Final

Decision Document for Quarry Pit Landfill (MCB Hawaii Site 0002)

MCB HAWAII, KANEOHE, HAWAII

June 2014

Department of the Navy
Naval Facilities Engineering Command, Hawaii
400 Marshall Road
JBPHH HI 96860-3139

Environmental Technical Services
Contract Number N62742-09-D-1957, CTO HC06

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Prepared for:

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400 Marshall Road
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Prepared by:

element environmental llc
environmental · engineering · water resources

98-030 Hekaha Street, Unit 9
Aiea, HI 96701

Prepared under:

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ACRONYMS AND ABBREVIATIONS

AAV	Amphibious Assault Vehicle
ARAR	applicable or relevant and appropriate requirement
ASTM	American Society for Testing and Materials
BEQ	Bachelor Enlisted Quarters
bgs	below ground surface
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
COPC	chemical of potential concern
CSM	Conceptual Site Model
CSRS	Confirmation Study Ranking System
CTO	contract task order
CWA	Clean Water Act
DD	Decision Document
DL	detection limit
DoD	Department of Defense
DOH	Department of Health, State of Hawaii
DON	Department of the Navy
DRO	diesel range organic
DU	decision unit
E2	Element Environmental, LLC
EAL	environmental action level
EO	Executive Order
EPA	Environmental Protection Agency, United States
ETI	Earth Tech, Inc.
°F	degree Fahrenheit
FAI	Fukunaga & Associates, Inc.
FS	feasibility study
HLA	Harding Lawson Associates
HMMWV	High Mobility Multipurpose Wheeled Vehicle
IAS	Initial Assessment Study
JBPHH	Joint Base Pearl Harbor-Hickam
LRO	lubrication range organic
LTMM	Long Term Monitoring and Maintenance
LUC	land use control
LUCP	Land Use Control Plan
Marine Corps	United States Marine Corps
MCAS	Marine Corps Air Station
MCB Hawaii	Marine Corps Base Hawaii
mg/kg	milligram per kilogram
µg/L	microgram per liter
mg/L	milligram per liter

MI	multi-increment
MLI	McDaniel Lambert, Inc.
MW	monitoring well
NAS	Naval Air Station
Navy	United States Navy
NAVFAC	Naval Facilities Engineering Command
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NEESA	Naval Energy and Environmental Support Activity
NPL	National Priorities List
NTR	Navy Technical Representative
O&M	operations and maintenance
PAH	polynuclear aromatic hydrocarbon
PAL	project action limit
PCB	polychlorinated biphenyl
PCP	pentachlorophenol
PID	photoionization detector
POL	petroleum, oil and lubricants
PP	proposed plan
ppm	part per million
RAB	Restoration Advisory Board
RACR	Remedial Action Completion Report
RI	remedial investigation
RMTC	R.M. Towill Corporation
SARA	Superfund Amendments and Reauthorization Act
SCS	Soil Conservation Service
sf	square foot
sHHRA	screening human health risk assessment
SI	site inspection
SLERA	screening-level ecological risk assessment
SVOC	semi-volatile organic compound
TAL	Target Analyte List
TBC	to be considered
TP	test pit
TPH	total petroleum hydrocarbon
UH	University of Hawaii
UIC	Underground Injection Control
US	United States
USACE	United States Army Corps of Engineers
USDA	United States Department of Agriculture
USGS	United States Geological Survey
VOC	volatile organic compound
WMA	Wildlife Management Area

1. Declaration

1.1 Site Name and Location

This decision document (DD) has been prepared for the Quarry Pit Landfill (Site 0002) and the adjacent Motor Pool Wetland located within Marine Corps Base Hawaii (MCB Hawaii), Kaneohe Bay, Oahu, Hawaii under the Naval Facilities Engineering Command, Hawaii (NAVFAC Hawaii) Environmental Technical Services program, Contract Number N62742-09-D-1957, Contract Task Order (CTO) HC06.

1.2 Statement of Basis and Purpose

This DD presents the selected final remedy for the site, which was chosen in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) as amended by the Superfund Amendments and Reauthorization Act (SARA), the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), and the Office of the President United States (U.S.) Executive Order (EO) 12580. The signatures below indicate concurrence with this selected final remedy by the U.S. Marine Corps (the Marine Corps) and the State of Hawaii Department of Health (DOH).

This DD incorporates elements of a streamlined Remedial Action Completion Report (RACR), as described in the *Department of Defense (DoD)/U.S. Environmental Protection Agency (EPA) Joint Guidance on Streamlined Closeout and National Priorities List (NPL) Deletion Process* (DoD 2006) and the Department of the Navy's (DON's) *Guidance to Documenting Milestones Throughout the Site Closeout Process* (DON 2006a). The RACR-Decision Document Cross-Reference is provided in Attachment A[1].

1.3 Assessment of the Site

The selected final remedy described in this DD is necessary to protect the public and the environment from exposure to pollutants, contaminants, and hazardous substances at the site.

1.4 Description of the Selected Remedy

The elements of the selected remedy are to be detailed in the Land Use Control Plan (LUCP), and include:

- Environmental notice added to the Base master plan;
- Restriction of future land use to recreational use (e.g., multi-purpose training and/or a park/playfield, etc.) or industrial/commercial use with land use restrictions;
- Maintenance of a two-foot cap to prevent exposure of debris buried in the landfill;
- Land use restrictions/concerns through the Base dig permit process;
- Prohibition of unauthorized disturbance, excavation, removal, or use of site soil;

[1] Text in blue font identifies where detailed site information is available via hyperlink while viewing this DD as a PDF. The detailed information is viewable by clicking on the blue text within the PDF. See Attachment B for an Index Table.

- Periodic monitoring of LUC effectiveness and compliance reporting; and
- Decommissioning of monitoring wells.

The LUCP will document in detail the engineering and institutional controls that have already been or will be implemented at the site to meet the LUC performance objectives. LUCs will ensure the long-term integrity of the site and protect human health and the environment by preventing potential exposure to debris buried in the landfill and/or contaminated soil. This decision was based on the following: the remedy will prevent future exposure to debris and/or contaminated soil.

The LUCP will also contain various environmental notices, land use restrictions, inspection requirements, and reporting requirements, and will clarify the responsibilities and rights of the interested parties. The LUCP will be effective immediately upon approval by the Marine Corps and the DOH.

If land ownership changes in the future, the quitclaim deed must ensure that the LUCP objectives are met and the site remains protective of human health and the environment over time.

1.5 STATUTORY DETERMINATIONS

The selected remedy for the site is protective of human health and the environment, complies with all applicable or relevant and appropriate requirements (ARARs), is cost-effective, and uses permanent solutions to the maximum extent practicable.

The LUCs will prevent direct contact with contaminated soil. The final remedy does not satisfy the statutory preference for treatment as a principal element of the final remedy because removal or treatment would be cost prohibitive based on the intended future use of the site.

Because this remedy will result in contaminants remaining on-site above levels that allow for unrestricted, residential (high-occupancy) use, a statutory review will be conducted within five years after initiation of the selected final remedy, as required under CERCLA Section 121(c) and NCP (40 Code of Federal Regulations [CFR] 300.430[f][4][ii]). The five-year review will be performed to ensure that the LUCs remain protective of human health and the environment over time.

1.6 DATA CERTIFICATION CHECKLIST

The following information is included in Section 2 of this DD. Additional information can be found in the Administrative Record file for the site.

- Chemicals of potential concern (COPCs) and their respective concentrations (Section 2.5.2)
- Summary of ecological and human health risks (Section 2.12.1)
- Cleanup goals established for COPCs and the basis for these levels (Section 2.5.2)
- Principle threat wastes (Section 2.10)
- Current and reasonably anticipated future land use assumptions (Section 2.6)
- Potential land and groundwater use that will be available at the site as a result of the selected remedy (Section 2.6)
- Estimated capital costs, annual operation and maintenance, and the number of years over which the remedy cost estimates are projected (Section 2.11.3)

If contamination posing unacceptable risks to human health or the environment is discovered after execution of this DD, the Marine Corps will undertake all necessary actions to ensure continued protection of human health and the environment.

1.7 SIGNATURE AND SUPPORT AGENCY ACCEPTANCE OF FINAL REMEDY

The Marine Corps with concurrence from the DOH; has determined that the completed site cleanup actions make the site suitable for commercial/industrial re-use. LUCs limiting future parcel re-use and prohibiting certain activities have been selected as the final remedy for the site. This DD also memorializes the completion of the final remedy and fulfillment of remedial action objectives. In accordance with CERCLA requirements, a five-year statutory review will be performed by the Marine Corps to ensure that the selected remedy remains protective of human health and the environment.

D. R. George
Captain, U. S. Marine Corps
Director, Environmental Compliance
and Protection Department
By direction of the Commanding Officer

6-3-2014
Date

Keith E. Kawaoka, D. Env.
Program Manager
Hazard Evaluation and Emergency Response Office
State of Hawaii, Department of Health

6-5-14
Date

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2. Decision Summary

This DD describes past site investigations, remedial actions taken, and rationale for selecting LUCs as the final remedy for the Quarry Pit Landfill (Site 0002) and the adjacent Motor Pool Wetland (Figure 1). The Marine Corps is the lead agency, and has selected the final remedy for the site, in concurrence with the DOH.

2.1 SITE NAME, LOCATION, AND DESCRIPTION

MCB Hawaii is located on the windward side of Oahu, and occupies the entire 2,951-acre Mokapu Peninsula. MCB Hawaii is bordered to the west by Kaneohe Bay, to the north by the Pacific Ocean, to the east by Kailua Bay, and to the south by the Nu'upia Ponds Wildlife Management Area (WMA) (Figure 2).

2.1.1 Quarry Pit Landfill

The project area is approximately 12.65 acres and is bounded by Mokapu Road on the north, the 3rd Marine Motor Pool ("motor pool" or "Marine Motor Pool") (Building 6030) on the east, Harris Avenue on the west, and Querulous Street to the south. The nearest occupied buildings are: a Sprung instant structure, which is located on the southern portion of the landfill; the Combat Logistics Battalion 3/CLB-3 Medical Platoon Navy Personnel Unit Medical Logistics building ("Medical Warehouse") (Building 4088), which lies to the west of the site; and Area 6755C3, High Mobility Multipurpose Wheeled Vehicle (HMMWV) Egress Assistance Trainer, consisting of one Sprung instant structure and one small wood structure, which lie to the southwest of the site. The central portion of the landfill is currently vacant, but was used by Paintball Hawaii & Pacific AirSoft, a commercial paintball and airsoft facility that operated onsite from 2000 until January 2012. The grass and shrubs within a large section of the former paintball field were previously maintained by mowing or weed whacking. The remainder of the site, with the exception of a grassy area adjacent to Mokapu Road to the north, is overgrown with vegetation.

2.1.2 Adjacent Motor Pool Wetland

The wetland, referred to as the "adjacent wetland" or "Motor Pool Wetland", is part of a large swale that runs in a north-south direction between the Quarry Pit Landfill and the motor pool parking lot. The wetland swale extends along the west side of the motor pool and receives runoff from the motor pool's storm drainage system (United States Army Corps of Engineers [USACE] 2002). Runoff discharges into the wetland from four locations: one from overland flow and a point source discharge consisting of four 36-inch diameter reinforced concrete culverts integrated into a grouted rock apron; one from three 12-inch pipe culverts; one from one 12-inch pipe culvert; and one from one 36-inch pipe culvert. An overflow swale appears to exit out of the wetland to the south towards Nu'upia Pond; however, a gradual upland slope precludes this from happening except under very large flow conditions. A berm exists along the west side of the wetland that ranges from approximately 0.21 to 2.27 feet higher in elevation than the Quarry Pit Landfill and 6.5 to 9 feet higher than the wetland surface.

The motor pool wetland supports endangered and migratory waterbirds. The installation's Natural Resources section does actively manage this wetland, but is constrained by the lack of equipment that can remove the large invasive trees growing in the wetland. Although the riparian vegetation has been maintained with amphibious assault vehicles (AAVs), access to this entire site has been difficult due to the construction of various training facilities that did not take into account access to this site by AAVs. This wetland could be very productive and funds will be requested to restore the wetland. Until then, limited manpower, equipment, and funding will continue to allow this wetland to degrade (Bookless 2014).

2.2 SITE HISTORY AND ENFORCEMENT ACTIVITIES

2.2.1 Site History

The project area was first used as a quarry pit and for storage/disposal operations during the construction of Fort Hase and Naval Air Station Kaneohe Bay in the 1940s through the 1960s and was known as the Quarry Pit and/or Boondocker Landfill. In the 1950s, the two bases were combined to form Marine Corps Air Station, Kaneohe Bay.

The Quarry Pit Landfill was the main on-base landfill from 1972 to 1976, and accepted most solid wastes, excluding refuse from residential areas. It was reported that 165,379 cubic yards of waste were disposed of at the landfill, including petroleum, oil and lubricants, solvents, paints, thinners, batteries, mercury, transformer oils, pentachlorophenol, and glass beads from paint stripping operations (Naval Energy and Environmental Support Activity [NEESA] 1984). In 1976, the landfill was closed in accordance with existing guidance and instructions at that time and left undeveloped until 2000 (FAI 2011).

2.2.2 Previous Investigations

This section provides an overview of previous investigations, studies, and site reconnaissance conducted between 1984 and 2010.

Initial Assessment Study (NEESA 1984). The NEESA performed an Initial Assessment Study (IAS) at MCB Hawaii to identify and assess sites posing potential threats to human health or the environment caused by past hazardous substance storage, handling, or disposal practices at naval activities (NEESA 1984). The IAS, which is similar to a preliminary assessment under the CERCLA, used information from historical records, aerial photographs, surface and aerial surveys, and personnel interviews to identify 18 sites at MCB Hawaii, including the Quarry Pit Landfill. Each site was then evaluated for contamination characteristics, migration pathways, and pollutant receptors. The evaluation used the two-step Confirmation Study Ranking System (CSRS) to systematically evaluate the relative severity of potential problems. The CSRS determines whether a confirmation study, which is similar to the SI under CERCLA, should be recommended for a site. The IAS recommended no confirmation studies for the Quarry Pit Landfill (Site 0002) provided it be left undisturbed, and listed the site as a construction hazard area. The EPA Region 9 representatives, however, reviewed the findings of the IAS, and after discussions with NAVFAC Field Division Pacific representatives, requested that further investigation be performed at the site (DON 2007).

Test Borings – BEQ Parking Lot Northeast of Building 4088 (1977). On June 15, 1977, Soils International completed a report entitled "Report, Foundation Investigation, Modernization of Bachelor Enlisted Quarters, Kaneohe Marine Corps Air Station, Kaneohe, Oahu, Construction Contract No. N62471-77-C-1351". According to FAI (2011) who reviewed the document, borings and test pits were installed for a Bachelor Enlisted Quarters (BEQ) parking lot located northeast of Building 4088 (currently referred to as the "Lemon Lot", see Figure 2). Subsurface conditions encountered in the borings and test pits generally consisted of approximately 15 to 17.5 feet of fill mixed with "sanitary landfill" material consisting of lumber, metal debris, plastic, and cloth.

The landfill materials in some borings extended to depths of about four to eight feet below the water table. The fill was classified as "moderately firm" clayey silty sand and was underlain by dense coral limestone to the bottom of the borings at depths ranging from 15 to 20 feet below existing grades.

The test pits encountered similar fill material underlain by sanitary landfill material to the bottom of the excavations at 0.5 to 7.5 feet below existing grades at the time of their investigation.

Test Borings – Medical Warehouse (Building 4088) (1984). A series of test borings, drilled in 1984 prior to construction of the Medical Warehouse (Building 4088), indicated the presence of refuse in some locations in the future warehouse site. Building 4088 is located adjacent to the west side of the landfill (Figure 2).

According to FAI (2011), who reviewed the August 16, 1985, "Record Drawing FY 86 MCON Project P-502 Medical Warehouse, MCAS Kaneohe Bay, NAVFAC Drawing No. 7064263 – 7064266," subsurface conditions encountered in available borings generally consisted of 0.5 to 9 feet of fill underlain by stiff silt and clay or medium dense sandy coral gravel and sand, and/or moderately hard coral. "Rubbish fill" was encountered in some of the borings drilled at the southeastern side of the warehouse. The logs described the rubbish fill as miscellaneous debris, broken cans, wood, plastic, paper, organic matter, wire, and papers. Below the fill and underlying rubbish fill, coral reef deposits consisting of medium dense coralline sand and gravel and moderately hard coral were generally encountered to the bottom of the borings to depths of 11.5 to 65 feet below existing grades.

Based on the 1985 record drawing, this warehouse consists of a pre-engineered building supported on shallow foundations founded on compacted granular fill. Foundation notes called for an allowable soil bearing pressure of 2,500 pounds per square foot for footings founded on compacted granular fill. Structural details on the drawings called for removal of trash to depths of about 9 to 16 feet below existing grades at the time of construction. The details also called for backfilling the excavations, approximately 6 to 13 feet below the footing, with compacted granular fill (FAI 2011).

Test Borings – Miles Equipment Facility and Rations Warehouse (Building 3098) (1986). According to FAI (2011), who reviewed the January 17, 1986, "Record Drawing, Miles Equipment Facility and Rations Warehouse (Building 3098), Marine Corps Air Station, Kaneohe Bay, Hawaii, NAVFAC Drawing No. 7056608," borings drilled for Building 3098, Miles Equipment Facility and Rations Warehouse, located near the southeastern corner of the landfill site, generally consisted of coralline gravel to depths of 25 feet below existing grades. Rubbish fill was not indicated in the boring logs for this building. This structure is now identified as HMMWV Egress Assistance Trainer (see Figure 2).

Test Borings – Marine Motor Pool (Building 6030) (1987). According to FAI (2011), who reviewed the June 3, 1987, "Record Drawing, FY87 MCON Project P-530, Combat Vehicle & Field Maintenance Shops (Building 6030), Part A, Marine Corps Air Station, Kaneohe Bay, Hawaii, NAVFAC Drawing No. 7069545, 7069546," subsurface conditions encountered in the borings for this facility generally consisted of several feet of clayey silt at the surface underlain by "calcareous rubblestone" to the bottom of the borings at 5 to 21.5 feet below existing grades (see Figure 2).

Site Inspection (HLA 1989). In response to regulatory comments on the IAS, a Site Inspection (SI) was conducted at the Quarry Pit Landfill by Harding Lawson Associates (HLA) in 1989. The purpose of the SI was to evaluate whether the wastes disposed of at the landfill posed a threat to human health or the environment. The scope of the investigation included collection and analysis of groundwater samples, and performance of a water level assessment.

The target analytes in the groundwater were volatile organic compounds (VOCs), polynuclear aromatic hydrocarbons (PAHs), lead, and mercury. Fuel-related hydrocarbons were detected in the groundwater sample collected from monitoring well (MW) MW-05, which is located crossgradient from the landfill and 250 feet directly downgradient from the exchange service station (Figure 2). The report concluded that leaking fuel tanks at the service station, not the Quarry Pit Landfill, were the source of the fuel-related hydrocarbons in the groundwater at MW-05.

The compound 1,1-dichloroethene (DCE) was detected in the groundwater sample from crossgradient well MW-06 at its detection limit (DL) of 1.0 microgram per liter (µg/L), which was below the National Primary Drinking Water Standard maximum concentration level of 7 µg/L for 1,1-DCE. No other target analytes were detected in the groundwater samples collected from the other MWs.

Although the SI report concluded that the public health risks at the time due to the landfill were likely minimal, it recommended that more comprehensive investigations and risk assessments be considered should land-use changes be planned for the landfill (HLA 1989).

Wetland Boundary Delineations (USACE 2002). Ground-based wetland boundary delineations were determined at MCB Hawaii during 2001 to 2002 by a qualified wetland ecologist with the USACE (2002), assisted by MCB Hawaii natural resources staff. The wetland located between the Quarry Pit Landfill and the motor pool was one of seven wetland areas identified and mapped as jurisdictional under the criteria of the Clean Water Act (CWA) administered by the USACE. The wetland was described in the report as follows:

The wetland is part of a large swale that runs along the west side of the motor pool and includes a drainage sump that collects runoff from the adjacent motor pool parking lot;

In addition to overland runoff, there are four 36-inch-diameter reinforced concrete pipe culverts (all integrated into a grouted rock apron), which terminate in this area;

The west side of the wetland, adjacent to the landfill, has a berm that is four to six feet higher than the wetland bottom and two to three feet higher than the landfill surface;

An overflow swale appears to exit out of this wetland area towards Nu'upia Ponds to the south; however, a gradual upland slope precludes this from happening except under very large flow conditions;

The edges of the pond were dominated by Christmas berry that blended into sourbush in the wetland. Other vegetation included milo, koa haole, and kamani. A lone wiliwili tree (*Erythina sandwicensis)* was observed at the south end of the wetland; and

Aquatic species observed included toads and mosquito fish.

The wetland was opportunistically plowed (not cleared) on July 11, 2001 using AAVs. The AAVs helped to take the vegetation all the way down to the ground surface. Indian fleabane, California grass, and Christmas berry were removed from the centers of the wetland, but were still dominant at the edges. Prior to the AAV clearing, the center of the wetland was dominated by California grass. In December 2001, the large open area was recolonized primarily with sedges. Clearing with the AAVs enhances the amount of available habitat for waterbirds.

The USACE report (2002) stated that the primary function of this wetland is to filter pollutants from runoff. The wetland also provides habitat to aquatic species.

Focused Site Inspection (ETI in DON 2007). In 2007, Earth Tech, Inc. (ETI) conducted a focused SI at the Quarry Pit Landfill (Site 0002) (DON 2007) to determine whether COPCs from the landfill pose a threat to human health or the environment at the former Paintball/AirSoft facility and to evaluate the lateral and vertical extent of refuse and the thickness of the landfill cover. The scope of the investigation included a geophysical survey, six test pit excavations, soil sampling, sampling of soil-filled drums, and soil gas sampling.

The geophysical survey did not conclusively define the lateral and vertical extent of the landfill; however, test pits confirmed the thickness of the landfill cap, which was found to vary between two- and five-feet thick.

According to ETI (ETI in DON 2007), subsurface conditions encountered in test pits generally consisted of several feet of sandy silt and clayey gravel fill at the surface underlain by rubbish to the bottom of the test pits at depths of 2 to 5.5 feet below existing grades. Rubbish encountered in these pits generally included plastic sheeting, electrical wire fragments, plastic, wood, particle board debris, a metal wheel, 55-gallon drum fragments, Styrofoam, paper, a bicycle, glass, concrete, metal tubing, plastic cartons, glass bottles, glass panes, textiles, plastic bags, fast food wrappers, and electrical wire insulation. Excavation of the test pits were stopped in rubbish. Groundwater was not encountered in the test pits due to their relatively shallow depths.

Target analytes for the surface and subsurface soil samples included total petroleum hydrocarbon (TPH) as diesel range organics (DRO) and lubrication range organics (LRO), VOCs, semi-volatile organic compounds (SVOCs), polychlorinated biphenyls (PCBs), mercury, other metals and elements. Only three analytes (acetone, benzo[a]pyrene, and TPH [C_{10} to C_{40}]) were detected in the surface soil samples (collected from two of the six test pits) at concentrations exceeding the DOH Environmental Action Levels (EALs). An informal risk assessment, conducted by the Navy Environmental Health Center, indicated that there was no unacceptable risk to potential users and workers from soils at the former Paintball/AirSoft facility.

Detailed findings from the six exploratory test pits that were excavated at the west side of the landfill (Test Pit [TP]-1 through TP-6) are as follows:

- TP-1, located in the northwest corner of the landfill, had a three-foot layer of cover soil. Rubbish encountered in TP-1 included plastic sheeting, electrical wire fragments, miscellaneous plastic debris, and wood and particle board debris. Target analytes detected in the soil cover included the VOCs 2-butanone and acetone and the metals antimony, cobalt, and nickel; however, only acetone exceeded its EAL.
- TP-2, located southwest of TP-1 in an area that had been graded by the tenant, had a 2.25-foot layer of cover soil. Rubbish encountered in TP-2 included a metal wheel, 55-gallon drum fragments, Styrofoam, plastic debris, plastic sheeting, and oxidized steel debris. Target analytes detected in the soil cover included the VOC methylene chloride, TPH (C_{10} to C_{40}), and the metal zinc; however, only TPH exceeded its EAL.
- TP-3, located southeast of TP-2, had a two-foot layer of cover soil. Rubbish encountered in TP-3 included cinder block and concrete rubble. Target analytes detected in the soil cover included the VOCs ethylbenzene, m,p-xylene, o-xylene, and toluene; and the metals cadmium and mercury; however, none of the analytes were detected at concentrations that exceeded EALs.
- TP-4, located south of TP-2, had a five-foot layer of cover soil. Rubbish encountered in TP-4 included plastic bags with plastic, paper, Styrofoam, and some wood chips. Target analytes detected in the soil cover included the metals aluminum, antimony, chromium, copper, iron, manganese, and silver; however, none of the metals were detected at concentrations that exceeded EALs.
- TP-5, located southeast of TP-4, had a three-foot layer of cover soil. Rubbish encountered in TP-5 included plastic liners, paper, plastic trash, and wood debris. Target analytes detected in the

soil cover included 11 of the 16 PAHs monitored by DOH and the metals lead and tin; however, only the PAH benzo(a)pyrene exceeded its EAL.

- TP-6, located south of TP-4 and TP-5, had a 3.5-foot layer of cover soil. Rubbish encountered in TP-6 included plastic sheeting, metal tubing, a bicycle, broken glass, paper, and concrete. Target analytes detected in the soil cover included the PCB Aroclor-1260 and the metals arsenic and selenium; however, none of the analytes were detected at concentrations that exceeded EALs.

Three permanent soil gas wells and six temporary soil gas wells were installed at the site. The three permanent wells were located adjacent to the east side of the Medical Warehouse (Wells GP #1, #2, and #3). The six temporary wells were located within the landfill (Wells TP-1 thru TP-6). All nine of the wells were monitored for VOCs, using a MiniRae 2000 photoionization detector (PID). The soil gas well with the highest concentration of VOCs, Well GP #3, was sampled and analyzed for site COPCs including VOCs in air, using EPA Method TO-14A, and Permanent Gases, using American Society for Testing and Materials (ASTM) D1946-90. COPCs were not detected in the gas sample at concentrations exceeding screening criteria (DOH's 2005 shallow soil gas action levels for evaluation of vapor intrusion for residential land use); however, acetone, 2-butanone, benzene, toluene, ethylbenzene, m,p-xylene, o-xylene, 4-ethyltoluene, 1,2,4-trimethylbenzene, and 2-propanol were detected in the sample at concentrations above laboratory DLs. Methane was not detected in any of the three well samples.

Six temporary soil gas probes, installed at the bottom of each of the six test pits, were monitored for VOCs (using a PID) and the landfill gases methane, carbon dioxide, and oxygen, using a GA-90 landfill gas analyzer. PID readings in the temporary wells ranged from a low of 1.6 parts per million (ppm) in TP-6 to a high of 33.5 ppm in TP-1. Methane was not detected in any of the temporary gas wells. All of the wells had elevated concentrations of carbon dioxide and decreased concentrations of oxygen.

The soil contained within the drums on the east side of the landfill outside of the former Paintball/AirSoft facility was similar to that used for the landfill cover. Arsenic and nickel concentrations were detected at concentrations slightly above background concentrations and EALs. It was not known if the presence of arsenic and nickel was from the deteriorating metal drums or from the soils used to fill the drums. ETI concluded that the soils within the drums be considered non-hazardous for the purposes of disposal according to the criteria in 40 CFR §261.24.

The report recommended the following:

- Excavations be performed at each of the geophysical transect locations to better define the landfill boundary;
- At least one additional round of landfill gas monitoring be conducted at the Medical Warehouse perimeter gas probes for methane and carbon dioxide using field instrumentation;
- All of the soil-filled barrier drums present on the east side of the landfill be excavated and removed from the site and disposed of at an approved landfill before they deteriorate further;
- An additional round of groundwater samples be collected and analyzed; and
- An ecological risk assessment be performed to more fully assess any impacts the COPCs at the Quarry Pit Landfill may have on the environment, including the adjacent wetland.

Site Reconnaissance (E2 2010). A site reconnaissance of the subject property was conducted on May 7, 2010, during the proposal development phase of the current project. E2 personnel met with Mr. Joel Narusawa, the NAVFAC Hawaii Navy Technical Representative (NTR) for the project, and Project

Manager Mr. Brett Chambers and Natural Resource Manager Mr. Lance Bookless of the Environmental Compliance and Protection Department of MCB Hawaii. Mr. Bookless walked the field crew through portions of the project site to familiarize the project team members with the location of the wetland and the vegetation that would need to be cleared for the field work. Mr. Bookless requested that a 20-foot vegetative buffer be left in place for dust and silt control at the northern half of the site (north along Mokapu Road, west along the Lemon Lot, and east along the boundary of the adjacent wetland).

Observations of general site conditions were made that could affect sampling procedures, sampling locations, and health and safety requirements. The following observations were documented during the reconnaissance:

The presence of one Sprung instant structure was observed on the southern portion of the landfill.

The locations of adjacent structures (i.e., Medical Warehouse [Building 4088], 3rd Marine Motor Pool [Building 6030], and Area 6755C3 HMMWV Egress Assistance Trainer) were verified.

The middle of the site was relatively clear of vegetation and contained various small obstacles/barriers utilized in the former Paintball/AirSoft operations.

The northern end of the site was heavily vegetated with California grass and koa haole trees.

A small soil berm approximately two to three feet in height was observed along the eastern boundary of the landfill adjacent to the wetland. A portion of the wetland was observed in the northern half of the site during the reconnaissance. The wetland bottom appeared to be four to six feet below the top of the berm. The wetland appeared to be relatively dry with some areas of standing water. A stone revetment wall was observed along the eastern bank of the wetland near the edge of the motor pool parking lot.

The three gas probe wells adjacent to the Medical Warehouse were observed to be intact and finished flush to grade.

The existing monitoring wells surrounding the landfill were located. Seven of the eight wells were finished aboveground with traffic bollards. The aboveground outer well casings were intact, but all were rusted and several of the outer well covers were damaged or missing. It appeared that one of the wells located along Mokapu Road was damaged with the aboveground outer well casing and the inner well cover both missing. The well appeared to still be intact below the existing ground surface.

RI/FS (E2 2012). In 2011, a Remedial Investigation/Feasibility Study (RI/FS) was prepared for the site (Element Environmental, LLC [E2] 2012). The project area was divided into a total of seven decision units (DUs) - the Quarry Pit Landfill was divided into DU-1 through DU-5, and the adjacent wetland area was divided into DU-6 and DU-7. The nature and extent of solid waste in the Quarry Pit Landfill were evaluated by conducting a geophysical survey, excavating trenches (20 total, Figure 3), drilling boreholes (210 total, Figure 4), and installing/sampling groundwater monitoring wells (16 total, Figure 5) throughout the landfill area. Trenching and drilling were not conducted in either of the adjacent wetland DUs. The magnitude and extent of COPCs in soil and groundwater in the landfill, and in surface sediment and surface water in the adjacent wetland were evaluated by collecting and analyzing the appropriate samples. Landfill soil gases were evaluated in several locations within and along the perimeter of the landfill using hand-held meters. The landfill boundary was confirmed by various investigation surveys (i.e., geophysical survey, topographic survey, soil borings, trenching, and review of previous investigations and historical documents) (Figure 6).

The volume of debris (Figure 7) within the Quarry Pit Landfill was estimated to be approximately 90,400 cubic yards, with an average debris thickness of 5 feet, a maximum debris thickness of 8.5 feet, and a minimum debris thickness of zero feet. The debris layer at the Quarry Pit Landfill was predominately composed of a wide array of household debris with small amounts of industrial and medical / debris mixed with sandy to silty clay.

The lateral and vertical extent of the soil cap (Figure 8) was evaluated by excavating trenches and installing soil borings throughout the landfill. Debris was not observed in about 25 of the 150 individual soil borings. In the soil borings where debris was encountered, a relatively thin soil cap thickness (as thin as 13 inches) was measured and recorded in 27 boreholes, most of which were located in DU-1 and DU-2. Figure 4 shows the variations of the thickness of the soil cap based on stratigraphic data collected from the soil borings. Areas of the landfill colored red indicate a soil cover thickness that is less than 2 feet (an estimated area of 2.72 acres). The nature of the soil cap material consists primarily of dry to moist, brown to dark brown clays, sandy or silty clays, and clayey sands.

Screening Human Health Risk Assessment: The risks presented in the screening human health risk assessment (sHHRA) (McDaniel Lambert, Inc. [MLI] in E2 2012) are based on soil and sediment multi-increment (MI) samples that are representative of each DU, assuming that potential receptors will not be spending a large amount of time in any specific area. The sHHRA results for the two recreational use scenarios evaluated under Concept #1 (Physical Training Area and Recreational Area - Park or Playfield), which MCB Hawaii has indicated are the most likely future uses, are summarized here.

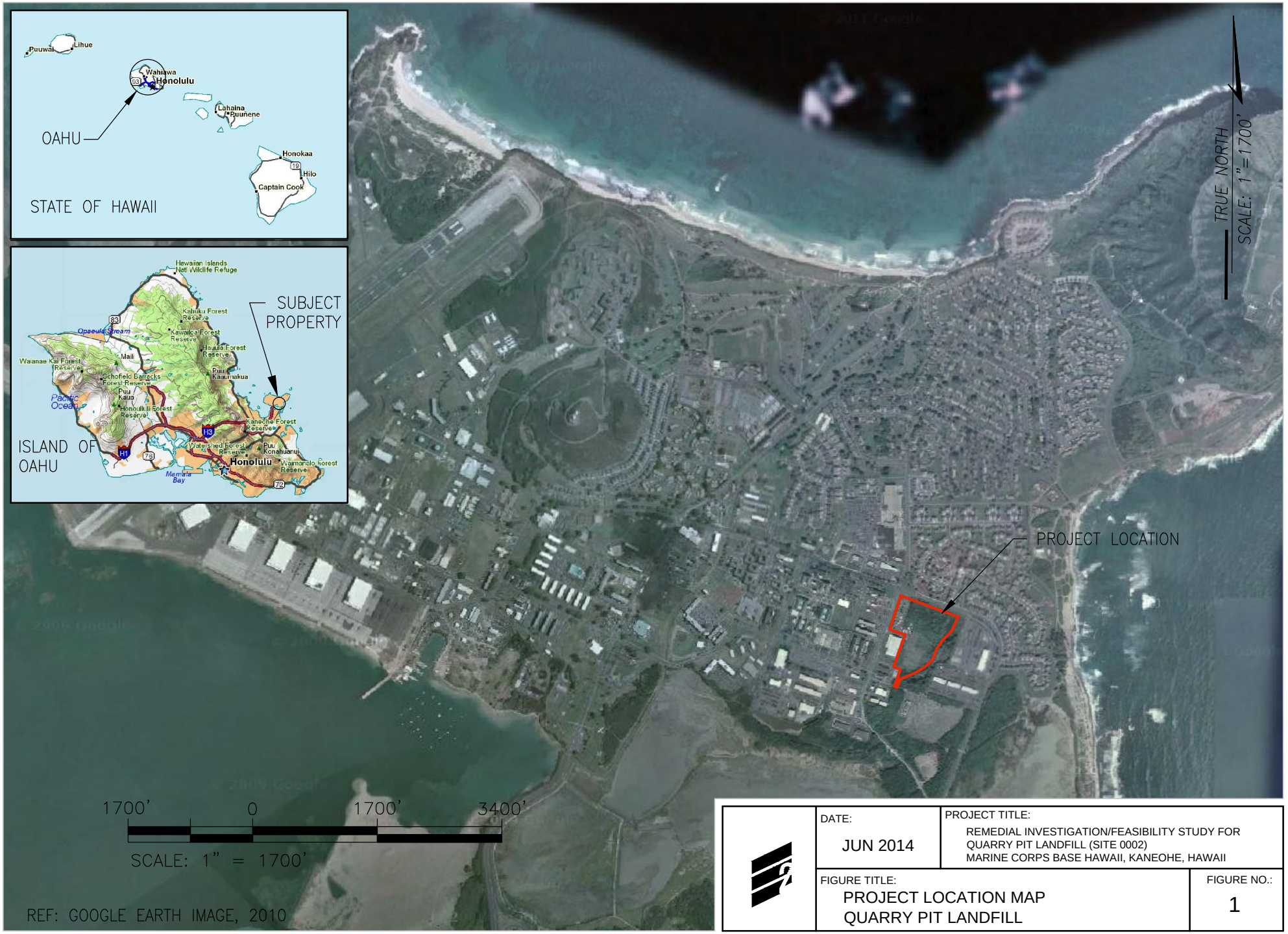
The physical training use (adult) cancer risks are within the EPA risk management range for the landfill DU-1 through DU-5.

The park/playfield recreational use (adult and child) cancer risks are within the EPA risk management range for the main portion of the landfill, which are DU-1 through DU-4. The cancer risks for DU-5, which is the berm area between the landfill and the adjacent wetlands, exceed the upper end of the risk management range ($1x10^{-4}$). However, the exposure risk calculation for DU-5 is considered conservative because it assumes that receptors would only be spending time within DU-5, which is unlikely since it is a bermed area that will likely not be used. Due to elevated levels of PCBs in discrete trench locations in DU-1 through DU-4, future use as a playground area or any other type of recreational use concentrated in small portions of the landfill would require further characterization.

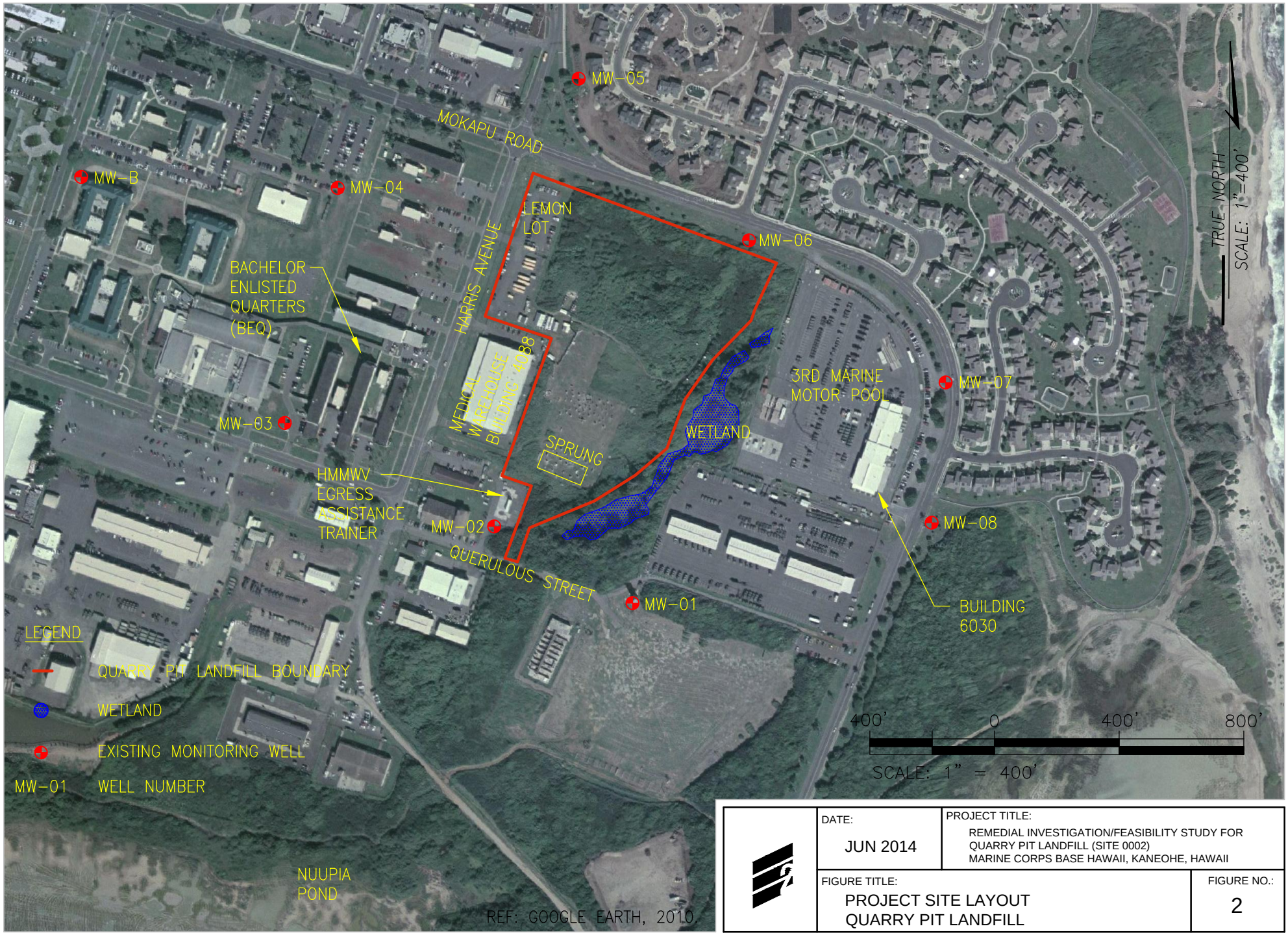
Screening Level Ecological Risk Assessment: The screening-level ecological risk assessment (SLERA) (MLI in E2 2012) incorporated site-specific information from the biological survey and provided an evaluation of potential ecological risks from contamination in the wetland area, which serves as a filter for pollutants in runoff from the Motor Pool parking lot and the surrounding areas. Based on the RI findings, no further action for the Quarry Pit Landfill is required at this time due to ecological risk concerns.

2.2.3 Enforcement Activities

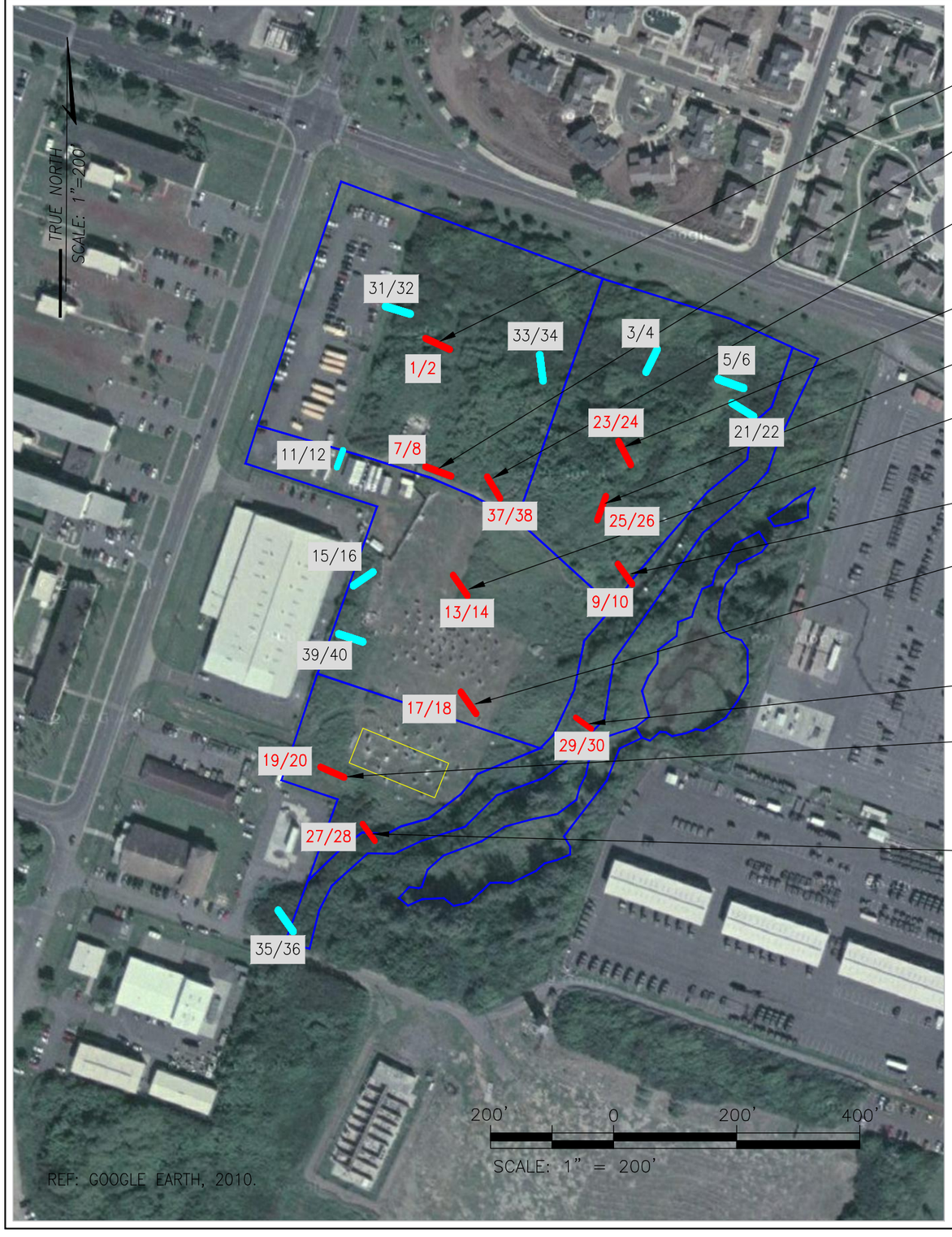
No enforcement activities have been recorded to date at the site, which is not on the NPL.



	DATE: JUN 2014	PROJECT TITLE: REMEDIAL INVESTIGATION/FEASIBILITY STUDY FOR QUARRY PIT LANDFILL (SITE 0002) MARINE CORPS BASE HAWAII, KANEOHE, HAWAII
	FIGURE TITLE: PROJECT LOCATION MAP QUARRY PIT LANDFILL	FIGURE NO.: 1



	DATE: JUN 2014	PROJECT TITLE: REMEDIAL INVESTIGATION/FEASIBILITY STUDY FOR QUARRY PIT LANDFILL (SITE 0002) MARINE CORPS BASE HAWAII, KANEOHE, HAWAII
	FIGURE TITLE: PROJECT SITE LAYOUT QUARRY PIT LANDFILL	FIGURE NO.: 2



1/2	SURFACE (0-3.5')	SUBSURFACE (3.5'-7.6')	PROJECT ACTION LEVEL	ACCEPTED BACKGROUND
BARIUM	744	***793***	750	690

7/8	(0-1.3')	(1.3'-8.25')		
AROCLOR-1242	ND	***2.1***	1.1	NA
TOTAL PCBs	0.11	***2.1***	1.1	NA

37/38	(0-2.5')	(2.5'-6.5')		
DIMETHYL PHTHALATE	ND	***0.094***	0.035	NA
AROCLOR-1260	***2.3***	0.54	1.1	NA
TOTAL PCBs	***2.3***	0.54	1.1	NA

23/24	(0-2')	(2'-6.5')		
ARSENIC	4.7	***31.5***	20	24

25/26	(0-1.5')	(1.5'-6.5')		
DIMETHYL PHTHALATE	ND	***0.17***	0.035	NA

13/14	(0-1.5')	(1.5'-7')		
BENZO(A)PYRENE	***0.15***	***1.9***	0.15	NA
BENZO(B)FLUORANTHENE	0.26	***2.3***	1.5	NA
DIBENZ(A,H)ANTHRACENE	0.026	***0.42***	0.15	NA

9/10	(0-2.5')	(2.5'-6.5')		
BENZO(A)PYRENE	***0.27***	0.096	0.15	NA

17/18	(0-2.0')	(2'-9.7')		
BENZO(A)ANTHRACENE	***2***	0.033	1.5	NA
BENZO(A)PYRENE	***2.5***	0.059	0.15	NA
BENZO(B)FLUORANTHENE	***3.2***	0.1	1.5	NA
DIBENZ(A,H)ANTHRACENE	***0.51***	0.014	0.15	NA
INDENO(1,2,3-CD)PYRENE	***3.2***	0.071	1.5	NA

29/30	(0-1')	(1'-7')		
BARIUM	***921***	***830***	750	690

19/20	(0-2')	(2'-4.5')		
1,4-DICHLOROBENZENE	ND	***0.12***	0.037	NA
BENZO(A)PYRENE	0.0044	***0.36***	0.15	NA
AROCLOR-1260	***40***	***14***	1.1	NA
TOTAL PCBs	***40***	***14***	1.1	NA

27/28	(0-2')	(2'-6')		
AROCLOR-1260	***18***	***1.9***	1.1	NA
TOTAL PCBs	***18***	***1.9***	1.1	NA

LEGEND

- DU BOUNDARY
- LANDFILL TRENCH WITH EXCEEDANCES
- LANDFILL TRENCH WITH NO EXCEEDANCES
- 29/30 TRENCH NUMBER
- SPRUNG

NOTES:
1) ***BOLD*** INDICATES RESULT IS IN EXCEEDENCE OF THE PAL AND BACKGROUND LEVELS
2) ALL RESULTS ARE IN [mg/kg]
3) TRENCHES WITH EXCEEDANCES ARE NUMBERED IN RED
4) ALL OTHER TRENCHES (IN BLUE) HAVE NO EXCEEDANCES
5) ND – NON DETECT
6) NA – NOT APPLICABLE

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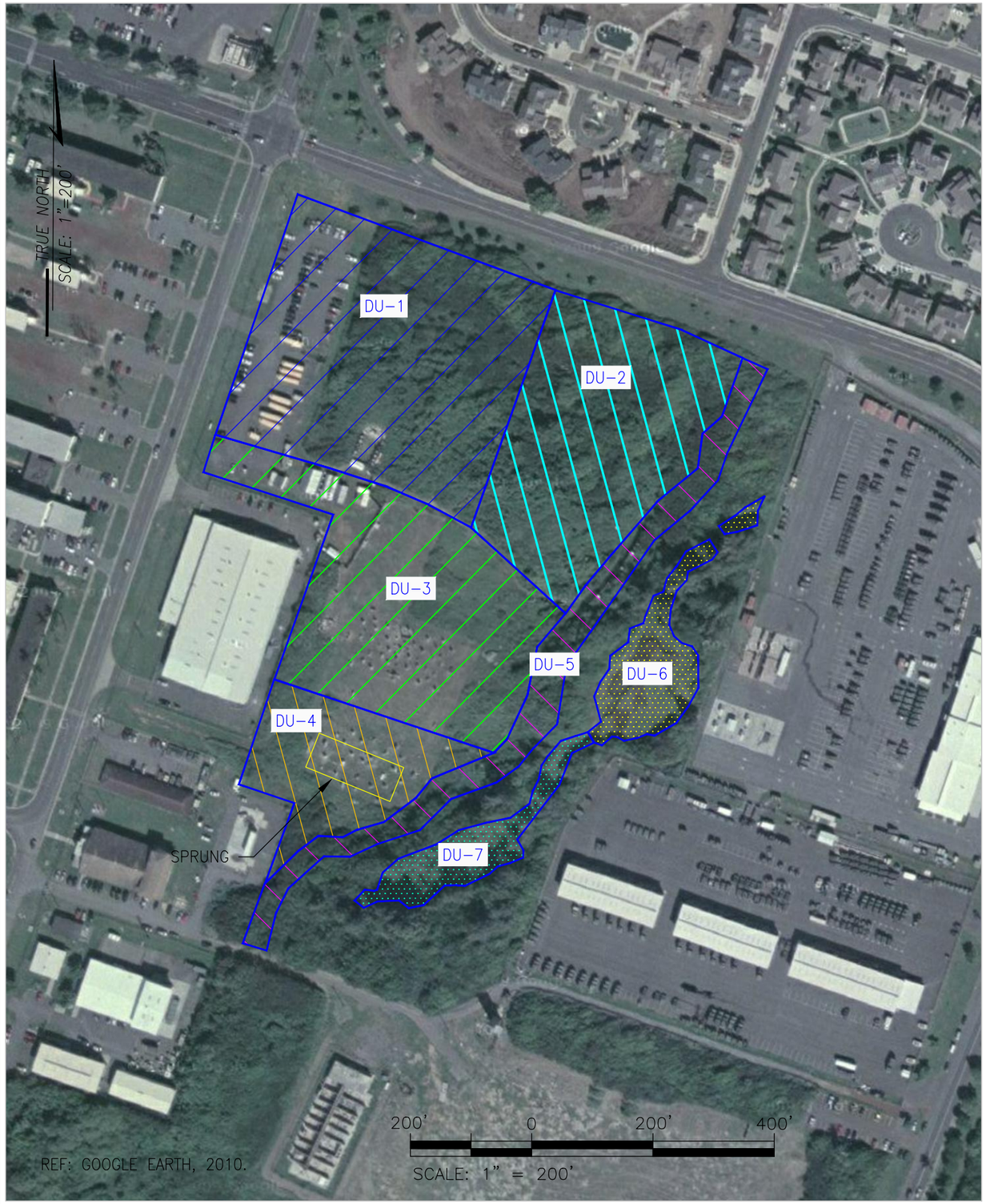
PROJECT TITLE:
REMEDIAL INVESTIGATION/FEASIBILITY STUDY FOR
QUARRY PIT LANDFILL (SITE 0002)
MARINE CORPS BASE HAWAII, KANEOHE, HAWAII

FIGURE TITLE:

LANDFILL TRENCHES MI SOIL SAMPLE ANALYTICAL RESULTS [mg/kg] EXCEEDING PALs

DATE: JUNE 2014

FIGURE NO.: 3



	SURFACE (0'-1.5')	SUBSURFACE (2.5'-6.5')	CAPILLARY FRINGE (7.3'-10')	PAL	ACCEPTED BACKGROUND
DU1					
NO EXCEEDANCES	-	-	-	-	-

DU2	(0'-2.5')	(1.5'-4.0')	(6.0'-8.25')		
NO EXCEEDANCES	-	-	-	-	-

DU3	(0'-2.5')	(1.5'-7.5')	(6.42'-10.0')		
1,4-DICHLOROBENZENE	ND	ND	***0.056***	0.037	NA
BENZO(A)PYRENE	***0.62***	0.031	0.043	0.15	NA

DU4	(0'-1.5')	(2.5'-4.5')	(6.75'-9.75')		
BENZO(A)PYRENE	***0.23***	0.0019	0.05	0.15	NA

DU5	(0'-2.0')	(1.5'-5.0')	(6.33'-9.42')		
BENZO(A)ANTHRACENE	***2.7***	0.0026	0.01	1.5	NA
BENZO(A)PYRENE	***4.3***	0.0034	0.012	0.15	NA
BENZO(B)FLUORANTHENE	***5.3***	0.0055	0.018	1.5	NA
DIBENZ(A,H)ANTHRACENE	***0.71***	ND	0.0025	0.15	NA
INDENO(1,2,3-CD)PYRENE	***2.5***	0.0032	0.0081	1.5	NA

DU6	(0-1.5')	NA	NA		
NO EXCEEDANCES	-	-	-	-	-

DU7	(0-1.5')	NA	NA		
NO EXCEEDANCES	-	-	-	-	-

NOTES:
1) ***BOLD*** INDICATES RESULT IS IN EXCEEDENCE OF THE PAL AND BACKGROUND LEVELS
2) ALL RESULTS ARE IN [mg/kg]
3) ND – NON DETECT
4) NA – NOT APPLICABLE
5) PAL – PROJECT ACTION LEVEL

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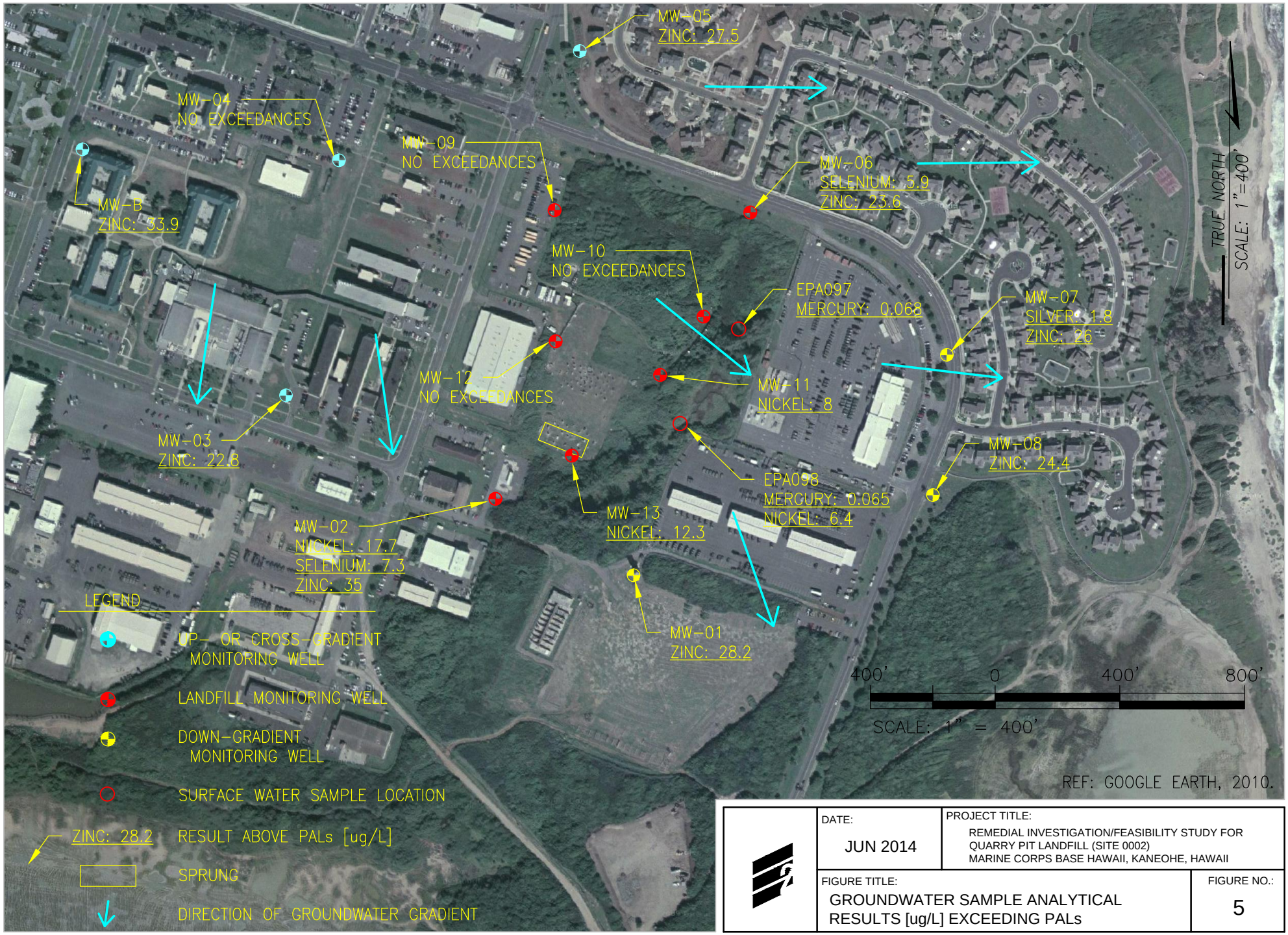
PROJECT TITLE:
REMEDIAL INVESTIGATION/FEASIBILITY STUDY FOR
QUARRY PIT LANDFILL (SITE 0002)
MARINE CORPS BASE HAWAII, KANEOHE, HAWAII

FIGURE TITLE:
LANDFILL MI SOIL SAMPLE ANALYTICAL RESULTS [mg/kg] EXCEEDING PALs

DATE: JUNE 2014

FIGURE NO.: 4

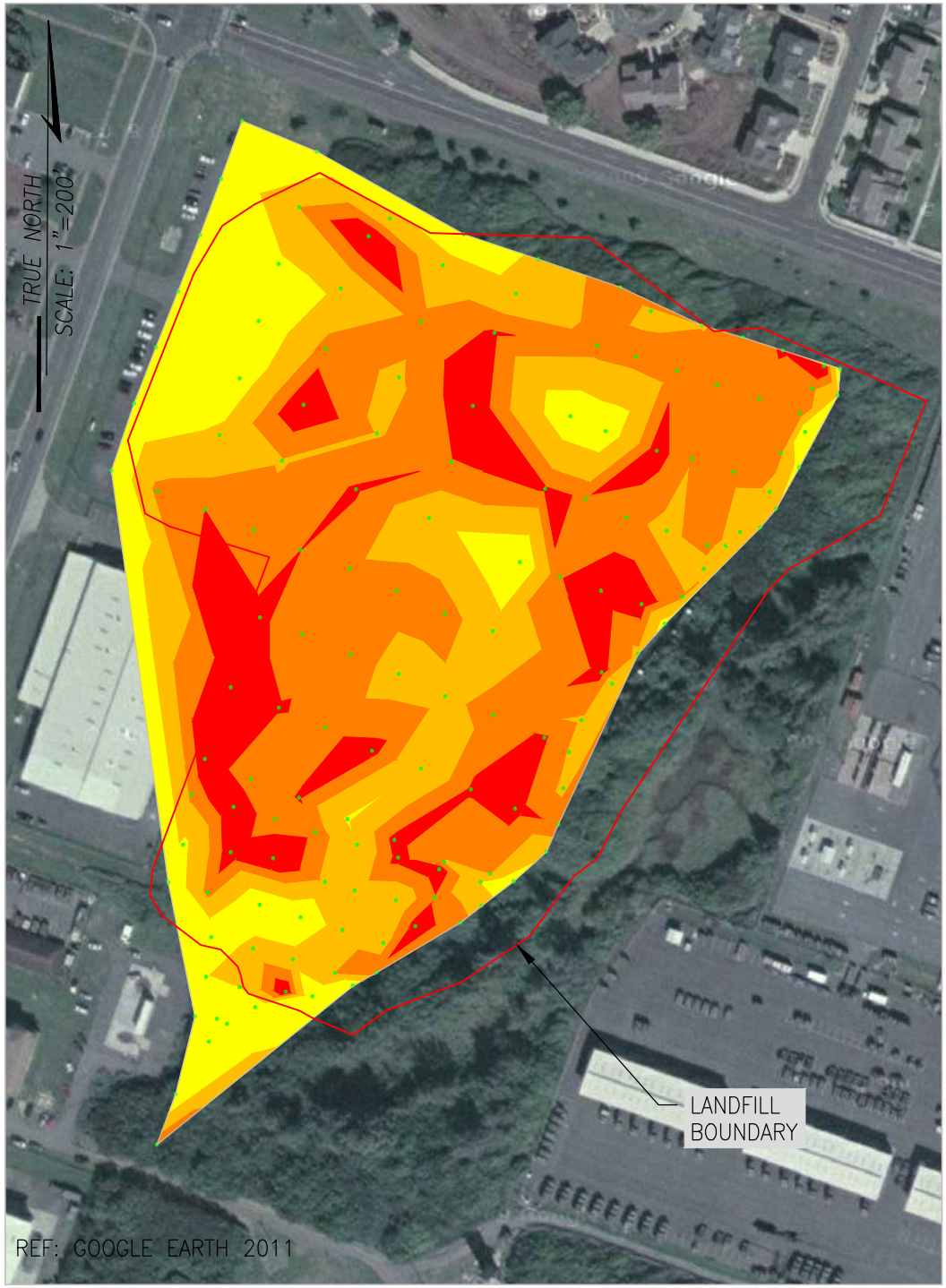


	DATE: JUN 2014	PROJECT TITLE: REMEDIAL INVESTIGATION/FEASIBILITY STUDY FOR QUARRY PIT LANDFILL (SITE 0002) MARINE CORPS BASE HAWAII, KANEOHE, HAWAII
	FIGURE TITLE: GROUNDWATER SAMPLE ANALYTICAL RESULTS [ug/L] EXCEEDING PALs	FIGURE NO.: 5

100' 0 100' 200'

SCALE: 1" = 200'

	DATE: JUN 2014	PROJECT TITLE: REMEDIAL INVESTIGATION/FEASIBILITY STUDY FOR QUARRY PIT LANDFILL (SITE 0002) MARINE CORPS BASE HAWAII, KANEOHE, HAWAII
	FIGURE TITLE: LANDFILL BOUNDARY CONFIRMED BY INVESTIGATION SURVEYS	FIGURE NO.: 6



LANDFILL DEBRIS					
NUMBER	MINIMUM THICKNESS (FEET)	MAXIMUM THICKNESS (FEET)	AREA (ACRES)	VOLUME (CUBIC YARDS)	COLOR
1	0.0	2.5	2.19	4,400	
2	2.5	5.0	3.50	21,000	
3	5.0	6.5	5.11	47,000	
4	6.5	8.5	1.53	18,000	

TOTAL VOLUME: 90,400 CUBIC YARDS

200' 0 200' 400'

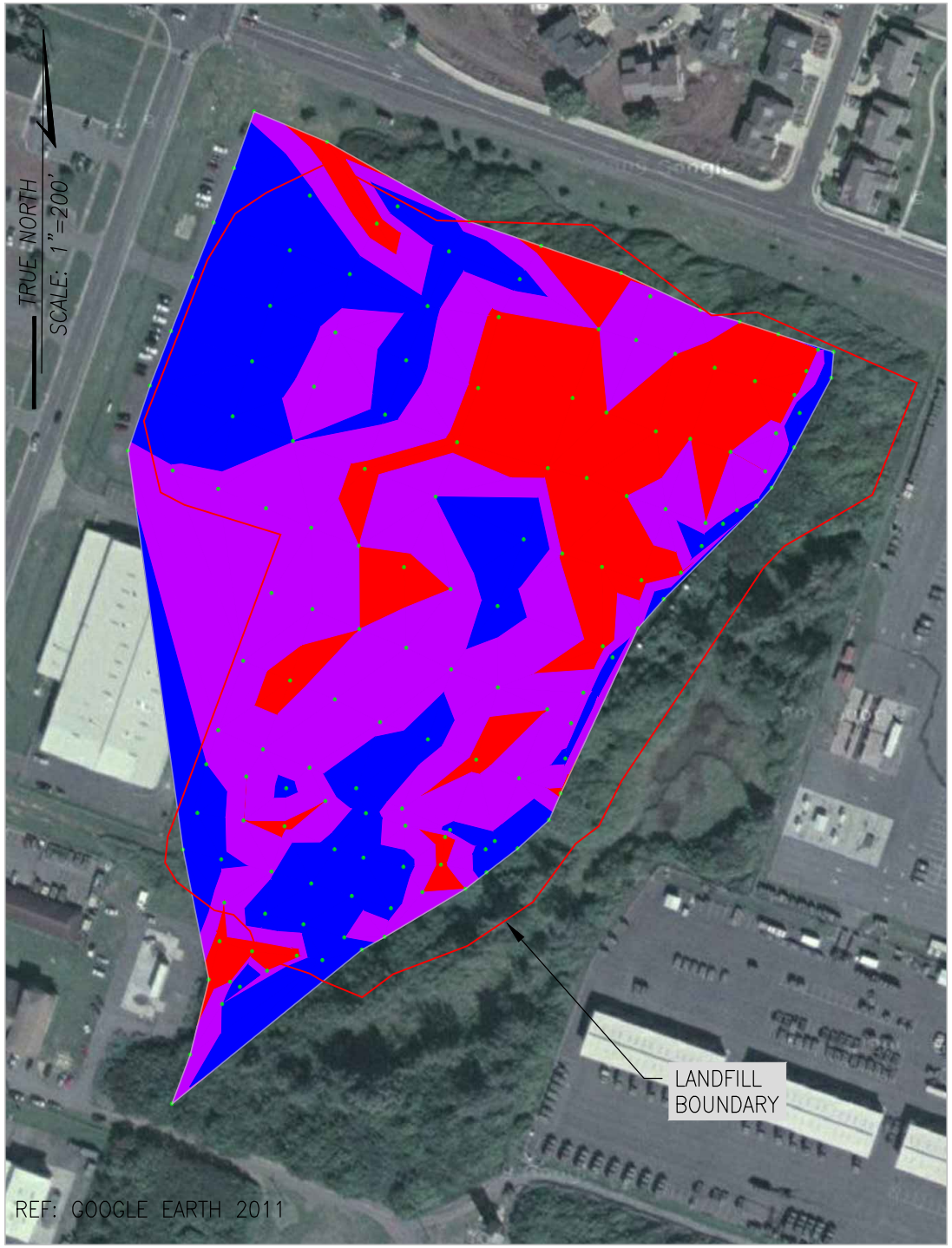
SCALE: 1" = 200'

DATE: JUN 2014

PROJECT TITLE: REMEDIAL INVESTIGATION/FEASIBILITY STUDY FOR QUARRY PIT LANDFILL (SITE 0002) MARINE CORPS BASE HAWAII, KANEOHE, HAWAII

FIGURE TITLE: BURIED DEBRIS THICKNESS QUARRY PIT LANDFILL

FIGURE NO.: 7



LANDFILL CAP THICKNESS				
NUMBER	MINIMUM THICKNESS (FEET)	MAXIMUM THICKNESS (FEET)	AREA (ACRES)	COLOR
1	0.0	2.0	2.72	
2	2.0	4.0	5.96	
3	4.0	10.0	3.67	

200' 0 200' 400'

SCALE: 1" = 200'

DATE: JUN 2014

PROJECT TITLE: REMEDIAL INVESTIGATION/FEASIBILITY STUDY FOR QUARRY PIT LANDFILL (SITE 0002) MARINE CORPS BASE HAWAII, KANEOHE, HAWAII

FIGURE TITLE: LANDFILL CAP THICKNESS QUARRY PIT LANDFILL

FIGURE NO.: 8

2.3 COMMUNITY PARTICIPATION

Public participation in the decision process for environmental activities at the site has continually been encouraged throughout the environmental restoration and site closure processes. In an effort to involve the public in the decision-making process, a Restoration Advisory Board (RAB) was established. The RAB is composed of the Marine Corps, the Navy, DOH, EPA, and community representatives. The Marine Corps has conducted RAB meetings (typically on a semi-annual basis) and other public meetings, as well as issued fact sheets that summarize the site investigation and cleanup activities, and published announcements in the *Honolulu Star-Advertiser*. The RAB team has provided review and comment leading to the selection of the final remedy in this DD. In addition, the Marine Corps also established a point-of-contact for the public at MCB Hawaii Kaneohe.

A Proposed Plan (PP) (E2 2013) for the site was prepared to formally present the selected remedy to the public and to solicit public comments. A Notice of Public Meeting was published in the *Honolulu Star-Advertiser* on April 26, 2013. The public meeting for the PP was held on May 14, 2013 at Aikahi Elementary School in Kailua, Hawaii. The public comment period for the PP was held from May 1 to May 30, 2013. Questions and concerns received during the meeting were addressed at the meeting and are documented in the meeting transcript (Attachment C). Responses to written and verbal comments received during the comment period and public meeting are presented in the Responsiveness Summary (Attachment D).

Throughout the investigation process of this site, the Marine Corps has prepared several fact sheets to inform and update the community on the progress of the site environmental investigation and cleanup activities. These fact sheets and other project documents, including work plans, technical reports, and other materials relating to the site investigation activities, can be found in the information repositories established at the University of Hawaii's Hamilton Library, Kailua Public Library, and Kaneohe Public Library.

Additional project information is located in the Administrative Record file for the site located at:

Naval Facilities Engineering Command, Hawaii
400 Marshall Road
JBPHH Hawaii 96860-3139

2.4 SCOPE AND ROLE OF THE RESPONSE ACTION

A response action is necessary to protect human health and the environment from exposure to contaminants remaining in soil at the site. The response action of LUCs will prevent direct exposure to contaminated soil while leaving contamination in place and will effectively reduce risks to human health and the environment and continue to do so as long as the LUCs are maintained. The specific LUC objectives are:

- Add an environmental notice to the Base master plan;
- Restrict future land use to recreational land use (e.g., multi-purpose training and/or a park/playfield) or industrial/commercial use;
- Maintain a 2-foot cap to prevent exposure of debris buried in the landfill;
- Inform personnel of land use restrictions/concerns through the Base dig permit process;
- Prohibit unauthorized disturbance, excavation, removal, or use of site soil; and

- Periodically monitor LUC effectiveness and compliance reporting.

2.5 SITE CHARACTERISTICS

2.5.1 Physical Characteristics

Meteorology. Northeasterly trade winds prevail over Oahu approximately 80 percent of the time, with average wind speeds ranging from 10 to 15 miles per hour. The trade winds blow more strongly and consistently from April through December. Southerly or "Kona" winds occur roughly less than half the time during the months of December through March. The northeasterly trade winds carry a large quantity of moisture from the Pacific Ocean to the island. Orographic lifting as the trade winds encounter the Koolau Mountain range causes the air temperature to drop and air moisture to precipitate. The mean annual precipitation at the upper reaches of the Koolau Mountains is approximately 150 inches, and the windward side of the island generally experiences more rainfall than the leeward side. The orographic effect also tends to produce most of the precipitation in the form of passing showers in the evenings and early mornings.

The overall climate on Oahu is warm and humid year round. The average daily temperature on Oahu ranges between 65 and 85 degrees Fahrenheit (°F) with relative humidity ranging from 30 to 90 percent (Juvik and Juvik 1998). Based on a 38-year study at MCB Hawaii, the mean daily temperature at the project site is 71.6°F and the average annual rainfall is 38.9 inches. Prevailing northeasterly trade winds occur at MCB Hawaii throughout the year at a mean wind speed of 7.0 knots (HLA 1989).

Geology and Soils. MCB Hawaii is located on Mokapu Peninsula, on the windward side of the island of Oahu. The topography of the peninsula is dominated by three remnant hydromagmatic volcanic features, which erupted during the post-erosional phase of volcanism on the island (Honolulu Volcanic Series) between 500,000 to 1,000,000 years ago: Kuau or Pyramid Rock, Puu Hawaii Loa, and Ulupau Crater. The volcanic activity associated with these eruptions produced layered ash deposits, which blanketed much of MCB Hawaii. The ash eventually underwent a cementing process that transformed the originally unconsolidated ash into a cemented tuff. Large fluctuations in sea levels produced coral reefs atop the base of these volcanic vents, which today comprise much of the peninsula's relatively porous, calcareous land surface. Other portions of the peninsula are covered by sand dunes created by the prevailing trade winds blowing the sand present on the long beaches fringing the windward Mokapu shores inland.

The Quarry Pit Landfill is situated on a flat coastal plain. The topographic survey, completed on August 15, 2011 by R.M. Towill Corporation (RMTC), shows that ground surface elevations at the landfill range from +107.25 to +115.27 feet above mean low water with the landfill topography sloping toward the south and southeast. All elevations in this DD are referenced to mean low water datum assumed as elevation +100 feet.

The soil at the landfill site consists of well-drained, moderately permeable soil of the Mamala series (United States Department of Agriculture [USDA] Soil Conservation Service [SCS] 1972). Based on the well borings advanced by HLA (DON 2007) at locations in the vicinity of the project area, the surface layer of soil consists of dark brown silt and sandy silt, with occasional lenses of sand. The surface soil layer ranges from approximately one-foot thick at the east end of the project area to 12-feet thick at the west end. This surface layer is underlain by shallow marine sediments and littoral deposits comprised of silty sands and gravels, which contain detrital fragments of coral.

Based on the test pits excavated by (ETI in DON 2007) within the margins of the landfill, the landfill cover varies from two- to five-feet thick and consists of a yellowish brown to dark brown/gray, gravelly

sandy silt. Based on the test pits and soil borings completed within the Quarry Pit Landfill by E2, as part of this RI/FS, the soil cap varies from 0.46- to 8.83-feet thick and consists of a dry, brown to dark brown, silty sandy clay.

Hydrology and Hydrogeology. Based on the topographic survey completed for this RI/FS, surface runoff at the landfill site generally flows in the south and east directions; although, the runoff will tend to pond within the landfill site. Due to the presence of the berm along the eastern end of the landfill, runoff will not readily flow into the adjacent wetland except under heavy flow conditions.

An overflow swale does extend out of the wetland toward the Nu'upia Ponds to the south; however, the gradual upland slope in this area would prevent overflow except under very heavy flow conditions. Based on the concentration of litter debris towards the center of standing water in the wetland observed during this RI, it is unlikely that there is much flow out of the area. The wetland provides a habitat for aquatic species; however, no threatened or endangered species were noted in the wetland area during site visits conducted in 2000 and 2001 or during the recent biological screening assessment conducted on April 21, 2011. Depending on whether the vegetation has been recently disturbed or opportunistically plowed (not cleared) through by AAVs or other means, the adjacent wetland area hosts opportunistic foraging for the endangered Hawaiian Stilt, the Cattle Egret, the Black-Crowned Night Heron, and other assorted shorebirds or waterbirds (likely wandering tattlers, plovers, hybrid Koloa-Mallard ducks, etc.) (Drigot 2011).

The aquifer identification and classification maps designate the aquifer systems on Mokapu Peninsula the same as those present in the nearby town of Kailua. According to this designation, the groundwater directly beneath the project site consists of a shallow, basal, unconfined sedimentary aquifer that is currently used, ecologically important, low in salinity (i.e., between 250 to 1,000 milligrams per liter [mg/L] chloride), irreplaceable, and has a high vulnerability to contamination (Mink and Lau 1990). The groundwater in this aquifer is tidally influenced and generally flows toward the east, with groundwater elevations varying from approximately nine to ten feet below ground surface (bgs) at the project site. Tidal fluctuations reportedly vary from approximately 0.5 foot in wells at the eastern portion of the site to 0.1 foot in the west. The shallow groundwater is believed to originate from infiltration of precipitation combined with intrusion of seawater (DON 2007).

A deeper aquifer (located beneath the shallow, unconfined sedimentary aquifer at several hundred feet bgs at the project site) is designated a basal, confined, dike/flank lava aquifer that is currently used for drinking water and is considered to be irreplaceable with a low vulnerability to contamination (Mink and Lau 1990).

Despite these aquifer designations, MCB Hawaii does not contain a viable drinking water source and lies seaward of the Underground Injection Control (UIC) line. The UIC line was developed by the DOH to delineate the boundary between non-drinking water aquifers and underground sources of drinking water throughout the state. Areas that are seaward of the UIC line are considered to be located above non-drinking water aquifers. MCB Hawaii purchases its entire water supply from the Honolulu Board of Water Supply (NEESA 1984).

2.5.2 Nature and Extent of Contamination

Surface and subsurface soil, and groundwater samples were collected during the RI/FS to determine the nature and extent of contamination exceeding the site cleanup goals and established background concentrations. Samples were analyzed for the following: TPH-DRO, TPH-LRO, VOCs, SVOCs, PAHs, PCBs, and Target Analyte List (TAL) 23 metals.

The site cleanup goals were the DOH Tier 1 EALs for Unrestricted Use (DOH 2009a).

The RI/FS divided the site into five DUs based on the property use (i.e., one DU consisted of the former Paintball/AirSoft recreational area), areas with high probabilities of containing buried waste, and potential transition areas (i.e., the bermed area between the landfill and the adjacent wetland).

COPCs identified for the soil at the Quarry Pit Landfill site include:

- SVOCs – 1,4-dichlorobenzene on a regional level in the capillary fringe of DU-3 and a localized level in the subsurface soils of DU-4 and dimethyl phthalate on a localized level in the subsurface soils of DU-1 and DU-2;
- PAHs – benzo(a)anthracene on a regional level in surface soils of DU-5 and on a localized level in DU-3; benzo(a)pyrene on a regional level in surface soils of DU-3, DU -4, and DU -5 and a localized level in surface and subsurface soils in DU-3, DU -4, and DU -5; and benzo[b]fluoranthene, dibenz(a,h)anthracene, and indeno(1,2,3-cd)pyrene on a regional level in surface soils of DU-5 and on a localized level in DU-3;
- PCBs – Aroclor-1242 in subsurface soil on a localized level in DU-1 and Aroclor-1260 in surface and subsurface soils on a localized level in DU-1 and DU-4; and
- Metals – barium on a localized level in surface and subsurface soils of DU-1 and DU-5 and arsenic in subsurface soil on a localized level in DU-2.

Five metals were detected in both groundwater and surface water at concentrations above project action limits (PALs); silver, mercury, nickel, selenium, and zinc. All five of these metals were observed in surface and subsurface soils at the Quarry Pit Landfill site on a regional level at concentrations ranging from trace to elevated, but below background metals concentrations. It is likely that the presence of metals in the groundwater and surface water are due to the presence of naturally occurring metals in the soils. COPCs do not appear to be migrating off site (E2 2012).

2.5.3 Remedial Action Objectives

The primary objective of the remedial actions proposed in the FS is to reduce and/or eliminate potential exposure to contaminants that have been identified as posing unacceptable risk to human and/or ecological receptors. The response actions are designed to address exposure risks under current and future land uses. The future land use of the site is recreational use (e.g., multi-purpose training and/or a park/playfield, etc.) or industrial/commercial use. For the purposes of the FS, response actions that produce restricted use and unrestricted use were evaluated. However, the recommended alternative will be selected based on achieving and/or exceeding the requirements for troop training or recreational use at the site.

Table 1 below provides a summary of the impacted soil remaining in place at the site.

Table 1: Summary of Restricted Use Areas

Chemical	DOH Tier 1 EAL for Unrestricted Use	Maximum Concentration	Depth of Maximum Exceedance
Soil			
PAHs	1.5 mg/kg	5.3 mg/kg	Landfill surface
PCBs	1.1 mg/kg	40 mg/kg	Trench surface
SVOCs	0.037 mg/kg	0.17 mg/kg	Trench subsurface
Barium	750 mg/kg	921 mg/kg	Trench surface
Arsenic	20 mg/kg	31.5 mg/kg	Trench subsurface
Groundwater			
Nickel	5 µg/L	17.7 µg/L	On-site groundwater
Selenium	5 µg/L	7.3 µg/L	On-site groundwater
Zinc	22 µg/L	35 µg/L	On-site groundwater
Silver	1 µg/L	1.8 µg/L	Down-gradient groundwater
Mercury	0.047 µg/L	0.068 µg/L	Wetland surface water

Notes:
mg/kg = milligram per kilogram
µg/L = microgram per liter

2.6 CURRENT AND POTENTIAL FUTURE SITE AND RESOURCE USES

2.6.1 Quarry Pit Landfill

Previous Site Use. The project area was first used as a quarry pit during the construction of Fort Hase and Naval Air Station (NAS) Kaneohe Bay in the 1940s and was known as the Quarry Pit and/or Boondocker Landfill. In the 1950s, the two bases were combined to form Marine Corps Air Station (MCAS), Kaneohe Bay. Documents indicate that the landfill was only open from 1972 to 1976 for solid waste disposal; however, aerial photographs clearly indicate that the site was used intermittently from the 1940s to the 1960s for storage and/or disposal operations. Details of what materials may have been at the site prior to 1972 are unavailable (NEESA 1984).

Some time prior to 1959, two buildings were constructed adjacent to, or partially on, the southwest corner of the landfill. Building 1020, the building located furthest to the south, was a theater, and Building 116 was a self-serve laundromat (DON 1967).

The Quarry Pit Landfill was the main on-base landfill from 1972 to 1976, and accepted most solid wastes, excluding refuse from residential areas. It was reported that 165,379 cubic yards of waste were disposed of at the landfill, including petroleum, oil and lubricants (POL), solvents, paints, thinners, batteries, mercury, transformer oils, pentachlorophenol (PCP), and glass beads from paint stripping operations. However, only small quantities of hazardous wastes are expected at the Quarry Pit Landfill, because the H-3 Landfill was located closer to the industrial operations and was still being used by the workers while the Quarry Pit Landfill was open (NEESA 1984).

In 1976, the landfill was closed in accordance with existing guidance and instructions at that time and left undeveloped until 2000 (FAI 2011). Starting in 2000, Paintball Hawaii & Pacific AirSoft, a commercial paintball operation, used the southern two-thirds of the area as a paintball recreational facility (Figure 2, FAI 2011). The facility was periodically used Monday through Friday for military training purposes.

The facility was open to the public on Saturday and Sunday from 9:00 am to 5:00 pm and for private parties on Fridays. The facility was open to people of all ages, including children under the age of 18. Paintballs were supplied by the facility, or brought in by the players. The paint used in paintball facilities was designed to be non-toxic. The facility was expanded in 2007 to include the use of airsoft. Users were required to use the biodegradable airsoft pellets supplied by the facility. Heavy equipment was used to re-grade part of the site, and in the process, some of the existing landfill cover materials have been disturbed. Paintball operations closed in January 2012.

The Medical Warehouse, located on the west side of the site, was built in 1989. The motor pool was constructed on the east side of the adjacent wetland in 1990 (RMTC).

Current and Future Land Use. The central portion of the landfill is currently vacant. There is one temporary structure (a Sprung) located in the southern portion of the landfill, which is reportedly used for storage. The floor of the Sprung consists of impermeable, interlocking rubber tiles. The remainder of the landfill is unused and is overgrown with vegetation; however, the site has potential for use by the Hawaiian Stilt for foraging. Potential future land uses include: recreational uses as a multi-purpose troop training area or park/playfield; industrial/commercial uses; and maintaining as an open green space in its natural state.

2.6.2 3rd Marine Motor Pool and Adjacent Wetland

Previous Site Use. According to information included in the 2002 MCB Hawaii wetland delineation (USACE 2002), in the 1940s, the Quarry Pit area, including the adjacent wetland, was quarried for the construction of Fort Hase and NAS Kaneohe Bay.

Some time prior to 1963 (University of Hawaii [UH]), the adjacent wetland and land to the south and east were developed with what may have been an antenna field. Three buildings were present at the site, including Buildings 1189 and 1190, which were Communications/Electrical Maintenance Shops, and Building 1191 (function was not identified) (DON 1967). By 1978 all three buildings had been removed.

In 1963, the Quarry Pit area was again excavated, which increased the excavation footprint. An aerial photograph dated December 20, 1963 shows that the area east of the landfill (where the motor pool and adjacent wetland are now located) had been cleared, and shows a dark spot (possible indication of water) in the vicinity of the present wetland (USACE 2002). By 1968 (RMTC), the "antenna field" appears to have been partially overgrown with vegetation.

According to information included in the MCB Hawaii wetland study, from 1972 to 1976, the Quarry Pit was the main landfill that received most of the station's wastes. The landfill reportedly stopped short of the eastern Quarry Pit excavation boundary, which resulted in a low swale-like feature that became the adjacent wetland (USACE 2002). In the 1978 United States Geological Survey (USGS) orthophotoquad, the adjacent wetland is shown to extend in a northeast to southwest direction, as it does today (USACE 2002). The wetland was opportunistically plowed (not cleared) in the early 2000s using AAVs. Clearing with the AAVs enhanced the amount of available habitat for waterbirds.

The 3rd Marine Motor Pool was built in 1990 (RMTC) adjacent to the east of the wetland.

Current and Future Land Use. The land adjacent to the east of the Quarry Pit Landfill is currently occupied by wetland, and further east, by the motor pool. The USACE report (2002) stated that the primary function of this wetland is to filter pollutants from runoff. The wetland also provides habitat to aquatic species. Depending on whether the vegetation has been recently disturbed or plowed through by

AAVs or other means, the adjacent wetland area hosts opportunistic foraging for the endangered Hawaiian Stilt, the Cattle Egret, the Black-Crowned Night Heron, and other assorted shorebirds or waterbirds (likely wandering tattlers, plovers, hybrid Koloa-Mallard ducks, etc.) (Drigot 2011).

Future land use of the wetland and motor pool is unlikely to change.

2.7 SUMMARY OF CURRENT SITE RISKS

2.7.1 Conceptual Site Model

The Conceptual Site Model (CSM) for the Quarry Pit Landfill and the Motor Pool Wetlands identify potential exposure pathways for the human and ecological receptors that were evaluated during the RI/FS. The CSMs are based on the following:

- Anecdotal information provided by NAVFAC Hawaii and MCB Hawaii Environmental Compliance and Protection Department;
- Observations made by E2 personnel at the site during the initial site reconnaissance in May 2010;
- Information obtained during the scoping meeting conducted in October 2010;
- Observations made during field work conducted from June through August 2011;
- Information obtained from the geophysical and topographic surveys, the biological screening assessment, and the synoptic water level survey conducted between April and September 2011;
- Soil, sediment, surface water, and groundwater analytical results from sampling activities conducted from June through August 2011;
- Landfill (soil) gas monitoring results obtained in July and August 2011; and
- Information provided in the *FS for Reuse of Former Quarry Pit Landfill, MCBH, Kaneohe, Oahu, Hawaii* (FAI 2011).

The concern is that wastes (including POLs, solvents, paint thinners, lead batteries, mercury, and transformer oils) were disposed at the Quarry Pit Landfill while it was open from 1972 to 1976. Chemicals placed in the landfill could have potentially traveled into the soils present in the landfill and into the adjacent wetland.

Because the primary contamination source is no longer active, the CSM focused on secondary sources, release mechanisms, and potential pathways for exposure of human and ecological receptors. Based on the suspected former site activities, the COPCs for the project site include TPH-DRO\LRO, VOCs, SVOCs, PAHs, PCBs, TAL 23 metals, and landfill gases. This list of COPCs is appropriate for sites that may contain a range of petroleum hydrocarbons, such as a mixture of diesel, oil, and solvents.

Due to the nature of the contaminant deposition (i.e., disposal below the surface), impacts to the soil are likely concentrated in the subsurface soil (at 2- to 10-feet bgs) as well as the surface soil (from 0- to 2-feet bgs). The potential presence of contamination in soil was evaluated by collecting 15 MI soil samples from 210 soil borings and 40 MI soil samples from 20 trenches located throughout the landfill. The potential leaching of chemicals to the underlying shallow groundwater aquifer was also evaluated by collecting 14 samples of shallow groundwater from beneath the site and adjacent areas. The potential intrusion of chemicals into the adjacent and onsite buildings (the Medical Warehouse and the Sprung) was evaluated by monitoring landfill gas in soil gas wells installed at the site. Lastly, the potential

leaching of chemicals to the adjacent wetlands was evaluated by collecting two surface sediment and two surface water samples from the adjacent wetland.

Only potentially complete exposure pathways are evaluated in a risk assessment. A potentially complete exposure pathway must include all of the following elements before a quantitative assessment is performed:

- Sources and types of chemicals present
- Affected media
- Chemical release and transport mechanisms (e.g., spillage and advection, vaporization)
- Known and potential routes of exposure (e.g., ingestion, dermal contact, inhalation)
- Known or potential human and environmental receptors (e.g., residents, workers, wildlife)

The absence of any one of these elements results in an incomplete exposure pathway. With no potential for human or ecological exposure to COPCs, the potential for adverse health effects would be deemed negligible and not warrant further evaluation.

Hypothetical receptors, depending on the proposed land use alternative, include residents, commercial employees, recreational users, and construction workers. For each of the development scenarios, a construction worker is evaluated. The onsite construction worker is an exclusively outdoor worker who is present at the site during the construction phase. The hypothetical receptors specific to each of the proposed development scenarios are described below:

Concept #1: Recreational area – training area, park, playfield and/or parking lot.

This concept includes an evaluation of two types of recreational use. For future use as a training area, the landfill open space would be used by only adult recreators (no children). For the hypothetical park development scenario (e.g. park, ball field, etc.), hypothetical recreational users include adults and children.

Concept #2: Residential use – temporary housing or portable buildings.

The evaluation of residents in this concept represents the "unrestricted land use" scenario, which assumes a long-term residential setting for adults and children.

Concept #3: Commercial use –Bachelor Enlisted Quarters (BEQ) or industrial warehouse.

This concept includes an evaluation of two types of commercial use. For the proposed BEQ, future residents living onsite are assumed to be only adult residents (no children). For the proposed industrial warehouse, onsite commercial workers are assumed to be full-time employees.

Concept #4: Other use – Maintaining as an open green space in its natural state.

This concept includes an evaluation of the site as is, since there are virtually no natural green spaces left on base other than the protected Nu'upia Ponds or around the airfield, within the built-up environment. A vegetated area would also act as a buffer to the nearby wetland that hopefully will be restored in the next several years.

Potential exposure pathways for these three development scenarios are described below.

Inhalation Exposure Pathways

Exposures via inhalation pathways occur when COPCs transported in air as vapor and/or suspended particulates are inhaled by a receptor. It is possible for future residents, recreational users, commercial workers or construction workers to be exposed to chemicals via inhalation of outdoor air. While it is unlikely for maintenance workers to inhale suspended particulates from sediment, evaluation of this pathway was included in the soil screening levels used to evaluate wetland sediment.

Inhalation of COPCs in indoor air as a result of vapor intrusion applies only to receptors spending time indoors, specifically future residents or indoor commercial employees. For future residents and commercial employees who may spend time indoors, the vapor intrusion pathway is evaluated qualitatively because VOC concentrations in landfill soil and ground water are not above EALs and do not warrant additional investigation (HDOH 2009).

Dermal Contact Exposure Pathways

Dermal contact exposure pathways encompass all activities that result in direct contact with contaminated environmental media. It is possible for future residents, recreational users and commercial workers to be to be exposed to chemicals in surface soil via dermal contact. Construction workers digging trenches may come in contact with chemicals in subsurface soil via dermal contact. Additionally, maintenance workers may come in contact with chemicals in sediment in the wetland.

Ingestion Exposure Pathways

Future residents, recreational users, commercial workers, and construction workers may accidentally ingest soil or sediment they contact.

In summary, all receptors may be exposed to COPCs in soil via direct exposure, which includes incidental ingestion, dermal contact, and inhalation of vapors or dust particles in outdoor air. In addition, future residents or indoor commercial employees may be exposed to chemicals in indoor air via subsurface vapor intrusion.

2.8 REMEDIAL ACTION OBJECTIVES

The primary objective of the remedial actions proposed in this FS is to reduce and/or eliminate potential exposure to contaminants that have been identified as posing unacceptable risk to human and/or ecological receptors. The response actions are designed to address exposure risks under current and future land uses. The future land use of the site is recreational use (e.g., multi-purpose training and/or a park/playfield) or industrial/commercial use. For the purposes of this FS, response actions that produce restricted use and unrestricted use are evaluated. However, the recommended alternative will be selected based on achieving and/or exceeding the requirements for troop training or recreational use at the site.

2.9 DESCRIPTION AND EVALUATION OF REMEDIAL ACTION ALTERNATIVES

The MCB Hawaii Environmental Department has indicated that the planned future uses of the site may possibly be as a multi-purpose training area similar in use to the existing Boondocker training area located adjacent to the south of the Quarry Pit Landfill (Chambers 2012) and/or a park/playfield (Hu 2012). No new building structures are planned for the multi-purpose training area or park/playfield at this time. A

parking structure is also planned near the south end of the Lemon Lot, which will be used by residents in the adjacent BEQs. The Medical Warehouse adjacent to the west of the site may also be expanded in the future. The exposure risk to troops for this future multi-purpose training area and parking lot is akin to the recreational scenario evaluated under redevelopment Concept #1, which indicated acceptable risk levels.

The five alternatives were rated on their general effectiveness, implementability, and cost. Alternatives rated poor in either effectiveness or implementability were eliminated from further consideration, with the exception of No Action, which was retained as a baseline for comparison. Table 2 below summarizes the results of the screening.

Table 2: Screening of Alternatives

Remedial Alternative	General Effectiveness	Implementability	Cost
No Action	Poor – Does not address potential risks posed by future development.	Excellent	None
LUCs	Very Good – LUCs will address risks to future users. However, it does not eliminate the contamination from the site.	Excellent	Low
Surface Capping with LUCs	Very Good – Surface Capping with LUCs will address risks to future users. However, it does not eliminate the contamination from the site.	Very Good – The surface cap will need to be designed to allow for surface water drainage.	Moderate
Excavation and Off-site Disposal	Excellent – Soil and debris will be removed from the site, allowing for unrestricted use.	Poor – Cost to remove 90,400 cubic yards of soil and debris is considered prohibitive.	High – Due to the potential for localized PCB contamination, the entire volume of the landfill is considered to require excavation and disposal.
Ex-Situ Treatment by Thermal Desorption	Very Good – Treatment may reduce contamination levels to allow for unrestricted use at the site.	Poor – Cost to treat 90,400 cubic yards of soil and debris is considered probative. Also requires a treatability study to determine the effectiveness.	High – Due to the potential for localized PCB contamination, the entire volume of the landfill is considered to require excavation and treatment.

Based on this screening evaluation, the following remedial alternatives were retained for a more detailed analysis:

- Alternative 1: No Action;
- Alternative 2: LUCs; and
- Alternative 3: Surface Capping with LUCs.

The three remedial alternatives retained for analysis were evaluated utilizing the nine NCP criteria for evaluation as specified in CERCLA (40 CFR §300.430). The nine criteria include: Overall protection of

human health and the environment; Compliance with ARARs; Long-term effectiveness and permanence; Reduction of toxicity, mobility, or volume through treatment; Short-term effectiveness; Implementability; Cost; State acceptance; and Community acceptance.

2.9.1 No Action Alternative

The No Action alternative assumes that no remedial activities will be conducted at the Quarry Pit Landfill site. No effort would be made to reduce, remove, or encapsulate the residual PAH and PCB contamination that is present in soils at the project site. Currently, a soil cap does exist on the site; however, the depth of the soil cap is less than two-feet thick in places. In addition, portions of the soil cap (i.e., DU-5) contain levels of PAHs that exceed acceptable human health risk ranges for unrestricted use.

The advantages and disadvantages of the No Action alternative are summarized below.

Advantages

- Involves no handling of contaminated materials, which could put workers at risk.
- No initial capital cost required.

Disadvantages

- Exposure risks to PAHs and PCBs in soil at the site are within acceptable ranges under the future land use scenario as recreational (e.g., a multi-purpose training area and/or park/playfield). However, LUCs will not be placed on the site that would restrict redevelopment of the area for residential use where exposure risks to PAHs and PCBs are not within acceptable levels. The potential for exposure should the land use change to residential is not compliant with ARARs.
- Likely viewed as an unresponsive alternative by regulatory agencies and the community.

In comparison to the other alternatives, the No Action alternative's relative ranking is "3." This alternative is ranked the lowest of the alternatives evaluated because it is not protective of human health and the environment since no LUCs would be implemented to protect future residents from exposure to the PAH and PCB contamination present in site soils should the land use change.

2.9.2 Land Use Controls

Exposure risks to PAHs and PCBs in soil at the site are within acceptable ranges under future land use scenarios as recreational (e.g., a multi-purpose training area and/or park/playfield) or industrial/commercial. LUCs would include the restriction of future use of the property to recreational uses (e.g., multi-purpose training and/or a park/playfield) or industrial/commercial uses as described in a LUCP and an environmental notice added to the Base master plan. These controls provide an administrative means of limiting risk associated with the project site, by limiting the potential land uses in the future while site contamination conditions remain as they are currently. In addition, it is recommended that a 2-foot cap be maintained at the site (i.e., 18-inches of cover and 6-inches of topsoil) to prevent exposure to debris buried in the landfill.

The LUCP will address the long-term management measures for the site and include provisions or requirements that will be implemented should future use of the site change from recreational (e.g., a multi-purpose training area or a park/playfield) or industrial/commercial. The LUCP will include:

- Brief summary of the site background and history of contaminant releases;

- Identification of the COPCs;
- Clear depiction of the extent and magnitude of remaining contamination in soil, groundwater and/or soil gas, presented on easily readable, to-scale maps;
- Identification and discussion of all potential environmental hazards;
- Requirements for long-term monitoring of contaminants in soil, groundwater, and/or soil gas;
- Discussion of engineering and/or institutional controls needed to address identified environmental hazards to eliminate exposure pathways;
- Guidance on proper handling, reuse and disposal of contaminated soil and/or groundwater that is encountered during future site activities;
- Specific description of construction worker protections and notifications required;
- Use restrictions to protect occupants, residents, guests, etc.;
- Measures for repair or replacement of engineering controls that are disturbed or breached during future site activities; and
- Any other information required to adequately mitigate and manage remaining environmental concerns at the site.

The advantages and disadvantages of this alternative are summarized below.

Advantages

- Involves no handling of contaminated materials, which could put workers at risk.
- Little site disturbance, low capital costs.

Disadvantages

- Restricts future use options for the property.
- Long-term monitoring and maintenance are generally required.
- Does not reduce the toxicity, mobility, or volume of the contaminants. PAHs may naturally attenuate over time, but PCBs are relatively recalcitrant.
- Community acceptance may be fair to good because this remedial option may be perceived as a "do-nothing" option.

In comparison to the other alternatives, the LUC alternative's relative ranking is "1." Exposure risks to PAHs and PCBs in soil at the site are within acceptable ranges under the future land use scenarios as recreational (e.g., a multi-purpose training area and/or park/playfield) or industrial/commercial. The LUCs will ensure that land use at the site will be restricted to recreational use (e.g., multi-purpose training) or industrial/commercial use and the LUCP will be in place should MCB Hawaii decide to change land uses. The drawback of this remedial alternative is that it does not reduce the toxicity, mobility, or volume of contaminants. However, the sampling results from the RI indicate that the PAH and PCB contamination is not migrating off-site or to the groundwater. The Surface Capping with LUCs alternative to be described in the following section does further reduce the mobility of contaminants and prevent direct exposure to soil contamination to allow for more-sensitive land uses. However, when considering the planned future use as recreational (e.g., a multi-purpose training area and/or a

park/playfield) or industrial/commercial, the cost for the installation and maintenance of a surface cap is not warranted at this time.

2.9.3 Surface Capping with Land Use Controls

This technology involves construction of a surface cap at the project site in addition to implementing the legal and administrative LUCs. The current soil cap on the project site is not consistently 2 feet deep and a portion of the soil cap (i.e., DU-5) contains PAHs at levels that may pose a health risk to future residents. A two foot soil cap could be placed across the entire Quarry Pit Landfill site that would limit exposure to the PAHs and PCBs found in the site soils. The soil cap will be effective in remediating all contaminants to the degree that receptors will not be in contact with the contaminants; however, contaminant levels will not decrease at the site. Installation of a surface cap offers the advantage of more-sensitive land uses such as residential uses. LUCs implemented through a LUCP would still be required to restrict activities (e.g., excavations) and future uses that could interfere with the integrity of the surface cap. An environmental notice would also be added to the Base master plan to restrict land development.

The advantages and disadvantages of this alternative are summarized below.

Advantages

- Easily installed.
- Reduces direct exposure/contact of human receptors with contaminants which allows for more-sensitive land uses.
- Reduces the potential erosion of contaminated soil.

Disadvantages

- Long-term monitoring and maintenance are generally required.
- Does not reduce the toxicity or volume of contaminants. PAHs may naturally attenuate over time, but PCBs are relatively recalcitrant.
- May limit future use options at the site.
- LUCP is required if subsurface soil below the surface cap requires disturbance during future improvements (i.e., installation of foundations and utilities).

In comparison to the other alternatives, the Surface Capping with LUCs alternative's relative ranking is "2." The surface cap will prevent direct exposure of human receptors to soil contamination that allows for more-sensitive land uses. In addition, the surface cap does reduce the potential for erosion of contaminated soil. Because the planned future use is uncertain (possibly a multi-purpose training area and/or a park/playing field and/or an industrial/commercial use), and risk levels have been shown to be acceptable for these uses, the cost for the installation and maintenance of a surface cap is not warranted at this time.

Table 3 summarizes the major components, details, and costs of the retained remedial action alternatives. Cost estimates were developed, based on historical cost averages for individual remedial activities and adjusted for typical cost variations occurring within the general region of the subject site. In addition, real costs from similar projects were used where appropriate.

Table 3: Response Action Alternatives

Alternative	Components	Details	Cost
1: No Action	• None	No Action assumes that no remedial activities will be conducted at the project site.	$0
2: LUCs	• Engineering and Institutional (legal) controls (LUCs) • Long-term monitoring and maintenance (LTMM) and reporting (CERCLA 5-year reviews)	LUCs would include the restriction of future use of the property to recreational use (e.g., multi-purpose training and/or a park/playfield) or industrial use/commercial as described in a LUCP, and an environmental notice added to the Base master plan. These controls provide an administrative means of limiting risk associated with the project site, by limiting the potential land uses in the future while site contamination conditions remain as they are currently. The LUCP will address the long-term management measures for the site and include provisions or requirements that will be implemented should future use of the site change from recreational use (e.g., a multi-purpose training area or a park/playfield) or industrial/commercial use.	Capital Cost: $80,000 Annual O&M Cost: $3,000 Total Cost: $170,000 Timeframe: 30 years
3: Surface Capping with LUCs	• Installation of Surface Cap • Engineering and Institutional (legal) controls (LUCs) • Long-term monitoring and maintenance (LTMM) and reporting (CERCLA 5-year reviews)	This technology involves construction/maintenance of a 2-foot soil cap at the project site. LUCs as described in a LUCP would include future use restrictions such that the surface cap is maintained and an environmental notice added to the Base master plan to restrict land development.	Capital Cost: $1,867,000 Annual O&M Cost: $3,000 Total Cost: $1,957,000 Costs were not estimated for landfill cap maintenance (which was assumed to be part of tenant maintenance operations).

Notes:
LTMM long-term monitoring and maintenance
O&M operations and maintenance

2.10 EVALUATION OF ALTERNATIVES

The RI conducted for the project site suggests that remedial action is required to reduce or eliminate potential risks to human receptors from PAH and PCB contamination present in soils at the Quarry Pit Landfill site. A detailed analysis of alternatives and a five-tiered scale was used to perform a comparative analysis of the alternatives and select the preferred alternative.

In comparing the three remedial alternatives evaluated for this site, the following relative ranking in order of preference was concluded:

(1) LUCs;

(2) Surface Capping with LUCs; and

(3) No Action.

Based on communication with MCB Hawaii, the Quarry Pit Landfill site is projected to be redeveloped for recreational use as a multi-purpose training area and/or a park/playfield. The sHHRA and SLERA (MLI 2012) completed during the RI indicate acceptable risk levels for multi-purpose training use, recreational use, and industrial/commercial use. The LUC alternative ensures that land use at the site will be restricted to recreational uses (e.g., multi-purpose training or a park/playfield) or industrial/commercial uses. The LUCP will address the long-term management measures for the site and include provisions or requirements that will be implemented should future use of the site change from recreational use (e.g., a multi-purpose training area or a park/playfield) or industrial/commercial use.

Installation of a surface cap offers the advantage of more-sensitive land uses such as residential uses. LUCs implemented through a LUCP would still be required to restrict activities (e.g., excavations) and future uses that could interfere with the integrity of the surface cap. Because the planned future use is uncertain (possibly a multi-purpose training area and/or a park/playing field and/or an industrial/commercial use), and risk levels have been shown to be acceptable for these uses, the cost for the installation and maintenance of a surface cap is not warranted at this time. Should MCB Hawaii decide to change the future land use of the site to residential use, then consideration should be made for surface capping.

Alternative 1 is an unacceptable solution based on the nine criteria of the NCP. Therefore it will not be discussed further.

Alternatives 2 and 3 are both protective of human health and the environment, compliant with the ARARs, and provide long-term effectiveness. Neither alternative reduces the toxicity or volume of contaminants; although, Alternative 3 does reduce the mobility of contaminants through consolidation (not through treatment). The short-term effectiveness of Alternative 2 is rated higher because Alternative 3 would result in excavation activities at the site, which could result in exposure to site workers and possibly the public.

The capital cost of Alternative 2 is approximately $0.08 million, and the capital cost of Alternative 3 is almost $1.9 million. Although Alternative 3 will provide installation of a surface cap, to allow for unrestricted land use, the capital cost difference of just over $1.8 million makes Alternative 3 prohibitive and not warranted at this time. The cost of Alternative 3 does not include landfill cap maintenance, which was assumed to be part of tenant maintenance operations. In addition, the proposed use of the property will continue to be recreational (e.g., multi-purpose training area or a park/playfield) or industrial/commercial. Although Alternative 2 does not require removal of debris and contaminated soil above the cleanup goals, it does provide for environmental notices to restrict the excavation, removal, or transportation of soil off site from within the boundaries, unless the soil meets all applicable regulations and standards or prior written approval is obtained from the DOH. It would also restrict the use or prohibit the use of the site for residential or other non-commercial/industrial purposes until appropriate remedial actions are completed, applicable laws and regulations are complied with, and written approval is obtained from the DOH.

Alternative 2 is protective, reasonable, and is the most cost effective alternative; therefore, it is recommended as the preferred alternative.

2.11 PRINCIPAL THREAT WASTE

The NCP establishes an expectation that treatment will be used to address the principal threats (i.e., source material that is highly toxic and/or highly mobile) posed by a site wherever practicable. Although PAHs, PCBs, SVOCs, and metals remain at the site in soil and metals remain at the site in groundwater,

they have been reliably contained, are not mobile, and the implementation of LUCs will ensure that they pose no significant risk to human health or the environment. Therefore, there are no principal threat wastes at the site.

2.12 SELECTED FINAL REMEDY

2.12.1 Summary of the Rationale for the Selected Final Remedy

Nine criteria were used to evaluate the response action alternatives to select the most feasible remedy. Criteria were applied using a five-tiered scale (ranging from excellent through poor).

In comparing the three remedial alternatives and considering the future land use as recreational (e.g., a multi-purpose training area or a park/playfield) or industrial/commercial, LUCs implemented through a LUCP (Alternative 2) was selected as the preferred alternative.

Based on communication with MCB Hawaii, the Quarry Pit Landfill site is projected to be redeveloped for recreational use as a multi-purpose training area and/or a park/playfield. The sHHRA and SLERA (MLI 2012) completed during the RI indicate acceptable risk levels for multi-purpose training use, recreational use, and industrial/commercial use. The LUCs alternative ensures that land use at the site will be restricted to recreational use (e.g., multi-purpose training and/or a park/playfield) or industrial/commercial use. The LUCP will address the long-term management measures for the site and include provisions or requirements that will be implemented should future use of the site change from recreational (e.g., a multi-purpose training area or a park/playfield) or industrial/commercial.

2.12.2 Description of the Selected Final Remedy

In accordance with the CERCLA, the Marine Corps solicited public comment on the preferred alternative, which was presented to the public in the Proposed Plan. The public was invited to comment on the preferred alternative during a 30-day comment period. Following receipt of comments, the Marine Corps and the DOH selected LUCs as the final remedy for the site.

Under CERCLA, LUCs are appropriate for sites that have been shown to be safe and suitable for industrial or commercial reuse, but may not be suitable for unrestricted (residential) reuse. The remedial verification and risk evaluations have shown that the site is suitable for commercial/industrial reuse. Potential risk to human health at the site could come from extended exposure to surface soil under a residential redevelopment scenario. The establishment of LUCs provides the best alternative for eliminating or limiting these future exposure pathways. The Marine Corps and the DOH recommend that LTMM and LUCs serve as the final remedy for the site. The final remedy will fulfill the response action objectives by:

- Prohibiting unauthorized digging or disturbing of site soil.
- Prohibiting unauthorized excavation and removal of site soil to an offsite location.
- Prohibiting the development and use of the property for residential housing, elementary or secondary schools, child care facilities, and playgrounds.

The engineering and institutional LUCs for the site will be presented in detail in the LUCP. Excavation area boundaries will be instituted to prohibit any land modifications that might disturb the existing site conditions and potentially expose contaminated soil at the site (e.g., vegetation clearing, excavation, and construction of structures, etc.).

Should the properties ever be transferred, the LUCs will be maintained through appropriate deed restrictions. Implementation of LUCs will be confirmed by annual inspections to be performed by the Marine Corps or subsequent property owner if the properties are ever transferred.

The Marine Corps is responsible for implementing, maintaining, reporting on, and enforcing the LUCs. This may be modified to include another party should the site-specific circumstances warrant it. The Marine Corps shall implement internal procedures for upholding LUCs by maintaining a database of the LUCs (i.e., Naval Installation Restoration Information Solution). The Marine Corps shall commit to notify the DOH in advance of any changes to the internal procedures that would affect the LUCs.

Although the Marine Corps may later transfer these procedural responsibilities to another party by contract, property transfer agreement, or through other means, the Marine Corps shall retain ultimate responsibility for remedy integrity.

Performance objectives for the LUCs being implemented as an integral part of the final remedy for the site are to restrict current and future land use to activities compatible with maintaining the vegetative soil cover system and to ensure long-term viability of the final remedy. Specific LUC performance objectives include the following:

- Ensure that the site is not used for any purpose that violates the objectives of the LUCs by restricting the site to recreational or industrial/commercial use only and prohibiting the development and use of this area for residential purposes.
- Minimize or eliminate direct human contact with or ingestion of landfill waste.
- Provide adequate notice of the presence of the contaminants to any potential landowners. In addition, per MCB Hawaii requirements, any party planning to excavate on the base must first apply for a dig permit with MCB Hawaii. Provide notice to dig permit applicants during the permit review process of the presence of landfill waste.
- Prevent unauthorized excavation and uncontrolled waste removal. Provide notice to dig permit applicants planning to excavate in this area that planned activities must include proper handling and disposal of landfill waste; and must prevent migration or relocation of landfill waste to areas where human or ecological exposure could occur.

2.12.3 Summary of Estimated Remedy Cost

The final remedy cost is approximately $170,000 (including capital and operations and maintenance [O&M] costs), as discussed in Section 2.9.3.

The information in the cost estimate is based on the best available information regarding the anticipated scope of the remedial alternative. Changes in the cost elements are likely to occur as a result of new information and data collected during the engineering design of the remedial alternative (LUCP).

2.12.4 Expected Outcome of the Selected Final Remedy

The selected final remedy for the site reduces potential future human health and ecological risks by preventing future exposure to contaminated media and restricting activities at the site. This will be achieved by implementing LUCs. This final remedy does not change the current or planned future land use or reduce the toxicity or volume of contamination.

2.12.5 Selected Final Remedy Ongoing Activities

LUCs would include the restriction of future use of the property to recreational (e.g., multi-purpose training and/or a park/playfield) or industrial/commercial uses as described in a LUCP, and an environmental notice added to the Base master plan. These controls provide an administrative means of limiting risk associated with the project site, by limiting the potential land uses in the future while site contamination conditions remain as they are currently.

The LUCP will address the long-term management measures for the site and include provisions or requirements that will be implemented should future use of the site change from recreational (e.g., a multi-purpose training area or a park/playfield) or industrial/commercial.

Within 90 days of this DD being signed, the Marine Corps shall prepare and submit to the DOH for review and approval the LUCP that shall contain implementation and maintenance actions, including periodic inspections. The LUCP will detail how the specific LUCs will be implemented and maintained, and specifies the requirements for annual inspections and five-year reviews.

Monitoring of the environmental use restrictions and controls will be conducted annually by the landowner. The monitoring results will be included in a separate report or as a section of another environmental report, if appropriate, and provided to the Marine Corps and DOH. The annual monitoring reports will be used in preparation for the five-year review to evaluate the effectiveness of the remedy.

The annual monitoring report, submitted to the regulatory agencies by the landowner, will evaluate the status of the institutional controls and how any institutional control deficiencies or inconsistent uses have been addressed. The annual evaluation will address whether the use restrictions and controls referenced above were communicated in the deed(s), whether the owners and state and local agencies were notified of the use restriction and controls affecting the property, and whether use of the properties have conformed to such restrictions and controls.

2.13 STATUTORY DETERMINATIONS

2.13.1 Protection of Human Health and the Environment

The selected final remedy will be protective of human health and the environment by controlling land use to ensure that contaminated soil remaining at the site is not disturbed.

2.13.2 Compliance with Applicable or Relevant and Appropriate Requirements

The chemical-specific, location-specific, and action-specific ARARs and to be considered (TBC) criteria, identified for the response action, are required to address contamination and debris remaining in place at the site.

2.13.3 Cost-Effectiveness

The selected final remedy is cost-effective and represents a reasonable value for the expended public funding. Each response alternative was evaluated to determine whether the overall effectiveness satisfied the cleanup goals. The relationship of the overall effectiveness of the selected alternative was determined to be proportional to its costs. The selected final remedy is effective in meeting response action objectives and protecting human health and the environment, is implementable, and is cost-effective.

2.13.4 Utilization of Permanent Solutions and Alternative Treatment Technologies

The selected alternative represents the maximum extent to which permanent solutions and treatment technologies can be utilized in a cost-effective manner. Specifically, this alternative provides the best short- and long-term effectiveness, is protective of human health and the environment, complies with ARARs, achieves response action objectives, is feasible, and reduces contaminant mobility by institutional, site development restrictions.

2.13.5 Preference for Treatment as a Principal Element

This final remedy does not satisfy the statutory preference for treatment as a principal element of the final remedy. The NCP (40 CFR Section 300.430[a][1][iii][A]) establishes the expectation that treatment will be used to address the principal threats at a site where practicable. A principal threat waste is source material with toxicity and mobility characteristics that combine to pose a potential risk greater than the risk level that is acceptable for the current or future exposure scenarios. There are no principal threat wastes at the site. Because there are no principal threat wastes, treatment is not necessary as a principal element of the final remedy for the site.

2.13.6 Five-Year Statutory Review Requirement

Because contaminants remain at the site above levels that allow for unlimited use and unrestricted exposure, a 5-year statutory review pursuant to CERCLA §121(c) and NCP (40 CFR Section 300.430[a][1][iii][A]) is required to ensure that LUC elements of the selected final remedy remain protective of human health and the environment. The first 5-year review should be performed 5 years after regulatory approval of this DD and continue until the site is suitable for unrestricted use.

2.14 DOCUMENTATION OF SIGNIFICANT CHANGES

The PP identified the implementation of LUCs (E2 2013) as the Marine Corps's recommended alternative. On May 1, 2013, the PP was released for public comment and a public meeting was held on May 14, 2013 to present and discuss the PP.

The Marine Corps has reviewed all comments received during the May 14, 2013 public meeting and during the May 1 to 30, 2013 public comment period. Based on all site information and risk evaluations completed to date, the Marine Corps and the DOH have confirmed that the selected final remedy is protective of human health and the environment. None of the comments affect the preference for the selected final remedy. Therefore, no significant changes to the final remedy, as originally identified in the PP, were necessary as a result of public comment.

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3. Responsiveness Summary

The public meeting to discuss the PP for the site was held at Aikahi Elementary School in Kailua, Hawaii, on May 14, 2013, and a 30-day public comment period was held from May 1-30, 2013. No written comments were received on the PP during the public comment period. Verbal comments were provided at the May 14 public meeting. The verbal comments were requests for clarification in nature, and did not take issue with the selected remedy of LUCs. The verbal comments and responses to these comments on the PP are included in Attachment C.

3.1 STAKEHOLDER ISSUES AND LEAD AGENCY RESPONSES

The transcript of the public meeting conducted on May 14, 2013 was thoroughly reviewed by the Marine Corps to prepare the Responsiveness Summary. The comments and questions from the public have been condensed to provide a better understanding of each specific issue. The Marine Corps and the DOH have selected the final remedy for the site only after careful consideration of the public's comments.

3.2 TECHNICAL AND LEGAL ISSUES

The key technical issue for the selected final remedy is the continued long-term care of the soil covering the contaminated soil remaining at the site.

Potential legal issues for the selected final remedy include the LUCs. The user of the site must continue to implement and maintain the LUCs and monitor any activities at the site that might impact the integrity of the LUCs.

3.3 NOTIFICATIONS

Notices of existing contamination, changes to site conditions, and conveyance will be detailed in the LUCP.

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4. References

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Attachment A
RACR-Decision Document Cross-Reference

Table A-1: RACR-Decision Document Cross-Reference Table

Item	RACR Section Contents	Corresponding Decision Document Section(s)
A.	Overview – A brief discussion of • Site characteristics • Chemicals of concern • Major finding and results of site investigation activities	2.1: Site Name, Location, and Description 2.2.1: Site History 2.4: Scope and Role of Response Action 2.5: Site Characteristics 2.7.1: Conceptual Site Model
B.	Remedial Action Objectives – Identifies the remedial action objectives and cleanup standards specified in the Decision Document, and subsequent modifications, if any.	2.2.1: Site History 2.5: Site Characteristics 2.8: Remedial Action Objectives
C.	Remedial Actions – Briefly discusses the remedial actions taken to meet the remedial objectives.	2.2.1: Site History 2.4: Scope and Role of Response Action
D.	Demonstration of Completion – Presents information needed to demonstrate attainment of remedial objectives, e.g., final sampling report, visual inspection report.	2.2.1: Site History 2.4: Scope and Role of Response Action 2.12: Selected Final Remedy
E.	Ongoing Activities – Describes the activities, if any, still being performed or to be performed, e.g., operations and maintenance, 5-year reviews.	2.12.2: Description of Selected Remedy 2.12.5: Selected Final Remedy Ongoing Activity 2.13.6: Five-Year Statutory Review Requirement
F.	Community Relations – Briefly summarizes the public outreach activities conducted at the site, e.g., community relations plan; the date the RAB was formed and terminated; the dates of public meetings; environmental justice initiatives.	2.3: Community Participation 3: Responsiveness Summary
G.	Certification Statement – A statement by a U.S. Navy representative authorized to sign decision documents, certifying that the RACR memorializes the completion of the remedial action objectives.	1.7: Signature and Support Agency Acceptance of Final Remedy

Notes:
RAB Restoration Advisory Board
RACR Remedial Action Completion Report

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Attachment B
Portable Document Format Hyperlink Index Table

Table B-1: Portable Document Format Hyperlink Index Table

Item	Reference Phrase in DD	Location in DD	Identification of Referenced Document Available in the Administrative Record[1]
1	Attachment A	Section 1.2, Page 1	RACR-Decision Document Cross-Reference
2	Attachment B	Footnote, Page 1	Portable Document Format Hyperlink Index Table
3	NCP (CFR 300.430[f][4][ii])	Section 1.5, Page 2	40 Code of Regulations 300.430[f][4][ii], National Oil and Hazardous Substances Pollution Contingency Plan, Subpart E– Hazardous Substance Response, § 300.430 Remedial investigation/feasibility study and selection of remedy.
4	Figure 1	Section 2, Page 5	Project Location Map
5	Figure 2	Section 2.1, Page 5	Project Site Layout
6	Initial Assessment Study (NEESA 1984)	Section 2.2.2, Page 6	Naval Energy and Environmental Support Activity (NEESA). 1984. *Initial Assessment Study of Marine Corps Air Station Kaneohe Bay, Hawaii*. April.
7	Site Inspection (HLA 1989)	Section 2.2.2, Page 7	Harding Lawson Associates (HLA). 1989. *Site Inspection Quarry Pit Landfill, Marine Corps Air Station, Kaneohe Bay, Hawaii.* Prepared for Pacific Division, Naval Facilities Engineering Command, Pearl Harbor, Hawaii. September.
8	Wetland Boundary Delineations (USACE 2002)	Section 2.2.2, Page 8	United States Army Corps of Engineers (Honolulu District) (USACE). 2002. *Wetlands of MCB Hawaii, Island of Oahu, Hawaii*. Final Report. September.
9	Focused Site Inspection (ETI in DON 2007)	Section 2.2.2, Page 8	Department of the Navy (DON). 2007. Focused Site Investigation Report Site 2, Quarry Pit Landfill, MCB Hawaii, Kaneohe Bay, Oahu, Hawaii. Pearl Harbor, Hawaii. March.
10	Remedial Investigation/Feasibility Study (E2 2012)	Section 2.2.2, Page 11	E2. 2012a. *Remedial Investigation/Feasibility Study for Quarry Pit Landfill (MCB Hawaii Site 0002), MCB Hawaii, Kaneohe, Hawaii*. NAVFAC, Hawaii. September.
11	Figure 3	Section 2.2.2, Page 11	Landfill Trenches MI Soil Sample Analytical Results (mg/kg) Exceeding PALs
12	Figure 4	Section 2.2.2, Page 11	Landfill MI Soil Sample Analytical Results (mg/kg) Exceeding PALs
13	Figure 5	Section 2.2.2, Page 11	Groundwater Sample Analytical Results (µg/L) Exceeding PALs
14	Figure 6	Section 2.2.2, Page 11	Landfill Boundary Confirmed by Investigation Surveys
15	Figure 7	Section 2.2.2, Page 12	Buried Debris Thickness
16	Figure 8	Section 2.2.2, Page 12	Landfill Cap Thickness
17	Proposed Plan (PP) for the Quarry Pit Landfill	Section 2.3, Page 29	E2. 2013. *Final Proposed Plan Quarry Pit Landfill (MCB Hawaii Site 0002), MCB Hawaii, Kaneohe, Hawaii*. NAVFAC, Hawaii. May.

Item	Reference Phrase in DD	Location in DD	Identification of Referenced Document Available in the Administrative Record[1]
18	Attachment C	Section 2.3, Page 29	Public Meeting Transcript
19	Attachment D	Section 2.3, Page 29	Response to Comments on the Proposed Plan
20	cleanup goals and established background concentrations.	Section 2.5.2, Page 31	E2. 2012. *Final Remedial Investigation/Feasibility Study for Quarry Pit Landfill (MCB Hawaii Site 0002), MCB Hawaii, Kaneohe, Hawaii*. NAVFAC, Hawaii. September.
21	Alternative 1: No Action	Section 2.9, Page 38	E2. 2012. *Final Remedial Investigation/Feasibility Study for Quarry Pit Landfill (MCB Hawaii Site 0002), MCB Hawaii, Kaneohe, Hawaii*. NAVFAC, Hawaii. September.
22	Alternative 2: Land Use Controls	Section 2.9, Page 38	E2. 2012. *Final Remedial Investigation/Feasibility Study for Quarry Pit Landfill (MCB Hawaii Site 0002), MCB Hawaii, Kaneohe, Hawaii*. NAVFAC, Hawaii. September.
23	Alternative 3: Cleanup to Unrestricted Land Use	Section 2.9, Page 38	E2. 2012. *Final Remedial Investigation/Feasibility Study for Quarry Pit Landfill (MCB Hawaii Site 0002), MCB Hawaii, Kaneohe, Hawaii*. NAVFAC, Hawaii. September.
24	nine NCP criteria	Section 2.9, Page 38	E2. 2012. *Final Remedial Investigation/Feasibility Study for Quarry Pit Landfill (MCB Hawaii Site 0002), MCB Hawaii, Kaneohe, Hawaii*. NAVFAC, Hawaii. September.
25	Cost estimates	Section 2.9, Page 41	E2. 2012. *Final Remedial Investigation/Feasibility Study for Quarry Pit Landfill (MCB Hawaii Site 0002), MCB Hawaii, Kaneohe, Hawaii*. NAVFAC, Hawaii. September.
26	ARARs and to be considered (TBC) criteria	Section 2.13.2, Page 46	E2. 2012. *Final Remedial Investigation/Feasibility Study for Quarry Pit Landfill (MCB Hawaii Site 0002), MCB Hawaii, Kaneohe, Hawaii*. NAVFAC, Hawaii. September.

Attachment C
Public Meeting Transcript

Naval Facilities Engineering Command

Proposed Plan for

H-3 Landfill (Site 0001) and

Quarry Pit Landfill (Site 0002)

TRANSCRIPT OF PUBLIC MEETING

Tuesday, May 14, 2013

Aikahi Elementary School

Kailua, Hawai`i

Reported by: Jessica R. Perry, CSR, RPR

P R O C E E D I N G S

MS. OKAMOTO: My name is Janice Okamoto. I'm the environmental restoration manager for the program that is doing the investigation. Tonight we have two briefs for two proposed plans for sites at Marine Corps Base Hawaii, Kaneohe. One is the Quarry Pit Landfill and one is the H-3 Landfill.

I just wanted to let you know that tonight we also -- because it's a public meeting and we have a transcript that we normally put out after the meeting, we do have a stenographer. So she's recording the meeting, the presentation as well as questions and answers.

What I wanted to go through was this point at which we're at for these two projects are where we have final alternatives that are being proposed. And to help with understanding where we are, I just wanted to go through typically the CERCLA process. CERCLA is the regulatory framework that we're working on.

So for this process, this is a slide that typically -- I'm borrowing a slide from the brief, but typically the first investigation is a preliminary investigation, and that's one where, for the CERCLA process, we go and do historical research, we do

records search, we do interviews, and see whether or not there's a site that may have had past practices where there might have been releases, where, say, they changed the oil and poured it down on the ground or something, and we would go back and look at it.

The next step is if that first look or research is showing that, yeah, this is a site that we really should investigate further, typically right here it's written "site inspection," but for this one that's what that report called it, but for the next phase it's the site inspection, and that one we go to the sites and say the records showing we may have had a problem here and what we do there is we collect samples of the soil and we say, knowing that the records said that they dumped things in this type of an area, we would collect soils there and analyze it for the type of contaminants that that operation had. So we would say, yeah, we found something, we need to go further. Or we didn't find something, we looked in the reasonable areas, this site, we're not going to go further.

So if we do find or we confirm that there is presence in the second step, like I said, it's site inspection, the next step is usually a remedial investigation. And that one, it's even more intensive

where you say we have already gone through, we have presence, there's something there of concern, and what the objective of the remedial objective is to define how far out and how deep the contamination is. Once we do that, what we do is we evaluate whether or not what the risk is for that, not only for human health but also for ecological.

After the remedial investigation is done and it goes through that evaluation and it says, yeah, two outcomes could happen, one would be no further action based on looking at what's there and the levels that are there, that it's within an acceptable range that's established by the VA or DOH or Department of Health, or it might say that we have a problem, we need to go further.

If it says go further, we go to something called the feasibility study. What that does is it look at different alternatives. Say you have an area that has soil contamination, it could range from excavate and take it somewhere so it's treated somewhere else, it could be treated on site, it could be control the area so that there's what we call land use controls, and there's various factors that be put into what alternative is selected.

Once this feasibility study is done, the

alternative that comes out of it is presented in a proposed plan, and that's where we are today for these two sites. And to go further down, after we have the public comment period, the 30-day public comment period, we go to what we call a decision document. You'll either hear it to be called a record of decision, decision document, that sort of thing. In that we formally write what the selected alternative is, and in that case it's signed by both the Marine Corps, in this case, as well as the Department of Health to say, yeah, this is what we'll do, this is the agreement on how we're going to follow through with the site.

Then we go out and do, if it needs to, if it involves a design, we do a design. If it involves writing a plan to control the area, we do that. And if we show that it is, you know, the first annual inspection, it shows, yeah, this is protected and this is how we're going to go through with the site, and then we get site close-out.

What you see here on the right side, the right side, typically you will see, what I'm honing in on, is this removal action. There's always an option in this process, in this CERCLA process to go through this formal process. It takes a bit, but it does it

incrementally so that we make sure we find the right things. On the right side, we can do a removal action at any time. If during the records search we see the records, we go out to the site and see we need to doing something, we can jump into a removal action. If during a site inspection, we come up with that same conclusion, we go to a removal action. Same thing with the remedial, we would go straight to that.

And in some cases it's -- it truly is an action that's just an interim action, where we try and just take care of it for then and then we'll go back into the study phase. Or in some cases that removal action might be also because we're looking at the site, we see the contamination, and we say this is really simple, it's a really small area, let's just take care of it. And in that case we may have a no -- we may have no contamination left at the site, and in that case it would move straight through to a site close-out or a proposed plan decision document to say we took care of it, because it was really small. So there's different ways or pathways that we can go through when we do our investigation.

So, again, for the two sites that we're presenting tonight, we have the proposed plan. The first one that we're presenting is the H-3 Landfill,

the former H-3 Landfill site, and Joel Narusawa is the remedial project manager for that.

For this one, for -- we have two briefs, and what we're going to do is present first the H-3 Landfill, and if there's questions to that, please ask it after and then we'll get through it and get it all answered, and at that point we'll transition our recording to be the next brief. So if we could do that, thanks.

I'm sorry, I had one more thing. We do have the stenographer, and if there's any questions, please ask it, but if you could just -- could you say your name so she can put it down. Thank you.

MR. NARUSAWA: My name is Joel Narusawa. I work for the Navy, supporting the Marine Corps Base Hawaii. Tonight I'm going to talk about the proposed plan for the H-3 Landfill. This site is being managed under the installation restoration program for the Navy, supporting the Marine Corps.

The site is located at the main entrance. When it was originally -- when waste was originally placed in this location, this was actually the rear of the facility, but with the realignment, if you will, it's now front and center. The H-3 comes right to the site and it goes right through the center of it, and

it turns into G Street right there.

So we have buried waste on both sides of the roadway. There are displays on top of it. It's primarily vegetative cover, soil and vegetative cover. There is a storm channel that runs along the perimeter right here. There are wetlands on this side of the landfill, if you're not familiar with the area, and Kaneohe Bay is on the left side of the roadway, just so you understand the setting.

Again, waste was disposed from 1940 to 1972. Predominantly the waste that was disposed of here was composed of construction and demolition debris. It's called the H-3 Landfill, or referred to as H-3, because of the amount of the roadway -- waste from construction of the roadway went into this location. There was other waste which included what we've got listed here, typical for the type of activities that occurred on the base. Most of the residential waste, according to our records was transported off facility to a different disposal facility.

There's been a number of environmental projects on this -- focusing on this site. This 1984 initial assessment study was more comprehensive. It looked at -- it did an assessment of the whole

facility, and this particular site was one of the locations that was identified for further assessment. A follow-on study which collected samples, both sediment, water, groundwater was done in 1988, and they called it the confirmation study, and they didn't find -- they didn't find sample results that indicated follow-on action was required, so thus they recommended no further action at that time.

In order to -- as time progressed, the Navy and Marine Corps had other requirements that came into play and the site was originally closed, but there wasn't the formal CERCLA process that was followed. As Janice noted, normally on the tail end of the assessment and evaluation of the remedial alternative, you have -- you have -- it doesn't show here, sorry, but right here in the site close-out normally you have a documented decision document or record of decision. That was not done for this particular site, so we came back and that's what we're trying to get in place right now, to properly document the actions and decisions for this site. We also did it to reevaluate and verify that no further action is appropriate, to see if there's been any release of contaminants through that period of time.

We had in 19 -- 2009, sorry, time

critical removal action, which repaired a portion of the landfill slope.

Let me go back to this slide.

Right around here, just before the bend, that portion, maybe about 50 linear feet through the side slope of the landfill, it was shored up. Erosion was noted, so we went in, we stabilized that portion of it, but in the process we also noted that there was differential erosion that was occurring along the rest of the side slopes for the landfill, so we've got another project planned to address that in combination with the -- the work that was done previously in 2009.

What we're talking about here, the proposed plan is a follow-on from the remedial investigation feasibility study. The remedial investigation is primarily just to determine the nature and extent of contamination related to a particular site, and the feasibility study -- the feasibility study looks at the different alternatives that get evaluated and preferred remedial alternatives is identified in this proposed plan right here.

So this is where we are, trying to get a -- we're doing the proposed plan, soliciting public comment. Throughout this whole process we've been -- involved several stakeholders, which include the

Department of Health, Fish and Wildlife, and those are the big ones that come to mind. So now we're at the point where we've collected enough data, we've narrowed down the alternatives that make sense for this site, and we're soliciting public comments.

There's a 30-day public comment period that started May 1st. It will end May 30th.

Here's the time period for removal action that was done in 2009. This is the removal action or the site stabilization project that we have planned. We did phase 1 of the project which consolidated exposed waste on this left side of the roadway, and phase 2 will address from this right side of the landfill back toward the 3rd Street, back this way.

Sorry to jump around like that. Let's see, this is a diagram or a figure that shows the landfill. We did trenching to verify the extent of the landfill. Prior to this we had an approximate boundary and that's shown by this dashed line, but we had more information due to the trenching and geophysics and soil borings that we've done. So we're fairly confident this is what's represented -- or what's represented here is a better depiction of the outline for the landfill.

We do have a few monitoring wells located

around the perimeter from which we collected groundwater samples. We also collected sediment and surface water samples too.

These are the findings from the remedial investigation. There was no landfill gas, like methane, that was identified to be an issue. There are -- there is vegetation on the soil cover and side walls that does help control the amount of erosion and infiltration that does occur. The cover thickness, the soil cover was verified. We actually did collect samples of the cover material and do geotechnical sample tests on that.

We did do analytical or chemical analysis on samples for the surface sediment, groundwater and surface water. These are some of the contaminants that were identified that were above our project action levels. The project action levels that were used were the Department of Health, generally the Department of Health, tier 1 levels for the different contaminants. They're basically concentrations that are -- we utilize to screen a site to determine if further evaluation, risk assessment is required.

So we did human health risk assessment to determine if there was concerns related to human health, and we also did one which focused on

ecological risk assessments, since we do have wildlife management area immediately adjacent to this area. So it is considered sensitive.

So here are the remedial action objectives that we're trying to meet that apply to this site, that the contaminates remain on site and to prevent migration of contaminants off site and that the contaminants are not disturbed.

So three remedial action alternatives were identified -- one is normally this evaluation process has a standard no further action. That's not going to happen at this site. The second one is land use controls with side slope stabilization, and the third is clean closure, which is basically -- I call it a dig and haul, basically dig up the waste from this location, take it to another disposal facility. And these are the estimates on the quantity of waste that would be generated or need to be handled in order to perform that action.

The preferred remedial alternative that we've selected or that we're proposing and we're trying to solicit comments on is the implementation of land use controls, in combination with side slope stabilization. So we will shore up the side walls of the landfill. That's already in the works, because it

is in need of stabilization. There's a number of different reasons why this was picked, and these are the reasons why.

Oh, I should mention also, sorry, in addition to the -- land use controls entail different things. It's not just that there are restrictions on the type of use on that particular area, it's also that there's required inspections, periodic inspections, monitoring, there's obviously controls on what you can do in that location, there's sometimes engineering controls that's required, fencing, other things like that, posting of signage so people know that there's restrictions, digging perhaps, or things similar just to inform people that you have concerns with the site and points of contact, who to contact if you have questions related to that site.

Let's see, so as I mentioned before, public comment period started 1st of May and it ends 30th of May. There are several ways of providing comments. You can provide written or oral comments during this meeting or you can send written comments via mail, fax or email. The information is available in these three locations: Kailua Public Library, Kaneohe Public Library and Hamilton Library at UH Manoa. Comments can be sent to attention to

Mr. Randall Hu over there at this address and/or he can be contacted by telephone and fax here.

Any questions?

MS. OKAMOTO: Thank you, Joel. So the other proposed plan that we're presenting is the Quarry Pit Landfill, and Kelly is the remedial project manager on that. She'll present.

MS. AKAMINE: Good evening, everyone. My name is Kelly Akamine. I'm the environmental remedial project manager for the site for Quarry Pit Landfill located at Marine Corps Base Hawaii in Kaneohe.

So Marine Corps Base Hawaii is located on the east side in Kaneohe, and my project here is located about a mile away from the main gate, if you're familiar with that area. Here's an aerial photograph showing the location of the Quarry Pit Landfill site. The project area is about 12.65 acres and there's a wetland shown here in blue on the right side. Also shown is a medical warehouse right here to the left side of the landfill and further west are bachelor enlisted quarters with the parking area. With the exception of the grassy area on the north side, next to Mokapu Road, typically the area is overgrown with vegetation.

Now this is the site background and

summary. So in the 1940s, the quarry pit was first used as a -- for -- during the construction of Fort Hase and Naval Air Station Kaneohe Bay and it was known as the Quarry Pit or Boondocker Landfill. In the 1950s the two bases were combined. And in the 1940s -- sometime in between the 1940s and 1960s the site used intermittently for storage and disposal operations. From 1972 to 1976 it was the main on-base landfill and accepted most solid waste, except for residential wastes; however, only small quantities of hazardous waste are expected at the Quarry Pit Landfill because the landfill was not located close to the industrial operations. In 1976 the landfill was closed in accordance to existing guidance and instructions at that time and left undeveloped until 2000.

Starting in 2000, Paintball Hawaii and Pacific Airsoft used part of the site as a commercial paintball recreational facility, as the photograph shows here. Paintball operations closed in January 2012 and the site has been vacant since.

So as Joel and Janice spoke about this process before, my project also went through the process with the preliminary assessment in 1984. A site inspection done in 1989, and we did the remedial

investigation and following feasibility study completed in September 2012. We're currently in the proposed plan and decision document phase of the process.

So this slide shows the previous investigations, where in 1984 an initial assessment study was done for the Marine Corps Base Hawaii, and with that the Quarry Pit Landfill was identified and listed as a site -- or a construction hazard area and recommended no confirmation studies if left undisturbed. But the EPA Region 9 requested further investigation be performed at the site.

In 1989 the site inspection that was done was to evaluate whether the landfill waste was -- posed a threat to human health or the environment. The site inspection included collection of groundwater sampling and the water level assessment. Although the site inspection concluded that public health risks at the time were likely minimal, it recommended more comprehensive investigation and risk assessment if land use changes were planned for the landfill.

So the latest and last investigation we did was a remedial investigation and a feasibility study. The objective of this study was to, one, determine the type of buried waste and soil cover over

the buried waste and its footprint; two, determine the type of contamination in landfill soil, groundwater and gas and adjacent wetlands surface water and sediment, if any; and, three, evaluate if the site is safe for people and ecological receptors in the environment. The investigation activities included an ecological assessment, soil, groundwater, sediment and soil gas sampling and evaluation of the data.

A geophysical survey, along with record drawings, trenching and topographic surveys were conducted to help determine the landfill boundaries, with the focus of the 12.65-acre area that was used for disposal between 1972 and 1976. The geophysical surveys measured the density differences between the landfill cap material, the buried debris and then the native soil, so that the results verified that the landfill extent, with results correlating well with physical features present at the site.

The geophysical survey also served to locate underground utilities prior to excavation and drilling. The trenches were excavated throughout the site to assist in determining the location of buried waste and landfill boundaries by comparing the soil types. Some of the waste materials found in the trenching are consistent with operations that used the

landfill.

So soil samples were collected to determine the average contaminant concentrations over predefined areas known as decision units or DUs. The project area was divided into five DUs, these five DUs, on site with two adjacent -- two DUs then adjacent wetland areas. The five on-site DUs range from 2 to 4 acres in size and the two wetland DUs are about half an acre each. Trenches were dug to help determine degree depth and samples collected within the trenches down to 7 1/2 feet. Separately, borings were made outside of the trenches within the five on-site DUs and samples were collected there.

This photograph shows the 14 monitoring wells from which groundwater was sampled to evaluate potential contamination migrating from the landfill. There are seven on site in green and seven off site on blue and yellow. And the seven off site in blue are the upgradient wells and the seven -- I'm sorry, four off site upgradient is in blue, three in yellow are downgradient.

It also helped determine the groundwater flow direction, which is southeasterly. Wetland surface water and sediment samples were collected from the two adjacent wetland DUs to determine if

contamination from the landfill migrated off site and impacted the adjacent wetland.

Soil gas was monitored from locations behind the medical warehouse and from these three existing soil gas wells and four newly installed soil gas wells located within the site. We analyzed our data based on what we know typically found in landfills, and this is a list of the analytes and their acronyms that I'll be referring to in the next slide.

State of Hawaii Department of Health tier 1 and site-specific tier 2 environmental action levels were used as the project action levels for this site.

When comparing the sampling results with their respective PALs, there were exceedances in various areas upon the site. Maximum exceedances are shown in this table. There were exceedances found in the trenches, but regionally the soil cap found -- was found to be within acceptable human health range for the planned land use, which I will discuss later.

Although there are exceedances in the water, background sample levels show that they are likely due to the presence of naturally occurring metals in the soil and since you do not see the same exceedances from on site in the downgradient samples,

those contaminants are indicated to not be traveling off site.

All the other contaminants listed on the previous slide that we tested for did not exceed the PALs, which include all the sediment and soil gas sampling. The sediment sampling indicates that contaminants from the landfill soil is also not traveling off site to the wetlands and down to the groundwater.

The data was used in screening human health and ecological risk assessment. So for human health evaluation, the main portion of the Quarry Pit Landfill was evaluated to industrial, recreational and residential use. The main portion was found to be acceptable for recreational or industrial use and would not trigger any remedial action. This means that the risks to current and future construction, whether it's recreational users and future residents were within the EPA acceptable risks. There are no further action or ecological concerns at the Quarry Pit Landfill.

As part of the feasibility study, we used recreation and industrial area use as a screening criteria based on discussions with Marine Corps Base Hawaii. Five remedial alternatives were initially

screened and the alternatives were rated on their effectiveness, implementability and cost, after which the last two alternatives were removed from consideration.

First three alternatives were then compared using the nine CERCLA evaluation criteria, advantages, disadvantages, implementability, considerations and costs. Based on communication with Marine Corps Base Hawaii, the site is expected to be used as a multipurpose training area and/or park. The risk assessment completed during the 2012 remedial investigation feasibility study indicated acceptable risk levels for multipurpose training use, recreational use and industrial or commercial use. The land use control alternative ensures that the land use at the site will be restricted to multipurpose training or a park.

The recommended remedial alternative is land use controls. Details of why this alternative was selected include exposure to risks -- exposure risk to PAHs and PCBs in the soil at the site were within acceptable ranges under the current land use. A remedial action work plan required for LUC alternatives will address long-term management measures for the site and include provisions or

requirements that will be implemented should future use change.

A minimum of a 2-foot cap would be maintained to prevent exposure to landfill debris. Advantages include no handling of contaminated materials, therefore, no worker risk of exposure, and little site disturbance, therefore, low capital cost. The disadvantages include restricted future use options, long-term monitoring and maintenance, doesn't reduce the containments and the community acceptance might not be widespread.

This is the general time line of what's next. As we discussed, the remedial investigation feasibility study report was finalized in September of last year. The Navy is presenting the proposed plan and selected remedial alternative here at this public meeting and encourages all interested parties to continue to review and comment until May 30. Comments can be sent to, and more information can be obtained, at this address or this phone number and fax number. You may also find more information at the Kailua, Kaneohe and UH's Hamilton libraries.

After carefully considering all comments received during the public comment period, the Navy and State of Hawaii Department of Health will select

the final remedy for this site. The final remedy will then be presented in a decision document later this year. As presented in a previous slide, the proposed recommendation for the site is currently land use controls, but this may change after comments are received and reviewed. If the recommendation does not change, response can commence and consists of decommissioning of groundwater monitoring wells and installation of land use control signage at targeted locations around the landfill.

This concludes the public meeting and we welcome any comments or questions.

MS. OKAMOTO: Thanks Kelly. So, again, as Joel and Kelly had mentioned, these are two proposed plans that are during our comment period, comments can still be provided. There's written sheets or sheets that are out there if you have comments you can submit them, and the proposed plans are also available at the libraries, Kailua, Kaneohe and UH libraries.

There's nothing else?

MR. BERMUDEZ: My name is Kahu Ricky Bermudez. My question is basically I just need some more time to look at this and I'd like to get the word out, but I was wondering how many people commented or

were able to comment on your evaluation here? Do you folks have a number? Yeah, do you have a number of how many people?

MS. OKAMOTO: The comments that we had are usually we're working with the regulators, which would be Department of Health and Fish and Wildlife, typically those are the folks that have given us comments on that.

MR. BERMUDEZ: I think if the comments are very low, I think we need to see better outreach, but other than that I think you folks did a great job and I thank you folks for sharing your time this evening. And I didn't see anything negative or anything bad. I think, again, I would like to see more audience participation from our community, but again you folks did a great job and thank you for coming out this evening and spending time this evening.

MS. OKAMOTO: Thank you.

MR. HARTER: Bob Harter from the Department of Emergency Management, City and County of Honolulu.

On the map, could you show the map, the quarry. Yes, Quarry Pit Landfill, probably about like slide ten. Okay, right there. The -- did the quarry

before they built the military quarters there, did the quarry go back any farther? I mean, quarries -- I just -- because it looks like, you know, it's cut straight right there where the road went through, but was there something beyond that at one time?

MR. YAMAUCHI: I can answer that question. This is Ryan Yamauchi. I'm with Element Environmental. We were the consultants working on this project.

The landfill itself was excavated a bit further, but when they backfilled for the BG they verified that there wasn't any rubbish beyond that point. And some of our trenching within the parking lot, that's one of the things that we did, was to try to verify whether the trash was beyond the roadway, but we verified that it stopped right there.

MR. HARTER: So at the time of the road construction or the quarters construction?

MR. YAMAUCHI: I believe it was when the quarters and the --

MR. HARTER: I'm not sure of the time line myself of what came first, the road or the quarters, you know, coming from that back gate there.

MR. YAMAUCHI: I believe it was the roadway first.

MR. HU: There's a -- oh, sorry. Randall Hu, Marine Corps Base Hawaii. Which one is the pointer?

MS. OKAMOTO: The red button is the pointer.

MR. HU: So the road runs here, and in the 1940s, around World War II time, the quarry was dug out to construct Fort Hase beach, and so the quarry extended into this area, not exactly, but it did go on the other side of the road. But the waste was placed on this side of the road, which was confirmed by the remedial investigation and the landfill boundaries.

So, yes, the quarry did extend on the other side of the road, but the landfill is on this side of the road.

MR. HARTER: And I guess my focus is on the quarters where the housing is, did it go that direction?

MR. HU: No.

MR. HARTER: Okay.

MR. NARUSAWA: What they did as far as -- I had the project site before Kelly. What they did as part of their investigation, they used old aerial photos to help them align the way it is right now.

They also did geophysics and trenching to verify the limits of the landfill.

MR. HARTER: So to build the quarters, did they have to cap that because there was something there or not?

MR. YAMAUCHI: I think it was backfilled. I mean, when you look at the series of aerial photos, it was backfilled either before the quarters were built. And then we looked at the geotechnical borings that they did for the quarters and they verified that there was no debris.

MR. HARTER: They did not use that side, seemingly that side as a dump site, so they didn't have to clean it out, refill it, put quarters on top.

MR. YAMAUCHI: Yeah, so that side was filled before the landfill was even used, you know, as an active landfill for debris and rubbish.

MS. OKAMOTO: Anything else?

MR. HARTER: Part of the question referencing outreach, since they live across the street from that area, were they informed in any particular different way than putting it in the *Star-Advertiser*?

MS. OKAMOTO: For the meeting or for --

MR. HARTER: For the meeting.

MS. OKAMOTO: The meeting, there were invitations that were sent out to the members of the neighborhood board. It was also sent to folks that had --

MR. HARTER: Honolulu neighborhood board or those quarters that are across the street from it?

MS. OKAMOTO: Oh, for --

MR. HARTER: Yeah, those are the ones I'm concerned about because they --

MS. OKAMOTO: No, as far as outreach on base?

CAPTAIN GEORGE: Are you talking on base?

MR. HARTER: On base.

CAPTAIN GEORGE: No, because it's known that that area is not affected by the project, so... but I understand what you're asking, you know, considering that this is an outreach for the community, what about the base community.

MR. HARTER: Correct.

CAPTAIN GEORGE: Well, from the perspective of representing the base, we understand how the area of potential interest here for the landfill and the locations in which the houses are, there's no correlation in between the two. Those areas have been investigated, so our follow-on actions

are not necessarily in that area. So in short, no, we did not inform --

MR. HARTER: Though they live across the street from the site?

CAPTAIN GEORGE: They do. And what we do is inform command, who inform their Marines, who inform their spouses of activities that happen on the base.

MR. BERMUDEZ: On Thursday there's a Kaneohe board meeting, and I think it would be nice if you maybe had the representative -- you don't have to do a whole show, but just maybe talk a little bit. At least you know, one of them speaks a little bit, here is what we did in the meeting, and do some outreach before the end of May, because it seems like we're really short on time.

I don't see any major things. I don't see -- because I see like this is like you said, a local dump. I think I would be concerned -- my concern is more where the ponds are, to me that's the leaching and stuff, and it sounds like, you know, I want to look at the report a little bit more and almost want to get a second report from somebody else, another person, but I do trust, you know, I guess, what you folks have going on there because you are

trying to make a positive impact.

MS. OKAMOTO: And again, I think one of the slides have it where all the reports are -- should be at those three libraries.

MR. BERMUDEZ: I think that would be good to just inform people in the Kaneohe neighborhood board on Thursday at 7:00 at Ben Parker School, so if anybody could volunteer. I think it would be like five minutes at the most. You know, it would be better, better than them showing up because this is your folks -- your input about it. Any questions, I'm sure the parties can do that. Thanks for your time.

MS. OKAMOTO: Thank you. Thank you, everyone, for taking the time and that's the end of the public meeting.

(The public meeting adjourned at 8:35 p.m.)

C E R T I F I C A T E

I, Jessica R. Perry, Certified Shorthand Reporter for the State of Hawaii, hereby certify that the proceedings were taken down by me in machine shorthand and was thereafter reduced to typewritten form under my supervision; that the foregoing represents to the best of my ability, a true and right transcript of the proceedings had in the foregoing matter.

I further certify that I am not attorney for any of the parties hereto, nor in any way concerned with the cause.

DATED this 30th day of May, 2013, in Honolulu, Hawaii.

_____

Jessica R. Perry, RPR, CSR No. 404

Attachment D
Responses to Comments on the Proposed Plan

Table D-1: Public Comments on the PP

Comment No.	Comment	Response to Comment
1	MR. BERMUDEZ: My name is Kahu Ricky Bermudez. My question is basically I just need some more time to look at this and I'd like to get the word out, but I was wondering how many people commented or were able to comment on your evaluation here? Do you folks have a number? Yeah, do you have a number of how many people?	MS. FUKUMOTO: The comments that we had are usually we're working with the regulators, which would be Department of Health and Fish and Wildlife, typically those are the folks that have given us comments on that.
	MR. BERMUDEZ: I think if the comments are very low, I think we need to see better outreach, but other than that I think you folks did a great job and I thank you folks for sharing your time this evening. And I didn't see anything negative or anything bad. I think, again, I would like to see more audience participation from our community, but again you folks did a great job and thank you for coming out this evening and spending time this evening.	MS. FUKUMOTO: Thank you.
2	MR. HARTER: Bob Harter from the Department of Emergency Management, City and County of Honolulu. The – did the quarry before they built the military quarters there, did the quarry go back any farther? I mean, quarries because it looks like it's cut straight right there where the road went through, but was there something beyond that at one time?	MR. YAMAUCHI: I can answer that question. This is Ryan Yamauchi. I'm with Element Environmental. We were the consultants working on this project. The landfill itself was excavated a bit further, but when they backfilled for the BG they verified that there wasn't any rubbish beyond that point. And some of our trenching within the parking lot, that's one of the things that we did, was to try to verify whether the trash was beyond the roadway, but we verified that it stopped right there.
	MR. HARTER: So at the time of the road construction or the quarters construction?	MR. YAMAUCHI: I believe it was when the quarters and the --
	MR. HARTER: I'm not sure of the time line myself of what came first, the road or the quarters coming from the back gate there.	MR. YAMAUCHI: I believe it was the roadway first. MR. HU: Randall Hu, Marine Corps Base Hawaii. So the road runs here, and in the 1940s, around World War II time, the quarry was dug out to construct Fort Hase beach, and so the quarry extended into this area, not exactly, but it did go on the other side of the road. But the waste was placed on this side of the road, which was confirmed by the remedial investigation and the landfill boundaries. So, yes, the quarry did extend on the other side of the road, but the landfill is on this side of the road.
	MR. HARTER: And I guess my focus is on the quarters where the housing is, did it go that direction?	MR. HU: No. MR. NARUSAWA: What they did as far as – I had the project site before Kelly. What they did as part of their investigation, they used old aerial photos to help them align the way it is right now. They also did geophysics and trenching to verify the limits of the landfill.
	MR. HARTER: So to build the quarters, did they have to cap that because there was something there or not?	MR. YAMAUCHI: I think it was backfilled. I mean, when you look at the series of aerial photos, it was backfilled either before the quarters were built. And when we looked at the geotechnical borings that they did for the quarters and they verified that there was no debris.
	MR. HARTER: They did not use that side, seemingly that side as a dump site, so they didn't have to clean it out, refill it, put quarters on top?	MR. YAMAUCHI: Yeah, so that side was filled before the landfill was even used as an active landfill for debris and rubbish.

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	MR. HARTER: Honolulu neighborhood board or those quarters that are across the street from it? Yeah, those are the ones I'm concerned about because they –	MS. FUKUMOTO: No, as far as outreach on base? CAPTAIN GEORGE: Are you talking on base?
	MR. HARTER: On base.	CAPTAIN GEORGE: No, because it's known that that area is not affected by the project, so… but I understand what you're asking, considering that this is an outreach for the community, what about the base community.
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	MR. HARTER: Though they live across the street from the site?	CAPTAIN GEORGE: They do. And what we do is inform command, who inform their Marines, who inform their spouses of activities that happen on the base.
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	I don't see any major things. I don't see – because I see like this is like you said, a local dump. I think I would be concerned – my concern is more where the ponds are, to me that's the leaching and stuff, and it sounds like, I want to look at the report a little bit more and almost want to get a second report from somebody else, another person, but I do trust, I guess, what you folks have going on there because you are trying to make a positive impact.	
	MR. BERMUDEZ: I think that would be good to just inform people in the Kaneohe neighborhood board on Thursday at 7:00 at Ben Parker School, so if anybody could volunteer. I think it would be like five minutes at the most. It would be better, better than them showing up because this is your folks – your input about it. Any questions, I'm sure the parties can do that. Thanks for your time.	MS. FUKUMOTO: Thank you.