DRAFT

Work Plan/Sampling and Analysis Plan

Tank 5 Area Characterization

RED HILL BULK FUEL STORAGE FACILITY
JOINT BASE PEARL HARBOR-HICKAM, HAWAII

DOH FACILITY ID: 9-102271
DOH RELEASE ID: 990051, 010011, 020028, 140010

July 2014

Department of the Navy
Naval Facilities Engineering Command, Hawaii
400 Marshall Road
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Contract No. N62583-11-D-0515, Contract Task Order No. KB01

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ACRONYMS AND ABBREVIATIONS

2D	two dimensional
amsl	above mean sea level
AMEC	AMEC Earth and Environmental Inc.
APP	Accident Prevention Plan
bgs	below ground surface
BPM	Battelle Project Manager
BTEX	benzene, toluene, ethylbenzene, and xylenes
BWS	Board of Water Supply
°C	degrees Celsius
CFR	Code of Federal Regulations
COC	Chain of Custody
COPCs	Contaminants or Constituents of Potential Concern
CTO	Contract Task Order
DLNR	State of Hawaii Department of Land and Natural Resources
DO	dissolved oxygen
DoD	Department of Defense
DOT	Department of Transportation
DQO	data quality objectives
EAL	Environmental Action Level
ESI	Environmental Science International
EW	Extraction well
F-76	marine diesel fuel
FISC	Fleet and Industrial Supply Center
FM	Field Task Manager
GC/MS	gas chromatography/mass spectrometry
GPP	Groundwater Protection Plan
HAR	Hawaii Administrative Rules
HDOH	State of Hawaii Department of Health
HECo	Hawaiian Electric Company
HPWS	Hawaii rules relating to public water systems
ID	Identification
IDW	Investigation-derived waste
JBPHH	Joint Base Pearl Harbor-Hickam
JP-5	Jet Fuel Propellant-5
JP-8	Jet Fuel Propellant-8
LCS	laboratory control samples
LD	laboratory duplicate
LNAPL	light non-aqueous phase liquid

ACRONYMS AND ABBREVIATIONS (Continued)

LOQ	limit of quantitation
MCL	maximum contaminant level
MDL	method detection limit
mL/min	milliliters per minute
MOFAT	Multiphase Organic Flow and Multi-component Transport
MS	matrix spike
MSD	matrix spike duplicate
MW	Monitoring well
NAVFAC	Naval Facilities Engineering Command
NAVSUP FLC	Naval Supply Systems Command Fleet Logistics Center
Navy	United States Navy
NPDW	National Primary Drinking Water Act
Ogden	Ogden Environmental and Energy Services Co., Inc.
OSHA	Occupational Safety and Health Administration
ORP	oxidation-reduction potential
PAHs	polycyclic aromatic hydrocarbons
PAL	Project Action Level
pH	potential of hydrogen (hydrogen activity)
PID	photo-ionization detector
PM	Project Manager
POC	Point of Contact
PPE	personal protective equipment
PPM	Parsons Project Manager
PSHEP	Project Safety, Health, and Environment Plan
PVC	Polyvinyl chloride
QA	Quality Assurance
QA/QC	Quality Assurance/ Quality Control
QAPP	Quality Assurance Project Plan
QC	Quality Control
RHMW	Red Hill Monitoring Well
RHSF	Red Hill Bulk Fuel Storage Facility
RPD	relative percent difference
RPM	Remedial Project Manager
SDWA	Safe Drinking Water Act
SI	Site Investigation
SOP	Standard Operating Procedure
SSHO	Site Safety and Health Officer
TEC	The Environmental Company, Inc.

ACRONYMS AND ABBREVIATIONS (Continued)

TPH	Total petroleum hydrocarbons
TPH-DRO	Total petroleum hydrocarbons-diesel range organics
TPH-GRO	Total petroleum hydrocarbons-gasoline range organics
TVH	Total volatile hydrocarbons
TVPH	Total volatile petroleum hydrocarbons
US	United States
USACE	United States Army Corp of Engineers
USEPA	U.S. Environmental Protection Agency
UST	Underground storage tank
UTM	Universal Transverse Mercator
VOA	Volatile Organic Analysis
VOCs	Volatile Organic Compounds
VMP	Vapor monitoring point
VW	Vent well
WP/SAP	Work Plan/Sampling and Analysis Plan

SECTION 1

INTRODUCTION

This Work Plan/Sampling and Analysis Plan (WP/SAP) describes the purpose and methodology for characterizing the nature and extent of a petroleum fuel release beneath Tank 5 at the Red Hill Bulk Fuel Storage Facility, Joint Base Pearl Harbor-Hickam (JBPHH), Hawaii, hereafter referred to as the "Facility". The Facility is located on the Island of Oahu (Figure 1). The State of Hawaii Department of Health (HDOH) Facility I.D. number for the Facility is 9-102271. The HDOH Release I.D. numbers are 990051, 010011, 020028, and 140010. Parsons, in association with Battelle, has prepared this document for Naval Facilities Engineering Command (NAVFAC) Hawaii, under NAVFAC Pacific Contract No. N62583-11-D-0515, Contract Task Order (CTO) KB01.

1.1 PROJECT PURPOSE AND OBJECTIVES

The purpose of this project is to evaluate the nature and extent of petroleum beneath Tank 5. A release of Jet Fuel Propellant-8 (JP-8) from Tank 5 was reported to the HDOH on January 13, 2014. The location of Tank 5 and the subsurface characterization area are shown on Figure 2. It is the United States Navy's (Navy) intention to continue compliance with HDOH release response requirements for the reported release from Tank 5. These requirements are documented in letters from the HDOH to the Navy dated February 12, 2014 and February 26, 2014 and will be addressed by performing an investigation beneath Tank 5. The following are objectives for the investigation:

- Test for the presence of fuel (hereafter referred to in this plan as light non-aqueous phase liquid or "LNAPL") or individual fuel contaminant constituents within fractured, vesicular basalt beneath the tank.
- Evaluate the extent of LNAPL or fuel constituents in vapor in the unsaturated fractured basalt vadose zone beneath the tank and above the groundwater that flows through underlying layers of fractured basalt bedrock (the zone of fractured basalt above groundwater is referred to in this plan as the vadose zone and the underlying zone of

fractured basalt that groundwater flows through is referred to as the groundwater aquifer or 'saturated zone').

Coreholes will be drilled through the vadose zone and rock samples will be collected from the cores. Monitoring wells will be subsequently installed in the coreholes to collect air (vapor) and groundwater samples.

Basalt rock, vapor, and groundwater samples will be collected and analyzed for LNAPL/petroleum constituents to determine if LNAPL is migrating downward toward the aquifer.

The results will be utilized in a vadose zone contaminant fate and transport model to predict the possible downward movement of LNAPL to groundwater. If LNAPL or elevated concentrations of petroleum constituents are detected, provisions are included to install a bioventing or extraction well as appropriate for a remedial treatability study.

1.2 LOCATION AND SETTING

The Facility is located on the island of Oahu, Hawaii, approximately 2.5 miles northeast of Pearl Harbor (Figure 1). The Facility is located on a low ridge on the western edge of the Koolau Mountain Range that divides Halawa Valley from Moanalua Valley. The Facility is bordered on the north by Halawa Correctional Facility and private businesses, on the west by the U.S. Coast Guard reservation, on the south by residential neighborhoods, and on the east by Moanalua Valley. A quarry is located less than a quarter mile away to the northwest. The Facility occupies 144 acres and the elevation ranges from approximately 200 to 500 feet above mean sea level (amsl).

The Facility is located above the boundary of the Waimalu and Moanalua Aquifer Systems of the Pearl Harbor and Honolulu Aquifer Sector, respectively. Both aquifers are sources of potable water for several public water supply systems, including the Board of Water Supply (BWS) Halawa Shaft Pump Station (2353-01) approximately 3,000 feet northwest from the Facility and the Navy Red Hill Pumping Station (designated 2254-01), located approximately 3,000 feet hydraulically down-gradient from the Facility.

Information obtained from the City and County of Honolulu Department of Planning and Permitting indicates that the Facility is located on federal government land (zoned F1- Military and Federal).

1.3 SITE HISTORY

The Facility was constructed by the U.S. Government in the early 1940s. The Facility contains 18 active and 2 inactive underground storage tanks (USTs) that are operated by Naval Supply Systems Command Fleet Logistics Center (NAVSUP FLC) Pearl Harbor (formerly Fleet and Industrial Supply Center [FISC]).

The 20 USTs and a series of tunnels were field constructed in-place as a self-contained underground unit deep within a basalt ridge at Red Hill. The USTs were constructed of plate steel encased in 2 to 4 feet of concrete between the steel plate and surrounding basalt. The USTs are approximately 250 feet high and 100 feet in diameter and are aligned vertically such that the upper domes of the tanks are between 100 feet and 200 feet below ground surface (bgs). The lower dome of each tank rests on an approximate 50-foot wide by 20-foot thick concrete pad that was placed prior to the construction of the tanks. The bottoms of the USTs are located between 80 and 100 feet above the underlying water table.

The USTs currently contain jet fuel propellant (JP-5 and JP-8) and marine diesel fuel (F-76). Several tanks in the past have stored Navy special fuel oil, Navy distillate, aviation gasoline, and motor gasoline (Environet, 2010).

Various environmental activities have been conducted at the Facility since the late 1990s. Investigations of past releases were conducted in 1996 (Ogden Environmental and Energy Services Co., Inc. [Ogden]), 2002 (AMEC Earth and Environmental, Inc. [AMEC]), and 2007 (The Environmental Company, Inc. [TEC]). A groundwater flow and contaminant transport model was completed as part of the 2007 TEC investigation and updated in 2010 by TEC. A Groundwater Protection Plan (GPP) was developed in 2008 based on results of the site investigations (SIs), modeling, and Tier 3 Risk Assessment, also conducted by TEC in 2007. The GPP was updated in 2009.

The Navy has been conducting quarterly sampling of existing groundwater monitoring wells located inside and outside of the Red Hill tunnel since 2008. Currently, there are four

monitoring wells (Red Hill Monitoring Well 01 [RHMW01], RHMW02, RHMW03, and RHMW05) located in the tunnel, one sample point located at the Red Hill Shaft (RHMW2254-01), and two monitoring wells (HDMW2253-03 and OWDFMW01) located outside of the tunnel as shown in Figure 1 that are sampled quarterly.

1.4 REGULATORY REQUIREMENTS

Based on the history of the Site, the State and Federal regulatory requirements that apply to the Facility include the following:

- Safe Drinking Water Act (SDWA) and National Primary Drinking Water Act (NPDW); the NPDW regulations are located in 40 Code of Federal Regulations (CFR) Part 141 and the regulations implement the provisions of the SDWA. They establish the maximum contaminant levels (MCLs) for various substances in potable water.
- Hawaii Rules Relating to Public Water Systems (HPWS) – The HDOH HPWS (Hawaii Administrative Rules [HAR] Title 11, Chapter 20) sets forth the MCLs of certain chemicals in public and private drinking water systems. These MCLs are analogous to those in the NPDW regulations.
- State of Hawaii UST Regulations (HAR, Title 19, Chapter 342L and HAR, Title 11, Chapter 281). Owners and operators of USTs that contain regulated substances such as petroleum are required to take specific actions when investigating releases from their USTs. Regulations and requirements are explained in detail in the Technical Guidance Manual for Underground Storage Tank Closure and Release Response (HDOH, 2000).

SECTION 2
PROJECT ORGANIZATION

This section provides a summary of the key project personnel, subcontractors, the project organizational structure, planning, schedule, and project safety.

2.1 ROLE AND RESPONSIBILITIES

A clear understanding of each individual and organization's role and responsibilities will be instrumental in the completion of this project. Key personnel and organizations for this project are included in Table 1 (tables are provided at the end of this work plan).

This organizational structure is designed to ensure that all personnel involved with the project will receive proper instructions and information. Appropriate project safety and quality assurance (QA) procedures will be followed. The roles and responsibilities of key personnel directly involved with work planning, field, data review, and reporting activities are included below.

2.1.1 NAFAC Remedial Project Manager

Mr. Bruce Tsutsui is the NAVFAC Remedial Project Manager (RPM) and oversees the Red Hill Phase 1A Tank 5 Site Investigation program for NAVFAC and is responsible for providing Navy technical guidance for the project and coordinating access to the Tank 5 investigation area through Adit No. 3.

2.1.2 Battelle Project Manager

Ms Carolyn Scala, P.E., is the Battelle Project Manager (BPM) and is responsible for the overall management of the project and reports to the NAVFAC RPM. The BPM is responsible for the operations of the overall project and ensuring activities are conducted in accordance with the project scope and within contract terms and conditions. The BPM will provide management and direction to the project personnel assigned to the project including Parsons and other subcontractors. The BPM is responsible for ensuring completion of the work in accordance with applicable codes and standards, including Battelle corporate, Occupational Safety and Health Administration (OSHA), and any client-specific requirements, and ensuring compliance with

programs and procedures applicable to the project. The BPM is also responsible for coordination with the NAVFAC RPM.

2.1.3 Parsons Project Manager

Mr. Gene Wright, P.G. is the Parsons Project Manager (PPM) and is responsible for the management of the work planning, field, and reporting activities subcontracted to Parsons and reports to the Battelle Project Manager. The PPM is responsible for the daily operations of Parsons personnel assigned to the project and ensuring daily activities are conducted in accordance with the project scope and within subcontract terms and conditions. The PPM will provide management and direction to the Parsons personnel assigned to the project and subcontractors as directed by Battelle. The PPM is responsible for ensuring completion of the field tasks in accordance with applicable codes and standards, ensuring compliance with environmental, health, and safety requirements, including Parsons corporate, OSHA, and any client-specific requirements, and ensuring compliance with programs and procedures applicable to the project. In addition, the PPM is also responsible for coordination with the NAVFAC RPM within the scope of the subcontract.

2.1.4 Field Task Manager

Mr. Thomas (Mitch) Jensen, P.G., is the Field Task Manager (FM) and reports to the PPM. The FM will be responsible for the management of site activities and personnel. The FM is responsible for the following: supervising site personnel, coordinating with subcontractors and vendors (as approved by Battelle), ensuring completion of the field tasks in accordance with the contract documents, applicable codes and standards, ensuring compliance with environmental, health, and safety requirements, including Parsons corporate, OSHA, and any client-specific requirements, and ensuring compliance with programs and procedures applicable to the project. Mr. William Stohler, P.G., and Mr. John Hall, P.G., P.E., are Alternate FMs and will have the same responsibilities as Mr. Jensen.

2.1.5 Site Safety and Health Officer

Mr. Jensen will also serve as Site Safety and Health Officer (SSHO) and has the responsibility and authority to implement the Accident Prevention Plan (APP) and Project Safety, Health, and Environment Plan (PSHEP) and to verify compliance. Mr. William Stohler, P.G., and Mr. John

Hall, P.G., P.E., are Alternate SSHOs and also have responsibility and authority to implement the APP and PSHEP, and to verify compliance. The SSHO or Alternate SSHO has the authority to halt site work if unsafe conditions are detected. The specific responsibilities of the SSHO include managing the safety and health functions on-site; serving as the project's Point of Contact (POC) for safety and health matters; ensuring site monitoring, worker training, and effective selection and use of personal protective equipment (PPE); assessing site conditions for unsafe acts and conditions and providing corrective action; maintaining effective safety and health records as described in the PSHEP; coordinating with the PPM and others as necessary for safety and health efforts. Mr. Stohler or Mr. Hall may also serve as the Alternate FM.

2.1.6 Chemist

Ms. Tammy Chang is the Project Chemist is responsible for reviewing analytical data to ensure that the data meet the data quality objectives for the project. Upon receipt of analytical data from Battelle, Ms. Chang or designated alternate will perform a check to verify that contract deliverables have been met; review sample custody, receipt conditions, and holding times; and review sample results (including limits of quantitation and results for field duplicates).

The Project Chemist will be responsible for communicating any deviations from the Work Plan to the BPM and PPM. The chemist will work with the BPM and PPM to make any decisions based on laboratory Quality Assurance/Quality Control (QA/QC) issues.

2.1.7 QA Manager

The BPM and PPM will serve as QA Managers and will be responsible for implementing and maintaining the QA program; monitoring QA activities to ensure conformance with authorized policies, procedures, and sound practices; conduct meetings with personnel covering the QA procedures and requirements, as appropriate; identifying and resolving non-conformances in accordance with the requirements of applicable procedures and policies; monitoring corrective action documentation for conditions adverse to quality; tracking and verifying implementation of corrective actions; providing closeout documentation upon completion of corrective action; ensuring that records, logs, permits, regulatory-required documentation, manufacturers' instructions, warrantees, standard procedures, and project plans are maintained and stored in a

retrievable manner and that controlled copies of standard procedures and project plans are available to appropriate personnel.

2.1.8 Subcontractors

All subcontractors will report to the BPM and furnish all personnel, equipment, and materials required to complete their tasks. The inspection and approval of all subcontracted work will be the responsibility of Parsons on behalf of Battelle.

2.2 PLANNING

The BPM and PPM are responsible for the project set-up and planning. The planning tasks include the following.

- Obtaining RAPIDGate or temporary security passes for all personnel and vehicles requiring access to the Facility and surrounding properties. All member of the field team will also obtain a NAVSUP badge with Red Hill tunnel access prior to commencing any fieldwork.
- Acquiring additional information which includes utility maps, as-built drawings and record drawings, historical data, and any other pertinent information.
- Obtaining all federal, state, and local permits and approvals required to perform the fieldwork.
- Identifying the staging and decontamination area, and material storage.
- Attending site visits and other meetings.
- Preparing and submitting draft and final planning documents prior to initiating fieldwork.

2.3 PERMITTING

All work will be performed in compliance with all applicable federal regulations. In addition, the work will be performed to meet the requirements of state and local laws, rules, and regulations.

2.4 PROJECT SCHEDULE

Field work will be scheduled between Monday and Friday, between the hours of 0700 and 1700 hours. Parsons assumes normal work schedule access within the Facility tunnel complex. The project schedule is provided in Appendix A. The task is Field Work Phase 1A – Site

Characterization. As shown on the schedule, it is anticipated that field work will commence on or before November 3, 2014 and be completed on or about January 16, 2015.

The sequence and estimated duration of the drilling program is anticipated to be as follows:

- Mobilize drilling equipment to Tank 5 through Adit No.3;
- Drill one angled corehole in the cross tunnel beneath Tank 5, ream the corehole, and install three vapor monitoring point (VMP) instruments. Allow 7 days for drilling and VMP installation;
- Drill one angled corehole in the cross tunnel beneath Tank 5, ream the corehole, and install one monitoring well and one VMP instrument. Allow 7 to 8 days for drilling, well installation, and development;
- Drill and ream one vertical corehole in the cross tunnel beneath Tank 5 for air injection, vapor extraction, and/or LNAPL extraction depending on the presence or absence of petroleum in core or at the top of groundwater at the previously installed VMP and monitoring well locations. Allow 7 to 8 days for drilling and well installation;
- Drill one angled corehole in the Adit No. 3 tunnel approximately 40 feet southwest of the Tank 5 cross tunnel, ream the corehole, and install two VMP instruments. Allow 7 to 8 days for drilling and VMP installation;
- Drill one vertical corehole in the Adit No. 3 tunnel approximately 60 feet southwest of Tank 5, ream the corehole, and install three VMP instruments. Allow 7 days for drilling and VMP installation (alternate location);
- Drill one vertical corehole in the Adit No.3 tunnel approximately 150 feet southwest of Tank 5, ream the corehole, and install one monitoring well. Allow 7 to 8 days for drilling, and well installation and development;
- Install surface completions;
- Sample VMPs and monitoring wells;
- Survey VMP and monitoring well locations; and
- Remove drilling-related materials and equipment from Adit No. 3.

The above sequence may change depending on the phase of contamination (vapor, residual, liquid) that is detected. Additional details are provided in Section 3.

2.5 HEALTH AND SAFETY REQUIREMENTS

All members of the field team are required to read the APP and the PSHEP (included as an appendix to the APP), and sign the PSHEP as verification that they understand the plans. Parsons will take all necessary measures to provide a safe work environment during field activities. The PSHEP includes appropriate Activity Hazard Analyses, and outlines personnel risk minimization through compliance with OSHA and the U.S. Army Corp of Engineers (USACE, 2008) safety regulations. The APP and PSHEP are provided as Appendix B.

SECTION 3

FIELD ACTIVITIES AND METHODOLOGY

This section describes the drilling, rock sampling, groundwater monitoring well and vent well (VW) or extraction well (EW) and VMP installation, well development, vapor and groundwater sampling, and related procedures to characterize a potential petroleum fuel release beneath Tank 5 at the Facility. Field activities are proposed that utilize field screening technologies, quality control (QC) procedures, and appropriate real-time communication and decision-making. Therefore, the work plan is intended to be flexible.

3.1 PRE-INVESTIGATION ACTIVITIES

Pre-investigation activities for the characterization to be completed prior to and/or concurrent with field mobilization are described in this subsection. The work area will be in the tunnels (adits) beneath and near Tank 5. Specific requirements to access and work in the tunnels include railroad locomotive and crane training and certification through NAVSUP FLC. Additionally, site reconnaissance and coordination to identify and access approved water and electricity for use in conducting the drilling and sampling activities must be conducted. This also includes on-site hazard analysis to protect employees including subcontractors and Navy personnel from any potential job related accidents or injuries during field work. Other requirements such as not using combustible engines in the tunnels and controlling vapors and dust must be followed and any other requirements that the NAVSUP FLC tunnel supervisor may deem necessary to alleviate unwanted impacts to ongoing operations.

3.2 SCOPE OF FIELD ACTIVITIES

Mobilization for field work within the Facility tunnels at Tank 5 is scheduled to begin on or before November 3, 2014. The work will include:

- Site and drilling location preparation and planning;
- Continuous rock coring and logging, corehole reaming, and installation of VMPs and groundwater monitoring wells at six locations for a total of 660 feet of drilling;
- Sampling existing VMPs in the area of Tank 5;

- Sounding the monitoring wells for groundwater elevation and potential presence of LNAPL. The characterization team will make any necessary corrections to groundwater levels based on the presence of LNAPL;
- Potentially sampling rock for laboratory analysis of samples for contaminants of potential concern (COPCs) based on field screening;
- Casing the bedrock within the coreholes during coring to mitigate potential migration to groundwater of any encountered contamination;
- Constructing flush-mount wellhead completions for VMPs and wells;
- Developing monitoring wells, installing dedicated bladder pumps, and sampling groundwater monitoring wells for COPCs;
- Purging VMPs and sampling vapor for COPCs;
- Surveying VMPs and wells to establish northing and easting coordinates and elevations;
- Managing investigation-derived waste (IDW) generated during the drilling and sampling activities; and
- Site restoration.

3.3 ANALYTICAL METHODS AND REGULATORY COMPARISON CRITERIA

The rock, vapor, and groundwater samples collected for laboratory analysis will be analyzed for petroleum constituents only. Rock samples will be analyzed for gasoline and diesel range total petroleum hydrocarbons (TPH), the volatile organic compounds (VOCs) benzene, toluene, ethylbenzene, and xylenes (BTEX), polycyclic aromatic hydrocarbons (PAHs) to include naphthalenes, and lead. Vapor samples will be analyzed for BTEX, naphthalene, methane, helium (if necessary), and total volatile petroleum hydrocarbons (TVPH). Groundwater samples will be analyzed for BTEX, polycyclic aromatic hydrocarbons (PAHs), dissolved lead, and for methane and the general water chemistry anions. The corresponding vapor, soil, and groundwater analytical methods are provided in Table 2 - Vapor Analytical Methods, Project Action Limits, and Laboratory Specific Limits, in Table 3 - Soil Analytical Methods, Project Action Limits, and Laboratory Specific Limits, and in Table 4 - Groundwater Analytical Methods, Project Action Limits, and Laboratory Specific Limits.

HDOH environmental action levels (EALs) for soil and groundwater will be used for comparison purposes (HDOH, 2012) and are provided in Table 2 - Vapor Analytical Methods,

Project Action Limits, and Laboratory Specific Limits, in Table 3 - Soil Analytical Methods, Project Action Limits and Laboratory Specific Limits and in Table 4 - Groundwater Analytical Methods, Project Action Limits and Laboratory Specific Limits.

3.4 DRILLING LOCATION ACCESS AND SITE PREPARATION

Access to the tunnels will be at the entrance to Adit No. 3, which is located at the western portion of the Facility property near the Oily Waste Disposal Facility (Figure 1). At this location, all equipment including the drilling rig will be lowered to the adit tunnel floor with a crane, and then, loaded onto small railroad cars to be transported to the Tank 5 drilling location. The distance from the Adit No. 3 entrance to the drilling location is about 3,800 feet. Site preparation will include locating, accessing, and setup of electrical and water sources near Tank 5, and concrete cutting of the adit tunnel floor at the drilling locations to facilitate the drilling and well completion activities. All utilities, fuel transmission and water lines, etc. run in courses on the sidewall of the tunnel, so these are not in risk of being intersected during drilling.

3.5 TRAFFIC CONTROL

Traffic control inside the tunnels will be limited to movement via the railroad cars of other contractors or NAVFAC personnel. Cones and signs as required will be utilized onsite to provide warning to Navy personnel and contractors of work near the Tank 5.

3.6 DRILLING, WELL INSTALLATION, AND SAMPLE COLLECTION ACTIVITIES

The proposed wells and VMPs will be installed in the cross-tunnel (cross-adit) near Tank 5 and in the main tunnel west-southwest from the cross-tunnel. Groundwater monitoring wells, VMPs, and a potential VW or EW will be drilled and installed at the approximate locations shown in plan view on Figure 3. A cross-section (A-A') that shows the angle projection of the wells and VMPs under the tank from their proposed locations within the Tank 5 cross-adit is shown on Figure 4. The depths shown on the figures are below ground surface (bgs). The ground surface reference datum for drilling is the tunnel floor situated at approximately 106 feet amsl. This elevation is known from the surveyed elevation of existing monitoring well RHMW02 (Figure 3). The locations may be moved slightly from the intended locations due to the actual ground

conditions and siting concerns related to feasibility and safety. The general order and the details and rationale for each proposed well and VMP are provided as follows:

- **T5-B01** is a VMP with three screening points that will be installed at a 45° angle from the horizontal. The total drilled length is 115 feet, which results in a depth of 82 feet bgs. The objective is to characterize vapor in basalt in a vertical profile beneath the existing SVMP05 shallow angle (15°) VMP. The lowest screening point at 82 feet bgs will be about 6 feet above the water table so that vapors emitted from groundwater may be detected.
- **T5-B02** is a combination groundwater monitoring well with one attached vapor screening point installed at a 60° angle from the horizontal. The total drilled length is 120 feet, which results in a depth of 104 feet bgs. The objective is to characterize groundwater beneath the tank and near the center of the tank. The purpose of the single vapor screening point is to monitor potential vapors beneath the observed leak location at greater depth (46 feet) and in vertical profile with vapor screening points within planned T5-B01 and existing SVMP05. The well will be screened to a depth of approximately 16 feet below the water table so that the top of the well screen is about 2 feet above the water table.
- **T5-B03** is a vertical VW for air injection or vapor extraction that will be installed for a remedial treatability study. The total depth is 98 feet bgs. The VW will be screened over the entire thickness of the vadose zone and about 10 feet into the water table. If LNAPL is encountered or has potential to be encountered during drilling, the VW will be moved further from the source to mitigate the possibility for migration of LNAPL into and down the well. The VW will extend below water to allow air flow to or from the water surface, for potential air sparging of groundwater, and for groundwater sampling prior to completion as an air injection, extraction, or sparging well.
- **T5-B04** is a VMP with two screening points that will be installed at a 45° angle from the horizontal. The total drilled length is 115 feet, which results in a depth of 82 feet bgs. The objective is to characterize vapor in basalt west from the center of the tank at a similar depth and alignment as T5-B01. The lowest screening point at 82 feet bgs will be about 6 feet above the water table so that vapors emitted from groundwater may be detected hydraulically downgradient from the center of the tank.
- **T5-B05** is a vertical VMP with three screening points that will be installed at the same approximate depths as T5-B01 and T5-B02, e.g., 22 feet bgs, 46 feet bgs, and 82 feet bgs. The total drilled depth is 82 feet bgs. The lowest screening point at 82 feet bgs will be about 6 feet above the water table so that vapors emitted from groundwater may be detected. This VMP will be approximately 60 feet from the T5-B03 VW and will be used to determine radial influences for vapor concentrations and oxygen, air permeability, and in situ biological respiration.

- **T5-B06** is a vertical groundwater monitoring well to determine groundwater contamination and hydraulic head approximately 150 feet west-southwest and hydraulically downgradient from Tank 5. The well will be screened to a depth of approximately 16 feet below the water table so that the screen is about 4 feet above the water table.

The array of monitoring points detailed above is designed to meet the scope as outlined in Section 1 and in this section, and is multi-faceted to provide initial characterization, monitoring for potential future migration of contamination, and the basic infrastructure for a treatability study.

3.6.1 Drilling and Rock Sampling

A small, electric powered Hagby ONRAM 1000/3 drill rig will be used to advance the vertical and inclined coreholes near and beneath Tank 5. The subcontracted drilling company has successfully used this drill rig during prior work in the Facility tunnels. The ONRAM is capable of coring various corehole sizes and also can be utilized to over-ream the corehole using air rotary methods to enlarge the hole for installation of monitoring wells.

Collection of continuous rock cores will allow for observation, logging, and field screening of the basalt, and based on these, rock samples may be collected for laboratory analysis. Samples will be collected in analyte appropriate containers supplied by the laboratory and will be preserved and handled in accordance with the Quality Assurance Project Plan (QAPP).

3.6.1.1 Rock Coring

Rock coring will commence just below ground surface. Access to the subsurface will be through holes cut into the adit tunnel floor. Competent bedrock should be encountered just below the concrete floor. Continuous rock cores will be obtained in a 5-foot-long NQ core barrel (3-inch outside diameter yielding an approximate 1.9-inch rock core) using the ONRAM wireline and core retrieval system. Rock coring will advance to the lengths and depths below grade or ground surface described above for the individual coreholes. Clean water from an accessible source inside the tunnel will be required for rock coring and drilling and will be used for circulation fluid. The use of water means that dust will likely not be generated.

Rock cores will be described in accordance with standard logging procedures. A summary rock core chart will be used in the field as a guide to aid in the descriptions. In general, rock color; texture; strength; degree and orientation of fracturing; shape, size and volume of voids;

weathering; and secondary staining or mineralization will be noted on the geologic logs. The Geological Society of America rock color chart with Munsell™ color chips will be used for color determination. Lithologic descriptions, photoionization detector (PID) screening results and other observations will be provided on a geologic log.

3.6.1.2 Air Rotary

In order to tool the coreholes with monitoring points, the coreholes will be reamed 4.75-inch diameter to total depth using open-hole air rotary with a specialized bit for the ONRAM system. Limited amounts of clean, potable water and environmentally safe drilling foam (as required) will be injected during drilling to mitigate dust and to increase fluidization to remove cuttings from the boreholes. Cuttings return using this method can be variable. Cuttings, when removed from the hole, will be collected in a 55-gallon drum with an air stack to reduce dust.

3.6.2 Monitoring Well, Vent Well, and Monitoring Point Installation

Construction of the wells and VMPs are detailed in the following sections.

3.6.2.1 Monitoring Well Installation

The groundwater monitoring wells will be installed in basalt and screened within the basal aquifer. Two-inch diameter, Schedule 40 polyvinyl chloride (PVC) monitoring wells with 20 feet of slotted screen, pre-packed with a minimum diameter (3.5-inch diameter or less) sand envelope will be constructed within the 4.75-inch boreholes. Because of potential difficulties with placing sand in an angled corehole, a pre-packed screen is deemed necessary for the inclined monitoring well to ensure that sand is present around the screen. The 20-foot screens will straddle that water table such that about 16 feet of screen is below the water table.

Coarse #3 Monterey silica sand will be tremied in the borehole annulus above the pre-packed screen to approximately 5 feet above the well screen, followed by a slow-hydrating bentonite pellet seal, then either bentonite pellets or wet bentonite grout to near surface (less viscous cement-bentonite grout should not be used because of high rock porosity). Dry bentonite where used will be tremied and hydrated with clean, potable water. Well construction diagrams will be provided on the geologic logs.

The monitoring wells will be completed within 12-inch diameter, circular, steel skirts or rectangular utility-type boxes with traffic-rated locking lids over the recessed wells. The circular skirts or boxes will be set in concrete flush with the floor level of the tunnel to provide strength and a surface seal.

3.6.2.2 Vent Well Installation

The vent/extraction well will be installed in basalt and screened along its entire length and approximately 10 feet into the basal aquifer. The well will be constructed of 2-inch Schedule 40 PVC slotted 0.020 for maximum air flow. Coarse #3 Monterey silica sand will be tremied in the borehole annulus to above the screen. If in the unlikely event LNAPL is encountered during drilling, that portion will not be screened and bentonite will be placed in the corresponding annular space to seal the annulus of the well. Surface completion will the same as that described above for monitoring wells, except the utility or traffic box may be slightly larger to accommodate future connections at the wellhead for a treatability study.

3.6.2.3 Vapor Monitoring Point Installation

The screening points of the nested VMPs will be installed within the basalt vadose zone at the locations shown on Figures 3 and 4. Color-coded VMPs will be installed throughout the vertical profile at the VMP locations. Each VMP will be constructed with a 3/8-inch-diameter by 6-inch-long, fine mesh stainless steel screen attached to 1/4-inch polyethylene tubing (of different colors) that extend to the ground surface. A 3/8-inch-diameter by 6-inch-long, stainless steel blank extension will be attached to the bottom of each VMP screen to facilitate attachment of the screen to a sacrificial, 1-inch diameter PVC blank casing, or in the case of T5-B02, to the 2- inch well casing. Each screen point will be attached at the specified depth beginning with the deepest VMP. Up to three separate spools of tubing will be handled at the surface by the field crew. The separate lines of tubing will be closely aligned and taped side to side to the 1-inch PVC blank or 2-inch well casing (T5-B02) at about 10-foot intervals all the way to the ground surface. The annular space surrounding the VMP screens and tubing will be filled with coarse #3 Monterey silica sand from approximately 3 feet below to 3 foot above each VMP screen. Slow-hydrating bentonite pellets will be tremied into the borehole and hydrated to provide a seal between the VMP sand packs. Alternatively, wet bentonite may be used instead of pellets, and may be necessary for the

angled VMPs. Cement-bentonite grout will not used during construction of the VMPs because of concerns that the heat of formation could melt the polyethylene tubing.

The VMPs will be completed flush mount in 12-inch-diameter steel well boxes fitted with a traffic-rated locking lid over the recessed wells and individual VMP tubes. The individual VMP tubes will be secured at the wellhead beneath the flush-mount protective covers.

3.6.3 Vapor Sampling

Baseline vapor samples will be collected from the VMPs after they all have been installed. However, this should occur after equilibrium has been re-established. Existing VMPs beneath Tank 5 (3 VMPs) and Tank 6 (3 VMPs) will also be sampled. Because the method of drilling (using air to ream the coreholes) readily displaces vapors in the porous and permeable basalt, a minimum period of time should pass before sampling or the samples will not truly reflect the *in situ* conditions within the vadose zone. At Subsite ST03 near Kipapa Gulch in Mililani Town, Oahu, equilibrium, determined by monitoring, was not re-established until about 3 months after drilling (Parsons, 2013). However, a substantial volume of air was injected during the drilling operations at ST03. For this Tank 5 investigation, the amount of air injected will be much less than at ST03. Therefore, one month may be sufficient to allow for re-equilibration. Periodic monitoring to determine when equilibrium is re-established is not planned.

Purge volume tests should be performed to determine the appropriate purge volume for each screened interval and to confirm adequate air flow. Purge volume and leak tests and vapor sampling will be conducted in accordance with procedures described in Standard Operating Procedure (SOP) #1 included in Appendix C. A blank vapor sampling form also is included in Appendix C. Leak tests should not be required because the shallowest VMPs are greater than 20 feet bgs. After purging the appropriate volume, vapor samples for laboratory analysis will be collected from the vent/extraction well and each VMP sample interval by attaching a 1-liter SUMMA™ canister with a flow control device directly to the quick connect of the appropriate color-coded tubing at the well head or box. Flow controllers are calibrated by the laboratory to provide a flow rate of approximately 50 milliliters per minute (mL/min). Additional vapor will be collected at each sampling interval for field screening using a graduated syringe to extract the sample and then to transfer the sample to a Tedlar® bag.

Total ionizable VOCs will be analyzed in the field using a PID, and total volatile hydrocarbons (TVH), O_2, CO_2, and methane will be analyzed using an RKI Eagle, a specialty multi-gas meter. Vapor samples collected in SUMMA™ canisters will be submitted to an off-site laboratory for determination of VOCs, specifically BTEX and naphthalene, using gas chromatography/mass spectrometry (GC/MS) by United States Environmental Protection Agency (USEPA) Method TO-15, for analysis of total petroleum hydrocarbons (C6-C12) by USEPA Method TO-3, and methane and helium (if necessary) by ASTM D-1946.

3.6.4 Monitoring Well Development, Pump Installation and Groundwater Sampling

3.6.4.1 Monitoring Well Development

Monitoring well development will consist of surging and bailing groundwater until fines are removed and the water clarifies. This normally occurs between a minimum of five well volumes and a maximum of 10 well volumes and ensures that formation water enters the well and that the water affected by drilling is removed. The parameters of dissolved oxygen (DO), oxidation-reduction potential (ORP), potential of hydrogen (pH), temperature, specific conductance, and turbidity will be monitored during the development cycle. Because DO and ORP are affected by the agitation of surging and bailing, the values obtained for these parameters during development may vary. If the development water is not relatively clear and sediment free after 10 well volumes, it will be assumed that further development will not be beneficial, and development will end. Development activities will be recorded in the field book and computer generated well development forms with all pertinent information will be constructed.

3.6.4.2 Dedicated Groundwater Pump System Installation

Dedicated pneumatic bladder pump sampling systems will be installed in each monitoring well after well development. The sampling system will consist of a stainless-steel bladder pump with the screen intake 3-feet below the top of the pump, small-diameter Teflon-coated stainless steel safety cable, polyethylene air and discharge tubing, and a well cap assembly with fittings. The bladder pumps will be installed with the intake approximately 8 feet below the water table. The pre-determined, exact length of tubing and safety cable will be requested when ordered. Cable ties will be applied approximately every 10 feet to secure the tubing to the safety cable. Pump installation will require two workers to lower the pump assembly into the well. The sampling

ports of the bladder pump system terminate in a PVC plate and are part of a well cap assembly that consists of the plate and a 2-inch sleeve. This sleeve assembly slips over the 2-inch well casing at the wellhead.

3.6.4.3 Groundwater Depth Monitoring, Purging, and Sampling

Depths to groundwater will be measured with a water level interface probe through the access hole on of the well cap assembly. Groundwater purging and sampling with a bladder pump is a low flow or micropurge technique that is considered applicable for use in permeable formations that have minimal water level drawdown, such as in the Pearl Harbor Basal Aquifer. For this technique, water level drawdown should be less than approximately 0.33 foot during purging. Drawdown measured in the monitoring wells during purging is anticipated to be negligible because of high formation permeability. Low flow purging requires water in the well to be in equilibrium with the aquifer formation and flow into the pump intake to be horizontal and laminar so that mixing from turbulence does not occur. Therefore, this technique minimizes disturbance in the well screen and aquifer, which reduces turbidity, aeration, mixing, and loss of VOCs.

The pumping flow rates should average from 0.5 to 1.0-liter per cycle. Liquefied nitrogen gas or an electric air compressor will be used as the compressed air source for operation of the bladder pumps. Gas bottles or the air compressor and other sampling equipment will have to be moved approximately 3,800 feet from the entrance at Adit 3 to the work location.

During purging, the water quality parameters of DO, ORP, temperature, pH, specific conductance, and turbidity will be measured and recorded. These groundwater sampling parameters will be measured continuously through use of a flow-thru cell connected to a U-52 multi-parameter meter, or similar meter. The sampling parameters and other pertinent sampling information will be included on the groundwater sampling form that is provided in Appendix C. Stabilization of the water quality parameters is the criterion for sample collection. Samples will be collected after three successive measurements of the water quality field parameters have stabilized according to the criteria shown on groundwater sampling form. It is anticipated that about 5 gallons of water will be purged from each well. Following purging, the flow-through cell will be bypassed so that samples are collected directly from the pump discharge line. Approximately 1.25 gallons (5 liters) of water will be collected for each sample set. So in total,

about 6.25 gallons or more will be removed from each well during the low-flow purging and sampling process.

Groundwater samples will be analyzed for the COPCs listed on the groundwater sampling form (Appendix C). The analytical methods, container types and volumes, and preservation also are shown on the form. Additional details including holding times are provided in the QAPP in Section 4.

Only initial baseline samples will be collected from the monitoring wells after installation and development to determine if contamination is present. Results of the initial samples will be provided in a data summary report. Future monitoring and frequency will be determined by NAVFAC pending the analytical groundwater results.

3.7 SAMPLE IDENTIFICATION, HANDLING, AND SHIPPING

Soil and groundwater samples will be identified on sample containers and on the chain-of-custody (CoC) forms. The proposed monitoring point nomenclature for the Tank 5 site investigation is T5-B01, T5-B02, T5-B03 and so on. Collected rock samples will be designated with an RO identifier followed by the sample depth. For example, T5-B01-RO-54 indicates a rock sample collected at 54 feet (bgs if vertical or length along the inclination if angled). Groundwater samples will be designated with a GW identifier followed by the sequential sample number. For example, T5-B02-GW-01 indicates the first groundwater sample collected from T5-B02.

Standard CoC protocol will be maintained during sample collection, handling, management, and shipment to the laboratory. Rock or water samples will be kept on ice after collection to keep them cool (4 +/-2 degrees Celsius [°C]) and packaged in coolers to be shipped to the laboratory as expeditiously as possible (normally the same day of collection). A temperature blank (a vial filled with distilled water) will be included in every cooler to determine the internal temperature of the cooler upon receipt at the laboratory. Samples for VOC analysis will be combined in one cooler and shipped with a trip blank. All rock and water samples will be shipped to APPL Inc. in California via Federal Express for the earliest next day delivery to ensure that the samples arrive at the proper temperature.

SUMMA™ canisters for vapor analysis will be shipped back to the contracted laboratory in the same partitioned container in which they sent, along with the flow control vacuum gage and the

recorded initial and final vacuum readings. SUMMA™ canisters are shipped at ambient temperature and do not require cooling.

Copies of the laboratory provided CoC with signatures will be retained for verification and documentation. The field manager will coordinate shipment to the laboratory, and the project manager will contact the laboratory to determine any discrepancies or deficiencies upon receipt of the samples.

3.8 EQUIPMENT DECONTAMINATION

All down-hole-drilling and sampling tools will be cleaned prior to and after use. A previously used staging area near the Adit 3 entrance at RHSF or another acceptable location will be used for decontamination. Liquids will be captured and containerized in properly labeled Department of Transportation (DOT) approved 55-gallon drums or other suitable temporary containers.

3.9 INVESTIGATION-DERIVED WASTE MANAGEMENT

IDW will include rock cuttings generated during borehole drilling operations, well development and purge water, and decontamination water. Non-hazardous waste labels with the required labeling information will be placed on the IDW containers as they are removed from the tunnel to the staging area outside the tunnel. These labels will include contract information, site activity, date, contents, project type, comments, and NAVFAC contact information. IDW will be properly disposed of pending analytical results. Off-site disposal will be coordinated with the NAVFAC environmental directorate for proper signing approval. Documentation will be maintained and included as required in the applicable reports.

3.10 SURVEYING

Surveying of the VMPs, monitoring wells and other pertinent site features will be performed as needed. The wells and VMPs will be surveyed after they are all installed and tied into an established control point within the tunnels. Northing and easting coordinates will be referenced to the Universal Transverse Mercator (UTM) projection and grid system (Zone 4). Ground surface and well datum elevations (in feet) will be referenced to mean sea level. The survey data will be provided on the geologic and construction logs and compiled in a data table.

3.11 VADOSE ZONE LNAPL MODELING

Data obtained during the Tank 5 investigation and prior site investigations will be used to develop a two-dimensional (x-z or r-z) multiphase oil-water flow model to simulate release and migration of LNAPL in the unsaturated (vadose) zone. The vadose zone LNAPL model will be developed using MOFAT (Multiphase Organic Flow and Multi-component Transport), a two-dimensional (2D) finite element model developed by USEPA (Katyal, et al., 1991) for simulating coupled multiphase flow and multi-component transport in 2D planar or radially symmetric vertical sections. MOFAT uses a three-phase van Genuchten constitutive model for saturation-pressure-permeability relations and has capabilities to accurately simulate heterogeneity and anisotropy in the domain. Available site-specific data will be used to define hydraulic conductivity and various soil moisture retention parameters.

Various release scenarios will be simulated from Tank 5 to understand LNAPL migration characteristics (vertical and lateral spreads, saturation, and retention in the unsaturated zone) for varying oil leak rates and volumes to help estimate potential LNAPL loading to the underlying aquifer. A sensitivity analysis will also be performed to assess the impact of uncertainty in the most sensitive parameters on the LNAPL migration and distribution in the unsaturated zone.

SECTION 4

QUALITY ASSURANCE PROJECT PLAN

This QAPP further defines the sampling and analysis discussed in Section 3 with procedures and methods incorporated. The QAPP includes the discussions of the following:

- Summary of the data quality objectives (DQO) process,
- QA/QC sampling and sample handling procedures,
- Laboratory QC,
- Field QC,
- Analytical data quality review,
- Data reporting and documentation,
- Oversight and assessment, and
- Corrective action.

This QAPP is based on the previously approved work plan/sampling and analysis plan prepared by ESI (2012).

4.1 SUMMARY OF THE DATA QUALITY OBJECTIVES PROCESS

The overall sampling and analysis strategy was developed using USEPA Guidance for Quality Assurance Project Plans, USEPA QA/G-5, Quality Assurance Management Systems (USEPA, 2001).

4.1.1 Statement of the Problem

A release of JP-8 jet fuel from Tank 5 may have occurred in January 2014 and was reported to the HDOH on January 13, 2014. Downward migration of LNAPL may impact the underlying drinking water aquifer.

4.1.2 Identify the Goals

The purpose of this project is to evaluate the nature and extent of petroleum, if present, in the basalt vadose zone and the groundwater saturated zone beneath Tank 5.

4.1.3 Identify the Information

The nature and extent of petroleum, if present, in the basalt vadose zone and groundwater saturated zone beneath and around Tank 5 will be determined by collecting and analyzing vapor, basalt rock, and groundwater samples. Data will be screened by comparing analytical results to the Project Action Limits (PALs). The PALs for groundwater are the more conservative of either the gross contamination levels or the EALs for a site where groundwater is a current or potential drinking water source and a surface water body is located greater than 150 meters from the site (HDOH, 2012). The PALs for soil are the most conservative of either the gross contamination levels or the leaching and groundwater protection EALs (HDOH, 2012). The PALs for vapor are the shallow soil gas EALs for evaluation of potential vapor intrusion hazards (HDOH, 2012). The PALs for vapor, soil, and groundwater are provided in Tables 2 through 4, respectively.

4.1.4 Define the Boundaries of the Study

Rock samples will be collected from the rock cores advanced beneath and near Tank 5, between the bottom elevation of the tank and the groundwater table. Vapor samples will be collected from vapor monitoring points, also installed beneath and near Tank 5, between the bottom elevation of the tank and the groundwater table. Groundwater samples will be collected from monitoring wells in the immediate vicinity of Tank 5. The monitoring is limited to one round of rock, vapor, and groundwater sampling from locations within the Facility beneath and near Tank 5.

4.1.5 Develop the Analytical Approach

Groundwater

- If COPC concentrations in groundwater exceed the PALs, then the fate and transport of COPCs from the Facility to the downgradient potable water supply pump stations will be evaluated, and the need for a remedial feasibility study will be evaluated.
- If COPC concentrations in groundwater do not exceed the PALs, then routine groundwater monitoring will continue under the long term monitoring program.

Rock

- If COPC concentrations in rock exceed the PALs, then the need for a remedial feasibility study will be evaluated.

- If COPC concentrations in rock do not exceed the PALs, then no further evaluation will be required.

Vapor

- If COPC concentrations in vapor exceed the PALs, then the need for a remedial feasibility study will be evaluated.
- If COPC concentrations in vapor do not exceed the PALs, then routine vapor monitoring will continue under the long term monitoring program.

4.1.6 Specify Performance Acceptance Criteria

The probability of procedural errors will be controlled through the consistent application of the standard sampling and analysis procedures and sound data quality management.

4.1.7 Develop the Plan for Obtaining Data

The boring locations were chosen to characterize the nature and extent of COPCs potentially present within the rock matrix, soil vapor, and groundwater beneath or near Tank 5. Depths of rock samples will be selected based on field screening and visual evidence of petroleum contamination. The analytical methods and criteria are presented in subsequent sections. Also discussed are field and laboratory QA, data management, and data evaluation.

4.2 QA/QC SAMPLING AND SAMPLE HANDLING PROCEDURES

All QA/QC sampling and sample handling procedures will be performed in accordance *Technical Guidance Manual for Underground Storage Tank Closure and Release Response* (HDOH, 2000). The number of field samples and associated QC samples are provided in Table 5.

4.2.1 Sample Collection Method

Collection and handling procedures have been designed to ensure that project personnel will be able to collect, label, preserve, and transport samples in a consistent manner to maintain sample integrity for the intended purposes. Field activities will be performed in accordance with the procedures described in Section 3. Analytes, sample containers, preservation, and holding times for samples are provided in Table 6. Groundwater samples collected for dissolved lead analysis will be field filtered.

4.2.2 Field QC Samples

The field QC samples for this project will consist of duplicates, matrix spike/matrix spike duplicates (MS/MSDs), and trip blanks.

4.2.2.1 Duplicates

Field duplicate samples are used to document the overall precision of the sample collection program. Field duplicate samples will be collected at a minimum of ten percent. The field duplicate sample will be assigned a unique identification number. The duplicate will be analyzed for the same parameters as project samples.

4.2.2.2 MS/MSD

Laboratory MS and MSD analysis are used to assess analytical accuracy and precision in response to potential matrix interference. If all of the MS and MSD recoveries are within specified ranges, then all the data is considered accurate. MS and MSD samples will be collected for groundwater and rock matrix analysis.

4.2.2.3 Trip Blanks

Trip blanks are used to detect VOC contamination attributable to shipping and field handling procedures. The trip blanks will be prepared by the analytical laboratory using reagent grade water in 40 milliliter volatile organic analysis (VOA) vials. Trip blanks will accompany every cooler that contain groundwater and rock samples to be analyzed for VOCs and TPH-gasoline range organics (TPH-GRO). The trip blanks will travel with the cooler from the analytical laboratory to the field and will be returned to the analytical laboratory along with the project samples. The trip blanks will be analyzed for the same VOCs and TPH-GRO as the project samples with which they are shipped.

4.2.3 Sample Containers

The groundwater samples for chemical analyses will be placed in the sample containers listed in Table 6, preserved as indicated, and analyzed within the holding times. These containers, preservatives, and holding times are specified in the respective analytical methods. The contract laboratory will supply the required sample containers.

4.2.4 Sample Labeling

Samples will be identified on sample containers and on the chain-of-custody forms in accordance with the existing site protocol and nomenclature as described in Section 3.7. The new wells and soil vapor monitoring points installed at the Facility will be identified as shown in Figure 3.

4.2.5 Field Instrument Calibration/Documentation

The following activities and documentation will be performed and maintained for all field equipment requiring periodic calibration:

- Electronic equipment requiring calibration will be calibrated prior to use by those persons directly responsible for the equipment, such as the field staff.
- Field equipment will be checked daily to verify that all of the equipment is calibrated according to the manufacturer's instructions and is operating properly prior to use.
- Field equipment that has been dropped, damaged, or is believed to be inaccurate will be tagged as in operable, removed from service and recalibrated. Field equipment that cannot be repaired or recalibrated will be replaced.
- Documentation pertinent to the calibration and maintenance of field equipment will be maintained in a bound field logbook. Entries made into the logbook regarding the status of field equipment will contain, but are not necessarily limited to, the following information:
    - Date, time, and calibration readings;
    - Name of person conducting calibration; and
    - Type of field equipment being serviced and identification number (e.g., serial number) and reference standard used for calibration (e.g., pH of buffer solution).

The field logbook or photocopies of applicable pages will be made part of the permanent project record upon completion of the project.

4.3 LABORATORY REQUIREMENTS

All laboratory activities will be performed in accordance with the Department of Defense (DoD) Quality Systems Manual for Environmental Laboratories, Version 4.2 (DoD, 2010).

4.3.1 Project Analytes

Analytical data will be generated using USEPA methodologies published in "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods SW-846" (USEPA, 1996). The following analytical methods will be used during this investigation:

- TPH-GRO – USEPA Method 8015B;
- TPH-diesel range organics (TPH-DRO) – USEPA Method 8015B;
- VOCs (BTEX) – USEPA Method 8260B;
- PAHs – USEPA Method 8270C SIM;
- Dissolved Lead – USEPA Method 6020;
- Methane – RSK SOP 175
- Alkalinity – USEPA 310.1
- Sulfate – USEPA 9056A
- Nitrate/Nitrite as N – USEPA Method 353.2.
- VOCs (BTEX) – TO-15
- Naphthalene – TO-15
- Methane and Helium – ASTM D1946

Standard sample preparation and extraction procedures for each analytical method will be used by the laboratory. Soil samples, if collected for VOC, PAH, and the TPH hydrocarbon fraction range analyses, will be analyzed by the same methods as the water samples with the same holding times.

4.3.2 Reporting Limits

Reporting limits are established by the laboratory based on the limits of quantitation (LOQs), historical data, and EPA limits established for the analytical methods employed. The reporting limits for samples may require adjustment due to the matrix interference or if high analyte concentrations necessitate sample dilution before analysis. Matrix interference and sample dilutions have the effect of increasing the reporting limits. Failure to meet the specified reporting limits will be described in the sample delivery group case narrative and summarized in the data review reports.

4.4 ANALYTICAL DATA QUALITY REVIEW

Data quality will be assessed by evaluating the accuracy, precision, representativeness, completeness, comparability, and sensitivity parameters.

4.4.1 Accuracy

Accuracy is defined as the degree of agreement of a measurement to an accepted reference or true value. When applied to a set of observed values or measurements, accuracy will be a combination of random and systematic error. Analytical accuracy will be defined as the percent recovery of an analyte in a reference standard or spiked sample. Accuracy limits for laboratory control samples are established by individual laboratories. The acceptance criteria for accuracy are dependent on the analytical method, and are based on historical laboratory data. Failure to meet the accuracy limits will be described in the sample delivery group as a case narrative and summarized in the data review reports.

The percent differences of the continuing calibration are also an indication of accuracy. Sample results are qualified "UJ" for non-detects and "J" for detects, if the percent differences for a continuing calibration is out of the acceptable range, this will be reported by the laboratory in the analytical analysis.

4.4.2 Precision

Precision is defined as the agreement between a set of replicate measurements without assumption or regard about the true value. Precision limits for the laboratory measurements will be evaluated from the sample/sample duplicate analyses results. Field sampling precision will be evaluated from the field duplicate sample analyses results.

The relative percent difference (RPD) measured between two duplicate samples will serve as the quantitative measure of precision. Precision for sampling is evaluated separately from precision for analytical data. Field co-located samples help clarify the distinction between uncertainty due to analytical variability and heterogeneity of the sample matrix. Laboratory control samples (LCS) and duplicate LCS analyses results will be used to assess analytical precision.

4.4.3 Completeness

Completeness is defined as the overall percentage of valid analytical results (including estimated results) compared to the total number of analytical results reported by the analytical laboratory. The completeness goal for this project is 90 percent. Successful completion of data acquisition can only be accomplished if both the field and laboratory portions of the project are performed according to the procedures described in the QAPP.

4.4.4 Representativeness

Representativeness is the degree that data accurately and precisely represents a characteristic of a population, parameter variations at a sampling point, or an environmental condition. Representativeness will be achieved by conducting sampling in compliance with the sample collection procedures described in Section 3. Field duplicate samples will be collected and used as a means to assess field representativeness.

4.4.5 Comparability

Comparability expresses the confidence with which one data set can be compared to another data set. Comparability can be related to accuracy and precision because these quantities are measures of data reliability. Data are considered comparable if collection techniques, measurement procedures, methods, and reporting are equivalent for the samples within a sample set. Comparability for sampling will be determined to be acceptable based on the following criteria: a consistent approach to sampling was applied throughout the program; samples were consistently preserved; and samples were collected under similar physical conditions.

4.4.6 Sensitivity

Sensitivity is defined as the ability of an analytical method or instrument to detect the target analytes at the level of interest. Sensitivity is assessed based on calibration criteria, and instrument method detection limits (MDLs) and LOQs, which are presented in Tables 2 through 4. Sensitivity will be measured by including a calibration standard for the analytes at or close to the quantitation limit.

4.5 DATA REPORTING AND DOCUMENTATION

The laboratory will prepare and retain full analytical and QC documentation. The following items present the key components of the hard copy deliverables that will be generated:

- Data packages along with supporting QC data,
- Original copy CoC forms or certified copies,
- Cover sheet listing the samples included in the report and narrative comments describing problems encountered during the analysis,
- Tabulated presentation of analytical results for all samples including reporting limits for all analyses and any laboratory assigned data qualifiers (data qualifiers will be defined and documented in the case narrative),
- Tabulated presentation of the results for all method and preparation blanks as applicable, and
- Analytical results for all laboratory QC sample analyses (LCS results and recoveries, surrogate recoveries, recoveries, and RPDs, laboratory duplicate (LD), and serial dilution results).

4.6 OVERSIGHT AND ASSESSMENT

The QA/QC protocols and procedures will be implemented for all project activities. The plans and procedures implemented in the field and laboratory will be evaluated by direct oversight of activities, surveillance, and review of the documentation and data. The oversight and assessment of project activities will be performed by the BPM, PPM, or designated alternate. If problems or incidences of nonconformance are identified, the following section identifies personnel that will deal with them and corrective measures that will be implemented.

4.7 CORRECTIVE ACTION

The BPM and PPM are responsible for maintaining quality throughout this project. The FM is responsible for ensuring the day-to-day quality of field activities.

All incidences of nonconformance with the established QC procedures will be expeditiously identified and controlled. No additional work that is dependent on a nonconforming activity that potentially affects data quality will be performed until the identified nonconformance is

corrected. Documentation describing the nonconformity will be submitted to the BPM and PPM. The documentation will include corrective measures to prevent nonconformity from recurring.

When errors, deficiencies, or out-of-control situations exist, the QA program provides systematic procedures, called "corrective actions," to resolve problems and restore proper functioning to the analytical system. Laboratory personnel are alerted that corrective actions may be necessary if:

- QC data are outside acceptable limits for precision and accuracy;
- Blanks or LCS contain contaminants above acceptable limits;
- There are unusual changes in detection limits;
- Deficiencies are detected during internal or external audits or from the results of performance evaluation samples; or
- Inquiries concerning data quality are received from clients.

Corrective action procedures are often handled at the bench level by the analyst, who reviews the preparation or extraction procedure for possible errors, checks the instrument calibration, spike and calibration mixes, and instrument sensitivity. If the problem persists or cannot be identified, the matter is referred to the laboratory technical personnel, Laboratory project manager (PM), and/or QA managers (BPM and PPM) for further investigation. Once the problem is resolved, full documentation of the corrective action procedure will be filed with the QA managers through an anomaly or non-conformance form. This form will be kept by both QA managers. Corrective action documentation is routinely reviewed by the QA managers.

Corrective action is dictated by the type and extent of the non-conformance. Corrective action may be initiated and carried out by non-supervisory staff, but final approval and data review by management is necessary before reporting any information. All potentially affected data must be thoroughly reviewed for acceptance or rejection. Samples are monitored closely so that they can be analyzed within the recommended holding time. However, should a sample be analyzed outside of the specified holding time, a Holding Time Violation Notification is filled out and the Laboratory PM is informed immediately. It is the Laboratory PM's responsibility to inform the BPM and PPM so that a decision can be made to re-sample.

The Laboratory PM or QA officer share the responsibility of reviewing all laboratory analytical activities to ensure compliance with the QC requirements outlined in this QAPP. This

review serves as a control function in that it should be conducted frequently so deviations from method requirements will be immediately identified and corrected.

4.7.1 Field Corrective Action

The FM will review the procedures being implemented in the field for consistency with the established protocols. Sample collection procedures will be checked for completeness. When procedures are not strictly in compliance with the established protocol, the deviation will be documented and reported to the BPM and PPM. Non-conformances will be expeditiously identified and controlled. No additional work that is dependent on a nonconforming activity that potentially affects data quality will be performed until the identified nonconformance is corrected.

Corrective actions will be defined by the BPM and PPM and documented as appropriate. After implementation of the corrective action, the FM will provide the BPM and PPM with a written memorandum documenting field implementation. The memorandum will become part of the project files.

4.7.2 Laboratory Corrective Action

The Laboratory QA/QC officer or designated alternate will be responsible for initiating corrective action as necessary. Non-conformance or problems occurring at the laboratory will be reported to the BPM and PPM within one working day of identification. Appropriate corrective action will be required if analyses of QC samples or laboratory conditions do not meet criteria specified in the respective methods, the laboratory QAPP, or this work plan.

The chemist or designated alternate will review the field and laboratory data generated for this project to determine if the project QA objectives are met. If any non-conformance is found in the laboratory analytical results or documentation procedures during data assessment and validation, the impact of those non-conformances on the overall project QA objectives will be assessed. Appropriate actions, including resampling or reanalysis, may be recommended to the BPM and PPM, so that the objectives can be achieved.

4.7.3 Corrective Action Following Data Assessment

The chemist or designated alternate will review the field and laboratory data generated for this project to determine if project QA objectives are met. If non-conformances are found in the field

procedures, sample collection procedures, field documentation procedures, laboratory analytical and documentation procedures, or data review procedures, the impact of those non-conformances on the overall project objectives will be evaluated. Appropriate actions, including resampling or reanalysis, will be recommended to the BPM and PPM so that the project objectives can be achieved.

SECTION 5

REPORTING

A characterization report that documents drilling, and VMP and monitoring well installation, rock vapor, rock core, and groundwater sampling activities, and presents results of vapor, rock core, and groundwater sampling will be prepared. Supporting figures, tables, and calculations will be included. The characterization report will be submitted in draft and final versions. A response to comments on the draft submittal indicating how each Government/regulatory comment was addressed will be prepared. The reporting schedule is provided in Appendix A.

A tentative outline for the characterization Report is as follows:

1. Introduction and Background Information
2. Site Investigation Activities
3. Site Investigation Results
4. Conceptual Site Model and Screening Level Risk Evaluation
5. Conclusions
6. References

Appendices: Boring Logs and VMP and Groundwater Well Completion Diagrams, Field Data, Survey Data, Laboratory Analytical Reports, and Analytical Data Quality Assessment Reports.

A separate technical memorandum will be prepared to document the vadose zone LNAPL model development, parameters and assumptions, and the results of various simulations and predictions. The technical memorandum will also include a discussion of uncertainty in the model predictions and results from the sensitivity analysis performed.

SECTION 6

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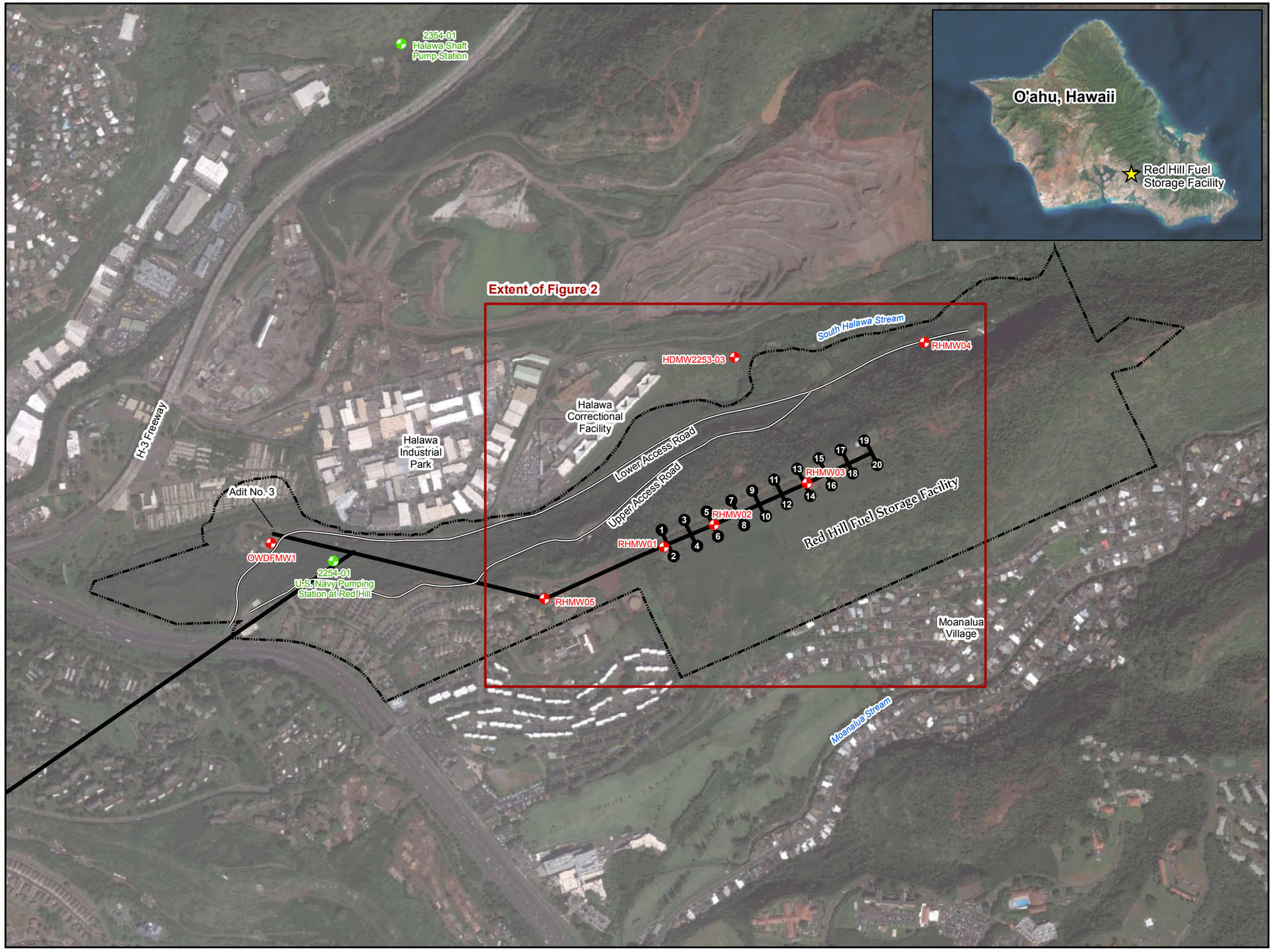
FIGURES



LEGEND

- Existing Monitoring Well
- Pumping Station
- Red Hill UST ID Number
- Red Hill Tunnels
- Access Road
- Boundary of Red Hill Fuel Storage Facility

0 375 750 Feet

N

FIGURE 1

SITE PLAN MAP

Tank 5 Area Characterization
Red Hill Fuel Storage Facility
Joint Base Pearl Harbor - Hickam
Hawaii

PARSONS

South Jordan, Utah

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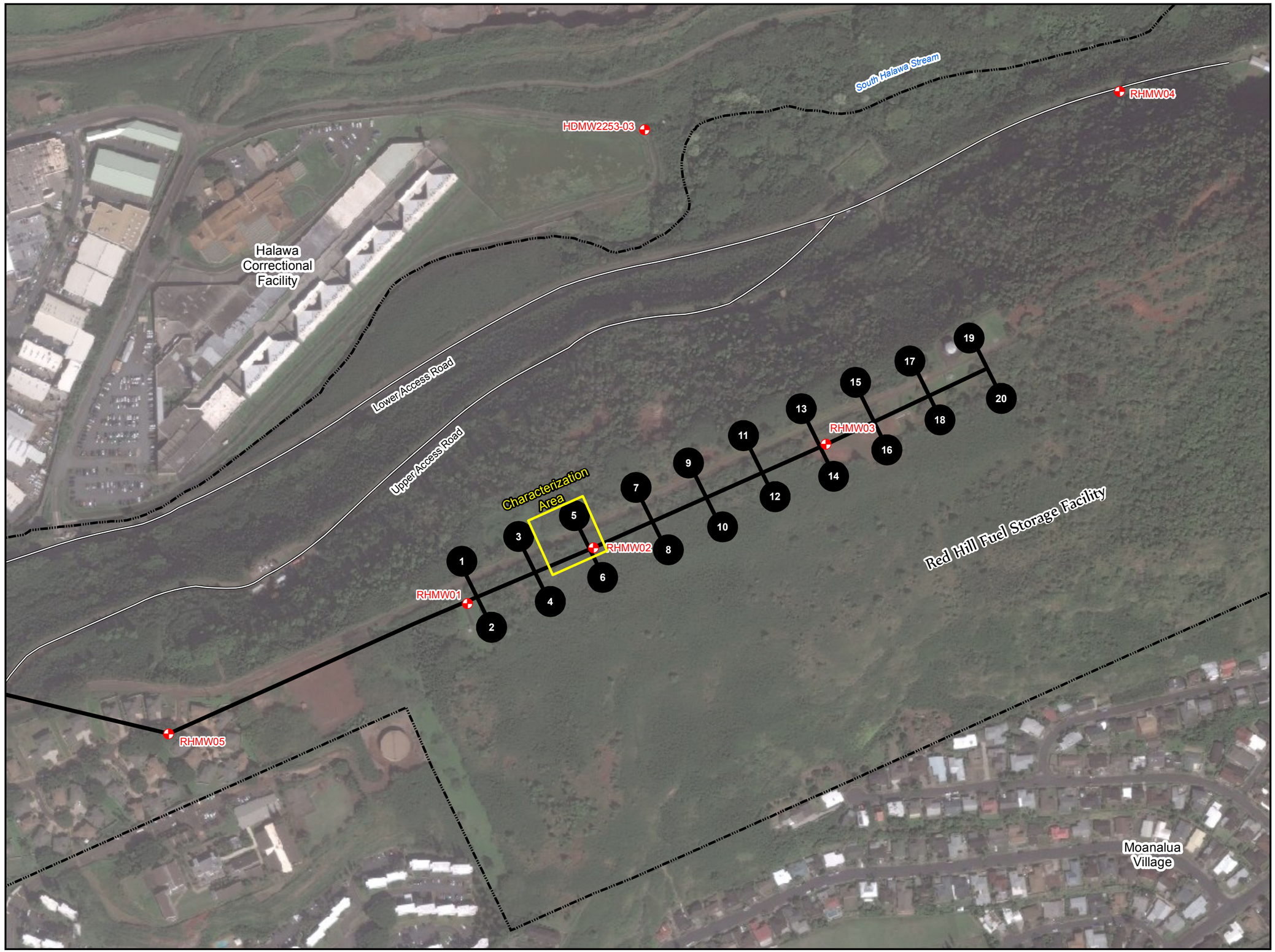

LEGEND

- Existing Monitoring Well
- 1 — Red Hill UST ID Number
- Red Hill Tunnels
- Access Road
- Characterization Area
- Boundary of Red Hill Fuel Storage Facility

0 150 300 Feet

N

FIGURE 2

TANK 5 CHARACTERIZATION AREA

Tank 5 Area Characterization
Red Hill Fuel Storage Facility
Joint Base Pearl Harbor - Hickam
Hawaii

PARSONS

South Jordan, Utah

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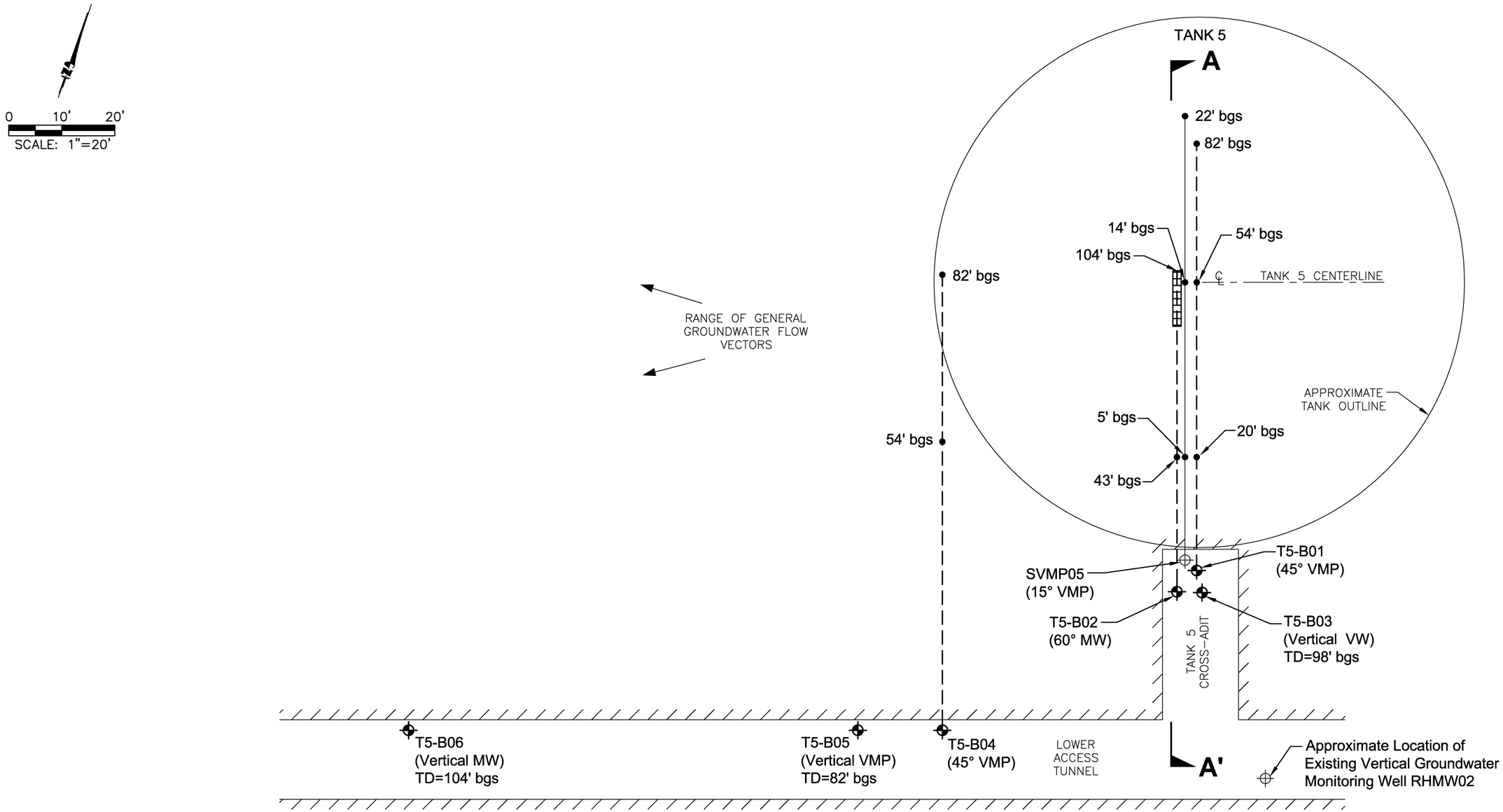


Legend

- Proposed Groundwater Monitoring Well, Vapor Monitoring Point, or Vent Well Location
- Existing Groundwater Monitoring Well and Vapor Monitoring Point Location
- VMP
- bgs Below Ground Surface
- Lateral Projection of Angle Boring (See Cross Section)
- Screen Interval

Notes:

1. Well and VMP locations may change as contaminant information is obtained. T5-B05 is an optional VMP location.
2. The ground surface reference datum is the floor of the tunnel situated at approximately 106 feet above mean sea level.

FIGURE 3

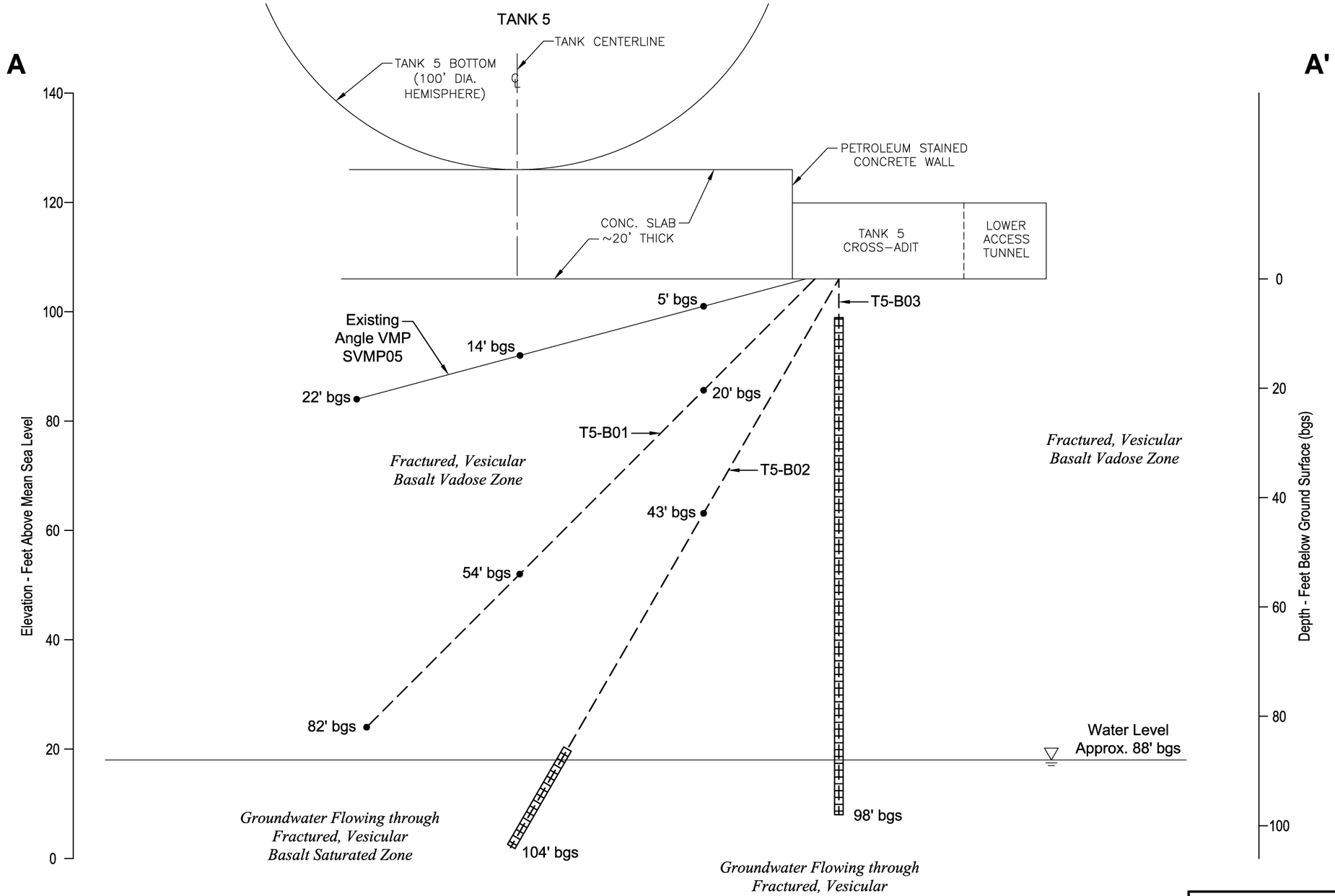
Monitoring Well, Vapor Monitoring Point, and Vent Well Locations Plan View

Tank 5 Area Characterization
Red Hill Fuel Storage Facility
Joint Base Pearl Harbor - Hickam, Hawaii

PARSONS

South Jordan, Utah

749435 REDHILL-TANKPLAN.DWG 7/22/14 SDM



Legend

- • VMP
- bgs Below Ground Surface
- Screen Interval

Note:
The ground surface reference datum is the floor of the tunnel situated at approximately 106 feet above mean sea level.

FIGURE 4

Monitoring Well, Vapor Monitoring Point, and Vent Well Locations Section A-A'

Tank 5 Area Characterization
Red Hill Fuel Storage Facility
Joint Base Pearl Harbor - Hickam, Hawaii

PARSONS

South Jordan, Utah

749435 REDHILL_TANKSEC.DWG 7/22/14 SDM

TABLES

TABLE 1
KEY PERSONNEL
Tank 5 Area Characterization
Red Hill Fuel Storage Facility
Joint Base Pearl Harbor-Hickam

Name	Title	Address	Phone/Fax	E-mail
Bruce Tsutsui	NAVFAC Hawaii Remedial Project Manager	400 Marshall Road, Building X-11 JBPHH, HI 96860-3139	Ph: 808-471-1171 x353	bruce.tsutsui@navy.mil
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John Ratz	Parsons Technical Resource	1776 Lincoln Avenue, Suite 600 Denver, CO 80290	Ph: 303-764-8718 Cell: 808-330-3432	john.ratz@parsons.com
Mitch Jensen	Parsons Field Task Manager for Site Characterization	10235 South Jordan Gateway, 3rd Floor South Jordan, UT 84095	Ph: 801-553-3311 Cell: 801-380-1375	mitch.jensen@parsons.com
William Stohler	Parsons Alternate Field Task / Safety Manager for Characterization	Honolulu Hi, Works from home	Cell: 808-258-7371	william.stohler@parsons.com
John Hall	Parsons Alternate Field Task / Safety Manager for Characterization	Grand Junction CO, Works from home	Cell: 970-244-8829	john.f.hall@parsons.com
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TABLE 2

SOIL VAPOR ANALYTICAL METHODS, PROJECT ACTION LEVELS, AND LABORATORY SPECIFIC LIMITS

Tank 5 Area Characterization
Red Hill Fuel Storage Facility
Joint Base Pearl Harbor-Hickam, Hawaii

Analytes	DOH EAL (µg/m^3)		PAL (µg/m^3)	PQL Goal (µg /m^3)	Laboratory Specific Limits		
	Lowest Residential	Lowest Commercial/ Industrial			LOQ (µg/m^3)	LOD (µg/m^3)	MDL (µg/m^3)
Analytical Group: VOCs (Method TO-15)							
Benzene	310	1,000	310	31	8.0	0.8	0.15
Toluene	1,000,000	2,900,000	1.0E+06	1.0E+05	9.4	0.94	0.28
Ethylbenzene	970	3,300	970	97	11	1.1	0.39
Xylenes	21,000	58,000	2.1E+04	2.1E+03	11	1.1	0.77
Naphthalene	72	240	72	7.2	26	2.6	1.3
Analytical Group: VOCs (Method TO-3)							
Total Volatile Petroleum Hydrocarbon	130,000	370,000	1.3E+05	1.3E+04	100	51	76
Other (ASTM D1946)							
					LOQ (%)	**LOD (%)**	**MDL (%)**
Methane	NA	NA	NA	NA	0.0010	TBD	0.000045
Helium	NA	NA	NA	NA	0.10	TBD	TBD

Notes:
DOH EAL – State of Hawaii Department of Health Hazard Evaluation and Emergency Response Office Environmental Action Levels for shallow soil gas action levels for evaluation of potential vapor intrusion hazards.
LOD – Limit of Detection
LOQ – Limit of Quantification
MDL – Method Detection Limit
PAL – Project Action Level
PQL – Project Quantification Limit
NA – Not applicable
TBD – to be determined. LOD and MDL information for methane and helium that are currently noted as TBD will be available upon the laboratory obtaining an updated DOD ELAP Accreditation for ASTM D1946 before August 30, 2014.
Helium will only be sampled at shallow vapor monitoring point locations (5 foot depth or less), if necessary.

TABLE 3

SOIL ANALYTICAL METHODS, PROJECT ACTION LEVELS, AND LABORATORY SPECIFIC LIMITS

Tank 5 Area Characterization
Red Hill Fuel Storage Facility
Joint Base Pearl Harbor-Hickam, Hawaii

Analytes	DOH EAL (mg/kg)		PAL (mg/kg)	PQL Goal (mg/kg)	Laboratory Specific Limits		
	Gross Contamination	Leaching & Groundwater Protection			LOQ (mg/kg)	LOD (mg/kg)	MDL (mg/kg)
Analytical Group: BTEX (EPA 8260C)							
Benzene	500	0.3	0.3	0.03	0.005	0.0020	0.0006
Toluene	500	3.2	3.2	0.32	0.005	0.0020	0.0006
Ethylbenzene	480	3.7	3.7	0.37	0.005	0.0020	0.0006
Xylenes	390	2.1	2.1	0.21	0.01	0.002	0.001
Analytical Group: PAHs (EPA 8270C SIM)							
Acenaphthene	1,000	120	120	12	0.005	0.0017	0.0010
Acenaphthylene	500	100	100	10	0.005	0.0017	0.0009
Anthracene	500	59	59	5.9	0.005	0.0017	0.0008
Benzo[a]anthracene	500	10	10	1	0.005	0.0017	0.0009
Benzo[g,h,i]perylene	500	35	35	3.5	0.005	0.0017	0.0013
Benzo[a]pyrene	500	20	20	2	0.005	0.0017	0.0009
Benzo[b]fluoranthene	500	9.2	9.2	0.92	0.005	0.0017	0.0011
Benzo[k]fluoranthene	500	39	39	3.9	0.005	0.0017	0.0010
Chrysene	1,000	30	30	3	0.005	0.0017	0.0008
Dibenzo[a,h]anthracene	500	12	12	1.2	0.005	0.0017	0.0009
Fluoranthene	500	1,200	500	50	0.005	0.0017	0.0012
Fluorene	500	370	370	37	0.005	0.0017	0.0010
Ideno[1,2,3-cd]pyrene	500	30	30	3	0.005	0.0017	0.0009
1,-methylnaphthalene	500	1.8	1.8	0.18	0.005	0.0017	0.0010
2,-methylnaphthalene	500	4.1	4.1	0.41	0.005	0.0017	0.0009
Naphthalene	500	4.4	4.4	0.44	0.005	0.0017	0.0009
Phenanthrene	500	570	500	50	0.005	0.0017	0.0011
Pyrene	500	610	500	50	0.005	0.0017	0.0012
Analytical Group: TPH (EPA 8015)							
TPH as Gasoline Range Organics	100	100	100	10	2.0	0.80	0.34
TPH as Diesel Range Organics	500	100	100	10	5.0	1.00	0.65
Analytical Group: Metals (EPA 6020A)							
Lead	1,000	73[(1)]	73	7.3	0.1	0.05	0.02

Notes:

(1) The background concentration for lead in soil will be used for preliminary data screening purposes.

DOH EAL – State of Hawaii Department of Health Hazard Evaluation and Emergency Response Office Environmental Action Levels for sites where groundwater is a current drinking water source and surface water is greater than 150 meters from the site – January 2012.

LOD – Limit of Detection
LOQ – Limit of Quantification
MDL – Method Detection Limit
PAL – Project Action Level
PQL – Project Quantification Limit

TABLE 4

GROUNDWATER ANALYTICAL METHODS, PROJECT ACTION LEVELS, AND LABORATORY SPECIFIC LIMITS

Tank 5 Area Characterization
Red Hill Fuel Storage Facility
Joint Base Pearl Harbor-Hickam, Hawaii

Analytes	DOH EAL (µg/L)		PAL (µg/L)	PQL Goal (µg/L)	Laboratory Specific Limits		
	Drinking Water Toxicity	Gross Contamination			LOQ (µg/L)	LOD (µg/L)	MDL (µg/L)
Analytical Group: BTEX (EPA 8260C)							
Benzene	5	170	5	0.5	1.0	0.30	0.16
Toluene	1,000	40	40	4	1.0	0.30	0.17
Ethylbenzene	700	30	30	3	1.0	0.50	0.23
Xylenes	10,000	20	20	2	2.0	0.30	0.19
Analytical Group: PAHs (EPA 8270C SIM)							
Acenaphthene	370	20	20	2	0.2	0.10	0.06
Acenaphthylene	240	2,000	240	24	0.2	0.10	0.06
Anthracene	1,800	22	22	2.2	0.2	0.10	0.05
Benzo[a]anthracene	0.092	4.7	0.092	0.0092	0.2*	0.10	0.07
Benzo[g,h,i]perylene	1,500	0.13	0.13	0.013	0.2*	0.10	0.08
Benzo[a]pyrene	0.2	0.81	0.2	0.02	0.2	0.10	0.06
Benzo[b]fluoranthene	0.092	0.75	0.092	0.0092	0.2*	0.10	0.06
Benzo[k]fluoranthene	0.92	0.4	0.4	0.04	0.2	0.10	0.07
Chrysene	9.2	1	1	0.1	0.2	0.10	0.05
Dibenzo[a,h]anthracene	0.0092	0.52	0.0092	0.00092	0.2*	0.10	0.05
Fluoranthene	1,500	130	130	13	0.2	0.10	0.08
Fluorene	240	950	240	24	0.2	0.10	0.06
Ideno[1,2,3-cd]pyrene	0.092	0.095	0.092	0.0092	0.2*	0.10	0.07
1,-methylnaphthalene	4.7	10	4.7	0.47	0.2	0.10	0.06
2,-methylnaphthalene	24	10	10	1	0.2	0.10	0.06
Naphthalene	17	21	17	1.7	0.2	0.10	0.05
Phenanthrene	240	410	240	24	0.2	0.10	0.07
Pyrene	180	68	68	6.8	0.2	0.10	0.08
Analytical Group: TPH (EPA 8015)							
TPH as Gasoline Range Organics	100	100	100	10	20	18.0	8.6
TPH as Diesel Range Organics	190	100	100	10	150	50.0	40.4
Analytical Group: Metals (EPA 6020)							
Dissolved Lead	15	50,000	15	1.5	3	0.4	0.19

TABLE 4 (Continued)

GROUNDWATER ANALYTICAL METHODS, PROJECT ACTION LEVELS, AND LABORATORY SPECIFIC LIMITS

Tank 5 Area Characterization
Red Hill Fuel Storage Facility
Joint Base Pearl Harbor-Hickam, Hawaii

Analytes	DOH EAL (µg/L)		PAL (µg/L)	PQL Goal (µg/L)	Laboratory Specific Limits		
	Drinking Water Toxicity	Gross Contamination			LOQ (µg/L)	LOD (µg/L)	MDL (µg/L)
General Chemistry							
Methane (RSK-175)	NA	NA	NA	NA	1.0	0.45	0.25
Sulfate (9056A)	NA	NA	NA	NA	1.0 mg/L	0.198 mg/L	0.090 mg/L
Nitrate/Nitrite (353.2)	NA	NA	NA	NA	0.1 mg/L	0.1 mg/L	0.028 mg/L
Alkalinity (SM2320B)	NA	NA	NA	NA	2.0 mg/L	1.7 mg/L	0.85 mg/L

Notes:

DOH EAL – State of Hawaii Department of Health Hazard Evaluation and Emergency Response Office Environmental Action Levels for sites where groundwater is a current drinking water source and surface water is greater than 150 meters from the site.

LOD – Limit of Detection

LOQ – Limit of Quantification

MDL – Method Detection Limit

PAL – Project Action Level

PQL – Project Quantification Limit

NA – Not applicable

* - In the case where an EAL for a specific chemical is less than the LOQ for a commercial laboratory, it is generally acceptable to consider the LOQ in place of the actions level.

TABLE 5
VAPOR, ROCK AND GROUNDWATER SAMPLING AND ANALYSIS

Tank 5 Area Characterization
Red Hill Fuel Storage Facility
Joint Base Pearl Harbor-Hickam, Hawaii

Analytical Parameter	Analytical Method	Number of Samples to be Collected				
		Field Samples[(1)]	Field Duplicates[(2)]	Trip Blanks[(3)]	MS/MSD	Total Number Samples
Rock Vapor Analysis						
TVH	TO-3	17	3	0	0	20
VOCs	TO-15	17	3	0	0	20
Methane	ASTM-D1946	17	3	0	0	20
Helium	ASTM-D1946	17	3	0	0	20
Rock Analysis						
TPH-DRO	EPA 8015 B	16	2	0	1	19
TPH-GRO	EPA 8015 B	16	2	1	1	20
VOCs	EPA 8260 B	16	2	1	1	20
PAHs	EPA 8270C SIM	16	2	0	1	19
Lead	EPA 6020A	16	2	0	1	19
Groundwater Analysis						
TPH-DRO	EPA 8015 B	4	1	0	1	6
TPH-GRO	EPA 8260 B	4	1	1	1	7
VOCs	EPA 8260 B	4	1	1	1	7
PAHs	EPA 8270C SIM	4	1	0	1	6
Methane	RSK 175	4	1	0	1	6
Sulfate	EPA 9056A	4	1	0	1	6
Nitrate/Nitrite	EPA 353.2	4	1	0	1	6
Alkalinity	SM2320B	4	1	0	1	6
Dissolved Lead	EPA 6020A	4	1	0	1	6

(1) Maximum number of field samples to be collected shown in table. Actual location and number of samples to be determined based on field screening results.

(2) One ambient blank is included in the rock vapor field duplicate sample count.

(3) One trip blank per cooler used to ship samples to the laboratory for VOC and TPH-GRO sample analysis.

MS	Matrix Spike
MSD	Matrix Spike Duplicate
TVH	Total Volatile Hydrocarbon
EPA	U.S. Environmental Protection Agency
PAH	Polycyclic Aromatic Hydrocarbons
VOC	Volatile Organic Compound
TPH-DRO	Total Petroleum Hydrocarbon –Diesel Range Organics
TPH-GRO	Total Petroleum Hydrocarbon –Gasoline Range Organics

Note: Helium will only be sampled at shallow vapor monitoring point locations (5 foot depth or less) , if necessary.

TABLE 6

ANALYTICAL METHODS, SAMPLE CONTAINERS, PRESERVATION, AND HOLDING TIMES FOR SAMPLE COLLECTION

Tank 5 Area Characterization
Red Hill Fuel Storage Facility
Joint Base Pearl Harbor-Hickam, Hawaii

Analyte	Number/ Type of Containers per Sample	Preservative	Holding Time	
			Extraction	Analysis
Groundwater				
TPH-DRO	1-Liter amber glass	4° Celsius	7 days	40 days
TPH-GRO	Three 40 milliliter glass vials with Teflon-lined septum	4° Celsius	-	7 days
VOCs	Three 40 milliliter glass vials with Teflon-lined septum	4° Celsius	-	7 days
Methane	Three 40 milliliter glass vials with Teflon-lined septum	4° Celsius	-	28 days
PAHs	Two 1-liter amber glass bottle	4° Celsius	7 days	40 days
Alkalinity/ Sulfate	One 250 milliliter polyethylene bottle	4° Celsius	-	14 days/ 28 days
Nitrate/ Nitrite	One 125 milliliter polyethylene bottle	sulfuric acid	-	28 days
Dissolved Lead	One 500 milliliter polyethylene bottle	HNO_3 to pH < 2, 4^oCelsius	-	180 days
Rock				
TPH-DRO	8 oz amber glass wide-mouth jar with Teflon lined screw cap (50 g sample)	4° Celsius	14 days	40 days
TPH-GRO	1 x preweighed VOA Vial (to be used with TerraCore sampling devices; 5 g sample)	Methanol, 4° Celsius	-	14 days

TABLE 6 (Continued)

ANALYTICAL METHODS, SAMPLE CONTAINERS, PRESERVATION, AND HOLDING TIMES FOR SAMPLE COLLECTION

Tank 5 Area Characterization
Red Hill Fuel Storage Facility
Joint Base Pearl Harbor-Hickam, Hawaii

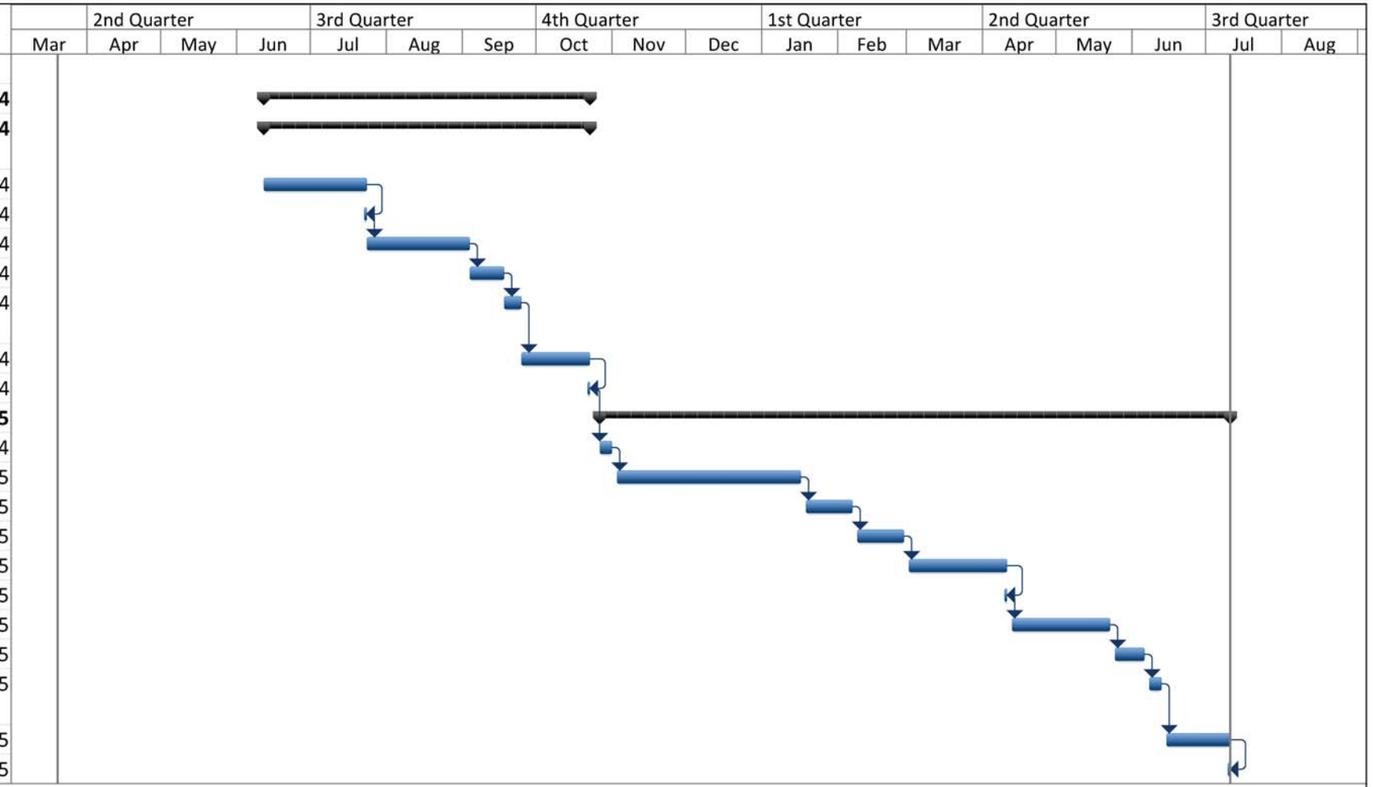
Analyte	Number/ Type of Containers per Sample	Preservative	Holding Time	
			Extraction	Analysis
Rock				
VOCs	3 x preweighed VOA Vial (to be used with TerraCore sampling devices; 5 g each sample Vial)	2 x Vials with DI water and Sodium Bisulfate; 1 x Vial with methanol; all 4° Celsius	-	14 days
PAHs	8 oz amber glass wide-mouth jar with Teflon lined screw cap (30 g sample)	4° Celsius	14 days	40 days
Lead	4 oz. amber glass wide-mouth jar with Teflon-lined screw cap	4° Celsius	-	180 days
Vapor				
VOCs	6-Liter Summa canister	None	-	30 days
TVH	6-Liter Summa canister	None	-	30 days
Methane/ Helium	6-Liter Summa canister	None	-	30 days

TPH-DRO	Total Petroleum Hydrocarbon-Diesel Range Organics
TPH-RRO	Total Petroleum Hydrocarbon-Residual Range Organics
TPH-GRO	Total Petroleum Hydrocarbon-Gasoline Range Organics
TVH	Total Volatile Hydrocarbons
PAH	Polycyclic Aromatic Hydrocarbons
VOC	Volatile Organic Hydrocarbons
HNO_3	Nitric Acid
Note:	Dissolved lead will be field filtered.

APPENDIX A

MONITORING WELL INSTALLATION SCHEDULE

ID	Task Name	Duration	Start	Finish
1				
2	**Pre-construction Submittals**	**95 days**	**Thu 6/12/14**	**Wed 10/22/14**
3	**Work Plan with Sampling and Analysis Plan (SAP) and Health and Safety Plan (HSP)**	**95 days**	**Thu 6/12/14**	**Wed 10/22/14**
4	Prepare Draft Work Plan/SAP/HSP	30 days	Thu 6/12/14	Wed 7/23/14
5	Submit Draft	1 day	Wed 7/23/14	Wed 7/23/14
6	Navy and regulatory review of Draft	30 days	Thu 7/24/14	Wed 9/3/14
7	Prepare response to comments	10 days	Thu 9/4/14	Wed 9/17/14
8	Navy and regulatory review and approval of response to comments	5 days	Thu 9/18/14	Wed 9/24/14
9	Prepare Final Work Plan and SAP	20 days	Thu 9/25/14	Wed 10/22/14
10	Submit Final Work Plan and SAP	1 day	Wed 10/22/14	Wed 10/22/14
11	**Field Work Phase 1a - Site Characterization**	**185 days**	**Mon 10/27/14**	**Fri 7/10/15**
12	Mobilization	5 days	Mon 10/27/14	Fri 10/31/14
13	Boring Installation and Sample Collection	55 days	Mon 11/3/14	Fri 1/16/15
14	Sample Analysis	15 days	Mon 1/19/15	Fri 2/6/15
15	Data Validation	15 days	Mon 2/9/15	Fri 2/27/15
16	Prepare Draft Remedial Investigation Report	30 days	Mon 3/2/15	Fri 4/10/15
17	Submit Draft	1 day	Fri 4/10/15	Fri 4/10/15
18	Navy and regulatory review of Draft	30 days	Mon 4/13/15	Fri 5/22/15
19	Prepare response to comments	10 days	Mon 5/25/15	Fri 6/5/15
20	Navy and regulatory review and approval of response to comments	5 days	Mon 6/8/15	Fri 6/12/15
21	Prepare Final Remedial Investigation Report	20 days	Mon 6/15/15	Fri 7/10/15
22	Submit Final Remedial Investigation Report	1 day	Fri 7/10/15	Fri 7/10/15



Project: TO68-Schedule-Rev3
Date: Thu 7/17/14

Task		Project Summary		Inactive Milestone		Manual Summary Rollup		Deadline	
Split		External Tasks		Inactive Summary		Manual Summary		Progress	
Milestone		External Milestone		Manual Task		Start-only			
Summary		Inactive Task		Duration-only		Finish-only			

FIGURE A.1

SCHEDULE
TANK 5 AREA CHARACTERIZATION

Red Hill Fuel Storage Facility
Joint Base Pearl Harbor-Hickam, Hawaii

PARSONS

South Jordan, Utah

draw\749435 Table A.1.cdr ma 07/22/14

APPENDIX B

ACCIDENT PREVENTION PLAN AND ASSOCIATED SITE SAFETY, HEALTH, AND ENVIRONMENT PLAN

DRAFT
ACCIDENT PREVENTION PLAN
TANK 5 AREA CHARACTERIZATION
RED HILL BULK FUEL STORAGE FACILITY
JOINT BASE PEARL HARBOR-HICKAM, HAWAII

Prepared For

Department of the Navy

Naval Facilities Engineering Command Hawaii

400 Marshall Road
JBPHH HI 96860-3139

JULY 2014

Prepared By

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ATTACHMENTS

No. **Title**

A Site Safety, Health and Environment Plan

ACRONYMS AND ABBREVIATIONS

AHA	Activity Hazard Analysis
APP	Accident Prevention Plan
CFR	*Code of Federal Regulations*
CO	Contracting Officer
COC	chemical of concern
COR	Contracting Officer Representative
CPR	cardiopulmonary resuscitation
EAP	Employee Assistance Program
EM	Engineering Manual
EMR	experience modification rate
ESHARP	Environment, Safety, Health, and Risk Management Program
HAZWOPER	Hazardous Waste Operations and Emergency Response
HDOH	Hawaii Department of Health
IDW	investigation-derived waste
IIPP	Injury and Illness Prevention Program
JBPHH	Joint Base Pearl Harbor-Hickam
LNAPL	light non-aqueous phase liquid
MSDS	material safety data sheet
NAVFAC	Naval Facilities Engineering Command
Navy	United States Navy
OSHA	Occupational Safety and Health Administration
PPE	personal protective equipment
PSHEP	Project Safety, Health, and Enviroment PlanRPM Remedial Project Manager
SAP	Sampling and Analysis Plan
SDS	safety data sheet
SH&E Officer	Safety, Health, and Environment Officer
USACE	U.S. Army Corps of Engineers
VMP	Vapor monitoring point

SECTION 1

SIGNATURE PAGE

Draft
Accident Prevention Plan for Tank 5 Area Characterization, Red Hill Bulk Fuel Storage Facility, Joint Base Pearl Harbor-Hickam, Hawaii.

Date: July 2014

Reviewer:

Judy Blakemore Date
Parsons Safety Manager

Plan Concurrence:

Gene Wright Date
Parsons Project Manager

SECTION 2

BACKGROUND INFORMATION

This Accident Prevention Plan (APP) has been developed to protect and guide the personnel implementing the *Work Plan/Sampling and Analysis Plan, Tank 5 Site Investigation, Red Hill Bulk Fuel Storage Facility* (Battelle and Parsons, 2014) on Joint Base Pearl Harbor-Hickam (JBPHH). The work is being conducted for Naval Facilities Engineering Command (NAVFAC), Hawaii, in accordance with the Hawaii Department of Health (HDOH) Technical Guidance Manual for Underground Storage Tank Closure and Release Response (HDOH, 2000).

This APP has been prepared to meet applicable requirements of the United States Army Corps of Engineers (USACE) Safety and Health Requirements Manual Engineering Manual (EM) 385-1-1, 15 September 2008; the *Code of Federal Regulations* (CFR), 29 CFR 1910.1200 Hazard Communication Standard; and the corporate safety and health policies of Parsons, which are incorporated by reference (Parsons, 2010). Parsons personnel will also conduct work in accordance with Parsons' Environment, Safety, Health, and Risk Management Program (ESHARP) (Parsons, 2012) for the implementation of key environmental, health, and safety initiatives on all of Parsons' projects. The Project Safety, Health, Environment Plan (PSHEP) for this project is provided as Attachment A of this APP.

2.1 CONTRACTOR

The prime contractor for this project is Battelle. The field work for this project will be performed by Parsons, a subcontractor to Battelle, with support from Battelle's other subcontractors.

2.2 CONTRACT NUMBER

Contract No. N62583-11-D-0515. Contract Task Order Number: KB01.

2.3 PROJECT NAME

*Tank 5 Area Characterization, Red Hill Bulk Fuel Storage Facility, Joint Base Pea*rl Harbor-Hickam, Hawaii.

2.4 PROJECT LOCATION AND DESCRIPTION

Tank 5 Area Characterization

Field activities will be performed as detailed in the Work Plan/Sampling and Analysis Plan (SAP), and this APP/PSHEP. Field work and associated reporting tasks have been identified as follows:

- Attending site visits and other meetings.
- Preparing and submitting draft and final planning documents prior to initiating fieldwork.
- Mobilize drilling equipment to Tank 5 through Adit No.3;
- Drill one angled corehole in the cross tunnel beneath Tank 5, ream the corehole, and install three vapor monitoring point (VMP) instruments;
- Drill one angled corehole in the cross tunnel beneath Tank 5, ream the corehole, and install one monitoring well and one VMP instrument;
- Drill one angled corehole in the Adit No. 3 tunnel approximately 40 feet southwest of the Tank 5 cross tunnel, ream the corehole, and install two VMP instruments;
- Drill one vertical corehole in the Adit No. 3 tunnel approximately 60 feet southwest of Tank 5, ream the corehole, and install three VMP instruments;
- Drill one vertical corehole in the Adit No.3 tunnel approximately 150 feet southwest of Tank 5, ream the corehole, and install one monitoring well;
- Drill and ream one vertical corehole in the cross tunnel beneath Tank 5 for air injection, vapor extraction, and/or light non-aqueous phase liquid (LNAPL) extraction depending on the presence or absence of petroleum in core or at the top of groundwater table at the previously installed VMP and monitoring well locations.
- Install surface completions;
- Sample VMPs and monitoring wells;
- Survey VMP and monitoring well locations; and
- Remove drilling-related materials and equipment from Adit No. 3.

General assumptions applicable to all field work activities include the following:

- The United States Navy (Navy) will assist in expediting site access, personnel, vehicle, and photographic permits for field team and subcontractors.

- Field efforts are of short enough duration to not require a field office.
- Investigation-derived waste (IDW) will be managed in accordance with the *Work Plan/Sampling and Analysis Plan* (Battelle and Parsons, 2014).
- Environmental issues associated with this project are addressed in the *Work Plan/Sampling and Analysis Plan* for this project.

2.5 CONTRACTOR ACCIDENT EXPERIENCE

Parsons Experience Modification Rate (EMR) as of January 1, 2014 is **0.56.**

2.6 WORK REQUIRING ACTIVITY HAZARD ANALYSIS

The planned field tasks requiring Activity Hazard Analyses (AHA) are as follows:

- Travel (AHA 1)
- Land Survey (AHA 2)
- Drilling and Well Installation (AHA 3)
- Soil and Groundwater Sampling (AHA 4)
- IDW Management (AHA 5)

The AHAs for each of the above field tasks are included as Appendix B of the PSHEP.

SECTION 3

STATEMENT OF SAFETY AND HEALTH POLICY AND COMPLIANCE PROCEDURES

Battelle and Parsons will be conducting activities covered in this APP and the attached PSHEP. Both parties will be accountable for complying with (1) this APP and PSHEP and (2) their respective companies' corporate safety and health programs, and those persons will undergo the training required, as specified in Section 6.0. Battelle's other subcontractors will also be accountable for complying with (1) this APP and PSHEP and (2) their respective companies' corporate safety and health programs, and those persons will undergo the training required, as specified in Section 6.0. The safety and health of employees will take precedence whenever conflicts with production or other objectives arise.

In addition to complying with this APP and the respective corporate safety and health program, persons working on this project are encouraged to be active participants in their workplace safety and health activities and to actively take advantage of the worker rights in a responsible manner, without reprisal.

The following may result in disciplinary action, up to and including discharge of any employee from their company:

- Violation of the safety and health requirements of their company's policy or of this APP
- Unauthorized or illegal possession, use, or sale of alcohol or controlled substances on work premises, during working hours, while engaged in corporate activities, or in corporate vehicles
- Use or sale of firearms or explosives on work premises
- Use of cellular phone while driving

SECTION 4

RESPONSIBILITIES AND LINES OF AUTHORITIES

Parsons, as the lead field entity, has the ultimate responsibility for the implementation of this health and safety program. All personnel are responsible for understanding this APP, complying with safety procedures, and proactively making safety and environmental awareness part of their day-to-day conduct. Site managers are accountable for any and all activities resulting in a safety or environmental incident. Staff members are accountable for their own health and safety and have the authority to request a work stoppage when they feel unsafe behaviors, actions, or situations are occurring. The Safety, Health, and Environment Officer (SH&E Officer) is the competent person for all field activities and all field personnel will be given a list of emergency contacts including the SH&E Officer.

The PSHEP (Attachment A) lists the specific personnel that will fill the stated positions for this project. Lines of authority are also detailed in the PSHEP. See Section 3.0 of the PSHEP for details.

AHAs are a vital part of this system, as is using pre-task safety planning. All work is prepared under these processes, and no work will commence until the pre-task safety and health analysis is completed and discussed with the team.

All work requiring a competent person per Occupational Safety and Health Administration (OSHA) definition (29 CFR 1926.32(f)), will not be started until that competent person is designated and onsite. *Competent person* means one who is capable of identifying existing and predictable hazards in the surroundings or working conditions that are unsanitary, hazardous, or dangerous to employees. A c*ompetent person* has authorization to take prompt corrective measures to eliminate any hazardous conditions.

The following may result in disciplinary action, up to and including discharge of any employee from the company:

- Violation of the safety, health, or environmental requirements of the company's policy or of this APP.
- Unauthorized or illegal possession, use, or sale of alcohol or controlled substances on work premises, during working hours, while engaged in corporate activities, or in corporate vehicles.
- Use or sale of firearms or explosives on work premises.

SECTION 5

SUBCONTRACTORS AND SUPPLIERS

Parsons, other subcontractors, and suppliers providing onsite services will be subject to the safety provisions of this APP and attached PSHEP (Attachment A) and to their respective corporate policies, which are incorporated by reference. Battelle is responsible for selection of non-Parsons subcontractors and safety issues related to these subcontractors (e.g., review of subcontractors' corporate safety plans). Subsection 10.5.7 of the PSHEP provides further details.

Field personnel will conduct site work in accordance with this APP and associated documents. Specific safety, health, and environmental requirements, including those listed in the PSHEP (Attachment A), will be communicated through safety meetings at the start of each day. The site-specific safety, health, and environmental requirements and site conditions will be reviewed with field personnel during these meetings.

SECTION 6

TRAINING

Site workers, supervisors, and managers will have training appropriate to their assigned duties and as specified in the PSHEP and AHAs that are applicable to the work being performed. As specified in Section 5 of the PSHEP, the SH&E Officer (who will also conduct the project safety, health, and environmental inspections) will meet the training and indoctrination requirements prescribed in this APP and the attached PSHEP, as well as the Hazardous Waste Operations and Emergency Response (HAZWOPER) supervisory training.

Details of required training are specified in Section 5.0 of the PSHEP.

SECTION 7

SAFETY, HEALTH, AND ENVIRONMENTAL INSPECTIONS

7.1 INSPECTION DETAILS

The project SH&E Officer (specifically identified in the attached PSHEP) will provide onsite safety, health, and environmental inspections for this project. The SH&E Officer will meet the training and indoctrination requirements as prescribed in this APP and the attached PSHEP, including HAZWOPER supervisory training, cardiopulmonary resuscitation (CPR), first aid, and Bloodborne Pathogens training. The SH&E Officer will also have hands-on experience overseeing drilling, sampling, vapor monitoring, and groundwater monitoring.

Select field activities conducted under this scope of work may require OSHA-competent person training. For general site tasks, the SH&E Officer will be the designated competent person. At a minimum, the SH&E Officer will conduct daily visual inspections of work areas for hazards specific to conducting tasks.

Section 4.0 of the PSHEP provides further inspection details.

7.2 RECORDKEEPING

Project safety and health documentation will be maintained by the SH&E Officer. Records to be maintained will include the following:

- HAZWOPER training certificates
- First aid, CPR, and Bloodborne Pathogens training certificates
- Documentation of medical surveillance
- Daily safety and health briefing acknowledgment forms
- Deficiency identification, correction, and follow-up documentation
- Accident reports and investigation records
- Material Safety Data Sheets / Safety Data Sheets (MSDS/SDS)

7.3 EXTERNAL INSPECTION/CERTIFICATIONS

External inspections/certifications are not required for this project other than regulatory review of the Work Plan/Sampling and Analysis Plan.

SECTION 8

ACCIDENT REPORTING

The SH&E Officer is responsible for all incidents reporting. Specific details are found in Section 7.0 of the PSHEP.

Also, all accidents will be reported as soon as possible, but not more than 24 hours afterward, to the Contracting Officer / Contracting Officer Representative (CO/COR) and/or (Navy) Resident Officer in Charge of Construction and/or Navy Remedial Project Manager (RPM). The contractor will thoroughly investigate the incident and submit the findings of the investigation along with appropriate corrective actions to the CO/COR in the prescribed format as soon as possible, but no later than five working days following the incident. Corrective actions will be implemented as soon as reasonably possible.

The following require immediate accident notification:

- A fatal injury
- A permanent total disability
- A permanent partial disability
- The hospitalization of three or more people resulting from a single occurrence
- Property damage of $200,000 or more

Parsons personnel will adhere to the corporate incident reporting requirements as stated in the Parsons ESHARP Guidebook, reporting incidents through the Parsons IndustrySafe online reporting system.

SECTION 9

PLANS REQUIRED BY THE EM 385-1-1 SAFETY MANUAL

Upon review of the minimum basic outline for APPs as listed in Appendix A of the 2008 EM 385-1-1, the plans required by the EM 385-1-1 Safety Manual are presented below. Plans and procedures that are not applicable to this project will be noted with a short explanation.

9.1 LAYOUT PLAN (04.A.01)

A site layout will be provided with the Work Plan/Sampling and Analysis Plan submittal.

9.2 HOSPITAL ADDRESSES AND ROUTE

Information on the nearest medical facility with emergency care is discussed in Section 9.0 of this APP, as well as at the beginning of and in Section 15.0 of the PSHEP.

9.3 EMERGENCY RESPONSE PLANS (01.E)

Section 15.0 of the PSHEP provides site details. Medical support for this project will be provided onsite and offsite.

9.4 ONSITE MEDICAL SUPPORT (SECTION 03.A.02; 03.D)

When two or more field staff are present onsite, at least two will have current certification in basic first aid and CPR, along with annual Bloodborne Pathogens training. The SH&E Officer will be the lead person, unless injured, to initiate any required first aid until offsite medical support can be engaged.

Call 911 from outside of the tunnel in the event of a medical emergency. If a medical emergency occurres, transport the injured staff member, if possible, to the entrance to the Adit No. 3 entrance and call for assistance. If the injured person(s) can not be moved send another team member to call for help. Navy emergency communications and procedures for tunnel operations will be followed.

9.5 OFFSITE MEDICAL SUPPORT

In the event of a medical emergency, or if follow-up to basic first aid is required, offsite medical support will be engaged. The contact and location information for the nearest offsite medical support is presented below. A map indicating the travel route to the nearest medical facility with emergency care is presented in the PSHEP.

Medical facility with 24 hour emergency room
Queens Medical Center
1301 Punchbowl Street, Honolulu, Hawaii 96813
(808) 538-9011

Emergency numbers (in case of emergency, contact the police):
Security & Police – (808) 449-2200
Police Assistance – (808) 723-8800
Fire Department and Medical Emergency dispatch for the base – (808) 449-7117

Further specific details are provided in the beginning of and in Section 15.0 of the PSHEP.

9.6 ALCOHOL AND DRUG ABUSE PREVENTION (01.C.02)

To maintain a drug- and alcohol-free workplace, Battelle and Parsons have established a drug- and alcohol-free awareness and prevention program.

9.7 EMPLOYEE ASSISTANCE PROGRAM

As part of their benefits, Battelle employees have access to the Employee Assistance Program (EAP).

9.8 SITE SANITATION PLAN (SECTION 02)

The following constitutes the Site Sanitation Plan for this project.

9.8.1 Drinking Water

A cooler containing an adequate supply of drinking water will be available at the site for site workers and will be replenished each day, as needed. The cooler will be stored outside the exclusion zone on or near the field vehicles.

9.8.2 Toilets

Access to toilet facilities will be made available during onsite work. Publically accessible facilities are located within the Red Hill tunnel.

9.8.3 Washing Facilities

Access to washing facilities will be available onsite at the same location as the toilets. Waterless hand sanitizers and/or cleaning wipes will be available for use in washing hands/faces immediately upon exiting the exclusion zone.

9.8.4 Food Service

No food service will be provided onsite. After proper decontamination, site workers can consume their food within the support zone or go offsite for food.

9.8.5 Waste Disposal

Waste will be managed in accordance with the *Work Plan/Sampling and Analysis Plan* (Battelle and Parsons, 2014).

9.8.6 Vermin Control

Waste materials will be securely stored and transported offsite to provide vermin control.

9.9 ACCESS AND HAUL ROAD PLAN (4.B)

Haul roads will not be built or used during this project. Existing roadways at the Red Hill Facility and JBPPH will be used during the performance of this project.

9.10 RESPIRATORY PROTECTION PLAN (05.G)

Based on previous studies at the site, it is unlikely that significant exposure to respiratory hazards will be encountered during the drilling, monitoring point installation, and vapor and groundwater sampling. Therefore, respiratory protection is not anticipated for these tasks. The respiratory protection plan for the above activities is detailed in the PSHEP. Field personnel will review their company respiratory protection program since escape-only respirators are required for all field personnel.

9.11 HEALTH HAZARD CONTROL PLAN (06.A)

Safety and health hazards for performing work covered under this APP are identified through the preparation of AHAs (provided in the PSHEP). Each AHA also indicates recommended controls for each identified potential safety/health hazard.

Appropriate personal protective equipment (PPE) will be supplied and used at all times for this project. PPE selection is based on the hazard control measures specified in the AHAs of the PSHEP (Section 6.0 of the PSHEP).

9.12 HAZARD COMMUNICATION PROGRAM (06.B.01)

Chemical products be stored and used on the project site or stored on field vehicles. Because of the potential hazards associated with chemicals, special precautions that must be taken include the following:

- Tracking and controlling hazardous chemical products received and stored.
- Performing a hazard evaluation of each chemical product, using such sources as MSDSs/SDSs.
- Informing workers of the potential hazards through training, MSDSs/SDSs, and appropriate labeling of containers.
- Conducting air monitoring in the case of potential respiratory hazards.
- Designing and implementing engineering controls such as ventilation and source control.
- Developing storage, handling, housekeeping, and decontamination procedures.
- Assigning appropriate PPE such as eye and face protection, gloves, body protection, and respirators.
- Training personnel handling chemicals on safe handling procedures, PPE, and emergency and spill cleanup procedures.

Hazardous substances that may be encountered in vapor, rock, groundwater on the project site are not covered by this program. The PSHEP (Attachment A) addresses chemical and other hazard assessment and mitigation associated with site contaminants including investigation and remediation of waste materials.

9.12.1 Chemicals Covered by this Project Program

For this program, chemicals considered to be hazardous are those

- with an established OSHA Permissible Exposure Limit;
- included in the American Conference of Governmental Industrial Hygienists Threshold Limit Values for Chemical Substances; or
- found to be suspected or confirmed carcinogens by the National Toxicology Program in the latest edition of the Annual Report on Carcinogens, or by the International Agency for Research on Cancer in the latest edition of the International Agency for Research on Cancer monographs.

Chemicals to be used during field activities include preservatives for groundwater samples (e.g., hydrochloric acid). Chemical preservatives are only used in de minimis quantities.

Exceptions to this policy, by OSHA definition, include consumer products that are used in a consumer fashion and pose no more of an exposure hazard than a consumer would face.

9.12.2 Training

Employees who work with or are potentially exposed to hazardous chemicals will receive initial training on the elements of this Hazard Communication Program, including the following:

- Content and requirements of this program and the OSHA Hazard Communication Standards
- The potential physical and toxic hazards of the chemicals used in their work location, and especially the hazards of non-routine tasks
- Chemical inventory and tracking procedures
- Location of this program, the chemical inventory, and the MSDSs/SDSs
- How to read MSDSs/SDSs
- Methods to detect the release of or exposure to chemicals in their area
- Content and interpretation of labels
- Safe use and handling of chemicals
- Required personal protective equipment
- Basic emergency procedures

Additional training will be provided on an annual basis, whenever a new chemical is added to the workplace, and when non-routine tasks are planned.

9.12.3 Labeling

The SH&E Officer will ensure that hazardous chemicals brought onto the site are properly labeled with at least the following information, in English, as a minimum, and the language of non-English-speaking employees who may use the product, as appropriate:

- The identity of the product and chemical components
- Appropriate hazard warnings
- Name and address of the manufacturer, importer, or other responsible party

Hazard warnings will also be transmitted in the form of the National Fire Protection Association or Hazardous Materials Identification System color-coded warnings, which are ranked on a 0 to 4 scale. When chemicals are transferred to a portable container, labels containing chemical identification and hazard warnings must be affixed to the portable container.

Parsons field personnel will have completed the ParsonsU module entitled *Hazard Communication and GHS.*

9.12.4 Current Onsite Inventory

There is currently no inventory of hazardous materials stored onsite for this project.

9.13 PROCESS SAFETY MANAGEMENT PLAN (06.B.04)

There will be no large-scale handling of chemicals requiring this plan; therefore, this section is not applicable.

9.14 LEAD ABATEMENT PLAN (06.B.05)

Lead is not a potential chemical of concern, and no abatement activities are part of the scope of work.

9.15 ASBESTOS ABATEMENT PLAN (06.B.05)

Asbestos is not a potential chemical of concern, and no abatement activities are part of the scope of work.

9.16 RADIATION SAFETY PROGRAM (06.E.03.A)

The Red Hill Bulk Fuel Storage Facility is not listed as a radiological control area.

9.17 ABRASIVE BLASTING (06.H.01)

Not applicable because not part of the scope of work.

9.18 HEAT/COLD STRESS MONITORING PLAN (06.I.02)

Addressed in detail in Subsection 9.1.1 of the PSHEP.

9.19 CRYSTALLINE SILICA MONITORING PLAN (06.M)

Not applicable because not part of the scope of work.

9.20 NIGHT OPERATIONS LIGHTING PLAN (07.A.08)

There will be no night operations.

9.21 FIRE PREVENTION PLAN (09.A)

The following serves as the Fire Prevention Plan for the project.

9.21.1 Workplace Fire Hazards

Contaminant concentrations historically detected in rock or groundwater at the site do not indicate a source of flammable liquids or vapors that would be generated during sampling procedures or during storage of decontamination water. However, the Tank 5 area characterization is being performed to evaluate a potential release of JP-8 that was reported to have occurred in mid-January 2014.

Potential fire hazards include the use of electrical equipment during drilling (electric drill rig). Any additional information related to a fire or safety hazard, or facility protocol/procedure will be communicated to the field team.

9.21.2 Potential Ignition Sources

Potential but unlikely ignition sources are vapor or liquid JP-8 during drilling, and paper, or other combustible material contacting electric motor parts of the drill rig.

9.21.3 Fire Suppression Equipment

The drill rig and field vehicles will be supplied with a Class ABC fire extinguisher.

9.21.4 Responsibility Assignments

Equipment maintenance (truck, fire extinguisher, and sampling equipment) falls under the responsibility of the field staff and will be overseen by the SH&E Officer; these responsibilities include an inspection of vehicles and fire extinguishers to ensure that they are in proper condition.

The SH&E Officer will ensure that vehicles are not brought close to dried vegetation outside of the tunnel that could contact vehicle ignition sources (that is, the undercarriage). The SH&E Officer will also ensure proper site housekeeping, including collection and disposal of any rubbish.

9.22 WILD LAND FIRE MANAGEMENT PLAN (09.K)

All work will be conducted within the Red Hill tunnel and developed/landscaped areas of the Facility, so such a plan is unnecessary.

9.23 HAZARDOUS ENERGY CONTROL PLAN (12.A.01)

Electrical safety is addressed by Red Hill tunnel safety documents. Navy requirements for electrical safety will be followed.

9.24 CRITICAL LIFT PLAN (16.H)

There is a crane at the entrance to the Red Hill Adit No. 3, which is entrance to the tunnel that will be used in the site investigation. The distance of the crane lift is approximately six feet from the entrance ramp to the tunnel floor. The Navy requires that the crane operator be certified and provides the required training. The drilling subcontractor has the required crane certification and will lower and lift drilling and other equipment to and from the tunnel floor. The Navy does not require a critical lift plan for these routine activities.

9.25 CONTINGENCY PLAN FOR SEVERE WEATHER (19.A.03)

Development of a severe weather contingency plan is normally related to marine operations and therefore does not apply to this scope of work. However, field work on this project will be suspended in the event of severe weather that could impact travel to the Red Hill Facility and outside field activities. Such work suspension will be communicated immediately to NAVFAC. Severe weather concerns are related to excessive rainfall and wind events and are subject to SH&E Officer's discretion on whether this may make travel and outside field work unsafe to proceed. Weather advisories will be monitored before every field event. Specific procedures to adhere to in the event of a tsunami are addresses in the PSHEP.

9.26 FLOAT PLAN (19.F.04)

There is no work over water planned as part of this scope of work.

9.27 FALL PROTECTION PLAN (21.C)

At this time, no work is planned as part of the scope of work that requires working from heights that would require use of a fall protection plan.

9.28 DEMOLITION PLAN (23.A.01)

There is no demolition work as part of this scope of work.

9.29 EXCAVATION/TRENCHING PLAN (25.A.01)

There is no excavation or trenching work as part of this scope of work.

9.30 EMERGENCY RESCUE (TUNNELING) (26.A)

All employees will have 5-minute escape-only respirators in their possession and will be trained in the use of the respirators per manufacturer's instruction and their company respiratory protection program.

9.31 UNDERGROUND CONSTRUCTION FIRE PREVENTION AND PROTECTION PLAN (26.D.01)

There is no underground construction work as part of this scope of work.

9.32 COMPRESSED AIR PLAN (26.I.01)

Compressed air or compressed nitrogen gas will be used for groundwater sampling. A small electrical air compressor may be used and the manufacturer's operating instructions will be followed. Nitrogen gas may be used and is discussed in AHA 4.

9.33 FORMWORK AND SHORING PLANS (27.C)

The project does not involve constructing any systems or excavations requiring formwork or shoring.

9.34 PRE-CAST CONCRETE PLAN (27.D)

Not applicable to this project.

9.35 LIFT SLAB PLANS (27.E)

Not applicable to this project.

9.36 STEEL ERECTION PLAN (27.F.01)

Not applicable to this project.

9.37 SAFETY AND HEALTH PLAN (28.B)

An PSHEP is attached to this APP as Attachment A. The PSHEP meets the requirements for work on hazardous waste sites in accordance with 29 CFR 1910.120 and 29 CFR 1926.65.

Detailed site-specific hazards and controls are provided in the attached PSHEP (Attachment A) and AHAs.

9.38 BLASTING SAFETY PLAN (29.A.01)

This scope of work does not require blasting; therefore, a blasting safety plan is not applicable.

9.39 DIVING PLAN (30.A.13)

Not applicable to this project.

9.40 CONFINED SPACE PROGRAM (34.A)

The scope of work does not include entering or working within confined spaces.

SECTION 10

RISK MANAGEMENT PROCESSES

The specific processes are addressed in the attached PSHEP, as well in the task-specific AHAs included in the PSHEP.

SECTION 11

REFERENCES

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United States Army Corps of Engineers (USACE). 2008. *Safety and Health Requirements, Manual No. EM 385-1-1*. Department of the Army, U.S, Army Corps of Engineers. Washington D.C. 20314-1000. September 15. http://www.usace.army.mil/CESO/Pages/EM385-1-1.aspx.

ATTACHMENT A

SITE SAFETY, HEALTH, AND ENVIRONMENT PLAN

PROJECT SAFETY, HEALTH, AND ENVIRONMENT PLAN

Prepared by:

PARSONS

10235 South Jordan Gateway, Suite 300
South Jordan, UT 84095

July 2014

_____ _____
Project Manager Date

_____ _____
SH&E Manager Date

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Client Project Management POC		Contact No.
Mr. Bruce Tsutsui, NAVFAC-Pacific		Direct Line: (808) 471-1171 x353 Email: bruce.tsutsui@navy.mil

EMERGENCY (MEDICAL/POLICE/FIRE) SERVICES

All Emergencies	**911**
Medical	
Hospital Name	**Queens Medical Center**
Hospital Address	1301 Punchbowl Street Honolulu, HI 96813
Hospital Telephone Number	General: 808-538-9011
Clinic Name	**Concentra Medical Center**
Clinic Address	545 Ohohia Street Honolulu, HI 96819
Clinic Phone Number	General: 808-831-3000
NAVFAC Emergency Services	911
Police	
Name	**Honolulu Police Department (District 3)**
Address	1100 Waimano Home Rd Pearl City, HI 96782
Telephone Number	General: 808 723-8800
Fire Department	
Name	**City and County of Honolulu Fire Department**
Telephone Number	General: 808-533-2595
Tsunami Emergency Warning Channels (Radio)	KSS-AM 590 khz KRTR-FM 96.3 mhz

OTHER PERTINENT CONTACT NUMBERS

Poison Control Center 800-222-1222

Parsons

Parsons Project Manager (Gene Wright)..... 801-572-5999 (w)
..... 801-553-3317 (c)
Parsons Program Manager (Mr. Ed Heyse).....256-217-2573
Site Safety, Health, and Environment Officer (Thomas Jensen)..... 801-553-8829 (w)
..... 801-380-1375 (c)
Site Safety, Health, and Environment Officer (alternate; William Stohler)..... 808-258-7371(c)
Parsons Project Safety and Health Officer (Mr. Tim Mustard, C.I.H.)..... 303-564-3537

Battelle

Battelle Project Manager (Carolyn Scala)..... 215-504-5003 (w)/609-548-6082(c)

ROUTE TO HOSPITAL

Emergency medical treatment is available at the Queens Medical Center 24 hours a day, 7 days a week. A map to the hospital is located on the following page. The route to the health centers will be discussed during the first day of work at any new work location

Queens Medical Center
1301 Punchbowl Street
Honolulu, HI 96813
808-538-9011

From the drilling locations, turn left and proceed to the first intersection.

Make a sharp right and follow the road until it turns into Icarus Way.

Continue to Forward Avenue.

Turn left onto Forward Avenue.

Turn right onto Ala Kapuna Street.

Turn left onto Moanalua Road which eventually merges onto H201E/HI-78E.

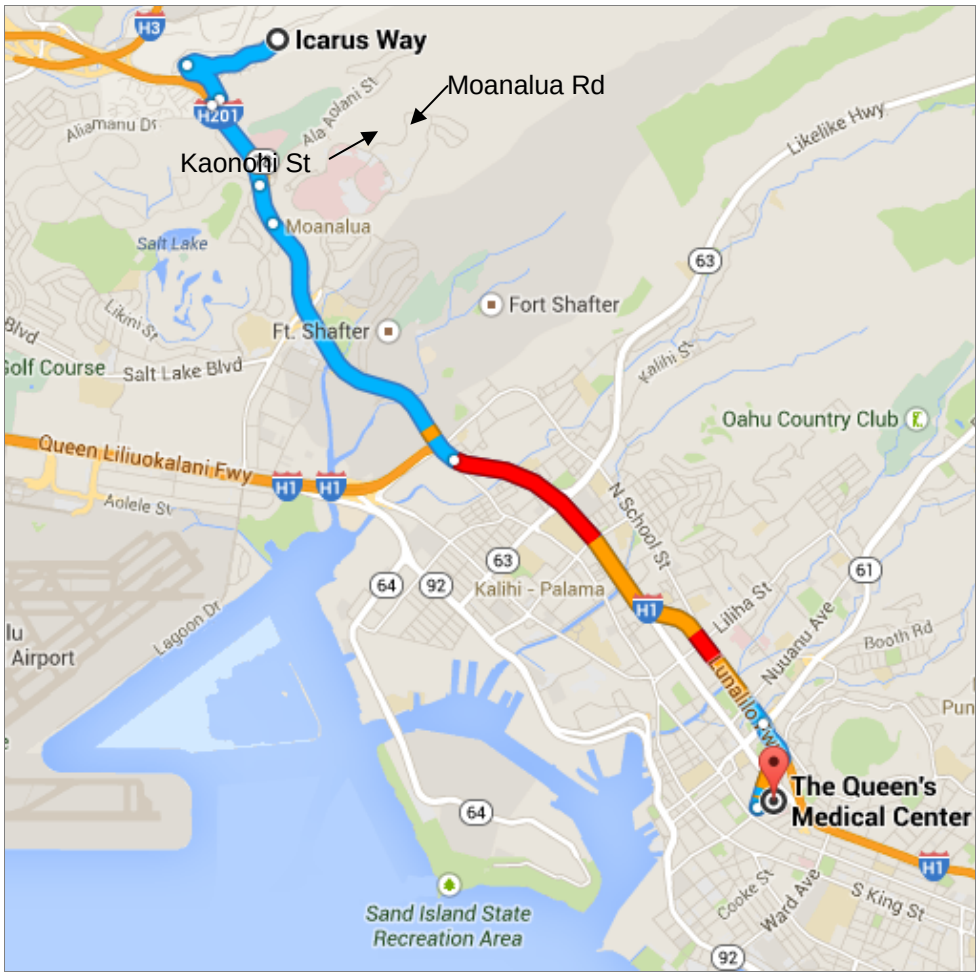
H201E/HI-78E becomes H1E.

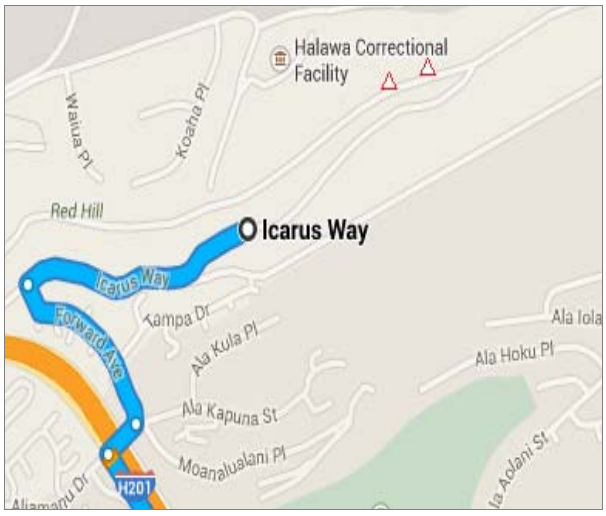
Take the Punchbowl Street exit (Exit 21B). The road will curve to the right.

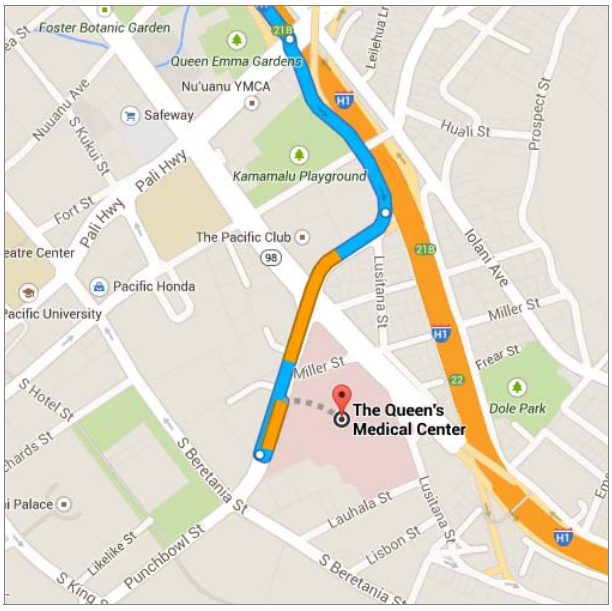
The hospital is on the left, requiring a u-turn.

Total Travel Estimate: 7 miles – about 15 minutes

Map to the Hospital







Red triangles represent approximate drilling locations.

ROUTE TO URGENT CARE CLINIC

Urgent medical treatment is available at the Concentra Medical Center from 8 am to 5 pm, Monday through Friday. A map to the clinic is located on the following page. The route to the health centers will be discussed during the first day of work at any new work location.

Concentra Medical Center
545 Ohohia Street
Honolulu, HI 96819
808-831-3000
Hours: 8 am to 5 pm, Monday through Friday

From the drilling locations, turn left and proceed to the first intersection.

Make a sharp right and follow the road until it turns into Icarus Way.

Continue to Forward Avenue.

Turn left onto Forward Avenue.

Turn right onto Ala Kapuna Street.

Turn left onto Moanalua Road which eventually merges onto H201E/HI-78E.

Take Exit 3 for Puuloa Road.

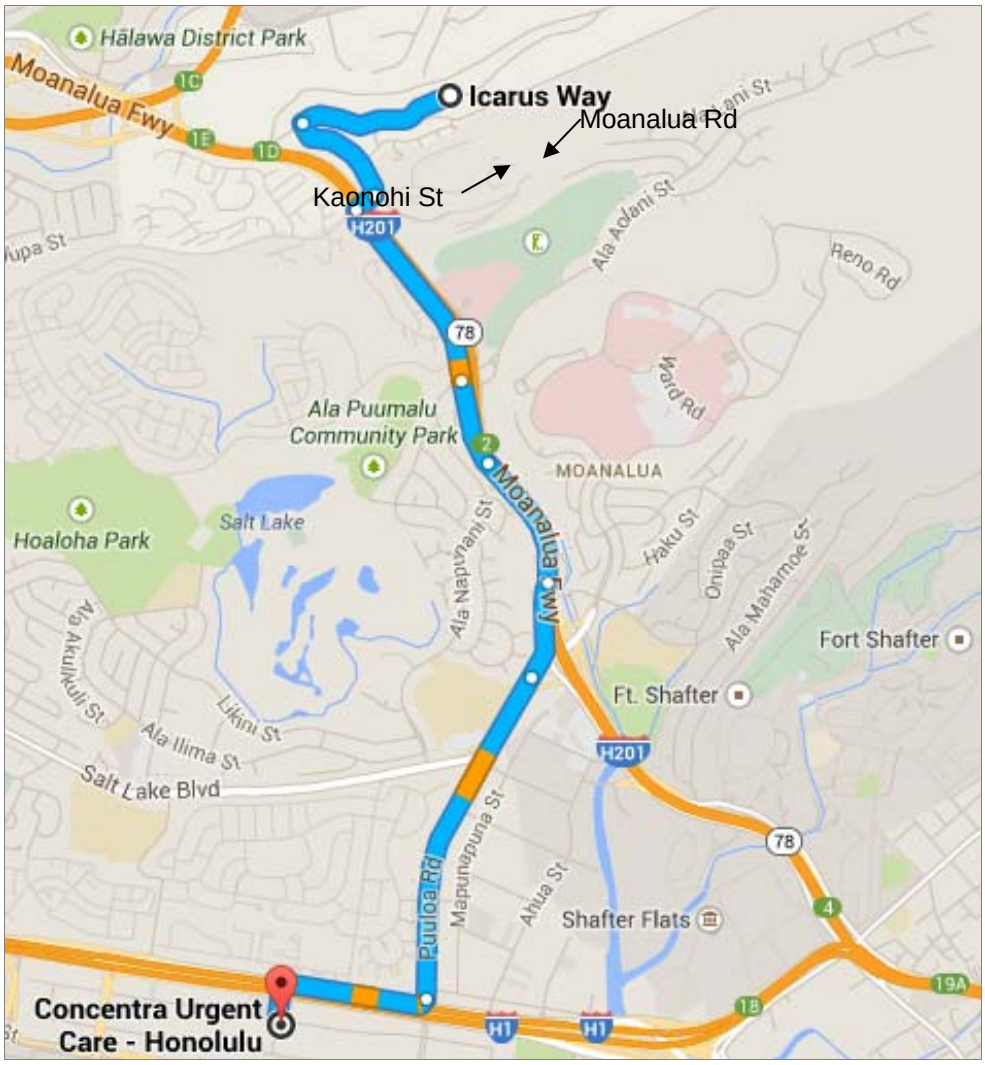
Turn right onto HI-92W.

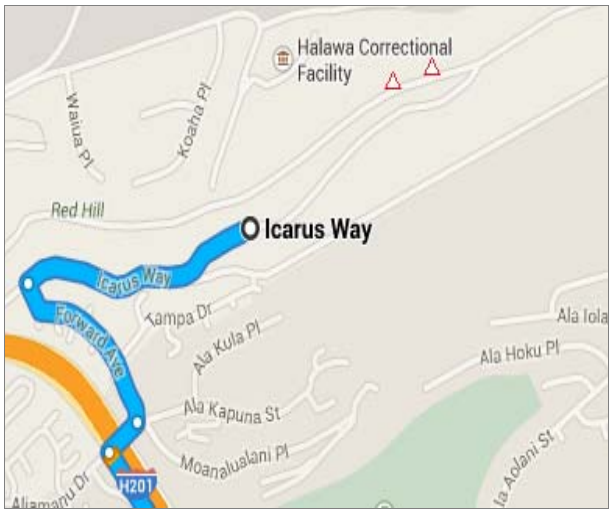
Take the second left onto Ohohia Street.

The clinic is on the left.

Total Travel Estimate: 4 miles – about 10 minutes

Map to the Urgent Care Clinic





Red triangles represent approximate drilling locations.

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ACRONYMS AND ABBREVIATIONS

%	Percent
ACGIH	American Conference of Governmental Industrial Hygienists
A-E	Architect-Engineering
AED	Automatic External Defibrillator
AHA	Activity Hazards Analysis
AMEC	AMEC Earth and Environmental, Inc.
amsl	above mean sea level
ANSI	American National Standards Institute
Battelle	Battelle Memorial Institute
bgs	Below Ground Surface
BTEX	Benzene, Toluene, Ethylbenzene, Xylenes
ºC	Degrees Celsius
CFR	Code of Federal Regulations
CNS	Central Nervous System
CSHM	Parsons Corporate Safety and Health Manual
COC	Contaminant(s) of concern
CPR	Cardiopulmonary Resuscitation
CRZ	Contamination Reduction Zone
dbA	Decibel A
DEET	N,N-diethyl-meta-toluamide
1,2-DCA	1,2-Dichloroethane
EDB	Ethylene Dibromide
EM	Engineering Manual
ESHARP	Environment, Safety, Health, and Risk Program
eV	Electron Volts
EZ	Exclusion Zone
ºF	Degrees Fahrenheit
FCE	Functional Capacity Evaluation
GBU	Global Business Unit
GPP	Groundwater Protection Plan
HAZWOPER	Hazardous Waste Operations and Emergency Response
IDLH	Immediately Dangerous to Life or Health
IDW	Investigation-Derived Waste
kV	Kilovolt
JBPHH	Joint Base Pearl Harbor-Hickam
LEL	Lower Explosive Limit

ACRONYMS AND ABBREVIATIONS (Continued)

LNAPL	light non-aqueous phase liquid
mg/m^3	Milligrams per Cubic Meter
(M)SDS	(Material) Safety Data Sheet
NA	Not Available
NAVFAC	Naval Facilities Engineering Command
Navy	The Department of Navy
NIOSH	National Institute for Occupational Safety and Health
Ogden	Ogden Environmental and Energy Services Co., Inc.
OSHA	Occupational Safety and Health Administration
OSHEP	Office Safety, Health, and Environment Plan
PEL	Permissible Exposure Limit
PID	Photoionization Detector
PM	Project Manager
POC	Point of Contact
PPE	Personal Protective Equipment
ppm	Parts per Million
PSHEP	Project Safety, Health, and Environment Plan
PSM	Process Safety Management
PVC	Polyvinyl Chloride
RHSF	Red Hill Bulk Storage Facility
RFP	Request for Proposal
SAP	Sampling and Analysis Plan
SH&E	Safety, Health, and Environment(al)
SOP	Standard Operating Procedure
SPF	Sun Protection Factor
SSHEP	Subcontractor Safety, Health, and Environmental Safety Plan
START	Supervisory Training in Accident Reduction Techniques
TEC	The Environmental Company, Inc.
TLV	Threshold Limit Value
U.S.	United States
UST	underground storage tank
UV	Ultraviolet
VMP	vapor monitoring point
WC	Worker's Compensation

SECTION 1 – INTRODUCTION

1.1 PARSONS SAFETY, HEALTH, AND ENVIRONMENT POLICY

Exhibit 1.1 – Parsons Corporate SH&E Policy

PARSONS

Corporate Safety, Health & Environment Policy Statement

As an industry-leading engineering, construction, and technical services firm, Parsons is firmly committed to maintaining a safe, healthy, and environmentally compliant workplace at all its offices and project facilities, guided by the following tenets:

- Safety, Health and Environment (SH&E) is a core value.
- Executive management will lead the SH&E process.
- SH&E will be a responsibility shared by all.
- SH&E performance will be a key business performance indicator.
- SH&E performance will be communicated openly.
- Employees will be given the knowledge and skills necessary to perform their jobs in a high-performance SH&E manner.
- We will extend our SH&E efforts beyond the workplace to include travel, homes, and communities.
- We will continually strive to improve our SH&E processes.

To meet our SH&E objectives, all employees are expected to be actively engaged with regard to SH&E issues. This requires the combined efforts of a concerned management, responsible and knowledgeable supervision, and conscientious, well-trained employees.

Parsons will meet or exceed the applicable SH&E legal and other requirements and will continuously monitor and improve operations, procedures, technologies, and programs that are conducive to maintaining a safe, healthy, and environmentally compliant workplace.

Charles L. Harrington

Chairman and Chief Executive Officer

1.2 THE PROJECT SAFETY, HEALTH, AND ENVIRONMENT PLAN (PSHEP)

Parsons goal is zero incidents using control measures designed to minimize or eliminate hazards to personnel, processes, equipment, the general public and the environment. This PSHEP outlines safety, health, and environmental (SH&E) requirements and guidelines developed by Parsons for project work. When implemented, these requirements will help protect site personnel, visitors, the public, and the environment from incidents caused due to SH&E hazards. Parsons employees should never perform a task that may endanger their own safety and health, the safety and health of coworkers or the public, or damage the environment.

This plan should be updated as conditions change or situations change, usually by addenda to the PSHEP, when applicable. All Parsons and subcontractor personnel must understand and implement the PSEHP and any addenda. Parsons documents this process by having employees sign an acknowledgement form stating that they understand the PSEHP and its requirements.

SECTION 2 – SCOPE OF WORK

2.1 SITE DESCRIPTION AND CONTAMINATION CHARACTERIZATION

The Red Hill Bulk Fuel Storage Facility (RHSF) is located on the island of Oahu, Hawaii, approximately 2.5 miles northeast of Pearl Harbor. The Facility is managed by Joint Base Pearl Harbor-Hickam (JBPHH). The Facility is located in a low ridge on the western edge of the Koolau Mountain Range that divides Halawa Valley from Moanalua Valley. The Facility is bordered on the north by Halawa Correctional Facility and private businesses, on the west by the U.S. Coast Guard reservation, on the south by residential neighborhoods, and on the east by Moanalua Valley. A quarry is located less than a quarter mile away to the northwest. The Facility occupies 144 acres and the elevation ranges from approximately 200 to 500 feet above mean sea level (amsl).

The Facility was constructed by the U.S. Government in the early 1940s. Twenty underground storage tanks (USTs) and a series of tunnels were constructed. The USTs were constructed of steel and they currently contain jet fuel propellant (JP-5 and JP-8) and marine diesel fuel (F-76). Several tanks in the past have stored Department of Navy (Navy) special fuel oil, Navy distillate, aviation gasoline, and motor gasoline (Environet, 2010). The fueling system is a self-contained underground unit that was installed deep with the basalt ridge. The USTs are 245 feet long and 100 feet in diameter and are aligned vertically such that the upper domes of the tanks are between 100 feet and 200 feet below ground surface (bgs). Each tank rests on an approximate 50-foot wide by 20-foot thick concrete pad that was poured prior to setting the tanks.

Various environmental activities have been conducted at the Facility since the late 1990s. Site Investigations were conducted in 1996 (Ogden Environmental and Energy Services Co., Inc. [Ogden]), 2002 (AMEC Earth and Environmental, Inc. [AMEC]), and 2007 (The Environmental Company, Inc. [TEC]). A groundwater flow and contaminant transport model was completed as part of the 2007 TEC investigation and updated in 2010 by TEC. A Groundwater Protection Plan (GPP) was developed in 2008 based on results of the SIs, modeling, and Tier 3 Risk Assessment, also conducted by TEC in 2007. The GPP was updated in 2009.

The Navy has been conducting quarterly sampling of existing groundwater monitoring wells located inside and outside of the Red Hill tunnel since 2008. Currently, there are four monitoring wells located in the tunnel, one sample point located at the Red Hill Shaft, and two monitoring wells located outside of the tunnel that are sampled quarterly. Contaminants that have been detected in groundwater are petroleum-related compounds associated with earlier releases. Petroleum compounds have also been detected in vapor samples from some vapor monitoring points (VMPs) located beneath the USTs.

2.2 SCOPE OF WORK

Parsons has been subcontracted to support Battelle Memorial Institute (Battelle) in their contracted role with the Naval Facilities (NAVFAC) Engineering Command is providing Architect-Engineering (A-E) services at the Facility as specified in Contract Number N62583-11-D-0515, Task Order Number 0068. Parsons and Battelle will install two monitoring wells at the north perimeter boundary of the Site to evaluate potential off-site migration of petroleum-related contamination in groundwater and to provide additional monitoring points to determine the distribution of hydraulic head for input into an existing groundwater model of this area.

The rock coring, monitoring well installation and VMP installation program will involve the following field activities:

- Mobilize drilling equipment to Tank 5 through Adit No.3;
- Drill one angled corehole in the cross tunnel beneath Tank 5, ream the corehole, and install three VMP instruments;
- Drill one angled corehole in the cross tunnel beneath Tank 5, ream the corehole, and install one monitoring well and one VMP instrument;
- Drill and ream one vertical corehole in the cross tunnel beneath Tank 5 for air injection, vapor extraction, and/or light non-aqueous phase liquid (LNAPL) extraction depending on the presence or absence of petroleum in the core or at the top of groundwater at the previously installed VMP and monitoring well locations;
- Drill one angled corehole in the Adit No. 3 tunnel approximately 40 feet southwest of the Tank 5 cross tunnel, ream the corehole, and install two VMP instruments.
- Drill one vertical corehole in the cross tunnel beneath Tank 5, ream the corehole, and install three VMP instruments.
- Drill one vertical corehole in the Adit No. 3 tunnel approximately 60 feet southwest of Tank 5, ream the corehole, and install three VMP instruments (alternate).
- Drill one vertical corehole in the Adit No.3 tunnel approximately 150 feet southwest of Tank 5, ream the corehole, and install one monitoring well.
- Install surface completions;
- Sample VMPs and monitoring wells;
- Survey VMP and monitoring well locations; and
- Remove drilling-related materials and equipment from Adit No. 3.

The above sequence may change depending on the phase of contamination (vapor, residual, liquid) that is detected.

Additional activities include project management, work plan preparation, meeting support, and report preparation. These activities are covered by Parsons' South Jordan *Office Safety, Health, and Environment Plans* (OSHEP), incorporated by reference. Hazards and hazard mitigation related to office work and air and ground travel are also discussed in the OSHEPs.

2.3 PROJECT SAFETY, HEALTH AND ENVIRONMENTAL PLAN APPLICATION

This PSHEP and its referenced documents apply to all locations, facilities, operations, and projects associated with contract work performed by Parsons, Battelle, and its subcontractors at the Facility.

SECTION 3 – STAFF ORGANIZATION, QUALIFICATIONS, AND RESPONSIBILITIES

3.1 SH&E RESPONSIBILITY MATRIX

Exhibit 3.1 summarizes the responsibilities of selected roles related to the primary SH&E activities identified in the PSEHP.

Exhibit 3.1 – Project Responsibility Matrix

Project Responsibility Matrix		Project												GBU							Corporate					
Phases	Work Elements	Project Manager	Safety & Health	Environmental	Construction/Site Management	Engineering	First Line Supervision	Facilities and Maintenance	Training	Contracts/Procurement	Security	Sustainability	Quality	President	Operations/Risk Management	Division Management	Sector Management	Safety, Health & Environment	Quality	Business Development	CEO	Operations/Risk Management	Safety, Health & Environment	Security	Workers' Compensation	Insurance
Introduction to ESHARP for Project	1. Environment, Safety, Health, and Risk Program (ESHARP) Project Management	R	D	D	P	P	P	P	P	P	P	P	P	P	P	P	P	A	P	P	P	P	P	P	P	P
Business Development	2. Business Development	R	P	P	P	P				P				P	P	A	P	P	P	D	P	P	P	P		P
Startup	3. Initial Hazard Analysis and Planning	A	R	D	P	P					D							P					P	P		
	4. Project Safety, Health, and Environmental Plan (PSHEP)	A	D	D	P										P	P	P	R					P	P		
	5. Stakeholder PSEHP Alignment Meeting	A	D	D	P													R								
Construction and/or Field	6. Preconstruction Safety, Health & Environment Activities	A	D	D	P		P						P				P	R	P					P		
	7. Project/Site Orientation, Training, and Recurring Field SH&E Meetings	A	D	D	P		P	P	P									R						P		
	8. SH&E Committee	A	D	D	P		P	P			P							R						P		
	9. Meet Building Trades, Safety, Health, Environmental Regulatory Agencies, & Others	A	D	D	P													R						P	P	
	10. Review Contractor/Subcontractor SH&E Programs	A	D	D	P					P								R						P		
	11. Subcontractor Premobilization Meeting	A	D	D	P	P				P	P							R						P		
	12. Risk Mitigation Planning (2-week look ahead)	A	D	D	R													D						P		
	13. Activity Hazards Analysis	A	D	D	P	P	P	P										R						P		
	14. Project Management Site Safety, Health, & Environmental Inspections	A	D	D	P											P	P	R	P					P		
	15. Audits, Inspections, and Recordkeeping	A	D	D	P		P						P			P	P	R	P					P		
	16. Incident Management Process	A	D	D	P		P						P		P	P	P	R	P					P		P
Testing, Commissioning, Operations, and Decommissioning	17. Management Systems and Transition	A	R	R	D	P	P	P	P		P	P	P	P	P	P	P	P	P		P	P	P	P		P
	18. Equipment and Systems Integrity	A	P	P	R	P	P	D	P				P					P	P				P			
	19. Operations Training and Education	A	D	D	P	P	P	P	P		P		P					R					P			
	20. Assessments and Corrective Action	A	D	D	P	P	P	P	P		P		P					R					P			
	21. Operations Emergency Management	A	P	P	P	P	P	P	P	P	D		P					R					P	P		
	22. Safe and Environmentally Compliant Work Practices	A	D	D	P	R	R	P	P									P					P			
Closeout	23. Lessons Learned and Final SH&E Report	A	D	D	P											P	P	R	P				P			
	24. Records Retention	A	P	P					P		D		P					R	P				P			

R – Responsible and accountable for ensuring the project develops and implements the work element.
D – Develops the plan, tool, training, document, or other item needed for the work element.
P – Participates by providing advice, assisting in the implementation or development, reviewing and providing comments, or otherwise supporting the development or implementation effort.
A – Approval at the management level with responsibility for the project; establishes requirements for the project or serves as sponsor for the item.

SECTION 4 – HAZARD RISK AND ANALYSIS

4.1 SITE RISK ANALYSIS

Before work begins, Project Managers lead a team that performs a risk analysis at each work site to identify hazards and risks that require specific control measures. Potential SH&E hazards/risks are listed below and Activity Hazard Analyses (AHAs) for the major work elements are included in Attachment A.

4.1.1 Weather Hazards

The Facility is located on Oahu Hawaii, where weather hazards include extreme temperatures, thunderstorms, and lighting storms. Heat stress is addressed in greater detail in Section 9.1. When thunderstorms and their associated potential of lightning strikes are in the vicinity the "30-30 rule" will be followed. The first "30" represents 30 seconds. If the time between when you see the flash and hear the thunder is 30 seconds or less, the lightning is close enough to hit you and outdoor field operations will be suspended and the crew will seek shelter immediately in vehicles or buildings. The second "30" stands for 30 minutes. The crew will not leave the sheltered area for at least 30 minutes after the last flash of lightning is seen or thunder heard. More than one half of lightning deaths occur after a thunderstorm has passed. High winds sometimes accompany thunderstorms and precautions should be taken if the winds exceed 30 mph. Work will be conducted within the Red Hill tunnel beneath and in the area of Tank 5. Crews will not be exposed to weather hazards except when travelling to and from the work location.

4.1.2 Tsunami Hazards

The island of Oahu is in the middle of the Pacific Ocean and has a high potential for a tsunami. A tsunami is a series of enormous waves created by an underwater disturbance such as an earthquake, landslide, volcanic eruption, or meteorite. A tsunami can move hundreds of miles per hour in the open ocean and smash into land with waves as high as 100 feet or more. The effects of a tsunami can range from essentially no damage to heavy damage with fatalities, with drowning being the leading cause. Contractors and subcontractors should be aware of the potential for a tsunami at all times when on the island. Warning systems, in the form of a large siren, are in place throughout the island. The warning system will be activated in the event of an oncoming tsunami. While the Facility is not within the evacuation zone (Exhibit 4.1), tsunamis can occur at any time and workers should be aware of the location at all times, including the location of their hotel, with respect to the evacuation zone. Additional maps of the island can be found in the hotel phone book or at (http://www.pdc.org/iweb/tsunami_zones.jsp). Evacuation zones include below 100 feet (30 meters) in elevation along the coast. Higher ground is considered above 3 floors in a concrete building or above 100 feet (30 meters) in elevation along the coast.

The warning system is tested the first workday of the month at 11:15. Sirens that occur not within this time frame should be cause for alarm. Workers should tune into one of two radio channels for updates (KSSK-AM 590 khz or KRTR-FM 96.3 mhz). The on-site SH&E Officer should have a gathering point selected in case of evacuation at each site, and alert the rest of the team of the location during the tailgate meeting every morning. If the tsunami occurs outside of working hours,

the team should contact each other once the "all clear" notice has been issued, as well as the Parsons Emergency Hotline at 866.727.1411.

4.1.3 Biological Hazards

Various biological hazards may be encountered at the Facility. These hazards include scorpions, insects, centipedes, and spiders, but these should be present only in the outside areas and are not expected inside the tunnels. Precautions should be taken to be aware of foot and hand placement. Proper personal protective equipment (PPE), i.e., gloves, work shoes, long sleeve coveralls) can provide protection. While mold and mildew are not expected to be a problem, choose living and storage spaces carefully, especially if you are sensitive to mold and mildew. If you cannot tolerate mold or mildew in your hotel room, consider asking for another room.

4.1.3.1 Insect, Arachnid, and Arthropod Bites and Stings

Poisonous or nuisance insects and insect-like creatures at the Facility may include scorpions, centipedes, spiders, ants, bees (honeybees, bumble bees, wasps, and hornets), mosquitoes, black flies, and no-see-ums. The possibility of an allergic reaction exists if a person has been bitten or stung. Immediate care is needed if a person is allergic to insect bites/stings. Personnel with insect allergies should inform the Project Manager and SH&E Officer prior to beginning work. If **an allergic reaction occurs (which may be life-threatening)**, with reactions in the form of swelling of the tissues, nausea, dizziness, difficulty breathing, blurring of vision, unconsciousness, convulsions, fall in blood pressure, shock and consequently the threat of death, **treatment and advanced medical support are needed immediately.**

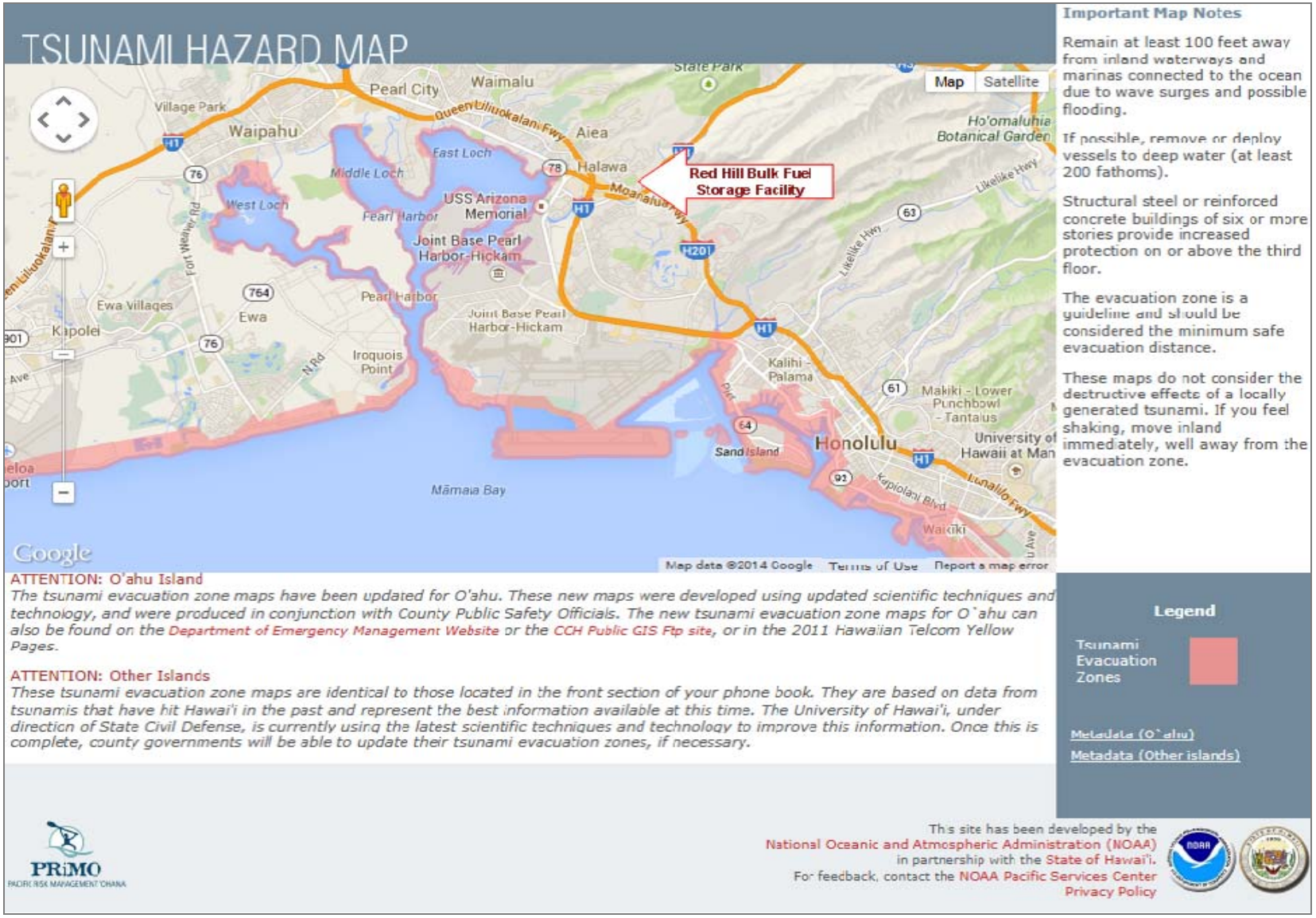
If an allergic person receives a spider bite or insect bite/sting, seek immediate medical attention, keep the victim calm, and check vital signs frequently. If the person carries an epinephrine pen, you may help the person locate and prepare the pen for use but do not administer the epinephrine. The person having the reaction must self administer if they are capable. Rescue breathing should be given if necessary to supply oxygen to the victim. The victim may experience swelling of the breathing passageways. If this occurs, the person providing the rescue breathing may have to slightly increase the air pressure to ensure that the victim receives an adequate supply of air.

For non-life-threatening reactions, call WorkCare for medical advice.

It is advisable to confer with your personal physician before your field effort begins, for recommendations appropriate for your personal treatment in the event you are bitten/stung. Typical treatments consist of applying a topical antihistamine or aloe vera. If this treatment is recommended by your physician, you will be responsible for equipping yourself with the necessary products, since Parsons cannot supply over-the-counter medications.

Sturdy work clothes and shoes will be worn by field personnel to help prevent injuries caused by bites or stings. Care should be taken when opening well covers, since this is a location where insects are frequently found.

Exhibit 4.1 – Tsunami Hazard Map



Source: National Oceanic and Atmospheric Administration (Map for all of Hawaii available from: http://tsunami.csc.noaa.gov/map.html)

Centipedes

Centipedes

Centipedes are flattened, elongated arthropods with many segments, each with one pair of clawed legs, and may be abundant at the project sites. The head has one pair of antennae, and the first body segment immediately behind the head has jaws containing poison glands. They range in color from light yellow to dark brown or reddish-brown.

Centipedes typically have poor to nonexistent eyesight, relying on their antennae and ground vibrations for touch. In spite of their poor eyesight, they move quickly to hunt and catch prey. Their diet consists of earthworms, spiders, insects, and depending on the species, may even hunt mice, small birds, toads, reptiles, or other centipedes. They are not typically a threat to humans, and do not carry diseases to man, animals, or plants. A bite to a human may result in slight welling or pain, resembling that of a bee sting.

Stinging Nettle Caterpillar

Stinging Nettle Caterpillar

The Stinging Nettle Caterpillar has been identified at several locations on Oahu and may also be present in the outside areas at the Facility. Information regarding the Stinging Nettle Caterpillar identification and first aid is provided in Attachment B.

Bees, Wasps, Hornets

Bees, wasps, and hornets may be nuisances to field personnel at outside areas of the Facility. In general, bees and wasps will not be aggressive if left alone. Properly trained personnel will administer first aid should a bee or wasp sting occur. The erythrina gall wasp, a parasite that infests trees producing swollen shoots and leaves that are curled and deformed or have small growths (galls), may be present at the subject sites. Avoid contact with affected trees to prevent the release of the wasps from the galls in which they develop.

Mild insect stings and bites should be treated by applying a baking soda paste or ice wrapped in a wet cloth. Do not pull out stingers with tweezers or your fingers. Stingers should be gently scraped from the skin, working from the side of the sting, using your fingernail, the edge of a credit card, a dull knife blade, or other straightedge object.

Scorpions

In Hawaii, scorpions may be brown to yellowish in color and range from 1/2 inch to 4 inches in length. Their bodies are divided into two parts: a short, thick upper body, and a long abdomen with a six-segment tail. A scorpion has six pairs of jointed appendages: one pair of small pincers, one pair of large claws, and four pairs of jointed legs. They are most active at night. A scorpion sting is very painful but does not usually result in death.

Spiders

Species of spiders that may be present at the work site include brown violin spiders, black widow spiders, garden spiders, crab spiders, happy face spiders, and cane spiders. Only brown violin and black widow spiders are poisonous to humans. The black widow spider has a shiny black body about the size of a pea, with a red or yellow hourglass-shaped mark on its abdomen. It weaves shapeless diffuse webs in undisturbed areas. A bite may result in severe pain, illness, and possible death from complications, but usually not from the bite itself. Of the non-poisonous spiders, the cane spiders are the most intimidating, ranging in size from 2 inches to 7 inches in length, and are pale brown to yellow and gray, with black streaks and bars. They are fast and aggressive, and can jump five feet at an attacker, if threatened. Cane spiders are non-venomous, and their bite does not produce pain or swelling.

Ants

Ants may be observed at the site. Do not stand on, place equipment on, or otherwise disturb the anthills. An insect repellent may be used if it does not interfere with the desired sampling analyses. Frequent self-checks for crawling ants should also be performed.

Mosquitoes

Equine encephalitis, an inflammation of the brain, can be carried by mosquitoes. Symptoms range from none to mild, flu-like symptoms (fever, headache, sore throat) to rare infection of the central nervous system with sudden fever and severe headaches followed quickly by seizures and coma. In the more severe variety, the mortality rate is up to 60 percent, with permanent brain damage in many of the survivors.

Dengue Fever has occurred in the Hawaii within the past 5 years. Exposure to the disease occurs when a person is bitten by a mosquito that has also bitten an infected person. Symptoms of the disease include the sudden onset of fever that can last up to 7 days. Treatment includes typical pain and fever medications found at any drugstore. Aspirin is not to be used as there is a risk of bleeding and complications with Reye's Syndrome. If someone is thought to exhibit the symptoms of Dengue fever, he or she will be taken to see a doctor.

While West Nile Virus has not been observed in Hawaii but may still be a threat. The virus spreads via the bite of an infected mosquito and can infect people, horses, many types of birds, and some other animals. Most people who become infected with West Nile virus will have either no symptoms or only mild ones. On occasion, West Nile virus infection can result in a severe and sometimes fatal illness known as West Nile encephalitis (an inflammation of the brain). The risk of severe disease is higher for persons 50 years of age and older. There is some evidence to suggest that West Nile virus can be spread from person to person (through blood). Human illness from West Nile virus is rare, even in areas where the virus has been reported. The chance that any one person is going to become ill from a mosquito bite is low. You can further reduce your chances of becoming ill by protecting yourself from mosquito bites.

You can reduce your chances of becoming ill from mosquito-borne diseases by protecting yourself from mosquito bites. Prevention includes avoiding areas of dense mosquito populations, wearing long-sleeved clothes and long pants treated with repellents containing permethrin or N,N-diethyl-meta-toluamide (DEET). When possible, wear long-sleeved clothes and long pants treated with repellents containing permethrin or DEET since mosquitoes may bite through thin clothing. Light-colored, tightly-woven clothing is advisable. Mosquitoes are attracted to dark colors, especially

blue. Avoid the use of scented soaps, lotions, and shampoos. Do not apply repellents containing permethrin directly to exposed skin. If you spray your clothing, there is no need to spray repellent containing DEET on the skin under your clothing. Also, consider staying indoors at dawn, dusk, and in the early evening, which are peak mosquito biting times. Use mosquito netting and or mesh clothing such as BuzzOff™, as necessary. If natural alternatives to DEET are chosen, only use products that contain ≥10% active repellent ingredient.

4.1.3.2 Poisonous or Harmful Plants

Poison oak and poison ivy are not found in Hawaii. However, there are numerous poisonous plants commonly found in the Hawaiian Islands. Plumeria, Oleander, and the Angel's Trumpet flower are a few examples of poisonous plants in Hawaii. However, in each case the plant is only poisonous if ingested. It should be brought to attention at daily safety briefings that under no circumstances should any form of wild vegetation be consumed on the jobsite.

Kiawe Tree Thorns

In addition to poisonous plants, there are plants that have physical hazards. The kiawe tree and the bougainvillea plant both have long hard thorns. The thorns of the keawe tree have been known to pierce through the soles of work boots. Where present, the keawe and the bougainvillea should be avoided and/or removed from the worksite. Poisonous or harmful plants may be present in the outside areas of the Facility.

Personnel should wear durable long pants, long sleeves, and leather boots when working in areas containing these plant species.

4.1.4 Chemical Hazards

Exhibit 4.2 lists potential chemical hazards that have been detected or may be anticipated at the Facility. This exhibit lists the potential routes of exposure and their symptoms for each contaminant. Other information such as Threshold Limit Values (TLVs), Permissible Exposure Limits (PELs), Immediately Dangerous to Life or Health (IDLH) values, and applicable properties are also found in this exhibit.

4.1.4.1 Additional Chemical Hazards

To support the field activities at the Facility, chemicals and potentially hazardous materials will be used. These chemicals and mixtures will be accompanied by (Material) Safety Data Sheets ([M]SDS) which will be kept onsite. All material storage, labeling, handling guidelines outlined on the (M)SDS will be followed. All hazardous materials will be stored in manufacturer-provided containers or properly labeled containers appropriate for the material. The Site SH&E Officer will review the appropriate (M)SDSs with employees prior to handling/using these chemicals and mixtures. (M)SDSs will be maintained on-site under separate cover.

Hexane and sodium bisulfate may be used onsite for sample preservation. Other substances that may be used include fuels, cleaners, calibration standards, and field test analysis reagents including, but not limited to:

- Gasoline
- Isopropyl alcohol
- Sodium hydroxide
- Sulfuric acid
- Hydrochloric acid
- Nitric acid
- Phenolphthalein
- Bromocresol green-methyl red
- Ferrous iron reagent
- Zinc acetate
- Dissolved oxygen chemets and Vacu-vials
- Isobutylene (gas)
- Potential of Hydrogen (pH) buffers (pH 4, 7, 10)
- Zoebel solution

Exhibit 4.2 – Potential Chemical Hazards

Compound	PEL [a/] (ppm)	TLV [b/] (ppm)	IDLH [c/] (ppm)	Odor Threshold[d/] (ppm)	Ionization Potential[e/] (eV)	Summary of Physical Description/Health Effects/Symptoms [f/]
Benzene	1 (29 CFR 1910.1028)[g/]	0.5 (skin)[h/]	500	4.7	9.24	Colorless to light-yellow liquid (solid<42°F) with an aromatic odor. Eye, nose, skin, and respiratory system irritant. Causes giddiness, headaches, nausea, staggered gait, fatigue, anorexia, exhaustion, dermatitis, bone marrow depression, and leukemia. Mutagen, experimental teratogen, and carcinogen.
1,2-Dichloroethane (1,2-DCA, Ethylene Dichloride)	1	10	50	100	11.5	Colorless liquid with a pleasant, chloroform-like odor. Strong narcotic. Irritates eyes. Causes corneal opaqueness, nausea, central nervous system (CNS), depression, vomiting, dermatitis, and damage to liver, kidneys, and cardiovascular system. In animals, causes cancer of the forestomach, mammary gland, and circulatory system. Mutagen, experimental teratogen, and carcinogen.
Ethylbenzene	100	20	800 (LEL) [i/]	0.25-200	8.76	Colorless liquid with an aromatic odor. Irritates eyes, skin, and mucous membranes. Causes dermatitis, headaches, narcosis, and coma. Mutagen and experimental teratogen.
Ethylene Dibromide (EDB, 1,2-Dibromoethane)	20	NA (skin)	100	10-25	9.45	Colorless liquid or solid (<50°F) fumigant with a sweet odor. Irritates respiratory system, eyes, and skin. Causes dermatitis with skin vesicles, reproductive effects, and liver, heart, spleen, and kidney damage. In animals, causes skin and lung tumors. Mutagen, experimental teratogen, and carcinogen.
Gasoline	300	300	NA [j/]	0.005-10	NA	Clear/amber flammable, volatile liquid with a characteristic odor. Irritates eyes, skin, and mucous membranes. Causes dermatitis, headaches, fatigue, blurred vision, dizziness, slurred speech, confusion, convulsions, chemical pneumonia, and possible liver and kidney damage. In animals, causes liver and kidney cancer. Monitor for BTEX[k/] constituents. Carcinogen.
Jet Fuel	400 [l/]	200 [m/] mg/m^3 [n/] (skin)	1,100 [l/]	0.08-1	NA	Colorless to light-brown liquid with a fuel-like odor. Long-term effects include liver, kidney, and central nervous system (CNS) damage. JP-4 is a questionable carcinogen.

Exhibit 4.2 – Potential Chemical Hazards (Continued)

Compound	PEL [a/] (ppm)	TLV [b/] (ppm)	IDLH [c/] (ppm)	Odor Threshold[d/] (ppm)	Ionization Potential[e/] (eV)	Summary of Physical Description/Health Effects/Symptoms [f/]
Lead	0.05 mg/m^3 (29 CFR 1910.1025) [o/]	0.05 mg/m^3	100 mg/m^3	NA	NA	Heavy, ductile, bluish-gray, soft metal. Irritates eyes. Causes weakness, exhaustion, insomnia, facial pallor, anorexia, low-weight, malnutrition, constipation, abdominal pain, gastritis, colic, constipation, gingival lead line, anemia, wrist and ankle paralysis, joint pains, tremors, low blood pressure, and kidney disease. Mutagen, experimental teratogen, and suspected carcinogen.
1-Methylnaphthalene	NA	0.5 (skin)	NA	0.02	7.69	Colorless liquid or oil. Irritates eyes, skin, mucous membranes, and upper respiratory tract. Causes flushing, headache, restlessness, fever, nausea, vomiting anorexia, diarrhea, anemia, jaundice, decreased urinary output, euphoria, dermatitis, skin sensitization, allergic skin reaction, corneal damage, visual disturbance, lung damage, convulsions, and coma.
2-Methylnaphthalene	NA	0.5 (skin)	NA	0.003-0.04	7.96	Colorless gas or solid with a disagreeable garlic or rotten cabbage odor. Irritates eyes, skin, and upper respiratory tract. Causes lung damage.
Naphthalene	10	10 (skin)	250	0.003-0.3	8.12	Colorless to brown solid (shipped as a molten liquid) with a mothball-like odor. Irritates eyes, skin, upper respiratory tract, and bladder. Causes headaches, confusion, excitement, convulsions, coma, vague discomfort, nausea, vomiting, abdominal pain, profuse sweating, jaundice, hematoma, hemoglobin in the urine, renal shutdown, dermatitis, optic nerve disorders, and corneal and liver damage. Experimental teratogen and questionable carcinogen.
Toluene	100	20	500	0.2-40 [p/]	8.82	Colorless liquid with sweet, pungent, benzene-like odor. Irritates eyes and nose. Causes fatigue, weakness, dizziness, headaches, hallucinations or distorted perceptions, confusion, euphoria, dilated pupils, nervousness, tearing, muscle fatigue, insomnia, skin tingling, dermatitis, bone marrow changes, and liver and kidney damage. Mutagen and experimental teratogen.

Exhibit 4.2 – Potential Chemical Hazards (Continued)

Compound	PEL [a/] (ppm)	TLV [b/] (ppm)	IDLH [c/] (ppm)	Odor Threshold[d/] (ppm)	Ionization Potential[e/] (eV)	Summary of Physical Description/Health Effects/Symptoms [f/]
Xylene (o-, m-, and p-isomers)	100	100	900	0.05-200 [p/]	8.56 8.44 (p)	Colorless liquid with aromatic odor. P-isomer is a solid <56°F. Irritates eyes, skin, nose, and throat. Causes dizziness, drowsiness, staggered gait, incoordination, irritability, excitement, corneal irregularities, conjunctivitis, dermatitis, anorexia, nausea, vomiting, abdominal pain, and olfactory and pulmonary changes. Also targets blood, liver, and kidneys. Mutagen and experimental teratogen.

a/ PEL = Permissible Exposure Limit. OSHA-enforced average air concentration to which a worker may be exposed for an 8-hour workday without harm. Expressed as parts per million (ppm) unless noted otherwise. PELs are published in the NIOSH Pocket Guide to Chemical Hazards, 2005, online revisions, 2010. In accordance with the OSHA General Duty Clause, it is Parsons' policy to use vacated PELs when they are more conservative than current PEL values. Information about vacated PELs is located in Appendix G of the NIOSH Pocket Guide.

b/ TLV = Threshold Limit Value - Time-Weighted Average. Average air concentration (same definition as PEL, above) recommended by the American Conference of Governmental Industrial Hygienists (ACGIH), *2014 TLVs® and BEIs®*.

c/ IDLH = Immediately Dangerous to Life or Health. Air concentration at which an unprotected worker can escape without debilitating injury or health effects. Expressed as ppm unless noted otherwise. IDLH values are published in the NIOSH Pocket Guide to Chemical Hazards, 2005, online revisions, 2010.

d/ When a range is given, use the highest concentration.

e/ Ionization Potential, measured in electron volts (eV), used to determine if field air monitoring equipment can detect substance. Values are published in the NIOSH Pocket Guide to Chemical Hazards, 2005.

f/ This table is provided as a summary and does not provide all information about the chemical hazards listed. Additional information and training will be provided to field personnel as needed, requested, or required by law.

g/ Refer to expanded rules for this compound.

h/ (skin) = Refers to the potential contribution to the overall exposure by the cutaneous route.

i/ LEL indicates that the IDLH value was based on 10% of the lower explosive limit for safety considerations, even though relevant toxicological data indicated that irreversible health effects or impairment of escape existed only at higher concentrations *(NIOSH Pocket Guide to Chemical Hazards, 2005, online revisions, 2010.*

j/ NA = Not available.

k/ BTEX = benzene, toluene, ethylbenzene, and xylenes

l/ Based on exposure limits for petroleum distillates (petroleum naphtha).

m/ Based on exposure limits for kerosene, as total hydrocarbon vapor. Application restricted to conditions in which there are negligible aerosol exposures.

n/ mg/m^3 = milligrams per cubic meter

o/ CFR = Code of Federal Regulations. Refer to expanded rules for this compound.

p/ Olfactory fatigue has been reported for the compound and odor may not serve as an adequate warning property.

4.1.5 Safety Hazards

Physical hazards consist of those hazards associated the natural environment and other manmade objects. Additional information related to safety hazards and control measures is located in the AHAs.

4.1.5.1 Slip, Trip, and Fall Hazards

Work sites may contain slip, trip, and fall hazards for site workers, such as:

- Stairs (use handrails)
- Tunnel train tracks (do not step on or over rails)
- Holes, pits, or ditches
- Deteriorated asphalt or concrete
- Slippery surfaces
- Steep grades
- Uneven grades
- Sharp objects, such as nails, metal shards, and broken glass
- Weather conditions, such as snow or rain, will make surfaces slippery and obscure visibility
- Site personnel will be instructed to look for potential safety hazards and immediately inform the Site SH&E Officer or the Site Manager about any new hazards. If the hazard cannot be immediately removed, action must be taken to warn site workers about the hazard.

4.1.5.2 Motor Vehicles and Heavy Equipment

Working with large motor vehicles and heavy equipment can be a major hazard. Injuries can result from equipment hitting or running over personnel, or overturning of vehicles. Vehicles and heavy equipment design and operation will be according to 29 Code of Federal Regulations (CFR) Subpart O, 1926.600 through 1926.602. An electric drilling rig, support vehicles, backhoes, and other heavy equipment may be expected for these investigations. However, motorized vehicles will only be operated outside of the tunnels because of the requirement that only electric operated equipment and motors can be utilized inside the tunnels. The following precautions will be taken to help prevent injuries and accidents.

- Brakes, hydraulic lines, light signals, fire extinguishers, fluid levels, steering, tires, horn, and other safety devices will be checked and maintained in good working order throughout the duration of field activities. Completion of a daily vehicle inspection report will be required for vehicles that are used on a daily basis (drill rig, backhoe, forklift, semi, or dump truck). Support vehicles such as pickup trucks can be inspected weekly.
- Large construction motor vehicles will not be backed up unless the vehicle has a reverse signal alarm audible above the surrounding noise level, backup warning lights, or the vehicle is backed up only when an observer signals it is safe to do so.

- Construction and heavy equipment will be provided with necessary safety equipment including seat belts, rollover protection, emergency shut-off during rollover, backup warning lights, and audible alarms. Safety protection systems will be checked daily and documented on the vehicle inspection report.
- Blades and buckets will be lowered to the ground and parking brakes will be set before shutting off any heavy equipment or vehicle.
- Field support vehicles will be equipped with an appropriate first aid kit and fire extinguisher.
- The crane at the entrance of Adit No. 3 will be used to bring in and take out the drilling and other equipment needed for the current scope of work in the tunnel. Only trained and certified operators may operate this crane. Unnecessary personnel must stay out of the immediate area during these lifts and not distract the operator unless a problem is observed in the rigging. Only one person may provide predetermined signals to the operator and no one is permitted to stand or work under a suspended load.
- A small electric train engine and flatbed cars may be used by the drilling subcontractor to transport equipment to the work area. The above precautions will be taken as applicable to the train.

4.1.5.3 Underground Utilities Hazards

There are no known utilities buried in the main tunnel or Tank 5 cross tunnel. Utilities are in pipes and conduits attached to the tunnel wall and are visible. Existing utility maps will be utilized.

4.1.5.4 Overhead Electrical Lines

Precautions will be exercised when drilling or conducting any activities near any overhead electrical lines. However, all electrical lines are in marked conduits that are attached to the tunnel wall. Under normal circumstances, the driller must maintain a safe clearance distance between overhead utility lines and the drill rig mast, as specified in Exhibit 4.3 below from 29 CFR 1925.1408, Table A. Table A does not apply to drilling in the tunnel. Spotters will be used to confirm that the safe distance is being observed so that no utilities are contacted.

4.1.5.5 Confined Space Entry

Occupational of Safety and Health Administration (OSHA) confined space entry standards (29 CFR 1910.146) and the Parsons Corporate Safety and Health Manual (CHSM) will be followed if confined space entry is required. No confined space entry is anticipated during the implementation of this work plan.

4.1.5.6 Noise-Induced Hearing Loss

Planned activities may involve the use of heavy equipment, such as drill rigs and backhoes. The unprotected exposure of site workers to this noise during activities can result in noise-induced hearing loss. The Site SH&E Officer will ensure that either earmuffs or disposable foam earplugs are made available to, and used by, personnel near operating heavy equipment, or other sources of high intensity noise. Hearing protection is required any time the noise level reaches 85 decibel A (dbA) or greater.

Exhibit 4.3 – Table A – Minimum Clearance Distances

Voltage (nominal, kilovolt [kV], alternating current)	Minimum clearance distance (feet)
up to 50	10
over 50 to 200	15
over 200 to 350	20
over 350 to 500	25
over 500 to 750	35
over 750 to 1,000	45
over 1,000	(As established by the utility owner/operator or registered professional engineer who is a qualified person with respect to electrical power transmission and distribution.)

Note: The value that follows "to" is up to and includes that value. For example, over 50 to 200 means up to and including 200kV.

Noise monitoring will be accomplished by field determination. If a normal speaking voice cannot be heard at a minimum three-foot distance, hearing protection will be required. Hearing protection is required within 50 feet of an operating drill rig or field generator.

4.1.5.7 Excavation/Trenching Activities

Excavation activities are not planned for the monitoring well installation at the Facility. In the event excavation is required, site personnel will not enter the excavations/trenches greater than 4 feet at any time unless protective systems (i.e., shoring, sloping, or benching) are in place and an approved excavation plan is present. OSHA and Parsons requirements for excavation activities must be followed. The Site SH&E Officer shall have working knowledge of 29 CFR Part 1926.651 and CHSM-33.

The Parsons requirement of protective systems at 4 feet is more restrictive than the OSHA requirement of 5 feet. Parsons also requires ladders for egress in excavations greater than or equal to 3 feet, rather than the OSHA requirement of 4 feet. These requirements must be communicated to all Parsons and Parsons subcontractor personnel.

4.1.5.8 Site Illumination

Site illumination is not anticipated to be required for this project. Should illumination be necessary, site illumination will be in accordance with 29 CFR 1926.56 and CHSM-5-01. Generators will be operated in accordance with manufacturer's guidelines.

4.1.5.9 Site Sanitation

Toilets and hand-washing facilities are available at locations within the tunnel and are provided with potable water, soap, and single use towels. At a minimum, a water jug, liquid soap, and paper towels will be provided for field team personnel for washing their hands prior to eating or drinking, and prior to leaving the site.

Non-investigation solid waste will be bagged and disposed of offsite in an appropriate container. Investigation derived waste (IDW) will be handled in accordance with the Facility Work Plan/Sampling and Analysis Plan (SAP).

4.1.5.10 Encountering Homeless Persons and/or Associated Wastes

Site workers need to be aware that homeless persons may inhabit the area near the Facility. Evidence may include worn bedding, clothing, trash, and other miscellaneous objects that appear out of place. Homeless persons often reside or take refuge along busy highways, under bridges, and in vacant lots or wooded areas. Homeless persons have been encountered along Waiawa Stream where they appear to have inhabited storm water control structures (i.e., large box culverts).

During site mobilization, inspect the work areas for signs of homeless persons and associated hazards (trash, broken glass, and human excrement). Move or dispose of any trash or debris creating hazards while wearing appropriate PPE. Stake off, fence off, and/or cover any human excrement as needed to prevent contact. If necessary, request a police officer be present when work is initiated. Stop work at any time and contact the Project Manager (PM) or Site SH&E Officer or Manager if conditions are found to be unsafe. Strictly reinforce the buddy system; do no visit sites without a buddy present, even for short visits. Purchase and carry overboots for field crew use. Purchase mace for Parsons employees to carry off-site (mace is not allowed on active Navy property). Food and beverage are not allowed in the work area. Wash hands or use antibacterial hand solution upon exiting the exclusion zone.

4.1.5.11 Traffic

The investigation activities at the Facility are located within the Red Hill tunnel beneath Tank 5. Well maintained Facility roads to the Adit No. 3 entrance will be used. Traffic control will not be required outside of the tunnels. Traffic control inside the tunnels will be limited to movement via the railroad cars of other contractors or NAVFAC personnel. Cones and signs as required will be utilized to provide warning to JBPHH personnel and contractors of work near the Tank 5.

4.2 Five Hazard Control Measures – Order of Precedence

Site SH&E hazards and risks are controlled using one or more of the control measures listed below in order of precedence:

- **Engineer/design to eliminate or minimize hazards.** A major component of the design phase is to select appropriate features to eliminate a hazard/risk and render it fail-safe or provide redundancy using backup components.
- **Guard the hazard.** Hazards that cannot be eliminated by design must be reduced to an acceptable risk level by guards or isolation devices that render them inactive.
- **Provide warnings.** Hazards or risks that cannot be totally eliminated by design or guarding are controlled through using a warning or alarm device.
- **Provide special procedures or training.** When design, guarding, or warnings cannot eliminate hazards/risks, subcontractors must develop procedures, training, and audits to

ensure safe and environmentally compliant completion of work. Training cannot be a substitute for hazard elimination when life-threatening hazards are present.

- **Provide personal protective equipment (PPE).** To protect workers from injury, the last method in the order of precedence is the use of PPE, such as hard hats, gloves, eye protection, life jackets, and other protective equipment with the understanding that bulky, cumbersome, and heavy PPE is often discarded or not used, rendering this method ineffective **without proper controls.**

4.3 ACTIVITY HAZARDS ANALYSIS

The applicable AHAs for the work at the Facility are included in Attachment A. The AHA training form is provided below in Exhibit 4.4 and in Attachment D – Safety Forms.

4.4 SAFETY SYSTEMS AUDIT PROTOCOL

Global Business Unit (GBU) SH&E Directors may use the Safety Systems Audit Protocol for field staff and subcontractors whose work requires that they be on site for more than six months. The protocol provides management with a rating that reflects the effectiveness of the SH&E Program. Appendix B1 of the Environment, Safety, Health, and Risk Program (ESHARP) Manual provides the program, protocol, and methodology.

4.5 CONSTRUCTION SITE INSPECTION

The construction site inspection is a protocol designed to identify and correct unsafe acts or conditions in the scope of work by either Parsons or any subcontractor. The Site SH&E Officer will tour the site at least weekly recording observations and any noncompliances. Items found to be out of compliance must be assigned a corrective action and tracked to completion.

4.6 WEEKLY SH&E SITE INSPECTIONS

The Project Manager or most senior onsite person conducts a weekly site walk using a checklist such as the Weekly SH&E Inspection Checklist (Exhibit 4.5) to identify problem areas. Items found to be out of compliance must be assigned corrective action and tracked to completion.

Exhibit 4.4 – SH&E Activity Hazards Analysis Training Record

PARSONS SH&E Activity Hazards Analysis Training Record		
Job Number:		
AHA Number:		
Job Location		
Date:		
Name of Trainer:		
Subjects Covered:		
Training Aids Used:		
Attendees – Please Sign Name Legibly Below		
Use additional sheets if necessary.		

Exhibit 4.5 – Weekly SH&E Inspection Checklist

PARSONS

Weekly SH&E Inspection Checklist (Sheet 1 of 2)

	Week Ending Date:
Project Name	Project Number:
Name of Auditor:	Signature:

Check each box during your inspection or indicate N/A. Substandard conditions found must be identified on the back of this checklist

☐	Electrical: temporary power, circuits marked, GFCI protection, damaged cords, cords protected, correct outlets, and signage.
☐	Environmental: Air emissions controlled, hazard com program, specific MSDS sheets, fuel signage, spillage dike, dust control, HAZMAT storage, and waste disposal.
☐	Excavations: Guarded, Soil Condition, Trenching Controls, Blue Stake/Equivalent, Daily Inspections Subcontractor, and Proper Access.
☐	Fire Safety: Extinguishers; Proper Size, Numbers, Proper Locations, Hose Stations, Hot Work Permit, Fuel Storage.
☐	Framing Activities: Proper Positions, Monitor, Fall Protection, Housekeeping, Forklift Activity, Training, and Tool Use.
☐	Guarding: Floors, Walls, Windows, Leading Edge, Roof, Elevator Shafts, Open Holes, Material, Quality, and Handrail
☐	Housekeeping: Office, Walkways, Waste Material, Lay Down Yard, Grounds, and Subcontractor Areas, Food Debris.
☐	Ladders: Height, Secured Top/ Bottom, Condition, Employee Position; Three Points of Contact.
☐	Material Handling: Rigging, Material Condition, Training, Tasks, Proper Lifting, Wheel Barrows, Stacking/Storage.
☐	Medical: First Aid Kits, Numbers Posted, Address Knowledge, Nearest Emergency Assistance, CPR/First Aid Training.
☐	Mobile Equipment: Inspections, Condition, Backup Alarms, Leaks, Fuel Storage, Proper Parking, and Training.
☐	PPE: Hearing, Head, Hand, Eye, Foot, Fall, Seatbelts, Respiratory,
☐	Sanitary: Drinking Water, Toilets Clean and Adequate, Soap and Water for Washing
☐	Scaffolds: Component Damage, Footing, Secured, Guardrail, Training, Inspections, Pins & Bracing, Planking, and Ladders.
☐	Tools: Damage, Cords, Blades, Guards, Hoses, Handles, Switches, Training, Proper Use, Storage, Adequate.
☐	Training: Forklift, Man Lift, Water Truck, Orientation, Task, Hazards, Power Tools, Scaffolds, and Trenching.
☐	Welding: Hot Work Permit, PPE, Gas Checks, Confined Space, Tank Storage, Equipment Inspections, and Fire Protection
☐	Miscellaneous: Any condition or behavior not identified on this checklist.

Exhibit 4.5 – Weekly SH&E Inspection Checklist (Continued)

PARSONS

Weekly SH&E Inspection Checklist (Sheet 2 of 2)

				Week Ending Date:	
Project Name				Project Number:	
Name of Auditor:				Signature:	
Hazard Type	1.	Improper or Inadequate Guarding	8.	Substandard Housekeeping	
	2.	Improper Wiring	9.	Hazardous Environmental Conditions	
	3.	Defective Tools, Equipment, Substances	10.	Radiation Exposures	
	4.	Hazardous Arrangements	11.	Congestion or Restricted Movement	
	5.	Inadequate Illumination	12.	Inadequate Warning System	
	6.	Inadequate Ventilation	13.	Fire & Explosive Hazard	
	7.	Improper Personal Protective Equipment	14.	Other:	
Basic Causes	1.	Inadequate Engineering	7.	Inadequate Leadership & Supervision	
	2.	Normal Wear & Tear	8.	Physical Incapacity	
	3.	Inadequate Purchasing	9.	Lack of Knowledge	
	4.	Inadequate Maintenance	10.	Improper Motivation	
	5.	Inadequate Work Standards	11.	Mental Incapacity	
	6.	Abuse	12.	Other:	
Hazard Classification	Class A: Likelihood of Death Class B: Likelihood of Serious Injury Class C: Likelihood of Minor Injury				

Items	Hazard Type	Basic Cause	Hazard Class	Location	Remedial Action(s)

Comments:

4.7 SH&E Enforcement

Parsons, Battelle, and its subcontractors will enforce all applicable SH&E requirements of regional, federal, municipal, state, local, and other applicable regulations, including OSHA 1910 and 1926 and Engineering Manual (EM) 385-1-1, where applicable. Subcontractors must also comply with and enforce Parsons CSHM, ESHARP, and site requirements.

Parsons, Battelle, and its subcontractors must have written progressive disciplinary systems available for review in their Human Resources departments.

4.8 Notice of Violation of Safety and Health Regulations

The project has a formal Notice of Subcontractor Violation of SH&E Regulations Program to ensure that violations are issued as the result of an IDLH situation, respiratory airborne hazards, and/or when the subcontractor repeatedly fails to comply with SH&E requirements. Refer to Exhibit 4.6, Notice of Subcontractor Violation of SH&E Regulations.

The Notice of Subcontractors Noncompliance to SH&E Regulations (Exhibit 4.7) documents poor performance and requires a response from subcontractor senior management. The notice contains five distinct levels of discipline, from submission of a recovery plan to contract termination.

Currently Parsons is not expected to have subcontractors on this project.

Exhibit 4.6 – Notice of Subcontractor Violation of Safety, Health, and Environmental Regulations

PARSONS

Notice of Subcontractor Violation of Safety, Health, and Environmental Regulations

Date:

Contractor Name:		
Address:		
Attention:		

This letter officially notifies you that you have been found to be in violation of the following Safety, Health, and Environmental Regulations:

_____

on (date) _____, by _____

Confined Space Entry	☐	Lockout/Tagout	☐	Hot Work	☐	Personal protective equipment
Knowledge of environmental requirements	☐	Awareness of warning alarms	☐	Evacuation routes	☐	Backup alarms
Assembly locations	☐	Fall Protection	☐	Scaffolding	☐	Environmental/hazardous material storage
Trenching	☐	Safe Work Practices	☐	Security Practices	☐	Spill to the environment
Waste storage or disposal	☐	Wastewater discharge	☐	Buried items	☐	Violation of environmental regulation

Other: _____

Environmental:

This/These violations occurred at the following locations: _____

At the following times and dates:

The name of the employee(s) was (were):

Exhibit 4.7 – Notice of Subcontractor Nonconformance with Safety, Health, and Environmental Regulations

PARSONS

Notice of Noncompliance with Safety, Health and Environmental Regulations

Under conditions of this enforcement procedure check all items that apply:

☐	1.	You are being notified of this violation and should take corrective action to prevent a reoccurrence. The corrective action shall be documented to the Parsons Construction Management representative immediately.
☐	2.	You must submit a plan for compliance to your Parsons Construction Management representative and the Construction Safety Manager within two days of receipt of this letter. The compliance plan must include the means or methods of compliance and the date that the requirements for compliance will be completed. Once compliance has been achieved, a follow up letter must be sent to the Parsons Construction Management representative and Construction Safety Manager. Failure to comply will result in disciplinary action against your Company.
☐	3.	You are required to review the stated procedures with your Parsons Construction Management representative. Work may not commence on the site until the review is complete and the Subcontractor responds formally that the procedure is understood and will comply.
☐	4.	You are required to review the stated procedures with your Parsons Construction Management representative. Work may not commence on the site until the review is complete and you must confirm formally the disciplinary action to be taken against the supervisor and employees.
☐	5.	All work on the site will stop until the Parsons Construction Management representative reviews all the facts with the Subcontractor and determines if the contract between the parties will be terminated.

Sincerely,

Parsons Representative

cc:
Issuing Construction Manager Representative
Job File
GBU Safety Director
Project Manager

SECTION 5 – SAFETY TRAINING

5.1 TRAINING

- All field personnel working onsite will have received training from their employer complying with those requirements specified by 29 CFR 1910.120, including completion of three days of supervised field work. Current copies of training certificates, as applicable, will be maintained onsite for all field personnel.
- The Field Team Manager/Site SH&E Officer is responsible for supervising personnel engaged in site work, and will have at least eight additional hours of supervisory training in accordance with 29 CFR 1910.120[e][4]). In addition, training for the Field Team Manager/Site SH&E Officer will include the employer's SH&E program (ESHARP/START) and the associated employee training program, PPE program, health hazard monitoring procedures and techniques, and any other necessary training to perform the project tasks.
- All field personnel will maintain current certification in first aid/cardiopulmonary resuscitation (CPR)/automatic external defibrillator (AED)/Bloodborne Pathogens.
- The field team including subcontractors will obtain any Navy training pertaining to evacuation and emergency plans, and possible rules of conduct required for work in the tunnels.
- In accordance with 29 CFR 1910.134, field personnel will receive training in their company's respiratory protection program and for the use of the escape-only respirators.
- Visitors will receive the appropriate site-specific or project orientation for the location.
- Training documentation will be maintained onsite by the Site SH&E Officer.

5.2 PROJECT SAFETY ORIENTATION

The Parsons Project Manager, Site SH&E Officer, or Project SH&E Manager conducts site-specific orientation for all new Parsons staff, Battelle staff, and subcontractor personnel. Topics discussed typically include those included in the new employee orientation as noted in Section 5.10. NAVSUP FLC may also require an orientation meeting prior to starting work in the tunnels.

Orientation takes approximately one hour to complete and includes applicable Client, Parsons, Battelle, and regulatory reference material, including:

- Client SH&E requirements;
- Applicable regional, municipal, and local regulations and including OSHA 1910 General Industry and 1926 Construction Regulations; and
- Parsons, Battelle, and subcontractor requirements.

Subcontractors must conduct similar orientations for their staff and craft employees and must document all orientations using the Initial Subcontractor Employee Training Acknowledgement (Exhibit 5.1). The Project Manager maintains orientation documents and acknowledgement forms. Currently Parsons is not expected to have subcontractors on this project.

5.3 ZERO INCIDENT TECHNIQUES/START TRAINING

Consistent with Parsons corporate initiatives in safety, all Parsons managers and supervisors must complete Supervisory Training in Accident Reduction Techniques (START) training. Records of training completion are maintained by the Project Safety Manager and forwarded to the GBU Safety Director.

5.4 DAILY HUDDLE

Field supervisors conduct daily SH&E huddles with employees to review the day's work and to remind employees of SH&E work procedures established for the tasks at hand. SH&E huddles are informal and brief, usually 5 minutes, and all workers must participate. Supervisors should always ask whether any workers have questions before they are released for work.

Daily Planners such as Daily SH&E Planner (Exhibit 5.2) or the Take 5 Card (Exhibit 5.3) enable supervisors and employees to formally document SH&E huddle participation as well as the day's activities, associated risks, and relevant control measures. The daily safety huddle must be documented using either one of these forms or an alternate means of documentation to be determined by the Project Manager. Supervisors can distribute planners during SH&E huddles. Planners engage employees and improve the effectiveness of the safety huddle meeting.

If a field supervisor uses planners, employees must show the completed planner to any manager on a project for signature. This review becomes an audit of field supervisors and can be the basis of an incentive program, with signed cards being eligible for rewards.

Exhibit 5.1 – Initial Subcontractor Employee Training Acknowledgement

PARSONS

Initial Subcontractor Employee Training Acknowledgment

Name of Trainer: _____

Training Subject: _____

Training materials used: _____

Name of employee: _____

Date of hire/assignment: _____

I, xxx (name), hereby certify that I have received training as described above in the following areas:

- The potential occupational hazards in general in the work area and associated with my job assignment.
- General SH&E requirements indicate the safe work conditions, safe work practices, personal protective equipment, and environmental requirements required for my work.
- The hazards of any chemicals to which I may be exposed and my right to information contained on material safety data sheets for those chemicals, and how to understand this information.
- My right to ask questions, or provide any information to the employer on safety, health, or environment either directly or anonymously without any fear of reprisal.
- Disciplinary procedures the employer will use to enforce compliance with general safety requirements.
- I understand this training and agree to comply with general safety requirements for my work area.

_____ _____

Employee Signature Date

Exhibit 5.2 – Daily SH&E Planner

PARSONS Daily SH&E Planner (Sheet 1 of 3)		
Personal Safety & Health Planner for Your Daily SH&E Huddle		
Employee Name:	Date:	
Employee Number:	Craft:	
Supervisor:	Location of Work:	
Work Description:		
Employee Planning Checklist Complete the checklist for each new work operation. Check the "YES" box for those items needed to safely perform your work. All boxes marked "YES" should be properly addressed before the work operation begins.		
Employee Daily Work Area Assessment All conditions must be satisfied in order to start or continue working. Formally check your work area at least four times a day and at the start of teach new work operation. Report all problems to your supervisor.		
Employee Planning Checklist		
Personal Protective Equipment	Yes	N/A
Hard Hat/Safety Glasses	☐	☐
Face Shield	☐	☐
Goggles – Cutting, Chemical, Dust	☐	☐
Hearing Protection	☐	☐
Respirator	☐	☐
Gloves – Type	☐	☐
Clothing – Type	☐	☐
Foot Protection	☐	☐
Other	☐	☐
Special Equipment	Yes	N/A
Harness/Double Lanyards/Decelerator Device	☐	☐
Life Line – Horizontal, Vertical, Retractable	☐	☐
Air Monitor	☐	☐
Tripod/Rescue Devices	☐	☐
Barricades/Flagging	☐	☐
Fire Extinguishers	☐	☐
Signs	☐	☐
Electrical Insulating Materials, Blankets, Tools, Gloves	☐	☐
Chemical/Oil Spill Kits	☐	☐
Communication Devices – Radios, Horns	☐	☐

Exhibit 5.2 – Daily SH&E Planner (Continued)

PARSONS Daily SH&E Planner (Sheet 2 of 3)		
Employee Planning Checklist (Continued)		
Environmental Issues	Yes	N/A
Resource Conservation/Sustainability	☐	☐
Air Pollution/Emissions	☐	☐
Wastewater Discharges	☐	☐
Drinking Water	☐	☐
Management of Hazardous Materials and Hazardous and Solid Wastes	☐	☐
Emergency Response to Spills and Releases	☐	☐
Environmental Assessments	☐	☐
Buried Items	☐	☐
Protected Ecological and Cultural Resources	☐	☐
Specific Reports (Required by Environmental Regulation) on Toxic or Hazardous Chemicals Usage and Storage	☐	☐
Other	☐	☐
	☐	☐
	☐	☐
Work Permits	Yes	N/A
Activity Hazards Analysis	☐	☐
Trench and Excavation Notice	☐	☐
Confined Space Permit	☐	☐
Welding and Cutting Permit	☐	☐
Crane and Hoist Lift Plan	☐	☐
Crane Suspended Work Platform	☐	☐
Other	☐	☐
Tagging Procedure	Yes	N/A
Scaffolding	☐	☐
Lockout and/or Tagout	☐	☐
Other	☐	☐

Exhibit 5.2 – Daily SH&E Planner (Continued)

PARSONS Daily SH&E Planner (Sheet 3 of 3)									
Employee Daily Work Area Assessment									
Times									
Initials									
							Yes	N/A	
A means of safe access and egress is provided to my work area.							☐	☐	
My work area is clean and organized.							☐	☐	
I have the tools and equipment necessary to perform my work.							☐	☐	
My work area has adequate lighting.							☐	☐	
I know how to, and have the means available, to summon emergency assistance.							☐	☐	
I have a copy of, or have been trained on, the MSDS for the hazardous material I am working with.							☐	☐	
The equipment I am working on, or working in, has been properly tagged out/ locked out, cleaned, vented, and drained, as well as stored energy released as required.							☐	☐	
My work operation is properly controlled so that other workers will not be adversely affected by dust, fumes, sparks, slag, welding flash, floor holes, fall hazards, falling objects, overhead loads, slippery surfaces, etc.							☐	☐	
I have performed an act of safety.							☐	☐	
I have the necessary training to safely perform my work.							☐	☐	
I will not be handling liquid chemicals, fuels, etc. and do not need spill response equipment and supplies; or I have the materials and know how to get assistance if needed.							☐	☐	
I will not be discharging any wastewater or storm water from my work area.							☐	☐	
The work I am doing is not covered by an environmental permit.							☐	☐	
I do not generate any chemical wastes as part of work.							☐	☐	
I have the authority to stop unsafe operations!							☐	☐	
Supervisor's Safety & Health Audit									
Times:									
Initials:									
Safety, Health, and Environmental Suggestions:									

Exhibit 5.3 – Take 5 Card

PARSONS

Take Five

You are required to pause prior to each job and ask yourself the questions below.
Take corrective actions to mitigate hazards PRIOR to beginning the work.
Remember, no job is so important that you must jeopardize your safety. After any breaks or if conditions change, review again.

- ☐ Have I been properly trained?
- ☐ Have I reviewed the AHA for this task?
- ☐ Are there any changes in conditions that are not accounted for on the AHA?
- ☐ Do I have all the right people involved?
- ☐ Is there overlapping work I need to be aware of?
- ☐ Am I using the proper tools? Are they in good condition?
- ☐ Do I have the proper PPE?

I have reviewed each question above and am satisfied that all necessary precautions have been taken and my safety concerns have been mitigated. I will comply with the AHA.

_____Job

_____Employee Name

_____Work Order

_____Date

5.5 WEEKLY TOOLBOX SH&E MEETINGS

Parsons and its subcontractors conduct toolbox safety meetings at the beginning of each week. These meetings include topics relevant to upcoming work and may include reviews of recent incidents. The Project SH&E Manager or his designee documents toolbox training content and attendance and retains all records.

5.6 ACTIVITY HAZARDS ANALYSIS TRAINING

When the AHA is complete, the Parsons Site SH&E Officer or subcontractor conducts a training session with all employees involved with the task. The training may be informal and at the site where the task is performed. Employees should be given an opportunity to provide input regarding task steps, hazards identified, and appropriate control measures.

Employees acknowledge AHA training by signing the AHA training form (Exhibit 4.4) and the Site SH&E Officer documents and maintains the AHA training records.

5.7 REGULATORY TRAINING PROGRAMS

Regional, municipal, local, and OSHA regulations require specific training in certain circumstances. Based on the scope of work and meetings with regulatory officials, the following training topics are provided on the project, as warranted:

- General – all workers engaged in activities which are potentially exposed to hazardous substances and health hazards must be trained to meet 1910.120(e)(1). Annual 8-hour refresher training as per 29 CFR 1910.120(e)(3) is required for workers and supervisors must be trained to meet 29 CFR 1910.120(e)(4).
- CPR/AED/First aid and Bloodborne Pathogens – provided to Parsons' field personnel. See Section 13.1.
- Respiratory protection – must meet 29 CFR 1910.134. Medical qualification by a physician is required to wear a respirator. Annual fit testing and training is also required. No medical evaluation or fit testing is required for the use of escape-only respirators.

The Project Safety Manager organizes this training. Instructors are typically Parsons' SH&E experts certified in the topics they instruct.

5.8 SPECIALIZED TRAINING AND ORIENTATIONS

Project personnel receive specialized training on client rules and requirements as well as the unique tools, equipment, and procedures used to perform the work. The project budget includes funding for training, when required.

5.9 PROJECT SAFETY, HEALTH & ENVIRONMENT (SH&E) COMMITTEE

A SH&E Committee must be established when 5 full-time Parsons employees or when 25 or more total Parsons and subcontractor employees are assigned to the project. Typically this project will have less than 5 full-time employees, so no SH&E Committee will be required. SH&E Committee topics such as potential unsafe conditions, training needs, recent near misses/incidents, audit and

inspection results, and incentives will be discussed with project employees in safety briefings and meetings.

5.10 New Employee Orientation

The Talent Management Department has a comprehensive employee orientation program. The SH&E personnel help to develop applicable SH&E sections of the orientation and meet with new employees to review site procedures and requirements. Topics within this orientation include:

- Names of personnel responsible for site safety and health
- Reporting emergencies, incidents, and unsafe conditions
- Emergency plans
- Safety, health, and other hazards at the site
- Review of all activities on site and related AHAs (see Attachment A)
- Proper use of personal protective equipment
- Work practices by which a worker can minimize risk from hazards
- Safe use of engineering controls and equipment on site
- Acute effects of compounds at the site (Exhibit 4.2)
- Decontamination procedures
- Other applicable environmental issues and regulatory requirements

All new employees on a project, including new hires and transfers, must attend the site orientation program on their first day and sign an acknowledgment form indicating they attended and understood the orientation. Any employee who is unsure of any information presented in the orientation must request clarification. Employees who do not participate in the orientation or refuse to sign the acknowledgment cannot work on site and/or work in exclusion zones.

5.11 Awareness Campaign

The project has an awareness program consistent with the Parsons SH&E awareness campaign and its various elements (e.g., signs, posters, banners, and focus briefings). This program promotes employee awareness of SH&E goals and daily risks, hazards, and exposures in the field. In addition to topics selected by Corporate Safety each month, the project will supplement the awareness program with information specifically applicable to the scope of work.

Since there will not be a field office, the main awareness boards are those in the Parsons South Jordan (or other home) Office or the home office of non-Parsons Honolulu employees. The Site SH&E Officer will communicate and distribute necessary information in the morning safety briefings and as necessary. The Project SH&E Manager may also provide training, presentations, or informational materials as part of the awareness campaign.

5.12 Stakeholder PSHEP Alignment Meeting

A stakeholder PSHEP alignment meeting should be held before beginning any field work.

In lieu of a single Stakeholder PSHEP Alignment Meeting, all applicable Parsons field personnel, subcontractors, regulators, and client representatives will be provided a copy of this PSHEP. Each individual that participates in field activities will be required to review this document and provide a signature stating they accept and understand the provisions of the PSHEP prior to starting field work.

Parsons should present the PSHEP and obtain stakeholders concurrence with the approach outlined in the plan. The meeting should include a review of stakeholder roles and responsibilities and elements of control appropriate to project risks. Parsons may conduct separate teleconferences with stakeholders to obtain concurrence.

5.13 AUDITS AND INSPECTIONS

The Project SH&E Manager has implemented an audit and inspection program in conjunction with the GBU and Corporate SH&E and Quality Assurance Departments. The Project Manager conducts weekly site inspections. If the Project Manager is not onsite, the most senior person onsite will conduct the inspection. A weekly inspection report will be completed and saved in the project files. Office areas (including trailers) are audited using an audit/inspection checklists. There will not be a field office or trailer for Facility activities. Additional information on audits and inspections during construction is detailed in Section 4.5 and 4.6 of this PSHEP.

5.14 SH&E MEETINGS

All project meetings that include five or more people must begin with a SH&E moment. The meeting chairperson may present the SH&E topic or ask for a volunteer to open the discussion. In general, these "SH&E moments" are brief, perhaps a minute or two, and should be directly relevant to the work of the day or applicable to most employees (e.g., non-work related injuries, waste management procedures, effects of storm water discharges, home exposure to hazardous materials).

Monthly all hands SH&E meetings are held to review critical safety procedures, discuss safety incidents, and celebrate safety milestones. The Project Manager announces the time and schedule of these meetings at least one week in advance. These meetings will only be conducted during the duration of the Facility field program.

5.15 REWARDS AND RECOGNITION

5.15.1 Rewards and Recognition Program

Each Project should develop a "Rewards and Recognition" program to foster continuous improvement in SH&E performance. Each proposal should include sufficient budget to structure a project-specific program.

5.15.1.1 Rewards and Recognition Corporate Policy Procedure

Parsons Corporate Safety Rewards and Recognition Policy recognizes Parsons employees and project teams who make a performance contribution to Parsons SH&E. This policy recognizes achievements or accomplishments that contribute to the overall SH&E objectives of the company.

This policy outlines acceptable methods of rewards and recognition and provides sample plans that focus on leading indicators rather than lagging indicators. Projects and programs are encouraged to

reward their teams and individual employees with items from the Parsons Online Safety Products Store and are encouraged to base incentives on leading SH&E indicators.

Rewards and Recognition Procedure applies to all Parsons projects with a duration of at least 6 months. It also applies to additional joint venture projects as determined by the GBU President, GBU SH&E Director, and the Corporate SH&E Director.

5.15.1.2 Examples of Leading Indicators

Examples of leading indicators or actions to reward and recognize are as follows:

- Participating in or leading a safety meeting.
- Providing suggestions for improving workplace SH&E.
- Serving on a SH&E committee.
- Creating or revising an AHA worksheet.

Celebrations of achievements at a project or office level are still important. Project luncheons at milestone achievements are encouraged and are the appropriate place to recognize the collective achievements of working without incident. For additional information, please review the Rewards and Recognition Procedure.

Exhibit 5.4 represents regional, municipal, local, and/or OSHA regulations, owner, and Parsons corporate regulations and requirements applicable to the project. Based on the most recent risk assessments, the Parsons Project Manager and Project Safety Manager update the listed topics periodically. Training and other requirements are updated in this PSHEP as required by changes to Exhibit 5.4, Competent Person and Activity Hazards Analysis Requirements.

Parsons, Battelle, and its subcontractors are individually responsible for training their respective employees and for complying with all project requirements. Failure to comply could lead to disciplinary actions against Parsons employees and subcontractors or their employees. Further guidance is available in the Parsons Corporate Safety and Health Manual; ParShare link is as follows: Corporate Safety and Health Manual.

Exhibit 5.4 – Competent Person and Activity Hazards Analysis Requirements

Safety and Health Requirement	Parsons Safety, Health, and Environmental Manual	OSHA Regulation	EM 385-1-1 Regulation	Competent/ Qualified Person	Training Required	Written Plan and AHA Required
General Safety and Health		1926.20	01.A	*Yes*	*Yes*	*Yes*
Safety Training		1926.21	01.B.01	*Yes*	*Yes*	*Yes*
First Aid and Medical	2	1926.23, 50	03.A	*Yes*	*Yes*	*Yes*
Fire Protection and Prevention	12	1926.24, 150-155, 352	09.A	*Yes*	*Yes*	*Yes*
Housekeeping	4	1926.25	14.C	*N/A*	*N/A*	*N/A*
Illumination	4	1926.26, 56	07.A	*Recommended*	*N/A*	*N/A*
Sanitation	4	1926.27, 51	02.A	*N/A*	*N/A*	*N/A*

Exhibit 5.4 – Competent Person and Activity Hazards Analysis Requirements (Continued)

Safety and Health Requirement	Parsons Safety, Health, and Environmental Manual	OSHA Regulation	EM 385-1-1 Regulation	Competent/ Qualified Person	Training Required	Written Plan and AHA Required
Personal Protective Equipment	6	1926.28, 95-98, 100-107	05.A	*Yes*	*Yes*	*Yes*
Incorporation by Reference		1926.31	Preamble	*N/A*	*N/A*	*N/A*
Emergency Employee Action Plans	11	1926.35	01.E	*Recommended*	*Yes*	*Yes*
Noise Exposure	7	1926.52	05.C	*Yes*	*Yes*	*Yes*
Gases, Vapors, Dusts and Mists	9	1926.1926.55		*Yes*	*Yes*	*Yes*
Ventilation	37	1926.57, 353		*Recommended*	*Yes*	*Yes*
Hazard Communication	10	1926.59	1.B.06	*Yes*	*Yes*	*Yes*
Hazardous Waste Operations and Emergency Response	13	1926.65 1910.120	28.A	*Yes*	*Yes*	*Yes*
Accident Prevention Signs and Tags	16	1926.200	08.A	*N/A*	*N/A*	*N/A*
Signaling	16	1926.201	08.B	*Recommended*	*N/A*	*Yes*
Barricades	16	1926.202		*Recommended*	*N/A*	*N/A*
Material Storage	17	1926.250	14.B	*N/A*	*Yes*	*Yes*
Waste Disposal		1926.252	14.D	*Yes*	*Yes*	*Yes*
Tools	29	1926.300-307	13.A	*N/A*	*N/A*	*Yes*
Electrical	24	1926.400-415	11.E	*Yes*	*Yes*	*Yes*
General Electrical	24	1926.416	11.A	*Yes*	*Yes*	*Yes*
Batteries/Battery Charging Equipment	24	1926.441	11.E	*N/A*	*Yes*	*Yes*
Cranes, Derricks, Hoists, Elevators and Conveyors	26	1926.550	16.A	*Yes*	*Yes*	*Yes*
Motor Vehicles, Mechanized Equipment	25	1926.600-603	18.A	*Yes*	*Yes*	*Yes*
Site Clearing	32	1926.604	31.A	*N/A*	*Yes*	*Yes*
Excavations	33	1926.650-652	25.A	*Yes*	*Yes*	*Yes*
Excavation Permit	33	N/A	N/A	*Yes*	*Yes*	*Yes*
Stairways and Ladders Scope	18	1926.1050	21.A	*N/A*	*Yes*	*Yes*
Stairway/Ladder General Requirements	18	1926.1051		*Yes*	*Yes*	*Yes*
Stairways	18	1926.1052	21.E	*Recommended*	*Yes*	*N/A*
Ladders	19	1926.1053	21.D	*Yes*	*Yes*	*Yes*
Ladder/Stair Training	19	1926.1060		*Yes*	*Yes*	*Yes*
Internal Traffic Control	16	N/A	8.D	*N/A*	*Yes*	*Yes*
Traffic Movement Restriction Times	16	N/A	8.C	*N/A*	*Yes*	*Yes*

Exhibit 5.4 – Competent Person and Activity Hazards Analysis Requirements (Continued)

Safety and Health Requirement	Parsons Safety, Health, and Environmental Manual	OSHA Regulation	EM 385-1-1 Regulation	Competent/ Qualified Person	Training Required	Written Plan and AHA Required
Line Breaking	23	1910.119 and 1926.54		*Yes*	*Yes*	*Yes*
Major Material Movements	17	N/A	N/A	*N/A*	*Yes*	*Yes*
Right-of-way Restrictions	16	N/A	N/A	*Recommended*	*Yes*	*Yes*

SECTION 6 – PERSONAL PROTECTIVE EQUIPMENT

6.1 LEVELS OF PROTECTION AND PERSONAL PROTECTIVE EQUIPMENT

This PSHEP, in conjunction with Parsons Safety Policies and Procedures, serves as the written certification for use of PPE. The Parsons Project SH&E Manager has evaluated the scope of work and site-specific conditions for this project, and has established initial protection levels for the site work activities based on the anticipated levels of site contaminants, physical hazards, and scope of work, as specified in this section.

The personal protection level prescribed for the monitoring well installation at the Facility will be OSHA Level D or OSHA Level D-modified (increased protection such as polyvinyl chloride [PVC]/nitrile gloves or Tyvek® coveralls when handling chemicals or potentially contaminated material). Level C or Level B personal protection is not anticipated.

The specific protective equipment for the tasks outlined in this PSHEP is listed below. Only persons trained and experienced in using the monitoring equipment will be used to operate the on-site monitoring equipment.

Level D

- Safety glasses with side shields (or splash goggles, when liquid hazards exist)
- Safety boots (steel toe and shank)
- Hard hat (where bump and overhead hazards exist)
- Coveralls, long sleeve shirts
- Hearing protection when near heavy equipment or noisy environment (i.e., generators, drill rigs, etc.)
- High visibility traffic vests

Respirator protection is not anticipated and will only be allowed with approval from the Project Safety Manager. However if required and approved, respiratory protection, selection, use, and maintenance shall meet OSHA requirements and where applicable, the recognized consensus guidelines (American National Standards Institute [ANSI], National Institute for Occupational Safety and Health [NIOSH]). Facial hair that interferes with a satisfactory fit of the mask-to-face seal will not be allowed. Individuals will be required to provide documentation of safety training and fit testing before being allowed to wear respiratory protection equipment on this project. If Level C protection is necessary, a full-face respirator with organic vapor cartridge will be required to be worn by all persons entering the restricted work area.

Battelle staff and Battelle's subcontractors will be responsible for their own respiratory program, if required, while working at the site. Subcontractors shall purchase NIOSH-approved respiratory protection for use by their employees. Only those individuals who are medically qualified to wear respiratory protective equipment shall be issued respirators. A signed and dated physician's statement for respirator clearance must be filed with the Site SH&E Officer.

PPE used during the course of this field investigation will meet the following applicable OSHA Standards:

Type of Protection	Regulation	Source
Eye and face	29 CFR 1910.133	ANSI Z87.1
Respiratory	29 CFR 1910.134	ANSI Z88.1
Head	29 CFR 1910.135	ANSI Z89.1
Foot	29 CFR 1910.136	ANSI Z41.1

6.2 Action Levels

PELs, and TLVs (presented in Exhibit 4.2) should also be used to determine the required levels of protection for work activities. These measurements will be determined using the monitoring instruments or their equivalent as specified in Section 8.1 of this plan.

6.3 PPE Inspection, Cleaning, Maintenance, and Storage

All PPE will be inspected before being used to ensure that it is in functional order and that its structural integrity has not been compromised. Reusable PPE (such as safety glasses and hard hats) also will be inspected before being used if it has been in storage for any length of time and following any maintenance. Site personnel finding a piece of PPE that is defective will report it to the Site SH&E Officer, and the defective article will be repaired or replaced.

Any PPE stored and designated as emergency rescue equipment will be inspected when it is brought to the site or secured for the project, and periodically thereafter, to ensure that the equipment is not being adversely affected by prolonged storage. Any equipment found to be defective will be replaced immediately.

PPE will be maintained in accordance with the manufacturer's instructions, and only by personnel who have received proper instruction in the maintenance of the PPE. PPE will be stored in a manner that the equipment's natural shape is not compromised.

6.4 Escape-Only Respirators

All personnel working in the Facility are required to carry escape-only respirators provided by their company, and be trained in their use and maintenance. These respirators are intended for use in the event of a Facility emergency.

SECTION 7 – MEDICAL SURVEILLANCE

7.1 MEDICAL REQUIREMENTS AND WORKERS' COMPENSATION

In accordance with corporate requirements the Project SH&E Manager has established and implemented the following medical requirements for the project:

7.1.1 Functional Capacity Evaluations (FCEs)

FCEs may be required for the following positions:

- Hazardous Waste Operations and Emergency Response (HAZWOPER) – trained field personnel

FCEs are conducted by clinics performing medical monitoring physicals and WorkCare analysis.

7.1.2 Substance Abuse Tests

Parsons Talent Management Department administers required substance abuse tests for Parsons employees. For the Corporate Substance Abuse Policy, go to the PWeb, Policies and Practices, Corporate Policies folder. Battelle and Battelle's subcontractors shall adhere to their own corporate policies for substance abuse tests.

7.1.3 Onsite Medical Services and Panel of Physicians

The Parsons Corporate Workers' Compensation Analyst establishes Parsons medical providers for the project and selects medical facilities to treat work-related injuries and illnesses, as in Section 7.1.4.

7.1.4 Workers' Compensation Program

Parsons Corporate Risk Management Department establishes the workers' compensation carrier. If a workers' compensation (WC) loss involving a Parsons employee occurs, the Parsons Corporate WC Analyst, Donna Miller, handles all communication with the insurance carrier. Contact Donna Miller at 661-904-0978 or Donna.Miller@parsons.com, for additional information as needed.

Locations of the Parsons WC medical providers on Oahu are provided at the beginning and end of this PSHEP. While Parsons advises employees to use these providers, the employee may select medical care from a provider of his/her choice.

If a WC loss involving a Battelle employee or an employee of a subcontractor to Battelle occurs, they shall follow their respective employer's policies and procedures regarding workers' compensation carrier.

7.1.5 Medical Monitoring

Potential health hazards and potential exposures associated with this project require implementation of the following medical monitoring:

Labor Classification	Monitor for	Comments
Field Personnel	Noise	If noise exposures exceed 85 decibels over an 8-hour time weighted average, an employee must participate in a Hearing Conservation Program.
Field Personnel	Chemical exposures	If an employee is exposed at or above the Permissible Exposure Limit (PEL) of a chemical for more than 30 days in a year, they must participate in a Medical Surveillance Program.
Field Personnel	Respirator use	If an employee is required to wear a respirator on the project, they must participate in an appropriate Medical Surveillance Program for respirator use.

Tim Mustard, the Project SH&E Manager (303) 564-3537 administers the medical monitoring program for Parsons employees.

Personnel engaged in hazardous waste operations are required to be enrolled in a medical monitoring program, as specified in 29 CFR 1910.120(f). A letter signed by a physician attesting to each worker's fitness for duty will be provided to the Site SH&E Officer before the individual begins work. Medical examination certifications will be obtained for all Parsons, Battelle, and subcontractor field personnel as necessary prior to the start of field work, and will be kept on file at the project field site.

Participation in a medical surveillance program is not required for the use of escape-only respirators.

7.2 MEASUREMENT AND REPORTING

7.2.1 Emergencies

7.2.1.1 Work Care – For Domestic Use Only

For domestic project use only, Parsons and WorkCare have partnered together to promote Incident Intervention™, a resource designed to provide Parsons employees with immediate access to qualified medical clinicians who are able to provide our employees with prompt medical assessment in the event of nonlife threatening, nonmedical emergency work related injury or illness. Through this process, Parsons can leverage clinical expert resources to coordinate appropriate treatment care. WorkCare serves as a "medical advocate" for the employee, the WorkCare clinician provides responsive evaluation of the incident, assists the employee/employer in determining the most appropriate course of action, and consults with the treating physician.

7.2.1.2 Work-Related Injury Procedures

Parsons Employees

If the incident that occurred is serious/life threatening or requires emergency response, first summons medical attention before contacting your GBU Safety Director, filing the IndustrySafe Online Incident Report, or involving WorkCare.

To coordinate the WorkCare triage process, it is imperative that Parsons employees report all work-related injuries immediately to their supervisors.

For work-related injuries or illnesses that may require physician direction on appropriate treatment, Parsons employees should then promptly contact WorkCare, ideally before seeking medical care, as this will provide the greatest opportunity for appropriate intervention.

If an injured employee requires medical care for a work related injury/illness, the Order for Treatment of Work-Related Injury/Illness Form MUST be sent with the injured worker and/or faxed to the occupational medicine clinic at the time of the initial evaluation. Here is the link to the document on ParShare: Order for Treatment of Work-Related Injury or Illness. WorkCare forms will be provided to the Site SH&E Officer.

WorkCare's Incident Intervention is available 24/7 and 365 days per year.

WorkCare contact number is **1-888-449-7787**.

Be prepared to provide the following:

- Injured worker's name
- Injured worker's contact number
- Injured worker's location (at a minimum include the city and state)
- Employee ID number
- Employee's GBU
- Employee's project or office location
- Functional manager's name

Battelle and Subcontractor Employees

If an employee of Battelle or their subcontractors sustains an injury appropriate care will be given in accordance with their company procedures. The Parsons SH&E Officer may file an IndustrySafe Online Incident Report.

Battelle and their subcontractors will be responsible for making notifications within their respective organizations Employees of Battelle and their subcontractors are not required to coordinate care of injuries with WorkCare unless required by their company policy.

7.2.2 Measurement and Compliance

To accurately measure performance and comply with corporate and regulatory requirements, Parsons, Battelle, and its subcontractors have an emergency communications system to contact the following for the events listed below:

Parsons:

Program Manager	Ed Heyse	256-217-2573 (w) 303-563-9452 (c)

Project Manager	Gene Wright	301-553-3317 (w) 801-592-4279 (c)
Site SH&E Officer	Thomas Jensen	801-553-3311 (w) 801-380-1375 (c)
Site SH&E Officer (alternate)	William Stohler	808-258-7371 (c)
Project SH&E Manager	Tim Mustard, C.I.H.	303-564-3537

Battelle:

Project Manager	Carolyn Scala	215-504-5003 (w) 609-548-6082 (c)

This notification information is provided to site workers. In addition, this information is prominently displayed in the PSHEP (e.g., on the back of the plan cover).

The SH&E Manager and Quality Manager establish a measurement system to provide indicators of SH&E performance, including the following metrics:

- Consecutive days without a recordable incident
- Consecutive days without a days-away-from-work incident

7.2.3 Incident Reporting

Employees involved in or witnessing an injury, worker exposure, environmental incident, or near miss must immediately report it to the responsible on-site supervisor, who in turn immediately relays the report to the Parsons Site SH&E Officer (Thomas Jensen, 801-380-1375), the Parsons Project Manager (Gene Wright, 801-553-3317 or 801-592-4276), and to Battelle's Project Manager (Carolyn Scala, 215-504-5003 or 609-548-6082). No supervisor may decline to accept or relay a report of SH&E incident or significant near miss from a subordinate.

Parsons Incident Reporting

Parsons Project Manager must ensure that all SH&E incidents are reported to the GBU SH&E Director and other management personnel (as required) within four hours. The Project SH&E Manager or Site SH&E Officer (who have been trained on Parsons reporting requirements and Online Safety Reporting System) prepares and submits SH&E reports.

The Project SH&E Manager must notify the local OSHA office and/or regional, municipal and/or local regulations office in writing within 8 hours if an accident involves the death of an employee or hospitalization of three or more workers. In addition, spills/releases of reportable quantities and other reporting required by environmental regulation are the responsibility of the Project SH&E Manager.

Battelle's Incident Reporting

Battelle employees shall follow Battelle's incident reporting procedures and requirements.

7.3 INCIDENT INVESTIGATIONS

All accidents, worker over exposures, environmental incidents and significant near misses are investigated by an individual or team with training in incident investigation and root cause analysis. Subcontractors must investigate incidents involving their employees or activities and submit an investigation report to the Parsons Project Manager within 48 hours of an incident.

In Parsons, the GBU SH&E Director investigates or assigns an investigator to each significant incident. The investigator submits a final investigation report using the online safety reporting system within 72 hours of the incident. The Project SH&E Manager maintains the investigation file.

7.4 RESPONSIBILITY/IDENTIFICATION OF KEY LINE PERSONNEL

Project Key Personnel - Parsons

Project Office:	Parsons South Jordan, Utah Office	
Address:	10235 South Jordan Gateway, Suite 300 South Jordan, UT 84095	
Telephone	Fax	Email
(301) 572-5999	(801) 572-9069	
Company Executive responsible for project		Contact No.
Todd Heino, P.E. V.P.		Direct Line: (617) 449-1405 Cell Phone: (339) 206-7413 Email: todd.heino@parsons.com
Program Manager		Contact No.
Ed Heyse, PhD, P.E		Direct Line: (256) 217-2573 Cell Phone: (303) 563-9452 Email: ed.heyse@parsons.com
Project Manager		Contact No.
Gene Wright, P.G.		Direct Line: (801) 553-3317 Cell Phone: (801) 592-4276 Email: gene.wright@parsons.com
Project Safety, Health, and Environment Manager		Contact No.
Tim Mustard, C.I.H.		Cell Phone: (303) 564-3537 Email: tim.mustard@parsons.com
Field Team Manager/Site Safety, Health, and Environment Officer		Contact No.
Thomas M. Jensen, P.G. William Stohler (Alternate)		Direct Line: (801) 553-3311 Cell Phone: (801) 380-1375 Email:mitch.jensen@parsons.com Cell Phone: (808) 258-7371 Email: william.stohler@parsons.com
Client Project Management POC		Contact No.
Mr. Bruce Tsutsui, NAVFAC-Pacific		Direct Line: (808) 471-1171 x353 Email: bruce.tsutsui@navy.mil

The personnel listed above have the authority and responsibility for implementing the provisions of this project.

SECTION 8 – EXPOSURE AIR MONITORING AND AIR SAMPLING PROGRAM

8.1 AIR MONITORING/SAMPLING

Air monitoring will be used to identify and quantify airborne levels of hazardous substances. Periodic monitoring is required during some onsite activities. Only activities which may encounter airborne contamination (i.e., drilling) require air monitoring. Drilling activities at locations cross-gradient to groundwater flow are not expected to result in exposure to any of the contaminants discussed in this safety plan. However the following discussion will be followed in the event that air monitoring results indicate the presence of contaminants.

The types of monitoring and equipment that may be used are described below.

Type of Equipment	Minimum Calibration Frequency	Parameter(s) to be Measured	Minimum Sampling Frequency	Sampling Locations
Photoionization Detector (PID)	Daily or as needed	Organic Vapors	5-ft intervals (while drilling) At each well during sampling Continuous if VOCs detected above background	Breathing zone (while drilling, and performing groundwater sampling)
Colorimetric Tubes	None	Organic Vapors	If PID readings ≥ 0.5 ppm above background for benzene	Breathing Zone
Personal Sampling Pump	Before and after use to determine average flow rate	Organic Vapors, others as necessary	When PID readings ≥ 0.5 ppm above background.	At locations of highest concentrations of contaminants.
Passive Diffusion Badges	None	Organic Vapors	When PID readings ≥ 0.5 ppm above background.	At locations of highest concentrations of contaminants.

8.1.1 Photoionization Detector (PID) and Colorimetric Detector Tubes

During field investigation activities, a PID such as PhotoVac MiniRae® or MicroTIP®, will be used to measure ambient air concentrations in the worker breathing zone along with colorimetric, chemical-specific Sensidyne®, Dräeger®, or equivalent tubes as needed. The PID will have an 11.7 elevtron volts (eV) lamp that will allow it to detect the volatile petroleum hydrocarbon constituents of concern, including 1,2-dichloroethane (1,2-DCA).

The PID will be calibrated with 100 parts per million (ppm) isobutylene gas in accordance with manufacturer's specifications. To detect specific contaminants of concern (COCs) and their concentrations, colorimetric detector tubes may be used in areas where these compounds have been previously detected or are suspected in the soil and/or groundwater.

Benzene and 1,2-DCA (PEL = 1 ppm) are sometimes found at petroleum-release sites, and are the potential contaminants with the lowest action limits. Although benzene has a PEL of 1 ppm and a TLV or 0.5 ppm, at petroleum release sites, benzene is present as a fuel component rather than a pure chemical, so it is not expected to be present at a concentration of 1 ppm, until a PID reading of 2.5 ppm due to interference with the other BTEX components. Therefore, benzene has an action level of 2.5 ppm. The contaminants of concern (COCs) with the lowest exposure limit on this site at the source area are 1- and 2-methylnaphthalene (TLV = 0.5 ppm).

Since no detector tubes are available for 1,2-DCA and 1- and 2-methylnaphthalene for the required range, if the air monitoring with a PID indicates organic vapor concentrations of 0.5 ppm above background sustained for more than 30 seconds in the worker breathing zone, the field team will employ engineering controls, such as fans, to mitigate the inhalation hazard. Colorimetric tubes are available for benzene and can be used if necessary or requested.

If engineering controls and work practices are ineffective in keeping levels less than 0.5 ppm above background in the breathing zone, the Site SH&E Officer, with concurrence from the Project SH&E Manager, will determine whether it is safe to continue activities without respiratory protection or upgrade to Level B or C protection.

8.1.2 Personal Air Monitoring

Personal air monitoring using passive diffusion badges or pumps and sorbent tubes will be conducted to document employee exposure if contaminants are observed at levels exceeding their action levels (the lower of the PEL or TLV).

SECTION 9 – ENVIRONMENTAL HAZARDS

9.1 ENVIRONMENTAL HAZARDS

Environmental hazards can occur from heat stress, hypothermia, solar radiation, and fires and explosions. Heat stress could occur in Hawaii at any time of the year, especially when protective clothing decreases the body's natural ventilation. Heat stress can occur even when temperatures are moderate if employees are wearing impermeable protective clothing. Average high temperatures in the lowlands of Oahu are approximately 79 degrees Fahrenheit (°F), with decreasing temperatures at higher elevations. Average high temperatures are coolest in January (72°F) and warmest in August (89°F). Average humidity on Oahu ranges from approximately 8% to 60%. Heat stress will be a factor for work outside the Adit 3 tunnel entrance but should not be a factor inside the tunnels because they are ventilated with temperature control.

By knowing the initial warning signs and acting on them, hyperthermia should not be a factor at the job site.

9.1.1 Heat Stress

Heat stress prevention is important because once a person suffers from heat stroke or heat exhaustion, that person may be more likely to have additional heat-related illnesses. The following steps to prevent heat stress should be followed:

- Urge workers to drink water to keep their body fluids at normal levels. Constantly use the buddy system to ensure that all personnel are adequately hydrated. In order to minimize the occurrence of heat stress; drink 16 ounces of water before beginning work, such as in the morning or after lunch.
- Provide a cool, shaded, or air-conditioned area for rest breaks.
- Discourage the intake of coffee during working hours. Avoid consuming alcohol and caffeinated beverages that dehydrate the body.
- Adjust work schedules according to monitoring requirements and performing work during cooler hours of the day. In hot weather, consider conducting labor-intensive field activities during the early morning or evening hours.
- Allow individuals to acclimate to site work conditions by slowly increasing workloads. Do not begin with extremely demanding activities.
- Ensure that adequate shelter is available to protect personnel against heat that can decrease physical efficiency and increase the probability of heat stress.

Prolonged exposure to an extremely hot, humid environment may lead to heat cramps, heat exhaustion, or heat stroke. Recognizing the signs of various forms of heat stress and providing immediate treatment is crucial to maintaining the health of project personnel.

Exhibit 9.1 provides a summary of the symptoms and treatment of the three forms of heat stress: heat cramps, heat exhaustion, and heat stroke. Heat stoke occurs when the body is no longer able to cool itself.

Heat stress monitoring will be initiated for workers wearing semi-permeable or impermeable clothing, when temperatures above 70°F (21 degrees Celsius [°C]), using one or both of the following methods:

- Heart rate. Count the radial pulse during a 30-second period as early as possible in the rest period.
- If the heart rate exceeds 110 beats per minute at the beginning of the rest period, shorten the next work cycle by one-third and keep the rest period the same. A standard work cycle is considered 80 % work and 20 % rest (i.e. every 4 hours of work there is 1 hour of rest). If the heart rate still exceeds 110 beats per minute at the next rest period, shorten the following work cycle by one-third.
- Oral temperature. Use a clinical thermometer (3 minutes under the tongue) or similar device to measure the oral temperature at the end of the work period (before drinking).
- If oral temperature exceeds 99.6°F (37.6°C) at the beginning of the next rest period, shorten the following cycle by one-third. If oral temperature still exceeds 99.6°F (37.6°C) at the beginning of the next rest period, shorten the following cycle by one-third.
- Do not permit a worker to continue current activities when oral temperature exceeds 100.6°F (38.1°C).

Exhibit 9.1 Symptoms and Treatment of Heat Cramps, Heat Exhaustion, and Heatstroke

Condition	Symptoms	Treatment
Heat Cramps	The victim may perspire profusely and suffer from severe muscle cramps and pain, especially in the muscles of the legs or the abdomen. Faintness, dizziness, and exhaustion may be present.	Remove the victim to a cool, shady location and give them salty liquid. Rest and inactivity are important. Gently stretch the leg muscles by pulling the toes up to relieve the pain. The victim should rest for at least 12 hours prior to resuming any additional activity. Do not massage the muscle or give salt tablets.
Heat Exhaustion	The victim is listless, fatigued, and faint. Skin is ashen, cool, and damp, and the victim is often sweating profusely. Weakness, dizziness, headache, nausea, blurred vision, irritability, and mild muscular cramps are common. Temperature is normal and pulse is thready and elevated, possibly to 100 beats per minute. In severe cases, the victim is in a semiconscious or unconscious state.	Loosen clothing and place the victim in a reclining position in a cool, shady location. Administer cool water or a saltwater solution orally. Cool the person down by removing the clothing and sponging with cool cloths. The victim should rest for at least 24 hours. Normally this condition is easily reversed and nonfatal; however, if the person does not respond well to treatment or appears overly fatigued, refer immediately to a hospital.
Heatstroke	The onset of heatstroke is rapid. Initially, the person experiences headache, nausea, and weakness. Later, signs of confusion, lack of coordination, and lapse into unconsciousness may occur. Skin is hot, flushed, and dry, and the person appears feverish. Pulse rate is high, up to 160 beats per minute, and temperature is elevated to 105 °F to 110 °F.	The victim's temperature must be immediately reduced to below 100 °F. Immerse in a tub of ice water, use an alcohol rub, or cover with wet sheets and/or blankets soaked in cold water. Vigorous massaging with cold cloths or ice cubes is valuable in reducing the temperature. When temperature is reduced, keep the victim in a cool, well-ventilated area. Immediately obtain an ambulance and medical assistance. *Caution*: Prolonged cold after temperature has been reduced may cause hypothermia.

9.1.2 Solar Radiation

Excessive exposure to the sun may cause sunburn, cancers, and eye damage from ultraviolet (UV) radiation. The best defense against sunburn and skin cancer is to wear a hat, pants, and long-sleeved shirt when working outdoors. Sunscreens with a high Sun Protection Factor (SPF) (such as SPF-30 or greater) should be applied to exposed skin 30 to 60 minutes before exposure and **reapplied periodically**. Ultraviolet radiation contained in sunlight not only causes sunburn, but can result in eye inflammation, cataracts, and retinal injury. Personnel should choose sunglasses with side shields and lenses, which filter out UV radiation.

9.1.3 Fire and Explosions

The field team will be equipped with fire extinguishers. Field team members will be trained in the use of the extinguishers. Personnel may fight small fires if it is safe to do so. In the event of a fire or explosion, move personnel to a safe location (an established rally point) within the tunnels system and account for each individual and then evacuate to the nearest adit entrance (exit) and make notification through the proper channels.

SECTION 10 – STANDARD OPERATING PROCEDURES (SOPS)

10.1 GENERAL SAFETY

Field personnel will be able to recognize and understand potential hazards associated with the operations they will be performing. Personnel active in site operations must be thoroughly familiar with the programs, practices, and procedures outlined in this PSEHP. Additional information may be provided by Facility personnel.

The following are considered standard safe work practices/rules for work on this project.

- Eating, drinking, chewing tobacco, smoking, and carrying matches or lighters are prohibited in a contaminated or potentially contaminated area or where the possibility for contamination transfer exists.
- Personnel will avoid contact with potentially contaminated substances or materials. Avoid, whenever possible, kneeling or sitting on the ground. Do not place monitoring equipment on potentially contaminated surfaces.
- All field members should be alert to all potentially dangerous situations (e.g., presence of strong, irritating, unusual, or nauseating odors).
- Personnel will employ appropriate work practices and engineering controls as necessary to minimize exposure to contaminants.
- For the site, field personnel shall be familiar with:
  - Potential harmful chemicals,
  - Terrain,
  - Location of work zones,
  - Location of emergency equipment, and
  - Designated PPE and clothing for work assignment.
- All workers will use protective equipment as specified in this PSHEP.
- Wearing PPE can impair the ability to operate site equipment. All field personnel should pay specific attention to decreased performance capabilities resulting from the use of PPE, such as poor tactile skills when wearing certain types of gloves. Prior knowledge of the limitations imposed by the use of such equipment will allow the worker to compensate for the decrease in his or her capability to perform, allowing for conduction of field operations in a safe manner.
- Wearing jewelry, such as rings and loose bracelets and necklaces, is prohibited for personnel operating mechanized or electrical field equipment in order to avoid their entanglement in or interference with such machinery or equipment.
- Overhead power lines or buried cables pose a danger of shock or electrocution if workers contact or sever them during operations. The location of these potential hazards will be ascertained before beginning site activities.
- Buddy system procedures will be enforced during site operations.

- Inspect for the presence of homeless persons and take proper precautions.
- Site personnel will perform only those tasks that they are qualified to perform.
- Site visitors will be escorted by qualified personnel at all times.
- Running and horseplay are prohibited in all areas of the site.
- The number of personnel in the Exclusion Zone (EZ) will be the minimum number necessary to perform the task in a safe and efficient manner.

10.2 WORK PERMITS

No work permits are anticipated for the Tank 5 area characterization at the Facility. Should unforeseen permits be required, NAVFAC will be notified and the permit will be prepared and approved.

10.3 MATERIAL HANDLING (INCLUDING DRUM AND CONTAINER HANDLING)

Material handling including the handling of roll-offs, drums, and small containers are discussed in the applicable AHA.

10.4 ACTIVITY HAZARD ANALYSIS

AHAs are included in Attachment A.

10.5 PRECONSTRUCTION PHASE SOPS

10.5.1 Risk Analysis and Safety Specification Development

Parsons procurement procedures require that a site-specific SH&E risk analysis be conducted before issuance of construction request for proposals (RFPs). Using the prebid risk analysis checklist, the Project Manager leads this analysis to document existing exposures that may impact the work, surrounding facilities, equipment, workers, or the public at large. The analysis includes locating, documenting, and photographing items such as:

- Overhead and underground power lines
- Sewer and water utilities
- Existing building interferences
- Crane access ways
- Traffic
- Security
- Fences
- Water hazards
- Existing geographical and environmental conditions
- Confined spaces

- Potential for environmental spills/releases
- Wastewater discharges
- Air emissions
- Waste and hazardous materials management
- Damage to ecological or cultural resources
- Risks due to buried items
- Other environmental regulatory requirements

Upon completion of the site risk analysis, high-risk activities are listed in the RFPs (as applicable), and bidders must describe controls and mitigation strategies to address these activities in their proposals. The RFP should note that the list is representative and that the selected contractor must identify and control all work-related hazards, worker exposures and potential environmental incidents.

Currently Parsons is not expected to have subcontractors on this project, but this and the following information is presented if the contract changes.

10.5.2 Design and Constructability Review

Periodic constructability reviews are held in accordance with the Project Management Plan. The Project SH&E Manager participates in the review to ensure that safety, health and environmental issues are adequately addressed. During the constructability review, the discussion focuses on how work is sequenced, potential interference with continuing operations, and safe and environmentally compliant work approaches. AHAs conducted before work begins can mitigate identified/presumed risks.

10.5.3 Prebid Meeting

Prebid meetings may be required to ensure that bidders understand the RFP. These meetings must include a discussion of safety, health and environmental performance expectations. During the prebid meeting, the Project Manager can use the Preconstruction SH&E Meeting, Site Specific SH&E Review Checklist, and Project Technical and General Conditions Specification Review (3 Sheets) (Exhibit 10.1) to review the project SH&E philosophy, principles, and Parsons requirements with prospective bidders. Although this information is included in the RFP, the meeting reinforces the message.

10.5.4 Subcontractor Prequalification Review

Parsons project procurement procedures require that all Parsons subcontractors submit prequalification documentation for evaluation. Parsons Project Manager or Project SH&E Manager conducts the safety prequalification evaluation in accordance with the attached Parsons subcontractor prequalification process and form Subcontractor SH&E Qualifications Scorecard (Exhibit 10.2). No Parsons subcontractors are expected on this project. Battelle will be responsible for pre-qualifying their subcontractors.

10.5.5 Preconstruction Meeting

Parsons and Battelle's Project Managers will hold a preconstruction meeting before the subcontractor begins work. The meeting includes subcontractor representatives, Battelle's Project Manager, Parsons Project Manager, the Field Team Managers, and subcontractor representatives. This meeting may be held via a telephone conference call. During the SH&E review, meeting participants review specific SH&E concerns, the prebid risk analysis, and competent person and site-specific SSHEP requirements. The Project Managers provide the SH&E Points of Contact and emergency management information. Parsons Project Manager uses the Preconstruction SH&E Meeting, Site Specific SH&E Review Checklist, and Project Technical and General Conditions Specification Review (3 Sheets) (Exhibit 10.1) to document the meeting.

10.5.6 Competent Person Submission Review

Parsons, Battelle and its subcontractors must identify the OSHA-regulated and certified competent persons for work or tasks that require this level of expertise. The supervisor of the competent person must certify the specific competencies of the named competent person in writing. A designated competent person will be identified by Parsons for drilling operations prior to the start of the drilling program.

The supervisor and competent person sign and submit the Competent Person Form (Exhibit 10.3) to the Parsons Project Manager. (Note: click on this link for the Subcontractor Competent Person Form).

Exhibit 10.1 – Preconstruction SH&E Meeting, Site-Specific Review, and Project Technical General Conditions Specification Review Form

PARSONS Preconstruction SH&E Meeting Site-Specific SH&E Review Checklist Project Technical and General Conditions Specification Review (Sheet 1 of 3)	
Date:	
Subcontractor Representative:	
Phone:	
Project Location:	
Parsons Project Manager:	
Phone:	
Subcontractor Safety & Health Representative:	
Phone:	
Parsons Safety & Health Manager:	
Phone:	
Subcontractor Environmental Representative:	
Phone:	
Parsons Environmental Representative:	
Phone:	
This checklist supports the identification of work activities and programs in a preconstruction SH&E meeting. This list also includes items identified through the subcontractor review and high-risk activities identified through the project specification review. High-risk activities (denoted with an asterisk) checked with a checkmark must be followed up during the construction phase with training, written plans and/or a specific Activity Hazard Analysis (AHA). This list should be reviewed with prospective bidders during the pre-bid meeting. NOTE: Use check box and add specifics and details as applicable (next to the callouts)	
SAFETY & HEALTH	
☐	Site-Specific Safety, Health and Environmental Plans
☐	Competent/Qualified Person Documentation
☐	SH&E Audits/Inspections
☐	Subcontractor Responsibilities
☐	Site Orientation Requirements
☐	Preconstruction SH&E Meeting/Date
☐	Crane Inspection Certification
☐	Personal Protective Equipment (PPE) (Work activities or work site requires hearing protection/using respirators/special protective clothing/other)
☐	Public Exposure (Work activities or location requires special precautions to protect the public)
CONSTRUCTION SAFETY ISSUES	
☐	Steel Erection (SENRAC Requirements)
☐	Excavations/Trenching
☐	Powered Industrial Trucks, Fork Lifts
☐	Crane Work/Heavy Lifts, Rigging
☐	Work involving Hazardous Materials

Exhibit 10.1 – Preconstruction SH&E Meeting, Site-Specific Review, and Project Technical General Conditions Specification Review Form (Continued)

PARSONS Preconstruction SH&E Meeting Site-Specific SH&E Review Checklist Project Technical and General Conditions Specification Review (Sheet 2 of 3)	
CONSTRUCTION SAFETY ISSUES (Cont-d)	
☐	Electrical Tie-ins/Lockout – Tagout
☐	Aerial Lift Work – Scissor Lifts, Extendable Boom, etc.
☐	Underground, Caissons, Cofferdams
☐	Scaffold Erection/Work
☐	Demolition
☐	Marine Work/Live Boating
☐	Heavy Hauling
☐	Concrete
☐	Diving
☐	Work Adjacent to Production Areas
☐	Site Security/Visitor Control/Public Areas
☐	Process Safety Management (PSM)
☐	Permits (Excavations, Scaffolding, Demolition, Traffic, Confined Space, Hot Work, Line Breaking, etc.)
☐	Confined Space (Confined space entry is required)
☐	Welding and cutting (Acetylene/gas cutting, arc welding, soldering and brazing)
☐	Ladders (Portable ladder use is required)
☐	Traffic Control (Work is on or near highways, roads, or mass transit)
MEDICAL	
☐	Substance Abuse Screening
☐	Emergency Procedures
☐	Site Security
☐	Smoking Policy
☐	Medical Services Requirements
☐	Treatment Locations, Addresses, and/or Phone List
ENVIRONMENTAL	
☐	Environmental Hazards
☐	Air Pollution/Emissions and required reporting
☐	Wastewater Discharges
☐	Drinking Water
☐	Management of Hazardous Materials and Hazardous and Solid Wastes
☐	Emergency Response to Spills and Releases Environmental Assessments
☐	Protected Ecological and Cultural Resources
☐	Specific Reports on Toxic or Hazardous Chemicals Usage and Storage (Required by Environmental Regulation)

Exhibit 10.1 – Premobilization SH&E Meeting, Site-Specific Review, and Project Technical General Conditions Specification Review Form (Continued)

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Preconstruction SH&E Meeting Form
Site-Specific SH&E Review Checklist
Project Technical and General Conditions Specification Review (Sheet 3 of 3)

	ENVIRONMENTAL (Cont-d)
☐	Materials to be Recycled
☐	Possibility of Buried Items Onsite (cultural artifacts, tanks, wastes, and ordinance) and what to do if encountered
☐	Environmental Regulatory Requirements
☐	Environmental Assets
☐	Resource Conservation/Sustainability

Additional Notes/Comments:

ATTENDEES

Name	Title	Company

Exhibit 10.2 – Subcontractor SH&E Qualification Scorecard

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Subcontractor SH&E Qualification Scorecard (Page 1 of 3)

Safety and Health

1. Select the type of activity that best describes the services that your company performs:

☐ Asbestos Abatement	☐ Carpentry	☐ Concrete	☐ Consulting	☐ Demolition	☐ Earthwork
☐ Electrical	☐ Engineering	☐ Maintenance	☐ Masonry	☐ Plumbing / HVAC	☐ Roofing / Sheet Metal
☐ Surveying	☐ Steel Erection	☐ Other (Describe) _____			

2. ☐ Yes ☐ No Do you have a written safety program? If yes, provide a copy of the table of contents and a copy of your firm's policy statement.

3. ☐ Yes ☐ No Do your safety procedures comply with government agency requirements? If yes, provide name of agency/agencies. _____

4. ☐ Yes ☐ No Do you require and use site-specific safety plans?

5. ☐ Yes ☐ No Does your company have a written drug/substance abuse policy with testing?
What type? ☐ Pre-employment ☐ Post Accident ☐ Just Cause ☐ Random

6. ☐ Yes ☐ No Do you have a site orientation program for new hires?

7. ☐ Yes ☐ No If you have an orientation program for new hires, does it include subcontractors?

8. ☐ Yes ☐ No Do you require subcontractors to submit safety plans?

9. ☐ Yes ☐ No Do you hold documented site safety meetings for field supervisors?
How Often? ☐ Weekly ☐ Biweekly ☐ Monthly ☐ Daily

10. ☐ Yes ☐ No Do you hold craft toolbox safety meetings?
How Often? ☐ Weekly ☐ Biweekly ☐ Monthly ☐ Daily

11. ☐ Yes ☐ No Do you hold pre-task safety meetings with your employees?

12. ☐ Yes ☐ No Does your company use activity hazard analysis (AHAs), job safety analysis (JSAs), job hazard analysis (JHAs), or the like to identify and mitigate or eliminate hazards prior to performing high risk or nonroutine activities?

13. ☐ Yes ☐ No Do any of your employees wear a respirator for more than 30 days a year?

14. ☐ Yes ☐ No Does your company conduct air monitoring to determine if employees are exposed to hazardous substances or health hazards at or above the established permissible exposure limit, without regard to the use of respirators?

15. ☐ Yes ☐ No Have you been inspected by OSHA or received any OSHA citations in the past 5 years? If yes, provide an attachment describing the outcome of the inspection along with copies of citations received. Provide a description of the actions taken to abate the citations as an attachment to this application. Respond to any open citations shown on the OSHA website (www.osha.gov).

16. ☐ Yes ☐ No Identify below by name, phone number, and title the person in your firm directly responsible for the firm's Safety Program management and attach a copy of his or her resume to this application.
_____

17. How do you conduct project safety inspections, and how often are they performed?
_____
_____
How often? ☐ Other – Insurance Carrier ☐ Monthly – Not Documented ☐ Weekly – Not Documented
☐ Monthly – Documented ☐ Weekly – Documented ☐ As Required – Documented

18. Describe your firm's program to motivate, encourage, and monitor safe work performance.
_____
_____

19. ☐ Yes ☐ No What type of incident(s) is investigated to determine root cause and develop corrective actions?
☐ Injuries ☐ Equipment/Property Damage ☐ Environmental ☐ Near Misses

Exhibit 10.2 – Subcontractor SH&E Qualification Scorecard (Continued)

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Subcontractor SH&E Qualification Scorecard (Page 2 of 3)

OSHA INFORMATION

* Please use your OSHA 300 Log to fill in the number of injuries and illnesses for the last 3 years

Year	1	2	3
Number of lost/restricted workday cases (Totals OSHA 300 Log, columns K and L).			
Number of recordable cases + without restricted activity or lost workdays (Totals OSHA 300 Log, columns I and J).			
Number of fatalities (Totals + OSHA 300 Log, column G)			
Total OSHA Log A			

Total employee hours worked in the last 3 years (do not include any nonwork time, even through paid)

Year	Hours (B)
1	
2	
3	

Recordable Injury Frequency Rate
Multiply total for each year (A) x 200,000 and divide by total employee hours for that year (B)

$$\frac{A \times 200{,}000}{B}$$

Year	Rate
1	
2	
3	

Experience Modification Rate (EMR)

Policy Year	EMR
1	
2	
3	

Are the following accident records and accident summaries kept ? How often are they recorded?

	No	Yes	Monthly	Annually
Accidents totaled for the entire company	☐	☐	____	____
Accidents totaled by project	☐	☐	____	____

	OSHA 300a injury summaries for the last 3 years should be provided with this evaluation document.
	Provide a description and root cause analysis for each fatality or lost time injury for the past 3 years.
	Provide copies of investigation reports from the last 3 injuries or Workers' Compensation claims, not including any fatality or lost time injury.

The Applicant shall maintain records of such evaluations and make them available for review and approval of Parsons representatives at all reasonable times should Applicant be awarded a contract based on this application.

Exhibit 10.2 – Subcontractor SH&E Qualification Scorecard (Continued)

PARSONS Subcontractor SH&E Qualification Scorecard (Page 3 of 3)		
Environmental [a]		
1.	☐ Yes ☐ No	Do you have a written environmental policy, program and personnel assigned to Environmental leadership role(s) in your corporation/company? If yes, provide a copy of the documentation and resumes for personnel leading the environmental program, and resumes for those assigned to this contract/subcontract.
2.	☐ Yes ☐ No	Is your organization ISO 14001 certified or are you compliant with this standard? If yes, provide copies of your manual, procedure or process description and any certification statements or certificates.
3.	☐ Yes ☐ No	Has your company/corporation undertaken 10 projects within the last 5 years that included environmental responsibilities in your scope of work? Provide project narratives for each of these projects, to include dates, description of environmental aspects of the projects, names of involved environmental personnel, locations, regulatory, and client points of contact for each project.
4.	☐ Yes ☐ No	Do you have any notice of violations (NOVs), incidents, releases causing environmental damage? Describe each of these NOVs, incidents, and releases.
5.	☐ Yes ☐ No	Do you have a standard policy/guidance document or manual on environmental issues? Do the supervisors and managers you are proposing have environmental training or project experience? If so, provide evidence of this in proposed resumes.
6.	☐ Yes ☐ No	Does your firm require daily or weekly inspections of your worksites which include environmental aspects of the work?
7.	☐ Yes ☐ No	Do these inspections include fuel management areas, hazardous materials storage, and other areas or issues of environmental concern? Provide any process or procedural documentation that includes specifics on these environmental aspects.
[a] Evaluation of the environmental culture and capabilities of a firm can be difficult. No single repository or source is available to indicate whether a firm has experienced previous environmental citations or fines as most of these records are developed and maintained at the regulatory agency level. The evaluation of the firm must be based upon documentation provided by the firm, to include discussions with references provided, review of state records, and contact of state regulatory personnel. A qualitative assessment of the firm's capabilities and experience should be used to provide an overall assessment of the firm's culture and possible benefit to Parsons team.		
By submitting this application, the Applicant agrees to use the above criteria and this form when selecting lower tier subcontractors.		

Exhibit 10.3 – Competent Person Form

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Competent Person Form

Definition

A competent person is a person having the ability to recognize existing and predictable hazards and having the authority to correct them.

Responsibility

The designated competent person is responsible for recognizing and correcting SH&E risks/hazards. This person has the authority to stop work in a potential SH&E concern on the jobsite. This form must be completed by each designated competent person. *Where an employee is responsible for multiple crafts, it will be necessary to maintain additional designated competent persons and forms.* Each competent person on a Parsons project must submit this completed form to the Parsons Project Manager before beginning work on the project and must update it any time the designated representative(s) changes.

Acknowledgment

I, _____

Employee Name

have been assigned _____to be the competent person in the areas indicated and
I _____ acknowledge that I have been thoroughly trained and an experienced in hazard recognition and have the authority to stop work and correct hazards in the event of a potential hazardous or imminent danger situation.
Check appropriate listed below items.

☐	Air Pollution and Emissions	☐	Environmental Assessments	☐	Mechanical Demolition
☐	Asbestos	☐	Excavations and Trenches	☐	Protected Ecological and Cultural Resources
☐	Bolting, Riveting, and Fitting	☐	Fall Protection	☐	Resource Conservation
☐	Buried Items	☐	First Aid and CPR	☐	Respiratory Protection
☐	Concrete, Forms, and Shoring	☐	Hearing Protection	☐	Rigging
☐	Cranes and Derricks	☐	Ladders	☐	Scaffolding
☐	Demolition	☐	Lead	☐	Tunnels and Shafts
☐	Drinking Water	☐	Management of Hazardous Materials and Hazardous Solid Wastes	☐	Underground Construction
☐	Electrical			☐	Wastewater
☐	Emergency Response to Spills and Releases	☐	Marine Work and Diving	☐	Welding and Cutting
		☐	Material and Personnel Hoists		
☐	Other				

10.5.7 Subcontractor Safety Plan Submission Review

All Parsons subcontractors must submit their project SH&E program to the Parsons Project Manager for review and acceptance before commencing work. The Project Manager reviews the safety program for adequacy in accordance with the PSHEP. Battelle will review their subcontractor's project SH&E programs according to Battelle's requirements. Parsons does not expect to have contractors working on this project, but the information below is included if subcontractors are required.

10.5.7.1 Subcontractor Safety, Health, and Environmental Safety Plans (SSHEPs)

At least 10 days before work begins, each Parsons subcontractor must submit two copies of its SH&E program to the Parsons Project Manager for review. The Project Manager and Project SH&E Manager review the plan to ensure that it meets Parsons and client requirements.

If a contractor needs assistance developing a SSHEP, the Project SH&E Manager can provide an electronic copy of a Model SSHEP.

The subcontractor safety plan must address the following elements:

- Responsibilities
- SH&E Compliance
- Communication
- Hazard assessment
- Hazard correction
- Risk of environmental incident
- Control measures to prevent environmental incident
- Incident investigation
- Training and instruction
- Recordkeeping
- The plan must include all applicable requirements of Parsons PSHEP, OSHA CFR 1910/1926 and applicable federal, regional, state, municipal, and/or local environmental regulation.
- Scope of work evaluation describing sequence of work and associated hazardous or environmentally risky activities
- AHAs including evaluation of environmental risks
- Site employee SH&E orientation program to address location-specific issues
- Site-specific Emergency Action Plan that includes a list of key management personnel and contact information (home, office, project site, and cellular telephone numbers).
- Site-specific Medical Emergency Plan that lists qualified First Aid personnel by name and includes copies of their current certificates

- List of key line management personnel, by name and position, who will enforce the plan
- List of key competent or qualified personnel by name and copy of current documentation identifying specific certified competency (e.g., scaffolding, excavations, fall protection)
- A written progressive disciplinary program for violations of SH&E procedures
- Trenching and Shoring Plan (if applicable)
- 100% Fall Protection Plan (if applicable)
- Waste and hazardous material management (if applicable)
- Control measures for storm water and other wastewater discharges (if applicable)
- Identification of risks and control measures for activities that could involve environmental spills/releases
- Measures to address any other environmental regulatory requirements
- Contractor task hazard and risk planning
- Subcontractor weekly SH&E planning submission
- Contractor daily task SH&E planning

10.5.8 Premobilization SH&E Meeting

Field Team Managers may conduct a Premobilization SH&E Meeting on or before the first day of subcontractor mobilization in the field at the work site. Exhibit 10.4, Subcontractor Premobilization SH&E Form, shows the checklist used for the SH&E portion of this meeting. The meeting includes a review of the prebid site/area risk analysis and a walk through of the work area to locate items on the prebid risk analysis checklist.

Exhibit 10.4 – Subcontractor Premobilization SH&E Meeting Form

PARSONS

Subcontractor Premobilization SH&E Meeting Form

Date:	Project/Location:
Parsons Representative:	Subcontractor Representative:

The following project site safety, health, security, and environmental requirements, procedures, and hazards have been identified and reviewed with the subcontractor:

Mark with "X"	Item	Mark with "X"	Item	Mark with "X"	Item
☐	Air Pollution and Emissions	☐	Fall Protection, Guardrails, and/or Scaffolding	☐	Personal Protective Equipment
☐	Asbestos			☐	Process Safety Management (PSM)
☐	Buried Items	☐	Fire Protection		
☐	Competent / Qualified Person	☐	Hazardous Materials and Wastes	☐	Protected Ecological and Cultural Resources
☐	Confined Spaces (Permit / Non-Permit)	☐	Hot Work, Welding, and/or Cutting	☐	Resource Conservation and Sustainability
☐	Cranes / Hoists / Annual Inspection Certificate(s)	☐	Ladders	☐	Site Security, Visitor Control, and Public Exposure
☐	Demolition	☐	Lead Paint	☐	Specific Reports (Required by Environmental Regulation) on Toxic or Hazardous Chemicals Usage and Storage
☐	Drinking Water	☐	Lockout / Tagout		
☐	Electrical	☐	Management of Hazardous Materials and Hazardous Solid Wastes		
☐	Emergency Response to Spills and Releases			☐	PSHEP, Emergency Planning and Response Plan
☐	Environmental Assessments	☐	Overhead Power Lines	☐	Wastewater Discharges
☐	Excavations and Trenches	☐	Permits (Excavations, Scaffolding, Demolition, Traffic, Confined Spaces, etc.)	☐	Vehicle and Heavy Equipment
				☐	Other:

Protection of the Public:

Additional Project Concerns:

Attendees:

Name	Title	Company

SECTION 11 – SITE CONTROL MEASURES

11.1 SITE CONTROL MEASURES

As part of the system to help control access to the worksite and to reduce and mitigate potential contamination of workers, the following site control measures will be followed. Site control involves the physical arrangement and entry control of the work zones. Due to the limited space in the Facility tunnels, site work zones will have to be adapted to the work area.

11.1.1 Site Security/Entry Control

Site security related to environmental activities will be enforced by the Parsons Field Team Manager/Site SH&E Officer, or designee, who will ensure that only authorized workers are allowed into the work area. Site security is necessary to prevent exposure of unauthorized, unprotected individuals in the work area.

Site personnel will be briefed on specific procedures during orientation at the site. Visitors to the site will contact the Parsons Field Manager with visitor names and arrival dates and times.

11.1.2 Site Work Zones

Zones will be delineated at the site to segregate different types of operations. To reduce the spread of hazardous materials by workers from the contaminated areas to the clean areas, the flow of personnel and equipment between the zones shall be controlled. The establishment of the work zones will help ensure that personnel are properly protected against the hazards present where they are working, work activities and contamination are confined to the appropriate areas, and personnel can be located and evacuated in an emergency. Location of site-specific work zones cannot be defined at this time and will vary depending on factors including but not limited to weather, site-location, whether contamination is present, and equipment setup. The site work zones are generally established by the Parsons Field Team Manager/Site SH&E Officer or designee. The following types of zones are established for site activities.

Exclusion Zone (Contamination Zone)

The exclusion zone (EZ) will include work areas where activities such as intrusive investigations take place. Within the EZ, all personnel will wear prescribed levels of PPE. The hotline, or EZ boundary, will be established through visual observations and/or general air monitoring requirements. This boundary will be physically marked or well-defined by physical and geographic boundaries.

Activities conducted by Parsons during drilling will be conducted at the outer edge of the exclusion zone and upwind of the drilling to minimize exposure potential. All Parsons and Battelle personnel and subcontractors will be properly trained in controlling and minimizing access to the EZ. Should an unauthorized person enter the EZ, they will be stopped and escorted to the support zone. If necessary, work will be stopped until the situation is resolved. Unauthorized entry will be recorded in the field notebook.

Contamination-Reduction Zone (CRZ)

This zone provides an area to prevent or reduce the transfer of hazardous materials that may have been picked up by personnel or equipment leaving the EZ. Decontamination operations are described in Section 11.

Support Zone

The support zone is considered a clean area. The support zone for the site will be ideally located upwind of the work site. However, due to site conditions, the support zone may be located crosswind, or downwind, if absolutely necessary. A streamer or flag will be attached to the drill rig mast or vehicle antenna to denote the wind direction. The support zone contains the support vehicles equipped with first-aid kits, fire extinguishers, decontamination materials, and other support supplies. Level D PPE is appropriate apparel within this zone. Contaminated clothing and equipment are not permitted in the support zone.

11.1.3 Site Communication

Site communication is necessary to alert field team members in the EZ and CRZ to emergency conditions, convey safety information, and communicate changes or clarification in the work to be performed. For internal site communication, the field team members will use their voices, radios, or prearranged hand signals and responses. These hand signals will be briefed during daily Health and Safety meetings. If possible, cell phones will be at the site to alert emergency personnel should any accident or incident occur requiring assistance. **Cell phones will not work within the tunnels.**

11.1.4 Safe Work Practices

To ensure a strong safety awareness program during field activities, this plan will be communicated to Parsons' employees and subcontractors. Employees will receive adequate training, and standing work orders will be developed and communicated to the employees.

Standing orders for personnel entering the CRZ and the EZ are as follows:

- No smoking, eating, drinking, or chewing of tobacco or gum
- No matches/lighters in the zones
- No touching, kicking, or disturbing any debris, containers, or other objects
- Use access control points
- Wear appropriate PPE
- Avoid walking through puddles or stained soil
- Discovery of unusual or unexpected conditions will result in immediate evacuation and reassessment of site conditions and health and safety practices

The following guidelines will also be followed while working on-site:

- Conduct daily tailgate safety briefings prior to beginning work
- Conduct daily/weekly safety meetings as necessary
- Take precautions to reduce injuries from heavy equipment, utilities, and other tools

SECTION 12 – PERSONAL HYGIENE AND DECONTAMINATION

Procedures for leaving a contaminated area must be planned and implemented prior to going onsite. Work areas and decontamination procedures must be established based on expected site conditions.

At a minimum, adequate wash water must be present in the Support Zone for personnel to be able to wash their face and hands. Personal protective equipment and sampling equipment must be decontaminated or disposed. The disposable PPE and sampling equipment will be placed in plastic bags and disposed of properly.

12.1 PERSONNEL DECONTAMINATION

To prevent harmful materials from being transferred into clean areas or from exposing unprotected workers, field personnel exiting an area of potential contamination will undergo decontamination. The extent of decontamination depends on a number of factors, the most important being the type and concentration of the contaminant involved.

An exclusion zone, contamination reduction zone, and support zone will be established whenever field personnel are using PPE. Decontamination station layout will be made on a site-specific basis and will be based on the level of PPE used, the types of chemical hazards encountered, and the site conditions, including topography, wind direction, and traffic patterns. Defined site access and egress points will be established and personnel will enter and exit only through these points. As a general rule, persons assisting in the decontamination station may be in one level lower of respiratory protection than required in the work zone. Most of these factors have no bearing for work in the tunnels

If personnel are in Level D-modified protection (no respirator but using protective gloves and/or suits and other equipment), a portable decontamination station will be set up at the site. The decontamination station will include provisions for collecting disposable PPE (e.g., garbage bags); washing boots, gloves, vinyl rain suits, field instruments and tools; and washing hands, face, and other exposed body parts. Refuse from decontamination will be properly disposed of in accordance with procedures for IDW management. IDW will be managed in accordance with the Facility Work Plan.

Buckets of water or garden sprayers will be used for rinsing. Large plastic garbage bags will be used to store decontaminated clothing (gloves, Tyvek® coveralls, etc.) and equipment. Metal or plastic cans or drums will be used to store potentially contaminated liquids. Washing and rinsing are done in combination with a sequential doffing of clothing starting at the first decon station with the most heavily contaminated article and progressing to the last station with the least contaminated article. An exclusion zone will be established for drilling and excavating to prevent personnel from entering these areas without proper safety equipment (e.g., hard hat, steel-toe boots, etc.).

12.2 DECONTAMINATION PROCEDURES DURING MEDICAL EMERGENCIES

During some medical emergencies, it may be possible that decontamination would aggravate or cause more serious health effects. If prompt, life saving, first aid and medical treatment are

required, decontamination procedures may be modified. WorkCare (888-449-7787) should be contacted for advice.

Physical injuries can range from a sprained ankle to a compound fracture, and from a minor cut to massive bleeding. Depending on the seriousness of the injury, treatment may be given at the site by trained personnel. For minor medical problems or injuries, the normal decontamination procedure should be followed.

For more serious injuries, additional assistance may be required at the site, or the victim may have to be transported to a medical facility. Life-saving care should be started immediately, without considering decontamination. The outside garments don't need to be removed unless they cause delays, interfere with treatment, or aggravate the problem. Respirators and backpack assemblies must always be removed. Chemical-resistant clothing can be cut away. If the outer contaminated garments cannot be safely removed, the individual should be wrapped in plastic, rubber, or blankets to help prevent contaminating medical personnel and the inside of ambulances. Outside garments are then removed at the medical facility. No attempt should be made to wash or rinse the victim at the site unless it is known that the individual has been contaminated with an extremely toxic or corrosive material that could also cause severe injury or loss of life.

SECTION 13 – EQUIPMENT DECONTAMINATION

13.1 EQUIPMENT DECONTAMINATION

Drill rigs and equipment will be washed with a high-pressure spray washer prior to mobilizing onto the work site and prior to leaving the site. Drilling equipment used for multiple boreholes will be decontaminated prior to drilling each boring at the site. This likely requires moving the equipment from inside the tunnel to the staging area and decontamination area at the entrance to Adit 3. Personnel performing decontamination will don appropriate PPE including: safety eyewear, coveralls, gloves, and steel toe shoes.

All equipment that may directly or indirectly contact solid media or groundwater in the subsurface shall be decontaminated in the designated decontamination area. This includes casing, drill rod and strings, drill bits, and sampling devices. In addition, the contractor shall take care to prevent any solid media or groundwater samples from coming into contact with potentially contaminating substances such as oil, engine exhaust, corroded surfaces, and dirt.

The following procedure shall be used to decontaminate equipment noted above. The external surfaces of equipment shall be washed with high-pressure hot water and, if necessary, scrubbed until all visible dirt, grime, grease, oil, loose paint, rust flakes, etc., have been removed. The equipment shall then be rinsed with potable water. The inside surfaces of casing and drill rods shall also be washed as described.

SECTION 14 – EMERGENCY EQUIPMENT AND FIRST AID

14.1 COMPETENT FIRST AID PERSON

At least two competent persons must be available at the work site at all times to render First Aid. This person must have a valid and current certificate in First Aid/CPR training from the Red Cross/Crescent, or equivalent and verifiable regional, municipal, or local training programs. First Aid supplies must be accessible for immediate use and in sufficient quantity to handle common First Aid incidents.

To meet this requirement, the project has the majority of the field personnel trained in CPR and first aid, so that at least two of these employees are on site at all times when work is being performed.

14.2 EMERGENCY EQUIPMENT AND FIRST AID

First aid equipment and a fire extinguisher will be kept at the work area and field personnel will be informed daily of their location. The inventory of all first aid kits will be checked after use and weekly during field activities. Fire extinguishers will be inspected weekly.

All field personnel will be notified of and trained in emergency communication procedures within the tunnels to ensure communication in the event of an emergency.

SECTION 15 – EMERGENCY RESPONSE AND CONTINGENCY PROCEDURES

15.1 EMERGENCY RESPONSE

In the event of any situation or unplanned occurrence requiring assistance, the appropriate contact(s) should be made from the list below. For emergency situations, telephone contact should be made with the site point of contact or site emergency personnel, if applicable, who will then contact the appropriate response teams. It is critical that the correct emergency contact numbers be used for each entity, so as not to delay the response.

This will be posted in visible locations within the project area.

EMERGENCY (MEDICAL/POLICE/FIRE) SERVICES

All Emergencies	**911**
Medical	
Hospital Name	**Queens Medical Center**
Hospital Address	1301 Punchbowl Street Honolulu, HI 96813
Hospital Telephone Number	General: 808-538-9011
Clinic Name	**Concentra Medical Center**
Clinic Address	545 Ohohia Street Honolulu, HI 96819
Clinic Phone Number	General: 808-831-3000
NAVFAC Emergency Services	911
Police	
Name	**Honolulu Police Department (District 3)**
Address	1100 Waimano Home Rd Pearl City, HI 96782
Telephone Number	General: 808 723-8800
Fire Department	
Name	**City and County of Honolulu Fire Department**
Telephone Number	General: 808-533-2595
Tsunami Emergency Warning Channels (Radio)	KSS-AM 590 khz KRTR-FM 96.3 mhz

OTHER PERTINENT CONTACT NUMBERS

Poison Control Center 800-222-1222

Parsons

Parsons Project Manager (Gene Wright)..... 801-572-5999 (w)
..... 801-553-3317 (c)
Parsons Program Manager (Mr. Ed Heyse).....256-217-2573
Site Safety, Health, and Environment Officer (Thomas Jensen)..... 801-553-8829 (w)
..... 801-380-1375 (c)
Site Safety, Health, and Environment Officer (alternate; William Stohler)..... 808-258-7371(c)
Parsons Project Safety and Health Officer (Mr. Tim Mustard, C.I.H.)..... 303-564-3537

Battelle

Battelle Project Manager (Carolyn Scala)..... 215-504-5003 (w)/609-548-6082(c)

15.2 EMERGENCY RESPONSE AND CONTINGENCY PROCEDURES

The following is to define the general procedures to protect human health and the environment in the event of an accident or emergency during field activities. Facility-specific procedures will be communicated to field personnel during the orientation. The emergency response procedures developed for this investigation comply with 29 CFR 1910.120(1) and address the following elements:

- Pre-emergency planning;
- Personnel roles, lines of authority, training, and communications;
- Posted instructions and emergency contacts;
- Emergency recognition and prevention;
- Criteria and procedures for site evacuation;
- Procedures for decontamination and medical treatment;
- Evacuation routes and procedures;
- Emergency alerting and response procedure; and
- Critique of emergency responses and follow-up.

The Site SH&E Officer will be responsible for keeping the emergency contact list current and for taking necessary action and contacting the appropriate emergency resources in the event of an emergency.

If an emergency occurs while personnel are in site work zones, voice alarms or three blasts on an air horn (or vehicle horn) will be used to alert other site personnel of the emergency. On hearing the alarm, site personnel will cease work activities, secure the site, and proceed to assemble at the field office.

The overall responsibility during emergencies rests with the Site SH&E Officer. In case of emergency, the Site SH&E Officer will implement the site emergency procedures, and is specifically responsible for the following:

- Assessing the situation and determine the existing hazards, potential for additional hazards, and need for additional response. Ensure the hazardous condition is stabilized, eliminated, or permanently fixed. If personnel or properties are jeopardized, a determination must be made to alert the local community.
- Locating all victims, assessing their conditions, and making an on-scene determination of the resources needed to stabilize and transport.
- Implementing the emergency response procedures, including ordering site evacuations, coordinating fire-fighting efforts, and directing spill control and cleanup;
- Supervising site evacuation and decontamination procedures;
- Contacting emergency services such as the fire department, ambulance, and security services, as may be required or requested by the emergency rescue team;
- Assisting in providing first aid services and medical support or evacuation for injured or exposed personnel;
- Determining the cause of the incident and ways to prevent future occurrences; and
- Preparing the necessary incident forms and reporting the incident in IndustrySafe.

ROUTE TO HOSPITAL

Emergency medical treatment is available at the Queens Medical Center 24 hours a day, 7 days a week. A map to the hospital is located on the following page. The route to the health centers will be discussed during the first day of work at any new work location

Queens Medical Center
1301 Punchbowl Street
Honolulu, HI 96813
808-538-9011

From the drilling locations, turn left and proceed to the first intersection.

Make a sharp right and follow the road until it turns into Icarus Way.

Continue to Forward Avenue.

Turn left onto Forward Avenue.

Turn right onto Ala Kapuna Street.

Turn left onto Moanalua Road which eventually merges onto H201E/HI-78E.

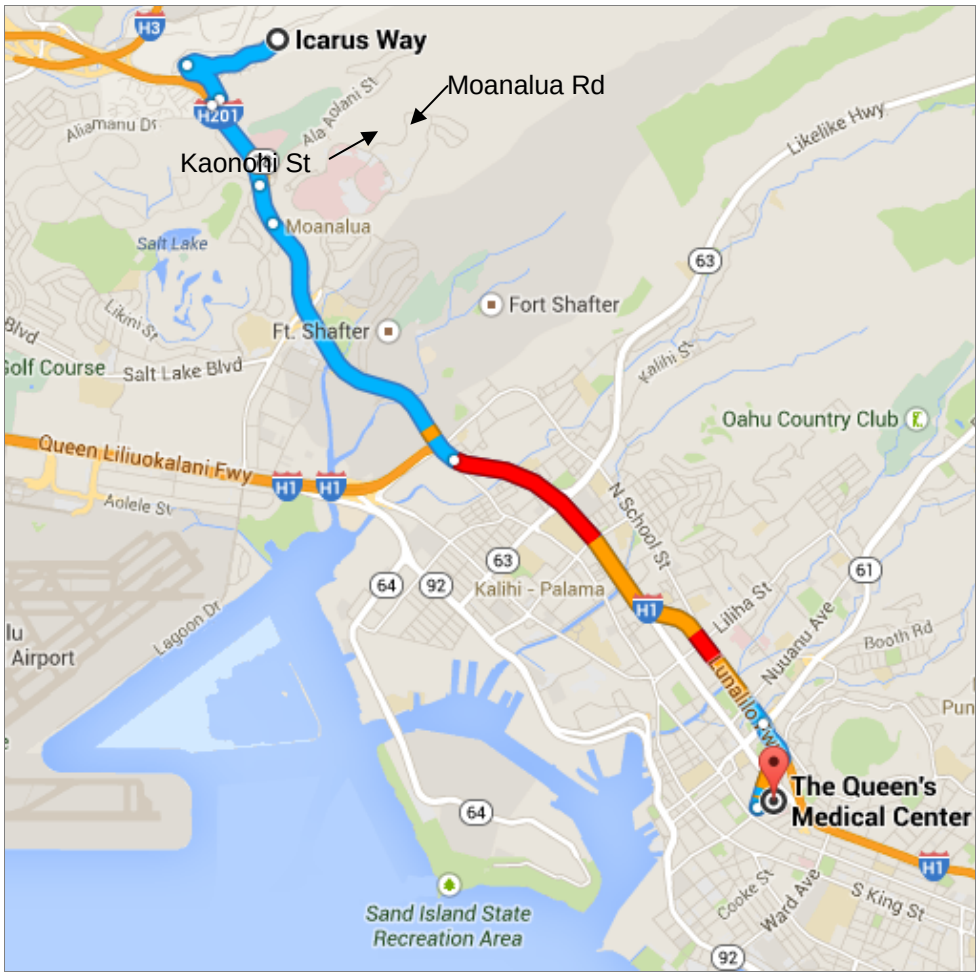
H201E/HI-78E becomes H1E.

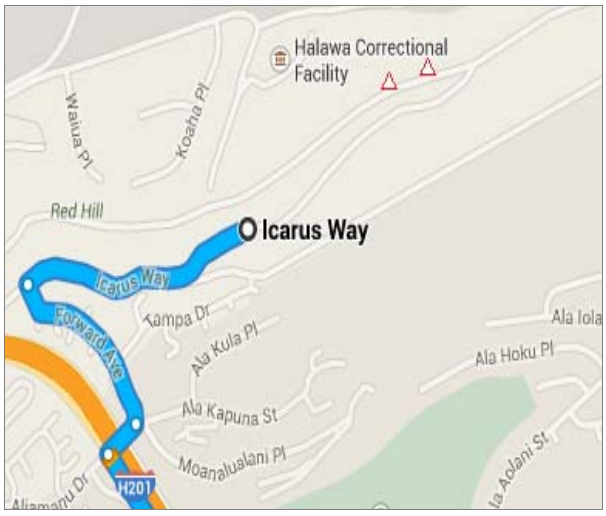
Take the Punchbowl Street exit (Exit 21B). The road will curve to the right.

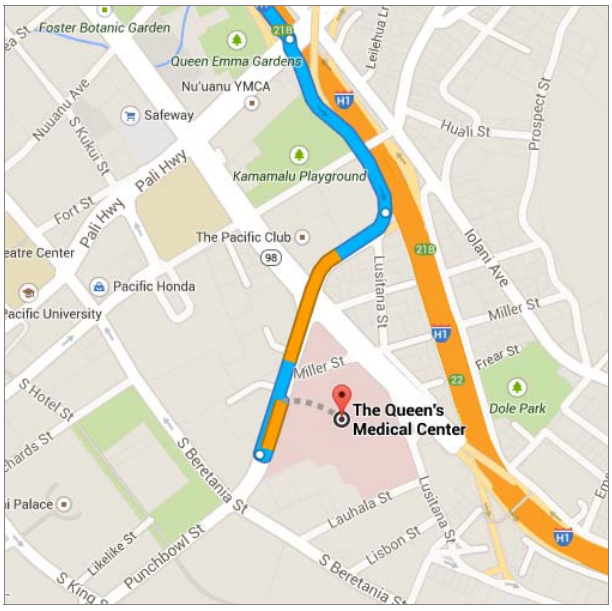
The hospital is on the left, requiring a u-turn.

Total Travel Estimate: 7 miles – about 15 minutes

Exhibit 15.1 - Map to the Hospital







Red triangles represent approximate drilling locations.

ROUTE TO URGENT CARE CLINIC

Urgent medical treatment is available at the Concentra Medical Center from 8 am to 5 pm, Monday through Friday. A map to the clinic is located on the following page. The route to the health centers will be discussed during the first day of work at any new work location.

Concentra Medical Center
545 Ohohia Street
Honolulu, HI 96819
808-831-3000
Hours: 8 am to 5 pm, Monday through Friday

From the drilling locations, turn left and proceed to the first intersection.

Make a sharp right and follow the road until it turns into Icarus Way.

Continue to Forward Avenue.

Turn left onto Forward Avenue.

Turn right onto Ala Kapuna Street.

Turn left onto Moanalua Road which eventually merges onto H201E/HI-78E.

Take Exit 3 for Puuloa Road.

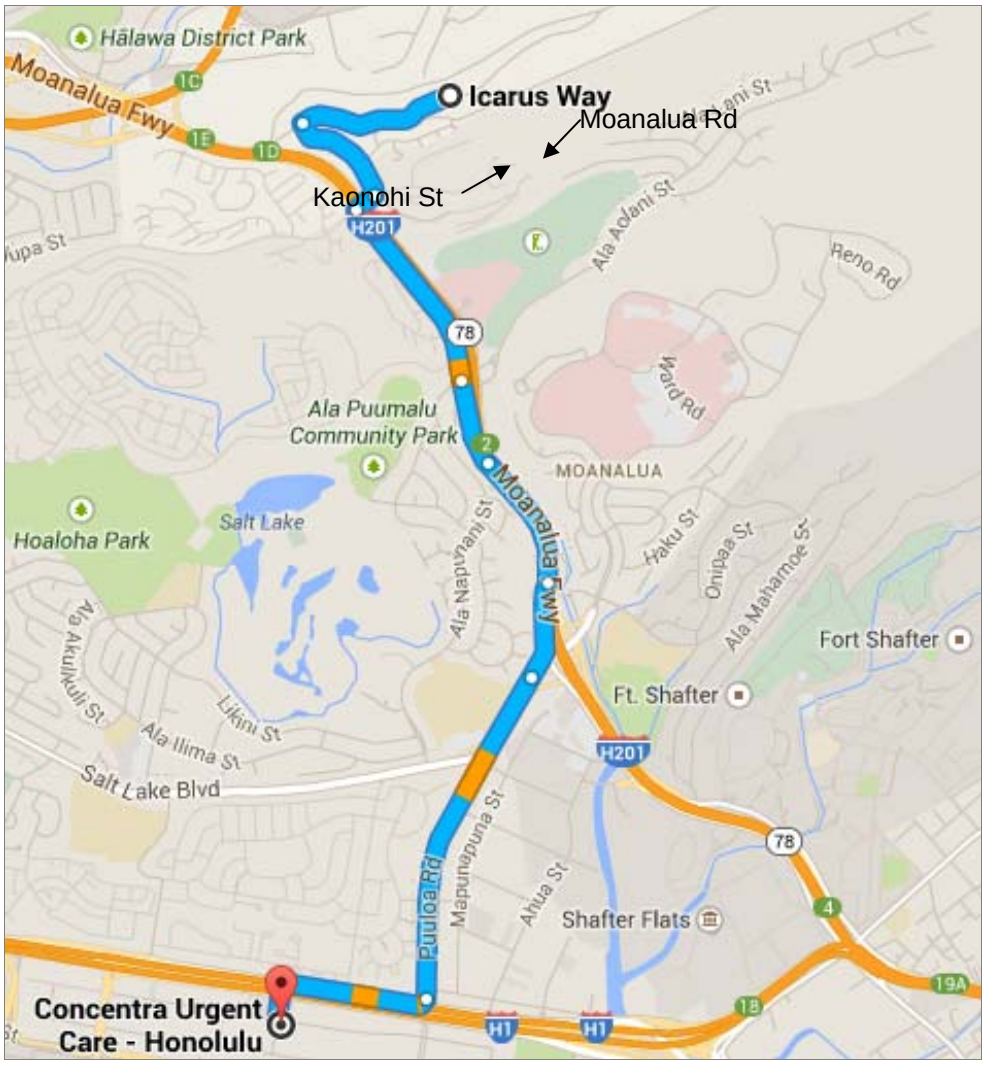
Turn right onto HI-92W.

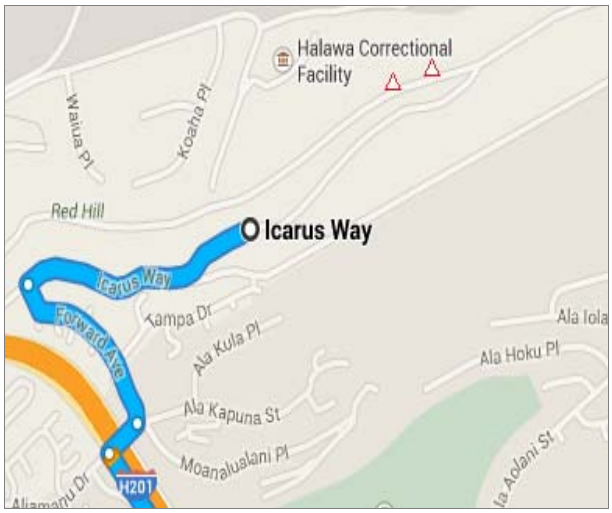
Take the second left onto Ohohia Street.

The clinic is on the left.

Total Travel Estimate: 4 miles – about 10 minutes

Exhibit 15.2 - Map to the Urgent Care Clinic





Red triangles represent approximate drilling locations.

Attachment 1

Activity Hazard Analyses

Activity Hazard Analysis (AHA) 1

Activity/Work Task: TRAVEL	Overall Risk Assessment Code (RAC) (Use highest code)	**M**
Project Location: Red Hill Bulk Fuel Storage Facility, Hawaii	**Risk Assessment Code (RAC) Matrix**	
Job Number: 749435	**Severity** / **Probability**	
Date Prepared: April 8, 2014		
Prepared by (Name/Title): Judy Blakemore/ Safety Manager		
Reviewed by (Name/Title): Gene Wright/ PM		
Notes: (Field Notes, Review Comments, etc.)		

Severity	Frequent	Likely	Occasional	Seldom	Unlikely
Catastrophic	**E**	**E**	**H**	**H**	**M**
Critical	**E**	**H**	**H**	**M**	**L**
Marginal	**H**	**M**	**M**	**L**	**L**
Negligible	**M**	**L**	**L**	**L**	**L**

Step 1: Review each **"Hazard"** with identified safety **"Controls"** and determine RAC (See above)

"Probability" is the likelihood to cause an incident, near miss, or accident and identified as: Frequent, Likely, Occasional, Seldom or Unlikely.

"Severity" is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible

Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" on AHA. Annotate the overall highest RAC at the top of AHA.

RAC Chart

- **E = Extremely High Risk**
- **H = High Risk**
- **M = Moderate Risk**
- **L = Low Risk**

Job Steps	Hazards	Controls	P	S	RAC
Travel by automobile	Lack of awareness	• Use common sense. Don't be a target for criminals due to vulnerability. • Avoid bringing/carrying large amounts of cash and valuables (leave them home). • Put personal items out of sight in the trunk of the car. • Gather as much information as possible about the location to which you are going. • Travel during daylight hours if possible. • Allow adequate time for delays due to construction, accidents, or other unforeseen circumstances. • Drive defensively. • Complete the ParsonsU driving modules. • Drive appropriately for road, traffic, and weather conditions. Postpone travel as necessary. • Perform walk-around before driving off. • Use lights and wipers during inclement weather. • Pay attention to unusual vehicle noises and parts that appear out-of-place or broken. Have these items/deficiencies checked out and repaired as soon as possible. • Stay alert for animals crossing your path and signs indicating animal crossings.	**S**	**M**	**L**

Job Steps	Hazards	Controls	P	S	RAC
Travel by automobile (cont.)	Operation of motor vehicle	• Drivers must have a valid driver's license and wear a seat belt at all times. • Get adequate rest prior to driving. • Walk around vehicle before getting in and driving away. • Use of communication devices (cell phone, radio, etc.) while driving is prohibited. Do not answer your cell phone. • If vehicle is rented, become familiar with all controls before driving. • Ensure seat, mirrors, steering wheel, radios, and other controls are set before driving. Lock doors. • Ensure windows and mirrors are cleaned as needed throughout trip. • Wear sunglasses as necessary to reduce glare and fatigue. • Pull over and rest in a safe location if experiencing signs of fatigue or drowsiness. • Do not use cruise control on rainy, snowy, or icy roads. • Park only in approved parking spaces or safe areas not within the equipment travel path. • Use parking brake when parking on a slope or near road edge. • When exiting vehicle, observe ground surface before stepping out, watching for ice, snow, water, cracks, and uneven surfaces. If ground is slippery, hold onto secure part of vehicle. • Follow posted speed limits and other traffic controls. • Do not tailgate. • Ignore and avoid discourteous drivers. • Do not aggravate or exchange gestures with persons in other vehicles. • Consider carrying these useful items in your vehicle - extra clothing and water, rain gear, gloves, paper towels, windshield washer fluid, ice scraper/squeegee, jumper cables, first aid kit, tool kit, fire extinguisher, etc.	S	Cr	M
	Breakdown	• Use common sense about your safety and security. • Stay with your vehicle if it is safe to do so. Otherwise move away from the vehicle. • Raise vehicle hood or attach something white to antenna or out the window to indicate help needed. • Be cautious if persons stop to assist. • Call 911 as necessary. • Use emergency flashers and a safety device such as reflective triangles to indicate presence of disabled vehicle.	U	Cr	L
	Tire Blow-out	• Grip steering at first sign of trouble. • Do not slam on brakes, but let the vehicle slow down itself as you work the vehicle off the road and out of traffic to the safest place possible. • Do not turn off vehicle since that will disable the brakes and steering. • Use emergency flashers and a safety device such as reflective triangles to indicate presence of disabled vehicle. • Review information in Section 4.0 of this AHA for changing the flat tire or obtain professional assistance. (See breakdown section above.)	U	Cr	L
Travel by Air	Theft	• Never let your luggage out of your sight (unless you're checking it onboard). • Carry on board cash, checks, credit cards, passport, jewelry, gifts, keys, medicine, and valuables. • Put a distinguishing or brightly-colored tag on your luggage that makes it easy for you to spot and track.	U	Cr	L

Job Steps	Hazards	Controls	P	S	RAC
Travel by Air (cont.)	Onboard Emergency	• Pay attention to the flight attendants' safety briefings. • Try to obtain a seat within 3 to 4 rows of an emergency exit. • Count the number of rows ahead of you and behind you to the nearest exists. • Do not accept a seat in an emergency exit row if unable to perform the required duties.	U	Cr	L
Gas Station Refueling	Fire	• Shut down vehicle prior to refueling. • No smoking while refueling. • Do not use cell phones or perform other activities that may distract you while refueling. • Remain outside the vehicle. • Position dispensing nozzle correctly and watch to ensure the gas is not overflowing. • Be careful not to spill or drip fuel while refueling. • Ensure clothing does not become contaminated with flammable or combustible fluids. Change clothing if it becomes contaminated.	S	Cr	M
Jump Battery	Traffic / Struck-by	• Ensure vehicles are safely positioned out of the flow of traffic. • Use emergency flashers and a safety device such as reflective triangles to indicate presence of disabled vehicle. • Do not stand between vehicles if possible.	U	Cr	L
	Fire or Explosion	• Connect red (positive) jumper cable clamp to dead battery positive (+) post. • Connect red (positive) jumper cable clamp to live battery positive (+) post. • Connect black (negative) jumper cable clamp to live battery negative (-) post. • Connect black (negative) jumper cable clamp to clean metal part of disabled vehicle, not to negative (-) post of disabled vehicle. • When the disabled vehicle starts, remove the cable in the reverse order they were placed.	U	Cr	L
Flat Tire Changing	Traffic / Struck-by	• Pull over to a safe place, out of traffic, where there is sufficient room to change the flat tire, sacrificing the wheel rim if you have to. Use emergency flashers and a safety device such as reflective triangles to indicate presence of disabled vehicle. • Call for help if necessary. Do not attempt to change the tire yourself if it is unsafe to do so.	U	Cr	L

Job Steps	Hazards	Controls	P	S	RAC
Flat Tire Changing (cont.)	Musculo-skeletal, Puncture, Cuts or Other Bodily Injury	• Read the owner's manual for your vehicle to determine how to free the jack assembly, place the jack under the vehicle, and remove the spare tire. • Call for help if necessary. • Minimize the amount of time body parts need to be under the vehicle • Wear gloves and place blanket, jacket, or other item on ground to keep clean and minimize cuts and scrapes. • Remove items from trunk or back seat to make removal of jack assembly and spare tire easier. • Chock the wheels with chocks supplied with the jack assembly or with available rocks or wood. • Loosen the lug nuts prior to jacking the tire off the ground. • Remove the nut covers or plastic wheel cover if necessary to access the lug nuts. • For trucks, be aware of pinch points when unfolding rods to lower spare tire. • Lower the tire with enough slack to make the spare easier to reach. • Check the tire pressure as soon as it is accessible to ensure it is properly inflated. • If you have trouble lifting the spare tire onto the hub, use the lug wrench as a lever to lift the tire enough to place it on the hub. • Ensure lug nuts are tightened adequately and evenly, tightening in a diagonal pattern. • Lifting carefully, place flat tire in trunk, truck bed, or under truck in the opposite order of lowering the tire. • If the spare tire is not a full-size tire, it cannot be driven as fast or far as a full-size tire. • Repair/replace the full-size tire as soon as possible.	S	Cr	M
Parking	Security	• Park only in approved parking spaces preferably in a well-lighted area near the hotel/room entrance or where there is the most public exposure. • Avoid stairwells in parking garages. • Having the correct key in hand before leaving the building allows for time to assess your surroundings. • Once inside your vehicle, lock the doors. • Travel with coworkers or clients into or out of buildings. • Watch for loiterers. Beware of people who approach asking directions. Keep a polite but safe distance. • If you feel someone is following you, go to the nearest occupied building and ask for assistance or to your vehicle and call 911. • If you are confronted with a dangerous situation, cry out for assistance. Yelling "FIRE! FIRE!" instead of "HELP!" will generally bring faster attention.	U	Cr	L

Job Steps	Hazards	Controls	P	S	RAC
Hotel Stay	Security	• Whenever possible, stay at locations with a good reputation and security measures. • Do not let your luggage out of your sight. • Ask for hotel staff assistance if your belongings require multiple trips to your vehicle to unload. • Leave valuables at home. Do not leave your computer or valuables in your room during the day when you are not there. Lock them in the trunk of the field vehicle or in the hotel safe. • Do not answer the door without first looking through the view hole, identifying the person, or requesting their name. If uncertain, leave the door chain in place. • If traveling with someone with whom you feel comfortable, ask that your rooms be close to each other. If traveling with someone with whom you are not comfortable, ask that the rooms be on separate floors and not switched by anyone. • If you believe someone is following or harassing you, report it immediately to hotel security. • Do not get on an elevator if you are suspicious of someone on it. If already on an elevator and someone suspicious gets on, get off the elevator. If you feel threatened, press as many floor buttons as possible to afford more opportunities to escape or obtain help. Press the alarm button if it is separate from the emergency stop. • When you exit the room, tug on the door handle to ensure it latches. • Do not leave your room key card in the door. Double check every time you enter/exit your room.	**U**	**Cr**	**L**
	Emergencies	• Familiarize yourself with hotel safety/emergency instructions. • Determine and walk the route you would take in the event of an emergency. • Count doorways from your room to the exit stairwells. • Maintain critical items (cell phone and charger, car keys, wallet, etc.) in an area that is easily accessible without lights.	**U**	**Cr**	**L**

Equipment to be Used	Training Requirements/Competent or Qualified Personnel name(s)	Inspection Requirements
Personal or rental vehicle Small tools, jumper cables, jack	Completion of ParsonsU driving modules	Perform walk-around before driving off. Have vehicle deficiencies checked out and make repairs as soon as possible.

Activity Hazard Analysis (AHA) 2

Activity/Work Task: **Site Reconnaissance, Geophysical Utility Clearance, Land Survey, and Well Gauging**	Overall Risk Assessment Code (RAC) (Use highest code)	**L**
Project Location: **Red Hill Bulk Fuel Storage Facility, Hawaii**	**Risk Assessment Code (RAC) Matrix**	
Job Number: **749435**	**Severity** / **Probability**	
Date Prepared: **06/30/14**		
Prepared by (Name/Title): **Gene Wright, PM**		
Reviewed by (Name/Title): **Judy Blakemore/Safety Manger**		
Notes: (Field Notes, Review Comments, etc.)		

Severity	Frequent	Likely	Occasional	Seldom	Unlikely
Catastrophic	E	E	H	H	M
Critical	E	H	H	M	L
Marginal	H	M	M	L	L
Negligible	M	L	L	L	L

Step 1: Review each "Hazard" with identified safety "Controls" and determine RAC (See above).
The RAC is developed after correctly identifying all of the hazards and fully implementing all controls.

"Probability" is the likelihood to cause an incident, near miss, or accident and identified as: Frequent, Likely, Occasional, Seldom or Unlikely.

"Severity" is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible

Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" on AHA. Annotate the overall highest RAC at the top of AHA.

RAC Chart

- **E = Extremely High Risk**
- **H = High Risk**
- **M = Moderate Risk**
- **L = Low Risk**

Job Steps	Hazards	Controls	P	S	RAC
Visual inspection of well site	Uneven site surface (slips, trips, and falls)	Worker attention to walking/working surface. Wearing appropriate safety footwear properly (e.g., boots with ankle support, laces tied and proper soles).	S	M	L
	Underground utilities	Observe painted and flagged utility markings. Walk around them carefully. Review utility maps from locating company and client.	S	N	L
Accessing the work location	Fire	Do not park vehicles in fields or in an area where vegetation could catch fire from the exhaust system.	U	M	L
	Slips/trips/falls	Visually determine the approximate location of the desired point of destination and the corresponding path of egress. Be aware of ground surface conditions. Wear boots with slip-resistant soles.	S	M	L
	Pollen	Take medication (e.g., antihistamine) to minimize allergic reaction to pollen. Wear dust mask, if necessary. (Working outside of the tunnel.)	S	N	L
	Hidden objects (abandoned utilities, conduit, and pipes)	Conduit and pipe are attached to tunnel wall.. Watch for grates on tunnel floor.	S	M	L
	Streams (not applicable in tunnel)	Observe depth of stream and speed of current before proceeding through the stream.	S	M	L

Activity/Work Task: **Site Reconnaissance, Geophysical Utility Clearance, Land Survey, and Well Gauging**		Overall Risk Assessment Code (RAC) (Use highest code)			M
Project Location: Red Hill Bulk Fuel Storage Facility, Hawaii					
Job Steps	**Hazards**	**Controls**	**P**	**S**	**RAC**
Accessing the work location (Cont.)	Walking on uneven or wet terrain (e.g., slopes, leaves, covered objects, holes, puddles)	Wear steel toe rubber boots versus over-the-shoe rubber boots when walking long distances. Use a walking stick or other object for additional support/balance and to check for animal burrows/holes in high vegetation.	**S**	**M**	**L**
	Insects, rodents, etc. (not applicable in tunnel)	Wear light colored clothing and/or Tyvek coveralls for additional skin protection, if necessary. Apply bug repellant spray or lotion to exposed skin. Let other field team members know if you are allergic to bee stings and would require assistance with medication for treatment.	**S**	**Cr**	**M**
	Vegetation (not applicable in tunnel)	Create a clear path or route with mechanical equipment, whenever possible. Wear appropriate PPE for the vegetation (e.g., Tyvek or Carhartt coveralls, leather gloves, face shield) for vegetation that could cause cuts/punctures and/or is higher than waist level.	**U**	**N**	**L**
	Inclement weather, storms, lightning, wind, dust, heat, sun, cold (not applicable in tunnel)	Check weather forecast. Seek shelters in vehicles or buildings during a storm. Wear proper clothing and PPE. Be aware of slip hazards, puddles, etc. Do not begin or continue work until lightning subsides for 30 minutes. Wear goggles if dust/debris is visible. Have sunscreen (SPF > 15) available for ultraviolet protection. Have sufficient drinking water for hydration. Know the symptoms of heat stress. Watch for symptoms of heat stress in fellow workers. Call WorkCare as necessary.	**U**	**Cr**	**L**
	Struck by/against	Wear appropriate personal protective equipment (PPE) based on the surrounding work environment (e.g., hard hat, safety glasses, work boots, traffic safety vest, hearing protection). Be aware of train activity and other contractor or Navy personnel.	**U**	**Cr**	**L**

Equipment to be Used	Training Requirements/Competent or Qualified Personnel name(s)	Inspection Requirements
Motor Vehicle	All assigned employees are required to familiarize themselves with the contents of this AHA before starting a work activity and review it with their Supervisor during their Daily Safety Huddle.	▪ Check PPE for abnormal wear and tear, rips, etc. ▪ Look for signs and symptoms of dehydration, or heat exhaustion. ▪ Check area for hazards (e.g., overhead hazards, flying debris/particulates or splashes, vehicle traffic or heavy equipment operation, or loud noises) ▪ For working in a highly vegetated area, look for objects that could be covered by vegetation, tall grass, etc. ▪ If driving, look under vehicle for sufficient height clearance from vegetation. ▪ Look for the safest route – avoid slopes, low hanging branches, gulleys, ditches, etc.
Escape-only respirator	Training in accordance with OSHA 29 CFR 1910.134, Respiratory Protection Program, and manufacturer's instructions	▪ Ensure equipment is not damaged.

Activity Hazard Analysis (AHA) 3

Activity/Work Task: **Drilling and Well Installation**	Overall Risk Assessment Code (RAC) (Use highest code)	**M**
Project Location: **Red Hill Bulk Fuel Storage Facility, Hawaii**	**Risk Assessment Code (RAC) Matrix**	
Job Number: **749435**	**Severity** / **Probability**	
Date Prepared: **06/30/14**		
Prepared by (Name/Title): **Gene Wright, PM**		
Reviewed by (Name/Title): **Judy Blakemore/Safety Manger**		
Notes: (Field Notes, Review Comments, etc.)		

Severity	Frequent	Likely	Occasional	Seldom	Unlikely
Catastrophic	E	E	H	H	M
Critical	E	H	H	M	L
Marginal	H	M	M	L	L
Negligible	M	L	L	L	L

Step 1: Review each "Hazard" with identified safety "Controls" and determine RAC (See above).
The RAC is developed after correctly identifying all of the hazards and fully implementing all controls.

"Probability" is the likelihood to cause an incident, near miss, or accident and identified as: Frequent, Likely, Occasional, Seldom or Unlikely.

"Severity" is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible

Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" on AHA. Annotate the overall highest RAC at the top of AHA.

RAC Chart

- **E = Extremely High Risk**
- **H = High Risk**
- **M = Moderate Risk**
- **L = Low Risk**

Job Steps	Hazards	Controls	P	S	RAC
Mobilization of drill rig	Uneven site surface (rollover)	▪ Visual inspection of access route to sampling areas for soft spots, holes, rocks, etc. ▪ Operator training (drill rig, locomotive). ▪ Rollover protection (cab or equivalent). ▪ Proper use of outriggers to stabilize drilling.	S	Cr	M
	Vehicles, trains, and heavy equipment traffic in work area	▪ Traffic cones, caution tape, and delineators will be used in the working area. ▪ High visibility apparel will be worn at all times, particularly when working near roadways or heavy equipment. ▪ Operation of heavy equipment by trained personnel only and in accordance with the PSHEP. ▪ Be alert when working around heavy equipment. ▪ All personnel working around a drill rig must know locations of the rig kill switches. ▪ Use ground guides (i.e., spotters) for the backing of all vehicles. No heavy equipment will be operated without a ground guide. ▪ Obtain the attention of the operator before moving into the area of the equipment. ▪ Watch for trains operating on tunnel tracks. ▪ Ensure you are positioned safely when train cars are operating in your vicinity.	S	M	L

Activity/Work Task: Drilling and Well Installation		Overall Risk Assessment Code (RAC) (Use highest code)			M
Project Location: Red Hill Bulk Fuel Storage Facility, Hawaii					
Job Steps	**Hazards**	**Controls**	**P**	**S**	**RAC**
Mobilization of drill rig (Contd.)	Crane use, suspended loads	▪ Crane operation by trained/certified personnel only. ▪ Hand signals by one worker only. ▪ Do not distract crane operator unless rigging issue ▪ Keep unnecessary personnel out of area. ▪ Do not walk or work under suspended load.	S	Cr	M
	Overhead power lines and structures	▪ Visual inspection of access route ▪ Ensure all overhead and underground features have been identified in area prior to start of activities. ▪ Maintain distances from overhead power lines as shown in the PSHEP and below. ▪ Confirm utility clearance and geophysical survey has been performed. ▪ Wear appropriate PPE, including long sleeves, pants, and steel-toed boots.	U	Cr	L
	Slips, trips, and falls	▪ Good housekeeping. ▪ Pay attention to walking/working surface. ▪ Step over train tracks rather than on them. ▪ Wearing appropriate safety footwear properly (e.g., boots with ankle support, laces tied, and proper soles).	S	M	L
	Insects, rodents, animals, etc. (not applicable in tunnel)	▪ Wear light colored clothing and/or Tyvek coveralls for additional skin protection, if necessary. ▪ Apply insect repellant spray or lotion to exposed skin. ▪ Let other field team members know if you are allergic to bee stings and would require assistance with medication for treatment.	S	Cr	M
	Inclement weather, storms, lightning, wind, dust, heat, sun, cold (not applicable in tunnel)	▪ Check weather forecast. Seek shelters in vehicles or buildings during a storm. ▪ Wear proper clothing and PPE. ▪ Be aware of slip hazards, puddles, etc. ▪ Do not begin or continue work until lightning subsides for 30 minutes. ▪ Wear goggles if dust/debris is visible. ▪ Have sunscreen (SPF > 15) available for ultraviolet protection. ▪ Have sufficient drinking water for hydration. ▪ Know the symptoms of heat stress. ▪ Watch for symptoms of heat stress in fellow workers. ▪ Call WorkCare as necessary.	U	Cr	L

Activity/Work Task: Drilling and Well Installation		Overall Risk Assessment Code (RAC) (Use highest code)			M
Project Location: Red Hill Bulk Fuel Storage Facility, Hawaii					
Job Steps	**Hazards**	**Controls**	**P**	**S**	**RAC**
Well drilling and soil logging/sampling	General chemical exposure	▪ Wear proper PPE – latex inner glove and/or nitrile outer glove, Tyvek, and respirator (as needed and as shown in Section 6 of the PSHEP). ▪ Monitor to determine exposure and Action Levels (If any, see Section 6 of the PSHEP). ▪ Follow proper decontamination procedures when leaving the "exclusion zone". ▪ Practice good personal hygiene; wash up before eating, eat or drink in designated clean areas. ▪ In case of chemical exposure to eyes, the victim will be directed to the nearest eyewash station to treat eye irritation. Eyewash bottle will be used as interim measure at the discretion of Site SH&E Officer. ▪ Review hazardous properties of site contaminants and vehicle exhaust with workers before sampling operations begin. ▪ Orient operator cross-wind. ▪ Keep all sampling supplies and bottles upwind or cross-wind. ▪ Dust control measures such as wetting down of soil. ▪ Follow proper decontamination procedures when leaving the "exclusion zone" (see PSHEP).	**U**	**M**	**L**
	High Noise Levels	▪ Use hearing protection when exposed to excessive noise levels (greater than 85 dBA over an 8-hour work period). ▪ The need to raise your voice at 1 foot or shout at 3 feet is a sign hear protection is required.	**U**	**M**	**L**
	Failure of Equipment	▪ Proper site-specific safety training for operator and crew. ▪ Daily inspection to include: o Check vehicle/equipment condition o Properly block and level machine with outriggers o Store equipment properly o Check condition of all fittings, drive rods, cables, and hydraulic lines ▪ Verify first aid kit and fire extinguisher	**S**	**Cr**	**M**

Activity/Work Task: Drilling and Well Installation		Overall Risk Assessment Code (RAC) (Use highest code)			M
Project Location: Red Hill Bulk Fuel Storage Facility, Hawaii					
Job Steps	**Hazards**	**Controls**	**P**	**S**	**RAC**
Well drilling and soil logging/sampling (cont.)	Fire	▪ Turn engine off before refueling ▪ Eliminate sources of ignition from the work area ▪ Prohibit smoking in well drilling area ▪ Provide a charged ABC (or equivalent) fire extinguishers with a tag documenting inspections ▪ Store flammable liquids in well ventilated areas ▪ Prohibit storage of flammable liquids in plastic containers ▪ Store combustible materials away from flammables ▪ Separate flammables and oxidizers by 20 feet minimum	U	Cr	L
Breaking of soil with drill rig or other powered equipment and digging to required depth (<4 feet); leveling, and vegetation clearance	Noise of operating equipment	▪ Wear necessary hearing protection (ear plugs, ear muffs, etc.) while equipment is operating.	U	M	L
	Overhead hazard	▪ Wear hard hat; do not allow personnel to stand within the swing radius of equipment booms/arms when equipment is in operation.	S	M	L
	Open holes from excavation (not applicable in tunnel)	▪ Use barricades around excavation (as required).	S	M	L
	Underground utilities (utilities are attached to tunnel wall)	▪ Ensure all underground features have been identified in area per Subsurface Clearance Protocol (SCP) prior to start of activities. ▪ Have emergency telephone number available. ▪ Confirm utility clearance and geophysical survey has been performed. ▪ Ensure borings are hand-augered to a minimum of 5 feet to clear underground utilities if marked utilities are within 15 feet of boring location	S	Cr	M
	Pinch hazards of equipment	▪ Review Standard Operating Procedures (SOP) for equipment. ▪ No loose clothing or jewelry while operating equipment. ▪ Ensure all field personnel know the location of the rig kill switches.	S	Cr	M
	Flying objects, particles	▪ Wear appropriate PPE (such as safety glasses and hard hats). Goggles if a splash hazard. Face shield for a more severe exposure) ▪ Equipment operator and ground personnel must pay attention to one another). ▪ Do not position your body between equipment and a fixed point if possible. ▪ Be in communication with each other (eye contact, radio, hand signals or verbal communication). ▪ Have appropriate eyewash station nearby for immediate use.	S	M	L

Activity/Work Task: Drilling and Well Installation			Overall Risk Assessment Code (RAC) (Use highest code)		M
Project Location: Red Hill Bulk Fuel Storage Facility, Hawaii					
Job Steps	**Hazards**	**Controls**	**P**	**S**	**RAC**
Ground Disturbance: Boring advancement to a total depth (>4 feet)	Moving/rotating equipment	▪ Clear area of obstructions and communicate with all workers involved that drilling is beginning; ensure emergency brake on rig is engaged. ▪ Stay clear of rotating auger, core, or rotary drive head; make sure auger is equipped with auger guards. Know locations of drill rig kill switches. ▪ Do not wear loose clothing; wear appropriate PPE, including steel-toed boots and hard hat. ▪ Stay up-wind of drilling-generated dust.	S	Cr	M
	Noise of operating equipment	▪ Wear necessary hearing protection (ear plugs, ear muffs, etc.) while equipment is operating.	U	M	L
	Suspended loads	▪ Wear hard hat; do not walk under suspended loads. When possible, remove overhead hazards promptly.	S	M	L
Ambient Air Monitoring	Vapors	▪ Approach area where vapors are suspected from upwind direction and stay upwind/crosswind of from potential source of vapors. ▪ Ensure personnel have been trained on instrument use.	S	M	L
Well Installation	Suspended loads	▪ Wear hard hat; do not walk/work under suspended loads.	S	M	L
	Flying objects	▪ Wear appropriate PPE (e.g., safety glasses and hard hats; goggles if a splash hazard; face shield for a more severe exposure).	S	N	L
	Moving equipment	▪ Ensure emergency brake on rig is engaged and wheels are chocked.	U	M	L
	Noise of operating equipment	▪ Wear necessary hearing protection (e.g., ear plugs, ear muffs) while equipment is operating.	U	M	L
	Heavy material lifting	▪ Do not lift or move heavy materials (greater than 50 lbs) without adequate assistance; bend and lift with legs and arms, keeping back straight.	S	M	L

Activity/Work Task: Drilling and Well Installation		Overall Risk Assessment Code (RAC) (Use highest code)			M
Project Location: Red Hill Bulk Fuel Storage Facility, Hawaii					
Job Steps	**Hazards**	**Controls**	**P**	**S**	**RAC**
Decontamination of equipment	High-pressure water, splashes, flying particles	▪ Keep unnecessary people away from decontamination activities. ▪ Wear sturdy gloves that will not get cut by high-pressure water. ▪ Wear safety goggles or face shield. ▪ Assume stance that affords greatest control of pressure washer. ▪ Never leave the pressure washer unattended. ▪ Never point the pressure washer at anyone or expose others to the hazards of using the machine. ▪ Ensure items are heavy enough or properly secured so as not to be moved by the high-pressure water. ▪ Objects to be cleaned must never be hand-held. ▪ Never modify the pressure washer. ▪ Use whip checks if available. ▪ If injury occurs, seek medical advice immediately	**S**	**Cr**	**M**
	Noise	▪ Wear adequate hearing protection while using pressure washer.	**S**	**M**	**L**
De-mobilization of drill rig	Uneven site surface (rollover)	▪ Visual inspection of access route to sampling areas for soft spots, holes, rocks, etc. ▪ Operator training. (locomotive) ▪ Rollover protection (cab or equivalent). ▪ Proper use of outriggers to stabilize drill rig.	**S**	**Cr**	**M**
	Overhead power lines and structures (power lines are in conduit and attached to tunnel wall)	▪ Visual inspection of access route. ▪ Maintain distances from overhead power lines as shown in the PSHEP and below. ▪ Operator training.	**U**	**Cr**	**L**
	Equipment contamination	▪ Decontaminate equipment prior to leaving work area per decontamination procedures.	**U**	**N**	**L**

Equipment to be Used	Training Requirements/Competent or Qualified Personnel name(s)	Inspection Requirements
Motor Vehicle, Drill rig	All assigned employees are required to familiarize themselves with the contents of this AHA before starting a work activity and review it with their Supervisor during their Daily Safety Huddle. All personnel engaged in hazardous substance removal or other activities that expose or potentially expose them to hazardous substances or health hazards shall receive appropriate training as required by 29 CFR 1910.120(e), including, but not limited to, initial 40-hour, 3 days of supervised field work, and annual 8-hour refresher training. Supervisors and Site SH&E Officers will also receive the 8-hour Supervisor training. Only level D PPE is addressed in the PSHEP and first planned for this work. Any respirator use will require consultation with the Division Health and Safety Manager and an amendment to the PSHEP. All field personnel will participate in a Medical Surveillance Program. Medical qualification, training and fit-testing must be received on an annual basis for individuals that wear a respirator as required by 29 CFR 1910.120(f).	▪ Check PPE for abnormal wear and tear, rips, etc. ▪ Check area for hazards (e.g., overhead hazards, flying debris/ particulates or splashes, vehicle traffic or heavy equipment operation, or loud noises). ▪ Inspect equipment daily including cables, pulleys, hoses, fittings, mast, hinge points and connections, drive rods etc. ▪ Inspect pressure washer prior to use.
Hand Tools	▪ Same as above. ▪ Qualified personnel must be familiar with the SOP.	▪ Same as above. ▪ Check if hand tool is in working condition.
PID	▪ Same as above. ▪ Qualified personnel must be familiar with the SOP.	▪ Check wind direction using flagging or similar device; ▪ Calibrate PID and make sure the instrument is working properly.
Escape-only respirator	▪ Training in accordance with OSHA 29 CFR 1910.134, Respiratory Protection Program, and manufacturer's instructions	▪ Ensure equipment is not damaged.

Minimum Clearance from Energized Overhead Electrical Line

Nominal System Voltage	Minimum Required Clearance
0 - 50 kV	10 feet
51 - 200 kV	15 feet
201 - 300 kV	20 feet
301 - 500 kV	25 feet
501 - 750 kV	35 feet
751 - 1000 kV	45 feet

Minimum clearance is not applicable in tunnel.

Activity Hazard Analysis (AHA) 4

Activity/Work Task: **Soil and Groundwater Sampling**	Overall Risk Assessment Code (RAC) (Use highest code) **L**
Project Location: **Red Hill Bulk Fuel Storage Facility, Hawaii**	
Job Number: **749435**	
Date Prepared: **06/30/14**	
Prepared by (Name/Title): **Gene Wright, PM**	
Reviewed by (Name/Title): **Judy Blakemore/Safety Manager**	
Notes: (Field Notes, Review Comments, etc.)	

Risk Assessment Code (RAC) Matrix

Severity	Probability				
	Frequent	Likely	Occasional	Seldom	Unlikely
Catastrophic	E	E	H	H	M
Critical	E	H	H	M	L
Marginal	H	M	M	L	L
Negligible	M	L	L	L	L

Step 1: Review each "Hazard" with identified safety "Controls" and determine RAC (See above).

The RAC is developed after correctly identifying all of the hazards and fully implementing all controls.

"Probability" is the likelihood to cause an incident, near miss, or accident and identified as: Frequent, Likely, Occasional, Seldom or Unlikely.

"Severity" is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible

Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" on AHA. Annotate the overall highest RAC at the top of AHA.

RAC Chart

- **E = Extremely High Risk**
- **H = High Risk**
- **M = Moderate Risk**
- **L = Low Risk**

Job Steps	Hazards	Controls	P	S	RAC
Soil, Soil Gas, and GW Sampling	General Chemical Exposure	▪ Wear proper PPE – latex inner glove and/or nitrile outer glove and Tyvek (as needed and as shown in Section 6 of the PSHEP). ▪ Monitor to determine exposure and Action Levels (If any, see Section 6 of the PSHEP). ▪ Follow proper decontamination procedures when leaving the "exclusion zone". ▪ Practice good personal hygiene; wash up before eating, eat or drink in designated clean areas. ▪ In case of chemical exposure to eyes, the victim will be directed to the nearest eyewash station to treat eye irritation. Eyewash bottle will be used as interim measure at the discretion of Site H&S Officer.	U	M	L
	Inclement weather, storms, lightning, wind, dust (not applicable in tunnel)	▪ Check weather forecast. Seek shelters in vehicles or buildings during a storm. ▪ Wear proper clothing and PPE. ▪ Be aware of slip hazards, puddles, etc. ▪ Do not begin or continue work until lightning subsides for 30 minutes. ▪ Wear goggles if dust/debris is visible. ▪ Have sunscreen (SPF > 15) available for ultraviolet protection. ▪ Have sufficient drinking water for hydration. ▪ Know the symptoms of heat stress. ▪ Watch for symptoms of heat stress in fellow workers. ▪ Call WorkCare as necessary.	U	Cr	L

Activity/Work Task: Soil and Groundwater Sampling			Overall Risk Assessment Code (RAC) (Use highest code)		L
Project Location: Red Hill Bulk Fuel Storage Facility, Hawaii					
Job Steps	**Hazards**	**Controls**	**P**	**S**	**RAC**
Field testing/collecting sample	Exposure to analytical chemicals	▪ Follow manufacturer's instructions with field kit or field instrument for handling analytical chemicals or instrument; wear appropriate PPE including nitrile gloves.	**U**	**M**	**L**
	Cuts, scratches, other injuries	▪ Use the tool for its intended purpose; when a tool becomes damaged, repair it before using it again or replace it. ▪ Wear safety glasses and leather or cut-resistant gloves and safety glasses, when appropriate.	**S**	**M**	**L**
Field testing/collecting sample	Trip/Slip/Fall	▪ When possible choose flat, level, obstacle free work area. ▪ Do not leave tools on ladders or other overhead working spaces; do not leave tools on the ground. Never throw or drop tools. ▪ Good housekeeping. ▪ Pay attention to walking/working surface.	**S**	**M**	**L**
	Using hand tools	▪ All tools will be in good working order. ▪ No damaged equipment will be used until repaired or replaced. ▪ Use the tool for its intended purpose. ▪ Wear safety glasses and leather or cut-resistant gloves, when appropriate.	S	M	L
	Procuring sample from acetate sleeves	▪ Wear PPE (e.g., nitrile gloves and goggles). Follow SOP for handling analytical chemicals. ▪ The acetate has sharp edges especially after being cut open. Use care when handling and appropriate gloves.	**S**	**M**	**L**

Activity/Work Task: Soil and Groundwater Sampling		Overall Risk Assessment Code (RAC) (Use highest code)			L
Project Location: Red Hill Bulk Fuel Storage Facility, Hawaii					
Job Steps	**Hazards**	**Controls**	**P**	**S**	**RAC**
Using portable generators, electrical equipment (combustion engines not allowed in tunnel)	Electrical shock	▪ Insure generator is GFCI protected. ▪ Keep all electrical equipment from excessively wet conditions or standing water. ▪ Do not abuse the cord – never carry a tool by its cord or yank the cord to remove the plug from a receptacle. ▪ Inspect cords for frayed insulation, exposed wire, or damaged plug or receptacle ends. Replace cord if damaged. ▪ Disconnect all cords from the power source when not in use and when servicing.	U	Cr	L
	Slips, Trips, and Falls	▪ Worker awareness of potential slippery surfaces and tripping hazards. ▪ Wear work boots with slip-resistant soles.	S	N	L
Using portable generators, electrical equipment, nitrogen gas cylinders (combustion engine not allowed in tunnel)	Fire	▪ Turn generator off before refueling. ▪ Eliminate sources of ignition from the work area. ▪ Prohibit smoking in working area. ▪ Provide a charged ABC (or equivalent) fire extinguishers with a tag documenting inspections. ▪ Store flammable liquids in well ventilated areas and away from the sun. ▪ Ensure that nitrogen gas cylinders are secured up-right or horizontally. ▪ Ensure that top valves on cylinders are closed and protective covers are in place. ▪ Tighten all tubing connections with hand tools. ▪ If ground conditions allow, use dolly to move cylinders to well head.	U	Cr	L
Packing sample for off-site shipment to lab	Accidental breakage of glass bottles	▪ Wear cut-resistant gloves during packaging of glass bottles.	U	M	L
	Chemical exposure	▪ Training and safety awareness of potential exposure to contaminants at the site. ▪ Training of personal decontamination procedure. ▪ Wear necessary PPE (see potential chemical exposure section above and/or field kit manufacturer's instructions). ▪ Immediate cleanup of spills of sample material.	U	N	L

Equipment to be Used	Training Requirements/Competent or Qualified Personnel name(s)	Inspection Requirements
General	All assigned employees are required to familiarize themselves with the contents of this AHA before starting a work activity and review it with their Supervisor during their Daily Safety Huddle. All personnel engaged in hazardous substance removal or other activities that expose or potentially expose them to hazardous substances or health hazards shall receive appropriate training as required by 29 CFR 1910.120(e), including, but not limited to, initial 40-hour, 3 days of supervised field work, and annual 8-hour refresher training. Supervisors and Site SH&E Officers will also receive the 8-hour Supervisor training. Only level D PPE is addressed in the HASP and planned for this work. Any respirator use will first require consultation with the Project Health and Safety manager and an amendment to the PSHEP. All field personnel will participate in a Medical Surveillance Program. Medical qualification, training and fit-testing must be received on an annual basis for individuals that wear a respirator as required by 29 CFR 1910.120(f).	▪ Check PPE for abnormal wear and tear, rips, etc. ▪ Check area for hazards (i.e., overhead hazards, flying debris/particulates or splashes, vehicle traffic or heavy equipment operation, loud noises, etc.)
Hand Tools	Same as above. Qualified personnel must be familiar with the SOP.	▪ Same as above. ▪ Check if hand tool is in working condition. ▪ Check if all tools are stored appropriately when not in use.
PID	Same as above. Qualified personnel must be familiar with the SOP.	▪ Check wind direction using flagging or similar device. ▪ Calibrate PID and make sure the instrument is working properly
Portable generators, electrical equipment	Same as above.	▪ Inspect proper operating condition of kill switches and cord connections.
Escape-only respirator	Training in accordance with OSHA 29 CFR 1910.134, Respiratory Protection Program, and manufacturer's instructions	▪ Ensure equipment is not damaged.

Activity Hazard Analysis (AHA) 5

Activity/Work Task: **Management of IDW**	Overall Risk Assessment Code (RAC) (Use highest code)	**M**
Project Location: **Red Hill Bulk Fuel Storage Facility, Hawaii**	**Risk Assessment Code (RAC) Matrix**	
Job Number: **749435**	**Severity** / **Probability**	
Date Prepared: **07/01/14**		
Prepared by (Name/Title): **Gene Wright, PM**		
Reviewed by (Name/Title): **Judy Blakemore, Safety Manager**		
Notes: (Field Notes, Review Comments, etc.)		

Severity	Frequent	Likely	Occasional	Seldom	Unlikely
Catastrophic	E	E	H	H	M
Critical	E	H	H	M	L
Marginal	H	M	M	L	L
Negligible	M	L	L	L	L

Step 1: Review each "Hazard" with identified safety "Controls" and determine RAC (See above).
The RAC is developed after correctly identifying all of the hazards and fully implementing all controls.

"Probability" is the likelihood to cause an incident, near miss, or accident and identified as: Frequent, Likely, Occasional, Seldom or Unlikely.

"Severity" is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible

Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" on AHA. Annotate the overall highest RAC at the top of AHA.

RAC Chart

- **E = Extremely High Risk**
- **H = High Risk**
- **M = Moderate Risk**
- **L = Low Risk**

Job Steps	Hazards	Controls	P	S	RAC
Conducting various field tasks (e.g., drilling, sampling, IDW management) at the site	General chemical exposure	▪ Wear proper PPE – latex inner glove and/or nitrile outer glove, Tyvek, and respirator (as needed and as shown in Section 6 of the PSHEP). ▪ Monitor to determine exposure and Action Levels (If any, see Section 6 of the PSHEP). ▪ Follow proper decontamination procedures when leaving the "exclusion zone". ▪ Practice good personal hygiene; wash up before eating, eat or drink in designated clean areas. ▪ In case of chemical exposure to eyes, the victim will be directed to the nearest eyewash station to treat eye irritation. Eyewash bottle will be used as interim measure at the discretion of Site SH&E Officer.	U	M	L

Activity/Work Task: Management of IDW			Overall Risk Assessment Code (RAC) (Use highest code)		M
Project Location: Red Hill Bulk Fuel Storage Facility, Hawaii					
Job Steps	**Hazards**	**Controls**	**P**	**S**	**RAC**
Disposal of bulk liquids and solids. IDW will be moved and sampled by the IDW contractor. If IDW is not kept on-site in drums or water tank near the bore hole, IDW will be staged at the Adit 3 lay down area in the Oily Waste Disposal Facility.	Injuries and accidental spills from improper container and drum handling	▪ Provide drum handling training. ▪ Conduct inspection of the integrity of drums and container before handling or moving. ▪ Check label; if unlabeled drums and containers, treat as hazardous waste until it is properly characterized. ▪ Segregate and keep separate incompatible chemicals and substances. ▪ If drums and containers cannot be moved without leakage or rupture, place them in oversized drums. ▪ Provide antistatic grounding of drums and metal containers. ▪ Do not move pressurized drums or containers. ▪ When moving or opening containers or drums, use equipment and procedures to isolate the workers. ▪ Keep container or drum handling to a minimum. ▪ Provide spill containment in the immediate drum or container area. ▪ No manual lifting or handling of drums/containers to prevent muscular stress or strain or other injuries.	S	M	L
	Failure of on-site equipment	▪ Provide training on proper use of equipment. ▪ Conduct daily inspection of equipment.	U	M	L
	Inhalation and dermal contact with hazardous substances	▪ Provide workers with proper skin, eye, and respiratory protection based on the exposure hazards present. ▪ Review hazardous properties of site contaminants with workers and implement control measures before hazardous waste removal operations begin. ▪ Keep all equipment, vehicles, and tools upwind.	S	M	L
	Slip, trip, and fall hazard	▪ Conduct site safety briefing to reinforce general site hazards. ▪ Stay alert and be aware of your surroundings at all times. ▪ Maintain firm footing. ▪ Use "buddy" system. ▪ Watch for obstacles, uneven, and wet surfaces. ▪ Maintain good housekeeping.	S	M	L

Activity/Work Task: Management of IDW		Overall Risk Assessment Code (RAC) (Use highest code)			M
Project Location: Red Hill Bulk Fuel Storage Facility, Hawaii					
Job Steps	**Hazards**	**Controls**	**P**	**S**	**RAC**
Disposal of bulk liquids and solids (Cont.)	Struck by protruding objects, liquid splash	▪ Wear hard hats, safety glasses with side shields and steel-toed safety boot at all times. ▪ Wear safety goggles when cleaning, decontaminating equipment, or working with liquids or potential splash or eye hazards. ▪ Provide eye wash station or sterile eye wash bottle for emergency eye wash.	U	M	L
	Musculoskeletal Disorders (MSD)	▪ Observe proper lifting techniques. ▪ Obey sensible lifting limits (50-lb maximum per person one-time manual lifting, 35-lb maximum for repeated lifts). ▪ Use mechanical lifting equipment (hand carts, trucks) or more than one person to move large, awkward loads.	S	M	L
	Sharp Objects	▪ Maintain all tools in a safe condition. ▪ Keep guards in place during use. ▪ Always cut away from body and hands. ▪ Wear cut-resistant gloves. ▪ Wear boots with steel toes and shanks. ▪ Have a current tetanus booster as recommended by occupational physician. ▪ Be extra cautious in areas containing sharp objects. ▪ Presence and check content of first aid kit.	U	M	L
	Inclement weather, storms, lightning, wind, dust (not applicable in tunnel)	▪ Check weather forecast. Seek shelters in vehicles or buildings during a storm. ▪ Wear proper clothing and PPE. ▪ Be aware of slip hazards, puddles, etc. ▪ Do not begin or continue work until lightning subsides for 30 minutes. ▪ Wear goggles if dust/debris is visible. ▪ Have sunscreen (SPF > 15) available for ultraviolet protection. ▪ Have sufficient drinking water for hydration. ▪ Know the symptoms of heat stress. ▪ Watch for symptoms of heat stress in fellow workers. ▪ Call WorkCare as necessary.	U	Cr	L

Activity/Work Task: Management of IDW			Overall Risk Assessment Code (RAC) (Use highest code)		M
Project Location: Red Hill Bulk Fuel Storage Facility, Hawaii					
Job Steps	**Hazards**	**Controls**	**P**	**S**	**RAC**
Handling drums	Pinch Points	▪ Leave enough space between drums in the IDW storage area. Closely stored 55-gallon steel drums, when moved or handled, create pinch points between each other or the dolly being used to move them. ▪ Identify possible pinch point hazards when handling drums and drum lids. ▪ Be on guard whenever you put your hands, fingers, toes, or feet "between" anything.	S	M	L
	Heavy Lifting	▪ Use proper lifting techniques and ergonomic principles. ▪ Seek assistance if necessary.	S	M	L
	Insects, rodents, animals, etc. (not applicable in tunnel)	▪ Wear light colored clothing and/or Tyvek coveralls for additional skin protection, if necessary. ▪ Apply insect repellant spray or lotion to exposed skin. ▪ Let other field team members know if you are allergic to bee stings and would require assistance with medication for treatment.	S	Cr	M
Operation of Motor Vehicle	Vehicle and heavy equipment traffic in work area	▪ Operation of heavy equipment in accordance with the PSHEP. ▪ Only trained personnel will operate heavy equipment. ▪ Be alert when working around heavy equipment. ▪ Obtain operators attention before approaching heavy equipment. ▪ Ground guide for the backing of all vehicles. No heavy equipment will be operated without a ground guide. ▪ Barriers, warning signs, designated walkways, or other safeguards will be provided in accordance with the site specifics. ▪ High visibility apparel will be worn when working near roadways or heavy equipment.	U	M	L
	Driving hazards	▪ Drivers will have a valid driver's license and will wear a seat belt at all times. ▪ Drivers are prohibited from using any communication devices (e.g., cell phones) while operating any motor vehicles. ▪ Personnel will practice defensive driving techniques. ▪ Walk around the vehicle before driving away. ▪ Adhere to Base and off-Base speed limits.	U	N	L

Equipment to be Used	Training Requirements/Competent or Qualified Personnel name(s)	Inspection Requirements
Motor Vehicle/Heavy Equipment (i.e. vac track, fork lift), drums, bins, and possible above-ground tanks	All assigned employees are required to familiarize themselves with the contents of this AHA before starting a work activity and review it with their Supervisor during their Daily Safety Huddle. All personnel engaged in hazardous substance removal or other activities that expose or potentially expose them to hazardous substances or health hazards shall receive appropriate training as required by 29 CFR 1910.120(e), including, but not limited to, initial 40-hour, 3 days of supervised field work, and annual 8-hour refresher training. Supervisors and Site SH&E Officers will also receive the 8-hour Supervisor training. Only level D PPE is addressed in the PSHEP and planned for this work. Any respirator use will first require consultation with the Project Health and Safety Manager and an amendment to the PSHEP. All field personnel will participate in a Medical Surveillance Program. Medical qualification, training and fit-testing must be received on an annual basis for individuals that wear a respirator as required by 29 CFR 1910.120(f).	▪ Check PPE for abnormal wear and tear, rips, etc. ▪ Look for signs and symptoms of dehydration, or heat exhaustion. ▪ Check area for hazards (e.g., overhead hazards, flying debris/particulates or splashes, vehicle traffic or heavy equipment operation, or loud noises). ▪ For working in a highly vegetated area, look for objects that could be covered by vegetation, tall grass, etc; look out for snakes. Check for ticks on light colored clothing after completing assignment. ▪ If driving, look under vehicle for sufficient height clearance from vegetation. ▪ Look for the safest route – avoid slopes, low hanging branches, gulleys, ditches, etc.
Escape-only respirator	Training in accordance with OSHA 29 CFR 1910.134, Respiratory Protection Program, and manufacturer's instructions	▪ Ensure equipment is not damaged.

Attachment 2

Stinging Nettle Caterpillar

To report new infestations, call the Hawai'i Department of Agriculture.
On Hawai'i, call HDOA at 974-4140, or the UH-CTAHR Beaumont Agricultural Research Center, 981-5194. On other islands, call HDOA at 973-9534 (O'ahu), 873-3555 (Maui), 274-3069 (Kaua'i).

Authors

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Hawai'i Department of Agriculture, Plant Pest Control Branch, [1]Honolulu, [2]Hilo.

Photos of larva and predator wasps by W. Nagamine; other photos by S. Chun and A. Hara.

Caution: Pesticide use is governed by state and federal regulations. Read the pesticide label to ensure that the intended use is included on it, and follow all label directions.

References

Cock, M.J.W., H.C.J. Godfray, and J.D. Holloway (eds). 1987. Slug and nettle caterpillars. CAB International, Wallingford, UK.

Conant P., A.H. Hara, L.M.Nakahara, R.A. Heu. Nettle caterpillar. New Pest Advisory no. 01-03, March 2002 (revision). Hawai'i Department of Agriculture.

Nagamine, W. (In preparation). Biology of *Darna pallivitta* Moore. Hawaii Department of Agriculture, Plant Pest Control Branch.

Cooperative Extension Service
College of Tropical Agriculture and Human Resources
University of Hawai'i at Mānoa

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Stinging Nettle Caterpillar

Darna pallivitta

PEST ALERT

Cooperative Extension Service
College of Tropical Agriculture and Human Resources
University of Hawai'i at Mānoa

Stinging Nettle Caterpillar

Darna pallivitta

Report any new infestations of stinging nettle caterpillar on Hawai'i to the Hawai'i Department of Agriculture (HDOA), Hilo, 974-4140, or the UH-CTAHR Beaumont Agricultural Research Center, Hilo, 981-5194. On other islands, call HDOA offices at 973-9530 (O'ahu), 873-3555 (Maui), or 274-3069 (Kaua'i).

The nettle caterpillar is of major concern because of its painful sting, voracious appetite, lengthy larval feeding stage (2 months), high fecundity (480 eggs per female), and wide host range. A heavy infestation can defoliate a potted plant in just a few days.

Stinging nettle caterpillar was first discovered in Hawai'i in September, 2001, at a foliage nursery in Pana'ewa on the island of Hawai'i. Nursery workers there experienced an unusual burning and itching sensation on their skin after handling rhapis palms. Specimens sent to the Smithsonian Institution were identified as *Darna pallivitta* Moore. The insect probably arrived from Taiwan and is also found in China, Thailand, Malaysia, and Indonesia. In Hawai'i, *D. pallivitta* has been found so far (Sept. 2005) only on the Big Island, with infestations radiating from the Pana'ewa area in Hilo. Ultraviolet light traps set out island-wide by the Department of Health to monitor mosquito populations have detected adult *D. pallivitta* moths in outlying Kea'au as well as at the Hilo airport.

What to do if you are stung

- Avoid further contact with the caterpillar's spines.
- Wash the area immediately with soap and water to reduce initial pain.
- An oral antihistamine may stop itching and swelling.
- Hydrocortisone cream may also stop itching and swelling.
- ***Get medical attention immediately if you experience difficulty breathing or are stung in the eye.***
- Skin reactions vary from a red welt to severe swelling lasting a couple of days.

The caterpillar's spiny hairs release an irritant on contact

Harm to humans

The nettle caterpillar's stinging, spiny hairs have a physical effect on human skin similar to that of fiberglass. In addition, the spines release an irritant (a mixture of histamines) produced by a poison gland. The irritant causes the skin to burn and itch. If spines get into the eyes, the irritation can be acute; seek medical attention quickly.

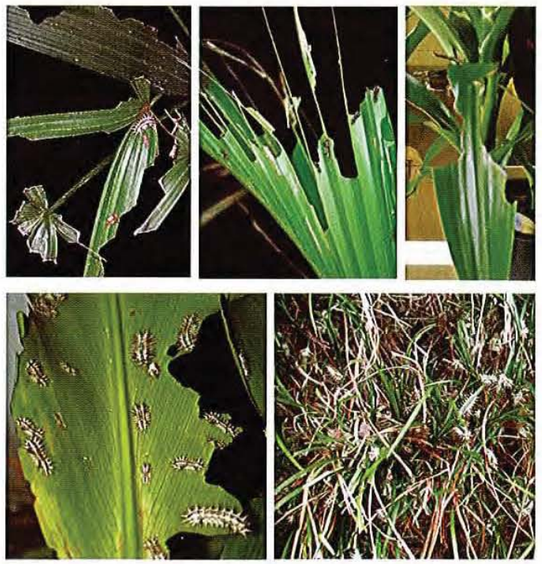
Identifying and Managing Stinging Nettle Caterpillars

Host Plants

In Hawai'i, the nettle caterpillar has been found on more than 30 plants including palms, pasture and ornamental grasses, weeds, and foliage plants. The nursery industry has a very low tolerance for the nettle caterpillar—any feeding by the larvae significantly damages and reduces the value of ornamental and landscape plants. Many of the host plants are of high economic value for export and are common in residential and commercial landscaping.

The pest has been observed to complete its life cycle on palms, including areca, fishtail, manila, rhapis, phoenix, and coconut; it also reproduces on dracaena (cultivars 'Lisa', 'Compacta', and Massangeana') and on starfruit, ti, iris, coffee, honohono grass, the beach pea (indigenous *Vigna marina*) and the endemic mamaki.

The caterpillar has been observed feeding (but not reproducing) on many other plants, including bamboo orchid, banana, 'Pink Quill' bromeliad, chickweed, Chinese star jasmine, cigar plant, rabbitsfoot fern, gardenia, glory bush (*Tibouchina*), 'Golden Glory' perennial peanut, californiagrass, hilograss, mondograss, napiergrass, vaseygrass, wainakugrass, guava, Koster's curse, macadamia, maunaloa vine, monstera, ponytail palm, red and shampoo gingers, sleeping grass, Spanish clover (silverleaf desmodium), walking iris, wedelia, whaleback, and the endemics maile and wiliwili (data gathered by UH-CTAHR and HDOA).



Damage by feeding of large larvae on (clockwise from upper left) rhapis, coconut, dracaena, mondograss, and ti.

Life Cycle

Life cycle

The nettle caterpillar's life span from egg to adult is 75–99 days, depending on the number of larval stages (instars), which ranges from 8 to 11 (45–72 days total). Adult female and male moths live for approximately 10 and 11 days, respectively. As the larvae develop over the 7-day incubation period, the C-shaped embryos are clearly visible. When the larvae are ready to pupate, they migrate toward the base of the host plant to find protected crevices in dried leaves and overlapping plant parts, and they often pupate in clusters. The larva's underside darkens to orange just before pupation. The prepupa spins brown silk around itself, eventually forming a hardened outer shell. The round cocoons are ⅝ inch (16 mm) long, and pupation occurs within the cocoon after 5 days.

Eggs

The female adult moth deposits eggs in small clusters, a line, or singly, usually on the undersides of older leaves. Eggs are flattened, transparent ovals, 1/32 inch (0.8 mm) wide and 1/16 inch (1.6 mm) long, appearing as a glassy sheen on the leaf surface that can easily be overlooked.

Larva

The larva can be up to 1 inch (25 mm) long and is covered with many rows of stinging spines. Larvae vary from white to light gray, with a dark longitudinal stripe down the back.

Prepupa, pupa

Larvae begin feeding 2 days after hatching. Onset of pupation depends on food availability and environmental conditions. The pupal period ranges from 17 to 21 days.

Larvae often pupate in clusters in sheltered spots at the base of the host plant.

Eggs

Incubating larvae

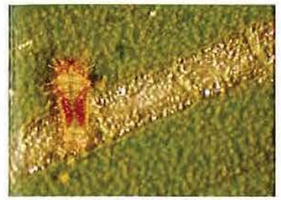
Newly hatched larvae

An early larva on a quarter

Fully developed larva, about 1 inch long

Prepupa

Pupa



Smaller larvae damage by feeding on the leaf surface, creating "window pane" effect.

Adult moth

Adult

The adult moth is approximately ½ inch (12.7 mm) long. The forewing is divided by a white diagonal marking, with the upper portion rust-colored and the lower portion lighter brown; the hind wings are uniform light brown. These nocturnal moths have not been observed feeding. Mating begins about two days after emergence. During the day they are inactive and retreat into vegetation, usually in an upside-down, perching position.

Adults, resting

Male *Female*

Control Methods

Physical control

The adult moth is instinctively attracted to light, so minimize outdoor lighting at night and use bug-zappers with ultraviolet bulbs to reduce the numbers of this pest. Position the unit away from any potential host plants and under protected eaves, and place a bucket of soapy water directly beneath it to capture fallen moths.

Cultural control

Control weeds and modify landscape plantings to limit caterpillar food availability. To avoid transporting the eggs, which are difficult to detect, to new areas, don't bring in known host plants from any infested area.

Biological control

HDOA staff discovered a locally established trichogrammatid wasp depositing its eggs into *D. pallivitta* eggs, which provide a food source for the wasp larvae, which eventually emerge as adults. This wasp, however, has had only limited effect on the nettle caterpillar population on Hawai'i. Therefore, HDOA has worked with researchers in Indonesia and Taiwan to identify other biological control agents of *D. pallivitta*.

A parasitic wasp from Indonesia (*Nesolynx* species), lays many eggs in the cocoon of *D. pallivitta* but was rejected for release in Hawai'i because it is not specific to the pest. Larvae of another wasp (*Aroplectrus dimerus*) from Taiwan are being evaluated; they feed and develop on the nettle caterpillar, killing it. A cytoplasmic polyhedrosis virus found infecting *D. pallivitta* larvae in Waiakea has potential to help control heavy infestations.

Chemical control

Some pesticides (pyrethroid, organophosphate, carbamate, and microbial types including *Bacillus thuringiensis*, or Bt) are effective against the larval stage of the nettle caterpillar. Consult a UH-CTAHR Cooperative Extension Service agent or an agricultural products professional for help in choosing an insecticide.

Attachment 3

Safety Forms

PARSONS

Daily SH&E Meeting Sign-in Sheet

MONITORING WELL INSTALLATION
RED HILL BULK FUEL STORAGE FACILITY
JOINT BASE PEARL HARBOR-HICKAM, HAWAII

Safety Meeting Presenter: _____Date: _____

Weather Conditions:

Temperature (^{o}F) = _____ Wind Direction = _____ Wind Speed = _____

Clear - Sunny – Cloudy – Rain - Snow Forecast _____

Current Site Conditions (circle as appropriate):

Dry - Wet - Muddy - Frozen - Snow Covered - Other (describe) _____

1. Incidents or Injuries to report from Previous Day Activities: No Yes - explain below:

2. Safe and/or At-Risk Observations from Previous Day Activities:

3. Activities Taking Place Today:

4. Anticipated Hazards:

5. Engineering Controls-Work Practices-PPE to Protect Against Hazards:

6. Additional Safety Topic or Comments:

PARSONS

Safety Meeting Sign-in Sheet

MONITORING WELL INSTALLATION
RED HILL BULK FUEL STORAGE FACILITY
JOINT BASE PEARL HARBOR-HICKAM, HAWAII

PRINTED NAME	SIGNATURE	COMPANY

PARSONS

Subcontractor Premobilization SH&E Meeting Form

Date:	Project/Location:
Parsons Representative:	Subcontractor Representative:

The following project site safety, health, security, and environmental requirements, procedures, and hazards have been identified and reviewed with the subcontractor:

Mark with "X"	Item	Mark with "X"	Item	Mark with "X"	Item
☐	Air Pollution and Emissions	☐	Fall Protection, Guardrails, and/or Scaffolding	☐	Personal Protective Equipment
☐	Asbestos			☐	Process Safety Management (PSM)
☐	Buried Items	☐	Fire Protection		
☐	Competent / Qualified Person	☐	Hazardous Materials and Wastes	☐	Protected Ecological and Cultural Resources
☐	Confined Spaces (Permit / Non-Permit)	☐	Hot Work, Welding, and/or Cutting	☐	Resource Conservation and Sustainability
☐	Cranes / Hoists / Annual Inspection Certificate(s)	☐	Ladders	☐	Site Security, Visitor Control, and Public Exposure
☐	Demolition	☐	Lead Paint	☐	Specific Reports (Required by Environmental Regulation) on Toxic or Hazardous Chemicals Usage and Storage
☐	Drinking Water	☐	Lockout / Tagout		
☐	Electrical	☐	Management of Hazardous Materials and Hazardous Solid Wastes		
☐	Emergency Response to Spills and Releases			☐	SSHEP, Emergency Planning and Response Plan
☐	Environmental Assessments	☐	Overhead Power Lines	☐	Wastewater Discharges
☐	Excavations and Trenches	☐	Permits (Excavations, Scaffolding, Demolition, Traffic, Confined Spaces, etc.)	☐	Vehicle and Heavy Equipment
				☐	Other:

Protection of the Public:

Additional Project Concerns:

Attendees:

Name	Title	Company

PARSONS

Employee/Subcontractor Training Acknowledgement

MONITORING WELL INSTALLATION
RED HILL BULK FUEL STORAGE FACILITY
JOINT BASE PEARL HARBOR-HICKAM, HAWAII

Name of Trainer: _____

Training Subject: _____

Training materials used: _____

Name of employee: _____

Date of hire/assignment: _____

I, _____, hereby certify that I have received training as described above in the following areas:

- Names of personnel responsible for site safety and health.
- Safety, health or other hazards at the site.
- The proper use of personal protective equipment.
- The potential occupational hazards in general in the work area and associated with my job assignment.
- Work practices by which a worker can minimize risks from hazards.
- Safe use of engineering controls and equipment on the site.
- Acute effects of compounds on the site.
- Decontamination procedures.
- General safety requirements indicate the safe work conditions, safe work practices, and personal protective equipment required for my work.
- The hazards of any chemicals to which I may be exposed and my right to information contained on material safety data sheets for those chemicals, and how to understand this information.
- My right to ask questions, or provide any information to the employer on safety either directly or anonymously without any fear of reprisal.
- Disciplinary procedures the employer will use to enforce compliance with general safety requirements.

I understand this training and agree to comply with general safety requirements for my work area.

_____ _____

Signature Date

PARSONS

SH&E Activity Hazards Analysis Training Record

Job Number:		
AHA Number:		
Job Location		
Date:		
Name of Trainer:		
Subjects Covered:		
Training Aids Used:		

Attendees – Please Sign Name Legibly Below		
Use additional sheets if necessary.		

PARSONS

Competent Person Form

Definition

A competent person is a person having the ability to recognize existing and predictable hazards and having the authority to correct them.

Responsibility

The designated competent person is responsible for recognizing and correcting SH&E risks/hazards. This person has the authority to stop work in a potential SH&E concern on the jobsite. This form must be completed by each designated competent person. ***Where an employee is responsible for multiple crafts, it will be necessary to maintain additional designated competent persons and forms.*** Each competent person on a Parsons project must submit this completed form to the Parsons Project Manager before beginning work on the project and must update it any time the designated representative(s) changes.

Acknowledgment

I, _____

Employee Name

have been assigned by _____to be the competent person in the areas indicated and I _____ acknowledge that I have been thoroughly trained and an experienced in hazard recognition and have the authority to stop work and correct hazards in the event of a potential hazardous or imminent danger situation.

Check appropriate listed below items.

☐	Air Pollution and Emissions	☐	Environmental Assessments	☐	Mechanical Demolition
☐	Asbestos	☐	Excavations and Trenches	☐	Protected Ecological and Cultural Resources
☐	Bolting, Riveting, and Fitting	☐	Fall Protection	☐	Resource Conservation
☐	Buried Items	☐	First Aid and CPR	☐	Respiratory Protection
☐	Concrete, Forms, and Shoring	☐	Hearing Protection	☐	Rigging
☐	Cranes and Derricks	☐	Ladders	☐	Scaffolding
☐	Demolition	☐	Lead	☐	Tunnels and Shafts
☐	Drinking Water	☐	Management of Hazardous Materials and Hazardous Solid Wastes	☐	Underground Construction
☐	Electrical			☐	Wastewater
☐	Emergency Response to Spills and Releases	☐	Marine Work and Diving	☐	Welding and Cutting
		☐	Material and Personnel Hoists		
☐	Other				

PARSONS

Project Safety, Health, and Environment Plan Acceptance Form

This form is to be completed by project personnel prior to working on the project work site.

I have read and agree to abide by the contents of the Health and Safety Plan for the following project:

MONITORING WELL INSTALLATION
RED HILL BULK FUEL STORAGE FACILITY
JOINT BASE PEARL HARBOR-HICKAM, HAWAII

_____

Signed

_____

Date

PARSONS

Weekly SH&E Inspection Checklist (Sheet 1 of 2)

	Week Ending Date:
Project Name	Project Number:
Name:	Signature:

Check each box during your inspection or indicate N/A. Substandard conditions found must be identified on the back of this checklist.

	Electrical: temporary power, circuits marked, GFC protection, damaged cords, correct outlets, and signage.
	Environmental: Air emissions controlled, hazard communication program, specific MSDS sheets, fuel signage, spillage dike, dust control, HAZMAT storage, and waste disposal.
	Excavations: Guarded, Soil Condition, Trenching Controls, Blue Stake/Equivalent, Daily Inspections Subcontractor, and Proper Access.
	Fire Safety: Extinguishers; Proper Size, Numbers, Proper Locations, Hose Stations, Hot Work Permit, Fuel Storage.
	Framing Activities: Proper Positions, Monitor, Fall Protection, Housekeeping, Forklift Activity, Training, and Tool Use.
	Guarding: Floors, Walls, Windows, Leading Edge, Roof, Elevator Shafts, Open Holes, Material, Quality, and Handrail
	Housekeeping: Office, Walkways, Waste Material, Lay Down Yard, Grounds, and Subcontractor Areas, Food Debris.
	Ladders: Height, Secured Top/ Bottom, Condition, Employee Position; Three Points of Contact.
	Material Handling: Rigging, Material Condition, Training, Tasks, Proper Lifting, Wheel Barrows, Stacking/Storage.
	Medical: First Aid Kits, Numbers Posted, Address Knowledge, Nearest Emergency Assistance, CPR/First Aid Training.
	Mobile Equipment: Inspections, Condition, Backup Alarms, Leaks, Fuel Storage, Proper Parking, and Training.
	PPE: Hearing, Head, Hand, Eye, Foot, Fall, Seatbelts, Respiratory,
	Sanitary: Drinking Water, Toilets Clean and Adequate, Soap and Water for Washing
	Scaffolds: Component Damage, Footing, Secured, Guardrail, Training, Inspections, Pins & Bracing, Planking, and Ladders.
	Tools: Damage, Cords, Blades, Guards, Hoses, Handles, Switches, Training, Proper Use, Storage, Adequate.
	Training: Forklift, Man Lift, Water Truck, Orientation, Task, Hazards, Power Tools, Scaffolds, and Trenching.
	Welding: Hot Work Permit, PPE, Gas Checks, Confined Space, Tank Storage, Equipment Inspections, and Fire Protection
	Miscellaneous: Any condition or behavior not identified on this checklist.

PARSONS

Weekly SH&E Inspection Checklist (Sheet 2 of 2)

			Week Ending Date:		
Project Name			Project Number:		
Name:			Signature:		
Hazard Type	1.	Improper or Inadequate Guarding	8.	Substandard Housekeeping	
	2.	Improper Wiring	9.	Hazardous Environmental Conditions	
	3.	Defective Tools, Equipment, Substances	10.	Radiation Exposures	
	4.	Hazardous Arrangements	11.	Congestion or Restricted Movement	
	5.	Inadequate Illumination	12.	Inadequate Warning System	
	6.	Inadequate Ventilation	13.	Fire & Explosive Hazard	
	7.	Improper Personal Protective Equipment	14.	Other:	
Basic Causes	1.	Inadequate Engineering	7.	Inadequate Leadership & Supervision	
	2.	Normal Wear & Tear	8.	Physical Incapacity	
	3.	Inadequate Purchasing	9.	Lack of Knowledge	
	4.	Inadequate Maintenance	10.	Improper Motivation	
	5.	Inadequate Work Standards	11.	Mental Incapacity	
	6.	Abuse	12.	Other:	
Hazard Classification	Class A: Likelihood of Death Class B: Likelihood of Serious Injury Class C: Likelihood of Minor Injury				

Items	Hazard Type	Basic Cause	Hazard Class	Location	Remedial Action(s)

Comments:

ParShare link: Weekly SH&E Inspection Checklist

PARSONS

"Near Miss" Incident Investigation Report Form

1) Project name and number:_____

2) "Near miss" location:_____

3) Incident date and time:_____

4) Personnel present (optional):_____

5) Describe incident:_____
_____
_____
_____
_____

6) What action or condition contributed to incident?_____
_____
_____
_____

7) What action was taken or suggested to prevent reoccurrence?_____
_____
_____
_____

8) Comments_____
_____
_____

9) Date of report_____ Prepared by_____

10) Office health and safety representative review:

_____ _____
Signature Date

PARSONS

Daily Vehicle Inspection Report

☑ = OK ☒ = Adjustment Made **R** = Repair Needed

Date:_____ Time:_____ License Plate Number:_____

Vehicle Make and Type:_____Rental Agency _____

General Vehicle Inspection:

1. Windshield ☐ 3. Vehicle Interior ☐
2. Vehicle Exterior ☐ 4. Leaks under Vehicle ☐

Check that the following are in proper working order:

1. Lights:
   - a. Headlights ☐
   - b. Taillights ☐
   - c. Turn Signals ☐
   - d. Brake Lights ☐
   - e. Back-up Lights ☐
   - f. Interior Lights ☐
2. Brakes ☐
3. Horn ☐
4. Tires properly inflated (refer to sticker on door or vehicle manual) ☐
5. Spare tire present and properly inflated ☐
6. Windshield wipers ☐
7. Windshield washers ☐
8. Defrosters/Defoggers ☐
9. Battery terminals free of corrosion ☐
10. Cooling system hoses ☐
11. Belts ☐
12. Fluid levels: (Circle approximate level)
    - a. Oil: Full 1 Quart low Does not register
    - b. Coolant: Full cool Needs some coolant Does not register
    - c. Transmission: Full 1 Pint low Does not register
      (NOTE: Check transmission fluid while vehicle is running!)
    - d. Fuel: E 1/4 1/2 3/4 F

Please note any problems, unusual conditions, repairs made or fluids added (except fuel):

_____

_____

PARSONS

Notice of Subcontractor Violation of Safety and Health Regulations

Date: _____

Contractor Name: _____

Address: _____

_____

_____

Attention: _____

This letter officially notifies you that you have been found to be in violation of the following Safety Regulations:

_____

on (date) _____, by_____.

Confined Space Entry		Lockout/Tagout		Hot Work		Personal Protective Equipment	
Knowledge of the environment		Awareness of warning alarms		Evacuation routes		Back-up Alarms	
Assembly locations		Fall Protection		Scaffolding		Environmental/Hazardous Material Storage	
Trenching		Safe Work Practices		Security Practices			

Other: _____

_____

_____

This/These violations occurred at the following locations: _____

_____

at the following times_____ and dates _____

The name of the employees was/were _____

under the supervision of_____.

PARSONS	MONITORING WELL INSTALLATION RED HILL BULK FUEL STORAGE FACILITY JOINT BASE PEARL HARBOR-HICKAM, HAWAII

Date: _____

Task: _____

Name: _____

Before you begin any new task ask yourself the following questions. Take corrective actions as necessary prior to beginning work.

- ☐ Do I know exactly what I am doing?
- ☐ Have I reviewed the AHA for this task?
- ☐ Do I have all the right people involved?
- ☐ Is there any potential that I or my coworkers could get hurt?
- ☐ Are there any questions I should be asking fellow employees?
- ☐ Should I talk to my supervisor?
- ☐ Have I read the Work Plan and fully understand the procedures relating to this job?
- ☐ Am I using the proper tools?
- ☐ Do I have the proper PPE?
- ☐ Will I be working as safely as I know how?
- ☐ Do I see anything that just doesn't look quite right?
- ☐ Am I in a hurry? Would I be safer if I slowed down?

Each of these questions should be answered to your full satisfaction before you proceed with the work. Remember, no job is so important that you must jeopardize your safety.

Job Hazards? (List direct hazard of job duties)

1. Hazards: _____
   Mitigation: _____
2. Hazards: _____
   Mitigation: _____
3. Hazards: _____
   Mitigation: _____

Work Area	Yes	No
Work Area Clean	☐	☐
Permits Attained	☐	☐
Standard PPE (Hard hat, vest, glasses, gloves, safety boots)	☐	☐
Additional PPE needed:		

PARSONS

Notice of Noncompliance with Safety and Health Regulations

Under conditions of this enforcement procedure, check all items that apply:

_____ 1. You are being notified of this violation and should take corrective action to prevent a reoccurrence. The corrective action shall be documented to the Parsons Construction Management representative immediately.

_____ 2. You must submit a plan for compliance to your Parsons Construction Management representative and the Construction Safety Manager within two days of receipt of this letter. The compliance plan must include the means or methods of compliance and the date that the requirements for compliance will be completed. Once compliance has been achieved, a follow up letter must be sent to the Parsons Construction Management representative and Construction Safety Manager. Failure to comply will result in disciplinary action against your Company.

_____ 3. You are required to review the stated procedures with your Parsons Construction Management representative. Work may not commence on the site until the review is complete and the Subcontractor responds formally that the procedure is understood and will comply.

_____ 4. You are required to review the stated procedures with your Parsons Construction Management representative. Work may not commence on the site until the review is complete and you must confirm formally the disciplinary action to be taken against the supervisor and employees.

_____ 5. All work on the site will stop until the Parsons Construction Management representative reviews all the facts with the Subcontractor and determines if the contract between the parties will be terminated.

Sincerely,

_____

Parsons Representative

PARSONS

Air Monitoring Data Form

MONITORING WELL INSTALLATION
RED HILL BULK FUEL STORAGE FACILITY
JOINT BASE PEARL HARBOR-HICKAM, HAWAII

Name: Field Crew:

PROJECT NAME_____ PROJECT NUMBER:_____

Person Sampling	Person(s) Sampled /Location	Date	Time	PID/BG** (PPM)	Dräger (PPM)	LEL/BG (%)	O_2/BG (%)	Other	Notes

PID

Model_____

Serial #_____

Cal.* Gas_____

Cal. Reading_____

BG Reading_____

Explosimeter

Model_____

Serial #_____

Cal Gas_____

Cal. Reading_____

BG Reading_____

Other

Model_____

Serial #_____

Cal Gas_____

Cal. Reading_____

BG Reading_____

*Cal=Calibration

**BG = Background

PARSONS

Air Purifying Respirator (APR) Log

MONITORING WELL INSTALLATION
RED HILL BULK FUEL STORAGE FACILITY
JOINT BASE PEARL HARBOR-HICKAM, HAWAII

User	Date of Use	Cleaned and Inspected Prior To Use (Initials)	Cartridges Changed Prior to Use (Yes, No, N/A)	Total Hours on Cartridge

APR Performance Comments:

Site Visitors Log

MONITORING WELL INSTALLATION
RED HILL BULK FUEL STORAGE FACILITY
JOINT BASE PEARL HARBOR-HICKAM, HAWAII

Page _____ of _____ Pages

Name (Print)	Signature	Company	Date	Time In	Time Out	On Site Safety Brief (Initials)

APPENDIX C

PROJECT FORMS

SOP #1 – VAPOR SAMPLING

1.1 SAMPLE COLLECTION - SUMMA CANISTERS

1) The required volume shall be purged from each vapor probe (purge volume or time should be determined or known before sampling). Close the pinch valve on the VMP tubing before removing syringe or pump.

2) Samples for laboratory analyses shall be collected directly into pre-cleaned, 1-liter, evacuated SUMMA® canisters.

3) Prior to SUMMA® canister sampling, each canister shall be checked to verify that the vacuum in the canister is greater than 22 inches of mercury (in Hg). If the vacuum is less than 22 inches, the SUMMA® canister will not be used.

   A) Make sure canister valve is closed.

   B) Remove brass cap, attach flow controller/pressure gauge assembly.

   C) Install brass cap on pressure gauge assembly.

   D) Open canister valve, read vacuum, then close valve. The initial vacuum will then be recorded on the sampling form and canister tag.

4) Remove brass cap from pressure gauge assembly, attach "Summa canister adaptor" (a Swagelock fitting with short piece of Tygon tubing).

5) Attach Summa canister to VMP tubing.

6) Open pinch valve on VMP tubing.

7) Open canister valve, record Start Time on the sampling form and canister tag.

8) Close canister valve and pinch valve when vacuum is around 2-4 in Hg (should take about 10-15 minutes to fill).

9) Record final vacuum and Stop Time on the sampling form and canister tag.

10) Remove controller/pressure gauge assembly and replace brass cap on Summa canister.

11) Collect sample for field screening – see procedure below.

Complete chain of custody (COC), pack canisters, ship to analytical laboratory. Keep canisters at ambient temperature (out of the sun or inside a hot vehicle).

The laboratory should include COCs with the canisters.

Request analysis for VOCs (TO-15) and Total Petroleum Hydrocarbon-gasoline [C6-C12] (TO-3), Methane (ASTM D-1946), and Helium (ASTM D-1946) if a leak test is performed, or other compounds as required by contract.

Request turn-around time per subcontract with analytical laboratory.

Duplicate Lab Sample(s): Use "T" fitting and connect two canisters using new Tygon tubing. Collect duplicate samples as required by the work plan.

Ambient Blank(s): Collect ambient blanks as required by the work plan. Follow the above procedures but just place the canister next to where you're sampling; however, don't connect the canister to the VMP – just sample open air.

1.2 LEAK AND PURGE VOLUME TESTING

Prior to collecting vapor samples, leak tests and purge volume tests may be performed to ensure soil vapor point installation, construction, and sampling techniques are adequate. Leak tests should be conducted for VMPs shallower than 10 feet bgs. Purge volume tests will be will be performed for vapor probes installed at each depth of the VMPs.

Procedures for conducting leak tests are as follows:

<u>Leak Test</u>

1) A leak test may be performed on the shallowest vapor probe of each nested VMP.
2) A leak test chamber shall be constructed which shall fit over the completed VMP and aboveground sampling equipment used for sampling (e.g., tubing or fittings).

3) Helium gas shall be released inside the chamber to maintain a helium concentration between approximately 25 and 50 percent. A helium detector will be used to ensure helium gas is present at the appropriate levels within the leak test chamber.

4) Vapor shall be extracted from the vapor probe using a graduated syringe at a rate of approximately 50 mL/min. Three sequential 400 mL samples, followed by two 1,000 mL samples, shall be withdrawn from the vapor probe.

5) Each sample shall be transferred to a Tedlar® bag and screened for the presence of helium, which would suggest a leak in the system or short-circuiting of the borehole.

6) If helium gas is detected in the extracted gas, corrective action shall be taken and the leak test performed again to verify the integrity of the construction and sampling methods.

1.3 SAMPLE COLLECTION - FIELD SCREENING

1) Calibrate RKI Eagle or similar instrument. 0% oxygen (use nitrogen cal gas); 15% CO_2, 500 ppm hexane. Make sure the hexane/CH_4 is set to parts per million (ppm), not lower explosive limit (LEL).

2) Calibrate PID – use 100 ppm isobutylene.

3) Each vapor probe shall be purged the required volume. Be sure to close the pinch valve on the VMP tubing before removing syringe or pump.

4) Collect sample in Tedlar bag using the desiccator chamber.

5) Field screen for oxygen, carbon dioxide, and hexane (may be indicated by "CH_4" on meter using a RKI Eagle or similar instrument. Obtain total VOCs using a photoionization detector (PID). If the O_2 is 10 percent or less, measure/record O_2 and CO_2, and, then use the dilution fitting on the RKI for hexane/CH4 . Make sure the RKI is set to read ppm (not LEL) for hexane/CH_4.

1.4 FIELD SCREENING ONLY

1) Before, after, or while collecting samples in SUMMA canisters, collect and field screen samples (no SUMMA sample) from all remaining VMPs.

PARSONS

Groundwater Sampling Form

Project Name: **Red Hill FS Facility at JBPHH** **Project Number:** **749435**

Well Designation: _____ Date: _____

Weather: _____

Static Water Level (ft-btoc): _____ Casing Diameter (in): _____

Total Well Depth (ft-btoc): _____ Well Notes: _____

Purging Method: Bail / Bladder Pump/ Grundfos Redi-Flo2 / Peristaltic Pump / Other- _____

Casing Volume (gal.) _____ CV =(CID/24)^2(TD-WL)(PI)(7.48) gallons/casing

Time	Vol. Purged (gallons)	Temp. (^{o}C)	pH (SU)	Specific Conductivity (mS/cm)	Dissolved Oxygen (mg/L)	Redox Potential (mv)	Turbidity (NTUs)	Observations
Stabilization Criteria:		± 1.0 °C	± 0.1	± 3%	± 0.3 mg/L	± 10 mV	± 10%	

Total Volume Removed: _____ (gal / liters) _____ (stabilized?)

Sample ID: _____ Date/Time Sampled: _____

Duplicate Sample ID: _____ MS/MSD collected? Yes / No

Laboratory Analytical Methods:

_____	VOCs by SW 8260B	3x - 40 ml VOA
_____	PAHs by SW8270C	2x - 1 L amber glass
_____	TPH-GRO by EPA 8015B-P	3x - 40 ml VOA
_____	TPH-DRO by EPA 8015Bm-E	2x - 1 L amber glass
_____	Methane by RSK 175	3x - 40 ml VOA
_____	Alkalinity and Sulfate	250 mL poly
_____	Nitrate/Nitrite as N by EPA 353.2	125 mL poly w/H2SO4
_____	Dissolved Lead by SW6020 (field filtered)	500 mL poly w/HNO3

Field Geochemistry: **Results:** **Method/Comment:**

Sampled By: _____

Notes: _____

SOIL VAPOR SAMPLING RECORD

Project Name: _____ Project Number: _____

VMP LOCID: _____ Screen Depth: _____

Canister No. _____

Date Sampled: _____ Duplicate ID: _____

Time Sampled: _____ Duplicate Sample Time:

Sample ID: _____ Start: _____

Analyses Requested: _____ Stop: _____

Helium Leak Test Date: _____

Associated Ambient Blank ID: _____

Weather: _____

_____

Purging Device (circle): Syringe Diaphragm Pump Other _____

Sample Container/Volume (circle): 1-Liter SUMMA® 5-Liter SUMMA® Other _____

Helium Leak Test

Time	Purge Volume (cc)	Oxygen (%)	Carbon (%)	Helium Concentration	
				Chamber	Sample

Purge/Purge Test

Purge Volume (cc)	Oxygen (%)	Carbon Dioxide (%)	VOCs (ppmv)

Sample

Start Time	Stop Time	Oxygen (%)	Carbon Dioxide (%)	Methane (%)	VOCs (ppmv)

Field Instruments Used: _____

Sampled by: _____

Typical Record Sheet for Air Permeability Test

SITE _____ TYPE OF TEST _____

DATE _____ TEST DATE _____

SAMPLER(S) _____ TIME _____

Pressure/Vacuum ("H_2O)

Distance from Vent Well (ft)		MP1	MP2	MP3	MP4	Distance from Vent Well (ft)		MP5	MP6	MP7	MP8
Time	In (I)					Time	In (I)				

Typical Record Sheet for Air Permeability Test

SITE _____ MONITORING POINTS _____

DATE _____ O_2 METER NO. _____ CO_2 METER NO. _____

LOCATION _____ HYDROCARBON METER NO. _____

SAMPLER(S) _____ SHUT DOWN DATE _____ TIME _____

Date/ Time	CO_2%	O_2%	Total Hydrocarbon	Helium	Comments	Date/Time	CO_2%	O_2%	Total Hydrocarbon	Helium	Comments