 ft (60 meters) on a 4 percent grade, and as may be dictated by field conditions on a grade of 5 percent or greater.

Materials: Pipe may be any heavy-duty, flexible tubing designed for this purpose, including nonperforated, corrugated plastic pipe; corrugated metal pipe; bituminous fiber pipe; or specially designed flexible tubing.

A standard flared end section secured with a watertight fitting should be used for the inlet. A standard T-section fitting may also be used. Extension collars should be 1 ft (300 mm) long segments of corrugated pipe. All fittings must be watertight.

Slope of drain: Try for a 3 percent minimum.

CONSTRUCTION GUIDELINES

Temporary slope drains should be installed with inlets at points where water is discharged from ditches, berms, or other points of concentrated flow. All drains should be anchored to the slope to prevent disruption by water or other forces. The inlet section of the drain should be properly installed to funnel the flow into the drain. It is often necessary to construct cross berms to direct flow into the inlet.

- Place the pipe slope drain on undisturbed or well-compacted soil.

- Soil around and under the entrance section must be hand tamped in 4 to 8 in (100- to 200-mm) lifts to the top of the dike to prevent piping failure around the inlet.

- Place filter cloth under the inlet, extend it 3 to 5 ft (1 to 2 meters) in front of the inlet, and key it in 6 in (150 mm) on all sides to prevent erosion. A 6 in (150-mm) metal toe plate may also be used for this purpose.

- Securely stake the pipe slope drain to the slope at intervals of 10 ft (3 meters) or less, using grommets provided for this purpose.

- Make sure that all slope drain sections are securely fastened together and have watertight fittings.

- Extend the pipe beyond the toe of the slope and discharge at a nonerosive velocity into a stabilized area or to a sedimentation trap or pond. Use rock outlet protection if necessary.

- The pipe slope drain should have a slope of 3 percent or steeper.

- The height at the centerline of the earth dike should range from a minimum of 1 ft (300 mm) over the pipe to twice the diameter of the pipe measured from the invert of the pipe. It should also be at least 6 in (150 mm) higher than the adjoining ridge on either side.

- At no point along the dike will the elevation of the top of the dike be less than 6 in (150 mm) higher than the top of the pipe.

- Immediately stabilize all areas disturbed by installation or removal of the pipe slope drain.

MAINTENANCE

- Inspect the slope drain regularly and after every storm. Make any necessary repairs within 7 days or before the next storm (whichever comes first).

- Check to see that water is not bypassing the inlet or undercutting the inlet or pipe. If necessary, install headwalls or sandbags to prevent bypass flow.

- Check for erosion at the outlet point and check the pipe for breaks or clogs. Install additional outlet protection if needed and immediately repair the breaks and clean any clogs.

- Do not allow construction traffic to cross the pipe slope drain and do not place any material on it.

- If a sediment trap has been provided, clean it out when the sediment level reaches one-third to one-half the design volume.

- A temporary slope drain should remain in place up to 30 days after slopes have been completely stabilized.

BMP #126 - Slope Roughening

DESCRIPTION

This BMP entails establishing a rough soil surface by creating horizontal grooves, furrows, depressions, or steps running parallel to the slope contour over the entire face of a slope. This reduces the speed of runoff, increases infiltration, and traps sediment. It also helps establish vegetative cover by reducing runoff velocity and providing stable, level areas where seedlings can take hold and grow. This measure may be used prior to seeding/planting and should be applied using appropriate machinery.

Alternately, in some cases, leaving the slope in a roughened condition will control erosion and provide suitable rooting areas for plant seedlings better than a finely-graded slope. Other measures, such as flow diversion must be used to keep erosion from occurring while vegetation is being established.

Targeted Pollutants

- ● Sediment
- ○ Phosphorus
- ○ Trace metals
- ○ Bacteria
- ○ Petroleum hydrocarbons

Physical Limits

Drainage area	1 ac
Max slope	20%
Min bedrock depth	3 ft
Min water table	5 ft
SCS soil type	BCD
Freeze/Thaw	good
Drainage/Flood control	no

APPLICATIONS

Slope and surface roughening provide simple, inexpensive, and immediate short-term erosion control for bare soil where vegetative cover is not yet established. The practice is appropriate for all slopes, although different methods are used depending on the steepness of the slope, the type of slope (cut or fill), soil and rock characteristics, future mowing and maintenance requirements, and type of equipment available. All slopes steeper than 3:1 and greater than 5 ft (1.5 meters) vertical height require roughening and may also require terracing, grooving, or furrowing prior to seeding.

LIMITATIONS

This BMP is limited to slopes in medium to highly cohesive soils or in soft rock which can be excavated without ripping. Slope angle must be gentle enough to permit access to heavy equipment. The method is not applicable for use in moraines and other depositional soils. In addition, serration is of limited effectiveness in anything more than a gentle rain, and it is only a temporary measure. If the roughening is washed away in a heavy storm, the surface will have to be reroughened and reseeded.

This BMP is not a stand-alone measure, it must be implemented in conjunction with other BMPs.

DESIGN PARAMETERS

Slope roughening can be used with seeding, planting, and temporary mulching to stabilize an area. For steeper slopes and slopes that will be left roughened for longer period of time, try a combination of surface roughening and vegetative stabilization. Surface roughening should be applied immediately after grading activities have ceased (temporarily or permanently) in an area.

Different methods can be used to roughen the slope surface. They include stair-step grading, grooving (using disks, spring harrows, or teeth on a front-end loader), and tracking (driving a crawler tractor up and down a slope, leaving the cleat imprints perpendicular to the slope). The selection of an appropriate method depends on the grade of the slope, mowing requirements after vegetative cover is established, whether the slope was formed by cutting or filling, and type of equipment available.

<u>Slopes steeper than 2:1</u>: Any slope steeper than 2:1 should be terraced or stair-step graded, with benches wide enough to retain sediment eroded from the slope above. See BMP #127 (Gradient Terracing).

<u>Slopes between 3:1 and 2:1</u>: Cut slopes with a gradient steeper than 3:1 but less than 2:1 should be stair-step graded or groove cut. Stair-step grading works well with soils containing large amounts of small rock. Each step catches material discarded from above and provides a level site where vegetation can grow. Stairs should be wide enough to work with standard earth-moving equipment. Grooving can be done by any implement that can be safely operated on the slope, including those described above. Grooves should not be less than 3.1 in (80 mm) deep or more than 16 in (400 mm) apart.

Fill slopes with a gradient steeper than 3:1 but less than 2:1 should be compacted every 12 in (300 mm) of depth. The face of the slope should consist of loose, uncompacted fill 4 to 6 in (100 to 150 mm) deep that can be left rough or can be grooved as described above, if necessary.

It is important to avoid excessive compacting of the soil surface, especially when tracking, because soil compaction inhibits vegetation growth and causes higher runoff speed. Therefore, it is best to limit roughening with tracked machinery to sandy soils that do not compact easily and to avoid tracking on clay soils.

<u>Slopes flatter than 3:1</u>: Any cut or filled slope that will be mowed should have a gradient less than 3:1. Such a slope can be roughened with shallow grooves parallel to the slope contour by using normal tilling. Grooves should be close together (less than 10 in (250 mm)) and not less than 1 in (25 mm) deep.

CONSTRUCTION GUIDELINES

<u>Timing of work</u>: To slow erosion, slope or surface roughening should be done as soon as possible after the vegetation has been removed from the slope. The roughened areas should be seeded as quickly as possible, preferably within seven days after serration/roughening if weather conditions or water availability permits. In material that ravels or sloughs readily, delay the revegetation effort until at least 30 days after slope serration.

On slopes composed of material that weathers rapidly, slope roughening should be completed early in the summer. This will allow material to slough off the step face <u>prior</u> to fall seeding or planting so it does not smother the seeds or seedlings.

Equipment: Various types of heavy equipment of various kinds can be successfully used for slope roughening:

- A front-end loader equipped with disks, harrows, or teeth can make grooves across the slope.
- Driving a crawler tractor up and down the slope will make cleat imprints perpendicular to the slope.
- A dozer, equipped with a special blade containing a series of square grooves and positioned at the same angle as the cut, can serrate the slope along the contours.

Methods:

- Fill slopes constructed with highly erodible soils or soils containing high-clay contents shall be minimally compacted prior to establishing a roughened surface. However, excessive compaction of the surface soil is undesirable because of reduction in infiltration and suppression of vegetation rooting.
- Make the grooves or depressions approximately horizontal (or parallel the roadway grade if its profile grade is less than 2 percent).
- Excavate each series of grooves in the opposite direction from the preceding series to minimize buildup of loose material at the ends of the steps or cuts.
- Loose material collected at the ends of steps should be removed and the ends blended into the natural ground surface.
- If encountering rock that is too hard to rip, try to blend the grooves into the rock.
- Remove materials which fall into the ditchline or roadway and any rock fragments larger than one-third the shelf width.
- Construct a slope bench at the bottom of the slope face.

MAINTENANCE

Inspect the slopes periodically for damage from surface runoff and seepage and inspect after each runoff-producing storm. Damage caused by construction-related activities should be repaired as soon as possible. If rills appear (small watercourses that have steep sides and are usually less than 100 mm deep), they should be immediately filled, and the slope should be promptly regraded and adequately protected.

BMP #127 - Gradient Terracing

DESCRIPTION

Gradient terracing is a term used to describe an earth embankment or ridge-and-channel arrangement constructed along the face of a slope at regular intervals. Gradient terraces are constructed at a positive grade. They reduce erosion damage by capturing surface runoff and directing it to a stable outlet at a speed that minimizes erosion.

Targeted Pollutants

- ● Sediment
- ○ Phosphorus
- ○ Trace metals
- ○ Bacteria
- ○ Petroleum hydrocarbons

Physical Limits

Drainage area	10 ac
Max slope	50%
Min bedrock depth	6 ft
Min water table	8 ft
SCS soil type	BCD
Freeze/Thaw	good
Drainage/Flood control	Yes

APPLICATIONS

Gradient terraces are usually limited to use on long, steep slopes that have a water erosion problem or where it is anticipated that water erosion will be a problem. They are used for reducing runoff velocity and increasing the distance of overland runoff flow. They hold moisture better than do smooth slopes, and they minimize sediment loading of surface runoff.

LIMITATIONS

Gradient terraces should not be constructed on excessively steep slopes or in areas with sandy or rocky soils. They will be effective only where suitable runoff outlets will be available. Gradient terraces may significantly increase cut and fill costs and cause sloughing if too much water infiltrates the soil.

DESIGN PARAMETERS

Gradient terraces should be designed and installed according to a plan determined by an engineering survey and layout. It is important that gradient terraces are designed with adequate outlets, such as a grassed waterway, vegetated area, or tile outlet. In all cases, the outlet should direct the runoff from the terrace system to a point where the outflow will not cause erosion or other damage. Vegetative cover should be used in the outlet where possible. The design elevation of the water surface of the terrace should not be lower than that at the junction of the outlet area when both are operating at design flow. Terraces can be constructed with linings to carry water to the outlet and can be used with a dike or similar measure above the terrace to divert runon from reaching the terraced slope.

CONSTRUCTION GUIDELINES

Construction of gradient terraces should be completed using equipment that is capable of meeting the specification established in the construction plans.

MAINTENANCE

Inspect the gradient terraces regularly during project construction and inspect them after any major storm. If used as a permanent BMP, inspect at least once a year after project completion and after major storms. Evaluate whether the terrace is functioning effectively as a runoff collection and diversion device and note whether other stabilization measures (including vegetation) are performing effectively. Take prompt action as needed to ensure proper drainage and slope stability.

BMP #128 - Retaining Walls

DESCRIPTION

Walls constructed against a slope or stream bank to prevent slope erosion or slope failure, or undercutting of the bank. Examples of retaining wall materials include: concrete, concrete masonry, rock, wood planking or railroad ties, and metal bins. Also see BMP #129- Gabions.

Targeted Pollutants

- ● Sediment
- ○ Phosphorus
- ○ Trace metals
- ○ Bacteria
- ○ Petroleum hydrocarbons

Physical Limits

Drainage area	unlimited
Max slope	67 %
Min bedrock depth	N/A
Min water table	3
SCS soil type	ABCD
Freeze/Thaw	fair
Drainage/Flood control	no

APPLICATIONS

For slope protection or stabilization under extreme conditions or to protect erodible, unstable stream banks.

Concrete retaining wall: An engineered concrete wall which is designed to stabilize a slope and retain the rock or soil behind it. In addition to a solid concrete wall, precast, interlocking concrete blocks could be used.

Masonry retaining wall: An engineered structure similar to a concrete retaining wall but using masonry blocks, usually of specific design for aesthetic appeal.

Native rock retaining wall: A low-gravity wall constructed of rock materials native to the construction site. It provides an aesthetically attractive method of stabilizing a slope. Native rock is suitable for walls up to about 6.5 feet (2 meters) in vertical height where the slope is steeper than 2:1 behind the wall. They can be higher on slopes of 2:1 (or flatter) gradient with proper engineering design.

Redwood (wood planking) retaining wall: A retaining wall constructed of redwood planking and posts. Redwood retaining walls are useful for relatively small slopes of loose material which are underlain by a rigid rock base material or a firm, non-plastic subsoil with high shear strength. The firm foundation is necessary to securely anchor the wall. Can construct in poorer foundation soils by using longer posts and closer spacing, 3 feet (1.0 meter) maximum. Redwood will generally last longer than other woods.

Railroad tie retaining wall: A retaining wall constructed of railroad ties. These are useful for relatively small slopes of loose material which are underlain by a rigid base of rock or a firm, non-plastic subsoil. The wall must be securely anchored to the rock base or firm subsoil.

Mechanically stabilized earth (MSE) retaining walls: The following are considered MSE walls: reinforced earth, retained earth, Hilfiker, Genesis (Keystone/Tensar), and T-wall. All of those designs use some type of anchored structure to retain earthen materials behind a wall.

LIMITATIONS

Retaining walls should be considered a permanent measure only. Cost and site-specific design requirements limit their use to situations where other stabilization measures would be ineffective or aesthetically unacceptable.

- Native rock retaining walls have a maximum height of about 6.5 feet (2 meters).
- Redwood retaining walls require a firm foundation to anchor the wall.
- Wood treated with creosote or other chemicals to retard decay may leach out and cause toxic effects. Treated railroad ties should not be used along sensitive streams for instance.

DESIGN PARAMETERS

Retaining walls require a site-specific design. Wall heights, requirements for drainage, and suitable materials must be determined through on-site inspections. Listed in this fact sheet are some suggestions of appropriate applications of retaining walls for erosion control. All types of retaining walls should conform to local building codes and ordinances. Plans and specifications should be prepared by professional engineers for most installations, including all that fall outside the parameters listed under the physical limits.

CONSTRUCTION GUIDELINES

<u>Concrete retaining walls</u>: Construct as designed by a professional engineer or as shown on the plans.

<u>Masonry retaining walls</u>: Construct as designed by a professional engineer or as shown on the plans.

<u>Native rock retaining walls</u>:

- Remove all large rocks from the eroding slope face and stockpile on site.
- Excavate a footing trench along the toe of the slope.
- Place the largest rocks in the footing trench with their longitudinal axis normal to the embankment face. Arrange subsequent rock layers so that each rock above the foundation course has a three-point bearing on the underlying rocks.
- The slope of the wall should be between 1/2:1 and vertical, depending upon the height of the wall, the height of the slope, the width of the right-of-way, or other limitations on space.
- Obtain fill material from the slope and place it behind the rock wall. Slope above the wall should be maintained at 2:1 or less with a slope bench at the toe. Backfill the footing trench with excavated material.
- If a roadway is located at the toe of the wall, pave the roadway up to the base of the rock wall and provide roadway curb for water transport. If a

roadway is not located at the toe of the retaining wall, slope the backfilled material away from the wall at 2 percent and stabilize it.

- Revegetate the stabilized slope immediately with a method applicable to the particular site. (See Sections 4.5 and 5.2 of this manual.)

Redwood (wood planking) retaining wall:

- Prepare the site by rough grading the slope surface, then work from the bottom of the slope towards the top.
- Set the bottom course of redwood posts into rigid base foundation material and secure with a concrete collar.
- Install planking on the upslope side of the posts. Provide sufficient vertical spacing to allow drainage at the base of the wall and between planks.
- Backfill behind the wall with material from the slope above. Slope the backfill material between redwood walls at 2 percent toward the top of the lower wall.
- Proceed in a similar fashion up the slope to the desired height.
- Revegetate the backfilled benches behind the walls according to procedures applicable to the specific site (see Sections 4.5 and 5.2 of this manual).

Railroad tie retaining wall:

- Prepare the site by rough grading the slope surface, then work from the bottom of the slope toward the top.
- Set the bottom course of railroad ties onto a rigid base foundation material and secure with pinning or metal collars.
- Backfill behind the wall with material from the slope above. Slope the backfill material between the tiers of railroad ties at 2 percent toward the top of the lower wall. If the engineered wall requires deadmen, install in accordance with the design drawing.
- Proceed in a similar fashion up the slope to the desired height. If the total height exceeds 2 meters, the wall must be designed and approved by a registered engineer.
- Revegetate the backfilled benches behind the walls according to procedures applicable to the specific site (see Sections 4.5 and 5.2 of this manual).

MSE retaining wall:

- Prepare the site and construct as shown on the plans.

MAINTENANCE

Retaining walls must be inspected periodically on regular intervals to detect signs of structural failure, and to check for damage caused by subsurface drainage or material sloughing. In stream bank installations, inspect for signs of undercutting and other instability. Make all repairs promptly, as needed.

BMP #129 - Gabions

DESCRIPTION

Rectangular wire-mesh cages that are filled with rock and wired together to form a protective but permeable structure for slope stabilization and erosion control .

Targeted Pollutants	
●	Sediment
○	Phosphorus
○	Trace metals
○	Bacteria
○	Petroleum hydrocarbons

Physical Limits	
Drainage area	unlimited
Max slope	40%
Min bedrock depth	N/A
Min water table	2 ft
SCS soil type	ABCD
Freeze/Thaw	good
Drainage/Flood control	no

APPLICATIONS

Gabions can be used as retaining walls to mechanically stabilize steep slopes, or for revetments, weirs, channel linings, culvert headwalls, and culvert outlet aprons. They are particularly useful where seepage is anticipated. For related information, refer to BMP #128 (Retaining walls).

LIMITATIONS

Materials costs and professional design requirements may make use of gabions impractical. Gabions may alter stream dynamics or adversely affect wildlife habitat. When used in channels with high sediment loads, the galvanizing wire on the cages quickly wears off, causing rusting and the premature failure of the cages.

DESIGN PARAMETERS

- Construction plans and specifications should be prepared by professionals familiar with the use of gabions. The structure must be able to handle expected storm and flood conditions.
- On streambank applications, the foundation is an important design feature of the structure. Consider the potential for the stream to erode the sides and bottom of the channel and make sure the gabions will be supported properly.
- The gabion structure must be securely "keyed" into the foundation and abutment surfaces. The rock filling holds the gabions in place by gravity, but tie-backs may be used if conditions warrant additional structural strength.
- Gabions are usually placed on a filter blanket (gravel layer of filter cloth) or both.

Materials

Gabions should be fabricated in such a manner that the sides, ends, lids, and diaphragms can be assembled at the construction site into a rectangular basket of required sizes. Gabions should be of single unit construction -- the base, ends, and sides should either be woven into a single unit or one edge of these members connected to the base section of the gabion in such a manner that strength and flexibility at the point of connection is at least equal to that of the mesh.

Where the length of the gabion exceeds its horizontal width, the gabion should be equally divided by diaphragms, of the same mesh and gage as the body of the gabions, into cells whose length does not exceed the horizontal width. The gabion should be furnished with the necessary diaphragms secured in proper position on the base section in such a manner that no additional tying at this juncture will be necessary.

All perimeter edges should be securely selvedged or bound so that the joints formed by tying the selvedges have the same strength as the body of the mesh.

The fill material for the wire gabions should be rock ranging in size from a minimum of 4 inches (100 mm) to a maximum of 8 inches (200 mm), both measured in the greatest dimension. Rock should be sound, durable, well graded, and should be obtained from a source approved by the Engineer.

See the ITD Catalog of Best Management Practices (July 1994) for additional detailed design criteria for gabions.

CONSTRUCTION GUIDELINES

Empty gabion baskets should be placed on a smooth, firm foundation excavated as directed by the plans. Each row, tier, or layer of baskets should be reasonably straight and should conform to the line and grade shown on the plans or established by the Project Engineer. The empty gabion baskets should be fastened to the adjacent baskets along the top and vertical edges. Each layer should be fastened to the underlying layer along the front, back and ends. Fastening should be performed in the same manner as provided for assembling the gabion units.

Unless otherwise indicated on the plans, the vertical joints between basket units of adjacent tiers or layers, along the length of the structure, should be staggered by at least one cell.

Before filling each gabion with rock, all kinks and folds in the wire mesh should be removed and all baskets should be properly aligned. A standard fence stretcher, chain fall or steel rod may be used to stretch the wire baskets and hold alignment.

The gabion cells should be carefully filled with rock placed by hand/machine in such a manner that the alignment of the structure will be maintained and so as to avoid bulges and to minimize voids. All exposed rock surface should have a reasonably smooth and neat appearance. No sharp rock edges should project through the wire mesh.

The gabion cells in any row or layer should be filled in stages so that local deformations may be avoided. At no time should any cell be filled to a depth exceeding 12 inches (305 mm) more than any adjacent cell.

The layer of rock should completely fill the gabion basket so that the lid will bear on the rock when it is secured. The lid should be joined to the sides, ends, and diaphragms in the same manner as specified for joining the vertical edges. The gabion basket lid should be secured so that no more than 1 inch (25 mm) gap remains at any connection.

Gabion rows or layers not completed at the end of each shift should have the last gabion filled with rock tied internally as an end gabion.

The area behind the gabion structure should be backfilled with granular material. Geotextile, if required, should be spread uniformly over the back of the gabion structure as shown on the plans. Joining edges of the geotextile should be overlapped a minimum of 12 inches (305 mm) and should be anchored in position with approved anchoring devices. The Contractor should place the backfill material in a manner that will not tear, puncture, or shift the geotextile.

See the ITD Catalog of Best Management Practices (July 1994) for additional detailed design criteria for gabions.

MAINTENANCE

Inspect regularly and after each major storm. Check for signs of undercutting or other instability. Repair damaged areas immediately to restore designed effectiveness and to prevent damage or erosion of the slope or streambank.

Check wire of cages for rusting and wear. Repair where possible or replace.

BMP #130 - Riprap Slope and Outlet Protection

DESCRIPTION

An arranged layer or pile of rock placed over the soil surface on slopes and at or below storm drain outfalls or temporary dikes.

Riprap used as slope protection protects against erosion and dissipates the energy of runoff or surface water flow. Outlet protection reduces the speed of concentrated storm water flows and thereby reduces erosion or scouring at storm water outlets. In addition, outlet protection lowers the potential for downstream erosion. This type of protection can be achieved through a variety of techniques, including stone or riprap outlet structures and armored scour holes installed below the storm drain outlet.

Targeted Pollutants

- ● Sediment
- ○ Phosphorus
- ○ Trace metals
- ○ Bacteria
- ○ Petroleum hydrocarbons

Physical Limits

Drainage area	5 ac
Max slope	40%
Min bedrock depth	N/A
Min water table	N/A
SCS soil type	ABCD
Freeze/Thaw	good
Drainage/flood control	no

APPLICATIONS

For slope protection, use riprap or blanketed slopes. Outlet protection should be installed at the outlets of all pipes, culverts, catch basins, sediment basins, ponds, interceptor dikes, and swales or channel sections where the velocity of flow may cause erosion in the receiving channel. Outlet protection should also be used at outlets where the velocity of flow at the design capacity may result in plunge pools (small, permanent pools located at an inlet or outfall).

Outlet protection should be installed early during construction activities, but may be added at any time, as necessary.

LIMITATIONS

The minimum particle size of the rock must be sized for the maximum expected velocity of flow out of the outlet and the soil conditions where the outlet will be located.

DESIGN PARAMETERS

The design of rock outlet protection depends entirely on the location. Pipe outlets at the top of cuts or on slopes steeper than 10 percent, cannot be protected by rock aprons or riprap sections due to reconcentration of flows and high velocities encountered after the flow leaves the apron.

Tailwater depth: The depth of tailwater immediately below the pipe outlet must be determined for the design capacity of the pipe. If the tailwater depth is less than half the diameter of the outlet pipe and the receiving stream is wide enough to accept divergence of the flow, it shall be classified as a Minimum Tailwater Condition. If the tailwater depth is greater than half the pipe diameter and the receiving stream will continue to confine the flow, it shall be classified as a Maximum Tailwater Condition. Pipes which outlet onto flat areas with no defined channel may be assumed to have a Minimum Tailwater Condition.

Apron Size: The apron length and width shall be determined according to the tailwater condition.

If the pipe discharges directly into a well-defined channel, the apron shall extend across the channel bottom and up the channel banks to an elevation one foot above the maximum tailwater depth or to the top of the bank, whichever is less.

The upstream end of the apron, adjacent to the pipe shall have a width two (2) times the diameter of the outlet pipe, or conform to pipe end section if used.

Bottom Grade: The outlet protection apron shall be constructed with no slope along its length. There shall be no overfall at the end of the apron. The elevation of the downstream end of the apron shall be equal to the elevation of the receiving channel or adjacent ground.

Alignment: The outlet protection apron shall be located so that there are no bends in the horizontal alignment.

Materials: The outlet protection may be done using rock riprap, grouted riprap or gabions (BMP #129). Riprap size shall be based on calculated shear stress. It shall be composed of a well graded mixture of stone size so that 50 percent of the pieces, by weight, shall be larger than the d50 size determined by using the charts. A well graded mixture as used herein is defined as a mixture composed primarily of larger stone sizes but with a sufficient mixture of other sizes to fill the smaller voids between the stones. The diameter of the largest stone size in such a mixture shall be 1.5 times the d50 size. Thickness: The minimum thickness of the riprap layer shall be 1.5 times the maximum tone diameter for d50 of 15 inches or less; and 1.2 times the maximum tone size for d50 greater than 15 inches. The following chart lists some examples:

ROCK RIPRAP SIZES AND THICKNESS

Unit shear stress (lb/ft^2)	**d_{50} (inches)**	**d_{max} (inches)**	**Minimum blanket thickness (inches)**
0.67	2	4	6
2.00	6	9	14
3.00	9	14	20
4.00	12	18	27
5.00	15	22	32

6.00	18	27	32
7.80	21	32	38
8.00	24	36	43

Unit shear stress calculated as T = yds

where:

T = shear stress in lb/ft^2

y = unit weight of water, 62.4 lb/ft^3

d = flow depth in ft

s = channel gradient in ft/ft

Stone Quality: Stone for riprap shall consist of field stone or rough unhewn quarry stone. The stone shall be hard and angular and of a quality that will not disintegrate on exposure to water or weathering. The specific gravity of the individual stones shall be at least 2.5.

Recycled concrete equivalent may be used provided it has a density of at least 150 pounds per cubic foot, and does not have any exposed steel or reinforcing bars.

Filter: A filter is a layer of material placed between the riprap and the underlying soil surface to prevent soil movement into and through the riprap. Riprap shall have a filter placed under it in all cases.

A filter can be of two general forms: A gravel layer or a plastic filter cloth. The plastic filter cloth can be woven or non-woven monofilament yarns, and shall meet these base requirements: thickness 10-60 mils, grab strength 90-120 lbs; and shall conform to ASTM D-1777 and ASTM D-1682.

Gravel filter blanket, when used, shall be designed by comparing particle sizes of the overlying material and the base material. Design criteria is available in any soils or civil engineering reference or from the National Resources Conservation Service (formerly the Soil Conservation Service).

DESIGN PROCEDURE AND EXAMPLES

1. Investigate the downstream channel to assure that non-erosive velocities can be maintained.

1. Determine the tailwater condition at the outlet to establish which curve to use.

2. Enter the appropriate chart with the depth of flow and discharge velocity to determine the riprap size and apron length required. It is noted that references to pipe diameter in the charts are based on full flow. For other than full pipe flow, the parameters of depth of flow and velocity must be used.

3. Calculate apron width at the downstream end if a flared section is to be employed.

Example 1: ***Pipe Flow (full) with discharge to unconfined section***

A circular conduit is flowing full:

Q = 280 cfs, diam. = 66", tailwater (surface) is 2 ft. above pipe invert, (minimum tailwater condition)

Read d_{50} = 1.2', and apron length 38'

Apron width = diam. + L_a = 5.5 + 38 = 43.5'

Example 2: ***Box Flow (partial) with high tailwater***

A box conduit discharging under partial flow conditions. A concrete box 5.5' x 10' is flowing 5.0' deep, Q = 600 cfs and tailwater surface is 5' above invert (Max. tailwater condition).

$$V = \frac{Q}{A} = \frac{600}{5x10} = 12 \text{ fps}$$

At the intersection of the curve d = 60" and V = 12 fps, read d_{50} = 0.4'

Then reading to the d = 60" curve, read apron length = 40'

Apron width, W = conduit width + 0.04 L_a = 10+(0.4) (40) = 26'

Example 3: ***Open Channel Flow with Discharge to Unconfined Section***

A trapezoidal concrete channel 5' wide with 2:1 side slopes is flowing 2' deep, Q = 180 cfs (velocity = 10 fps) and the tailwater surface downstream is 0.8' (minimum tailwater condition).

At intersection of the curve d-24' and V = 10 fps, read d_{50} = 0.7'

Then reading up to the d = 24" curve, read apron length = 22'

Apron width, W = bottom of width of channel + L_a = 5 + 22 = 27'

Example 4: ***Pipe flow (partial) with discharge to a confined section***

A 48" pipe is discharging with a depth of 3', Q = 100 cfs, and discharge velocity of 10 fps (established from partial flow analysis) to a confined trapezoidal channel with a 2' bottom, 2:1 side slopes, n = .04, and grade of 0.6%.

Calculation of the downstream channel (by Manning's Equation) indicates a normal depth of 3.1' and normal velocity of 3.9 fps.

Since the receiving channel is confined, the maximum tailwater condition controls.

At the intersection of d = 36" and v = 10 fps, Read d_{50} = 0.3'

Reading up to the d = 36" curve, read apron length = 30'

Since the maximum flow depth in this reach is 3.1', that is the minimum depth of riprap to be maintained for the entire length.

CONSTRUCTION GUIDELINES

- The subgrade for the filter, riprap or gabion shall be prepared to the required lines and grades. Any fill required in the subgrade shall be compacted to a density of approximately that of the surrounding undisturbed material.
- The rock or gravel shall conform to the specified grading limits when installed respectively in the riprap or filter.
- Filter cloth shall be protected from punching, cutting, or tearing. Any damage other than an occasional small hole shall be repaired by placing another piece of cloth over the damaged part or by completely replacing the cloth. All overlaps whether for repairs or for joining two pieces of cloth shall be a minimum of one foot.
- Stone for the riprap or gabion outlets may be placed by equipment. Both shall be constructed to the full course thickness in one operation and in such a manner as to avoid displacement of underlying materials. The stone for riprap or gabion outlets shall be delivered and placed in a manner that will insure that it is reasonably homogenous with the smaller stones and spalls filling the voids between the larger stones. Riprap shall be placed in a manner to prevent damage to the filter blanket or filter cloth. Hand placement will be required to the extent necessary to prevent damage to the permanent works.
- Complete construction of the outlet protection before allowing erosive flows to pass through the outlet.

MAINTENANCE

Once a riprap outlet has been installed, the maintenance needs are relatively low. Inspect after heavy storms and high flows for scouring under the outlet and dislodged stones, and repair damage promptly. For dikes, maintain the area upstream of the outlet structure so that accumulated sediments can be removed when they reach a depth of one-third the height of the dike, or 12 inches (300 mm), whichever is less.

BMP #131 - Inlet Protection

DESCRIPTION

Targeted Pollutants
● Sediment
○ Phosphorus
○ Trace metals
○ Bacteria
○ Petroleum hydrocarbons

Physical Limits	
Drainage area	1 ac
Max slope	5%
Min bedrock depth	2 ft
Min water table	2 ft
SCS soil type	ABCD
Freeze/Thaw	good
Drainage/Flood control	no

Inlet protection consists of a filtering measure placed around an inlet or drain to trap sediment and prevent the sediment from entering the storm drain system. Additionally, it serves to prevent the silting-in of inlets, storm drainage systems, or receiving channels. Inlet protection may be composed of gravel and stone with a wire mesh filter, block and gravel, filter fabric, or sod. Care must be taken not to cause flooding with diverted flow.

APPLICATIONS

Inlet protection is appropriate for small drainage areas (less than 1 acre) where storm drains will be ready for use before the drainage area reaches final stabilization. Storm drain inlet protection is also used where:

- A permanent storm drain structure is being constructed on site and there is danger of sediment silting it in before permanent site stabilization.
- There is a threat of sediment silting in an inlet which is in place prior to permanent stabilization.
- Ponding around the inlet structure could be a problem to traffic on site.

Filter fabric is used for inlet protection when storm water flows are relatively small, with low velocities. Filter fabric inlet protection is appropriate for most types of inlets where the drainage area is 1 acre or less.

Block and gravel filters can be used where velocities are higher. They may be used with most types of inlets where overflow capability is needed and in areas of heavy flows (238 gal/min (15 liters/second) or greater).

Gravel and mesh filters can be used where flows are higher and in locations subject to disturbance by site traffic. This type of protection may be used with most inlets where overflow capability is needed and in areas of heavy flows (238 gal/min (15 liters/second) or greater).

Sod inlet filters are usually used where sediments in the storm water runoff are low.

LIMITATIONS

Filter fabric inlet protection cannot be used where inlets are paved because the fabric must be staked.

Straw bales (BMP #134) are not recommended for inlet protection when the area adjacent to the inlet is paved. Additionally, the bales must be anchored. Consider sandbags (BMP #142) in situations where anchoring of straw bales is not possible (e.g., paved road surfaces).

Inlet protection is a high maintenance item compared with other more permanent measures.

DESIGN PARAMETERS

Several different designs are in use and the configurations vary. Most of the following design considerations apply to all three main types of inlet protection (filter fabric, gravel and mesh, and block and gravel). Some additional concerns apply to only one or two of the types.

Drainage area: Not to exceed 1 acre. Overland flow to the inlet should be no greater than 15 liters/second.

Slope gradient: The drainage area should be fairly flat, with slopes of 5 percent or less. With filter fabric designs, the area immediately surrounding the inlet should not exceed a slope of one percent.

Height of filter fabric: To avoid failure caused by pressure against the fabric when overtopping occurs, it is recommended that the height of the filter fabric be limited to 16 in (0.4 meters) above the crest of the drop inlet.

Sump: Where possible, a filter fabric or block-and-gravel protection device should be provided with a sediment trapping sump 12 to 20 in (300 to 500 mm) deep as measured from the crest of the inlet. Side slopes should be 2:1. The recommended volume of excavation is 860 ft^3/acre (60 cubic meters/hectare) of ground disturbed.

Orientation: To achieve maximum trapping efficiency in gravel-and-mesh or block-and-gravel traps, the longest dimension of the basin should be oriented toward the longest inflow area.

Materials for filter fabric inlet protection:

- Filter fabric (see the fabric specifications for silt fence, BMP #135)
- Wooden stakes 2x2 in (50 mm x 50 mm) (or 2x4 in (50 mm x 100 mm)), with a minimum length of 3 ft (1.0 meter)
- Heavy-duty wire staples at least 45 in (10 mm) long
- Washed gravel 0.8 to 1.2 in (20 to 30 mm) in diameter, with less than 5 percent fines

Materials for excavated gravel inlet protection:

- Hardware cloth or wire mesh with 2/5 to 3/5 in (10 to 15 mm) openings
- Filter fabric (see the fabric specifications for silt fence, BMP #135)
- Washed gravel 0.8 to 4 in (20 mm to 100 mm) in diameter

Materials for block and gravel inlet protection:

- Hardware cloth or wire mesh with 2/5 to 3/5 in (10 to 15 mm) openings
- Filter fabric (see the fabric specifications for silt fence, BMP #135)
- Concrete blocks 4 to 12 in (100 mm to 300 mm) wide
- Washed gravel 0.8 to 4 in (20 mm to 100 mm) in diameter

CONSTRUCTION GUIDELINES

Filter fabric:

- Place a stake at each corner of the inlet and around the edges at no more than 3 ft (1 meter) apart. Drive the stakes into the ground 20 in (500 mm) if possible, or a minimum of 8 in (200 mm).
- For stability, install a framework of wood strips around the stakes at the crest of the overflow area, 20 in (500 mm) above the crest of the drop inlet.
- Excavate a trench 8 to 12 (200 to 300 mm) deep around the outside perimeter of the stakes. If a sediment trapping sump is being provided, then the excavation may be as deep as 2 ft (600 mm).
- Staple the filter fabric to the wooden stakes with heavy-duty staples, overlapping the joints to the next stake. Ensure that 12 to 32 in (300 to 800 mm) of filter fabric extends at the bottom so it can be formed into the trench.
- Place the bottom of the fabric in the trench and backfill the trench all the way around, using washed gravel to a minimum depth of 4 in (100 mm). Use enough gravel to ensure contact between the filter fabric and the underlying surface.

Gravel and mesh:

- Remove any obstructions to excavating and grading. Excavate sump area, grade slopes, and properly dispose of soil.
- Secure the inlet grate to prevent seepage of sediment-laden water.
- Place wire mesh over the drop inlet so the wire extends a minimum of 300 mm beyond each side of the inlet structure. Overlap the strips of mesh if more than one is necessary.
- Place filter fabric over the mesh, extending it at least 500 mm beyond the inlet opening on all sides. Ensure that weep holes in the inlet structure are protected by filter fabric and gravel.
- Place stone or gravel over the fabric/wire mesh to a depth of at least 300 mm.

Block and gravel:

- Secure the inlet grate to prevent seepage of sediment-laden water.
- Place wire mesh over the drop inlet so the wire extends a minimum of 12 to 20 in (300 mm to 500 mm) beyond each side of the inlet structure. Overlap the strips of mesh if more than one is necessary.
- Place filter fabric (optional) over the mesh and extend it at least 20 in (500 mm) beyond the inlet structure.
- Place concrete blocks over the filter fabric in a single row lengthwise on their sides along the sides of the inlet. Excavate the foundation a minimum of 2 in (50 mm) below the crest of the inlet. The bottom row of blocks should be against the edge of the structure for lateral support.
- The open ends of the block should face outward, not upward, and the ends of adjacent blocks should abut. Lay one block on each side of the structure on its side to allow for dewatering of the pool.
- The block barrier should be at least 12 in (300 mm) high and may be up to a maximum of 24 in (600 m) high. It may be from 4 to 12in (100 mm to 300 mm) deep, depending on the size of block used.
- Prior to backfilling, place wire mesh over the outside vertical end of the blocks so that stone does not wash down the inlet.
- Place gravel against the wire mesh to the top of the blocks.

<u>Swale, ditch line or yard inlet protection:</u>

- Excavate completely around inlet to a depth of 18" below notch elevation.
- Drive 2 x 4 post 1' into ground at four corners of inlet. Place nail strips between posts on ends of inlet. Assemble top portion of 2 x 4 frame using overlap joint shown. Top of frame (weir) must be 6" below edge of roadway adjacent to inlet.
- Stretch wire mesh tightly around frame and fasten securely. Ends must meet at post.
- Stretch filter cloth tightly over wire mesh, the cloth must extend from top of frame to 18" below inlet notch elevation. Fasten securely to frame. Ends must meet at post, be overlapped and folded, then fastened down.
- Backfill around inlet in compacted 6" layers until layer of earth is even with notch elevation on ends and top elevation on sides.
- If the inlet is not in a low point, construct a compacted earth dike in the ditch line below it. The top of the dike is to be at least 6" higher than the top of frame (weir).
- This structure must be inspected frequently and the filter fabric replaced when clogged.

<u>Curb Inlet Protection</u>:

- Attach a continuous piece of wire mesh (30" min. width by throat length plus 4') to the 2" x 4" weir (measuring throat length plus 2') as shown on the standard drawing.
- Place a piece of approved filter cloth (40-85 sieve) of the same dimensions as the wire mesh over the wire mesh and securely attach to the 2" of 4" weir.
- Securely nail the 2" x 4" weir to 9" long vertical spacers to be located between the weir and inlet face (max. 6' apart).
- Place the assembly against the inlet throat and nail (minimum 2') lengths of 2" x 4" to the top of the weir at spacer locations. These 2" x 4" anchors shall extend across the inlet top and be held in place by sandbags or alternate weight.
- The assembly shall be placed so that the end spacers are a minimum 1' beyond both ends of the throat opening.
- Form the wire mesh and filter cloth to the concrete gutter and against the face of curb on both sides of the inlet. Place clean 2" stone over the wire mesh and filter fabric in such a manner as to prevent water from entering the inlet under or around the filter cloth.
- This type of protection must be inspected frequently and the filter cloth and stone replaced when clogged with sediment.

Assure that storm flow does not bypass inlet by installing temporary earth or asphalt dikes directing flow into inlet.

MAINTENANCE

- Inspect regularly and after every storm. Make any repairs necessary to ensure the measure is in good working order.
- Remove accumulated sediment and restore the trap to its original dimensions when sediment has accumulated to half the design depth of the trap. All sediments removed must be disposed of properly.
- On gravel-and-mesh devices, clean (or remove and replace) the stone filter or filter fabric if it becomes clogged.
- On filter fabric devices, replace the fabric immediately if it becomes clogged. Make sure the stakes are firmly in the ground and that the filter fabric continues to be securely anchored.
- Inlet protection should remain in place and operational up to 30 days after the drainage area is completely stabilized.

Inlet protection (IDT, 1994)

Straw Bale Inlet Protection (Minnesota Pollution Control Agency, 2000; based on Michigan Soil Erosion and Sediment Control Guidebook

Curb Inlet Sediment Barrier (Woodward-Clyde Consultants, 1994)

Inlet protection Detail

BMP #132 - Check Dams

DESCRIPTION

A small dam constructed in an open channel, swale, or drainageway. Check dams may be temporary or permanent barriers made of logs and brush, straw bales, stone, or other materials. They are used to reduce or prevent excessive bank and bottom erosion by reducing the gradient or runoff velocity.

Targeted Pollutants	
●	Sediment
○	Phosphorus
○	Trace metals
○	Bacteria
○	Petroleum hydrocarbons

Physical Limits	
Drainage area	10 ac
Max slope	50%
Min bedrock depth	2 ft
Min water table	N/A
SCS soil type	ABCD
Freeze/Thaw	good
Drainage/Flood control	yes

APPLICATIONS

Check dams are often used in natural or constructed channels or swales where adequate vegetation cannot be established promptly. They are used below small drainage structures (smaller than 36 inch (900 mm) pipe culverts) but may be used below large structures if a diversion ditch cannot be used. Log and brush check dams should be placed where they will not cause flooding and where they can be left in place.

LIMITATIONS

Check dams should never be placed in live streams unless approved by appropriate local, state and/or federal authorities.

DESIGN PARAMETERS

Drainage area: The drainage area above the check dam should be between 1 and 4 hectares.

Spacing: The dams must be spaced so that the toe of the upstream dam is never any higher than the top of the downstream dam. Excavating a sump immediately upstream from the check dam improves its effectiveness.

Height: Maximum height should be 2 feet (600 mm). The center of the dam must be 16 to 10 inches (50 to 250 mm) lower than either edge, to form a weir for the outfall.

Width: The check dam should be as much as 20 inches (500 mm) wider than the banks of the channel to prevent undercutting as overflow water re-enters the channel.

Stabilization: Provide outlet stabilization below the lowest check dam (where the risk of erosion is greatest) and consider the use of channel linings or protection such as plastic sheeting or riprap where there may be significant erosion or prolonged submergence.

Materials:

- Stone 2 to 16 inches (50 to 400 mm) in diameter
- Logs 6 to 8 inches (150 to 200 mm) in diameter
- Sandbags filled with pea gravel
- Filter fabric meeting the standard specifications (see BMP #135, Silt Fence)

Embedding: The logs should be driven into the ground a minimum of 28 inches (700 mm).

CONSTRUCTION GUIDELINES

Rock check dams: Place the stones on filter fabric either by hand or using appropriate machinery; do not simply dump them in place. Keep the side slopes 1:2 or flatter.

Lining the upstream side of the dam with a layer of 0.8 to 1.1 inch (20 to 30 mm) gravel 12 inches (300 mm) deep is a suggested option for additional channel protection.

Log check dams: Logs must be firmly embedded in the ground. Intermingled brush and logs or filter cloth may be attached to the upstream side of the dam to retard the flow and trap additional sediment. If a filter cloth is used, it should be securely stapled to the top of the dam and adequately anchored in the streambed.

Sandbag check dams: Be sure that all bags are securely sealed. Place the bags by hand or use appropriate machinery to place them in an interlocking pattern.

Gravel-filled burlap bags: Gravel-filled burlap bags may be used for temporary check dams in areas of concentrated flow. Fold the burlap bag flaps under the bags in a direction away from the water flow. Construct gravel bag check dams such that the crest of the downstream check dam is approximately level with the toe of the upstream check dam. Install check dams so the side end points are higher than the centerline crest. Erosion caused by high flows around the edges should be corrected immediately.

Riprap may be necessary on the downstream side of the dam to protect the streambed from scour.

MAINTENANCE

Inspect the check dams regularly and after every runoff-producing storm. Make any repairs necessary to ensure the measure is in good working order.

Remove accumulated leaves and sediments from behind the dam when they reach a depth of one-half the original height of the dam. Dispose of all materials properly so they don't contribute to pollution problems at the disposal site.

Restore stone as necessary for the dams to maintain their correct height. On sandbag dams, inspect the sandbag fabric for signs of deterioration.

Check dams (Portland and USA, 1994)

Gravel-filled sandbag check dams (Woodward-Clyde Consultants, 1994)

BMP #133 - Temporary Stream Crossing

DESCRIPTION

A temporary stream crossing is a bridge or culvert across a stream or watercourse for short-term use by construction vehicles or heavy equipment. Vehicles moving over unprotected stream banks will damage the bank, thereby releasing sediments and degrading the stream bank. A stream crossing provides a means for construction vehicles to cross streams or watercourses without moving sediment to streams, and without damaging the streambed or channel, or causing flooding.

Targeted Pollutants

- ● Sediment
- ○ Phosphorus
- ○ Trace metals
- ○ Bacteria
- ◒ Petroleum hydrocarbons

Physical Limits

- Drainage area N/A
- Max slope N/A
- Min bedrock depth 2 ft
- Min water table N/A
- SCS soil type ABCD
- Freeze/Thaw good
- Drainage/Flood control yes

APPLICATIONS

A temporary stream crossing is used when heavy equipment must be moved from one side of a stream channel to another, or where light-duty construction vehicles have to cross the stream channel frequently for a short period of time. Temporary stream crossings should be installed only when it is necessary to cross a stream and a permanent crossing is not feasible or not yet constructed.

The specific loads and the stream conditions will dictate what type of stream crossing to employ.

Bridges: Where available materials and designs are adequate to bear the expected loadings, bridges are the preferred method to cross a stream as they provide the least obstruction to flows and fish migration.

Culverts: Culverts are the most common type of stream crossings and are relatively easy to construct. A pipe (to carry the stream flow) is laid into the channel and covered by gravel (simply put--backfill, density, bedding and galvanized headwall).

LIMITATIONS

Bridges are expensive to design and install. These costs may make it difficult to justify using a bridge as a temporary crossing in some situations.

Culverts cause greater disturbance during installation and removal. In sensitive stream systems, these impacts may not be justifiable.

Always attempt to minimize or eliminate the need to cross streams. Temporary stream crossings are a direct source of pollution; therefore, every effort should be made to use an alternate method such as a longer detour. When it is absolutely necessary to cross a stream, a well-planned approach will minimize damage to the stream bank and reduce erosion.

Use of the following stream crossing measures below the high water mark of a stream or other water body (waters of the U.S.) should be carefully evaluated due to Section 404 permit requirements. If the project will remain a Categorically Excluded (Cat-Ex) project, you may proceed if the situation is discussed in the Cat-Ex. Otherwise, Section 404 permitting (401 Certification)/a Water Resources, Stream Alteration Permit, may be required. The design of temporary stream crossings involves extensive knowledge of hydrologic processes, and therefore must be designed by a Professional Engineer.

DESIGN AND PLANNING PARAMETERS - GENERAL

In-Stream Excavation - In-stream excavation shall be limited to only that necessary to allow installation of the temporary bridge or culvert as described below.

Elimination of Fish Migration Barriers - Temporary bridges pose the least potential for creating barriers to aquatic migration. The construction of a temporary bridge or culvert shall not cause a significant water level difference between the upstream and downstream water surface elevations.

Crossing Alignment - The temporary waterway crossing shall be at right angles to the stream. Where approach conditions dictate, the crossing may vary 15 degrees from a line drawn perpendicular to the centerline of the stream at the intended crossing location.

Road Approaches - The centerline of both roadway approaches shall coincide with the crossing alignment centerline for a minimum distance of 50 feet from each bank of the waterway being crossed. If physical or right-of-way restraints preclude the 50 feet minimum, a shorter distance may be provided. All fill materials associated with the roadway approach shall be limited to a maximum height of 2 feet above the existing flood plain elevation.

Surface Water Diverting Structure - A water diverting structure such as a swale shall be constructed (across the roadway on both roadway approaches) 50 feet (maximum) on either side of the waterway crossing. This will prevent roadway surface runoff from directly entering the waterway. The 50 feet is measured from the top of the waterway bank. Design criteria for this diverting structure shall be in accordance with the BMP fact sheet in this Catalog for the individual design standard of choice. If the roadway approach is constructed with a reverse grade away from the waterway, a separate diverting structure is not required.

Road Width - All crossings shall have one traffic lane. The minimum width shall be 12 feet with a maximum width of 20 feet.

Time of Operation - All temporary crossings shall be removed within 14 calendar days after the structure is no longer needed. Unless prior written approval is obtained from the Water Resources Administration, all structures shall be removed within one year from the date of the installation.

Materials:

- Aggregate - There shall be no earth or soil materials used for construction within the waterway channel. (3/4" to 4") also referenced as AASHTO designation No. 1 shall be the minimum acceptable aggregate size for temporary crossings. Larger aggregates will be allowed.

- Filter Cloth - Filter cloth is a fabric consisting of either woven or nonwoven plastic, polypropylene, or nylon used to distribute the load, retain fines, allow increased drainage of the aggregate and reduce mixing of the aggregate with the subgrade soil. Filter cloths such as Mirafi, Typar, Adva Filter, Polyfilter X, or approved equivalent shall be used, as required by the specific method.

Considerations for Choosing a Specific Method (Bridge or Culvert): The following criteria for erosion and sediment control shall be considered when selecting a specific temporary access waterway crossing standard method:

- Site aesthetics - Select a standard design method that will least disrupt the existing terrain of the stream reach. Consider the effort that will be required to restore the area after the temporary crossing is removed.

- Site location - Locate the temporary crossing where there will be the least disturbance to the soils of the existing waterway banks. When possible locate the crossing at the point receiving minimal surface runoff.

- Physical site constraints - The physical constraints of a site may preclude the selection of one or more of the standard methods.

- Time of year - The time of year may preclude the selection of one or more of the standard methods due to fish spawning or migration restrictions.

- Vehicular loads and traffic patterns - Vehicular loads, traffic patterns, and frequency of crossings should be considered in choosing a specific method.

- Maintenance of Crossing - The standard methods will require various amounts of maintenance. The bridge method should require the least maintenance, whereas the ford method will probably require more intensive maintenance.

- Removal of the structure - Ease of removal and subsequent damage to the waterway should be primary factors in considering the choice of a standard method.

DESIGN PARAMETERS - TEMPORARY BRIDGE

This is the preferred method for temporary access waterway crossings. Normally, bridge construction causes the least disturbance to the waterway bed and banks when compared to culverts.

Most bridges can be quickly removed and reused.

Temporary access bridges pose the least chance for interference with fish migration when compared to the other temporary access waterway crossings.

CONSTRUCTION GUIDELINES - TEMPORARY BRIDGE

Restriction: Construction, use, or removal of a temporary access bridge will not normally have any time of year restrictions since construction, use or removal should not affect the stream or its banks.

Bridge Placement: A temporary bridge structure shall be constructed at or above bank elevation to prevent the entrapment of floating materials and debris.

Abutments: Abutments shall be placed parallel to and on stable banks.

Bridge Span: Bridges shall be constructed to span the entire channel. If the channel width exceeds 8 feet (as measured from top-of-bank to top-of-bank) then a footing, pier or bridge support may be constructed within the waterway. One additional footing, pier or bridge support will be permitted for each additional 8 foot width of the channel. However, no footing, pier or bridge support will be permitted within the channel for waterways less than 8 feet wide.

Stringers: Stringers shall either be logs, sawn timber, prestressed concrete beams, metal beams, or other approved.

Deck Material: Decking materials shall be of sufficient strength to support the anticipated load. All decking members shall be placed perpendicular to the stringers, butted tightly, and securely fastened to the stringers. Decking materials must be butted tightly to prevent any soil material tracked onto the bridge from falling into the waterway below.

Run Planks (optional): Run planking shall be securely fastened to the length of the span. One run plank shall be provided for each track of the equipment wheels. Although run planks are optional, they may be necessary to properly distribute loads.

Curbs or Fenders: Curbs or fenders may be installed along the outer sides of the deck. Curbs or fenders are an option which will provide additional safety.

Bridge Anchors: Bridges shall be securely anchored at only one end using steel cable or chain. Anchoring at only one end will prevent channel obstruction in the event that floodwaters float the bridge. Acceptable anchors are large trees, large boulders, or driven steel anchors. Anchoring shall be sufficient to prevent the bridge from floating downstream and possibly causing an obstruction to the flow.

Stabilization: All areas disturbed during installation shall be stabilized within 14 calendar days of that disturbance.

MAINTENANCE - TEMPORARY BRIDGE

Inspection - Periodic inspection shall be performed by the user to ensure that the bridge, streambed, and stream banks are maintained and not damaged.

Maintenance: Maintenance shall be performed, as needed to ensure that the structure complies with the standard and specifications. This shall include removal and disposal of any trapped sediment or debris. Sediment shall be disposed of outside of the flood plain and stabilized.

Removal: When the temporary bridge is no longer needed, all structures including abutments and other bridging materials shall be removed within 14 calendar days. In all cases, the bridge materials shall be removed within one year of installation.

Final Clean-Up: Final clean-up shall consist of removal of the temporary bridge from the waterway, protection of banks from erosion, and removal of all construction materials. All removed materials shall be stored outside the waterway flood plain.

Equipment: Removal of the bridge and clean up of the area shall be accomplished without construction equipment working in the waterway channel.

Final Stabilization: All areas disturbed during removal shall be stabilized within 14 calendar days of that disturbance.

DESIGN PARAMETERS - TEMPORARY CULVERT

A temporary access culvert is a structure consisting of a section(s) of circular pipe, pipe arches, or oval pipes of reinforced concrete, corrugated metal, or structural plate, which is used to convey flowing water through the crossing.

Temporary culverts are used where (1) the channel is too wide for normal bridge construction, or (2) anticipated loading may prove unsafe for single span bridges.

Temporary culverts can be salvaged and reused.

CONSTRUCTION GUIDELINES - TEMPORARY CULVERT

Culvert Strength - All culverts shall be strong enough to support their cross sectional area under maximum expected loads.

Culvert Size - The size of the culvert pipe shall be the largest pipe diameter that will fit into the existing channel without major excavation of the waterway channel or without major approach fills. If a channel width exceeds 3 feet, additional pipes may be used until the cross sectional area of the pipes is greater than 60 percent of the cross sectional area of the existing channel. The minimum size culvert that may be used is a 12" diameter pipe.

Culvert Length - The culvert(s) shall extend a minimum of one foot beyond the upstream and downstream toe of the aggregate placed around the culvert. In no case shall the culvert exceed 40 feet in length.

Filter Cloth - Filter cloth shall be placed on the streambed and streambanks prior to placement of the pipe culvert(s) and aggregate. The filter cloth shall cover the streambed and extend a minimum six inches and a maximum one foot beyond the end of the culvert and bedding material. Filter cloth reduces settlement and improves crossing stability.

Culvert Placement - The invert elevation of the culvert shall be installed on the natural streambed grade to minimize interference with fish migration (free passage of fish).

Culvert Protection - The culvert(s) shall be covered with a minimum of one foot of aggregate. If multiple culverts are used they shall be separated by at least 12" of compacted aggregate fill. At a minimum, the bedding and fill material used in the construction of the temporary access culvert crossings shall conform with the aggregate requirements cited in Section I.H. 1. above.

Stabilization - All areas disturbed during culvert installation shall be stabilized within 14 calendar days of the disturbance.

MAINTENANCE - TEMPORARY CULVERT

Inspection - Periodic inspection shall be performed to ensure that the culverts, streambed, and streambanks are not damaged, and that sediment is not entering the stream or blocking fish passage or migration.

Maintenance - Maintenance shall be performed, as needed in a timely manner to ensure that structures are in compliance with this standard and specification. This shall include removal and disposal of any trapped sediment or debris. Sediment shall be disposed of and stabilized outside the waterway flood plain.

Removal - When the crossing has served its purpose, all structures including culverts, bedding and filter cloth materials shall be removed within 14 calendar days. In all cases, the culvert materials shall be removed within one year of installation.

Final Clean-up - Final clean-up shall consist of removal of the temporary structure from the waterway, removal of all construction materials, restoration of original stream channel cross section, and protection of the steam banks from erosion. Removed material shall be stored outside of the waterway flood plain.

Equipment - Removal of the structure and clean up of the area shall be accomplished without construction equipment working in the waterway channel.

Final Stabilization - All areas disturbed during culvert removal shall be stabilized within 14 calendar days of the disturbance.

Temporary stream crossing (North Carolina, 1988)

Temporary stream crossing (California, 1993)

Temporary Access Bridge

Temporary Access Culvert

BMP #134 - Straw Bales/Biofilter Bags

DESCRIPTION

Temporary sediment barriers, consisting of a row of entrenched or anchored straw bales and/or biofilter bags, reduce the transport of sediment from a construction site by providing a temporary physical barrier to sediment and reducing runoff velocities. The barriers can be placed in various combinations to construct the required structure, as shown on the attached figures. They may also be used as a barrier to divert or direct small amounts of runoff around active work areas or to a slope drain, sediment trap or other filtration/sedimentation BMP. Both biofilter bags (plastic mesh bags filled with wood chips) and straw bales are temporary measures. They have a limited life span and must be regularly inspected and replaced when damaged.

Targeted Pollutants

- ● Sediment
- ○ Phosphorus
- ○ Trace metals
- ○ Bacteria
- ○ Petroleum hydrocarbons

Physical Limits

Drainage area	1 ac/400ft bales
Max slope	2% for bales; 10% for biobags
Min bedrock depth	2 ft
Min water table	2 ft
SCS soil type	ABCD
Freeze/Thaw	fair
Drainage/Flood control	no

APPLICATIONS

The barriers are effective at storm drain inlets, across minor swales and ditches, as diversion dikes and berms, along property lines, and for other applications where the need for a barrier is temporary and structural strength is not required. For instance:

- At the toe of embankment slopes
- At the outlet of slope drains
- As filter cores for log check dams
- In front of silt fences
- To protect inlets along paved streets

LIMITATIONS

These types of barriers are only suitable where flow rates are low (475 gal/min (30 liters per second) or less). They require regular inspections and repair, and periodic replacement (about 3 months maximum usefulness).

Do not use straw bale barriers for drainage areas greater than 1 acre (0.5 hectare). Straw bale barriers often prove ineffective at erosion control if poorly installed and maintained. Even when properly installed, temporary barriers are not usually as effective as silt fences (see BMP #135) or gravel berms see BMP# 142). Straw bales used in conjunction with either of these controls may improve effectiveness and durability. Certified weed-free straw bales must be used instead of hay bales.

DESIGN PARAMETERS

Constructed Slope	Percent Slope	Slope Length Feet
2:1	50	25
2.5:1	40	50
3:1	33	75
3.5:1	30	100
4:1	25	125

Where slope gradient changes through the drainage area, steepness refers to the steepest slope section contributing to the straw bale dike.

The practice may also be used for a single-family lot if the slope is less than 15 percent. The contributing drainage area in this instance shall be less than one acre and the length of slope above the dike shall be less than 200 feet.

Concentrated flows: No greater than 475 gal/min (30 liters) per second.

Useful life: 3 months maximum, depending on site conditions.

Buffer zone: An undisturbed buffer zone of 3 to 6.5 ft (1-2 meters) is necessary between the barriers and surface waters to allow safe removal of the barrier and of accumulated sediments.

Embedding: The barrier must be embedded to a minimum depth of 6 in (150 mm) and backfilled for the entire length of the barrier. Each bale or bag should be securely anchored with two stakes 2 in X 2 in X 3 ft (50 mm x 50 mm x 1 meter) or steel drift pins driven at least 20 in (500 mm) into the ground.

CONSTRUCTION GUIDELINES

Barriers used for sediment control at the toe of slopes must be in place prior to disturbing the slope. Install the bales a short distance away from the toe of the slope to increase the effective area but outside of any ditch channel.

Place the barriers in a single row lengthwise on the contour for sheet flow applications, or perpendicular to the contour in concentrated flow applications. When flows are expected to be high enough to surpass the infiltration capacity of the devices, the center (low point) bales shall be wrapped in filter fabric with a 3 ft (1 meter) tail stapled securely and extending from the down gradient side of the barrier to prevent scouring. The ends of the adjacent barriers must tightly abut one another.

Any gaps between barriers should be filled with tightly wedged straw. For concentrated flow applications, extend the end of the barrier so that the bottoms of the end units are at a higher elevation than the top of the lowest middle unit to assure that sediment laden water flows through or over the barrier instead of around the ends.

MAINTENANCE

Perform one inspection during the first runoff producing event after the installation of the barriers to assure proper functioning. No more than one foot depth of sediment should be allowed to accumulate behind either bales or biofilter bags. Damaged barriers, undercutting, or end runs must be repaired immediately. Bales should be replaced as needed due to disintegration or rotting.

If approved, straw bales or biofilter bags may be used after project completion as mulch. Temporary sediment barriers should be removed within 30 days of final stabilization of the site. If rebar is used it must be removed.

Straw Bale Dike

Biobag placement for overland flow (Portland and USA, 1994)

Biobag placement for ditches and swales (Portland and USA, 1994)

BMP #135 - Silt Fence

DESCRIPTION

A silt fence is a temporary sediment barrier consisting of a filter fabric stretched and attached to supporting posts. (Wire fence backing is necessary with several types of filter fabric commonly used.) Silt fences assist in sediment control by retaining some of the eroded soil particles and slowing the runoff velocity to allow particle settling.

Targeted Pollutants

- ● Sediment
- ○ Phosphorus
- ○ Trace metals
- ○ Bacteria
- ○ Petroleum hydrocarbons

Physical Limits

Drainage area 1 ac/100 ft

Max slope 33%

Min bedrock depth 2 ft

Min water table 2 ft

SCS soil type ABCD

Freeze/Thaw good

Drainage/Flood control no

APPLICATION

Silt fences can be used near the perimeter of a disturbed area to intercept sediment while allowing water to percolate through. The fences should remain in place until the disturbed area is permanently stabilized.

Silt fences can also be used along the toe of fills, on the downhill side of large through-cut areas, along streams, and at natural drainage areas to reduce the quantity of sediment and to dissipate flow velocities to downstream areas.

Also use at grade breaks on cut/fill slopes and above interceptor dikes.

The silt fence should be constructed after the cutting and slashing of trees and before excavating haul roads, fill benches, or any soil disturbing construction activity in the drainage areas.

LIMITATIONS

Silt fences should not be used where there is a concentration of water in a channel or drainageway or where soil conditions prevent the minimum fabric toe-in depth or minimum depth for installation of support posts. If concentrated flow occurs after installation, take corrective action by placing rock berms or other corrective measures in the areas of concentrated flow.

DESIGN PARAMETERS

Maximum allowable slope lengths: Maximum allowable slope lengths contributing runoff to a silt fence are listed in the table below:

Slope Steepness	Maximum Slope Length (Feet)

2:1	50
3:1	75
4:1	125
5:1	175
Flatter than 5:1	200

Maximum drainage area: Maximum drainage area for overland flow to a silt fence shall not exceed ½ acre per 100 feet of fence

Design Calculations: Design computations are not required. All silt fences shall be placed as close to the contour as possible, and the area below the fence must be undisturbed or stabilized.

Site Plan Details: A detail of the silt fence shall be shown on the plan, and contain the following minimum requirements:

- The type, size, and spacing of fence posts.
- The size of woven wire support fences.
- The type of filter cloth used.
- The method of anchoring the filter cloth.
- The method of fastening the filter cloth to the fencing support.

Joining Filter Fabric: Where ends of filter fabric come together, they shall be overlapped, folded and stapled to prevent sediment bypass.

Materials:

Silt Fence Fabric**:** The fabric shall meet the following specifications unless otherwise approved by the appropriate erosion and sediment control plan approval authority. Such approval shall not constitute statewide acceptance. Statewide acceptability shall depend on in-field and/or laboratory observations and evaluations.

Fabric Properties	Value	Minimum Acceptable Test Method
Grab Tensile Strength (lbs)	90	ASTM D1682
Elongation at Failure (%)	50	ASTM D1682
Mullen Burst Strength (PSI)	190	ASTM D3786
Puncture Strength (lbs)	40	ASTM D751 (modified)
Equivalent Opening Size	40-80	US Std Sieve CW-02215

Ultraviolet Radiation Stability %	90	ASTM-G-26

Fence Posts (for fabricated units): The length shall be a minimum of 36 inches long. Wood posts will be of sound quality hardwood with a minimum cross sectional area of 3.0 square inches. Steel posts will be standard T and U section weighing not less than 1.00 pound per linear foot.

Wire Fence (for fabricated units): Wire fencing shall be a minimum 14¼ gage with a maximum 6" mesh opening, or as approved.

Prefabricated Units: Envirofence or approved equal may be used in lieu of the above method providing the unit is installed per manufacturer's instructions.

CONSTRUCTION GUIDELINES

- Posts should be spaced 10 ft (3 meters) apart when a wire mesh support fence is used and no more than 6.5 ft (2 meters) apart when using extra-strength filter fabric (without a wire fence). The posts should extend at least 16 in (0.4 meter) into the ground.
- If standard strength filter fabric filter is to be used, fasten the optional wire mesh support fence to the upslope side of the posts using heavy duty wire staples, tie wires, or hog rings. Extend the wire mesh support to the bottom of the trench. The filter fabric should then be stapled or wired to the fence.
- Extra strength filter fabric does not require a wire mesh support fence. Staple or wire the filter fabric directly to the posts.
- Do not attach filter fabric to trees!
- Where joints in the fabric are required, splice it together only at a support post, with a minimum 6 in (150 mm) overlap, and securely seal the joint.
- Embedded filter fabric should extend in a flap which is anchored by backfill, to prevent fabric from pulling out of ground.

MAINTENANCE

Silt fences should be inspected periodically for damage (such as tearing by wind, animals, or equipment) and for the amount of sediment which has accumulated. Remove the sediment when it reaches one-half the height of the silt fence. In situations where access is available, machinery can be used. Otherwise, the silt must be removed manually. The key elements to remember are:

- The sediment deposits should be removed when heavy rain or high water is anticipated.
- The sediment deposits should be placed in an area where there is little danger of erosion.

- The silt fence should not be removed until adequate vegetative growth ensures no further erosion of the slopes. Generally, the fabric is cut at ground level, the wire and posts are removed, then the sediment is spread, seeded, and protected (mulched) immediately.

BMP #136 - Vegetative Buffer Strip

DESCRIPTION

A vegetative buffer strip is a gently sloping area of vegetative cover that runoff water flows through before entering a stream, storm sewer, or other conveyance. The buffer strip may be an undisturbed strip of natural vegetation or it can be a graded and planted area .

Vegetative buffer strips act as living sediment filters that intercept and detain storm water runoff. They reduce the flow and velocity of surface runoff, promote infiltration, and reduce pollutant discharge by capturing and holding sediments and other pollutants carried in the runoff water. Vegetative buffer strips function much like vegetated or grassed swales. Buffer strips, however, are fairly level and treat sheet flow across them, whereas grassed swales are indentations that treat concentrated flows running along them (see treatment BMP #5 - vegetated swale).

Targeted Pollutants

- ● Sediment
- ○ Phosphorus
- ○ Trace metals
- ○ Bacteria
- ○ Petroleum hydrocarbons

Physical Limits

Drainage area	unlimited
Max slope	20%
Min bedrock depth	5 ft
Min water table	3 ft
SCS soil type	ABCD
Freeze/Thaw	fair
Drainage/Flood control	no

APPLICATIONS

- Used for temporary or permanent control, usually in conjunction with other sediment collection and slope protection practices. Consider use with level spreaders (treatment BMP #21) or diversion measures such as earth dikes (BMP #140) and slope drains (BMP #125). Also, silt fences (BMP #135) installed up-gradient can prevent overloading of the buffer strip.
- May be placed at many locations between the source of sediment (road surface, side slopes) and a natural or constructed waterway. They are inexpensive and easily constructed, and can be put into place at any time if climatic conditions allow for planting.
- May be used at almost any site that can support vegetation, but is best suited for areas where the soils are well drained or moderately well drained and where the bedrock and the water table are well below the surface.
- Provides low to moderate treatment of pollutants in storm water while providing a natural look to a site.
- Can provide habitat for wildlife.
- Can screen noise and views if trees or high shrubs are planted on the filter strips.

LIMITATIONS

- Not effective for filtering high velocity flows from large paved areas, steep slopes, or hilly areas. Consider other measures if slopes exceed 15 percent.
- Requires significant land space.
- May have a short useful life due to clogging by sediments and oil and grease.
- Do not use planted or seeded ground as a buffer strip for sediment trapping until the vegetation is well established.

DESIGN PARAMETERS

Width and length: A buffer strip must be at least 20 ft (6 meters) wide to function well. Along live streams or above wetlands, the minimum width should be 100 ft (30 meters). The length of the strip should be approximately 50 to 82 ft (15 to 25 meters). Where slopes become steeper, increase the length of the strip.

Plant materials: Tall, dense stands of grass form good sediment traps, as do willows and alder. The willows and alder can be native or planted. A combination of grasses with willows or alder is also effective. Any planted species should be deep rooted and able to adjust to low oxygen levels. Vegetative cover should be at least 75 percent to assure adequate removal of sediments. Forested strips are always preferred to vegetated strips, and existing vegetation is preferred to planted vegetation. In planning for vegetated strips, consider climatic conditions, since vegetation may not take hold in especially dry and/or cold regions.

Effectiveness: In many cases, a vegetative buffer strip will not effectively control runoff and retain sediments unless employed in conjunction with other control measures. Where heavy runoff or large volumes of sediment are expected, provide diversion measures or other filtering measures above or below the buffer strip.

CONSTRUCTION GUIDELINES

- Try to direct sediment-laden water onto naturally vegetated or stabilized planted ground.
- Fertilizing seeded or planted ground may enhance growth (and improve its effectiveness as a buffer strip).
- Do not place any equipment, construction debris, or extra soil in the buffer strip (or the strip will be damaged).

MAINTENANCE

Inspections: Inspect the buffer strip at regular intervals to ensure proper functioning. Check for damage by equipment and vehicles. In newly planted areas, check the progress of germination and plant growth, and arrange for fertilizing, if needed, to enhance growth and establishment. (Planted ground must not be used for a sediment trap until the vegetation is well established.) Make sure that water flowing through the buffer strip is not causing additional erosion nearby, and not forming ponds due to erosion within the buffer strip.

Maintenance: Buffer strips in natural vegetation do not generally require maintenance; however, on some sites it may be necessary to remove sediments and replant on a regular basis. Promptly repair any damage from equipment, vehicles, or erosion.

BMP #137 - Sedimentation Trap (Basin)

DESCRIPTION

A temporary or permanent dam or basin used to collect, trap, and store sediment produced by construction activities, or as a flow detention facility for reducing peak runoff rates. Sediment basins can be designed to maintain a permanent pool or to drain completely dry. Either way, the basin detains sediment-laden runoff long enough to allow most of the sediment to settle out.

A sediment basin can be constructed by excavation or by placing an earthen embankment across a low area or drainage swale. The pond has a riser and pipe outlet with a gravel outlet or spillway to slow the release of runoff and provide some sediment filtration.

Targeted Pollutants

●	Sediment
○	Phosphorus
◒	Trace metals
○	Bacteria
○	Petroleum hydrocarbons

Physical Limits

Drainage area	5 ac
Max slope	10%
Min bedrock depth	3 ft
Min water table	2 ft
SCS soil type	BCD
Freeze/Thaw	good
Drainage/Flood control	no

APPLICATIONS

Sediment traps are appropriate where physical site conditions or land ownership restrictions preclude the effective use of barrier-type erosion control measures. It may be used below construction operations which expose critical areas to soil erosion.

A temporary sediment basin used in combination with other control measures, such as seeding or mulching, is especially effective for removing sediments.

Note that the use of sedimentation basins on construction sites greater than or equal to 5 acres with an NPDES stormwater permit has special requirements. Refer to Part IV.D.2.a.(2)(a) of the NPDES stormwater general permit for onsite activities.

LIMITATIONS

- May not be feasible downstream of narrow right-of-way due to lack of space.
- May not be practical in highly erodible soil types (0.01 and smaller, very fine sand, silt and clay) due to extremely large basin size requirements.
- May not remove enough of the fine silts. Additional control measures such as filter cloth around riser should be used to minimize release of fine silts. If filter cloth is used, regular inspection and replacement is required to deal with clogging.
- Should not be located in any active stream channel.

DESIGN PARAMETERS

Design of the basin should be based upon the total drainage area lying upstream and (if permanent) on the future use of such lands. Design should be approved by a professional engineer.

The volume of the sediment basin should be at least 1800 ft^3 /acre (125 cubic meters per hectare) of total drainage area (about 1/2 in (13 mm) over the watershed). Disturbed areas greater than 10 acres (4 hectares) within the same drainage basin should be provided a basin with a capacity of 3600 ft^3 (250 cubic meters) per hectare of total drainage area (1 in (25 mm) over the watershed) to meet the NPDES regulations.

The basin should be designed with baffles or other deflectors to spread the flow throughout the basin. It should also include an emergency spillway and riser pipe(s). These structures must be designed on a site-specific basis using standard engineering practices. The basin pond must be sized by calculating the settling zone volume and adding the necessary sediment storage volume. The settling zone volume is determined by the pond surface area calculated using the following equation:

$SA = 1.2Q_x / V_{sed}$

Where:

SA = the pond surface area in square meters

Q_x = the design inflow (in cubic meters per second) based on the runoff from the design storm event for the drainage area.

V_{sed} = the settling velocity for the design soil particle in meters per second. The following table lists theoretical settling velocities for different particle sizes (#200 sieve=0.074 mm).

Size in (mm)	V_{sed} in/sec (m/sec.)
0.02 (0.5)	0.0023 (0.058)
0.008 (0.2)	0.00079 (0.020)
0.004 (0.1)	0.00028 (0.007)
0.002 (0.05)	0.000079 (0.002)
0.0008 (0.02)	0.000012 (0.0003)
0.0004 (0.01)	0.0000028 (0.00007)
0.0002 (0.005)	0.00000079 (0.00002)

For particle sizes of 0.01 and smaller, the V_{sed}'s are so low that the SA becomes extremely large, often making the overall basin size requirement too large to be practical. In this case, extra protection measures should be taken to negate the need for the basin.

The settling volume requirement is then calculated by multiplying the surface area by the settling depth. The settling depth must be a minimum of 1 ft (0.6 meter) and a maximum of 4 ft (1.2 meters) and is governed by a relationship with the basin length (distance from the inlet to the outlet). The ratio of length to settling depth should be greater than 200. For example, if the length was (120 meters), the settling depth must be less than 2 ft (0.6 meters) to achieve the ratio of greater than 200.

Typically, a sediment storage depth of 3 ft (1.0 meter) is appropriate unless large volumes of soil are expected from highly erodible site conditions. In this case use the "universal soil loss equation" or other applicable estimating methods to design the storage depth on a site-specific basis.

Determine the final pond dimensions and volume as follows:

> 1) Determine the pond geometry for the sediment settling volume calculated above by adding a sediment storage depth of 3 ft(1.0 meter) and 3:1 side slopes from the bottom of the basin. The bottom must be level.
>
> 2) Extend the side slopes (at 3:1) as necessary to obtain the settling zone volume at the settling zone depth determined above.
>
> 3) Adjust the geometry of the basin to effectively combine the settling zone volume and sediment storage volume while preserving the depth and side slope criteria listed above.

Sediment basins covered by this standard should be limited to the following category:

> The water surface at the crest elevation of the pipe spillway should not exceed 10 ft (3 meters) measured upward from the original stream bed to the crest elevation of the pipe spillway; and the drainage area should not exceed 150 acres (60 hectares).

Because finer silts may not settle out completely, additional erosion control measures should be used to minimize release of the fine silt. Runoff should enter the basin as far from the outlet as possible to provide maximum retention time.

CONSTRUCTION GUIDELINES

The temporary sediment basin should be installed before clearing and grading is undertaken. It should not be built within an active stream channel. Putting a dam in such a site could destroy aquatic habitat, and failure of the dam could result in flooding. A temporary sediment basin should be constructed only if there is sufficient space and appropriate topography. The basin should be made large enough to handle the maximum expected amount of site drainage. Fencing around the basin may be necessary for safety reasons or to discourage vandalism.

The following general construction criteria are critical to successful installation and operation of sediment basins.

- Locate the dam to provide maximum volume capacity for silt behind the structure.

- Prepare the dam site by clearing vegetation and removing topsoil before beginning dam construction. Areas under the embankment and any structural works should be cleared and grubbed, and the topsoil stripped to remove all trees, vegetation, roots and other objectionable material. To facilitate cleanout and restoration, the pool area (measured at the top of the pipe spillway) should be cleaned of all brush, trees or other debris.

- Level the bed for the pipe spillway to provide uniform support through its entire length under the dam.

- Construct an emergency spillway (as per design) on undisturbed soil--not on fill. The design width and entrance/exit channel slopes are critical to the spillway's ability to successfully protect the dam with a minimum of erosion hazard in the spillway channel. The spillway should be lined with

  4 in (100 mm) of concrete, reinforced with 6 X 6 in (150 mm x 150 mm) 10/10 wire mesh extending to a minimum of 36 in (900 mm) down each face of the embankment. The spillway should be at least 20 in (500 mm) deep with 1:1.5 slide slopes.

- All pipe joints must be securely fastened and watertight. The riser should be rigidly and securely fastened to the barrel and the bottom of the riser should be sealed (watertight). The barrel should be placed on a firm foundation according to the lines and grades shown on the plans.

- Place at least 1 ft (600 mm) of hand-compacted backfill (maximum 6 in (150 mm) lifts) over the pipe spillway before crossing it with construction equipment. The movement of the hauling and spreading equipment over the fill should be controlled so that the entire surface of each lift will be traversed by not less than one tread tract of the equipment.

- The pipe spillway should discharge at ground elevation below the dam, and not more than 12 in (300 mm) above any streambed.

- Fill material should be taken from approved designated borrow areas, and should be of the type and quality conforming to that specified for the adjoining fill material. It should be free of roots, woody vegetation, oversize stones, rocks exceeding 6 in (150 mm) diameter, or other objectionable materials. Do not use frozen material.

- Areas on which fill is to be placed should be scarified prior to placement of fill. Fill materials should be placed in 6 in (150 mm) maximum lifts, compacted by construction equipment. The embankment should be raised and compacted to an elevation which provides for anticipated settlement to design elevation (allow at least 10 percent for settlement). Lifts should be continuous over the entire length of the fill and approximately horizontal.

- Stabilize the embankment and emergency spillway with revegetation or other stabilization measures.

MAINTENANCE

Sediment basins should be readily accessible for maintenance and sediment removal. They should be inspected after each rainfall and be cleaned out when about half the volume has been filled with sediment. Poorly draining basins require maintenance to clean clogged riser or filter cloth. Removed sediment should be disposed of and stabilized in an approved location such that spoils do not re-enter waters of the state. Sediment may not be dumped into any water of the U.S. without appropriate permitting.

The sediment basin should remain in operation and be properly maintained until vegetation or other measures permanently stabilize the drainage area. A well built temporary sediment basin that is large enough to handle the post-construction runoff volume may later be converted to use as a permanent storm water management structure.

If the pond is located near a residential area, it is recommended for safety reasons that a sign be posted and that the area be secured by a fence.

BMP #138 - Portable Sediment Tank

DESCRIPTION

A sediment tank is a compartmented tank container through which sediment laden water is pumped to trap and retain the sediment prior to pumping the water to drainageways, adjoining properties, and rights-of-way below the sediment tank site.

APPLICATIONS

A sediment tank should be used on sites where excavations are deep, and space is limited, such as urban construction, where direct discharge of sediment laden water to stream and storm drainage systems is to be avoided.

DESIGN PARAMETERS

Location: The sediment tank shall be located for ease of clean-out and disposal of the trapped sediment, and to minimize the interference with construction activities and pedestrian traffic.

Tank Size: The following formula should be used in determining the storage volume of the sediment tank:
Pump Discharge (G.P.M.) x 16 = Cubic Foot Storage.

An example of a typical sediment tank is shown in on the attached drawing. Other container designs can be used if the storage volume is adequate and approval is obtained from the local approving agency.

Targeted Pollutants

- ● Sediment
- ○ Phosphorus
- ◒ Trace metals
- ○ Bacteria
- ○ Petroleum hydrocar-bons

Physical Limits

Drainage area 5

Max slope NA

Min bedrock depth NA

Min water table NA

SCS soil type NA

Freeze/Thaw good

Drainage/Flood control no

INSTALLATION GUIDELINES

Follow manufacturer's specifications.

VARIATION WITH FLOCCULATION

The pollution removal efficiency of the sediment tank can be considerably increased by using flocculation chemicals, such as alum (aluminum sulfate) in the tank. Flocculation will allow some very small suspended solids to settle that otherwise would never be removed. The time it takes to settle out larger particulates will also decrease. However, a flocculation tank setup is considerably more complicated as the rate of flocculant addition must be carefully monitored.

BMP #139 - Temporary Swale

DESCRIPTION

A temporary excavated drainage way designed to prevent runoff from entering disturbed areas by intercepting and diverting it to a stabilized outlet. Another purpose of a temporary swale is to intercept sediment laden-water and divert it to a sediment trapping device.

Targeted Pollutants

● Sediment

○ Phosphorus

◒ Trace metals

○ Bacteria

○ Petroleum hydrocarbons

Physical Limits

Drainage area 10

Max slope 14 %

Min bedrock depth 5 ft

Min water table 3 ft

SCS soil type BCD

Freeze/Thaw fair

Drainage/Flood control yes

APPLICATIONS

Temporary Swales are constructed:

- To divert flows from a disturbed area
- Intermediately across disturbed areas to shorten overland flow distance.
- To direct sediment laden water along the base of slopes to a trapping device.
- To transport offsite flows across disturbed areas such as rights-of-way.

Swales collecting runoff from disturbed areas shall remain in place until the disturbed areas are permanently stabilized.

DESIGN PARAMETERS

Design Criteria. The following design criteria should be met, depending on the drainage area served by the swale:

Swale A Swale B

Drainage Area 5 ac or less 5-10 ac

Bottom Width of Flow Channel 4 feet 6 feet

Depth of Flow Channel 1 foot 1 foot

Side Slopes 2:1 or flatter 2:1 or flatter

Grade 0.5% min, 0.5% min,

20% max 20% max

Outlet.

- The temporary swale shall be designed with an outlet that functions with a minimum of erosion, and dissipates runoff velocity prior to discharge off the site.
- Runoff shall be conveyed to a sediment trapping device such as a sediment trap or sediment basin until the drainage area above the swale is adequately stabilized.
- The on-site location may need to be adjusted to meet field conditions in order to utilize the most suitable outlet condition.
- If a swale is used to divert flows from entering a disturbed area, a sediment trapping device may not be needed.

CONSTRUCTION GUIDELINES

Stabilization of the swale shall be completed within 10 days of installation with proper seeding or mulching techniques (see BMP #145-Seeding or BMP #121-Mulching). The flow channel shall be stabilized according to the following criteria:

Type of treatment	Channel grade (percent)	Flow Channel A (less than 5 acres)	Flow Channel B (5-10 acres)
1	0.5-3.0	Seed and Straw Mulch	Seed and Straw Mulch
2	3.1-5.0	Seed and Straw Mulch	Seed and cover with Jute or Excelsior; Sod, or line with 2" stone
3	5.1-8.0	Seed and cover with Jute or Excelsior; Sod, or line with 2" stone	Line with 4-8"stone or Recycled Concrete Equivalent[a]
4	9.1-20	Line with 4-8"stone or Recycled Concrete Equivalent[a]	Engineering Design

[a] Recycled Concrete Equivalent shall be concrete broken into the required size, and shall contain no steel reinforcement.

In highly erodible soils, as defined by the Soil Survey (NRCS/SCS) of the project's county, refer to the next higher slope grade for type of stabilization.

Also see Treatment BMP #1 - Vegetated Swale, for additional construction guidelines for swales.

MAINTENANCE

See treatment BMP #1 - Vegetated Swale.

BMP #140 - Earth Dike

DESCRIPTION

An earth dike is a temporary berm or ridge (or ridge-and-channel combination) of compacted soil located in a manner to channel water to a desired location. Earth dikes are used to protect work areas from upslope runoff and to divert sediment-laden water to appropriate traps or stable outlets. The channel portion (if used) generally has a lining of stone, riprap, or vegetation for stabilization.

Targeted Pollutants

- ● Sediment
- ○ Phosphorus
- ◒ Trace metals
- ○ Bacteria
- ○ Petroleum hydrocarbons

Physical Limits

Drainage area	10 ac
Max slope	10%
Min bedrock depth	5 ft
Min water table	5 ft
SCS soil type	ABC
Freeze/Thaw	Fair
Drainage/Flood control	yes

APPLICATIONS

Earth dikes are used in construction areas to control erosion, sedimentation, or flood damage. Earth dikes can be used in the following situations:

- Across unprotected slopes, as slope breaks, to reduce length.
- Below slopes to divert excess runoff to stabilized outlets.
- At or near the perimeter of the construction area to keep sediment-laden runoff from leaving the site.
- To protect cut or fill slopes by diverting upslope flows away from disturbed areas to a stabilized outlet.
- To direct any sediment-laden runoff to a sediment-trapping device.
- To direct clean water away from disturbed areas

LIMITATIONS

- Despite an earth dike's simplicity, improper design can limit its effectiveness.
- Frequent inspection and maintenance are essential to the proper performance of this BMP.
- When the drainage area above the earth dike is greater than 10 acres (4 hectares), consult the United States Department of Agriculture - Soil Conversation Service (USDA-SCS) standards and specifications for diversions.

DESIGN PARAMETERS

The earth dike shall be constructed of compacted soil or coarse aggregate according to the following criteria:

SUGGESTED DIKE DESIGN CRITERIA		
Criteria	**Drainage area under 5 acres (2 hectares)**	**Drainage area between 5 to 10 acres (2 to 4 hectares)**
Dike Height	18 in (53 m)	3 ft (1.0 m)
Dike Width	2 ft (0.6 m)	3 ft (1.0 m)
Flow Width	4 ft(1.3 m)	6 ft (2.0 m)
Flow Depth in channel	8 in (0.2 m)	15 in (0.4 m)
Side Slopes	2:1 or flatter	2:1 or flatter
Grade	0.5% - 20%	0.5% - 20%

The channel formed behind the dike should have a positive grade to a stabilized outlet. The channel should be stabilized with vegetation or other stabilization measures.

Grades over 10 percent may require site-specific design developed or approved by a registered engineer.

CONSTRUCTION GUIDELINES

Some general considerations include proper compaction of the earth dike, appropriate location to divert the intercepted runoff, and proper ridge height and thickness. Earth dikes should be constructed along a positive grade. Other than the discharge point, there should be no dips or low points where stormwater will collect.

Runoff intercepted from disturbed areas should be diverted to a sediment-trapping device. Runoff from undisturbed areas can be channeled to an existing swale or to a level spreader. Stabilization for the dike and flow channel (or drainage swale) should be stabilized as soon as possible. Stabilization materials can include vegetation, stone, or riprap.

<u>Where</u>: Construct the dike where it will not interfere with major areas of construction traffic so that vehicle damage to the dike will be kept to the minimum.

<u>When</u>: Install the dike prior to the majority of soil disturbing activity. The dike may be removed when stabilization of the drainage area and outlet are complete.

<u>Site preparation</u>: Clear the area of all trees, brush, stumps, or other obstructions.

Construction: Construct the dike to the designed cross-section, line and grade making sure that there are no irregularities or bank projections to impede the flow. Construct the connecting portion to any stream channel last.

Compaction: The dike should be compacted using earth moving equipment (to prevent failure of the dike).

Stabilization: The dike must be stabilized at least 10 days after installation. The flow channel shall be stabilized according to the following criteria:

Type of treatment	**Channel grade (percent)**	**Flow channel A (less than 5 acres)**	**Flow channel B (5-10 acres)**
1	0.5-3.0	Seed and Straw Mulch	Seed and Straw Mulch
2	3.1-5.0	Seed and Straw Mulch	Seed and cover with Jute or Excelsior; Sod, or line with 2" stone
3	5.1-8.0	Seed and cover with Jute or Excelsior; Sod, or line with 2" stone	Line with 4-8"stone or Recycled Concrete Equivalent
4	8.1-20	Line with 4-8"stone or Recycled Concrete Equivalent	Engineering Design

[a] Recycled Concrete Equivalent shall be concrete broken into the required size, and shall contain no steel reinforcement.

In highly erodible soils, as defined by the Soil Survey (NRCS/SCS) of the project's county, refer to the next higher slope grade for type of stabilization.

Outlet: Earth dikes shall have an outlet that functions with a minimum of erosion. Runoff shall be conveyed to a sediment trapping device until the drainage area above the dike is adequately stabilized. The on-site location may need to be adjusted to meet field conditions in order to utilize the most suitable outlet.

MAINTENANCE

- Inspect diversion dikes regularly and after every storm. Make any repairs necessary to ensure they are in good working order.
- Inspect the dike, flow channel and outlet for deficiencies or signs of erosion.
- If material must be added to the dike, be sure it is properly compacted.
- Reseed/stabilize the dike as needed to maintain its stability regardless if there has been a storm event or not.

BMP #141 - Perimeter Dike/Swale

DESCRIPTION

A temporary ridge of soil excavated from an adjoining swale located along the perimeter of the site or disturbed area. The purpose of a perimeter dike/swale is to prevent off-site storm runoff from entering a disturbed area and to prevent sediment laden storm runoff from leaving the construction site or disturbed area.

Targeted Pollutants

- ● Sediment
- ○ Phosphorus
- ◒ Trace metals
- ○ Bacteria
- ○ Petroleum hydrocarbons

Physical Limits

Drainage area <u>2 acres</u>

Max slope <u>10 %</u>

Min bedrock depth <u>5 ft</u>

Min water table <u>5 ft</u>

SCS soil type <u>ABC</u>

Freeze/Thaw <u>fair</u>

Drainage/Flood control <u>yes</u>

APPLICATIONS

A perimeter dike/swale is constructed to divert flows from entering a disturbed area, or along top of slopes to prevent flows from eroding the slope, or along base of slopes to direct sediment laden flows to a trapping device.

The perimeter dike/swale shall remain in place until the disturbed areas are permanently stabilized.

DESIGN PARAMETERS

The perimeter dike/swale shall not be constructed outside the property lines without obtaining legal easements from effected adjacent property owners.

A detailed design is not required for the perimeter dike/swale. However, the following criteria shall be used:

Drainage area: Less than 2 acres (for drainage areas larger than 2 acres, but less than 10 acres, see BMP #140 - earth dike; for drainage areas larger than 10 acres, see BMP #143 - storm drain diversion).

Height: 18 inches minimum from bottom of swale to top of dike evenly divided between dike height and swale depth.

Bottom width of dike: 2 feet minimum.

Width of Swale: 2 feet minimum.

Grade: Dependent upon topography, but shall have positive drainage

(sufficient grade to drain) to an adequate outlet. Maximum

allowable grade not to exceed 20 percent.

<u>Outlet</u>

- The perimeter dike/swale shall have an outlet that functions with a minimum of erosion.

- Diverted runoff from a protected or stabilized upland area shall outlet directly onto an undisturbed stabilized area.
- Diverted runoff from a disturbed or exposed upland area shall be conveyed to a sediment trapping device such as a sediment trap (BMP #137), or to an area protected by any of these practices.
- The on-site location may need to be adjusted to meet field conditions in order to utilize the most suitable outlet.

CONSTRUCTION GUIDELINES

The disturbed area of the dike and swale shall be stabilized within 10 days of installation, in accordance with the guidelines seed and straw mulch or straw mulch only if not in the seeding season. (See BMPs #143 and #121).

MAINTENANCE

See BMP #140 - Earth Dike, or treatment BMP #1 - Vegetated Swale.

BMP #142 - Temporary Berms (Sandbags)

DESCRIPTION

A temporary berm is a ridge of compacted soil, or sandbags which intercepts and diverts runoff from small construction areas. Temporary berms are often constructed along the top edge of fill slopes but may also be constructed across the roadway (as a transverse berm) at a slight angle with the centerline.

Berms are used to prevent runoff onto newly constructed slopes until vegetation is established or until permanent measures are in place. They intercept flow from the construction area and direct it to temporary slope drains or to outlets where it can be safely discharged.

Targeted Pollutants

- ● Sediment
- ○ Phosphorus
- ○ Trace metals
- ○ Bacteria
- ○ Petroleum hydrocarbons

Physical Limits

Drainage area 5 ac

Max slope 50%

Min bedrock depth N/A

Min water table N/A

SCS soil type ABCD

Freeze/Thaw good

Drainage/Flood control yes

APPLICATIONS

Temporary berms are used to direct or divert runoff flows, or as barriers to collect and store runoff. They are used at storm drain inlets, across minor swales and ditches, and for other applications where the structure is of a temporary nature.

LIMITATIONS

Temporary berms do not provide filtration. Therefore, they can only be used for minor flows.

DESIGN PARAMETERS

Soil berm: A berm of soil with an approximate height of 12 to 20 in (300 to 500 mm) with a minimum top width of 2 to 2.3 ft (600 to 700) mm and side slopes of 2:1 or flatter. Berms should be high enough to prevent flow from overtopping. Berms are normally constructed from embankment materials.

Sandbag berm: The following dimensions are suitable for sandbag berms.

- Height - 20 in (0.5 meter) minimum
- Top width - 20 in (0.5 meter) minimum
- Bottom width - approximately 4.25 to 5 ft (1.3 to 1.5 meters)
- Sandbag size - length 2 to 2.6 ft (0.6 to 0.8 meters), width 16 to 20 in (0.4 to 0.5 meters), depth or thickness 6 to 8 in (150 to 200 mm), and weight 88 to 132 lb (40-60 kg)

CONSTRUCTION GUIDELINES

Soil berm: All berms should be graded to drain to a slope drain inlet. When practical, embankments should be constructed with a gradual slope to one side of the embankment. This will permit the placement of all temporary berms and slope drains on one side of the embankment. When fills are constructed on sidehill slopes, the top surface should slope toward the inside so that surface runoff will be away from the fill slope.

- Compact the entire width of the berm. This can be accomplished with the track of a bulldozer or, preferably, with a grader wheel (rubber).

Sandbag berm:

- Install so that flow under or between bags is prevented.
- Stack the sandbags in an interlocking fashion to provide additional strength for resisting the force of the flowing water. However, do not stack them more than three high without broadening the foundation using additional sandbags, or providing additional stability.
- Sandbag sediment barriers should store the runoff from design storm as specified.

MAINTENANCE:

Temporary berms should be inspected and repaired periodically as well as after each significant rainfall.

Sandbags should be reshaped or replaced as needed during inspection. Additional inspections should be made daily during wet weather. When silt reaches 6 inches (150 mm), the accumulated silt should be removed and disposed of at an approved site in a manner that will not contribute to additional siltation. The sandbag berm should be left in place until all upstream areas are stabilized and accumulated silt has been removed. Removal of bags should be done by hand.

BMP #143 - Temporary Storm Drain Diversion

DESCRIPTION

The re-direction of a storm drain line or outfall channel so that it may temporarily discharge into a sediment trapping device. The purpose is to prevent sediment laden water from entering a watercourse, public or private property through a storm drain system, or to temporarily provide underground conveyance of sediment laden water to a sediment trapping device.

Targeted Pollutants

- ● Sediment
- ○ Phosphorus
- ○ Trace metals
- ○ Bacteria
- ○ Petroleum hydrocarbons

Physical Limits

Drainage area 5 ac

Max slope 50%

Min bedrock depth NA

Min water table NA

SCS soil type ABCD

Freeze/Thaw good

Drainage/Flood control yes

APPLICATIONS

One of the following practices or procedures shall be used whenever the off-site drainage area is less than 50 percent of the on-site drainage area to that system. A special exception may be given, at the discretion of the local permitting authority, where site conditions make this procedure impossible.

DESIGN METHODS FOR TEMPORARY DIVERSION

- Construction of a sediment trap (basin) (see BMP #137) below a permanent storm drain outfall: Temporarily divert storm flow into the basin or trap constructed below permanent outfall channel.
- In-line diversion of storm drain at an inlet or manhole: Achieved by installing a pipe stub in the side of a manhole or inlet and temporarily blocking the permanent outfall pipe from that structure. A temporary outfall ditch or pipe may be used to convey storm flow from the stub to a sediment trap or basin. This method may be used just above a permanent outfall or prior to connecting into an existing storm drain system.
- Delay completion of the permanent storm drain outfall and temporarily divert storm flow into a sediment trap: Earth dike (BMP #140), swale (BMP #139) or designed diversion is used, depending on the drainage area, to direct flow into a sediment trap. The trap should be constructed to one side of the proposed permanent storm drain location whenever possible.
- Installation of a stormwater management basin early in the construction sequence: Install temporary measures to allow use as a sediment basin. Since these structures are designed to receive storm drain outfalls, diversion should not be necessary.

COMPLETION AND DISPOSITION

When the areas contributing sediment to the system have been stabilized procedures can be taken to restore the system to its planned use.

The following removal and restoration procedure is recommended:

1. Flush the storm drain system to remove any accumulated sediment.

1. Remove the sediment control devices, such as traps, basins, dikes, swales, etc.

2. For sites where an inlet was modified, brick shut the temporary pipe stub and open the permanent outfall pipe.

3. Establish permanent stabilized outfall channel as noted on the plans.

4. Restore the area to grades shown on the plan and stabilize with vegetative measures.

5. For basins that will be converted to stormwater management, remove the accumulated sediment, open the low flow orifice, and seed all disturbed areas to permanent vegetation.

BMP #144 - Topsoiling

Targeted Pollutants

- ● Sediment
- ○ Phosphorus
- ○ Trace metals
- ○ Bacteria
- ○ Petroleum hydrocarbons

Physical Limits

Drainage area unlimited

Max slope 50%

Min bedrock depth 3 ft

Min water table 2 ft

SCS soil type N/A

Freeze/Thaw fair

Drainage/Flood control no

DESCRIPTION

This BMP includes the placement of topsoil or other suitable plant growth material over disturbed lands to provide a suitable soil medium for vegetative growth and a supply of native or locally occurring seeds and propagules. Topsoiling may involve bringing in soils from off site or merely replacing fertile topsoils that were stripped and stockpiled during earlier site development activities.

APPLICATIONS

Topsoiling is recommended on slopes 2:1 or flatter where the native soil is unsuitable for vegetative growth. It is an effective way of improving plant establishment on sites where moisture, nutrients, or pH levels are low, or where the remaining soil is too shallow to support root systems.

LIMITATIONS

Be careful not to apply topsoil over a subsoil of contrasting texture. For instance, a clay-like topsoil placed over a sandy soil may cause the topsoil to slough as water flows between the two soil layers of different permeability. Also, topsoil should not be applied when the subsoil is frozen or extremely wet.

DESIGN PARAMETERS

Plan to maintain the existing or established grade of the subsoil. The topsoil should be uniformly distributed at a minimum compacted depth of 2 inches (50 mm) on slopes 3:1 or steeper, and 4 inches (100 mm) deep on flatter slopes. The soil should be a loam, sandy loam, clay loam, silt loam, sandy clay loam, or other mixture approved by an agronomist. It should be free of subsoil, refuse, sticks, noxious weed seeds, other extraneous materials, and stones larger than 1.5 inches (40 mm) diameter.

Topsoil can either be obtained commercially or stripped, stockpiled, and replaced on the construction site. Stockpiled topsoils should undergo a laboratory analysis to determine organic content, pH, and soluble salts. A pH of 6.0 to 7.5 and organic content of not less than 1.5 percent by weight is recommended. Where soil pH is less than 6.0, lime may be applied to adjust pH to 6.5 or higher. Any soils having soluble salt content greater than 500 parts per million should not be used.

If desired, it is possible to place a thin layer of topsoil 1.2 to 2 inches (30 to 50 mm) thick on benched slopes. In such applications, it is important not to apply so much topsoil that the value of the benches is destroyed. This method is especially valuable on rocky benches, especially on south- or west-facing slopes, however, proper placement of the soil is often a problem. In some cases, soil has been bucketed onto slopes. This produces an uneven spread and the quantity is hard to control. Soil can also be blown onto the slope using a snow blower. In that case, organic matter can be mixed with the soil, but the soil should be screened to remove any rocks larger than 2 inches (50 mm). The advantage is that the amount of soil needed is much less and it can be spread very rapidly on the horizontal surfaces. The soil may need some form of stabilization before the next rain event. Consider whether mulch, matting, geotextiles or seeding is required and when.

CONSTRUCTION GUIDELINES

The following guidelines apply to the placement of topsoil:

- The existing or established grade of subsoil should be maintained.
- Lime may be uniformly applied over designated areas where subsoil is highly acidic or heavy in clay content.
- Prior to spreading topsoil, loosen the subgrade by discing (or other method) to a depth of 2 inches (50 mm) to permit bonding of subsoil to topsoil. Tracking a bulldozer vertically over the slope will pack the soil and create horizontal erosion check slots to prevent topsoil from sliding down the slope.
- Spread the topsoil uniformly at a minimum compacted depth of 2 inches (50 mm) on 1:3 or steeper slopes and 4 inches (100 mm) on flatter slopes. A depth of 6 to 12 inches (150 to 300 mm) is preferred. Any surface irregularities should be corrected in an effort to prevent formation of water-holding depressions.
- Where quantities of stockpiled topsoil on site are limited, it is more desirable to cover all areas of exposed subsoil to a lesser depth than to cover partial areas to the suggested minimum depth of 3.1 inches (80 mm).
- Topsoil should not be placed when the subgrade is frozen, excessively wet or in a condition that may otherwise be detrimental to proper grading or proposed sodding or vegetation establishment.

MAINTENANCE

Periodically and after major storm events, inspect, repair, and reseed as necessary to control slope erosion and subsequent topsoil losses.

BMP #145 - Seeding

DESCRIPTION

Permanent Seeding means growing a long-term or permanent vegetative cover (plants) on disturbed areas or areas that need assistance in revegetation. The purpose of permanent seeding is to reduce erosion and sedimentation and to establish desirable competitive ground cover for wildlife habitat and ease of roadside maintenance. This practice uses prescribed perennial grasses, legumes and native shrubs or wild flowers that will hold the soils, reduce storm water runoff and act as a bio-filtering system on long term basis.

The guidelines given in this fact sheet for design, construction and maintenance can also be used to install temporary seeding on construction sites.

Targeted Pollutants

- ● Sediment
- ◒ Phosphorus
- ◒ Trace metals
- ○ Bacteria
- ○ Petroleum hydrocarbons

Physical Limits

Drainage area	unlimited
Max slope	5%
Min bedrock depth	2 ft
Min water table	2 ft
SCS soil type	ABCD
Freeze/Thaw	fair
Drainage/Flood control	no

APPLICATIONS

Temporary seeding should be considered as slope protection and erosion control practice for construction sites. Permanent seeding should be considered for any disturbed area where all construction or maintenance activities have ceased or been finalized and is now ready for permanent vegetative cover. Typical areas subject to permanent vegetative cover are all areas disturbed by new construction, reconstruction, maintenance, materials source site and areas in need of revegetation.

The primary advantages of seeding are:

- It establishes good soil stabilization.
- It prevents soil erosion and sedimentation.
- It contains and filters storm water runoff.

Additional advantages specific to permanent seeding are:

- It provides wildlife ground cover and habitat.
- It competes with undesirable vegetation and noxious weeds.
- It provides aesthetic qualities.
- It reduces the cost of maintenance.

LIMITATIONS

Permanent vegetative ground cover will take several years before sufficient establishment takes place. Establishment will occur quicker in high precipitation areas, usually over 20 inches (500 mm), as opposed to the arid or semi-arid regions of the state. Permanent seeding should be conducted in conjunction with various forms of mulching, matting and annual grass (cereal grain) as a nurse crop.

Other factors that contribute to the success or failure of permanent seeding are:

- Seeding should be done at the proper time of year.
- Proper application of fertilizers as prescribed will contribute to the success of the seeding.
- Once seeded, the site should not be disturbed.
- Irrigation may have to be used in low precipitation area (arid/semi-arid) for establishment.

DESIGN PARAMETERS

Conduct all permanent seeding and fertilizing in accordance with local requirements. See Appendix F in this manual for additional guidelines.

CONSTRUCTION GUIDELINES

- Permanent seeding is the last phase of reclaiming any disturbed soils.

MAINTENANCE

- Inspect all seeded areas on a regular basis and after each major storm event to check for areas where corrective measures may have to be made.
- Indicate which areas need to be reseeded or where other remedial actions are necessary to assure establishment of permanent seeding.
- Continue monitoring of the site/area until permanent vegetation is established.

BMP #146 - Sodding

DESCRIPTION

This BMP entails the placement of rolls or strips of sod as a landscape planting or erosion control measure. Sod is a layer of soil bound by grass and plant roots into a thick mat. It is commercially available in rolled strips that are laid over an area of exposed soil. Sod stabilizes the area by immediately covering the surface with vegetation and enabling storm water to infiltrate into the ground.

Targeted Pollutants

●	Sediment
◒	Phosphorus
◒	Trace metals
○	Bacteria
○	Petroleum hydrocarbons

Physical Limits

Drainage area	unlimited
Max slope	14%
Min bedrock depth	2 ft
Min water table	2 ft
SCS soil type	ABCD
Freeze/Thaw	fair
Drainage/Flood control	no

APPLICATIONS

Sodding is appropriate for any graded or cleared area that might erode and where a permanent, long-lived plant cover is needed immediately. It can be a temporary or permanent BMP. Possible uses for sod include buffer zones, stream banks, dikes, swales, slopes, outlets, level spreaders, and filter strips.

Primary advantages of sod are:

- Provides immediate dense vegetative cover and erosion control.
- Provides more stabilizing protection than initial seeding.
- Generates less weed growth than seeded vegetation does.
- Can be available for site activities (open to foot traffic) within a shorter time than can seeded vegetation.
- Can be placed at any time of the year as long as water is available and moisture conditions in the soil are favorable.

LIMITATIONS

- Purchase and installation costs are higher than for seeding.
- Continued irrigation may be required if the sod is placed during dry seasons or on sandy soils. Watering may be necessary after planting and during periods of drought or intense heat.
- Sod should not be installed during very hot or wet weather.

DESIGN PARAMETERS

Materials: Use grasses that require little or no maintenance (watering or fertilizing). This may require advance planning to obtain grasses that are desirable for the location.

Site preparation: The soil surface should be find graded before laying down the sod. Topsoil may be needed in areas where soil textures or conditions are inadequate (such as dense or impermeable soils). Add lime and fertilizers as needed to promote good plant growth conditions.

Slope: Do not place sod on slopes greater than 3:1 if slopes are to be mowed. If placed on steep slopes, the sod should be laid with staggered joints or be pegged down (or both).

Installation methods: Sod can be applied in strips or other patterns, or alternate areas can be seeded to reduce expense. If placed on steep slopes or next to running waterways, consider placing chicken wire, jute, or other matting over the sod for extra protection against lifting. See BMP #124-Matting and Netting or BMP #123-Geotextiles.

CONSTRUCTION GUIDELINES

- Spread and grade the topsoil (if used). Sod may be placed directly on the ground (without topsoil) only if it has been specifically grown for sites with no topsoil.
- Prepare the soil surface by fine-grading the surface before laying sod. Sodding should then take place immediately after the soil bed is established.
- Lay the sod in a staggered pattern, as shown. Sod in waterways must be laid parallel to the flow.
- Sod can be laid in strips on the contour to reduce effective slope length.
- Roll or compact the sod immediately after installation to ensure firm contact with the underlying soil.
- Water to a depth of 4 inches (100 mm), as needed.

MAINTENANCE

- Inspect the sod frequently after it is first installed, especially after large storm events, until it is established as permanent cover. Remove and replace any dead sod.
- Once the sod is established, mow the area as needed.
- Water as often as necessary during periods of intense heat or lack of rain.
- Sodding usually serves as both a temporary and permanent measure and therefore does not require removal.

BMP #147 - Planting

DESCRIPTION

This BMP fact sheet describes the process of establishing vegetation by setting out plants that have been grown to a specified size or age. The plants may be potted in plastic tubes or in containers of various sizes, or root wrapped, or may be bare root stock .

Plantings are often specified for aesthetic purposes (landscaping) but can serve various erosion control functions as well. The living trees and shrubs in a planted area will grow large enough to provide soil stabilization and erosion control benefits sooner than the seeds of woody species can germinate and grow to effective size.

The use of trees and shrubs also provides greater aesthetic and biological diversity and, in many areas, is more compatible with vegetation on lands adjoining the planted site.

Also refer to Appendix F for additional design guidance regarding using landscaping to maximize water quality benefits.

Targeted Pollutants

- Sediment
- Phosphorus
- Trace metals
- Bacteria
- Petroleum hydrocarbons

Physical Limits

Drainage area unlimited

Max slope 50%

Min bedrock depth 3 ft

Min water table 3 ft

SCS soil type ABCD

Freeze/Thaw fair

Drainage/Flood control no

APPLICATIONS

Planting is the preferred method of revegetation in many situations where seeding and other slope treatments are either not effective or not appropriate as permanent measures. Such areas may include:

- Any finished slope that will remain undisturbed for at least ten years, especially if the area is bordered by forests, wetlands or other naturally occurring woody vegetation. On such sites, trees and shrubs may be the desirable vegetation from a long-term perspective, but may be very difficult or unreliable to establish from seed.
- Extremely rocky slopes or sites. If natural vegetation is present in significant amounts, such areas are difficult to seed and mulch effectively. Plantings can be used to provide additional stabilization.
- Streets or materials source sites that have been abandoned permanently.
- All types of landscaping, including urban thoroughfares and interchanges, and residential streets where landscape aesthetics are a concern.
- Wetlands and wildlife habitat areas: in such areas, it may be critical to plant the desired species initially, so that the site is not overrun by weeds or undesirable plant species that detract from the intended use of the site.

- Areas where the higher rate of transpiration for trees and shrubs (compared to grasses and forbs) helps remove excess moisture from the soil.

LIMITATIONS

- Purchase and installation costs are higher than for seeding.
- Continued or periodic irrigation may be required if planting occurs during dry season or on sandy soils. Watering may also be necessary up to two years after planting and during periods of drought or intense heat.
- Specific seasons of work apply for planting. Planting outside the designated season should not be allowed unless provisions for special care and maintenance of the plants are enforceable.

DESIGN PARAMETERS

Advantages of Planting: Many shrubs and trees are difficult to establish from seed in natural environments and natural seed crops vary widely from year to year. Rapid invasion from native vegetation and rapid establishment of sown seed of woody species is therefore unreliable. Vegetative plantings are used to provide living shrubs and trees that will grow to adequate size to provide soil stabilization and erosion control faster than seeds of woody species can germinate and grow to these dimensions.

Materials: Planted material may be grown from either cuttings or seed. At delivery to a job site, the plants may be potted (in containers), root wrapped, or bare root stock. Some species are successfully planted as sprigs or tubelings.

Use of Native Species: If possible, use species that are native to the area. Native species provide long-term soil stabilization which is aesthetically harmonious with natural vegetation and which requires little long-term maintenance. Short-term maintenance is necessary to ensure the establishment of the vegetation.

Maximizing Effectiveness: Successful planting projects depend on selecting suitable plant species, using healthy planting stock, and planting when the season and weather conditions are favorable. The site must be properly prepared for planting, and must be properly maintained after planting to ensure long-term survival of the plants. Make sure the contract and plans include adequate provisions for all aspects of the planting process.

Since vegetative planting places living plants on a site, thus decreasing the length of time necessary to establish a complete revegetation project, it is more effective than seeding methods for revegetation. Adequate maintenance is absolutely necessary to achieve this effectiveness since vegetative planting require irrigation for at least the first year, and will benefit from irrigation for two or more years.

Vegetative planting may be combined with seeded grasses and legumes which provide immediate surface coverage (see BMP #145-Seeding).

CONSTRUCTION GUIDELINES

Make sure that planting site is adequately graded and that tree locations and planting areas (for shrubs, vines, and ground covers) are marked and approved before planting begins.

Plant materials must be examined before use to ensure that species, container sizes, and root and soil condition are acceptable. If possible, the growth medium for containerized plants should be similar to the soil type on the revegietation site. Container size guidelines are as follows:

- Tree species may be of bare root stock or of potted stock. Pots should be one gallon (4 liter) size or larger.
- Shrub species may be of bare root stock or of potted stock. The preferred planting pot is a tube of woven plastic that is planted with the plant contained in it. The pot deteriorates over time. The pots should be 2 inches (50 mm) long, with both ends open.
- Paper pots must be 2 to 3.1 inches (50 to 80 mm) square and 8.5 to 12 inches (220 to 300 mm) long. The paper around the rim should be removed to ground level at planting.
- Peat pots are not recommended since research has shown greater mortality of plantings in peat pots due to drying. If peat pots are used, any exposed peat pot material showing after planting should be removed.
- In general, no container should be less than 2 inches (50 mm) wide and 6 inches (150 mm) deep.

Plant storage: Store bundled bare root planting stock, whether tree or shrub species, in a cool, moist place from time of receipt until time of planting. This time should not exceed 10 days.

Store potted planting stock in shade, out-of-doors, and kept lightly sprinkled with water to maintain a moist soil from the time of receipt to the time of planting. This time should not exceed 30 days.

Planting procedures:

- Plant the mixture of trees and shrubs that has been prescribed. In no case should this be less that 690 plants per acre (1,700 plants per hectare). If bare root stocks are used, planting rates should be increased by 1.25 times the stated rate.
- Voluntary or unskilled labor may be used in planting. However, a supervisor who is skilled in the techniques being used should direct the labor.
- Construct a basin 12 inches (300 mm) in diameter and depressed no more than 2 inches (50 mm) from the elevation of the downslope lip.
- Open the planting hole with a planting bar or shovel. Then place the plant near the downslope lip of the basin. This allows sloughing from the slope to fall in to the basin without burying the young plant.

- Carefully remove plants from their containers, if any, and place them in the planting holes so that the crown of the plant is at the surface of the soil. No air space should be allowed around the roots, nor should the roots be folded under. Plants in individual containers made of decomposable material are planted without removing them from the container.

- Apply fertilizer at the rate specified, and place wood chip or wood fiber mulch to a depth of 2 inches (50 mm) around each plant.

- The soil should be wetted to field capacity to a depth of 3.1 to 4 inches (80 to 100 mm) at the time of planting and each time the soil moisture level drops below the permanent wilting percentage.

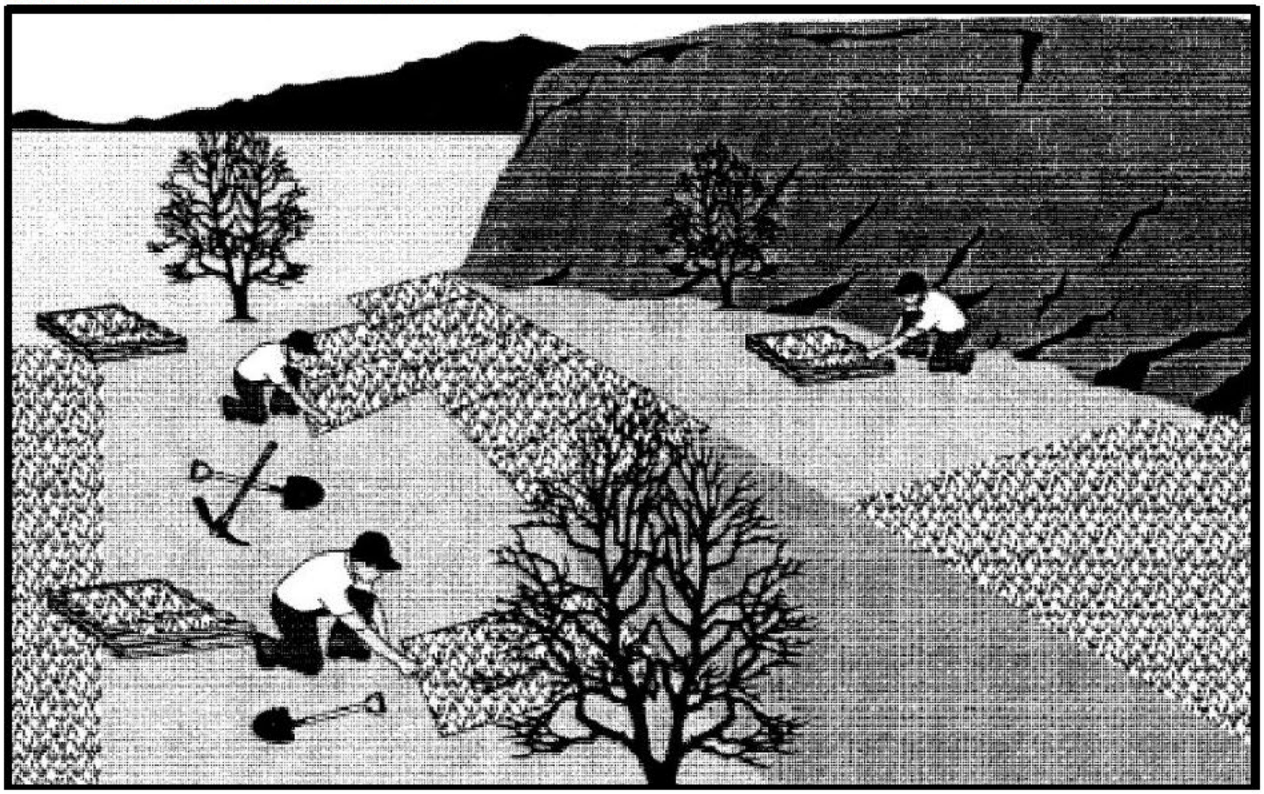
MAINTENANCE

- Irrigation of vegetative plantings during the first two years following planting is required to increase the survival rate. Water as often as necessary during periods of intense heat or lack of rain.

- Inspect plantings frequently after first installed to see if plants are thriving. Remove and replace dead plants to restore the prescribed number of living plants per hectare.

- After storm events, examine the planting basins and mulch cover and make any needed repairs.

BMP A - REVEGETATE BARREN AREAS



Description of Potential Pollutant and Source: Barren areas are typically sources of erosion-related pollutants.

Description of BMP: Seeding, sodding and planting shrubs and trees can be used to revegetate a barren area. It is usually necessary to fertilize and water in order to establish new vegetation. Native plants should be used wherever possible to reduce water demands. The local Soil and Water Conservation District and the Board of Water Supply have information regarding appropriate native plants and seed mixes. See BMPs B and C for information on mulches and soil binders.

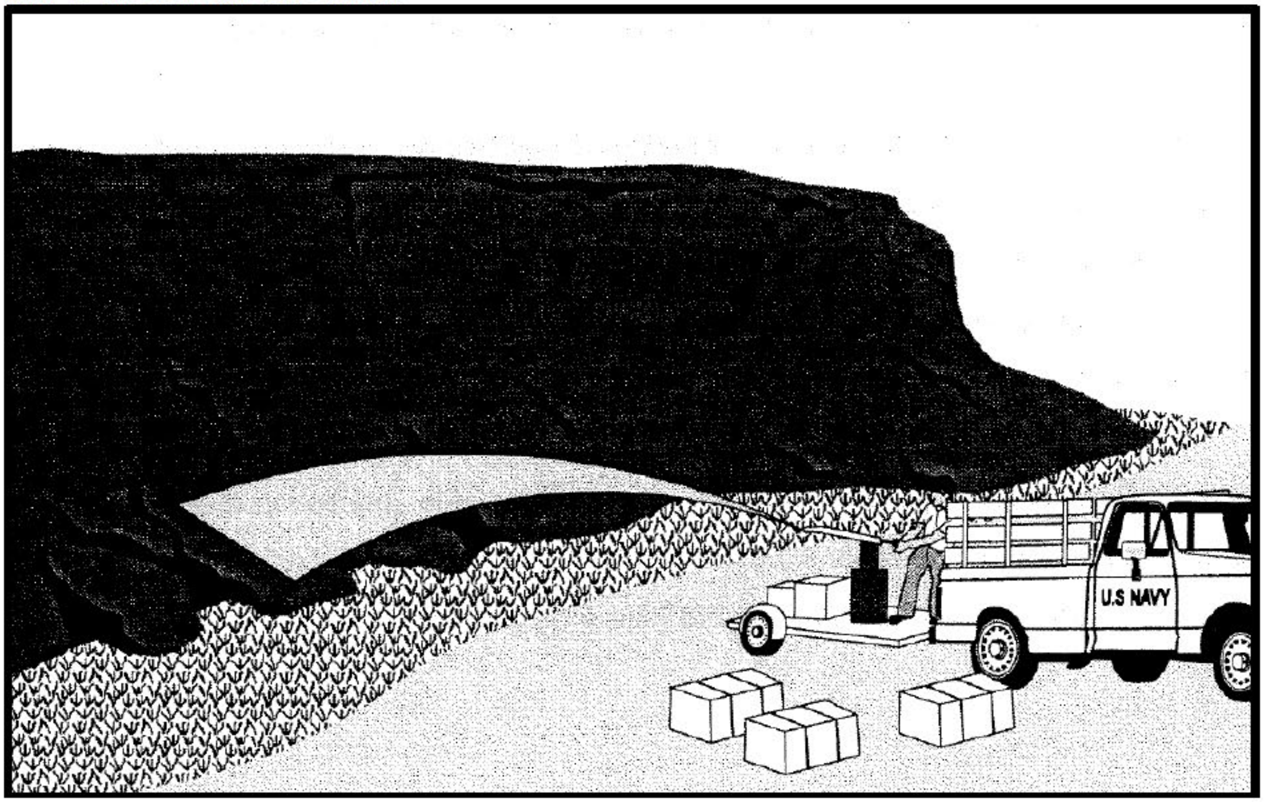
Application Guidance: Sites which are eroding due to lack of vegetation will be revegetated.

Maintenance: Maintenance activities may include fertilizing, irrigation, pruning, and weed and pest control.

Effectiveness and Cost: Establishing vegetation is very effective in reducing erosion. The cost of revegetation will vary depending on the method used, the availability of water, and size of area.

Limitations: It may be difficult to establish vegetation in areas which are heavily used, lack sufficient water, or have poor soils. Irrigation is required for revegetation until plants are established.

BMP B - MULCH EXPOSED AREAS



Description of Potential Pollutant and Source: Exposed areas are sources of erosion-related pollutants.

Description of BMP: Mulch exposed areas. Organic mulching is used to provide temporary erosion control, moisture, and shade to areas being revegetated. Organic mulches include hay, straw, wood fiber, and recycled paper. Mulches must be crimped or netted into the soil. Inorganic mulches, such as gravel, cobbles, and decomposed granite can be used for permanent protection of exposed soil from raindrop impact and runoff in areas where the establishment of new vegetation is not feasible.

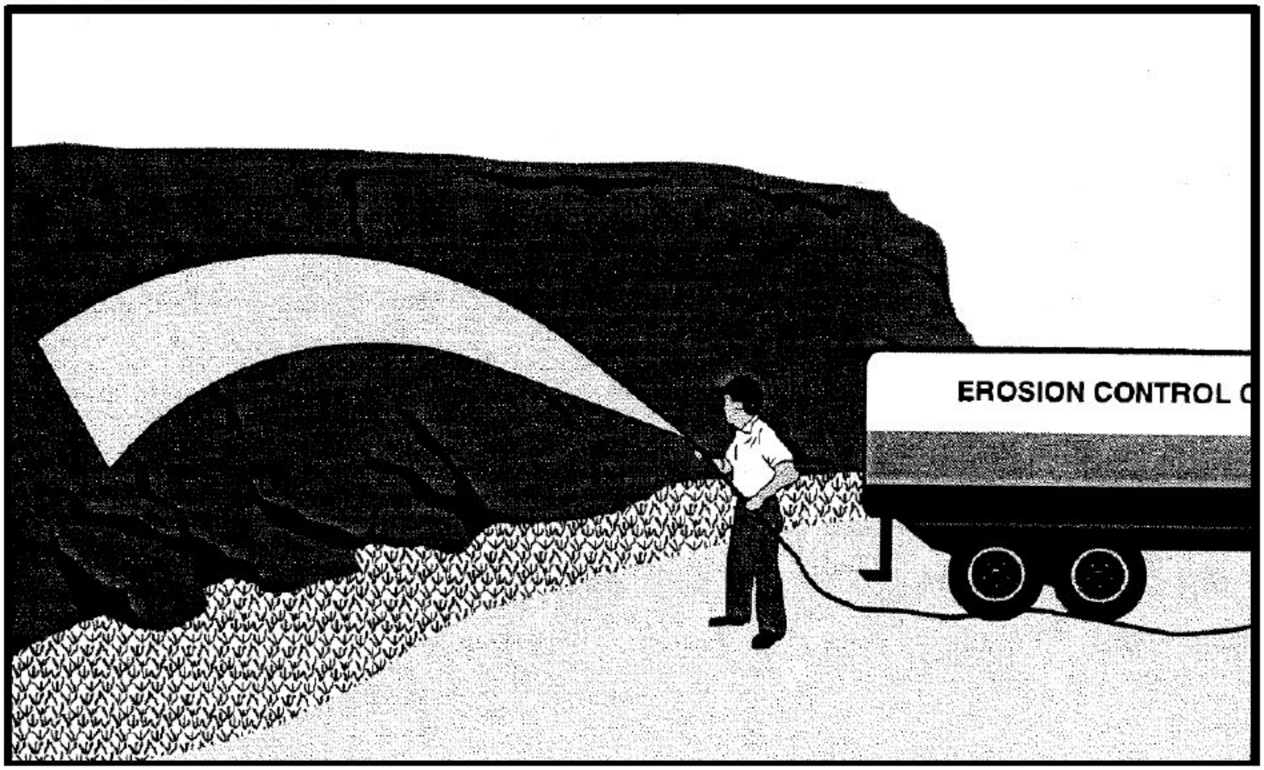
Application Guidance: Organic mulching will be used to provide temporary erosion control and to enhance the establishment of new vegetation. Inorganic mulches can be used to stabilize areas that cannot be seeded or planted, such as areas that are heavily trafficked or have insufficient rainfall.

Maintenance: Areas that have been mulched will be periodically inspected, and any damaged areas will be re-mulched. Organic mulches will be inspected weekly and after every rainfall.

Effectiveness and Cost: Organic mulches are relatively ineffective in reducing erosion but are highly effective in the establishment of new vegetation. The cost varies with the size of area and type of mulch selected. Inorganic mulches are highly effective in reducing erosion provided the soil is adequately covered. The cost varies with the size of the area and the availability and type of mulch selected.

Limitations: Mulches are applied hydraulically and are limited in application to slopes adjacent to areas accessible by large equipment. Mulches provide limited temporary erosion control and are intended primarily to enhance the establishment of vegetation.

BMP C - USE SOIL BINDERS



Description of Potential Pollutant and Source: Exposed areas are sources of erosion-related pollutants.

Description of BMP: Use soil binders. These are also known as chemical mulches, chemical stabilizers, or soil palliatives. Binders made of acrylic co-polymers, emulsifications, and other materials are sprayed onto the surface of the soil to hold the soil in place and provide short-term protection against erosion from storm water runoff and wind. Soil binders can be used alone, as temporary "bare earth" erosion control, or with seed and mulch as temporary erosion control until the new vegetation is established. Some soil binders are completely biodegradable.

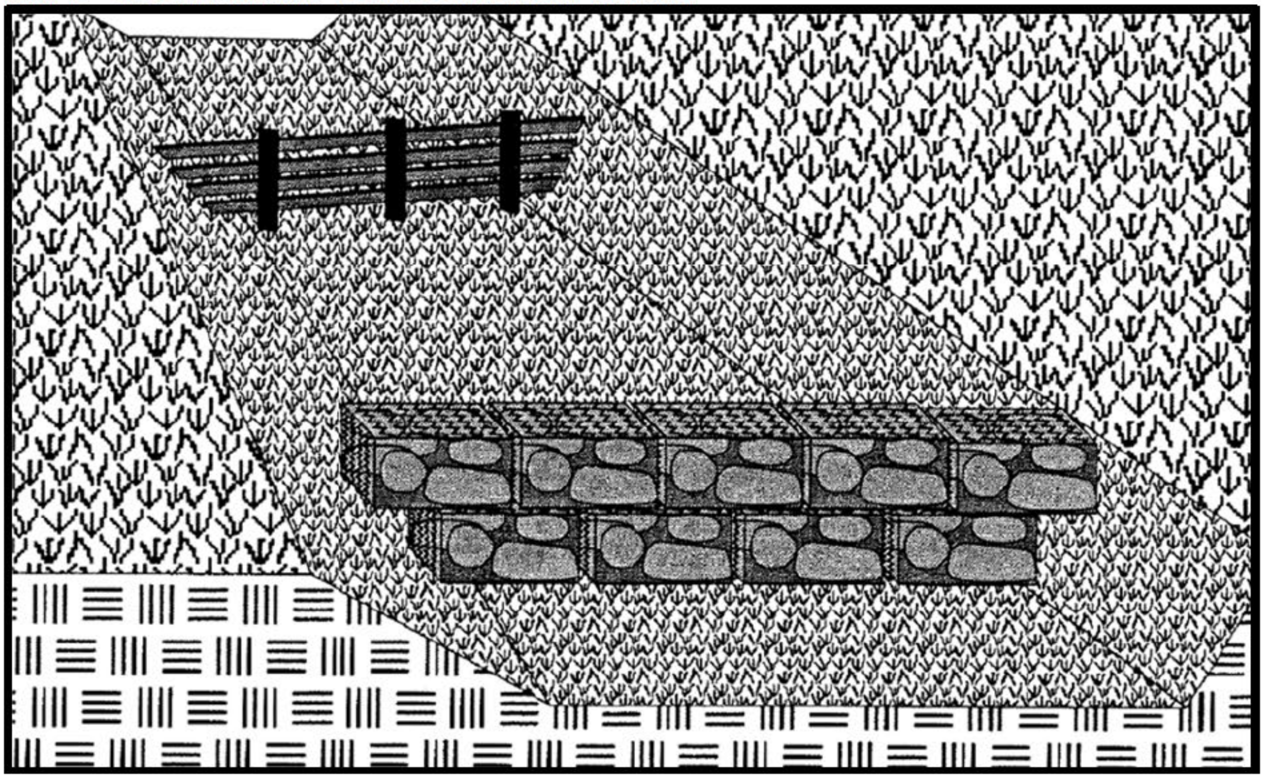
Application Guidance: Soil binders will be used in eroding areas where temporary seeding practices cannot be used because of season, or where more effective erosion control is needed until the vegetation is established. Soil binders provide immediate protection to soils that are in danger of erosion. Soil binders are not a long-term solution to erosion.

Maintenance: Soil binders are a temporary practice and must be periodically reapplied to be effective. Some soil binders can last twelve to eighteen months on bare earth when applied at the appropriate rate.

Effectiveness and Cost: Soil binders, when applied with seed and mulch, can provide immediate and inexpensive short-term erosion control that is more effective than seeding and mulching without binders. Soil binders used alone can provide effective, relatively inexpensive, short-term erosion control.

Limitations: The use of soil binders is a temporary erosion control practice. The application rates and procedure recommended by the manufacturer of the soil binder product must be followed. Soil binders are applied with large spray equipment and are limited to readily accessible areas.

BMP D - USE CHECK DAMS TO REDUCE RUNOFF VEWCITY



Description of Potential Pollutant and Source: Water in an unlined channel or swale which flows at a high velocity can cause erosion and transport of sediment downstream.

Description of BMP: Use check dams to reduce runoff velocity. Check dams are small dams constructed across a swale or drainage channel. Check dams can be built from logs, stones, or gabions. Check dams are used to reduce the velocity of the flow, which reduces the amount of erosion caused by the flow.

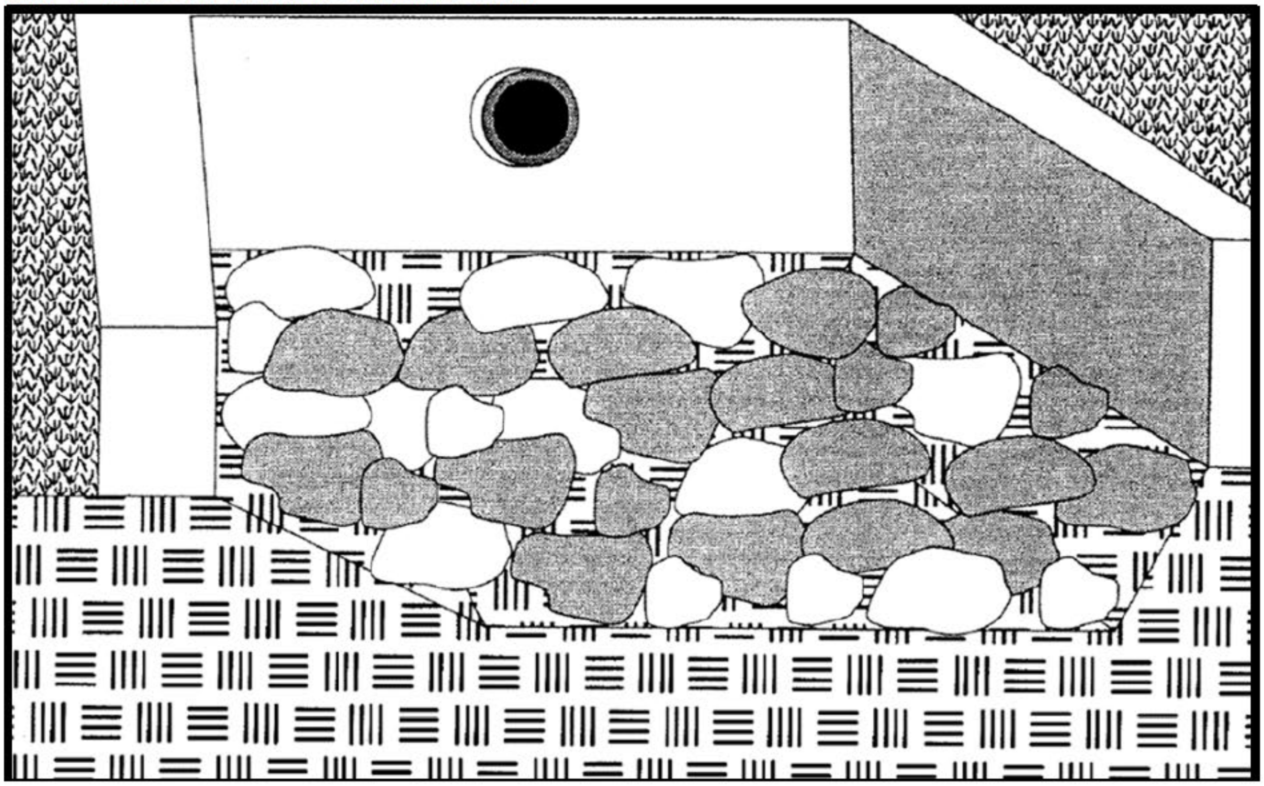
Application Guidance: Check dams will be used when erosion is caused by high velocities in a swale or drainage channel. This will typically occur in a steeply sloped swale. Check dams will only be used in small ditches and swales that drain ten acres or less.

Maintenance: Check dams will be inspected for sediment and debris accumulation after every major storm event. The accumulated sediment must periodically be removed.

Effectiveness and Cost: Check dams can provide effective, inexpensive erosion control for stream banks.

Limitations: Check dams should not be placed in streams.

BMP E - REDUCE FWW VELOCITY AT OUTLET



Description of Potential Pollutant and Source: Concentrated storm water runoff exiting a pipe or swale outfall can cause erosion and transport of sediment downstream.

Description of BMP: Use outlet protection to reduce the velocity of storm water flowing out of storm water pipe outlets or the end of channels. Stone, riprap, pavement, or concrete can be used for outlet protection.

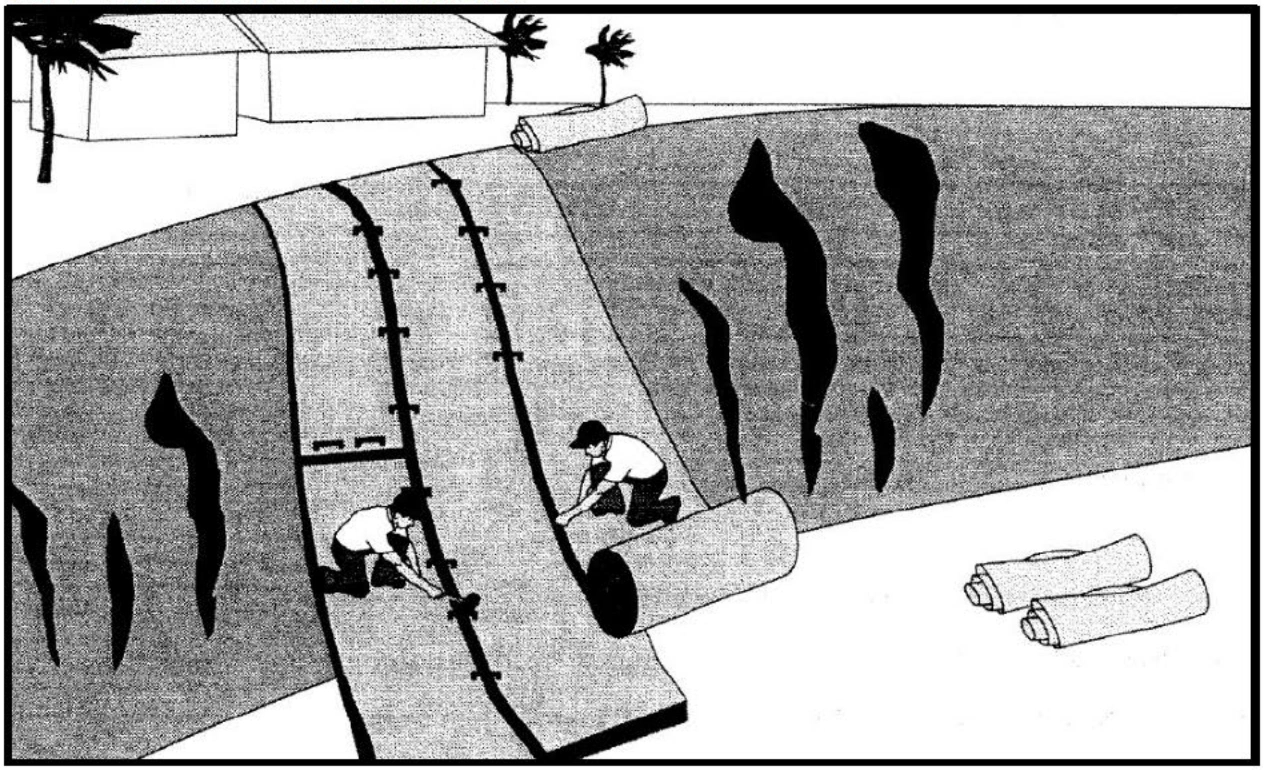
Application Guidance: Outlet protection will be used whenever there is erosion at storm water pipe or channel outlets.

Maintenance: Outlet protection will be periodically inspected for erosion and scouring.

Effectiveness and Cost: Outlet protection can provide effective, inexpensive erosion control.

Limitations: None

BMP F - USE EROSION CONTROL BLANKETS



Description of Potential Pollutant and Source: Exposed areas are sources of erosion-related pollutants.

Description of BMP: Use erosion control blankets. These are used with seeding to provide temporary and/or permanent erosion control, depending on the type of blanket. Biodegradable blankets made of wood fiber, straw, coconut, or combinations are used in conjunction with seeding for short-term erosion control on steep or rapidly eroding areas where mulches or binders would not be effective enough. Synthetic blankets made of vinyl, rigid nylon, or flexible polypropylene are used with seeding for long-term erosion control in swales, ditches, channels or other areas of concentrated flow. Turf reinforcement mats are three dimensional mats that are soil filled and seeded to provide a permanent reinforces soil-map-vegetation matrix. Soil fibers, either individual or continuous fibers (roving), are sprayed on the soil with seed to provide an in-place matrix for short-term or long-term erosion control, depending on whether organic or synthetic fibers are used.

Application Guidance: Erosion control blankets will be used in critical (steep or rapidly eroding) areas or areas of concentrated flow in conjunction with seeding for the establishment of vegetation.

Maintenance: Maintenance activities include inspection after major storms for securing or damage.

Effectiveness and Cost: Erosion control blankets are highly effective for short-term and long-tern erosion control. Costs are higher initially than mulches or binders, erosion control blankets but can be cost-effective in the long-term.

Limitations: Erosion control blankets are placed by hand and, therefore, are not limited in application; they also may be applied on slopes steeper than one to one. In contrast, soil fibers are placed with equipment and are limited to readily accessible area

APPENDIX 13-1

Program Effectiveness Assessment Plan

FINAL

PROGRAM EFFECTIVENESS ASSESSMENT PLAN

Storm Water Management Program Plan

Marine Corps Base Hawaii

NPDES Permit No. HI 000007

Prepared by:

Marine Corps Base Hawaii

March 2023

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List of Acronyms and Abbreviations

AMS	Asset Management System
BMP	Best Management Practice
CASQA	California Storm Water Quality Association
DOE	State of Hawaii Department of Education
DOH	State of Hawaii Department of Health
FY	Fiscal Year
GIS	Geographic Information System
MCBH	Marine Corps Base Hawaii
MCD	Facilities Engineering Maintenance Control Division
MEP	Maximum Extent Practicable
MS4	Municipal Separate Storm Sewer System
NAVFAC	Naval Facilities Engineering Systems Command
NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System
O&M	Operation and Maintenance
PPV	Public-Private Venture
SWMP	Storm Water Management Program
SWPPP	Storm Water Pollution Prevention Plan
TMDL	Total Maximum Daily Load

1 Introduction

As of the effective date, September 1, 2021, the Marine Corps Base Hawaii (MCBH) is required to comply with the conditions of the National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4) Permit No. HIS000007 (referred to hereinafter as the "MS4 Permit"). The MS4 Permit includes authorized storm water and specified non-storm water discharges into Kaneohe Bay, Nuupia, Halekou, and Kaluapuhi Ponds, Kailua Bay, and the Mokapu Central Drainage Channel. Per the MS4 Permit, Part G.1.d., MCBH is required to provide a Program Effectiveness Assessment Plan. The MS4 Permit states:

> *Reporting Requirements, Part G.1.d:*
>
> *"Program Effectiveness Reporting - Within six (6) months from the effective date of the permit, the Permittee shall submit to DOH and implement their written strategy for determining the effectiveness of its SWMP. The strategy shall include water quality monitoring efforts as well as program implementation information and other indicators. The Permittee shall include an assessment of program effectiveness and identification of water quality improvements or degradation in its Annual Report."*

This plan presents the strategy for:

(1) Measuring progress of permit compliance and implementation of Best Management Practices (BMPs);
(2) Tracking program component effectiveness over the permit period; and
(3) Setting the framework to be able to link program implementation with environmental improvements over time.

1.1 Strategy

This plan has been developed to incorporate elements of the California Storm Water Quality Association (CASQA) approach to program effectiveness as detailed in their 2007 manual. The approach is based on expected outcomes that result from implementing the various components of the storm water management program. The outcomes are characterized into six Outcome Levels as shown on Figure 1, which has been adapted from CASQA. The pyramid structure illustrates the progression from implementing activities to protecting water quality. The Outcome Levels help categorize and define the desired results or goals of programs and control measures.

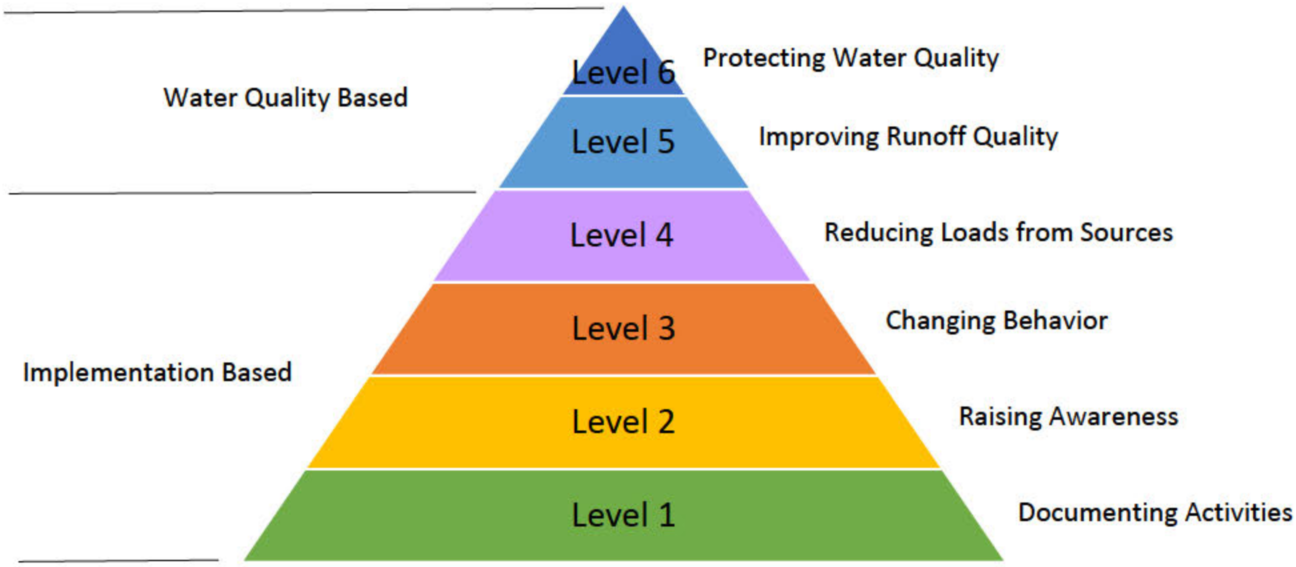

Figure 1: Outcome Levels

The Outcome Levels are defined as follows:

Level 1 – Documenting Activities

Many program activities are directly established as permit requirements and can be tracked by simply documenting activities. Level 1 outcomes may take the form of a confirmation of task completion (yes/no answers) or direct tabulation of efforts (such as the number of inspections completed or plans reviewed). Level 1 outcomes can also include documenting progress towards measurable goals by confirming whether they have been met or not. Level 1 outcomes reflect program implementation and permit compliance and are assumed to be beneficial to water quality but are not indicators of the direct impact of program implementation on environmental conditions.

Level 2 – Raising Awareness

Level 2 outcomes reflect how well the program is able to increase the level of knowledge and awareness and change attitudes of target audiences including tenant commands, civilian workers, residents, commercial and industrial businesses, contractors, and designers. Measuring these outcomes is done through various methods including surveys and training quizzes, and may be inferred through observations of community involvement such as the number of visits to the MCBH environmental website, and other partner websites. Similar to Level 1 outcomes, Level 2 outcomes are assumed to be beneficial to water quality but are not indicators of the direct impact of program implementation on environmental conditions.

Level 3 – Changing Behavior

The goal of raising knowledge and awareness (in Level 2 outcomes) is to effect behavior change that results in the implementation of recommended BMPs. Level 3 outcomes indicate how effective program components are in motivating behavior change and BMP implementation among target audiences. These changes can be tracked using surveys; site visits and inspections to observe BMP implementation at sites such as construction sites or industrial facilities; and tabulating changes in program involvement.

Level 4 – Reducing Pollutant Loads from Sources

Many BMPs are intended to reduce the amount of pollutants that have the potential to discharge into the MS4. Level 4 outcomes provide program managers with feedback and data regarding reductions in pollutant loads as a result of the implementation or enhancement of a BMP. These outcomes can include information such as the amount of debris collected during street sweeping, the amount of trash collected during volunteer cleanups, and by examining photos of the debris present in drainage ways and detention basins. The data are compared to baseline estimates to provide feedback on the effectiveness of BMPs and control strategies.

Level 5 – Improving Runoff Quality

The primary goal of the Storm Water Management Program (SWMP) Plan is to reduce pollutants to the MS4 to the maximum extent practicable (MEP) and to ensure that discharges do not cause or contribute to exceedances of water quality standards in receiving waters. Level 5 outcomes may be the most direct measure of program effectiveness as it relates to improving the quality of storm water runoff. Level 5 outcomes may be measured as reductions in one or more specific pollutants and may reflect effectiveness of BMP implementation at the above outcome levels.

Level 6 – Protecting Receiving Water Quality

The ultimate objective of any NPDES SWMP Plan is to protect receiving water quality. These outcomes are the most challenging to document and are many times affected by more than the quality of storm water discharges, including sanitary sewer overflows, rising groundwater, agricultural runoff, and other non-point source pollutants. Additionally, receiving water quality is dependent upon partnerships with other agencies, land owners and stakeholders, and the general public. Assessment methods include compliance with water quality standards, Total Maximum Daily Load (TMDL) programs, biological assessments, and other monitoring assessments. It may take years to establish a reliable data set and even longer periods of time to allow the cumulative impacts of multiple program elements to take effect.

1.2 Assessment Measures

In each outcome level, several methods are available to determine if outcomes are being achieved. These methods include:

- Confirming that permit requirements have been met;
- Tabulating specific activities and load reduction;
- Surveying employees and residents;
- Inspecting construction sites and post-construction BMPs; and
- Monitoring runoff and receiving waters.

A summary of the assessment methods and their application to each outcome level are listed in Table 1, below.

Table 1: Assessment Methods for Different Outcome Levels

Assessment Method	Outcome Level					
	Level 1 Documenting Activities	Level 2 Raising Awareness	Level 3 Changing Behavior	Level 4 Reducing Loads from Sources	Level 5 Improving Runoff Quality	Level 6 Protecting Receiving Water Quality
Confirmation	X					
Tabulation	X	X	X	X		
Survey		X	X			
Inspection	X	X	X	X		
Monitoring				X	X	X

Notes: Table has been adapted from CASQA Municipal Stormwater Program Effectiveness Assessment Guidance, 2007.

The various data collected will be tracked and compared from year to year in order to meet goals or as a way to view trends and help guide the program for subsequent years. The data will be tracked using program databases and the MCBH Facilities Engineering Maintenance Control Division (MCD)'s Geographic Information System (GIS), which contains an inventory of MS4 features and other related data. Upgrading the existing GIS and data tracking database to a comprehensive GIS-based asset management system (AMS) is an ongoing process. An integrated storm water AMS will allow for effective monitoring, tracking, and maintenance of the MCBH MS4 components and preventative storm water quality measures.

1.3 Measurable Goals

As required by the MS4 Permit, MCBH has developed specific measurable goals or milestones related to each program component. The measurable goals are based on past experiences, previous trends, results of previous surveys, or compliance with the Permit. Measurable goals have been incorporated into this Program Effectiveness Assessment Plan as data assessment measures and are used to assist tracking program effectiveness.

1.4 Program Assessment and Reporting

Overall program assessment will be incorporated into the Annual Report, as required by the Permit. Most program assessment will be conducted at the implementation level (Outcome Levels 1 to 4). Water quality assessments (Outcome Levels 5 and 6) are conducted as part of MCBH's ongoing monitoring program.

1.5 Document Organization

The following chapters describe the outcomes that MCBH aims to achieve during this Permit term and the data collected that will be used to assess each of the following SWMP elements:

- Public Education and Outreach;
- Illicit Discharge Detection and Elimination;
- Construction Site Runoff Control;
- Post-Construction Storm Water Management in New Development and Redevelopment;
- Pollution Prevention and Good Housekeeping; and
- Industrial and Commercial Discharge Management.

Each section will present outcome objectives and assessments measures as follows:

- Outcome Objectives: lists the desired outcomes that each program will strive to achieve during the permit term. The outcomes are categorized by the Outcome Levels.
- Assessment Measures: lists the data that will be used to assess each desired outcome. The measures are categorized by assessment method (i.e., confirmation, tabulation, etc.) and may directly or indirectly measure progress towards the desired outcome.

2 Public Education and Outreach

Assessing the Public Education and Outreach is an iterative process that relies on a variety of methods. The target audiences include tenant commands; residents; industrial and commercial businesses; consultants; construction operators; and school children. The desired outcomes are to raise awareness and effect behavior change through a variety of methods including distributing educational materials, conducting media campaigns, holding workshops, forming partnerships with other agencies and groups, and participating in special events. This program will be assessed to Outcome Levels 1 through 3.

Outcome Level	Outcome Objectives and Data Assessment
1 2	*Objective:* Increase public support, interest, knowledge, and awareness of the Storm Water Management Program. *Assessment Measures:* <u>Confirmation:</u> o Distribute brochures/pamphlets to new arrivals in orientation materials. o Provide storm water pollution prevention information to Base staff during general storm water awareness training. o Implement outreach through community newsletters and the Base website. o Stencil a minimum of 50 storm drains per year, with priority given to industrial and commercial areas, and areas with pedestrian traffic. o <u>Tabulation:</u> o Number of brochures/pamphlets distributed to new arrivals. o Number of training classes and number attendees. o Number of visits/views on the Base website. o Number of volunteer hours. o Number of storm drains stenciled. o Annual survey. o Number of public informational/training meetings
1 2	*Objective*: Increase public participation in special events. *Assessment Measure:* <u>Tabulation:</u> o Number of events. o Number of volunteers. o Number of volunteer hours. o Number of participants in special events each year.

3 Illicit Discharge Detection and Elimination

The goal of MCBH's Illicit Discharge Detection and Elimination Program is to eliminate improper discharge activities. This will be accomplished through maintenance of up-to-date records and maps of the storm drain system; training and implementation of Marine Corps instructions prohibiting illicit storm water discharges; advertising and providing locations for turn-in of household waste materials; continuing the review and approval process for new storm drain connections; responding to complaints; and inspection of facilities and the storm drain system. This program will be assessed primarily at Outcome Levels 1 through 3.

Outcome Level	Outcome Objectives and Data Assessment
1 2 3	*Objective:* Encourage and facilitate public involvement in identifying and reporting illicit discharge. *Assessment Measures:* <u>Confirmation:</u> o Maintain base hotline and respond to complaints. <u>Tabulation:</u> o Number of complaints.
1 3	*Objective:* Decrease the number of improper discharge activities. *Assessment Measure:* <u>Confirmation:</u> o Maintain base hotline and respond to complaints. o Advertise and provide locations for turn-in of household waste materials. o Inspection of facilities and the storm drain system. <u>Tabulation:</u> o Number of complaints. o Number of illicit discharge investigations. o Number of follow-up visits. o Number of corrective actions completed including distribution of educational materials. <u>Inspection:</u> o Photo documentation of identified problem areas.

1 2	*Objective:* Continue to maintain an educated Base staff regarding illicit discharge detection and elimination. *Assessment Measure:* <u>Confirmation:</u> ○ Provide training to Environmental Compliance Coordinators and all pertinent Base personnel on Illicit Discharge Detection and Elimination Program policies at least annually. Include training on Marine Corps Order 5090.2 that prohibits non-storm water discharges into the Base storm drain system. <u>Inspection:</u> ○ Results of in-house audits. ○ Results of Storm Water Pollution Prevention Plan (SWPPP) inspections.
1	*Objective:* Continue review and approval of new storm drain connections through use of the Digging Work Clearance Permit application form. *Assessment Measure:* <u>Confirmation:</u> ○ Maintain up-to-date map of storm water system components in GIS-based AMS. <u>Tabulation:</u> ○ Number of new drain connection agreements approved each year, as required.

4 Construction Site Runoff Control

The Construction Site Runoff Control Program focuses on storm water discharges from construction projects that drain to drainage facilities and natural drainage ways that MCBH has ownership and responsibility for. Construction projects on Base include smaller projects completed by MCD, larger projects completed by Naval Facilities Engineering Systems Command (NAVFAC), and other projects by the Department of Education (DOE), Marine Corps Community Services (MCCS), and Housing Public-Private Venture (PPV), Ohana Military Communities/Hunt.

MCBH tracks the implementation of BMPs to minimize polluted runoff through design drawing review and completing inspections of active construction sites. The Construction Site Runoff Control Program will be assessed at Outcome Levels 1 through 3.

Outcome Level	Outcome Objectives and Data Assessment
1	*Objective:* Continue to maintain an effective plan review program to ensure proper permits are obtained and followed. *Assessment Measures:* Confirmation: o BMP Checklist for Construction Site Plan Approval is completed. o Construction sites of one or more acres will submit a notice of intent (NOI) for coverage under the State of Hawaii Department of Health's (DOH's) general permit for construction activities or an individual NPDES permit application. o Plan review will ensure new developments meet Federal and State regulations, NPDES permit conditions, and building and landscape design criteria.
1	*Objective:* Continue to maintain an effective construction site inspection program. *Assessment Measure:* Confirmation: o Construction sites inspected in accordance with established frequencies. o Scheduled follow-up inspections are conducted. o Construction Site BMP Checklists are completed for all inspections. o Appropriate enforcement actions are taken when warranted.

1 2	*Objective:* Continue to maintain an educated and trained staff. *Assessment Measure:* <u>Confirmation:</u> ○ Provide training for employees responsible for plan review. ○ Provide training for employees responsible for construction site inspections.
2 3	*Objective:* Increase contractor effectiveness. *Assessment Measure:* <u>Tabulation:</u> ○ Number of written notices issued. ○ Number of stop work orders issued. ○ Number of contract enforcement provisions applied. ○ Number of DOH referrals. ○ Number of repeat violations. ○ Response time for corrective actions.
1	*Objective:* Continue to maintain inventory of construction sites. *Assessment Measure:* <u>Confirmation:</u> ○ All approved projects added to database. ○ Inspection data recorded.
1	*Objective:* Continue review and approval of new storm drain connections through use of the Digging Work Clearance Permit application form. *Assessment Measure:* <u>Confirmation:</u> ○ Maintain up-to-date map of storm water system components in GIS-based AMS. <u>Tabulation:</u> ○ Number of new drain connection agreements approved each year, as required.

5 Post-Construction Management in New Development and Redevelopment

Post-construction storm water discharges can impact receiving waters by increasing the type and quantity of pollutants in storm water, and by increasing the overall quantity of storm water delivered to the receiving water body during storms. The objective of post-construction runoff controls is to improve storm water quality by installing and maintaining post-construction BMPs, both structural and non-structural, in applicable development and redevelopment projects that have the potential to discharge pollutants into the MS4. The Post-Construction Management Program includes inspection and operation and maintenance of post-construction BMPs.

Outcome Level	Outcome Objectives and Data Assessment
1	*Objective:* Continue to maintain an effective plan review program to ensure post-construction runoff controls are incorporated into new development and redevelopment projects. *Assessment Measures:* Confirmation: o BMP Checklist for Construction Site Plan Approval is completed. o Plan review will ensure new developments meet Federal and State regulations and NPDES permit conditions.
1 2	*Objective:* Continue to maintain an effective post-construction BMP inspection and maintenance program. *Assessment Measure:* Confirmation: o Post-construction BMPs inspected for operation and maintenance (O&M) in accordance with established frequencies. o Scheduled follow-up O&M inspections are conducted. o Post-construction BMP Inspection Reports are completed for all inspections. o O&M completed in accordance with established frequencies. Tabulation: o Number of post-construction BMP O&M inspections. o Number of follow-up O&M inspections.

1 2	*Objective:* Continue to maintain an educated and trained staff. *Assessment Measure:* <u>Confirmation:</u> ○ Provide training for employees responsible for plan review. ○ Provide training for employees responsible for post-construction BMP O&M inspections.
2 3	*Objective:* Increase awareness of post-construction facility responsibilities. *Assessment Measure:* <u>Confirmation:</u> ○ Education/outreach to facilities with post-construction BMPs. <u>Tabulation/Inspection:</u> ○ Number of O&M inspections with missing or incomplete inspection and maintenance logs. ○ Number of inspections with corrective actions required. ○ Number of O&M inspections requiring follow-up inspections.

6 Pollution Prevention and Good Housekeeping

The objective of the Pollution Prevention/Good Housekeeping Program is to reduce the amount of pollutants entering receiving bodies of water through both education and proper procedures. It requires examination and subsequent alternation of actions to help ensure a reduction in the type of pollution that:

(1) Collects on streets, parking lots, open spaces, and storage and vehicle maintenance areas and is discharged into local waterways; and
(2) Results from actions such as environmentally damaging land development and flood management practices or poor maintenance of storm sewer systems.

The program is assessed at Outcome Levels 1 through 4.

Outcome Level	Outcome Objectives and Data Assessment
1 2	*Objective:* Continue to maintain an educated and trained staff. *Assessment Measures:* <u>Confirmation:</u> o Inspect industrial facilities included in the Permit annually. o Train maintenance personnel annually and have new maintenance employees trained as part of the orientation program.
1 4	*Objective:* Decrease potential for storm water impact from street debris. *Assessment Measures:* <u>Confirmation:</u> o Complete street sweeping. o Conduct cleaning and debris removal from drainage structures. o Stencil a minimum of 50 storm drains per year, with priority given to industrial and commercial areas, and areas with pedestrian traffic. <u>Tabulation:</u> o Number of storm drains stenciled. o Number of curb miles swept. o Volume of trash collected.
1 2 4	*Objective:* Decrease potential for storm water impact from chemical applications. *Assessment Measures:* <u>Confirmation:</u> o Develop an Authorized Use List of chemicals used. o Monitor fertilizer and pesticide application in application logs and reduce usage where feasible.

	○ Periodically collect and dispose of unused pesticides, herbicides, and fertilizers according to manufacturers' instruction. ○ Conduct annual training for personnel on proper maintenance activities. ○ Conduct annual training for personnel and contractors applying pesticides, herbicides or fertilizers. <u>Tabulation:</u> ○ Volume of excess/unused chemicals collected for disposal. ○ Number of facilities inspected annually. ○ Number of training sessions, and/or number of attendees to training sessions.
3 4	*Objective:* Improve implementation of temporary or post-construction BMPs to reduce pollutants to the MS4. *Assessment Measure:* <u>Confirmation:</u> ○ Develop, implement, and maintain up-to-date site-specific BMPs and SWPPPs developed and implemented, as needed. <u>Inspections:</u> ○ Number of facilities inspected annually.
1 4	*Objective:* Improve condition and utility of storm water system through inspection and maintenance program. *Assessment Measure:* <u>Confirmation:</u> ○ Conduct cleaning and debris removal from storm drainage structures, at least once during the term of the permit. <u>Tabulation:</u> ○ Number of inlets/catch basins cleaned or maintained. ○ Number of inlets/catch basins inspected. ○ Number of inspections resulting in recommendations of additional maintenance. ○ Volume of debris removed.
1	*Objective:* Continue to maintain an updated inventory of the MS4. *Assessment Measure:* <u>Confirmation:</u> ○ Maintain an up-to-date map of storm water system components in GIS-based AMS.

1 4	*Objective:* Reduce discharge of pollutants to the MS4 by Retrofitting Structural BMPs. *Assessment Measure:* Confirmation: ○ Develop and implement an Action Plan for Retrofitting Structural BMPs. Tabulation: ○ See Action Plan for Retrofitting Structural BMPs.
1 2 4	*Objective:* Reduce discharge of trash into and out of the MS4. *Assessment Measure:* Confirmation: ○ Develop and implement a Trash Reduction Plan Tabulation: ○ See Trash Reduction Plan
1 4	*Objective:* Reduce effects of erosion on storm water quality. *Assessment Measure:* Confirmation: ○ Develop and implement an Erosion Control BMPs Program Plan. Tabulation: ○ See Erosion Control BMPs Program Plan

7 Industrial and Commercial Discharge Management

The Industrial and Commercial Activities Discharge Management Program addresses environmental compliance at industrial and commercial facilities within the Base. The program focuses on documenting the inspection efforts, raising awareness among private commercial and industrial facility personnel, and increasing use of BMPs by these personnel. This program is assessed at Outcome Levels 1 through 3.

Outcome Level	Outcome Objectives and Data Assessment
1 2 3	*Objective:* Increase use of BMPs among industrial and commercial facilities to reduce possible spills, illegal connections, and illicit discharges. *Assessment Measures:* Confirmation: o Inspect industrial facilities included in the Permit annually. o Require a permit or written equivalent approval for drainage connections and discharge of surface runoff into the MS4. o Provide all facilities educational/BMP handouts or other outreach materials. o Deficiencies corrected by facilities issued a non-compliance notice. o Conduct annual training for inspectors (to identify deficiencies, assess potential impacts to receiving waters, and evaluate the appropriateness and effectiveness of deployed BMPs). Tabulation/Inspection: o Number of inspections conducted. o Number of revisits completed. o Number of deficiencies issued. o Number of inspector training sessions, and/or number of attendees to inspector training sessions.
1 4	*Objective:* Improve implementation of temporary or post-construction BMPs at industrial and commercial facilities to reduce pollutants to the MS4. *Assessment Measure:* Confirmation: o Develop, implement, and maintain up-to-date site-specific BMPs and SWPPPs developed and implemented, as needed. o Require a permit or written equivalent approval for drainage connections and discharge of surface runoff into the MS4. o Conduct annual training for inspectors (to identify deficiencies, assess potential impacts to receiving waters, and evaluate the appropriateness and effectiveness of deployed BMPs).

	Inspections: ○ Number of facilities implementing temporary or post-construction BMPs. ○ Number of inspector training sessions, and/or number of attendees to inspector training sessions.
1 2	*Objective:* Improve monitoring and tracking of industrial and commercial discharge management. *Assessment Measure:* Confirmation: ○ Maintain up-to-date inventory/database of industrial facilities and activities. ○ Maintain up-to-date inventory/database of commercial facilities and activities, sorted by priority area. ○ Require a permit or written equivalent approval for drainage connections and discharge of surface runoff into the MS4. ○ Develop and maintain database of permits/written approvals for drainage connections and discharge of surface runoff into the MS4.

8 Monitoring

MCBH conducts storm water monitoring at industrial facilities. Storm water monitoring consists of quarterly storm water discharge visual assessments at all industrial facilities listed in the Permit in addition to sector-specific annual effluent monitoring and quarterly benchmark sampling. The results of the monitoring are summarized in the Annual Monitoring Report submitted to DOH. As data are collected over time, the results can be used to evaluate long-term trends in pollutant reductions and assist in determining the effectiveness of the various programs in the SWMP Plan. MCBH may also utilize water quality monitoring analysis results conducted by other agencies such as the City and County of Honolulu, the United State Geological Survey, and DOH to provide a comparison between discharges from the MS4 and water quality in receiving waters. The water quality monitoring results from sampling the MS4 will be used to compare relative contributions and progress towards improving water quality. The monitoring program provides data assessment measures to assess the program at Levels 4 through 6 and sets the framework for an integrated assessment between all Outcome Levels.