Site Characterization for Banana Patch Properties, Pearl City, Oahu, Hawaii

Honolulu Rail Transit Project

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Prepared for:

Honolulu Authority for Rapid Transportation

Table of Contents

Figures

Tables

Appendices

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Abbreviations and Acronyms

µg/kg	micrograms per kilogram
µg/L	micrograms per liter
bgs	below ground surface
C/I	commercial/industrial
COPC	chemicals of potential concern
CSM	conceptual site model
DL	detection limit
DPS	direct push system
DU	decision unit
EAL	Environmental Action Level
EHE	Environmental Hazard Evaluation
EHMP	Environmental Hazard Management Plan
EM	electromagnetic
GPS	Global Positioning System
HAR	Hawaii Administrative Rules
HART	Honolulu Authority for Rapid Transportation
HAZWOPER	Hazardous Waste Operations and Emergency Response
HDOH	State of Hawaii Department of Health
HEER	Hazard Evaluation and Emergency Response
HEPCRA	Hawaii Emergency Planning and Community Right-to-Know Act
HERL	Hawaii Environmental Response Law
HRS	Hawaii Revised Statutes
HRTP	Honolulu Rail Transit Project
HQ	hazard quotient
IDW	investigation-derived waste
IS	incremental sampling
LNAPL	light, non-aqueous phase liquid
LOD	limit of detection
LOQ	limit of quantitation
LUC	land use control
mg/kg	milligram per kilogram
mg/L	milligram per liter
mL	milliliter
NOAA	National Oceanic and Atmospheric Administration

PAH	polycyclic aromatic hydrocarbons
PCB	polychlorinated biphenyls
PEC	Probable Effects Concentration
PVC	polyvinyl chloride
QAP	Quality Assurance Plan
QAPP	Quality Assurance Program Plan
QC	quality control
RCRA	Resource Conservation and Recovery Act
REC	Recognized Environmental Conditions
SCP	Hawaii State Contingency Plan
SHWB	Solid and Hazardous Waste Branch
SOP	Standard Operating Procedure
SQuiRTs	Screening Quick Reference Tables
SU	sampling unit
TCLP	toxicity characteristic leaching procedure
TEC	Threshold Effects Concentration
TEL	Threshold Effects Level
TGM	Technical Guidance Manual
TMK	tax map key
TPH-d	total petroleum hydrocarbons, diesel-range organics (C10-C28)
TPH-g	total petroleum hydrocarbons, gasoline-range organics (C6-C10)
TPH-o	total petroleum hydrocarbons, oil –range organics (>C28-C40)
TW	temporary well
UECA	Uniform Environmental Covenants Act
VOA	volatile organic analysis
VOC	volatile organic compound

1.0 Introduction

This report documents a site characterization conducted for the Banana Patch Properties located in Pearl City, Oahu, Hawaii (Figure 1-1). The characterization area consists of approximately 7.5 acres located along the south edge of Kamehameha Highway approximately 500 feet southeast of the intersection of Kamehameha Highway and Waihona Street, and north and adjacent to Waiawa Stream, in the Waiawa area of Pearl City on the Island of Oahu (Figure 1-1). Work planning was conducted between April 29, and May 13, 2014. The site characterization field work was conducted from May 16 through June 5, 2014.

This report was prepared by CH2M HILL for the Honolulu Authority for Rapid Transportation (HART) in support of the Honolulu Rail Transit Project (HRTP). The site characterization was conducted under CH2M HILL's contract with HART (Contract SC-HRT-1200100 dated August 23, 2012), under Task Order 4.

1.1 Project Background and Objectives

On behalf of HART, CH2M HILL prepared a Work Plan titled *Site Characterization for Banana Patch Property, Pearl City, Oahu, Hawaii* (herein referred to as the Work Plan) (CH2M HILL, 2014a) that described proposed site characterization activities at the Banana Patch Properties (hereafter referred to as the Site). This site characterization was necessary to support the future construction of the Pearl Highlands Station (the Station), the associated section of the rail guideway, and related parking and bus transfer structures. Construction also includes excavation of a significant volume of soil to re-establish the 100-year floodplain that had been modified by past illegal dumping/filling activities.

The site characterization was conducted by HART in advance of future excavation and construction activities at the Site in order to evaluate the nature and extent of potential contamination, pre-characterize materials that may require offsite disposal during construction, evaluate potential risks to site workers during construction, and make decisions regarding potential mitigation measures to eliminate risk to construction workers. Data developed during the investigation were also used to develop an Environmental Hazard Management Plan (EHMP) for the Site. As described in the Work Plan, various activities were conducted at different portions of the Site to achieve the following task-specific objectives:

- Evaluate and delineate, to the extent practicable, the presence and extent of construction and other debris in the subsurface associated with previous dumping or fill activities.
- Qualitatively evaluate the composition and types of fill, construction debris, solid waste, and other debris that is present in the subsurface at the Site.
- Characterize and evaluate surface and subsurface soil and groundwater at the Site.
- Evaluate conditions at the Waiawa Stream bank to estimate the quantities and general characteristics of construction and other debris present within the north bank of the stream.
- Evaluate if sediment within the Waiawa Stream bed has been impacted by historical Site use or other sources.

To meet the objectives specified above, the following activities were conducted:

- Geophysical investigation in accessible areas of the Site to identify metallic and other debris or anomalous structures in the subsurface
- Test pit excavation to further and intrusively investigate selected geophysical anomalies
- Advancement of soil borings and incremental sampling (IS) of surface and subsurface soil for laboratory analysis

- Installation of temporary wells and sampling of groundwater for laboratory analysis
- Waiawa Stream bank visual survey and soil IS for laboratory analysis
- Waiawa Stream bed sediment IS for laboratory analysis

1.2 Regulatory Framework

The HRTP work is governed under various local, state, and federal regulations as described in the Final Environmental Impact Statement. Statutory requirements for identification, reporting, and responding to releases are described in Hawaii laws and regulations that are administered by the State of Hawaii Department of Health (HDOH) Hazard Evaluation and Emergency Response (HEER) Office, and include the following:

- Hawaii Revised Statutes – (HRS)
  - HRS 128-D, Hawaii Environmental Response Law (HERL)
  - HRS 128-E, Hawaii Emergency Planning and Community Right-to-Know Act (HEPCRA)
  - HRS 508-C, Uniform Environmental Covenants Act (UECA)
- Hawaii Administrative Rules – (HAR)
  - HAR 11-451, Hawaii State Contingency Plan (Hawaii SCP)
  - HAR 11-453, HEPCRA[1]

Statutory requirements for managing waste are described in Hawaii laws and regulations administered by the HDOH, Solid and Hazardous Waste Branch (SHWB), and include the following:

- HRS 342-G, Integrated Solid Waste Management
- HRS 342-H, Solid Waste Pollution
- HRS 342-I, Special Waste Management
- HRS 342-J, Hazardous Waste
- HRS 342-L, Underground Storage Tanks
- HAR 11-58.1, Solid Waste Management Control
- HAR 11-104.1, Infectious Waste Management
- HAR 11-260 through 280, Hazardous Waste Management
- HAR 11-281, Underground Storage Tanks

Statutory requirements for managing waters are described in Hawaii laws and regulations administered by the HDOH, Clean Water Branch, and include the following:

- HRS 342D, Water Pollution
- HRS 342E, Nonpoint Source Pollution Management and Control
- HAR 11-55, Water Pollution Control
- HAR 11-62, Wastewater Systems

[1] Reference to HAR 11-453 applies to storage and reporting requirements for chemicals stored in reportable quantities and subsequently released by Contractors from laydown areas.

Although a release of a hazardous substance had not been reported for the Site, HART worked in conjunction with the HDOH HEER office to develop the site characterization requirements and HDOH HEER is considered to be the lead regulatory agency overseeing site characterization activities. The HEER Office has prepared a document to provide guidance on the *Screening for Environmental Hazards at Sites with Contaminated Soil and Groundwater* (HDOH, Fall 2011). In this guidance, HDOH provides environmental action level (EAL) tables organized to reflect four default conceptual site models (CSMs) for contaminated sites in Hawaii based on groundwater utility and proximity to a surface water body. As further discussed in Section 2, the Site is adjacent to Waiawa Stream and does not directly overlie a current or potential source of drinking water (i.e., the shallow aquifer beneath the Site is not used for drinking water purposes). Therefore, the EALs applicable for the Site are those for sites within 150 meters (500 feet) of a surface water body, where drinking water is not threatened (Table B-1 of HDOH guidance). However, for evaluation purposes results were conservatively compared also to the lowest Tier 1 EALs (those for sites within 150 meters from surface water and where drinking water is threatened). The comparison to different EALs allows to evaluate different exposure scenarios, including the unrestricted/residential scenario in case the soil is removed for reuse offsite (that is, outside the Pearl Highlands Work Area).

The HDOH HEER office will review site characterization results and the associated Environmental Hazard Evaluation (EHE) and EHMP developed for the Site. Data developed during this investigation will also be submitted to the HDOH Solid and Hazardous Waste Branch (SHWB) as part of waste disposal planning associated with upcoming construction activities.

1.3 Document Organization

This site characterization report is organized as follows:

- **Section 2.0 – Site Background.** Provides a brief description of site history, conditions, and previous investigation.
- **Section 3.0 – Investigation Procedures**. Briefly describes the field procedures for all tasks conducted to characterize the Site.
- **Section 4.0 – Results**. Summarizes the results from the various site characterization activities, including geophysical surveys, test pitting, soil sample analytical results, sediment sample analytical results, and groundwater sample analytical result.
- **Section 5.0 – Environmental Hazard Evaluation**. Describes the potential environmental hazards posed by buried debris and chemicals of potential concern (COPCs) detected in site characterization sampling.
- **Section 6.0 – Environmental Hazard Management Plan.** Presents the proposed approaches for mitigating and managing the potential environmental hazards posed by buried debris and COPCs detected in site characterization sampling.
- **Section 7.0 – Conclusions and Recommendations.** Summarizes the fundamental findings and recommendations from the site characterization project.
- **Appendix A – A Photographs of Field Activities.** Presents representative photographs from all phases of the field investigation.
- **Appendix B – Geophysical Survey Figures.** Includes figures illustrating the results of the geophysical surveys.
- **Appendix C – Test Pit Logs.** Provides logs from test pits with photographic documentation of the types of debris encountered.
- **Appendix D – Soil Boring Logs.** Provides the field logs from soil borings.
- **Appendix E – Groundwater Sampling Logs.** Provides the field logs from groundwater sampling.

- **Appendix F – Laboratory Reports.** Includes the laboratory reports from soil, sediment, and groundwater sampling. *[Because of the large size of the files, the lab reports will only be provided on CD-ROM]*
- **Appendix G – Data Quality Evaluation Report**. Includes data validation findings for samples collected during the investigation.
- **Appendix H –Technical Review Comments and HDOH Concurrence.** Includes technical review comments and responses on the Revision 0 version of this document, as well as concurrence that comments have been adequately addressed and resolved in this Revision 1 version of this document.

This report is focused on the results, EHE, EHMP, and recommendations for future use of the Site soil during and after construction activities. Additional details on Site background, data collection strategies and procedures, quality control plan, and project team organization can be found in the Work Plan (CH2M HILL, 2014a).

2.0 Site Background and Setting

This section provides a summary of Site background information including, site description, previous land use, previous site investigations, and the geologic and hydrogeologic setting.

2.1 Summary of Previous Investigations

Limited site investigation was conducted at the Site before the site characterization investigation conducted during this project. Previous investigations include a Phase 1 Site Assessment and a geotechnical investigation to support future HRTP construction efforts. These are briefly summarized as follows.

2.2.1 Phase 1 Environmental Assessment

In 2009, Environet Inc., conducted a Phase 1 Site Assessment for one of the parcels within the Banana Patch (Tax Map Key [TMK] 96003016), titled *Phase 1 Environmental Site Assessment Former Banana Patch, Pearl City, Oahu, Hawaii 96797, TMK (1) 9-6-3, Parcel 16* (Environet Inc, 2009). The assessment was conducted to evaluate existing conditions, investigate the environmental history, and identify the presence of recognized environmental conditions (RECs) within and around the Site. The Phase 1 Environmental Site Assessment consisted of reviewing of historical and regulatory records, visually evaluating site conditions, evaluating Site geology and hydrogeology records, and interviews with persons that had knowledge about former Site activities. This assessment revealed no evidence of current or historical RECs in connection with the Site. No intrusive investigation was conducted during the Phase 1 assessment.

The Phase 1 Environmental Site Assessment reported that the Site was a banana farm from 1957 until sometime between 1969 and 1998. Aerial photographs indicate that large scale agricultural cover was also present at the Site and the surrounding area as early as 1949, continuing for many decades. Since 1981, nearby properties northwest of the Site have been used as a base yard for heavy construction equipment. From 2004 through 2009, a portion of the Site was used as a storage yard for wrecked automobiles.

Items of environmental concern noted in the Phase 1 report included the following:

- Because land use at the Site was agricultural for decades, it is possible that the application of fertilizers and pesticides applied over the years may have accumulated in the underlying soil.
- Automobiles may have potentially leaked small quantities of petroleum products directly onto the unpaved ground at the Site while it was being used as an automobile storage yard.
- A spent automobile battery was found partially buried with other miscellaneous trash. Automobile batteries usually contain lead and sulfuric acid, and could potentially result in surface and subsurface soil contamination.

2.2.2 Geotechnical Investigation

In 2014, Geolabs Inc. conducted an intrusive geotechnical investigation at the Site and adjacent areas; findings were presented in the *Geotechnical Data Report for Honolulu Rail Transit Project Pearl Highlands Parking Structure Transit Center and H2R1 Ramp, Pearl City Oahu, Hawaii* (Geolabs, 2014). The objective of the geotechnical exploration program was to characterize the geologic and hydrogeologic conditions at the locations planned for the parking structure, transit center, and Ramp H2R1, in support of the preliminary civil and structural engineering design for the Station.

During the geotechnical investigation, Geolabs advanced 22 borings to depths ranging from 59 to 141.5 feet below ground surface (bgs). Because this was a geotechnical investigation, no soil or groundwater samples were collected or analyzed. Based on the geotechnical borings conducted by Geolabs, it was estimated that fill mixed with construction debris is present in the subsurface soil at the Site down to depths ranging between approximately 6 and

18 feet bgs. The fill was estimated to be thickest in low lying areas and when overlying native alluvium, which was generally deposited in a low energy environment such as an estuary or bay. The native alluvium under the fill was generally characterized as a reddish brown to dark brown silty clay or clayey silt with a soft to stiff consistency.

2.2 Site Description and History

As described in the Phase 1 report, the Site and adjacent properties were historically used for both agricultural and residential purposes, with a portion of the Site previously used as a storage yard for wrecked cars. The Site was recently acquired by HART for the HRTP. For investigation purposes, the Site was divided into the following sub-areas (see Figure 2-1):

- **Flat area (approximately 6 acres), including decision units (DUs) DU1 through DU6, north of Waiawa Stream:** Future work in this area will include construction of the Station and related parking structure along the rail guideway. The planned location of the Station is within the stream's 100-year floodplain, which is currently overlain by illegally placed fill material and debris. The 100-year floodplain will be re-established during future construction work by removing a significant volume of fill material and debris (preliminarily estimated at 25,000 cubic yards). The existing fill material, debris, and native soil will be excavated to an estimated depth of 15 feet bgs and will be either reused within the Pearl Highlands Work Area or properly disposed of at a permitted facility offsite. The flat area is therefore further subdivided into three main areas for investigation purposes:
    - Two areas with a combined size of approximately 2 acres where current plans include only fill placement to raise the elevation up to the planned final grade for the ramp, parking garage, and Station. These two areas are located at the east and west ends of the Site, and are referred to as DU1 and DU4, respectively. Because of conditions observed during the investigation, DU1 has been further subdivided into DU1N (where no significant geophysical anomalies were observed) and DU1S (characterized by the presence of significant geophysical anomalies associated with construction debris).
    - An area of approximately 3 acres (DU2 and DU3), where current plans include no or limited excavation (with the exception of column foundation locations) to achieve planned final grade.
    - An area of approximately 1 acre (DU5 and DU6), where current plans include significant excavation in order to re-establish the 100-year floodplain.
- North stream bank (approximately 1 acre), referred to as DU7 and consisting of the embankment directly adjacent to the flat area along the north edge of Waiawa Stream
- The stream bed (approximately 1 acre), including the portions of Waiawa Stream upstream of (DU8), adjacent to (DU9), and downstream of (DU10) of the Site

With the exception of foundations and pavement associated with former buildings, bare soil is exposed at the surface across most of DU2, DU3, DU4, DU5, and DU6. Demolition debris is present at the surface in the western portion of DU6, where a church and residential structures were recently demolished. In the western portion of the Site (DU1 and DU2), recently vacated residential units are still present and have significant amounts of household waste and debris at the surface around them. Various types of vegetation and large trees are present throughout the Site.

According to the City and County of Honolulu, Department of Planning and Permitting website, the Site is zoned as AG-2. The AG-2 agricultural district conserves and protects agricultural activities on smaller parcels of land (City and County of Honolulu, 2011). The 1998 United States Geological Survey (USGS) Topographic Map of the area shows the land portion of the Site as generally flat with an elevation of approximately 20 to 25 feet above mean sea level. The Middle Loch of Pearl Harbor is located approximately 2,000 feet south of the Site.

2.3 Geology and Hydrogeology

The Site is located on the southwest side of the Koolau Mountains, and is underlain by alluvial sediments and the eroded remains of the Koolau Volcanic Shield that consist of tholeitic and olivine basalts with small amounts of oceanite. Soil in the general Site area is designated Kawaihapai clay loam (K1A), (Foote et al., 1972). This series consists of silty clay soil that is present on smooth slopes. In a representative profile the surface soil consists dark brown clay loam up to 22 inches thick (Environet Inc., 2009) and is underlain by dark-brown stratified sandy loam up to 32 inches thick. The substratum is typically stony and gravelly. Soils at the Site exhibit moderate permeability, runoff is slow, and the erosion hazard is low. The available water capacity is about 1.8 inches per foot in the surface layers and about 1.6 inches per foot in the subsoil. In some places, this soil is subject to flooding (Foote et al., 1972). Because the Site is within a floodplain and is adjacent to Waiawa Stream, it is expected that the area was subject to periodic flooding prior to development and placement of fill material.

According to Mink and Lau (Mink and Lau, 1990), the Site lies over two superimposed aquifers. The shallow aquifer, code 30202116 (12211), is a basal (i.e., fresh water in contact with seawater), unconfined, sedimentary aquifer that is ecologically important but is not used as a drinking water resource. This aquifer has low salinity and is irreplaceable and highly vulnerable. The deeper aquifer, code 30202121 (12212), is a basal, confined, flank-type aquifer that is also ecologically important. This aquifer has low salinity and is irreplaceable and is moderately vulnerable.

General groundwater flow direction in the area is to the south, toward Pearl Harbor. It is expected that Waiawa Stream is hydraulically interconnected with the shallow aquifer and that the groundwater beneath the Site generally flows towards the Waiawa Stream in a south-southwest direction. The depth to groundwater at the Site is approximately 12 to 20 feet bgs.

Two production wells (well identification numbers 3-2459-016 and 3-2459-017 in the state Department of Land and Natural Resources well index) are present onsite and appear to be installed in the deeper aquifer at approximately 130 to 140 feet bgs. The past use of these wells is unknown.

Current and historical activities along Waiawa Stream, including activities at the Site, may have contributed to contamination of stream bed sediment. The state of Hawaii placed Waiawa Stream on Hawaii’s 303(d) list, which identifies water bodies that are “water quality limited” because they do not meet regulatory standards for certain constituents or parameters (HDOH, 2014).

Waiawa Stream is classified as an interrupted perennial stream, meaning the stream and tributaries are continuously flowing in the uplands, but stream flow is absent in a lowland segment during the dry season (Hawaii Cooperative Park Service Unit, 1990). Waiawa Stream is perennial flowing in the Site area, fed by local springs (AECOS, 1991). A 36-inch-diameter storm-drain culvert daylights at the base of the Kamehameha Highway from the bank at a point directly under the location of the future Pearl Highlands Station along the rail guideway. This storm drain appears to be discharging a perennial flow that may be spring water from Waiawa Springs captured from the *mauka* (mountain-ward) side of the highway, although the source of the apparently continuous flow has not been verified by CH2M HILL.

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3.0 Field Investigation Procedures

This section summarizes the investigation procedures followed for the site characterization. Investigation activities were conducted in general accordance with the Work Plan (CH2M HILL, 2014a) and referenced standard operating procedures (SOPs) included in CH2M HILL's *Project Quality Assurance Plan* (QAP) (CH2M HILL, 2014b). Photographs of field activities are included in Appendix A.

3.1 Pre-Investigation Activities

Several activities took place before starting the field investigation, including coordinating site access, obtaining required permits, mobilizing, conducting site reconnaissance to identify site boundaries, and identifying sampling locations and work areas. Photographs from site reconnaissance and other field activities are included in Appendix A.

All work and Site access was coordinated with HART and other contractors working in the area. Before the start of field activities, CH2M HILL contacted the Hawaii One Call Utility Locating Center to identify existing underground utilities at the Site. As a secondary measure, a third-party utility locating firm (Geotek Hawaii) was also contracted to clear the planned intrusive locations using a Ridgid Seek Tech SR-60. No active or inactive buried utility lines were identified by either the Hawaii One Call Utility Locating Center or by the third-party utility surveyor in the areas where soil borings or test pits were planned. However, an abandoned pipe was identified during trenching (see Section 4.1).

Before starting geophysical survey and direct push system (DPS) drilling activities, it was also necessary to clear dense vegetation to gain access to certain areas of the Site. Vegetation clearance was conducted by using gas-powered string trimmers, as well as an excavator to push down vegetation. No soil grubbing was conducted.

Site reconnaissance was conducted to identify site boundaries, geophysical transects, and boring locations. The boundaries of the DUs were surveyed by CH2M HILL personnel using a hand-held Trimble Navigation Ltd. Global Positioning System (GPS) unit. Within each DU, soil boring locations and test pit locations were marked using marking paint and/or flags and surveyed using the hand-held GPS unit.

3.2 Geophysical Investigation

From May 16 to May 21, 2014, Geotek Hawaii conducted a geophysical survey in accessible portions of the flat area (DU1 through DU6) to identify the presence of subsurface anomalies.

The geophysical survey was conducted using the Geonics, Ltd. EM31-MK2 and EM61-MK2 instruments with transects conducted on approximately 5-foot spacing, as was practical given site conditions. As shown in Figure 3-1 and captured in the photo log in Appendix A, the geophysical survey area was limited to approximately 50 percent of the Site because of presence of the following:

- Residential structures, chicken coops, surface debris, soil stockpiles, and vegetation in DU1 and DU2
- Surface debris, heavy equipment, and materials stored in DU3
- Steep slope on the east side of DU4
- Connex boxes, vegetation, and surface debris in DU5
- Surface debris and a depression in DU6

The geophysical survey transect locations for both the EM31-MK2 and EM61-MK2 instruments were determined using GPS, except within the southernmost portion of DU1S where trees prevented GPS from functioning accurately. Throughout the rest of the Site, GPS data was recorded at 1 hertz, with sub-meter horizontal accuracy.

The Geonics, Ltd. EM31-MK2 measures the electrical conductivity of subsurface materials as deep as 15 feet bgs by inducing a time-varying magnetic field and measuring the amplitude and phase shift of an induced secondary magnetic field. Variations in subsurface conductivity may be caused by the presence of buried metal objects, presence of non-metallic wastes and debris, or by changes in geologic conditions that alter the conductive signature of subsurface materials.

The EM61-MK2 is a high-resolution, time-domain electromagnetic instrument designed to detect, with high spatial resolution, shallow ferrous and non-ferrous metallic objects. The standard EM61-MK2 system consists of two air-cored, 1-meter-by-0.5-meter coils, a digital data recorder, batteries and operating electronics. The EM61 transmitter generates a pulsed primary magnetic field, which induces eddy currents in nearby metallic objects. The effective survey depth of EM61-MK2 is generally 10 feet bgs.

Maps presenting the geophysical survey data are included in Appendix B. Geophysical survey results are discussed in Section 4.1.

3.3 Test Pit Investigation

At selected areas where subsurface anomalies were identified during the geophysical surveys, test pits were excavated by Pacific Commercial Services using a Hitachi 135 Track Excavator. The approximate location of each test pit was logged using a hand held Trimble GPS unit. Test pit locations are shown on Figure 3-2 and further discussed in Section 4.1. Test pit logs are provided in Appendix C and summarized in Table 3-1.

As detailed in the Work Plan, the objective of the test pit investigation was to identify the type and extent of buried metallic and non-metallic wastes, debris, and obstructions (e.g., former building foundations) within the proposed construction footprint. Test pit activities included the following:

- At selected areas (up to one per DU) where anomalies were identified during geophysical surveys, test pits were excavated to a maximum depth of approximately 10 feet bgs with variable areal extent.
- CH2M HILL logged and photographed the test pits to document the type(s) of buried objects causing the geophysical anomalies.
- Estimates of the relative quantities of different types of debris and solid waste were developed to assess the amount of soil that can potentially be reused during future construction and the volume of debris, waste, and soil that may need disposal.
- All excavated material (soil and debris) was replaced in the respective test pit from which it was excavated from, and the ground surface was restored to the previous approximate elevation.

3.4 Drilling Methods and Lithologic Observations

Borings for soil sampling were advanced in the flat area by Geotek HI between May 19 and May 28, 2014, using track- and truck-mounted DPS Geoprobe 6600 series rigs. The approximate soil boring locations in each of the DUs are shown on Figure 3-2. Soil samples from each soil boring were separated into multiple vertical sampling units (SUs) to evaluate different exposure scenarios and waste disposal options as further described in Section 3.5.

Core barrels were dedicated to each vertical SU interval, and disposable acetate liners were used to collect soil from each depth interval within each DU. Because of the use of dedicated/disposable sampling equipment, and because no evidence of gross contamination was encountered during the project, no decontamination of sampling tools/rods was conducted between subsequent vertical SUs within each DU. Decontamination of all sampling equipment was conducted between susbequent DUs.

Continuous coring techniques were used to advance all soil borings to approximately 20 feet bgs while collecting soil cores in acetate sleeves for sample collection. Selected borings were advanced to greater depths (up to 30 feet bgs) at select locations for temporary well installation. All recovered soil cores were screened for volatile vapors using a

Rae Systems MultiRae equipped with a photoionization detector. No volatile vapors were detected in soil cores during the investigation. Field boring logs are provided in Appendix D.

The composition of the fill and the key characteristics of the prevailing lithologic units encountered during the investigation include the following:

- **Fill:** Fill materials were encountered in all soil borings ranging in thickness from approximately 3 feet in DU1N to 20 feet (total boring depth) at some locations in DU3 and DU6 (see boring logs in Appendix D). Fill was relatively thinner in the northwest portion of the Site (DU1N) and thicker in the eastern portion of the Site at DU3, DU5, and DU6.

Fill encountered during the investigation generally consisted of reddish brown silty clay to silty sand with gravel mixed throughout. The consistency was generally medium-stiff to stiff in sections where silty clay dominated, and ranged from loose to dense when the sand and gravel composition increased. Gravel-size material encountered consisted mostly of road fill materials such as asphalt and concrete, with some coralline and basalt gravel. Asphalt, including asphalt paper, and concrete indicative of road fill debris were present within the fill at many boring location. There was very little plastic or glass debris and no visual evidence of gross contamination. Fill materials were generally dry to moist, indicating that they are generally not in contact with the underlying aquifer.

- **Native Soil:** Below the fill materials, the predominant native soil generally consisted of recent alluvium, saprolite eroded from weathered basalt, marsh, and lagoon deposits (Geolabs, 2014). General characteristics of these sediments include the following:
  - **Recent Alluvium:** tan to brown silty clay with varying amounts of sand. The consistency is generally in the range of very soft to medium stiff, with low to moderate plasticity and dry to moist.
  - **Saprolite (Weathered Basalt):** reddish brown to dark brown silty clay eroded from weathered basalt. This silty clay was generally medium stiff with a moderate plasticity and dry to moist.
  - **Marsh Deposits:** dark gray and brown silt and clay with traces of fine-grained sand and fibrous organic materials; very soft to soft consistency, moist to wet.
  - **Lagoon Deposits**: light gray to medium gray sandy silt or silty sand with a very soft to soft consistency, very loose to loose relative density, moist to wet.

The depth to water measured in the temporary wells installed in the flat area of the Site generally ranged from 15 to 20 feet bgs. Therefore, most of the 20 foot deep soil borings reached the capillary fringe or extended below the water table. However, native soil with a relatively high clay content was commonly present at borings in the 15- to 20-foot depth interval. The clay unit near the water table appears to act as an aquitard, inhibiting groundwater movement into the overlying fill materials. Water levels were generally higher in the temporary wells than what observed in boring soil cores, potentially indicating artesian conditions. Based on field observations, the shallow aquifer beneath the Site appears to be semi-confined by the clay unit.

3.5 Soil Sample Collection

Soil borings and test pits were completed in the DUs within the flat area to collect soil samples and characterize potential soil contamination that may have resulted from dumping and other historic activities conducted at the Site. As summarized in Table 3-2, each DU was separated into multiple vertical SUs to delineate potential surface and subsurface contamination, assess different exposure scenarios, and evaluate future waste disposal options. Vertical SUs were established as follows:

- Flat area with future fill:
  - **DU1N**
    - **A (0 to 0.5 feet bgs)** – to evaluate surface soil conditions that could potentially affect current and future construction workers
    - **B (0.5 to 3 feet bgs)** - for vertical delineation of potential contamination and to evaluate conditions that could potentially affect future construction workers
    - **C (3-foot interval below the fill)** – for vertical delineation of potential contamination
  - **DU1S:**
    - **A (0 to 0.5 feet bgs)** – to evaluate surface soil conditions that could potentially affect current and future construction workers
    - **B (8 to 10 feet bgs)** – to qualitatively evaluate characteristics of possible construction debris and waste identified within DU1S by geophysical investigations, evaluate potential disposal options, and assess conditions that could potentially affect future construction workers if debris/waste is removed
    - **C (3-foot interval below the fill)** – for vertical delineation of potential contamination
  - **DU4:**
    - **A (0 to 0.5 feet bgs)** – to evaluate surface soil conditions that could potentially affect current and future construction workers
    - **B (0 to 3 feet bgs)** - to evaluate conditions that could potentially affect current and future construction workers
- **Flat area with no or limited future excavation (DU2 and DU3):**
  - **A (0 to 0.5 feet bgs)** – to evaluate surface soil conditions that could potentially affect current and future construction workers and future commercial/industrial receptors
  - **B (0.5 to 3 feet bgs)** - for vertical delineation of potential contamination and to evaluate conditions that could potentially affect future construction workers and future commercial/industrial receptors
  - **C (3-foot interval below the fill)** – for vertical delineation of potential contamination and to evaluate conditions that could potentially affect future construction workers during excavation/drilling where the parking structure and rail station will be constructed
- **Flat area with future excavation (DU5 and DU6):**
  - **A (0 to 5 feet bgs)** – to evaluate potential disposal options and assess conditions that could potentially affect future construction workers during soil removal to re-establish the 100-year floodplain
  - **B (5 to 10 feet bgs)** - to evaluate potential disposal options and assess conditions that could potentially affect future construction workers during soil removal to re-establish the 100-year floodplain
  - **C (10 to 15 feet bgs)** - to evaluate potential disposal options and assess conditions that could potentially affect future construction workers during soil removal to re-establish the 100-year floodplain
  - **D (3-foot interval below the fill)** – for vertical delineation of potential contamination and to evaluate conditions that could potentially affect future receptors

As listed in Table 3-2, replicate samples were collected within the “A” depth interval in DU4 (0 to 0.5 foot bgs) and DU6 (0 to 5 feet bgs). Approximately 30 increments per IS sample were collected at each vertical SU in each DU. Exceptions were the “C” vertical SU at DU1S and the “D” vertical SU at DU6, where significant construction debris resulted in drilling refusal at many locations with a limited number of increments (12 and 20, respectively) collected. Because of time constraints and lack of evidence of contamination, a limited number of soil increments (15) was also collected at the “B” and “C” SU vertical interval in DU1N.

Fill material was not combined with the underlying native soil during sample collection. A dedicated Terra Core sampler was used to collect soil increments at each vertical SU. Individual soil increments for non-volatile organic compound analysis at each SU consisted of a 50-gram soil aliquot collected by plunging the 5-gram Terra Core sampler 10 times at different depths along the vertical SU interval and extruding the sampler content each time into a dedicated resealable bag. Each sample/SU consisted of a resealable bag containing approximately 1.5 kilograms of soil, which was placed in ice during collection and transport to the analytical laboratory, where samples were processed (drying and sieving/subsampling) and analyzed in accordance with instructions provided in the HDOH Technical Guidance Manual (TGM) (HDOH, 2009). At each IS sample interval below 0.5 feet bgs (i.e., no volatile analysis for surface soil) soil aliquots were also placed into 40 milliliter (mL) volatile organic compound (VOA) vials for volatile organic compound (VOC) analysis. Increments for VOC analysis consisted of 15-gram aliquots collected by plunging the sampler into the soil core at three different depths along the vertical SU interval and then extruding the content into a 40-mL VOA vial that was immediately placed into a cooler with dry ice to freeze the samples. Once at the laboratory, under controlled conditions and while soil was still frozen, all soil aliquots/vials from each SU were combined together for methanol extraction and analysis.

Because of space and access constraints at DU4, where soil investigation was limited to surface/near-surface soil sampling from 0 to 0.5 feet bgs and 0.5 to 3 feet bgs, the 30 IS increments at each vertical SU were collected using a hand drill onto a stainless steel plate. Soil on the plate at each increment location was then transferred into a resealable bag and shipped to the laboratory for analysis. Same sampling method was adopted for surface soil (“A” SU) in DU1N.

IS samples from each SU were analyzed for the following compounds: VOCs (only samples collected deeper than 0.5 feet bgs); total petroleum hydrocarbons (TPH) gasoline-range organics (TPH-g); TPH, diesel-range organics (TPH-d); and TPH, oil-range organics (TPH-o); polycyclic aromatic hydrocarbons (PAH); pesticides; polychlorinated biphenyls (PCBs); herbicides; and Resource Conservation and Recovery Act (RCRA) 8 metals. No evidence of burned material or ash was encountered during soil sampling so no samples were submitted for dioxin/furan analysis.

In addition, waste characterization samples were collected and analyzed at SUs exceeding the HDOH Tier 1 EALs, by grouping together representative portions of soil from each vertical SU from 6 adjacent borings. These samples (FAWC- series samples) were analyzed for the compounds that exceeded Tier 1 EAL in the IS samples; toxic characteristics leaching procedure (TCLP) analysis was also conducted for samples with total metal results greater than 20 times the TCLP limit. The purpose of these samples was to further characterize the distribution of contaminated soil to support the development of disposal alternatives. These results are presented in Section 4.3.

Discrete samples (FADS-DU6D1-0514, FADS-DU6D2-0514, and FADS-DU6D3-0514) were also collected from borings advanced downgradient of two cesspools within the existing depressed area in DU6 to assess potential contamination (Figure 2-1). Samples at these locations were collected in the 3-foot interval below the estimated bottom depth of the cesspool and analyzed for the same parameters as the site characterization soil samples.

3.6 Stream Bank Sampling

As shown on Figure 2-1 and Table 3-2, the stream bank characterization included collection of one IS sample from DU7. The initial stream bank characterization consisted of a visual survey to (1) evaluate if separating the stream bank into multiple DUs was warranted, (2) describe and visually characterize the construction debris and solid waste present along the bank, and (3) estimate the relative percentages of soil, construction and other debris, and solid waste. These estimates were based solely on what could be observed at the surface. No excavation (test pits or borings) was conducted along the bank to evaluate the nature or extent of debris and potential contamination.

Because the debris along the bank is fairly homogeneous, the entire section of the north stream bank along the Site boundary was sampled as a single DU using an IS approach. Photographs of the stream bank survey are provided in Appendix A. The IS sample was collected from 100 increment locations, using hand tools and a random sampling approach, with some of the increments located adjacent to debris and waste along the stream bank. Sample increments were collected between 0 and 1 foot below the surface of the bank and perpendicular to it using a hand drill with a stainless-steel drill bit. All 100 increments were collected into a resealable bag, subsampled in the field, and shipped to the laboratory, where samples were processed (drying and sieving/subsampling) and analyzed in accordance with instructions provided in the HDOH TGM (HDOH, 2009). The IS sample was analyzed for TPH-d, TPH-o, PAHs, pesticides, PCBs, herbicides, and RCRA 8 metals. No evidence of gross contamination or ash or burned material was observed, therefore no discrete samples were collected and analyzed separately from the other IS sample collected in the DU.

3.7 Stream Bed Sediment Sampling

As shown on Figure 2-1 and Table 3-2, the stream bed characterization included collection of IS from the following three DUs:

- DU8: approximately 375 linear feet of stream bed located directly upstream of the Site
- DU9: approximately 1,200 linear feet of stream bed located adjacent to the Site
- DU10: approximately 350 linear feet of stream bed located directly downstream of the Site

Replicate samples were collected at DU9, in the portion of the stream adjacent to the Site. Sampling within DU9 was conducted to evaluate if illegal dumping on the stream bank and/or potential contamination in the Site subsurface soil have impacted the stream bed. Sampling within DU8 was conducted to obtain ambient data and evaluate if potential contamination of sediments within the stream bed section adjacent to the Site could potentially be because of upstream sources. Results from DU10 were collected to help understanding if potential contamination from the Site is impacting the downstream portion of Waiawa Stream.

Using a systematic random IS sampling approach, 30 increment locations were sampled in each DU. Sample increments were collected from the vertical interval between 0 and 0.5 feet below the bed of the stream, composited into a separate resealable bag for each DU, and sent to the laboratory for further IS processing. Because of the excessive amount of time required for drying, stream bed samples were analyzed wet. Samples were analyzed for the following compounds: TPH-d and TPH-o, PAHs, pesticides, PCBs, herbicides, and RCRA 8 metals.

3.8 Temporary Well Construction and Groundwater Sampling

To evaluate if groundwater has been affected by potential subsurface soil contamination, 11 temporary wells (TW-series wells, on Figure 3-3) were constructed and sampled during the site investigation. In addition, an existing monitoring well (labeled at TW-012 in Figure 3-3 for the purpose of this investigation) in the northeastern portion of DU6 was also sampled to meet the project objective of collecting groundwater samples at a frequency of approximately one sample per half acre.

Temporary wells were installed following procedures outlined in the Work Plan (well construction details are summarized in Table 3-3). To install the temporary wells (1.0 and 1.5 inch diameter), boreholes with an approximate diameter of 3.25 inches were advanced to maximum depths of 30 feet bgs. Temporary wells were constructed using polyvinyl chloride (PVC) screens and riser pipe with the top of pre-packed sand filter pack screens located approximately at the water table, and extending up to 10 feet below the water table. After installation, each temporary well was developed by pumping for approximately 12 to 20 minutes. As listed in Table 3-3, the water table is present at approximately 15 to 20 feet bgs in wells completed in the flat area.

At least 24 hours after well development was completed, groundwater samples were collected using bladder pumps and low flow sampling methods. Groundwater sampling logs are included in Appendix E. Groundwater samples were analyzed for VOCs, TPH-g, TPH-d, TPH-o, pesticides, PCBs, herbicides, and RCRA 8 metals (samples for dissolved metals analysis were filtered using a 0.45 micron filter). No evidence of light, non-aqueous phase liquid (LNAPL) or other gross contamination was noted in development or purged water; therefore, water generated during well development and groundwater sample purging was returned to the ground at the Site in the vicinity of each well it was pumped from.

In addition to groundwater samples, one discrete sample (sample ID, FASC-LNAPL01-0514) containing an oil-like substance was collected using a bailer from a 5-inch-diameter, thin-walled, steel-cased well that is located about 10 feet upgradient of TW-001 (see Figure 3-3). This sample was analyzed for TPH-g, TPH-d, and TPH-o, and was estimated to be oil because of the high concentration (505,000 milligrams per kilogram [mg/kg]) of TPH-o.

3.9 Investigation-derived Waste Management

No investigation-derived waste (IDW) was generated during sampling activities that required storage in 55-gallon drums or offsite disposal. IDW generated during sampling activities and management activities included the following:

- Soil IDW: Soil IDW included soil generated during soil boring, test pitting, and soil sampling activities. Because no evidence of grossly contaminated soil was observed, excess soil disturbed during sampling activities (i.e., not shipped to the laboratory for analysis) was placed back into the borehole or test pit it was excavated from.
- Other solid waste generated during sampling activities included used personal protective equipment, and municipal-type waste: These wastes consisted of acetate sleeves from soil borings, nitrile gloves, Ziploc bags, and paper towels. All of these items were disposed of offsite as municipal solid waste.
- Liquid waste: No liquid waste was generated during characterization activities because decontamination fluid and purged groundwater were re-infiltrated onsite near the locations from which they were generated.

3.10 Sample Management and Laboratory Analysis

To achieve the project objectives, samples were collected and analyzed in accordance with the Work Plan and the project specific Quality Assurance Program Plan (QAPP) (CH2M HILL, 2014c). Samples were analyzed by Accutest Laboratory, San Jose California, which has been certified by the California Environmental Laboratory Accreditation Program to perform these services.

Target analyte results were compared to the screening level objectives identified in the QAPP. Methods of analysis and detection limit goals are also defined in the QAPP, which shows that the limit of detection (LOD), limit of quantitation (LOQ), or the detection limit (DL) for each listed target compound will, in most cases, meet the screening level objectives for the project. The methods selected for analysis were the most up to date and technologically sound commonly available laboratory methods at the time the work was conducted. All samples were collected and preserved as defined in the QAPP, which also defines the applicable method specific holding times for each method.

Analytical methods were completed in accordance with the method-specific requirements as described in the project-specific QAPP. Analytical data was provided to CH2M HILL as Level IV data deliverables in portable document format (PDF) as well as in electronic data deliverable format as defined by the CH2M HILL LabSpec 7. All results were validated by CH2M HILL chemists for compliance with QAPP requirements.

Validation was performed on an analytical batch basis by assessing quality control (QC) samples and associated field sample results. Data validation guidelines have been developed in accordance with the method requirements and professional judgment. The following information was reviewed as part of a Level-II type summary data validation:

- Chain-of-custody documentation
- Holding time

- QC sample frequencies
- Method blanks
- Laboratory control sample
- Surrogate spikes
- Matric spike/ matric spike duplicate
- Field replicate (duplicate and triplicate) precision
- Case narrative review and other method-specific criteria

Full laboratory data reports are included as Appendix F, while the data quality evaluation report is included in Appendix G.

4.0 Results

This section summarizes the results of the investigations conducted at the Site in May and June 2014 to evaluate if illegal filling and dumping activities conducted at the Site in the past may have impacted soil and groundwater at the Site, or sediments in Waiawa Stream. Investigations included the following:

- A geophysical and test pit investigation to estimate the distribution of fill and construction debris
- Soil sampling and analysis of the flat area
- Soil sampling and analysis of the north bank of Waiawa Stream and the Waiawa Stream bed
- Groundwater sampling and analysis

4.1 Preliminary Estimates of Fill and Construction Debris

Geophysical electromagnetic surveys were conducted at the Site to identify anomalies potentially associated with construction or metallic debris. Select anomalies that were believed to be associated with construction or metallic debris in the subsurface were further investigated through the excavation of test pits. Larger geophysical anomalies were investigated to delineate the lateral and vertical extent of the debris and to estimate the relative composition of the debris present in the subsurface at the Site.

The areas with the greatest density of anomalies (as indicated by EM61 response of greater than 300 millivolts) are shown on Figure 4-1 in pink to purple color. Also shown on Figure 4-1 are the approximate locations of test pits excavated to investigate the types of debris causing these anomalies in DU1, DU2, DU3, and DU6. Additional figures presenting the geophysical survey data are included in Appendix B.

Geophysical observations include the following:

- Unoccupied houses in DU1 and the western third of DU2 remain in place, so limited geophysical investigation could be conducted in these areas. Foundation footings and associated construction materials are likely causing low-level anomalies around the houses in these areas.
- The southeastern portion of DU2 was inaccessible to geophysical investigation because of the presence of soil piles accumulated during HRTP construction.
- Numerous surface metal objects stockpiled at the time of the investigation in the eastern side of DU3 pending use during HRTP construction (including metal connex boxes, roll off bins, and pallets with metal-containing construction parts) interfered with the geophysical equipment, causing anomalies in this area that cannot be inferred as being related to subsurface debris. There were also large connex boxes near Borings 12 and 15 in DU3 that resulted in an anomaly (which shows up as a pink area with a white center on Figure 4-1) that is not indicative of subsurface debris.
- Limited geophysical investigation was conducted in DU4 because of heavy vegetation and a steep elevation change as the stream bank on the eastern side of DU4 merges with the Waiawa Stream.
- Geophysical investigation of the existing depression covering almost half of DU6 was not conducted because of limited access and safety reasons; however, the area (approximately 0.2 acre) was investigated using seven test pits.
- The southern half of DU1 adjacent to the Waiawa Stream had a large area (approximately 0.2 acre) of subsurface anomalies. Because of the presence of dense trees in this area, GPS data could not be recorded for all of this area, although high subsurface response was reported by the geophysical surveyor.

- The central-western portion of DU2 had a small area with a subsurface anomaly that was investigated using a test pit.
- There was also an area of approximately 0.1 acre on the northeastern portion of DU3, far enough away from potential interferences in this DU, which was identified as a subsurface anomaly. This area was investigated using a test pit.

The test pit logs are summarized in Table 3-1 and included in Appendix C. The areas with geophysical anomalies described above that were investigated with test pits include the following:

- Seven test pits were excavated down to approximately 10 feet bgs in the southern portion of DU1, where the largest area of anomalies was detected during the geophysical survey (Figure 4-1). Concrete, rebar, tires, a water heater, a portion of a 55-gallon drum, and other miscellaneous metal debris were encountered in the excavations down to approximately 10 feet bgs and accounted for approximately 40 percent of the volume in all test pits, except for DU1S-TP3 and DU1S-TP5, where no or very minimal debris was found. As summarized in Table 3-1, the approximate relative composition of debris was estimated as follows:
  - 15 to 20 percent concrete
  - 15 percent metal
  - 5 to 10 percent other debris

Because of the extensive debris concentrated in the southern portion of DU1, while no significant geophysical anomalies suggesting subsurface construction/metallic debris were detected in the northern portion, DU1 was split into two DUs: DU1N and DU1S. Similarly, because the extensive debris observed in DU1S was expected to make DPS drilling difficult, 30 IS increments were collected at the surface and from the debris layer within the DU1S test pits for soil chemical characterization purposes.

- One test pit was excavated at DU2 to approximately 3 feet bgs. A 2-inch metal clothesline post was found at the surface, covered by dense underbrush vegetation. No subsurface debris was observed at this location.
- One test pit was excavated within DU3 to approximately 8 feet bgs. Metal and concrete debris was observed to extend to a depth of at least 8 feet bgs. A potentially abandoned concrete pipe was encountered at the bottom of the test pit (approximately 8 feet bgs), but excavation was discontinued before uncovering the pipe to avoid damaging this apparently abandoned utility line. Because the pipe was not uncovered, the diameter could not be estimated. As summarized in Table 3-1, the approximate relative composition of debris was estimated as follows:
  - 10 percent concrete
  - 10 percent metal
  - 5 percent other debris
- Seven test pits were also excavated in a portion of DU6 where an existing excavation was already present from previous housing demolition work that still contained surface debris. Test pits at DU6 generally encountered asphalt, concrete, wood debris, and plastic within the vertical interval from 0 to 5 feet bgs at each excavation, except for test pit DU6-TP7. At test pit DU6-TP7 an abandoned cesspool was identified; other than the cesspool, no debris was identified at this location. As summarized in Table 3-1, the approximate average composition of debris in the DU6 test pits was estimated as follows:
  - 20 percent concrete
  - 10 percent metal
  - 10 percent other debris

Because the large open depression covers a significant portion of DU6, making it was inaccessible to the DPS rigs, soil sample increments were also collected within the test pits to supplement the soil boring IS collected for soil characterization purposes. Test pit and boring increments from comparable depths were combined together to form the IS samples collected at various SU depths within DU6.

Based on soil boring observations, three representative cross sections were prepared to show the estimated vertical relationship between fill material, construction/metal debris, and native soil. Cross sections are presented on Figures 4-2a, 4-2b, and 4-2c, and the locations of the cross sections are shown on Figure 3-2. Based on the investigation results fill material is present across the entire Site and is thickest (approximately 20 feet thick) in the eastern portion of the Site, on the western side of DU3 (DU3 west), and in the existing depression in DU6.

As shown on Figure 4-1 and Figures 4-2a-c, construction and metal debris appears to be limited to the following areas: DU1S, DU3, and the existing depressed area in DU6.

Construction debris (concrete and metal debris) and other debris were also observed on the north bank of Waiawa Stream (DU7), where a visual survey was conducted before IS sample collection to qualitatively evaluate fill/debris relative composition and set up sampling DU. The approximate relative composition of debris on the stream bank was estimated as follows:

- 10 percent concrete
- 5 percent metal
- 5 to 10 percent other debris

Table 4-1 lists the estimated volume of debris that may require offsite disposal based on the estimated lateral and vertical extent of the areas shown on Figure 4-1. Based on geophysical and test pit data, a total area of approximately 0.5 acre is estimated to contain construction and metal debris in the flat area. Test pit data suggest that the approximate thickness for construction debris is 8 feet in the DU3 east, 3 feet in DU6, and 10 feet or more in DU1S. Based on visual observations, an additional 1-acre area impacted by construction and other debris is estimated along the north stream bank, where a depth of approximately 3 feet is assumed (i.e., not test pits or intrusive investigation of debris was conducted along the bank).

Based on these estimates, a total volume of approximately 75,000 cubic feet of construction and metal debris may be present in the subsurface at the Site. Of this, approximately 30,000 cubic feet appears to be metal debris and 45,000 cubic feet appears to be concrete and other construction debris.

4.2 Flat Area Soil Characterization

The flat area includes DU1 through DU6. Soil characterization of the flat area included soil sampling to evaluate surface and subsurface conditions and current and future exposure scenarios. Three subareas within the flat area were identified based on future construction and exposure scenarios. Samples were collected using both IS and discrete sampling approaches (Table 3-2 presents a summary of collection methods). Soil analytical results are discussed below. Analytical results for analytes detected above laboratory DLs are summarized in Table 4-2. For evaluation purposes, soil detections were conservatively compared to the following HDOH EALs (HDOH, Fall 2011):

- Tier 1 (lowest) EALs for unrestricted/residential sites within 150 meters of a surface water body, where drinking water is threatened.
- EALs for unrestricted/residential sites within 150 meters of a surface water body, where drinking water is not threatened
- EALs for commercial/industrial (C/I) sites within 150 meters of a surface water body, where drinking water is threatened.
- EALs for C/I sites within 150 meters of a surface water body, where drinking water is not threatened

Analytes detected above the EALs are summarized in Table 4-2 and Figure 4-3. Results for each specific area are discussed in the following subsections.

4.2.1 Area with Future Fill

The area with future fill includes DU1N, DU1S, and DU4; soil characterization in these DUs included surface and subsurface soil sampling to evaluate if contamination was present and to evaluate current and future exposure scenarios. As briefly discussed in Section 4.1, DU1 was split into two DUs based on geophysical and test pit investigation results. No significant geophysical anomalies were detected in the northern portion of the DU, leading to the conclusion that no subsurface construction or metal debris was present in this subarea; significant anomalies detected in the southern portion of DU1 were confirmed to correspond to construction and other debris. Therefore, DU1 was divided into two DUs (DU1N and DU1S) so that samples representative of the differing conditions in each area would be collected. All samples in the area with future fill were collected using an IS approach.

Analytical results for analytes detected above laboratory DLs are summarized in Table 4-2. Analytes detected above the Tier 1 EALs are shown on Figure 4-3. The following discusses detected analytes and those that exceeded the HDOH EALs, for the three DUs:

- **DU1N** – Samples were collected from three vertical SUs:
  - **A (0 to 0.5 feet bgs)** –TPHs, PAHs, and RCRA 8 metals were detected in surface soil. Concentrations were below the Tier 1 EALs except for benzo[a]pyrene, which was detected at a concentration of 159 micrograms per kilogram (μg/kg), above the Tier 1 EAL of 150 μg/kg but below the C/I EAL of 2.1 mg/kg.
  - **B (0.5 to 3 feet bgs)** –TPHs, PAHs, organochlorine pesticides, PCBs, and RCRA 8 metals were detected in this depth interval. However, all concentrations are below the Tier 1 EALs.
  - **C (3-foot interval below the fill)**[2] –TPHs, PAHs, organochlorine pesticides, PCBs, and RCRA 8 metals were detected in subsurface soil in the 3-foot interval below the fill. However, all concentrations were below the Tier 1 EALs.
- **DU1S** – Samples were collected from three vertical SUs:
  - **A (0 to 0.5 feet bgs)** –TPHs, PAHs, organochlorine pesticides, herbicides, and the RCRA 8 metals were detected in surface soil. However all concentrations were below the Tier 1 EALs.
  - **B (0.5 to 3 feet bgs)** –TPHs, PAHs, organochlorine pesticides, herbicides, PCBs, and the RCRA 8 metals were detected in this depth interval. Concentrations were below the Tier 1 EALs except for TPH-o and benzo[a]pyrene.
    - TPH-o was detected at a concentration of 647 mg/kg, above the Tier 1 EAL of 500 mg/kg but below the C/I EALs of 1,000 mg/kg.
    - Benzo[a]pyrene was detected at a concentration of 243 μg/kg, above the Tier 1 EAL of 150 μg/kg but below the C/I EALs of 2,100 μg/kg.
  - **C (3-foot interval below the fill)**[3] –TPHs, PAHs, organochlorine pesticides, and RCRA 8 metals were detected in subsurface soil in the 3-foot interval below the fill. However, all concentrations were below the Tier 1 EALs.

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[2] Fill material in DU1N was found at a depth ranging between 3 feet and 12 feet bgs (average depth of approximately 6 feet bgs).

[3] Fill material in DU1S was found at a depth ranging between 10 feet and 13 feet bgs (average depth of approximately 10.5 feet bgs).

- **DU4** – Samples were collected from two different vertical SUs, with primary, replicate and triplicate samples collected from the A SU depth:
  - **A (0 to 0.5 feet bgs)** –TPHs, PAHs, organochlorine pesticides, herbicides, and RCRA 8 metals were detected in surface soil. Concentrations were below the Tier 1 EALs, except for heptachlor epoxide and lead.
    - Heptachlor epoxide was detected at estimated concentrations (J qualified) ranging from 61.6J to 79.3J µg/kg in the replicate samples. These results are above the Tier 1 EAL of 53 µg/kg but below the C/I EAL of 190 µg/kg.
    - Lead was detected at concentrations ranging from 720 to 873 mg/kg in the replicate samples. These results are all above the Tier 1 EAL of 200 mg/kg, and range from below to above the C/I EAL of 800 mg/kg.
  - **B (0 to 3 feet bgs)** – This sample was analyzed for RCRA 8 metals, based on the Tier 1 EAL exceedance in the A horizon sample. Numerous RCRA 8 metals were detected. Lead was detected at 902 mg/kg, above the Tier 1 EAL of 200 mg/kg and the C/I EAL of 800 mg/kg. TPHs, PAHs, pesticides, PCBs, and herbicides were not analyzed in this sample because they were not detected above the Tier 1 EAL in the surface soil sample.

4.2.2 Area with No or Limited Future Excavation

The area with no or minimal future excavation includes DU2 and DU3. Soil characterization in these DUs included surface and subsurface soil sampling to evaluate if contamination was present and to evaluate current and future exposure scenarios. All samples were collected using an IS approach.

Analytical results for analytes detected above laboratory DLs are summarized in Table 4-2. Analytes detected above the Tier 1 EALs are shown on Figure 4-3. The following discusses detected analytes and those that exceeded the HDOH EALs, for the two DUs:

- **DU2** – Samples were collected from three different vertical SUs:
  - **A (0 to 0.5 feet bgs)** – TPH-o, chlordane, and RCRA 8 metals were detected in surface soil. Concentrations were below Tier 1 EALs, except for TPH-o, which was detected at a concentration of 1,410 mg/kg—above the Tier 1 EAL of 500 mg/kg and the C/I EALs of of 1,000 mg/kg.
  - **B (0.5 to 3 feet bgs)** – TPHs, PAHs, organochlorine pesticides, and RCRA 8 metals were detected in subsurface soil between 0.5 and 3 feet bgs. Concentrations were below the Tier 1 EALs, except for TPH-o and benzo[a]pyrene, which were detected at a concentration of 736 mg/kg and 734 µg/kg, respectively. Although concentrations of these two compounds were above the Tier 1 EALs (500 mg/kg and 0.15 mg/kg, respectively), the C/I EALs (1,000 mg/kg and 2.1 mg/kg) were not exceeded.
  - **C (3-foot interval below the fill)[4]** –TPHs, PAHs, organochlorine pesticides, herbicides, and RCRA 8 metals were detected in subsurface soil in the 3-foot interval below the fill. However, all concentrations were below Tier 1 EALs.
- **DU3** – Samples were collected from three different vertical SUs:
  - **A (0 to 0.5 feet bgs)** –TPHs, PAHs, organochlorine pesticides, PCBs, and RCRA 8 metals were detected in surface soil. Concentrations were below the Tier 1 EALs, except for TPH-o, which was detected at a concentration of 634 mg/kg, above the Tier 1 EAL of 500 mg/kg but below the C/I EALs of 1,000 mg/kg.

[4] Fill material in DU2 was found at a depth ranging between 8 feet and 18 feet bgs (average depth of approximately 13 feet bgs).

— **B (0.5 to 3 feet bgs)** –TPHs, PAHs, organochlorine pesticides, PCBs, herbicides, and RCRA 8 metals were detected in subsurface soil between 0.5 and 3 feet bgs. However, all concentrations were below Tier 1 EALs.

— **C (3-foot interval below the fill)**[5] –TPHs, PAHs, organochlorine pesticides, PCBs, and RCRA 8 metals were detected in subsurface soil beneath the fill. However, all concentrations were below Tier 1 EALs.

4.2.3 Area with Future Excavation

The area with future excavation includes DU5 and DU6; soil characterization in these DUs included surface and subsurface soil sampling to evaluate if contamination was present and to evaluate waste disposal alternatives. All samples were collected using an IS approach.

Analytical results for analytes detected above laboratory DLs are summarized in Table 4-2. Analytes detected above the Tier 1 EALs are shown on Figure 4-3. The following discusses analytes that were detected and that exceeded the HDOH EALs, for the two DUs:

- **DU5** – Samples were collected from four different vertical SUs:

— **A (0 to 5 feet bgs)** –TPHs, PAHs, organochlorine pesticides, herbicides, and RCRA 8 metals were detected in this interval. Concentrations were below the Tier 1 EALs except for TPH-d, TPH-o, arsenic, and lead.

➢ TPH-d was detected at a concentration of 208J mg/kg, which is above the Tier 1 EAL of 100 mg/kg but below the C/I EAL (drinking water not threatened) of 500 mg/kg.

➢ TPH-o was detected at a concentration of 1,970 mg/kg, which is above the Tier 1 and C/I EALs of 500 mg/kg and 1,000 mg/kg, respectively.

➢ Arsenic was detected at a concentration of 50.1 mg/kg, which is above the Tier 1 EAL of 24 mg/kg and below the C/I EAL of 95 mg/kg.

➢ Lead was detected at a concentration of 804 mg/kg, which is above the Tier 1 and C/I EALs of 200 mg/kg and 800 mg/kg, respectively.

— **B (5 to 10 feet bgs)** –TPHs, PAHs, organochlorine pesticides, herbicides, and RCRA 8 metals were detected in subsurface soil between 5 and 10 feet bgs. Concentrations were below the Tier 1 EALs, except for TPH-d, TPH-o, and benzo[a]pyrene.

➢ Benzo[a]pyrene was detected at a concentration of 211 μg/kg, which is above the Tier 1 EAL of 150 μg/kg but below the C/I EALs of 2,100 μg/kg.

➢ TPH-d was detected at a concentration of 283J mg/kg, which is above the Tier 1 EAL but below the C/I EAL (drinking water not threatened) of 500 mg/kg.

➢ TPH-o was detected at a concentration of 2,450 mg/kg, which above the Tier 1 EAL and C/I EAL of 500 mg/kg and 1,000 mg/kg, respectively.

— **C (10 to 15 feet bgs)** – PAHs, TPHs, organochlorine pesticides, and RCRA 8 metals were detected in subsurface soil between 10 and 15 feet bgs. Concentrations were below the Tier 1 EALs except for benzo[a]pyrene, TPH-d, and TPH-o.

➢ TPH-d was detected at an estimated concentration of 262 mg/kg, which is above the Tier 1 and C/I EAL of 100 mg/kg but below the C/I EAL (drinking water not threatened) of 500 mg/kg.

[5] Fill material in DU3 was found at a depth ranging between 12 feet and 20 feet bgs (average depth of approximately 16.5 feet bgs).

- TPH-o was detected at an estimated concentration of 2,370 mg/kg, which is above the Tier 1 EAL and C/I EALs of 500 mg/kg and 1,000 mg/kg, respectively.
- Benzo[a]pyrene was detected at a concentration of 176 µg/kg, which is above the Tier 1 EAL of 150 µg/kg but below the C/I EAL of 2,100 µg/kg.

— **D (interval below the fill)[6]** –TPHs, PAHs, organochlorine pesticides, and RCRA 8 metals were generally detected at low levels in subsurface soil immediately below the fill. Concentrations were below the Tier 1 EALs except TPH-o. TPH-o was detected at a concentration of 619 mg/kg, which is above the Tier 1 EAL of 500 mg/kg but below the C/I EALs of 1,000 mg/kg.

- **DU6** – Samples were collected from four different vertical SUs:

— **A (0 to 5 feet bgs)** –TPHs, PAHs, organochlorine pesticides, herbicides, and RCRA 8 metals were detected in this interval in the primary, replicate and triplicate samples. Concentrations were below the Tier 1 EALs, except for TPH-d, TPH-o, benzo[a]pyrene, and lead.

- TPH-d was detected at estimated concentrations ranging from 158 to 200 mg/kg, which is above the Tier 1 EAL of 100 mg/kg but below the C/I EAL (drinking water not threatened) of 500 mg/kg.
- TPH-o was detected at concentrations ranging from of 1,070 to 1,290 mg/kg, which is above the Tier 1 and C/I EALs of 500 mg/kg and 1,000 mg/kg, respectively.
- Benzo[a]pyrene was detected at a concentration ranging from 856 to 1,080 µg/kg, which is above the Tier 1 EAL of 150 µg/kg but below the C/I EAL of 2,100 µg/kg.
- Lead was detected at a concentration of 227 mg/kg in the replicate sample only, above the Tier 1 EAL of 200 mg/kg but below the C/I EALs of 800 mg/kg.

— **B (5 to 10 feet bgs)** –TPHs, PAHs, organochlorine pesticides, herbicides, and RCRA 8 metals were detected in this interval. Concentrations were below the Tier 1 EALs except for TPH-d, TPH-d, benzo[a]pyrene, and lead.

- TPH-d was detected at a concentration of 163J mg/kg, which is above the Tier 1 EAL of 100 mg/kg but below the C/I EAL (drinking water not threatened) of 500 mg/kg.
- TPH-o was detected at concentration of 1,150 mg/kg, which is above the Tier 1 and C/I EALs of 500 mg/kg and 1,000 mg/kg, respectively.
- Benzo[a]pyrene was detected at a concentration of 738 µg/kg, which is above the Tier 1 EAL of 150 µg/kg but below the C/I EAL of 2,100 µg/kg.
- Lead was detected at a concentration of 239 mg/kg, which is above the Tier 1 EAL of 200 mg/kg but below the C/I EALs of 800 mg/kg.

— **C (10 to 15 feet bgs)** –TPHs, PAHs, organochlorine pesticides, herbicides, and RCRA 8 metals were detected in this interval. Concentrations were below the Tier 1 EALs, except for TPH-d, TPH-o, and benzo[a]pyrene.

- TPH-d was detected at an estimated concentration of 141 mg/kg, which is above the Tier 1 EAL of 100 mg/kg but below the C/I EAL (drinking water not threatened) of 500 mg/kg.
- TPH-o was detected at concentration of 1,010 mg/kg, which is above Tier 1 and C/I EALs of 500 mg/kg and 1,000 mg/kg, respectively.

[6] Fill material in DU5 was found at a depth ranging between 9 feet and 18 feet bgs (average depth of approximately 14 feet bgs).

- Benzo[a]pyrene was detected at a concentration of 617 μg/kg, which is above the Tier 1 EAL of 150 μg/kg but below the C/I EAL of 2,100 μg/kg.

— **D (3-foot interval below the fill)**[7] –TPHs, PAHs, organochlorine pesticides, and RCRA 8 metals were detected at generally low concentrations in this interval. Concentrations were below Tier 1 EALs, except for heptachlor epoxide. Heptachlor epoxide was detected at a concentration of 8.14J μg/kg. This result is above the Tier 1 EAL of 53 μg/kg, but below the C/I EAL of 190 μg/kg.

4.3 Flat Area Waste Characterization

Table 4-3 presents the sample results for soil samples analyzed for additional waste characterization, which were used to further characterize the nature and extent of contaminated soil and to support the development of disposal alternatives. Waste characterization samples were collected in the field and archived during normal sample collection, combining representative portions of soil from 6 adjacent borings of each SU together (see section 3.6 for more details). Flat area archived, combined soil samples from vertical SUs resulted in exceedances of the Tier 1 EALs for TPH-d and TPH-o were analyzed to obtain further definition of the areas of each DU contributing the highest TPH concentration to each composite SU sample. In addition, samples that had total metals greater than 20 times the TCLP limit were analyzed for TCLP. Results for these waste characterization samples are summarized as follows (Table 4-3):

- TPH-d and TPH-o detections were compared against the HDOH Tier 1 EALs to evaluate disposal options, and against the C/I EALs (drinking water not threatened) to evaluate reuse within the Pearly Highlands Work Area. Only the “C” horizon sample from DU5 (FAWC-DU51318C) contained TPH-d and TPH-o at concentrations greater than the C/I Tier 1 EALs.
- In the samples analyzed that had total metals greater than 20 times the TCLP limit, there were no exceedances of TCLP limits.

4.4 Discrete Soil Sample Results

Three discrete samples were collected from borings advanced downgradient of two cesspools in the DU6 excavation area, to assess potential contamination. Two borings were advanced for sample collection (FADS-DU6D1-0514 and FADS-DU6D2-0514) downgradient of a cesspool identified within the eastern side of the excavation in DU6 (Figure 2-1) during site investigation. One boring was advanced for sample collection (FADS-DU6D3-0514), downgradient of the cesspool on the western side of DU6. Samples at these locations were collected in the 3-foot interval below the estimated bottom depth of the cesspools (approximately 14 to 17 feet bgs) and analyzed for the same parameters as IS samples. The two cesspools within DU6 had been recently inspected. They did not contain sewage or sludge and were temporarily filled during grading activities. These cesspools will be excavated and removed during construction of the Pearl Highlands Garage and Station. Other cesspools located around residential structures will be investigated and properly abandoned as part of future construction efforts.

As summarized in Table 4-2, TPHs, PAHs, organochlorine pesticides, herbicides, and RCRA 8 metals were detected in the FADS-DU6D1-0514 and FADS-DU6D3-0514 samples. TPHs, herbicides, and RCRA 8 metals were detected in the FADS-DU6D2-0514 sample. Analytes detected in the three samples were below the Tier 1 EALs, except for lead, which was found in sample FADS-DU6D3-0514 at a concentration of 362 mg/kg, above the Tier 1 EAL of 200 but below the C/I EALs of 800 mg/kg.

4.5 Stream Bank Characterization

The Waiawa Stream bank includes DU7, as shown on Figure 2-1. Surface soil samples were collected along the stream bank to evaluate if potential contamination from the flat area and/or debris on the stream bank itself had also

[7] Fill material in DU6 was found at a depth ranging between 12 feet and 20 feet bgs (average depth of approximately 16 feet bgs).

impacted the northern bank of Waiawa Stream. All samples were collected using an IS approach. The initial stream bank characterization consisted of a visual survey to evaluate if separating the stream bank into multiple DUs was warranted. Because the types and distribution of debris observed at the surface were generally consistent along the portion of the stream bank evaluated, the entire section of the stream bank along the site boundary was identified as a single DU.

The IS sample in DU7 was composed of 100 increments taken from the surface to 1 foot below the surface of the bank (and perpendicular to it). As summarized in Table 4-2, TPHs, PAHs, organochlorine pesticides, PCBs, and RCRA 8 metals were detected, but concentrations were below the Tier 1 EALs.

4.6 Stream Bed Characterization

The Waiawa Stream bed includes DU8 (upgradient), DU9 (adjacent to the Site), and DU10 (downgradient from the Site), as shown on Figure 2-1. Samples were collected to evaluate whether potential contamination from the stream bank and subsurface soil at the flat area have impacted the stream bed. An upgradient (DU8) reach of the stream was sampled to evaluate ambient contamination levels upstream of the Site, and a downgradient (DU10) reach of the stream was sampled to evaluate if the potential contamination in DU9, was also present downstream of the Site. All samples were collected using an IS approach.

IS samples from both DU8 and DU10 were composed of 30 increments, and one set of replicate IS samples was also collected from DU9. Analytical results were compared to the National Oceanic and Atmospheric Administration Screening Quick Reference Tables (NOAA SQuiRTs), Threshold Effects Concentration (TECs) and Probable Effects Concentration (PECs) (NOAA, November 2008). The following samples exceeded the NOAA SQuiRTs PEC and/or TEC screening criteria (see Table 4-4 and Figure 4-4):

- **DU8 (upgradient of Site)** – RCRA 8 metals (chromium) were detected above the NOAA SQuiRTs TECs.
- **DU9 (adjacent to Site)** – Replicate samples were collected. RCRA 8 metals (chromium and lead) were detected above the NOAA SQuiRTs TECs in at least one of these three samples.
- **DU10 (downgradient of Site)** – RCRA 8 metals (cadmium and chromium) were detected above the NOAA SQuiRTs TECs, the latter also above the PEC level.

These data indicate that RCRA 8 metals are present at concentrations above the NOAA SQuiRTs PEC and/or TEC screening levels in all stream bed sediments sampled, including those upstream, adjacent to, and downstream of the Site.Although the chromium and lead concentrations found in the stream exceed NOAA sediment PECs and TECs, they are below natural background levels for soil in Hawaii (HDOH, December 2014). Low levels of other constituents for which no NOAA sediment criteria are available (for example, TPH-d, TPH-o, pentachlorophenol, and selenium), were also detected in sediment samples. Concentrations of these constituents were relatively low, well below the unrestricted Tier 1 EALs for soil.

4.7 Groundwater Characterization

To evaluate if groundwater has been affected by subsurface soil contamination at the Site, 11 temporary wells were constructed and sampled during the site investigation. In addition, an existing monitoring well in the northeastern portion of DU6 was also sampled to meet the project objective of collecting groundwater samples at a frequency of approximately one groundwater sample per half acre. As listed in Table 4-5, groundwater analytes detected above the laboratory DLs included VOCs, TPHs, organochlorine pesticides, and RCRA 8 metals. Groundwater analytical results for detections above the HDOH Tier 1 EALs and the C/I HDOH EALs (drinking water not threatened) are summarized in Table 4-5 and presented on Figure 4-5. Analytes detected above the Tier 1 EALs include the following:

- TPH-g was detected at TW-002 at a concentration of 148 micrograms per liter (μg/L), above the unrestricted Tier 1 EAL of 100 μg/L but below the C/I EAL of 500 μg/L.

- TPH-d was detected above the unrestricted Tier 1 EAL of 0.1 milligrams per liter (mg/L) at TW-007, TW-008, and TW-010 at concentrations of 0.149 mg/L, 0.125 mg/L, and 0.118 mg/L, respectively. Concentrations were below the C/I EAL of 0.64 mg/L.
- TPH-o was detected above the unrestricted Tier 1 EAL of 0.1 mg/L at TW-007 and TW-008 at estimated concentrations of 0.123 mg/L and 0.132 mg/L, respectively. Concentrations were below the C/I EAL of 0.64 mg/L.
- Organochlorine pesticides detected above the unrestricted Tier 1 EALs include the following:
  - Aldrin was detected above the unrestricted Tier 1 EAL of 0.004 µg/L at wells TW-002 (estimated concentration of 0.0059) and TW-008 (0.46 µg/L).
  - Chlordane was detected above the unrestricted Tier 1 EAL of 0.004 µg/L at well TW-005 at an estimated concentration of 0.056 µg/L.
  - Dieldrin was detected above the unrestricted Tier 1 EAL of 0.0019 µg/L at the following wells: TW-001 (estimated concentration of 0.0035 µg/L), TW-002 (0.0032 µg/L), TW-003 (estimated concentration of 0.0052µg/L), TW-005 (estimated concentration of 0.0028 µg/L), TW-006 (estimated concentration of 0.0033 µg/L), TW-008 (0.24 µg/L), TW-009 (estimated concentration of 0.0036 µg/L), and TW-010 (estimated concentration of 0.0023 µg/L).
  - Heptachlor was detected above the unrestricted Tier 1 EAL of 0.0036 µg/L in all groundwater samples. However, all results were B qualified, meaning that quantitation between primary and confirmation analyses differed by greater than 40 percent, so there is some uncertainty to the actual concentration of heptachlor in groundwater.
  - Heptachlor epoxide was detected above the unrestricted Tier 1 EAL of 0.0036 µg/L at the following wells: TW-003 (estimated concentration of 0.0076 µg/L), TW-005 (estimated concentration of 0.0053 µg/L), TW-006 (0.019 µg/L), TW-007 (estimated concentration of 0.0078 µg/L), TW-009 (estimated concentration of 0.0063 µg/L), and TW-010 (estimated concentration of 0.0047 µg/L).

  Except for aldrin in TW-002, concentrations of organochlorine pesticides in groundwater were also above the C/I EALs. Because organochlorine pesticides samples were not filtered before testing, the presence of heptachlor is possibly related to low levels of chlordane in shallow soil in most DUs.
- Dissolved selenium was detected above the unrestricted Tier 1 and C/I EALs of 5 µg/L at TW-002, TW-003, TW-006, TW-007, TW-008, TW-010, TW-011, the TW-011 field duplicate, and TW-012. All concentrations above the EALs (except for TW-001 [21.7 µg/L]) were estimated concentrations of less than 10 µg/L.
- Dissolved silver was detected in TW-006 at 1.4 µg/L (estimated “J” value), above the unrestricted Tier 1 and C/I EALs of 1 µg/L.

In addition, one discrete sample (FASC-LNAPL01-0514) of an oil-like substance was collected using a bailer from the thin walled 5-inch steel-cased well located in DU3, about 10 feet upgradient of TW-001 (Figure 3-3). This sample was analyzed for TPH-g, TPH-d, and TPH-o. TPH-g was detected at 42.9 mg/kg, TPH-d was detected at 70,500 mg/kg, and TPH-o was detected at 505,000 mg/kg. A measurement of the thickness of LNAPL was attempted with an oil-water interface probe, but the substance was too viscous to obtain an accurate measurement. Depth to water in TW-001 and the steel-cased well containing oil were estimated to be within 0.2 foot of each other, and limited LNAPL was retrieved in the bailer sample.

In the temporary well TW-001, located approximately 12 feet downgradient (south) of the 5-inch steel-cased well, TPH-g and TPH-o were not detected while TPH-d was detected at an estimated concentration of 0.034 mg/L, below the unrestricted Tier 1 EAL of 0.1 mg/L. Further downgradient at TW-004 (near the Waiawa Stream), TPH-g, TPH-d, and TPH-o were all non-detect.

5.0 Conceptual Site Model and Environmental Hazard Evaluation

This section describes the CSM for the Site and provides the EHE for the COPCs found in soil and groundwater.

5.1 Conceptual Site Model

A CSM for the Site has been developed based on the results of the investigation conducted in May and June 2014 and available historical information for the Site. The elements of the CSM are described in the subsections below. The CSM is graphically represented in Figure 5-1.

5.1.1 Site Land Use

Historically, the Site and adjacent properties were used for both agricultural and residential purposes; available records also indicate that a portion of the Site was previously used as a storage yard for wrecked cars. The Site was recently acquired by HART for the HRTP and demolition of existing residential units is in process. The current and reasonably anticipated land use for the Site is C/I. However, because of the potential removal and reuse of soil outside the Pearl Highlands Work Area, unrestricted/residential use of soil is also evaluated.

5.1.2 Contaminants of Potential Concern

In this report, COPCs are defined as those compounds with concentrations above the Tier 1 (lowest) EAL. Based on investigation results, the COPCs at the Site are the following:

- Soil
  - TPH-d
  - TPH-o
  - Benzo[a]pyrene
  - Heptachlor epoxide
  - Arsenic
  - Lead
- Groundwater
  - Aldrin
  - Chlordane
  - Dieldrin
  - Heptachlor
  - Heptachlor epoxide
  - Lead
  - Mercury[8]
  - Selenium

[8] Although mercury was not detected, the detection limit for groundwater was higher than the Tier 1 EAL. As a conservative measure, it is therefore considered as a potential COPC.

    — Silver

- Sediments
    — Cadmium
    — Chromium
    — Lead

5.1.3 Sources of Contamination

Based on investigation data, the most likely source of contamination at the Site is the fill material found between the surface and depths of up to approximately 15 feet bgs. Historical agricultural use may also have been a source of contamination within the Site and in the Waiawa Stream flowing adjacent to the Site. Because of the presence of organochlorine pesticides in all wells at the Site, with relatively higher concentrations in the upgradient wells, it is possible that use of chemical products during past agricultural use on a larger area (including, but extending beyond the Site boundary – i.e., regional scale) may have contributed to groundwater contamination. Finally, a limited volume of LNAPL was observed within a steel-cased well located within DU-3 that may be contributing to gross contamination concerns within that DU in the immediate vicinity of the well (as further discussed in Section 5.2.1.1).

As described in previous sections, fill material includes construction debris (concrete and metal debris) and other waste, which are a likely source of contamination in soil, and may have also contributed to relatively high levels of pesticides and metals in groundwater.

5.1.4 Transport Mechanism

Transport mechanisms for COPCs found in fill/debris between the surface and approximately 10 to 15 feet bgs at the Site include the following:

- Leaching of COPCs from surface/subsurface soil to deeper soil
- Leaching of COPCs from subsurface soil to the shallow aquifer
- Migration of COPCs from shallow groundwater to surface water

5.1.5 Potential Receptors and Exposure Pathways

Based on current and reasonably anticipated future land use of the Site and the investigation results, potentially complete exposure pathways exist for the following human and ecological exposure scenarios:

- **Future Hypothetical residents:** Potential exposure of hypothetical residents to COPCs in surface soil and subsurface soil (down to 10 feet bgs) could occur by incidental ingestion, dermal contact, and inhalation of soil particles if contaminated soil was removed and reused outside the Pearl Highlands Work Area in a residential area.

- **Future rail workers/users:** Potential intermittent exposure of future workers/rail users to COPCs in surface and subsurface soil (down to 10 feet bgs) is assumed to occur by incidental ingestion, dermal contact, and inhalation of soil dust particles.

- **Trespassers/recreational users:** Potential intermittent exposure of trespassers and recreational users to COPCs in surface and subsurface soil (down to 1 foot bgs) could occur during rail guideway/station construction by incidental ingestion, dermal contact, and inhalation of soil dust particles.

- **Construction workers:** Exposure of construction workers to COPCs in surface and subsurface soil (down to construction depths) could occur during rail guideway/station construction by incidental ingestion, dermal contact, and inhalation of soil dust particles. Potential exposure of construction workers to groundwater, and sediment could also occur by incidental ingestion and dermal contact.

- **Ecological aquatic receptors**: Potential exposure of aquatic ecological receptors populating the Waiawa Stream could occur by ingestion of and dermal contact with groundwater draining into the stream. Potential exposure of ecological aquatic receptors to sediment could also occur by incidental ingestion and dermal contact. Although terrestrial ecological receptors (e.g., chickens, birds, mongoose, cats, dogs, and pigs) frequented that area when it was used for residential purposes, their habitat has been displaced because of construction work and will not be re-established in the future because of the presence of the rail guideway/station. Therefore, terrestrial ecological receptors are not expected to be present at the Site in the reasonably anticipated future.

5.2 Environmental Hazard Evaluation

This section evaluates potential hazards associated with COPC concentrations in soil and groundwater at Site. All results exceeding the applicable HDOH Tier 1 EALs were carried over to Tier 2 for the EHE of different exposure scenarios/hazards. This EHE is subdivided in two subsections to evaluate soil and groundwater against the appropriate hazard-specific EALs. After Tier 1 evaluation conducted in Section 4, where analytical results were compared against the unrestricted Tier 1 (lowest) EALs to select the COPCs, those compounds exceeding the Tier 1 EALs for sites within 150 meters of surface water bodies and where drinking water is not threatened (HDOH, Fall 2011) were carried over to Tier 2 evaluation. During the Tier 2 evaluation, results were compared against hazard-specific EALs to evaluate the potential exposure scenarios.

5.2.1 Soil

Soil analytical data were compared to the appropriate EALs for the following potential hazards:

- Gross contamination
- Leaching to groundwater
- Human direct exposure

Drinking water resources and vapor intrusion EALs were not considered in this evaluation because the unconfined aquifer system beneath the Site is not used for drinking water purposes and none of the COPCs detected in soil are volatile. In addition, as discussed in Section 5.1, the Site is being redeveloped and no terrestrial ecological receptors are present at the Site. Therefore, soil terrestrial ecotoxicity EALs do not apply for the Site. Different land use/exposure scenarios were evaluated, including unrestricted land use, a commercial/industrial land use scenario, and a construction/trench workers scenario. Outcomes of the EHE for soil are discussed below and are summarized in Table 5-1 and Figure 5-2.

5.2.1.1 Gross Contamination

Gross contamination of soil generally refers to the presence of LNAPL, offensive odors, unaesthetic appearance, general resource degradation, and generation of explosive vapors (HDOH, Fall 2011). Soil data were initially compared to gross contamination EALs for "Exposed or Potentially Exposed Soil" provided as Table F-2 in the HDOH EAL Surfer (HDOH, Fall 2011). Additional evaluation was then conducted based on field observation of soils encountered during the site investigation.

Based on comparison to gross contamination EALs (Table 5-1), soil samples from DU1S, DU2, DU3, DU5, and DU6 were flagged as posing potential gross contamination hazards under a hypothetical residential scenario because they exceeded the TPH-d and TPH-o EALs of 500 mg/kg, primarily within the vertical interval where fill material was encountered (vertical SUs “A” and “B”).[9] Based on analytical results, under the current and reasonably anticipated future C/I scenario, potential gross contamination concerns are limited to a small portion of DU5 (approximately 5,000 square feet), where soil sample FAWC-DU51318C-0514 exceeded the gross contamination EAL for TPH-d and

[9] The depth interval in the sample ID is shown after the DU number (e.g., FASC-DU1SB-0514 is the sample collected in the flat area for soil characterization [FASC-] at DU1S [DU1S] within the B [0.5 to 3 feet bgs] SU/depth interval [B-], in May 2014 [0514]).

TPH-o. This sample was composited from six adjacent borings (Borings 13 through 18) in the vertical interval where fill material was encountered ("C" depth interval of 10 to 15 feet bgs). Because of the exceedances of the gross contamination EALs in surface and subsurface soil, a Tier 2 EHE was conducted to address more specific components that may contribute to a potential overall gross contamination area at the Site.

Light, Non Aqueous Phase Liquid

Evidence of LNAPL (i.e., petroleum-saturated soil or strong odor/staining) was not observed during drilling and test pitting activities at any of the DUs. However, LNAPL (0.2 foot) was identified as present within a thin walled 5-inch steel-cased well located in DU3 (Figure 3-3). A sample of the fluid was collected from the pipe and analyzed for petroleum hydrocarbons. The laboratory chromatograms indicate that the predominant carbon range for the sample is C28 to C40, which is within the typical range of lubricating or heavy fuel oils. After sampling, no measurable LNAPL was observed in the well, suggesting that any LNAPL in the formation may be at residual saturation within the surrounding soils and with limited mobility. LNAPL was also measured in a temporary well (0.02 foot in well TW-001) located within DU3 approximately 12 feet downgradient (south) of the steel-cased well. However, uncertainties exist regarding the presence of LNAPL in TW-001 because although 0.02 foot of LNAPL was measured before sample collection, no LNAPL or sheen was observed in the groundwater sample, and no odor or staining was observed on the oil-water interface probe or groundwater sampling equipment. Furthermore, no staining, odor, or LNAPL was detected in the boring associated with the temporary well and LNAPL was not detected in the temporary well during gauging conducted the day after installation. Therefore, it is possible that the 0.02-foot measurement during groundwater sampling was a false detection.

Because of the LNAPL encountered in the 5-inch steel-cased well and potentially at TW-001, it is inferred that oil is present in the subsurface within DU3 and extends to the south at least as far as the location of TW-001. The lateral and vertical extent of oil within the subsurface at DU3 was not delineated during the site investigation. However, because no LNAPL was detected in temporary wells TW-002, TW-004, and TW-008, the LNAPL contamination is likely limited in extent to the vicinity of the steel pipe and TW-001.

Odor Concerns

With the exception of soil boring 4 and the steel pipe in DU3, no LNAPL, staining, or odor were observed during test pitting and soil boring activities. In addition, COPCs detected in soil and groundwater are not volatile; therefore, it is inferred that no odor concerns exist in most areas of the Site. Because LNAPL was detected in a steel pipe at DU3, and may be present in surrounding soils, odor concerns may exist for soils excavated in the vicinity of the steel pipe.

Unaesthetic Appearance and General Resource Degradation Concerns

Based on no staining, odor or other unaesthetic appearance, subsurface soil contamination at the Site has not caused any resource degradation concern.

Explosive Vapor Concerns

The COPCs in soil and groundwater at the Site are not volatile. Therefore no explosive vapor concerns exist at the Site.

Summary of Gross Contamination Concerns

It is concluded that gross contamination concerns in soil at the Site are limited to the area in the vicinity of the steel-cased well where LNAPL was encountered within DU3. As noted above, the extent of LNAPL contamination in subsurface soil near the steel-cased well was not thoroughly delineated during this investigation.

5.2.1.2 Leaching to Groundwater

Soil data were compared to the leaching EALs (Table E in the HDOH EAL Surfer; HDOH, FALL 2011) to evaluate whether contaminants in soil could potentially leach to groundwater. As shown in Table 5-1, this evaluation resulted in flagging DU2, DU5, and DU6, as posing potential leaching concerns because of exceedances of TPH-d (DU5 only) and TPH-o. However, TPH concentrations in groundwater are below the applicable Tier 1 EALs, suggesting that concentrations in soil are not significantly impacting groundwater.

5.2.1.3 Human Direct Exposure

Soil data from the investigation conducted at the Site in May and June 2014 were compared to the direct exposure EALs (Table I-1 in the HDOH EAL Surfer; HDOH, Fall 2011) to evaluate whether contaminants in soil potentially pose risks to human health by direct contact. Table I-1 in HDOH 2011 guidance provides EALs based on target risk of 10^{-6} for carcinogen compounds, soil saturation levels, risk with target hazard quotient (HQ) of 0.2 (0.5 for TPH), or risk with a HQ of 1.0, for non-carcinogen compounds.

As shown in Table 5-1, this evaluation resulted in flagging all DUs except for DU3 as posing potential direct exposure hazards under a hypothetical residential scenario because of exceedances of various COPCs. Under the current and reasonably anticipated C/I land use scenario and construction workers scenario, direct exposure concerns are limited to DU4 and DU5, where lead and TPH-d (DU5 only) exceeded the direct exposure EALs of 200 mg/kg and 500 mg/kg, respectively. Concentrations of TPH, PAHs, and lead above the direct exposure EALs in surface soil samples are typical of urban background, especially along roadsides (possibly from asphalt or oil in the original fill material, and from pre-1970s-era auto exhaust) (HDOH, December 2014).

5.2.2 Groundwater

Groundwater analytical data were compared to the appropriate EALs for the following potential hazards:

- Aquatic ecotoxicity
- Gross contamination

Drinking water toxicity and vapor intrusion EALs were not considered in this evaluation because the shallow unconfined aquifer beneath the Site is not used for drinking water purposes and none of the COPCs in groundwater are volatile. Outcomes of the EHE for groundwater are discussed in the following subsections and are summarized in Table 5-2 and Figure 5-3.

5.2.2.1 Aquatic Ecotoxicity

As described in Sections 2.3, the shallow aquifer beneath the Site is adjacent and likely hydraulically connected to Waiawa Stream. Therefore, groundwater data from the investigation were compared to the aquatic ecotoxicity EALs (Table D-4a in the HDOH EAL Surfer; HDOH, FALL 2011) to evaluate whether contaminants in groundwater potentially pose risks to ecological receptors in the stream.

As shown in Table 5-2, this evaluation resulted in flagging all DUs, except for DU4, as posing potential aquatic ecotoxicity hazards. COPCs include pesticides and metals. No groundwater monitoring well could be installed within DU4 because of limited accessibility, and it is unknown if potential aquatic ecotoxicity hazards related to groundwater contamination exist in this DU.

5.2.2.2 Gross Contamination

Gross contamination of groundwater generally refers to the presence of LNAPL, offensive odors, unaesthetic appearance, general resource degradation, and generation of explosive vapors (HDOH, FALL 2011). Groundwater data were compared to gross contamination EALs provided as Table G-2 in the HDOH EAL Surfer (HDOH, FALL 2011).

As shown in Table 5-2, this evaluation resulted in no exceedances of the gross contamination EALs and no flagging was applied for any of the DUs based on analytical results. However, approximately 0.2 foot of oil was initially observed in DU3 in a steel-cased well and could extend within the subsurface from the steel well south toward temporary well TW-001 (located approximately 12 feet downgradient of the steel-cased well) (Figure 3-3). LNAPL presence was not confirmed during subsequent gauging, after LNAPL in the well was collected with a bailer and sent to the laboratory for analysis. As described in Section 5.2.1.1, the lateral and vertical extent of LNAPL was not thoroughly delineated during this investigation. It is therefore concluded that the LNAPL present within the steel-cased well represents gross contamination concerns there and in the immediate vicinity, within DU3.

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6.0 Environmental Hazard Management Plan

The EHE, described in Section 5.0, identified potentially unacceptable risks and hazards in soil including human direct exposure, gross contamination, and leaching to groundwater. Potential risks from residual contamination in groundwater include potential impacts to aquatic habitats and gross contamination. Consequently, as indicated in HDOH TGM (HDOH, 2009), these potential risks will be addressed through an EHMP. This site-specific EHMP describes the proposed strategy for long-term management of contaminated soil, groundwater, and sediment at the Site.

6.1 Summary of Environmental Hazards

Based on the site investigation data and the EHE, it is concluded that potential gross contamination, direct exposure, leaching, and ecotoxicity concerns exist in soil and/or groundwater in the flat area of the Site. The EHE did not include stream sediments because no HDOH hazard-specific EALs are available for this medium; however, metal concentrations are present above the reference values in sediment and contamination must also be managed as described in this EHMP. Because none of the COPCs detected in soil and groundwater are volatile and LNAPL detected in DU3 is deeper than 10 feet and consists of residual range petroleum hydrocarbons, it is concluded that contamination at the Site does not pose vapor intrusion hazards.

The environmental concerns requiring long-term management in different portions of the flat area are summarized as follows (see Table 6-1 and Figures 6-1 and 6-2 for soil and Table 6-2 and Figure 6-3 for groundwater):

- **Area with Future Fill**
  - **DU1N** – Direct human exposure in surface soil (0 to 0.5 foot bgs) under a residential scenario. Aquatic ecotoxicity concerns in groundwater.
  - **DU1S** – Direct human exposure in near-surface soil (0.5 to 3 feet bgs) under a residential scenario. Aquatic ecotoxicity concerns in groundwater.
  - **DU4** – Direct human exposure in surface (0 to 0.5 foot bgs) and near surface (0 to 3 feet bgs) soil under residential, C/I, and construction workers scenarios. No data is available for deeper soil and groundwater.
- **Area with No or Limited Future Excavation**
  - **DU2** – Potential leaching concerns in near-surface soil (0.5 to 3 feet bgs) under residential and C/I scenarios, and direct human exposure in near-surface soil (0.5 to 3 feet bgs) under a residential scenario. Aquatic ecotoxicity concerns in groundwater. Because of lack of TPH contamination in deeper portions of the subsurface soil and in groundwater, potential leaching concerns from surface soil to groundwater are not confirmed (Table 6-1 and Figure 6-1). However, excavated soil that is not reused within the Pearl Highlands Work Area may require offsite disposal because of potential leaching concerns under different conditions.
  - **DU3** – Gross contamination concerns in native soil under residential, C/I, and construction workers scenarios because of presence of LNAPL (Figure 6-1) which has not been fully delineated. Aquatic ecotoxicity and gross contamination concerns in groundwater.
- **Area with Future Excavation**
  - **DU5** - Direct human exposure and/or leaching concerns in soil from the surface to 15 feet bgs under residential and C/I scenarios; direct human exposure concerns in soil between 10 and 15 feet bgs under a construction worker scenario. As detailed in Figure 6-2, soil environmental concerns are inferred to be limited to a portion of the DU. Aquatic ecotoxicity concerns in groundwater.

— **DU6** – Direct human exposure and leaching concerns in soil from surface to 15 feet bgs, and direct human exposure in native soil under a residential scenario; leaching concerns in soil from surface to 15 feet bgs under a C/I scenario. As detailed in Figure 6-2, soil environmental concerns are limited to a portion of the DU. Aquatic ecotoxicity concerns in groundwater.

As discussed in Section 5.2 (EHE), gross contamination EALs for soil were exceeded in some instances, but no evidence of adverse impact was observed except in a limited portion of DU3, where LNAPL is present. Therefore, it was concluded that gross contamination concerns are limited to a small portion of DU3.

Although no EAL exceedances were reported in the Waiawa Stream bank, extensive construction and other debris were identified during the site investigation. Future construction along the stream bank is likely to remove significant amounts of debris, which will be screened and evaluated for reuse, recycling, or disposal. Debris identified in other areas away from the stream bank (e.g., DU1S) appear to have been deposited prior to 1993, which predates Solid Waste Management regulations. Nonetheless, debris removed during construction will also be evaluated for reuse, recycling, or disposal options. HART will work with HDOH SHWB to identify the requirements to manage debris that may remain in place following construction.

6.2 Site Controls Implementation and Long Term Management of Contaminated Media

Environmental hazards and concerns identified above will require land use controls (LUCs) and long-term management of contaminated soil and groundwater during construction and future Site activities. Because different construction activities will occur in different portions of the Site, site controls and soil and groundwater management practices are outlined in the following subsections and summarized in Table 6-3 by area, based on planned activities. All volume estimates provided in the sections below are based on data collected during visual surveys, geophysical investigation, the advancement of soil borings, and test pitting. The data developed during the investigation are not comprehensive for the entire Site because of limited site access, and thus are inherently limited in accuracy. In addition, estimates of fill and debris may not account for variability between borings and test pits and may not accurately reflect actual subsurface conditions. ***Therefore, these estimates are preliminary, and actual volumes may vary significantly.***

Construction activities that pose a potential risk of exposure for construction workers to contaminated soil or dust (such as excavation of soil), or exposure to contaminated groundwater, must be supervised by properly trained and certified personnel. All personnel working in areas where there is potential for direct contact with contaminated media shall have current 40-hour Hazardous Waste Operations and Emergency Response (HAZWOPER) certification and annual 8-hour HAZWOPER refresher training. The contractor's written health and safety plan will also be required to identify HAZWOPER-regulated tasks, associated hazards, monitoring and control measures, and emergency response requirements.

Although it is suspected that some of the detected contaminants may be regional contamination associated to historic activities, because groundwater at the Site exceeds the aquatic ecotoxicity EALs for pesticides and metals and stream bed sediments are also impacted by metals, surface water sampling of Waiawa Stream may be required during and after construction activities to confirm that groundwater from the Site is not impacting the stream or aquatic receptors. Also, groundwater extracted during future construction activities at the Site should not be directly discharged to the stream because of toxicity concerns for aquatic ecological receptors (Figure 6-3).

Soil that is removed from the Site (any DU) and is planned for reuse anywhere other than within the Pearl Highlands Work Area will require additional sampling (e.g., one sample per 200 cubic yards of soil).

Contaminated soil and groundwater handled during future construction activities will be managed in accordance with the Programmatic EHE/EHMP, as necessary and where applicable. Debris removed during construction will be evaluated for reuse, recycling, or disposal options.

6.2.1 Flat Area with Future Fill

This area includes DU1N, DU1S, and DU4, where fill material will be placed during future construction activities to bring current grade to the Station and parking structure final subgrade elevation. Environmental concerns have been identified in these DUs at different depths and will be managed through LUCs (administrative and institutional controls) and long-term management of soil during future activities, as follows (Table 6-3):

- **DU1N** - No environmental concerns exist in this DU under C/I and construction worker scenarios. Surface debris will need to be removed during construction, but soil can be left in place. Administrative LUCs will be applied to limit future land use to C/I and restrict offsite reuse of soil.
- **DU1S** - No environmental concerns appear to exist in this DU under C/I and construction worker scenarios. Soil can be left in place. Administrative LUCs will be applied to limit land use to C/I and restrict offsite reuse of soil. A relatively large volume of construction debris is present in this DU (Table 4-1). Approximately 30,000 cubic feet (1,100 cubic yards) have been estimated, consisting of approximately 17,000 cubic feet (650 cubic yards) of concrete debris and 13,000 cubic feet (450 cubic yards) of metal debris. Although no excavation is currently planned in this DU based on the existing design of the rail guideway/ station/garage/ramp, removal of debris may be required. In such an event, debris should be recycled or properly disposed of offsite.
- **DU4** – Direct human exposure concerns exist in this DU under residential, C/I, and construction worker scenarios. The area should be remediated through soil removal and disposal. Alternatively, future construction activities in this area should include proper use of personal protective equipment by construction workers, and installation of a geotextile marker at the surface of impacted soil with at least 3 feet of soil with concentrations below the C/I EALs placed above the marker to minimize exposure of future human receptors. In the latter case, administrative LUCs will be applied to limit land use to C/I and to require offsite disposal of soil removed during future activities at the Site.

6.2.2 Flat Area with No or Limited Future Excavation

This area includes DU2 and DU3, where future excavation activities will be limited to the locations where columns will be installed for the construction of the Station parking structure. Environmental concerns have been identified in these DUs at different depths and will be managed through LUCs (administrative and institutional controls) and long-term management of soil during future activities, as follows (Table 6-3):

- **DU2 –** Potential environmental hazards exist in this DU because of potential leaching concerns in surface soil and human direct exposure concerns in near-surface soil (0.5 to 3 feet bgs) under residential and C/I land use scenarios. However, soil excavated during future construction of structural columns can be reused within the Pearl Highlands Work Area or properly disposed of at a permitted facility because leaching to groundwater is not confirmed (i.e., soil COPC concentrations from this DU are below relevant EALs for groundwater) and human exposure concerns are limited to residential use only. No actions are necessary if soil remains in place or is reused within the Pearl Highlands Work Area. However, LUCs will be applied to restrict future use of soil in residential and offsite C/I areas.
- **DU3 -** No environmental concerns exist in this DU under C/I and construction workers scenarios, except for the presence of LNAPL in a limited area around Boring 4 (co-located with temporary well TW-001, approximately 10 feet south of the steel-cased well where LNAPL was found). Although not fully delineated, it is assumed that gross contamination concerns are limited to the capillary fringe of the shallow aquifer in the vicinity of the steel-cased well where LNAPL was identified. Based on the limited data collected during this investigation, it is not possible to estimate the volume of petroleum contaminated soil present in DU3. It is recommended that this area is remediated during future construction activities by excavating impacted soil and disposing of it as non-hazardous waste at an offsite facility. Additional delineation should be conducted before or during removal to further evaluate extent of potential LNAPL. If the LNAPL-impacted soil is removed from DU3 during construction activities and disposed of offsite, no LUCs will apply and soil

excavated in the remaining areas of DU3 during future construction activities can be reused within the Pearl Highlands Work Area.

Relatively small volumes of construction debris are present in this DU at two different locations (Table 4-1). Approximately 15,000 cubic feet (550 cubic yards) have been estimated, consisting of approximately 8,000 cubic feet (300 cubic yards) of concrete debris and 7,000 cubic feet (250 cubic yards) of metal debris. Although the existing design indicates excavation in this DU will be limited to that required for the installation of structural columns to sustain the rail guideway and the Station, removal of debris may be required. In such an event, unpainted concrete meeting inert fill requirements may be reused within the Pearl Highlands Work Area as fill, while metal debris and concrete not meeting inert fill requirements should be recycled/disposed of offsite. If LNAPL-impacted soil and construction debris are not removed from the subsurface, LUCs may apply for DU3 to manage contamination/debris in place.

6.2.3 Flat Area with Future Excavation

This area includes DU5 and DU6, where future excavation activities will be conducted to re-establish the 100-year floodplain. Future excavation depth is assumed to be 15 feet bgs. Environmental concerns have been identified in these DUs at different depths and will be managed through LUCs (administrative and institutional controls) and long-term management of soil during future activities, as follows (Table 6-3):

- **DU5 –** Environmental hazards exist in this DU because of direct human exposure and leaching concerns in soil under residential and C/I land use scenarios. Removed soil will need to be handled as follows:
  - **0 to 10 feet bgs** (Figure 6-2a) **–** Soil removed from the area around Borings 1 through 6 and 25 through 30 (approximately 13,800 square feet for an estimated volume of 138,000 cubic feet [approximately 5,100 cubic yards]) can be reused within the Pearl Highlands Work Area or properly disposed of at a permitted facility.[10] Soil from remaining portion of the DU (approximately 10,300 square feet for an estimated volume of 103,000 cubic feet [approximately 3,800 cubic yards]) will need to be disposed of offsite at a permitted facility as non-hazardous waste.
  - **10 to 15 feet bgs** (Figure 6-2b) **–** Soil removed from the area around Borings 1 through 12 and 19 through 30 (approximately 19,300 square feet for an estimated volume of 96,500 cubic feet [approximately 3,600 cubic yards]) can be reused within the Pearl Highlands Work Area or properly disposed of at a permitted facility. Soil from remaining portion of the DU (approximately 4,800 square feet for an estimated volume of 24,000 cubic feet [approximately 900 cubic yards]) will need to be disposed of offsite at a permitted facility as non-hazardous waste.
  - **Native soil –** Native soil can remain in place with no restrictions.

Once soil is removed to re-establish the 100-year floodplain, it is anticipated that only native soil will remain, and that no restrictions for soil will apply for this DU.

- **DU6 –** Environmental hazards exist in this DU because of direct human exposure and leaching concerns for soil under residential and C/I land use scenarios. Excavated soil will need to be handled as follows (Figure 6-2):
  - **0 to 10 feet bgs** (Figure 6-2a) **–** Soil removed from this depth interval (approximately 315,000 cubic feet or 11,600 cubic yards) will need to be disposed of offsite at a permitted facility as non-hazardous waste. Relatively small volumes of construction debris are present in this DU within this depth interval (Table 4-1). Approximately 7,800 cubic feet (300 cubic yards) have been estimated, consisting of approximately 5,200 cubic feet (200 cubic yards) of concrete debris and 2,600 cubic feet (100 cubic yards) of metal

[10] Because of a very marginal lead exceedance of the C/I EAL in sample FASC-DU5A-0514 (804 mg/kg against an EAL of 800 mg/kg), soil from this horizon would be best if reused in areas with future filling by placing it at the bottom, with at least 3 feet of soil with concentrations below the C/I EAL at the top.

debris. Removal of debris may be required. In such an event, unpainted concrete meeting inert fill requirements may be reused within the Pearl Highlands Work Area or properly disposed of at a permitted facility as fill, while metal debris and concrete not meeting inert fill requirements should be recycled or properly disposed of offsite.

- **10-15 feet bgs** (Figure 6-2b) **–** Soil removed from the area around borings 7 through 12 (approximately 12,400 square feet for an estimated volume of 62,000 cubic feet [approximately 2,300 cubic yards]) can be reused within the Pearl Highlands Work Area or properly disposed of at a permitted facility. Soil from remaining portion of the DU (approximately 17,400 square feet for an estimated volume of 87,000 cubic feet [approximately 3,200 cubic yards]) will need to be disposed of offsite at a permitted facility as non-hazardous waste.
- **Native soil –** Native soil can remain in place, but LUCs will apply to limit offsite reuse of soil and to limit future land use to C/I.

6.2.4 Stream Bank

This area includes DU7, where future excavation activities may be necessary in the eastern portion of the DU to re-establish the 100-year floodplain. Although no excavation activities are planned for the western portion of this DU, significant concrete and metal debris is present along the embankment at the north edge of Waiawa Stream. No test pits were conducted in this area; therefore, volume estimates are based on visual observation of what is present at the surface of the stream embankment. As such the estimates are preliminary and actual quantities may vary significantly. Based on the types and volume of debris present at the embankment, and assuming a depth of debris of 3 feet, a volume of construction debris of approximately 21,500 cubic feet (800 cubic yards) is estimated (Table 4-1) and may need to be removed. Of this volume, approximately 14,500 cubic feet (550 cubic yards) may consist of concrete that may be reused within the Pearl Highlands Work Area if it meets the inert fill requirements. The remaining 7,000 cubic feet (250 cubic yards) of metal debris and concrete not meeting inert fill requirements may need to be recycled or properly disposed of offsite.

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7.0 Conclusions and Recommendations

This section summarizes the conclusions and recommendations of the site characterization activities conducted from May to June 2014 at the Site. The overall objective of the project was to characterize the site soil, sediment, and groundwater to evaluate environmental conditions and provide data that may be used for construction and waste disposal planning. In addition, the data was used to develop preliminary volume estimates for debris and contaminated soil that requires disposal. These volume estimates are based on limited data collected and interpretation during the investigation. As such they are considered preliminary and the actual volumes of either contaminated soil or debris encountered during construction could vary significantly.

A summary of activities conducted at the Site and conclusions are given below in Section 7.1, while recommendations are provided in Section 7.2.

7.1 Activities Summary and Conclusions

7.1.1 Flat Area Geophysical and Fill Characterization

Geophysical surveys of the flat area showed areas of anomalies in the following areas where debris was confirmed with test pit excavation:

- **DU1S** – An area of approximately 8,700 square feet containing metal and concrete debris was estimated. Test pit excavation activities and borings conducted in this area suggest that the buried debris extends to approximately 10 feet bgs. Based on relative composition of debris observed in test pits, approximately 17,000 cubic feet (650 cubic yards) of concrete and 13,000 cubic feet (450 cubic yards) of metal debris are estimated to be present in this area.
- **DU3** – An area of approximately 6,600 square feet containing metal and concrete debris was estimated within this DU. Test pit excavation activities and borings conducted in this area suggest that the buried debris extends to approximately 10 feet bgs. Based on relative percent of debris, approximately 8,000 cubic feet (300 cubic yards) of concrete and 7,000 cubic feet (250 cubic yards) of metal debris are estimated to be present in this area.
- **DU6** – An area of approximately 8,700 square feet containing metal and concrete debris was estimated within this DU. Test pit excavation activities and borings conducted in this area suggest that the debris is buried to approximately 3 feet bgs. Based on relative composition of debris observed in test pits, approximately 5,200 cubic feet (200 cubic yards) of concrete and 2,600 cubic feet (100 cubic yards) of metal debris are estimated to be present in this area.

Over 130 soil borings were advanced down to an average depth of approximately 20 feet bgs. Soil boring observations indicate that fill materials were present in all borings, with the thinnest fill present in the northwest portion of the Site and the thickest fill present on the eastern portion of the Site. Fill materials encountered during the investigation ranged from a thickness of 3 feet thick in DU1N, to over 15 feet thick in DU3, DU5, and DU6. Fill material appears to extend offsite in the west, east and northern directions. To the south, fill materials stop at the Waiawa Stream bank where fill and debris is observed at the surface.

7.1.2 Flat Area Soil Characterization

The flat area included the area with future fill activities (DU1N, DU1S, and DU4), the area with limited or no future excavation (DU2 and DU3, and the area with future excavation (DU5 and DU6). Soil characterization of these subareas included surface and subsurface soil sampling to evaluate soil conditions and current and future exposure scenarios. Samples were collected using both IS and discrete sampling approaches. For screening purposes, soil detections were conservatively compared to the HDOH Tier 1 (lowest) EALs for unrestricted sites within 150 meters of surface water bodies, where groundwater is threatened. Detections above the Tier 1 EALs were also compared to the HDOH C/I land use EALs. Analytes that were detected are summarized separately in the following subsections.

7.1.2.1 Area with Future Fill

- **DU1N –** PAHs, TPHs, organochlorine pesticides, PCBs, and RCRA 8 metals were detected in soil. Concentrations were below the Tier 1 EALs except for benzo[a]pyrene in surface soil (0 to 0.5 feet bgs), where it was detected at a concentration of 159 µg/kg, above the Tier 1 EAL of 150 µg/kg but below the C/I EAL of 2,100 µg/kg**.**
- **DU1S** – PAHs, TPHs, organochlorine pesticides, herbicides, PCBs, and the RCRA 8 metals were detected in soil. Concentrations were below the Tier 1 EALs except for benzo[a]pyrene and TPH-o in near-surface soil (0.5 to 3 feet bgs), where they were detected at a concentration of 243 µg/kg and 647 mg/kg, respectively, above their Tier 1 EALs of 150 µg/kg g and 1,000 mg/kg. Concentrations were below the C/I EALs.
- **DU4** – PAHs, TPHs, organochlorine pesticides, herbicides, and RCRA 8 metals were detected in soil. Concentrations were below the Tier 1 EALs except for heptachlor epoxide and lead in surface and near-surface soil (0 to 3 feet bgs). Heptachlor epoxide was detected up to 79.3 µg/kg, above the Tier 1 EAL of 3 µg/kg, but below the C/I EAL of 190 µg/kg. Lead was detected at concentrations up to 873 mg/kg, above the Tier 1 EAL of 200 mg/kg and the C/I EAL of 800 mg/kg.

7.1.2.2 Area with No or Minimal Future Excavation

- **DU2** – PAHs, TPHs, organochlorine pesticides, herbicides, and RCRA 8 metals were detected in soil. Concentrations were below Tier 1 EALs except for benzo[a]pyrene and TPH-o in surface and near-surface soil (0 to 3 feet bgs), where they were detected at concentrations of up to 734 µg/kg and 1,410 mg/kg, respectively, above the Tier 1 (both compounds) and C/I (TPH-o only) EALs.
- **DU3** –PAHs, TPHs, organochlorine pesticides, herbicides, PCBs, and RCRA 8 metals were detected in soil. Concentrations were below the Tier 1 EALs, except for TPH-o in surface soil (0 to 0.5 foot bgs), where a concentration of 634 mg/kg was detected, above the Tier 1 EAL of 500 mg/kg but below the C/I EAL of 1,000 mg/kg.

7.1.2.3 Area with Future Excavation

- **DU5** – PAHs, TPHs, organochlorine pesticides, herbicides, and RCRA 8 metals were detected in soil. Concentrations were below the Tier 1 EALs except for benzo[a]pyrene, TPHs, arsenic, and lead down to 15 feet bgs. Concentrations appear to decrease with depth and the only analyte reported above the Tier 1 EAL in native soil (where sample depth was 15 to 18 feet bgs) is TPH-o, which was detected at a concentration of 619 mg/kg, above the Tier 1 EAL of 500 mg/kg but below the C/I EAL of 1,000 mg/kg.
- **DU6** – PAHs, TPHs, organochlorine pesticides, herbicides, and RCRA 8 metals were detected in soil. Concentrations were below the Tier 1 EALs except for benzo[a]pyrene, TPHs, organochlorine pesticides, and lead down to 15 feet bgs. Concentrations appear to decrease with depth, except for heptachlor epoxide, detected in native soil (where sample depth was 15 to 18 feet bgs) at a concentration of 81.4 µg/kg, above the Tier 1 EAL of 53 µg/kg but below the C/I EAL of 190 µg/kg.

Based on the analytical results, the potential risk associated with exposure to contaminants at the Site was evaluated for various scenarios, including for construction workers, future site users under the C/I land use scenario, and an unrestricted/residential scenario to evaluate potential exposure risk if soil is excavated and reused outside the Pearl Highlands Work Area. In addition, potential risks to aquatic organisms in Waiawa Stream were evaluated.

Waste characterization samples were collected in DU5 and DU6, where excavation activities will be conducted in the future to re-establish the 100-year floodplain. Representative portions of soil from six adjacent borings were grouped together and analyzed for the parameters exceeding the C/I EALs in IS samples and TCLP. The purpose of these samples was to further characterize the nature and extent of contaminated soil and to support the development of waste disposal alternatives. Soil areas/volumes needing disposal were refined to limit disposal costs. The soil was determined to be non-hazardous, non-special waste.

7.1.3 Stream Bank Characterization

The Waiawa Stream bank includes DU7. One surface soil (0 to 1 foot bgs) IS sample (composited from 100 soil increment locations) was collected to evaluate if potential contamination from the flat area had also affected the northern side of the Waiawa Stream. The stream bank characterization started with a visual survey. Debris present along the northern bank of the stream include a street sweeper, an abandoned automobile, and various types of construction debris. The distribution of construction debris was generally consistent. PAHs, TPHs, organochlorine pesticides, PCBs, and RCRA 8 metals were detected in the soil IS samples, though concentrations were below the Tier 1 EALs for all analytes.

7.1.4 Stream Bed Characterization

The Waiawa Stream bed sampling included DU8 (upstream), DU9 (adjacent to the Site), and DU10 (downstream from the Site). Samples were collected to evaluate whether potential contamination from the stream bank and subsurface soil from the deeper portions of the flat area have impacted the stream bed. An upstream (DU8) reach of the stream was sampled to evaluate potential ambient contamination levels upstream, and a downstream (DU10) reach of the stream was sampled to evaluate if the potential contamination in DU9, adjacent to the Site, was also present downstream. Concentrations were compared against the NOAA SQuiRT PEC/TECs sediment screening values; the screening indicates that chromium is present at concentrations above the SQuiRT TEC levels, but below the PEC, at all three sampled DUs. Concentrations in DUs upstream and adjacent to the Site are consistent, while the concentration at the downstream DU is slightly higher. Cadmium and lead also exceed the SQuiRT TECs, but concentrations are below the upper screening levels. Although slightly higher in the downstream and adjacent DUs, the difference in contaminant concentrations does not appear to be significant enough to clearly indicate that the Site is the source of the downstream contamination.

7.1.5 Groundwater Results

To evaluate if groundwater has been affected by subsurface soil contamination at the Site, eleven temporary wells were constructed and sampled together with an existing well during the site investigation. Aldrin, chlordane, dieldrin, heptachlor, heptachlor epoxide, and selenium were detected at concentrations above the Tier 1 EAL in all areas sampled. However, no onsite source was found for these constituents (that is, there were no exceedances of EALs in soil [with the exception of a very marginal exceedance of the residential EAL for heptachlor epoxide in surface soil within DU4]). Therefore, it is believed that groundwater contamination within the Pearl Highlands Work Area is from past regional pesticides and termiticides agricultural/residential applications.

7.1.6 Conceptual Site Model

The Site was a banana farm from 1957 until sometime between 1969 and 1998. Since 1981, nearby properties northwest of the Site have been used as a base yard for heavy construction equipment. From 2004 through 2009, a portion of the Site was used as a storage yard for wrecked automobiles (Environet, 2009).

Many decades of agricultural land use at the Site and surrounding area have likely contributed pesticides and metals to soil, groundwater, and sediment (i.e., relatively high concentrations in groundwater and sediment do not correspond to high concentrations in soil/fill). Fill material is present in the subsurface down to 10 to 15 feet bgs and contains construction debris (concrete and metal debris) and other debris, which likely also have contributed to the environmental condition of the subsurface soil. The fill material appears to end at the south edge of the property along the bank of the Waiawa Stream, and to continue offsite to the north towards the Kamehameha Highway and also to the east and west.

Based on current and reasonably anticipated future land use of the Site and the investigation results, potentially complete human exposure pathways exist for hypothetical residents, future rail workers/users, trespassers, and construction workers. Exposure to COPCs in surface and subsurface soil could occur by incidental ingestion, dermal contact, and inhalation of soil dust particles. Construction workers could also be exposed to groundwater and sediment through incidental ingestion and dermal contact. Potentially complete pathways also exist for aquatic organisms in Waiawa Stream through incidental ingestion and dermal contact.

7.1.7 Environmental Hazard Evaluation

All analytes exceeding the Tier 1 EALs were carried over to a Tier 2 EHE to evaluate environmental hazards/concerns present at the Site. Based on the site investigation data, it is concluded that potential gross contamination, direct exposure, leaching, and ecotoxicity concerns exist in soil and/or groundwater in the flat area of the Site. Because none of the COPCs detected in soil and groundwater are volatile, and because LNAPL detected in DU3 is deeper than 10 feet and consists of residual range petroleum hydrocarbons, it is concluded that contamination at the Site does not pose vapor intrusion hazards. The environmental concerns requiring long-term management in different portions of the flat area are summarized as follows:

- **Area with Future Fill (DU1N, DU1S, and DU4) -** Direct human exposure in surface (0 to 0.5 foot bgs) and near surface (0.5 to 3 feet bgs) soil under residential, C/I (DU4 only), and construction workers (DU4 only) scenarios. Aquatic ecotoxicity concerns exist for groundwater.
- **Area with No or Limited Future Excavation (DU2 and DU3) -** Potential leaching concerns in surface soil (0 to 0.5 foot bgs) under residential and C/I scenarios, and direct human exposure in near-surface soil (0.5 to 3 feet bgs) under a residential scenario exist in DU2. Gross contamination concerns in native soil are present in DU3 under residential, C/I, and construction workers scenarios because of presence of LNAPL. Aquatic ecotoxicity concerns exist for groundwater.
- **Area with Future Excavation (DU5 and DU6) -** Direct human exposure and leaching concerns in soil from the surface to 15 feet bgs under residential and C/I scenarios; direct human exposure in native soil under a residential scenario (DU6 only); direct human exposure concerns in soil between 10 and 15 feet bgs under a construction worker scenario (DU5 only). Soil environmental concerns are inferred to be limited to a portion of the DU. Aquatic ecotoxicty concerns exist for groundwater.

Although no EAL exceedances were reported in the Waiawa Stream bank, extensive construction and other debris were identified during the site investigation.

7.1.8 Environmental Hazard Management Plan

Environmental hazards and concerns identified above will require LUCs and long-term management of contaminated soil and groundwater during construction and future Site activities. LUCs will apply in all DUs/SUs/subareas where COPCs are present at concentrations above Tier 1 EALs and where LNAPL is present, including the following:

- **Area with Future Fill**
  - **DU1N** – LUCs for surface soil (0 to 0.5 feet bgs) to limit land use to C/I and restrict future use of soil outside the Pearl Highlands Work Area.
  - **DU1S** - LUCs to restrict future use of near-surface soil (0.5 to 3 feet bgs) outside the Pearl Highlands Work Area.
  - **DU4** - LUCs to restrict future use of surface and near-surface soil (0 to 3 feet bgs) outside the Pearl Highlands Work Area. LUCs to control use of soil onsite and exposure to construction workers (may require upgrade in level of protection).
- **Area with Limited or No Future Excavation**
  - **DU2** – LUCs to restrict future use of soil outside the Pearl Highlands Work Area.
  - **DU3** - LUCs to control use, handling, and disposal of LNAPL-impacted soil, and exposure of construction workers to LNAPL.

- **Area with Future Excavation**
  - **DU5** – LUCs to limit site use and restrict offsite reuse of the soil if no remediation (soil removal) is conducted. Excavation of soil between 10 and 15 feet bgs will require excavation by construction workers who are HAZWOPER-certified (upgrade in level of protection may also be necessary).
  - **DU6** - LUCs to limit site use and restrict offsite reuse of the soil if no remediation (soil removal) is conducted.

Short- and long-term management activities should include soil reuse within the Pearl Highlands Work Area whenever possible, disposal of excavated soil with concentrations above the C/I EALs, where excavation of construction debris is necessary, reuse of concrete meeting the inert fill requirements, and recycling or proper disposal of concrete not meeting inert fill requirements and metal debris. Soil excavated during future construction activities from less-impacted portions of DU5 and DU6 should be reused within the Pearl Highlands Work Area to minimize offsite disposal of soil.

7.2 Recommendations

Information presented in this report are based on data collected during visual surveys, geophysical investigation, the advancement of soil borings, and test pitting. The data developed during the investigation are not comprehensive for the entire Site because of limited site access, and the potential for variability in subsurface soil and groundwater conditions, and thus are inherently limited in accuracy. In addition, fill and debris observed within borings and test pits were highly variable, and therefore, estimates of fill and debris volumes may not account for variability in areas between borings and test pits. Therefore actual site conditions may vary significantly from those described in this report.

Based on the investigation results and the EHE/EHMP findings, the activities outlined in the following subsections are recommended for the Site during future construction activities and post-construction activities.

7.2.1 Flat Area with Future Fill

This area includes DU1N, DU1S, and DU4, where fill material will be placed during future construction activities to bring current grade to the Station and parking structure final subgrade elevation. Environmental concerns have been identified in these DUs at different depths and should be managed through LUCs (administrative and institutional controls) and long-term management of soil during future activities, as follows:

- **DU1N** – Although no environmental concerns exist in this DU under C/I and construction worker scenarios, it is recommended that debris be removed before filling/construction activities unless determined to meet inert fill and construction requirements. Surface and subsurface soil can be left in place. Administrative LUCs should be applied to limit future land use to C/I and restrict offsite reuse of surface soil.

- **DU1S** - Although no environmental concerns exist in this DU under C/I and construction worker scenarios and no excavation is currently planned in this DU based on the existing design of the rail guideway and station, the presence of construction debris in the subsurface soil may require removal actions. Approximately 650 cubic yards of concrete and 450 cubic yards of metal debris have been estimated to be present to depths of approximately 10 feet bgs over an area of approximately 8,700 square feet. If construction debris is removed, unpainted concrete meeting inert fill requirements should be reused within the Pearl Highlands Work Area as fill, while metal debris and concrete not meeting inert fill requirements should be recycled or properly disposed of offsite. The acceptance criteria for recycling facilities should be evaluated to determine if additional sampling and characterization are required. Administrative LUCs should be applied in this DU to limit land use to C/I and restrict offsite reuse of soil.

- **DU4** – During future filling and construction activities, it is recommended that this area be remediated through placement of a geotextile marker at the surface with at least 3 feet of soil with concentrations below the C/I EALs placed above the marker to minimize exposure of future human receptors. Additional delineation may also be necessary. Administrative LUCs should be applied until Tier 1 EALs are met to limit land use to C/I and to require offsite disposal of soil removed during future activities at the Site.

7.2.2 Flat Area with No or Limited Future Excavation

This area includes DU2 and DU3, where future excavation activities will be limited to the locations where columns are planned for the construction of the Station parking structure. Environmental concerns have been identified in these DUs at different depths and should be managed through LUCs and long-term management of soil during future activities, as follows:

- **DU2 –** Soil excavated during future construction of structural columns can be reused within the Pearl Highlands Work Area because leaching to groundwater is not confirmed to be a concern (i.e., soil COPC concentrations from this DU are below relevant EALs for groundwater) and human exposure concerns are limited to residential use only.
  No actions are necessary if soil remains in place or is reused within the Pearl Highlands Work Area. However, LUCs should be applied to avoid future use of soil in residential and offsite C/I areas until Tier 1 EALs are met.
- **DU3 -** No environmental concerns exist in this DU under C/I and construction workers scenarios, except for the presence of LNAPL in a limited area around the steel-cased well where LNAPL was encountered. Based on the limited data collected during the investigation, it is not possible to estimate the volume of petroleum contaminated soil present in DU3. It is recommended that this area be remediated during future construction activities by excavating impacted soil and disposing of it as non-hazardous waste at an offsite facility. Additional delineation and remedial activities can be conducted during future construction activities to remove LNAPL and grossly contaminated soil potentially remaining in the area to the extent practicable.

Approximately 300 cubic yards of concrete and 250 cubic yards of metal debris are estimated to be present in DU3 down to approximately 10 feet bgs over an area of approximately 6,600 square feet. Although the existing design indicates excavation in DU3 will be limited, removal of debris may be required. In such an event, unpainted concrete meeting inert fill requirements should be reused within the Pearl Highlands Work Area as fill, while metal debris and concrete not meeting inert fill requirements should be recycled/disposed of offsite. If LNAPL-impacted soil and construction debris are removed from DU3, no LUCs will apply and soil excavated in the remaining areas of DU3 during future construction activities can be reused within the Pearl Highlands Work Area.

7.2.3 Flat Area with Future Excavation

This area includes DU5 and DU6, where future excavation activities will be conducted to re-establish the 100-year floodplain. Future excavation depth is assumed to be 15 feet bgs. Environmental concerns have been identified in these DUs at different depths and should be managed through LUCs (administrative and institutional controls) and long-term management of soil during future activities:

- **DU5 –** Soil that will be removed from this DU should be handled as follows:
  - **0 to 10 feet bgs –** Soil removed from the area around Borings 1 through 6 and 25 through 30 (approximately 13,800 square feet for an estimated volume of approximately 5,100 cubic yards) can be reused within the Pearl Highlands Work Area. Because of a very marginal lead exceedance of the C/I EAL in sample FASC-DU5A-0514 (804 mg/kg against an EAL of 800 mg/kg), soil from this horizon would be best if reused in areas with future filling by placing it at the bottom with at least 3 feet of soil with concentrations below the C/I EAL at the top. Soil from remaining portion of the DU (approximately 10,300 square feet for an estimated volume of approximately 3,800 cubic yards) should be properly disposed of offsite at a permitted facility as non-hazardous waste.
  - **10 to 15 feet bgs –** Soil removed from the area around Borings 1 through 12 and 19 through 30 (approximately 19,300 square feet for an estimated volume of approximately 3,600 cubic yards) can be reused within the Pearl Highlands Work Area. Soil from remaining portion of the DU (approximately

4,800 square feet for an estimated volume of approximately 900 cubic yards) should be properly disposed of offsite at a permitted facility as non-hazardous waste.

Once soil is removed to re-establish the 100-year floodplain, it is anticipated that only native soil will remain, and that no restrictions for soil will apply for this DU.

- **DU6 –** Soil that will be removed from this DU should be handled as follows:
  - **0 to 10 feet bgs –** Soil removed from this depth interval (approximately 11,600 cubic yards) should be properly disposed of offsite at a permitted facility as non-hazardous waste. Approximately 200 cubic yards of concrete and 100 cubic yards of metal debris have been estimated to be present in this depth interval and removal may be required. In such an event, unpainted concrete meeting inert fill requirements should be reused within the Pearl Highlands Work Area as fill, while metal debris and concrete not meeting inert fill requirements should be recycled or properly disposed of offsite.
  - **10 to 15 feet bgs –** Soil removed from the area around Borings 7 through 12 (approximately 12,400 square feet for an estimated volume of approximately 2,300 cubic yards) can be reused within the Pearl Highlands Work Area. Soil from remaining portion of the DU (approximately 17,400 square feet for an estimated volume of approximately 3,200 cubic yards) should be properly disposed of offsite at a permitted facility as non-hazardous waste.

7.2.4 Stream Bank

This area includes DU7, where future excavation activities will be limited to eastern portion of the DU to re-establish the 100-year floodplain. Although no excavation activities are planned for the western portion of this DU, concrete and metal debris is present along the embankment at the north edge of Waiawa Stream. Based on the types and volume of debris present at the embankment, and assuming an average debris thickness of 3 feet, a volume of construction debris of approximately 800 cubic yards is estimated and may need to be removed. Of this volume, approximately 550 cubic yards may consist of concrete that should be reused within the Pearl Highlands Work Area if it meets the inert fill requirements, while metal debris and concrete not meeting inert fill requirements should be recycled or properly disposed of offsite.

7.2.5 Stream Bed

Although it is suspected that some of the detected contaminants may be regional contamination associated to historic activities, because of potential aquatic ecotoxicity concerns in the groundwater of the shallow aquifer at the Site, and because COPC concentrations in the stream bed sediments are above the SQuiRT TEC levels, it is recommended that Waiawa Stream surface water monitoring be conducted during construction activities to identify potential impacts during construction.

7.2.6 Further General Recommendations

If the above recommendations are implemented it is expected that no restrictions will apply in the future for DU3, DU5, and DU7. However, confirmation sampling may be required prior to removal of land use restrictions. LUCs will apply to other DUs to limit handling and use of contaminated soil, but no unacceptable exposure to current and future receptors is expected if future land use remains C/I.

Construction activities that pose a potential risk of exposure for construction workers to contaminated soil or dust (such as excavation of soil), or exposure to contaminated groundwater, must be supervised by properly trained and certified personnel. All personnel working in areas where there is potential for direct contact with contaminated media should have current 40-hour HAZWOPER certification and annual 8-hour HAZWOPER refresher training. The contractor’s written health and safety plan should also be required to identify HAZWOPER-regulated tasks, associated hazards, monitoring and control measures, and emergency response requirements.

Because of aquatic ecotoxicity concerns, no groundwater should be directly discharged to Waiawa Stream during future construction activities. However, groundwater contamination above the C/I EALs is limited to organochlorine pesticides and, marginally, selenium and silver. No onsite source was found for these constituents (that is, there were no exceedances of EALs in soil [with the exception of a very marginal exceedance of the residential EAL for heptachlor epoxide in surface soil within DU4]). Therefore, it is believed that groundwater contamination is from past regional pesticides and termiticides agricultural/residential applications, and future groundwater monitoring at the Pearl Highlands Work Area is not necessary. Because no future groundwater monitoring is necessary within the Pearl Highlands Work Area, all temporary wells should be abandoned in accordance with Option 3 of Section 6.2.5.2 of the HDOH TGM. The 5-inch-diameter, thin-walled, steel-cased well located about 12 feet upgradient of TW-001 should also be properly abandoned to prevent potential future unauthorized disposal.

Soil that is removed from the Site (any DU) and is planned for reuse outside the Pearl Highlands Work Area will require additional sampling for pre-characterization of soil intended for offsite reuse (e.g., one sample per 200 cubic yards of soil). Soil exceeding residential EALs should be either reused within the Pearl Highlands Work Area or properly disposed of at a permitted facility (if also exceeding C/I EALs). No soil exceeding residential EALs will be reused outside of the Pearl Highlands Work Area.

7.3 Data Gaps

The following main data gaps are identified for the Site:

- LNAPL impact in DU3 is assumed to be limited to an area in the vicinity of the steel pipe where LNAPL was encountered, but it has not been fully delineated. The lateral and vertical extent of LNAPL are unknown, and should be further evaluated.
- An area of approximately 3,000 square feet in the southern portions of DU2/DU5 could not be sampled because of the presence of soil stockpiles.
- Because of an existing depression over approximately 0.2 acre within DU6 from previous housing demolition work, investigation in this area was limited to test pits. Although soil increments were also collected within the test pits to supplement the soil boring IS samples, the distribution of increments from test pits was limited to a portion of the depressed area. This is especially the case for the shallow (0 to 5 feet bgs) SU/sampling interval, where soil was partially removed during previous demolition work.
- The vertical extent of contamination in DU4 and DU6 has not fully delineated. Although concentrations at the deepest investigated depths (3 feet and 18 feet bgs, respectively) are relatively low and this data gap has no implication on current/future exposure (concentrations are below C/I EALs) or construction activities in DU6, full delineation to Tier 1 EALs in these DUs was not achieved.
- As anticipated in the work plan, no detailed characterization of the waste and debris encountered was conducted during this investigation, and it is unknown how much of the concrete debris found in DU1S, DU3, and DU6 meets the inert fill requirements and can be reused within the Pearl Highlands Work Area as structural fill. Further assessment of the debris should be conducted in conjunction with construction.

8.0 References

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Figures

Legend

Banana Patch Property, 5.6 acres

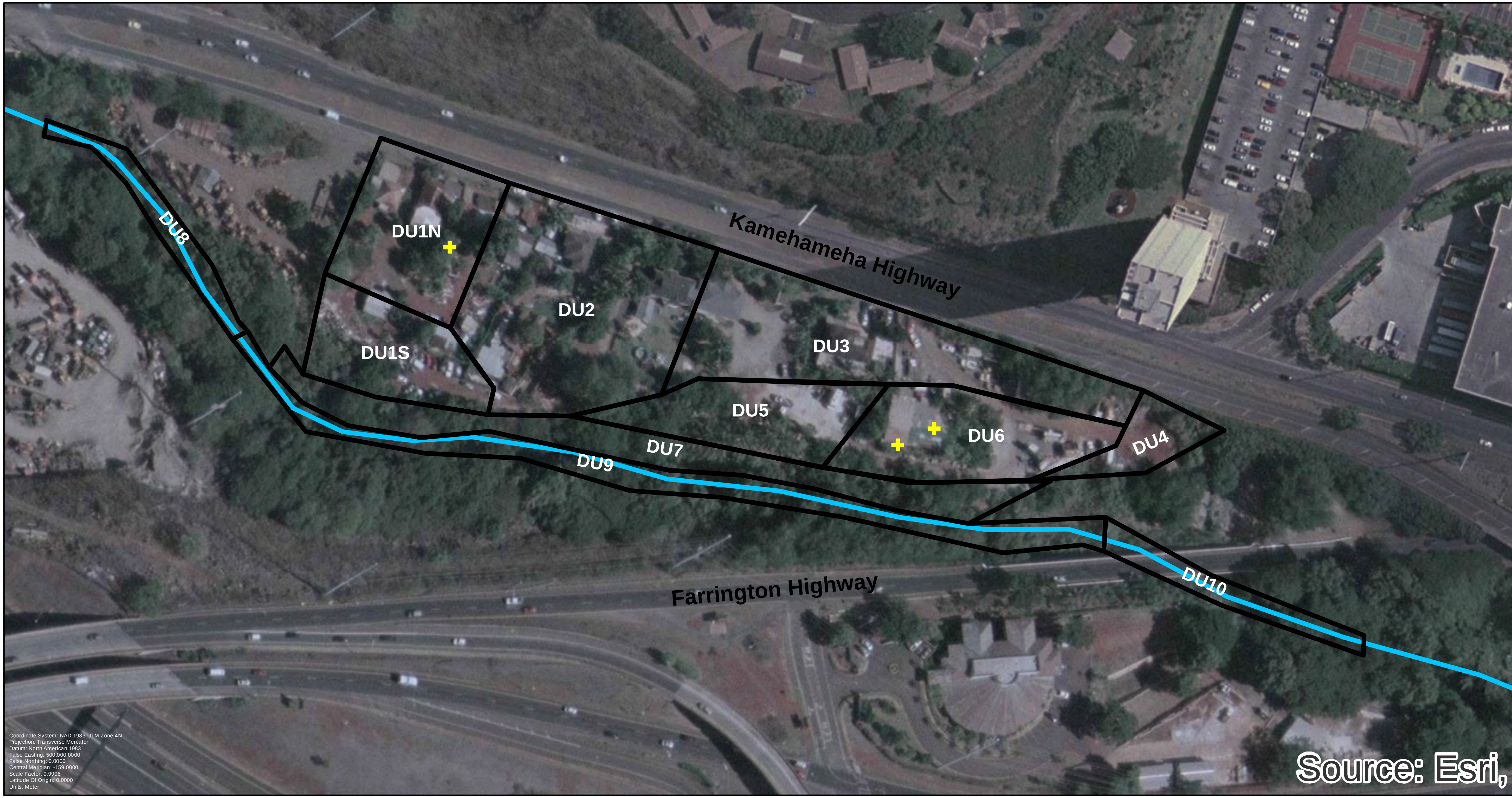
Note: Boundary was surveyed usingTrimble global positioning system instrument. Locations are approximate.

N

0 500 1,000 2,000 Feet

Figure 1-1
Site Location

Site Characterization Report
of Banana Patch Properties
Pearl City, Oahu, Hawaii
Honolulu Rail Transit Project



Legend

- Decision Unit (DU)
- Cesspool
- Waiawa Stream

Note: Decision Unit and Cesspool locations were surveyed usingTrimble global positioning system instrument. Locations are approximate.

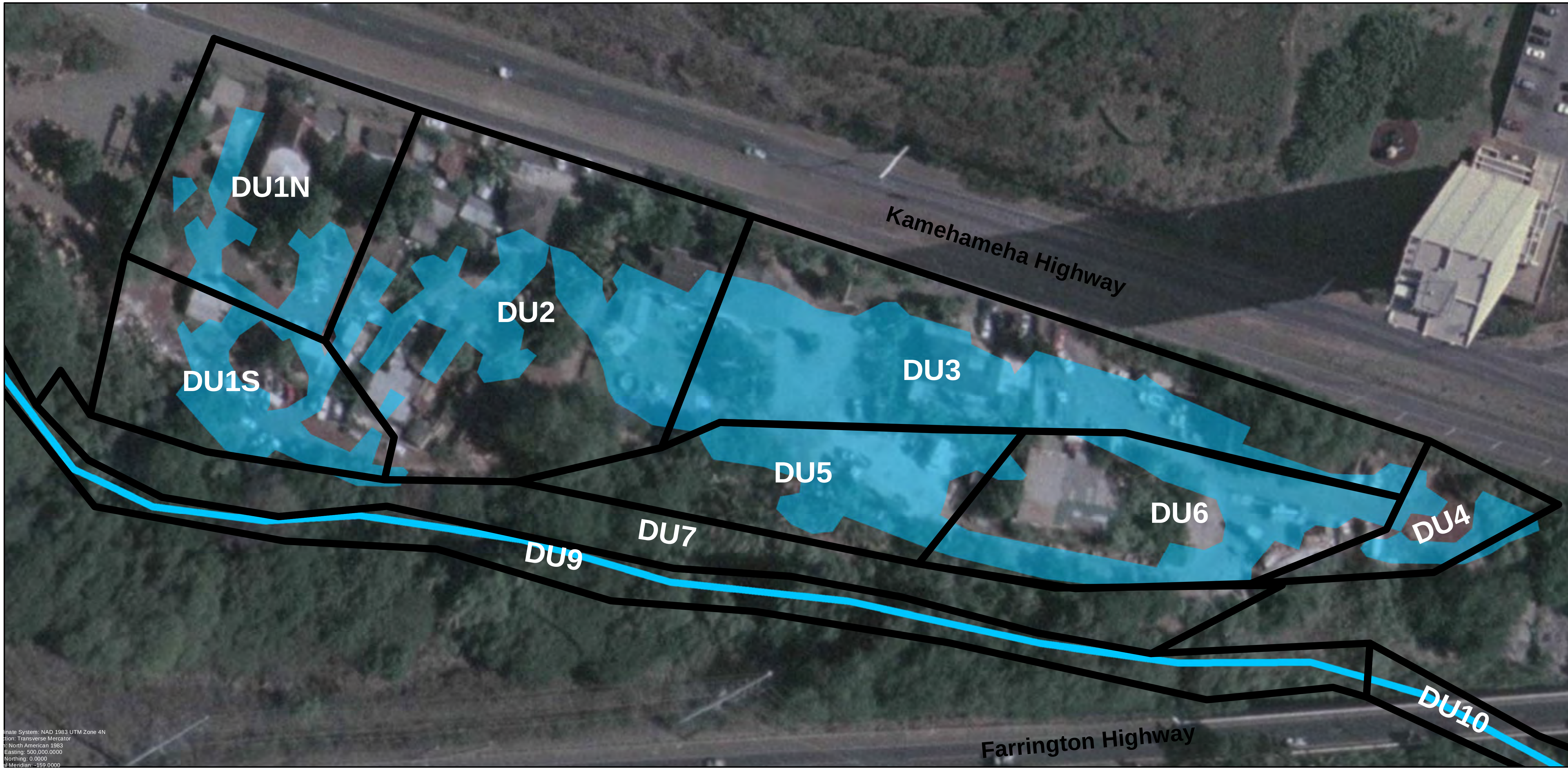
Acronym List:
DU: Decision Unit

N

0 80 160 320 Feet

Figure 2-1
Site Layout

Site Characterization Report of Banana Patch Properties Pearl City, Oahu, Hawaii Honolulu Rail Transit Project



Legend

- Decision Unit (DU)
- Area Covered by Geophysical Investigation
- Waiawa Stream

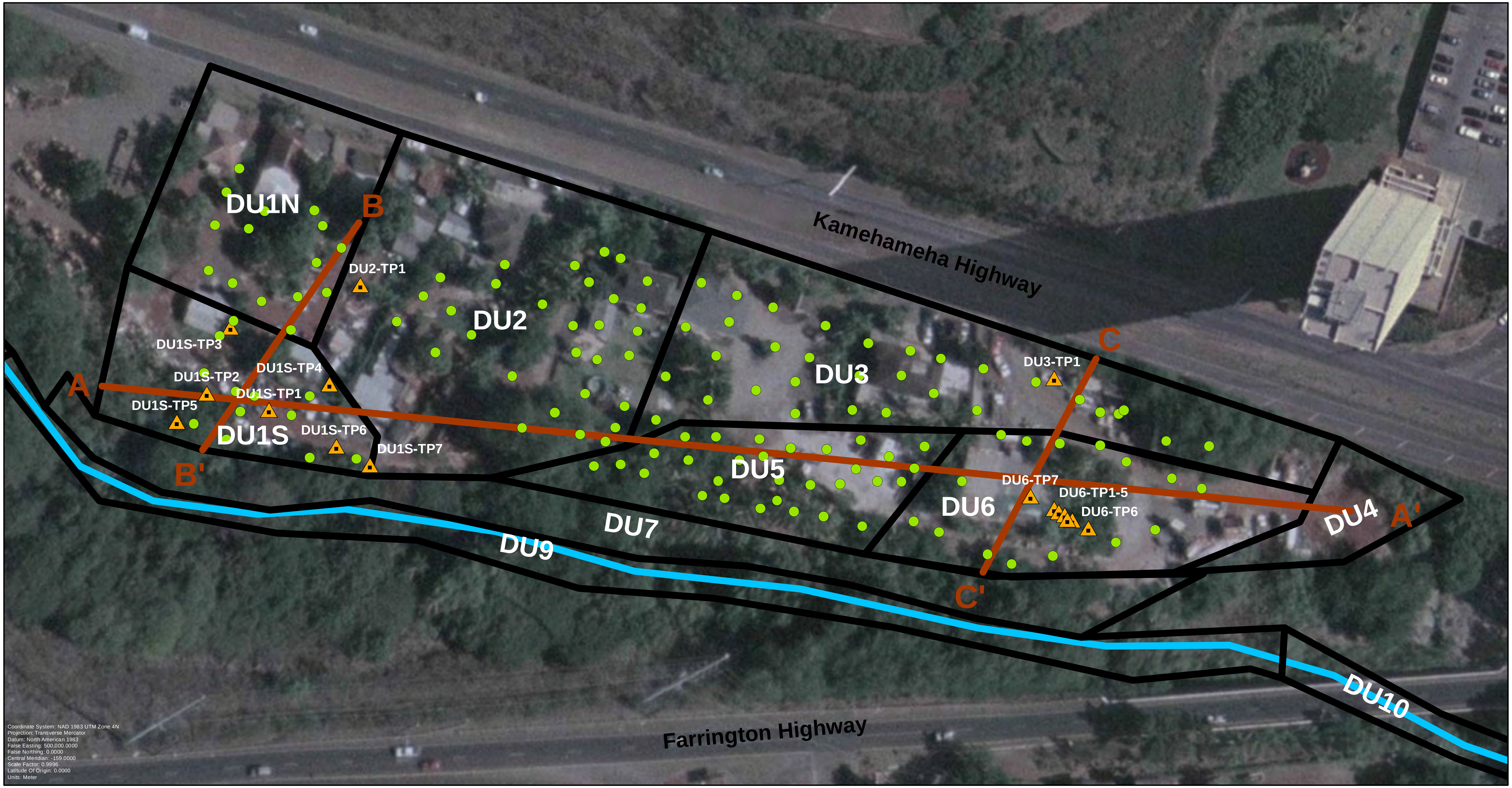
Note:
The geophysical survey area was limited to approximately 50% of the flat area of the site due to presence of residential structures, chicken coops, surface debris, soil stockpiles, and vegetation in DU1 and DU2; surface debris, heavy equipment, and materials stored in DU3; steep slope on the east side of DU4; connex boxes, vegetation, and surface debris in DU5; and surface debris and a depression in DU6.

Acronym List:
DU: Decision Unit

0 50 100 200 Feet

Figure 3-1
Geophysical Survey Area

Site Characterization Report
for Banana Patch Properties
Pearl City, Oahu, Hawaii
Honolulu Rail Transit Project



Legend

- Decision Unit (DU)
- Soil Boring
- Cross Section Line
- Test Pit

Note: Note: Decision Unit, Boring, and Test Pit locations were surveyed usingTrimble global positioning system instrument. Locations are approximate.

Acronym List:
DU: Decision Unit
TP: Test Pit

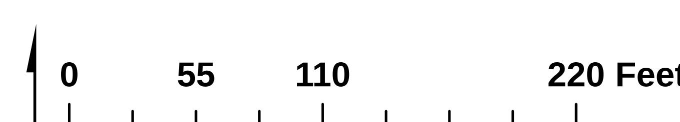
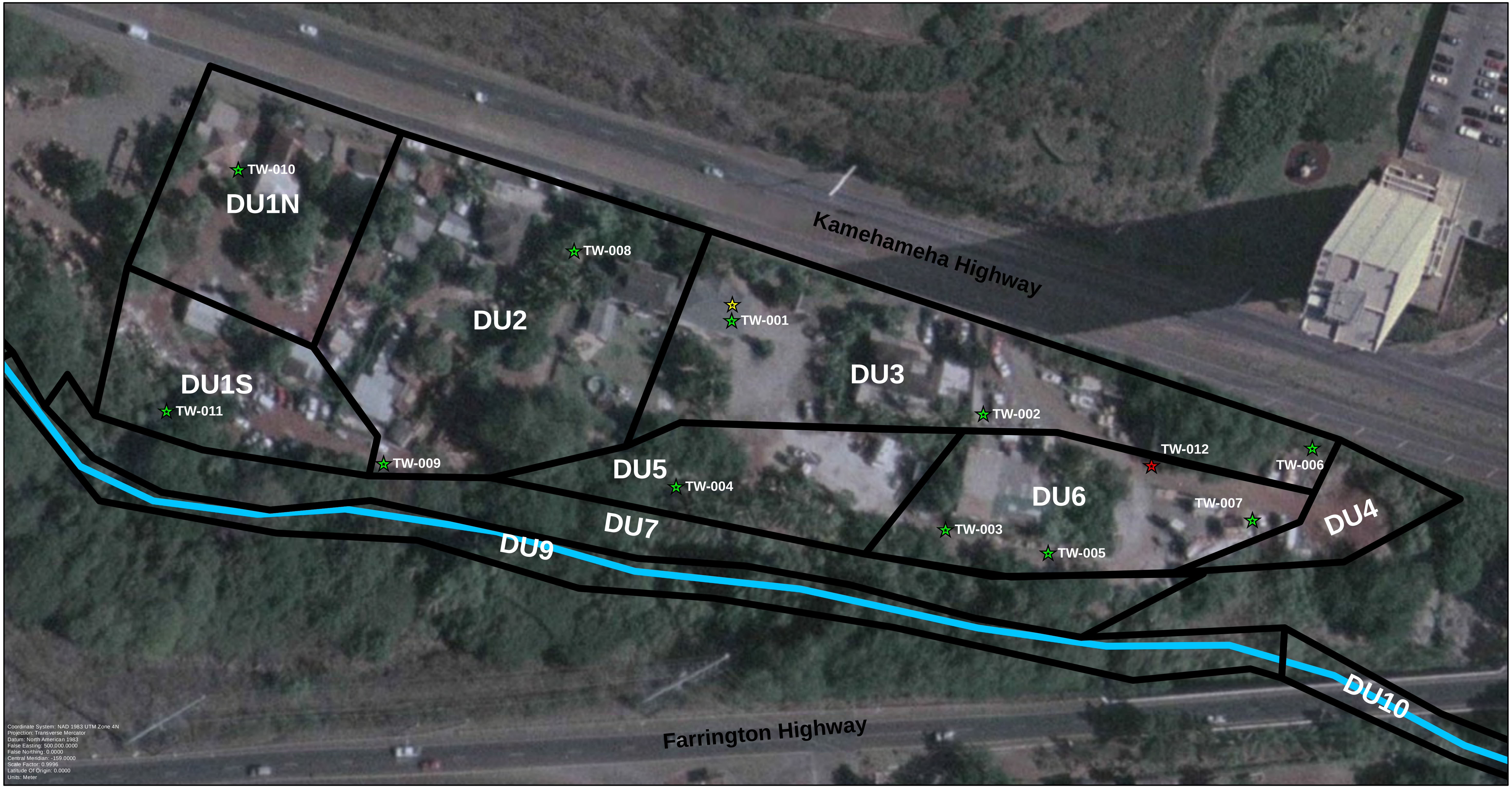


Figure 3-**2**
Soil Boring and Test Pit Locations

Site Characterization Report of Banana Patch Properties
Pearl City, Oahu, Hawaii
Honolulu Rail Transit Project



Legend

- Decision Unit (DU)
- Existing Monitoring Well
- Temporary Monitoring Well
- 5-inch Thin Wall Steel Cased Well

Note: Note: Temporary Monitoring Well locations were surveyed usingTrimble global positioning system instrument. Locations are approximate.
TW-012 corresponds to an existing Monitoring Well.

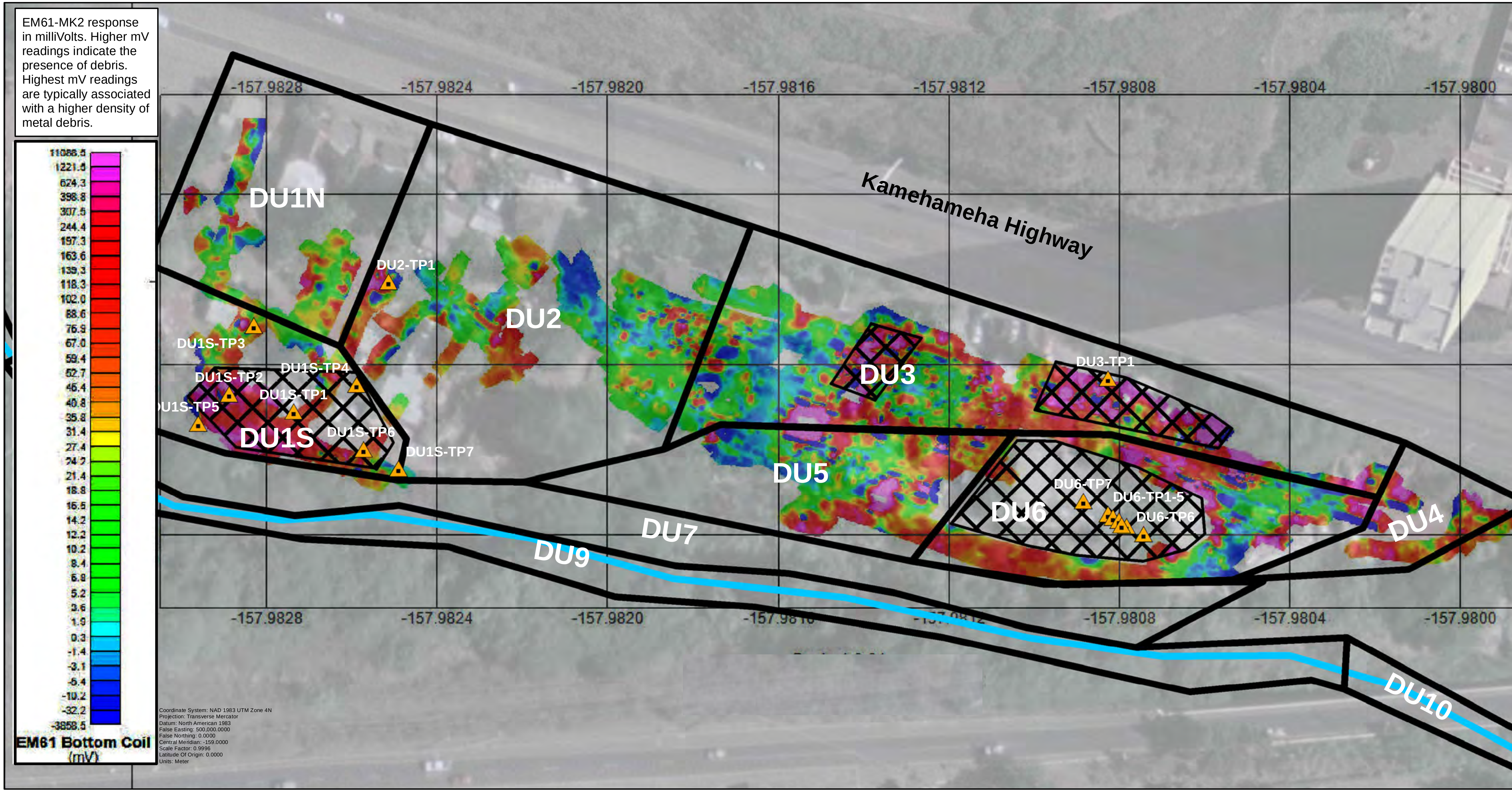
Acronym List:
DU: Decision Unit
TW: Temporary Well

N

0 50 100 200 Feet

Figure 3-3
Temporary Monitoring Well Locations

Site Characterization Report of Banana Patch Properties
Pearl City, Oahu, Hawaii
Honolulu Rail Transit Project



Legend

- Decision Unit (DU)
- Test Pit
- Estimated Extent of Metal Debris

Note:
1) Test pits were surveyed using a Trimble GPS instrument. Locations are approximate.
2) As discussed in Section 4.1 of the report there were numerous areas containing surface metal objects for construction activities during the geophysical investigation. These areas show high EM61 response, but do not indicate subsurface debris are present.
3) Additional geophysical figures are provided in Appendix B.

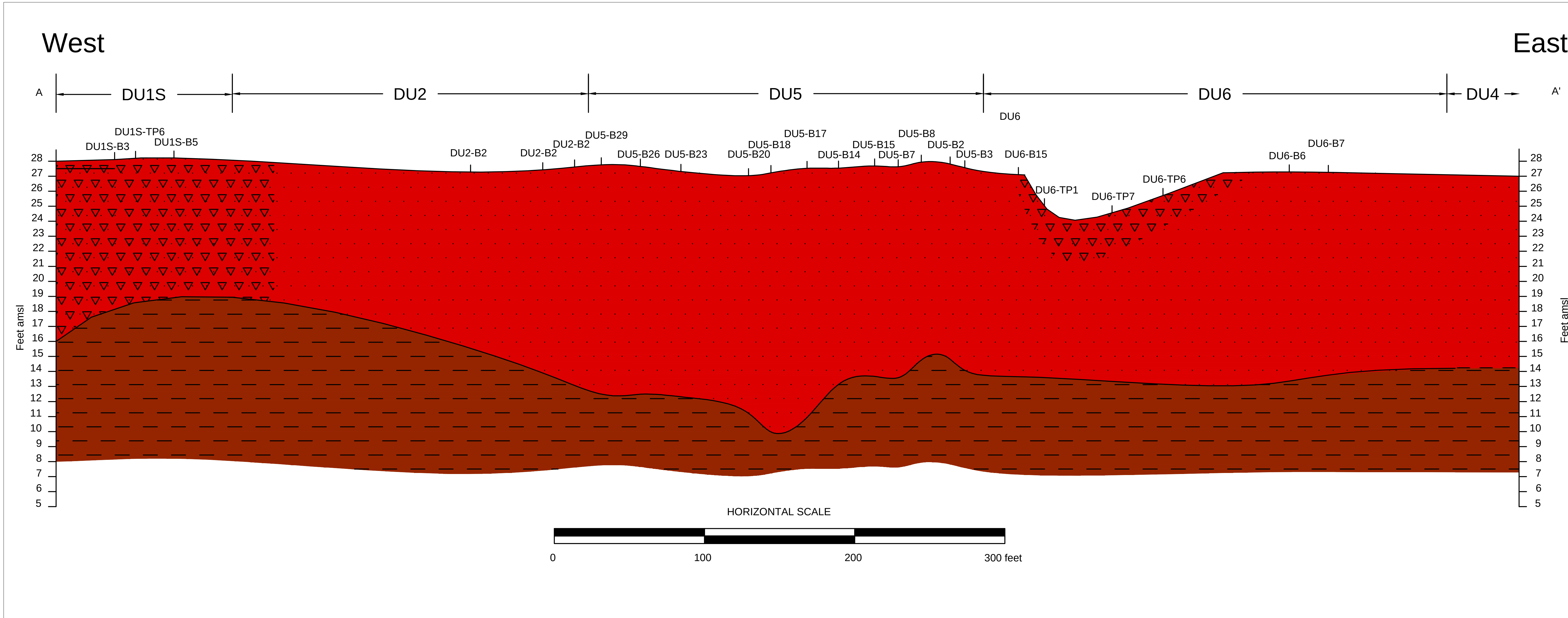
Acronym List:
DU: Decision Unit
mV: millivolt
TP: Test Pit

0 50 100 200 Feet

N

Figure 4-1
Geophysical Anomalies and Test Pit Locations

Site Characterization Report for Banana Patch Properties
Pearl City, Oahu, Hawaii
Honolulu Rail Transit Project



LEGEND

Fill - Red to brown silt and clay with fragments of coral and basalt. Presence of debris (fragments of concrete, asphalt and glass). Dry to moist. Consistency ranges from medium stiff to stiff in fine sediments and loose to dense in coarser sediments. Clays have medium plasticity. Stiff to medium plasticity.

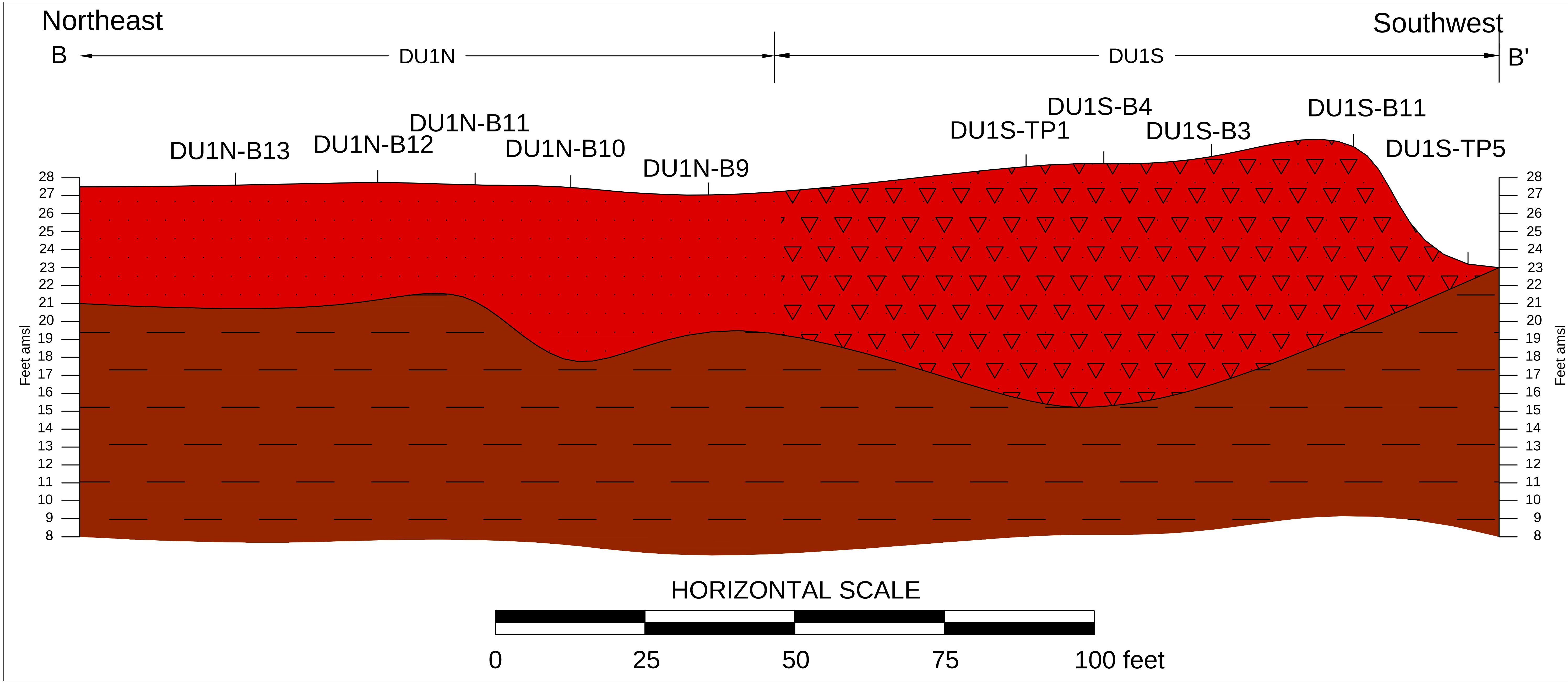
Fill Mixed with Metal Debris- Red to brown silt and clay with fragments of coral and basalt. Presence of concrete and metal debris (based on geophysical investigation results [see Figure 4] and visual evidence). Dry to moist. Consistency ranges from medium stiff to stiff in fine sediments and loose to dense in coarser sediments. Clays have medium plasticity.Stiff to medium plasticity.

Native Soil - Red to dark brown silty clay, with trace fine sand and organic matter in some borings. Moist in borings without fine sand or organic matter, and moist to wet in some borings with fine sand and/or organic matter present. Low to medium plasticity clays.

Notes:
- This cross section is intended to show the approximate location of fill/debris and native soil. No detailed lithological logging was conducted (see test pit and boring logs in Appendices C and D, respectively). No lithology shown beyond maximum investigation depth of approximately 20 feet.
- Locations are based on GPS coordinates. Handheld GPS instrument theoretical precision is submeter, but precision may have been affected by thick vegetation. Please refer to Figure 3-1 for cross section location.
- Vertical exageration 10x.

amsl = above mean sea level
bgs = below ground surface
DU = decision unit

Figure 4-2a
Cross Section A-A' (West-East)
Site Characterization Report for
Banana Patch Properties
Pearl City, Oahu, Hawaii
Honolulu Rail Transit Project



LEGEND

Fill - Red to brown silt and clay with fragments of coral and basalt. Presence of debris (fragments of concrete, asphalt and glass). Dry to moist. Consistency ranges from medium stiff to stiff in fine sediments and loose to dense in coarser sediments. Clays have medium plasticity. Stiff to medium plasticity.

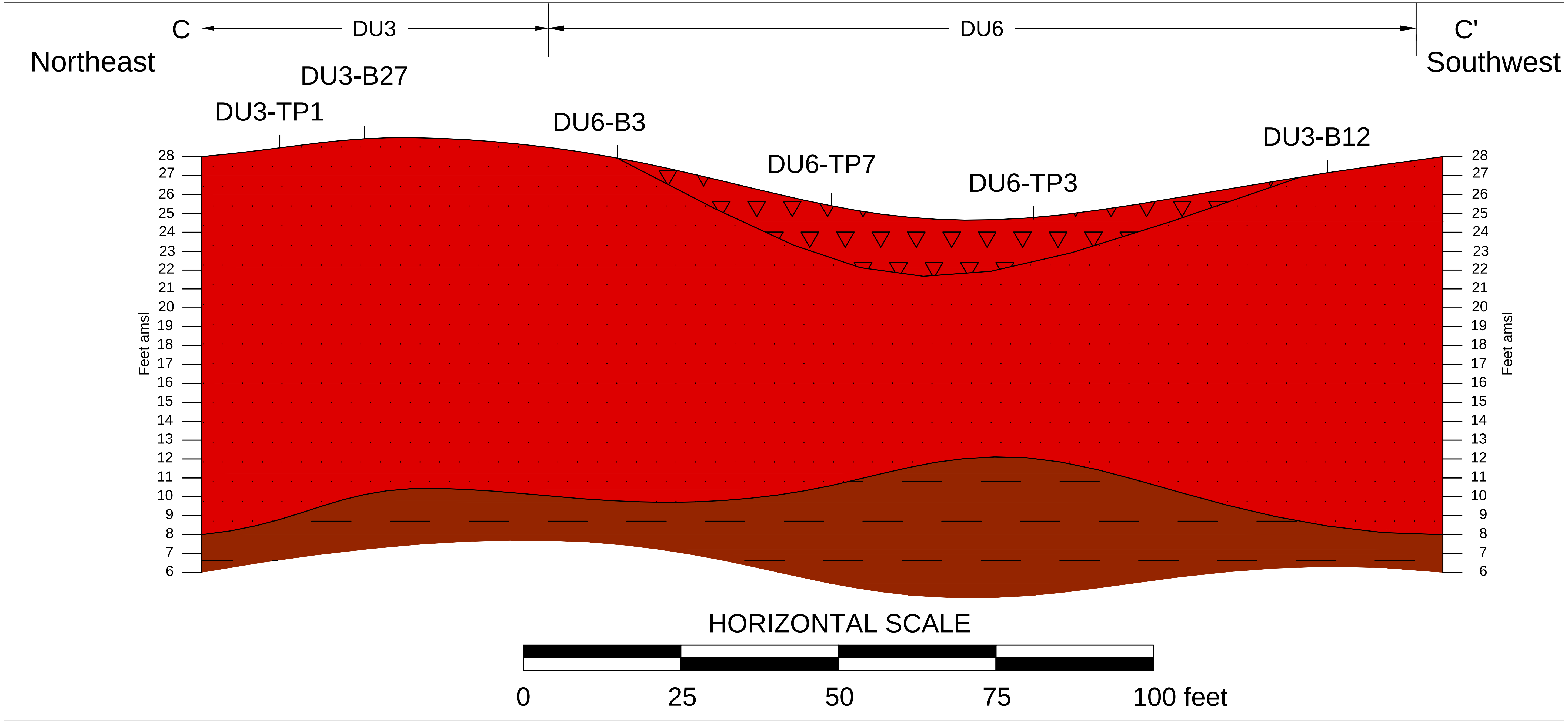
Fill Mixed with Metal Debris- Red to brown silt and clay with fragments of coral and basalt. Presence of concrete and metal debris (based on geophysical investigation results [see Figure 4] and visual evidence). Dry to moist. Consistency ranges from medium stiff to stiff in fine sediments and loose to dense in coarser sediments. Clays have medium plasticity.Stiff to medium plasticity.

Native Soil - Red to dark brown silty clay, with trace fine sand and organic matter in some borings. Moist in borings without fine sand or organic matter, and moist to wet in some borings with fine sand and/or organic matter present. Low to medium plasticity clays.

Notes:
- This cross section is intended to show the approximate location of fill/debris and native soil. No detailed lithological logging was conducted (see test pit and boring logs in Appendices C and D, respectively). No lithology shown beyond maximum investigation depth of approximately 20 feet.
- Locations are based on GPS coordinates. Handheld GPS instrument theoretical precision is submeter, but precision may have been affected by thick vegetation. Please refer to Figure 3-1 for cross section location.
- Vertical exageration 3x.

amsl = above mean sea level
bgs = below ground surface
DU = decision unit

Figure 4-2b
Cross Section B-B'
(Northeast-Southwest)
Site Characterization Report for
Banana Patch Properties
Pearl City, Oahu, Hawaii
Honolulu Rail Transit Project



LEGEND

Fill - Red to brown silt and clay with fragments of coral and basalt. Presence of debris (fragments of concrete, asphalt and glass). Dry to moist. Consistency ranges from medium stiff to stiff in fine sediments and loose to dense in coarser sediments. Clays have medium plasticity. Stiff to medium plasticity.

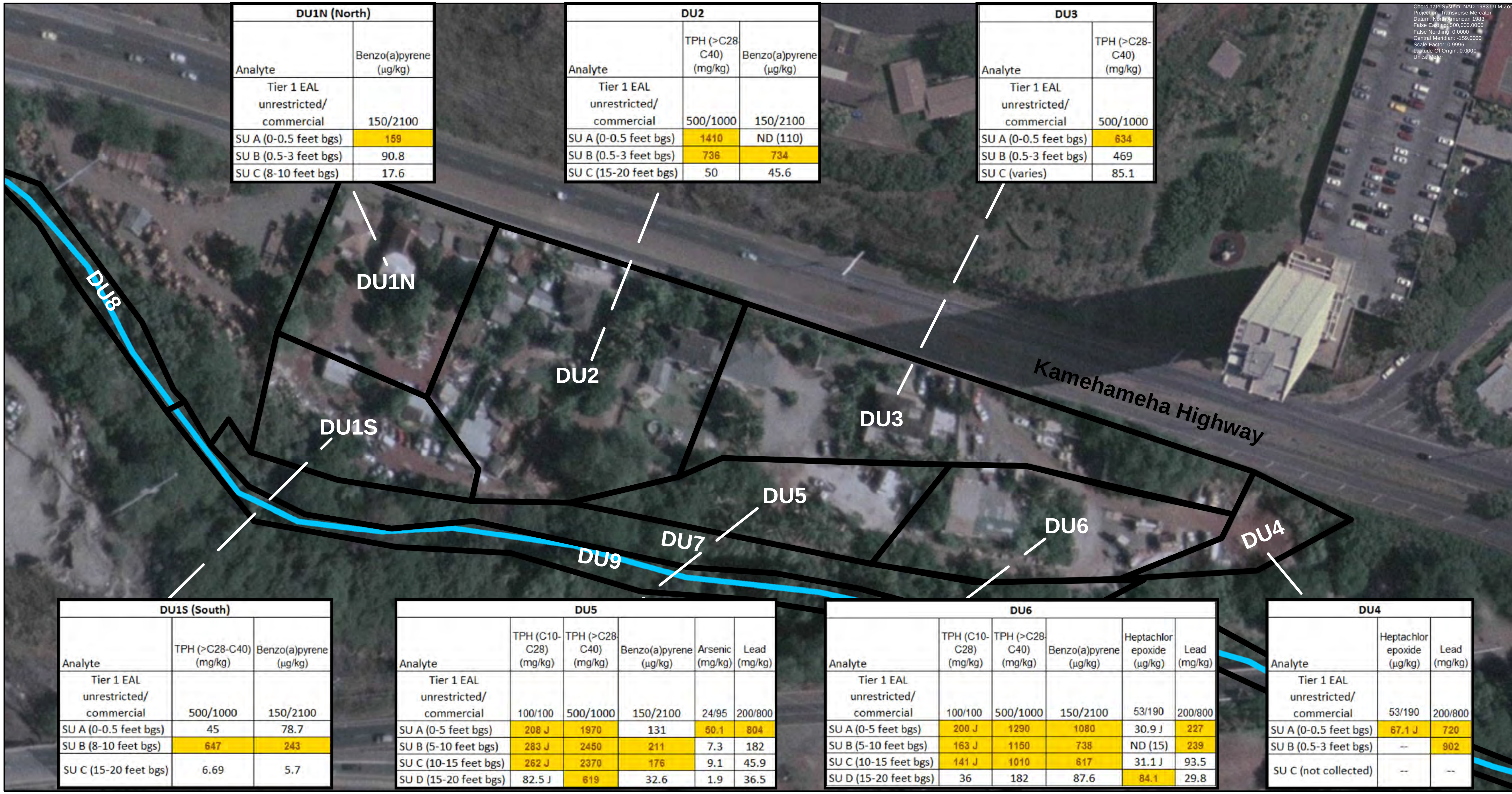
Fill Mixed with Metal Debris- Red to brown silt and clay with fragments of coral and basalt. Presence of concrete and metal debris (based on geophysical investigation results [see Figure 4] and visual evidence). Dry to moist. Consistency ranges from medium stiff to stiff in fine sediments and loose to dense in coarser sediments. Clays have medium plasticity.Stiff to medium plasticity.

Native Soil - Red to dark brown silty clay, with trace fine sand and organic matter in some borings. Moist in borings without fine sand or organic matter, and moist to wet in some borings with fine sand and/or organic matter present. Low to medium plasticity clays.

Notes:
- This cross section is intended to show the approximate location of fill/debris and native soil. No detailed lithological logging was conducted (see test pit and boring logs in Appendices C and D, respectively). No lithology shown beyond maximum investigation depth of approximately 20 feet.
- Locations are based on GPS coordinates. Handheld GPS instrument theoretical precision is submeter, but precision may have been affected by thick vegetation. Please refer to Figure 3-1 for cross section location.
- Vertical exageration 3x.

amsl = above mean sea level
bgs = below ground surface
DU = decision unit

Figure 4-2c
Cross Section C-C'
(Northeast-Southwest)
Site Characterization Report for
Banana Patch Properties
Pearl City, Oahu, Hawaii
Honolulu Rail Transit Project



DU1N (North)

Analyte	Benzo(a)pyrene (µg/kg)
Tier 1 EAL unrestricted/ commercial	150/2100
SU A (0-0.5 feet bgs)	159
SU B (0.5-3 feet bgs)	90.8
SU C (8-10 feet bgs)	17.6

DU2

Analyte	TPH (>C28-C40) (mg/kg)	Benzo(a)pyrene (µg/kg)
Tier 1 EAL unrestricted/ commercial	500/1000	150/2100
SU A (0-0.5 feet bgs)	1410	ND (110)
SU B (0.5-3 feet bgs)	736	734
SU C (15-20 feet bgs)	50	45.6

DU3

Analyte	TPH (>C28-C40) (mg/kg)
Tier 1 EAL unrestricted/ commercial	500/1000
SU A (0-0.5 feet bgs)	634
SU B (0.5-3 feet bgs)	469
SU C (varies)	85.1

DU1S (South)

Analyte	TPH (>C28-C40) (mg/kg)	Benzo(a)pyrene (µg/kg)
Tier 1 EAL unrestricted/ commercial	500/1000	150/2100
SU A (0-0.5 feet bgs)	45	78.7
SU B (8-10 feet bgs)	647	243
SU C (15-20 feet bgs)	6.69	5.7

DU5

Analyte	TPH (C10-C28) (mg/kg)	TPH (>C28-C40) (mg/kg)	Benzo(a)pyrene (µg/kg)	Arsenic (mg/kg)	Lead (mg/kg)
Tier 1 EAL unrestricted/ commercial	100/100	500/1000	150/2100	24/95	200/800
SU A (0-5 feet bgs)	208 J	1970	131	50.1	804
SU B (5-10 feet bgs)	283 J	2450	211	7.3	182
SU C (10-15 feet bgs)	262 J	2370	176	9.1	45.9
SU D (15-20 feet bgs)	82.5 J	619	32.6	1.9	36.5

DU6

Analyte	TPH (C10-C28) (mg/kg)	TPH (>C28-C40) (mg/kg)	Benzo(a)pyrene (µg/kg)	Heptachlor epoxide (µg/kg)	Lead (mg/kg)
Tier 1 EAL unrestricted/ commercial	100/100	500/1000	150/2100	53/190	200/800
SU A (0-5 feet bgs)	200 J	1290	1080	30.9 J	227
SU B (5-10 feet bgs)	163 J	1150	738	ND (15)	239
SU C (10-15 feet bgs)	141 J	1010	617	31.1 J	93.5
SU D (15-20 feet bgs)	36	182	87.6	84.1	29.8

DU4

Analyte	Heptachlor epoxide (µg/kg)	Lead (mg/kg)
Tier 1 EAL unrestricted/ commercial	53/190	200/800
SU A (0-0.5 feet bgs)	67.1 J	720
SU B (0.5-3 feet bgs)	--	902
SU C (not collected)	--	--

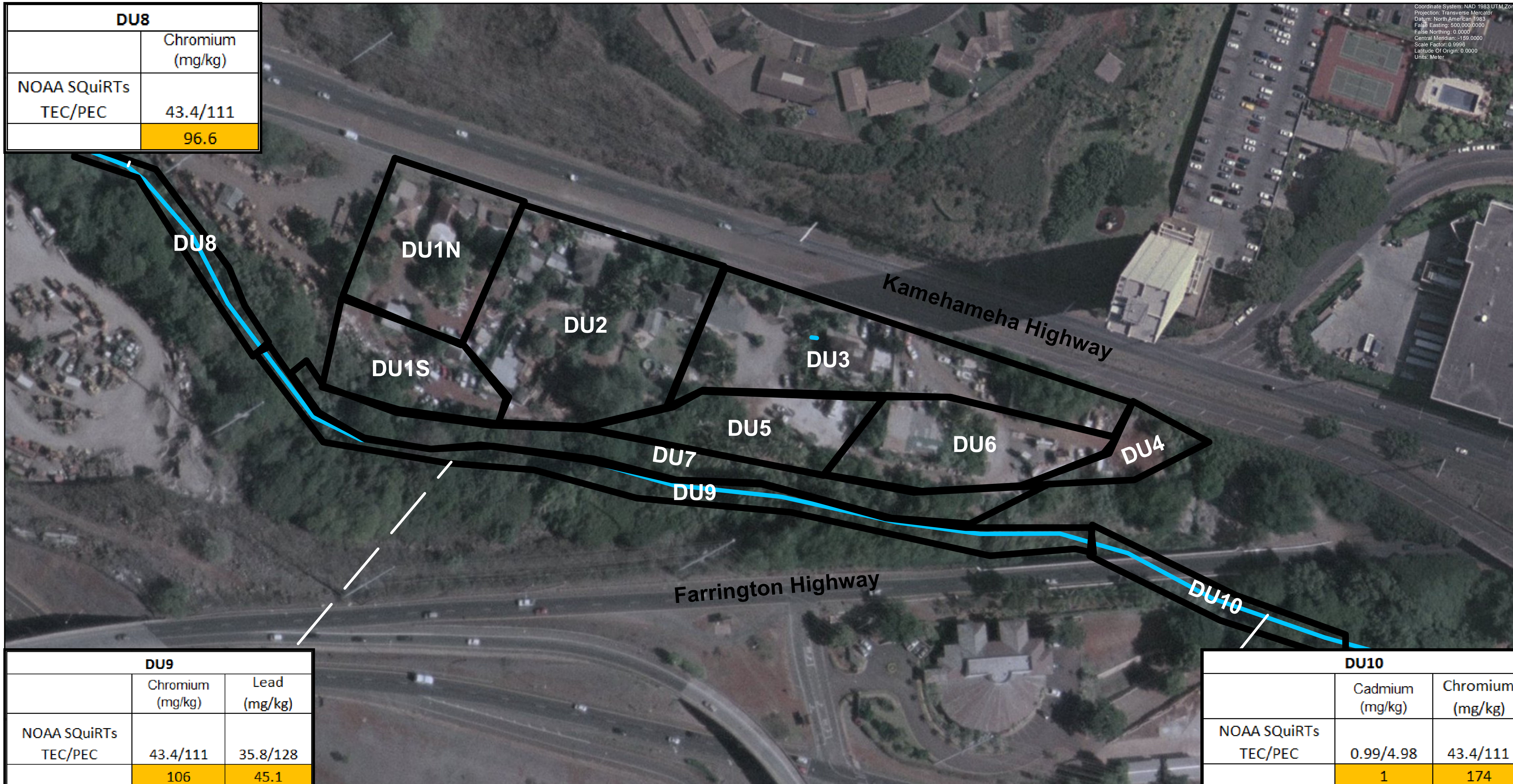
Note:
1) Soil analytical data were compared to the State of Hawaii Department of Health Tier 1 Environmental Action Levels (EALs) for sites within 150 meters of a surface water body, where drinking water is threatened (HDOH, 2011, Table A-2).
2) Exceedences of Tier 1 EALs are highlighted in yellow.
3) All results reported in milligrams per kilogram (mg/kg), except for benzo(a)pyrene and heptachlor epoxide which are reported in micrograms per kilogram (µg/kg).

Acronym List
bgs: Below Ground Surface
DU: Decision Unit
J: the analyte was positively identified, the quantitation is an estimate.
ND: non-detect
SU: sampling unit (sampling depth interval)
TPH: total petroleum hydrocarbons
TPH (C10-28) indicates diesel range
TPH (>C28-40) indicates oil range

N
0 50 100 150 200 Feet

Figure 4-3
Soil Results above Screening Levels

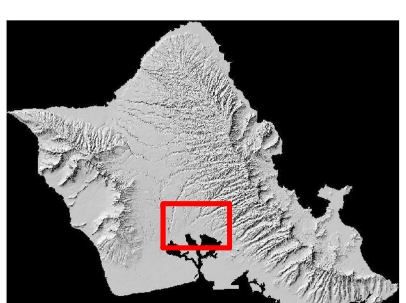
Site Characterization Report of Banana Patch Properties
Pearl City, Oahu, Hawaii
Honolulu Rail Transit Project



DU8	
	Chromium (mg/kg)
NOAA SQuiRTs TEC/PEC	43.4/111
	96.6

DU9		
	Chromium (mg/kg)	Lead (mg/kg)
NOAA SQuiRTs TEC/PEC	43.4/111	35.8/128
	106	45.1

DU10		
	Cadmium (mg/kg)	Chromium (mg/kg)
NOAA SQuiRTs TEC/PEC	0.99/4.98	43.4/111
	1	174



Note:
1) Sediment analytical data were compared to the National Oceanic and Atmospheric Administration Screening Quick Reference Table (NOAA SQuiRTs) Threshold Effects Concentration (TECs) and Probable Effects Levels (PELs) (NOAA, November 2008). Exceedences are highlighted in yellow.

Acronym List
DU: Decision Unit

0 50 100 200 Feet

Figure 4-4
Sediment Results above Screening Levels

Site Characterization Report of Banana Patch Properties
Pearl City, Oahu, Hawaii
Honolulu Rail Transit Project

TW010				
Analyte	Result	Tier 1 EAL unrestricted	Tier 1 EAL commercial/industrial	Units
Dieldrin	0.0023 J	0.0019	0.0019	µg/l
Heptachlor	0.019 B	0.0036	0.0036	µg/l
Heptachlor epoxide	0.0047 J	0.0036	0.0036	µg/l
Selenium	7.7 J	5	5	µg/l
TPH (C10-C28)	0.118	0.1	0.64	mg/l

TW008				
Analyte	Result	Tier 1 EAL unrestricted	Tier 1 EAL commercial/industrial	Units
TPH (C10-C28)	0.125	0.1	0.64	mg/l
Aldrin	0.46	0.004	0.13	µg/l
Dieldrin	0.24	0.0019	0.0019	µg/l
TPH (>C28-C40)	0.132 J	0.1	0.64	mg/l
Heptachlor	0.053 JB	0.0036	0.0036	µg/l
Selenium	5.8 J	5	5	µg/l

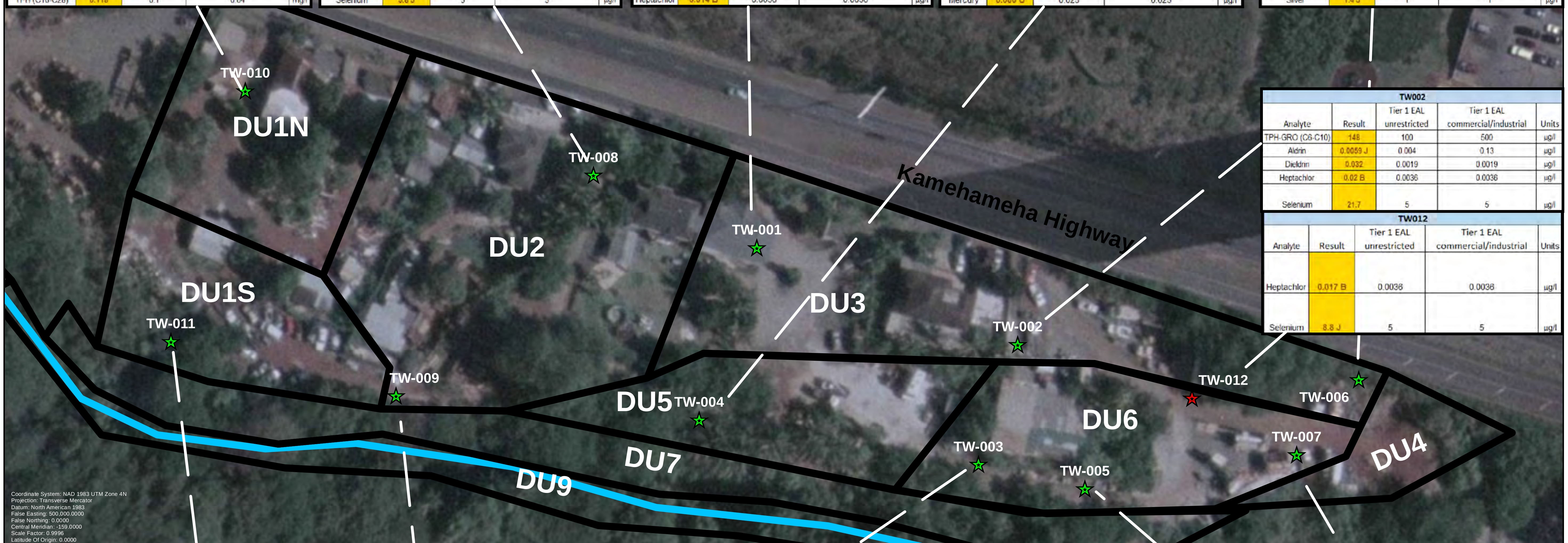
TW001				
Analyte	Result	Tier 1 EAL unrestricted	Tier 1 EAL commercial/industrial	
Dieldrin	0.0035 J	0.0019	0.0019	µg/l
Heptachlor	0.014 B	0.0036	0.0036	µg/l

TW004				
Analyte	Result	Tier 1 EAL unrestricted	Tier 1 EAL commercial/industrial	Units
Heptachlor	0.016 B	0.0036	0.0036	µg/l
Mercury	0.080 U	0.025	0.025	µg/l

TW006				
Analyte	Result	Tier 1 EAL unrestricted	Tier 1 EAL commercial/industrial	Units
Chlordane	0.056 J	0.004	0.004	µg/l
Dieldrin	0.0033 J	0.0019	0.0019	µg/l
Heptachlor	0.017 B	0.0036	0.0036	µg/l
Heptachlor epoxide	0.019	0.0036	0.0036	µg/l
Selenium	9.4 J	5	5	µg/l
Silver	1.4 J	1	1	µg/l

TW002				
Analyte	Result	Tier 1 EAL unrestricted	Tier 1 EAL commercial/industrial	Units
TPH-GRO (C6-C10)	148	100	500	µg/l
Aldrin	0.0059 J	0.004	0.13	µg/l
Dieldrin	0.032	0.0019	0.0019	µg/l
Heptachlor	0.02 B	0.0036	0.0036	µg/l
Selenium	21.7	5	5	µg/l

TW012				
Analyte	Result	Tier 1 EAL unrestricted	Tier 1 EAL commercial/industrial	Units
Heptachlor	0.017 B	0.0036	0.0036	µg/l
Selenium	8.8 J	5	5	µg/l



TW011				
Analyte	Result	Tier 1 EAL unrestricted	Tier 1 EAL commercial/industrial	Units
Heptachlor	0.013 B	0.0036	0.0036	µg/l
Selenium	9.1 J	5	5	µg/l

TW009				
Analyte	Result	Tier 1 EAL unrestricted	Tier 1 EAL commercial/industrial	Units
Dieldrin	0.0036 J	0.0019	0.0019	µg/l
Heptachlor	0.018 B	0.0036	0.0036	µg/l
Heptachlor epoxide	0.0063 J	0.0036	0.0036	µg/l

TW003				
Analyte	Result	Tier 1 EAL unrestricted	Tier 1 EAL commercial/industrial	Units
Dieldrin	0.0062 J	0.0019	0.0019	µg/l
Heptachlor	0.02 B	0.0036	0.0036	µg/l
Heptachlor epoxide	0.0076 J	0.0036	0.0038	µg/l
Selenium	5.8 J	5	5	µg/l

TW005				
Analyte	Result	Tier 1 EAL unrestricted	Tier 1 EAL commercial/industrial	Units
Dieldrin	0.0028 J	0.0019	0.0019	µg/l
Heptachlor	0.017 B	0.0036	0.0036	µg/l
Heptachlor epoxide	0.0053 J	0.0036	0.0036	µg/l

TW007				
Analyte	Result	Tier 1 EAL unrestricted	Tier 1 EAL commercial/industrial	Units
TPH (C10-C28)	0.149	0.1	0.64	mg/l
TPH (>C28-C40)	0.123 J	0.1	0.64	mg/l
Heptachlor	0.019 B	0.0036	0.0036	µg/l
Heptachlor epoxide	0.0078 J	0.0036	0.0036	µg/l
Selenium	9 J	5	5	µg/l

Legend

- Decision Unit (DU)
- Existing Monitoring Well
- Temporary Monitoring Well
- Waiawa Stream

Acronym List:
B: Quantitation between primary and confirmation differed by > 40%. Lower value reported.
bgs: Below Ground Surface
C/I: Commercial / Industrial
DU: Decision Unit
EAL: environmental action level
HDOH: State of Hawaii Department of Health
J: the analyte was positively identified, the quantitation is an estimate.
mg/L: milligrams per liter
TPH: total petroleum hydrocarbons
TPH (C10-28) indicates diesel range
TPH (>C28-40) indicates oil range
TW: Test Well
µg/L: micrograms per liter

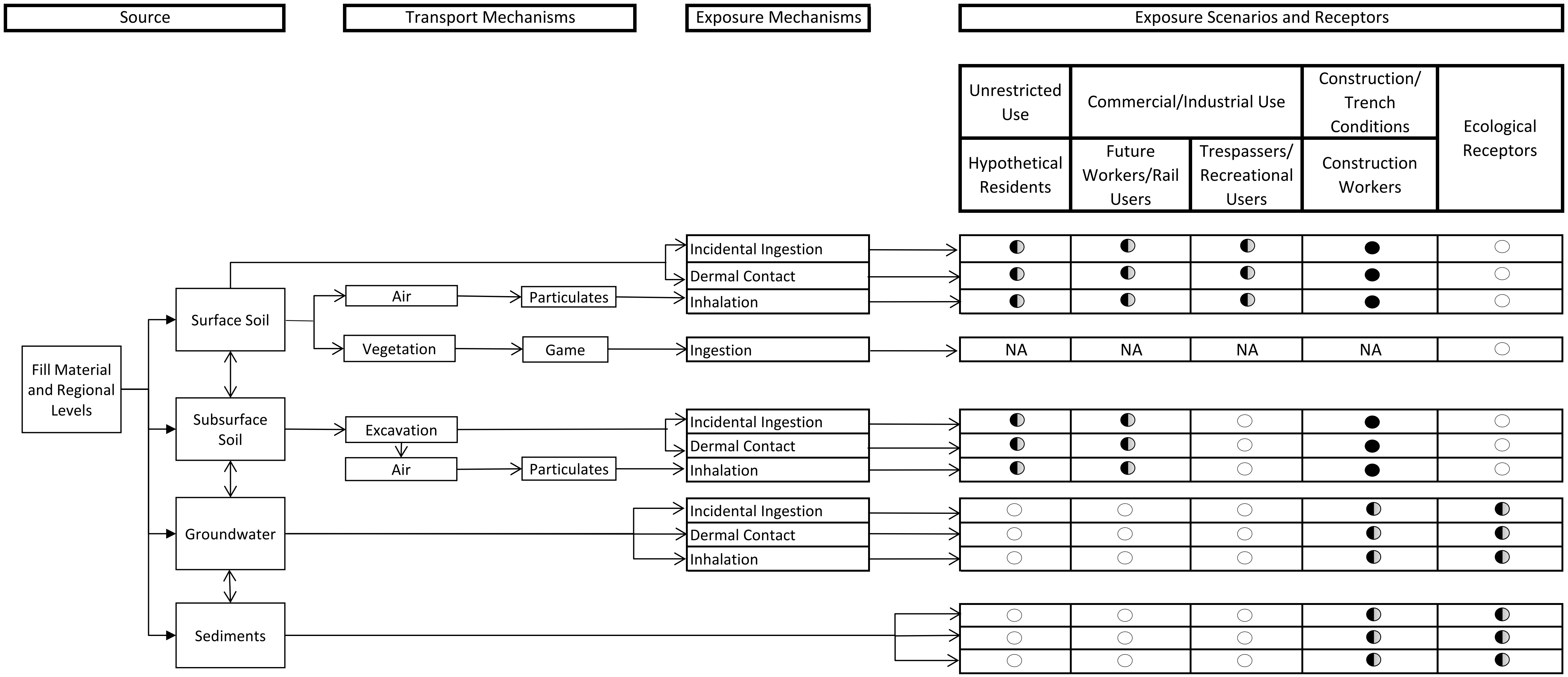
Note:
1) Groundwater analytical data were compared to the unrestricted HDOH Tier 1 EALs for sites within 150 meters of a surface water body where drinking water is threatened (Tier 1 EAL unrestricted); and C/I HDOH Tier 1 EALs for sites within 150 meters of a surface water body where drinking water is not threatened (Tier 1 EAL C/I).
2) TW-012 coorespponds to an existing monitoring well

N

0 50 100 200 Feet

Figure 4-5
Groundwater Results Above Screening Levels

Site Characterization Report of Banana Patch Properties Pearl City, Oahu, Hawaii Honolulu Rail Transit Project



Legend:

○ = Incomplete Pathway
◐ = Potentially Complete Pathway
● = Complete Pathway
NA = Not Applicable

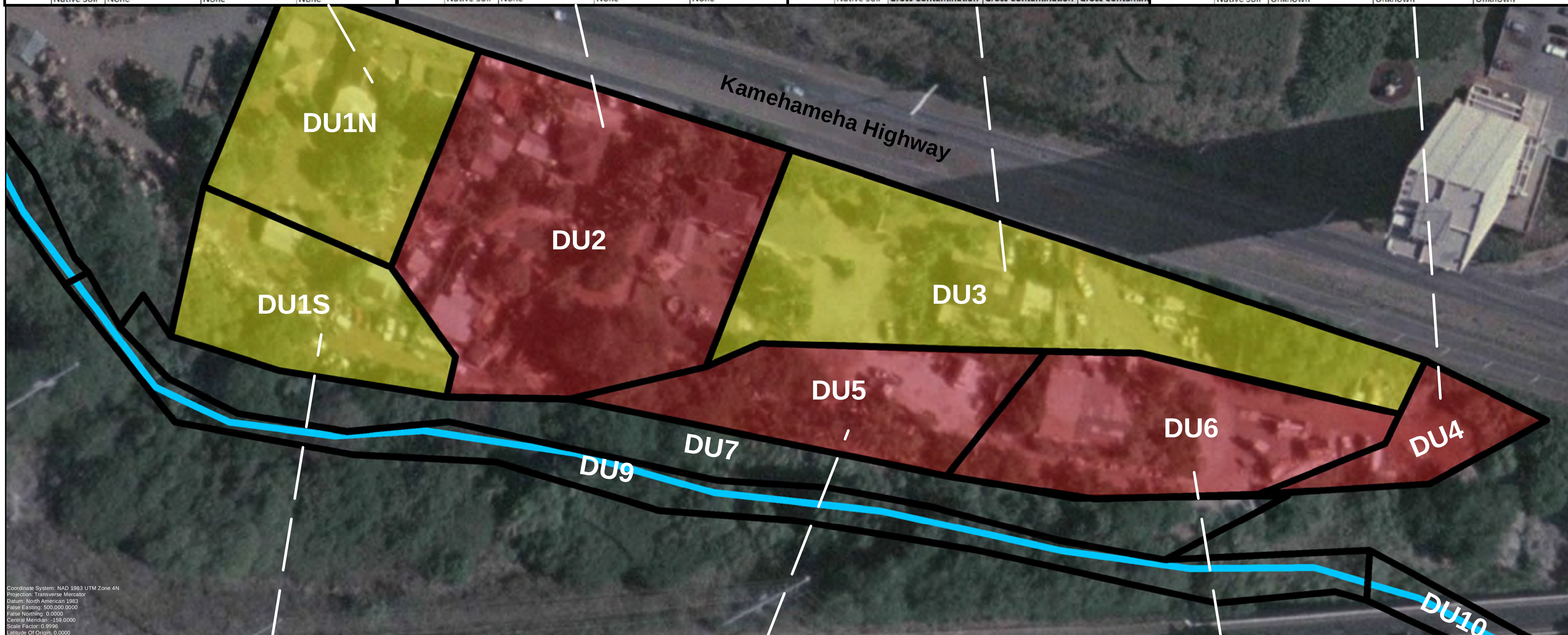
FIGURE 5-1
Conceptual Site Model
Site Characterization Report for Banana Patch Properties,
Pearl City, Oahu, Hawaii
Honolulu Rail Transit Project

Decision Unit	Depth (ft bgs)	Potential Hazard		
		Residential	C/I	Construction Workers
DU1N	0-0.5	Direct Exposure	None	None
	0.5-3.0	None	None	None
	Native Soil	None	None	None

Decision Unit	Depth (ft bgs)	Potential Hazard		
		Residential	C/I	Construction Workers
DU2	0-0.5	None	None	None
	0.5-3.0	Direct Exposure	None	None
	Native Soil	None	None	None

Decision Unit	Depth (ft bgs)	Potential Hazard		
		Residential	C/I	Construction W
DU3	0-0.5	None	None	None
	0.5-3.0	None	None	None
	Native Soil	Gross Contamination	Gross Contamination	Gross Contamina

Decision Unit	Depth (ft bgs)	Potential Hazard		
		Residential	C/I	Construction Workers
DU4	0-0.5	Direct Exposure	Direct Exposure	Direct Exposure
	0.5-3.0	Direct Exposure	Direct Exposure	Direct Exposure
	Native Soil	Unknown	Unknown	Unknown



Decision Unit	Depth (ft bgs)	Potential Hazard		
		Residential	C/I	Construction Workers
DU1S	0-0.5	None	None	None
	0.5-3.0	Direct Exposure	None	None
	Native Soil	None	None	None

Decision Unit	Depth (ft bgs)	Potential Hazard		
		Residential	C/I	Construction Workers
DU5	0-5	Direct Exposure+Leacing	Direct Exposure+Leacin	None
	5-10	Direct Exposure+Leacing	Leaching	None
	10-15	Direct Exposure+Leacing	Leaching	Direct Exposure
	Native Soil	None	None	None

Decision Unit	Depth (ft bgs)	Potential Hazard		
		Residential	C/I	Construction Workers
DU6	0-5	Direct Exposure+Leacing	Leaching	None
	5-10	Direct Exposure+Leacing	Leaching	None
	10-15	Direct Exposure+Leacing	Leaching	None
	Native Soil	Direct Exposure	None	None

Legend

- Decision Unit (DU)
- Exceeds Unrestricted/ Residential (Tier 1) EALs
- Exceeds C/I EALs
- Waiawa Stream

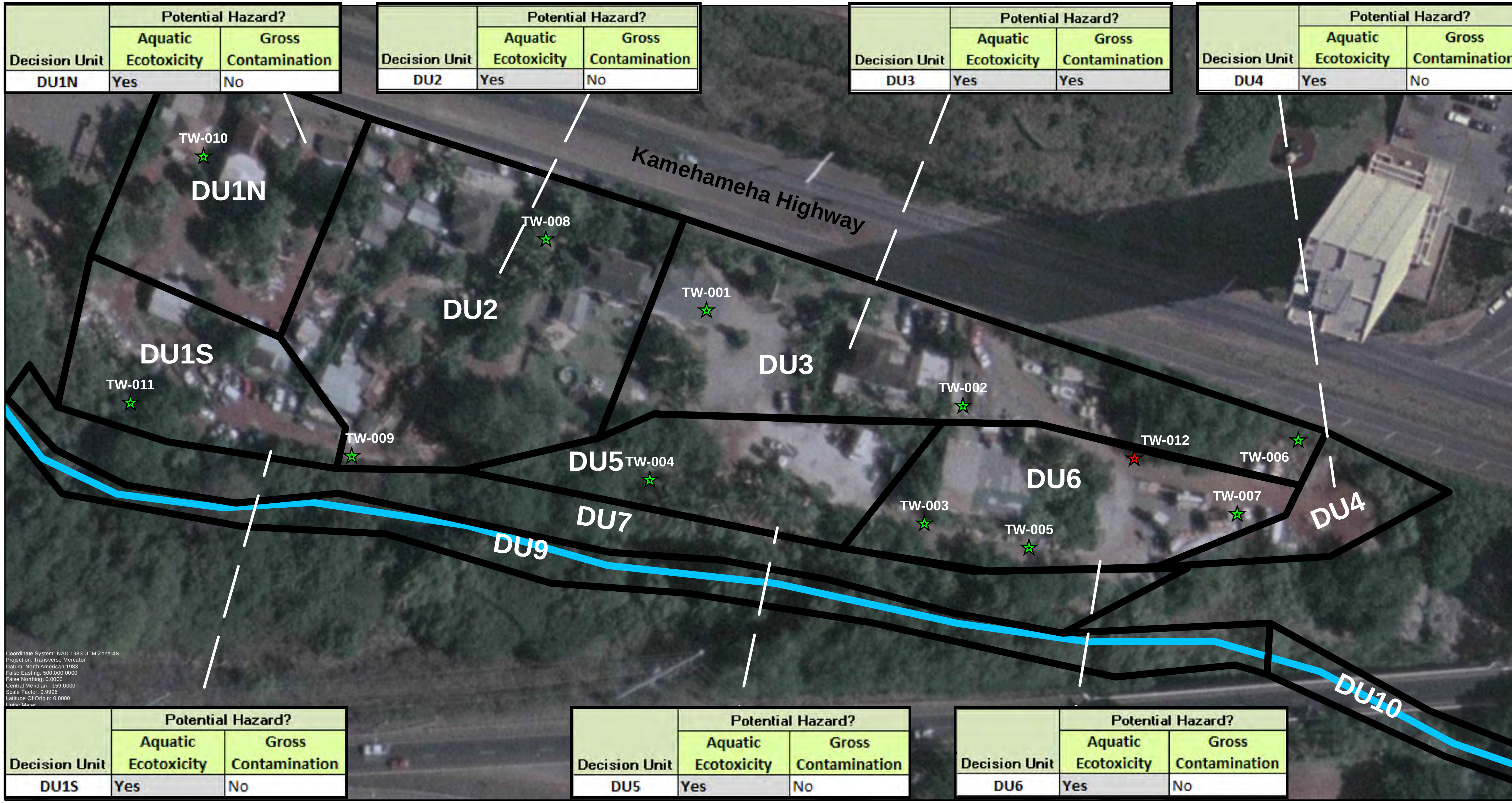
Acronym List:
bgs: Below Ground Surface
C/I: Commercial / Industrial
DU: Decision Unit
EAL: State of Hawaii Environmental Action Level
ft: Feet

N

0 50 100 200 Feet

Figure 5-2
Environmental Hazard Evaluation Summary - Soil

Site Characterization Report for Banana Patch Properties Pearl City, Oahu, Hawaii Honolulu Rail Transit Project



Decision Unit	Potential Hazard? Aquatic Ecotoxicity	Potential Hazard? Gross Contamination
DU1N	Yes	No
DU2	Yes	No
DU3	Yes	Yes
DU4	Yes	No
DU1S	Yes	No
DU5	Yes	No
DU6	Yes	No

Legend

- Decision Unit (DU)
- Existing Monitoring Well
- Test Well
- Waiawa Stream

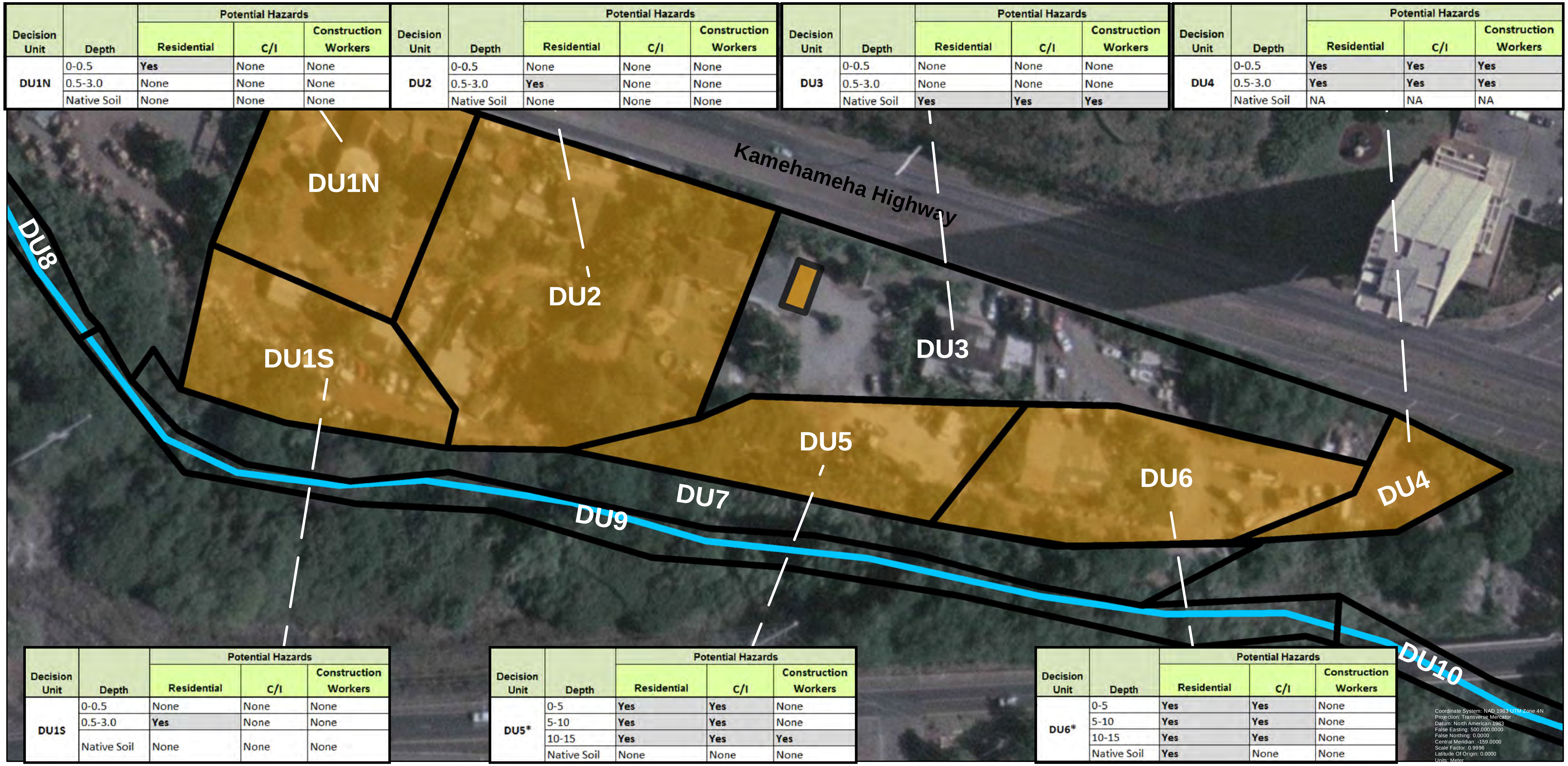
Note: TW-012 cooresponds to existing Monitoring Well

Acronym List:
DU: Decision Unit
TW: Test Well

0 50 100 200 Feet

Figure 5-3 Environmental Hazard Evaluation Summary - Groundwater

Site Characterization Report of Banana Patch Properties
Pearl City, Oahu, Hawaii
Honolulu Rail Transit Project



Decision Unit	Depth	Potential Hazards		
		Residential	C/I	Construction Workers
DU1N	0-0.5	Yes	None	None
	0.5-3.0	None	None	None
	Native Soil	None	None	None

Decision Unit	Depth	Potential Hazards		
		Residential	C/I	Construction Workers
DU2	0-0.5	None	None	None
	0.5-3.0	Yes	None	None
	Native Soil	None	None	None

Decision Unit	Depth	Potential Hazards		
		Residential	C/I	Construction Workers
DU3	0-0.5	None	None	None
	0.5-3.0	None	None	None
	Native Soil	Yes	Yes	Yes

Decision Unit	Depth	Potential Hazards		
		Residential	C/I	Construction Workers
DU4	0-0.5	Yes	Yes	Yes
	0.5-3.0	Yes	Yes	Yes
	Native Soil	NA	NA	NA

Decision Unit	Depth	Potential Hazards		
		Residential	C/I	Construction Workers
DU1S	0-0.5	None	None	None
	0.5-3.0	Yes	None	None
	Native Soil	None	None	None

Decision Unit	Depth	Potential Hazards		
		Residential	C/I	Construction Workers
DU5*	0-5	Yes	Yes	None
	5-10	Yes	Yes	None
	10-15	Yes	Yes	Yes
	Native Soil	None	None	None

Decision Unit	Depth	Potential Hazards		
		Residential	C/I	Construction Workers
DU6*	0-5	Yes	Yes	None
	5-10	Yes	Yes	None
	10-15	Yes	Yes	None
	Native Soil	Yes	None	None

Legend

- Decision Unit (DU)
- Area Requiring Site Controls
- Waiawa Stream

Note:
*Environmental hazard present only in a portion of the DU. Refer to Figure 6-2 for more details.

Area requiring site controls within DU3 is approximate.

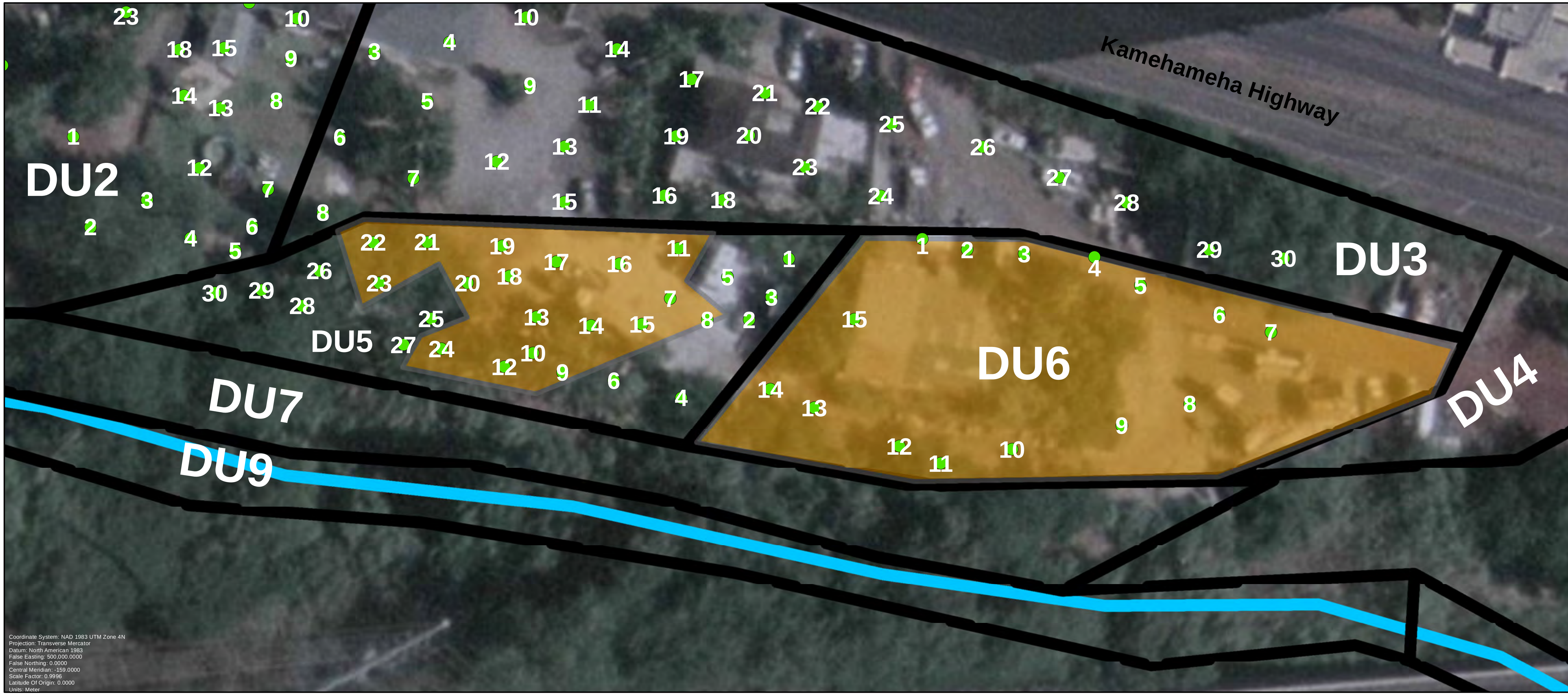
Acronym List:
bgs: Below Ground Surface
C/I: Commercial / Industrial
DU: Decision Unit
ft: Feet

N

0 50 100 200 Feet

Figure 6-1
Site-wide Environmental Hazard Management Area - Soil

Site Characterization Report for Banana Patch Properties
Pearl City, Oahu, Hawaii
Honolulu Rail Transit Project



Legend

- Decision Unit (DU)
- Environmental Hazard Managment Area (A-B Horizon)
- Soil Boring

Note: The "A- B" horizons correspond to the following depths.

- DU5/6: 0-10 foot depth interval, requiring site controls because of direct exposure concerns in a limited portion of the DUs.

Area of Environmental Hazard Management Areas:
DU5: 10291.4 square feet
DU6: 29837.8 square feet

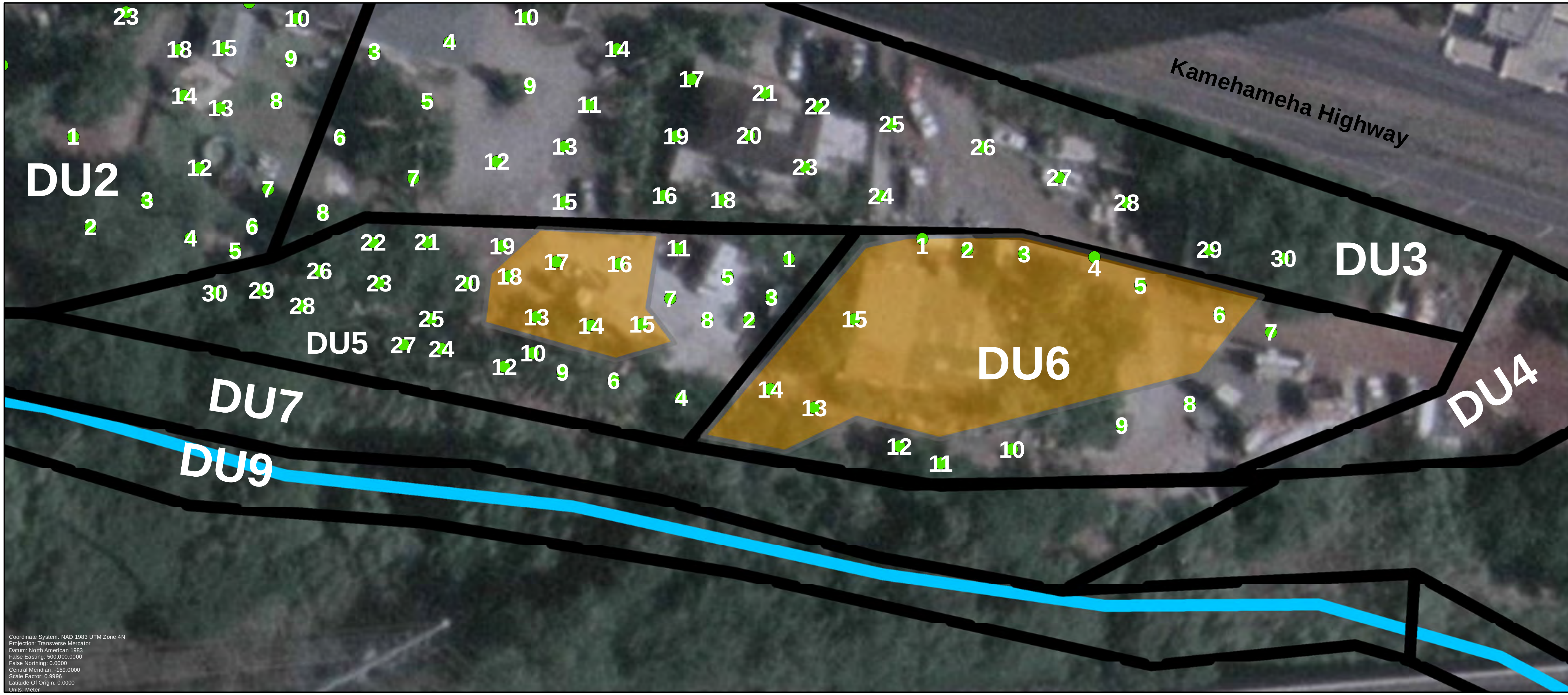
Acronym List:
bgs: Below Ground Surface
DU: Decision Unit
LNAPL: Non-Aqueous Phase Liquid

N

0 30 60 120 Feet

Figure 6-2a
Specific Environmental Hazard Management Areas for Soil - DU5 and DU6
A-B Horizon

Site Characterization Report
for Banana Patch Properties
Pearl City, Oahu, Hawaii
Honolulu Rail Transit Project



Legend

- Decision Unit (DU)
- Environmental Hazard Management Area (C Horizon)
- Soil Boring

Note: The "C" horizons corresponds to the following depths.

- DU5/6: 10-15 foot depth interval, requiring site controls because of direct exposure concerns in a limited portion of the DUs.

Areas of Environmental Hazard Management Areas:
DU5: 4784.8 square feet
DU6: 17389.5 square feet

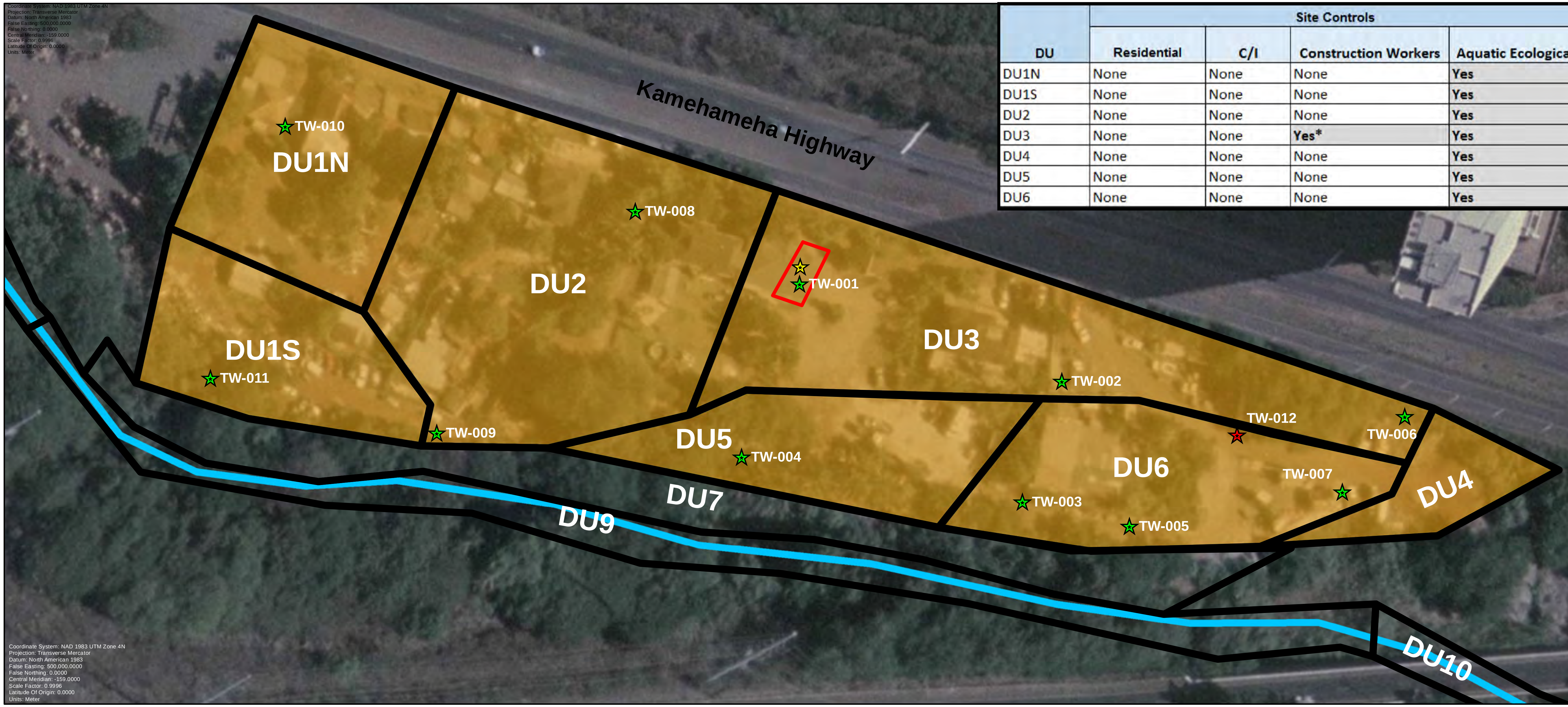
Acronym List:
bgs: Below Ground Surface
DU: Decision Unit
LNAPL: Non-Aqueous Phase Liquid

N

0 30 60 120 Feet

Figure 6-2b
Specific Environmental Hazard Management Areas for Soil - DU5 and DU6 C Horizon

Site Characterization Report for Banana Patch Properties
Pearl City, Oahu, Hawaii
Honolulu Rail Transit Project



DU	Site Controls			
	Residential	C/I	Construction Workers	Aquatic Ecological
DU1N	None	None	None	Yes
DU1S	None	None	None	Yes
DU2	None	None	None	Yes
DU3	None	None	Yes*	Yes
DU4	None	None	None	Yes
DU5	None	None	None	Yes
DU6	None	None	None	Yes

Legend

- Decision Unit (DU)
- Test Well
- Existing Monitoring Well
- 5-inch Thin Wall Steel Cased Well
- Area requiring Site Controls due to aquatic ecotoxicology and gross contamination concerns
- Area requiring Site Controls due to aquatic ecotoxicology concerns

Note: Groundwater from the site should not be discharged to surface water without further evaluation/treatment. TW-012 coresponds to existing Monitoring Well.

*Site Controls in DU3 under a construction workers scenario is limited to the source around TW-001 because of the presence of LNAPL.

Acronym List:
C/I: Commercial/Industrial
DU: Decision Unit
TW: Test Well

0 50 100 200 Feet

Figure 6-3
Environmental Hazard Management Area - Groundwater

Site Characterization Report of Banana Patch Properties
Pearl City, Oahu, Hawaii
Honolulu Rail Transit Project

Tables

TABLE 3-1

Test Pit Excavation Summary

Site Characterization Report for Banana Patch Properties, Pearl City, Oahu, Hawaii

Honolulu Rail Transit Project

			Test Pit Dimensions			Field Observations						Relative Percentage of Debris			
Decision Unit #[a]	**Test Pit #**	**Excavation Date**	**Length (ft)**	**Width (ft)**	**Depth (ft)**	**Visual Contamination**	**Olfactory Contamination**	**PID (ppmv)**	**LEL (%)**	**H_2S (ppmv)**	**# of Increments Collected per SU (A/B/C/D)**	**Concrete**	**Metal**	**Other**	**Notes/ Observations**
DU1	1	5/20/2014	16	12	9.5	No	No	0.0	0.0%	0	0	20%	15%	5%	Concrete, rebar, tires, water heater, partial drum, misc. metal debris
	2	5/20/2014	12	8	10	No	No	0.0	0.0%	0	0	15%	15%	10%	Concrete, rebar, tires, stove, partial drum, tyvek suits, misc. metal debris
	3	5/20/2014	11	4	9.5	No	No	0.0	0.0%	0	0	0%	<1%	0%	One metal hub cap. No other debris encountered
	4	5/20/2014	12	4	10.5	No	No	0.0	0.0%	0	0	15%	15%	10%	Concrete, rebar, metal pipe. Plastic chemical sprayer
	5	5/20/2014	12	4	10.5	No	No	0.0	0.0%	0	0	0%	0%	0%	No debris encountered
	6	5/21/2014	30	9	10.5	No	No	0.0	0.0%	0	0	20%	15%	5%	Concrete, rebar, metal pipe
	7	5/21/2014	30	9	10.5	No	No	0.0	0.0%	0	0	20%	15%	5%	Concrete, rebar, metal pipe
DU2	1	5/22/2014	11	3.5	3	No	No	0.0	0.0%	0	0	0%	0%	0%	2-inch steel clothesline post/cross-support located under vegetation on the surface. Likely source for geophysical anomaly.
DU3	1	5/21/2014	10	8	8	No	No	0-8.2	0.0%	0	0	10%	10%	5%	Concrete, metal, tarp (maybe super sack)
DU6	1	5/21/2014	10	3	15	No	No	0.0	0.0%	0	4/4/0/0	40%	20%	10%	Asphalt, concrete, wood, plastic only in upper 5 feet
	2	5/21/2014	10	3	15	No	No	0.0	0.0%	0	4/4/0/0	35%	10%	10%	Asphalt, concrete, wood, plastic only in upper 5 feet 10% concrete, 5% asphalt,5% other below 5 feet
	3	5/22/014	10	3	15	No	No	0.0	0.0%	0	3/3/3/0	5%	5%	5%	Asphalt, concrete, wood in upper 2 feet and then metal cable at approximately 8 feet Debris is sparse
	4	5/22/2014	10	3	15	No	No	0.0	0.0%	0	4/4/0/0	5%	5%	5%	Concrete, rebar throughout but sparse
	5	5/22/2014	10	3	15	No	No	0.0	0.0%	0	3/3/3/0	5%	5%	5%	Concrete and metal throughout but sparse
	6	5/22/2014	16	3	18	No	No	0.0	0.0%	0	6/6/0/0	10%	5%	5%	Concrete and metal throughout but sparse
	7	5/22/2014	10	3	3	No	No	0.0	0.0%	0	6/6/0/0	0%	0%	0%	Undocumented cesspool uncovered at approximately 3 feet bgs.

Notes:

[a] Test pits were not excavated within DU4 and DU5 due to limited access and/or lack of definitive subsurface anomalies identified during the geophysical survey.

Acronyms:

bgs = below ground surface
ft= feet
LEL = lower explosive limit
PID = photoionization detector
ppmv = parts per million by volume
SU = sample unit

TABLE 3-2

Decision Unit Soil Sample Collection and Analysis Summary

Site Characterization Report for Banana Patch Properties, Pearl City, Oahu, Hawaii

Honolulu Rail Transit Project

Area	Decision Unit	Sample ID	Sample Date	Sample Unit (SU)	SU Depth (ft bgs)[a]	Collection Method	Number of Incremental Samples (IS)	Analytes									Note
								VOC	TPH-g	TPH-d	TPH-o	PAH	Pesticides	PCB	Herbicides	RCRA Metals	
Flat Area with Future Fill	DU1N	FASC-DU1NA-0514	5/23/2014	A	0-0.5	Hand Drill	30			x	x	x	x	x	x	x	
		FASC-DU1NB-0514	5/28/2014	B	0.5-3.0	DPS	15	x	x	x	x	x	x	x	x	x	After geophysical/test pit investigation, DU1 was split into two DUs. Because of time constraints and lack of evidence of contamination, a limited number of increments were collected for the subsurface SUs.
		FASC-DU1NC-0514	5/28/2014	C	varies	DPS	15	x	x	x	x	x	x	x	x	x	
Flat Area with Future Fill	DU1S	FASC-DU1SA-0514	5/23/2014	A	0-0.5	Test Pit	30			x	x	x	x		x	x	30 IS from collected from test pits TP1 through TP7
		FASC-DU1SB-0514	5/28/2014	B	0.5-3.0	Test Pit	30	x	x	x	x	x	x	x	x	x	30 IS from collected from test pits TP1 through TP7
		FASC-DU1SC-0514	5/28/2014	C	varies	DPS	12	x	x	x	x	x	x	x	x	x	After geophysical/test pit investigation, DU1 was split into two DUs. Because of time constraints and drilling refusal at many locations, a limited number of increments were collected for the deepest SU.
Flat Area with no Excavation	DU2	FASC-DU2A-0514	5/22/2014	A	0-0.5	DPS	30			x	x	x	x	x	x	x	
		FASC-DU2B-0514	5/22/2014	B	0.5-3.0	DPS	30	x	x	x	x	x	x	x	x	x	
		FASC-DU2C-0514	5/22/2014	C	varies	DPS	30	x	x	x	x	x	x	x	x	x	
Flat Area with no Excavation	DU3	FASC-DU3A-0514	5/19/2014	A	0-0.5	DPS	30			x	x	x	x	x	x	x	
		FASC-DU3B-0514	5/19/2014	B	0.5-3.0	DPS	30	x	x	x	x	x	x	x	x	x	
		FASC-DU3C-0514	5/19/2014	C	varies	DPS	28	x	x	x	x	x	x	x	x	x	No C sample at B24 and B26
Flat Area with Future Fill	DU4	FASC-DU4A-0514	5/23/2014	A	0-0.5	Hand Drill	30			x	x	x	x	x	x	x	Primary
		FASC-DU204A-0514	5/23/2014	A Rep.	0-0.5	Hand Drill	30			x	x	x	x	x	x	x	Replicate
		FASC-DU304A-0514	5/23/2014	A Trip.	0-0.5	Hand Drill	30			x	x	x	x	x	x	x	Triplicate
		FASC-DU4B-0514	6/5/2014	B	0-3.0	Hand Drill	30									x	
Flat Area with Excavation	DU5	FASC-DU5A-0514	5/21/2014	A	0-5.0	DPS	30	x		x	x	x	x	x	x	x	
		FASC-DU5B-0514	5/21/2014	B	5.0-10.0	DPS	30	x	x	x	x	x	x	x	x	x	
		FASC-DU5C-0514	5/21/2014	C	10.0-15.0	DPS	28	x	x	x	x	x	x	x	x	x	No C sample at B5 and B8
		FASC-DU5D-0514	5/21/2014	D	15.0-20.0	DPS	30	x	x	x	x	x	x	x	x	x	

TABLE 3-2

Decision Unit Soil Sample Collection and Analysis Summary

Site Characterization Report for Banana Patch Properties, Pearl City, Oahu, Hawaii

Honolulu Rail Transit Project

Area	Decision Unit	Sample ID	Sample Date	Sample Unit (SU)	SU Depth (ft bgs)[a]	Collection Method	Number of Incremental Samples (IS)	Analytes: VOC	TPH-g	TPH-d	TPH-o	PAH	Pesticides	PCB	Herbicides	RCRA Metals	Note
Flat Area with Excavation	DU6	FASC-DU6A-0514	5/20/2014	A	0-5.0	DPS/Test Pit	30	x		x	x	x	x	x	x	x	Duplicate and triplicate samples collected for A interval. Samples from each SU composed of 15 soil increments collected from soil borings and 15 increments collected from test pits TP1 through TP5 (3 per test pit depth). No C sample from B4
		FASC-DU206A-0514	5/20/2014	A Rep.	0-5.0	DPS/Test Pit	30	x		x	x	x	x	x	x	x	
		FASC-DU306A-0514	5/20/2014	A Trip.	0-5.0	DPS/Test Pit	30	x		x	x	x	x	x	x	x	
		FASC-DU6B-0514	5/20/2014	B	5.0-10.0	DPS/Test Pit	30	x	x	x	x	x	x	x	x	x	
		FASC-DU6C-0514	5/20/2014	C	10.0-15.0	DPS/Test Pit	29	x	x	x	x	x	x	x	x	x	
		FASC-DU6D-0514	5/20/2014	D	15.0-20.0	DPS/Test Pit	20	x	x	x	x	x	x	x	x	x	Sample from SU/depth interval D composed of 14 soil increments collected from soil borings and 6 increments collected from test pit TP6 (other test pit did not reach depth interval D, and more increments from a single test pit would have biased the sample)
Stream Bank	DU7	BKSC-DU7-0514	5/28/2014	A	0-1.0	Hand Drill	100			x	x	x	x	x	x	x	
Upgradient Stream	DU8	SBSD-DU8-0514	5/17/2014	A	0-0.5	Hand	30			x	x	x	x	x	x	x	
Adjacent Stream	DU9	SBSD-DU9-0514	5/20/2014	A	0-0.5	Hand	30			x	x	x	x	x	x	x	30 IS also collected for both duplicate and triplicate analysis
		SBSD-DU209-0514	5/20/2014	A Rep.	0-0.5	Hand	30			x	x	x	x	x	x	x	
		SBSD-DU309-0514	5/20/2014	A Trip.	0-0.5	Hand	30			x	x	x	x	x	x	x	
Downgradient Stream	DU10	SBSD-DU10-0514	5/17/2014	A	0-0.5	Hand	30			x	x	x	x	x	x	x	

Notes:

[a]Sampling Depths

A = 0 - 0.5 ft bgs, except for DU5 A and DU6 A (0 to 5 ft bgs), and DU7 A = 0 to 1 ft bgs.

B = 0.5 - 3 ft bgs, except for DU5 B and DU6 B (5 to 10 ft bgs)

C = 3 ft interval below the fill for DUs 1N, 1S, 2, and 3

C = 10-15 ft bgs in DUs 5 and 6

D = 3 ft interval below the fill for DUs 5 and 6

Acronyms:

bgs = below ground surface

DU = Decision Unit

ft= feet

PAH = polycyclic aromatic hydrocarbons

PCB = polychlorinated biphenyls

RCRA = Resource Conservation and Recovery Act

TPH-g = total petroleum hydrocarbons, gasoline-range organics (C6-C10)

TPH-d = total petroleum hydrocarbons, diesel-range organics (C10-C28)

TPH-o = total petroleum hydrocarbons, oil-range organics (>C28-C40)

VOC = volatile organic compound

TABLE 3-3

Temporary Well Construction and Groundwater Analysis Summary

Site Characterization Report for Banana Patch Properties, Pearl City, Oahu, Hawaii

Honolulu Rail Transit Project

LOC ID[a]	Decision Unit Location	Sample ID	Sample Date	Screen Interval (ft bgs)	Depth to Water (ft btoc)	Analytes								
						VOC	TPH-g	TPH-d	TPH-o	PAH	Pesticides	PCB	Herbicides	RCRA Metals
TW-001	DU3	FASC-TW001-0514	5/29/2014	15-25	11.78	x	x	x	x	x	x	x	x	x
TW-002	DU3	FASC-TW002-0514	5/30/2014	15-25	20.79	x	x	x	x	x	x	x	x	x
TW-003	DU6	FASC-TW003-0514	5/30/2014	22.7-27.7	17.99	x	x	x	x	x	x	x	x	x
TW-004	DU5	FASC-TW004-0514	6/2/2014	15-25	15.97	x	x	x	x	x	x	x	x	x
TW-005	DU6	FASC-TW005-0514	5/30/2014	20-30	17.21	x	x	x	x	x	x	x	x	x
TW-006	DU3	FASC-TW006-0514	5/30/2014	15-25	17.08	x	x	x	x	x	x	x	x	x
TW-007	DU4	FASC-TW007-0514	5/30/2014	15-25	17.33	x	x	x	x	x	x	x	x	x
TW-008	DU2	FASC-TW008-0514	5/30/2014	20-30	17.92	x	x	x	x	x	x	x	x	x
TW-009	DU2	FASC-TW009-0514	5/29/2014	20-30	20.29	x	x	x	x	x	x	x	x	x
TW-010	DU1N	FASC-TW010-0514	6/2/2014	11.8-21.8	19.24	x	x	x	x	x	x	x	x	x
TW-011	DU1S	FASC-TW011-0514	5/29/2014	5-15	8.84	x	x	x	x	x	x	x	x	x
TW-011FD	DU1S	FASC-TW111-0514	5/29/2014	5-15	8.84	x	x	x	x	x	x	x	x	x
TW-012[b]	DU6	FASC-TW-012-0514	5/30/2014	20-30	17.12	x	x	x	x	x	x	x	x	x

Notes:

[a]All temporary wells (TW) constructed within 3.25-inch boreholes using a Strataprobe 6600 rig with 1" polyvinyl chloride (PVC) casing and prefilter packed 0.020 slotted screens.

[b]TW-012 is an existing 3-inch diameter PVC monitoring well located in DU6. The screen length on this well is esimted based on the total well depth.

Abbrevations:

bgs = below ground surface

btoc = below top of casing (Note: Top of casing elevation was not surveyed)

DU = Decision Unit

FD = field duplicate

ft= feet

PAH = polycyclic aromatic hydrocarbons

PCB = polychlorinated biphenyls

RCRA = Resource Conservation and Recovery Act

TPH-g = total petroleum hydrocarbons, gasoline-range organics (C6-C10)

TPH-d = total petroleum hydrocarbons, diesel-range organics (C10-C28)

TPH-o = total petroleum hydrocarbons, oil-range organics (>C28-C40)

VOC = volatile organic compound

TABLE 4-1
Preliminary Fill and Debris Volume Estimate
Site Characterization Report For Banana Patch Properties, Pearl City, Oahu, Hawaii
Honolulu Rail Transit Project

Decision Unit[a]	Approximate Areal Extent of Fill (ft^2)	Approximate Thickness of Fill (ft)	Estimated Volume of Fill[b] (ft^3)	Relative % Concrete Debris	Relative % Metal Debris	Estimated Volume of Concrete Debris[b] (ft^3)	Estimated Volume of Metal Debris[b] (ft^3)	Comment
DU1S	8,700	10	87,000	20	15	17,400	13,050	Debris from 2-3 feet to 10-15 feet based on test pits and borings that indicate debris ends 10-15 feet bgs.
DU3 East	4,400	10	44,000	10	10	4,400	4,400	Only 1 test pit completed within DU3.
DU3 West[c]	2,200	10	22,000	15	12.5	3,300	2,750	
DU6	8,700	3	26,100	20	10	5,220	2,610	
DU7	48,000	3	144,000	10	5	14,400	7,200	Geophysical survey and test pits could not be performed along stream bank. The estimated thickness of debris is estimated based on visual survey only.
Totals	**72,000**		**323,100**			**44,720**	**30,010**	

Notes:
[a]See Figure 4-1 for debris areas listed above.
[b]All volume estimates provided in this table are based on data collected during visual surveys, geophysical investigation, the advancement of soil borings, and test pitting.
The data developed during the investigation are not comprehensive for the entire Site because of limited site access, and thus are inherently limited in accuracy.
In addition, fill and debris observed within borings and test pits were highly variable, and therefore, estimates of fill and debris may not account for variability in areas between borings and test pits.
Therefore, these estimates are preliminary, and actual volumes may vary significantly.
[c]DU3 west was not investigated with test pits during the site investigation. The depth and composition of debris is unknown, and was estimated based on other test pit characteristics and borings.

Acronyms:
ft = feet

TABLE 4-2

Chemicals Detected in Soil

Site Characterization Report for Banana Patch Properties, Pearl City, Oahu, Hawaii

Honolulu Rail Transit Project

Sample ID / **Sample Date**		**HDOH Tier 1 EALs[1]**	**HDOH EALs[2]**	**HDOH EALs[1]**	**HDOH EALs[2]**	**FASC-DU1NA-0514** / **5/23/2014**	**FASC-DU1NB-0514** / **5/28/2014**	**FASC-DU1NC-0514** / **5/28/2014**	**FASC-DU1SA-0514** / **5/22/2014**	**FASC-DU1SB-0514** / **5/22/2014**	**FASC-DU1SC-0514** / **5/28/2014**	**FASC-DU2A-0514** / **5/22/2014**
Decision Unit (DU)		**Unrestricted**	**Unrestricted**	**Commercial/ Industrial**	**Commercial/ Industrial**	**DU1N**	**DU1N**	**DU1N**	**DU1S**	**DU1S**	**DU1S**	**DU2**
Sub Unit (SU)		**DW, <150m to SW**	**NDW, <150m to SW**	**DW, <150m to SW**	**NDW, <150m to SW**	**A (0-0.5 feet bgs)**	**B (0.5-3 feet bgs)**	**C (varies)**	**A (0-0.5 feet bgs)**	**B (8-10 feet bgs)**	**C (varies)**	**A (0-0.5 feet bgs)**
GC/MS Volatile Organic Compounds (SW846 8260B)												
Tetrachloroethylene	µg/kg	88	88	250	250	-	ND (16)	ND (19)	-	ND (17)	ND (19)	-
TPH-g (C6-C10)	µg/kg	100000	100000	100000	400000	-	ND (1400)	ND (1500)	-	ND (1500)	ND (1600)	-
GC Total Petroleum Hydrocarbons (TPH) (SW846 8015B M)												
TPH-d (C10-C28)	mg/kg	100	500	100	500	29.4 J	17.4	14	45.0 J	84.5	6.69	ND (170)
TPH-o (>C28-C40)	mg/kg	500	500	1000	1000	267	135	61.5	359	**647**	31.6	**1410**
GC/MS Polynuclear Aromatic Hydrocarbons (PAHs) (SW846 8270C BY SIM)												
Acenaphthene	µg/kg	120000	120000	120000	120000	ND (6.6)	ND (6.6)	ND (1.7)	ND (6.7)	ND (8.3)	ND (1.7)	ND (330)
Acenaphthylene	µg/kg	13000	13000	13000	13000	ND (6.6)	ND (6.6)	ND (1.7)	ND (6.7)	ND (8.3)	ND (1.7)	ND (330)
Anthracene	µg/kg	4300	4300	4300	4300	12.5 J	8.4 J	1.7 J	ND (6.7)	22.0 J	ND (1.7)	ND (330)
Benzo(a)anthracene	µg/kg	1500	1500	10000	10000	123	79.6	14.2	53.1	200	4.3	ND (170)
Benzo(a)pyrene	µg/kg	150	150	2100	2100	**159**	90.8	17.6	78.7	**243**	5.7	ND (110)
Benzo(b)fluoranthene	µg/kg	1500	1500	9200	21000	174	99	13.6	78.1	234	4.6	ND (130)
Benzo(g,h,i)perylene	µg/kg	27000	27000	27000	27000	86.8	66.8	12.5	54.1	166	4.7	ND (150)
Benzo(k)fluoranthene	µg/kg	15000	15000	39000	39000	162	82.2	17.3	72.6	203	5.7	ND (150)
Chrysene	µg/kg	10000	10000	10000	10000	165	102	22.7	72.5	260	6.5	ND (130)
Dibenzo(a,h)anthracene	µg/kg	150	150	2100	2100	25.3	14.9	ND (0.93)	6.0 J	22.5	ND (0.93)	ND (190)
Fluoranthene	µg/kg	87000	87000	87000	87000	260	180	40.4	102	359	9.9 J	ND (330)
Fluorene	µg/kg	100000	100000	100000	100000	ND (6.6)	ND (6.6)	ND (1.7)	ND (6.7)	ND (8.3)	ND (1.7)	ND (330)
Indeno(1,2,3-cd)pyrene	µg/kg	1500	1500	21000	21000	106	69.7	14.2	54.3	186	5	ND (170)
1-Methylnaphthalene	µg/kg	790	790	790	790	ND (13)	ND (13)	ND (3.3)	ND (13)	ND (17)	ND (3.3)	ND (660)
2-Methylnaphthalene	µg/kg	870	870	870	870	ND (13)	ND (13)	ND (3.3)	ND (13)	ND (17)	ND (3.3)	ND (660)
Naphthalene	µg/kg	4400	4500	4400	6200	ND (13)	ND (13)	ND (3.3)	ND (13)	ND (17)	ND (3.3)	ND (660)
Phenanthrene	µg/kg	69000	69000	69000	69000	87.1	50.7 J	23.5	26.7 J	158	3.7 J	ND (330)
Pyrene	µg/kg	44000	44000	44000	44000	319	139	36.9	141	447	7.4 J	ND (330)
GC Pesticides (SW846 8081A)												
Chlordane	µg/kg	16000	16000	29000	29000	ND (330)	182	57.8	1210 J	2740	7.1 J	793 J
Dieldrin	µg/kg	1500	1500	11000	11000	ND (60)	21.2	2.7 J	316	959	ND (0.60)	ND (30)
4,4'-DDD	µg/kg	2000	2000	7200	7200	ND (70)	ND (2.1)	ND (0.70)	ND (28)	ND (28)	ND (0.70)	ND (35)
4,4'-DDE	µg/kg	1400	1400	5100	5100	ND (60)	74.2	32.5	62.2 J	86.2 J	5	ND (30)
4,4'-DDT	µg/kg	1700	1700	5600	5600	ND (50)	24.7	6.5	33.0 J	90.4 J	3.6	ND (25)
Endrin	µg/kg	3700	3700	30000	30000	ND (60)	ND (1.8)	ND (0.60)	ND (24)	ND (24)	ND (0.60)	ND (30)
Heptachlor	µg/kg	110	110	380	380	ND (46)	ND (1.4)	ND (0.47)	ND (19)	ND (19)	ND (0.47)	ND (23)
Heptachlor epoxide	µg/kg	53	53	190	190	ND (50)	3.8 J	ND (0.50)	ND (20)	27.8 J	ND (0.50)	ND (25)
GC Polychlorinated Biphenyls (PCBs) (SW846 8082)												
Aroclor 1248	µg/kg	1100	1100	6300	6300	ND (170)	ND (17)	51.3	ND (170)	ND (170)	ND (17)	ND (170)
Aroclor 1260	µg/kg	1100	1100	6300	6300	ND (66)	7.9 J	ND (6.7)	ND (67)	ND (67)	ND (6.6)	ND (66)
GC Herbicides (SW846 8151A)												
Dinoseb	µg/kg	-	-	-	-	ND (20)	ND (21)	ND (22)	21.5 J [b]	57.1 J [b]	ND (23)	ND (19)
Pentachlorophenol	µg/kg	820	890	820	2700	ND (0.63)	6	1.9 J	3.9 J	15.1	1.3 J	ND (0.59)

TABLE 4-2

Chemicals Detected in Soil

Site Characterization Report for Banana Patch Properties, Pearl City, Oahu, Hawaii

Honolulu Rail Transit Project

Sample ID / **Sample Date**		HDOH Tier 1 EALs[1]	HDOH EALs[2]	HDOH EALs[1]	HDOH EALs[2]	FASC-DU1NA-0514 5/23/2014	FASC-DU1NB-0514 5/28/2014	FASC-DU1NC-0514 5/28/2014	FASC-DU1SA-0514 5/22/2014	FASC-DU1SB-0514 5/22/2014	FASC-DU1SC-0514 5/28/2014	FASC-DU2A-0514 5/22/2014
Decision Unit (DU)		Unrestricted	Unrestricted	Commercial/ Industrial	Commercial/ Industrial	DU1N	DU1N	DU1N	DU1S	DU1S	DU1S	DU2
Sub Unit (SU)		DW, <150m to SW	NDW, <150m to SW	DW, <150m to SW	NDW, <150m to SW	A (0-0.5 feet bgs)	B (0.5-3 feet bgs)	C (varies)	A (0-0.5 feet bgs)	B (8-10 feet bgs)	C (varies)	A (0-0.5 feet bgs)
RCRA Metals Analysis												
Arsenic	mg/kg	24	24	95	95	6.4 [c]	5.0 [d]	3.4 J [d]	4.5 [c]	6.0 [c]	4.8 J [d]	1.9 J [c]
Barium	mg/kg	1000	1000	2500	2500	58.8 [c]	98.6 [d]	109 [d]	102 [c]	155 [c]	98.0 [d]	67.6 [c]
Cadmium	mg/kg	14	14	120	120	0.18 J [c]	0.22 J [d]	0.73 J [d]	0.015 U [c]	0.55 J [c]	0.42 J [d]	0.015 J [c]
Chromium	mg/kg	1100	1100	1100	1100	218 [c]	258 [d]	257 [d]	198 [c]	144 [c]	234 [d]	156 [c]
Lead	mg/kg	200	200	800	800	24.1 [c]	33.3 [d]	153 [d]	33.3 [c]	124 [c]	16.9 [d]	25.4 [c]
Mercury	mg/kg	4.7	4.7	61	61	0.2	0.17	0.12	0.18	0.25	0.086	0.53
Selenium	mg/kg	78	78	1000	1000	2.7 [c]	11.5 [d]	12.1 [d]	2.8 [c]	3.7 [c]	9.7 [d]	2.6 [c]
Silver	mg/kg	78	78	1000	1000	0.99 [c]	1.4 J [d]	3.2 [d]	0.75 J [c]	1.2 [c]	1.0 J [d]	1.5 [c]
General Chemistry												
Moisture, Percent	%	-	-	-	-	19.2	20.2	26.2	18.5	17.7	28.1	14

Notes:

[a] Quantitation between primary and confirmation differed by >40%. Lower value reported.

[b] Primary and confirmation results differ by more than 40%. Lower value reported due to possible coelution.

[c] Elevated reporting limit(s) due to dilution required for high interfering element.

[d] Elevated reporting limit(s) due to matrix interference and/or dilution required for high interfering element.

J = The analyte was positively identified; the quantitation is an estimation

[1] HDOH Tier 1 Environmental Action Levels are for sites over a drinking water resource and less than 150 meters to nearest surface water (HDOH, summer 2008 and subsequent updates).

[2] HDOH Tier 1 Environmental Action Levels are for sites over a non-drinking water resource and less than 150 meters to nearest surface water (HDOH, summer 2008 and subsequent updates).

Acronyms:

µg/kg = micrograms per kilogram
bgs = below ground surface
DU = Decision Unit
ft= feet
GC = gas chromatography
MS = mass spectrometry
ND = not detected (the analyte is below the method detection limit indicated in parenthesis)
PAH = polycyclic aromatic hydrocarbons
PCB = polychlorinated biphenyls
RCRA = Resource Conservation and Recovery Act
TPH-g = total petroleum hydrocarbons, gasoline-range organics (C6-C10)
TPH-d = total petroleum hydrocarbons, diesel-range organics (C10-C28)
TPH-o = total petroleum hydrocarbons, oil-range organics (>C28-C40)

	HITS ONLY. Only parameters detected in at least one sample are shown.
Bold	The sample/compound concentration exceeds the specific EAL
"-"	Compound not analyzed

TABLE 4-2

Chemicals Detected in Soil

Site Characterization Report for Banana Patch Properties, Pearl City, Oahu, Hawaii

Honolulu Rail Transit Project

Sample ID / **Sample Date**		**HDOH Tier 1 EALs[1]**	**HDOH EALs[2]**	**HDOH EALs[1]**	**HDOH EALs[2]**	**FASC-DU2B-0514** 5/22/2014	**FASC-DU2C-0514** 5/22/2014	**FASC-DU3A-0514** 5/19/2014	**FASC-DU3B-0514** 5/19/2014	**FASC-DU3C-0514** 5/19/2014	**FASC-DU4A-0514** 5/23/2014	**FASC-DU204A-** 5/23/2014
Decision Unit (DU)		**Unrestricted**	**Unrestricted**	**Commercial/ Industrial**	**Commercial/ Industrial**	**DU2**	**DU2**	**DU3**	**DU3**	**DU3**	**DU4**	**DU4**
Sub Unit (SU)		**DW, <150m to SW**	**NDW, <150m to SW**	**DW, <150m to SW**	**NDW, <150m to SW**	**B (0.5-3 feet bgs)**	**C (varies)**	**A (0-0.5 feet bgs)**	**B (0.5-3 feet bgs)**	**C (varies)**	**A (0-0.5 feet bgs)**	**A (0-0.5 feet bgs)-duplicate**
GC/MS Volatile Organic Compounds (SW846 8260B)												
Tetrachloroethylene	µg/kg	88	88	250	250	ND (17)	ND (23)	-	ND (13)	ND (24)	-	-
TPH-g (C6-C10)	µg/kg	100000	100000	100000	400000	ND (1400)	ND (1900)	-	ND (1100)	ND (2000)	-	-
GC Total Petroleum Hydrocarbons (TPH) (SW846 8015B M)												
TPH-d (C10-C28)	mg/kg	100	500	100	500	100	11.5	64.4 J	46.1 J	10.3 J	37.6	50.2
TPH-o (>C28-C40)	mg/kg	500	500	1000	1000	**736**	50	**634**	469	85.1	289	378
GC/MS Polynuclear Aromatic Hydrocarbons (PAHs) (SW846 8270C BY SIM)												
Acenaphthene	µg/kg	120000	120000	120000	120000	58.4 J	ND (3.3)	ND (17)	ND (33)	ND (3.3)	ND (3.3)	ND (6.7)
Acenaphthylene	µg/kg	13000	13000	13000	13000	ND (49)	ND (3.3)	ND (17)	ND (33)	ND (3.3)	ND (3.3)	ND (6.7)
Anthracene	µg/kg	4300	4300	4300	4300	173 J	4.6 J	ND (17)	ND (33)	ND (3.3)	8.5 J	16.1 J
Benzo(a)anthracene	µg/kg	1500	1500	10000	10000	744	42.5	101	100	4.4 J	79.1	131
Benzo(a)pyrene	µg/kg	150	150	2100	2100	**734**	45.6	122	117	4.1 J	86.2	147
Benzo(b)fluoranthene	µg/kg	1500	1500	9200	21000	686	46.8	117	86.2	4.2 J	92.3	152
Benzo(g,h,i)perylene	µg/kg	27000	27000	27000	27000	328	21.4	77.1	67.4	3.9 J	36.8	58
Benzo(k)fluoranthene	µg/kg	15000	15000	39000	39000	731	39.6	165	138	6.2 J	100	170
Chrysene	µg/kg	10000	10000	10000	10000	969	50	137	134	5.7 J	108	189
Dibenzo(a,h)anthracene	µg/kg	150	150	2100	2100	53.4 J	3.7 J	23.9 J	ND (19)	ND (1.9)	13.3	16.2
Fluoranthene	µg/kg	87000	87000	87000	87000	1850	75.2	178	183 J	9.3 J	150	283
Fluorene	µg/kg	100000	100000	100000	100000	ND (49)	ND (3.3)	ND (17)	ND (33)	ND (3.3)	ND (3.3)	ND (6.7)
Indeno(1,2,3-cd)pyrene	µg/kg	1500	1500	21000	21000	412	27.4	78	57.6 J	3.4 J	46.7	71.7
1-Methylnaphthalene	µg/kg	790	790	790	790	ND (99)	ND (6.6)	ND (33)	ND (67)	ND (6.7)	ND (6.6)	ND (13)
2-Methylnaphthalene	µg/kg	870	870	870	870	ND (99)	ND (6.6)	ND (33)	ND (67)	ND (6.7)	ND (6.6)	ND (13)
Naphthalene	µg/kg	4400	4500	4400	6200	ND (99)	ND (6.6)	ND (33)	ND (67)	ND (6.7)	ND (6.6)	ND (13)
Phenanthrene	µg/kg	69000	69000	69000	69000	1060	19.7 J	61.8 J	65.7 J	5.6 J	59	124
Pyrene	µg/kg	44000	44000	44000	44000	1690	66.2	230	212 J	10.5 J	180	353
GC Pesticides (SW846 8081A)												
Chlordane	µg/kg	16000	16000	29000	29000	873 J	ND (33)	741 J	2110	85.4 J	2390	2180
Dieldrin	µg/kg	1500	1500	11000	11000	64.1 J	ND (6.0)	123	95.4 J	ND (6.0)	129 J	129 J
4,4'-DDD	µg/kg	2000	2000	7200	7200	ND (28)	ND (7.0)	35.0 J	ND (21)	ND (7.0)	ND (28)	ND (28)
4,4'-DDE	µg/kg	1400	1400	5100	5100	31.5 J	34.3	52.5 J	56.1 J	20.4 J	41.1 J	39.6 J
4,4'-DDT	µg/kg	1700	1700	5600	5600	ND (20)	62	877	112	ND (5.0)	53.8 J	38.6 J
Endrin	µg/kg	3700	3700	30000	30000	ND (24)	ND (6.0)	ND (18)	ND (18)	ND (6.0)	ND (24)	ND (24)
Heptachlor	µg/kg	110	110	380	380	ND (19)	ND (4.7)	ND (14)	ND (14)	ND (4.7)	ND (19)	ND (19)
Heptachlor epoxide	µg/kg	53	53	190	190	ND (20)	ND (5.0)	17.4 J	23.9 J	ND (5.0)	**67.1 J**	**61.6 J**
GC Polychlorinated Biphenyls (PCBs) (SW846 8082)												
Aroclor 1248	µg/kg	1100	1100	6300	6300	ND (170)	ND (50)	ND (17)	ND (17)	ND (17)	ND (170)	ND (170)
Aroclor 1260	µg/kg	1100	1100	6300	6300	ND (66)	ND (20)	44.7	23.4 J	9.0 J	ND (66)	ND (66)
GC Herbicides (SW846 8151A)												
Dinoseb	µg/kg	-	-	-	-	ND (20)	40.4 J	ND (20)	22.7 J [b]	ND (26)	ND (20)	64.5 J
Pentachlorophenol	µg/kg	820	890	820	2700	2.2 J	1.4 J [b]	10	3.8 [b]	5.2	1.9 J	9.7

TABLE 4-2

Chemicals Detected in Soil

Site Characterization Report for Banana Patch Properties, Pearl City, Oahu, Hawaii

Honolulu Rail Transit Project

Sample ID / Sample Date		HDOH Tier 1 EALs[1]	HDOH EALs[2]	HDOH EALs[1]	HDOH EALs[2]	FASC-DU2B-0514 5/22/2014	FASC-DU2C-0514 5/22/2014	FASC-DU3A-0514 5/19/2014	FASC-DU3B-0514 5/19/2014	FASC-DU3C-0514 5/19/2014	FASC-DU4A-0514 5/23/2014	FASC-DU204A- 5/23/2014
Decision Unit (DU)		**Unrestricted**	**Unrestricted**	**Commercial/ Industrial**	**Commercial/ Industrial**	**DU2**	**DU2**	**DU3**	**DU3**	**DU3**	**DU4**	**DU4**
Sub Unit (SU)		**DW, <150m to SW**	**NDW, <150m to SW**	**DW, <150m to SW**	**NDW, <150m to SW**	**B (0.5-3 feet bgs)**	**C (varies)**	**A (0-0.5 feet bgs)**	**B (0.5-3 feet bgs)**	**C (varies)**	**A (0-0.5 feet bgs)**	**A (0-0.5 feet bgs)-duplicate**
RCRA Metals Analysis												
Arsenic	mg/kg	24	24	95	95	1.6 J [c]	0.070 U [c]	7.9 [c]	9.7 [c]	1.3 J [c]	3.0 [c]	1.7 J [c]
Barium	mg/kg	1000	1000	2500	2500	87.5 [c]	75.6 [c]	107 [c]	81.0 [c]	33.1 [c]	149 [c]	130 [c]
Cadmium	mg/kg	14	14	120	120	0.32 J [c]	0.090 J [c]	1.0 [c]	0.66 J [c]	0.59 J [c]	0.14 J [c]	0.12 J [c]
Chromium	mg/kg	1100	1100	1100	1100	142 [c]	134 [c]	135 [c]	114 [c]	91.0 [c]	103 [c]	122 [c]
Lead	mg/kg	200	200	800	800	41.6 [c]	87.6 [c]	157 [c]	62.6 [c]	21.7 [c]	**720 [c]**	**851 [c]**
Mercury	mg/kg	4.7	4.7	61	61	0.17	0.058	0.21	0.16	0.066	0.14	0.13
Selenium	mg/kg	78	78	1000	1000	2.3 [c]	2.3 [c]	1.8 J [c]	1.7 J [c]	2.0 [c]	3.0 [c]	1.9 J [c]
Silver	mg/kg	78	78	1000	1000	0.96 [c]	1.0 [c]	0.043 U [c]	0.082 J [c]	0.13 J [c]	0.61 J [c]	1.2 [c]
General Chemistry												
Moisture, Percent	%	-	-	-	-	15.8	30.6	15.3	6	35.2	17.2	17.6

Notes:

[a] Quantitation between primary and confirmation differed by >40%. Lower value reported.

[b] Primary and confirmation results differ by more than 40%. Lower value reported due to possible coelution.

[c] Elevated reporting limit(s) due to dilution required for high interfering element.

[d] Elevated reporting limit(s) due to matrix interference and/or dilution required for high interfering element.

J = The analyte was positively identified; the quantitation is an estimation

[1] HDOH Tier 1 Environmental Action Levels are for sites over a drinking water resource and less than 150 meters to nearest surface water (HDOH, summer 2008 and subsequent updates).

[2] HDOH Tier 1 Environmental Action Levels are for sites over a non-drinking water resource and less than 150 meters to nearest surface water (HDOH, summer 2008 and subsequent updates).

Acronyms:

µg/kg = micrograms per kilogram
bgs = below ground surface
DU = Decision Unit
ft= feet
GC = gas chromatography
MS = mass spectrometry
ND = not detected (the analyte is below the method detection limit indicated in parenthesis)
PAH = polycyclic aromatic hydrocarbons
PCB = polychlorinated biphenyls
RCRA = Resource Conservation and Recovery Act
TPH-g = total petroleum hydrocarbons, gasoline-range organics (C6-C10)
TPH-d = total petroleum hydrocarbons, diesel-range organics (C10-C28)
TPH-o = total petroleum hydrocarbons, oil-range organics (>C28-C40)

	HITS ONLY. Only parameters detected in at least one sample are shown.
Bold	The sample/compound concentration exceeds the specific EAL
"-"	Compound not analyzed

TABLE 4-2

Chemicals Detected in Soil

Site Characterization Report for Banana Patch Properties, Pearl City, Oahu, Hawaii

Honolulu Rail Transit Project

Sample ID		**HDOH Tier 1 EALs[1]**	**HDOH EALs[2]**	**HDOH EALs[1]**	**HDOH EALs[2]**	**FASC-DU304A-**	**FASC-DU4B-0614**	**FASC-DU5A-0514**	**FASC-DU5B-0514**	**FASC-DU5C-0514**	**FASC-DU5D-0514**	**FASC-DU6A-0514**	**FASC-DU206A-**
Sample Date						**5/23/2014**	**5/23/2014**	**5/21/2014**	**5/21/2014**	**5/21/2014**	**5/21/2014**	**5/20/2014**	**5/20/2014**
Decision Unit (DU)		**Unrestricted**	**Unrestricted**	**Commercial/ Industrial**	**Commercial/ Industrial**	**DU4**	**DU4**	**DU5**	**DU5**	**DU5**	**DU5**	**DU6**	**DU6**
Sub Unit (SU)		**DW, <150m to SW**	**NDW, <150m to SW**	**DW, <150m to SW**	**NDW, <150m to SW**	**A (0-0.5 feet bgs)-triplicate**	**B (0-3 feet bgs)**	**A (0-5 feet bgs)**	**B (5-10 feet bgs)**	**C (10-15 feet bgs)**	**D (15-20 feet bgs)**	**A (0-5 feet bgs)**	**A (0-5 feet bgs)-duplicate**
GC/MS Volatile Organic Compounds (SW846 8260B)													
Tetrachloroethylene	µg/kg	88	88	250	250	-	-	ND (17)	ND (16)	ND (16)	ND (23)	ND (20)	ND (16)
TPH-g (C6-C10)	µg/kg	100000	100000	100000	400000	-	-	ND (1400)	ND (1300)	ND (1300)	ND (1900)	ND (1700)	ND (1300)
GC Total Petroleum Hydrocarbons (TPH) (SW846 8015B M)													
TPH-d (C10-C28)	mg/kg	100	500	100	500	40.3	-	**208 J**	**283 J**	**262 J**	82.5 J	**185 J**	**200 J**
TPH-o (>C28-C40)	mg/kg	500	500	1000	1000	324	-	**1970**	**2450**	**2370**	**619**	**1070**	**1290**
GC/MS Polynuclear Aromatic Hydrocarbons (PAHs) (SW846 8270C BY SIM)													
Acenaphthene	µg/kg	120000	120000	120000	120000	ND (6.7)	-	ND (50)	ND (50)	ND (50)	ND (6.6)	32.9 J	25.3 J
Acenaphthylene	µg/kg	13000	13000	13000	13000	ND (6.7)	-	ND (50)	ND (50)	ND (50)	ND (6.6)	31.9 J	ND (25)
Anthracene	µg/kg	4300	4300	4300	4300	12.8 J	-	ND (50)	ND (50)	ND (50)	ND (6.6)	124 J	88.7 J
Benzo(a)anthracene	µg/kg	1500	1500	10000	10000	85.4	-	101	176	101	18.6	947	731
Benzo(a)pyrene	µg/kg	150	150	2100	2100	88.3	-	131	**211**	**176**	32.6	**1080**	**905**
Benzo(b)fluoranthene	µg/kg	1500	1500	9200	21000	82.3	-	117	264	220	41.5	853	592
Benzo(g,h,i)perylene	µg/kg	27000	27000	27000	27000	54.2	-	103	142	102	17.6	373	309
Benzo(k)fluoranthene	µg/kg	15000	15000	39000	39000	97.3	-	110	182	194	36.6	1370	1210
Chrysene	µg/kg	10000	10000	10000	10000	122	-	141	230	220	41.4	1370	1110
Dibenzo(a,h)anthracene	µg/kg	150	150	2100	2100	8.8 J	-	ND (28)	ND (28)	30.5 J	4.5 J	137	96.7
Fluoranthene	µg/kg	87000	87000	87000	87000	190	-	165 J	269 J	94.5 J	23.4 J	1440	1100
Fluorene	µg/kg	100000	100000	100000	100000	ND (6.7)	-	ND (50)	ND (50)	ND (50)	ND (6.6)	33.8 J	ND (25)
Indeno(1,2,3-cd)pyrene	µg/kg	1500	1500	21000	21000	51.6	-	89.3 J	143	102	20.3	427	381
1-Methylnaphthalene	µg/kg	790	790	790	790	ND (13)	-	ND (100)	ND (100)	ND (100)	ND (13)	52.3 J	ND (50)
2-Methylnaphthalene	µg/kg	870	870	870	870	ND (13)	-	ND (100)	ND (100)	ND (100)	ND (13)	ND (50)	ND (50)
Naphthalene	µg/kg	4400	4500	4400	6200	ND (13)	-	ND (100)	ND (100)	ND (100)	ND (13)	ND (50)	ND (50)
Phenanthrene	µg/kg	69000	69000	69000	69000	93.5	-	52.9 J	86.1 J	ND (50)	7.6 J	1110	781
Pyrene	µg/kg	44000	44000	44000	44000	192	-	215 J	308 J	144 J	36.0 J	2530	2060
GC Pesticides (SW846 8081A)													
Chlordane	µg/kg	16000	16000	29000	29000	3080	-	1680 J	753 J	565 J	935	1710	1670
Dieldrin	µg/kg	1500	1500	11000	11000	186	-	50.0 J	35.9 J	ND (30)	ND (12)	471	529
4,4'-DDD	µg/kg	2000	2000	7200	7200	ND (28)	-	ND (35)	ND (21)	ND (35)	ND (14)	ND (21)	ND (21)
4,4'-DDE	µg/kg	1400	1400	5100	5100	42.0 J	-	33.1 J	ND (18)	ND (30)	12.9 J	25.4 J	20.8 J
4,4'-DDT	µg/kg	1700	1700	5600	5600	80.8 J	-	ND (25)	16.6 J	ND (25)	ND (10)	24.9 J	24.6 J
Endrin	µg/kg	3700	3700	30000	30000	ND (24)	-	ND (30)	ND (18)	ND (30)	ND (12)	ND (18)	ND (18)
Heptachlor	µg/kg	110	110	380	380	ND (19)	-	ND (23)	ND (14)	ND (23)	ND (9.3)	ND (14)	ND (14)
Heptachlor epoxide	µg/kg	53	53	190	190	**79.3 J**	-	ND (25)	ND (15)	ND (25)	ND (10)	25.5 J	25.7 J
GC Polychlorinated Biphenyls (PCBs) (SW846 8082)													
Aroclor 1248	µg/kg	1100	1100	6300	6300	ND (170)	-	ND (330)	ND (330)	ND (330)	ND (170)	ND (170)	ND (170)
Aroclor 1260	µg/kg	1100	1100	6300	6300	ND (66)	-	ND (130)	ND (130)	ND (130)	ND (67)	ND (67)	ND (67)
GC Herbicides (SW846 8151A)													
Dinoseb	µg/kg	-	-	-	-	19.6 J [b]	-	32.8 J	23.2 J	ND (18)	ND (23)	52.3 J	53.8 J [b]
Pentachlorophenol	µg/kg	820	890	820	2700	21	-	2.6 J	5.6	2.1 J	1.1 J [b]	4.8 [b]	7.4

TABLE 4-2

Chemicals Detected in Soil

Site Characterization Report for Banana Patch Properties, Pearl City, Oahu, Hawaii

Honolulu Rail Transit Project

Sample ID / **Sample Date**		HDOH Tier 1 EALs[1]	HDOH EALs[2]	HDOH EALs[1]	HDOH EALs[2]	FASC-DU304A- 5/23/2014	FASC-DU4B-0614 5/23/2014	FASC-DU5A-0514 5/21/2014	FASC-DU5B-0514 5/21/2014	FASC-DU5C-0514 5/21/2014	FASC-DU5D-0514 5/21/2014	FASC-DU6A-0514 5/20/2014	FASC-DU206A- 5/20/2014
Decision Unit (DU)		Unrestricted	Unrestricted	Commercial/ Industrial	Commercial/ Industrial	DU4	DU4	DU5	DU5	DU5	DU5	DU6	DU6
Sub Unit (SU)		DW, <150m to SW	NDW, <150m to SW	DW, <150m to SW	NDW, <150m to SW	A (0-0.5 feet bgs)- triplicate	B (0-3 feet bgs)	A (0-5 feet bgs)	B (5-10 feet bgs)	C (10-15 feet bgs)	D (15-20 feet bgs)	A (0-5 feet bgs)	A (0-5 feet bgs)- duplicate
RCRA Metals Analysis													
Arsenic	mg/kg	24	24	95	95	1.8 J [c]	0.50 J [d]	**50.1 [c]**	7.3 [c]	9.1 [c]	1.9 J [c]	6.2 [c]	8.5 [c]
Barium	mg/kg	1000	1000	2500	2500	132 [c]	162 [d]	115 [c]	139 [c]	99.1 [c]	112 [c]	113 [c]	98.5 [c]
Cadmium	mg/kg	14	14	120	120	0.19 J [c]	1.0 J [d]	0.045 J [c]	0.20 J [c]	0.14 J [c]	0.015 U [c]	1.0 [c]	1.2 [c]
Chromium	mg/kg	1100	1100	1100	1100	122 [c]	101 [d]	193 [c]	122 [c]	139 [c]	165 [c]	103 [c]	119 [c]
Lead	mg/kg	200	200	800	800	**873 [c]**	**902 [d]**	**804 [c]**	182 [c]	45.9 [c]	36.5 [c]	118 [c]	**227 [c]**
Mercury	mg/kg	4.7	4.7	61	61	0.13	0.11	0.14	0.15	0.15	0.081	0.14	0.21
Selenium	mg/kg	78	78	1000	1000	2.4 [c]	2.8 [d]	4.0 [c]	2.5 [c]	2.8 [c]	2.7 [c]	1.1 J [c]	2.1 [c]
Silver	mg/kg	78	78	1000	1000	0.044 U [c]	0.49 J [d]	0.39 J [c]	0.69 J [c]	1.1 [c]	0.84 J [c]	0.12 J [c]	0.044 U [c]
General Chemistry													
Moisture, Percent	%	-	-	-	-	6.3	17.9	16.9	12.8	12.7	30.2	16.3	14

Notes:

[a] Quantitation between primary and confirmation differed by >40%. Lower value reported.

[b] Primary and confirmation results differ by more than 40%. Lower value reported due to possible coelution.

[c] Elevated reporting limit(s) due to dilution required for high interfering element.

[d] Elevated reporting limit(s) due to matrix interference and/or dilution required for high interfering element.

J = The analyte was positively identified; the quantitation is an estimation

[1] HDOH Tier 1 Environmental Action Levels are for sites over a drinking water resource and less than 150 meters to nearest surface water (HDOH, summer 2008 and subsequent updates).

[2] HDOH Tier 1 Environmental Action Levels are for sites over a non-drinking water resource and less than 150 meters to nearest surface water (HDOH, summer 2008 and subsequent updates).

Acronyms:

µg/kg = micrograms per kilogram
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DU = Decision Unit
ft= feet
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MS = mass spectrometry
ND = not detected (the analyte is below the method detection limit indicated in parenthesis)
PAH = polycyclic aromatic hydrocarbons
PCB = polychlorinated biphenyls
RCRA = Resource Conservation and Recovery Act
TPH-g = total petroleum hydrocarbons, gasoline-range organics (C6-C10)
TPH-d = total petroleum hydrocarbons, diesel-range organics (C10-C28)
TPH-o = total petroleum hydrocarbons, oil-range organics (>C28-C40)

	HITS ONLY. Only parameters detected in at least one sample are shown.
Bold	The sample/compound concentration exceeds the specific EAL
"-"	Compound not analyzed

TABLE 4-2

Chemicals Detected in Soil

Site Characterization Report for Banana Patch Properties, Pearl City, Oahu, Hawaii

Honolulu Rail Transit Project

Sample ID **Sample Date**		**HDOH Tier 1 EALs[1]**	**HDOH EALs[2]**	**HDOH EALs[1]**	**HDOH EALs[2]**	**FASC-DU306A-** **5/20/2014**	**FASC-DU6B-0514** **5/20/2014**	**FASC-DU6C-0514** **5/20/2014**	**FASC-DU6D-0514** **5/20/2014**	**FADS-DU6D1-0514** **5/23/2014**	**FADS-DU6D2-0514** **5/23/2014**	**FADS-DU6D3-0514** **5/28/2014**	**BKSC-DU7-0514** **5/28/2014**
Decision Unit (DU)		**Unrestricted**	**Unrestricted**	**Commercial/ Industrial**	**Commercial/ Industrial**	**DU6**	**DU6**	**DU6**	**DU6**	**DU6**	**DU6**	**DU6**	**DU7**
Sub Unit (SU)		**DW, <150m to SW**	**NDW, <150m to SW**	**DW, <150m to SW**	**NDW, <150m to SW**	**A (0-5 feet bgs)-triplicate**	**B (5-10 feet bgs)**	**C (10-15 feet bgs)**	**D (15-20 feet bgs)**	**Discrete (14-17 feet bgs)**	**Discrete (14-17 feet bgs)**	**Discrete (14-17 feet bgs)**	**Stream Bank (0-1 feet bgs**
GC/MS Volatile Organic Compounds (SW846 8260B)													
Tetrachloroethylene	µg/kg	88	88	250	250	ND (17)	ND (17)	ND (22)	ND (20)	ND (21)	ND (23)	ND (21)	-
TPH-g (C6-C10)	µg/kg	100000	100000	100000	400000	ND (1400)	ND (1400)	ND (1800)	ND (1700)	ND (1700)	ND (1900)	ND (1800)	-
GC Total Petroleum Hydrocarbons (TPH) (SW846 8015B M)													
TPH-d (C10-C28)	mg/kg	100	500	100	500	**158 J**	**163 J**	**141 J**	36.0 J	6.23	3.32 J	4.24 J	33.4
TPH-o (>C28-C40)	mg/kg	500	500	1000	1000	**1140**	**1150**	**1010**	182	22.3	6.73 J	25.1	257
GC/MS Polynuclear Aromatic Hydrocarbons (PAHs) (SW846 8270C BY SIM)													
Acenaphthene	µg/kg	120000	120000	120000	120000	ND (25)	27.4 J	ND (25)	ND (8.3)	ND (4.7)	ND (2.6)	3.0 J	ND (6.6)
Acenaphthylene	µg/kg	13000	13000	13000	13000	28.4 J	ND (25)	ND (25)	ND (8.3)	ND (4.7)	ND (2.6)	2.3 J	ND (6.6)
Anthracene	µg/kg	4300	4300	4300	4300	100 J	101 J	73.7 J	15.3 J	ND (4.7)	ND (2.6)	12.1 J	15.0 J
Benzo(a)anthracene	µg/kg	1500	1500	10000	10000	666	671	539	84.1	7.2 J	ND (1.3)	64.7	130
Benzo(a)pyrene	µg/kg	150	150	2100	2100	**856**	**738**	**617**	87.6	15.7	ND (0.88)	63.2	123
Benzo(b)fluoranthene	µg/kg	1500	1500	9200	21000	563	674	480	80.2	15.4	ND (1.0)	45.4	92.3
Benzo(g,h,i)perylene	µg/kg	27000	27000	27000	27000	325	235	207	36.2	17.3	ND (1.1)	33.4	67.9
Benzo(k)fluoranthene	µg/kg	15000	15000	39000	39000	1130	1020	805	122	18.2	ND (1.2)	51.5	109
Chrysene	µg/kg	10000	10000	10000	10000	999	936	726	109	10.5	ND (1.0)	93.2	149
Dibenzo(a,h)anthracene	µg/kg	150	150	2100	2100	125	106	77.3	14.4 J	4.7 J	ND (1.5)	10.9	19.8
Fluoranthene	µg/kg	87000	87000	87000	87000	1060	950	786	142	6.1 J	ND (2.6)	104	192
Fluorene	µg/kg	100000	100000	100000	100000	ND (25)	ND (25)	ND (25)	ND (8.3)	ND (4.7)	ND (2.6)	2.7 J	ND (6.6)
Indeno(1,2,3-cd)pyrene	µg/kg	1500	1500	21000	21000	354	291	254	45.4	16.9	ND (1.3)	36.4	73.4
1-Methylnaphthalene	µg/kg	790	790	790	790	ND (50)	ND (50)	ND (50)	ND (17)	ND (9.4)	ND (5.2)	11.8 J	ND (13)
2-Methylnaphthalene	µg/kg	870	870	870	870	ND (50)	ND (50)	ND (50)	ND (17)	ND (9.4)	ND (5.2)	8.0 J	ND (13)
Naphthalene	µg/kg	4400	4500	4400	6200	ND (50)	ND (50)	ND (50)	ND (17)	ND (9.4)	ND (5.2)	4.0 J	ND (13)
Phenanthrene	µg/kg	69000	69000	69000	69000	767	596	437	75.3 J	ND (4.7)	ND (2.6)	126	98
Pyrene	µg/kg	44000	44000	44000	44000	1920	1590	1220	201	7.0 J	ND (2.6)	128	233
GC Pesticides (SW846 8081A)													
Chlordane	µg/kg	16000	16000	29000	29000	2000	1410	3810	2100	12.3 J	ND (5.2)	48.1 J	526
Dieldrin	µg/kg	1500	1500	11000	11000	539	105	140	ND (18)	ND (0.85)	ND (0.93)	ND (1.2)	6.9 J [a]
4,4'-DDD	µg/kg	2000	2000	7200	7200	ND (21)	ND (21)	ND (21)	ND (21)	ND (0.99)	ND (1.1)	3.1 J [a]	ND (2.1)
4,4'-DDE	µg/kg	1400	1400	5100	5100	23.2 J	ND (18)	32.2 J	ND (18)	12	ND (0.93)	13.9	8.0 J
4,4'-DDT	µg/kg	1700	1700	5600	5600	25.9 J	44.9 J	137	ND (15)	1.7 J	ND (0.77)	11.6	11.9
Endrin	µg/kg	3700	3700	30000	30000	ND (18)	ND (18)	ND (18)	ND (18)	1.8 J	ND (0.93)	ND (1.2)	ND (1.8)
Heptachlor	µg/kg	110	110	380	380	ND (14)	ND (14)	ND (14)	ND (14)	0.80 J	ND (0.72)	ND (0.93)	ND (1.4)
Heptachlor epoxide	µg/kg	53	53	190	190	30.9 J	ND (15)	31.1 J	**84.1 J**	ND (0.71)	ND (0.77)	ND (1.0)	8.3 J
GC Polychlorinated Biphenyls (PCBs) (SW846 8082)													
Aroclor 1248	µg/kg	1100	1100	6300	6300	ND (170)	ND (170)	ND (170)	ND (170)	ND (24)	ND (26)	ND (17)	ND (17)
Aroclor 1260	µg/kg	1100	1100	6300	6300	ND (66)	ND (67)	ND (67)	ND (66)	ND (9.4)	ND (10)	ND (6.7)	26.2 J
GC Herbicides (SW846 8151A)													
Dinoseb	µg/kg	-	-	-	-	47.5 J [b]	34.2 J	58.6 J [b]	ND (22)	47.1 J [b]	ND (25)	ND (24)	ND (22)
Pentachlorophenol	µg/kg	820	890	820	2700	5.3 [b]	7.8	20.9	13.2 [b]	28.3	1.4 J	1.8 J	1.3 J

TABLE 4-2

Chemicals Detected in Soil

Site Characterization Report for Banana Patch Properties, Pearl City, Oahu, Hawaii

Honolulu Rail Transit Project

Sample ID / Sample Date		HDOH Tier 1 EALs[1]	HDOH EALs[2]	HDOH EALs[1]	HDOH EALs[2]	FASC-DU306A- 5/20/2014	FASC-DU6B-0514 5/20/2014	FASC-DU6C-0514 5/20/2014	FASC-DU6D-0514 5/20/2014	FADS-DU6D1-0514 5/23/2014	FADS-DU6D2-0514 5/23/2014	FADS-DU6D3-0514 5/28/2014	BKSC-DU7-0514 5/28/2014
Decision Unit (DU)		**Unrestricted**	**Unrestricted**	**Commercial/ Industrial**	**Commercial/ Industrial**	**DU6**	**DU6**	**DU6**	**DU6**	**DU6**	**DU6**	**DU6**	**DU7**
Sub Unit (SU)		**DW, <150m to SW**	**NDW, <150m to SW**	**DW, <150m to SW**	**NDW, <150m to SW**	**A (0-5 feet bgs)-triplicate**	**B (5-10 feet bgs)**	**C (10-15 feet bgs)**	**D (15-20 feet bgs)**	**Discrete (14-17 feet bgs)**	**Discrete (14-17 feet bgs)**	**Discrete (14-17 feet bgs)**	**Stream Bank (0-1 feet bgs**
RCRA Metals Analysis													
Arsenic	mg/kg	24	24	95	95	6.6 [c]	11.0 [c]	8.4 [c]	6.4 [c]	1.2 J [d]	0.99 J [d]	4.2 J [d]	5.5 [d]
Barium	mg/kg	1000	1000	2500	2500	94.7 [c]	174 [c]	119 [c]	75.7 [c]	86.7 [d]	67.6 [d]	128 [d]	121 [d]
Cadmium	mg/kg	14	14	120	120	1.0 [c]	1.2 [c]	0.68 J [c]	0.66 J [c]	0.78 J [d]	0.64 J [d]	0.53 J [d]	0.73 J [d]
Chromium	mg/kg	1100	1100	1100	1100	119 [c]	97.5 [c]	96.6 [c]	100 [c]	164 [d]	154 [d]	245 [d]	234 [d]
Lead	mg/kg	200	200	800	800	74.5 [c]	**239 [c]**	93.5 [c]	29.8 [c]	30.4 [d]	3.0 [d]	**362 [d]**	141 [d]
Mercury	mg/kg	4.7	4.7	61	61	0.15	0.36	0.31	0.14	0.092	0.057 J	0.13	0.1
Selenium	mg/kg	78	78	1000	1000	1.9 J [c]	0.93 J [c]	1.7 J [c]	2.1 [c]	3.0 [d]	2.5 J [d]	13.6 [d]	10.7 [d]
Silver	mg/kg	78	78	1000	1000	0.043 U [c]	2.8 [c]	0.044 U [c]	0.18 J [c]	0.20 J [d]	0.072 J [d]	1.4 J [d]	3.1 [d]
General Chemistry													
Moisture, Percent	%	-	-	-	-	16.6	7.4	26.3	25.4	29.9	36.1	29.7	25.4

Notes:

[a] Quantitation between primary and confirmation differed by >40%. Lower value reported.

[b] Primary and confirmation results differ by more than 40%. Lower value reported due to possible coelution.

[c] Elevated reporting limit(s) due to dilution required for high interfering element.

[d] Elevated reporting limit(s) due to matrix interference and/or dilution required for high interfering element.

J = The analyte was positively identified; the quantitation is an estimation

[1] HDOH Tier 1 Environmental Action Levels are for sites over a drinking water resource and less than 150 meters to nearest surface water (HDOH, summer 2008 and subsequent updates).

[2] HDOH Tier 1 Environmental Action Levels are for sites over a non-drinking water resource and less than 150 meters to nearest surface water (HDOH, summer 2008 and subsequent updates).

Acronyms:

µg/kg = micrograms per kilogram

bgs = below ground surface

DU = Decision Unit

ft= feet

GC = gas chromatography

MS = mass spectrometry

ND = not detected (the analyte is below the method detection limit indicated in parenthesis)

PAH = polycyclic aromatic hydrocarbons

PCB = polychlorinated biphenyls

RCRA = Resource Conservation and Recovery Act

TPH-g = total petroleum hydrocarbons, gasoline-range organics (C6-C10)

TPH-d = total petroleum hydrocarbons, diesel-range organics (C10-C28)

TPH-o = total petroleum hydrocarbons, oil-range organics (>C28-C40)

	HITS ONLY. Only parameters detected in at least one sample are shown.
Bold	The sample/compound concentration exceeds the specific EAL
"-"	Compound not analyzed

TABLE 4-3

Soil Samples Analyzed for Additional Waste Characterization

Site Characterization Report for Banana Patch Properties, Pearl City, Oahu, Hawaii

Honolulu Rail Transit Project

Sample ID / Sample Date		HDOH Tier 1 EALs[1]	HDOH EALs[2]	RCRA TCLP Limit[3]	FASC-DU1SA-0514 5/22/2014	FASC-DU1SB-0514 5/22/2014	FASC-DU2A-0514 5/22/2014	FASC-DU2B-0514 5/22/2014	FASC-DU2C-0514 5/19/2014	FASC-DU3A-0514 5/19/2014	FASC-DU3B-0514 5/19/2014
Decision Unit (DU)		Unrestricted	C/I		DU1S (South)	DU1S (South)	DU2	DU2	DU2	DU3	DU3
Sample Unit (SU)	Units	DW, <150m SW	NDW, <150m SW		A (0-0.5 feet bgs)	B (8-10 feet bgs)	A (0-0.5 feet bgs)	B (0.5-3 feet bgs)	C (varies)	A (0-0.5 feet bgs)	B (0.5-3 feet bgs)
GC Total Petroleum Hydrocarbons (TPH) (SW846 8015B M)											
TPH-d (C10-C28)	mg/kg	100	500	-	45.0 J	84.5	ND (170)	100	11.5	64.4 J	46.1 J
TPH-ORO (>C28-C40)	mg/kg	500	1000	-	359	647	1410	736	50	634	469
Metals Analysis											
Chromium	mg/kg	1100	1100	-	198 [c]	144 [c]	156 [c]	142 [c]	134 [c]	135 [c]	114 [c]
Lead	mg/kg	200	800	-	33.3 [c]	124 [c]	25.4 [c]	41.6 [c]	87.6 [c]	157 [c]	62.6 [c]
TCLP Metals Analysis											
Chromium	mg/L	-	-	5	0.0021 U	0.0021 U	0.0021 U	0.0035 J	0.0021 U	0.030 J	0.022 J
Lead	mg/L	-	-	5	-	0.0043 U	-	-	-	0.015 J	0.0045 J
General Chemistry											
Moisture, Percent	%	-	-	-	18.5	17.7	14	15.8	30.6	15.3	6

Notes:

[a] Quantitation between primary and confirmation differed by >40%. Lower value reported.

[b] Primary and confirmation results differ by more than 40%. Lower value reported due to possible coelution.

[c] Elevated reporting limit(s) due to dilution required for high interfering element.

[d] Elevated reporting limit(s) due to matrix interference and/or dilution required for high interfering element.

J = The analyte was positively identified; the quantitation is an estimation

U = The analyte was not detected (below the indicated detection limit)

[1] HDOH Tier 1 Environmental Action Levels are for unrestricted/residential sites within 150 meters of surface water bodies, where groundwater is threatened (HDOH, summer 2008 and subsequent updates).

[2] HDOH Environmental Action Levels are for commercial/industrial sites within 150 meters of surface water bodies, where groundwater is not threatened (HDOH, summer 2008 and subsequent updates).

[3] Toxicity Characteristic Leaching Procedure (TCLP) limit derived from Resource Conservation and Recovery Act (RCRA) (40 CFR 261, Appendix II, 1993).

Samples below had total metals results >20Xs the TCLP limit and were additionally analyzed for TCLP.

Acronyms:

bgs = below ground surface
C/I = commercial/industrial
DU = Decision Unit
ft= feet
GC = gas chromatography
MS = mass spectrometry
PAH = polycyclic aromatic hydrocarbons
PCB = polychlorinated biphenyls
RCRA = Resource Conservation and Recovery Act

	HITS ONLY. Only parameters detected in at least one sample are shown.
Bold	Indicates that soil may be considered "special waste" with higher pricing if disposed at landfill. Contractor to verify additional waste sampling/characterization requirements with landfill.
"-"	Compound not analyzed

TABLE 4-3
Soil Samples Analyzed for Additional Waste Characterization
Site Characterization Report for Banana Patch Properties, Pearl City, Oahu, Hawaii
Honolulu Rail Transit Project

Sample ID Sample Date		HDOH Tier 1 EALs[1] Unrestricted	HDOH EALs[2] C/I	RCRA TCLP Limit[3]	FASC-DU4A-0514 5/23/2014	FASC-DU5A-0514 5/21/2014	FASC-DU5B-0514 5/21/2014	FASC-DU5C-0514 5/21/2014	FASC-DU5D-0514 5/21/2014	FAWC-DU50106AB- 5/21/2014	FAWC-DU50106C- 5/21/2014
Decision Unit (DU)					DU4	DU5	DU5	DU5	DU5	DU5	DU5
Sample Unit (SU)	Units	DW, <150m SW	NDW, <150m SW		A (0-0.5 feet bgs)	A (0-0.5 feet bgs)	B (5-10 feet bgs)	C (10-15 feet bgs)	D (15-20 feet bgs)	A and B borings 1-6	C borings 1-6
GC Total Petroleum Hydrocarbons (TPH) (SW846 8015B M)											
TPH-d (C10-C28)	mg/kg	100	500	-	37.6	208 J	283 J	262 J	82.5 J	102	9.65
TPH-ORO (>C28-C40)	mg/kg	500	1000	-	289	1970	2450	2370	619	683	57.7
Metals Analysis											
Chromium	mg/kg	1100	1100	-	103 c	193 c	122 c	139 c	165 c	-	-
Lead	mg/kg	200	800	-	720 c	**804 c**	182 c	45.9 c	36.5 c	-	-
TCLP Metals Analysis											
Chromium	mg/L	-	-	5	0.0021 U	0.0021 U	0.0021 U	0.0021 U	0.018 J	-	-
Lead	mg/L	-	-	5	0.19	0.13	0.028 J	-	-	-	-
General Chemistry											
Moisture, Percent	%	-	-	-	17.2	16.9	12.8	12.7	30.2	16.2	27.5

Notes:
[a] Quantitation between primary and confirmation differed by >40%. Lower value reported.
[b] Primary and confirmation results differ by more than 40%. Lower value reported due to possible coelution.
[c] Elevated reporting limit(s) due to dilution required for high interfering element.
[d] Elevated reporting limit(s) due to matrix interference and/or dilution required for high interfering element.

J = The analyte was positively identified; the quantitation is an estimation
U = The analyte was not detected (below the indicated detection limit)

[1] HDOH Tier 1 Environmental Action Levels are for unrestricted/residential sites within 150 meters of surface water bodies, where groundwater is threatened (HDOH, summer 2008 and subsequent updates).
[2] HDOH Environmental Action Levels are for commercial/industrial sites within 150 meters of surface water bodies, where groundwater is not threatened (HDOH, summer 2008 and subsequent updates).
[3] Toxicity Characteristic Leaching Procedure (TCLP) limit derived from Resource Conservation and Recovery Act (RCRA) (40 CFR 261, Appendix II, 1993).
Samples below had total metals results >20Xs the TCLP limit and were additionally analyzed for TCLP.

Acronyms:
bgs = below ground surface
C/I = commercial/industrial
DU = Decision Unit
ft= feet
GC = gas chromatography
MS = mass spectrometry
PAH = polycyclic aromatic hydrocarbons
PCB = polychlorinated biphenyls
RCRA = Resource Conservation and Recovery Act

	HITS ONLY. Only parameters detected in at least one sample are shown.
Bold	Indicates that soil may be considered "special waste" with higher pricing if disposed at landfill.
	Contractor to verify additional waste sampling/characterization requirements with landfill.
"-"	Compound not analyzed

TABLE 4-3

Soil Samples Analyzed for Additional Waste Characterization

Site Characterization Report for Banana Patch Properties, Pearl City, Oahu, Hawaii

Honolulu Rail Transit Project

Sample ID / Sample Date / Decision Unit (DU) / Sample Unit (SU)	Units	HDOH Tier 1 EALs[1] Unrestricted DW, <150m SW	HDOH EALs[2] C/I NDW, <150m SW	RCRA TCLP Limit[3]	FAWC-DU50712AB- 5/21/2014 DU5 A and B borings 7-12	FAWC-DU50712C- 5/21/2014 DU5 C borings 7-12	FAWC-DU51318AB- 5/21/2014 DU5 A and B borings 13-18	FAWC-DU51318C- 5/21/2014 DU5 C borings 13-18	FAWC-DU51924AB- 5/21/2014 DU5 A and B borings 19-24	FAWC-DU51924C- 5/21/2014 DU5 C borings 19-24
GC Total Petroleum Hydrocarbons (TPH) (SW846 8015B M)										
TPH-d (C10-C28)	mg/kg	100	500	-	180 J	6.97 J	161 J	**545**	159 J	20.7 J
TPH-ORO (>C28-C40)	mg/kg	500	1000	-	1550	47	1600	**3020**	1460	222
Metals Analysis										
Chromium	mg/kg	1100	1100	-	-	-	-	-	-	-
Lead	mg/kg	200	800	-	-	-	-	-	-	-
TCLP Metals Analysis										
Chromium	mg/L	-	-	5	-	-	-	-	-	-
Lead	mg/L	-	-	5	-	-	-	-	-	-
General Chemistry										
Moisture, Percent	%	-	-	-	14.9	29.7	12.4	19	13	23.8

Notes:

[a] Quantitation between primary and confirmation differed by >40%. Lower value reported.

[b] Primary and confirmation results differ by more than 40%. Lower value reported due to possible coelution.

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[d] Elevated reporting limit(s) due to matrix interference and/or dilution required for high interfering element.

J = The analyte was positively identified; the quantitation is an estimation

U = The analyte was not detected (below the indicated detection limit)

[1] HDOH Tier 1 Environmental Action Levels are for unrestricted/residential sites within 150 meters of surface water bodies, where groundwater is threatened (HDOH, summer 2008 and subsequent updates).

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[3] Toxicity Characteristic Leaching Procedure (TCLP) limit derived from Resource Conservation and Recovery Act (RCRA) (40 CFR 261, Appendix II, 1993).

Samples below had total metals results >20Xs the TCLP limit and were additionally analyzed for TCLP.

Acronyms:

bgs = below ground surface

C/I = commercial/industrial

DU = Decision Unit

ft= feet

GC = gas chromatography

MS = mass spectrometry

PAH = polycyclic aromatic hydrocarbons

PCB = polychlorinated biphenyls

RCRA = Resource Conservation and Recovery Act

	HITS ONLY. Only parameters detected in at least one sample are shown.
Bold	Indicates that soil may be considered "special waste" with higher pricing if disposed at landfill.
	Contractor to verify additional waste sampling/characterization requirements with landfill.
"-"	Compound not analyzed

TABLE 4-3

Soil Samples Analyzed for Additional Waste Characterization

Site Characterization Report for Banana Patch Properties, Pearl City, Oahu, Hawaii

Honolulu Rail Transit Project

Sample ID Sample Date		HDOH Tier 1 EALs[1]	HDOH EALs[2]	RCRA TCLP Limit[3]	FAWC-DU52530AB- 5/21/2014	FAWC-DU52530C- 5/21/2014	FASC-DU6A-0514 5/20/2014	FASC-DU6B-0514 5/20/2014	FASC-DU6D-0514 5/20/2014	FAWC-DU60106AB- 5/20/2014
Decision Unit (DU)		Unrestricted	C/I		DU5	DU5	DU6	DU6	DU6	DU6
Sample Unit (SU)	Units	DW, <150m SW	NDW, <150m SW		A and B borings 25-30	C borings 25-30	A (0-5 feet bgs)	B (5-10 feet bgs)	D (15-20 feet bgs)	A and B borings 1-6
GC Total Petroleum Hydrocarbons (TPH) (SW846 8015B M)										
TPH-d (C10-C28)	mg/kg	100	500	-	73.2 J	21.8 J	185 J	163 J	36.0 J	105 J
TPH-ORO (>C28-C40)	mg/kg	500	1000	-	671	237	1070	1150	182	1200
Metals Analysis										
Chromium	mg/kg	1100	1100	-	-	-	119 [c]	97.5 [c]	100 [c]	-
Lead	mg/kg	200	800	-	-	-	227 [c]	239 [c]	29.8 [c]	-
TCLP Metals Analysis										
Chromium	mg/L	-	-	5	-	-	0.0021 U	0.0021 U	0.0021 U	-
Lead	mg/L	-	-	5	-	-	0.0043 U	0.0043 U	0.0043 U	-
General Chemistry										
Moisture, Percent	%	-	-	-	16.5	27.9	16.3	7.4	25.4	14.2

Notes:

[a] Quantitation between primary and confirmation differed by >40%. Lower value reported.

[b] Primary and confirmation results differ by more than 40%. Lower value reported due to possible coelution.

[c] Elevated reporting limit(s) due to dilution required for high interfering element.

[d] Elevated reporting limit(s) due to matrix interference and/or dilution required for high interfering element.

J = The analyte was positively identified; the quantitation is an estimation

U = The analyte was not detected (below the indicated detection limit)

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[2] HDOH Environmental Action Levels are for commercial/industrial sites within 150 meters of surface water bodies, where groundwater is not threatened (HDOH, summer 2008 and subsequent updates).

[3] Toxicity Characteristic Leaching Procedure (TCLP) limit derived from Resource Conservation and Recovery Act (RCRA) (40 CFR 261, Appendix II, 1993).

Samples below had total metals results >20Xs the TCLP limit and were additionally analyzed for TCLP.

Acronyms:

bgs = below ground surface
C/I = commercial/industrial
DU = Decision Unit
ft= feet
GC = gas chromatography
MS = mass spectrometry
PAH = polycyclic aromatic hydrocarbons
PCB = polychlorinated biphenyls
RCRA = Resource Conservation and Recovery Act

	HITS ONLY. Only parameters detected in at least one sample are shown.
Bold	Indicates that soil may be considered "special waste" with higher pricing if disposed at landfill.
	Contractor to verify additional waste sampling/characterization requirements with landfill.
"-"	Compound not analyzed

TABLE 4-3

Soil Samples Analyzed for Additional Waste Characterization

Site Characterization Report for Banana Patch Properties, Pearl City, Oahu, Hawaii

Honolulu Rail Transit Project

Sample ID / Sample Date / Decision Unit (DU) / Sample Unit (SU)	Units	HDOH Tier 1 EALs[1] Unrestricted DW, <150m SW	HDOH EALs[2] C/I NDW, <150m SW	RCRA TCLP Limit[3]	FAWC-DU60106C- 5/20/2014 DU6 C borings 1-6	FAWC-DU60712AB- 5/20/2014 DU6 A and B borings 7-12	FAWC-DU60712C- 5/20/2014 DU6 C borings 7-12	SBSD-DU9-0514 5/20/2014 DU9 Stream Bed (adjacent)	SBSD-DU10-0514 5/17/2014 DU10 Stream Bed (downgradient)
GC Total Petroleum Hydrocarbons (TPH) (SW846 8015B M)									
TPH-d (C10-C28)	mg/kg	100	500	-	94.0 J	265	22.6 J	32.9 J	52.4 J
TPH-ORO (>C28-C40)	mg/kg	500	1000	-	1150	2200	297	294	395
Metals Analysis									
Chromium	mg/kg	1100	1100	-	-	-	-	106 [c]	174 [c]
Lead	mg/kg	200	800	-	-	-	-	11.9 [c]	17.6 [c]
TCLP Metals Analysis									
Chromium	mg/L	-	-	5	-	-	-	0.012 J	0.0021 U
Lead	mg/L	-	-	5	-	-	-	-	-
General Chemistry									
Moisture, Percent	%	-	-	-	19.5	12.7	30.2		

Notes:

[a] Quantitation between primary and confirmation differed by >40%. Lower value reported.

[b] Primary and confirmation results differ by more than 40%. Lower value reported due to possible coelution.

[c] Elevated reporting limit(s) due to dilution required for high interfering element.

[d] Elevated reporting limit(s) due to matrix interference and/or dilution required for high interfering element.

J = The analyte was positively identified; the quantitation is an estimation

U = The analyte was not detected (below the indicated detection limit)

[1] HDOH Tier 1 Environmental Action Levels are for unrestricted/residential sites within 150 meters of surface water bodies, where groundwater is threatened (HDOH, summer 2008 and subsequent updates).

[2] HDOH Environmental Action Levels are for commercial/industrial sites within 150 meters of surface water bodies, where groundwater is not threatened (HDOH, summer 2008 and subsequent updates).

[3] Toxicity Characteristic Leaching Procedure (TCLP) limit derived from Resource Conservation and Recovery Act (RCRA) (40 CFR 261, Appendix II, 1993).

Samples below had total metals results >20Xs the TCLP limit and were additionally analyzed for TCLP.

Acronyms:

bgs = below ground surface

C/I = commercial/industrial

DU = Decision Unit

ft= feet

GC = gas chromatography

MS = mass spectrometry

PAH = polycyclic aromatic hydrocarbons

PCB = polychlorinated biphenyls

RCRA = Resource Conservation and Recovery Act

	HITS ONLY. Only parameters detected in at least one sample are shown.
Bold	Indicates that soil may be considered "special waste" with higher pricing if disposed at landfill.
	Contractor to verify additional waste sampling/characterization requirements with landfill.
"-"	Compound not analyzed

TABLE 4-4

Chemicals Detected in Sediment

Site Characterization Report for Banana Patch Properties, Pearl City, Oahu, Hawaii

Honolulu Rail Transit Project

Sample ID / Sample Date / Decision Unit	Units	NOAA SQuIRTs TEC (11/2008)[1]	NOAA SQuIRTs PEC (11/2008)[1]	SBSD-DU8-0514 5/17/2014 DU8 (upgradient)	SBSD-DU9-0514 5/20/2014 DU9 (adjacent)	SBSD-DU209-0514 5/20/2014 DU9-duplicate (adjacent)	SBSD-DU309-0514 5/20/2014 DU9-triplicate (adjacent)	SBSD-DU10-0514 5/17/2014 DU10 (downgradient)
TPH-d and ORO								
TPH-d (C10-C28)	mg/kg	-	-	46.9 J	32.9 J	40.2 J	39.4 J	52.4 J
TPH-o (>C28-C40)	mg/kg	-	-	333	294	370	360	395
PAHs								
Benzo(a)anthracene	µg/kg	108	385	58.5 J	52	40.3	41.5	48.7
Benzo(a)pyrene	µg/kg	150	1450	72.8	61.1	49.4	47.9	58.7
Benzo(b)fluoranthene	µg/kg	-	-	79.7	66.8	43.1	42.9	69.8
Benzo(g,h,i)perylene	µg/kg	-	300 (UET)	42.4 J	30.0 J	28.0 J	24.4 J	28.4 J
Benzo(k)fluoranthene	µg/kg	-	13400 (UET)	79.3	71.9	51.8	62.7	69.9
Chrysene	µg/kg	166	1290	77.6	73.1	50.6	56.5	67.8
Dibenzo(a,h)anthracene	µg/kg	33	100 (UET)	ND (19)	ND (9.3)	ND (9.3)	ND (9.3)	11.2 J
Fluoranthene	µg/kg	423	2230	109 J	107 J	56.1 J	72.3 J	87.5 J
Indeno(1,2,3-cd)pyrene	µg/kg	-	330 (UET)	51.2 J	33.1	26.3 J	26.1 J	34.7
Phenanthrene	µg/kg	204	1170	35.8 J	56.0 J	27.2 J	32.7 J	32.0 J
Pyrene	µg/kg	195	1520	117 J	133 J	75.4 J	88.1 J	110 J
PCBs								
Aroclor 1260	µg/kg	34.1 (sum)	-	ND (6.6)	8.3 J	ND (6.7)	7.1 J	7.1 J
Herbicides								
Pentachlorophenol	µg/kg	-	-	ND (0.69)	ND (0.69)	25.3	ND (0.67)	ND (0.70)
Metals Analysis								
Arsenic	mg/kg	9.79	33	1.5 J [c]	1.5 J [c]	1.9 J [c]	1.5 J [c]	2.5 [c]
Barium	mg/kg	-	-	48.2 [c]	46.3 [c]	42.7 [c]	48.9 [c]	94.8 [c]
Cadmium	mg/kg	0.99	4.98	0.73 J [c]	0.54 J [c]	0.63 J [c]	0.69 J [c]	**1.0 [c]**
Chromium	mg/kg	43.4	111	**96.6 [c]**	**99.1 [c]**	**93.1 [c]**	**106 [c]**	**174 [c]**
Lead	mg/kg	35.8	128	8.4 [c]	**45.1 [c]**	12.1 [c]	11.9 [c]	17.6 [c]
Mercury	mg/kg	0.18	1.06	0.066	0.056	0.057	0.059	0.069
Selenium	mg/kg	-	-	1.2 J [c]	1.2 J [c]	0.75 J [c]	2.1 [c]	2.2 [c]
Silver	mg/kg	-	4.5 (UET)	0.33 J [c]	0.51 J [c]	0.21 J [c]	0.11 J [c]	0.35 J [c]

Notes:

[a] Quantitation between primary and confirmation differed by >40%. Lower value reported.

[b] Primary and confirmation results differ by more than 40%. Lower value reported due to possible coelution.

[c] Elevated reporting limit(s) due to dilution required for high interfering element.

[d] Elevated reporting limit(s) due to matrix interference and/or dilution required for high interfering element.

J = The analyte was positively identified; the quantitation is an estimation

[1] Sediment samples were screened against NOAA SQuiRTs in order or priority:
1) Threshold Effects Concentration (TECs) (November 2008).
2) Probable Effects Concentration (PECs) (November 2008).
In the absence of TECs and PECs, UETs or PELs were used:
3) Upper Effects Threshold (UETs) (November 2008).
4) Probable Effects Levels (PELs) (November 2008).

Acronyms:

µg/kg = micrograms per kilogram
bgs = below ground surface
DU = Decision Unit
ft= feet
GC = gas chromatography
MS = mass spectrometry
ND = not detected (the analyte is below the detection limit indicated in parenthesis)
PAH = polycyclic aromatic hydrocarbons
PCB = polychlorinated biphenyls
RCRA = Resource Conservation and Recovery Act
TPH-g = total petroleum hydrocarbons, gasoline-range organics (C6-C10)
TPH-d = total petroleum hydrocarbons, diesel-range organics (C10-C28)
TPH-o = total petroleum hydrocarbons, oil-range organics (>C28-C40)

	HITS ONLY. Only parameters detected in at least one sample are shown.
Bold	The sample/compound concentration exceeds screening criteria.

TABLE 4-5

Chemicals Detected in Groundwater

Site Characterization Report for Banana Patch Properties, Pearl City, Oahu, Hawaii

Honolulu Rail Transit Project

Sample ID		HDOH Tier 1 EAL	HDOH Tier 1 EAL	FASC-TW001-0514	FASC-TW002-0514	FASC-TW003-0514	FASC-TW004-0514	FASC-TW005-0514	FASC-TW006-0514	FASC-TW007-0514	FASC-TW008-0514
Sample Date		**DW,<150m SW**	**NDW, <150m SW**	**5/29/2014**	**5/30/2014**	**5/30/2014**	**6/2/2014**	**5/30/2014**	**5/30/2014**	**5/30/2014**	**5/30/2014**
Decision Unit (DU)		**Unrestricted**	**Commercial/ industrial**	**DU3**	**DU3**	**DU6**	**DU5**	**DU6**	**DU3**	**DU4**	**DU2**
Well ID	**Units**	**11/2011)[1]**	**(11/2011)[2]**	**TW-001**	**TW-002**	**TW-003**	**TW-004**	**TW-005**	**TW-006**	**TW-007**	**TW-008**
GC/MS Volatile Organic Compounds (SW846 8260B)											
Acetone	µg/L	1500	1500	ND (4.0)	ND (4.0)	ND (4.0)	ND (4.0)	ND (4.0)	ND (4.0)	ND (4.0)	5.0 J
Trichlorofluoromethane	µg/L	-	-	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)
TPH-g (C6-C10)	µg/L	100	500	ND (25)	**148**	ND (25)	ND (25)	ND (25)	ND (25)	ND (25)	ND (25)
GC Total Petroleum Hydrocarbons (TPH) (SW846 8015B M)											
TPH-d (C10-C28)	mg/L	0.1	0.64	0.0340 J	0.0612 J	0.0284 J	ND (0.025)	ND (0.025)	0.0436 J	**0.149**	**0.125**
TPH-o (>C28-C40)	mg/L	0.1	0.64	ND (0.049)	0.0784 J	ND (0.048)	ND (0.049)	ND (0.050)	0.0883 J	**0.123 J**	**0.132 J**
GC Pesticides (SW846 8081A)											
Aldrin	µg/L	0.004	0.13	ND (0.0019)	**0.0059 J**	ND (0.0020)	ND (0.0020)	ND (0.0020)	ND (0.0020)	ND (0.0019)	**0.46**
Chlordane	µg/L	0.004	0.004	ND (0.0095)	ND (0.0099)	ND (0.010)	ND (0.010)	ND (0.0099)	**0.056 J**	ND (0.0094)	ND (0.097)
Dieldrin	µg/L	0.0019	0.0019	**0.0035 J**	**0.032**	**0.0052 J**	ND (0.0021)	**0.0028 J**	**0.0033 J**	ND (0.0020)	**0.24**
Heptachlor	µg/L	0.0036	0.0036	**0.014 B [d]**	**0.020 B [d]**	**0.020 B [d]**	**0.016 B [d]**	**0.017 B [d]**	**0.017 B [d]**	**0.019 B [d]**	**0.053 JB [d]**
Heptachlor epoxide	µg/L	0.0036	0.0036	ND (0.0033)	ND (0.0035)	**0.0076 J [b]**	ND (0.0035)	**0.0053 J [b]**	**0.019**	**0.0078 J [b]**	ND (0.034)
GC Herbicides (SW846 8151A)											
Pentachlorophenol	µg/L	1	7.9	ND (0.011)	0.013 J	0.017 J	ND (0.011)	ND (0.011)	ND (0.011)	ND (0.011)	0.065
RCRA Metals Analysis											
Arsenic	µg/L	10	36	2.7 J	4.4 J	1.3 J	3.4 J	0.65 U	0.65 U	3.4 J	0.65 U
Barium	µg/L	200	200	9.7 J	54.1 J	14.2 J	19.5 J	8.4 J	86.3 J	37.7 J	48.0 J
Cadmium	µg/L	3	3	1.0 J	1.6 J	1.8 J	0.90 J	0.15 U	0.15 U	0.15 U	1.7 J
Chromium	µg/L	74	74	0.41 U	0.41 U	6.6 J	0.41 U	0.41 U	0.41 U	1.7 J	0.41 U
Selenium	µg/L	5	5	4.3 J	**21.7**	**5.8 J**	2.2 U	4.3 J	**9.4 J**	**9.0 J**	**5.8 J**
Silver	µg/L	1	1	0.47 U	0.47 U	0.47 U	0.47 U	0.47 U	**1.4 J**	0.47 U	0.47 U

Notes:

[a] CCV outside of control limits (biased high); not detected in sample.

[b] Quantitation between primary and confirmation differed by >40%. Lower value reported.

[c] Results from signal #2.

[d] Value due to contamination. Associated Method Blank is outside QC limits. Sample confirmed by re-extraction and reanalysis.

[e] Value due to contamination. Associated Method Blank is outside QC limits; insufficient sample volume available for re-extraction.

J = The analyte was positively identified; the quantitation is an estimation

[1] HDOH Tier 1 Environmental Action Levels are for sites over a drinking water resource and less than 150 meters to nearest surface water (HDOH, 2011).

[2] HDOH Tier 1 Environmental Action Levels are for sites over a non-drinking water resource and less than 150 meters to nearest surface water (HDOH, 2011).

Acronyms:

µg/L = micrograms per liter

bgs = below ground surface

DU = Decision Unit

ft= feet

GC = gas chromatography

mg/L = milligrams per liter

MS = mass spectrometry

ND = not detected (the analyte below the detection limit indicated in parenthesis)

RCRA = Resource Conservation and Recovery Act

TPH-g = total petroleum hydrocarbons, gasoline-range organics (C6-C10)

TPH-d = total petroleum hydrocarbons, diesel-range organics (C10-C28)

TPH-o = total petroleum hydrocarbons, oil-range organics (>C28-C40)

HITS ONLY. Only parameters detected in at least one sample are shown.

Bold The sample/compound concentration exceeds the specific EAL

TABLE 4-5

Chemicals Detected in Groundwater

Site Characterization Report for Banana Patch Properties, Pearl City, Oahu, Hawaii

Honolulu Rail Transit Project

Sample ID		HDOH Tier 1 EAL	HDOH Tier 1 EAL	FASC-TW009-0514	FASC-TW010-0514	FASC-TW011-0514	FASC-TW111-0514	FASC-TW012-0514
Sample Date		DW,<150m SW	NDW, <150m SW	5/29/2014	6/2/2014	5/29/2014	5/29/2014	5/30/2014
Decision Unit (DU)		Unrestricted	Commercial/ industrial	DU1S	DU1N	DU1S	DU3	DU6
Well ID	Units	11/2011)[1]	(11/2011)[2]	TW-009	TW-010	TW-011	TW-011	TW-012
GC/MS Volatile Organic Compounds (SW846 8260B)								
Acetone	µg/L	1500	1500	ND (4.0)	ND (4.0)	ND (4.0)	ND (4.0)	ND (4.0)
Trichlorofluoromethane	µg/L	-	-	39.9	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)
TPH-g (C6-C10)	µg/L	100	500	ND (25)	ND (25)	ND (25)	ND (25)	ND (25)
GC Total Petroleum Hydrocarbons (TPH) (SW846 8015B M)								
TPH-d (C10-C28)	mg/L	0.1	0.64	0.0285 J	**0.118**	ND (0.025)	ND (0.024)	ND (0.024)
TPH-o (>C28-C40)	mg/L	0.1	0.64	ND (0.048)	0.0665 J	ND (0.050)	ND (0.048)	ND (0.048)
GC Pesticides (SW846 8081A)								
Aldrin	µg/L	0.004	0.13	ND (0.0020)	ND (0.0020)	ND (0.0019)	ND (0.0019)	ND (0.0019)
Chlordane	µg/L	0.004	0.004	ND (0.010)	ND (0.010)	ND (0.0095)	ND (0.0094)	ND (0.0097)
Dieldrin	µg/L	0.0019	0.0019	**0.0036 J**	**0.0023 J** [b]	ND (0.0020)	ND (0.0020)	ND (0.0020)
Heptachlor	µg/L	0.0036	0.0036	**0.018 B** [d]	**0.019 B** [e]	**0.013 B** [d]	**0.011 B** [d]	**0.017 B** [d]
Heptachlor epoxide	µg/L	0.0036	0.0036	**0.0063 J** [b]	**0.0047 J** [b]	ND (0.0033)	ND (0.0033)	ND (0.0034)
GC Herbicides (SW846 8151A)								
Pentachlorophenol	µg/L	1	7.9	0.018 J	0.055	ND (0.011)	ND (0.011)	ND (0.011)
RCRA Metals Analysis								
Arsenic	µg/L	10	36	0.65 U	0.65 U	0.65 U	0.65 U	3.9 J
Barium	µg/L	200	200	17.6 J	23.8 J	50.7 J	50.8 J	26.2 J
Cadmium	µg/L	3	3	1.4 J	0.60 J	1.0 J	0.15 U	2.2
Chromium	µg/L	74	74	0.41 U	0.41 U	0.41 U	1.5 J	0.41 U
Selenium	µg/L	5	5	2.2 J	**7.7 J**	**9.1 J**	**5.7 J**	**8.8 J**
Silver	µg/L	1	1	0.47 U	0.47 U	0.60 J	0.47 U	0.50 J

Notes:

[a] CCV outside of control limits (biased high); not detected in sample.

[b] Quantitation between primary and confirmation differed by >40%. Lower value reported.

[c] Results from signal #2.

[d] Value due to contamination. Associated Method Blank is outside QC limits. Sample confirmed by re-extraction and reanalysis.

[e] Value due to contamination. Associated Method Blank is outside QC limits; insufficient sample volume available for re-extraction.

J = The analyte was positively identified; the quantitation is an estimation

[1] HDOH Tier 1 Environmental Action Levels are for sites over a drinking water resource and less than 150 meters to nearest surface water (HDOH, 2011).

[2] HDOH Tier 1 Environmental Action Levels are for sites over a non-drinking water resource and less than 150 meters to nearest surface water (HDOH, 2011).

Acronyms:

µg/L = micrograms per liter

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DU = Decision Unit

ft= feet

GC = gas chromatography

mg/L = milligrams per liter

MS = mass spectrometry

ND = not detected (the analyte below the detection limit indicated in parenthesis)

RCRA = Resource Conservation and Recovery Act

TPH-g = total petroleum hydrocarbons, gasoline-range organics (C6-C10)

TPH-d = total petroleum hydrocarbons, diesel-range organics (C10-C28)

TPH-o = total petroleum hydrocarbons, oil-range organics (>C28-C40)

HITS ONLY. Only parameters detected in at least one sample are shown.

Bold The sample/compound concentration exceeds the specific EAL

TABLE 5-1

Environmental Hazard Evaluation Summary - Soil

Site Characterization Report For Banana Patch Properties, Pearl City, Oahu, Hawaii

Honolulu Rail Transit Project

Exposure Scenario					Unrestricted Land Use Scenario			Commercial/Industrial Land Use Scenario			Construction/Trench Worker Scenraio
Sample ID	**Analyte**	**Result**		**Units**	**HDOH gross Contamination EAL1**	**HDOH Leaching EAL[1]**	**HDOH Direct Exposure EAL[1]**	**HDOH gross Contamination EAL1**	**HDOH Leaching EAL[1]**	**HDOH Direct Exposure EAL[1]**	**HDOH Direct Exposure EAL[1]**
DU1N (North)											
FASC-DU1NA-0514	Benzo[a]pyrene	0.159		mg/kg	500	5.7	**0.15**	1,000	5.7	2.1	18
DU1S (South)											
FASC-DU1SB-0514	TPH-o (>C28-C40)	647		mg/kg	**500**	1,000	180,000	2,500	1,000	1,000,000	1,000,000
FASC-DU1SB-0514	Benzo[a]pyrene	0.243		mg/kg	500	5.7	**0.15**	1,000	5.7	2.1	18
DU2											
FASC-DU2A-0514	TPH-o (>C28-C40)	1,410		mg/kg	**500**	**1,000**	180,000	2,500	**1,000**	1,000,000	1,000,000
FASC-DU2B-0514	TPH-o (>C28-C40)	736		mg/kg	**500**	1,000	180,000	2,500	1,000	1,000,000	1,000,000
FASC-DU2B-0514	Benzo[a]pyrene	0.734		mg/kg	500	5.7	**0.15**	1,000	5.7	2.1	18
DU3											
FASC-DU3A-0514	TPH-o (>C28-C40)	634		mg/kg	**500**	1,000	180,000	2,500	1,000	1,000,000	1,000,000
DU4											
FASC-DU4A-0514	Heptachlor epoxide	0.0671	J	mg/kg	1,000	12	**0.053**	2,500	12	0.19	3.8
FASC-DU4A-0514	Lead	720		mg/kg	1,000	NA	**200**	2,500	NA	800	800
FASC-DU204A-0514	Heptachlor epoxide	0.0616	J	mg/kg	1,000	12	**0.053**	2,500	12	0.19	3.8
FASC-DU204A-0514	Lead	851		mg/kg	1,000	NA	**200**	2,500	NA	**800**	**800**
FASC-DU304A-0514	Heptachlor epoxide	0.0793	J	mg/kg	1,000	12	**0.053**	2,500	12	0.19	3.8
FASC-DU304A-0514	Lead	873		mg/kg	1,000	NA	**200**	2,500	NA	**800**	**800**
FASC-DU4B-0614	Lead	902		mg/kg	1,000	NA	**200**	2,500	NA	**800**	**800**
DU5											
FASC-DU5A-0514	TPH-d (C10-C28)	208	J	mg/kg	500	500	500	500	500	500	500
FASC-DU5A-0514	TPH-o (>C28-C40)	1,970		mg/kg	**500**	**1,000**	180,000	2,500	**1,000**	1,000,000	1,000,000
FASC-DU5A-0514	Arsenic	50.1		mg/kg	1,000	NA	**23**	2,500	NA	95	130
FASC-DU5A-0514	Lead	804		mg/kg	1,000	NA	**200**	2,500	NA	**800**	**800**
FASC-DU5B-0514	TPH-d (C10-C28)	283	J	mg/kg	500	500	500	500	500	500	500
FASC-DU5B-0514	TPH-o (>C28-C40)	2,450		mg/kg	**500**	**1,000**	180,000	2,500	**1,000**	1,000,000	1,000,000
FASC-DU5B-0514	Benzo[a]pyrene	0.211		mg/kg	500	5.7	**0.15**	1,000	5.7	2.1	18
FASC-DU5C-0514	TPH-d (C10-C28)	262	J	mg/kg	500	500	500	500	500	500	500
FASC-DU5C-0514	TPH-o (>C28-C40)	2,370		mg/kg	**500**	**1,000**	180,000	2,500	**1,000**	1,000,000	1,000,000
FASC-DU5C-0514	Benzo[a]pyrene	0.176		mg/kg	500	5.7	**0.15**	1,000	5.7	2.1	18
FASC-DU5D-0514	TPH-o (>C28-C40)	619		mg/kg	**500**	1,000	180,000	2,500	1,000	1,000,000	1,000,000
FAWC-DU50106AB-0514	TPH-d (C10-C28)	102		mg/kg	500	500	500	500	500	500	500
FAWC-DU50106AB-0514	TPH-o (>C28-C40)	683		mg/kg	**500**	1,000	180,000	2,500	1,000	1,000,000	1,000,000
FAWC-DU50712AB-0514	TPH-d (C10-C28)	180	J	mg/kg	500	500	500	500	500	500	500
FAWC-DU50712AB-0514	TPH-o (>C28-C40)	1,550		mg/kg	**500**	**1,000**	180,000	2,500	**1,000**	1,000,000	1,000,000
FAWC-DU51318AB-0514	TPH-d (C10-C28)	161	J	mg/kg	500	500	500	500	500	500	500
FAWC-DU51318AB-0514	TPH-o (>C28-C40)	1,600		mg/kg	**500**	**1,000**	180,000	2,500	**1,000**	1,000,000	1,000,000
FAWC-DU51318C-0514	TPH-d (C10-C28)	545		mg/kg	**500**	**500**	**500**	**500**	**500**	**500**	**500**
FAWC-DU51318C-0514	TPH-o (>C28-C40)	3,020		mg/kg	**500**	**1,000**	180,000	**2,500**	**1,000**	1,000,000	1,000,000
FAWC-DU51924AB-0514	TPH-d (C10-C28)	159	J	mg/kg	500	500	500	500	500	500	500
FAWC-DU51924AB-0514	TPH-o (>C28-C40)	1,460		mg/kg	**500**	**1,000**	180,000	2,500	**1,000**	1,000,000	1,000,000
FAWC-DU52530AB-0514	TPH-o (>C28-C40)	671		mg/kg	**500**	1,000	180,000	2,500	1,000	1,000,000	1,000,000

TABLE 5-1

Environmental Hazard Evaluation Summary - Soil

Site Characterization Report For Banana Patch Properties, Pearl City, Oahu, Hawaii

Honolulu Rail Transit Project

Exposure Scenario					Unrestricted Land Use Scenario			Commercial/Industrial Land Use Scenario			Construction/Trench Worker Scenraio
Sample ID	Analyte	Result		Units	HDOH gross Contamination EAL1	HDOH Leaching EAL[1]	HDOH Direct Exposure EAL[1]	HDOH gross Contamination EAL1	HDOH Leaching EAL[1]	HDOH Direct Exposure EAL[1]	HDOH Direct Exposure EAL[1]
DU6											
FASC-DU6A-0514	TPH-d (C10-C28)	185	J	mg/kg	500	500	500	500	500	500	500
FASC-DU6A-0514	TPH-o (>C28-C40)	1,070		mg/kg	**500**	**1,000**	180,000	2,500	**1,000**	1,000,000	1,000,000
FASC-DU6A-0514	Benzo[a]pyrene	1.08		mg/kg	500	5.7	**0.15**	1,000	5.7	2.1	18
FASC-DU206A-0514	TPH-d (C10-C28)	200	J	mg/kg	500	500	500	500	500	500	500
FASC-DU206A-0514	TPH-o (>C28-C40)	1,290		mg/kg	**500**	**1,000**	180,000	2,500	**1,000**	1,000,000	1,000,000
FASC-DU206A-0514	Lead	227		mg/kg	1,000	NA	**200**	2,500	NA	800	800
FASC-DU206A-0514	Benzo[a]pyrene	0.905		mg/kg	500	5.7	**0.15**	1,000	5.7	2.1	18
FASC-DU306A-0514	TPH-d (C10-C28)	158	J	mg/kg	500	500	500	500	500	500	500
FASC-DU306A-0514	TPH-o (>C28-C40)	1,140		mg/kg	**500**	**1,000**	180,000	2,500	**1,000**	1,000,000	1,000,000
FASC-DU306A-0514	Benzo[a]pyrene	0.856		mg/kg	500	5.7	**0.15**	1,000	5.7	2.1	18
FASC-DU6B-0514	TPH-d (C10-C28)	163	J	mg/kg	500	500	500	500	500	500	500
FASC-DU6B-0514	TPH-o (>C28-C40)	1,150		mg/kg	**500**	**1,000**	180,000	2,500	**1,000**	1,000,000	1,000,000
FASC-DU6B-0514	Lead	239		mg/kg	1,000	NA	**200**	2,500	NA	800	800
FASC-DU6B-0514	Benzo[a]pyrene	0.738		mg/kg	500	5.7	**0.15**	1,000	5.7	2.1	18
FASC-DU6C-0514	TPH-d (C10-C28)	141	J	mg/kg	500	500	500	500	500	500	500
FASC-DU6C-0514	TPH-o (>C28-C40)	1,010		mg/kg	**500**	**1,000**	180,000	2,500	**1,000**	1,000,000	1,000,000
FASC-DU6C-0514	Benzo[a]pyrene	0.617		mg/kg	500	5.7	**0.15**	1,000	5.7	2.1	18
FASC-DU6D-0514	Heptachlor epoxide	0.0841	J	mg/kg	1,000	12	**0.053**	2,500	12	0.19	3.8
FAWC-DU60106AB-0514	TPH-d (C10-C28)	105	J	mg/kg	500	500	500	500	500	500	500
FAWC-DU60106AB-0514	TPH-o (>C28-C40)	1,200		mg/kg	**500**	**1,000**	180,000	2,500	**1,000**	1,000,000	1,000,000
FAWC-DU60106C-0514	TPH-o (>C28-C40)	1,150		mg/kg	**500**	**1,000**	180,000	2,500	**1,000**	1,000,000	1,000,000
FAWC-DU60712AB-0514	TPH-d (C10-C28)	265		mg/kg	500	500	500	500	500	500	500
FAWC-DU60712AB-0514	TPH-o (>C28-C40)	2,200		mg/kg	**500**	**1,000**	180,000	2,500	**1,000**	1,000,000	1,000,000
FADS-DU6D3-0514	Lead	362		mg/kg	1,000	NA	**200**	2,500	NA	800	800

Notes:

J = The analyte was positively identified; the quantitation is an estimation

[1] HDOH Environmental Action Levels are for sites within 150 meters of surface water bodies, where drinking water is not threatened (HDOH, 2008 and subsequent updates).

* Only samples with exceedances of the Tier 1 EALs for sites within 150 meters of surface water bodies, where drinking water is not threatened (HDOH, Fall 2011), were evaluated and are included in this table.

** Direct exposure EAL for TPH-d is based on saturation limit. The risk-based EAL (based on a hazard quotient of 0.5) is 1,200 mg/kg for unrestricted land use scenario, and 8,500 mg/kg for commercial/industrial land use scenario.

Acronyms:

bgs = below gund surface
DU = Decision Unit
ft= feet
mg/kg = milligrams per kilogram
RCRA = Resource Conservation and Recovery Act
TPH-d = total petroleum hydcarbons, diesel-range organics (C10-C28)
TPH-o = total petroleum hydcarbons, oil-range organics (>C28-C40)

Bold The sample/compound concentration exceeds the specific EAL

TABLE 5-2

Environmental Hazard Evaluation Summary - Groundwater

Site Characterization Report For Banana Patch Properties, Pearl City, Oahu, Hawaii

Honolulu Rail Transit Project

Sample ID	Analyte	Result		Units	HDOH Aquatic Ecotoxicity EAL	HDOH Gross Contamination EAL
DU1N (North)						
FASC-TW010-0514	Dieldrin	0.0023	J	µg/L	**0.0019**	41
FASC-TW010-0514	Heptachlor	0.019	B	µg/L	**0.0036**	20
FASC-TW010-0514	Heptachlor epoxide	0.0047	J	µg/L	**0.0036**	100
FASC-TW010-0514	Mercury	0.08	U	µg/L	**0.025**	30
FASC-TW010-0514	Selenium	7.7	J	µg/L	**5**	50,000
DU1S (South)						
FASC-TW011-0514	Heptachlor	0.013	B	µg/L	**0.0036**	20
FASC-TW011-0514	Mercury	0.08	U	µg/L	**0.025**	30
FASC-TW011-0514	Selenium	9.1	J	µg/L	**5**	50,000
FASC-TW111-0514	Heptachlor	0.011	B	µg/L	**0.0036**	20
FASC-TW111-0514	Mercury	0.08	U	µg/L	**0.025**	30
FASC-TW111-0514	Selenium	5.7	J	µg/L	**5**	50,000
DU2						
FASC-TW008-0514	Aldrin	0.46		µg/L	**0.13**	8.5
FASC-TW008-0514	Dieldrin	0.24		µg/L	**0.0019**	41
FASC-TW008-0514	Heptachlor	0.053	JB	µg/L	**0.0036**	20
FASC-TW008-0514	Mercury	0.08	U	µg/L	**0.025**	30
FASC-TW008-0514	Selenium	5.8	J	µg/L	**5**	50,000
FASC-TW009-0514	Dieldrin	0.0036	J	µg/L	**0.0019**	41
FASC-TW009-0514	Heptachlor	0.018	B	µg/L	**0.0036**	20
FASC-TW009-0514	Heptachlor epoxide	0.0063	J	µg/L	**0.0036**	100
DU3						
FASC-TW001-0514	Dieldrin	0.0035	J	µg/L	**0.0019**	41
FASC-TW001-0514	Heptachlor	0.014	B	µg/L	**0.0036**	20
FASC-TW002-0514	Dieldrin	0.032		µg/L	**0.0019**	41
FASC-TW002-0514	Heptachlor	0.02	B	µg/L	**0.0036**	20
FASC-TW002-0514	Mercury	0.08	U	µg/L	**0.025**	30
FASC-TW002-0514	Selenium	21.7		µg/L	**5**	50,000
FASC-TW006-0514	Chlordane	0.056	J	µg/L	**0.004**	3
FASC-TW006-0514	Dieldrin	0.0033	J	µg/L	**0.0019**	41
FASC-TW006-0514	Heptachlor	0.017	B	µg/L	**0.0036**	20
FASC-TW006-0514	Heptachlor epoxide	0.019		µg/L	**0.0036**	100
FASC-TW006-0514	Mercury	0.08	U	µg/L	**0.025**	30
FASC-TW006-0514	Selenium	9.4	J	µg/L	**5**	50,000
FASC-TW006-0514	Silver	1.4	J	µg/L	**1**	100
DU5						
FASC-TW004-0514	Heptachlor	0.016	B	µg/L	**0.0036**	20
FASC-TW004-0514	Mercury	0.08	U	µg/L	**0.025**	30
DU6						
FASC-TW003-0514	Dieldrin	0.0052	J	µg/L	**0.0019**	41
FASC-TW003-0514	Heptachlor	0.02	B	µg/L	**0.0036**	20
FASC-TW003-0514	Heptachlor epoxide	0.0076	J	µg/L	**0.0036**	100
FASC-TW003-0514	Selenium	5.8	J	µg/L	**5**	50,000
FASC-TW005-0514	Dieldrin	0.0028	J	µg/L	**0.0019**	41
FASC-TW005-0514	Heptachlor	0.017	B	µg/L	**0.0036**	20
FASC-TW005-0514	Heptachlor epoxide	0.0053	J	µg/L	**0.0036**	100
FASC-TW005-0514	Mercury	0.08	U	µg/L	**0.025**	30
FASC-TW007-0514	Heptachlor	0.019	B	µg/L	**0.0036**	20
FASC-TW007-0514	Heptachlor epoxide	0.0078	J	µg/L	**0.0036**	100
FASC-TW007-0514	Selenium	9	J	µg/L	**5**	50,000
FASC-TW012-0514	Heptachlor	0.017	B	µg/L	**0.0036**	20
FASC-TW012-0514	Mercury	0.08	U	µg/L	**0.025**	30
FASC-TW012-0514	Selenium	8.8	J	µg/L	**5**	50,000

Notes:

B = Value due to contamination. Associated Method Blank is outside QC limits. Sample confirmed by re-extraction and reanalysis.

F = The analyte was detected at concentrations greater than the method detection limit, but less than the limit of quantitation

J = The analyte was positively identified; the quantitation is an estimation

U = The analyte was analyzed for, but not detected. The concentration is at or below the sample-specific method detection limit

[1] HDOH Tier 1 Environmental Action Levels are for sites over a non-drinking water resource and less than 150 meters to nearest surface water (HDOH, 2011).

* Only samples with exceedances of the Tier 1 (lowest) EALs for sites within 150 meters of surface water bodies, where drinking water is not threatened (HDOH, Fall 2011), were evaluated and are included in this table.

** Mercury was not detected. However, it is reported as an exceedance because the detection limit is higher than the Tier 1 EAL.

Acronyms:

DU = Decision Unit

µg/L = micrograms per liter

Bold The sample/compound concentration exceeds the specific EAL

TABLE 6-1
Environmental Hazard Management Summary - Soil
Site Characterization Report For Banana Patch Properties
Honolulu Rail Transit Project, Oahu, Hawaii

Decision Unit	Depth (feet bgs)	Potential Hazard: Residential	Potential Hazard: Commercial/Industrial	Potential Hazard: Construction Workers	Hazard Management
DU1N	0-0.5	**Direct Exposure**	None	None	LUC to control direct exposure of hypothetical residents.
	0.5-3.0	None	None	None	None
	Native Soil	None	None	None	None
DU1S	0-0.5	None	None	None	None
	0.5-3.0	**Direct Exposure**	None	None	LUC to control direct exposure of hypothetical residents.
	Native Soil	None	None	None	None
DU2	0-0.5	None	None	None	LUCs to avoid future use of soil in residential and offsite C/I areas because of potential leaching concerns. No actions if soil is not excavated because leaching to groundwater is not confirmed (i.e., soil COC concentrations are below relevant EALs in groundwater), but LUCs remains to prevent offsite use.
	0.5-3.0	**Direct Exposure**	None	None	LUC to control direct exposure of hypothetical residents.
	Native Soil	None	None	None	None
DU3	0-0.5	None	None	None	None
	0.5-3.0	None	None	None	None
	Native Soil	**Gross Contamination**	**Gross Contamination**	**Gross Contamination**	LUC to address presence of LNAPL in well, limited to western portion of DU around TW-001 (see Figure 6-1).
DU4	0-0.5	**Direct Exposure**	**Direct Exposure**	**Direct Exposure**	LUC to control direct exposure of hypothetical residents, C/I receptors, and construction workers.
	0-3	**Direct Exposure**	**Direct Exposure**	**Direct Exposure**	
	>3.0	Unknown	Unknown	Unknown	Unknown
DU5	0-5	**Direct Exposure+Leaching**	**Direct Exposure+Leaching**	None	LUC to control direct exposure of hypothetical residents and C/I receptors, and monitor groundwater to address leaching concerns.
	5-10	**Direct Exposure+Leaching**	**Leaching**	None	LUC to control direct exposure of hypothetical residents and monitor groundwater to address leaching concerns.
	10-15	**Direct Exposure+Leaching**	**Leaching**	**Direct Exposure**	LUC to control direct exposure of hypothetical residents and leaching to groundwater. LUC also to control exposure of construction workers limited to the area around boring locations 13 through 18.
	Native Soil	None	None	None	None
DU6	0-5	**Direct Exposure+Leaching**	**Leaching**	None	LUC to control direct exposure of hypothetical residents limited to soil within depressed area footprint.
	5-10	**Direct Exposure+Leaching**	**Leaching**	None	
	10-15	**Direct Exposure+Leaching**	**Leaching**	None	
	Native Soil	**Direct Exposure**	None	None	

Notes:

Acronyms:
bgs = below ground surface
C/I = commercial/industrial
DU = decision unit
TW = temporary well

TABLE 6-2

Environmental Hazard Management Summary - Groundwater

Site Characterization Report For Banana Patch Properties, Pearl City, Oahu, Hawaii

Honolulu Rail Transit Project

Decision Unit	Aquatic Ecotoxicity	Gross Contamination	Hazard Management
DU1N	**Yes**	None	Surface water monitoring needed during construction.
DU1S	**Yes**	None	Surface water monitoring needed during construction.
DU2	**Yes**	None	Surface water monitoring needed during construction.
DU3	**Yes**	**Yes**	Surface water monitoring needed during construction. LNAPL to be removed to the extent practicable.
DU4	NA*	NA	Surface water monitoring needed during construction.*
DU5	**Yes**	None	Surface water monitoring needed during construction.
DU6	**Yes**	None	Surface water monitoring needed during construction.

Notes:

* No groundwater sample collected within DU4. No excavation is expected in this DU during future construction. However, if excavation is conducted groundwater should be managed the same way as for other DUs (assuming that no additional data will be available in the future and aquatic ecotoxicity concerns are present also within DU4).

Acronyms:

DU = decision unit

TABLE 6-3
Site Controls and Long-Term Management Activities
Site Characterization Report For Banana Patch Properties, Pearl City, Oahu, Hawaii
Honolulu Rail Transit Project, Oahu, Hawaii

Subarea	Assumed Future Activities	Decision Unit	Depth (feet bgs)	Site Controls	Recommended Long-Term Management Activities	
					Soil	**Groundwater**
Flat Area with Future Fill	Filling activities to bring current grade to the future station/parking structure level. The parking structure will occupy this area in the future.	**DU1N**	0-0.5	LUCs to limit land use to C/I and restrict future use of soil in residential areas. Stream surface water sampling necessary to evaluate if groundwater/sediment are impacting aquatic ecological receptors.	None if left onsite. No offsite reuse in residential areas. Surface debris may require removal.	No direct discharge to stream. Stream surface water sampling necessary during construction.
			0.5-3.0	Stream surface water sampling necessary during construction to evaluate if groundwater/sediment are impacting aquatic ecological receptors.	None	
			Native Soil		None	
		DU1S	0-0.5	Stream surface water sampling necessary during construction to evaluate if groundwater/sediment are impacting aquatic ecotoxicity.	None	No direct discharge to stream. Stream surface water sampling necessary during construction.
			8-10	LUCs to limit land use to C/I and restrict future use of soil in residential areas. Stream surface water sampling necessary to evaluate if groundwater/sediment are impacting aquatic ecotoxicity.	None if left onsite. No offsite reuse in residential areas. Construction debris present in this DU (~1,100 cubic yards, of which ~650 cubic yards are concrete and ~450 cubic yards are metal debris) may need removal.	
			Native Soil	Stream surface water sampling necessary during construction to evaluate if groundwater/sediment are impacting aquatic ecotoxicity.	None	
		DU4	0-0.5	LUCs to restrict future use of soil in residential areas. LUCs to control use of soil on site and exposure to construction workers (may require upgrade in level of personal protective equipment).	Cover area with at least 3 feet of soil meeting C/I EALs from onsite sources (e.g., DUs 5 and 6).	More data necessary to evaluate. In absence, no direct discharge to stream. Stream surface water sampling may be necessary.
			0-3			
			>3.0	Need further delineation to evaluate site controls. In absence, assume LUCs to restrict future use of soil in offsite residential and C/I areas, and control exposure to construction workers (may require upgrade in level of protection).	Need further delineation to evaluate long-term management of soil and groundwater. In absence of delineation, assume LUCs to restrict future use of soil in offsite residential and C/I areas, and control exposure to construction workers if soil is excavated (may require upgrade in level of protection).	
Area With No or Limited Future Excavation	Construction activities with limited soil removal to install columns that will be part of the rail guideway/station.	**DU2**	0-0.5	LUCs to restrict future use of soil in residential and offsite C/I areas.	Soil excavated for column installation may be reused on site. No actions if soil remains in place, but LUCs will apply to prevent offsite use because of potential leaching concerns.	No direct discharge to stream. Stream surface water sampling necessary during construction.
			0.5-3.0	LUCs to restrict future use of soil in residential areas.	None if soil remains onsite (in place or reused in other areas within Site boundary).	
			Native Soil	None	None	
		DU3	0-0.5	None	None for soil. However, construction debris present in this DU (~550 cubic yards, of which ~300 cubic yards are concrete and ~250 cubic yards are metal debris) may need removal.	No direct discharge to stream. Stream surface water sampling necessary during construction.
			0.5-3.0	None		
			Native Soil	If LNAPL-impacted soil is not removed, LUCs will apply to monitor LNAPL, limit land use, and control use of soil.	LNAPL removal to the extent practicable. Removal of impacted soil (~200 cubic yards) around steel pipe and boring 4 recommended. Excavated soil will need offsite disposal or treatment.	

TABLE 6-3
Site Controls and Long-Term Management Activities
Site Characterization Report For Banana Patch Properties, Pearl City, Oahu, Hawaii
Honolulu Rail Transit Project, Oahu, Hawaii

Subarea	Assumed Future Activities	Decision Unit	Depth (feet bgs)	Site Controls	Recommended Long-Term Management Activities: Soil	Recommended Long-Term Management Activities: Groundwater
Area With Future Excavation	Removal of soil down to approximately 15 feet bgs to re-establish the 100-year flood plain. Rail station will be constructed in this area.	**DU5**	0-5	Soil removal with no controls or LUCs to limit site use and control use of the soil. Direct human exposure to soil between 10 and 15 feet bgs for construction workers will require excavation with personnel who is HAZWOPER certified (upgrade in level of protection may also be necessary).	Soil removal. Soil from area around borings 1 through 6 and 25 through 30 (~3,700 cubic yards) can be reused onsite. Soil from remaining portions of the DU (~5,200) will need to be disposed offsite as non hazardous waste.	No direct discharge to stream. Stream surface water sampling necessary during construction.
			5-10			
			10-15		Soil removal. Soil from area around borings 1 through 12 and 19 through 30 (~3,600 cubic yards) can be reused onsite. Soil from remaining portions of the DU (~900 cubic yards) will need to be disposed offsite as non hazardous waste.	
			Native Soil	None	None	
		DU6	0-5	Soil removal with no controls or LUCs to control use of the soil and monitor groundwater.	Soil removal. All soil removed from this depth interval (~11,600 cubic yards) will need to be disposed offsite as non hazardous waste. Construction debris present in this DU (~300 cubic yards, of which ~200 cubic yards are concrete and ~100 cubic yards are metal debris) may need removal	No direct discharge to stream. Stream surface water sampling necessary during construction.
			5-10			
			10-15		Soil removal. Soil from area around borings 7 through 12 (~2,300 cubic yards) can be reused onsite. Soil from remaining portions of the DU (3,500 cubic yards) will need to be disposed offsite as non hazardous waste.	
			Native Soil	LUCs to limit site use (and use of soil) to C/I.	None	
Waiawa Stream Bank	Excavation planned in the eastern portion of the north bank to re-establish 100-year floodplain.	**DU7**	0-3	LUCs may apply for presence of debris/waste if not removed	Concrete (~550 cubic yards) and metal debris (~250 cubic yards) present in this DU may need removal. Concrete meeting the inert fill requirements can be reused on site; remaining concrete and metal debris should be recycled/disposed of offsite.	No direct discharge to stream. Stream surface water sampling necessary during construction.

Notes
- If reused offsite in residential areas, all soil will require additional sampling to meet Programmatic EHMP requirements (one sample every 200 cubic yards of soil).

Acronyms:
bgs = below ground surface
C/I = commercial/industrial
DU = decision unit
HAZWOPER = hazardous waste operations and emergency response
LNAPL = light non aqueous phase liquid
LUC = land use control
MNA = monitored natural attenuation
TW = temporary well

Appendix A
Photographs of Field Activities

Photo 1. Hitachi 135 Excavator for vegetation clearance and test pit excavation.

Photo 2. DU1: Clearing vegetation by trampling with excavator. No grubbing performed.

Photo 3. DU4: Clearing vegetation using trimmers in less accessible areas.

Photo 4. DU2: Clearing vegetation by trampling with mini excavator. No grubbing performed.

Photo 5. EM61 cart for geophysical survey.

Photo 6. Ridgid Seek Tech SR-60 for utilities locating/clearing.

Photo 7. DU1: Area cleared for geophysical survey/utilities locating.

Photo 8. DU1: Area with significant surface debris where geophysical survey could not be performed.

Photo 9. DU1: Area with structures where geophysical survey could not be performed.

Photo 10. DU1: Area with structures where geophysical survey could not be performed.

Photo 11. DU1: Area with structures where geophysical survey could not be performed.

Photo 12. DU1: Area with structures where geophysical survey could not be performed.

Photo 13. DU2: Area cleared for geophysical survey/utility clearance.

Photo 14. DU2: Area with significant surface debris where geophysical survey could not be performed.

Photo 15. DU2: Area of significant debris and chicken coops where geophysical survey could not be performed.

Photo 16. DU2: Area of significant debris and chicken coops where geophysical survey could not be performed.

Photo 17. DU2: Area with soil stockpiles where geophysical survey could not be performed.

Photo 18. DU6: Area with surface debris and depression where geophysical survey could not be performed.

Photo 19. DU1, Test Pit 1: Excavating test pit.

Photo 20. DU1, Test Pit 1: Debris

Photo 21. DU1, Test Pit 2: Excavating test pit.

Photo 22. DU1, Test Pit 2: Debris

Photo 23. DU1, Test Pit 4: Debris within excavation.

Photo 24. DU1, Test Pit 6: Debris.

Photo 25. DU1, Test Pit 3: No debris.

Photo 26. DU3, Test Pit 1 Debris and potential concrete pipe at bottom of test pit.

Photo 27. DU6, Test Pit 1 within depression. Note: Debris on surface.

Photo 28. DU1, Test Pit 1 within depression. Note: Debris on surface.

Photo 29. DU6, Test Pit 7: Excavating within depression.

Photo 30. DU1, Test Pit 7 undocumented cesspool.

Photo 31. Track rig used for drilling.

Photo 32. Truck-mounted drill rig used for drilling.

Photo 33. Drilling.

Photo 34. Soil sampling station.

Photo 35. Soil sampling station.

Photo 36. Soil core

Photo 37. Soil core.

Photo 38. Soil core.

Photo 39. Soil core showing fill and native soil interface.

Photo 40. Drilling/installing temporary monitoring well.

Photo 41. DU3: Temporary monitoring well.

Photo 42. DU3, Borehole #8: Abandoned borehole.

Photo 43. DU7 Waiawa Stream Bank Debris Note: Vehicle in stream bank at water line of stream.

Photo 44. DU7 Waiawa Stream Bank Debris. Note: Street sweeper partially-buried in stream bank.

Photo 45. DU7 Waiawa Stream Bank Debris Note: Water heater and concrete.

Photo 46. DU7 Waiawa Stream Bank Debris

Photo 47. DU7 Waiawa Sttream Bank Debris.

Photo 48. D7 Waiawa Stream Bank Debris.

Photo 49. DU7 Waiawa Stream Bank Debris.

Photo 50. DU7 Waiawa Stream Bank Debris.

Photo 51. DU7 Waiawa Stream Bank Debris.

Photo 52. DU7 Waiawa Stream Bank Debris

Photo 53. DU9 Waiawa Stream Bed Sampling.

Photo 54. DU9 Waiawa Stream Bed Sampling.

Photo 55. DU9 Waiawa Stream Bed Sampling

Photo 56. DU9 Waiawa Stream Bed Sampling

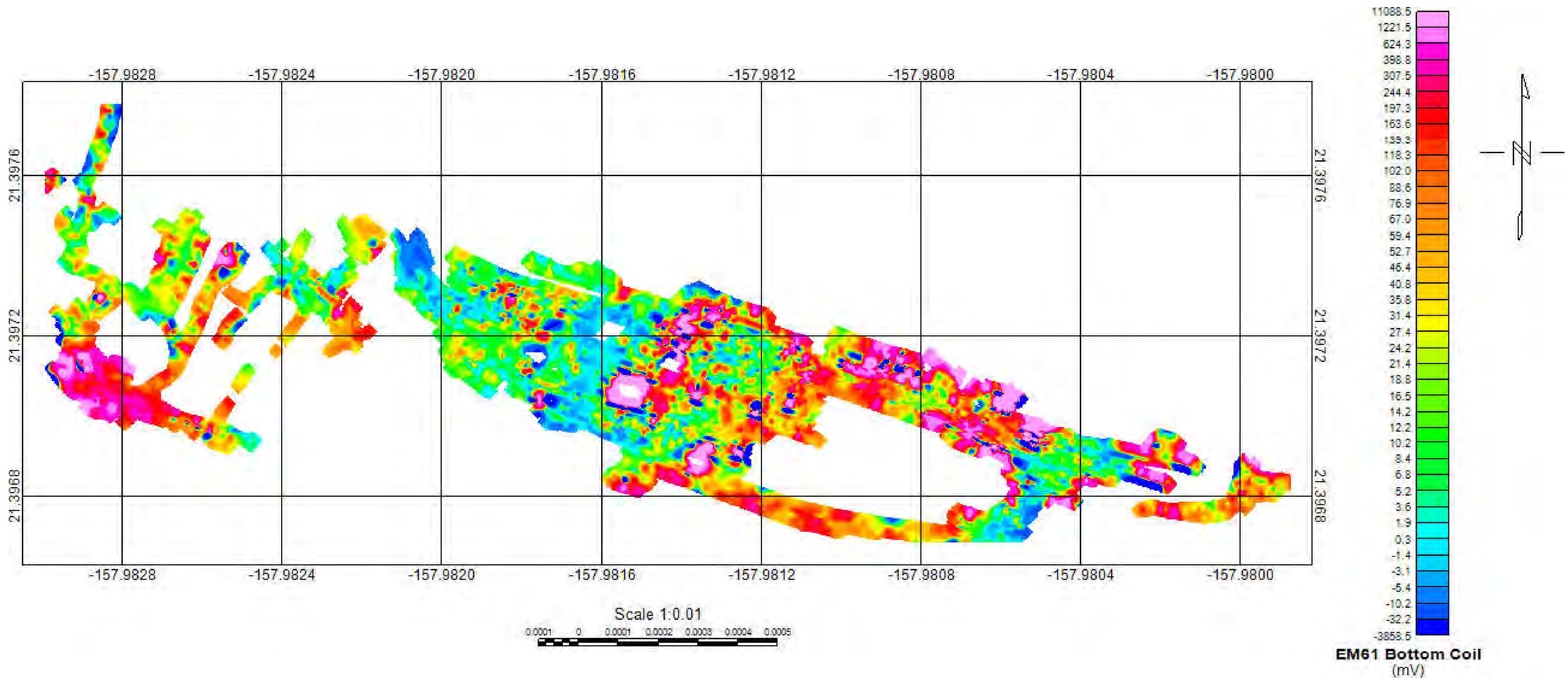
Photo 57. DU9 Waiawa Stream Bed Sampling.

Photo 58. DU9 Waiawa Stream Bed Sampling

Photo 59. DU10 Waiawa Stream Bed Sampling.

Photo 60. DU10 Waiawa Stream Bed Sampling.

Appendix B
Geophysical Survey Figures



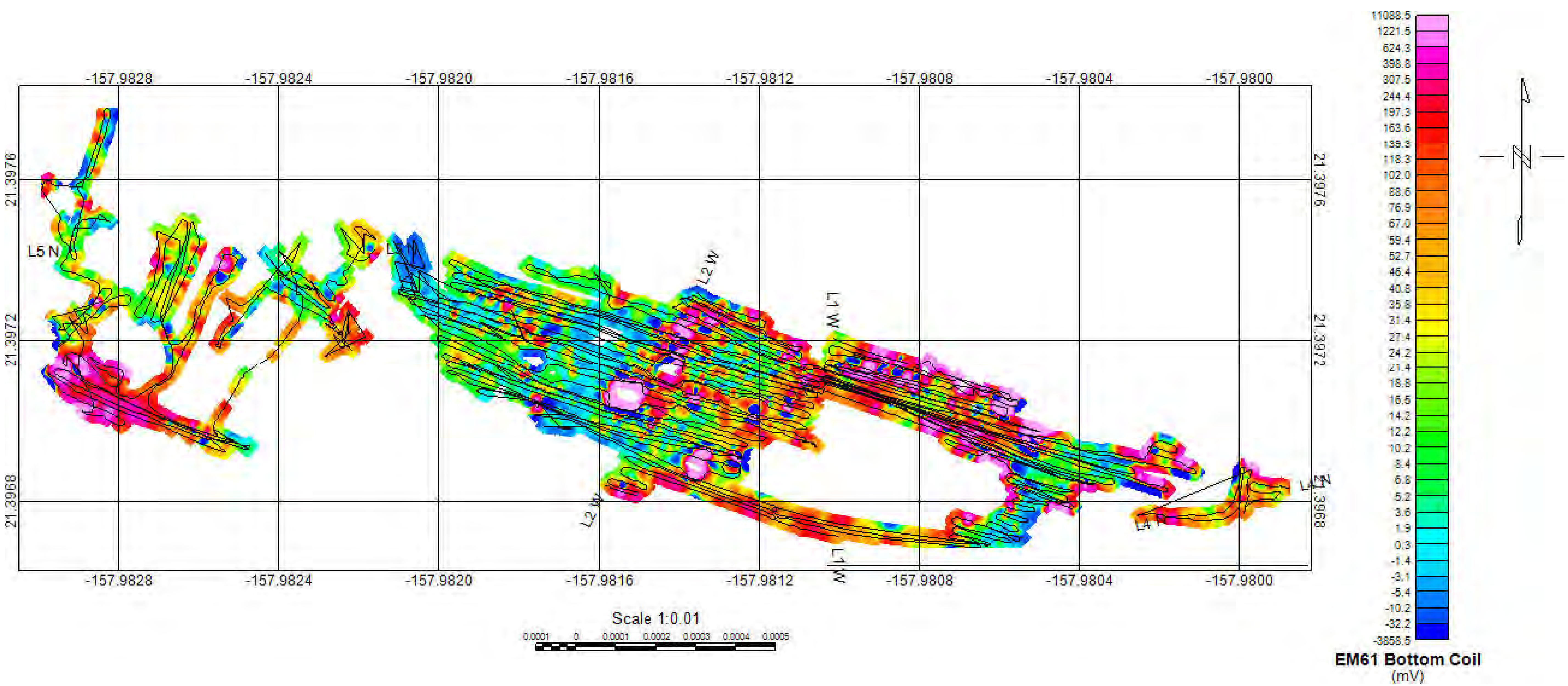
GeoTek Hawaii Inc.
Geophysical and Environmental Site Assessment

CH2MHill

Banana Patch, Honolulu, HI

EM61 Color Contour Map – Bottom Coil

Created By:	Date:	Figure:
CN	5/18/2014	1
GeoTek Project No:	File Path:	
HP-14-019		



GeoTek Hawaii Inc.
Geophysical and Environmental Site Assessment

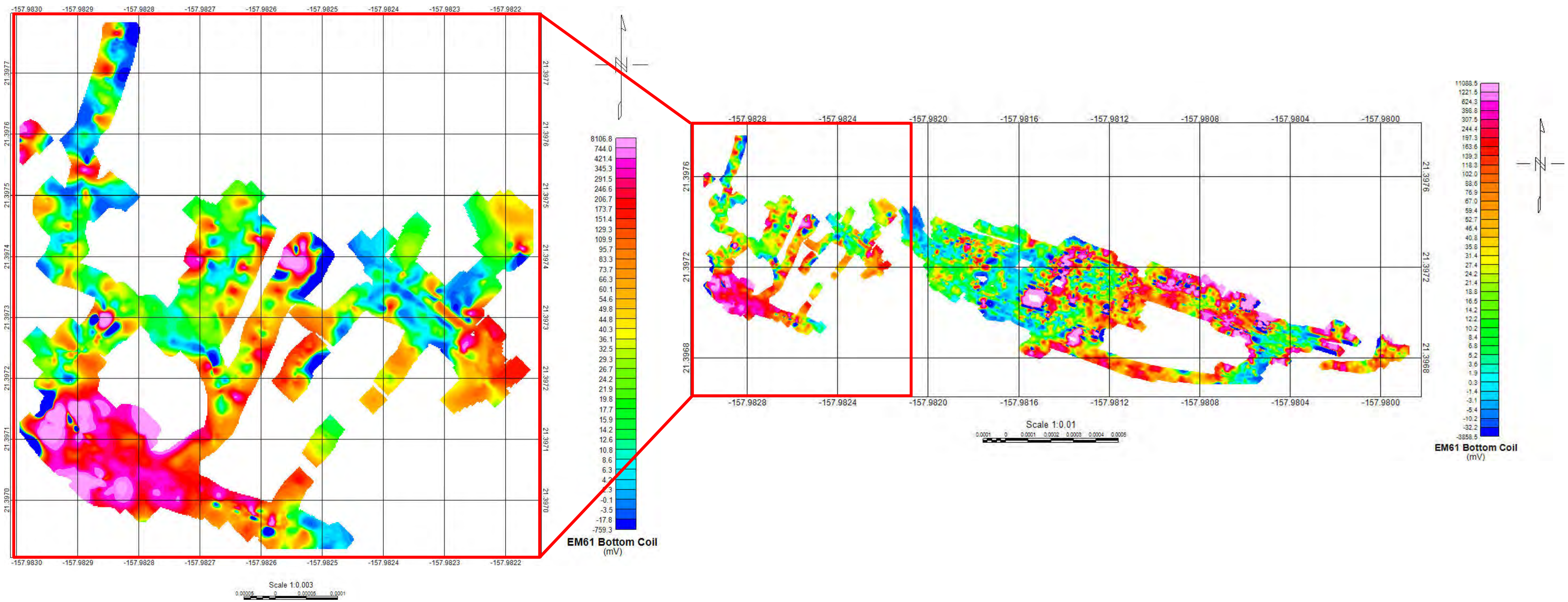
CH2MHill

Banana Patch, Honolulu, HI

EM61 Color Contour Map – Bottom Coil (w/ Line Paths)

Created By: CN	Date: 5/18/2014
GeoTek Project No: HP-14-019	File Path:

Figure: 2



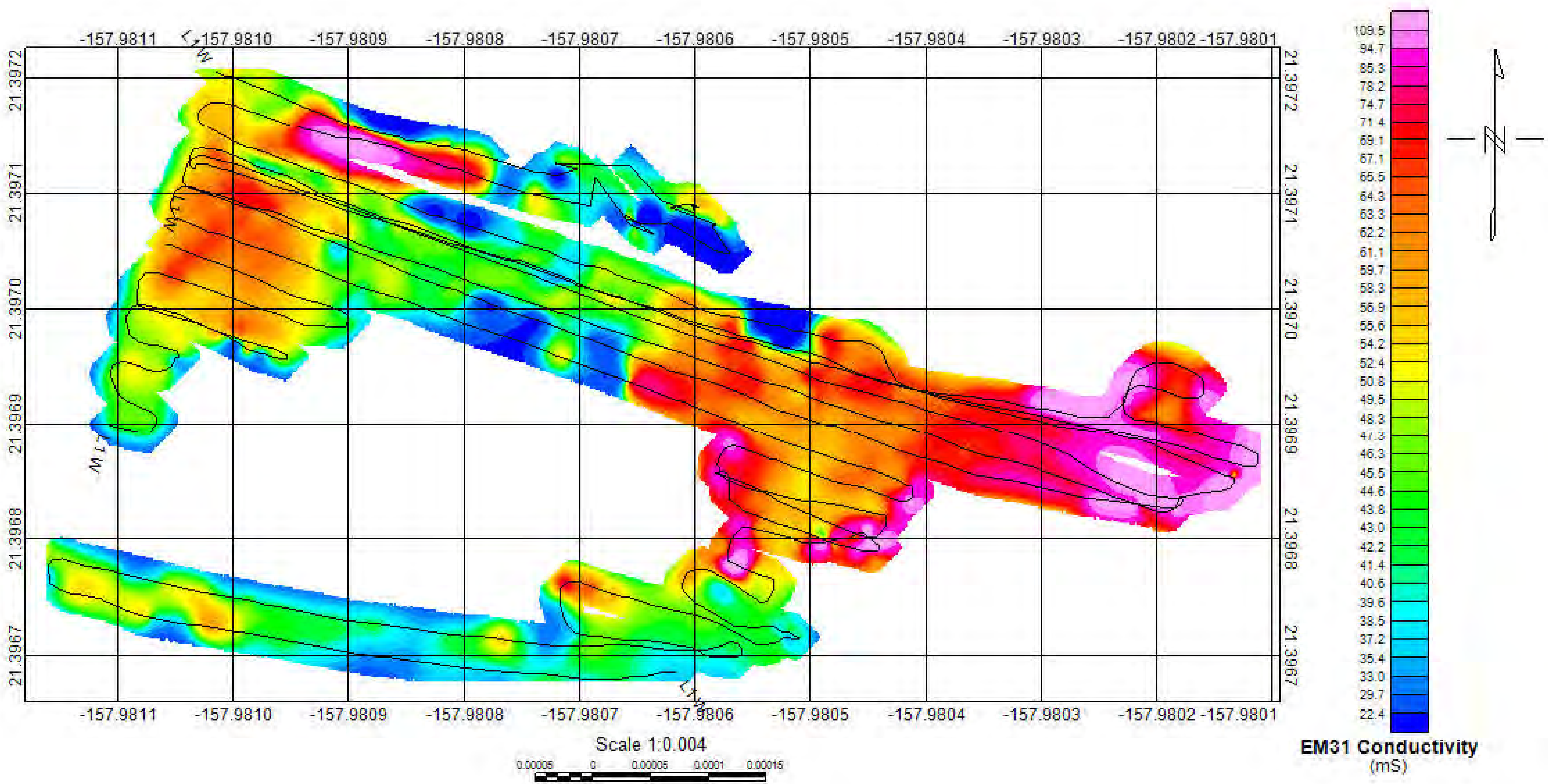
GeoTek Hawaii Inc.
Geophysical and Environmental Site Assessment

CH2MHill

Banana Patch, Honolulu, HI

EM61 Color Contour Map – Bottom Coil

Created By:	Date:	Figure:
CN	5/20/2014	3
GeoTek Project No: HP-14-019	File Path:	



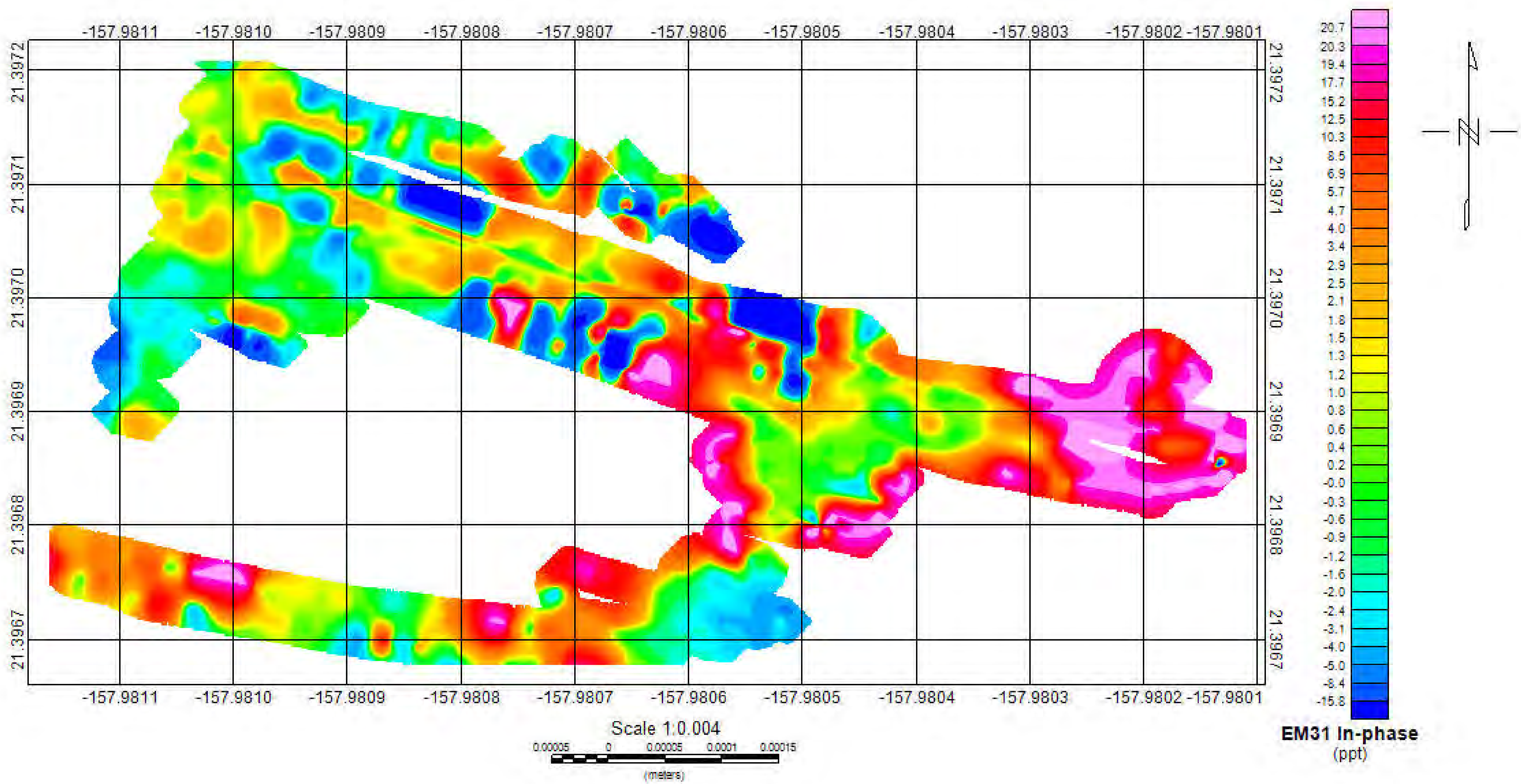
GeoTek Hawaii Inc.
Geophysical and Environmental Site Assessment

CH2MHill

Banana Patch, Honolulu, HI

EM31 Color Contour Map – Conductivity (w/ Line Paths)

Created By:	Date:	Figure:
CN	5/18/2014	4
GeoTek Project No: HP-14-019	File Path:	



GeoTek Hawaii Inc.
Geophysical and Environmental Site Assessment

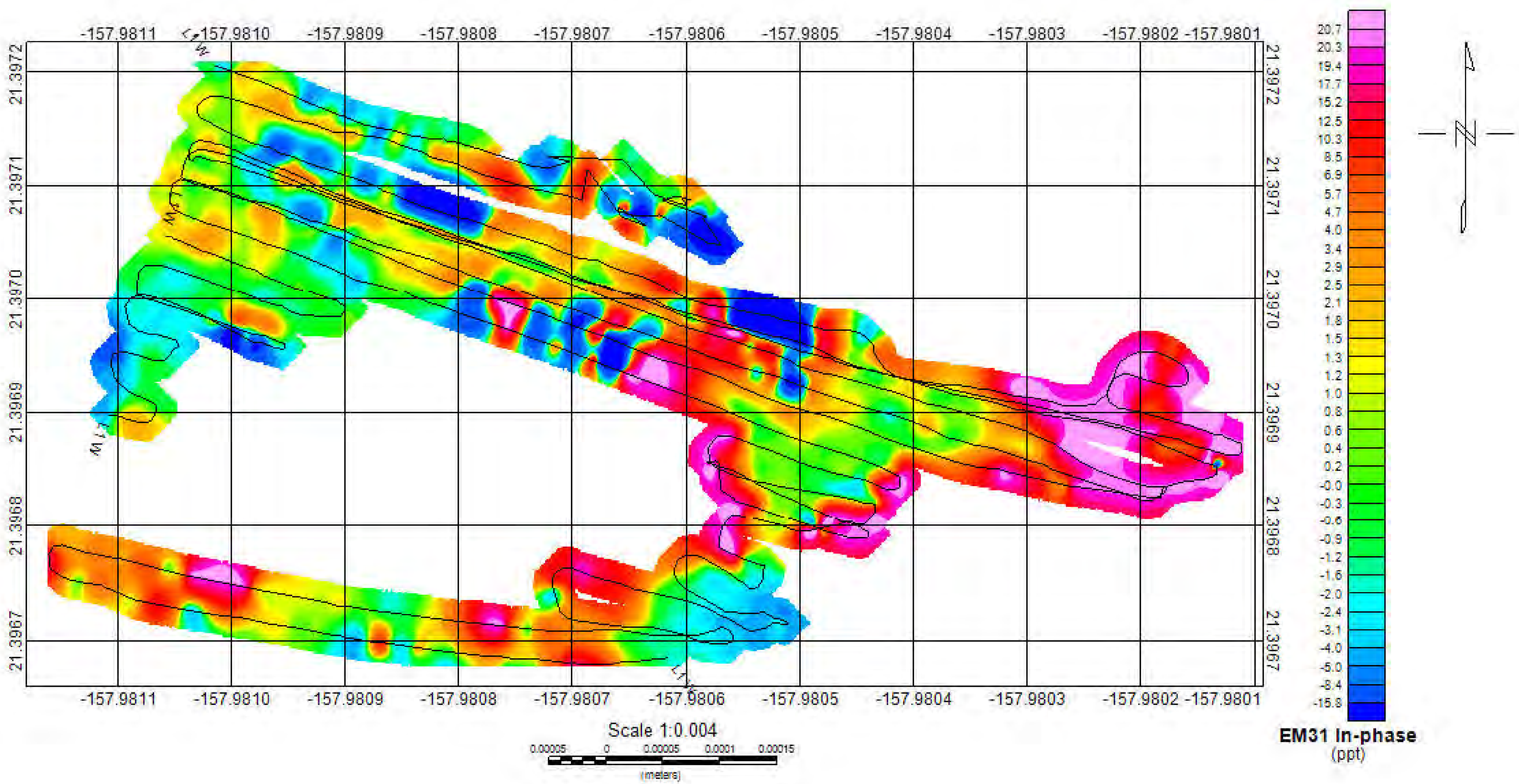
CH2MHill

Banana Patch, Honolulu, HI

EM31 Color Contour Map – In-phase

Created By:	Date:
CN	5/18/2014
GeoTek Project No:	File Path:
HP-14-019	

Figure: 5



GeoTek Hawaii Inc.
Geophysical and Environmental Site Assessment

CH2MHill

Banana Patch, Honolulu, HI

EM31 Color Contour Map – In-phase (w/ Line Paths)

Created By:	Date:	Figure:
CN	5/18/2014	6
GeoTek Project No: HP-14-019	File Path:	

Appendix C
Test Pit Logs

	PROJECT NUMBER	TEST PIT NUMBER	
CH2MHILL	495560.01.03.04	DU1 TP1	SHEET 1 OF 2

TEST PIT LOG

PROJECT : Site Characterization for Banana Patch Property	LOCATION :	DU1, TP1	DATE: 5/21/2014
WEATHER: Partly cloudy, hot, humid, 80s deg F	EXCAVATION CONTRACTOR :	Pacific Commercial Services	
EXCAVATION METHOD AND EQUIPMENT USED :	Hitachi 135 Track Excavator		
WATER LEVEL : N/A	**DATE/TIME** Start: 1535	End: 1600	LOGGER : FDH

TEST PIT PROFILE

Compass Direction NE-SW

Surface 0' BGS

Pit Dimensions	
16	L
12	W
9.5	H

Bottom of Pit 9.5 BGS

DEBRIS IDENTIFIED

Examples: Drums, steel or plastic and size; spray cans/bottles; newspapers; plastic; appliances; vehicles and/or parts; clothing; hazardous waste and type; chemical containers; batteries

Concrete, rebar, metal pipe, metal strap, water heater, tires, debris from 2-3 feet bgs throughout entire depth to 9.5 feet bgs.

Debris layer includes 20% concrete, 15% metal, 5% Other

Could not excavate further due to concrete and rebar at bottom.

PHOTO LOG

Photo Number	Compass Direction	Time	Description
			See photos 20140521-153626 through 20140521-155516 and 20140521-163052 through 20140521-163145
			20140521-172117

Logger Signature:______________________________________ Date:______________________________

PROJECT NUMBER	TEST PIT NUMBER	
495560.01.03.04	DU1, TP1	SHEET 2 OF 2

TEST PIT LOG

PROJECT : Site Characterization for Banana Patch LOCATION : DU1, TP1 DATE: 5/21/2014
WEATHER: Partly cloudy, hot, humid, 80s deg F EXCAVATION CONTRACTOR : Pacific Commercial Services (PCS)
EXCAVATION METHOD AND EQUIPMENT USED : Hitachi 135 Track Excavator
WATER LEVEL : N/A **DATE/TIME** Start: 1535 End: 1600 LOGGER : FDH

SOIL SAMPLES

Increment Soil Sample

Sample ID: DU1A (South) Depth: 0 - 0.5 feet bgs
Sampler Name: FDH Sample Date/Time: 5/21/2014 1600
Soil Description:
0-0.5 feet bgs - Silty clay, 7.5YR 5/6 Reddish Brown, Very Fine, Soft, Dry
Parameters Sampled for: 4 increments collected
TPH-DRO, -RRO, PAHs, pesticides/PCBs, herbicides, RCRA8 metals

Increment Soil Sample

Sample ID: DU1B (South) Depth: 8 - 10 feet bgs
Sampler Name: FDH Sample Date/Time: 5/21/2014 1610
Soil Description:
8 - 10 feet bgs - Silty clay, 7.5YR 5/4 brown very fine, trace sand, soft, dry mixed together with 7.5 YR 6/0 gray, very fine, trace sand, soft, dry
Parameters Sampled for: 4 increments collected
VOCs, TPH-GRO, -DRO, -RRO, PAHs, pesticides/PCBs, herbicides, RCRA8 metals

Increment Soil Sample

Sample ID: Not Collected Depth:
Sampler Name: Sample Date/Time:
Soil Description:

Parameters Sampled for:

BREATHING SPACE MONITORING

Time	MultiRAE	Landtech
1545	VOC 0.0 ppm	Not Measured
	Oxygen 20.9%	
	LEL 0%	
	CO 0 ppm	
	H2S 0.0 ppm	

NOTES

Debris identified throughout southern portion of DU1 and within test pit and extends deeper than the bottom of excavation.
DU1 - Test Pit #1 had fill/debris from 2-3 feet bgs and extended deeper than the bottom of the excavation.
Consequently, increments from only 2 of 3 vertical sub-units (SUs) A (0-0.5), B (8-10) were submitted. Vertical SU C will be collected via drilling.
The gray color and trace sand may be associated with the concrete debris.

Explanation of exceptions to SAP, PI's and SOP(s) including why, under what conditions, who authorized exception, anything considered in the decision:

Logger Signature:_______________________________________ Date:______________________________

	PROJECT NUMBER	TEST PIT NUMBER	
CH2MHILL	495560.01.03.04	DU1 TP2	SHEET 1 OF 2

TEST PIT LOG

PROJECT : Site Characterization for Banana Patch Property LOCATION : DU1, TP2 DATE: 5/21/2014
WEATHER: Partly cloudy, hot, humid, 80s deg F EXCAVATION CONTRACTOR : Pacific Commercial Services
EXCAVATION METHOD AND EQUIPMENT USED : Hitachi 135 Track Excavator
WATER LEVEL : N/A **DATE/TIME** Start: 1615 End: 1710 LOGGER : FDH

TEST PIT PROFILE

Compass Direction W-E

Surface 0' BGS

Pit Dimensions	
12	L
8	W
10	H

Bottom of Pit 10' BGS

DEBRIS IDENTIFIED

Examples: Drums, steel or plastic and size; spray cans/bottles; newspapers; plastic; appliances; vehicles and/or parts; clothing; hazardous waste and type; chemical containers; batteries

Concrete, rebar, metal pipe, tires, debris from 2-3 feet bgs throughout entire depth to 10 feet bgs.

Tyvek suits observed in test pit at ~ 3.0 feet bgs.

Metal debris: Stove, commercial vacuum cleaner, radiator, metal sheets, electric motors, pipe, rebar, wheel rotor

Miscellaneous: VHS tape (Little Mermaid circa 1990)

Debris layer includes 15% concrete, 15% metal, 10% other

Could not excavate further due to concrete and rebar at bottom.

PHOTO LOG

Photo Number	Compass Direction	Time	Description
			See photos 20140521-161756 through 20140521-162952 and 20140521-163919 through 20140521-172110

Logger Signature:______________________________ Date:________________________

	PROJECT NUMBER	TEST PIT NUMBER	
CH2MHILL	495560.01.03.04	DU1, TP2	SHEET 2 OF 2

TEST PIT LOG

PROJECT : Site Characterization for Banana Patch | LOCATION : DU1, TP2 | DATE: 5/21/2014

WEATHER: Partly cloudy, hot, humid, 80s deg F | EXCAVATION CONTRACTOR : Pacific Commercial Services (PCS)

EXCAVATION METHOD AND EQUIPMENT USED : Hitachi 135 Track Excavator

WATER LEVEL : N/A | **DATE/TIME** Start: 1615 End: 1710 | LOGGER : FDH

SOIL SAMPLES

Increment Soil Sample

Sample ID: DU1A (South) Depth: 0 - 5 feet bgs

Sampler Name: FDH Sample Date/Time: 5/21/2014

Soil Description:

0-0.5 feet bgs - Silty clay, 7.5YR 5/6 Reddish Brown, Very Fine, Soft, Dry

0.5-5.0 feet bgs - Transitions to Silty clay, 7.5YR 5/2 Brown, Very Fine, Trace Sand/Concrete, Soft, Dry

Parameters Sampled for: 4 increments collected

VOCs, TPH-GRO, -DRO, -RRO, PAHs, pesticides/PCBs, herbicides, RCRA8 metals

Increment Soil Sample

Sample ID: DU1B (South)

Sampler Name: FDH Sample Date/Time: 5/21/2014

Soil Description:

8-10 feet bgs - Silty clay, 7.5YR 4/2 brown, very fine, trace sand, soft, moist

Parameters Sampled for: 4 increments collected

VOCs, TPH-GRO, -DRO, -RRO, PAHs, pesticides/PCBs, herbicides, RCRA8 metals

Increment Soil Sample

Sample ID: Not collected

Sampler Name: Sample Date/Time:

Soil Description:

Parameters Sampled for:

BREATHING SPACE MONITORING

Time	MultiRAE	Landtech
1545	VOC 0.0 ppm	Not Measured
	Oxygen 20.9%	
	LEL 0%	
	CO 0 ppm	
	H2S 0.0 ppm	

NOTES

Debris identified throughout southern portion of DU1 and within test pit and extends deeper than the bottom of excavation.

DU1 - Test Pit #2 had fill/debris from 2-3 feet bgs and extended deeper than bottom of excavation.

Consequently, increments from only 2 of 3 vertical sub-units (SUs) A (0-0.5), B (8-10) were submitted. Vertical SU C will be collected via drilling.

The gray color and trace sand may be associated with the concrete debris.

Explanation of exceptions to SAP, PI's and SOP(s) including why, under what conditions, who authorized exception, anything considered in the decision:

Logger Signature:______________________________________ Date:_____________________________

	PROJECT NUMBER	TEST PIT NUMBER	
CH2MHILL	495560.01.03.04	DU1 TP3	SHEET 1 OF 2

TEST PIT LOG

PROJECT :	Site Characterization for Banana Patch Property	LOCATION :	DU1, TP3	DATE:	5/22/2014
WEATHER:	Partly cloudy, humid, 80 deg F	EXCAVATION CONTRACTOR :	Pacific Commercial Services		
EXCAVATION METHOD AND EQUIPMENT USED :		Hitachi 135 Track Excavator			
WATER LEVEL : N/A	**DATE/TIME**	Start: 855	End: 930	LOGGER :	FDH

TEST PIT PROFILE

Compass Direction N-S

Surface 0' BGS

Pit Dimensions	
11	L
4	W
9.5	H

Bottom of Pit 9.5 BGS

DEBRIS IDENTIFIED

Examples: Drums, steel or plastic and size; spray cans/bottles; newspapers; plastic; appliances; vehicles and/or parts; clothing; hazardous waste and type; chemical containers; batteries

One metal hub cap at 5-feet BGS. Few chunks of concrete. No other debris.

PHOTO LOG

Photo Number	Compass Direction	Time	Description
			See photos 20140522-085520 through 20140522-092410 and 20140522-094238

Logger Signature:______________________________ Date:______________________

	PROJECT NUMBER	TEST PIT NUMBER	SHEET 2 OF 2

TEST PIT LOG

PROJECT : Site Characterization for Banana Patch LOCATION : DU1, TP3 DATE: 5/22/2014
WEATHER: Partly cloudy, humid, 80 deg F EXCAVATION CONTRACTOR : Pacific Commercial Services (PCS)
EXCAVATION METHOD AND EQUIPMENT USED : Hitachi 135 Track Excavator
WATER LEVEL : **DATE/TIME** Start: 855 End: 930 LOGGER : FDH

SOIL SAMPLES

Increment Soil Sample			
Sample ID: DU1A (South)		Depth: 0 - 0.5 feet bgs	
Sampler Name:	FDH	Sample Date/Time:	5/22/2014
Soil Description:			
0-0.5feet bgs - Silty clay, 7.5YR 4/2 Brown, Very Fine, Soft, Dry			
Parameters Sampled for:	3 increments collected		
VOCs, TPH-GRO, -DRO, -RRO, PAHs, pesticides/PCBs, herbicides, RCRA8 metals			
Increment Soil Sample			
Sample ID: DU1B (South)		Depth: 0.5 - 3 feet bgs	
Sampler Name:	FDH	Sample Date/Time:	5/22/2014
Soil Description:			
0.5-3 feet bgs - Silty clay, 7.5YR 4/2 brown, very fine, trace sand, soft, moist			
Parameters Sampled for:	3 increments collected		
VOCs, TPH-GRO, -DRO, -RRO, PAHs, pesticides/PCBs, herbicides, RCRA8 metals			
Increment Soil Sample			
Sample ID: DU1C (South)		Depth: 8 - 10 feet bgs	
Sampler Name:	FDH	Sample Date/Time:	5/22/2014
Soil Description:			
8-10 feet bgs - Silty clay, 7.5YR 5/4 reddish brown to gray, very fine, stiff, moist			
Parameters Sampled for:	3 increments collected		
VOCs, TPH-GRO, -DRO, -RRO, PAHs, pesticides/PCBs, herbicides, RCRA8 metals			

BREATHING SPACE MONITORING

Time	MultiRAE	Landtech
855	VOC 0.0 ppm	Not Measured
	Oxygen 20.9%	
	LEL 0%	
	CO 0 ppm	
	H2S 0.0 ppm	
930	VOC 0.0 ppm	Not Measured
	Oxygen 20.9%	
	Oxygen 20.9%	
	LEL 0%	
	CO 0 ppm	
	H2S 0.0 ppm	

NOTES

DU1 - Test Pit #3 had very little fill/debris so all three vertical sub-units A (0-0.5), B (0.5 - 3), and C (8-10) submitted.

Explanation of exceptions to SAP, PI's and SOP(s) including why, under what conditions, who authorized exception, anything considered in the decision:

Logger Signature:______________________________________ Date:______________________________

	PROJECT NUMBER	TEST PIT NUMBER	
CH2MHILL	495560.01.03.04	DU1, TP4	SHEET 1 OF 2

TEST PIT LOG

PROJECT : Site Characterization for Banana Patch Property LOCATION : DU1, TP4 DATE: 5/22/2014
WEATHER: Partly cloudy, humid, 80 deg F EXCAVATION CONTRACTOR : Pacific Commercial Services
EXCAVATION METHOD AND EQUIPMENT USED : Hitachi 135 Track Excavator
WATER LEVEL : N/A **DATE/TIME** Start: 945 End: 1045 LOGGER : FDH

TEST PIT PROFILE

Compass Direction NE-SW

Surface 0' BGS

Pit Dimensions	
12	L
4	W
10.5	H

Bottom of Pit 10.5 BGS

DEBRIS IDENTIFIED

Examples: Drums, steel or plastic and size; spray cans/bottles; newspapers; plastic; appliances; vehicles and/or parts; clothing; hazardous waste and type; chemical containers; batteries

Concrete, rebar, metal pipe throughout from 2-3 feet bgs to 10 feet bgs. Plastic chemical sprayers.

Excavation was terminated due to sidewall sloughing and large concrete chunks on bottom that could not be excavated.

Sidewall collapse and undermining at 5 feet bgs.

Debris layer includes 15% concrete, 15% metal, 10% other.

PHOTO LOG

Photo Number	Compass Direction	Time	Description
			See photos 20140522-094212 and 20140522-103920 through 20140522-104706

Logger Signature:_______________________ Date:_______________________

PROJECT NUMBER	TEST PIT NUMBER	
495560.00	DU1, TP4	SHEET 2 OF 2

TEST PIT LOG

PROJECT : Site Characterization for Banana Patch | LOCATION : DU1, TP4 | DATE: 5/22/2014

WEATHER: Partly cloudy, humid, 80 deg F | EXCAVATION CONTRACTOR : Pacific Commercial Services (PCS)

EXCAVATION METHOD AND EQUIPMENT USED : Hitachi 135 Track Excavator

WATER LEVEL : N/A | **DATE/TIME** Start: 945 End: 1045 | LOGGER : FDH

SOIL SAMPLES

Increment Soil Sample

Sample ID: DU1A (South) | Depth: 0 - 0.5 feet bgs

Sampler Name: FDH | Sample Date/Time: N/A

Soil Description:

0-0.5feet bgs - Silty clay, 7.5YR 5/8 reddish brown, very fine, soft, slightly moist

Parameters Sampled for: 4 increments collected

TPH-DRO, -RRO, PAHs, pesticides/PCBs, herbicides, RCRA8 metals

Increment Soil Sample

Sample ID: DU1B (South) | Depth: 8 - 10 feet bgs

Sampler Name: FDH | Sample Date/Time: 5/22/2014

Soil Description:
8 - 10 feet bgs - Silty clay, 7.5YR 5/4 brown very fine, trace sand, soft, dry mixed together with 7.5 YR 6/0 gray, very fine, trace sand, soft, dry

Parameters Sampled for: 4 increments collected

VOCs, TPH-GRO, -DRO, -RRO, PAHs, pesticides/PCBs, herbicides, RCRA8 metals

Increment Soil Sample

Sample ID: No sample collected | Depth:

Sampler Name: FDH | Sample Date/Time: 5/22/2014

Soil Description:

Parameters Sampled for:

BREATHING SPACE MONITORING

Time	MultiRAE	Landtech
1000	VOC 0.0 ppm	Not Measured
	Oxygen 20.9%	
	LEL 0%	
	CO 0 ppm	
	H2S 0.0 ppm	

NOTES

DU1 - Test Pit #4 had fill/debris from 2-3 feet bgs and extended deeper than the bottom of the excavation.

Consequently, increments from only 2 of 3 vertical sub-units (SUs) A (0-0.5), B (8-10) were submitted. Vertical SU C will be collected via drilling.

The gray color and trace sand may be associated with the concrete debris.

Explanation of exceptions to SAP, PI's and SOP(s) including why, under what conditions, who authorized exception, anything considered in the decision:

Logger Signature:____ Date:_______________________________

	PROJECT NUMBER	TEST PIT NUMBER	
CH2MHILL	495560.01.03.04	DU1, TP5	SHEET 1 OF 2

TEST PIT LOG

PROJECT : Site Characterization for Banana Patch Property LOCATION : DU1, TP5 DATE: 5/22/2014
WEATHER: Partly cloudy, humid, 80 deg F EXCAVATION CONTRACTOR : Pacific Commercial Services
EXCAVATION METHOD AND EQUIPMENT USED : Hitachi 135 Track Excavator
WATER LEVEL : N/A **DATE/TIME** Start: 1110 End: 1130 LOGGER : FDH

TEST PIT PROFILE

Compass Direction W-E

Surface 0' BGS

Pit Dimensions	
12	L
4	W
10.5	H

Bottom of Pit 10.5 BGS

DEBRIS IDENTIFIED

Examples: Drums, steel or plastic and size; spray cans/bottles; newspapers; plastic; appliances; vehicles and/or parts; clothing; hazardous waste and type; chemical containers; batteries

No debris encountered in test pit.

PHOTO LOG

Photo Number	Compass Direction	Time	Description
			See photos 20140522-1123235 through 20140522-112303

Logger Signature:____________________ Date:____________________

CH2MHILL	PROJECT NUMBER 495560.00	TEST PIT NUMBER DU1, TP5	SHEET 2 OF 2

TEST PIT LOG

PROJECT :	Site Characterization for Banana Patch	LOCATION :	DU1, TP5	DATE:	5/22/2014
WEATHER:	Partly cloudy, humid, 80 deg F	EXCAVATION CONTRACTOR :	Pacific Commercial Services (PCS)		
EXCAVATION METHOD AND EQUIPMENT USED :		Hitachi 135 Track Excavator			
WATER LEVEL :	N/A	**DATE/TIME** Start: 1110	End: 1130	LOGGER :	FDH

SOIL SAMPLES				BREATHING SPACE MONITORING		
Increment Soil Sample				**Time**	**MultiRAE**	**Landtech**
Sample ID: DU1A (South)		Depth: 0 - 0.5 feet bgs		1135	VOC 0.0 ppm	Not Measured
Sampler Name:	FDH	Sample Date/Time:	N/A		Oxygen 20.9%	
Soil Description:					LEL 0%	
0-0.5feet bgs - Silty clay, 7.5YR 6/2 yellowish brown, very fine, soft, slightly moist					CO 0 ppm	
Parameters Sampled for:	3 increments collected				H2S 0.0 ppm	
TPH-DRO, -RRO, PAHs, pesticides/PCBs, herbicides, RCRA8 metals						
Increment Soil Sample						
Sample ID: DU1B (South)		Depth: 0.5 - 3 feet bgs				
Sampler Name:	FDH	Sample Date/Time:	5/22/2014			
Soil Description:						
0.5-3.0 feet bgs - Silty clay, 7.5YR 5/4 reddish brown, very fine, soft, moist						
Parameters Sampled for:	3 increments collected					
VOCs, TPH-GRO, -DRO, -RRO, PAHs, pesticides/PCBs, herbicides, RCRA8 metals						
Increment Soil Sample						
Sample ID: DU1C (South)		Depth: 8 - 10 feet bgs				
Sampler Name:	FDH	Sample Date/Time:	5/22/2014			
Soil Description:						
8-10 feet bgs - Silty clay, 7.5YR 5/4 reddish brown to gray, very fine, stiff, moist						
Parameters Sampled for:	3 increments collected					

NOTES

No debris encountered within test pit.

Explanation of exceptions to SAP, PI's and SOP(s) including why, under what conditions, who authorized exception, anything considered in the decision:

Logger Signature:____ Date:_______________________________

CH2MHILL	PROJECT NUMBER 495560.01.03.04	TEST PIT NUMBER DU1 TP6	SHEET 1 OF 2

TEST PIT LOG

PROJECT : Site Characterization for Banana Patch Property LOCATION : DU1, TP6 DATE: 5/22/2014
WEATHER: Partly cloudy, hot, humid EXCAVATION CONTRACTOR : Pacific Commercial Services
EXCAVATION METHOD AND EQUIPMENT USED : Hitachi 135 Track Excavator
WATER LEVEL : N/A **DATE/TIME** Start: 1315 End: 1415 LOGGER : FDH

TEST PIT PROFILE

Compass Direction W-E

Surface 0' BGS

Bottom of Pit 10 BGS

Pit Dimensions	
30	L
9	W
10	H

DEBRIS IDENTIFIED

Examples: Drums, steel or plastic and size; spray cans/bottles; newspapers; plastic; appliances; vehicles and/or parts; clothing; hazardous waste and type; chemical containers; batteries

Concrete, rebar, metal pipe throughout from 2-3 feet bgs to 10 feet bgs.

Excavation was terminated due to sidewall sloughing and large concrete chunks on bottom that could not be excavated.

Sidewall collapse and undermining at 3-5 feet bgs.

Debris layer includes 20% concrete, 15% metal, 5% other

PHOTO LOG

Photo Number	Compass Direction	Time	Description
			See photos 20140522-131647 through 20140522-142606

Logger Signature:______________________________________ Date:______________________________

CH2MHILL	PROJECT NUMBER 495560.00	TEST PIT NUMBER DU1, TP6	SHEET 2 OF 2

TEST PIT LOG

PROJECT :	Site Characterization for Banana Patch	LOCATION :	DU1, TP6	DATE:	5/22/2014
WEATHER:	Partly cloudy, hot, humid	EXCAVATION CONTRACTOR :	Pacific Commercial Services (PCS)		
EXCAVATION METHOD AND EQUIPMENT USED :		Hitachi 135 Track Excavator			
WATER LEVEL :	N/A	**DATE/TIME** Start: 1315	End: 1415	LOGGER :	FDH

SOILS SAMPLES

Increment Soil Sample

Sample ID:	DU1A (South)	Depth: 0 - 0.5 feet bgs	
Sampler Name:	FDH	Sample Date/Time:	N/A
Soil Description:			
0-0.5feet bgs - Silty clay, 7.5YR 5/8 reddish brown, very fine, soft, dry			
Parameters Sampled for: 6 increments collected			
TPH-DRO, -RRO, PAHs, pesticides/PCBs, herbicides, RCRA8 metals			

Increment Soil Sample

Sample ID:	DU1B (South)	Depth: 8 - 10 feet bgs	
Sampler Name:	FDH	Sample Date/Time:	5/22/2014
Soil Description:			
8 - 10 feet bgs - Silty clay, 7.5YR 5/4 brown very fine, trace sand, soft, dry mixed together with 7.5 YR 6/2 brown, very fine, trace sand, soft, dry			
Parameters Sampled for: 6 increments collected			
VOCs, TPH-GRO, -DRO, -RRO, PAHs, pesticides/PCBs, herbicides, RCRA8 metals			

Increment Soil Sample

Sample ID:	No sample collected	Depth:	
Sampler Name:		Sample Date/Time:	
Soil Description:			
Parameters Sampled for:			
No sample collected because did not encounter native material			

BREATHING SPACE MONITORING

Time	MultiRAE	Landtech
1335	VOC 0.0 ppm	Not Measured
	Oxygen 20.9%	
	LEL 0%	
	CO 0 ppm	
	H2S 0.0 ppm	
1400	VOC 0.0 ppm	
	Oxygen 20.9%	
	Oxygen 20.9%	
	LEL 0%	
	CO 0 ppm	
	H2S 0.0 ppm	

NOTES

DU1 - Test Pit #6 had fill/debris from 2 feet bgs and extended deeper than the bottom of the excavation.

Consequently, increments from only 2 of 3 vertical sub-units (SUs) A (0-0.5), B (8-10) were submitted. Vertical SU C will be collected via drilling.

The gray color and trace sand may be associated with the concrete debris.

Explanation of exceptions to SAP, PI's and SOP(s) including why, under what conditions, who authorized exception, anything considered in the decision:

Logger Signature:____ Date:______________________________

PROJECT NUMBER	TEST PIT NUMBER	
495560.01.03.04	DU1 TP7	SHEET 1 OF 2

TEST PIT LOG

PROJECT : Site Characterization for Banana Patch Property LOCATION : DU1, TP7 DATE: 5/22/2014
WEATHER: Partly cloudy, hot, humid EXCAVATION CONTRACTOR : Pacific Commercial Services
EXCAVATION METHOD AND EQUIPMENT USED : Hitachi 135 Track Excavator
WATER LEVEL : N/A **DATE/TIME** Start: 1420 End: 1445 LOGGER : FDH

TEST PIT PROFILE

Compass Direction W-E

Surface 0' BGS

Pit Dimensions	
30	L
9	W
10	H

Bottom of Pit 10 BGS

DEBRIS IDENTIFIED

Examples: Drums, steel or plastic and size; spray cans/bottles; newspapers; plastic; appliances; vehicles and/or parts; clothing; hazardous waste and type; chemical containers; batteries

Concrete, rebar, metal pipe throughout from 2-3 feet bgs to 10 feet bgs.

Excavation was terminated due to sidewall sloughing and large concrete chunks on bottom that could not be excavated.

Large chunks of concrete encountered. The ground surface around the test pit started to move when excavator pulled on concrete chunk.

Indicates that concrete extends well beyond the footprint of the test pit.

Debris layer includes 20% concrete, 15% metal, 5% other

PHOTO LOG

Photo Number	Compass Direction	Time	Description
			See photos 20140522-131647 through 20140522-142606

Logger Signature:______________________ Date:____________________

CH2MHILL	PROJECT NUMBER 495560.00	TEST PIT NUMBER DU1, TP7	SHEET 2 OF 2

TEST PIT LOG

PROJECT : Site Characterization for Banana Patch LOCATION : DU1, TP7 DATE: 5/22/2014
WEATHER: Partly cloudy, hot, humid EXCAVATION CONTRACTOR : Pacific Commercial Services (PCS)
EXCAVATION METHOD AND EQUIPMENT USED : Hitachi 135 Track Excavator
WATER LEVEL : N/A **DATE/TIME** Start: 1420 End: 1445 LOGGER : FDH

SOIL SAMPLES

Increment Soil Sample

Sample ID: DU1A (South) Depth: 0 - 0.5 feet bgs
Sampler Name: FDH Sample Date/Time: N/A
Soil Description:
0-0.5feet bgs - Silty clay, 7.5YR 6/2 yellowish brown, very fine, soft, slightly moist
Parameters Sampled for: 6 increments collected
TPH-DRO, -RRO, PAHs, pesticides/PCBs, herbicides, RCRA8 metals

Increment Soil Sample

Sample ID: DU1B (South) Depth: 8 - 10 feet bgs
Sampler Name: FDH Sample Date/Time: 5/22/2014
Soil Description:
8 - 10 feet bgs - Silty clay, 7.5YR 5/4 reddish brown, very fine, soft, moist
Parameters Sampled for: 6 increments collected
VOCs, TPH-GRO, -DRO, -RRO, PAHs, pesticides/PCBs, herbicides, RCRA8 metals

Increment Soil Sample

Sample ID: No increment collected Depth:
Sampler Name: Sample Date/Time:
Soil Description:

Parameters Sampled for:
No increments collected because did not encounter native material

BREATHING SPACE MONITORING

Time	MultiRAE	Landtech
1445	VOC 0.0 ppm	Not Measured
	Oxygen 20.9%	
	LEL 0%	
	CO 0 ppm	
	H2S 0.0 ppm	

NOTES

DU1 - Test Pit #7 had fill/debris from 2 feet bgs and extended deeper than the bottom of the excavation.
Consequently, increments from only 2 of 3 vertical sub-units (SUs) A (0-0.5), B (8-10) were submitted. Vertical SU C will be collected via drilling.
The gray color and trace sand may be associated with the concrete debris.

Explanation of exceptions to SAP, PI's and SOP(s) including why, under what conditions, who authorized exception, anything considered in the decision:

Logger Signature:____ Date:_______________________________

PROJECT NUMBER	TEST PIT NUMBER	
495560.01.03.04	DU2 TP1	SHEET 1 OF 2

TEST PIT LOG

PROJECT : Site Characterization for Banana Patch Property LOCATION : DU2, TP1 DATE: 5/22/2014
WEATHER: EXCAVATION CONTRACTOR : Pacific Commercial Services
EXCAVATION METHOD AND EQUIPMENT USED : Hitachi 135 Track Excavator
WATER LEVEL : N/A **DATE/TIME** Start: 1550 End: 1605 LOGGER : FDH

TEST PIT PROFILE

Compass Direction N-S

Surface 0' BGS

Pit Dimensions	
11	L
3.5	W
3	H

Bottom of Pit 3 BGS

DEBRIS IDENTIFIED

Examples: Drums, steel or plastic and size; spray cans/bottles; newspapers; plastic; appliances; vehicles and/or parts; clothing; hazardous waste and type; chemical containers; batteries

2-inch metal clothesline pipe on surface beneath dense vegetation likely the source of the anomaly

No subsurface debris observed.

PHOTO LOG

Photo Number	Compass Direction	Time	Description
			See photos 20140522-155038 through 20140522-155629

Logger Signature:_________________________ Date:____________________

	PROJECT NUMBER	TEST PIT NUMBER	
CH2MHILL	495560.00	DU2, TP1	SHEET 2 OF 2

TEST PIT LOG

PROJECT : Site Characterization for Banana Patch LOCATION : DU2, TP1 DATE: 5/22/2014
WEATHER: Partly cloudy, hot, humid, 80s deg F EXCAVATION CONTRACTOR : Pacific Commercial Services (PCS)
EXCAVATION METHOD AND EQUIPMENT USED : Hitachi 135 Track Excavator
WATER LEVEL : N/A **DATE/TIME** Start: 1550 End: 1605 LOGGER : FDH

SOIL SAMPLES

Increment Soil Sample

Sample ID: No sample collected Depth: 0 - 0.5 feet bgs
Sampler Name: FDH Sample Date/Time: N/A
Soil Description:
0-0.5feet bgs - Silty clay, 7.5YR 6/2 yellowish brown, very fine, soft, slightly moist
Parameters Sampled for:
No sample collected

Increment Soil Sample

Sample ID: No sample collected Depth: 0.5 - 3 feet bgs
Sampler Name: FDH Sample Date/Time: 5/22/2014
Soil Description:
0.5-3.0 feet bgs - Silty clay, 7.5YR 5/4 reddish brown, very fine, soft, moist
Parameters Sampled for:
No sample collected

Increment Soil Sample

Sample ID: No sample collected Depth:
Sampler Name: Sample Date/Time:
Soil Description:
Parameters Sampled for:

BREATHING SPACE MONITORING

Time	MultiRAE	Landtech
	Not Measured	Not Measured

NOTES

No debris encountered within test pit. Metal pipe on surface beneath vegetation likely source of geophysical anomaly.

Explanation of exceptions to SAP, PI's and SOP(s) including why, under what conditions, who authorized exception, anything considered in the decision:

Logger Signature:____ Date:______________________________

CH2MHILL	PROJECT NUMBER 495560.01.03.04	TEST PIT NUMBER DU3, TP1	SHEET 1 OF 2

TEST PIT LOG

PROJECT : Site Characterization for Banana Patch Property LOCATION : DU3, TP1 DATE: 5/21/2014
WEATHER: Partly cloudy, hot, humid, 80s deg F EXCAVATION CONTRACTOR : Pacific Commercial Services
EXCAVATION METHOD AND EQUIPMENT USED : Hitachi 135 Track Excavator
WATER LEVEL : N/A **DATE/TIME** Start: 1414 End: 1510 LOGGER : FDH

TEST PIT PROFILE

Compass Direction E-W

Surface 0' BGS

Pit Dimensions	
10	L
8	W
8	H

Bottom of Pit 8 BGS

DEBRIS IDENTIFIED

Examples: Drums, steel or plastic and size; spray cans/bottles; newspapers; plastic; appliances; vehicles and/or parts; clothing; hazardous waste and type; chemical containers; batteries

Debris starting from 1-2 feet bgs and then from 3 feet to bottom of test pit. Note: Potential concrete pipe located at bottom of test pit approximately 4-feet west of east end trending N-S.

Concrete, metal, tarp

Debris layer includes 10% concrete, 10% metal, 5% other

PHOTO LOG

Photo Number	Compass Direction	Time	Description
			See photos 20140521-141426 to 20140521-150220

Logger Signature:_________________________ Date:____________________

CH2MHILL	PROJECT NUMBER 495560.01.03.04	TEST PIT NUMBER DU3, TP1	SHEET 2 OF 2

TEST PIT LOG

PROJECT : Site Characterization for Banana Patch LOCATION : DU3, TP1 DATE: 5/21/2014
WEATHER: EXCAVATION CONTRACTOR : Pacific Commercial Services (PCS)
EXCAVATION METHOD AND EQUIPMENT USED : Hitachi 135 Track Excavator
WATER LEVEL : N/A **DATE/TIME** Start: 1414 End: 1510 LOGGER : FDH

SOIL SAMPLES

Increment Soil Sample

Sample ID: No sample collected Depth: 0 - 0.5 feet bgs
Sampler Name: FDH Sample Date/Time: N/A
Soil Description:
0-0.5feet bgs - Silty clay, 7.5YR 6/2 yellowish brown, very fine, soft, slightly moist
Parameters Sampled for:
No sample collected

Increment Soil Sample

Sample ID: No sample collected Depth: 0.5 - 3 feet bgs
Sampler Name: FDH Sample Date/Time: N/A
Soil Description:
0.5-3.0 feet bgs - Silty clay, 7.5YR 5/4 reddish brown, very fine, soft, moist
Parameters Sampled for:
No sample collected

Increment Soil Sample

Sample ID: No sample collected Depth: 3 - 8 feet bgs
Sampler Name: FDH Sample Date/Time: N/A
Soil Description:
8-10 feet bgs - Silty clay, 7.5YR 5/4 reddish brown to gray, very fine, stiff, moist
Parameters Sampled for:
No sample collected

BREATHING SPACE MONITORING

Time	MultiRAE	Landtech
	Not Measured	Not Measured

NOTES

Potential concrete pipe at bottom of excavation. OneCall did not indicate any utilities though could be old/abandoned utility.
Checked road for storm drains/grates. None found.
Pipe trends N-S within the test pit in direction toward depression within DU6.

Explanation of exceptions to SAP, PI's and SOP(s) including why, under what conditions, who authorized exception, anything considered in the decision:

Logger Signature:____ Date:______________________________

CH2MHILL	PROJECT NUMBER 495560.01.03.04	TEST PIT NUMBER DU6 TP1	SHEET 1 OF 2

TEST PIT LOG

PROJECT : Site Characterization for Banana Patch Property LOCATION : DU6, TP1 DATE: 5/20/2014
WEATHER: Partly cloudy, hot, humid, 80s deg F EXCAVATION CONTRACTOR : Pacific Commercial Services
EXCAVATION METHOD AND EQUIPMENT USED : Hitachi 135 Track Excavator
WATER LEVEL : N/A **DATE/TIME** Start: 1240 End: 1340 LOGGER : FDH

TEST PIT PROFILE

Compass Direction W-E

Surface 0' BGS

Pit Dimensions	
10	L
3	W
10	H

Bottom of Pit 10 BGS

DEBRIS IDENTIFIED

Examples: Drums, steel or plastic and size; spray cans/bottles; newspapers; plastic; appliances; vehicles and/or parts; clothing; hazardous waste and type; chemical containers; batteries

Asphalt, concrete, metal, tires, wood, plastic debris only in upper 3-4 feet bgs.

Debris does not appear to extend below that depth but sidewalls caving in so hard to tell.

Debris layer is 40% concrete, 20% asphalt, 10% other

PHOTO LOG

Photo Number	Compass Direction	Time	Description
			See photos 20140520-124407 through 20140520-133743and 20140521-163052 through 20140521-163145

Logger Signature:______________________________________ Date:_____________________________

	PROJECT NUMBER	TEST PIT NUMBER	
CH2MHILL	495560.01.03.04	DU6, TP1	SHEET 2 OF 2

TEST PIT LOG

PROJECT : Site Characterization for Banana Patch LOCATION : DU6, TP1 DATE: 5/20/2014
WEATHER: Partly cloudy, hot, humid, 80s deg F EXCAVATION CONTRACTOR : Pacific Commercial Services (PCS)
EXCAVATION METHOD AND EQUIPMENT USED : Hitachi 135 Track Excavator
WATER LEVEL : N/A **DATE/TIME** Start: 1240 End: 1340 LOGGER : FDH

SOIL SAMPLES

Increment Soil Sample

Sample ID: DU6A Depth: 0 - 5 feet bgs
Sampler Name: FDH Sample Date/Time: 5/20/2014
Soil Description:
0-5 feet bgs - Silty clay, 7.5YR 5/6 Reddish Brown, Very Fine, Trace Sand, Soft, Dry
Parameters Sampled for: 3 increments collected
TPH-DRO, -RRO, PAHs, pesticides/PCBs, herbicides, RCRA8 metals

Increment Soil Sample

Sample ID: DU6B Depth: 5 - 10 feet bgs
Sampler Name: FDH Sample Date/Time: 5/20/2014
Soil Description:
5 - 10 feet bgs - Silty clay, 7.5YR 3/3 dark brown, very fine, medium soft, dry to slightly moist
Parameters Sampled for: 3 increments collected
VOCs, TPH-GRO, -DRO, -RRO, PAHs, pesticides/PCBs, herbicides, RCRA8 metals

Increment Soil Sample

Sample ID: DU6C Depth: 10 - 15 feet bgs
Sampler Name: FDH Sample Date/Time: 5/20/2014
Soil Description:
Silty clay 7.5YR 3/3 dark brown, very fine, firm, slightly moist to moist
Parameters Sampled for: 3 increments collected
VOCs, TPH-GRO, -DRO, -RRO, PAHs, pesticides/PCBs, herbicides, RCRA8 metals

BREATHING SPACE MONITORING

Time	MultiRAE	Landtech
1300	VOC 0.0 ppm	Not Measured
	Oxygen 20.9%	
	LEL 0%	
	CO 0 ppm	
	H2S 0.0 ppm	

NOTES

DU6 - Test Pit #1 had fill/debris from surface to 3-4 feet bgs.
Debris appears to be limited to upper portion of depression.

Explanation of exceptions to SAP, PI's and SOP(s) including why, under what conditions, who authorized exception, anything considered in the decision:

Logger Signature:________________________ Date:____________________

PROJECT NUMBER	TEST PIT NUMBER	
495560.01.03.04	DU6 TP2	SHEET 1 OF 2

TEST PIT LOG

PROJECT : Site Characterization for Banana Patch Property LOCATION : DU6, TP2 DATE: 5/20/2014
WEATHER: Partly cloudy, hot, humid, 80s deg F EXCAVATION CONTRACTOR : Pacific Commercial Services
EXCAVATION METHOD AND EQUIPMENT USED : Hitachi 135 Track Excavator
WATER LEVEL : N/A **DATE/TIME** Start: 1340 End: 1410 LOGGER : FDH

TEST PIT PROFILE

Compass Direction W-E

Surface 0' BGS

Pit Dimensions	
10	L
3	W
10	H

Bottom of Pit 10 BGS

DEBRIS IDENTIFIED

Examples: Drums, steel or plastic and size; spray cans/bottles; newspapers; plastic; appliances; vehicles and/or parts; clothing; hazardous waste and type; chemical containers; batteries

Asphalt, concrete debris in upper 2 feet bgs and then metal cable at approximately 8 feet bgs. Debris is sparse.

Debris appears to relatively sparse throughout test pit.

Debris layer in upper 1-2 feet includes 35% concrete, 10% asphalt, 10% other

Debris beneath the upper 1-2 feet includes 10% concrete, 5% asphalt, 5% other

PHOTO LOG

Photo Number	Compass Direction	Time	Description
			See photos 20140520-135815 through 20140520-141002

Logger Signature:_______________________________ Date:_______________________

	PROJECT NUMBER	TEST PIT NUMBER	
CH2MHILL	495560.01.03.04	DU6, TP2	SHEET 2 OF 2

TEST PIT LOG

PROJECT :	Site Characterization for Banana Patch	LOCATION :	DU6, TP2	DATE:	5/20/2014
WEATHER:	Partly cloudy, hot, humid, 80s deg F	EXCAVATION CONTRACTOR :	Pacific Commercial Services (PCS)		
EXCAVATION METHOD AND EQUIPMENT USED :		Hitachi 135 Track Excavator			
WATER LEVEL : N/A	DATE/TIME	Start: 1340	End: 1410	LOGGER :	FDH

SOIL SAMPLES

Increment Soil Sample

Sample ID:	DU6A	Depth: 0 - 5 feet bgs	
Sampler Name:	FDH	Sample Date/Time:	5/20/2014
TPH-DRO, -RRO, PAHs, pesticides/PCBs, herbicides, RCRA8 metals			
Soil Description:			
0-5 feet bgs - Silty clay, 7.5YR 5/6 Reddish Brown, Very Fine, Trace Sand, Soft, Dry			
Parameters Sampled for:	2 increments collected from sidewall of depression,		
	1 increment collected from 1 foot bgs in test pit		
TPH-DRO, -RRO, PAHs, pesticides/PCBs, herbicides, RCRA8 metals			

Increment Soil Sample

Sample ID:	DU6B	Depth: 5 - 10 feet bgs	
Sampler Name:	FDH	Sample Date/Time:	5/20/2014
Soil Description:			
5 - 10 feet bgs - Silty clay, 7.5YR 3/3 dark brown, very fine, medium soft, dry to slightly moist			
Parameters Sampled for:	3 increments collected		
VOCs, TPH-GRO, -DRO, -RRO, PAHs, pesticides/PCBs, herbicides, RCRA8 metals			

Increment Soil Sample

Sample ID:	DU6C	Depth: 10 - 15 feet bgs	
Sampler Name:	FDH	Sample Date/Time:	5/20/2014
Soil Description:			
Silty clay 7.5YR 3/3 dark brown, very fine, firm, slightly moist to moist			
Parameters Sampled for:	3 increments collected		
VOCs, TPH-GRO, -DRO, -RRO, PAHs, pesticides/PCBs, herbicides, RCRA8 metals			

BREATHING SPACE MONITORING

Time	MultiRAE	Landtech
1300	VOC 0.0 ppm	Not Measured
	Oxygen 20.9%	
	LEL 0%	
	CO 0 ppm	
	H2S 0.0 ppm	

NOTES

DU6 - Test Pit #2 had fill/debris from surface to 2-3 feet bgs and then sparse/few debris below that depth.

Dense volume of debris appears to be limited to upper portion of depression.

Explanation of exceptions to SAP, PI's and SOP(s) including why, under what conditions, who authorized exception, anything considered in the decision:

Logger Signature:____ Date:_______________________________

PROJECT NUMBER	TEST PIT NUMBER	
495560.01.03.04	DU6 TP3	SHEET 1 OF 2

TEST PIT LOG

PROJECT : Site Characterization for Banana Patch Property LOCATION : DU6, TP3 DATE: 5/20/2014
WEATHER: Partly cloudy, hot, humid, 80s deg F EXCAVATION CONTRACTOR : Pacific Commercial Services
EXCAVATION METHOD AND EQUIPMENT USED : Hitachi 135 Track Excavator
WATER LEVEL : N/A **DATE/TIME** Start: 1410 End: 1420 LOGGER : FDH

TEST PIT PROFILE

Surface 0' BGS

Bottom of Pit 10 BGS

Compass Direction W-E

Pit Dimensions	
10	L
3	W
10	H

DEBRIS IDENTIFIED

Examples: Drums, steel or plastic and size; spray cans/bottles; newspapers; plastic; appliances; vehicles and/or parts; clothing; hazardous waste and type; chemical containers; batteries

Asphalt, concrete debris in upper 2 feet bgs and then metal cable at approximately 8 feet bgs. Debris is sparse.

Debris appears to relatively sparse throughout test pit.

Debris beneath the surface includes 5% concrete, 5% asphalt, 5% other

PHOTO LOG

Photo Number	Compass Direction	Time	Description
			See photos 20140520-142005 and 20140520-142555

Logger Signature:____________________________________ Date:______________________________

	PROJECT NUMBER	TEST PIT NUMBER	
CH2MHILL	495560.01.03.04	DU6, TP3	SHEET 2 OF 2

TEST PIT LOG

PROJECT : Site Characterization for Banana Patch LOCATION : DU6, TP3 DATE: 5/20/2014
WEATHER: Partly cloudy, hot, humid, 80s deg F EXCAVATION CONTRACTOR : Pacific Commercial Services (PCS)
EXCAVATION METHOD AND EQUIPMENT USED : Hitachi 135 Track Excavator
WATER LEVEL : N/A **DATE/TIME** Start: 1410 End: 1420 LOGGER : FDH

SOIL SAMPLES

Increment Soil Sample

Sample ID: DU6A Depth: 0 - 5 feet bgs
Sampler Name: FDH Sample Date/Time: 5/20/2014
Soil Description:
0-5 feet bgs - Silty clay, 7.5YR 5/6 Reddish Brown, Very Fine, Trace Sand, Soft, Dry
Parameters Sampled for: 3 increments collected
TPH-DRO, -RRO, PAHs, pesticides/PCBs, herbicides, RCRA8 metals

Increment Soil Sample

Sample ID: DU6B Depth: 5 - 10 feet bgs
Sampler Name: FDH Sample Date/Time: 5/20/2014
Soil Description:
5 - 10 feet bgs - Silty clay, 7.5YR 3/3 dark brown, very fine, medium soft, dry to slightly moist
Parameters Sampled for: 3 increments collected
VOCs, TPH-GRO, -DRO, -RRO, PAHs, pesticides/PCBs, herbicides, RCRA8 metals

Increment Soil Sample

Sample ID: DU6C Depth: 10 - 15 feet bgs
Sampler Name: FDH Sample Date/Time: 5/20/2014
Soil Description:
Silty clay 7.5YR 3/3 dark brown, very fine, firm, slightly moist to moist
Parameters Sampled for: 3 increments collected
VOCs, TPH-GRO, -DRO, -RRO, PAHs, pesticides/PCBs, herbicides, RCRA8 metals

BREATHING SPACE MONITORING

Time	MultiRAE	Landtech
1420	VOC 0.0 ppm	Not Measured
	Oxygen 20.9%	
	LEL 0%	
	CO 0 ppm	
	H2S 0.0 ppm	

NOTES

DU6 - Test Pit #3 had sparse/few debris throughout. Not much at all.

Explanation of exceptions to SAP, PI's and SOP(s) including why, under what conditions, who authorized exception, anything considered in the decision:

Logger Signature:____ Date:_______________________________

	PROJECT NUMBER	TEST PIT NUMBER	
CH2MHILL	495560.01.03.04	DU6 TP4	SHEET 1 OF 2

TEST PIT LOG

PROJECT : Site Characterization for Banana Patch Property LOCATION : DU6, TP4 DATE: 5/20/2014
WEATHER: Partly cloudy, hot, humid, 80s deg F EXCAVATION CONTRACTOR : Pacific Commercial Services
EXCAVATION METHOD AND EQUIPMENT USED : Hitachi 135 Track Excavator
WATER LEVEL : N/A **DATE/TIME** Start: 1425 End: 1500 LOGGER : FDH

TEST PIT PROFILE

Compass Direction W-E

Surface 0' BGS

Bottom of Pit 10 BGS

Pit Dimensions	
10	L
3	W
10	H

DEBRIS IDENTIFIED

Examples: Drums, steel or plastic and size; spray cans/bottles; newspapers; plastic; appliances; vehicles and/or parts; clothing; hazardous waste and type; chemical containers; batteries

Concrete, rebar debris throughout test pit but debris is sparse.

Debris beneath the surface includes 5% concrete, 5% asphalt, 5% other

PHOTO LOG

Photo Number	Compass Direction	Time	Description
			See photo 20140520-143457 through 20140520-145902

Logger Signature:_________________________ Date:____________________

	PROJECT NUMBER	TEST PIT NUMBER	
CH2MHILL	495560.01.03.04	DU6, TP4	SHEET 2 OF 2

TEST PIT LOG

PROJECT : Site Characterization for Banana Patch	LOCATION : DU6, TP4		DATE: 5/20/2014
WEATHER: Cloudy, hot, humid, 80s deg F	EXCAVATION CONTRACTOR : Pacific Commercial Services (PCS)		
EXCAVATION METHOD AND EQUIPMENT USED :	Hitachi 135 Track Excavator		
WATER LEVEL : N/A	**DATE/TIME** Start: 1425	End: 1500	LOGGER : FDH

SOIL SAMPLES

Increment Soil Sample

Sample ID: DU6A		Depth: 0 - 5 feet bgs	
Sampler Name:	FDH	Sample Date/Time:	5/20/2014
Soil Description:			
0-5 feet bgs - Silty clay, 7.5YR 5/6 Reddish Brown, Very Fine, Trace Sand, Soft, Dry			
Parameters Sampled for:	3 increments collected		
TPH-DRO, -RRO, PAHs, pesticides/PCBs, herbicides, RCRA8 metals			

Increment Soil Sample

Sample ID: DU6B		Depth: 5 - 10 feet bgs	
Sampler Name:	FDH	Sample Date/Time:	5/20/2014
Soil Description:			
5 - 10 feet bgs - Silty clay, 7.5YR 3/3 dark brown, very fine, medium soft, dry to slightly moist			
Parameters Sampled for:	3 increments collected		
VOCs, TPH-GRO, -DRO, -RRO, PAHs, pesticides/PCBs, herbicides, RCRA8 metals			

Increment Soil Sample

Sample ID: DU6C		Depth: 10 - 15 feet bgs	
Sampler Name:	FDH	Sample Date/Time:	5/20/2014
Soil Description:			
Silty clay 7.5YR 3/3 dark brown, very fine, firm, slightly moist to moist			
Parameters Sampled for:	3 increments collected		
VOCs, TPH-GRO, -DRO, -RRO, PAHs, pesticides/PCBs, herbicides, RCRA8 metals			

BREATHING SPACE MONITORING

Time	MultiRAE	Landtech
1500	VOC 0.0 ppm	Not Measured
	Oxygen 20.9%	
	LEL 0%	
	CO 0 ppm	
	H2S 0.0 ppm	

NOTES

DU6 - Test Pit #4 had sparse/few debris throughout. Not much at all.

Heavy rain from 1500-1545

Explanation of exceptions to SAP, PI's and SOP(s) including why, under what conditions, who authorized exception, anything considered in the decision:

Logger Signature:_______________________________________ Date:______________________________

	PROJECT NUMBER	TEST PIT NUMBER	
CH2MHILL	495560.01.03.04	DU6 TP5	SHEET 1 OF 2

TEST PIT LOG

PROJECT : Site Characterization for Banana Patch Property LOCATION : DU6, TP5 DATE: 5/20/2014
WEATHER: Partly cloudy, hot, humid, 80s deg F EXCAVATION CONTRACTOR : Pacific Commercial Services
EXCAVATION METHOD AND EQUIPMENT USED : Hitachi 135 Track Excavator
WATER LEVEL : N/A **DATE/TIME** Start: 1555 End: 1620 LOGGER : FDH

TEST PIT PROFILE

Compass Direction W-E

Surface 0' BGS

Bottom of Pit 10 BGS

Pit Dimensions	
10	L
3	W
10	H

DEBRIS IDENTIFIED

Examples: Drums, steel or plastic and size; spray cans/bottles; newspapers; plastic; appliances; vehicles and/or parts; clothing; hazardous waste and type; chemical containers; batteries

Concrete and metal debris sparse throughout test pit.

Debris includes 5% concrete, 5% asphalt, 5% other

PHOTO LOG

Photo Number	Compass Direction	Time	Description
			See photo 20140520-161214

Logger Signature:_________________________ Date:____________________

CH2MHILL	PROJECT NUMBER 495560.01.03.04	TEST PIT NUMBER DU6, TP5	SHEET 2 OF 2

TEST PIT LOG

PROJECT : Site Characterization for Banana Patch	LOCATION : DU6, TP5		DATE: 5/20/2014
WEATHER: Partly cloudy, hot, humid, 80s deg F	EXCAVATION CONTRACTOR : Pacific Commercial Services (PCS)		
EXCAVATION METHOD AND EQUIPMENT USED :	Hitachi 135 Track Excavator		
WATER LEVEL : N/A	DATE/TIME Start: 1555	End: 1620	LOGGER : FDH

SOIL SAMPLES

Increment Soil Sample

Sample ID: DU6A		Depth: 0 - 5 feet bgs	
Sampler Name:	FDH	Sample Date/Time:	5/20/2014
Soil Description:			
0-5 feet bgs - Silty clay, 7.5YR 5/6 Reddish Brown, Very Fine, Trace Sand, Soft, Dry			
Parameters Sampled for:	3 increments collected		
TPH-DRO, -RRO, PAHs, pesticides/PCBs, herbicides, RCRA8 metals			

Increment Soil Sample

Sample ID: DU6B		Depth: 5 - 10 feet bgs	
Sampler Name:	FDH	Sample Date/Time:	5/20/2014
Soil Description:			
5 - 10 feet bgs - Silty clay, 7.5YR 3/3 dark brown, very fine, medium soft, dry to slightly moist			
Parameters Sampled for:	3 increments collected		
VOCs, TPH-GRO, -DRO, -RRO, PAHs, pesticides/PCBs, herbicides, RCRA8 metals			

Increment Soil Sample

Sample ID: DU6C		Depth: 10 - 15 feet bgs	
Sampler Name:	FDH	Sample Date/Time:	5/20/2014
Soil Description:			
Silty clay 7.5YR 3/3 dark brown, very fine, firm, slightly moist to moist			
Parameters Sampled for:	3 increments collected		
VOCs, TPH-GRO, -DRO, -RRO, PAHs, pesticides/PCBs, herbicides, RCRA8 metals			

BREATHING SPACE MONITORING

Time	MultiRAE	Landtech
1620	VOC 0.0 ppm	Not Measured
	Oxygen 20.9%	
	LEL 0%	
	CO 0 ppm	
	H2S 0.0 ppm	

NOTES

DU6 - Test Pit #5 had sparse/few debris throughout. Not much at all.

Explanation of exceptions to SAP, PI's and SOP(s) including why, under what conditions, who authorized exception, anything considered in the decision:

Logger Signature:____ Date:_______________________________

PROJECT NUMBER	TEST PIT NUMBER	
495560.01.03.04	DU6 TP6	SHEET 1 OF 2

TEST PIT LOG

PROJECT : Site Characterization for Banana Patch Property LOCATION : DU6, TP6 DATE: 5/21/2014
WEATHER: Partly cloudy, hot, humid, 80s deg F EXCAVATION CONTRACTOR : Pacific Commercial Services
EXCAVATION METHOD AND EQUIPMENT USED : Hitachi 135 Track Excavator
WATER LEVEL : N/A **DATE/TIME** Start: 925 End: 1000 LOGGER : FDH

TEST PIT PROFILE

Compass Direction N-S

Surface 0' BGS

Pit Dimensions	
10	L
3	W
18	H

Bottom of Pit 18 BGS

DEBRIS IDENTIFIED

Examples: Drums, steel or plastic and size; spray cans/bottles; newspapers; plastic; appliances; vehicles and/or parts; clothing; hazardous waste and type; chemical containers; batteries

Concrete and metal debris sparse throughout test pit.

Metal pipe in sidewall at approximately 2-3 feet bgs trends E-W

Debris includes 10% concrete, 5% metal, 5% other

PHOTO LOG

Photo Number	Compass Direction	Time	Description
			See photos 20140521-092642 through 20140521-095703

Logger Signature:_____________________ Date:_______________

CH2MHILL	PROJECT NUMBER 495560.01.03.04	TEST PIT NUMBER DU6, TP5	SHEET 2 OF 2

TEST PIT LOG

PROJECT : Site Characterization for Banana Patch LOCATION : DU6, TP6 DATE: 5/21/2014
WEATHER: Partly cloudy, hot, humid, 80s deg F EXCAVATION CONTRACTOR : Pacific Commercial Services (PCS)
EXCAVATION METHOD AND EQUIPMENT USED : Hitachi 135 Track Excavator
WATER LEVEL : N/A **DATE/TIME** Start: 925 End: 1000 LOGGER : FDH

SOIL SAMPLES	BREATHING SPACE MONITORING		
Increment Soil Sample	**Time**	**MultiRAE**	**Landtech**
Sample ID: [No increments collected Depth: 0 - 5 feet bgs	1000	VOC 4.7 ppm*	Not Measured
Sampler Name: FDH Sample Date/Time:		Oxygen 20.9%	
Soil Description:		LEL 0%	
0-5 feet bgs - Silty clay, 7.5YR 5/6 Reddish Brown, Very Fine, Trace Sand, Soft, Dry		CO 0 ppm	
Parameters Sampled for:		H2S 0.0 ppm	
Increment Soil Sample		PID measurement may be false.	
Sample ID: No increments collected		No visual, olfactory	
Sampler Name: FDH Sample Date/Time:		evidence of contamination	
Soil Description:			
5 - 10 feet bgs - Silty clay, 7.5YR 3/3 dark brown, very fine, medium soft, dry to slightly moist			
Parameters Sampled for:			
Increment Soil Sample			
Sample ID: DU6D 15-20 feet bgs			
Sampler Name: FDH Sample Date/Time:			
Soil Description:			
Silty clay 7.5YR 3/3 dark brown, very fine, firm, slightly moist to moist			
Parameters Sampled for: 6 increments collected			
VOCs, TPH-GRO, -DRO, -RRO, PAHs, pesticides/PCBs, herbicides, RCRA8 metals			

NOTES

DU6 - Test Pit #6 had sparse/few debris throughout and concrete at bottom of test pit.

DU6A, DU6B, and DU6C SUs collected from other test pits and borings. Only DU6D SU required.

Increments from bottom of test pit to be combined with increments from borings to obtain DU6D (15-20 feet bgs) coverage for DU6.

Explanation of exceptions to SAP, PI's and SOP(s) including why, under what conditions, who authorized exception, anything considered in the decision:

Logger Signature:____ Date:_______________________________

	PROJECT NUMBER	TEST PIT NUMBER	
CH2MHILL	495560.01.03.04	DU6 TP7	SHEET 1 OF 2

TEST PIT LOG

PROJECT : Site Characterization for Banana Patch Property LOCATION : DU6, TP7 DATE: 5/21/2014
WEATHER: Partly cloudy, hot, humid, 80s deg F EXCAVATION CONTRACTOR : Pacific Commercial Services
EXCAVATION METHOD AND EQUIPMENT USED : Hitachi 135 Track Excavator
WATER LEVEL : N/A **DATE/TIME** Start: 1015 End: 1330 LOGGER : FDH

TEST PIT PROFILE

Compass Direction N-S

Surface 0' BGS

Pit Dimensions	
10	L
10	W
5	H

Bottom of Pit 5 BGS

DEBRIS IDENTIFIED

Examples: Drums, steel or plastic and size; spray cans/bottles; newspapers; plastic; appliances; vehicles and/or parts; clothing; hazardous waste and type; chemical containers; batteries

Cesspool is 8-9 feet diameter and at least 10 feet bgs to bottom that is filled with dry silt. Cesspool has partial rock ring on N and E

N portion of cesspool has very large column footing that extends deeper than bottom of cesspool.

PHOTO LOG

Photo Number	Compass Direction	Time	Description
			See photos 20140521-103716 through 20140521-131629

Logger Signature:_________________________ Date:____________________

	PROJECT NUMBER	TEST PIT NUMBER	
CH2MHILL	495560.01.03.04	DU6, TP7	SHEET 2 OF 2

TEST PIT LOG

PROJECT : Site Characterization for Banana Patch LOCATION : DU6, TP7 DATE: 5/21/2014
WEATHER: Partly cloudy, hot, humid, 80s deg F EXCAVATION CONTRACTOR : Pacific Commercial Services (PCS)
EXCAVATION METHOD AND EQUIPMENT USED : Hitachi 135 Track Excavator
WATER LEVEL : N/A **DATE/TIME** Start: 1015 End: 1330 LOGGER : FDH

SOIL SAMPLES

Increment Soil Sample

Sample ID: No increments collected Depth: 0 - 5 feet bgs
Sampler Name: Sample Date/Time:
Soil Description:
0-5 feet bgs - Silty clay, 7.5YR 5/6 Reddish Brown, Very Fine, Trace Sand, Soft, Dry
Parameters Sampled for:

Increment Soil Sample

Sample ID: No increments collected Depth:
Sampler Name: Sample Date/Time:
Soil Description:
Parameters Sampled for:

Increment Soil Sample

Sample ID: No increments collected Depth:
Sampler Name: Sample Date/Time:
Soil Description:
Parameters Sampled for:

BREATHING SPACE MONITORING

Time	MultiRAE	Landtech
1000	VOC 0 ppm	Not Measured
	Oxygen 20.9%	
	LEL 0%	
	CO 0 ppm	
	H2S 0.0 ppm	

NOTES

DU6 - Test Pit #7 uncovered undocumented cesspool. Relatively empty but dry silt at bottom along with rebar and concrete.
May collect a discrete sample at capillary fringe using drill rig.

Explanation of exceptions to SAP, PI's and SOP(s) including why, under what conditions, who authorized exception, anything considered in the decision:

Logger Signature:____ Date:_______________________________

Appendix D
Soil Boring Logs

5/27/14

CH2MHILL	PROJECT NUMBER	Decision Unit DU1-~~8~~N	Boring ID DU-1

SOIL BORING LOG

PROJECT : **HART** LOCATION : **Banana Patch**

LAT/LONG: DRILLING CONTRACTOR : **Geotek**

DRILLING METHOD AND EQUIPMENT USED :

WATER LEVELS : START : 1430 END : 1500 LOGGER : BSE

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT/%)	#/TYPE	PID READING (ppm)	SOIL CORE DESCRIPTION: SOIL TYPE, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: Sample Collection Information, Sample Sub-Unit Decision
0–5	↕	60	FILL		0-3': Mixture of silty gravel (GM), large basalt fragments, coral gravel. Some asphalt & concrete gravel. FILL. Native 3-5': silty clay (CL), dark reddish brown (5YR 3/2). Moist. Med. plasticity	0.5-3'
5–10	↕	80			same as 3-5': Med. soft.	3-6'
10–15	↕	50	CL		same as 3-5': soft very moist.	
15–20	↕	60			Same as above. Saturated @ 15-18 ft. some gravel. 18-20' moist, moderately stiff.	
20–25						

* temp well installed at this location.

CH2MHILL

PROJECT NUMBER	Decision Unit	Boring ID

FLOW CHART FOR SAMPLING RATIONALE

PROJECT: HART

LOCATION: Banana Patch

LAT/LONG:

DRILLING CONTRACTOR: Geotek

UTILITY CLRNCE CONFRMD: YES NO

DRILLING METHOD AND EQUIPMENT USED: DPS HAS TP

Geophysical anomalies/ Fill Exist?

	DU1	DU2	DU3	DU4	DU5	DU6
Yes	B	B	B	B	C	C
No	A	B	B	A	C	C

Did you see NAPL/Char/Ashes? YES NO IF YES:

Sample	Analysis
Collect into 8-oz jar	Dioxins, Furans

Sample ID's:

Replicate collected here? YES NO IF YES:

Sample ID's:

A - Collect only surface samples - do not perform intrusive work

B - Perform intrusive investigation.

Each boring to be divided into 3 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 0.5' bgs		Collect 10 plugs into ziplock	TPH-g/d/o, PAH, RCRA8, Pest/Herb, PCBs
- 0.5 to 3' bgs	0.5-3	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 8-10' bgs OR 3' interval below bottom of fill (native)	3-6	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 10' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

C - Perform intrusive investigation

Each boring to be divided into 4 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 5' bgs		Collect 10 plugs into ziplock	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 5 to 10' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 10' bgs to 15' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 15 to 28' bgs (native)		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 18' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

POST SAMPLING:

Soil remaining from each core will be kepts and stored.

	ACTUAL SUs)	Sample	Analysis
One archive for shallow (0-10)		Collect 1 VOA from shallow (0-10' bgs) and one from deep (10'+)	Archive
One archive for deep (10'+)		All remaining soil from 6 adjacent borings will be consolidated	

NOTE: Do not combine native material and fill

5/27/14

CH2MHILL	PROJECT NUMBER	Decision Unit DU1-N	Boring ID B-2
	SOIL BORING LOG		

PROJECT : **HART** LOCATION : **Banana Patch**

LAT/LONG: DRILLING CONTRACTOR : **Geotek**

DRILLING METHOD AND EQUIPMENT USED :

WATER LEVELS : START : 1530 END : 1550 LOGGER : BR

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY ~~(FT)~~ %	#/TYPE	PID READING (ppm)	SOIL CORE DESCRIPTION: SOIL TYPE, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: Sample Collection Information Sample Sub-Unit Decision
5		80	FILL	0	Silty clay (CL) with some gravel. Dark reddish brown (5YR 3/3). Slightly moist stiff. Low plasticity. Concrete & asphalt frags FILL. 3-5': Silty clay (CL). Same as above. No fill material	0.5-3'
10		70	CL	0	Same as 3-5' EOB @ 10'	3-6'
15						
20						
25						

CH2MHILL

PROJECT NUMBER	Decision Unit	Boring ID

FLOW CHART FOR SAMPLING RATIONALE

PROJECT : HART

LOCATION : Banana Patch

LAT/LONG:

DRILLING CONTRACTOR : Geotek

UTILITY CLRNCE CONFRMD: YES NO

DRILLING METHOD AND EQUIPMENT USED : DPS HAS TP

Geophysical anomalies/ Fill Exist?

	DU1	DU2	DU3	DU4	DU5	DU6
Yes	B	B	B	B	C	C
No	A	B	B	A	C	C

Did you see NAPL/Char/Ashes? YES NO IF YES:

Sample	Analysis
Collect into 8-oz jar	Dioxins, Furans

Sample ID's:

Replicate collected here? YES NO IF YES:

Sample ID's:

A - Collect only surface samples - do not perform intrusive work

B - Perform intrusive investigation.

Each boring to be divided into 3 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 0.5' bgs		Collect 10 plugs into ziplock	TPH-g/d/o, PAH, RCRA8, Pest/Herb, PCBs
- 0.5 to 3' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 8-10' bgs OR 3' interval below bottom of fill (native)		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 10' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

C - Perform intrusive investigation

Each boring to be divided into 4 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 5' bgs		Collect 10 plugs into ziplock	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb PCBs
- 5 to 10' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 10' bgs to 15' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 15 to 28' bgs (native)		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 18' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

POST SAMPLING:

Soil remaining from each core will be kepts and stored

	ACTUAL SUs)	Sample	Analysis
One archive for shallow (0-10)		Collect 1 VOA from shallow (0-10' bgs) and one from deep (10'+)	Archive
One archive for deep (10'+)		All remaining soil from 6 adjacent borings will be consolidated	

NOTE: Do not combine native material and fill

CH2MHILL

PROJECT NUMBER	Decision Unit DU1-N	Boring ID B-3

SOIL BORING LOG

PROJECT : **HART** LOCATION : **Banana Patch**

LAT/LONG: DRILLING CONTRACTOR : **Geotek**

DRILLING METHOD AND EQUIPMENT USED :

WATER LEVELS : START : 1550 END : 1615 LOGGER : BJ

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	#/TYPE	PID READING (ppm)	SOIL CORE DESCRIPTION: SOIL TYPE, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: Sample Collection Information Sample Sub-Unit Decision
0–5	↕	90	FILL	0	Silty clay (CL) with some gravel. Brown to reddish brown. Slightly moist. Stiff. Low plasticity. Concrete & asphalt fragments FILL	0.5-3'
5–10	↕	90	CL	0	Silty clay (CL). Very dark brown (7.5YR 2.5/3) moist. Stiff. Low plasticity.	5-8'
10–15					EOB @ 10'	
15–20						
20–25						

CH2MHILL

PROJECT NUMBER	Decision Unit	Boring ID

FLOW CHART FOR SAMPLING RATIONALE

PROJECT: HART

LOCATION: Banana Patch

LAT/LONG:

DRILLING CONTRACTOR: Geotek

UTILITY CLRNCE CONFRMD: YES NO

DRILLING METHOD AND EQUIPMENT USED: DPS HAS TP

Geophysical anomalies/ Fill Exist?

	DU1	DU2	DU3	DU4	DU5	DU6
Yes	B	B	B	B	C	C
No	A	B	B	A	C	C

Did you see NAPL/Char/Ashes? YES NO IF YES:

Sample	Analysis
Collect into 8-oz jar	Dioxins, Furans

Sample ID's:

Replicate collected here? YES NO IF YES:

Sample ID's:

A - Collect only surface samples - do not perform intrusive work

B - Perform intrusive investigation.

Each boring to be divided into 3 vertical SUs

SUs	ACTUAL SUs)	Sample	Analysis
- 0 to 0.5' bgs		Collect 10 plugs into ziplock	TPH-g/d/o, PAH, RCRA8, Pest/Herb, PCBs
- 0.5 to 3' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 8-10' bgs OR 3' interval below bottom of fill (native)		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 10' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

C - Perform intrusive investigation

Each boring to be divided into 4 vertical SUs

SUs	ACTUAL SUs)	Sample	Analysis
- 0 to 5' bgs		Collect 10 plugs into ziplock	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 5 to 10' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 10' bgs to 15' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 15 to 28' bgs (native)		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 18' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

POST SAMPLING:

Soil remaining from each core will be kepts and stored.

	ACTUAL SUs)	Sample	Analysis
One archive for shallow (0-10)		Collect 1 VOA from shallow (0-10' bgs) and one from deep (10'+)	Archive
One archive for deep (10'+)		All remaining soil from 6 adjacent borings will be consolidated	

NOTE: Do not combine native material and fill

5/28/14

CH2MHILL	PROJECT NUMBER	Decision Unit	Boring ID
		DU1 N	B4

SOIL BORING LOG

PROJECT : **HART** LOCATION : **Banana Patch**

LAT/LONG: DRILLING CONTRACTOR : **Geotek**

DRILLING METHOD AND EQUIPMENT USED : DPS

WATER LEVELS : START : 1105 END : 1130 LOGGER : SC

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	#/TYPE	PID READING (ppm)	SOIL CORE DESCRIPTION: SOIL TYPE, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: Sample Collection Information, Sample Sub-Unit Decision
5			ALL		Silty clay (CL) w/ gravel and sand. ~~Reddish brown~~ to brown, Dry Stiff. (7.5YR 4/3 to 2.5YR 4/6) Some fragments of coral, basalt and concrete.	B = 0.5 - 3'
10			NATIVE		Same as 0-5' w/ higher % (SC) of silt. Reddish 2.5YR 4/8 Very dry and stiff. No coral/concrete fragments	C = 5 - 8'
15					At ~12' % of clay increases and soil is more plastic and moist.	
20					EOB = 15' bgs	
25						

CH2MHILL

PROJECT NUMBER	Decision Unit DU1 N	Boring ID B4

FLOW CHART FOR SAMPLING RATIONALE

PROJECT : HART

LOCATION : Banana Patch

LAT/LONG:

DRILLING CONTRACTOR : Geotek

UTILITY CLRNCE CONFRMD: YES NO

DRILLING METHOD AND EQUIPMENT USED : DPS HAS TP

Geophysical anomalies/ Fill Exist?

	DU1	DU2	DU3	DU4	DU5	DU6
Yes	B	B	B	B	C	C
No	A	B	B	A	C	C

Sample	Analysis
Collect into 8-oz jar	Dioxins, Furans

Did you see NAPL/Char/Ashes? YES NO IF YES: Sample ID's:

Replicate collected here? YES NO IF YES: Sample ID's:

A - Collect only surface samples - do not perform intrusive work

B - Perform intrusive investigation.

Each boring to be divided into 3 vertical SUs

Depth	ACTUAL SUs)	Sample	Analysis
- 0 to 0.5' bgs	0-0.5	Collect 10 plugs into ziplock	TPH-g/d/o, PAH, RCRA8, Pest/Herb, PCBs
- 0.5 to 3' bgs	0.5-3	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 8-10' bgs OR 3' interval below bottom of fill (native)	5-8	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 10' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

C - Perform intrusive investigation

Each boring to be divided into 4 vertical SUs

Depth	ACTUAL SUs)	Sample	Analysis
- 0 to 5' bgs		Collect 10 plugs into ziplock	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 5 to 10' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 10' bgs to 15' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 15 to 18' bgs (native)		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 18' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

POST SAMPLING:

Soil remaining from each core will be kepts and stored.

	ACTUAL SUs)	Sample	Analysis
One archive for shallow (0-10)	0.5-3	Collect 1 VOA from shallow (0-10' bgs) and one from deep (10'+)	Archive
One archive for deep (10'+)	5-8	All remaining soil from 6 adjacent borings will be consolidated	

NOTE: Do not combine native material and fill

5/28/14

CH2MHILL	PROJECT NUMBER	Decision Unit DU1 N	Boring ID B5

SOIL BORING LOG

PROJECT : **HART** LOCATION : **Banana Patch**

LAT/LONG: DRILLING CONTRACTOR : **Geotek**

DRILLING METHOD AND EQUIPMENT USED : DPS

WATER LEVELS : START : 1130 END : 1150 LOGGER : SC

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	#/TYPE	PID READING (ppm)	SOIL CORE DESCRIPTION: SOIL TYPE, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: Sample Collection Information Sample Sub-Unit Decision
		100%	FILL		Silty clay (CL) w/ silty sand Red~~dish brown~~ (2.5 YR 4/8) Dry. low moisture. Low plasticity Plastic @ ~1' bgs	B=0.5-3' bgs
5		100%	NATIVE		~~Reddish~~ Silty clay (CL) Red~~dish brown~~ to brown (7.5 YR 4/3 to 2.5 YR 4/8) Dry. Stiff, Silt and sand content increase at ~8' bgs.	C=4-7' bgs
10					EOB = 10' bgs	
15						
20						
25						

CH2MHILL

PROJECT NUMBER	Decision Unit DU1 N	Boring ID B5

FLOW CHART FOR SAMPLING RATIONALE

PROJECT : HART

LOCATION : Banana Patch

LAT/LONG:

DRILLING CONTRACTOR : Geotek

UTILITY CLRNCE CONFRMD: YES NO

DRILLING METHOD AND EQUIPMENT USED : DPS HAS TP

Geophysical anomalies/ Fill Exist?

	DU1	DU2	DU3	DU4	DU5	DU6
Yes	B	B	B	B	C	C
No	A	B	B	A	C	C

Did you see NAPL/Char/Ashes? YES NO IF YES:

Replicate collected here? YES NO IF YES:

Sample	Analysis
Collect into 8-oz jar	Dioxins, Furans
Sample ID's:	
Sample ID's:	

A - Collect only surface samples - do not perform intrusive work

B - Perform intrusive investigation.

Each boring to be divided into 3 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 0.5' bgs	0-0.5	Collect 10 plugs into ziplock	TPH-g/d/o, PAH, RCRA8, Pest/Herb, PCBs
- 0.5 to 3' bgs	0.5-3	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 8-10' bgs OR 3' interval below bottom of fill (native)	4-7	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 10' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

C - Perform intrusive investigation

Each boring to be divided into 4 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 5' bgs		Collect 10 plugs into ziplock	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 5 to 10' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 10' bgs to 15' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 15 to 18' bgs (native)		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 18' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

POST SAMPLING:

Soil remaining from each core will be kepts and stored

	ACTUAL SUs)	Sample	Analysis
One archive for shallow (0-10)	0.5-3	Collect 1 VOA from shallow (0-10' bgs) and one from deep (10'+)	Archive
One archive for deep (10'+)	4-7	All remaining soil from 6 adjacent borings will be consolidated	

NOTE: Do not combine native material and fill

5/27/14

CH2MHILL

PROJECT NUMBER	Decision Unit	Boring ID
	DU 1-N	B-6

SOIL BORING LOG

PROJECT : **HART** LOCATION : **Banana Patch**

LAT/LONG: DRILLING CONTRACTOR : **Geotek**

DRILLING METHOD AND EQUIPMENT USED :

WATER LEVELS : START : 1000 END : 1020 LOGGER : BD

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT%)	#/TYPE	PID READING (ppm)	SOIL CORE DESCRIPTION SOIL TYPE, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS Sample Collection Information Sample Sub-Unit Decision
5		80	FILL	0	Silty clay (CL) with some gravel. Brown to reddish brown. Coral, basalt & concrete fragments. Slightly moist. low plasticity. Stiff. FILL	0.5-3'
10		40	CL	0	5-7: Same as 0-5. Silty clay (CL). very dark brown (7.5YR 2.5/3). Stiff, soft @ 8' Moist. Med. plasticity.	7-10'
15					EOB @ 10'	
20						
25						

CH2MHILL

PROJECT NUMBER	Decision Unit	Boring ID

FLOW CHART FOR SAMPLING RATIONALE

PROJECT : HART

LOCATION : Banana Patch

LAT/LONG:

DRILLING CONTRACTOR : Geotek

UTILITY CLRNCE CONFRMD: YES NO

DRILLING METHOD AND EQUIPMENT USED : DPS HAS TP

Geophysical anomalies/ Fill Exist?

	DU1	DU2	DU3	DU4	DU5	DU6
Yes	B	B	B	B	C	C
No	A	B	B	A	C	C

Sample	Analysis
Collect into 8-oz jar	Dioxins, Furans

Did you see NAPL/Char/Ashes? YES NO IF YES:

Replicate collected here? YES NO IF YES:

Sample ID's:

Sample ID's:

A - Collect only surface samples - do not perform intrusive work

B - Perform intrusive investigation.

Each boring to be divided into 3 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 0.5' bgs	~~0-0.5~~	Collect 10 plugs into ziplock	TPH-g/d/o, PAH, RCRA8, Pest/Herb, PCBs
- 0.5 to 3' bgs	0.5-3	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 8-10' bgs OR 3' interval below bottom of fill (native)	7-10	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 10' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

C - Perform intrusive investigation

Each boring to be divided into 4 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 5' bgs		Collect 10 plugs into ziplock	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 5 to 10' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 10' bgs to 15' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 15 to 28' bgs (native)		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 18' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

POST SAMPLING:

Soil remaining from each core will be kepts and stored.

	ACTUAL SUs)	Sample	Analysis
One archive for shallow (0-10)	3-10	Collect 1 VOA from shallow (0-10' bgs) and one from deep (10'+)	Archive
One archive for deep (10'+)		All remaining soil from 6 adjacent borings will be consolidated	

NOTE: Do not combine native material and fill

5/28/14

CH2MHILL	PROJECT NUMBER	Decision Unit DU1 N	Boring ID B7

SOIL BORING LOG

PROJECT : **HART**

LOCATION : **Banana Patch**

LAT/LONG:

DRILLING CONTRACTOR : **Geotek**

DRILLING METHOD AND EQUIPMENT USED :

WATER LEVELS :

START : 0830

END : 0850

LOGGER : SC

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	#/TYPE	PID READING (ppm)	SOIL CORE DESCRIPTION: SOIL TYPE, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: Sample Collection Information, Sample Sub-Unit Decision
0.5		100%			Sandy silt (ML) reddish brown. Dry No Plasticity	B-0.5'-3.0' (B)
					Sand and gravel. Brown yellow. Well graded (SW). Dry (10YR 6/6)	
					Silty clay w/ some gravel (7.5 YR 4/3 to 2.5 YR 4/6) Brown to reddish. Coral,	
5		100%	FILL		basalt, and concrete fragments. Rubber tire piece @ 8'	
10		100%			Silty clay w/ some sand and gravel Very dark brown (7.5 YR 2.5/3). Soft. Moist. Saturated @ 14' where there is more sand and gravel.	C-10'-13' (C)
15					EOB = 15' bgs	
20						
25						

CH2MHILL

PROJECT NUMBER	Decision Unit DU1N	Boring ID R7

FLOW CHART FOR SAMPLING RATIONALE

PROJECT: HART **LOCATION:** Banana Patch

LAT/LONG: **DRILLING CONTRACTOR:** Geotek

UTILITY CLRNCE CONFRMD: YES NO

DRILLING METHOD AND EQUIPMENT USED: DPS HAS TP

Geophysical anomalies/ Fill Exist?

	DU1	DU2	DU3	DU4	DU5	DU6
Yes	B	B	B	B	C	C
No	A	B	B	A	C	C

Sample	Analysis
Collect into 8-oz jar	Dioxins, Furans

Did you see NAPL/Char/Ashes? YES NO IF YES: Sample ID's:

Replicate collected here? YES NO IF YES: Sample ID's:

A - Collect only surface samples - do not perform intrusive work

B - Perform intrusive investigation.

Each boring to be divided into 3 vertical SUs

- 0 to 0.5' bgs
- 0.5 to 3' bgs
- 8-10' bgs OR 3' interval below bottom of fill (native)

ACTUAL SUs)	Sample	Analysis
0-0.5	Collect 10 plugs into ziplock	TPH-g/d/o, PAH, RCRA8, Pest/Herb, PCBs
0.5-3	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
10-13	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 10' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

C - Perform intrusive investigation

Each boring to be divided into 4 vertical SUs

- 0 to 5' bgs
- 5 to 10' bgs
- 10' bgs to 15' bgs
- 15 to 18' bgs (native)

ACTUAL SUs)	Sample	Analysis
	Collect 10 plugs into ziplock	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 18' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

POST SAMPLING:

Soil remaining from each core will be kepts and stored.

One archive for shallow (0-10)

One archive for deep (10'+)

ACTUAL SUs)	Sample	Analysis
0.5-3	Collect 1 VOA from shallow (0-10' bgs) and one from deep (10'+)	Archive
10-13	All remaining soil from 6 adjacent borings will be consolidated	

NOTE: Do not combine native material and fill

5/28/14

CH2MHILL

PROJECT NUMBER	Decision Unit	Boring ID
	DU1N	B8

SOIL BORING LOG

PROJECT : HART

LOCATION : Banana Patch

LAT/LONG:

DRILLING CONTRACTOR : Geotek

DRILLING METHOD AND EQUIPMENT USED : DPS

WATER LEVELS :

START : 0855

END : 0915

LOGGER : JC

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	#/TYPE	PID READING (ppm)	SOIL CORE DESCRIPTION: SOIL TYPE, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: Sample Collection Information Sample Sub-Unit Decision
0–5 (3.0)		100	FILL (0–3.0); NATIVE (3.0–10)		Silty clay (CL) w/some gravel Brown to reddish ~~brown~~. Coral, basalt, and concrete fragments, Dry, low plasticity. Stiff (7.5YR 5/3 to 2.5YR 4/6)	B= 0.5-3 (B)
5–10		100			Same as 0-5'. Silty clay. Reddish brow to dark brown (7.5YR 2.5/3). Very stiff, ~~loose~~, Moist at ~9'.	C- 3-6' (C)
10–15					EOB 10' bgs	
15–20						
20–25						

CH2MHILL

PROJECT NUMBER	Decision Unit DU1 N	Boring ID B8

FLOW CHART FOR SAMPLING RATIONALE

PROJECT : HART **LOCATION :** Banana Patch

LAT/LONG: **DRILLING CONTRACTOR :** Geotek

UTILITY CLRNCE CONFRMD: YES NO

DRILLING METHOD AND EQUIPMENT USED : DPS HAS TP

Geophysical anomalies/ Fill Exist?

	DU1	DU2	DU3	DU4	DU5	DU6
Yes	B	B	B	B	C	C
No	A	B	B	A	C	C

Sample	Analysis
Collect into 8-oz jar	Dioxins, Furans

Did you see NAPL/Char/Ashes? YES NO IF YES: Sample ID's:

Replicate collected here? YES NO IF YES: Sample ID's:

A - Collect only surface samples - do not perform intrusive work

B - Perform intrusive investigation.

Each boring to be divided into 3 vertical SUs

- 0 to 0.5' bgs
- 0.5 to 3' bgs
- 8-10' bgs OR 3' interval below bottom of fill (native)

ACTUAL SUs)	Sample	Analysis
0-0.5	Collect 10 plugs into ziplock	TPH-g/d/o, PAH, RCRA8, Pest/Herb, PCBs
0.5-3	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
3-6	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 10' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

C - Perform intrusive investigation

Each boring to be divided into 4 vertical SUs

- 0 to 5' bgs
- 5 to 10' bgs
- 10' bgs to 15' bgs
- 15 to 18' bgs (native)

ACTUAL SUs)	Sample	Analysis
	Collect 10 plugs into ziplock	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 18' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

POST SAMPLING:

Soil remaining from each core will be kepts and stored.

One archive for shallow (0-10)

One archive for deep (10'+)

ACTUAL SUs)	Sample	Analysis
0.5-3	Collect 1 VOA from shallow (0-10' bgs) and one from deep (10'+)	Archive
3-6	All remaining soil from 6 adjacent borings will be consolidated	

NOTE: Do not combine native material and fill

5/28/14

CH2MHILL	PROJECT NUMBER	Decision Unit: DU1 N	Boring ID: B9
	SOIL BORING LOG		

PROJECT : **HART**

LOCATION : **Banana Patch**

LAT/LONG:

DRILLING CONTRACTOR : **Geotek**

DRILLING METHOD AND EQUIPMENT USED :

WATER LEVELS :

START : 0915

END : 0930

LOGGER : SC

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	#/TYPE	PID READING (ppm)	SOIL CORE DESCRIPTION: SOIL TYPE, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: Sample Collection Information, Sample Sub-Unit Decision
0–5		100%	FILL		Silty clay (CL) w/ gravel. Brown to reddish ~~brown~~ (7.5YR 4/3 to 2.5YR 4/6) Coral, basalt and concrete ~~asphalt~~ fragments. Dry to slightly moist. Low plasticity to stiff. Coral fragments increase btw 4-5' bgs.	B=0.5-3'
5–10		100%	NATIVE		Same as 0-5', silty clay Red~~dish~~ (2.5YR 4/6) ~~brown~~. Stiff. Dry.	C=5-8'
10–15					EOB = 10' bgs	
15–20						
20–25						

CH2MHILL

PROJECT NUMBER	Decision Unit DU1 N	Boring ID B9

FLOW CHART FOR SAMPLING RATIONALE

PROJECT: HART

LOCATION: Banana Patch

LAT/LONG:

DRILLING CONTRACTOR: Geotek

UTILITY CLRNCE CONFRMD: YES NO

DRILLING METHOD AND EQUIPMENT USED: DPS HAS TP

Geophysical anomalies/ Fill Exist?

	DU1	DU2	DU3	DU4	DU5	DU6
Yes	B	B	B	B	C	C
No	A	B	B	A	C	C

Sample	Analysis
Collect into 8-oz jar	Dioxins, Furans

Did you see NAPL/Char/Ashes? YES NO IF YES: Sample ID's:

Replicate collected here? YES NO IF YES: Sample ID's:

A - Collect only surface samples - do not perform intrusive work

B - Perform intrusive investigation.

Each boring to be divided into 3 vertical SUs

- 0 to 0.5' bgs
- 0.5 to 3' bgs
- 8-10' bgs OR 3' interval below bottom of fill (native)

ACTUAL SUs)	Sample	Analysis
0-0.5	Collect 10 plugs into ziplock	TPH-g/d/o, PAH, RCRA8, Pest/Herb, PCBs
0.5-3	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
5-8	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 10' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

C - Perform intrusive investigation

Each boring to be divided into 4 vertical SUs

- 0 to 5' bgs
- 5 to 10' bgs
- 10' bgs to 15' bgs
- 15 to 18' bgs (native)

ACTUAL SUs)	Sample	Analysis
	Collect 10 plugs into ziplock	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 18' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

POST SAMPLING:

Soil remaining from each core will be kepts and stored.

One archive for shallow (0-10)

One archive for deep (10'+)

ACTUAL SUs)	Sample	Analysis
0.5-3	Collect 1 VOA from shallow (0-10' bgs) and one from deep (10'+)	Archive
5-8	All remaining soil from 6 adjacent borings will be consolidated	

NOTE: Do not combine native material and fill

5/28/14

CH2MHILL	PROJECT NUMBER	Decision Unit DU1 J	Boring ID B10
	SOIL BORING LOG		

PROJECT : **HART** LOCATION : **Banana Patch**

LAT/LONG: DRILLING CONTRACTOR : **Geotek**

DRILLING METHOD AND EQUIPMENT USED : DPS

WATER LEVELS : START : 094 END : 1000 LOGGER : JC

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	#/TYPE	PID READING (ppm)	SOIL CORE DESCRIPTION: SOIL TYPE, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: Sample Collection Information Sample Sub-Unit Decision
0–5		100%	FILL		Silty clay (CL) w/ gravel Brown to red (7.5YR 4/3 to 2.5YR 4/6). Coral, basalt and concrete fragments. Dry. Stiff. Glass fragments @ 8' bgs. Concrete fragments btw 10-12' bgs	B = 0.5'-3'
5–10		100%				
10–15		100%	NATIVE		Silty clay (CL) Dark brown (7.5YR 2.5/3). Med. plasticity. Very moist	C = 12'-15'
15–20					EOB = 15' bgs	
20–25						

CH2MHILL

PROJECT NUMBER	Decision Unit DU1W	Boring ID B10

FLOW CHART FOR SAMPLING RATIONALE

PROJECT : HART

LAT/LONG:

UTILITY CLRNCE CONFRMD: YES NO

DRILLING METHOD AND EQUIPMENT USED : DPS HAS TP

LOCATION : Banana Patch

DRILLING CONTRACTOR : Geotek

Geophysical anomalies/ Fill Exist?

	DU1	DU2	DU3	DU4	DU5	DU6
Yes	B	B	B	B	C	C
No	A	B	B	A	C	C

Sample	Analysis
Collect into 8-oz jar	Dioxins, Furans

Did you see NAPL/Char/Ashes? YES NO IF YES: Sample ID's:

Replicate collected here? YES NO IF YES: Sample ID's:

A - Collect only surface samples - do not perform intrusive work

B - Perform intrusive investigation.

Each boring to be divided into 3 vertical SUs

- 0 to 0.5' bgs
- 0.5 to 3' bgs
- 8-10' bgs OR 3' interval below bottom of fill (native)

ACTUAL SUs)	Sample	Analysis
0-0.5	Collect 10 plugs into ziplock	TPH-g/d/o, PAH, RCRA8, Pest/Herb, PCBs
0.5-3	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
12-15	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 10' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

C - Perform intrusive investigation

Each boring to be divided into 4 vertical SUs

- 0 to 5' bgs
- 5 to 10' bgs
- 10' bgs to 15' bgs
- 15 to 18' bgs (native)

ACTUAL SUs)	Sample	Analysis
	Collect 10 plugs into ziplock	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 18' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

POST SAMPLING:

Soil remaining from each core will be kepts and stored.

One archive for shallow (0-10)

One archive for deep (10'+)

ACTUAL SUs)	Sample	Analysis
0.5-3	Collect 1 VOA from shallow (0-10' bgs) and one from deep (10'+)	Archive
12-15	All remaining soil from 6 adjacent borings will be consolidated	

NOTE: Do not combine native material and fill

5/28/14

CH2MHILL

PROJECT NUMBER	Decision Unit	Boring ID
	DU1 N	B11

SOIL BORING LOG

PROJECT : **HART** LOCATION : **Banana Patch**

LAT/LONG: DRILLING CONTRACTOR : **Geotek**

DRILLING METHOD AND EQUIPMENT USED : DPS

WATER LEVELS : START : 1000 END : 1015 LOGGER : SC

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	#/TYPE	PID READING (ppm)	SOIL CORE DESCRIPTION: SOIL TYPE, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: Sample Collection Information Sample Sub-Unit Decision
0–5		75%	FILL		Silty clay (CL) w/ some gravel. Concrete and glass fragments btw 3-5' bgs. Dry. Dark reddish brown to red (2.5YR 2.5/4 to 4/6)	B - 0.5 - 3'
5–10		100%	NATIVE		Silty clay. Red ~~Reddish brown~~ (2.5YR 4/6). Low plasticity. Dry. Stiff. Basalt btw 5.5-6' bgs.	C - 6 - 9'
10–15					EOB = 10' bgs	
15–20						
20–25						

CH2MHILL

PROJECT NUMBER	Decision Unit	Boring ID
	DU 1	B11

FLOW CHART FOR SAMPLING RATIONALE

PROJECT : HART **LOCATION :** Banana Patch

LAT/LONG: **DRILLING CONTRACTOR :** Geotek

UTILITY CLRNCE CONFRMD: YES NO

DRILLING METHOD AND EQUIPMENT USED : DPS HAS TP

Geophysical anomalies/ Fill Exist?

	DU1	DU2	DU3	DU4	DU5	DU6
Yes	B	B	B	B	C	C
No	A	B	B	A	C	C

Did you see NAPL/Char/Ashes? YES NO IF YES:

Sample	Analysis
Collect into 8-oz jar	Dioxins, Furans

Replicate collected here? YES NO IF YES:

Sample ID's:

Sample ID's:

A - Collect only surface samples - do not perform intrusive work

B - Perform intrusive investigation.

Each boring to be divided into 3 vertical SUs

- 0 to 0.5' bgs
- 0.5 to 3' bgs
- 8-10' bgs OR 3' interval below bottom of fill (native)

ACTUAL SUs)	Sample	Analysis
0 - 0.5	Collect 10 plugs into ziplock	TPH-g/d/o, PAH, RCRA8, Pest/Herb, PCBs
0.5-3	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
6 - 9	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 10' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

C - Perform intrusive investigation

Each boring to be divided into 4 vertical SUs

- 0 to 5' bgs
- 5 to 10' bgs
- 10' bgs to 15' bgs
- 15 to 18' bgs (native)

ACTUAL SUs)	Sample	Analysis
	Collect 10 plugs into ziplock	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 18' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

POST SAMPLING:

Soil remaining from each core will be kepts and stored.

One archive for shallow (0-10)

One archive for deep (10'+)

ACTUAL SUs)	Sample	Analysis
0.5-3	Collect 1 VOA from shallow (0-10' bgs) and one from deep (10'+)	Archive
6-9	All remaining soil from 6 adjacent borings will be consolidated	

NOTE: Do not combine native material and fill

5/28/14

CH2MHILL	PROJECT NUMBER	Decision Unit DU1 N	Boring ID B12
	SOIL BORING LOG		

PROJECT : HART — LOCATION : Banana Patch

LAT/LONG: — DRILLING CONTRACTOR : Geotek

DRILLING METHOD AND EQUIPMENT USED : DPS

WATER LEVELS : — START : 1015 — END : 1030 — LOGGER : SC

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	#/TYPE	PID READING (ppm)	SOIL CORE DESCRIPTION: SOIL TYPE, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: Sample Collection Information Sample Sub-Unit Decision
0–5		100%	FILL		Sandy silt (ML)/silty clay (2.5 YR 4/6) ~~Reddish brown~~. Dry. Stiff. Some basalt/coral fragments at 4.5' bgs down to 6' bgs. Some plastic @ 0.5' bgs.	B=0.5-3' bgs
5–10		100%	NATIVE		Silty clay reddish brown. Low plasticity. Dry. Stiff. Basalt fragments.	C 7-10' bgs
10–15					EOB = 10' bgs	
15–20						
20–25						

CH2MHILL

PROJECT NUMBER	Decision Unit	Boring ID
	DU1 N	B12

FLOW CHART FOR SAMPLING RATIONALE

PROJECT : HART **LOCATION :** Banana Patch

LAT/LONG: **DRILLING CONTRACTOR :** Geotek

UTILITY CLRNCE CONFRMD: YES NO

DRILLING METHOD AND EQUIPMENT USED : DPS HAS TP

Geophysical anomalies/ Fill Exist?

	DU1	DU2	DU3	DU4	DU5	DU6
Yes	B	B	B	B	C	C
No	A	B	B	A	C	C

Sample	Analysis
Collect into 8-oz jar	Dioxins, Furans

Did you see NAPL/Char/Ashes? YES NO IF YES:

Replicate collected here? YES NO IF YES:

Sample ID's:

Sample ID's:

A - Collect only surface samples - do not perform intrusive work

B - Perform intrusive investigation.

Each boring to be divided into 3 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 0.5' bgs	0-0.5	Collect 10 plugs into ziplock	TPH-g/d/o, PAH, RCRA8, Pest/Herb, PCBs
- 0.5 to 3' bgs	0.5-3	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 8-10' bgs OR 3' interval below bottom of fill (native)	7-10	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 10' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

C - Perform intrusive investigation

Each boring to be divided into 4 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 5' bgs		Collect 10 plugs into ziplock	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 5 to 10' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 10' bgs to 15' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 15 to 18' bgs (native)		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 18' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

POST SAMPLING:

Soil remaining from each core will be kepts and stored.

	ACTUAL SUs)	Sample	Analysis
One archive for shallow (0-10)	0.5-3	Collect 1 VOA from shallow (0-10' bgs) and one from deep (10'+)	Archive
One archive for deep (10'+)	7-10	All remaining soil from 6 adjacent borings will be consolidated	

NOTE: Do not combine native material and fill

5/28/14

CH2MHILL	PROJECT NUMBER	Decision Unit DU1 N	Boring ID B13
	SOIL BORING LOG		

PROJECT : **HART** LOCATION : **Banana Patch**

LAT/LONG: DRILLING CONTRACTOR : **Geotek**

DRILLING METHOD AND EQUIPMENT USED : DPS

WATER LEVELS : START : 1030 END : 1045 LOGGER : SC

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	#/TYPE	PID READING (ppm)	SOIL CORE DESCRIPTION: SOIL TYPE, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: Sample Collection Information Sample Sub-Unit Decision
5		80%	FILL		Silty clay (CL) and sandy silt w/ concrete and coral fragments ~~Reddish brown~~ to brown Dry. Stiff. (2.5YR 4/6 to 2.5YR 4/6).	B = 0.5-3' bgs
10		80%	NATIVE		Silty clay (CL). ~~Reddish brown~~. Dry, Stiff. Some basalt fragments. (2.5YR 4/6)	C = 7-10' bgs
15					EOB = 10' bgs	
20						
25						

CH2MHILL

PROJECT NUMBER	Decision Unit DU1 N	Boring ID B13

FLOW CHART FOR SAMPLING RATIONALE

PROJECT : HART

LOCATION : Banana Patch

LAT/LONG:

DRILLING CONTRACTOR : Geotek

UTILITY CLRNCE CONFRMD: YES NO

DRILLING METHOD AND EQUIPMENT USED : DPS HAS TP

Geophysical anomalies/ Fill Exist?

	DU1	DU2	DU3	DU4	DU5	DU6
Yes	B	B	B	B	C	C
No	A	B	B	A	C	C

Sample	Analysis
Collect into 8-oz jar	Dioxins, Furans

Did you see NAPL/Char/Ashes? YES NO IF YES: Sample ID's:

Replicate collected here? YES NO IF YES: Sample ID's:

A - Collect only surface samples - do not perform intrusive work

B - Perform intrusive investigation.

Each boring to be divided into 3 vertical SUs

- 0 to 0.5' bgs
- 0.5 to 3' bgs
- 8-10' bgs OR 3' interval below bottom of fill (native)

ACTUAL SUs)	Sample	Analysis
0-0.5	Collect 10 plugs into ziplock	TPH-g/d/o, PAH, RCRA8, Pest/Herb, PCBs
0.5-3	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
7-10	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 10' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

C - Perform intrusive investigation

Each boring to be divided into 4 vertical SUs

- 0 to 5' bgs
- 5 to 10' bgs
- 10' bgs to 15' bgs
- 15 to 18' bgs (native)

ACTUAL SUs)	Sample	Analysis
	Collect 10 plugs into ziplock	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 18' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

POST SAMPLING:

Soil remaining from each core will be kepts and stored.

One archive for shallow (0-10)

One archive for deep (10'+)

ACTUAL SUs)	Sample	Analysis
0.5-3	Collect 1 VOA from shallow (0-10' bgs) and one from deep (10'+)	Archive
7-10	All remaining soil from 6 adjacent borings will be consolidated	

NOTE: Do not combine native material and fill

5/28/14

CH2MHILL	PROJECT NUMBER	Decision Unit DU1 N	Boring ID B14

SOIL BORING LOG

PROJECT : **HART** LOCATION : **Banana Patch**

LAT/LONG: DRILLING CONTRACTOR : **Geotek**

DRILLING METHOD AND EQUIPMENT USED :

WATER LEVELS : START : ~~1015~~ 1100 (SC) END : ~~1030~~ 1115 LOGGER :

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	#/TYPE	PID READING (ppm)	SOIL CORE DESCRIPTION: SOIL TYPE, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: Sample Collection Information Sample Sub-Unit Decision
0–5			FILL		Silty clay (CL) w/ some gravel, concrete, and coral fragments. Little metal debris (nail) @ ~ 9' bgs Dry. Stiff. Dark Red (2.5YR, 3/6)	B = 0.5-3' bgs
5–10			FILL		~~Same ... 10' bgs~~ Silty clay Reddish brown to dark brown (7.5YR, 2.5/3). Med plasticity. Moist. Organic material at 14' bgs.	
10–15			NATIVE			C = 10-13
15–20					EOB = 15' bgs	
20–25						

CH2MHILL

PROJECT NUMBER	Decision Unit DU1-N	Boring ID B14

FLOW CHART FOR SAMPLING RATIONALE

PROJECT : HART — **LOCATION :** Banana Patch

LAT/LONG: — **DRILLING CONTRACTOR :** Geotek

UTILITY CLRNCE CONFRMD: YES NO

DRILLING METHOD AND EQUIPMENT USED : DPS HAS TP

Geophysical anomalies/ Fill Exist?

	DU1	DU2	DU3	DU4	DU5	DU6
Yes	B	B	B	B	C	C
No	A	B	B	A	C	C

			Sample	Analysis
Did you see NAPL/Char/Ashes?	YES NO	IF YES:	Collect into 8-oz jar	Dioxins, Furans
Replicate collected here?	YES NO	IF YES:	Sample ID's:	
			Sample ID's:	

A - Collect only surface samples - do not perform intrusive work.

B - Perform intrusive investigation.

Each boring to be divided into 3 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 0.5' bgs	0-0.5	Collect 10 plugs into ziplock	TPH-g/d/o, PAH, RCRA8, Pest/Herb, PCBs
- 0.5 to 3' bgs	0.5-3	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 8-10' bgs OR 3' interval below bottom of fill (native)	10-13	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 10' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

C - Perform intrusive investigation

Each boring to be divided into 4 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 5' bgs		Collect 10 plugs into ziplock	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 5 to 10' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 10' bgs to 15' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 15 to 18' bgs (native)		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 18' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

POST SAMPLING:

Soil remaining from each core will be kepts and stored.

	ACTUAL SUs)	Sample	Analysis
One archive for shallow (0-10)	.5-3	Collect 1 VOA from shallow (0-10' bgs) and one from deep (10'+)	Archive
One archive for deep (10'+)	10-13	All remaining soil from 6 adjacent borings will be consolidated	

NOTE: Do not combine native material and fill

5/28/14

CH2MHILL	PROJECT NUMBER	Decision Unit DU1 N	Boring ID B15
	SOIL BORING LOG		

PROJECT : **HART** LOCATION : **Banana Patch**

LAT/LONG: DRILLING CONTRACTOR : **Geotek**

DRILLING METHOD AND EQUIPMENT USED : DPS

WATER LEVELS : START : 1045 END : 1100 LOGGER : SC

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	#/TYPE	PID READING (ppm)	SOIL CORE DESCRIPTION: SOIL TYPE, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: Sample Collection Information, Sample Sub-Unit Decision
		~~70~~%	FILL		Silty clay (CL) / Clayey silt w/ sand (ML), Red~~dish brown~~ (2.5YR 4/6); Dry. Stiff. Concrete fragments at ~3' bgs	B=0.5-3'
5		100%	NATIVE		Silty clay (CL). Red~~dish~~ ~~brown~~ to brown. Dry. Stiff (2.5YR 4/6 to 7.5YR 4/3)	C=4-7'
10					Weathered basalt (silty sand) ~~b~~brownish yellow. Evidence of oxidation (blackish staining). Dry. (10YR 6/8)	
		100%			Silty sand, Well graded (SW); Light olive ~~greenish~~ brown. Saturated. (2.5Y, 5/4)	
15					EOB = 15' bgs	
20						
25						

CH2MHILL

PROJECT NUMBER	Decision Unit DU1 N	Boring ID B15

FLOW CHART FOR SAMPLING RATIONALE

PROJECT : HART

LOCATION : Banana Patch

LAT/LONG:

DRILLING CONTRACTOR : Geotek

UTILITY CLRNCE CONFRMD: YES NO

DRILLING METHOD AND EQUIPMENT USED : DPS HAS TP

Geophysical anomalies/ Fill Exist?

	DU1	DU2	DU3	DU4	DU5	DU6
Yes	B	B	B	B	C	C
No	A	B	B	A	C	C

		Sample	Analysis
Did you see NAPL/Char/Ashes? YES NO	IF YES:	Collect into 8-oz jar	Dioxins, Furans
		Sample ID's:	
Replicate collected here? YES NO	IF YES:	Sample ID's:	

A - Collect only surface samples - do not perform intrusive work

B - Perform intrusive investigation.

Each boring to be divided into 3 vertical SUs

- 0 to 0.5' bgs
- 0.5 to 3' bgs
- 8-10' bgs OR 3' interval below bottom of fill (native)

ACTUAL SUs)	Sample	Analysis
0-0.5	Collect 10 plugs into ziplock	TPH-g/d/o, PAH, RCRA8, Pest/Herb, PCBs
0.5-3	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
4-7	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 10' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

C - Perform intrusive investigation

Each boring to be divided into 4 vertical SUs

- 0 to 5' bgs
- 5 to 10' bgs
- 10' bgs to 15' bgs
- 15 to 18' bgs (native)

ACTUAL SUs)	Sample	Analysis
	Collect 10 plugs into ziplock	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 18' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

POST SAMPLING:

Soil remaining from each core will be kepts and stored.

One archive for shallow (0-10)

One archive for deep (10'+)

ACTUAL SUs)	Sample	Analysis
0.5-3	Collect 1 VOA from shallow (0-10' bgs) and one from deep (10'+)	Archive
4-7	All remaining soil from 6 adjacent borings will be consolidated	

NOTE: Do not combine native material and fill

5/27/14

CH2MHILL	PROJECT NUMBER	Decision Unit DU 1-S	Boring ID B-1

SOIL BORING LOG

PROJECT : **HART** LOCATION : **Banana Patch**

LAT/LONG: DRILLING CONTRACTOR : **Geotek**

DRILLING METHOD AND EQUIPMENT USED : DPS

WATER LEVELS : START : 0945 END : 1000 LOGGER : BSR

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (~~FT~~ %)	#/TYPE	PID READING (ppm)	SOIL CORE DESCRIPTION: SOIL TYPE, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: Sample Collection Information Sample Sub-Unit Decision
0–5		70		0	silty clay (CL) with trace gravel. Reddish brown (2.5YR 2.5/4). Slightly moist. Medium stiff. Loose. Medium plasticity. Asphalt material @ 5'. FILL	
5–10		90	FILL	0	same as 0-5' Brown clay w/ basalt gravel from ~~7-8~~ 6-7'. Asphalt material 9-10'. FILL	
10–15		~~4~~0		0	Asphalt material 10-11'. Fill ends @ 11'. Silty clay (CL). Very dark brown (7.5YR 2.5/2). Moderately moist. Stiff Low plasticity.	13-16'
15–20		70	CL	0	same as 11-15'. Medium soft and moist at 19'.	
20–25					EOB @ 20'	

CH2MHILL

PROJECT NUMBER	Decision Unit	Boring ID

FLOW CHART FOR SAMPLING RATIONALE

PROJECT : HART

LOCATION : Banana Patch

LAT/LONG:

DRILLING CONTRACTOR : Geotek

UTILITY CLRNCE CONFRMD: YES NO

DRILLING METHOD AND EQUIPMENT USED : DPS HAS TP

Geophysical anomalies/ Fill Exist?

	DU1	DU2	DU3	DU4	DU5	DU6
Yes	B	B	B	B	C	C
No	A	B	B	A	C	C

Did you see NAPL/Char/Ashes? YES NO IF YES:

Sample	Analysis
Collect into 8-oz jar	Dioxins, Furans

Replicate collected here? YES NO IF YES:

Sample ID's:
Sample ID's:

A - Collect only surface samples - do not perform intrusive work

B - Perform intrusive investigation.

Each boring to be divided into 3 vertical SUs

- 0 to 0.5' bgs
- 0.5 to 3' bgs
- 8-10' bgs OR 3' interval below bottom of fill (native)

ACTUAL SUs)	Sample	Analysis
	Collect 10 plugs into ziplock	TPH-g/d/o, PAH, RCRA8, Pest/Herb, PCBs
	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
13-16'	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 10' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

C - Perform intrusive investigation

Each boring to be divided into 4 vertical SUs

- 0 to 5' bgs
- 5 to 10' bgs
- 10' bgs to 15' bgs
- 15 to 28' bgs (native)

ACTUAL SUs)	Sample	Analysis
	Collect 10 plugs into ziplock	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 18' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

POST SAMPLING:

Soil remaining from each core will be kepts and stored.

One archive for shallow (0-10)

One archive for deep (10'+)

ACTUAL SUs)	Sample	Analysis
	Collect 1 VOA from shallow (0-10' bgs) and one from deep (10'+)	Archive
Native	All remaining soil from 6 adjacent borings will be consolidated	

NOTE: Do not combine native material and fill

5/27/14

CH2MHILL	PROJECT NUMBER	Decision Unit DU1-S	Boring ID B-2

SOIL BORING LOG

PROJECT : **HART** LOCATION : **Banana Patch**

LAT/LONG: DRILLING CONTRACTOR : **Geotek**

DRILLING METHOD AND EQUIPMENT USED : DPS

WATER LEVELS : START : NR END : NR LOGGER : BR

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (%)	#/TYPE	PID READING (ppm)	SOIL CORE DESCRIPTION: SOIL TYPE, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: Sample Collection Information Sample Sub-Unit Decision
0–5	↕	50		0	Silty clay (CL) w/ trace gravel. Reddish brown (2.5YR 2.5/4). Slightly moist. Med. stiff. Low plasticity. Concrete debris @ 5'. FILL	
5–10	↕	40	FILL	0	Concrete debris 5-6'. Same as 0-5' from 6-10'. Dry. Stiff. Some gravel. FILL	
10–15	↕	~~??~~	unknown	0	Nothing recovered	
15–20	↕	50	CL	0	Silty clay (CL). Dark brown (7.5YR 3/3). Moist. Med. soft. Med. plasticity.	15-17 [illegible]
20–25					EOB @ 20'	

CH2MHILL

PROJECT NUMBER	Decision Unit	Boring ID

FLOW CHART FOR SAMPLING RATIONALE

PROJECT : HART

LOCATION : Banana Patch

LAT/LONG:

DRILLING CONTRACTOR : Geotek

UTILITY CLRNCE CONFRMD: YES NO

DRILLING METHOD AND EQUIPMENT USED : DPS HAS TP

Geophysical anomalies/ Fill Exist?

	DU1	DU2	DU3	DU4	DU5	DU6
Yes	B	B	B	B	C	C
No	A	B	B	A	C	C

Did you see NAPL/Char/Ashes? YES NO IF YES:

Replicate collected here? YES NO IF YES:

Sample	Analysis
Collect into 8-oz jar	Dioxins, Furans

Sample ID's:

Sample ID's:

A - Collect only surface samples - do not perform intrusive work

B - Perform intrusive investigation.

Each boring to be divided into 3 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 0.5' bgs		Collect 10 plugs into ziplock	TPH-g/d/o, PAH, RCRA8, Pest/Herb, PCBs
- 0.5 to 3' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 8-10' bgs OR 3' interval below bottom of fill (native)		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 10' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

C - Perform intrusive investigation

Each boring to be divided into 4 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 5' bgs		Collect 10 plugs into ziplock	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 5 to 10' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 10' bgs to 15' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 15 to 28' bgs (native)	15-17	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 18' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

POST SAMPLING:

Soil remaining from each core will be kepts and stored.

	ACTUAL SUs)	Sample	Analysis
One archive for shallow (0-10)		Collect 1 VOA from shallow (0-10' bgs) and one from deep (10'+)	Archive
One archive for deep (10'+)	Native	All remaining soil from 6 adjacent borings will be consolidated	

NOTE: Do not combine native material and fill

5/27/14

CH2MHILL	PROJECT NUMBER	Decision Unit DU1-S	Boring ID B-3

SOIL BORING LOG

PROJECT : **HART** LOCATION : **Banana Patch**

LAT/LONG: DRILLING CONTRACTOR : **Geotek**

DRILLING METHOD AND EQUIPMENT USED : DPS

WATER LEVELS : START : 0915 END : 0945 LOGGER : BR

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	#/TYPE	PID READING (ppm)	SOIL CORE DESCRIPTION: SOIL TYPE, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: Sample Collection Information Sample Sub-Unit Decision
5	0-5	40%	Fill	0	Silty clay (CL) with trace gravel. Reddish brown (2.5YR 2.5/4). Dry. Stiff. FILL	
10	5-10	30%	Fill	0	Silty clay (CL) w/some gravel. Gray to brown. Dry. Stiff. Concrete fragments present throughout. Metal debris. FILL	
15	10-15	70%		0	Same as 5-10' to 12'. Fill ends at 12'. Silty clay (CL). Dark brown (7.5YR 3/3). Moderately dry. Stiff. Low plasticity.	12-15'
20	15-20	75%	CL	0	Same as 12-15'. Very moist. Moderately soft. Low to med. plasticity.	
25					EOB @ 20'	

* Hit refusal @15'. Stepped out 6 ft, made it through to 20 ft.

CH2MHILL

PROJECT NUMBER	Decision Unit	Boring ID

FLOW CHART FOR SAMPLING RATIONALE

PROJECT: HART **LOCATION:** Banana Patch

LAT/LONG: **DRILLING CONTRACTOR:** Geotek

UTILITY CLRNCE CONFRMD: YES NO

DRILLING METHOD AND EQUIPMENT USED: DPS HAS TP

Geophysical anomalies/ Fill Exist?

	DU1	DU2	DU3	DU4	DU5	DU6
Yes	B	B	B	B	C	C
No	A	B	B	A	C	C

Sample	Analysis
Collect into 8-oz jar	Dioxins, Furans

Did you see NAPL/Char/Ashes? YES NO IF YES:

Replicate collected here? YES NO IF YES:

Sample ID's:

Sample ID's:

A - Collect only surface samples - do not perform intrusive work

B - Perform intrusive investigation.

Each boring to be divided into 3 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 0.5' bgs		Collect 10 plugs into ziplock	TPH-g/d/o, PAH, RCRA8, Pest/Herb, PCBs
- 0.5 to 3' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 8-10' bgs OR 3' interval below bottom of fill (native)	12-15'	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 10' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

C - Perform intrusive investigation

Each boring to be divided into 4 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 5' bgs		Collect 10 plugs into ziplock	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 5 to 10' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 10' bgs to 15' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 15 to 28' bgs (native)		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 18' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

POST SAMPLING:

Soil remaining from each core will be kepts and stored.

	ACTUAL SUs)	Sample	Analysis
One archive for shallow (0-10)		Collect 1 VOA from shallow (0-10' bgs) and one from deep (10'+)	Archive
One archive for deep (10'+)	Native	All remaining soil from 6 adjacent borings will be consolidated	

NOTE: Do not combine native material and fill

5/27/14

CH2MHILL	PROJECT NUMBER	Decision Unit DU 1-S	Boring ID B-4
	SOIL BORING LOG		

PROJECT : HART | LOCATION : Banana Patch

LAT/LONG: | DRILLING CONTRACTOR : Geotek

DRILLING METHOD AND EQUIPMENT USED :

WATER LEVELS : START : NR END : NR LOGGER : BR

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT) %	#/TYPE	PID READING (ppm)	SOIL CORE DESCRIPTION: SOIL TYPE, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: Sample Collection Information Sample Sub-Unit Decision
0–5		60	FILL	0	silty clay (CL) w/ trace gravel. Reddish brown (2.5YR 2.5/4). Slightly moist. Med. soft. Loose. FILL	
5–10		60	FILL	0	5-6' same as 0-5'. Concrete fragments, mixed w/ brown silty clay fragments & asphalt. FILL	
10–15		60	FILL / CL	0	Same as 5-10' down to ~~[illegible]~~ 13 ft. silty clay (CL). Dark brown (7.5YR 3/3). Slightly moist. Stiff. low plasticity.	
15–20		80	CL	0	Same as ~~[illegible]~~ 13-15' EOB @ 20'	13-16'
20–25						

CH2MHILL

PROJECT NUMBER	Decision Unit DU1-S	Boring ID B-4

FLOW CHART FOR SAMPLING RATIONALE

PROJECT : HART

LOCATION : Banana Patch

LAT/LONG:

DRILLING CONTRACTOR : Geotek

UTILITY CLRNCE CONFRMD: YES NO

DRILLING METHOD AND EQUIPMENT USED : DPS HAS TP

Geophysical anomalies/ Fill Exist?

	DU1	DU2	DU3	DU4	DU5	DU6
Yes	B	B	B	B	C	C
No	A	B	B	A	C	C

Did you see NAPL/Char/Ashes? YES NO IF YES:

Sample	Analysis
Collect into 8-oz jar	Dioxins, Furans

Replicate collected here? YES NO IF YES:

Sample ID's:

Sample ID's:

A - Collect only surface samples - do not perform intrusive work

B - Perform intrusive investigation.

Each boring to be divided into 3 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 0.5' bgs		Collect 10 plugs into ziplock	TPH-g/d/o, PAH, RCRA8, Pest/Herb, PCBs
- 0.5 to 3' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 8-10' bgs OR 3' interval below bottom of fill (native)		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 10' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

C - Perform intrusive investigation

Each boring to be divided into 4 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 5' bgs		Collect 10 plugs into ziplock	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 5 to 10' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 10' bgs to 15' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 15 to 28' bgs (native)	13-16'	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 18' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

POST SAMPLING:

Soil remaining from each core will be kepts and stored.

	ACTUAL SUs)	Sample	Analysis
One archive for shallow (0-10)		Collect 1 VOA from shallow (0-10' bgs) and one from deep (10'+)	Archive
One archive for deep (10'+)	Native	All remaining soil from 6 adjacent borings will be consolidated	

NOTE: Do not combine native material and fill

5/27/14

CH2MHILL	PROJECT NUMBER	Decision Unit DU1-S	Boring ID B-5

SOIL BORING LOG

PROJECT : **HART** LOCATION : **Banana Patch**

LAT/LONG: DRILLING CONTRACTOR : **Geotek**

DRILLING METHOD AND EQUIPMENT USED : DPS

WATER LEVELS : START : 1330 END : LOGGER : BR

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (%)	#/TYPE	PID READING (ppm)	SOIL CORE DESCRIPTION: SOIL TYPE, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: Sample Collection Information Sample Sub-Unit Decision
0–5					~~silty clay (CL) with trace gravel~~ 0-10' not recovered here. Logged during test pitting.	
5–10						
10–15		100	CL	0	silty clay (CL) with trace gravel. very dark brown (7.5YR 2.5/3). Slightly moist. Stiff. Moderately loose. Native	10-13'
15–20		90		0	silty clay (CL). Dark brown (7.5YR 3/2). Stiff. Moist. ~~low~~ Med plasticity. Soft at 19'. EOB @ 20'	
20–25						

CH2MHILL

PROJECT NUMBER	Decision Unit -	Boring ID

FLOW CHART FOR SAMPLING RATIONALE

PROJECT : HART

LOCATION : Banana Patch

LAT/LONG:

DRILLING CONTRACTOR : Geotek

UTILITY CLRNCE CONFRMD: YES NO

DRILLING METHOD AND EQUIPMENT USED : DPS HAS TP

Geophysical anomalies/ Fill Exist?

	DU1	DU2	DU3	DU4	DU5	DU6
Yes	B	B	B	B	C	C
No	A	B	B	A	C	C

Did you see NAPL/Char/Ashes? YES NO IF YES:

Sample	Analysis
Collect into 8-oz jar	Dioxins, Furans

Sample ID's:

Replicate collected here? YES NO IF YES:

Sample ID's:

A - Collect only surface samples - do not perform intrusive work

B - Perform intrusive investigation.

Each boring to be divided into 3 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 0.5' bgs		Collect 10 plugs into ziplock	TPH-g/d/o, PAH, RCRA8, Pest/Herb, PCBs
- 0.5 to 3' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 8-10' bgs OR 3' interval below bottom of fill (native)		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 10' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

C - Perform intrusive investigation

Each boring to be divided into 4 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 5' bgs		Collect 10 plugs into ziplock	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 5 to 10' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 10' bgs to 15' bgs	10-13'	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 15 to 28' bgs (native)		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 18' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

POST SAMPLING:

Soil remaining from each core will be kepts and stored.

	ACTUAL SUs)	Sample	Analysis
One archive for shallow (0-10)		Collect 1 VOA from shallow (0-10' bgs) and one from deep (10'+)	Archive
One archive for deep (10'+)	Native	All remaining soil from 6 adjacent borings will be consolidated	

NOTE: Do not combine native material and fill

5/27/14

CH2MHILL

PROJECT NUMBER	Decision Unit DU1-S	Boring ID B-6

SOIL BORING LOG

PROJECT : **HART** LOCATION : **Banana Patch**

LAT/LONG: DRILLING CONTRACTOR : **Geotek**

DRILLING METHOD AND EQUIPMENT USED :

WATER LEVELS : START : 1400 END : 1430 LOGGER : BB

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)/%	#/TYPE	PID READING (ppm)	SOIL CORE DESCRIPTION: SOIL TYPE, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: Sample Collection Information Sample Sub-Unit Decision
0–5					0-10' not ~~logged~~ recovered. Logged/sampled during test pitting	
5–10						
10–15	10–15	80	CL	0	silty clay (CL). Dark brown (7.5YR 3/3). Slightly moist stiff. Low plasticity. Native	10-13'
15–20	15–20	10		0	silty clay (CL). Very dark brown (7.5YR 2.5/2). Moderately stiff. Moist Med. plasticity.	
20–25					EOB @ 20'	

CH2MHILL

PROJECT NUMBER	Decision Unit	Boring ID

FLOW CHART FOR SAMPLING RATIONALE

PROJECT : HART **LOCATION :** Banana Patch

LAT/LONG: **DRILLING CONTRACTOR :** Geotek

UTILITY CLRNCE CONFRMD: YES NO

DRILLING METHOD AND EQUIPMENT USED : DPS HAS TP

Geophysical anomalies/ Fill Exist?

	DU1	DU2	DU3	DU4	DU5	DU6
Yes	B	B	B	B	C	C
No	A	B	B	A	C	C

Sample	Analysis
Collect into 8-oz jar	Dioxins, Furans

Did you see NAPL/Char/Ashes? YES NO IF YES: Sample ID's:

Replicate collected here? YES NO IF YES: Sample ID's:

A - Collect only surface samples - do not perform intrusive work

B - Perform intrusive investigation.

Each boring to be divided into 3 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 0.5' bgs		Collect 10 plugs into ziplock	TPH-g/d/o, PAH, RCRA8, Pest/Herb, PCBs
- 0.5 to 3' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 8-10' bgs OR 3' interval below bottom of fill (native)		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 10' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

C - Perform intrusive investigation

Each boring to be divided into 4 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 5' bgs		Collect 10 plugs into ziplock	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 5 to 10' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 10' bgs to 15' bgs	10-13'	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 15 to 28' bgs (native)		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 18' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

POST SAMPLING:

Soil remaining from each core will be kepts and stored.

	ACTUAL SUs)	Sample	Analysis
One archive for shallow (0-10)		Collect 1 VOA from shallow (0-10' bgs) and one from deep (10'+)	Archive
One archive for deep (10'+)	Native	All remaining soil from 6 adjacent borings will be consolidated	

NOTE: Do not combine native material and fill

5/27/14

CH2MHILL

PROJECT NUMBER	Decision Unit DU1 - S	Boring ID B-7

SOIL BORING LOG

PROJECT : **HART** LOCATION : **Banana Patch**

LAT/LONG: DRILLING CONTRACTOR : **Geotek**

DRILLING METHOD AND EQUIPMENT USED :

WATER LEVELS : START : 1500 END : 1530 LOGGER : BR

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	#/TYPE	PID READING (ppm)	SOIL CORE DESCRIPTION: SOIL TYPE, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: Sample Collection Information Sample Sub-Unit Decision
0–5					Silty clay (CL). Dark brown (7.5YR 3/4). Dry. loose. Stiff to soft. low plasticity. concrete from 10-10.5', likely slough.	10-13'
5–10					0-10' not collected. logged/sampled during test pitting	
10–15	↕	70	CL	0	→	
15–20	↕	80		0	same as 10-15'. Moist @ 17', low to med. plasticity. soft. EOB @ 20'	101
20–25						

CH2MHILL

PROJECT NUMBER	Decision Unit	Boring ID

FLOW CHART FOR SAMPLING RATIONALE

PROJECT : HART

LOCATION : Banana Patch

LAT/LONG:

DRILLING CONTRACTOR : Geotek

UTILITY CLRNCE CONFRMD: YES NO

DRILLING METHOD AND EQUIPMENT USED : DPS HAS TP

Geophysical anomalies/ Fill Exist?

	DU1	DU2	DU3	DU4	DU5	DU6
Yes	B	B	B	B	C	C
No	A	B	B	A	C	C

Sample	Analysis
Collect into 8-oz jar	Dioxins, Furans

Did you see NAPL/Char/Ashes? YES NO IF YES: Sample ID's:

Replicate collected here? YES NO IF YES: Sample ID's:

A - Collect only surface samples - do not perform intrusive work

B - Perform intrusive investigation.

Each boring to be divided into 3 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 0.5' bgs		Collect 10 plugs into ziplock	TPH-g/d/o, PAH, RCRA8, Pest/Herb, PCBs
- 0.5 to 3' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 8-10' bgs OR 3' interval below bottom of fill (native)	10-13'	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 10' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

C - Perform intrusive investigation

Each boring to be divided into 4 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 5' bgs		Collect 10 plugs into ziplock	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 5 to 10' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 10' bgs to 15' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 15 to 28' bgs (native)		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 18' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

POST SAMPLING:

Soil remaining from each core will be kepts and stored.

	ACTUAL SUs)	Sample	Analysis
One archive for shallow (0-10)		Collect 1 VOA from shallow (0-10' bgs) and one from deep (10'+)	Archive
One archive for deep (10'+)		All remaining soil from 6 adjacent borings will be consolidated	

NOTE: Do not combine native material and fill

5/27/14

CH2MHILL	PROJECT NUMBER	Decision Unit DU1-S	Boring ID B-8

SOIL BORING LOG

PROJECT : HART | LOCATION : Banana Patch

LAT/LONG: | DRILLING CONTRACTOR : Geotek

DRILLING METHOD AND EQUIPMENT USED :

WATER LEVELS : START : END : LOGGER :

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	#/TYPE	PID READING (ppm)	SOIL CORE DESCRIPTION: SOIL TYPE, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: Sample Collection Information Sample Sub-Unit Decision
0–5					0-10' not collected. logged/sampled during test pitting.	
5–10						
10–15		60	CL	0	Silty clay (CL). Very dark brown (7.5YR 2.5/3). Moist. Stiff. low plasticity.	10-13'
15–20		90		0	same as 10-15'. soft to med. soft. very moist. EOB @ 20'	
20–25						

CH2MHILL

PROJECT NUMBER	Decision Unit	Boring ID

FLOW CHART FOR SAMPLING RATIONALE

PROJECT : HART

LOCATION : Banana Patch

LAT/LONG:

DRILLING CONTRACTOR : Geotek

UTILITY CLRNCE CONFRMD: YES NO

DRILLING METHOD AND EQUIPMENT USED : DPS HAS TP

Geophysical anomalies/ Fill Exist?

	DU1	DU2	DU3	DU4	DU5	DU6
Yes	B	B	B	B	C	C
No	A	B	B	A	C	C

Did you see NAPL/Char/Ashes? YES NO IF YES:

Sample	Analysis
Collect into 8-oz jar	Dioxins, Furans

Sample ID's:

Replicate collected here? YES NO IF YES:

Sample ID's:

A - Collect only surface samples - do not perform intrusive work

B - Perform intrusive investigation.

Each boring to be divided into 3 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 0.5' bgs		Collect 10 plugs into ziplock	TPH-g/d/o, PAH, RCRA8, Pest/Herb, PCBs
- 0.5 to 3' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 8-10' bgs OR 3' interval below bottom of fill (native)		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 10' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

C - Perform intrusive investigation

Each boring to be divided into 4 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 5' bgs		Collect 10 plugs into ziplock	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 5 to 10' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 10' bgs to 15' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 15 to 28' bgs (native)		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 18' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

POST SAMPLING:

Soil remaining from each core will be kepts and stored.

	ACTUAL SUs)	Sample	Analysis
One archive for shallow (0-10)		Collect 1 VOA from shallow (0-10' bgs) and one from deep (10'+)	Archive
One archive for deep (10'+)		All remaining soil from 6 adjacent borings will be consolidated	

NOTE: Do not combine native material and fill

5/28/14

CH2MHILL

PROJECT NUMBER	Decision Unit	Boring ID
	DU15	B9

SOIL BORING LOG

PROJECT : **HART**

LOCATION : **Banana Patch**

LAT/LONG:

DRILLING CONTRACTOR : **Geotek**

DRILLING METHOD AND EQUIPMENT USED : DPS

WATER LEVELS :

START : 0830

END : 0915

LOGGER : JC

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	#/TYPE	PID READING (ppm)	SOIL CORE DESCRIPTION: SOIL TYPE, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: Sample Collection Information Sample Sub-Unit Decision
0–5		NO SAMPLING			No Sampling	
5–10					samples "a" and "b" collected during test pitting	
10–15		40%	NATIVE		Silty clay brown to dark brown (7.5 YR 2.5/3). Slightly moist stiff. Low plasticity.	c = 10-13' (c)
15–20		100%			Same as 10'-15', more moist, softer, and more plastic.	
20–25					EOB = 20' bgs	

CH2MHILL

PROJECT NUMBER	Decision Unit DU15	Boring ID B9

FLOW CHART FOR SAMPLING RATIONALE

PROJECT: HART
LOCATION: Banana Patch
LAT/LONG:
DRILLING CONTRACTOR: Geotek
UTILITY CLRNCE CONFRMD: YES NO
DRILLING METHOD AND EQUIPMENT USED: DPS HAS TP

Geophysical anomalies/ Fill Exist?

	DU1	DU2	DU3	DU4	DU5	DU6
Yes	B	B	B	B	C	C
No	A	B	B	A	C	C

Sample	Analysis
Collect into 8-oz jar	Dioxins, Furans

Did you see NAPL/Char/Ashes? YES NO IF YES: Sample ID's:

Replicate collected here? YES NO IF YES: Sample ID's:

A - Collect only surface samples - do not perform intrusive work

B - Perform intrusive investigation.

Each boring to be divided into 3 vertical SUs

- 0 to 0.5' bgs
- 0.5 to 3' bgs
- 8-10' bgs OR 3' interval below bottom of fill (native)

ACTUAL SUs)	Sample	Analysis
0 - 0.5	Collect 10 plugs into ziplock	TPH-g/d/o, PAH, RCRA8, Pest/Herb, PCBs
B-8-10	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
C-10-13	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 10' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

C - Perform intrusive investigation

Each boring to be divided into 4 vertical SUs

- 0 to 5' bgs
- 5 to 10' bgs
- 10' bgs to 15' bgs
- 15 to 18' bgs (native)

ACTUAL SUs)	Sample	Analysis
	Collect 10 plugs into ziplock	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 18' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

POST SAMPLING:

Soil remaining from each core will be kepts and stored.

One archive for shallow (0-10)

One archive for deep (10'+)

ACTUAL SUs)	Sample	Analysis
~~[illegible]~~	Collect 1 VOA from shallow (0-10' bgs) and one from deep (10'+)	Archive
11-13	All remaining soil from 6 adjacent borings will be consolidated	

NOTE: Do not combine native material and fill

5/28/14

CH2MHILL

PROJECT NUMBER	Decision Unit	Boring ID
	DU1S	B10

SOIL BORING LOG

PROJECT : **HART**

LOCATION : **Banana Patch**

LAT/LONG:

DRILLING CONTRACTOR : **Geotek**

DRILLING METHOD AND EQUIPMENT USED : DPS

WATER LEVELS :

START : 0930

END : 1010

LOGGER : SC

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	#/TYPE	PID READING (ppm)	SOIL CORE DESCRIPTION: SOIL TYPE, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: Sample Collection Information Sample Sub-Unit Decision
0–5			NATIVE		Silty clay w/ sand Brown to ~~reddish brown~~ Low plasticity. More plastic w/depth. Moist. Saturated from 9' bgs	(7.5YR 4/3 to 2.5YR 4/6)
5–10						~~10.8~~ SC
10–15						C = 10-13'
15–20					EOB = 15' bgs	
20–25						

* Co-located w/ TW011

CH2MHILL

PROJECT NUMBER	Decision Unit DU-5	Boring ID B10

FLOW CHART FOR SAMPLING RATIONALE

PROJECT : HART

LOCATION : Banana Patch

LAT/LONG:

DRILLING CONTRACTOR : Geotek

UTILITY CLRNCE CONFRMD: YES NO

DRILLING METHOD AND EQUIPMENT USED : DPS HAS TP

Geophysical anomalies/ Fill Exist?

	DU1	DU2	DU3	DU4	DU5	DU6
Yes	B	B	B	B	C	C
No	A	B	B	A	C	C

Sample	Analysis
Collect into 8-oz jar	Dioxins, Furans

Did you see NAPL/Char/Ashes? YES NO IF YES:

Replicate collected here? YES NO IF YES:

Sample ID's:

Sample ID's:

A - Collect only surface samples - do not perform intrusive work

B - Perform intrusive investigation.

Each boring to be divided into 3 vertical SUs

- 0 to 0.5' bgs
- 0.5 to 3' bgs
- 8-10' bgs OR 3' interval below bottom of fill (native)

ACTUAL SUs)	Sample	Analysis
0-0.5	Collect 10 plugs into ziplock	TPH-g/d/o, PAH, RCRA8, Pest/Herb, PCBs
8-10	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
10-13	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 10' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

C - Perform intrusive investigation

Each boring to be divided into 4 vertical SUs

- 0 to 5' bgs
- 5 to 10' bgs
- 10' bgs to 15' bgs
- 15 to 18' bgs (native)

ACTUAL SUs)	Sample	Analysis
	Collect 10 plugs into ziplock	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 18' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

POST SAMPLING:

Soil remaining from each core will be kepts and stored.

One archive for shallow (0-10)

One archive for deep (10'+)

ACTUAL SUs)	Sample	Analysis
	Collect 1 VOA from shallow (0-10' bgs) and one from deep (10'+)	Archive
10-13	All remaining soil from 6 adjacent borings will be consolidated	

NOTE: Do not combine native material and fill

5/28/14

CH2MHILL	PROJECT NUMBER	Decision Unit: DU1 S	Boring ID: B11

SOIL BORING LOG

PROJECT : **HART** LOCATION : **Banana Patch**

LAT/LONG: DRILLING CONTRACTOR : **Geotek**

DRILLING METHOD AND EQUIPMENT USED : DPS

WATER LEVELS : START : 1020 END : 1045 LOGGER : JC

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	#/TYPE	PID READING (ppm)	SOIL CORE DESCRIPTION: SOIL TYPE, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: Sample Collection Information, Sample Sub-Unit Decision
0–5					No sampling 0-10' bgs	
5–10						
10–15		100%	NATIVE		Silty clay brown to dark brown. Slightly moist, stiff to med. plasticity. Moisture increase btw 15-20'. (7.5YR 2.5/3)	C=10-13' bgs
15–20		100%				
20–25					EOB = 20' bgs	

CH2MHILL

PROJECT NUMBER	Decision Unit DU1 S	Boring ID B11

FLOW CHART FOR SAMPLING RATIONALE

PROJECT : HART
LOCATION : Banana Patch
LAT/LONG:
DRILLING CONTRACTOR : Geotek
UTILITY CLRNCE CONFRMD: YES NO
DRILLING METHOD AND EQUIPMENT USED : DPS HAS TP

Geophysical anomalies/ Fill Exist?

	DU1	DU2	DU3	DU4	DU5	DU6
Yes	B	B	B	B	C	C
No	A	B	B	A	C	C

Sample	Analysis
Collect into 8-oz jar	Dioxins, Furans

Did you see NAPL/Char/Ashes? YES NO IF YES: Sample ID's:

Replicate collected here? YES NO IF YES: Sample ID's:

A - Collect only surface samples - do not perform intrusive work

B - Perform intrusive investigation.

Each boring to be divided into 3 vertical SUs

- 0 to 0.5' bgs
- 0.5 to 3' bgs
- 8-10' bgs OR 3' interval below bottom of fill (native)

ACTUAL SUs)	Sample	Analysis
0-0.5	Collect 10 plugs into ziplock	TPH-g/d/o, PAH, RCRA8, Pest/Herb, PCBs
8-10	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
10-13	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 10' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

C - Perform intrusive investigation

Each boring to be divided into 4 vertical SUs

- 0 to 5' bgs
- 5 to 10' bgs
- 10' bgs to 15' bgs
- 15 to 18' bgs (native)

ACTUAL SUs)	Sample	Analysis
	Collect 10 plugs into ziplock	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 18' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

POST SAMPLING:

Soil remaining from each core will be kepts and stored.

One archive for shallow (0-10)

One archive for deep (10'+)

ACTUAL SUs)	Sample	Analysis
	Collect 1 VOA from shallow (0-10' bgs) and one from deep (10'+)	Archive
10-13	All remaining soil from 6 adjacent borings will be consolidated	

NOTE: Do not combine native material and fill

5/28/14

CH2MHILL	PROJECT NUMBER	Decision Unit DU1 S	Boring ID B12

SOIL BORING LOG

PROJECT : **HART** LOCATION : **Banana Patch**

LAT/LONG: DRILLING CONTRACTOR : **Geotek**

DRILLING METHOD AND EQUIPMENT USED : DPS

WATER LEVELS : START : 1100 END : 1130 LOGGER : SC

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	#/TYPE	PID READING (ppm)	SOIL CORE DESCRIPTION SOIL TYPE, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS Sample Collection Information Sample Sub-Unit Decision
0–5					NO SAMPLING	
5–10						
10–15		100%	NATIVE	NATIVE	Some concrete at top of core probably ploughed from above. Silty sand, Dark reddish brown, poorly sorted. (SP) (5YR, 3/4) Dry.	C: 10-13' bgs (C)
15–20		100%			Sandy, clayey silt (MH). Clay content increases w/ depth. Brown to dark brown (7.5YR 2.5/3) Moist, low plasticity.	
20–25					EOB = 20' bgs	

CH2MHILL

PROJECT NUMBER	Decision Unit	Boring ID
	DU1 S	B12

FLOW CHART FOR SAMPLING RATIONALE

PROJECT : HART

LOCATION : Banana Patch

LAT/LONG:

DRILLING CONTRACTOR : Geotek

UTILITY CLRNCE CONFRMD: YES NO

DRILLING METHOD AND EQUIPMENT USED : DPS HAS TP

Geophysical anomalies/ Fill Exist?

	DU1	DU2	DU3	DU4	DU5	DU6
Yes	B	B	B	B	C	C
No	A	B	B	A	C	C

Did you see NAPL/Char/Ashes? YES NO IF YES:

Sample	Analysis
Collect into 8-oz jar	Dioxins, Furans

Replicate collected here? YES NO IF YES:

Sample ID's:

Sample ID's:

A - Collect only surface samples - do not perform intrusive work

B - Perform intrusive investigation.

Each boring to be divided into 3 vertical SUs

- 0 to 0.5' bgs
- 0.5 to 3' bgs
- 8-10' bgs OR 3' interval below bottom of fill (native)

ACTUAL SUs)	Sample	Analysis
0-0.5	Collect 10 plugs into ziplock	TPH-g/d/o, PAH, RCRA8, Pest/Herb, PCBs
8-10	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
10-13	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 10' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

C - Perform intrusive investigation

Each boring to be divided into 4 vertical SUs

- 0 to 5' bgs
- 5 to 10' bgs
- 10' bgs to 15' bgs
- 15 to 18' bgs (native)

ACTUAL SUs)	Sample	Analysis
	Collect 10 plugs into ziplock	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 18' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

POST SAMPLING:

Soil remaining from each core will be kepts and stored.

One archive for shallow (0-10)

One archive for deep (10'+)

ACTUAL SUs)	Sample	Analysis
	Collect 1 VOA from shallow (0-10' bgs) and one from deep (10'+)	Archive
10-13	All remaining soil from 6 adjacent borings will be consolidated	

NOTE: Do not combine native material and fill

5/22/14

CH2MHILL

PROJECT NUMBER	Decision Unit	Boring ID
	DU 2	B1

SOIL BORING LOG

PROJECT : **HART** LOCATION : **Banana Patch**

LAT/LONG: DRILLING CONTRACTOR : **Geotek**

DRILLING METHOD AND EQUIPMENT USED : DPS Track Rig

WATER LEVELS : START : 1500 END : 1530 LOGGER : VM

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	#/TYPE	PID READING (ppm)	SOIL CORE DESCRIPTION: SOIL TYPE, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: Sample Collection Information, Sample Sub-Unit Decision
0–5		80%	FILL	0	Fill: Br SILT w/gravel, sand dr loose, roots Fill: Coraline Gravel, Lg, A, dry	sample ~~0-0.5' bgs~~ 0-0.5' 0.5-3.0' bgs
5–10		20%		0		NO sample -shoe jammed w/gravel poor recovery
10–15		60%		0	NATIVE: SILTY SAND- Br, damp.	~~Sample~~ ~~10-15' bgs~~ sample 13-16' bgs
15–20		60%		0	NATIVE : Dk grey clay. Med soft, plastic. Damp	~~Sample~~ ~~15-20' bgs~~
20–25					EOB @ 20' bgs	

*NOTE : PID readings taken every 6"

CH2MHILL

PROJECT NUMBER	Decision Unit	Boring ID
	DU2	B1

FLOW CHART FOR SAMPLING RATIONALE

PROJECT : HART **LOCATION :** Banana Patch

LAT/LONG: **DRILLING CONTRACTOR :** Geotek

UTILITY CLRNCE CONFRMD: YES NO

DRILLING METHOD AND EQUIPMENT USED : DPS HAS TP

Geophysical anomalies/ Fill Exist?

	DU1	DU2	DU3	DU4	DU5	DU6
Yes	B	B	B	B	C	C
No	A	B	B	A	C	C

Did you see NAPL/Char/Ashes? YES NO IF YES:

Sample	Analysis
Collect into 8-oz jar	Dioxins, Furans

Replicate collected here? YES NO IF YES:

Sample ID's:
Sample ID's:

A - Collect only surface samples - do not perform intrusive work

B - Perform intrusive investigation.

Each boring to be divided into 3 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 0.5' bgs	0-0.5	Collect 10 plugs into ziplock	TPH-g/d/o, PAH, RCRA8, Pest/Herb, PCBs
- 0.5 to 3' bgs	0.5-3	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 8-10' bgs OR 3' interval below bottom of fill (native)	13-16	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 10' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

C - Perform intrusive investigation

Each boring to be divided into 4 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 5' bgs		Collect 10 plugs into ziplock	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 5 to 10' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 10' bgs to 15' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 15 to 28' bgs (native)		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 18' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

POST SAMPLING:

Soil remaining from each core will be kepts and stored.

	ACTUAL SUs)	Sample	Analysis
One archive for shallow (0-~~10~~3)	0-3	Collect 1 VOA from shallow (0-10' bgs) and one from deep (10'+)	Archive
One archive for deep (~~1~~3'+)	3-20	All remaining soil from 6 adjacent borings will be consolidated	

NOTE: Do not combine native material and fill

CH2MHILL

PROJECT NUMBER	Decision Unit 2	Boring ID B2

SOIL BORING LOG

PROJECT : **HART** LOCATION : **Banana Patch**

LAT/LONG: DRILLING CONTRACTOR : **Geotek**

DRILLING METHOD AND EQUIPMENT USED : DPS

WATER LEVELS : START : NR END : NR LOGGER : BR

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	#/TYPE	PID READING (ppm)	SOIL CORE DESCRIPTION: SOIL TYPE, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: Sample Collection Information, Sample Sub-Unit Decision
0–5	↕	70%	FILL	0	Silty clay (CL) w/ some gravel. Reddish brown. Dry. Stiff, loose. Concrete debris @4'. FILL	0-0.5' 0.5-3.0'
5–10	↕	80%		0	Same as 0-5'. 6" of concrete @9'.	
10–15	↕	100%	CL	0	Same as 0-5'. Fill ends @12'. Abundant coral gravel. Silty clay (CL), brown. Moist. Stiff to med. stiff. Some sand 13-15'.	12-15'
15–20	↕	90%		0	Same as above. Very moist, soft, darker brown @ 17'. EOB @20'	
20–25						

CH2MHILL

PROJECT NUMBER	Decision Unit	Boring ID

FLOW CHART FOR SAMPLING RATIONALE

PROJECT: HART   **LOCATION:** Banana Patch

LAT/LONG: **DRILLING CONTRACTOR:** Geotek

UTILITY CLRNCE CONFRMD: YES NO

DRILLING METHOD AND EQUIPMENT USED: DPS HAS TP

Geophysical anomalies/ Fill Exist?

	DU1	DU2	DU3	DU4	DU5	DU6
Yes	B	B	B	B	C	C
No	A	B	B	A	C	C

Sample	Analysis
Collect into 8-oz jar	Dioxins, Furans

Did you see NAPL/Char/Ashes? YES NO IF YES:

Replicate collected here? YES NO IF YES: Sample ID's:

Sample ID's:

A - Collect only surface samples - do not perform intrusive work

B - Perform intrusive investigation.

Each boring to be divided into 3 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 0.5' bgs	0-0.5	Collect 10 plugs into ziplock	TPH-g/d/o, PAH, RCRA8, Pest/Herb, PCBs
- 0.5 to 3' bgs	0.5-3	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 8-10' bgs OR 3' interval below bottom of fill (native)	12-15	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 10' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

C - Perform intrusive investigation

Each boring to be divided into 4 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 5' bgs		Collect 10 plugs into ziplock	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 5 to 10' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 10' bgs to 15' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 15 to 28' bgs (native)		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 18' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

POST SAMPLING:

Soil remaining from each core will be kepts and stored.

	ACTUAL SUs)	Sample	Analysis
One archive for shallow (0-10)	0-3	Collect 1 VOA from shallow (0-10' bgs) and one from deep (10'+)	Archive
One archive for deep (10'+)	3-20	All remaining soil from 6 adjacent borings will be consolidated	

NOTE: Do not combine native material and fill

5/22/14

CH2MHILL	PROJECT NUMBER	Decision Unit 2	Boring ID B-3

SOIL BORING LOG

PROJECT : HART — LOCATION : Banana Patch

LAT/LONG: — DRILLING CONTRACTOR : Geotek

DRILLING METHOD AND EQUIPMENT USED :

WATER LEVELS : — START : 1615 — END : 1630 — LOGGER : BR

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	#/TYPE	PID READING (ppm)	SOIL CORE DESCRIPTION: SOIL TYPE, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: Sample Collection Information Sample Sub-Unit Decision
0–5	↕	90%	FILL	0	Silty clay (CL) w/ trace gravel. Reddish brown. Dry, stiff, loose. FILL	0-0.5' 0.5-3.0'
5–10	↕	70	FILL	0	Same as 0-5'. Brown @ 6'. FILL	
10–15	↕	70	FILL	0	Same as 0-5'. Concrete @ 14'. Silty clay @ 14.5'.	
15–20	↕	80	CL	0	Silty clay (CL). Brown. Moist. Med. stiff. Med. plasticity. EOB @ 20'	15-18'
20–25						

CH2MHILL

PROJECT NUMBER	Decision Unit	Boring ID

FLOW CHART FOR SAMPLING RATIONALE

PROJECT : HART **LOCATION :** Banana Patch

LAT/LONG: **DRILLING CONTRACTOR :** Geotek

UTILITY CLRNCE CONFRMD: YES NO

DRILLING METHOD AND EQUIPMENT USED : DPS HAS TP

Geophysical anomalies/ Fill Exist?

	DU1	DU2	DU3	DU4	DU5	DU6
Yes	B	B	B	B	C	C
No	A	B	B	A	C	C

Did you see NAPL/Char/Ashes? YES NO IF YES:

Sample	Analysis
Collect into 8-oz jar	Dioxins, Furans

Replicate collected here? YES NO IF YES:

Sample ID's:
Sample ID's:

A - Collect only surface samples - do not perform intrusive work

B - Perform intrusive investigation.

Each boring to be divided into 3 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 0.5' bgs	0-0.5	Collect 10 plugs into ziplock	TPH-g/d/o, PAH, RCRA8, Pest/Herb, PCBs
- 0.5 to 3' bgs	0.5-3	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 8-10' bgs OR 3' interval below bottom of fill (native)	15-18	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 10' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

C - Perform intrusive investigation

Each boring to be divided into 4 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 5' bgs		Collect 10 plugs into ziplock	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 5 to 10' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 10' bgs to 15' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 15 to 28' bgs (native)		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 18' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

POST SAMPLING:

Soil remaining from each core will be kepts and stored.

	ACTUAL SUs)	Sample	Analysis
One archive for shallow (0-10)	0-3	Collect 1 VOA from shallow (0-10' bgs) and one from deep (10'+)	Archive
One archive for deep (10'+)	3-20	All remaining soil from 6 adjacent borings will be consolidated	

NOTE: Do not combine native material and fill

5/23/14

CH2MHILL	PROJECT NUMBER	Decision Unit DU2	Boring ID B-4

SOIL BORING LOG

PROJECT : **HART** LOCATION : **Banana Patch**

LAT/LONG: DRILLING CONTRACTOR : **Geotek**

DRILLING METHOD AND EQUIPMENT USED : DPS Track Rig

WATER LEVELS : START : 0830 END : 0840 LOGGER : VM

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	#/TYPE	PID READING (ppm)	SOIL CORE DESCRIPTION: SOIL TYPE, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: Sample Collection Information, Sample Sub-Unit Decision
0–5	0–5	75%	FILL	0	FILL: Rd br SILT loose, w/ organics, dry FILL Coraline gravel w/ br SILT & debris Geotextile fabric (black) 3" above native	sample 0-0.5 sample 0.5-3' bgs
5–10	5–10	60%		0		
10–15	10–15	70%		0	Native: br CLAYEY SILT trace sand. Dry. Firm. Orange mottles to 17'.	
15–20	15–20	30%	NATIVE	0	wet and soft at 19'	sample 12-15' bgs
20–25						

CH2MHILL

PROJECT NUMBER	Decision Unit DU2	Boring ID B4

FLOW CHART FOR SAMPLING RATIONALE

PROJECT : HART

LOCATION : Banana Patch

LAT/LONG:

DRILLING CONTRACTOR : Geotek

UTILITY CLRNCE CONFRMD: YES NO

DRILLING METHOD AND EQUIPMENT USED : DPS HAS TP

Geophysical anomalies/ Fill Exist?

	DU1	DU2	DU3	DU4	DU5	DU6
Yes	B	B	B	B	C	C
No	A	B	B	A	C	C

Did you see NAPL/Char/Ashes? YES NO IF YES:

Sample	Analysis
Collect into 8-oz jar	Dioxins, Furans

Replicate collected here? YES NO IF YES:

Sample ID's:

Sample ID's:

A - Collect only surface samples - do not perform intrusive work

B - Perform intrusive investigation.

Each boring to be divided into 3 vertical SUs

- 0 to 0.5' bgs
- 0.5 to 3' bgs
- 8-10' bgs OR 3' interval below bottom of fill (native)

ACTUAL SUs)	Sample	Analysis
0-0.5	Collect 10 plugs into ziplock	TPH-g/d/o, PAH, RCRA8, Pest/Herb, PCBs
0.5-3	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
12-15	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 10' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

C - Perform intrusive investigation

Each boring to be divided into 4 vertical SUs

- 0 to 5' bgs
- 5 to 10' bgs
- 10' bgs to 15' bgs
- 15 to 28' bgs (native)

ACTUAL SUs)	Sample	Analysis
	Collect 10 plugs into ziplock	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 18' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

POST SAMPLING:

Soil remaining from each core will be kepts and stored.

One archive for shallow (0-10)

One archive for deep (10'+)

ACTUAL SUs)	Sample	Analysis
0-3	Collect 1 VOA from shallow (0-10' bgs) and one from deep (10'+)	Archive
3-20	All remaining soil from 6 adjacent borings will be consolidated	

NOTE: Do not combine native material and fill

5/23/14

CH2MHILL	PROJECT NUMBER	Decision Unit DU2	Boring ID B-5

SOIL BORING LOG

PROJECT : **HART** LOCATION : **Banana Patch**

LAT/LONG: DRILLING CONTRACTOR : **Geotek**

DRILLING METHOD AND EQUIPMENT USED : DPS Truck Mounted Rig

WATER LEVELS : START : 0900 END : 0930 LOGGER : VM

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	#/TYPE	PID READING (ppm)	SOIL CORE DESCRIPTION: SOIL TYPE, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: Sample Collection Information Sample Sub-Unit Decision
0–5	0–5	70%	FILL	0	FILL Rd br SILT, loose, Fissile, w/sand & organics FILL: Red-tan SILT, w/sand and gravel throughout, with Concrete rubble, dry. Fissile.	Sample 0-0.5 Sample 0.5-3
5–10	5–10	50%		0		
10–15	10–15	100%		0	Rd br SILT, dry - Trace	Sample 13.5-16.5
15–20	15–20	60%	NATIVE	0	Sand grading into Dk br clay w/organics Damp @ 19'	
20–25					EOB @ 20	

CH2MHILL

PROJECT NUMBER	Decision Unit DU2	Boring ID B-15

FLOW CHART FOR SAMPLING RATIONALE

PROJECT : HART

LOCATION : Banana Patch

LAT/LONG:

DRILLING CONTRACTOR : Geotek

UTILITY CLRNCE CONFRMD: YES NO

DRILLING METHOD AND EQUIPMENT USED : DPS HAS TP

Geophysical anomalies/ Fill Exist?

	DU1	DU2	DU3	DU4	DU5	DU6
Yes	B	B	B	B	C	C
No	A	B	B	A	C	C

			Sample	Analysis
Did you see NAPL/Char/Ashes?	YES	NO	IF YES: Collect into 8-oz jar	Dioxins, Furans
Replicate collected here?	YES	NO	IF YES: Sample ID's:	
			Sample ID's:	

A - Collect only surface samples - do not perform intrusive work

B - Perform intrusive investigation.

Each boring to be divided into 3 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 0.5' bgs	0 - 0.5	Collect 10 plugs into ziplock	TPH-g/d/o, PAH, RCRA8, Pest/Herb, PCBs
- 0.5 to 3' bgs	0.5-3	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 8-10' bgs OR 3' interval below bottom of fill (native)	13.5-16	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 10' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

C - Perform intrusive investigation

Each boring to be divided into 4 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 5' bgs	X	Collect 10 plugs into ziplock	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 5 to 10' bgs	X	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 10' bgs to 15' bgs	X	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 15 to 28' bgs (native)		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 18' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

POST SAMPLING:

Soil remaining from each core will be kepts and stored.

	ACTUAL SUs)	Sample	Analysis
One archive for shallow (0-10)	0-3	Collect 1 VOA from shallow (0-10' bgs) and one from deep (10'+)	Archive
One archive for deep (10'+)	3-20	All remaining soil from 6 adjacent borings will be consolidated	

NOTE: Do not combine native material and fill

5/23/14

CH2MHILL	PROJECT NUMBER	Decision Unit D2	Boring ID B6

SOIL BORING LOG

PROJECT : **HART** LOCATION : **Banana Patch**

LAT/LONG: DRILLING CONTRACTOR : **Geotek**

DRILLING METHOD AND EQUIPMENT USED : Track Rig

WATER LEVELS : START : END : LOGGER : VM

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	#/TYPE	PID READING (ppm)	SOIL CORE DESCRIPTION: SOIL TYPE, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: Sample Collection Information, Sample Sub-Unit Decision
0–5	0–5	90%	FILL		FILL: Rd SILT loose, dry, FISSILE w/ some F sand Trace organics	Sample 0-0.5 Sample 0.5-3
5–10	5–10	90%	FILL		FILL: Br SILT w/ Coralline gravel and concrete rubble throughout. wood fragment @ 13'	
10–15	10–15	70%	FILL			
15–20	15–20	40%	NATIVE		NATIVE: Br SILT w/ Little sand orange mottles, wet Native: Dk br CLAY damp, med-plastic wet seam @ 19.5	Sample 15-18
20–25						

CH2MHILL

PROJECT NUMBER	Decision Unit DU2	Boring ID B-16

FLOW CHART FOR SAMPLING RATIONALE

PROJECT : HART

LOCATION : Banana Patch

LAT/LONG:

DRILLING CONTRACTOR : Geotek

UTILITY CLRNCE CONFRMD: YES NO

DRILLING METHOD AND EQUIPMENT USED : DPS HAS TP

Geophysical anomalies/ Fill Exist?

	DU1	DU2	DU3	DU4	DU5	DU6
Yes	B	B	B	B	C	C
No	A	B	B	A	C	C

Did you see NAPL/Char/Ashes? YES NO IF YES:

Sample	Analysis
Collect into 8-oz jar	Dioxins, Furans

Replicate collected here? YES NO IF YES:

Sample ID's:

Sample ID's:

A - Collect only surface samples - do not perform intrusive work

B - Perform intrusive investigation.

Each boring to be divided into 3 vertical SUs

- 0 to 0.5' bgs
- 0.5 to 3' bgs
- 8-10' bgs OR 3' interval below bottom of fill (native)

ACTUAL SUs)	Sample	Analysis
0-0.5	Collect 10 plugs into ziplock	TPH-g/d/o, PAH, RCRA8, Pest/Herb, PCBs
0.5-3	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
15-18	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 10' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

C - Perform intrusive investigation

Each boring to be divided into 4 vertical SUs

- 0 to 5' bgs
- 5 to 10' bgs
- 10' bgs to 15' bgs
- 15 to 28' bgs (native)

ACTUAL SUs)	Sample	Analysis
	Collect 10 plugs into ziplock	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 18' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

POST SAMPLING:

Soil remaining from each core will be kepts and stored.

One archive for shallow (0-10)

One archive for deep (10'+)

ACTUAL SUs)	Sample	Analysis
0-3	Collect 1 VOA from shallow (0-10' bgs) and one from deep (10'+)	Archive
3-20	All remaining soil from 6 adjacent borings will be consolidated	

NOTE: Do not combine native material and fill

5/22/14

CH2MHILL

PROJECT NUMBER	Decision Unit 2	Boring ID B7

SOIL BORING LOG

PROJECT : HART LOCATION : Banana Patch

LAT/LONG: DRILLING CONTRACTOR : Geotek

DRILLING METHOD AND EQUIPMENT USED :

WATER LEVELS : START : NR END : NR LOGGER : BR

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	#/TYPE	PID READING (ppm)	SOIL CORE DESCRIPTION: SOIL TYPE, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: Sample Collection Information Sample Sub-Unit Decision
0–5		90%	FILL		Silty clay (CL) w/trace gravel. Reddish brown. Dry. Stiff, loose. Nonplastic. Concrete fragments @ 2'. FILL	0-0.5' 0.5-3.0
5–10		95%			Same as 0-5'. concrete @ 7'. FILL	
10–15		30%			same as 0-5'. concrete at 13'. 2" silty clay at 15'. Fill ends @ 15'.	15-18'
15–20		80%	CL		Silty clay (CL) with trace sand. Brown. Moist, very moist @ 17'. Med. soft. low to med. plasticity.	
20–25					EOB @ 20'	

CH2MHILL

PROJECT NUMBER	Decision Unit	Boring ID

FLOW CHART FOR SAMPLING RATIONALE

PROJECT : HART **LOCATION :** Banana Patch

LAT/LONG: **DRILLING CONTRACTOR :** Geotek

UTILITY CLRNCE CONFRMD: YES NO

DRILLING METHOD AND EQUIPMENT USED : DPS HAS TP

Geophysical anomalies/ Fill Exist?

	DU1	DU2	DU3	DU4	DU5	DU6
Yes	B	B	B	B	C	C
No	A	B	B	A	C	C

			Sample	Analysis
Did you see NAPL/Char/Ashes?	YES	NO	IF YES: Collect into 8-oz jar	Dioxins, Furans
Replicate collected here?	YES	NO	IF YES: Sample ID's:	
			Sample ID's:	

A - Collect only surface samples - do not perform intrusive work

B - Perform intrusive investigation.

Each boring to be divided into 3 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 0.5' bgs	0-0.5	Collect 10 plugs into ziplock	TPH-g/d/o, PAH, RCRA8, Pest/Herb, PCBs
- 0.5 to 3' bgs	0.5-3	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 8-10' bgs OR 3' interval below bottom of fill (native)	~~13~~ 15-18	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 10' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

C - Perform intrusive investigation

Each boring to be divided into 4 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 5' bgs		Collect 10 plugs into ziplock	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 5 to 10' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 10' bgs to 15' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 15 to 28' bgs (native)		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 18' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

POST SAMPLING:

Soil remaining from each core will be kepts and stored.

	ACTUAL SUs)	Sample	Analysis
One archive for shallow (0-10)	0-3	Collect 1 VOA from shallow (0-10' bgs) and one from deep (10'+)	Archive
One archive for deep (10'+)	3-20	All remaining soil from 6 adjacent borings will be consolidated	

NOTE: Do not combine native material and fill

CH2MHILL

PROJECT NUMBER	Decision Unit 2	Boring ID B8

SOIL BORING LOG

PROJECT : **HART** LOCATION : **Banana Patch**

LAT/LONG: DRILLING CONTRACTOR : **Geotek**

DRILLING METHOD AND EQUIPMENT USED :

WATER LEVELS : START : 1545 END : 1600 LOGGER : BR

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	#/TYPE	PID READING (ppm)	SOIL CORE DESCRIPTION: SOIL TYPE, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: Sample Collection Information Sample Sub-Unit Decision
0–5		95%		0	Silty clay (CL) w/some gravel. Reddish brown to brown. Dry. Stiff, loose. Concrete @ 1' and 3'. Coral gravel @ 4.5'. FILL	0-0.5' 0.5-3.0'
5–10		90%	FILL	0	Same as 0-5'. Trash & glass debris @ 8'. Asphalt material @ 10'. FILL	
10–15		60%	GM	0	Asphalt material 10-12'. Silty clay (CL) @ 12'. 6" thick. 6" crushed concrete @ 12.5'. ~~some~~ Silty gravel (GM) below. FILL	
15–20		100%	CL	0	Silty gravel (GM) with some sand, dark brown. Saturated. Silty clay (CL) @ 16'. Brown. very moist to moist. Med. stiff low plasticity.	15-18'
20–25					EOB @ 20'	

CH2MHILL

PROJECT NUMBER	Decision Unit	Boring ID

FLOW CHART FOR SAMPLING RATIONALE

PROJECT : HART　　　**LOCATION :** Banana Patch

LAT/LONG:　　　**DRILLING CONTRACTOR :** Geotek

UTILITY CLRNCE CONFRMD: YES NO

DRILLING METHOD AND EQUIPMENT USED : DPS HAS TP

Geophysical anomalies/ Fill Exist?

	DU1	DU2	DU3	DU4	DU5	DU6
Yes	B	B	B	B	C	C
No	A	B	B	A	C	C

Sample	Analysis
Collect into 8-oz jar	Dioxins, Furans

Did you see NAPL/Char/Ashes? YES NO IF YES:

Replicate collected here? YES NO IF YES:

Sample ID's:	
Sample ID's:	

A - Collect only surface samples - do not perform intrusive work

B - Perform intrusive investigation.

Each boring to be divided into 3 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 0.5' bgs	0-0.5	Collect 10 plugs into ziplock	TPH-g/d/o, PAH, RCRA8, Pest/Herb, PCBs
- 0.5 to 3' bgs	0.5-3	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 8-10' bgs OR 3' interval below bottom of fill (native)	15-18	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 10' bgs

2 - If fill exists, complete boring 3' below bottom of fill.

- Do not drill deeper than water table (exp. 15-18' bgs)

C - Perform intrusive investigation

Each boring to be divided into 4 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 5' bgs		Collect 10 plugs into ziplock	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 5 to 10' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 10' bgs to 15' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 15 to 28' bgs (native)		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 18' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

POST SAMPLING:

Soil remaining from each core will be kepts and stored.

	ACTUAL SUs)	Sample	Analysis
One archive for shallow (0-10)	0-3	Collect 1 VOA from shallow (0-10' bgs) and one from deep (10'+)	Archive
One archive for deep (10'+)	3-20	All remaining soil from 6 adjacent borings will be consolidated	

NOTE: Do not combine native material and fill

CH2MHILL

PROJECT NUMBER	Decision Unit	Boring ID
	2	B9

SOIL BORING LOG

PROJECT : HART LOCATION : Banana Patch

LAT/LONG: DRILLING CONTRACTOR : Geotek

DRILLING METHOD AND EQUIPMENT USED :

WATER LEVELS : START : 1620 END : 1635 LOGGER : BBR

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	#/TYPE	PID READING (ppm)	SOIL CORE DESCRIPTION: SOIL TYPE, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: Sample Collection Information Sample Sub-Unit Decision
5		90%		0	Silty clay (CL) w/ trace gravel. Brown to reddish brwn. Dry. Stiff, loose. Basalt & coral gravel. FILL	0-0.5' 0.5-3.0'
10		90%	FILL	0	Same as 0-5'. Gravel-rich 6-7'. Silty clay w/trace gravel 7-8'. Silty gravel (GM) 8-10'. FILL.	
15		60%		0	Same as 0-5'. Silty clay (CL) @ ~~13~~ 13'. Brwn. Moist. Med. stiff. Low to med. plasticity. Fill ends @ ~~13~~ 13'	12-15'
20		60%	CL	0	Same as 18-20'. Very moist & med. soft @ 18'. EOB @ 20'	
25						

CH2MHILL

PROJECT NUMBER	Decision Unit	Boring ID

FLOW CHART FOR SAMPLING RATIONALE

PROJECT : HART **LOCATION :** Banana Patch

LAT/LONG: **DRILLING CONTRACTOR :** Geotek

UTILITY CLRNCE CONFRMD: YES NO

DRILLING METHOD AND EQUIPMENT USED : DPS HAS TP

Geophysical anomalies/ Fill Exist?

	DU1	DU2	DU3	DU4	DU5	DU6
Yes	B	B	B	B	C	C
No	A	B	B	A	C	C

				Sample	Analysis
Did you see NAPL/Char/Ashes?	YES	NO	IF YES:	Collect into 8-oz jar	Dioxins, Furans
Replicate collected here?	YES	NO	IF YES:	Sample ID's:	
				Sample ID's:	

A - Collect only surface samples - do not perform intrusive work

B - Perform intrusive investigation.

Each boring to be divided into 3 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 0.5' bgs		Collect 10 plugs into ziplock	TPH-g/d/o, PAH, RCRA8, Pest/Herb, PCBs
- 0.5 to 3' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 8-10' bgs OR 3' interval below bottom of fill (native)		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 10' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

C - Perform intrusive investigation

Each boring to be divided into 4 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 5' bgs		Collect 10 plugs into ziplock	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 5 to 10' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 10' bgs to 15' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 15 to 28' bgs (native)		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 18' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

POST SAMPLING:

Soil remaining from each core will be kepts and stored.

	ACTUAL SUs)	Sample	Analysis
One archive for shallow (0-10)		Collect 1 VOA from shallow (0-10' bgs) and one from deep (10'+)	Archive
One archive for deep (10'+)		All remaining soil from 6 adjacent borings will be consolidated	

NOTE: Do not combine native material and fill

5/23/14

CH2MHILL

PROJECT NUMBER	Decision Unit	Boring ID
	DU02	310

SOIL BORING LOG

PROJECT : HART

LOCATION : Banana Patch

LAT/LONG:

DRILLING CONTRACTOR : Geotek

DRILLING METHOD AND EQUIPMENT USED : DPS Truck Rig

WATER LEVELS :

START : 0830

END : 0850

LOGGER : VM

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	#/TYPE	PID READING (ppm)	SOIL CORE DESCRIPTION: SOIL TYPE, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: Sample Collection Information, Sample Sub-Unit Decision
0–5		80%	FILL	0	FILL: Rd-br SILT w/coraline gravel throughout, concrete rubble, pea gravel (basalt), w/sand. Dry. Fissile	Sample 0-0.5 Sample 0.5-3
5–10		75%	FILL	0		
10–15		60%	FILL / NATIVE	0	NATIVE: Br siltyclay Trace sand. Damp. Med soft, semi plastic. orange mottles 12.5-14	Sample @ 12.5-15' bgs
15–20		75%	NATIVE	0	SANDY SILTY CLAY - wet Br. seam	
20–25					EOB @ 20'	

CH2MHILL

PROJECT NUMBER	Decision Unit DU2	Boring ID B-10

FLOW CHART FOR SAMPLING RATIONALE

PROJECT : HART
LOCATION : Banana Patch
LAT/LONG:
DRILLING CONTRACTOR : Geotek
UTILITY CLRNCE CONFRMD: YES NO
DRILLING METHOD AND EQUIPMENT USED : DPS HAS TP

Geophysical anomalies/ Fill Exist?

	DU1	DU2	DU3	DU4	DU5	DU6
Yes	B	B	B	B	C	C
No	A	B	B	A	C	C

Sample	Analysis
Collect into 8-oz jar	Dioxins, Furans

Did you see NAPL/Char/Ashes? YES NO IF YES:

Replicate collected here? YES NO IF YES:

Sample ID's:

Sample ID's:

A - Collect only surface samples - do not perform intrusive work

B - Perform intrusive investigation.

Each boring to be divided into 3 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 0.5' bgs	0-0.5	Collect 10 plugs into ziplock	TPH-g/d/o, PAH, RCRA8, Pest/Herb, PCBs
- 0.5 to 3' bgs	0.5-3	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 8-10' bgs OR 3' interval below bottom of fill (native)	12.5-15	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 10' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

C - Perform intrusive investigation

Each boring to be divided into 4 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 5' bgs		Collect 10 plugs into ziplock	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 5 to 10' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 10' bgs to 15' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 15 to 28' bgs (native)		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 18' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

POST SAMPLING:

Soil remaining from each core will be kepts and stored.

	ACTUAL SUs)	Sample	Analysis
One archive for shallow (0-10)	0-3	Collect 1 VOA from shallow (0-10' bgs) and one from deep (10'+)	Archive
One archive for deep (10'+)	3-20	All remaining soil from 6 adjacent borings will be consolidated	

NOTE: Do not combine native material and fill

5/23/14

CH2MHILL

PROJECT NUMBER	Decision Unit	Boring ID
		B-11

SOIL BORING LOG

PROJECT : HART LOCATION : Banana Patch

LAT/LONG: DRILLING CONTRACTOR : Geotek

DRILLING METHOD AND EQUIPMENT USED : Truck Mounted DPS

WATER LEVELS : START : 0900 END : 0920 LOGGER : VM

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	#/TYPE	PID READING (ppm)	SOIL CORE DESCRIPTION: SOIL TYPE, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: Sample Collection Information, Sample Sub-Unit Decision
0–5	50%		FILL	0	FILL: Rd SILT. DRY LOOSE FILL. Br SILT w/ Coraline gravel, concrete rubble,	Sample 0-0.5' bgs Sample 0.5-3' bgs
5–10	60%			0		
10–15	75%		~~FILL~~ NATIVE	0	FILL: Rd br SILT mottled w/grey, w some C sand Dry, very stiff. Fissile NATIVE: Br SILTY CLAY Damp, med firm.	Sample ~~[illegible]~~ 11-14' bgs
15–20	30%		NATIVE	0		
20–25					EOB @ 20'	

CH2MHILL

PROJECT NUMBER	Decision Unit DU2	Boring ID B-11

FLOW CHART FOR SAMPLING RATIONALE

PROJECT : HART
LOCATION : Banana Patch
LAT/LONG:
DRILLING CONTRACTOR : Geotek
UTILITY CLRNCE CONFRMD: YES NO
DRILLING METHOD AND EQUIPMENT USED : DPS HAS TP

Geophysical anomalies/ Fill Exist?

	DU1	DU2	DU3	DU4	DU5	DU6
Yes	B	B	B	B	C	C
No	A	B	B	A	C	C

Sample	Analysis
Collect into 8-oz jar	Dioxins, Furans

Did you see NAPL/Char/Ashes? YES NO IF YES: Sample ID's:

Replicate collected here? YES NO IF YES: Sample ID's:

A - Collect only surface samples - do not perform intrusive work

B - Perform intrusive investigation.

Each boring to be divided into 3 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 0.5' bgs	0-0.5	Collect 10 plugs into ziplock	TPH-g/d/o, PAH, RCRA8, Pest/Herb, PCBs
- 0.5 to 3' bgs	0.5-3	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 8-10' bgs OR 3' interval below bottom of fill (native)	11-14	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 10' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

C - Perform intrusive investigation

Each boring to be divided into 4 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 5' bgs	X	Collect 10 plugs into ziplock	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 5 to 10' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 10' bgs to 15' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 15 to 28' bgs (native)		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 18' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

POST SAMPLING:

Soil remaining from each core will be kepts and stored.

	ACTUAL SUs)	Sample	Analysis
One archive for shallow (0-10)	0-3	Collect 1 VOA from shallow (0-10' bgs) and one from deep (10'+)	Archive
One archive for deep (10'+)	3-20	All remaining soil from 6 adjacent borings will be consolidated	

NOTE: Do not combine native material and fill

5/23/14

CH2MHILL

PROJECT NUMBER	Decision Unit	Boring ID
	DU2	B-12

SOIL BORING LOG

PROJECT : HART

LOCATION : Banana Patch

LAT/LONG:

DRILLING CONTRACTOR : Geotek

DRILLING METHOD AND EQUIPMENT USED : Truck-Mounted Rig DPS

WATER LEVELS :

START : 0930

END : 0940

LOGGER : VM

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	#/TYPE	PID READING (ppm)	SOIL CORE DESCRIPTION: SOIL TYPE, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: Sample Collection Information, Sample Sub-Unit Decision
0–5		70%	FILL	0	FILL: Rd br SILT w/gravel loose, dry FILL Rd br SILT w/coral gravel and concrete rubble, and sand throughout. Dry, Fissile	Sample 0-0.5 Sample 0.5-3
5–10		60%		0		
10–15		30%		0		
15–20		30%	NATIVE	0	Native: Damp br SANDY Silt, Or. mottles 14.9-16 Grades to Dk br dry-damp SILTY CLAY	Sample 15-20' bgs ~~(adequate recovery)~~ (only 3' recovery)
20–25					EOB @ 20' bgs	

CH2MHILL

PROJECT NUMBER	Decision Unit DU2	Boring ID B-13

FLOW CHART FOR SAMPLING RATIONALE

PROJECT : HART

LOCATION : Banana Patch

LAT/LONG:

DRILLING CONTRACTOR : Geotek

UTILITY CLRNCE CONFRMD: YES NO

DRILLING METHOD AND EQUIPMENT USED : DPS HAS TP

Geophysical anomalies/ Fill Exist?

	DU1	DU2	DU3	DU4	DU5	DU6
Yes	B	B	B	B	C	C
No	A	B	B	A	C	C

Sample	Analysis
~~Collect into 8-oz jar~~	Dioxins, Furans

Did you see NAPL/Char/Ashes? YES NO IF YES: ~~Sample ID's:~~

Replicate collected here? YES NO IF YES: Sample ID's:

A - Collect only surface samples - do not perform intrusive work

B - Perform intrusive investigation.

Each boring to be divided into 3 vertical SUs

- 0 to 0.5' bgs
- 0.5 to 3' bgs
- 8-10' bgs OR 3' interval below bottom of fill (native)

ACTUAL SUs)	Sample	Analysis
0-0.5	Collect 10 plugs into ziplock	TPH-g/d/o, PAH, RCRA8, Pest/Herb, PCBs
0.5-3	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
15-20	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 10' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

C - Perform intrusive investigation

Each boring to be divided into 4 vertical SUs

- 0 to 5' bgs
- 5 to 10' bgs
- 10' bgs to 15' bgs
- 15 to 28' bgs (native)

ACTUAL SUs)	Sample	Analysis
	Collect 10 plugs into ziplock	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 18' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

POST SAMPLING:

Soil remaining from each core will be kepts and stored.

One archive for shallow (0-10)

One archive for deep (10'+)

ACTUAL SUs)	Sample	Analysis
0-3	Collect 1 VOA from shallow (0-10' bgs) and one from deep (10'+)	Archive
3-20	All remaining soil from 6 adjacent borings will be consolidated	

NOTE: Do not combine native material and fill

5/23/14

CH2MHILL

PROJECT NUMBER	Decision Unit	Boring ID
	D2	B-13

SOIL BORING LOG

PROJECT : **HART** LOCATION : **Banana Patch**

LAT/LONG: DRILLING CONTRACTOR : **Geotek**

DRILLING METHOD AND EQUIPMENT USED : Truck Rig

WATER LEVELS : START : 0950 END : 1000 LOGGER : VM

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	#/TYPE	PID READING (ppm)	SOIL CORE DESCRIPTION: SOIL TYPE, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: Sample Collection Information, Sample Sub-Unit Decision
0–5	60%		FILL	0	FILL: Rd SILT, w/organics dry, FISSILE FILL: Br SILT w/gravel Coralline & concrete rubble, and sand, throughout dry	Sample 0-0.5
5–10	60%			0		
10–15	50%			0	NATIVE: Rd br SILT w SAND, dry, stiff,	Sample 13-16' bgs
15–20	60%		NATIVE	0	grades to Dk brown SANDY SILT, to Dk br Clay @18' wet @ 16-18' in Sandy Seam	
20–25					EOB @ 20	

Note PID every 6"

CH2MHILL

PROJECT NUMBER	Decision Unit DU2	Boring ID B-13

FLOW CHART FOR SAMPLING RATIONALE

PROJECT : HART **LOCATION :** Banana Patch

LAT/LONG: **DRILLING CONTRACTOR :** Geotek

UTILITY CLRNCE CONFRMD: YES NO

DRILLING METHOD AND EQUIPMENT USED : DPS HAS TP

Geophysical anomalies/ Fill Exist?

	DU1	DU2	DU3	DU4	DU5	DU6
Yes	B	B	B	B	C	C
No	A	B	B	A	C	C

Sample	Analysis
Collect into 8-oz jar	Dioxins, Furans

Did you see NAPL/Char/Ashes? YES NO IF YES: Sample ID's:

Replicate collected here? YES NO IF YES: Sample ID's:

A - Collect only surface samples - do not perform intrusive work

B - Perform intrusive investigation.

Each boring to be divided into 3 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 0.5' bgs	0-0.5	Collect 10 plugs into ziplock	TPH-g/d/o, PAH, RCRA8, Pest/Herb, PCBs
- 0.5 to 3' bgs	0.5-3	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 8-10' bgs OR 3' interval below bottom of fill (native)	13-16	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 10' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

C - Perform intrusive investigation

Each boring to be divided into 4 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 5' bgs		Collect 10 plugs into ziplock	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 5 to 10' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 10' bgs to 15' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 15 to 28' bgs (native)		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 18' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

POST SAMPLING:

Soil remaining from each core will be kepts and stored.

	ACTUAL SUs)	Sample	Analysis
One archive for shallow (0-10)	0-3	Collect 1 VOA from shallow (0-10' bgs) and one from deep (10'+)	Archive
One archive for deep (10'+)	3-20	All remaining soil from 6 adjacent borings will be consolidated	

NOTE: Do not combine native material and fill

5/23/14

CH2MHILL

PROJECT NUMBER	Decision Unit	Boring ID
	D2	B-14

SOIL BORING LOG

PROJECT : **HART** LOCATION : **Banana Patch**

LAT/LONG: DRILLING CONTRACTOR : **Geotek**

DRILLING METHOD AND EQUIPMENT USED : Track Rig

WATER LEVELS : START : END : LOGGER : VM

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	#/TYPE	PID READING (ppm)	SOIL CORE DESCRIPTION: SOIL TYPE, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: Sample Collection Information Sample Sub-Unit Decision
0–5		60%	FILL	0	Rd br SILT FILL: dry, fissile, some gravel	Sample 0-0.5' Sample 0.5-3' bgs
5–10		70%		0	FILL: Br SILT w/ Coralline gravel and concrete rubble and sand throughout. Dry.	
10–15		80%		0	Native: Br SILT w/	Sample 14-17' bgs
15–20		60	NATIVE	0	Some sand, dry wet @ 17' bgs. in Sandy Silty seam. DK br CLAY Damp	
20–25					EOB @ 20'	

Note PID every 6"

CH2MHILL

PROJECT NUMBER	Decision Unit DU2	Boring ID B-14

FLOW CHART FOR SAMPLING RATIONALE

PROJECT : HART
LOCATION : Banana Patch
LAT/LONG:
DRILLING CONTRACTOR : Geotek
UTILITY CLRNCE CONFRMD: YES NO
DRILLING METHOD AND EQUIPMENT USED : DPS HAS TP

Geophysical anomalies/ Fill Exist?

	DU1	DU2	DU3	DU4	DU5	DU6
Yes	B	B	B	B	C	C
No	A	B	B	A	C	C

Did you see NAPL/Char/Ashes? YES NO IF YES:

Sample	Analysis
Collect into 8-oz jar	Dioxins, Furans

Replicate collected here? YES NO IF YES:

Sample ID's:

Sample ID's:

A - Collect only surface samples - do not perform intrusive work

B - Perform intrusive investigation.

Each boring to be divided into 3 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 0.5' bgs	0-0.5	Collect 10 plugs into ziplock	TPH-g/d/o, PAH, RCRA8, Pest/Herb, PCBs
- 0.5 to 3' bgs	0.5-3	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 8-10' bgs OR 3' interval below bottom of fill (native)	14-17	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 10' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

C - Perform intrusive investigation

Each boring to be divided into 4 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 5' bgs		Collect 10 plugs into ziplock	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 5 to 10' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 10' bgs to 15' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 15 to 28' bgs (native)		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 18' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

POST SAMPLING:

Soil remaining from each core will be kepts and stored.

	ACTUAL SUs)	Sample	Analysis
One archive for shallow (0-10)	0-3	Collect 1 VOA from shallow (0-10' bgs) and one from deep (10'+)	Archive
One archive for deep (10'+)	3-20	All remaining soil from 6 adjacent borings will be consolidated	

NOTE: Do not combine native material and fill

5/23/14

CH2MHILL

PROJECT NUMBER	Decision Unit	Boring ID
	DU2	B15

SOIL BORING LOG

PROJECT : **HART** LOCATION : **Banana Patch**

LAT/LONG: DRILLING CONTRACTOR : **Geotek**

DRILLING METHOD AND EQUIPMENT USED : Truck Rig

WATER LEVELS : START : 1015 END : 1030 LOGGER : VM

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	#/TYPE	PID READING (ppm)	SOIL CORE DESCRIPTION: SOIL TYPE, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: Sample Collection Information Sample Sub-Unit Decision
0–5	0–5	95%	FILL	0	FILL: Rd SILT w/sand. Dry FILL: Br SILT w/coralline gravel and concrete rubble, wood fragments, sand throughout	sample 0-0.5 sample 0.5-3
5–10	5–10	70%		0		
10–15	10–15	70%		0	NATIVE: Br SILT ~~[illegible]~~, damp med plastic	sample 12.5-15.5'
15–20	15–20	60%	NATIVE	0	SANDY SILT from 17-18.5 wet in seam DK br clay, damp.	
20–25					EOB@20' bgs	

Note PIP every 6"

CH2MHILL

PROJECT NUMBER	Decision Unit DU2	Boring ID B 15

FLOW CHART FOR SAMPLING RATIONALE

PROJECT : HART

LOCATION : Banana Patch

LAT/LONG:

DRILLING CONTRACTOR : Geotek

UTILITY CLRNCE CONFRMD: YES NO

DRILLING METHOD AND EQUIPMENT USED : DPS HAS TP

Geophysical anomalies/ Fill Exist?

	DU1	DU2	DU3	DU4	DU5	DU6
Yes	B	B	B	B	C	C
No	A	B	B	A	C	C

Did you see NAPL/Char/Ashes? YES NO IF YES:

Sample	Analysis
~~Collect into 8 oz jar~~	Dioxins, Furans

Replicate collected here? YES NO IF YES:

~~Sample ID's:~~

Sample ID's:

A - Collect only surface samples - do not perform intrusive work

B - Perform intrusive investigation.

Each boring to be divided into 3 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 0.5' bgs	0-0.5	Collect 10 plugs into ziplock	TPH-g/d/o, PAH, RCRA8, Pest/Herb, PCBs
- 0.5 to 3' bgs	0.5-3	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 8-10' bgs OR 3' interval below bottom of fill (native)	12.5-15.5	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 10' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

C - Perform intrusive investigation

Each boring to be divided into 4 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 5' bgs		Collect 10 plugs into ziplock	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 5 to 10' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 10' bgs to 15' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 15 to 28' bgs (native)		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 18' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

POST SAMPLING:

Soil remaining from each core will be kepts and stored.

	ACTUAL SUs)	Sample	Analysis
One archive for shallow (0-10)	0-3	Collect 1 VOA from shallow (0-10' bgs) and one from deep (10'+)	Archive
One archive for deep (10'+)	3-20	All remaining soil from 6 adjacent borings will be consolidated	

NOTE: Do not combine native material and fill

5/23/14

CH2MHILL

PROJECT NUMBER	Decision Unit DU2	Boring ID B-16

SOIL BORING LOG

PROJECT : **HART** LOCATION : **Banana Patch**

LAT/LONG: DRILLING CONTRACTOR : **Geotek**

DRILLING METHOD AND EQUIPMENT USED : Truck DPS

WATER LEVELS : START : 1015 END : 1035 LOGGER : VM

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	#/TYPE	PID READING (ppm)	SOIL CORE DESCRIPTION: SOIL TYPE, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: Sample Collection Information Sample Sub-Unit Decision
0–5			FILL	0	FILL: MIX Rd ~~br~~ SILT and br SILT fills, w/ ~~gravel~~ (coraline gravel) and concrete rubble throughout core, dry.	sample 0-~~0~~.5 Sample 0.5-3
5–10				0		
10–15			NATIVE	0	Rd br SILT, trace sand, med soft. damp	Sample 11-14' bgs
15–20				0	Br SILT: organics, med soft, damp. Trace sand	
20–25					Dkbr SILTY SAND seam in shoe	EOB@20' bgs

Note: PID every 6"

CH2MHILL

PROJECT NUMBER	Decision Unit DU2	Boring ID B16

FLOW CHART FOR SAMPLING RATIONALE

PROJECT : HART

LOCATION : Banana Patch

LAT/LONG:

DRILLING CONTRACTOR : Geotek

UTILITY CLRNCE CONFRMD: YES NO

DRILLING METHOD AND EQUIPMENT USED : DPS HAS TP

Geophysical anomalies/ Fill Exist?	DU1	DU2	DU3	DU4	DU5	DU6
Yes	B	B	B	B	C	C
No	A	B	B	A	C	C

Sample	Analysis
Collect into 8-oz jar	Dioxins, Furans

Did you see NAPL/Char/Ashes? YES NO IF YES: Sample ID's:

Replicate collected here? YES NO IF YES: Sample ID's:

A - Collect only surface samples - do not perform intrusive work

B - Perform intrusive investigation.

Each boring to be divided into 3 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 0.5' bgs	0-0.5	Collect 10 plugs into ziplock	TPH-g/d/o, PAH, RCRA8, Pest/Herb, PCBs
- 0.5 to 3' bgs	0.5-3	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 8-10' bgs OR 3' interval below bottom of fill (native)	11-14	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 10' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

C - Perform intrusive investigation

Each boring to be divided into 4 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 5' bgs		Collect 10 plugs into ziplock	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 5 to 10' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 10' bgs to 15' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 15 to 28' bgs (native)		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 18' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

POST SAMPLING:

Soil remaining from each core will be kepts and stored.

	ACTUAL SUs)	Sample	Analysis
One archive for shallow (0-10)	0-3	Collect 1 VOA from shallow (0-10' bgs) and one from deep (10'+)	Archive
One archive for deep (10'+)	3-10	All remaining soil from 6 adjacent borings will be consolidated	

NOTE: Do not combine native material and fill

5/23/14

CH2MHILL

PROJECT NUMBER	Decision Unit	Boring ID
	DU 2	B-17

SOIL BORING LOG

PROJECT : HART | LOCATION : Banana Patch

LAT/LONG: | DRILLING CONTRACTOR : Geotek

DRILLING METHOD AND EQUIPMENT USED : Truck Rig

WATER LEVELS : START : 1045 END : 1100 LOGGER : VM

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	#/TYPE	PID READING (ppm)	SOIL CORE DESCRIPTION: SOIL TYPE, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: Sample Collection Information, Sample Sub-Unit Decision
0–5	0–5	60	FILL	0	FILL: Rd SILT, dry, fissile FILL: Br SILT, dry, fissile, w/coraline gravel and ~~sand~~ sand throughout	sample 0-0.5 sample 0.5-3
5–10	5–10	50		0		
10–15	10–15	60	NATIVE	0	NATIVE: Rd br sandy SILT w/orange mottles and tan mottles, w/sm gravel ~~(angular) throughout~~.	sample 12-15'
15–20	15–20	65	NATIVE	0	wet SAA @ 16-19.5 Dk br SILTY CLAY, plastic, damp	
20–25					EOB@ 20' bgs	

Note: PID every 6"

CH2MHILL

PROJECT NUMBER	Decision Unit DU2	Boring ID B-17

FLOW CHART FOR SAMPLING RATIONALE

PROJECT : HART

LOCATION : Banana Patch

LAT/LONG:

DRILLING CONTRACTOR : Geotek

UTILITY CLRNCE CONFRMD: YES NO

DRILLING METHOD AND EQUIPMENT USED : DPS HAS TP

Geophysical anomalies/ Fill Exist?

	DU1	DU2	DU3	DU4	DU5	DU6
Yes	B	B	B	B	C	C
No	A	B	B	A	C	C

Did you see NAPL/Char/Ashes? YES NO IF YES:

Sample	Analysis
Collect into 8-oz jar	Dioxins, Furans

Replicate collected here? YES NO IF YES:

Sample ID's:

Sample ID's:

A - Collect only surface samples - do not perform intrusive work

B - Perform intrusive investigation.

Each boring to be divided into 3 vertical SUs

- 0 to 0.5' bgs
- 0.5 to 3' bgs
- 8-10' bgs OR 3' interval below bottom of fill (native)

ACTUAL SUs)	Sample	Analysis
0-0.5	Collect 10 plugs into ziplock	TPH-g/d/o, PAH, RCRA8, Pest/Herb, PCBs
0.5-3	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
12-15	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 10' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

C - Perform intrusive investigation

Each boring to be divided into 4 vertical SUs

- 0 to 5' bgs
- 5 to 10' bgs
- 10' bgs to 15' bgs
- 15 to 28' bgs (native)

ACTUAL SUs)	Sample	Analysis
	Collect 10 plugs into ziplock	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 18' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

POST SAMPLING:

Soil remaining from each core will be kepts and stored.

One archive for shallow (0-10)

One archive for deep (10'+)

ACTUAL SUs)	Sample	Analysis
0-3	Collect 1 VOA from shallow (0-10' bgs) and one from deep (10'+)	Archive
3-20	All remaining soil from 6 adjacent borings will be consolidated	

NOTE: Do not combine native material and fill

5/23/14

CH2MHILL

PROJECT NUMBER	Decision Unit	Boring ID
	DU2	B-18

SOIL BORING LOG

PROJECT : **HART** LOCATION : **Banana Patch**

LAT/LONG: DRILLING CONTRACTOR : **Geotek**

DRILLING METHOD AND EQUIPMENT USED : Track Rig

WATER LEVELS : START : 1030 END : 1045 LOGGER : VM

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	#/TYPE	PID READING (ppm)	SOIL CORE DESCRIPTION: SOIL TYPE, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: Sample Collection Information Sample Sub-Unit Decision
0–5	~~80~~	90%	FILL	0	FILL: Rd SILT w/ pea gravel sea m, dry, loose, fissile FILL: Br SILT w/ Coralline	Sample 0-0.5 Sample 0.5-3
5–10		80%		0	gravel, concrete rubble, sand throughout. dry	
10–15		60%		0	Native: Red br SILT mottled to 19' w/ orange,	13.5 Sample 13.5-14.5
15–20		85%	NATIVE	0	Stiff, dry-damp. SANDY ~~SILT~~ SAP M sand, wet	
20–25					EOB @ 20'	

CH2MHILL

PROJECT NUMBER	Decision Unit DU2	Boring ID B-18

FLOW CHART FOR SAMPLING RATIONALE

PROJECT : HART

LOCATION : Banana Patch

LAT/LONG:

DRILLING CONTRACTOR : Geotek

UTILITY CLRNCE CONFRMD: YES NO

DRILLING METHOD AND EQUIPMENT USED : DPS HAS TP

Geophysical anomalies/ Fill Exist?

	DU1	DU2	DU3	DU4	DU5	DU6
Yes	B	B	B	B	C	C
No	A	B	B	A	C	C

Did you see NAPL/Char/Ashes? YES NO IF YES:

Sample	Analysis
~~Collect into 8-oz jar~~	Dioxins, Furans

Sample ID's:

Replicate collected here? YES NO IF YES: Sample ID's:

A - Collect only surface samples - do not perform intrusive work

B - Perform intrusive investigation.

Each boring to be divided into 3 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 0.5' bgs	0-0.5	Collect 10 plugs into ziplock	TPH-g/d/o, PAH, RCRA8, Pest/Herb, PCBs
- 0.5 to 3' bgs	0.5-3	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 8-10' bgs OR 3' interval below bottom of fill (native)	13.5-16.5	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 10' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

C - Perform intrusive investigation

Each boring to be divided into 4 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 5' bgs		Collect 10 plugs into ziplock	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 5 to 10' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 10' bgs to 15' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 15 to 28' bgs (native)		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 18' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

POST SAMPLING:

Soil remaining from each core will be kepts and stored.

	ACTUAL SUs)	Sample	Analysis
One archive for shallow (0-10)	0-3	Collect 1 VOA from shallow (0-10' bgs) and one from deep (10'+)	Archive
One archive for deep (10'+)	3-10	All remaining soil from 6 adjacent borings will be consolidated	

NOTE: Do not combine native material and fill

5/23/14

CH2MHILL	PROJECT NUMBER	Decision Unit DU2	Boring ID B-19

SOIL BORING LOG

PROJECT : HART LOCATION : Banana Patch

LAT/LONG: DRILLING CONTRACTOR : Geotek

DRILLING METHOD AND EQUIPMENT USED : Track Rig

WATER LEVELS : START : 1045 END : 1105 LOGGER : VM

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	#/TYPE	PID READING (ppm)	SOIL CORE DESCRIPTION: SOIL TYPE, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: Sample Collection Information Sample Sub-Unit Decision
0–5		75%	FILL	0	FILL: Rd SILT, loose, dry, FISSILE, some gravel throughout FILL: Br SILT and GRAVEL - coral and	Sample 0-0.5 sample 0.5-3
5–10		50%	FILL	0	construction pea gravel. dry. w/sand throughout.	
10–15		30%	NATIVE	0	NATIVE: Rd br SILT trace sand. Damp Br SILT, damp, trace sand	Sample 13-16' (poor recovery)
15–20		40%	NATIVE	0		
20–25					EOB@20' bgs	

PID sampled every 6"

CH2MHILL

PROJECT NUMBER	Decision Unit DU2	Boring ID B-19

FLOW CHART FOR SAMPLING RATIONALE

PROJECT : HART
LOCATION : Banana Patch
LAT/LONG:
DRILLING CONTRACTOR : Geotek
UTILITY CLRNCE CONFRMD: YES NO
DRILLING METHOD AND EQUIPMENT USED : DPS HAS TP

Geophysical anomalies/ Fill Exist?

	DU1	DU2	DU3	DU4	DU5	DU6
Yes	B	B	B	B	C	C
No	A	B	B	A	C	C

Sample	Analysis
~~Collect into 8-oz jar~~	Dioxins, Furans

Did you see NAPL/Char/Ashes? YES NO IF YES:
Replicate collected here? YES NO IF YES: Sample ID's:

Sample ID's:

A - Collect only surface samples - do not perform intrusive work

B - Perform intrusive investigation.

Each boring to be divided into 3 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 0.5' bgs	0-0.5	Collect 10 plugs into ziplock	TPH-g/d/o, PAH, RCRA8, Pest/Herb, PCBs
- 0.5 to 3' bgs	0.5-3	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 8-10' bgs OR 3' interval below bottom of fill (native)	13-16	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 10' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

C - Perform intrusive investigation

Each boring to be divided into 4 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 5' bgs		Collect 10 plugs into ziplock	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 5 to 10' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 10' bgs to 15' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 15 to 28' bgs (native)		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 18' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

POST SAMPLING:

Soil remaining from each core will be kepts and stored.

	ACTUAL SUs)	Sample	Analysis
One archive for shallow (0-10)	0-3	Collect 1 VOA from shallow (0-10' bgs) and one from deep (10'+)	Archive
One archive for deep (10'+)	3-20	All remaining soil from 6 adjacent borings will be consolidated	

NOTE: Do not combine native material and fill

5/23/14

CH2MHILL

PROJECT NUMBER	Decision Unit	Boring ID
	DU2	B-20

SOIL BORING LOG

PROJECT : HART LOCATION : Banana Patch

LAT/LONG: DRILLING CONTRACTOR : Geotek

DRILLING METHOD AND EQUIPMENT USED : Truck mounted rig

WATER LEVELS : START : 1100 END : 1115 LOGGER : VM

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	#/TYPE	PID READING (ppm)	SOIL CORE DESCRIPTION — SOIL TYPE, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS — Sample Collection Information Sample Sub-Unit Decision
0–5	0–5	80	FILL	0	FILL: Rd loose SILT, dry FILL: BR SILT w/coralline gravel and concrete rubble throughout, Dry, Fissile	Sample 0-0.5 Sample 0.5-3
5–10	5–10	60		0		
10–15	10–15	25		0	CLAY IN SHOE @ 15'	Poor recovery
15–20	15–20	55	NATIVE	0	NATIVE: SILTY CLAY, Dk br. Trace Sand, damp.	Sample 17-20' due to limited recovery
20–25					EOB @ 20' bgs	

PID sampled every 6'

CH2MHILL

PROJECT NUMBER	Decision Unit DU2	Boring ID B-20

FLOW CHART FOR SAMPLING RATIONALE

PROJECT : HART **LOCATION :** Banana Patch

LAT/LONG: **DRILLING CONTRACTOR :** Geotek

UTILITY CLRNCE CONFRMD: YES NO

DRILLING METHOD AND EQUIPMENT USED : DPS HAS TP

Geophysical anomalies/ Fill Exist?

	DU1	DU2	DU3	DU4	DU5	DU6
Yes	B	B	B	B	C	C
No	A	B	B	A	C	C

Sample	Analysis
Collect into 8-oz jar	Dioxins, Furans

Did you see NAPL/Char/Ashes? YES NO IF YES:

Replicate collected here? YES NO IF YES:

Sample ID's:
Sample ID's:

A - Collect only surface samples - do not perform intrusive work

B - Perform intrusive investigation.

Each boring to be divided into 3 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 0.5' bgs	0-0.5	Collect 10 plugs into ziplock	TPH-g/d/o, PAH, RCRA8, Pest/Herb, PCBs
- 0.5 to 3' bgs	0.5-3	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 8-10' bgs OR 3' interval below bottom of fill (native)	17-20	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 10' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

C - Perform intrusive investigation

Each boring to be divided into 4 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 5' bgs	X	Collect 10 plugs into ziplock	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 5 to 10' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 10' bgs to 15' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 15 to 28' bgs (native)		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 18' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

POST SAMPLING:

Soil remaining from each core will be kepts and stored.

	ACTUAL SUs)	Sample	Analysis
One archive for shallow (0-10)	0-3	Collect 1 VOA from shallow (0-10' bgs) and one from deep (10'+)	Archive
One archive for deep (10'+)	3-20	All remaining soil from 6 adjacent borings will be consolidated	

NOTE: Do not combine native material and fill

CH2MHILL

PROJECT NUMBER	Decision Unit	Boring ID
	DU2	B-21

SOIL BORING LOG

PROJECT : HART — LOCATION : Banana Patch

LAT/LONG: — DRILLING CONTRACTOR : Geotek

DRILLING METHOD AND EQUIPMENT USED : DPS track rig

WATER LEVELS : — START : 1130 — END : 1145 — LOGGER : VM

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	#/TYPE	PID READING (ppm)	SOIL CORE DESCRIPTION: SOIL TYPE, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: Sample Collection Information, Sample Sub-Unit Decision
0–5		70%	FILL		FILL: Pea gravel w/ grey silt, dry, loose FILL: Rd SILT, dry, stiff	Sample 0-0.5 Sample 0.5-3
5–10		5%				v. poor recovery
10–15		10%				Poor recovery
15–20		90%	NATIVE		Native: Red brown SILT dry, stiff, c sand throughout Native. Dk br SILTY clay damp. Trace c sand	Sample 15-18'
20–25					EOB @ 20	

CH2MHILL

PROJECT NUMBER	Decision Unit	Boring ID
	DU2	B-21

FLOW CHART FOR SAMPLING RATIONALE

PROJECT : HART　　　　**LOCATION :** Banana Patch

LAT/LONG:　　　　**DRILLING CONTRACTOR :** Geotek

UTILITY CLRNCE CONFRMD: YES　NO

DRILLING METHOD AND EQUIPMENT USED : DPS　HAS　TP

Geophysical anomalies/ Fill Exist?

	DU1	DU2	DU3	DU4	DU5	DU6
Yes	B	B	B	B	C	C
No	A	B	B	A	C	C

Did you see NAPL/Char/Ashes? YES　NO　IF YES:

Replicate collected here? YES　NO　IF YES:

Sample	Analysis
~~Collect into 8oz jar~~	Dioxins, Furans

Sample ID's:

Sample ID's:

A - Collect only surface samples - do not perform intrusive work

B - Perform intrusive investigation.

Each boring to be divided into 3 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 0.5' bgs	0-0.5	Collect 10 plugs into ziplock	TPH-g/d/o, PAH, RCRA8, Pest/Herb, PCBs
- 0.5 to 3' bgs	0.5-3	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 8-10' bgs OR 3' interval below bottom of fill (native)	15-18	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 10' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

C - Perform intrusive investigation

Each boring to be divided into 4 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 5' bgs	X	Collect 10 plugs into ziplock	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 5 to 10' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 10' bgs to 15' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 15 to 28' bgs (native)		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 18' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

POST SAMPLING:

Soil remaining from each core will be kepts and stored.

	ACTUAL SUs)	Sample	Analysis
One archive for shallow (0-10)	0-3	Collect 1 VOA from shallow (0-10' bgs) and one from deep (10'+)	Archive
One archive for deep (10'+)	3-20	All remaining soil from 6 adjacent borings will be consolidated	

NOTE: Do not combine native material and fill

5/23/14

CH2MHILL	PROJECT NUMBER	Decision Unit DU2	Boring ID B22

SOIL BORING LOG

PROJECT : HART LOCATION : Banana Patch

LAT/LONG: DRILLING CONTRACTOR : Geotek

DRILLING METHOD AND EQUIPMENT USED : Track Rig

WATER LEVELS : START : 1115 END : 1130 LOGGER : VM

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	#/TYPE	PID READING (ppm)	SOIL CORE DESCRIPTION: SOIL TYPE, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: Sample Collection Information Sample Sub-Unit Decision
0–5	0–5	70%	FILL	0	FILL: PEA gravel w/black silt, dry, loose FILL: Rd SILT w/garbage (foam @ 4.5', dry, w/gravel throughout	Sample 0-0.5 Sample 0.5-3
5–10	5–10	30%	FILL	0	FILL: br SILT w/ sand and sm gravel, dry.	
10–15	10–15	60%	FILL	0		
15–20	15–20	40%	NATIVE	0	NATIVE Dk br SILT, damp, med soft, med plastic.	poor recovery Sample 18-20' bgs
20–25					EOB@20	

PID sampled every 6"

CH2MHILL

PROJECT NUMBER	Decision Unit DU2	Boring ID B22

FLOW CHART FOR SAMPLING RATIONALE

PROJECT : HART

LOCATION : Banana Patch

LAT/LONG:

DRILLING CONTRACTOR : Geotek

UTILITY CLRNCE CONFRMD: YES NO

DRILLING METHOD AND EQUIPMENT USED : DPS HAS TP

Geophysical anomalies/ Fill Exist?

	DU1	DU2	DU3	DU4	DU5	DU6
Yes	B	B	B	B	C	C
No	A	B	B	A	C	C

Did you see NAPL/Char/Ashes? YES NO IF YES:

Sample	Analysis
Collect into 8-oz jar	Dioxins, Furans

Replicate collected here? YES NO IF YES:

Sample ID's:	
Sample ID's:	

A - Collect only surface samples - do not perform intrusive work

B - Perform intrusive investigation.

Each boring to be divided into 3 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 0.5' bgs	0-0.5	Collect 10 plugs into ziplock	TPH-g/d/o, PAH, RCRA8, Pest/Herb, PCBs
- 0.5 to 3' bgs	0.5-3	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 8-10' bgs OR 3' interval below bottom of fill (native)	18-20	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 10' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

C - Perform intrusive investigation

Each boring to be divided into 4 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 5' bgs		Collect 10 plugs into ziplock	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 5 to 10' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 10' bgs to 15' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 15 to 28' bgs (native)		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 18' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

POST SAMPLING:

Soil remaining from each core will be kepts and stored.

	ACTUAL SUs)	Sample	Analysis
One archive for shallow (0-10)	0-3	Collect 1 VOA from shallow (0-10' bgs) and one from deep (10'+)	Archive
One archive for deep (10'+)	3-20	All remaining soil from 6 adjacent borings will be consolidated	

NOTE: Do not combine native material and fill

5/23/14

CH2MHILL

PROJECT NUMBER	Decision Unit	Boring ID
	DU 2	B-23

SOIL BORING LOG

PROJECT : HART LOCATION : Banana Patch

LAT/LONG: DRILLING CONTRACTOR : Geotek

DRILLING METHOD AND EQUIPMENT USED : Truck Rig

WATER LEVELS : START : 1130 END : 1145 LOGGER : VM

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	#/TYPE	PID READING (ppm)	SOIL CORE DESCRIPTION SOIL TYPE, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS Sample Collection Information Sample Sub-Unit Decision
0–5		80%	FILL	0	FILL: Pea GRAVEL w/dk br-b) silt. Loose, dry FILL: Red SILT, dry, stiff w/ coraline gravel/sand throughout, Dry.	Sample 0-0.5 Sample 0.5-3
5–10		40%		0		
10–15		10%		0		Very Poor recover
15–20		100%	NATIVE	0	Native: Red-br clayey silt, stiff, med plastic. damp Wet: Sandy silty clay M sand. Clay: Dk br dk br damp, plastic	sample 16-17.5
20–25					EOB@20	

CH2MHILL

PROJECT NUMBER	Decision Unit DU2	Boring ID B-23

FLOW CHART FOR SAMPLING RATIONALE

PROJECT : HART

LOCATION : Banana Patch

LAT/LONG:

DRILLING CONTRACTOR : Geotek

UTILITY CLRNCE CONFRMD: YES NO

DRILLING METHOD AND EQUIPMENT USED : DPS HAS TP

Geophysical anomalies/ Fill Exist?

	DU1	DU2	DU3	DU4	DU5	DU6
Yes	B	B	B	B	C	C
No	A	B	B	A	C	C

Did you see NAPL/Char/Ashes? YES NO IF YES:

Sample	Analysis
~~Collect into 8-oz jar~~	Dioxins, Furans

Replicate collected here? YES NO IF YES:

Sample ID's:

Sample ID's:

A - Collect only surface samples - do not perform intrusive work

B - Perform intrusive investigation.

Each boring to be divided into 3 vertical SUs

- 0 to 0.5' bgs
- 0.5 to 3' bgs
- 8-10' bgs OR 3' interval below bottom of fill (native)

ACTUAL SUs)	Sample	Analysis
0-0.5	Collect 10 plugs into ziplock	TPH-g/d/o, PAH, RCRA8, Pest/Herb, PCBs
0.5-3	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
16-17.5	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 10' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

C - Perform intrusive investigation

Each boring to be divided into 4 vertical SUs

- 0 to 5' bgs
- 5 to 10' bgs
- 10' bgs to 15' bgs
- 15 to 28' bgs (native)

ACTUAL SUs)	Sample	Analysis
	Collect 10 plugs into ziplock	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 18' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

POST SAMPLING:

Soil remaining from each core will be kepts and stored.

One archive for shallow (0-10)

One archive for deep (10'+)

ACTUAL SUs)	Sample	Analysis
0-3	Collect 1 VOA from shallow (0-10' bgs) and one from deep (10'+)	Archive
3-10	All remaining soil from 6 adjacent borings will be consolidated	

NOTE: Do not combine native material and fill

5-23-14

CH2MHILL	PROJECT NUMBER	Decision Unit DU 2	Boring ID B-24

SOIL BORING LOG

PROJECT : HART — LOCATION : Banana Patch

LAT/LONG: — DRILLING CONTRACTOR : Geotek

DRILLING METHOD AND EQUIPMENT USED : Track Mounted Rig

WATER LEVELS : — START : 1625 — END : — LOGGER : VM

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	#/TYPE	PID READING (ppm)	SOIL CORE DESCRIPTION: SOIL TYPE, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: Sample Collection Information, Sample Sub-Unit Decision
0–5	0–5	60%	FILL	0	FILL: Rd SILT, dry, fissile w/coralline gravel throughout FILL: Pea gravel w/dk br SILT. Dry. loose	Sample 0-0.5 Sample 0.5-3
5–10	5–10	55%		0	—"— FILL: Red-br SILT, dry, very stiff, coralline gravel throughout. Asphat paper at 8-8.5'.	
10–15	10–15	50%		0		
15–20	15–20	60%	NATIVE	0	Native: Greybr SILTY CLAY Damp. med plastic. Med firm.	Sample 14-17' bgs
20–25					EOB@ 20' bgs	

Note PID every 6"

CH2MHILL

PROJECT NUMBER	Decision Unit DU2	Boring ID B-24

FLOW CHART FOR SAMPLING RATIONALE

PROJECT : HART **LOCATION :** Banana Patch

LAT/LONG: **DRILLING CONTRACTOR :** Geotek

UTILITY CLRNCE CONFRMD: YES NO

DRILLING METHOD AND EQUIPMENT USED : DPS HAS TP

Geophysical anomalies/ Fill Exist?

	DU1	DU2	DU3	DU4	DU5	DU6
Yes	B	B	B	B	C	C
No	A	B	B	A	C	C

Sample	Analysis
~~Collect into 8-oz jar~~	Dioxins, Furans

Did you see NAPL/Char/Ashes? YES NO IF YES: ~~Sample ID's:~~

Replicate collected here? YES NO IF YES: ~~Sample ID's:~~

A - Collect only surface samples - do not perform intrusive work

B - Perform intrusive investigation.

Each boring to be divided into 3 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 0.5' bgs	0-0.5	Collect 10 plugs into ziplock	TPH-g/d/o, PAH, RCRA8, Pest/Herb, PCBs
- 0.5 to 3' bgs	0.5-3	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 8-10' bgs OR 3' interval below bottom of fill (native)	14-17	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 10' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

C - Perform intrusive investigation

Each boring to be divided into 4 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 5' bgs		Collect 10 plugs into ziplock	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 5 to 10' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 10' bgs to 15' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 15 to 28' bgs (native)		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 18' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

POST SAMPLING:

Soil remaining from each core will be kepts and stored.

	ACTUAL SUs)	Sample	Analysis
One archive for shallow (0-10)	0-3	Collect 1 VOA from shallow (0-10' bgs) and one from deep (10'+)	Archive
One archive for deep (10'+)	3-20	All remaining soil from 6 adjacent borings will be consolidated	

NOTE: Do not combine native material and fill

5-23-14

CH2MHILL

PROJECT NUMBER	Decision Unit	Boring ID
	DU2	B-25

SOIL BORING LOG

PROJECT : HART
LOCATION : Banana Patch
LAT/LONG:
DRILLING CONTRACTOR : Geotek
DRILLING METHOD AND EQUIPMENT USED : Track Rig
WATER LEVELS :
START : 1610
END : 1625
LOGGER : VM

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	#/TYPE	PID READING (ppm)	SOIL CORE DESCRIPTION: SOIL TYPE, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: Sample Collection Information, Sample Sub-Unit Decision
0–5	0–5	80%	FILL	0	FILL: Red SILT, dry, FISSILE FILL: Br SILT w/Gravel and sand throughout. Dry FILL: Red SILT w/Tan & Orange mottles, c sand. Dry, w/ gravel throughout.	Sample - 0-0.5' Sample 0.5-3'
5–10	5–10	80%	FILL / Native	0	NATIVE: Br SILTY CLAY Dry. Med Plastic.	Sample 8-11' bgs
10–15	10–15	75%	Native	0	NATIVE: DK Br SILTY CLAY Wet, soft SAA@ 14	
15–20	15–20	30%	Native	0		
20–25					EOB@20	

Note: PID every 6"

CH2MHILL

PROJECT NUMBER	Decision Unit	Boring ID B-25

FLOW CHART FOR SAMPLING RATIONALE

PROJECT : HART **LOCATION :** Banana Patch

LAT/LONG: **DRILLING CONTRACTOR :** Geotek

UTILITY CLRNCE CONFRMD: YES NO

DRILLING METHOD AND EQUIPMENT USED : DPS HAS TP

Geophysical anomalies/ Fill Exist?

	DU1	DU2	DU3	DU4	DU5	DU6
Yes	B	B	B	B	C	C
No	A	B	B	A	C	C

Sample	Analysis
~~Collect into 8 oz jar~~	Dioxins, Furans

Did you see NAPL/Char/Ashes? YES NO IF YES:

Replicate collected here? YES NO IF YES:

~~Sample ID's:~~

~~Sample ID's:~~

A - Collect only surface samples - do not perform intrusive work

B - Perform intrusive investigation.

Each boring to be divided into 3 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 0.5' bgs	0-0.5	Collect 10 plugs into ziplock	TPH-g/d/o, PAH, RCRA8, Pest/Herb, PCBs
- 0.5 to 3' bgs	05-3	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 8-10' bgs OR 3' interval below bottom of fill (native)	8-11	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 10' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

C - Perform intrusive investigation

Each boring to be divided into 4 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 5' bgs		Collect 10 plugs into ziplock	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 5 to 10' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 10' bgs to 15' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 15 to 28' bgs (native)		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 18' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

POST SAMPLING:

Soil remaining from each core will be kepts and stored.

	ACTUAL SUs)	Sample	Analysis
One archive for shallow (0-10)	0-3	Collect 1 VOA from shallow (0-10' bgs) and one from deep (10'+)	Archive
One archive for deep (10'+)	3-20	All remaining soil from 6 adjacent borings will be consolidated	

NOTE: Do not combine native material and fill

5-23-14

CH2MHILL

PROJECT NUMBER	Decision Unit	Boring ID
	DU2	B-26

SOIL BORING LOG

PROJECT : HART LOCATION : Banana Patch

LAT/LONG: DRILLING CONTRACTOR : Geotek

DRILLING METHOD AND EQUIPMENT USED : Track rig

WATER LEVELS : START : 1645 END : 1610 LOGGER : VM

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	#/TYPE	PID READING (ppm)	SOIL CORE DESCRIPTION: SOIL TYPE, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: Sample Collection Information, Sample Sub-Unit Decision
0–5		50%	FILL	0	FILL: Red SILT, dry, fissile, organics FILL: Br SILT w/coraline gravel and sand throughout dry, some pea gravel	Sample 0-0.5 Sample 0.5-3
5–10		75%	FILL / NATIVE	0	Native: Br SILTY CLAY trace sand, damp	sample 8-~~E~~11' bgs
10–15		50%	NATIVE	0	Native: Dk br SILTY SANDY CLAY wet lens	
15–20		60%	NATIVE	0	organics @ 19'	
20–25					EOB @ 20'	

NOTE PID = every 6"

CH2MHILL

PROJECT NUMBER	Decision Unit DU2	Boring ID B 26

FLOW CHART FOR SAMPLING RATIONALE

PROJECT : HART

LOCATION : Banana Patch

LAT/LONG:

DRILLING CONTRACTOR : Geotek

UTILITY CLRNCE CONFRMD: YES NO

DRILLING METHOD AND EQUIPMENT USED : DPS HAS TP

Geophysical anomalies/ Fill Exist?

	DU1	DU2	DU3	DU4	DU5	DU6
Yes	B	B	B	B	C	C
No	A	B	B	A	C	C

Did you see NAPL/Char/Ashes? YES NO IF YES:

Sample	Analysis
Collect into 8-oz jar	Dioxins, Furans

Replicate collected here? YES NO IF YES:

Sample ID's:

Sample ID's:

A - Collect only surface samples - do not perform intrusive work

B - Perform intrusive investigation.

Each boring to be divided into 3 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 0.5' bgs	0-0.5	Collect 10 plugs into ziplock	TPH-g/d/o, PAH, RCRA8, Pest/Herb, PCBs
- 0.5 to 3' bgs	0.5-3	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 8-10' bgs OR 3' interval below bottom of fill (native)	8-11	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 10' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

C - Perform intrusive investigation

Each boring to be divided into 4 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 5' bgs		Collect 10 plugs into ziplock	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 5 to 10' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 10' bgs to 15' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 15 to 28' bgs (native)		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 18' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

POST SAMPLING:

Soil remaining from each core will be kepts and stored.

	ACTUAL SUs)	Sample	Analysis
One archive for shallow (0-10)	0-3	Collect 1 VOA from shallow (0-10' bgs) and one from deep (10'+)	Archive
One archive for deep (10'+)	3-20	All remaining soil from 6 adjacent borings will be consolidated	

NOTE: Do not combine native material and fill

5/23/14

CH2MHILL

PROJECT NUMBER	Decision Unit	Boring ID
	DU 2	B~~20~~ 27

SOIL BORING LOG

PROJECT : **HART** LOCATION : **Banana Patch**

LAT/LONG: DRILLING CONTRACTOR : **Geotek**

DRILLING METHOD AND EQUIPMENT USED : DPS Track Rig

WATER LEVELS : START : END : LOGGER : VM

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	#/TYPE	PID READING (ppm)	SOIL CORE DESCRIPTION: SOIL TYPE, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: Sample Collection Information Sample Sub-Unit Decision
0–5		60%	FILL	0	FILL: Br-grey SILT w/sand and gravel dry. Loose.	Sample 0-0.5 Sample 0.5-3
5–10		60%		0	FILL: Pea gravel and black silt. Dry. FILL: SANDY SILT br w/ orange mottles. Damp, med-stiff	
10–15		75%		0	Coral Gravel Native: Reddish brown SILT dry - stiff. mottles. to damp	Sample 13-15' bgs
15–20		30%		0	Br CLAYEY SILT, wet trace organics	Poor recovery
20–25						

PID readings every 6"

CH2MHILL

PROJECT NUMBER	Decision Unit DU2	Boring ID B27

FLOW CHART FOR SAMPLING RATIONALE

PROJECT: HART
LOCATION: Banana Patch
LAT/LONG:
DRILLING CONTRACTOR: Geotek
UTILITY CLRNCE CONFRMD: YES NO
DRILLING METHOD AND EQUIPMENT USED: DPS HAS TP

Geophysical anomalies/ Fill Exist?

	DU1	DU2	DU3	DU4	DU5	DU6
Yes	B	B	B	B	C	C
No	A	B	B	A	C	C

Did you see NAPL/Char/Ashes? YES NO IF YES:

Sample	Analysis
Collect into 8-oz jar	Dioxins, Furans

Replicate collected here? YES NO IF YES:

Sample ID's:

Sample ID's:

A - Collect only surface samples - do not perform intrusive work

B - Perform intrusive investigation.

Each boring to be divided into 3 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 0.5' bgs	0-0.5	Collect 10 plugs into ziplock	TPH-g/d/o, PAH, RCRA8, Pest/Herb, PCBs
- 0.5 to 3' bgs	0.5-3	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 8-10' bgs OR 3' interval below bottom of fill (native)	13-15	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 10' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

C - Perform intrusive investigation

Each boring to be divided into 4 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 5' bgs		Collect 10 plugs into ziplock	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 5 to 10' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 10' bgs to 15' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 15 to 28' bgs (native)		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 18' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

POST SAMPLING:

Soil remaining from each core will be kepts and stored.

	ACTUAL SUs)	Sample	Analysis
One archive for shallow (0-10)	0-3	Collect 1 VOA from shallow (0-10' bgs) and one from deep (10'+)	Archive
One archive for deep (10'+)	3-20	All remaining soil from 6 adjacent borings will be consolidated	

NOTE: Do not combine native material and fill

5-23-14

CH2MHILL

PROJECT NUMBER	Decision Unit	Boring ID
	DU 2	B-28

SOIL BORING LOG

PROJECT : **HART** LOCATION : **Banana Patch**

LAT/LONG: DRILLING CONTRACTOR : **Geotek**

DRILLING METHOD AND EQUIPMENT USED : Track Mounted DPS

WATER LEVELS : START : 1430 END : 1500 LOGGER : VM

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	#/TYPE	PID READING (ppm)	SOIL CORE DESCRIPTION: SOIL TYPE, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: Sample Collection Information, Sample Sub-Unit Decision
5	0–5	80%	FILL	0	FILL: Red SILT (10R 2.5/6) dry, fissile FILL: Br SILT (5YR 5/2) w/gravel and sand throughout (coraline) dry	Sample 0-0.5' Sample 0.5-3'
10	5–10	80%	FILL	0	FILL: Br ~~Grey~~ CLAY, v stiff, plastic dry FILL: Red brown SILT w/sand damp w/coraline gravel	
15	10–15	50%	FILL / NATIVE	0	Native: Dk grey brown CLAY (5YR 3/1) Damp to wet @ 14.5	Sample 13-15' bgs
20	15–20	40%	NATIVE	0	Black organics @ 19' 3" Gravel lens @ 19.5 wet	
25					EOB @ 20' bgs	

CH2MHILL

PROJECT NUMBER	Decision Unit	Boring ID
	DU2	B-28

FLOW CHART FOR SAMPLING RATIONALE

PROJECT : HART **LOCATION :** Banana Patch

LAT/LONG: **DRILLING CONTRACTOR :** Geotek

UTILITY CLRNCE CONFRMD: YES NO

DRILLING METHOD AND EQUIPMENT USED : DPS HAS TP

Geophysical anomalies/ Fill Exist?

	DU1	DU2	DU3	DU4	DU5	DU6
Yes	B	B	B	B	C	C
No	A	B	B	A	C	C

Did you see NAPL/Char/Ashes? YES NO IF YES:

Sample	Analysis
Collect into 8-oz jar	Dioxins, Furans

Replicate collected here? YES NO IF YES:

Sample ID's:

Sample ID's:

A - Collect only surface samples - do not perform intrusive work

B - Perform intrusive investigation.

Each boring to be divided into 3 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 0.5' bgs	0-0.5	Collect 10 plugs into ziplock	TPH-g/d/o, PAH, RCRA8, Pest/Herb, PCBs
- 0.5 to 3' bgs	0.5-3	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 8-10' bgs OR 3' interval below bottom of fill (native)	13-15	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 10' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

C - Perform intrusive investigation

Each boring to be divided into 4 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 5' bgs		Collect 10 plugs into ziplock	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 5 to 10' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 10' bgs to 15' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 15 to 28' bgs (native)		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 18' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

POST SAMPLING:

Soil remaining from each core will be kepts and stored.

	ACTUAL SUs)	Sample	Analysis
One archive for shallow (0-10)	0-3	Collect 1 VOA from shallow (0-10' bgs) and one from deep (10'+)	Archive
One archive for deep (10'+)	3-20	All remaining soil from 6 adjacent borings will be consolidated	

NOTE: Do not combine native material and fill

5-2344

CH2MHILL

PROJECT NUMBER	Decision Unit	Boring ID
	DU2	B-29

SOIL BORING LOG

PROJECT : HART — LOCATION : Banana Patch

LAT/LONG: — DRILLING CONTRACTOR : Geotek

DRILLING METHOD AND EQUIPMENT USED : Track Mounted Rig

WATER LEVELS : — START : 1530 — END : ~~1515~~ 1545 — LOGGER : VM

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	#/TYPE	PID READING (ppm)	SOIL CORE DESCRIPTION: SOIL TYPE, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: Sample Collection Information, Sample Sub-Unit Decision
0–5		70%	FILL	0	FILL: Red silt, dry, fissile, w/ Coralline gravel and sand throughout	Sample 0-0.5' bgs Sample 0.5-3' bgs
5–10		75%		0	NATIVE: Brown SILT & CLAY	Sample 9-11' bgs
10–15		50%	NATIVE	0	Dry, Little plastic Wet SAA, w/wood chunk Damp SAA, trace sand in some lenses. Med Firm	
15–20		~~60%~~ 50%		0		
20–25					EOB @ 20' bgs	

CH2MHILL

PROJECT NUMBER	Decision Unit	Boring ID
	DU2	B-29

FLOW CHART FOR SAMPLING RATIONALE

PROJECT : HART **LOCATION :** Banana Patch

LAT/LONG: **DRILLING CONTRACTOR :** Geotek

UTILITY CLRNCE CONFRMD: YES NO

DRILLING METHOD AND EQUIPMENT USED : DPS HAS TP

Geophysical anomalies/ Fill Exist?

	DU1	DU2	DU3	DU4	DU5	DU6
Yes	B	B	B	B	C	C
No	A	B	B	A	C	C

Did you see NAPL/Char/Ashes? YES NO IF YES:

Replicate collected here? YES NO IF YES:

Sample	Analysis
Collect into 8-oz jar	Dioxins, Furans

Sample ID's:

Sample ID's:

A - Collect only surface samples - do not perform intrusive work

B - Perform intrusive investigation.

Each boring to be divided into 3 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 0.5' bgs	0-0.5	Collect 10 plugs into ziplock	TPH-g/d/o, PAH, RCRA8, Pest/Herb, PCBs
- 0.5 to 3' bgs	0.5-3	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 8-10' bgs OR 3' interval below bottom of fill (native)	9-11	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 10' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

C - Perform intrusive investigation

Each boring to be divided into 4 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 5' bgs		Collect 10 plugs into ziplock	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 5 to 10' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 10' bgs to 15' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 15 to 28' bgs (native)		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 18' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

POST SAMPLING:

Soil remaining from each core will be kepts and stored.

	ACTUAL SUs)	Sample	Analysis
One archive for shallow (0-10)	0-3	Collect 1 VOA from shallow (0-10' bgs) and one from deep (10'+)	Archive
One archive for deep (10'+)	3-20	All remaining soil from 6 adjacent borings will be consolidated	

NOTE: Do not combine native material and fill

5-23-14

CH2MHILL

PROJECT NUMBER	Decision Unit	Boring ID
	DU2	B 30

SOIL BORING LOG

PROJECT : **HART** LOCATION : **Banana Patch**

LAT/LONG: DRILLING CONTRACTOR : **Geotek**

DRILLING METHOD AND EQUIPMENT USED : Track Rig

WATER LEVELS : START : 1400 END : 1430 LOGGER : VM

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	#/TYPE	PID READING (ppm)	SOIL CORE DESCRIPTION: SOIL TYPE, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: Sample Collection Information Sample Sub-Unit Decision
0–5		90%	FILL	0	FILL: Br silt w/gravel (basalt) throughout FILL: Green CLAY (8GLEY1 5GY) w/orange mottles. V.stiff, dry plastic	Sample 0-0.5 Sample 05-3
5–10		60%	FILL	0	FILL: CLAY (GLEY1 10Y/5) stiff, V stiff, dry, plastic FILL coral gravel Native: Br SILT (5YR 2.5/2)	
10–15		40%	NATIVE	0	w SAND. ~~stiff~~. Damp Med stiff.	Sample @ 11-14' bgs
15–20		60%	NATIVE	0	DK Grey SILT w/black organics, damp 3" gravel lens @ 19.5, wet in lens (GLEY1 N/~~2.5~~ 3)	
20–25					EOB@ 20' bgs	

* PID readings every 6"

CH2MHILL

PROJECT NUMBER	Decision Unit DU2	Boring ID B30

FLOW CHART FOR SAMPLING RATIONALE

PROJECT : HART **LOCATION :** Banana Patch

LAT/LONG: **DRILLING CONTRACTOR :** Geotek

UTILITY CLRNCE CONFRMD: YES NO

DRILLING METHOD AND EQUIPMENT USED : DPS HAS TP

Geophysical anomalies/ Fill Exist?

	DU1	DU2	DU3	DU4	DU5	DU6
Yes	B	B	B	B	C	C
No	A	B	B	A	C	C

Did you see NAPL/Char/Ashes? YES NO IF YES:

Sample	Analysis
Collect into 8-oz jar	Dioxins, Furans

Replicate collected here? YES NO IF YES:

Sample ID's:

Sample ID's:

A - Collect only surface samples - do not perform intrusive work

B - Perform intrusive investigation.

Each boring to be divided into 3 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 0.5' bgs	0-0.5	Collect 10 plugs into ziplock	TPH-g/d/o, PAH, RCRA8, Pest/Herb, PCBs
- 0.5 to 3' bgs	0.5-3	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 8-10' bgs OR 3' interval below bottom of fill (native)	11-14	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 10' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

C - Perform intrusive investigation

Each boring to be divided into 4 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 5' bgs		Collect 10 plugs into ziplock	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 5 to 10' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 10' bgs to 15' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 15 to 28' bgs (native)		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 18' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

POST SAMPLING:

Soil remaining from each core will be kepts and stored.

	ACTUAL SUs)	Sample	Analysis
One archive for shallow (0-10)	0-3	Collect 1 VOA from shallow (0-10' bgs) and one from deep (10'+)	Archive
One archive for deep (10'+)	3-20	All remaining soil from 6 adjacent borings will be consolidated	

NOTE: Do not combine native material and fill

5-19-14

CH2MHILL

PROJECT NUMBER	Decision Unit	Boring ID
	DU3	1

SOIL BORING LOG

PROJECT : HART LOCATION : Banana Patch

LAT/LONG: DRILLING CONTRACTOR : Geotek

DRILLING METHOD AND EQUIPMENT USED : DPS, truck-mounted

WATER LEVELS : START : NR END : NR LOGGER : B. Roder

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	#/TYPE	PID READING (ppm)	SOIL CORE DESCRIPTION: SOIL TYPE, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: Sample Collection Information, Sample Sub-Unit Decision
0–5	0–5	~~50%~~ ~~75%~~ 50	FILL	0 0 0	Silty Clay (SC) with some sand, reddish brown 2.5YR/4, dry, non-plastic, trace gravel. FILL	Compressed in sleeve 50%. sample 0-0.5 ft sample 0.5-3 ft see log book
5–10	5–10	100	FILL	0 0 0 0	Silty Clay (SC) with some sand, reddish brown (5YR 3/4), dry then moist at 8 ft, non-plastic, trace gravel FILL	
10–15	10–15	100	FILL	0 0 0 0	10-11 ft - same as 5-10 ft. 11-12.5 ft - gravelly sand, glass fragments, light gray to brown FILL	debris - green glass fragments at 11-12.5 ft.
15–20	15–20	100	CL	0 0 0 0	15-16 ft - same as ~~10-15~~ 5-10 ft. 16-20 ft - dark brown (5YR 2.5/1) ~~silty~~ Clay, moist, medium plasticity, trace gravel. Organics. FILL ends at 17 ft.	sample from 17-20 ft bgs.
20–25					EOB @ 20' bgs	

CH2MHILL

PROJECT NUMBER	Decision Unit DU3	Boring ID 1

FLOW CHART FOR SAMPLING RATIONALE

PROJECT : HART

LOCATION : Banana Patch

LAT/LONG:

DRILLING CONTRACTOR : Geotek

UTILITY CLRNCE CONFRMD: YES NO

DRILLING METHOD AND EQUIPMENT USED : DPS HAS TP

Geophysical anomalies/ Fill Exist?

	DU1	DU2	DU3	DU4	DU5	DU6
Yes	B	B	B	B	C	C
No	A	B	B	A	C	C

Sample	Analysis
Collect into 8-oz jar	Dioxins, Furans

Did you see NAPL/Char/Ashes? YES NO IF YES:

Replicate collected here? YES NO IF YES: ~~Sample ID's:~~

~~Sample ID's:~~

A - Collect only surface samples - do not perform intrusive work

B - Perform intrusive investigation.

Each boring to be divided into 3 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 0.5' bgs	0-0.5	Collect 10 plugs into ziplock	TPH-g/d/o, PAH, RCRA8, Pest/Herb, PCBs
- 0.5 to 3' bgs	0.5-3	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 8-10' bgs OR 3' interval below bottom of fill (native)	17-20	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 10' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

C - Perform intrusive investigation

Each boring to be divided into 4 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 5' bgs		Collect 10 plugs into ziplock	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 5 to 10' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 10' bgs to 15' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 15 to 28' bgs (native)		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 18' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

POST SAMPLING:

Soil remaining from each core will be kepts and stored.

	ACTUAL SUs)	Sample	Analysis
One archive for shallow (0-10)	0-3	Collect 1 VOA from shallow (0-10' bgs) and one from deep (10'+)	Archive
One archive for deep (10'+)	3-20	All remaining soil from 6 adjacent borings will be consolidated	

NOTE: Do not combine native material and fill

5/19/14

CH2MHILL

PROJECT NUMBER	Decision Unit	Boring ID
	DU3	B2

SOIL BORING LOG

PROJECT : HART — LOCATION : Banana Patch

LAT/LONG: — DRILLING CONTRACTOR : Geotek

DRILLING METHOD AND EQUIPMENT USED : Track Rig DP5

WATER LEVELS : START : 5/19 NR — END : NR — LOGGER : I. Wood

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT) %	#/TYPE	PID* READING (ppm)	SOIL CORE DESCRIPTION: SOIL TYPE, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: Sample Collection Information Sample Sub-Unit Decision
0–5	0–5	100	CL	Ø	Reddish brown ~~SILTY~~ ~~CLAY~~ with some sand (fine), trace gravel, dry concrete at 3.75' FILL	Sample 0.-0.5 0.5-3' see log book
5–10	5–10	~~80~~ 60	SM / CL	Ø	~~SIL~~ Reddish brown SILTY SAND, trace gravel asphalt at 6'-7. Reddish Brown SC, dry ~~co~~ coralline gravel at 10' FILL	NO Sample
10–15	10–15	60	SM / CL	Ø	Reddish Brown, ~~SILTY SAND~~ with gravel, dry, FILL asphalt at 13' bgs 13-15' Reddish Brown CLAY with	No Sample
15–20	15–20			Ø	Sand and gravel, moist ~~becomes~~ Organic Matter at ~~16.5~~ 16.5' Starts Native 16.5' Dark ~~B~~ Brown CLAYEY SILT, with organic Matter ~~so~~ wet, Recent Alluvium	sample 17-20' see logbook
20–25					Total Depth 20' BGS	

* PID every 6" of core

CH2MHILL

PROJECT NUMBER	Decision Unit DU3	Boring ID B2

FLOW CHART FOR SAMPLING RATIONALE

PROJECT : HART **LOCATION :** Banana Patch

LAT/LONG: **DRILLING CONTRACTOR :** Geotek

UTILITY CLRNCE CONFRMD: YES NO

DRILLING METHOD AND EQUIPMENT USED : DPS HAS TP

Geophysical anomalies/ Fill Exist?

	DU1	DU2	DU3	DU4	DU5	DU6
Yes	B	B	B	B	C	C
No	A	B	B	A	C	C

Sample	Analysis
Collect into 8-oz jar	Dioxins, Furans

Did you see NAPL/Char/Ashes? YES NO IF YES:

Replicate collected here? YES NO IF YES: Sample ID's:

Sample ID's:

A - Collect only surface samples - do not perform intrusive work

B - Perform intrusive investigation.

Each boring to be divided into 3 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 0.5' bgs	0-0.5	Collect 10 plugs into ziplock	TPH-g/d/o, PAH, RCRA8, Pest/Herb, PCBs
- 0.5 to 3' bgs	0.5-3'	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 8-10' bgs OR 3' interval below bottom of fill (native)	17'-20'	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 10' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

C - Perform intrusive investigation

Each boring to be divided into 4 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 5' bgs		Collect 10 plugs into ziplock	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 5 to 10' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 10' bgs to 15' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 15 to 18' bgs (native)		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 18' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

POST SAMPLING:

Soil remaining from each core will be kepts and stored.

	ACTUAL SUs)	Sample	Analysis
One archive for shallow (0-10) 0-3	✓	Collect 1 VOA from shallow (0-10' bgs) and one from deep (10'+)	Archive
One archive for deep (10'+) 3-20'	✓	All remaining soil from 6 adjacent borings will be consolidated	

NOTE: Do not combine native material and fill

5/19/14

CH2MHILL

PROJECT NUMBER	Decision Unit	Boring ID
	DU 3	3

SOIL BORING LOG

PROJECT : HART
LOCATION : Banana Patch

LAT/LONG:
DRILLING CONTRACTOR : Geotek

DRILLING METHOD AND EQUIPMENT USED : DPS, truck-mounted

WATER LEVELS : START : NR END : NR LOGGER : Belinda Roder

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	#/TYPE	PID READING (ppm)	SOIL CORE DESCRIPTION: SOIL TYPE, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: Sample Collection Information Sample Sub-Unit Decision
0–5		~~75~~ 60	FILL	0	Silty clay with some sand (SC), reddish brown, dry, non plastic. Pumice fragments (1-3 cm) at 5 ft. FILL	Sample from 0-0.5 ft. Sample from 0.5 - 3 ft.
5–10		100	FILL	SC – GM –	Silty clay, reddish brown, mixed with gravelly sand, light gray. Dry. non-plastic. 3" concrete at 6.5 ft. FILL	
10–15		~~100~~ 85	FILL	CL	Fine sand with gravel (SC), reddish brown, dry. ~~SP~~ non-plastic. ~~Concrete~~ Basaltic fragments @ 16 ft. Silty clay, reddish brown, moist, med. plasticity. FILL ends at ~~16 ft.~~ 13 ft.	sample from ~~16-18~~ 14-16 ft.
15–20		~~50~~ 30	CL		~~CL~~ silty clay (CL), dark brown, medium plasticity, moist. One foot of wood from ~~16-18~~ 15-16	
20–25					EOB @ 20' bgs	

*NOTE PID collected every 6"

CH2MHILL

PROJECT NUMBER	Decision Unit 3	Boring ID 3

FLOW CHART FOR SAMPLING RATIONALE

PROJECT : HART **LOCATION :** Banana Patch

LAT/LONG: **DRILLING CONTRACTOR :** Geotek

UTILITY CLRNCE CONFRMD: YES NO

DRILLING METHOD AND EQUIPMENT USED : DPS HAS TP

Geophysical anomalies/ Fill Exist?

	DU1	DU2	DU3	DU4	DU5	DU6
Yes	B	B	B	B	C	C
No	A	B	B	A	C	C

Did you see NAPL/Char/Ashes? YES NO IF YES:

Sample	Analysis
Collect into 8-oz jar	Dioxins, Furans

Replicate collected here? YES NO IF YES:

Sample ID's:
Sample ID's:

A - Collect only surface samples - do not perform intrusive work

B - Perform intrusive investigation.

Each boring to be divided into 3 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 0.5' bgs	0-0.5	Collect 10 plugs into ziplock	TPH-g/d/o, PAH, RCRA8, Pest/Herb, PCBs
- 0.5 to 3' bgs	0.5-3	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 8-10' bgs OR 3' interval below bottom of fill (native)	14-16 ~~16-18~~ BP	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 10' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

C - Perform intrusive investigation

Each boring to be divided into 4 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 5' bgs		Collect 10 plugs into ziplock	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 5 to 10' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 10' bgs to 15' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 15 to 28' bgs (native)		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 18' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

POST SAMPLING:

Soil remaining from each core will be kepts and stored.

	ACTUAL SUs)	Sample	Analysis
One archive for shallow (0-10)	0-3	Collect 1 VOA from shallow (0-10' bgs) and one from deep (10'+)	Archive
One archive for deep (10'+)	3-20	All remaining soil from 6 adjacent borings will be consolidated	

NOTE: Do not combine native material and fill

5/19/14

CH2MHILL

PROJECT NUMBER	Decision Unit	Boring ID
	DU3	B4

SOIL BORING LOG

PROJECT : HART — LOCATION : Banana Patch

LAT/LONG:

DRILLING CONTRACTOR : Geotek

DRILLING METHOD AND EQUIPMENT USED : DPS Truck RIO

WATER LEVELS : — START : 5/19/14 10AM — END : 1030 — LOGGER : I. wood

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	#/TYPE	* PID READING (ppm)	SOIL CORE DESCRIPTION: SOIL TYPE, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: Sample Collection Information Sample Sub-Unit Decision
5	0 – 5	90	CL/GM	0	SILTY CLAY ~~and~~ and Gravel asphalt at 3.5', FILL Material	0-0.5 0.5-3' bgs
10		95	GC/GM	0	SILTY Gravel/CLAYEY Gravel, FILL, asphalt and coral gravels mixed with silt/clay	None
15		~~100~~ 80	GM / CL	0 ~~FILL~~ FILL Native	SILTY Gravel, coralline gravel, road fill ~~[illegible]~~ changes 13', moist Reddish Brown CLAY, stiff moist, trace gravel	None
20		100	SM	Native 0	Brownish Black SILTY SAND, loose, wet	16-18'
25					Stop at 20' bgs	

* PID at ~~each [illegible]~~ every 6" along all core.

CH2MHILL

PROJECT NUMBER	Decision Unit	Boring ID

FLOW CHART FOR SAMPLING RATIONALE

PROJECT : HART

LOCATION : Banana Patch

LAT/LONG:

DRILLING CONTRACTOR : Geotek

UTILITY CLRNCE CONFRMD: YES NO

DRILLING METHOD AND EQUIPMENT USED : DPS HAS TP

Geophysical anomalies/ Fill Exist?

	DU1	DU2	DU3	DU4	DU5	DU6
Yes	B	B	B	B	C	C
No	A	B	B	A	C	C

Did you see NAPL/Char/Ashes? YES NO IF YES:

Sample	Analysis
Collect into 8-oz jar	Dioxins, Furans

Replicate collected here? YES NO IF YES:

Sample ID's:
Sample ID's:

A - Collect only surface samples - do not perform intrusive work

B - Perform intrusive investigation.

Each boring to be divided into 3 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 0.5' bgs	0-0.5	Collect 10 plugs into ziplock	TPH-g/d/o, PAH, RCRA8, Pest/Herb, PCBs
- 0.5 to 3' bgs	0.5-3	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 8-10' bgs OR 3' interval below bottom of fill (native)	16-19	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 10' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

C - Perform intrusive investigation

Each boring to be divided into 4 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 5' bgs		Collect 10 plugs into ziplock	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 5 to 10' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 10' bgs to 15' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 15 to 28' bgs (native)		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 18' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

POST SAMPLING:

Soil remaining from each core will be kepts and stored.

	ACTUAL SUs)	Sample	Analysis
One archive for shallow (0-10)	0-3	Collect 1 VOA from shallow (0-10' bgs) and one from deep (10'+)	Archive
One archive for deep (10'+)	3-19	All remaining soil from 6 adjacent borings will be consolidated	

NOTE: Do not combine native material and fill — separating fill vs. Native

5-19-14

CH2MHILL

PROJECT NUMBER	Decision Unit 3	Boring ID 5

SOIL BORING LOG

PROJECT : HART LOCATION : Banana Patch

LAT/LONG: DRILLING CONTRACTOR : Geotek

DRILLING METHOD AND EQUIPMENT USED : DPS, truck-mounted

WATER LEVELS : START : NR END : NR LOGGER : B. Poder

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	#/TYPE	PID READING (ppm)	SOIL CORE DESCRIPTION: SOIL TYPE, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: Sample Collection Information Sample Sub-Unit Decision
0–5	0–5	80	FILL	0	Silty clay (CL) with some sand. Reddish brown, dry, non-plastic. Mixed with silty gravel (GM), dark brown, dry, non-plastic. FILL	sample 0-0.5 sample 0.5-3
5–10	5–10	100	FILL	0	Silty gravel (GM) with sand, brown to dark brown, dry, non-plastic. Asphalt fragments @ 9.5 ft. FILL	
10–15	10–15	60	FILL	0	Silty clay (CL), dark brown, moist, med. plastic. Fill ends at 16 ft.	sample 13-15 ft.
15–20	15–20	75	CL	0	Silty clay (CL), brown, wet from 15-18 ft. med. plasticity.	
20–25					EOB @ 20' bgs	

*NOTE - PID collected every 6"

CH2MHILL

PROJECT NUMBER	Decision Unit	Boring ID

FLOW CHART FOR SAMPLING RATIONALE

PROJECT : HART **LOCATION :** Banana Patch

LAT/LONG: **DRILLING CONTRACTOR :** Geotek

UTILITY CLRNCE CONFRMD: YES NO

DRILLING METHOD AND EQUIPMENT USED : DPS HAS TP

Geophysical anomalies/ Fill Exist?

	DU1	DU2	DU3	DU4	DU5	DU6
Yes	B	B	B	B	C	C
No	A	B	B	A	C	C

Did you see NAPL/Char/Ashes? YES NO IF YES:

Sample	Analysis
Collect into 8-oz jar	Dioxins, Furans

Replicate collected here? YES NO IF YES:

Sample ID's:

Sample ID's:

A - Collect only surface samples - do not perform intrusive work

B - Perform intrusive investigation.

Each boring to be divided into 3 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 0.5' bgs	0-0.5	Collect 10 plugs into ziplock	TPH-g/d/o, PAH, RCRA8, Pest/Herb, PCBs
- 0.5 to 3' bgs	0.5-3	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 8-10' bgs OR 3' interval below bottom of fill (native)	13-15	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 10' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

C - Perform intrusive investigation

Each boring to be divided into 4 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 5' bgs		Collect 10 plugs into ziplock	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 5 to 10' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 10' bgs to 15' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 15 to 28' bgs (native)		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 18' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

POST SAMPLING:

Soil remaining from each core will be kepts and stored.

	ACTUAL SUs)	Sample	Analysis
One archive for shallow (0-10)	0-3	Collect 1 VOA from shallow (0-10' bgs) and one from deep (10'+)	Archive
One archive for deep (10'+)	3-20	All remaining soil from 6 adjacent borings will be consolidated	

NOTE: Do not combine native material and fill

5/19/14

CH2MHILL

PROJECT NUMBER	Decision Unit	Boring ID B6

SOIL BORING LOG

PROJECT : HART   LOCATION : Banana Patch

LAT/LONG: DRILLING CONTRACTOR : Geotek

DRILLING METHOD AND EQUIPMENT USED : Track Rig DPS

WATER LEVELS :   START : 1045 5/19/14   END : 1100   LOGGER : I. wood

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	#/TYPE	PID READING (ppm) *	SOIL CORE DESCRIPTION: SOIL TYPE, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: Sample Collection Information, Sample Sub-Unit Decision
0–5		90	CL	Ø	Reddish Brown SILTY CLAY, with gravel and sand, ~~dense~~ med. dense to loose, dry FILL	0–0.5' 0.5–3' see log book
5–10		75	CL / CL	Ø	change to whitish gray coralline gravels present CLAY moist med stiff med plasticity with gravel FILL	None
10–15		100	CL	FILL Ø ~~FILL~~	~~CLAY~~ Dark Gray CLAY, with gravel and sand, med Stiff, moist	None
15–20		100	SC	Native Ø	Dark brownish gray CLAYEY SAND, with some gravel, loose, wet NATIVE = 16'–20'	16'–19' see log book
20–25					END Boring 20'	

* PID Every 6" ~~feet~~

CH2MHILL

PROJECT NUMBER	Decision Unit DU3	Boring ID ~~DU3~~ 1 BG

FLOW CHART FOR SAMPLING RATIONALE

PROJECT : HART

LOCATION : Banana Patch

LAT/LONG:

DRILLING CONTRACTOR : Geotek

UTILITY CLRNCE CONFRMD: YES NO

DRILLING METHOD AND EQUIPMENT USED : DPS HAS TP

Geophysical anomalies/ Fill Exist?

	DU1	DU2	DU3	DU4	DU5	DU6
Yes	B	B	B	B	C	C
No	A	B	B	A	C	C

Did you see NAPL/Char/Ashes? YES NO IF YES:

Sample	Analysis
Collect into 8-oz jar	Dioxins, Furans

Replicate collected here? YES NO IF YES:

Sample ID's:

Sample ID's:

A - Collect only surface samples - do not perform intrusive work

B - Perform intrusive investigation.

Each boring to be divided into 3 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 0.5' bgs	0-0.5	Collect 10 plugs into ziplock	TPH-g/d/o, PAH, RCRA8, Pest/Herb, PCBs
- 0.5 to 3' bgs	0.5-3	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 8-10' bgs OR 3' interval below bottom of fill (native)	16-19	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 10' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

C - Perform intrusive investigation

Each boring to be divided into 4 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 5' bgs		Collect 10 plugs into ziplock	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 5 to 10' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 10' bgs to 15' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 15 to 28' bgs (native)		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 18' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

POST SAMPLING:

Soil remaining from each core will be kepts and stored.

	ACTUAL SUs)	Sample	Analysis
One archive for shallow (0-10)	0-3	Collect 1 VOA from shallow (0-10' bgs) and one from deep (10'+)	Archive
One archive for deep (10'+)	3-20	All remaining soil from 6 adjacent borings will be consolidated	

NOTE: Do not combine native material and fill

– separate fill native for archive samples

5-19-14

CH2MHILL

PROJECT NUMBER	Decision Unit	Boring ID
	3	7

SOIL BORING LOG

PROJECT : **HART** LOCATION : **Banana Patch**

LAT/LONG: DRILLING CONTRACTOR : **Geotek**

DRILLING METHOD AND EQUIPMENT USED : DPS, truck-mounted

WATER LEVELS : START : 1100 END : 1120 LOGGER : B. Porter

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	#/TYPE	PID READING (ppm)	SOIL CORE DESCRIPTION: SOIL TYPE, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: Sample Collection Information, Sample Sub-Unit Decision
0–5		60	FILL	0	Silty clay (SC) with sand, some gravel. Reddish brown mixed w/dark brown. Dry. Nonplastic. Pumice frags @ 4.5 ft. FILL	sample 0-0.5' bgs; sample 0.5-3.0' bgs
5–10		100	FILL	0	Silty clay with sand and gravel. Reddish brown to light gray. Dry. Non-plastic. FILL	
10–15		75	FILL	0	Silty gravel (GM), reddish brown to dark brown dry, nonplastic. Clayey and moist at 14 ft. Fill ends at 14 ft.	Sample collected 14-16
15–20		90	CL	0	Silty clay (CL), dark brown, moist, med. plastic	
20–25					EOB @ 20' bgs	

*NOTE PID readings taken every 6"

CH2MHILL

PROJECT NUMBER	Decision Unit 3	Boring ID 7

FLOW CHART FOR SAMPLING RATIONALE

PROJECT : HART **LOCATION :** Banana Patch

LAT/LONG: **DRILLING CONTRACTOR :** Geotek

UTILITY CLRNCE CONFRMD: YES NO

DRILLING METHOD AND EQUIPMENT USED : DPS HAS TP

Geophysical anomalies/ Fill Exist?

	DU1	DU2	DU3	DU4	DU5	DU6
Yes	B	B	B	B	C	C
No	A	B	B	A	C	C

Did you see NAPL/Char/Ashes? YES NO IF YES:

Sample	Analysis
Collect into 8-oz jar	Dioxins, Furans

Replicate collected here? YES NO IF YES:

Sample ID's:

Sample ID's:

A - Collect only surface samples - do not perform intrusive work

B - Perform intrusive investigation.

Each boring to be divided into 3 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 0.5' bgs	0-0.5	Collect 10 plugs into ziplock	TPH-g/d/o, PAH, RCRA8, Pest/Herb, PCBs
- 0.5 to 3' bgs	0.5-3	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 8-10' bgs OR 3' interval below bottom of fill (native)	14-16	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 10' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

C - Perform intrusive investigation

Each boring to be divided into 4 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 5' bgs		Collect 10 plugs into ziplock	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 5 to 10' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 10' bgs to 15' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 15 to 28' bgs (native)		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 18' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

POST SAMPLING:

Soil remaining from each core will be kepts and stored.

	ACTUAL SUs)	Sample	Analysis
One archive for shallow (0-10)	0-3	Collect 1 VOA from shallow (0-10' bgs) and one from deep (10'+)	Archive
One archive for deep (10'+)	3-20	All remaining soil from 6 adjacent borings will be consolidated	

NOTE: Do not combine native material and fill

CH2MHILL

PROJECT NUMBER	Decision Unit	Boring ID
	DU3	B8

SOIL BORING LOG

PROJECT : HART LOCATION : Banana Patch

LAT/LONG: DRILLING CONTRACTOR : Geotek

DRILLING METHOD AND EQUIPMENT USED : DPS Truck RIG

WATER LEVELS : START : 5/19/14 11:10 END : 11:20 LOGGER : I-Wood

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	#/TYPE	* PID READING (ppm)	SOIL CORE DESCRIPTION: SOIL TYPE, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: Sample Collection Information Sample Sub-Unit Decision
0–5		50	GM	Ø	Reddish Brown SILTY GRAVEL, loose, dry FILL	0-0.5 0.5-3' bgs
5–10		65	CL GM	Ø	Reddish Brown SILTY CLAY and Gravel, med dense, dry fill Grayish White SILTY Gravel (coralline), loose, dry	NONE
10–15		75	CL	Ø FILL	10.5' Reddish Brown SILTY CLAY, with gravel (coralline), med dense, dry 13' asphalt fragments	
15–20		95	CL	Native	Grayish Brown, SILTY CLAY, med stiff, moist trace fine sand 20' stop	16-19 bgs
20–25						

* PID every 6" of core

CH2MHILL

PROJECT NUMBER	Decision Unit DU3	Boring ID ~~B6~~ B8

FLOW CHART FOR SAMPLING RATIONALE

PROJECT : HART

LOCATION : Banana Patch

LAT/LONG:

DRILLING CONTRACTOR : Geotek

UTILITY CLRNCE CONFRMD: YES NO

DRILLING METHOD AND EQUIPMENT USED : DPS HAS TP

Geophysical anomalies/ Fill Exist?

	DU1	DU2	DU3	DU4	DU5	DU6
Yes	B	B	B	B	C	C
No	A	B	B	A	C	C

Did you see NAPL/Char/Ashes? YES NO IF YES:

Sample	Analysis
Collect into 8-oz jar	Dioxins, Furans

Replicate collected here? YES NO IF YES:

Sample ID's:
Sample ID's:

A - Collect only surface samples - do not perform intrusive work

B - Perform intrusive investigation.

Each boring to be divided into 3 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 0.5' bgs	0-0.5	Collect 10 plugs into ziplock	TPH-g/d/o, PAH, RCRA8, Pest/Herb, PCBs
- 0.5 to 3' bgs	0.5-3	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 8-10' bgs OR 3' interval below bottom of fill (native)	16-19	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 10' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

C - Perform intrusive investigation

Each boring to be divided into 4 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 5' bgs		Collect 10 plugs into ziplock	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 5 to 10' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 10' bgs to 15' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 15 to 28' bgs (native)		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 18' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

POST SAMPLING:

Soil remaining from each core will be kepts and stored.

0-3'

	ACTUAL SUs)	Sample	Analysis
One archive for shallow (0-10)	~~0-4~~	Collect 1 VOA from shallow (0-10' bgs) and one from deep (10'+)	Archive
One archive for deep (10'+)		All remaining soil from 6 adjacent borings will be consolidated	

NOTE: Do not combine native material and fill

3.5-15-FILL
15-20 NATIVE

5-19-14

CH2MHILL

PROJECT NUMBER	Decision Unit	Boring ID
	3	9

SOIL BORING LOG

PROJECT : **HART** LOCATION : **Banana Patch**

LAT/LONG: DRILLING CONTRACTOR : **Geotek**

DRILLING METHOD AND EQUIPMENT USED : DPS - truck mounted

WATER LEVELS : START : 1140 END : 1200 LOGGER : B. Pode

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	#/TYPE	PID READING (ppm)	SOIL CORE DESCRIPTION: SOIL TYPE, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: Sample Collection Information, Sample Sub-Unit Decision
5	0–5	80	FILL	6	Silty clay (CL) with sand & gravel. Light brown mixed w/ reddish brown. Moist, non-plastic. Rock fragments 3-4 ft. FILL	sample 0-0.5' sample 0.5-3'
10	5–10	90	FILL	0	Silty clay (CL) with some gravel. Brown (7.5YR 3/3) moist, med. plasticity. Large pumice frags at 9-10 ft. Stiff. FILL	
15	10–15	90	FILL (to 14 ft) / CL	0	Silty clay (CL) with gravel, light gray to reddish brown, dry from 6-7 ft, moist below, med. plastic. Fill ends at 14 ft. Stiff-med stiff	sample 14-15'
20	15–20	80	CL	0	Silty clay (CL) with some sand & organic frags. Moist. Med. plasticity. med. stiff to soft.	
25						

NOTE! PID readings taken every 6"

CH2MHILL

PROJECT NUMBER	Decision Unit	Boring ID

FLOW CHART FOR SAMPLING RATIONALE

PROJECT : HART

LOCATION : Banana Patch

LAT/LONG:

DRILLING CONTRACTOR : Geotek

UTILITY CLRNCE CONFRMD: YES NO

DRILLING METHOD AND EQUIPMENT USED : DPS HAS TP

Geophysical anomalies/ Fill Exist?

	DU1	DU2	DU3	DU4	DU5	DU6
Yes	B	B	B	B	C	C
No	A	B	B	A	C	C

			Sample	Analysis
Did you see NAPL/Char/Ashes?	YES NO	IF YES:	Collect into 8-oz jar	Dioxins, Furans
Replicate collected here?	YES NO	IF YES:	Sample ID's:	
			Sample ID's:	

A - Collect only surface samples - do not perform intrusive work

B - Perform intrusive investigation.

Each boring to be divided into 3 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 0.5' bgs	0-0.5	Collect 10 plugs into ziplock	TPH-g/d/o, PAH, RCRA8, Pest/Herb, PCBs
- 0.5 to 3' bgs	0.5-3	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 8-10' bgs OR 3' interval below bottom of fill (native)	14-15	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 10' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

C - Perform intrusive investigation

Each boring to be divided into 4 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 5' bgs		Collect 10 plugs into ziplock	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 5 to 10' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 10' bgs to 15' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 15 to 28' bgs (native)		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 18' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

POST SAMPLING:

Soil remaining from each core will be kepts and stored.

	ACTUAL SUs)	Sample	Analysis
One archive for shallow (0-10)	0-3	Collect 1 VOA from shallow (0-10' bgs) and one from deep (10'+)	Archive
One archive for deep (10'+)	3-20	All remaining soil from 6 adjacent borings will be consolidated	

NOTE: Do not combine native material and fill

CH2MHILL

PROJECT NUMBER	Decision Unit	Boring ID
	DU3	B10

SOIL BORING LOG

PROJECT : HART LOCATION : Banana Patch

LAT/LONG: DRILLING CONTRACTOR : Geotek

DRILLING METHOD AND EQUIPMENT USED : DPS ~~Truck~~ Rig Truck

WATER LEVELS : START : 5/19/14 11:30 END : 11:45 LOGGER : I. Wood

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	#/TYPE	* PID READING (ppm)	SOIL CORE DESCRIPTION: SOIL TYPE, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: Sample Collection Information Sample Sub-Unit Decision
5	0 – 5	50	CL/SM	Ø	Redish Brown SILTY CLAY, and Grayish Black SILTY CLAY with Gravel (coralline) FILL	0-0.5 0.5-3'
10	5 – 10	80		Ø	Same as above	None
15	15	90	CL	Ø Native	Reddish Brown/Grayish Brown, SILTY CLAY med stiff, moist (FILL)	None
20	20	95	CL GM ~~CH~~ CL	Ø	Native at 14' bgs Redish Brown CLAY, soft wet brown 17' ~~[illegible]~~ SILTY GRAVEL 18.5' Dark Grayish Brown CLAYEY SILT with woody debris	17-19'
	20		CL CL	Ø	~~Brown CLAYEY SILT~~ woody debris, 18.5-20' Dark Brownish Gray CLAY, med stiff, moist	

*PID every 6" of core

20

CH2MHILL

PROJECT NUMBER	Decision Unit Du3	Boring ID B10

FLOW CHART FOR SAMPLING RATIONALE

PROJECT : HART

LOCATION : Banana Patch

LAT/LONG:

DRILLING CONTRACTOR : Geotek

UTILITY CLRNCE CONFRMD: YES NO

DRILLING METHOD AND EQUIPMENT USED : DPS HAS TP

Geophysical anomalies/ Fill Exist?	DU1	DU2	DU3	DU4	DU5	DU6
Yes	B	B	B	B	C	C
No	A	B	B	A	C	C

Did you see NAPL/Char/Ashes? YES NO IF YES:

Sample	Analysis
Collect into 8-oz jar	Dioxins, Furans

Replicate collected here? YES NO IF YES:

Sample ID's:

Sample ID's:

A - Collect only surface samples - do not perform intrusive work

B - Perform intrusive investigation.

Each boring to be divided into 3 vertical SUs

- 0 to 0.5' bgs
- 0.5 to 3' bgs
- 8-10' bgs OR 3' interval below bottom of fill (native)

ACTUAL SUs)	Sample	Analysis
0-0.5	Collect 10 plugs into ziplock	TPH-g/d/o, PAH, RCRA8, Pest/Herb, PCBs
0.5-3	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
17-19	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH; RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 10' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

C - Perform intrusive investigation

Each boring to be divided into 4 vertical SUs

- 0 to 5' bgs
- 5 to 10' bgs
- 10' bgs to 15' bgs
- 15 to 28' bgs (native)

ACTUAL SUs)	Sample	Analysis
	Collect 10 plugs into ziplock	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 18' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

POST SAMPLING:

Soil remaining from each core will be kepts and stored.

One archive for shallow (0-10)

One archive for deep (10'+)

ACTUAL SUs)	Sample	Analysis
0-3	Collect 1 VOA from shallow (0-10' bgs) and one from deep (10'+)	Archive
3-19	All remaining soil from 6 adjacent borings will be consolidated	

NOTE: Do not combine native material and fill — Field Decision to combine native and fill since fill is so deep

CH2MHILL

PROJECT NUMBER	Decision Unit	Boring ID
	3	11

SOIL BORING LOG

PROJECT : HART | LOCATION : Banana Patch

LAT/LONG: | DRILLING CONTRACTOR : Geotek

DRILLING METHOD AND EQUIPMENT USED :

WATER LEVELS : | START : | END : | LOGGER :

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	#/TYPE	PID READING (ppm)	SOIL CORE DESCRIPTION: SOIL TYPE, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: Sample Collection Information Sample Sub-Unit Decision
5		90			Silty Clay (CL) with some sand & gravel light brown to reddish brown dry to slightly moist at 3 ft. Non-plastic, stiff. FILL	sample 0-0.5' sample 0.5-3'
10		80	FILL		Silty clay w/ some sand. light brown to reddish brown. concrete at 9 ft. Stiff to moderately stiff. Plastic-medium. ~~moist~~ slightly moist ~~Fill ends @ 8.5 ft.~~ FILL	
15		60	CL		Silty clay w/ some sand & gravel. Light gray to Brown. Moderately stiff. slightly moist med. plasticity. Fill ends @ 12 ft.	sample 13-15'
20		60			Gray-brown silty clay. 3" black wood @ 15 ft. Wet & soft @ ~~16-17~~ 15-17 ft. Moist & med. stiff & below that. Wet from 17-18'	
25					EOB @ 20 ft.	

CH2MHILL

PROJECT NUMBER	Decision Unit	Boring ID

FLOW CHART FOR SAMPLING RATIONALE

PROJECT : HART

LOCATION : Banana Patch

LAT/LONG:

DRILLING CONTRACTOR : Geotek

UTILITY CLRNCE CONFRMD: YES NO

DRILLING METHOD AND EQUIPMENT USED : DPS HAS TP

Geophysical anomalies/ Fill Exist?

	DU1	DU2	DU3	DU4	DU5	DU6
Yes	B	B	B	B	C	C
No	A	B	B	A	C	C

				Sample	Analysis
Did you see NAPL/Char/Ashes?	YES	NO	IF YES:	Collect into 8-oz jar	Dioxins, Furans
Replicate collected here?	YES	NO	IF YES:	Sample ID's:	
				Sample ID's:	

A - Collect only surface samples - do not perform intrusive work

B - Perform intrusive investigation.

Each boring to be divided into 3 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 0.5' bgs	0-0.5	Collect 10 plugs into ziplock	TPH-g/d/o, PAH, RCRA8, Pest/Herb, PCBs
- 0.5 to 3' bgs	0.5-3	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 8-10' bgs OR 3' interval below bottom of fill (native)	13-15	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 10' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

C - Perform intrusive investigation

Each boring to be divided into 4 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 5' bgs		Collect 10 plugs into ziplock	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 5 to 10' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 10' bgs to 15' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 15 to 28' bgs (native)		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 18' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

POST SAMPLING:

Soil remaining from each core will be kepts and stored.

	ACTUAL SUs)	Sample	Analysis
One archive for shallow (0-10)	0-3	Collect 1 VOA from shallow (0-10' bgs) and one from deep (10'+)	Archive
One archive for deep (10'+)	3-20	All remaining soil from 6 adjacent borings will be consolidated	

NOTE: Do not combine native material and fill

CH2MHILL

PROJECT NUMBER	Decision Unit	Boring ID
	DU3	B12

SOIL BORING LOG

PROJECT : HART — LOCATION : Banana Patch

LAT/LONG: — DRILLING CONTRACTOR : Geotek

DRILLING METHOD AND EQUIPMENT USED :

WATER LEVELS : — START : 5/19/14 1300 — END : 1315 — LOGGER : I. wood

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT) %	#/TYPE	PID READING (ppm)	SOIL CORE DESCRIPTION: SOIL TYPE, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: Sample Collection Information, Sample Sub-Unit Decision
0–5		90%	CL	Ø	Reddish Brown SILTY CLAY with gravel, med stiff, dry FILL	0-0.5 0.5-3'
5–10		80	~~CL~~ GM	Ø	Brown/Tan SILTY/CLAY and ~~GRAVEL~~, medium dense, dry, -asphalt FILL (and coralline gravel present)	None
10–15		50	CL GM		-12' wood Material present	
			CL	Fill	~~CLA~~ Reddish Brown CLAY, med stiff/stiff	
15–20				Native	moist	16.5-18.5'
			SC		16.5' NATIVE Reddish Brown CLAYEY SAND, loose, wet	
			CL		18' Reddish Brown CLAY, ~~stiff~~ med stiff moist.	
20–25					Borings ends 20' b95	

CH2MHILL

PROJECT NUMBER	Decision Unit DU3	Boring ID B12

FLOW CHART FOR SAMPLING RATIONALE

PROJECT : HART

LOCATION : Banana Patch

LAT/LONG:

DRILLING CONTRACTOR : Geotek

UTILITY CLRNCE CONFRMD: YES NO

DRILLING METHOD AND EQUIPMENT USED : DPS HAS TP

Geophysical anomalies/ Fill Exist?

	DU1	DU2	DU3	DU4	DU5	DU6
Yes	B	B	B	B	C	C
No	A	B	B	A	C	C

	Sample	Analysis
Did you see NAPL/Char/Ashes? YES NO IF YES:	Collect into 8-oz jar	Dioxins, Furans
Replicate collected here? YES NO IF YES:	Sample ID's:	
	Sample ID's:	

A - Collect only surface samples - do not perform intrusive work

B - Perform intrusive investigation.

Each boring to be divided into 3 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 0.5' bgs	0-0.5	Collect 10 plugs into ziplock	TPH-g/d/o, PAH, RCRA8, Pest/Herb, PCBs
- 0.5 to 3' bgs	0.5-3	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 8-10' bgs OR 3' interval below bottom of fill (native)	16.5-18.5'	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 10' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

C - Perform intrusive investigation

Each boring to be divided into 4 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 5' bgs		Collect 10 plugs into ziplock	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 5 to 10' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 10' bgs to 15' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 15 to 28' bgs (native)		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 18' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

POST SAMPLING:

Soil remaining from each core will be kepts and stored.

	ACTUAL SUs)	Sample	Analysis
One archive for shallow (0-10)	0-3	Collect 1 VOA from shallow (0-10' bgs) and one from deep (10'+)	Archive
One archive for deep (10'+)	3-18.5	All remaining soil from 6 adjacent borings will be consolidated	

NOTE: Do not combine native material and fill

5/19/14

CH2MHILL	PROJECT NUMBER	Decision Unit 3	Boring ID 13

SOIL BORING LOG

PROJECT : **HART** LOCATION : **Banana Patch**

LAT/LONG: DRILLING CONTRACTOR : **Geotek**

DRILLING METHOD AND EQUIPMENT USED :

WATER LEVELS : NR START : NR END : NR LOGGER : B. Roder

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	#/TYPE	PID READING (ppm)	SOIL CORE DESCRIPTION: SOIL TYPE, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: Sample Collection Information, Sample Sub-Unit Decision
0–5	0–5	80		0	CL Silty clay with sand & gravel, reddish brown mixed w/ dark brown, dry, nonplastic, stiff FILL	sample 0-0.5 sample 0.5-3
5–10	5–10	60	FILL	0	~~Clayey~~ silty clay (CL) w/ sand & gravel, reddish brown to brown, Concrete from 9-10 ft. slightly moist. low plasticity. Moderately stiff FILL	
10–15	10–15	60	CL	0	Silty gravel (GM) to 13 ft. Light brown to light gray. soft. Dry. non-plastic. Fill ends @ 13 ft. 13 ft & below is silty clay reddish brown, moist, & med. stiff & med. plasticity.	sample 13-15'
15–20	15–20	20		0	Silty clay (CL), dark gray, wet, med. plasticity, soft.	
20–25					EOB @ 20 ft bgs	

CH2MHILL

PROJECT NUMBER	Decision Unit	Boring ID

FLOW CHART FOR SAMPLING RATIONALE

PROJECT : HART
LOCATION : Banana Patch
LAT/LONG:
DRILLING CONTRACTOR : Geotek
UTILITY CLRNCE CONFRMD: YES NO
DRILLING METHOD AND EQUIPMENT USED : DPS HAS TP

Geophysical anomalies/ Fill Exist?

	DU1	DU2	DU3	DU4	DU5	DU6
Yes	B	B	B	B	C	C
No	A	B	B	A	C	C

			Sample	Analysis
Did you see NAPL/Char/Ashes?	YES NO	IF YES:	Collect into 8-oz jar	Dioxins, Furans
Replicate collected here?	YES NO	IF YES:	Sample ID's:	
			Sample ID's:	

A - Collect only surface samples - do not perform intrusive work

B - Perform intrusive investigation.

Each boring to be divided into 3 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 0.5' bgs	0-0.5	Collect 10 plugs into ziplock	TPH-g/d/o, PAH, RCRA8, Pest/Herb, PCBs
- 0.5 to 3' bgs	0.5-3	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 8-10' bgs OR 3' interval below bottom of fill (native)	13-15	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 10' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

C - Perform intrusive investigation

Each boring to be divided into 4 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 5' bgs		Collect 10 plugs into ziplock	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 5 to 10' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 10' bgs to 15' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 15 to 28' bgs (native)		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 18' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

POST SAMPLING:

Soil remaining from each core will be kepts and stored.

	ACTUAL SUs)	Sample	Analysis
One archive for shallow (0-10)	0-3	Collect 1 VOA from shallow (0-10' bgs) and one from deep (10'+)	Archive
One archive for deep (10'+)	3-20	All remaining soil from 6 adjacent borings will be consolidated	

NOTE: Do not combine native material and fill

CH2MHILL

PROJECT NUMBER	Decision Unit DU3	Boring ID B14

SOIL BORING LOG

PROJECT : HART

LOCATION : Banana Patch

LAT/LONG:

DRILLING CONTRACTOR : Geotek

DRILLING METHOD AND EQUIPMENT USED :

WATER LEVELS :

START : 5/19/14 1315

END : 1330

LOGGER : I. Wood

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT) %	#/TYPE	PID READING (ppm)	SOIL CORE DESCRIPTION: SOIL TYPE, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: Sample Collection Information, Sample Sub-Unit Decision
0–5		80	CL	Ø	Reddish Brown SILTY CLAY with coralline gravel, med stiff/stiff dry, FILL	0–0.5' 0.5–3'
5–10		60	CL	Ø	FI 8'–9' change to Tanish Brown SILTY SAND with coralline gravel, loose, dry	None
				FILL		
10–15		80	CL	0	Same as 0–8 with some asphalt fragments	
				Native		
			ML	0	Dark Brown ~~CLAYEY~~ SILT with fine Sand soft, moist–wet	15–16'
15–20		90	ML ML		Same as above total depth 20'	
20–25						

CH2MHILL

PROJECT NUMBER	Decision Unit DU3	Boring ID B14

FLOW CHART FOR SAMPLING RATIONALE

PROJECT : HART

LOCATION : Banana Patch

LAT/LONG:

DRILLING CONTRACTOR : Geotek

UTILITY CLRNCE CONFRMD: YES NO

DRILLING METHOD AND EQUIPMENT USED : DPS HAS TP

Geophysical anomalies/ Fill Exist?

	DU1	DU2	DU3	DU4	DU5	DU6
Yes	B	B	B	B	C	C
No	A	B	B	A	C	C

Did you see NAPL/Char/Ashes? YES NO IF YES:

Sample	Analysis
Collect into 8-oz jar	Dioxins, Furans

Replicate collected here? YES NO IF YES:

Sample ID's:

Sample ID's:

A - Collect only surface samples - do not perform intrusive work

B - Perform intrusive investigation.

Each boring to be divided into 3 vertical SUs

- 0 to 0.5' bgs
- 0.5 to 3' bgs
- 8-10' bgs OR 3' interval below bottom of fill (native)

ACTUAL SUs)	Sample	Analysis
0-0.5	Collect 10 plugs into ziplock	TPH-g/d/o, PAH, RCRA8, Pest/Herb, PCBs
0.5-3	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
15-16'	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 10' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

C - Perform intrusive investigation

Each boring to be divided into 4 vertical SUs

- 0 to 5' bgs
- 5 to 10' bgs
- 10' bgs to 15' bgs
- 15 to 28' bgs (native)

ACTUAL SUs)	Sample	Analysis
	Collect 10 plugs into ziplock	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 18' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

POST SAMPLING:

Soil remaining from each core will be kepts and stored.

One archive for shallow (0-10)

One archive for deep (10'+)

ACTUAL SUs)	Sample	Analysis
0-3	Collect 1 VOA from shallow (0-10' bgs) and one from deep (10'+)	Archive
3-16	All remaining soil from 6 adjacent borings will be consolidated	

NOTE: Do not combine native material and fill

5/19/14

CH2MHILL

PROJECT NUMBER	Decision Unit	Boring ID
	3	15

SOIL BORING LOG

PROJECT : HART   LOCATION : Banana Patch

LAT/LONG: DRILLING CONTRACTOR : Geotek

DRILLING METHOD AND EQUIPMENT USED : DPS, truck-mounted

WATER LEVELS :   START : NR   END : NR   LOGGER :

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	#/TYPE	PID READING (ppm)	SOIL CORE DESCRIPTION: SOIL TYPE, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: Sample Collection Information Sample Sub-Unit Decision
5		90		0	Silty Clay (CL) with sand & trace gravel. Reddish brown slightly moist, low plasticity. Stiff. FILL	sample 0-0.5' sample 0.5-3'
10		80	FILL	0	Silty Gravel (GM), gray to brown, large basalt frags at 7 ft-8 ft. Moist, med. plasticity, moderately stiff. FILL	
15		~~90~~ 50		0	Silty Clay (CL), dark brown, moist, med. plasticity, med. stiff. ~~Coar~~ Coral sand & gravel @ ~~15-16~~ 12-13 ft. Fill ends at ~~10~~ 12 ft.	sample 13-15 ft.
20		60	CL	0	Silty clay (CL), brown to dk brown, wet 15-16 ft, moist below, med. plasticity, med. stiff.	
25					EOB @ 20 ft. bgs	

CH2MHILL

PROJECT NUMBER	Decision Unit	Boring ID

FLOW CHART FOR SAMPLING RATIONALE

PROJECT : HART   **LOCATION :** Banana Patch

LAT/LONG: **DRILLING CONTRACTOR :** Geotek

UTILITY CLRNCE CONFRMD: YES NO

DRILLING METHOD AND EQUIPMENT USED : DPS HAS TP

Geophysical anomalies/ Fill Exist?

	DU1	DU2	DU3	DU4	DU5	DU6
Yes	B	B	B	B	C	C
No	A	B	B	A	C	C

			Sample	Analysis
Did you see NAPL/Char/Ashes?	YES NO	IF YES:	Collect into 8-oz jar	Dioxins, Furans
Replicate collected here?	YES NO	IF YES:	Sample ID's:	
			Sample ID's:	

A - Collect only surface samples - do not perform intrusive work

B - Perform intrusive investigation.

Each boring to be divided into 3 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 0.5' bgs	0-0.5	Collect 10 plugs into ziplock	TPH-g/d/o, PAH, RCRA8, Pest/Herb, PCBs
- 0.5 to 3' bgs	0.5-3	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 8-10' bgs OR 3' interval below bottom of fill (native)	13-15	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 10' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

C - Perform intrusive investigation

Each boring to be divided into 4 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 5' bgs		Collect 10 plugs into ziplock	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 5 to 10' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 10' bgs to 15' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 15 to 28' bgs (native)		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 18' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

POST SAMPLING:

Soil remaining from each core will be kepts and stored.

	ACTUAL SUs)	Sample	Analysis
One archive for shallow (0-10)	0-3	Collect 1 VOA from shallow (0-10' bgs) and one from deep (10'+)	Archive
One archive for deep (10'+)	3-20	All remaining soil from 6 adjacent borings will be consolidated	

NOTE: Do not combine native material and fill

CH2MHILL

PROJECT NUMBER	Decision Unit DU3	Boring ID B16

SOIL BORING LOG

PROJECT : HART LOCATION : Banana Patch

LAT/LONG: DRILLING CONTRACTOR : Geotek

DRILLING METHOD AND EQUIPMENT USED : DPS Truck RIG

WATER LEVELS : START : 5/19/14 1340 END : 1350 LOGGER : I. wood

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	#/TYPE	PID READING (ppm)	SOIL CORE DESCRIPTION: SOIL TYPE, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: Sample Collection Information, Sample Sub-Unit Decision
0–5		60	CL/GM	Ø	Reddish Brown SILTY CLAY with coralline gravel, Med stiff, Dry (FILL)	0-0.5 0.5-3'
5–10		70	CL/GM	Ø	Same (FILL) cement pieces 7-8' asphalt 8-9' fragments	
10–15			CL/GM CL	SL	Cement pieces at 13' same as above (FILL) Reddish Brown CLAY Med stiff, moist ~~NATIVE~~	
15–20			CL/GM CL		SAME AS 0-13' FILL from 15'-17' Reddish Brown SILTY CLAY with fine sand	19-20'
20–25					Med stiff, moist NATIVE 17'-20' Stop 20' bgs	

CH2MHILL

PROJECT NUMBER	Decision Unit	Boring ID

FLOW CHART FOR SAMPLING RATIONALE

PROJECT : HART

LOCATION : Banana Patch

LAT/LONG:

DRILLING CONTRACTOR : Geotek

UTILITY CLRNCE CONFRMD: YES NO

DRILLING METHOD AND EQUIPMENT USED : DPS HAS TP

Geophysical anomalies/ Fill Exist?

	DU1	DU2	DU3	DU4	DU5	DU6
Yes	B	B	B	B	C	C
No	A	B	B	A	C	C

Sample	Analysis
Collect into 8-oz jar	Dioxins, Furans

Did you see NAPL/Char/Ashes? YES NO IF YES:

Replicate collected here? YES NO IF YES:

Sample ID's:

Sample ID's:

A - Collect only surface samples - do not perform intrusive work

B - Perform intrusive investigation.

Each boring to be divided into 3 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 0.5' bgs	0-0.5	Collect 10 plugs into ziplock	TPH-g/d/o, PAH, RCRA8, Pest/Herb, PCBs
- 0.5 to 3' bgs	0.5-3	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 8-10' bgs OR 3' interval below bottom of fill (native)	19-20'	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 10' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

C - Perform intrusive investigation

Each boring to be divided into 4 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 5' bgs		Collect 10 plugs into ziplock	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 5 to 10' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 10' bgs to 15' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 15 to 28' bgs (native)		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 18' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

POST SAMPLING:

Soil remaining from each core will be kepts and stored.

	ACTUAL SUs)	Sample	Analysis
One archive for shallow (0-10)	0-3	Collect 1 VOA from shallow (0-10' bgs) and one from deep (10'+)	Archive
One archive for deep (10'+)	3.5-19	All remaining soil from 6 adjacent borings will be consolidated	

NOTE: Do not combine native material and fill

CH2MHILL

PROJECT NUMBER	Decision Unit	Boring ID
	3	17

SOIL BORING LOG

PROJECT : **HART** LOCATION : **Banana Patch**

LAT/LONG: DRILLING CONTRACTOR : **Geotek**

DRILLING METHOD AND EQUIPMENT USED : DPS, truck-mounted

WATER LEVELS : START : NR END : NR LOGGER : B. Roder

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	#/TYPE	PID READING (ppm)	SOIL CORE DESCRIPTION: SOIL TYPE, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: Sample Collection Information Sample Sub-Unit Decision
5		90	FILL	0	Silty clay (CL) w/ sand & some gravel. Brown to light brown. Dry to slightly moist. Soft to med. stiff. non-plastic to low plasticity. FILL	sample 0-0.5 sample 0.5-3.0
10		60		0	silty clay (CL) with large rock fragments. Brown. slightly moist. Med. plasticity & med. stiff.	
15		80		0	Silty gravel (GM) to 14 ft. Silty clay (CL) 14-15 ft. Gray to brown stiff slightly moist, low plasticity. Fill ends @ 14 ft.	sample 14-17'
20		50	CL	0	Silty clay (CL), reddish brown, moist, soft, med. plasticity	
25					EOB @ 20 ft. bgs.	

CH2MHILL

PROJECT NUMBER	Decision Unit	Boring ID

FLOW CHART FOR SAMPLING RATIONALE

PROJECT : HART

LOCATION : Banana Patch

LAT/LONG:

DRILLING CONTRACTOR : Geotek

UTILITY CLRNCE CONFRMD: YES NO

DRILLING METHOD AND EQUIPMENT USED : DPS HAS TP

Geophysical anomalies/ Fill Exist?

	DU1	DU2	DU3	DU4	DU5	DU6
Yes	B	B	B	B	C	C
No	A	B	B	A	C	C

Sample	Analysis
Collect into 8-oz jar	Dioxins, Furans

Did you see NAPL/Char/Ashes? YES NO IF YES:

Replicate collected here? YES NO IF YES: Sample ID's:

Sample ID's:

A - Collect only surface samples - do not perform intrusive work

B - Perform intrusive investigation.

Each boring to be divided into 3 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 0.5' bgs	0-0.5	Collect 10 plugs into ziplock	TPH-g/d/o, PAH, RCRA8, Pest/Herb, PCBs
- 0.5 to 3' bgs	0.5-3	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 8-10' bgs OR 3' interval below bottom of fill (native)	14-17	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 10' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

C - Perform intrusive investigation

Each boring to be divided into 4 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 5' bgs		Collect 10 plugs into ziplock	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 5 to 10' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 10' bgs to 15' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 15 to 28' bgs (native)		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 18' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

POST SAMPLING:

Soil remaining from each core will be kepts and stored.

	ACTUAL SUs)	Sample	Analysis
One archive for shallow (0-10)	0-3	Collect 1 VOA from shallow (0-10' bgs) and one from deep (10'+)	Archive
One archive for deep (10'+)	3-20	All remaining soil from 6 adjacent borings will be consolidated	

NOTE: Do not combine native material and fill

CH2MHILL

PROJECT NUMBER	Decision Unit	Boring ID
	DU3	B18

SOIL BORING LOG

PROJECT : HART LOCATION : Banana Patch

LAT/LONG: DRILLING CONTRACTOR : Geotek

DRILLING METHOD AND EQUIPMENT USED : DPS Truck RIG

WATER LEVELS : START : 5/19/14 1400 END : 1415 LOGGER : I. Wood

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	#/TYPE	* PID READING (ppm)	SOIL CORE DESCRIPTION: SOIL TYPE, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: Sample Collection Information Sample Sub-Unit Decision
5		40	CL/GM	Ø	Reddish Brown SILTY CLAY with gravel, stiff, dry, FILL	0-0.5 0-3
10		50		Ø	SAME, Basalt ~~Rocks~~ Gravel Present 9-10'	None
15		50	CL		SAME, 14-15' ~~Reddi~~ as above but CLAY, med stiff, moist FILL	NONE
20			CL/GM CL		FILL as 0-14' cement fragments at 17'. 18.5' Reddish Brown	
25			CL		CLAY, with trace gravel, med stiff, moist, transition to native Total depth 20' bgs	19-20

Native

PID every 6" of core

CH2MHILL

PROJECT NUMBER	Decision Unit DU3	Boring ID B18

FLOW CHART FOR SAMPLING RATIONALE

PROJECT : HART **LOCATION :** Banana Patch

LAT/LONG: **DRILLING CONTRACTOR :** Geotek

UTILITY CLRNCE CONFRMD: YES NO

DRILLING METHOD AND EQUIPMENT USED : DPS HAS TP

Geophysical anomalies/ Fill Exist?

	DU1	DU2	DU3	DU4	DU5	DU6
Yes	B	B	B	B	C	C
No	A	B	B	A	C	C

Did you see NAPL/Char/Ashes? YES NO IF YES:

Sample	Analysis
Collect into 8-oz jar	Dioxins, Furans

Replicate collected here? YES NO IF YES:

Sample ID's:
Sample ID's:

A - Collect only surface samples - do not perform intrusive work

B - Perform intrusive investigation.

Each boring to be divided into 3 vertical SUs

- 0 to 0.5' bgs
- 0.5 to 3' bgs
- 8-10' bgs OR 3' interval below bottom of fill (native)

ACTUAL SUs)	Sample	Analysis
0-0.5	Collect 10 plugs into ziplock	TPH-g/d/o, PAH, RCRA8, Pest/Herb, PCBs
0.5-3	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
19-20	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 10' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

C - Perform intrusive investigation

Each boring to be divided into 4 vertical SUs

- 0 to 5' bgs
- 5 to 10' bgs
- 10' bgs to 15' bgs
- 15 to 28' bgs (native)

ACTUAL SUs)	Sample	Analysis
	Collect 10 plugs into ziplock	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 18' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

POST SAMPLING:

Soil remaining from each core will be kepts and stored.

One archive for shallow (0-10)

One archive for deep (10'+) fill

ACTUAL SUs)	Sample	Analysis
0-3	Collect 1 VOA from shallow (0-10' bgs) and one from deep (10'+)	Archive
3-18.5	All remaining soil from 6 adjacent borings will be consolidated	

NOTE: Do not combine native material and fill 18.5-20 - native

5-19-14

CH2MHILL

PROJECT NUMBER	Decision Unit 3	Boring ID 19

SOIL BORING LOG

PROJECT : HART LOCATION : Banana Patch

LAT/LONG: DRILLING CONTRACTOR : Geotek

DRILLING METHOD AND EQUIPMENT USED : DPS, truck-mounted

WATER LEVELS : START : NR END : NR LOGGER : B. Roder

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	#/TYPE	PID READING (ppm)	SOIL CORE DESCRIPTION: SOIL TYPE, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: Sample Collection Information, Sample Sub-Unit Decision
0–5	↕	60	FILL	0	Silty clay (CL) with some gravel. Light brown to brown. Dry to slightly moist. Non-plastic to low plasticity. Soft to stiff. FILL	sample 0-0.5 sample 0.5-3
5–10	↕	90	FILL	0	Silty clay (CL) with some gravel. Brown to reddish brown. Coral sand 6.5-7'. Cement frags 9.5-10'. Slightly moist, low plasticity. Stiff. FILL	
10–15	↕	70	FILL	0	Silty clay (CL) with some gravel. Brown. Slightly moist. Low to med. plasticity. Moderately stiff. Fill ends @ 14 ft.	~~sample 15-18 ft.~~ BR
15–20	↕	50	CL	0	Silty clay (CL). Reddish brown. Moist. Med. plasticity & med. stiffness. EOB @ 20 ft.	sample 15-18 ft.
20–25						

CH2MHILL

PROJECT NUMBER	Decision Unit 3	Boring ID 19

FLOW CHART FOR SAMPLING RATIONALE

PROJECT : HART

LOCATION : Banana Patch

LAT/LONG:

DRILLING CONTRACTOR : Geotek

UTILITY CLRNCE CONFRMD: YES NO

DRILLING METHOD AND EQUIPMENT USED : DPS HAS TP

Geophysical anomalies/ Fill Exist?

	DU1	DU2	DU3	DU4	DU5	DU6
Yes	B	B	B	B	C	C
No	A	B	B	A	C	C

Did you see NAPL/Char/Ashes? YES NO IF YES:

Sample	Analysis
Collect into 8-oz jar	Dioxins, Furans

Replicate collected here? YES NO IF YES:

Sample ID's:

Sample ID's:

A - Collect only surface samples - do not perform intrusive work

B - Perform intrusive investigation.

Each boring to be divided into 3 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 0.5' bgs	0-0.5	Collect 10 plugs into ziplock	TPH-g/d/o, PAH, RCRA8, Pest/Herb, PCBs
- 0.5 to 3' bgs	0.5-3	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 8-10' bgs OR 3' interval below bottom of fill (native)	15-18	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 10' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

C - Perform intrusive investigation

Each boring to be divided into 4 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 5' bgs		Collect 10 plugs into ziplock	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 5 to 10' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 10' bgs to 15' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 15 to 28' bgs (native)		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 18' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

POST SAMPLING:

Soil remaining from each core will be kepts and stored.

	ACTUAL SUs)	Sample	Analysis
One archive for shallow (0-10)	0-3	Collect 1 VOA from shallow (0-10' bgs) and one from deep (10'+)	Archive
One archive for deep (10'+)	3-20	All remaining soil from 6 adjacent borings will be consolidated	

NOTE: Do not combine native material and fill

CH2MHILL

PROJECT NUMBER	Decision Unit DU3	Boring ID B20

SOIL BORING LOG

PROJECT : HART LOCATION : Banana Patch

LAT/LONG: DRILLING CONTRACTOR : Geotek

DRILLING METHOD AND EQUIPMENT USED : DPS Track Rig

WATER LEVELS : START : 5/19/14 1445 END : 1500 LOGGER : I. Wood

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT) %	#/TYPE	PID READING (ppm)	SOIL CORE DESCRIPTION: SOIL TYPE, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: Sample Collection Information Sample Sub-Unit Decision
5		95	~~SC~~ CL	Ø	Reddish Brown SILTY CLAY with Gravel, Very stiff, dry (Fill)	0-0.5' 0.5-3'
10		95	CL/GM	Ø	~~Same~~ ~~bas~~ Reddish Brown SILTY CLAY and Gravel (basalt and coralline) ~~coralline gravels~~ FILL	No samples -loose 5-7' -stiff 7-10'
15		85		Ø	SAME, concrete fragments at 17' s~~tiff~~ CL/GM dense	No samples
			~~SC~~	Ø	Reddish Brown CLAYEY SILT, soft, trace fine sand, moist	17' NATIVE 19-20
20		80				
25						

CH2MHILL

PROJECT NUMBER	Decision Unit	Boring ID

FLOW CHART FOR SAMPLING RATIONALE

PROJECT : HART **LOCATION :** Banana Patch

LAT/LONG: **DRILLING CONTRACTOR :** Geotek

UTILITY CLRNCE CONFRMD: YES NO

DRILLING METHOD AND EQUIPMENT USED : DPS HAS TP

Geophysical anomalies/ Fill Exist?

	DU1	DU2	DU3	DU4	DU5	DU6
Yes	B	B	B	B	C	C
No	A	B	B	A	C	C

			Sample	Analysis
Did you see NAPL/Char/Ashes?	YES	NO	IF YES: Collect into 8-oz jar	Dioxins, Furans
Replicate collected here?	YES	NO	IF YES: Sample ID's:	
			Sample ID's:	

A - Collect only surface samples - do not perform intrusive work

B - Perform intrusive investigation.

Each boring to be divided into 3 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 0.5' bgs	0-0.5	Collect 10 plugs into ziplock	TPH-g/d/o, PAH, RCRA8, Pest/Herb, PCBs
- 0.5 to 3' bgs	0.5-3	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 8-10' bgs OR 3' interval below bottom of fill (native)	19-20	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 10' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

C - Perform intrusive investigation

Each boring to be divided into 4 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 5' bgs		Collect 10 plugs into ziplock	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 5 to 10' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 10' bgs to 15' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 15 to 28' bgs (native)		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 18' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

POST SAMPLING:

Soil remaining from each core will be kepts and stored.

FILL

	ACTUAL SUs)	Sample	Analysis
One archive for shallow (0-10)	0-3	Collect 1 VOA from shallow (0-10' bgs) and one from deep (10'+)	Archive
One archive for deep (10'+)	3-17	All remaining soil from 6 adjacent borings will be consolidated	

NOTE: Do not combine native material and fill and 17-20 Native

5-19-14

CH2MHILL	PROJECT NUMBER	Decision Unit 3	Boring ID 21

SOIL BORING LOG

PROJECT : **HART** LOCATION : **Banana Patch**

LAT/LONG: DRILLING CONTRACTOR : **Geotek**

DRILLING METHOD AND EQUIPMENT USED : DPS, truck-mounted

WATER LEVELS : START : NR END : NR LOGGER : B. Roder

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	#/TYPE	PID READING (ppm)	SOIL CORE DESCRIPTION: SOIL TYPE, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: Sample Collection Information Sample Sub-Unit Decision
0–5	0–5	90	FILL	0	Silty Clay (CL) with sand & gravel. Light brown to reddish brown. Slightly moist, ~~m~~ low plasticity, soft to moderately stiff. Concrete @ 3-4'. FILL	sample 0-0.5 sample 0.5-3
5–10	5–10	100	FILL	0	Silty clay (CL) with trace gravel. Brown. Moist. Med. plasticity. Med. stiff. Cement & rock frags 7-10 ft. FILL	
10–15	10–15	40		0	Same as 5-10 ft. Concrete & rock frags at 13-15 ft.	
15–20	15–20	80	CL	0	Silty clay (CL), reddish brown. Trace rock frags basalt. Moist to wet. Med. plasticity. Med. stiff. Fill ends @ 16 ft.	sample 17-20
20–25					EOB @ ~~to~~ 20 ft. bgs	

CH2MHILL

PROJECT NUMBER	Decision Unit 3	Boring ID 21

FLOW CHART FOR SAMPLING RATIONALE

PROJECT : HART

LOCATION : Banana Patch

LAT/LONG:

DRILLING CONTRACTOR : Geotek

UTILITY CLRNCE CONFRMD: YES NO

DRILLING METHOD AND EQUIPMENT USED : DPS HAS TP

Geophysical anomalies/ Fill Exist?

	DU1	DU2	DU3	DU4	DU5	DU6
Yes	B	B	B	B	C	C
No	A	B	B	A	C	C

			Sample	Analysis
Did you see NAPL/Char/Ashes?	YES NO	IF YES:	Collect into 8-oz jar	Dioxins, Furans
Replicate collected here?	YES NO	IF YES:	Sample ID's:	
			Sample ID's:	

A - Collect only surface samples - do not perform intrusive work

B - Perform intrusive investigation.

Each boring to be divided into 3 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 0.5' bgs	0-0.5	Collect 10 plugs into ziplock	TPH-g/d/o, PAH, RCRA8, Pest/Herb, PCBs
- 0.5 to 3' bgs	0.5-3	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 8-10' bgs OR 3' interval below bottom of fill (native)	17-20	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 10' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

C - Perform intrusive investigation

Each boring to be divided into 4 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 5' bgs		Collect 10 plugs into ziplock	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 5 to 10' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 10' bgs to 15' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 15 to 28' bgs (native)		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 18' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

POST SAMPLING:

Soil remaining from each core will be kepts and stored.

	ACTUAL SUs)	Sample	Analysis
One archive for shallow (0-10)	0-3	Collect 1 VOA from shallow (0-10' bgs) and one from deep (10'+)	Archive
One archive for deep (10'+)	3-20	All remaining soil from 6 adjacent borings will be consolidated	

NOTE: Do not combine native material and fill

CH2MHILL

PROJECT NUMBER	Decision Unit	Boring ID
457998	3	~~23~~ 22

SOIL BORING LOG

PROJECT : HART LOCATION : Banana Patch

LAT/LONG: DRILLING CONTRACTOR : Geotek

DRILLING METHOD AND EQUIPMENT USED : DPS

WATER LEVELS : START : NR END : NR LOGGER : B. Roder

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	#/TYPE	PID READING (ppm)	SOIL CORE DESCRIPTION: SOIL TYPE, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: Sample Collection Information, Sample Sub-Unit Decision
0–5	↕	50	FILL	0	Silty clay (CL) with sand & some gravel. Light brown to reddish brown. Slightly moist. Low plasticity. Coral gravel @ 4 ft. Moderately stiff.	sample 0-0.5 sample 0.5-3
5–10	↕	~~90~~ 60	FILL	0	Silty clay (CL), trace gravel. Reddish brown. Moist, med. plasticity, med. stiffness.	
10–15	↕	70	FILL	0	~~Silty clay~~ Same as 5-10 ft. Basalt frags at 13 ft.	
15–20	↕	70	a	0	Same as above. Wet at 19 ft. Dark brown. Fill ends @ 17 ft.	sample 17-20
20–25					EOB @ 20 ft bgs.	

PROJECT NUMBER	Decision Unit 3	Boring ID 22

CH2MHILL

FLOW CHART FOR SAMPLING RATIONALE

PROJECT : HART **LOCATION :** Banana Patch

LAT/LONG: **DRILLING CONTRACTOR :** Geotek

UTILITY CLRNCE CONFRMD: YES NO

DRILLING METHOD AND EQUIPMENT USED : DPS HAS TP

Geophysical anomalies/ Fill Exist?

	DU1	DU2	DU3	DU4	DU5	DU6
Yes	B	B	B	B	C	C
No	A	B	B	A	C	C

Did you see NAPL/Char/Ashes? YES NO IF YES:

Sample	Analysis
Collect into 8-oz jar	Dioxins, Furans

Replicate collected here? YES NO IF YES:

Sample ID's:
Sample ID's:

A - Collect only surface samples - do not perform intrusive work

B - Perform intrusive investigation.

Each boring to be divided into 3 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 0.5' bgs	0-0.5	Collect 10 plugs into ziplock	TPH-g/d/o, PAH, RCRA8, Pest/Herb, PCBs
- 0.5 to 3' bgs	0.5-3	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 8-10' bgs OR 3' interval below bottom of fill (native)	17-20	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 10' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

C - Perform intrusive investigation

Each boring to be divided into 4 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 5' bgs		Collect 10 plugs into ziplock	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 5 to 10' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 10' bgs to 15' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 15 to 28' bgs (native)		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 18' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

POST SAMPLING:

Soil remaining from each core will be kepts and stored.

	ACTUAL SUs)	Sample	Analysis
One archive for shallow (0-10)	0-3	Collect 1 VOA from shallow (0-10' bgs) and one from deep (10'+)	Archive
One archive for deep (10'+)	3-20	All remaining soil from 6 adjacent borings will be consolidated	

NOTE: Do not combine native material and fill

CH2MHILL

PROJECT NUMBER	Decision Unit DU3	Boring ID B23

FLOW CHART FOR SAMPLING RATIONALE

PROJECT : HART

LOCATION : Banana Patch

LAT/LONG:

DRILLING CONTRACTOR : Geotek

UTILITY CLRNCE CONFRMD: YES NO

DRILLING METHOD AND EQUIPMENT USED : DPS HAS TP

Geophysical anomalies/ Fill Exist?

	DU1	DU2	DU3	DU4	DU5	DU6
Yes	B	B	B	B	C	C
No	A	B	B	A	C	C

Did you see NAPL/Char/Ashes? YES NO IF YES:

Sample	Analysis
Collect into 8-oz jar	Dioxins, Furans

Replicate collected here? YES NO IF YES:

Sample ID's:
Sample ID's:

A - Collect only surface samples - do not perform intrusive work

B - Perform intrusive investigation.

Each boring to be divided into 3 vertical SUs

- 0 to 0.5' bgs
- 0.5 to 3' bgs
- 8-10' bgs OR 3' interval below bottom of fill (native)

ACTUAL SUs)	Sample	Analysis
0-0.5	Collect 10 plugs into ziplock	TPH-g/d/o, PAH, RCRA8, Pest/Herb, PCBs
0.5-3	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
15.5-17	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 10' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

C - Perform intrusive investigation

Each boring to be divided into 4 vertical SUs

- 0 to 5' bgs
- 5 to 10' bgs
- 10' bgs to 15' bgs
- 15 to 28' bgs (native)

ACTUAL SUs)	Sample	Analysis
	Collect 10 plugs into ziplock	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 18' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

POST SAMPLING:

Soil remaining from each core will be kepts and stored.

One archive for shallow (0-10)

One archive for deep (10'+) (1)

ACTUAL SUs)	Sample	Analysis
0-3	Collect 1 VOA from shallow (0-10' bgs) and one from deep (10'+)	Archive
3.5 15.5	All remaining soil from 6 adjacent borings will be consolidated	

NOTE: Do not combine native material and fill

(2) 15.5-17'

CH2MHILL

PROJECT NUMBER	Decision Unit	Boring ID
	DU3	B23

SOIL BORING LOG

PROJECT : **HART** LOCATION : **Banana Patch**

LAT/LONG: DRILLING CONTRACTOR : **Geotek**

DRILLING METHOD AND EQUIPMENT USED :

WATER LEVELS : START : 5/29/14 1315 END : 1530 LOGGER : I. Wood

DEPTH BELOW SURFACE (FT)	INTERVAL (FT) %/ID	RECOVERY (FT)	#/TYPE	PID READING (ppm)	SOIL CORE DESCRIPTION: SOIL TYPE, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: Sample Collection Information Sample Sub-Unit Decision
					Refusal at 5' ~~twice~~ two times then pass to ~~10'~~ 17' total depth refusal at 17' on concrete-dry	
0		60	CL/GM	Ø	Reddish Brown SILTY CLAY and ~~with~~ Gravels, loose, dry FILL	0 – 0.5' 0.5 – 3'
5		80		Ø	-6' concrete fragments -8' asphalt fragments FILL	
10		90	CL	Ø	Reddish Brown SILTY CLAY very stiff, dry FILL	
15		80		Ø		15.5 – 17' right above concrete
					Refusal at 17' bgs on concrete No native material present	
20						

CH2MHILL

PROJECT NUMBER	Decision Unit	Boring ID
457998	3	24

SOIL BORING LOG

PROJECT : HART LOCATION : Banana Patch

LAT/LONG: DRILLING CONTRACTOR : Geotek

DRILLING METHOD AND EQUIPMENT USED : DPS, track-mounted

WATER LEVELS : START : NR END : NR LOGGER : B. Roder

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	#/TYPE	PID READING (ppm)	SOIL CORE DESCRIPTION: SOIL TYPE, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: Sample Collection Information Sample Sub-Unit Decision
5		70		0	Silty clay (CL) with trace gravel and sand. Light gray intermixed with brown. Dry to moist. Non-plastic to low plasticity soft to stiff. FILL	0-0.5' 0.5-3.0'
10		70	FILL	0	Silty clay (CL) with trace gravel. Brown. low plasticity. moderately stiff. slightly moist. Concrete frags @ 5-6 ft. FILL	
15		5 ~~20~~		0	Same as 5-10 ft. FILL. ~~Refusal @ 12 ft.~~ ~~EOB @ 12 ft.~~ So loose, only 5% recovered. Drillers said wet @ 15 ft.	
20		0	unknown	0	5 ft. of water in acetate sleeve. Pea gravel appears to be present, preventing sample collection. EOB @ 20'	
25					* constructing temp. well at this location, screened from 15-20 ft.	

* Refusal, lost rod down hole. Stepped out ~3 ft. Hit refusal again at 12 ft. Stepped out a third time, ~10 ft away.

CH2MHILL

PROJECT NUMBER	Decision Unit	Boring ID

FLOW CHART FOR SAMPLING RATIONALE

PROJECT : HART　　**LOCATION :** Banana Patch

LAT/LONG:　　**DRILLING CONTRACTOR :** Geotek

UTILITY CLRNCE CONFRMD: YES NO

DRILLING METHOD AND EQUIPMENT USED : DPS HAS TP

Geophysical anomalies/ Fill Exist?

	DU1	DU2	DU3	DU4	DU5	DU6
Yes	B	B	B	B	C	C
No	A	B	B	A	C	C

Did you see NAPL/Char/Ashes? YES NO　IF YES:

Sample	Analysis
Collect into 8-oz jar	Dioxins, Furans

Replicate collected here? YES NO　IF YES: Sample ID's:

Sample ID's:

A - Collect only surface samples - do not perform intrusive work

B - Perform intrusive investigation.

Each boring to be divided into 3 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 0.5' bgs	0-0.5	Collect 10 plugs into ziplock	TPH-g/d/o, PAH, RCRA8, Pest/Herb, PCBs
- 0.5 to 3' bgs	0.5-3	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 8-10' bgs OR 3' interval below bottom of fill (native)		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

No Sample collected. No native material recovered.

1 - If no fill exists, completed boring to 10' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

C - Perform intrusive investigation

Each boring to be divided into 4 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 5' bgs		Collect 10 plugs into ziplock	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 5 to 10' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 10' bgs to 15' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 15 to 28' bgs (native)		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 18' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

POST SAMPLING:

Soil remaining from each core will be kepts and stored.

	ACTUAL SUs)	Sample	Analysis
One archive for shallow (0-10)	0-3	Collect 1 VOA from shallow (0-10' bgs) and one from deep (10'+)	Archive
One archive for deep (10'+)	3-15	All remaining soil from 6 adjacent borings will be consolidated	

NOTE: Do not combine native material and fill

0% recovered 15-20 ft.

CH2MHILL

PROJECT NUMBER	Decision Unit	Boring ID
451998	3	25

SOIL BORING LOG

PROJECT : HART LOCATION : Banana Patch

LAT/LONG: DRILLING CONTRACTOR : Geotek

DRILLING METHOD AND EQUIPMENT USED : DPS, track-mounted

WATER LEVELS : START : NR END : NR LOGGER :

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	#/TYPE	PID READING (ppm)	SOIL CORE DESCRIPTION: SOIL TYPE, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: Sample Collection Information Sample Sub-Unit Decision
5		80		0	Silty clay (CL) with some gravel & sand. Soft down to 3 ft. ~~Hard~~ Stiff but loose 3-5 ft. Reddish brown mixed with gray. Dry. Nonplastic. FILL	0-0.5' 0.5-3.0'
10		70		0	Silty clay (CL) with some gravel. Reddish brown. Slightly moist. Nonplastic. Stiff. Concrete frags at 8-9.5 ft. FILL	
15		80	FILL	0	Same as 5-10 ft. Concrete debris from 11-13 ft. FILL	
20		80	CL	0	Same as 5-10 ft. until 18 ft. Concrete frags & debris 18-19 ft. FILL. Silty clay (CL) at 19 ft. Reddish brown. Moist. Low to med. plasticity. Med. stiff. Fill ends at 19 ft.	19-20'
25					EOB @ 20'	

CH2MHILL

PROJECT NUMBER	Decision Unit	Boring ID

FLOW CHART FOR SAMPLING RATIONALE

PROJECT : HART　　**LOCATION :** Banana Patch

LAT/LONG:　　**DRILLING CONTRACTOR :** Geotek

UTILITY CLRNCE CONFRMD: YES NO

DRILLING METHOD AND EQUIPMENT USED : DPS HAS TP

Geophysical anomalies/ Fill Exist?

	DU1	DU2	DU3	DU4	DU5	DU6
Yes	B	B	B	B	C	C
No	A	B	B	A	C	C

			IF YES:	Sample	Analysis
Did you see NAPL/Char/Ashes?	YES	NO	IF YES:	Collect into 8-oz jar	Dioxins, Furans
Replicate collected here?	YES	NO	IF YES:	Sample ID's:	
				Sample ID's:	

A - Collect only surface samples - do not perform intrusive work

B - Perform intrusive investigation.

Each boring to be divided into 3 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 0.5' bgs	0-0.5	Collect 10 plugs into ziplock	TPH-g/d/o, PAH, RCRA8, Pest/Herb, PCBs
- 0.5 to 3' bgs	0.5-3	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 8-10' bgs OR 3' interval below bottom of fill (native)	19-20	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 10' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

C - Perform intrusive investigation

Each boring to be divided into 4 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 5' bgs		Collect 10 plugs into ziplock	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 5 to 10' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 10' bgs to 15' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 15 to 28' bgs (native)		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 18' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

POST SAMPLING:

Soil remaining from each core will be kepts and stored.

	ACTUAL SUs)	Sample	Analysis
One archive for shallow (0-10)	0-3	Collect 1 VOA from shallow (0-10' bgs) and one from deep (10'+)	Archive
One archive for deep (10'+)	3-20	All remaining soil from 6 adjacent borings will be consolidated	

NOTE: Do not combine native material and fill

CH2MHILL

PROJECT NUMBER	Decision Unit	Boring ID
457998	3	26

SOIL BORING LOG

PROJECT : HART LOCATION : Banana Patch

LAT/LONG: DRILLING CONTRACTOR : Geotek

DRILLING METHOD AND EQUIPMENT USED : DPS, track-mounted

WATER LEVELS : START : NR END : NR LOGGER : B. Roder

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	#/TYPE	PID READING (ppm)	SOIL CORE DESCRIPTION: SOIL TYPE, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: Sample Collection Information, Sample Sub-Unit Decision
0–5		60	FILL	0	Silty clay (CL) with some gravel. Brown. Some coral gravel. Dry. Non-plastic. Soft to moderately stiff. Metal debris at 5 ft. FILL	0-0.5' 0.5-3.0'
5–10		80		0	Silty gravel (GM). Brown. Dry. Moderately stiff. Nonplastic. Friable concrete 7-9 ft. FILL	
10–15		60		0	Same as 5-10 ft. Concrete frags ~~17-18~~ 16-17'. Some glass frags. FILL	
15–20		40		0	Same as 5-10 ft. EOB @ 20'	
20–25						

CH2MHILL

PROJECT NUMBER	Decision Unit	Boring ID

FLOW CHART FOR SAMPLING RATIONALE

PROJECT : HART **LOCATION :** Banana Patch

LAT/LONG: **DRILLING CONTRACTOR :** Geotek

UTILITY CLRNCE CONFRMD: YES NO

DRILLING METHOD AND EQUIPMENT USED : DPS HAS TP

Geophysical anomalies/ Fill Exist?

	DU1	DU2	DU3	DU4	DU5	DU6
Yes	B	B	B	B	C	C
No	A	B	B	A	C	C

Sample	Analysis
Collect into 8-oz jar	Dioxins, Furans

Did you see NAPL/Char/Ashes? YES NO IF YES:

Replicate collected here? YES NO IF YES:

Sample ID's:

Sample ID's:

A - Collect only surface samples - do not perform intrusive work

B - Perform intrusive investigation.

Each boring to be divided into 3 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 0.5' bgs	0-0.5	Collect 10 plugs into ziplock	TPH-g/d/o, PAH, RCRA8, Pest/Herb, PCBs
- 0.5 to 3' bgs	0.5-3	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 8-10' bgs OR 3' interval below bottom of fill (native)		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 10' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

C - Perform intrusive investigation

Each boring to be divided into 4 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 5' bgs		Collect 10 plugs into ziplock	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 5 to 10' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 10' bgs to 15' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 15 to 28' bgs (native)		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 18' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

POST SAMPLING:

Soil remaining from each core will be kepts and stored.

	ACTUAL SUs)	Sample	Analysis
One archive for shallow (0-10)	0-3	Collect 1 VOA from shallow (0-10' bgs) and one from deep (10'+)	Archive
One archive for deep (10'+)	3-20	All remaining soil from 6 adjacent borings will be consolidated	

NOTE: Do not combine native material and fill

CH2MHILL

PROJECT NUMBER	Decision Unit DU3	Boring ID B27

SOIL BORING LOG

PROJECT : **HART** LOCATION : **Banana Patch**

LAT/LONG: DRILLING CONTRACTOR : **Geotek**

DRILLING METHOD AND EQUIPMENT USED :

WATER LEVELS : START : END : LOGGER :

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	#/TYPE	PID READING (ppm)	SOIL CORE DESCRIPTION: SOIL TYPE, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: Sample Collection Information Sample Sub-Unit Decision
5		60	FILL		Silty clay (CL) with some gravel. 0.5-1' coral gravel. 1-3 basalt rock frags, 3-5 reddish brown, dry, friable, med. stiff. FILL	0-0.5' 0.5-3.0'
10		50	FILL		Silty clay (CL) w/gravel. Brown to reddish brown. Large (5-10cm) basalt frags. Dry, soft to moderately stiff. Nonplastic. FILL	
15		90	FILL		Silty gravel (GM). 30% coral gravel. White to brown. Dry. soft to moderately stiff. Nonplastic.	
20		40	FILL / CL		Same as 10-15 ft. Silty clay (CL) at 18 ft. Reddish brown. Moist. Med. plasticity. ~~Med.~~ Moderately stiff. FILL ends at 18 ft.	18-20'
25					EOB @ 20'	

CH2MHILL

PROJECT NUMBER	Decision Unit	Boring ID

FLOW CHART FOR SAMPLING RATIONALE

PROJECT : HART
LOCATION : Banana Patch
LAT/LONG:
DRILLING CONTRACTOR : Geotek
UTILITY CLRNCE CONFRMD: YES NO
DRILLING METHOD AND EQUIPMENT USED : DPS HAS TP

Geophysical anomalies/ Fill Exist?

	DU1	DU2	DU3	DU4	DU5	DU6
Yes	B	B	B	B	C	C
No	A	B	B	A	C	C

Did you see NAPL/Char/Ashes? YES NO IF YES:

Sample	Analysis
Collect into 8-oz jar	Dioxins, Furans

Replicate collected here? YES NO IF YES:

Sample ID's:

Sample ID's:

A - Collect only surface samples - do not perform intrusive work

B - Perform intrusive investigation.

Each boring to be divided into 3 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 0.5' bgs	0-0.5	Collect 10 plugs into ziplock	TPH-g/d/o, PAH, RCRA8, Pest/Herb, PCBs
- 0.5 to 3' bgs	0.5-3	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 8-10' bgs OR 3' interval below bottom of fill (native)	18-20	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 10' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

C - Perform intrusive investigation

Each boring to be divided into 4 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 5' bgs		Collect 10 plugs into ziplock	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 5 to 10' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 10' bgs to 15' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 15 to 28' bgs (native)		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 18' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

POST SAMPLING:

Soil remaining from each core will be kepts and stored.

	ACTUAL SUs)	Sample	Analysis
One archive for shallow (0-10)	0-3	Collect 1 VOA from shallow (0-10' bgs) and one from deep (10'+)	Archive
One archive for deep (10'+)	3-20	All remaining soil from 6 adjacent borings will be consolidated	

NOTE: Do not combine native material and fill

CH2MHILL

PROJECT NUMBER	Decision Unit	Boring ID
	DU3	B28

SOIL BORING LOG

PROJECT : **HART** LOCATION : **Banana Patch**

LAT/LONG: DRILLING CONTRACTOR : **Geotek**

DRILLING METHOD AND EQUIPMENT USED : DPS Rig

WATER LEVELS : START : 5/20/14 11:00 END : 11:15 LOGGER : I. Wood

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT) %	#/TYPE	PID READING (ppm)	SOIL CORE DESCRIPTION: SOIL TYPE, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: Sample Collection Information, Sample Sub-Unit Decision
0–5		70	Fill	0	Road Fill, asphalt and pea gravels	0-0.5'
			SM CL	0	Whitish Tan SILTY SAND with gravel, dry (asphalt fragments) loose	0.5-3'
5–10		40	SM	0	Reddish Brown SILTY ~~CLAY~~ with gravel, coralline, stiff, dry	
				0	Redish Brown SILTY SAND with gravel, loose, dry (FILL)	
10–15		80	SM	0	9-10' concrete fragments present, coral gravels	
				0	SAME FILL	
15–20		100		0	SAME FILL	
			CL	0	Redish Brown Clay, med stiff, moist, trace gravel NATIVE	18.5-20
20–25					~~Stop at~~ Stop at 20' bgs.	

PID every 6"

CH2MHILL

PROJECT NUMBER	Decision Unit DU3	Boring ID B28

FLOW CHART FOR SAMPLING RATIONALE

PROJECT : HART **LOCATION :** Banana Patch

LAT/LONG: **DRILLING CONTRACTOR :** Geotek

UTILITY CLRNCE CONFRMD: YES NO

DRILLING METHOD AND EQUIPMENT USED : DPS HAS TP

Geophysical anomalies/ Fill Exist?

	DU1	DU2	DU3	DU4	DU5	DU6
Yes	B	B	B	B	C	C
No	A	B	B	A	C	C

Sample	Analysis
Collect into 8-oz jar	Dioxins, Furans

Did you see NAPL/Char/Ashes? YES NO IF YES:

Replicate collected here? YES NO IF YES: Sample ID's:

Sample ID's:

A - Collect only surface samples - do not perform intrusive work

B - Perform intrusive investigation.

Each boring to be divided into 3 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 0.5' bgs	0-0.5	Collect 10 plugs into ziplock	TPH-g/d/o, PAH, RCRA8, Pest/Herb, PCBs
- 0.5 to 3' bgs	0.5-3	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 8-10' bgs OR 3' interval below bottom of fill (native)	18.5-20	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 10' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

C - Perform intrusive investigation

Each boring to be divided into 4 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 5' bgs		Collect 10 plugs into ziplock	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 5 to 10' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 10' bgs to 15' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 15 18 to 28' bgs (native)		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 18' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

POST SAMPLING:

Soil remaining from each core will be kepts and stored.

	ACTUAL SUs)	Sample	Analysis
One archive for shallow (0-10)	0-3	Collect 1 VOA from shallow (0-10' bgs) and one from deep (10'+)	Archive
One archive for deep (10'+)	3-17	All remaining soil from 6 adjacent borings will be consolidated	

NOTE: Do not combine native material and fill

fill

17-20 NATIVE

CH2MHILL

PROJECT NUMBER	Decision Unit 3	Boring ID 29

SOIL BORING LOG

PROJECT : HART LOCATION : Banana Patch

LAT/LONG: DRILLING CONTRACTOR : Geotek

DRILLING METHOD AND EQUIPMENT USED : DPS, I

WATER LEVELS : START : NR END : NR LOGGER : B. Roder

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	#/TYPE	PID READING (ppm)	SOIL CORE DESCRIPTION: SOIL TYPE, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: Sample Collection Information Sample Sub-Unit Decision
5	0-5	70	FILL	0	Silty clay (CL) with gravel. Brown to reddish brown. Dry to slightly moist. Soft in 0-1'; gravel-rich. Stiff 1-5'. Brick frags @ 3'. Nonplastic to low plasticity FILL	0-0.5' 0.5-3.0'
10	5-10	30		0	Silty gravel (GM). Dark brown. Dry. Friable. Soft. Nonplastic. Basaltic gravel.	
15	10-15	20		0	Same as 5-10'. Some coral gravel. Trash debris (possibly ~~cardbo~~ pressboard) at 6'.	
20	15-20	40	CL	0	Same as 5-10'. Concrete frags at 19 ft. Fill ends at 19 ft. Silty clay (CL) 19-20'. Reddish brown. Moist. Med. plasticity. med. stiffness.	19-20'
25					EOB @ 20'	

CH2MHILL

PROJECT NUMBER	Decision Unit	Boring ID

FLOW CHART FOR SAMPLING RATIONALE

PROJECT : HART

LOCATION : Banana Patch

LAT/LONG:

DRILLING CONTRACTOR : Geotek

UTILITY CLRNCE CONFRMD: YES NO

DRILLING METHOD AND EQUIPMENT USED : DPS HAS TP

Geophysical anomalies/ Fill Exist?

	DU1	DU2	DU3	DU4	DU5	DU6
Yes	B	B	B	B	C	C
No	A	B	B	A	C	C

			Sample	Analysis
Did you see NAPL/Char/Ashes?	YES	NO	IF YES: Collect into 8-oz jar	Dioxins, Furans
Replicate collected here?	YES	NO	IF YES: Sample ID's:	
			Sample ID's:	

A - Collect only surface samples - do not perform intrusive work

B - Perform intrusive investigation.

Each boring to be divided into 3 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 0.5' bgs	0-0.5	Collect 10 plugs into ziplock	TPH-g/d/o, PAH, RCRA8, Pest/Herb, PCBs
- 0.5 to 3' bgs	0.5-3	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 8-10' bgs OR 3' interval below bottom of fill (native)	19-20	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 10' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

C - Perform intrusive investigation

Each boring to be divided into 4 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 5' bgs		Collect 10 plugs into ziplock	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 5 to 10' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 10' bgs to 15' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 15 to 28' bgs (native)		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 18' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

POST SAMPLING:

Soil remaining from each core will be kepts and stored.

	ACTUAL SUs)	Sample	Analysis
One archive for shallow (0-10)	0-3	Collect 1 VOA from shallow (0-10' bgs) and one from deep (10'+)	Archive
One archive for deep (10'+)	3-20	All remaining soil from 6 adjacent borings will be consolidated	

NOTE: Do not combine native material and fill

CH2MHILL

PROJECT NUMBER	Decision Unit 3	Boring ID 30

SOIL BORING LOG

PROJECT : HART — LOCATION : Banana Patch

LAT/LONG: — DRILLING CONTRACTOR : Geotek

DRILLING METHOD AND EQUIPMENT USED : DPS

WATER LEVELS : START : NR END : NR LOGGER : B Roder

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	#/TYPE	PID READING (ppm)	SOIL CORE DESCRIPTION: SOIL TYPE, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: Sample Collection Information, Sample Sub-Unit Decision
0–5		90	FILL	0	Silty clay (CL) with trace gravel. Reddish brown, slightly moist. Stiff. Low plasticity. Pumice frags 4-5 ft. FILL	0-0.5' 0.5-3.0'
5–10		60	FILL	0	Silty clay (CL) w/ trace gravel. Brown to reddish brown. Mostly dry. Stiff to moderately stiff. Basalt & concrete frags 9-10 ft. FILL	
10–15		60	FILL	0	same as 5-10 ft. Basalt & metal frags at 15 ft. Refusal at 15 ft. FILL	
15–20		90	CL	0	Silty clay (CL). Reddish brown. Moist. Low plasticity. Med. stiff. Basalt frags 19-19.5	15-18 ft.
20–25					EOB @ 20'	

* Refusal @ 15 ft on first attempt. Reached 15-20' on second attempt, after ~5 ft step out

CH2MHILL

PROJECT NUMBER	Decision Unit	Boring ID

FLOW CHART FOR SAMPLING RATIONALE

PROJECT : HART

LOCATION : Banana Patch

LAT/LONG:

DRILLING CONTRACTOR : Geotek

UTILITY CLRNCE CONFRMD: YES NO

DRILLING METHOD AND EQUIPMENT USED : DPS HAS TP

Geophysical anomalies/ Fill Exist?

	DU1	DU2	DU3	DU4	DU5	DU6
Yes	B	B	B	B	C	C
No	A	B	B	A	C	C

Did you see NAPL/Char/Ashes? YES NO IF YES:

Sample	Analysis
Collect into 8-oz jar	Dioxins, Furans

Replicate collected here? YES NO IF YES:

Sample ID's:
Sample ID's:

A - Collect only surface samples - do not perform intrusive work

B - Perform intrusive investigation.

Each boring to be divided into 3 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 0.5' bgs	0-0.5	Collect 10 plugs into ziplock	TPH-g/d/o, PAH, RCRA8, Pest/Herb, PCBs
- 0.5 to 3' bgs	0.5-3	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 8-10' bgs OR 3' interval below bottom of fill (native)	15-18	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 10' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

C - Perform intrusive investigation

Each boring to be divided into 4 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 5' bgs		Collect 10 plugs into ziplock	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 5 to 10' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 10' bgs to 15' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 15 to 28' bgs (native)		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 18' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

POST SAMPLING:

Soil remaining from each core will be kepts and stored.

	ACTUAL SUs)	Sample	Analysis
One archive for shallow (0-10)	0-3	Collect 1 VOA from shallow (0-10' bgs) and one from deep (10'+)	Archive
One archive for deep (10'+)	3-20	All remaining soil from 6 adjacent borings will be consolidated	

NOTE: Do not combine native material and fill

5/21/14

CH2MHILL	PROJECT NUMBER 457998	Decision Unit 5	Boring ID 1

SOIL BORING LOG

PROJECT : **HART** LOCATION : **Banana Patch**

LAT/LONG: DRILLING CONTRACTOR : **Geotek**

DRILLING METHOD AND EQUIPMENT USED : DPS

WATER LEVELS : START : NR END : NR LOGGER : B. Poder

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	#/TYPE	PID READING (ppm)	SOIL CORE DESCRIPTION: SOIL TYPE, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: Sample Collection Information Sample Sub-Unit Decision
5		70			Silty clay (CL) with trace gravel. Reddish brown. Slightly moist. Stiff. Asphalt 0-1'. Concrete 2-3'. FILL	0-5'
10		50	FILL		same as 0-5'. concrete fragments throughout FILL	5-10'
15		10	unknown		Concrete fragments only. No sample collected.	
20		80	CL		Silty clay (CL). Brown. Med. soft to soft. low to med. plasticity. Moist. Native material. ~~Native starts @ 15'~~	15-20'
25					EOB @ 20'	

CH2MHILL

PROJECT NUMBER	Decision Unit	Boring ID

FLOW CHART FOR SAMPLING RATIONALE

PROJECT : HART **LOCATION :** Banana Patch

LAT/LONG: **DRILLING CONTRACTOR :** Geotek

UTILITY CLRNCE CONFRMD: YES NO

DRILLING METHOD AND EQUIPMENT USED : DPS HAS TP

Geophysical anomalies/ Fill Exist?

	DU1	DU2	DU3	DU4	DU5	DU6
Yes	B	B	B	B	C	C
No	A	B	B	A	C	C

Did you see NAPL/Char/Ashes? YES NO IF YES:

Sample	Analysis
Collect into 8-oz jar	Dioxins, Furans

Replicate collected here? YES NO IF YES:

Sample ID's:

Sample ID's:

A - Collect only surface samples - do not perform intrusive work

B - Perform intrusive investigation.

Each boring to be divided into 3 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 0.5' bgs		Collect 10 plugs into ziplock	TPH-g/d/o, PAH, RCRA8, Pest/Herb, PCBs
- 0.5 to 3' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 8-10' bgs OR 3' interval below bottom of fill (native)		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 10' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

C - Perform intrusive investigation

Each boring to be divided into 4 vertical SUs

No recovery

	ACTUAL SUs)	Sample	Analysis
- 0 to 5' bgs	0-5	Collect 10 plugs into ziplock	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 5 to 10' bgs	5-10	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 10' bgs to 15' bgs	X	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 15 to 28' bgs (native)	15-20	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 18' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

POST SAMPLING:

Soil remaining from each core will be kepts and stored.

	ACTUAL SUs)	Sample	Analysis
One archive for shallow (0-10)	0-10	Collect 1 VOA from shallow (0-10' bgs) and one from deep (10'+)	Archive
One archive for deep (10'+)	15-20	All remaining soil from 6 adjacent borings will be consolidated	

NOTE: Do not combine native material and fill

5/21/14

CH2MHILL	PROJECT NUMBER	Decision Unit 5	Boring ID 2
	SOIL BORING LOG		

PROJECT : **HART** LOCATION : **Banana Patch**

LAT/LONG: DRILLING CONTRACTOR : **Geotek**

DRILLING METHOD AND EQUIPMENT USED : DPS, track

WATER LEVELS : START : NR END : NR LOGGER : B. Rozler

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	#/TYPE	PID READING (ppm)	SOIL CORE DESCRIPTION: SOIL TYPE, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: Sample Collection Information, Sample Sub-Unit Decision
5		40	FILL	0	Silty clay (CL) with some gravel. Brown. Moist 0-0.5'. Dry 0.5-5'. Nonplastic. Soft. Concrete debris throughout. FILL	0-5'
10		60		0	Silty clay (CL) with trace gravel. Reddish brown. Soft. Nonplastic. Plastic debris @ 9'. FILL	5-10'
15		50 ~~60~~		0	concrete debris, 10-12'. Silty clay (CL). Dark brown. Moderately stiff. Low plasticity. Fill ends @ 12 ft.	10-15'
20		70	CL	0	same as 10-15'. CL EOB @ 20'	15-20'
25						

CH2MHILL

PROJECT NUMBER	Decision Unit	Boring ID

FLOW CHART FOR SAMPLING RATIONALE

PROJECT : HART

LOCATION : Banana Patch

LAT/LONG:

DRILLING CONTRACTOR : Geotek

UTILITY CLRNCE CONFRMD: YES NO

DRILLING METHOD AND EQUIPMENT USED : DPS HAS TP

Geophysical anomalies/ Fill Exist?

	DU1	DU2	DU3	DU4	DU5	DU6
Yes	B	B	B	B	C	C
No	A	B	B	A	C	C

Sample	Analysis
Collect into 8-oz jar	Dioxins, Furans

Did you see NAPL/Char/Ashes? YES NO IF YES: Sample ID's:

Replicate collected here? YES NO IF YES: Sample ID's:

A - Collect only surface samples - do not perform intrusive work

B - Perform intrusive investigation.

Each boring to be divided into 3 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 0.5' bgs		Collect 10 plugs into ziplock	TPH-g/d/o, PAH, RCRA8, Pest/Herb, PCBs
- 0.5 to 3' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 8-10' bgs OR 3' interval below bottom of fill (native)		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 10' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

C - Perform intrusive investigation

Each boring to be divided into 4 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 5' bgs		Collect 10 plugs into ziplock	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 5 to 10' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 10' bgs to 15' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 15 to 28' bgs (native)		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 18' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

POST SAMPLING:

Soil remaining from each core will be kepts and stored.

	ACTUAL SUs)	Sample	Analysis
One archive for shallow (0-10)		Collect 1 VOA from shallow (0-10' bgs) and one from deep (10'+)	Archive
One archive for deep (10'+)		All remaining soil from 6 adjacent borings will be consolidated	

NOTE: Do not combine native material and fill

CH2MHILL	PROJECT NUMBER	Decision Unit 5	Boring ID 3

SOIL BORING LOG

PROJECT : **HART** LOCATION : **Banana Patch**

LAT/LONG: DRILLING CONTRACTOR : **Geotek**

DRILLING METHOD AND EQUIPMENT USED :

WATER LEVELS : START : NR END : NR LOGGER : B. Roder

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	#/TYPE	PID READING (ppm)	SOIL CORE DESCRIPTION: SOIL TYPE, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: Sample Collection Information Sample Sub-Unit Decision
5		80		6	Silty clay (CL) with some gravel. Brown to gray. Dry. Stiff to soft. Concrete @ 3' and 5' FILL	0-5'
10		80	FILL	0	Same as 0-5' Concrete @ 7' FILL	5-10'
15		60		0	Same as 0-5' Silty clay (CL) at 14'. Reddish brown. Moist. Moderately stiff. Low to med. plasticity	10-15'
20		50	CL	0	Silty clay (CL), reddish brown. Moist. Med. stiff. Moderately high plasticity.	15-20'
25					EOB @ 20'	

CH2MHILL

PROJECT NUMBER	Decision Unit	Boring ID

FLOW CHART FOR SAMPLING RATIONALE

PROJECT : HART **LOCATION :** Banana Patch

LAT/LONG: **DRILLING CONTRACTOR :** Geotek

UTILITY CLRNCE CONFRMD: YES NO

DRILLING METHOD AND EQUIPMENT USED : DPS HAS TP

Geophysical anomalies/ Fill Exist?

	DU1	DU2	DU3	DU4	DU5	DU6
Yes	B	B	B	B	C	C
No	A	B	B	A	C	C

Sample	Analysis
Collect into 8-oz jar	Dioxins, Furans

Did you see NAPL/Char/Ashes? YES NO IF YES:

Replicate collected here? YES NO IF YES: Sample ID's:

Sample ID's:

A - Collect only surface samples - do not perform intrusive work

B - Perform intrusive investigation.

Each boring to be divided into 3 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 0.5' bgs		Collect 10 plugs into ziplock	TPH-g/d/o, PAH, RCRA8, Pest/Herb, PCBs
- 0.5 to 3' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 8-10' bgs OR 3' interval below bottom of fill (native)		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 10' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

C - Perform intrusive investigation

Each boring to be divided into 4 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 5' bgs	0-5	Collect 10 plugs into ziplock	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 5 to 10' bgs	5-10	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 10' bgs to 15' bgs	10-15	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 15 to 28' bgs (native)	15-20	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 18' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

POST SAMPLING:

Soil remaining from each core will be kepts and stored.

	ACTUAL SUs)	Sample	Analysis
One archive for shallow (0-10)	0-10	Collect 1 VOA from shallow (0-10' bgs) and one from deep (10'+)	Archive
One archive for deep (10'+)	10-20	All remaining soil from 6 adjacent borings will be consolidated	

NOTE: Do not combine native material and fill

CH2MHILL

SOIL BORING LOG

PROJECT NUMBER:

Decision Unit: DU5

Boring ID: ~~B3~~ B4

PROJECT : **HART**

LOCATION : **Banana Patch**

LAT/LONG:

DRILLING CONTRACTOR : **Geotek**

DRILLING METHOD AND EQUIPMENT USED : DPS

WATER LEVELS : —

START : 5/21/14 13:15

END : 13:35

LOGGER : I. Wood

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT) %	#/TYPE	PID READING (ppm)	SOIL CORE DESCRIPTION: SOIL TYPE, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: Sample Collection Information, Sample Sub-Unit Decision
0–5		70	CL	Ø	Reddish brown SILTY CLAY with fine sand and gravel V. Stiff, dry -coralline gravel 4.5' (FILL)	0-5
5–10		60		Ø	-concrete fragments 8.5-9' FILL	5-10
			MH	Ø	Reddish Brown CLAYEY SILT, Soft, dry	
10–15		50	~~SM~~	Ø		10-15
			SM		Reddish Brown SILTY SAND with concrete fragments, loose, dry	
15–20			MH		Same as 9.5-13	15-20
			CL	Fill	Reddish Brown SILTY CLAY, med stiff, moist at 17'	
			CL	Native Ø	-trace concrete fragments 15-17'	
20–25					total depth = 20	

PID every 6-inches

CH2MHILL

PROJECT NUMBER	Decision Unit	Boring ID B4

FLOW CHART FOR SAMPLING RATIONALE

PROJECT : HART **LOCATION :** Banana Patch

LAT/LONG: **DRILLING CONTRACTOR :** Geotek

UTILITY CLRNCE CONFRMD: YES NO

DRILLING METHOD AND EQUIPMENT USED : DPS HAS TP

Geophysical anomalies/ Fill Exist?

	DU1	DU2	DU3	DU4	DU5	DU6
Yes	B	B	B	B	C	C
No	A	B	B	A	C	C

Did you see NAPL/Char/Ashes? YES NO IF YES:

Replicate collected here? YES NO IF YES:

Sample	Analysis
Collect into 8-oz jar	Dioxins, Furans

Sample ID's:

Sample ID's:

A - Collect only surface samples - do not perform intrusive work

B - Perform intrusive investigation.

Each boring to be divided into 3 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 0.5' bgs		Collect 10 plugs into ziplock	TPH-g/d/o, PAH, RCRA8, Pest/Herb, PCBs
- 0.5 to 3' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 8-10' bgs OR 3' interval below bottom of fill (native)		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 10' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

C - Perform intrusive investigation

Each boring to be divided into 4 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 5' bgs	0-5	Collect 10 plugs into ziplock	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 5 to 10' bgs	5-10	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 10' bgs to 15' bgs	10-15	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 15 to 28' bgs (native)	15-20	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 18' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

POST SAMPLING:

Soil remaining from each core will be kepts and stored.

	ACTUAL SUs)	Sample	Analysis
One archive for shallow (0-10)	0-10	Collect 1 VOA from shallow (0-10' bgs) and one from deep (10'+)	Archive
One archive for deep (10'+)	10-20	All remaining soil from 6 adjacent borings will be consolidated	

NOTE: Do not combine native material and fill

CH2MHILL

PROJECT NUMBER	Decision Unit 5	Boring ID 5

SOIL BORING LOG

PROJECT : **HART** LOCATION : **Banana Patch**

LAT/LONG: DRILLING CONTRACTOR : **Geotek**

DRILLING METHOD AND EQUIPMENT USED : DPS

WATER LEVELS : START : NR END : NR LOGGER : B. Roder

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	#/TYPE	PID READING (ppm)	SOIL CORE DESCRIPTION: SOIL TYPE, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: Sample Collection Information Sample Sub-Unit Decision
5		80		0	Silty clay (CL) with trace gravel. Reddish brown. Slightly moist. Soft & loose. Nonplastic. Plastic debris @ 3'. FILL	0-5'
10		30	FILL	0	Top foot same as 0-5'. Black fibrous material (3" thick) below. Silty clay (CL) with trace gravel @ 9'. Brown. Some coral gravel. Fill. dry. Nonplastic.	5-10'
15		0 ~~8~~	unknown	0	Nothing Recovered. Other borings in area suggest this interval may be silt.	~~10-15'~~ NO SAMPLE
20		60	CL	0	Silty clay (CL). Reddish brown. Moist. Soft to med. soft. Moderately high plasticity. Native Material	15-20'
25					EOB @ 20'	

CH2MHILL

PROJECT NUMBER	Decision Unit	Boring ID

FLOW CHART FOR SAMPLING RATIONALE

PROJECT : HART **LOCATION :** Banana Patch

LAT/LONG: **DRILLING CONTRACTOR :** Geotek

UTILITY CLRNCE CONFRMD: YES NO

DRILLING METHOD AND EQUIPMENT USED : DPS HAS TP

Geophysical anomalies/ Fill Exist?

	DU1	DU2	DU3	DU4	DU5	DU6
Yes	B	B	B	B	C	C
No	A	B	B	A	C	C

			Sample	Analysis
Did you see NAPL/Char/Ashes?	YES	NO	IF YES: Collect into 8-oz jar	Dioxins, Furans
Replicate collected here?	YES	NO	IF YES: Sample ID's:	
			Sample ID's:	

A - Collect only surface samples - do not perform intrusive work

B - Perform intrusive investigation.

Each boring to be divided into 3 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 0.5' bgs		Collect 10 plugs into ziplock	TPH-g/d/o, PAH, RCRA8, Pest/Herb, PCBs
- 0.5 to 3' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 8-10' bgs OR 3' interval below bottom of fill (native)		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 10' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

C - Perform intrusive investigation

Each boring to be divided into 4 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 5' bgs	0-5	Collect 10 plugs into ziplock	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 5 to 10' bgs NO RECOVERY	5-10	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 10' bgs to 15' bgs	~~10-15~~	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 15 to 28' bgs (native)	15-20	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 18' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

POST SAMPLING:

Soil remaining from each core will be kepts and stored.

	ACTUAL SUs)	Sample	Analysis
One archive for shallow (0-10)	0-10	Collect 1 VOA from shallow (0-10' bgs) and one from deep (10'+)	Archive
One archive for deep (10'+)	~~10~~15-20	All remaining soil from 6 adjacent borings will be consolidated	

NOTE: Do not combine native material and fill

5/21/14

CH2MHILL	PROJECT NUMBER	Decision Unit 5	Boring ID 6

SOIL BORING LOG

PROJECT : HART   LOCATION : Banana Patch

LAT/LONG: DRILLING CONTRACTOR : Geotek

DRILLING METHOD AND EQUIPMENT USED : DPS

WATER LEVELS :   START : NR   END : NR   LOGGER : B. Roder

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	#/TYPE	PID READING (ppm)	SOIL CORE DESCRIPTION: SOIL TYPE, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: Sample Collection Information Sample Sub-Unit Decision
5		70	FILL	0	Silty clay (CL) w/trace gravel. Reddish brown. Dry to slightly moist. Nonplastic. stiff to soft. Plastic tarp material @ 5 ft. FILL	0-5'
10		50	FILL	0	Silty clay (CL) w/some gravel. Reddish brown to gray. Dry. Soft to stiff. Nonplastic. Acphalt material @ 7'. Basalt cobbles @ 9'. FILL	5-10'
15		60	CL	0	Concrete 10-10.5'. Silty Clay (CL), reddish brown. Med. stiffness. Low to med. plasticity. Moist. Fill ends at 11'.	10-15'
20		60		0	Same as 10-15'. More moist, almost wet. Darker brown @ 18'. EOB @ 20'	15-20'
25						

CH2MHILL

PROJECT NUMBER	Decision Unit	Boring ID

FLOW CHART FOR SAMPLING RATIONALE

PROJECT : HART

LOCATION : Banana Patch

LAT/LONG:

DRILLING CONTRACTOR : Geotek

UTILITY CLRNCE CONFRMD: YES NO

DRILLING METHOD AND EQUIPMENT USED : DPS HAS TP

Geophysical anomalies/ Fill Exist?

	DU1	DU2	DU3	DU4	DU5	DU6
Yes	B	B	B	B	C	C
No	A	B	B	A	C	C

Did you see NAPL/Char/Ashes? YES NO IF YES:

Sample	Analysis
Collect into 8-oz jar	Dioxins, Furans

Replicate collected here? YES NO IF YES:

Sample ID's:

Sample ID's:

A - Collect only surface samples - do not perform intrusive work

B - Perform intrusive investigation.

Each boring to be divided into 3 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 0.5' bgs		Collect 10 plugs into ziplock	TPH-g/d/o, PAH, RCRA8, Pest/Herb, PCBs
- 0.5 to 3' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 8-10' bgs OR 3' interval below bottom of fill (native)		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 10' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

C - Perform intrusive investigation

Each boring to be divided into 4 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 5' bgs	0-5	Collect 10 plugs into ziplock	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 5 to 10' bgs	5-10	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 10' bgs to 15' bgs	10-15	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 15 to 28' bgs (native)	15-20	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 18' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

POST SAMPLING:

Soil remaining from each core will be kepts and stored.

	ACTUAL SUs)	Sample	Analysis
One archive for shallow (0-10)	0-10	Collect 1 VOA from shallow (0-10' bgs) and one from deep (10'+)	Archive
One archive for deep (10'+)	10-15	All remaining soil from 6 adjacent borings will be consolidated	

NOTE: Do not combine native material and fill

CH2MHILL

PROJECT NUMBER	Decision Unit DU5	Boring ID B7

SOIL BORING LOG

PROJECT : **HART** LOCATION : **Banana Patch**

LAT/LONG: DRILLING CONTRACTOR : **Geotek**

DRILLING METHOD AND EQUIPMENT USED : DPS truck rig

WATER LEVELS : START : 5/21/14 ~~1443~~ 1345 END : 1405 LOGGER : T. Wood

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT) %	#/TYPE	PID READING (ppm)	SOIL CORE DESCRIPTION: SOIL TYPE, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: Sample Collection Information Sample Sub-Unit Decision
5		70	CL	Ø	Reddish brown SILTY CLAY with fine sand and gravel, stiff, dry, - asphalt present at 3'	0-5
10			SM / CL	Ø	SILTY SAND, with coralline gravel and asphalt, white/gray/blk. SILTY CLAY with concrete and coralline gravels,	5-10
15				Ø FILL	stiff, dry, reddish brown -FILL mixed with native clay.	10-15
20			CL	Native Ø	Same as above but Native SILTY CLAY med. stiff, reddish brown - no gravel fragments, - moist at 16', - moist to wet 17.5'	15-20
25					- trace fine sand 18.5-19 end boring 20'	

CH2MHILL

PROJECT NUMBER	Decision Unit DU5	Boring ID B7

FLOW CHART FOR SAMPLING RATIONALE

PROJECT : HART **LOCATION :** Banana Patch

LAT/LONG: **DRILLING CONTRACTOR :** Geotek

UTILITY CLRNCE CONFRMD: YES NO

DRILLING METHOD AND EQUIPMENT USED : DPS HAS TP

Geophysical anomalies/ Fill Exist?

	DU1	DU2	DU3	DU4	DU5	DU6
Yes	B	B	B	B	C	C
No	A	B	B	A	C	C

Did you see NAPL/Char/Ashes? YES NO IF YES:

Sample	Analysis
Collect into 8-oz jar	Dioxins, Furans

Replicate collected here? YES NO IF YES:

Sample ID's:

Sample ID's:

A - Collect only surface samples - do not perform intrusive work

B - Perform intrusive investigation.

Each boring to be divided into 3 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 0.5' bgs		Collect 10 plugs into ziplock	TPH-g/d/o, PAH, RCRA8, Pest/Herb, PCBs
- 0.5 to 3' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 8-10' bgs OR 3' interval below bottom of fill (native)		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 10' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

C - Perform intrusive investigation

Each boring to be divided into 4 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 5' bgs	0-5	Collect 10 plugs into ziplock	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 5 to 10' bgs	5-10	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 10' bgs to 15' bgs	10-15	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 15 to ~~20~~ 20 bgs (native)	15-20	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 18' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

POST SAMPLING:

Soil remaining from each core will be kepts and stored.

	ACTUAL SUs)	Sample	Analysis
One archive for shallow (0-10)	0-10	Collect 1 VOA from shallow (0-10' bgs) and one from deep (10'+)	Archive
One archive for deep (10'+)	10-20	All remaining soil from 6 adjacent borings will be consolidated	

NOTE: Do not combine native material and fill

CH2MHILL

PROJECT NUMBER	Decision Unit 5	Boring ID 8

SOIL BORING LOG

PROJECT : HART

LOCATION : Banana Patch

LAT/LONG:

DRILLING CONTRACTOR : Geotek

DRILLING METHOD AND EQUIPMENT USED :

WATER LEVELS : START : NR END : NR LOGGER : BR

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	#/TYPE	PID READING (ppm)	SOIL CORE DESCRIPTION SOIL TYPE, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS Sample Collection Information Sample Sub-Unit Decision
5		60	FILL	0	Red-br SILTY clay(CL) with trace gravel. Slightly moist. Stiff. Non-plastic. Some coral gravel. FILL	0-5'
10		70		0	same as 0-5'. More brown. Concrete @ 7'.	5-10'
15		20	unknown	0	Concrete fragments & metal debris only. No soil to collect sample from.	
20		50	CL	0	silty clay (CL). Reddish brown. Moist. Med. ~~soft~~ stiff to soft. Low to med. plasticity.	15-20'
25					EOB @ 20'	

CH2MHILL

PROJECT NUMBER	Decision Unit	Boring ID
	DU5	B-8

FLOW CHART FOR SAMPLING RATIONALE

PROJECT : HART

LOCATION : Banana Patch

LAT/LONG:

DRILLING CONTRACTOR : Geotek

UTILITY CLRNCE CONFRMD: YES NO

DRILLING METHOD AND EQUIPMENT USED : DPS HAS TP

Geophysical anomalies/ Fill Exist?

	DU1	DU2	DU3	DU4	DU5	DU6
Yes	B	B	B	B	C	C
No	A	B	B	A	C	C

			Sample	Analysis
Did you see NAPL/Char/Ashes?	YES NO	IF YES:	Collect into 8-oz jar	Dioxins, Furans
Replicate collected here?	YES NO	IF YES:	Sample ID's:	
			Sample ID's:	

A - Collect only surface samples - do not perform intrusive work

B - Perform intrusive investigation.

Each boring to be divided into 3 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 0.5' bgs		Collect 10 plugs into ziplock	TPH-g/d/o, PAH, RCRA8, Pest/Herb, PCBs
- 0.5 to 3' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 8-10' bgs OR 3' interval below bottom of fill (native)		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 10' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

C - Perform intrusive investigation

Each boring to be divided into 4 vertical SUs

NO RECOVERY

	ACTUAL SUs)	Sample	Analysis
- 0 to 5' bgs	0-5	Collect 10 plugs into ziplock	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 5 to 10' bgs	5-10	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 10' bgs to 15' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 15 to 28' bgs (native)	15-20	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 18' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

POST SAMPLING:

Soil remaining from each core will be kepts and stored.

	ACTUAL SUs)	Sample	Analysis
One archive for shallow (0-10)	0-10	Collect 1 VOA from shallow (0-10' bgs) and one from deep (10'+)	Archive
One archive for deep (10'+)	15-20	All remaining soil from 6 adjacent borings will be consolidated	

NOTE: Do not combine native material and fill

CH2MHILL	PROJECT NUMBER	Decision Unit DU5	Boring ID ~~B~~ 9

SOIL BORING LOG

PROJECT : **HART** LOCATION : **Banana Patch**

LAT/LONG: DRILLING CONTRACTOR : **Geotek**

DRILLING METHOD AND EQUIPMENT USED : DPS track rig 1445

WATER LEVELS : START : 5/21/14 1430 END : ~~1444~~ LOGGER : J. Wood

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	#/TYPE	PID READING (ppm)	SOIL CORE DESCRIPTION: SOIL TYPE, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: Sample Collection Information Sample Sub-Unit Decision
	ft	%				
0–5	60	60	CL / SM	Ø	SILTY CLAY, stiff dry, reddish brown – concrete fragments at 3.5'	0-5
5–10	80	80	GM / CL		SILTY SAND AND GRAVEL road fill, loose, dry, brown; SILTY CLAY with gravel, stiff, dry, – concrete fragments 8-9'	5-10 ~~10-15~~
10–15		100	SM/GM / CL	Fill / Native	Same as 3-6' – basalt rocks 11.5'; SILTY CLAY, stiff, moist, grayish brown	10-15
15–20		100			same	15-20
20–25					20' end	

* PID every 6" of core.

CH2MHILL

PROJECT NUMBER	Decision Unit DU5	Boring ID B9

FLOW CHART FOR SAMPLING RATIONALE

PROJECT : HART **LOCATION :** Banana Patch

LAT/LONG: **DRILLING CONTRACTOR :** Geotek

UTILITY CLRNCE CONFRMD: YES NO

DRILLING METHOD AND EQUIPMENT USED : DPS HAS TP

Geophysical anomalies/ Fill Exist?

	DU1	DU2	DU3	DU4	DU5	DU6
Yes	B	B	B	B	C	C
No	A	B	B	A	C	C

Sample	Analysis
Collect into 8-oz jar	Dioxins, Furans

Did you see NAPL/Char/Ashes? YES NO IF YES:

Replicate collected here? YES NO IF YES:

Sample ID's:

Sample ID's:

A - Collect only surface samples - do not perform intrusive work

B - Perform intrusive investigation.

Each boring to be divided into 3 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 0.5' bgs		Collect 10 plugs into ziplock	TPH-g/d/o, PAH, RCRA8, Pest/Herb, PCBs
- 0.5 to 3' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 8-10' bgs OR 3' interval below bottom of fill (native)		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 10' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

C - Perform intrusive investigation

Each boring to be divided into 4 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 5' bgs	0-5	Collect 10 plugs into ziplock	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 5 to 10' bgs	5-10	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 10' bgs to 15' bgs	10-15	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 15 to 28' bgs (native)	15-20	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 18' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

POST SAMPLING:

Soil remaining from each core will be kepts and stored.

	ACTUAL SUs)	Sample	Analysis
One archive for shallow (0-10)	0-10	Collect 1 VOA from shallow (0-10' bgs) and one from deep (10'+)	Archive
One archive for deep (10'+)	10-20	All remaining soil from 6 adjacent borings will be consolidated	

NOTE: Do not combine native material and fill

CH2MHILL

PROJECT NUMBER	Decision Unit	Boring ID
	DU5	B10

SOIL BORING LOG

PROJECT : **HART** LOCATION : **Banana Patch**

LAT/LONG: DRILLING CONTRACTOR : **Geotek**

DRILLING METHOD AND EQUIPMENT USED : DPS acetate sleeves

WATER LEVELS : START : 5/21/14 14:45 END : 1500 LOGGER : I. Wood

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT) %	#/TYPE	PID READING (ppm)	SOIL CORE DESCRIPTION: SOIL TYPE, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: Sample Collection Information, Sample Sub-Unit Decision
0–5		30	CL		SILTY CLAY, stiff, dry, reddish brown, - concrete ~~fragments~~ fragments throughout	
5–10		60	CL/SM		SILTY SAND and SILTY CLAY, loose silty sand, stiff silty clay	
10–15		50				
15–20		60	CL / CL		SILTY CLAY, soft, moist, gray to brown fine sand in CL 18-20', moist - wet, and 20'	
20–25						

CH2MHILL

PROJECT NUMBER	Decision Unit DU5	Boring ID B10

FLOW CHART FOR SAMPLING RATIONALE

PROJECT : HART **LOCATION :** Banana Patch

LAT/LONG: **DRILLING CONTRACTOR :** Geotek

UTILITY CLRNCE CONFRMD: YES NO

DRILLING METHOD AND EQUIPMENT USED : DPS HAS TP

Geophysical anomalies/ Fill Exist?

	DU1	DU2	DU3	DU4	DU5	DU6
Yes	B	B	B	B	C	C
No	A	B	B	A	C	C

Did you see NAPL/Char/Ashes? YES NO IF YES:

Sample	Analysis
Collect into 8-oz jar	Dioxins, Furans

Sample ID's:

Replicate collected here? YES NO IF YES: Sample ID's:

A - Collect only surface samples - do not perform intrusive work

B - Perform intrusive investigation.

Each boring to be divided into 3 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 0.5' bgs		Collect 10 plugs into ziplock	TPH-g/d/o, PAH, RCRA8, Pest/Herb, PCBs
- 0.5 to 3' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 8-10' bgs OR 3' interval below bottom of fill (native)		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 10' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

C - Perform intrusive investigation

Each boring to be divided into 4 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 5' bgs	0-5	Collect 10 plugs into ziplock	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 5 to 10' bgs	5-10	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 10' bgs to 15' bgs	10-15	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 15 to 18' bgs (native)	15-20	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 18' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

POST SAMPLING:

Soil remaining from each core will be kepts and stored.

	ACTUAL SUs)	Sample	Analysis
One archive for shallow (0-10)	0-10	Collect 1 VOA from shallow (0-10' bgs) and one from deep (10'+)	Archive
One archive for deep (10'+)	10-20	All remaining soil from 6 adjacent borings will be consolidated	

NOTE: Do not combine native material and fill

CH2MHILL

PROJECT NUMBER	Decision Unit DU5	Boring ID B11

SOIL BORING LOG

PROJECT : **HART** LOCATION : **Banana Patch**

LAT/LONG: DRILLING CONTRACTOR : **Geotek**

DRILLING METHOD AND EQUIPMENT USED : DPS

WATER LEVELS : START : 5/21/14 ~~1515~~ ~~40~~ 1515 END : 1530 LOGGER :

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT) %	#/TYPE	PID READING (ppm)	SOIL CORE DESCRIPTION: SOIL TYPE, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: Sample Collection Information Sample Sub-Unit Decision
0–5		80	CL		SILTY CLAY with gravel, stiff, dry, coralline gravels, asphalt present	0-5
5–10		70	CL	Fill ↑	SILTY CLAY, stiff, moist dry, reddish brown	5-10
10–15		100		Native		10-15
15–20		80			18-20' fine grained sand within CL	15-20
20–25						

CH2MHILL

PROJECT NUMBER	Decision Unit DU5	Boring ID B11

FLOW CHART FOR SAMPLING RATIONALE

PROJECT : HART
LOCATION : Banana Patch
LAT/LONG:
DRILLING CONTRACTOR : Geotek
UTILITY CLRNCE CONFRMD: YES NO
DRILLING METHOD AND EQUIPMENT USED : DPS HAS TP

Geophysical anomalies/ Fill Exist?

	DU1	DU2	DU3	DU4	DU5	DU6
Yes	B	B	B	B	C	C
No	A	B	B	A	C	C

				Sample	Analysis
Did you see NAPL/Char/Ashes?	YES	NO	IF YES:	Collect into 8-oz jar	Dioxins, Furans
Replicate collected here?	YES	NO	IF YES:	Sample ID's:	
				Sample ID's:	

A - Collect only surface samples - do not perform intrusive work

B - Perform intrusive investigation.

Each boring to be divided into 3 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 0.5' bgs		Collect 10 plugs into ziplock	TPH-g/d/o, PAH, RCRA8, Pest/Herb, PCBs
- 0.5 to 3' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 8-10' bgs OR 3' interval below bottom of fill (native)		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 10' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

C - Perform intrusive investigation

Each boring to be divided into 4 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 5' bgs	0-5	Collect 10 plugs into ziplock	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 5 to 10' bgs	5-10	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 10' bgs to 15' bgs	10-15	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 15 to ~~25~~ 18 bgs (native)	15-20	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 18' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

POST SAMPLING:

Soil remaining from each core will be kepts and stored.

	ACTUAL SUs)	Sample	Analysis
One archive for shallow (0-10)	0-10	Collect 1 VOA from shallow (0-10' bgs) and one from deep (10'+)	Archive
One archive for deep (10'+)	10-20	All remaining soil from 6 adjacent borings will be consolidated	

NOTE: Do not combine native material and fill

CH2MHILL

PROJECT NUMBER	Decision Unit 5	Boring ID 12

SOIL BORING LOG

PROJECT : HART

LOCATION : Banana Patch

LAT/LONG:

DRILLING CONTRACTOR : Geotek

DRILLING METHOD AND EQUIPMENT USED : DPS, track

WATER LEVELS : NA START : 15:15 END : 15:30 LOGGER : BR

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	#/TYPE	PID READING (ppm)	SOIL CORE DESCRIPTION: SOIL TYPE, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: Sample Collection Information, Sample Sub-Unit Decision
5		50	FILL	0	Silty clay (CL) w/some gravel. Red-brown. Slightly moist. Stiff. Low plasticity. Concrete fragments throughout. FILL	0-5'
10		60	FILL	0	Silty gravel (GM). Gray to dark brown. Dry. Nonplastic. Stiff, loose. Basaltic gravel. Some asphalt material. FILL	5-10'
15		50	CL	0	Same as 5-10' till 13'. Silty clay (CL). Dark brown. Moist. Med. soft to soft. Med to high plasticity. Fill ends @ 13'	10-15'
20		70	CL	0	Same as 13-15'. Very moist to wet @ 18'. EOB @ 20'	15-20'
25						

CH2MHILL

PROJECT NUMBER	Decision Unit	Boring ID

FLOW CHART FOR SAMPLING RATIONALE

PROJECT : HART | **LOCATION :** Banana Patch

LAT/LONG: | **DRILLING CONTRACTOR :** Geotek

UTILITY CLRNCE CONFRMD: YES NO

DRILLING METHOD AND EQUIPMENT USED : DPS HAS TP

Geophysical anomalies/ Fill Exist?

	DU1	DU2	DU3	DU4	DU5	DU6
Yes	B	B	B	B	C	C
No	A	B	B	A	C	C

			Sample	Analysis
Did you see NAPL/Char/Ashes?	YES NO	IF YES:	Collect into 8-oz jar	Dioxins, Furans
Replicate collected here?	YES NO	IF YES:	Sample ID's:	
			Sample ID's:	

A - Collect only surface samples - do not perform intrusive work

B - Perform intrusive investigation.

Each boring to be divided into 3 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 0.5' bgs		Collect 10 plugs into ziplock	TPH-g/d/o, PAH, RCRA8, Pest/Herb, PCBs
- 0.5 to 3' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 8-10' bgs OR 3' interval below bottom of fill (native)		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 10' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

C - Perform intrusive investigation

Each boring to be divided into 4 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 5' bgs	0-5	Collect 10 plugs into ziplock	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 5 to 10' bgs	5-10	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 10' bgs to 15' bgs	10-15	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 15 to 28' bgs (native)	15-20	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 18' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

POST SAMPLING:

Soil remaining from each core will be kepts and stored.

	ACTUAL SUs)	Sample	Analysis
One archive for shallow (0-10)	0-10	Collect 1 VOA from shallow (0-10' bgs) and one from deep (10'+)	Archive
One archive for deep (10'+)	10-20	All remaining soil from 6 adjacent borings will be consolidated	

NOTE: Do not combine native material and fill

5/21/14

CH2MHILL

PROJECT NUMBER	Decision Unit 5	Boring ID 13

SOIL BORING LOG

PROJECT : HART LOCATION : Banana Patch

LAT/LONG: DRILLING CONTRACTOR : Geotek

DRILLING METHOD AND EQUIPMENT USED :

WATER LEVELS : START : 1530 END : 1545 LOGGER : BR

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	#/TYPE	PID READING (ppm)	SOIL CORE DESCRIPTION: SOIL TYPE, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: Sample Collection Information Sample Sub-Unit Decision
5	~~90~~	90	FILL	0	Silty clay (CL) with some gravel. Dry. Stiff, loose in some sections. Brown to dark gray. Basalt + coral gravel. Some asphalt material. Nonplastic. FILL	0-5'
10	~~90~~	90	FILL	0	Silty clay (CL) w/ trace gravel. Red-brown. Dry. Nonplastic. Stiff. Platy structure. Concrete frags 9-10'. FILL	5-10'
15	~~60~~	60	FILL	0	Silty clay (CL) w/ trace gravel. Dark gray. Dry. Nonplastic. Stiff. Concrete frags. Silty clay (CL) at 14'. Dark brown. Moist. Moderately stiff. Med. plasticity. Fill ends @14'.	10-15'
20		30	CL	0	Same as 14-15' Very moist. Soft. EOB @ 20'	15-20'
25						

CH2MHILL

PROJECT NUMBER	Decision Unit	Boring ID

FLOW CHART FOR SAMPLING RATIONALE

PROJECT : HART

LOCATION : Banana Patch

LAT/LONG:

DRILLING CONTRACTOR : Geotek

UTILITY CLRNCE CONFRMD: YES NO

DRILLING METHOD AND EQUIPMENT USED : DPS HAS TP

Geophysical anomalies/ Fill Exist?

	DU1	DU2	DU3	DU4	DU5	DU6
Yes	B	B	B	B	C	C
No	A	B	B	A	C	C

				Sample	Analysis
Did you see NAPL/Char/Ashes?	YES	NO	IF YES:	Collect into 8-oz jar	Dioxins, Furans
Replicate collected here?	YES	NO	IF YES:	Sample ID's:	
				Sample ID's:	

A - Collect only surface samples - do not perform intrusive work

B - Perform intrusive investigation.

Each boring to be divided into 3 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 0.5' bgs		Collect 10 plugs into ziplock	TPH-g/d/o, PAH, RCRA8, Pest/Herb, PCBs
- 0.5 to 3' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 8-10' bgs OR 3' interval below bottom of fill (native)		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 10' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

C - Perform intrusive investigation

Each boring to be divided into 4 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 5' bgs	0-5	Collect 10 plugs into ziplock	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 5 to 10' bgs	5-10	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 10' bgs to 15' bgs	10-15	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 15 to 28' bgs (native)	15-20	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 18' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

POST SAMPLING:

Soil remaining from each core will be kepts and stored.

	ACTUAL SUs)	Sample	Analysis
One archive for shallow (0-10)	0-10	Collect 1 VOA from shallow (0-10' bgs) and one from deep (10'+)	Archive
One archive for deep (10'+)	10-20	All remaining soil from 6 adjacent borings will be consolidated	

NOTE: Do not combine native material and fill

5/21/14

CH2MHILL	PROJECT NUMBER	Decision Unit 5	Boring ID 14
	SOIL BORING LOG		

SOIL BORING LOG

PROJECT : HART | LOCATION : Banana Patch

LAT/LONG: | DRILLING CONTRACTOR : Geotek

DRILLING METHOD AND EQUIPMENT USED :

WATER LEVELS : | START : NR | END : NR | LOGGER : BR

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	#/TYPE	PID READING (ppm)	SOIL CORE DESCRIPTION: SOIL TYPE, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: Sample Collection Information Sample Sub-Unit Decision
5		90		0	Silty clay (CL) w/ some gravel. Red-brown. Dry. Stiff. Loose, friable. Platy structure. Asphalt & concrete frags throughout. FILL	0-5'
10		100	FILL	0	same as 0-5' to 6'. Silty gravel (GM). Brown to dk brown. Dry. Stiff. Loose in some areas. Asphalt fragments. FILL	5-10'
15		70		0	Same as 6'-10' to 12'. crushed concrete 12-13'. Silty clay (CL) at 13'. Dark brown. Moist. Med. Stiff. Fill ends @ 13'	10-15'
20			CL	0	Same as 13-15'. Very moist & soft. EOB @ 20'	15-20'
25						

CH2MHILL

PROJECT NUMBER	Decision Unit	Boring ID

FLOW CHART FOR SAMPLING RATIONALE

PROJECT : HART

LOCATION : Banana Patch

LAT/LONG:

DRILLING CONTRACTOR : Geotek

UTILITY CLRNCE CONFRMD: YES NO

DRILLING METHOD AND EQUIPMENT USED : DPS HAS TP

Geophysical anomalies/ Fill Exist?

	DU1	DU2	DU3	DU4	DU5	DU6
Yes	B	B	B	B	C	C
No	A	B	B	A	C	C

Did you see NAPL/Char/Ashes? YES NO IF YES:

Sample	Analysis
Collect into 8-oz jar	Dioxins, Furans

Replicate collected here? YES NO IF YES:

Sample ID's:

Sample ID's:

A - Collect only surface samples - do not perform intrusive work

B - Perform intrusive investigation.

Each boring to be divided into 3 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 0.5' bgs		Collect 10 plugs into ziplock	TPH-g/d/o, PAH, RCRA8, Pest/Herb, PCBs
- 0.5 to 3' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 8-10' bgs OR 3' interval below bottom of fill (native)		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 10' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

C - Perform intrusive investigation

Each boring to be divided into 4 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 5' bgs	0-5	Collect 10 plugs into ziplock	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 5 to 10' bgs	5-10	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 10' bgs to 15' bgs	10-15	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 15 to 28' bgs (native)	15-20	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 18' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

POST SAMPLING:

Soil remaining from each core will be kepts and stored.

	ACTUAL SUs)	Sample	Analysis
One archive for shallow (0-10)	0-10	Collect 1 VOA from shallow (0-10' bgs) and one from deep (10'+)	Archive
One archive for deep (10'+)	10-20	All remaining soil from 6 adjacent borings will be consolidated	

NOTE: Do not combine native material and fill

5/22/14

CH2MHILL

PROJECT NUMBER	Decision Unit	Boring ID
	DU5	B15

SOIL BORING LOG

PROJECT : HART — LOCATION : Banana Patch

LAT/LONG: — DRILLING CONTRACTOR : Geotek

DRILLING METHOD AND EQUIPMENT USED : ~~[illegible]~~ DPS trackrig

WATER LEVELS : — START : 0840 — END : 0900 — LOGGER : VM

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	#/TYPE	PID READING (ppm)	SOIL CORE DESCRIPTION: SOIL TYPE, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: Sample Collection Information, Sample Sub-Unit Decision
0–5	0–5	95%	FILL / FILL	0	Surficial FILL: Red-br SILTY CLAY, dry, firm, trace gravel FILL: Red CLAY, very stiff, dry, trace M gravel, angular FILL: Brown CLAY, stiff, w/	sample 0-5' bgs
5–10	5–10	90	FILL	0	M gravel throughout, w/ sand throughout. PS. Angular. Also, concrete chunks and coral fill throughout, dry to damp	sample 5-10' bgs
10–15	10–15	95	FILL / NATIVE	0	CLAYEY SILT: Red br Laminate structures. ~~[illegible]~~ slightly moist	sample 10-15' bgs
15–20	15–20	80	NATIVE	0	SAND SILT: Red br. ~~[illegible]~~ (orange mottles), soft, damp SILTY SAND: Red br. wet. sand: F/M ws. CLAY: Black, organic. Damp, Medium soft. EOB@20	sample 15-20' bgs
20–25						

* Note: PID readings collected every 6"

CH2MHILL

PROJECT NUMBER	Decision Unit DU5	Boring ID B15

FLOW CHART FOR SAMPLING RATIONALE

PROJECT : HART　　　　**LOCATION :** Banana Patch

LAT/LONG:　　　　**DRILLING CONTRACTOR :** Geotek

UTILITY CLRNCE CONFRMD: YES NO

DRILLING METHOD AND EQUIPMENT USED : DPS HAS TP

Geophysical anomalies/ Fill Exist?

	DU1	DU2	DU3	DU4	DU5	DU6
Yes	B	B	B	B	C	C
No	A	B	B	A	C	C

	Sample	Analysis
Did you see NAPL/Char/Ashes? YES NO — IF YES:	Collect into 8-oz jar	Dioxins, Furans
Replicate collected here? YES NO — IF YES:	Sample ID's:	
	Sample ID's:	

A - Collect only surface samples - do not perform intrusive work

B - Perform intrusive investigation.

Each boring to be divided into 3 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 0.5' bgs		Collect 10 plugs into ziplock	TPH-g/d/o, PAH, RCRA8, Pest/Herb, PCBs
- 0.5 to 3' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 8-10' bgs OR 3' interval below bottom of fill (native)		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 10' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

C - Perform intrusive investigation

Each boring to be divided into 4 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 5' bgs	0-5	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 5 to 10' bgs	5-10	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 10' bgs to 15' bgs	10-15	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 15 to 28' bgs (native)	15-20	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 18' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

POST SAMPLING:

Soil remaining from each core will be kepts and stored.

	ACTUAL SUs)	Sample	Analysis
One archive for shallow (0-10)	0-10	Collect 1 VOA from shallow (0-10' bgs) and one from deep (10'+)	Archive
One archive for deep (10'+)	10-20	All remaining soil from 6 adjacent borings will be consolidated	

NOTE: ~~Do not combine native material and fill~~

CH2MHILL

PROJECT NUMBER	Decision Unit DU5	Boring ID B16

SOIL BORING LOG

PROJECT : HART   LOCATION : Banana Patch

LAT/LONG: DRILLING CONTRACTOR : Geotek

DRILLING METHOD AND EQUIPMENT USED : DPS

WATER LEVELS :   START : 5/22/14 830   END : 845   LOGGER : I.Wood

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT) %D	#/TYPE	PID READING (ppm)	SOIL CORE DESCRIPTION: SOIL TYPE, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: Sample Collection Information, Sample Sub-Unit Decision
0–5		90	CL	Ø	SILTY CLAY, stiff, dry, little gravel, -coralline and basalt gravels roadfill. brownish gray with	0-5
5–10		100	CL, SM/GM, CL	Ø	-asphalt shingles at 9' SILTY SAND/SILTY GRAVEL med. dense, dry, tan to black (road fill)	5-10
10–15		90	CL	Ø Fill Native	same as 0'-8' with more gravels (asphalt and concrete fragments) med stiff. (FILL)	10-15
15–20				Ø	SILTY CLAY, stiff, med. plasticity, moist	15-20
20–25					total depth 20'	

CH2MHILL

PROJECT NUMBER	Decision Unit DU5	Boring ID B16

FLOW CHART FOR SAMPLING RATIONALE

PROJECT : HART **LOCATION :** Banana Patch

LAT/LONG: **DRILLING CONTRACTOR :** Geotek

UTILITY CLRNCE CONFRMD: YES NO

DRILLING METHOD AND EQUIPMENT USED : DPS HAS TP

Geophysical anomalies/ Fill Exist?

	DU1	DU2	DU3	DU4	DU5	DU6
Yes	B	B	B	B	C	C
No	A	B	B	A	C	C

Did you see NAPL/Char/Ashes? YES NO IF YES:

Sample	Analysis
Collect into 8-oz jar	Dioxins, Furans

Replicate collected here? YES NO IF YES:

Sample ID's:

Sample ID's:

A - Collect only surface samples - do not perform intrusive work

B - Perform intrusive investigation.

Each boring to be divided into 3 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 0.5' bgs		Collect 10 plugs into ziplock	TPH-g/d/o, PAH, RCRA8, Pest/Herb, PCBs
- 0.5 to 3' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 8-10' bgs OR 3' interval below bottom of fill (native)		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 10' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

C - Perform intrusive investigation

Each boring to be divided into 4 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 5' bgs	0-5	Collect 10 plugs into ziplock	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 5 to 10' bgs	5-10	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 10' bgs to 15' bgs	10-15	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 15 to ~~18~~' bgs (native)	15-20	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 18' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

POST SAMPLING:

Soil remaining from each core will be kepts and stored.

	ACTUAL SUs)	Sample	Analysis
One archive for shallow (0-10)	0-10	Collect 1 VOA from shallow (0-10' bgs) and one from deep (10'+)	Archive
One archive for deep (10'+)	10-20	All remaining soil from 6 adjacent borings will be consolidated	

NOTE: Do not combine native material and fill

CH2MHILL

PROJECT NUMBER	Decision Unit	Boring ID
	DU5	B17

SOIL BORING LOG

PROJECT : **HART** LOCATION : **Banana Patch**

LAT/LONG: DRILLING CONTRACTOR : **Geotek**

DRILLING METHOD AND EQUIPMENT USED : DPS

WATER LEVELS : START : 5/22/14 900 END : 915 LOGGER : I. Wood

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT) %	#/TYPE	PID READING (ppm)	SOIL CORE DESCRIPTION: SOIL TYPE, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: Sample Collection Information Sample Sub-Unit Decision
0–5		70	SM/GM Fill	Ø	SURFICIAL FILL SILTY SAND/SILTY GRAVEL, loose, dry	0-5'
			CL Fill		SILTY CLAY, stiff, moist reddish brown, with trace gravels	
5–10		60	GM	Ø	SILTY GRAVEL, loose grayish brown, dry, coralline gravels and asphalt fragments	5-10
					SILTY CLAY, ~~stiff~~,	
10–15		50	CL	Ø	with coralline gravels and asphalt fragments, stiff, dry, tan/black/brown. -12' concrete fragments 14' concrete fragments	10-15
15–20				Ø	FILL	15-20
			CL		NATIVE ~~GM~~ SILTY CLAY, med. stiff, moist, grayish brown	
20–25						

PID every 6" of core

CH2MHILL

PROJECT NUMBER	Decision Unit DU5	Boring ID B17

FLOW CHART FOR SAMPLING RATIONALE

PROJECT : HART | **LOCATION :** Banana Patch

LAT/LONG: | **DRILLING CONTRACTOR :** Geotek

UTILITY CLRNCE CONFRMD: YES NO

DRILLING METHOD AND EQUIPMENT USED : DPS HAS TP

Geophysical anomalies/ Fill Exist?

	DU1	DU2	DU3	DU4	DU5	DU6
Yes	B	B	B	B	C	C
No	A	B	B	A	C	C

Sample	Analysis
Collect into 8-oz jar	Dioxins, Furans

Did you see NAPL/Char/Ashes? YES NO IF YES:

Replicate collected here? YES NO IF YES:

Sample ID's:	
Sample ID's:	

A - Collect only surface samples - do not perform intrusive work

B - Perform intrusive investigation.

Each boring to be divided into 3 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 0.5' bgs		Collect 10 plugs into ziplock	TPH-g/d/o, PAH, RCRA8, Pest/Herb, PCBs
- 0.5 to 3' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 8-10' bgs OR 3' interval below bottom of fill (native)		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 10' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

C - Perform intrusive investigation

Each boring to be divided into 4 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 5' bgs	0-5	Collect 10 plugs into ziplock	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 5 to 10' bgs	5-10	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 10' bgs to 15' bgs	10-15	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 15 to 18' bgs (native)	15-20	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 18' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

POST SAMPLING:

Soil remaining from each core will be kepts and stored.

	ACTUAL SUs)	Sample	Analysis
One archive for shallow (0-10)	0-10	Collect 1 VOA from shallow (0-10' bgs) and one from deep (10'+)	Archive
One archive for deep (10'+)	10-20	All remaining soil from 6 adjacent borings will be consolidated	

NOTE: Do not combine native material and fill

5/22/14

CH2MHILL

PROJECT NUMBER	Decision Unit	Boring ID
	DU5	B-18

SOIL BORING LOG

PROJECT : HART — LOCATION : Banana Patch

LAT/LONG: — DRILLING CONTRACTOR : Geotek

DRILLING METHOD AND EQUIPMENT USED : DPS track rig

WATER LEVELS : — START : 0910 — END : 0920 — LOGGER :

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	#/TYPE	PID READING (ppm)	SOIL CORE DESCRIPTION: SOIL TYPE, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: Sample Collection Information, Sample Sub-Unit Decision
0–5		90%	FILL	0	FILL: Loose rubble on top of Red SILTY CLAY w/ gravel A. Dry. Very stiff. With lg gravel and sand throughout	Sample 0-5' bgs
5–10		95%	FILL	0		Sample 5-10' bgs
10–15		50%	FILL	0	~~FILL: Dk brown-black silty~~ SAND w/ sm gravel, A. Dry. Loose. Asphalt-like odor. No PID readings.	Sample 10-15' bgs
15–20		50%	FILL / NATIVE	0	Dk Br-red SILT w/ SAND. Trace F gravel, A. Seams MC sand w/ tiny shells. Wet. ~~Br-Red silty CLAY~~. Stiff, Dry to moist. Orange Mottles	Sample 15-20' bgs
20–25					EOB @ 20' bgs	

*Note PID = 6" interval

CH2MHILL

PROJECT NUMBER	Decision Unit DU5	Boring ID B-18

FLOW CHART FOR SAMPLING RATIONALE

PROJECT : HART

LOCATION : Banana Patch

LAT/LONG:

DRILLING CONTRACTOR : Geotek

UTILITY CLRNCE CONFRMD: YES NO

DRILLING METHOD AND EQUIPMENT USED : DPS HAS TP

Geophysical anomalies/ Fill Exist?

	DU1	DU2	DU3	DU4	DU5	DU6
Yes	B	B	B	B	C	C
No	A	B	B	A	C	C

	Sample	Analysis
	Collect into 8-oz jar	Dioxins, Furans

Did you see NAPL/Char/Ashes? YES NO IF YES: Sample ID's:

Replicate collected here? YES NO IF YES: Sample ID's:

A - Collect only surface samples - do not perform intrusive work

B - Perform intrusive investigation.

Each boring to be divided into 3 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 0.5' bgs		Collect 10 plugs into ziplock	TPH-g/d/o, PAH, RCRA8, Pest/Herb, PCBs
- 0.5 to 3' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 8-10' bgs OR 3' interval below bottom of fill (native)		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 10' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

C - Perform intrusive investigation

Each boring to be divided into 4 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 5' bgs	0-5	Collect 10 plugs into ziplock	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 5 to 10' bgs	5-10	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 10' bgs to 15' bgs	10-15	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 15 to 28' bgs (native)	15-20	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 18' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

POST SAMPLING:

Soil remaining from each core will be kepts and stored.

	ACTUAL SUs)	Sample	Analysis
One archive for shallow (0-10)	0-10	Collect 1 VOA from shallow (0-10' bgs) and one from deep (10'+)	Archive
One archive for deep (10'+)	10-15	All remaining soil from 6 adjacent borings will be consolidated	

NOTE: Do not combine native material and fill

CH2MHILL

SOIL BORING LOG

PROJECT NUMBER	Decision Unit	Boring ID
	DU5	B19

PROJECT : **HART** LOCATION : **Banana Patch**

LAT/LONG: DRILLING CONTRACTOR : **Geotek**

DRILLING METHOD AND EQUIPMENT USED : DPS

WATER LEVELS : START : 5/22/19 9:40 END : 1000 LOGGER : I. wood

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	#/TYPE	PID READING (ppm)	SOIL CORE DESCRIPTION: SOIL TYPE, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: Sample Collection Information, Sample Sub-Unit Decision
0–5		80	SM/GM, CL	Ø	~~SURFICIAL FILL~~ SILTY SAND/SILTY GRAVEL, loose, dry -asphalt fragments, coralline gravel FILL	0-5
5–10		100		Ø	SILTY CLAY, soft, moist grayish brown, FILL -increasing road gravel content, color varies (FILL)	5-10
10–15		90	GM, ~~CL~~ ML, ~~ML~~ ML	Fill / Native Ø	SILTY GRAVEL, concrete and asphalt road fill ~~SILTY CLAY~~ CLAYEY SILT, stiff dry, reddish brown, -increasing clay content w/	~~15-2~~ 10-15
15–20		80	SC, CL	Ø	CLAYEY SAND, soft, moist to wet, grayish brown, -same	15-20
20–25					20' total depth	

CH2MHILL

PROJECT NUMBER	Decision Unit DU5	Boring ID B19

FLOW CHART FOR SAMPLING RATIONALE

PROJECT : HART
LOCATION : Banana Patch
LAT/LONG:
DRILLING CONTRACTOR : Geotek
UTILITY CLRNCE CONFRMD: YES NO
DRILLING METHOD AND EQUIPMENT USED : DPS HAS TP

Geophysical anomalies/ Fill Exist?

	DU1	DU2	DU3	DU4	DU5	DU6
Yes	B	B	B	B	C	C
No	A	B	B	A	C	C

Did you see NAPL/Char/Ashes? YES NO IF YES:

Sample	Analysis
Collect into 8-oz jar	Dioxins, Furans

Replicate collected here? YES NO IF YES:

Sample ID's:
Sample ID's:

A - Collect only surface samples - do not perform intrusive work

B - Perform intrusive investigation.

Each boring to be divided into 3 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 0.5' bgs		Collect 10 plugs into ziplock	TPH-g/d/o, PAH, RCRA8, Pest/Herb, PCBs
- 0.5 to 3' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 8-10' bgs OR 3' interval below bottom of fill (native)		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 10' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

C - Perform intrusive investigation

Each boring to be divided into 4 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 5' bgs	0-5	Collect 10 plugs into ziplock	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 5 to 10' bgs	5-10	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 10' bgs to 15' bgs	10-15	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 15 to 18' bgs (native)	15-20	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 18' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

POST SAMPLING:

Soil remaining from each core will be kepts and stored.

	ACTUAL SUs)	Sample	Analysis
One archive for shallow (0-10)	0-10	Collect 1 VOA from shallow (0-10' bgs) and one from deep (10'+)	Archive
One archive for deep (10'+)	10-20	All remaining soil from 6 adjacent borings will be consolidated	

NOTE: Do not combine native material and fill

5/22/14

CH2MHILL

PROJECT NUMBER	Decision Unit	Boring ID
	DU5	B20

SOIL BORING LOG

PROJECT : HART — LOCATION : Banana Patch

LAT/LONG: — DRILLING CONTRACTOR : Geotek

DRILLING METHOD AND EQUIPMENT USED : DPS Track

WATER LEVELS : — START : 0920 — END : 1015 — LOGGER : VM

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	#/TYPE	PID READING (ppm)	SOIL CORE DESCRIPTION: SOIL TYPE, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: Sample Collection Information Sample Sub-Unit Decision
0–5		80%	FILL	0	FILL: Loose gravel (F, A) dry, w/ silt and SAND. Grey Brown. FILL: SILTY CLAY, tan-orange, dry, stiff. Trace M gravel throughout	Sample 0-5' bgs
5–10		95%		0	FILL: Loose dry F gravel w/SILT & SAND. FILL: Concrete, gravel w/ SILT & SAND. Grey. Dry. compact	Sample 5'-10' bgs. Refusal, step out
10–15		100%		0	~~FILL~~ FILL SAA. FILL: SILTY CLAY, coralline gravel and sand throughout, dry, stiff.	sample 10-15' bgs, refusal, step out
15–20		100%	NATIVE	0	NATIVE: Br silt w/ trace sand. Orange mottles throughout. Damp. Wet @ 17-18' bgs, Damp below.	sample 15-20' bgs
20–25					EOB @ 20' bgs	

Note: PID collected every 6"

CH2MHILL

PROJECT NUMBER	Decision Unit	Boring ID
	DU5	B-20

FLOW CHART FOR SAMPLING RATIONALE

PROJECT : HART **LOCATION :** Banana Patch

LAT/LONG: **DRILLING CONTRACTOR :** Geotek

UTILITY CLRNCE CONFRMD: YES NO

DRILLING METHOD AND EQUIPMENT USED : DPS HAS TP

Geophysical anomalies/ Fill Exist?

	DU1	DU2	DU3	DU4	DU5	DU6
Yes	B	B	B	B	C	C
No	A	B	B	A	C	C

Did you see NAPL/Char/Ashes? YES NO IF YES:

Sample	Analysis
Collect into 8-oz jar	Dioxins, Furans

Replicate collected here? YES NO IF YES:

Sample ID's:

Sample ID's:

A - Collect only surface samples - do not perform intrusive work

B - Perform intrusive investigation.

Each boring to be divided into 3 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 0.5' bgs		Collect 10 plugs into ziplock	TPH-g/d/o, PAH, RCRA8, Pest/Herb, PCBs
- 0.5 to 3' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 8-10' bgs OR 3' interval below bottom of fill (native)		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 10' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

C - Perform intrusive investigation

Each boring to be divided into 4 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 5' bgs	0-5	Collect 10 plugs into ziplock	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 5 to 10' bgs	5-10	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 10' bgs to 15' bgs	10-15	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 15 to 28' bgs (native)	15-20	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 18' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

POST SAMPLING:

Soil remaining from each core will be kepts and stored.

	ACTUAL SUs)	Sample	Analysis
One archive for shallow (0-10)	0-10	Collect 1 VOA from shallow (0-10' bgs) and one from deep (10'+)	Archive
One archive for deep (10'+)	10-20	All remaining soil from 6 adjacent borings will be consolidated	

NOTE: Do not combine native material and fill

CH2MHILL

PROJECT NUMBER	Decision Unit	Boring ID
	DU5	B21

SOIL BORING LOG

PROJECT : **HART** LOCATION : **Banana Patch**

LAT/LONG: DRILLING CONTRACTOR : **Geotek**

DRILLING METHOD AND EQUIPMENT USED : DPS

WATER LEVELS : START : 5/22/14 930 END : 945 LOGGER : BR

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	#/TYPE	PID READING (ppm)	SOIL CORE DESCRIPTION: SOIL TYPE, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: Sample Collection Information Sample Sub-Unit Decision
0–5		60%	FILL		Silty clay (CL), dark gray, some gravel, slightly moist, loose, stiff. Silty clay (CL) at 3'. Reddish brown, moist, stiff, low to med. plasticity. FILL	0-5'
5–10		90%	FILL		same as 0-3'. Intermixed w/ horizons of dry, platy silty ~~clay~~. Basalt & coral fragments up to 5 cm. FILL	5-10'
10–15		100%	FILL		same as 5-10'. FILL	10-15'
15–20		60%	CL		Silty clay (CL). Dark brown. Very moist to wet. Soft. Med. to high plasticity.	15-20'
20–25					EOB @ 20'	

CH2MHILL

PROJECT NUMBER	Decision Unit 5	Boring ID B21

FLOW CHART FOR SAMPLING RATIONALE

PROJECT : HART **LOCATION :** Banana Patch

LAT/LONG: **DRILLING CONTRACTOR :** Geotek

UTILITY CLRNCE CONFRMD: YES NO

DRILLING METHOD AND EQUIPMENT USED : DPS HAS TP

Geophysical anomalies/ Fill Exist?

	DU1	DU2	DU3	DU4	DU5	DU6
Yes	B	B	B	B	C	C
No	A	B	B	A	C	C

			Sample	Analysis
Did you see NAPL/Char/Ashes?	YES	NO	IF YES: Collect into 8-oz jar	Dioxins, Furans
Replicate collected here?	YES	NO	IF YES: Sample ID's:	
			Sample ID's:	

A - Collect only surface samples - do not perform intrusive work

B - Perform intrusive investigation.

Each boring to be divided into 3 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 0.5' bgs		Collect 10 plugs into ziplock	TPH-g/d/o, PAH, RCRA8, Pest/Herb, PCBs
- 0.5 to 3' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 8-10' bgs OR 3' interval below bottom of fill (native)		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 10' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

C - Perform intrusive investigation

Each boring to be divided into 4 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 5' bgs	0-5	Collect 10 plugs into ziplock	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 5 to 10' bgs	5-10	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 10' bgs to 15' bgs	10-15	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 15 to 28' bgs (native)	15-20	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 18' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

POST SAMPLING:

Soil remaining from each core will be kepts and stored.

	ACTUAL SUs)	Sample	Analysis
One archive for shallow (0-10)	0-10	Collect 1 VOA from shallow (0-10' bgs) and one from deep (10'+)	Archive
One archive for deep (10'+)	10-20	All remaining soil from 6 adjacent borings will be consolidated	

NOTE: Do not combine native material and fill

5/22/14

CH2MHILL

PROJECT NUMBER	Decision Unit	Boring ID
	DU5	B-22

SOIL BORING LOG

PROJECT : HART LOCATION : Banana Patch

LAT/LONG: DRILLING CONTRACTOR : Geotek

DRILLING METHOD AND EQUIPMENT USED : DPS Truck

WATER LEVELS : START : 1000 END : 1030 LOGGER : VM

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	#/TYPE	PID READING (ppm)	SOIL CORE DESCRIPTION SOIL TYPE, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS Sample Collection Information Sample Sub-Unit Decision
5		80%	FILL	0	FILL: Red silt w/F gravel, loose, dry FILL: Br Silt, hard, dry, compact w/gravel throughout F-C, A-SUBA, WS.	Sample 0-5' bgs
10		90%		0		Sample 5-10' bgs
15		95%		0	WOOD	Sample 10-15' bgs
20		50%	native	0	Br SILT. Trace sand throughout. Med soft. Moist, wet @ 19' bgs. Orange mottles throughout	Sample 15-20' bgs
25					EOB @ 20' bgs	

Note: PID collected every 6"

CH2MHILL

PROJECT NUMBER	Decision Unit DU5	Boring ID B-22

FLOW CHART FOR SAMPLING RATIONALE

PROJECT : HART **LOCATION :** Banana Patch

LAT/LONG: **DRILLING CONTRACTOR :** Geotek

UTILITY CLRNCE CONFRMD: YES NO

DRILLING METHOD AND EQUIPMENT USED : DPS HAS TP

Geophysical anomalies/ Fill Exist?

	DU1	DU2	DU3	DU4	DU5	DU6
Yes	B	B	B	B	C	C
No	A	B	B	A	C	C

Sample	Analysis
Collect into 8-oz jar	Dioxins, Furans

Did you see NAPL/Char/Ashes? YES NO IF YES:

Replicate collected here? YES NO IF YES:

Sample ID's:

Sample ID's:

A - Collect only surface samples - do not perform intrusive work

B - Perform intrusive investigation.

Each boring to be divided into 3 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 0.5' bgs		Collect 10 plugs into ziplock	TPH-g/d/o, PAH, RCRA8, Pest/Herb, PCBs
- 0.5 to 3' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 8-10' bgs OR 3' interval below bottom of fill (native)		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 10' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

C - Perform intrusive investigation

Each boring to be divided into 4 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 5' bgs	0-5	Collect 10 plugs into ziplock	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 5 to 10' bgs	5-10	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 10' bgs to 15' bgs	10-15	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 15 to 28' bgs (native)	15-20	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 18' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

POST SAMPLING:

Soil remaining from each core will be kepts and stored.

	ACTUAL SUs)	Sample	Analysis
One archive for shallow (0-10)	0-10	Collect 1 VOA from shallow (0-10' bgs) and one from deep (10'+)	Archive
One archive for deep (10'+)	10-15	All remaining soil from 6 adjacent borings will be consolidated	

NOTE: Do not combine native material and fill

CH2MHILL

PROJECT NUMBER	Decision Unit	Boring ID B23

SOIL BORING LOG

PROJECT : HART LOCATION : Banana Patch

LAT/LONG: DRILLING CONTRACTOR : Geotek

DRILLING METHOD AND EQUIPMENT USED : DPS, truck

WATER LEVELS : START : 1015 END : 1035 LOGGER : BR

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	#/TYPE	PID READING (ppm)	SOIL CORE DESCRIPTION: SOIL TYPE, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: Sample Collection Information, Sample Sub-Unit Decision
5	0-5	60%	FILL	0	Silty clay (CL) w/some gravel. Brown to gray. Dry. Loose. Concrete fragments @ 3'. Plastic debris @ 5'. FILL	0-5'
10	5-10	90%	FILL	0	Same as 0-5'. Reddish brown to 7'. Brown to 10'. Platy structure throughout. FILL	5-10'
15	10-15	40%	FILL	0	Same as 0-5'. Reddish brown. FILL	10-15'
20	15-20	60%	CL	0	Silty clay (CL), brown. Moist. Low to med. plasticity. Med. stiff. Soft & very moist @ 19'.	15-20'
25					EOB @ 20'.	

CH2MHILL

PROJECT NUMBER	Decision Unit	Boring ID

FLOW CHART FOR SAMPLING RATIONALE

PROJECT : HART　　　**LOCATION :** Banana Patch

LAT/LONG:　　　**DRILLING CONTRACTOR :** Geotek

UTILITY CLRNCE CONFRMD: YES NO

DRILLING METHOD AND EQUIPMENT USED : DPS HAS TP

Geophysical anomalies/ Fill Exist?

	DU1	DU2	DU3	DU4	DU5	DU6
Yes	B	B	B	B	C	C
No	A	B	B	A	C	C

				Sample	Analysis
Did you see NAPL/Char/Ashes?	YES	NO	IF YES:	Collect into 8-oz jar	Dioxins, Furans
Replicate collected here?	YES	NO	IF YES:	Sample ID's:	
				Sample ID's:	

A - Collect only surface samples - do not perform intrusive work

B - Perform intrusive investigation.

Each boring to be divided into 3 vertical SUs	ACTUAL SUs)	Sample	Analysis
- 0 to 0.5' bgs		Collect 10 plugs into ziplock	TPH-g/d/o, PAH, RCRA8, Pest/Herb, PCBs
- 0.5 to 3' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 8-10' bgs OR 3' interval below bottom of fill (native)		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 10' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

C - Perform intrusive investigation

Each boring to be divided into 4 vertical SUs	ACTUAL SUs)	Sample	Analysis
- 0 to 5' bgs	0-5	Collect 10 plugs into ziplock	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 5 to 10' bgs	5-10	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 10' bgs to 15' bgs	10-15	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 15 to 28' bgs (native)	15-20	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 18' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

POST SAMPLING:

Soil remaining from each core will be kepts and stored.	ACTUAL SUs)	Sample	Analysis
One archive for shallow (0-10)	0-10	Collect 1 VOA from shallow (0-10' bgs) and one from deep (10'+)	Archive
One archive for deep (10'+)	10-20	All remaining soil from 6 adjacent borings will be consolidated	

NOTE: Do not combine native material and fill

5/22/14

CH2MHILL

PROJECT NUMBER	Decision Unit	Boring ID
	DU5	B-234

SOIL BORING LOG

PROJECT : **HART** LOCATION : **Banana Patch**

LAT/LONG: DRILLING CONTRACTOR : **Geotek**

DRILLING METHOD AND EQUIPMENT USED : DPS-Track Rig

WATER LEVELS : START : 1030 END : 1100 LOGGER : VM

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	#/TYPE	PID READING (ppm)	SOIL CORE DESCRIPTION SOIL TYPE, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS Sample Collection Information Sample Sub-Unit Decision
0–5	0–5	50%	FILL		Red Silt, organics, dry, loose FILL: MIX Red and br clays w/SILT & SAND. Gravel (coralline) coarse, throughout. ~~Asphalt Black Small Gravel~~	Sample 0-5' bgs
5–10	5–10	100%				Sample 5-10' bgs
10–15	10–15	85			FILL: Black small gravel w/silt & SAND PS, A. Some c black gravel throughout NATIVE: Br SILT, damp, crumbly, Little Clay.	Sample 10-15' bgs
15–20	15–20	20%	NATIVE		SANDY SILT w/ SAA, wet @ 19' bgs	Sample 15-20' bgs
20–25					EOB@20'	

CH2MHILL

PROJECT NUMBER	Decision Unit	Boring ID
	5	B-24

FLOW CHART FOR SAMPLING RATIONALE

PROJECT : HART **LOCATION :** Banana Patch

LAT/LONG: **DRILLING CONTRACTOR :** Geotek

UTILITY CLRNCE CONFRMD: YES NO

DRILLING METHOD AND EQUIPMENT USED : DPS HAS TP

Geophysical anomalies/ Fill Exist?

	DU1	DU2	DU3	DU4	DU5	DU6
Yes	B	B	B	B	C	C
No	A	B	B	A	C	C

				Sample	Analysis
Did you see NAPL/Char/Ashes?	YES	NO	IF YES:	Collect into 8-oz jar	Dioxins, Furans
Replicate collected here?	YES	NO	IF YES:	Sample ID's:	
				Sample ID's:	

A - Collect only surface samples - do not perform intrusive work

B - Perform intrusive investigation.

Each boring to be divided into 3 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 0.5' bgs		Collect 10 plugs into ziplock	TPH-g/d/o, PAH, RCRA8, Pest/Herb, PCBs
- 0.5 to 3' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 8-10' bgs OR 3' interval below bottom of fill (native)		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 10' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

C - Perform intrusive investigation

Each boring to be divided into 4 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 5' bgs	0-5	Collect 10 plugs into ziplock	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 5 to 10' bgs	5-10	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 10' bgs to 15' bgs	10-15	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 15 to 28' bgs (native)	15-20	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 18' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

POST SAMPLING:

Soil remaining from each core will be kepts and stored.

	ACTUAL SUs)	Sample	Analysis
One archive for shallow (0-10)	0-10	Collect 1 VOA from shallow (0-10' bgs) and one from deep (10'+)	Archive
One archive for deep (10'+)	10-20	All remaining soil from 6 adjacent borings will be consolidated	

NOTE: Do not combine native material and fill

5/22/14

CH2MHILL	PROJECT NUMBER	Decision Unit 5	Boring ID B25

SOIL BORING LOG

PROJECT : HART — LOCATION : Banana Patch

LAT/LONG: — DRILLING CONTRACTOR : Geotek

DRILLING METHOD AND EQUIPMENT USED :

WATER LEVELS : — START : 1045 — END : 1100 — LOGGER : BR

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	#/TYPE	PID READING (ppm)	SOIL CORE DESCRIPTION: SOIL TYPE, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: Sample Collection Information Sample Sub-Unit Decision
5		80%		0	Silty clay (CL) w/ some gravel. Brown to gray. Dry. Loose. Soft. Nonplastic. Asphalt @ 1', throughout	0-5'
10		100%	FILL	0	Silty clay (CL) w/ trace gravel. Brown to reddish brown. Dry. Mostly hard, some soft, loose areas.	5-10'
15		80%		0	Same as 5-10'. Reddish brown. Dry, loose. Large basalt fragments @ 14'.	10-15'
20		50%	CL	0	Silty clay (CL). Brown. Moist. ~~[illegible]~~ Med. plasticity. Med. soft to soft. Very moist @ 19'. EOB @ 20'	15-20'
25						

CH2MHILL

PROJECT NUMBER	Decision Unit	Boring ID

FLOW CHART FOR SAMPLING RATIONALE

PROJECT : HART **LOCATION :** Banana Patch

LAT/LONG: **DRILLING CONTRACTOR :** Geotek

UTILITY CLRNCE CONFRMD: YES NO

DRILLING METHOD AND EQUIPMENT USED : DPS HAS TP

Geophysical anomalies/ Fill Exist?

	DU1	DU2	DU3	DU4	DU5	DU6
Yes	B	B	B	B	C	C
No	A	B	B	A	C	C

			Sample	Analysis
Did you see NAPL/Char/Ashes?	YES	NO	IF YES: Collect into 8-oz jar	Dioxins, Furans
Replicate collected here?	YES	NO	IF YES: Sample ID's:	
			Sample ID's:	

A - Collect only surface samples - do not perform intrusive work

B - Perform intrusive investigation.

Each boring to be divided into 3 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 0.5' bgs		Collect 10 plugs into ziplock	TPH-g/d/o, PAH, RCRA8, Pest/Herb, PCBs
- 0.5 to 3' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 8-10' bgs OR 3' interval below bottom of fill (native)		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 10' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

C - Perform intrusive investigation

Each boring to be divided into 4 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 5' bgs	0-5	Collect 10 plugs into ziplock	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 5 to 10' bgs	5-10	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 10' bgs to 15' bgs	10-15	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 15 to 28' bgs (native)	15-20	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 18' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

POST SAMPLING:

Soil remaining from each core will be kepts and stored.

	ACTUAL SUs)	Sample	Analysis
One archive for shallow (0-10)	0-10	Collect 1 VOA from shallow (0-10' bgs) and one from deep (10'+)	Archive
One archive for deep (10'+)	10-20	All remaining soil from 6 adjacent borings will be consolidated	

NOTE: Do not combine native material and fill

5/22/14

CH2MHILL

PROJECT NUMBER	Decision Unit	Boring ID
	DU 5	B-26

SOIL BORING LOG

PROJECT : **HART** LOCATION : **Banana Patch**

LAT/LONG: DRILLING CONTRACTOR : **Geotek**

DRILLING METHOD AND EQUIPMENT USED : DPS Track Rig

WATER LEVELS : START : 1100 END : 1140 LOGGER : VM

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	#/TYPE	PID READING (ppm)	SOIL CORE DESCRIPTION SOIL TYPE, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS Sample Collection Information Sample Sub-Unit Decision
0–5	0–5	40%	FILL	0	FILL: Red-br SILT w/ ~~S~~ F-C gravel PS, A. Dry. Loose FILL: Br SILT w/ F-C gravel PS, ~~dry~~ (coralline), ~~Tr~~ F-C gravel (basalt)	Sample 0-5' bgs
5–10	5–10	80%	FILL	0	w/ Sand F-C WS, A. Dry. Fissile.	Sample 5-10' bgs
10–15	10–15	100%	FILL	0		Sample 10-15' bgs
15–20	15–20	100%	NATIVE	0	NATIVE: Clayey SILT, br, orange mottles. Dry to damp. SANDY SILT seam, wet Wet SAA	Sample 15-20' bgs
20–25						

* Note PID readings every 6"

CH2MHILL

PROJECT NUMBER	Decision Unit DU 5	Boring ID B-26

FLOW CHART FOR SAMPLING RATIONALE

PROJECT : HART

LOCATION : Banana Patch

LAT/LONG:

DRILLING CONTRACTOR : Geotek

UTILITY CLRNCE CONFRMD: YES NO

DRILLING METHOD AND EQUIPMENT USED : DPS HAS TP

Geophysical anomalies/ Fill Exist?

	DU1	DU2	DU3	DU4	DU5	DU6
Yes	B	B	B	B	C	C
No	A	B	B	A	C	C

Did you see NAPL/Char/Ashes? YES NO IF YES:

Sample	Analysis
Collect into 8-oz jar	Dioxins, Furans

Replicate collected here? YES NO IF YES:

Sample ID's:
Sample ID's:

A - Collect only surface samples - do not perform intrusive work

B - Perform intrusive investigation.

Each boring to be divided into 3 vertical SUs

- 0 to 0.5' bgs
- 0.5 to 3' bgs
- 8-10' bgs OR 3' interval below bottom of fill (native)

ACTUAL SUs)	Sample	Analysis
	Collect 10 plugs into ziplock	TPH-g/d/o, PAH, RCRA8, Pest/Herb, PCBs
	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 10' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

C - Perform intrusive investigation

Each boring to be divided into 4 vertical SUs

- 0 to 5' bgs
- 5 to 10' bgs
- 10' bgs to 15' bgs
- 15 to 28' bgs (native)

ACTUAL SUs)	Sample	Analysis
0-5	Collect 10 plugs into ziplock	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
5-10	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
10-15	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
15-20	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 18' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

POST SAMPLING:

Soil remaining from each core will be kepts and stored.

One archive for shallow (0-10)

One archive for deep (10'+)

ACTUAL SUs)	Sample	Analysis
0-10	Collect 1 VOA from shallow (0-10' bgs) and one from deep (10'+)	Archive
10-20	All remaining soil from 6 adjacent borings will be consolidated	

NOTE: Do not combine native material and fill

CH2MHILL

PROJECT NUMBER	Decision Unit	Boring ID
457998	5	B27

SOIL BORING LOG

PROJECT : **HART** LOCATION : **Banana Patch**

LAT/LONG: DRILLING CONTRACTOR : **Geotek**

DRILLING METHOD AND EQUIPMENT USED :

WATER LEVELS : START : 1120 END : 1135 LOGGER : BR

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	#/TYPE	PID READING (ppm)	SOIL CORE DESCRIPTION: SOIL TYPE, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: Sample Collection Information, Sample Sub-Unit Decision
5		80%		0	Silty clay (CL) w/ trace gravel. Brown to dk gray. Dry, loose. soft. Silty clay (CL) at 4.5'. Dk brown. Med. stiff. Low plasticity. FILL.	0-5'
10		100%	FILL	0	Silty clay w/ trace gravel. Brown. Stiff. Dry. construction debris @ 5.5'. FILL	5-10'
15		70%		0	Same as 0-5'. Reddish brown. Dry, loose. Concrete @ 14'. FILL	10-15'
20		80%	CL	0	Silty clay (CL). Dark brown. Moist. Med. stiff. Med. plasticity. Very moist & soft @ 18'. EOB @ 20'	15-20'
25						

CH2MHILL

PROJECT NUMBER	Decision Unit	Boring ID

FLOW CHART FOR SAMPLING RATIONALE

PROJECT : HART **LOCATION :** Banana Patch

LAT/LONG: **DRILLING CONTRACTOR :** Geotek

UTILITY CLRNCE CONFRMD: YES NO

DRILLING METHOD AND EQUIPMENT USED : DPS HAS TP

Geophysical anomalies/ Fill Exist?

	DU1	DU2	DU3	DU4	DU5	DU6
Yes	B	B	B	B	C	C
No	A	B	B	A	C	C

Sample	Analysis
Collect into 8-oz jar	Dioxins, Furans

Did you see NAPL/Char/Ashes? YES NO IF YES: Sample ID's:

Replicate collected here? YES NO IF YES: Sample ID's:

A - Collect only surface samples - do not perform intrusive work

B - Perform intrusive investigation.

Each boring to be divided into 3 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 0.5' bgs		Collect 10 plugs into ziplock	TPH-g/d/o, PAH, RCRA8, Pest/Herb, PCBs
- 0.5 to 3' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 8-10' bgs OR 3' interval below bottom of fill (native)		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 10' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

C - Perform intrusive investigation

Each boring to be divided into 4 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 5' bgs	0-5	Collect 10 plugs into ziplock	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 5 to 10' bgs	5-10	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 10' bgs to 15' bgs	10-15	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 15 to 28' bgs (native)	15-20	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 18' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

POST SAMPLING:

Soil remaining from each core will be kepts and stored.

	ACTUAL SUs)	Sample	Analysis
One archive for shallow (0-10)	0-10	Collect 1 VOA from shallow (0-10' bgs) and one from deep (10'+)	Archive
One archive for deep (10'+)	10-20	All remaining soil from 6 adjacent borings will be consolidated	

NOTE: Do not combine native material and fill

5/22/14

CH2MHILL	PROJECT NUMBER	Decision Unit 5	Boring ID B28
	SOIL BORING LOG		

PROJECT : **HART** LOCATION : **Banana Patch**

LAT/LONG: DRILLING CONTRACTOR : **Geotek**

DRILLING METHOD AND EQUIPMENT USED :

WATER LEVELS : START : 1400 END : 1420 LOGGER : BR

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	#/TYPE	PID READING (ppm)	SOIL CORE DESCRIPTION: SOIL TYPE, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: Sample Collection Information Sample Sub-Unit Decision
5		70%		0	Silty clay (CL) w/trace gravel. Reddish brown. Dry. Stiff. Nonplastic. Concrete fragments @ 2'. FILL	0-5'
10		100%	FILL	0	Silty clay (CL) w/some gravel. Stiff. Loose. Brown to reddish brown. Concrete @ 9'. FILL	5-10'
15		100%		0	Same as 5-10'. Silty clay (CL) @ ~~8.5~~ 13.5' Brown. Moist. Moderately stiff. Low to med plasticity. Fill ends @ ~~8.5~~ 13.5'	10-15'
20		80%	CL	0	Same as ~~8.5-13~~ 13.5-15'. Very moist & soft @ 18'.	15-20'
30		100%		0	20-30': Same as 15-20'. Saturated/Wet. EOB @ 30'.	

CH2MHILL

PROJECT NUMBER	Decision Unit	Boring ID

FLOW CHART FOR SAMPLING RATIONALE

PROJECT : HART **LOCATION :** Banana Patch

LAT/LONG: **DRILLING CONTRACTOR :** Geotek

UTILITY CLRNCE CONFRMD: YES NO

DRILLING METHOD AND EQUIPMENT USED : DPS HAS TP

Geophysical anomalies/ Fill Exist?

	DU1	DU2	DU3	DU4	DU5	DU6
Yes	B	B	B	B	C	C
No	A	B	B	A	C	C

Did you see NAPL/Char/Ashes? YES NO IF YES:

Sample	Analysis
Collect into 8-oz jar	Dioxins, Furans

Replicate collected here? YES NO IF YES:

Sample ID's:

Sample ID's:

A - Collect only surface samples - do not perform intrusive work

B - Perform intrusive investigation.

Each boring to be divided into 3 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 0.5' bgs		Collect 10 plugs into ziplock	TPH-g/d/o, PAH, RCRA8, Pest/Herb, PCBs
- 0.5 to 3' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 8-10' bgs OR 3' interval below bottom of fill (native)		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 10' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

C - Perform intrusive investigation

Each boring to be divided into 4 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 5' bgs	0-5	Collect 10 plugs into ziplock	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 5 to 10' bgs	5-10	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 10' bgs to 15' bgs	10-15	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 15 to 28' bgs (native)	15-20	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 18' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

POST SAMPLING:

Soil remaining from each core will be kepts and stored.

	ACTUAL SUs)	Sample	Analysis
One archive for shallow (0-10)	0-10	Collect 1 VOA from shallow (0-10' bgs) and one from deep (10'+)	Archive
One archive for deep (10'+)	10-20	All remaining soil from 6 adjacent borings will be consolidated	

NOTE: Do not combine native material and fill

5/22/14

CH2MHILL

PROJECT NUMBER	Decision Unit	Boring ID
	D5	B-29

SOIL BORING LOG

PROJECT : HART LOCATION : Banana Patch

LAT/LONG: DRILLING CONTRACTOR : Geotek

DRILLING METHOD AND EQUIPMENT USED : DPS Track RIG

WATER LEVELS : START : 1330 END : 1420 LOGGER : VM

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	#/TYPE	PID READING (ppm)	SOIL CORE DESCRIPTION: SOIL TYPE, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: Sample Collection Information Sample Sub-Unit Decision
0–5		75%	FILL		FILL: Red silt, loose, dry, M gravel A throughout	sample ~~5-10~~ 0-5' bgs
5–10		75%			FILL: Br SILT w/Gravel & sand throughout. Coralline & basalt gravel F-C Angular, PS. F-C sand PS. Dry, fissile.	Sample 5-10' bgs
10–15		100%			Native: Br silt w/ some	Sample 10-15' bgs
15–20		90%			Clay. Dry to damp. Trace VF sand. Orange Motteling starts at 15.5' Wet @ 18'	Sample 15-20' bgs
20–25					EOB @ 20' bgs	

CH2MHILL

PROJECT NUMBER	Decision Unit D5	Boring ID B-29

FLOW CHART FOR SAMPLING RATIONALE

PROJECT : HART
LOCATION : Banana Patch
LAT/LONG:
DRILLING CONTRACTOR : Geotek
UTILITY CLRNCE CONFRMD: YES NO
DRILLING METHOD AND EQUIPMENT USED : DPS HAS TP

Geophysical anomalies/ Fill Exist?

	DU1	DU2	DU3	DU4	DU5	DU6
Yes	B	B	B	B	C	C
No	A	B	B	A	C	C

			Sample	Analysis
Did you see NAPL/Char/Ashes?	YES NO	IF YES:	~~Collect into 8-oz jar~~	Dioxins, Furans
Replicate collected here?	YES NO	IF YES:	Sample ID's:	
			Sample ID's:	

A - Collect only surface samples - do not perform intrusive work

B - Perform intrusive investigation.

Each boring to be divided into 3 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 0.5' bgs		Collect 10 plugs into ziplock	TPH-g/d/o, PAH, RCRA8, Pest/Herb, PCBs
- 0.5 to 3' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 8-10' bgs OR 3' interval below bottom of fill (native)		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 10' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

C - Perform intrusive investigation

Each boring to be divided into 4 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 5' bgs	0-5	Collect 10 plugs into ziplock	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 5 to 10' bgs	5-10	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 10' bgs to 15' bgs	10-15	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 15 to 28' bgs (native)	15-20	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 18' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

POST SAMPLING:

Soil remaining from each core will be kepts and stored.

	ACTUAL SUs)	Sample	Analysis
One archive for shallow (0-10)	0-10	Collect 1 VOA from shallow (0-10' bgs) and one from deep (10'+)	Archive
One archive for deep (10'+)	10-20	All remaining soil from 6 adjacent borings will be consolidated	

NOTE: Do not combine native material and fill

~~0~~5/22/14

CH2MHILL

PROJECT NUMBER	Decision Unit	Boring ID
	DU 5	B 30

SOIL BORING LOG

PROJECT : HART LOCATION : Banana Patch

LAT/LONG: DRILLING CONTRACTOR : Geotek

DRILLING METHOD AND EQUIPMENT USED : DPS Track Rig

WATER LEVELS : START : 1140 END : LOGGER : VM

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	#/TYPE	PID READING (ppm)	SOIL CORE DESCRIPTION: SOIL TYPE, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: Sample Collection Information Sample Sub-Unit Decision
0–5		70%	FILL	0	FILL: Red silt w/c gravel, A, dry, Fissile, loose FILL: Br silt w/ Basalt and coral Gravel F-C ~~GP~~ PS, w/ F-C sand, dry	Sample 0-5' bgs
5–10		75%		0		Sample 5-10' ~~0-5~~ bgs
10–15		100		0		Sample 10-15' bgs
15–20		100	NATIVE	0	NATIVE: Br SILT dry, orange mottles, ~~B~~ STIFF SILTY SAND : WET wet below sand, ~~soft~~ Med stiff to soft	Sample 15-20' bgs
20–25						

CH2MHILL

PROJECT NUMBER	Decision Unit	Boring ID
	DU 5	30

FLOW CHART FOR SAMPLING RATIONALE

PROJECT : HART

LOCATION : Banana Patch

LAT/LONG:

DRILLING CONTRACTOR : Geotek

UTILITY CLRNCE CONFRMD: YES NO

DRILLING METHOD AND EQUIPMENT USED : DPS HAS TP

Geophysical anomalies/ Fill Exist?

	DU1	DU2	DU3	DU4	DU5	DU6
Yes	B	B	B	B	C	C
No	A	B	B	A	C	C

Did you see NAPL/Char/Ashes? YES NO IF YES:

Sample	Analysis
~~Collect into 8 oz jar~~	Dioxins, Furans

Replicate collected here? YES NO IF YES:

Sample ID's:
Sample ID's:

A - Collect only surface samples - do not perform intrusive work

B - Perform intrusive investigation.

Each boring to be divided into 3 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 0.5' bgs	X	Collect 10 plugs into ziplock	TPH-g/d/o, PAH, RCRA8, Pest/Herb, PCBs
- 0.5 to 3' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 8-10' bgs OR 3' interval below bottom of fill (native)		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 10' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

C - Perform intrusive investigation

Each boring to be divided into 4 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 5' bgs	0-5	Collect 10 plugs into ziplock	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 5 to 10' bgs	5-10	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 10' bgs to 15' bgs	10-15	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 15 to 28' bgs (native)	15-20	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 18' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

POST SAMPLING:

Soil remaining from each core will be kepts and stored.

	ACTUAL SUs)	Sample	Analysis
One archive for shallow (0-10)	0-10	Collect 1 VOA from shallow (0-10' bgs) and one from deep (10'+)	Archive
One archive for deep (10'+)	10-30	All remaining soil from 6 adjacent borings will be consolidated	

NOTE: Do not combine native material and fill

CH2MHILL

PROJECT NUMBER	Decision Unit 6	Boring ID 1

SOIL BORING LOG

PROJECT : **HART** LOCATION : **Banana Patch**

LAT/LONG: DRILLING CONTRACTOR : **Geotek**

DRILLING METHOD AND EQUIPMENT USED : DPS, track

WATER LEVELS : START : NR END : NR LOGGER : B. Porder

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	#/TYPE	PID READING (ppm)	SOIL CORE DESCRIPTION: SOIL TYPE, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: Sample Collection Information, Sample Sub-Unit Decision
5	0-5	70	FILL	0	Silty clay (CL) with some sand and gravel. Light brown to reddish brown. Dry to slightly moist soft to stiff. Non-plastic to low plasticity. Some concrete fragments. FILL.	0-5' + duplicate & triplicate
10	5-10	90	FILL	0	Silty clay (CL) with trace gravel. Reddish brown. Slightly moist. Med. stiff. Med. plasticity. Pumice frags from 7-8'. Basalt frags (5cm) 9-10'. FILL	5-10'
15	10-15	70	FILL	0	Same as 5-10'. Basalt frags 12-13'. Concrete debris 14-15'. FILL	10-15'
20	15-20	~~70~~ 50	CL	0	Concrete debris ~~16-17~~ 15-16'. Silty clay (CL) w/ trace gravel. Dark brown. Moist. Soft. Med. plasticity. FILL ends @ 16'.	15-20'
25					EOB @ 20'	

CH2MHILL

PROJECT NUMBER	Decision Unit	Boring ID

FLOW CHART FOR SAMPLING RATIONALE

PROJECT : HART **LOCATION :** Banana Patch

LAT/LONG: **DRILLING CONTRACTOR :** Geotek

UTILITY CLRNCE CONFRMD: YES NO

DRILLING METHOD AND EQUIPMENT USED : DPS HAS TP

Geophysical anomalies/ Fill Exist?

	DU1	DU2	DU3	DU4	DU5	DU6
Yes	B	B	B	B	C	C
No	A	B	B	A	C	C

			Sample	Analysis
Did you see NAPL/Char/Ashes?	YES	NO	IF YES: Collect into 8-oz jar	Dioxins, Furans
Replicate collected here?	YES	NO	IF YES: Sample ID's:	
			Sample ID's:	

A - Collect only surface samples - do not perform intrusive work

B - Perform intrusive investigation.

Each boring to be divided into 3 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 0.5' bgs		Collect 10 plugs into ziplock	TPH-g/d/o, PAH, RCRA8, Pest/Herb, PCBs
- 0.5 to 3' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 8-10' bgs OR 3' interval below bottom of fill (native)		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 10' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

C - Perform intrusive investigation

Each boring to be divided into 4 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 5' bgs	0-5	Collect 10 plugs into ziplock	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 5 to 10' bgs	5-10	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 10' bgs to 15' bgs	10-15	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 15 to 28' bgs (native)	15-20	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 18' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

POST SAMPLING:

Soil remaining from each core will be kepts and stored.

	ACTUAL SUs)	Sample	Analysis
One archive for shallow (0-10)	0-10	Collect 1 VOA from shallow (0-10' bgs) and one from deep (10'+)	Archive
One archive for deep (10'+)	10-20	All remaining soil from 6 adjacent borings will be consolidated	

NOTE: Do not combine native material and fill

CH2MHILL	PROJECT NUMBER	Decision Unit 6	Boring ID 2

SOIL BORING LOG

PROJECT : **HART** LOCATION : **Banana Patch**

LAT/LONG: DRILLING CONTRACTOR : **Geotek**

DRILLING METHOD AND EQUIPMENT USED : DPS

WATER LEVELS : START : NR END : NR LOGGER : B. Roder

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	#/TYPE	PID READING (ppm)	SOIL CORE DESCRIPTION: SOIL TYPE, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: Sample Collection Information Sample Sub-Unit Decision
5		70		0	Silty clay (CL) with some gravel. Brown. Slightly moist. Basalt frags (1-3cm). low plasticity. Stiff. FILL	0-5' + duplicate & triplicate
10		60	FILL	0	Same as 0-5'. Reddish brown. Concrete debris at 6'. FILL	5-10'
15		50		0	Same as 5-10'. Concrete at 13'. Asphalt material @ 15'. FILL	10-15'
20		50	CL	0	Concrete 15-16'. Silty clay (CL), Dark brown. Moist. Med. stiff. Med-low plasticity. Fill ends @ 16'.	15-20'
25					EOB @ 20'.	

CH2MHILL

PROJECT NUMBER	Decision Unit	Boring ID

FLOW CHART FOR SAMPLING RATIONALE

PROJECT : HART **LOCATION :** Banana Patch

LAT/LONG: **DRILLING CONTRACTOR :** Geotek

UTILITY CLRNCE CONFRMD: YES NO

DRILLING METHOD AND EQUIPMENT USED : DPS HAS TP

Geophysical anomalies/ Fill Exist?

	DU1	DU2	DU3	DU4	DU5	DU6
Yes	B	B	B	B	C	C
No	A	B	B	A	C	C

Did you see NAPL/Char/Ashes? YES NO IF YES:

Sample	Analysis
Collect into 8-oz jar	Dioxins, Furans

Replicate collected here? YES NO IF YES:

Sample ID's:
Sample ID's:

A - Collect only surface samples - do not perform intrusive work

B - Perform intrusive investigation.

Each boring to be divided into 3 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 0.5' bgs		Collect 10 plugs into ziplock	TPH-g/d/o, PAH, RCRA8, Pest/Herb, PCBs
- 0.5 to 3' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 8-10' bgs OR 3' interval below bottom of fill (native)		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 10' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

C - Perform intrusive investigation

Each boring to be divided into 4 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 5' bgs	0-5	Collect 10 plugs into ziplock	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 5 to 10' bgs	5-10	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 10' bgs to 15' bgs	10-15	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 15 to 28' bgs (native)	15-20	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 18' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

POST SAMPLING:

Soil remaining from each core will be kepts and stored.

	ACTUAL SUs)	Sample	Analysis
One archive for shallow (0-10)	0-10	Collect 1 VOA from shallow (0-10' bgs) and one from deep (10'+)	Archive
One archive for deep (10'+)	10-20	All remaining soil from 6 adjacent borings will be consolidated	

NOTE: Do not combine native material and fill

CH2MHILL

PROJECT NUMBER	Decision Unit 6	Boring ID 3

SOIL BORING LOG

PROJECT : **HART** LOCATION : **Banana Patch**

LAT/LONG: DRILLING CONTRACTOR : **Geotek**

DRILLING METHOD AND EQUIPMENT USED : DPS

WATER LEVELS : START : NR END : NR LOGGER : B. Roder

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	#/TYPE	PID READING (ppm)	SOIL CORE DESCRIPTION: SOIL TYPE, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: Sample Collection Information Sample Sub-Unit Decision
5	0-5	90		0	silty clay (CL) with some gravel. Brown to dark gray. Dry to slightly moist. Stiff. Non-plastic. FILL	0-5' + duplicate & triplicate
10	5-10	90	FILL	0	Same as 0-5'. Coral Sand @ 7'. ~~cement~~ Concrete fragments @ 9'. FILL	5-10'
15	10-15	60		0	Same as 0-5'. Friable. Concrete @ 14'. FILL	10-15'
20	15-20	70	CL	0	Same as 0-5'. Concrete @ 17-19'. Fill ends @ 19'. silty clay (CL) at 19'. Dark brown, moist, med plasticity, med. soft.	15-20'
25					EOB' @ 20'	

CH2MHILL

PROJECT NUMBER	Decision Unit 6	Boring ID 3

FLOW CHART FOR SAMPLING RATIONALE

PROJECT : HART **LOCATION :** Banana Patch

LAT/LONG: **DRILLING CONTRACTOR :** Geotek

UTILITY CLRNCE CONFRMD: YES NO

DRILLING METHOD AND EQUIPMENT USED : DPS HAS TP

Geophysical anomalies/ Fill Exist?

	DU1	DU2	DU3	DU4	DU5	DU6
Yes	B	B	B	B	C	C
No	A	B	B	A	C	C

Did you see NAPL/Char/Ashes? YES NO IF YES:

Sample	Analysis
Collect into 8-oz jar	Dioxins, Furans

Replicate collected here? YES NO IF YES:

Sample ID's:
Sample ID's:

A - Collect only surface samples - do not perform intrusive work

B - Perform intrusive investigation.

Each boring to be divided into 3 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 0.5' bgs		Collect 10 plugs into ziplock	TPH-g/d/o, PAH, RCRA8, Pest/Herb, PCBs
- 0.5 to 3' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 8-10' bgs OR 3' interval below bottom of fill (native)		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 10' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

C - Perform intrusive investigation

Each boring to be divided into 4 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 5' bgs	0-5	Collect 10 plugs into ziplock	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 5 to 10' bgs	5-10	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 10' bgs to 15' bgs	10-15	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 15 to 28' bgs (native)	15-20	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 18' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

POST SAMPLING:

Soil remaining from each core will be kepts and stored.

	ACTUAL SUs)	Sample	Analysis
One archive for shallow (0-10)	0-10	Collect 1 VOA from shallow (0-10' bgs) and one from deep (10'+)	Archive
One archive for deep (10'+)	10-20	All remaining soil from 6 adjacent borings will be consolidated	

NOTE: Do not combine native material and fill

CH2MHILL	PROJECT NUMBER	Decision Unit DU 6	Boring ID B4

SOIL BORING LOG

PROJECT : HART LOCATION : Banana Patch

LAT/LONG: DRILLING CONTRACTOR : Geotek

DRILLING METHOD AND EQUIPMENT USED : DPS continuous core acetate sleeves

WATER LEVELS : START : 5/20/14 1345 END : 1400 LOGGER : I. Wood

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT) %	#/TYPE	* PID READING (ppm)	SOIL CORE DESCRIPTION: SOIL TYPE, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: Sample Collection Information Sample Sub-Unit Decision
0–5		90	SM GM	Ø	Reddish brown, tan, black, gray SILTY SAND and SILTY GRAVEL, with SILTY CLAY, dry, FILL	0-5' + Replicates
5–10		70 (80)		Ø	- basalt ~~fra~~ gravel 4-5' 10' - concrete 7-~~10'~~ fragments	5-10
10–15		0		Ø	No Recovery 10-15'	10-15 No sample
15–20		70	CL	0 FILL / Native 0	Reddish brown SILTY CLAY, ~~Reddy~~ med. stiff, moist with some fine sand	15-20
20–25						

* PID every 6" of core

CH2MHILL

PROJECT NUMBER	Decision Unit DU6	Boring ID B4

FLOW CHART FOR SAMPLING RATIONALE

PROJECT : HART **LOCATION :** Banana Patch

LAT/LONG: **DRILLING CONTRACTOR :** Geotek

UTILITY CLRNCE CONFRMD: YES NO

DRILLING METHOD AND EQUIPMENT USED : DPS HAS TP

Geophysical anomalies/ Fill Exist?

	DU1	DU2	DU3	DU4	DU5	DU6
Yes	B	B	B	B	C	C
No	A	B	B	A	C	C

Did you see NAPL/Char/Ashes? YES NO IF YES:

Sample	Analysis
Collect into 8-oz jar	Dioxins, Furans

Replicate collected here? YES NO IF YES:

Sample ID's:
Sample ID's:

A - Collect only surface samples - do not perform intrusive work

B - Perform intrusive investigation.

Each boring to be divided into 3 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 0.5' bgs		Collect 10 plugs into ziplock	TPH-g/d/o, PAH, RCRA8, Pest/Herb, PCBs
- 0.5 to 3' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 8-10' bgs OR 3' interval below bottom of fill (native)		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 10' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

C - Perform intrusive investigation

Each boring to be divided into 4 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 5' bgs	0-5	Collect 10 plugs into ziplock	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 5 to 10' bgs	5-10	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
~~Refusal~~ - 10' bgs to 15' bgs Not Collected	0	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 15 to 18' bgs (native)	15-20	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 18' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

POST SAMPLING:

Soil remaining from each core will be kepts and stored.

	ACTUAL SUs)	Sample	Analysis
One archive for shallow (0-10)	0-10	Collect 1 VOA from shallow (0-10' bgs) and one from deep (10'+)	Archive
One archive for deep (10'+)	10-20	All remaining soil from 6 adjacent borings will be consolidated	

NOTE: Do not combine native material and fill

CH2MHILL

PROJECT NUMBER	Decision Unit	Boring ID
	DU6	B5

SOIL BORING LOG

PROJECT : **HART** LOCATION : **Banana Patch**

LAT/LONG: DRILLING CONTRACTOR : **Geotek**

DRILLING METHOD AND EQUIPMENT USED : DPS continuous core acetate sleeves

WATER LEVELS : START : 5/20/14 1320 END : 13~~3~~45 LOGGER : I. Wood

DEPTH BELOW SURFACE (FT)	INTERVAL (FT) %	RECOVERY (FT)	#/TYPE	* PID READING (ppm)	SOIL CORE DESCRIPTION: SOIL TYPE, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: Sample Collection Information Sample Sub-Unit Decision
0–5	~~40~~	40	SM/SC	Ø	Reddish brown to tan and black SILTY SAND and SILTY CLAY with gravel, ~~too dense~~ med stiff, dry, ~~coralline~~ FILL — coralline gravel asphalt	0-5' + replicates
5–10	~~80~~	50	GM	Ø Ø	Reddish brown to tan SILTY GRAVEL, loose dry — asphalt/concrete present	5-10
10–15	~~30~~	30		Ø		10-15 ~~20~~
15–20	~~80~~	80	FILL ↑ Native	Ø	Large concrete fragments present, Brown CLAY, med stiff, moist	15-20
20–25						

* PID every 6" of core

CH2MHILL

PROJECT NUMBER	Decision Unit DU6	Boring ID B5

FLOW CHART FOR SAMPLING RATIONALE

PROJECT : HART

LOCATION : Banana Patch

LAT/LONG:

DRILLING CONTRACTOR : Geotek

UTILITY CLRNCE CONFRMD: YES NO

DRILLING METHOD AND EQUIPMENT USED : DPS HAS TP

Geophysical anomalies/ Fill Exist?

	DU1	DU2	DU3	DU4	DU5	DU6
Yes	B	B	B	B	C	C
No	A	B	B	A	C	C

Did you see NAPL/Char/Ashes? YES NO IF YES:

Sample	Analysis
Collect into 8-oz jar	Dioxins, Furans

Replicate collected here? YES NO IF YES:

Sample ID's:

Sample ID's:

A - Collect only surface samples - do not perform intrusive work

B - Perform intrusive investigation.

Each boring to be divided into 3 vertical SUs

- 0 to 0.5' bgs
- 0.5 to 3' bgs
- 8-10' bgs OR 3' interval below bottom of fill (native)

ACTUAL SUs)	Sample	Analysis
	Collect 10 plugs into ziplock	TPH-g/d/o, PAH, RCRA8, Pest/Herb, PCBs
	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 10' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

C - Perform intrusive investigation

Each boring to be divided into 4 vertical SUs

- 0 to 5' bgs
- 5 to 10' bgs
- 10' bgs to 15' bgs
- 15 to 28' bgs (native)

ACTUAL SUs)	Sample	Analysis
0-5	Collect 10 plugs into ziplock	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
5-10	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
10-15	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
15-20	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 18' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

POST SAMPLING:

Soil remaining from each core will be kepts and stored.

One archive for shallow (0-10)

One archive for deep (10'+)

ACTUAL SUs)	Sample	Analysis
0-10	Collect 1 VOA from shallow (0-10' bgs) and one from deep (10'+)	Archive
10-20	All remaining soil from 6 adjacent borings will be consolidated	

NOTE: Do not combine native material and fill

CH2MHILL

PROJECT NUMBER	Decision Unit	Boring ID
	6	6

SOIL BORING LOG

PROJECT : HART LOCATION : Banana Patch

LAT/LONG: DRILLING CONTRACTOR : Geotek

DRILLING METHOD AND EQUIPMENT USED : DPS, truck

WATER LEVELS : START : NR END : NR LOGGER : B. Poder

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	#/TYPE	PID READING (ppm)	SOIL CORE DESCRIPTION: SOIL TYPE, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: Sample Collection Information, Sample Sub-Unit Decision
5	0–5	80	FILL	0	Silty clay (CL) with some gravel. Reddish brown to light brown. Slightly moist. Stiff. Nonplastic to low-plasticity. Trash debris @ 5'. FILL	0-5' + duplicate & triplicate
10	5–10	50	FILL	0	Same as 0-5: Some coral & basalt gravel. FILL	5-10'
15	10–15	50	FILL	0	Same as 0-5: Asphalt & concrete fragments at 13 ft. FILL	10-15' ~~10-20'~~ BP
20	15–20	50	CL	0	Silty clay (CL). Reddish brown. Trace sand. Moist. Med. plasticity. Med. stiffness. EOB @ 20'	15-20'
25						

CH2MHILL

PROJECT NUMBER	Decision Unit	Boring ID

FLOW CHART FOR SAMPLING RATIONALE

PROJECT : HART

LOCATION : Banana Patch

LAT/LONG:

DRILLING CONTRACTOR : Geotek

UTILITY CLRNCE CONFRMD: YES NO

DRILLING METHOD AND EQUIPMENT USED : DPS HAS TP

Geophysical anomalies/ Fill Exist?

	DU1	DU2	DU3	DU4	DU5	DU6
Yes	B	B	B	B	C	C
No	A	B	B	A	C	C

Did you see NAPL/Char/Ashes? YES NO IF YES:

Sample	Analysis
Collect into 8-oz jar	Dioxins, Furans

Replicate collected here? YES NO IF YES:

Sample ID's:

Sample ID's:

A - Collect only surface samples - do not perform intrusive work

B - Perform intrusive investigation.

Each boring to be divided into 3 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 0.5' bgs		Collect 10 plugs into ziplock	TPH-g/d/o, PAH, RCRA8, Pest/Herb, PCBs
- 0.5 to 3' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 8-10' bgs OR 3' interval below bottom of fill (native)		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 10' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

C - Perform intrusive investigation

Each boring to be divided into 4 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 5' bgs	0-5	Collect 10 plugs into ziplock	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 5 to 10' bgs	5-10	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 10' bgs to 15' bgs	10-15	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 15 to 28' bgs (native)	15-20	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 18' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

POST SAMPLING:

Soil remaining from each core will be kepts and stored.

	ACTUAL SUs)	Sample	Analysis
One archive for shallow (0-10)	0-10	Collect 1 VOA from shallow (0-10' bgs) and one from deep (10'+)	Archive
One archive for deep (10'+)	10-20	All remaining soil from 6 adjacent borings will be consolidated	

NOTE: Do not combine native material and fill

CH2MHILL

PROJECT NUMBER	Decision Unit	Boring ID
	DU6	~~B-A~~ 7

SOIL BORING LOG

PROJECT : HART LOCATION : Banana Patch

LAT/LONG: DRILLING CONTRACTOR : Geotek

DRILLING METHOD AND EQUIPMENT USED : DPS ~~track and~~ Continuous core acetate sleeves

WATER LEVELS : START : 5/20/14 1315 END : 1330 LOGGER : I. Wood

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT) %	#/TYPE	* PID READING (ppm)	SOIL CORE DESCRIPTION: SOIL TYPE, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: Sample Collection Information Sample Sub-Unit Decision
0–5		50	SM/GM	0 0	Reddish brown to black, tan SILTY SAND with clay and gravels – dry loose FILL – Concrete 3–4'	Collect replicate at 0–5' bgs 0–5 primary duplicate triplicate
5–10		60		0 0	– asphalt 9–10' dry FILL	5–10
10–15		70	CL CL	0 Native	Reddish brown SILTY CLAY, stiff, dry some coralline gravels, and road fill gravels FILL Reddish dark	10–15
15–20		100		0 0	brown CLAY, med stiff, moist to wet – Strong H_2S odor 17–20', no PID/ detections for H_2S or CH_4 on GEM 5000	15–20
20–25						Archive 0–10' 10–20'

* PID every 6" of core

CH2MHILL

PROJECT NUMBER	Decision Unit DU6	Boring ID B7

FLOW CHART FOR SAMPLING RATIONALE

PROJECT : HART

LOCATION : Banana Patch

LAT/LONG:

DRILLING CONTRACTOR : Geotek

UTILITY CLRNCE CONFRMD: YES NO

DRILLING METHOD AND EQUIPMENT USED : DPS HAS TP

Geophysical anomalies/ Fill Exist?		DU1	DU2	DU3	DU4	DU5	DU6
	Yes	B	B	B	B	C	C
	No	A	B	B	A	C	C

			Sample	Analysis
Did you see NAPL/Char/Ashes?	YES	NO	IF YES: Collect into 8-oz jar	Dioxins, Furans
Replicate collected here?	YES	~~NO~~	IF YES: Sample ID's:	
			Sample ID's:	

Replicate DU6 0-5' bgs

A - Collect only surface samples - do not perform intrusive work

B - Perform intrusive investigation.

Each boring to be divided into 3 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 0.5' bgs		Collect 10 plugs into ziplock	TPH-g/d/o, PAH, RCRA8, Pest/Herb, PCBs
- 0.5 to 3' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 8-10' bgs OR 3' interval below bottom of fill (native)		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 10' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

C - Perform intrusive investigation

Each boring to be divided into 4 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 5' bgs	0-5	Collect 10 plugs into ziplock	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 5 to 10' bgs	5-10	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 10' bgs to 15' bgs	10-15	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 15 to 28' bgs (native)	15-18	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 18' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

POST SAMPLING:

Soil remaining from each core will be kepts and stored.

	ACTUAL SUs)	Sample	Analysis
One archive for shallow (0-10)	0-10	Collect 1 VOA from shallow (0-10' bgs) and one from deep (10'+)	Archive
One archive for deep (10'+)	10-20	All remaining soil from 6 adjacent borings will be consolidated	

NOTE: Do not combine native material and fill

— Fill and Native combined 10-20 in DU6

CH2MHILL

PROJECT NUMBER	Decision Unit 6	Boring ID 8

SOIL BORING LOG

PROJECT : HART LOCATION : Banana Patch

LAT/LONG: DRILLING CONTRACTOR : Geotek

DRILLING METHOD AND EQUIPMENT USED : DPS

WATER LEVELS : START : NR END : NR LOGGER : B. Roder

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	#/TYPE	PID READING (ppm)	SOIL CORE DESCRIPTION: SOIL TYPE, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: Sample Collection Information Sample Sub-Unit Decision
5		50		0	Silty clay (CL) with some gravel. Reddish brown. Stiff. Slightly moist. Nonplastic. FILL	0-5' + duplicate & triplicate
10		80	FILL	0	same as 0-5'. Asphalt material @ 7'. Silty clay (CL) 8-10'. Reddish brown. Moist. Stiff. Low plasticity. FILL	5-10'
15		70		0	Same as 0-5'. Coral, cement & pumice fragments. FILL	10-15'
20		90	CL	0	Same as 0-5'. Silty clay (CL) at 17'. Reddish brown, moist, soft, med. plasticity. Fill ends @ 17'.	15-20'
25					EOB @ 20'	

CH2MHILL

PROJECT NUMBER	Decision Unit	Boring ID

FLOW CHART FOR SAMPLING RATIONALE

PROJECT : HART

LOCATION : Banana Patch

LAT/LONG:

DRILLING CONTRACTOR : Geotek

UTILITY CLRNCE CONFRMD: YES NO

DRILLING METHOD AND EQUIPMENT USED : DPS HAS TP

Geophysical anomalies/ Fill Exist?

	DU1	DU2	DU3	DU4	DU5	DU6
Yes	B	B	B	B	C	C
No	A	B	B	A	C	C

Did you see NAPL/Char/Ashes? YES NO IF YES:

Sample	Analysis
Collect into 8-oz jar	Dioxins, Furans

Replicate collected here? YES NO IF YES:

Sample ID's:
Sample ID's:

A - Collect only surface samples - do not perform intrusive work

B - Perform intrusive investigation.

Each boring to be divided into 3 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 0.5' bgs		Collect 10 plugs into ziplock	TPH-g/d/o, PAH, RCRA8, Pest/Herb, PCBs
- 0.5 to 3' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 8-10' bgs OR 3' interval below bottom of fill (native)		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 10' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

C - Perform intrusive investigation

Each boring to be divided into 4 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 5' bgs		Collect 10 plugs into ziplock	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 5 to 10' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 10' bgs to 15' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 15 to 28' bgs (native)		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 18' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

POST SAMPLING:

Soil remaining from each core will be kepts and stored.

	ACTUAL SUs)	Sample	Analysis
One archive for shallow (0-10)		Collect 1 VOA from shallow (0-10' bgs) and one from deep (10'+)	Archive
One archive for deep (10'+)		All remaining soil from 6 adjacent borings will be consolidated	

NOTE: Do not combine native material and fill

CH2MHILL

PROJECT NUMBER	Decision Unit 6	Boring ID 9

SOIL BORING LOG

PROJECT : HART

LOCATION : Banana Patch

LAT/LONG:

DRILLING CONTRACTOR : Geotek

DRILLING METHOD AND EQUIPMENT USED : DPS, track

WATER LEVELS : START : NR END : NR LOGGER : B. Roder

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	#/TYPE	PID READING (ppm)	SOIL CORE DESCRIPTION: SOIL TYPE, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: Sample Collection Information Sample Sub-Unit Decision
5	0-5	40		0	Silty clay (CL) w/ trace gravel. Brown to reddish brown. Slightly moist, stiff. Non-plastic. FILL	0-5' + duplicate & triplicate
10	5-10	50	FILL	0	Silty gravel (GM). Loose & friable. Soft. Dry. Non-plastic. Asphalt & concrete debris, 8-10'. FILL	5-10'
15	10-15	50		0	Same as 0-5'. Concrete debris 10-11'. Fill ends @ 13'	10-15'
20	15-20	30	CL	0	Silty clay (CL). Wet. Soft. Low plasticity. Brown to reddish brown.	15-20'
25					EOB @ 20'	

CH2MHILL

PROJECT NUMBER	Decision Unit	Boring ID

FLOW CHART FOR SAMPLING RATIONALE

PROJECT : HART

LOCATION : Banana Patch

LAT/LONG:

DRILLING CONTRACTOR : Geotek

UTILITY CLRNCE CONFRMD: YES NO

DRILLING METHOD AND EQUIPMENT USED : DPS HAS TP

Geophysical anomalies/ Fill Exist?

	DU1	DU2	DU3	DU4	DU5	DU6
Yes	B	B	B	B	C	C
No	A	B	B	A	C	C

Did you see NAPL/Char/Ashes? YES NO IF YES:

Sample	Analysis
Collect into 8-oz jar	Dioxins, Furans

Replicate collected here? YES NO IF YES:

Sample ID's:	
Sample ID's:	

A - Collect only surface samples - do not perform intrusive work

B - Perform intrusive investigation.

Each boring to be divided into 3 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 0.5' bgs		Collect 10 plugs into ziplock	TPH-g/d/o, PAH, RCRA8, Pest/Herb, PCBs
- 0.5 to 3' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 8-10' bgs OR 3' interval below bottom of fill (native)		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 10' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

C - Perform intrusive investigation

Each boring to be divided into 4 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 5' bgs	0-5	Collect 10 plugs into ziplock	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 5 to 10' bgs	5-10	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 10' bgs to 15' bgs	10-15	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 15 to 28' bgs (native)	15-20	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 18' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

POST SAMPLING:

Soil remaining from each core will be kepts and stored.

	ACTUAL SUs)	Sample	Analysis
One archive for shallow (0-10)	0-10	Collect 1 VOA from shallow (0-10' bgs) and one from deep (10'+)	Archive
One archive for deep (10'+)	10-20	All remaining soil from 6 adjacent borings will be consolidated	

NOTE: Do not combine native material and fill

CH2MHILL

PROJECT NUMBER	Decision Unit DU6	Boring ID B10

SOIL BORING LOG

PROJECT : HART LOCATION : Banana Patch

LAT/LONG: DRILLING CONTRACTOR : Geotek

DRILLING METHOD AND EQUIPMENT USED : DPS truck Rig

WATER LEVELS : START : 5/21/14 915 END : 945 LOGGER : I. Wood

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT) %	#/TYPE	*PID READING (ppm)	SOIL CORE DESCRIPTION: SOIL TYPE, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: Sample Collection Information Sample Sub-Unit Decision
0–5		90	GM/CL	Ø	Brown to black to tan SILTY GRAVEL, ~~fine~~ med. dense, dry (FILL) - concrete, asphalt fragments throughout	0-5 ~~rep + trip~~ Primary, dup / trip.
5–10		80		Ø	- SILTY CLAY 2-3' stiff, dry	5-10
10–15		80	CL	Ø ↑ FILL / Native	- concrete fragments 13' - coralline gravel at 14' Reddish Brownish ~~(CL)~~	10-15
15–20		60 ~~80~~		Ø	SILTY CLAY, med. stiff, moist, NATIVE	15-20
20–25						

Refusal at 10' ~~on~~ on concrete two times.

* PID every 6-inches

CH2MHILL

PROJECT NUMBER	Decision Unit 6	Boring ID B10

FLOW CHART FOR SAMPLING RATIONALE

PROJECT : HART

LOCATION : Banana Patch

LAT/LONG:

DRILLING CONTRACTOR : Geotek

UTILITY CLRNCE CONFRMD: YES NO

DRILLING METHOD AND EQUIPMENT USED : DPS HAS TP

Geophysical anomalies/ Fill Exist?

	DU1	DU2	DU3	DU4	DU5	DU6
Yes	B	B	B	B	C	C
No	A	B	B	A	C	C

Sample	Analysis
Collect into 8-oz jar	Dioxins, Furans

Did you see NAPL/Char/Ashes? YES NO IF YES:

Replicate collected here? YES NO IF YES:

Sample ID's:

Sample ID's:

A - Collect only surface samples - do not perform intrusive work

B - Perform intrusive investigation.

Each boring to be divided into 3 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 0.5' bgs		Collect 10 plugs into ziplock	TPH-g/d/o, PAH, RCRA8, Pest/Herb, PCBs
- 0.5 to 3' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 8-10' bgs OR 3' interval below bottom of fill (native)		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 10' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

C - Perform intrusive investigation

Each boring to be divided into 4 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 5' bgs	0-5	Collect 10 plugs into ziplock	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 5 to 10' bgs	5-10	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 10' bgs to 15' bgs	10-15	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 15 to ~~18~~ 8' bgs (native)	15-20	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 18' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

POST SAMPLING:

Soil remaining from each core will be kepts and stored.

	ACTUAL SUs)	Sample	Analysis
One archive for shallow (0-10)	0-10	Collect 1 VOA from shallow (0-10' bgs) and one from deep (10'+)	Archive
One archive for deep (10'+)	10-20	All remaining soil from 6 adjacent borings will be consolidated	

NOTE: Do not combine native material and fill

CH2MHILL

PROJECT NUMBER	Decision Unit DU6	Boring ID B11

SOIL BORING LOG

PROJECT : HART LOCATION : Banana Patch

LAT/LONG: DRILLING CONTRACTOR : Geotek

DRILLING METHOD AND EQUIPMENT USED : DPS

WATER LEVELS : START : 5/21/14 10:00 END : 10:15 LOGGER : I. Wood

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT) %	#/TYPE	PID READING (ppm)	SOIL CORE DESCRIPTION: SOIL TYPE, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: Sample Collection Information Sample Sub-Unit Decision
5		50	CL GM	Ø	Reddish Brown, SILTY CLAY, stiff, dry –concrete 4-5'	0-5' Primary Dup. Triplicate
10		50		Ø	Grayish Black SILTY GRAVEL, angular road fill gravels, loose, dry –concrete 9–9.5' –Coral at 9.5'	5-10'
15		60	CL	FILL ↑ Native ↓ Ø	–Coral at 11.5' –concret at 12' SILTY CLAY reddish brown, med stiff, moist NATIVE	10-15'
20				Ø	SAME	15-20'
25						

CH2MHILL

PROJECT NUMBER	Decision Unit DU6	Boring ID B11

FLOW CHART FOR SAMPLING RATIONALE

PROJECT : HART

LOCATION : Banana Patch

LAT/LONG:

DRILLING CONTRACTOR : Geotek

UTILITY CLRNCE CONFRMD: YES NO

DRILLING METHOD AND EQUIPMENT USED : DPS HAS TP

Geophysical anomalies/ Fill Exist?

	DU1	DU2	DU3	DU4	DU5	DU6
Yes	B	B	B	B	C	C
No	A	B	B	A	C	C

Did you see NAPL/Char/Ashes? YES NO IF YES:

Sample	Analysis
Collect into 8-oz jar	Dioxins, Furans

Replicate collected here? YES NO IF YES:

Sample ID's:

Sample ID's:

A - Collect only surface samples - do not perform intrusive work

B - Perform intrusive investigation.

Each boring to be divided into 3 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 0.5' bgs		Collect 10 plugs into ziplock	TPH-g/d/o, PAH, RCRA8, Pest/Herb, PCBs
- 0.5 to 3' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 8-10' bgs OR 3' interval below bottom of fill (native)		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 10' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

C - Perform intrusive investigation

Each boring to be divided into 4 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 5' bgs	0-5	Collect 10 plugs into ziplock	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 5 to 10' bgs	0-5	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 10' bgs to 15' bgs	10-15	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 15 to ~~20~~ 18 bgs (native)	15-20	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 18' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

POST SAMPLING:

Soil remaining from each core will be kepts and stored.

	ACTUAL SUs)	Sample	Analysis
One archive for shallow (0-10)		Collect 1 VOA from shallow (0-10' bgs) and one from deep (10'+)	Archive
One archive for deep (10'+)		All remaining soil from 6 adjacent borings will be consolidated	

NOTE: Do not combine native material and fill

5/21/14

CH2MHILL

PROJECT NUMBER	Decision Unit	Boring ID
	6	12

SOIL BORING LOG

PROJECT : **HART** LOCATION : **Banana Patch**

LAT/LONG: DRILLING CONTRACTOR : **Geotek**

DRILLING METHOD AND EQUIPMENT USED : DPS

WATER LEVELS : START : NR END : NR LOGGER : B. Roder

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	#/TYPE	PID READING (ppm)	SOIL CORE DESCRIPTION: SOIL TYPE, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: Sample Collection Information, Sample Sub-Unit Decision
5		70			Silty clay (CL) with gravel. Reddish brwn. Slightly moist. Stiff. Low plasticity to non-plastic. Concrete & asphalt fragments. FILL	0-5' + duplicate & triplicate
10		30	FILL		same as 0-5'. Concrete @ 9'. 10-15' - same as 0-5'. FILL	5-10'
15		40			same as 0-5'. less gravel from 15-16.5'. Concrete & coral gravel 16.5-17.5'. Fill ends at 19'. silty clay (CL), med. plastic to soft. moist. Reddish brwn. Low plasticity to med.	10-15'
20		100	2L		EOB @ 20'	15-20'
25						

CH2MHILL

PROJECT NUMBER	Decision Unit	Boring ID

FLOW CHART FOR SAMPLING RATIONALE

PROJECT : HART

LOCATION : Banana Patch

LAT/LONG:

DRILLING CONTRACTOR : Geotek

UTILITY CLRNCE CONFRMD: YES NO

DRILLING METHOD AND EQUIPMENT USED : DPS HAS TP

Geophysical anomalies/ Fill Exist?

	DU1	DU2	DU3	DU4	DU5	DU6
Yes	B	B	B	B	C	C
No	A	B	B	A	C	C

Did you see NAPL/Char/Ashes? YES NO IF YES:

Sample	Analysis
Collect into 8-oz jar	Dioxins, Furans

Replicate collected here? YES NO IF YES:

Sample ID's:

Sample ID's:

A - Collect only surface samples - do not perform intrusive work

B - Perform intrusive investigation.

Each boring to be divided into 3 vertical SUs

SU	ACTUAL SUs)	Sample	Analysis
- 0 to 0.5' bgs		Collect 10 plugs into ziplock	TPH-g/d/o, PAH, RCRA8, Pest/Herb, PCBs
- 0.5 to 3' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 8-10' bgs OR 3' interval below bottom of fill (native)		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 10' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

C - Perform intrusive investigation

Each boring to be divided into 4 vertical SUs

SU	ACTUAL SUs)	Sample	Analysis
- 0 to 5' bgs	0-5	Collect 10 plugs into ziplock	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 5 to 10' bgs	5-10	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 10' bgs to 15' bgs	10-15	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 15 to 28' bgs (native)	15-20	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 18' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

POST SAMPLING:

Soil remaining from each core will be kepts and stored.

	ACTUAL SUs)	Sample	Analysis
One archive for shallow (0-10)	0-10	Collect 1 VOA from shallow (0-10' bgs) and one from deep (10'+)	Archive
One archive for deep (10'+)	10-20	All remaining soil from 6 adjacent borings will be consolidated	

NOTE: Do not combine native material and fill

CH2MHILL

PROJECT NUMBER	Decision Unit DU6	Boring ID B13

SOIL BORING LOG

PROJECT : **HART** LOCATION : **Banana Patch**

LAT/LONG: DRILLING CONTRACTOR : **Geotek**

DRILLING METHOD AND EQUIPMENT USED : DPS

WATER LEVELS : START : 5/21/14 10:40 END : 10:55 LOGGER : I. wood

DEPTH BELOW SURFACE (FT)	INTERVAL (FT) %	RECOVERY (FT)	#/TYPE	PID READING (ppm)	SOIL CORE DESCRIPTION: SOIL TYPE, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: Sample Collection Information Sample Sub-Unit Decision
0–5	80		CL	Ø	Reddish brown SILTY CLAY with gravel, med stiff/stiff	0-5 primary dup. triplicate
5–10	80		SM / GM	Ø	~~Reddish~~ Reddish Brown SILTY SAND, (fine sand), loose, dry Brown to black/tan SILTY GRAVEL, loose, dry	Plastic at 7' bgs 2 pieces 5-10
10–15				Ø	road fill materials, -concrete at 12' bgs	10-15
15–20	0		?	?		NO 15-20 foot sample collected due to poor recovery
20–25	10			Ø	Drill to 25' and get poor recovery, still no water bearing zone for well, continue to 30'	NO Sample 20-30' construct well 25-30'

Concrete at bottom of 15'-20' sample
no recovery

90% recovery 25-30' sample: Brown SILTY GRAVEL 25.5 → 28' loose, wet
28'-30' Gray CLAYEY SAND, soft, wet

CH2MHILL

PROJECT NUMBER	Decision Unit D6	Boring ID B13

FLOW CHART FOR SAMPLING RATIONALE

PROJECT : HART **LOCATION :** Banana Patch

LAT/LONG: **DRILLING CONTRACTOR :** Geotek

UTILITY CLRNCE CONFRMD: YES NO

DRILLING METHOD AND EQUIPMENT USED : DPS HAS TP

Geophysical anomalies/ Fill Exist?

	DU1	DU2	DU3	DU4	DU5	DU6
Yes	B	B	B	B	C	C
No	A	B	B	A	C	C

				Sample	Analysis
Did you see NAPL/Char/Ashes?	YES	NO	IF YES:	Collect into 8-oz jar	Dioxins, Furans
Replicate collected here?	YES	NO	IF YES:	Sample ID's:	
				Sample ID's:	

A - Collect only surface samples - do not perform intrusive work NA

B - Perform intrusive investigation.

Each boring to be divided into 3 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 0.5' bgs	0-.5	Collect 10 plugs into ziplock	TPH-g/d/o, PAH, RCRA8, Pest/Herb, PCBs
- 0.5 to 3' bgs	0.5	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 8-10' bgs OR 3' interval below bottom of fill (native)		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 10' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

C - Perform intrusive investigation

Each boring to be divided into 4 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 5' bgs	0-5	Collect 10 plugs into ziplock	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 5 to 10' bgs	5-10	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 10' bgs to 15' bgs	10-15	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 15 to 18' bgs (native)	NONE	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 18' bgs poor recovery

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

POST SAMPLING:

Soil remaining from each core will be kepts and stored.

	ACTUAL SUs)	Sample	Analysis
One archive for shallow (0-10)	0-10	Collect 1 VOA from shallow (0-10' bgs) and one from deep (10'+)	Archive
One archive for deep (10'+)	10-15	All remaining soil from 6 adjacent borings will be consolidated	

NOTE: Do not combine native material and fill no recovery deeper.

5/21/14

CH2MHILL

PROJECT NUMBER	Decision Unit	Boring ID
457998	6	~~10~~ (PAR) 14

SOIL BORING LOG

PROJECT : **HART** LOCATION : **Banana Patch**

LAT/LONG: DRILLING CONTRACTOR : **Geotek**

DRILLING METHOD AND EQUIPMENT USED : DPS

WATER LEVELS : START : NR END : NR LOGGER : B. Roder

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	#/TYPE	PID READING (ppm)	SOIL CORE DESCRIPTION: SOIL TYPE, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: Sample Collection Information Sample Sub-Unit Decision
0–5		60	FILL	0	Silty clay (CL) with some gravel. Reddish brown. Stiff. Slightly moist, mostly dry. Nonplastic. Asphalt material @ 5'. FILL	0-5' + duplicate & triplicate
5–10		60	FILL	0	Same as 0-5'. Loose, friable. Concrete frags at 7' and 9'. FILL	5-10'
10–15		60	FILL	0	Silty gravel (GM). Brown. Dry. Loose, ~~friable~~. Soft, Non-plastic. Coral, concrete & basalt fragments. FILL	10-15'
15–20		100	CL	0	Same as 10-15' down to 17'. Silty clay (CL), reddish brown. Moist. Moderately stiff to med. stiff. Low to med. plasticity. FILL ends @ 17'.	15-20'
20–25					EOB @ 20'	

CH2MHILL

PROJECT NUMBER	Decision Unit	Boring ID

FLOW CHART FOR SAMPLING RATIONALE

PROJECT : HART **LOCATION :** Banana Patch

LAT/LONG: **DRILLING CONTRACTOR :** Geotek

UTILITY CLRNCE CONFRMD: YES NO

DRILLING METHOD AND EQUIPMENT USED : DPS HAS TP

Geophysical anomalies/ Fill Exist?

	DU1	DU2	DU3	DU4	DU5	DU6
Yes	B	B	B	B	C	C
No	A	B	B	A	C	C

			Sample	Analysis
Did you see NAPL/Char/Ashes?	YES	NO	IF YES: Collect into 8-oz jar	Dioxins, Furans
			Sample ID's:	
Replicate collected here?	YES	NO	IF YES: Sample ID's:	

A - Collect only surface samples - do not perform intrusive work

B - Perform intrusive investigation.

Each boring to be divided into 3 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 0.5' bgs		Collect 10 plugs into ziplock	TPH-g/d/o, PAH, RCRA8, Pest/Herb, PCBs
- 0.5 to 3' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 8-10' bgs OR 3' interval below bottom of fill (native)		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 10' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

C - Perform intrusive investigation

Each boring to be divided into 4 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 5' bgs	0-5	Collect 10 plugs into ziplock	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 5 to 10' bgs	5-10	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 10' bgs to 15' bgs	10-15	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 15 to 28' bgs (native)	15-20	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 18' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

POST SAMPLING:

Soil remaining from each core will be kepts and stored.

	ACTUAL SUs)	Sample	Analysis
One archive for shallow (0-10)	0-10	Collect 1 VOA from shallow (0-10' bgs) and one from deep (10'+)	Archive
One archive for deep (10'+)	10-20	All remaining soil from 6 adjacent borings will be consolidated	

NOTE: Do not combine native material and fill

5/21/14

CH2MHILL

PROJECT NUMBER	Decision Unit 6	Boring ID 15

SOIL BORING LOG

PROJECT : **HART** LOCATION : **Banana Patch**

LAT/LONG: DRILLING CONTRACTOR : **Geotek**

DRILLING METHOD AND EQUIPMENT USED :

WATER LEVELS : START : NR END : NR LOGGER : B. Roder

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	#/TYPE	PID READING (ppm)	SOIL CORE DESCRIPTION: SOIL TYPE, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: Sample Collection Information Sample Sub-Unit Decision
5		60		0	Silty clay (CL) with gravel, brown, slightly ~~dry~~ moist, soft, nonplastic. Concrete debris throughout. FILL	0-5' +duplicate & triplicate
10		50	FILL	0	Same as 0-5'. Concrete, basalt & coral fragments FILL	5-10'
15		60		0	Same as 0-5' to 13'. Asphalt material at 12.5'. Silty clay (CL). Reddish brown. Moist. ~~Soft~~ Med. Stiff. Moderate to high plasticity. FILL ends at 13'	10-15'
20		90	CL	0	Silty clay (CL). Dark brown. Moist. Med. plasticity. Med. stiff to soft. EOB @ 20'	15-20
25						

CH2MHILL

PROJECT NUMBER	Decision Unit	Boring ID

FLOW CHART FOR SAMPLING RATIONALE

PROJECT: HART **LOCATION:** Banana Patch

LAT/LONG: **DRILLING CONTRACTOR:** Geotek

UTILITY CLRNCE CONFRMD: YES NO

DRILLING METHOD AND EQUIPMENT USED: DPS HAS TP

Geophysical anomalies/ Fill Exist?

	DU1	DU2	DU3	DU4	DU5	DU6
Yes	B	B	B	B	C	C
No	A	B	B	A	C	C

			Sample	Analysis
Did you see NAPL/Char/Ashes?	YES	NO	IF YES: Collect into 8-oz jar	Dioxins, Furans
Replicate collected here?	YES	NO	IF YES: Sample ID's:	
			Sample ID's:	

A - Collect only surface samples - do not perform intrusive work

B - Perform intrusive investigation.

Each boring to be divided into 3 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 0.5' bgs		Collect 10 plugs into ziplock	TPH-g/d/o, PAH, RCRA8, Pest/Herb, PCBs
- 0.5 to 3' bgs		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 8-10' bgs OR 3' interval below bottom of fill (native)		Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 10' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

C - Perform intrusive investigation

Each boring to be divided into 4 vertical SUs

	ACTUAL SUs)	Sample	Analysis
- 0 to 5' bgs	0-5	Collect 10 plugs into ziplock	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 5 to 10' bgs	5-10	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 10' bgs to 15' bgs	10-15	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs
- 15 to 28' bgs (native)	15-20	Collect 10 plugs into ziplock, 3 plugs into 1 VOA	TPH-g/d/o, VOCs, PAH, RCRA8, Pest/Herb, PCBs

1 - If no fill exists, completed boring to 18' bgs

2 - If fill exists, complete boring 3' below bottom of fill

- Do not drill deeper than water table (exp. 15-18' bgs)

POST SAMPLING:

Soil remaining from each core will be kepts and stored.

	ACTUAL SUs)	Sample	Analysis
One archive for shallow (0-10)	0-10	Collect 1 VOA from shallow (0-10' bgs) and one from deep (10'+)	Archive
One archive for deep (10'+)	10-20	All remaining soil from 6 adjacent borings will be consolidated	

NOTE: Do not combine native material and fill

Appendix E
Groundwater Sampling Logs

Groundwater/Porewater Purge and Sample Log

CH2MHILL

Project: Banana Patch Site Characterization		Site:	Banana Patch
Project No: 495560		Well ID:	TW-001
Field Crew: A. Nelson, W. Irish		Date:	5/29/2014

Screen Interval (ft bgs):	15 to 25 ■ bgs ☐ btoc	Climatic Conditions:	■ sunny ☐ cloudy ☐ partially cloudy ☐ rainy
Well Diameter (in):	1.5	Purge Method:	☐ peristaltic ☐ bailer ☐ waterra ☐ submersible ■ bladder
PID reading (ppmv):	0.0 (at top of casing)	Pump Intake Depth (ft bgs):	18.5
Water Level Indicator:	■ Oil/Water Probe ☐ Water Level Meter	Ground Surface to TOC (ft):	0.5
	☐ Probe (PROBE) ☐ Tape (TAPE)	Length of Saturated Zone (ft):	13.24
Total Well Depth (ft/in bgs)	25.02 / 300.24	Pump Rate (ml/min):	150-250
Depth to Water (ft/in bgs):	11.78 / 141.36	Casing Volume (gal):	1.2
Liquid in Well:	■ WATER (W) ☐ LNAPL (L)	Sampling Method — VOCs	■ Bladder Pump
	☐ DNAPL (D) ☐ DRY (Y)	Sampling Method — nonVOCs	■ Bladder Pump ☐ Peristaltic Pump
Depth to LNAPL (ft bgs):	11.76	Sampling Depth (ft bgs):	18.50

Field Parameters

Time	Depth to Water (ft bgs)	Purge Rate (ml/min)	Liters Removed	Turbidity (NTU)	Temp (°C)	DO (mg/L)	Cond. (uS/cm)	Salinity (ppt)	pH	ORP (mV) field	ORP (mV) corrected	Comments
Requirements for Parameter Stabilization*				NTU	± 1°	±10% or <1 mg/L	± 3%	NA	± 0.1	± 10 mV	NA	
	Start pump											
1635	11.85											
1641	11.87	150	0.60	4.24	25.24	4.73	629	0.30	6.77	44.0	268.4	
1645	11.90	150	0.75	3.14	25.08	4.72	624	0.30	6.78	44.8	269.2	
1650	12.00	200	1.00	2.75	24.03	4.78	609	0.30	6.78	44.9	269.3	
1655	12.05	250	11.25	2.70	24.00	4.56	605	0.30	6.72	49.2	273.6	
1700	12.05	250	11.25	2.71	23.90	4.58	600	0.30	6.75	47.9	272.3	

Sample, Development, or Purge Water Information

Color	Clear	IDW Disposal Method: Reinfiltration Next to Well	Analytical Laboratory: Accutest
Odor	None		
Turbidity	Low		Transported via: ☐ Hand ■ Overnight
Laboratory Analysis (No. of Bottles)	■ VOCs SW8260C ■ GRO SW8260 ■ RRO SW8015D ■ Metals SW6010 (Field Filtered? ■ Y ☐ N) ☐ PAHs SW8270C-SIM ■ DRO SW8015D ■ Pesticides SW8081A ■ Herbicides SW8151 ☐ PCBs SW8082 See COC		

Laboratory Sample

	Sample ID	Sample Date	Sample Time	Total No. of Bottles
Normal Sample	FASC-TW001-0514	5/29/2014	1702	3 VOAs, 6 amber L, 1 poly
Field Duplicate				
Matrix Spike	FASC-TW001-0514MS	5/29/2014	1745	3 VOAs, 6 amber L, 1 poly
Matrix Spike Duplicate	FASC-TW001-0514MSD	5/29/2014	1800	3 VOAs, 6 amber L, 1 poly

Notes:

Equipment used:		Make	Model	SN		Make	Model	SN		Make	Model	SN
	Water Level Indicator:	GT		GTHR006	Water Quality Instrument:	YSI	550	GTHR010	Pump Controller:	Geotech	geocontrol PRO	1374
	Turbidity Meter:	GT	21007	GTHR014	Pump:	Geotech	geocontrol PRO	1374	PID:	RAE	MultiRAE	6-103111

Signature/Sampler:

Capacity of Casing (gal/linear feet): 1"-0.041; 2"-0.16; 4"-0.65; 6"-1.47; 8"-2.61; 10"-4.08

* Per the Installation-Wide Field Sampling Plan, well purging should be considered complete when three successive readings of all of the indicator parameters stabilize to within the tolerances indicated in this form.
For turbidity and dissolved oxygen stabilization two criteria are given; well purging should be considered complete whichever of these two criteria occurs first.

°C = degree Celsius; DO = dissolved oxygen; in = inch; mV = millivolts; PID = photoionization detector
bgs = below ground surface; ft = foot; LNAPL = light nonaqueous phase liquid; NTU = nephelometric turbidity unit; ppmv = part per million by volume
btoc = below top of casing; ml/min = milliliters per minute; uS/cm = microsiemens per centimeter; ORP = oxidation reduction potential; VOC = volatile organic compound

ORP measurements recorded in the field have been corrected and are also reported against the standard hydrogen electrode (SHE) applying the following formula:

$ORP_{(sample)} = ORP_{(field)} + CF$; CF = Eh(Zobell's-theor) - Eh(Zobell's-ref.) ; Eh(Zobell's-theor) = 430 - 2.3(T-25) - 0.0038(T-25)2 ; Eh(Zobell's-ref.) = -1.3(T)+260.5

Groundwater/Porewater Purge and Sample Log

CH2MHILL

Project: Banana Patch Site Characterization		Site:	Banana Patch
Project No: 495560		Well ID:	TW-002
Field Crew: A. Nelson, W. Irish		Date:	5/30/2014

Screen Interval (ft bgs):	11.5 to 21.5 ■ bgs ☐ btoc	Climatic Conditions:	■ sunny ☐ cloudy ☐ partially cloudy ☐ rainy
Well Diameter (in):	1.0 0.08333333	Purge Method:	☐ peristaltic ☐ bailer ☐ waterra ☐ submersible ■ bladder
PID reading (ppmv):	0.0 (at top of casing)	Pump Intake Depth (ft bgs):	23.0
Water Level Indicator:	■ Oil/Water Probe ☐ Water Level Meter	Ground Surface to TOC (ft):	3.5
	☐ Probe (PROBE) ☐ Tape (TAPE)	Length of Saturated Zone (ft):	4.02
Total Well Depth (ft/in bgs)	25.00 btoc 300	Pump Rate (ml/min):	350
Depth to Water (ft/in bgs):	20.98 btoc 251.76	Casing Volume (gal):	0.2
Liquid in Well:	■ WATER (W) ☐ LNAPL (L)	Sampling Method — VOCs	■ Bladder Pump
	☐ DNAPL (D) ☐ DRY (Y)	Sampling Method — nonVOCs	■ Bladder Pump ☐ Peristaltic Pump
Depth to LNAPL (ft bgs):	None	Sampling Depth (ft bgs):	23.00

Field Parameters

Time	Depth to Water (ft bgs)	Purge Rate (ml/min)	Liters Removed	Turbidity (NTU)	Temp (°C)	DO (mg/L)	Cond. (uS/cm)	Salinity (ppt)	pH	ORP (mV) field	ORP (mV) corrected	Comments
Requirements for Parameter Stabilization*				NTU	± 1°	±10% or <1 mg/L	± 3%	NA	± 0.1	± 10 mV	NA	
	Start pump											
1630	20.79											
1635	20.79	350	1.75	29.9	26.54	4.76	2008	0.99	4.48	-45.2	178.6	
1640	20.80	350	1.75	12.3	26.49	2.65	2004	0.99	4.40	-45.5	178.3	
1645	20.79	350	1.75	5.71	26.45	2.35	1993	0.98	4.37	-49.6	174.2	
1650	20.78	350	1.75	4.65	26.46	2.22	1998	0.98	4.48	-52.4	171.4	

Sample, Development, or Purge Water Information

Color	Clear/Slightly yellow	IDW Disposal Method: Reinfiltration Next to Well	Analytical Laboratory: Accutest
Odor	None		
Turbidity	Low		Transported via: ☐ Hand ■ Overnight

Laboratory Analysis (No. of Bottles):
■ VOCs SW8260C ■ GRO SW8260 ■ RRO SW8015D ■ Metals SW6010 (Field Filtered? ■ Y ☐ N)
☐ PAHs SW8270C-SIM ■ DRO SW8015D ■ Pesticides SW8081A ■ Herbicides SW8151
☐ PCBs SW8082 See COC

Laboratory Sample

	Sample ID	Sample Date	Sample Time	Total No. of Bottles
Normal Sample	FASC-TW002-0514	5/30/2014	1700	3 VOAs, 6 amber L, 1 poly
Field Duplicate	--	--	--	--
Matrix Spike	--	--	--	--
Matrix Spike Duplicate	--	--	--	--

Notes:

Equipment used:

	Make	Model	SN		Make	Model	SN		Make	Model	SN
Water Level Indicator:	Heron	H.Oil	C102864	Water Quality Instrument:	YSI	556 MPS	GTHR 012	Pump Controller:	Geotech	geoconrol PRO	1563
Turbidity Meter:	Hach	2100P	GTHR013	Pump:	Geotech	geocontrol PRO	1563	PID:	RAE	MultiRAE	C103111

Signature/Sampler:

Capacity of Casing (gal/linear feet): 1"-0.041; 2"-0.16; 4"-0.65; 6"-1.47; 8"-2.61; 10"-4.08

* Per the Installation-Wide Field Sampling Plan, well purging should be considered complete when three successive readings of all of the indicator parameters stabilize to within the tolerances indicated in this form.
For turbidity and dissolved oxygen stabilization two criteria are given; well purging should be considered complete whichever of these two criteria occurs first.

°C = degree Celsius	DO = dissolved oxygen	in = inch	mV = millivolts	PID = photoionization detector
bgs = below ground surface	ft = foot	LNAPL = light nonaqueous phase liquid	NTU = nephelometric turbidity unit	ppmv = part per million by volume
btoc = below top of casing	ml/min = milliliters per minute	uS/cm = microsiemens per centimeter	ORP = oxidation reduction potential	VOC = volatile organic compound

ORP measurements recorded in the field have been corrected and are also reported against the standard hydrogen electrode (SHE) applying the following formula:

$ORP_{(sample)} = ORP_{(field)} + CF$; CF = Eh(Zobell's-theor) - Eh(Zobell's-ref.) ; Eh(Zobell's-theor) = 430 - 2.3(T-25) - 0.0038(T-25)2 ; Eh(Zobell's-ref.) = -1.3(T)+260.5

Groundwater/Porewater Purge and Sample Log

CH2MHILL

Project:	Banana Patch Site Characterization	Site:	Banana Patch
Project No:	495560	Well ID:	TW-003
Field Crew:	A. Nelson, W. Irish	Date:	5/30/2014

Screen Interval (ft bgs):	23 to 28 ■ bgs ☐ btoc	Climatic Conditions:	☐ sunny ■ cloudy ☐ partially cloudy ☐ rainy
Well Diameter (in):	1.0	Purge Method:	☐ peristaltic ☐ bailer ☐ waterra ☐ submersible ■ bladder
PID reading (ppmv):	0.1 (at top of casing)	Pump Intake Depth (ft bgs):	25.0
Water Level Indicator:	■ Oil/Water Probe ☐ Water Level Meter	Ground Surface to TOC (ft):	0
	☐ Probe (PROBE) ☐ Tape (TAPE)	Length of Saturated Zone (ft):	9.68
Total Well Depth (ft/in bgs)	27.67 332.04	Pump Rate (ml/min):	200
Depth to Water (ft/in bgs):	17.99 215.88	Casing Volume (gal):	0.4
Liquid in Well:	■ WATER (W) ☐ LNAPL (L)	Sampling Method — VOCs	■ Bladder Pump
	☐ DNAPL (D) ☐ DRY (Y)	Sampling Method — nonVOCs	■ Bladder Pump ☐ Peristaltic Pump
Depth to LNAPL (ft bgs):	None	Sampling Depth (ft bgs):	25.0

Field Parameters

Time	Depth to Water (ft bgs)	Purge Rate (ml/min)	Liters Removed	Turbidity (NTU)	Temp (°C)	DO (mg/L)	Cond. (uS/cm)	Salinity (ppt)	pH	ORP (mV) field	ORP (mV) corrected	Comments
Requirements for Parameter Stabilization*				NTU	± 1°	±10% or <1 mg/L	± 3%	NA	± 0.1	± 10 mV	NA	
	Start pump											
1435	17.99											Water very turbid when pump first turned on. >1000 NTU
1440	18.39	200	1.00	>1000	26.39	2.95	836	0.40	4.58	10.4	234.7	
1445	18.41	200	1.00	>1000	26.42	2.11	821	0.39	4.47	8.4	232.7	
1450	18.39	200	1.00	399	26.54	2.73	816	0.39	5.24	-2.2	222.1	
1455	18.39	200	1.00	341	26.35	1.89	807	0.38	5.17	-17.0	207.3	
1500	18.41	200	1.00	234	26.23	1.67	803	0.38	5.18	-24.3	200.0	
1505	18.42	200	1.00	156	25.49	1.41	797	0.38	5.23	-27.0	197.3	

Sample, Development, or Purge Water Information

Color	Tan	IDW Disposal Method	Analytical Laboratory: Accutest
Odor	None	Reinfiltration Next to Well	
Turbidity	High		Transported via: ☐ Hand ■ Overnight
Laboratory Analysis (No. of Bottles)	■ VOCs SW8260C ■ GRO SW8260 ■ RRO SW8015D ■ Metals SW6010 (Field Filtered? ■ Y ☐ N)		
	☐ PAHs SW8270C-SIM ■ DRO SW8015D ■ Pesticides SW8081A ■ Herbicides SW8151		
	☐ PCBs SW8082 See COC		

Laboratory Sample

	Sample ID	Sample Date	Sample Time	Total No. of Bottles
Normal Sample	FASC-TW003-0514	5/30/2014	1509	3 VOAs, 6 amber L, 1 poly
Field Duplicate	--	--	--	--
Matrix Spike	--	--	--	--
Matrix Spike Duplicate	--	--	--	--

Notes: Water is very turbid. No odor or sediment in cup.

Equipment used:		Make	Model	SN
	Water Level Indicator:	Heron	H.Oil	C102864
	Turbidity Meter:	Hach	2100P	GTHR013
	Water Quality Instrument:	YSI	556 MPS	GTHR 012
	Pump:	Geotech	geocontrol PRO	1563
	Pump Controller:	Geotech	geoconrol PRO	1563
	PID:	RAE	MultiRAE	C103111

Signature/Sampler:

Capacity of Casing (gal/linear feet): 1"-0.041; 2"-0.16; 4"-0.65; 6"-1.47; 8"-2.61; 10"-4.08

* Per the Installation-Wide Field Sampling Plan, well purging should be considered complete when three successive readings of all of the indicator parameters stabilize to within the tolerances indicated in this form.
For turbidity and dissolved oxygen stabilization two criteria are given; well purging should be considered complete whichever of these two criteria occurs first.

°C = degree Celsius; DO = dissolved oxygen; in = inch; mV = millivolts; PID = photoionization detector
bgs = below ground surface; ft = foot; LNAPL = light nonaqueous phase liquid; NTU = nephelometric turbidity unit; ppmv = part per million by volume
btoc = below top of casing; ml/min = milliliters per minute; uS/cm = microsiemens per centimeter; ORP = oxidation reduction potential; VOC = volatile organic compound

ORP measurements recorded in the field have been corrected and are also reported against the standard hydrogen electrode (SHE) applying the following formula:

$ORP_{(sample)} = ORP_{(field)} + CF$; CF = Eh(Zobell's-theor) - Eh(Zobell's-ref.) ; Eh(Zobell's-theor) = 430 - 2.3(T-25) - 0.0038(T-25)2 ; Eh(Zobell's-ref.) = -1.3(T)+260.5

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Groundwater/Porewater Purge and Sample Log

Project:	Banana Patch Site Characterization	Site:	Banana Patch
Project No:	495560	Well ID:	TW-004
Field Crew:	M. Bissell, A. Nelson	Date:	6/2/2014

Screen Interval (ft bgs):	15 to 25 ■ bgs ☐ btoc	Climatic Conditions:	■ sunny ☐ cloudy ☐ partially cloudy ☐ rainy
Well Diameter (in):	1.5	Purge Method:	☐ peristaltic ☐ bailer ☐ waterra ☐ submersible ■ bladder
PID reading (ppmv):	0.0 (at top of casing)	Pump Intake Depth (ft bgs):	20
Water Level Indicator:	■ Oil/Water Probe ☐ Water Level Meter	Ground Surface to TOC (ft):	0
	☐ Probe (PROBE) ☐ Tape (TAPE)	Length of Saturated Zone (ft):	9.06
Total Well Depth (ft/in bgs)	25.03 300.36	Pump Rate (ml/min):	250
Depth to Water (ft/in bgs):	15.97 191.64	Casing Volume (gal):	0.8
Liquid in Well:	■ WATER (W) ☐ LNAPL (L)	Sampling Method — VOCs	■ Bladder Pump
	☐ DNAPL (D) ☐ DRY (Y)	Sampling Method — nonVOCs	■ Bladder Pump ☐ Peristaltic Pump
Depth to LNAPL (ft bgs):	None	Sampling Depth (ft bgs):	20.00

Field Parameters

Time	Depth to Water (ft bgs)	Purge Rate (ml/min)	Liters Removed	Turbidity (NTU)	Temp (°C)	DO (mg/L)	Cond. (uS/cm)	Salinity (ppt)	pH	ORP (mV) field	ORP (mV) corrected	Comments
Requirements for Parameter Stabilization*				NTU	± 1°	±10% or <1 mg/L	± 3%	NA	± 0.1	± 10 mV	NA	
	Start pump											
1119												
1128	16.02	250	1.25	245	25.26	0.48	994	0.49	6.86	-42.1	182.1	
1133	16.01	250	1.25	118	25.08	0.49	989	0.49	6.93	-47.4	176.8	
1138	16.02	250	1.25	62.0	24.49	0.49	985	0.48	6.93	-51.4	172.8	
1143	16.02	250	1.25	37.7	25.07	0.39	984	0.48	6.91	-59.8	164.4	
1148	16.02	250	1.25	23.4	24.96	0.37	980	0.48	6.90	-59.5	164.7	

Sample, Development, or Purge Water Information

Color	Clear	IDW Disposal Method	Analytical Laboratory: Accutest
Odor	None	Reinfiltration Next to Well	
Turbidity	Low		Transported via: ☐ Hand ■ Overnight

Laboratory Analysis (No. of Bottles):
■ VOCs SW8260C ■ GRO SW8260 ■ RRO SW8015D ■ Metals SW6010 (Field Filtered? ■ Y ☐ N)
☐ PAHs SW8270C-SIM ■ DRO SW8015D ■ Pesticides SW8081A ■ Herbicides SW8151
☐ PCBs SW8082 See COC

Laboratory Sample

	Sample ID	Sample Date	Sample Time	Total No. of Bottles
Normal Sample	FASC-TW004-0514	6/2/2014	1150	3 VOAs, 6 amber L, 1 poly
Field Duplicate	--	--	--	--
Matrix Spike	--	--	--	--
Matrix Spike Duplicate	--	--	--	--

Notes:

Equipment used:

	Make	Model	SN		Make	Model	SN		Make	Model	SN
Water Level Indicator:	Heron	H.Oil	C102864	Water Quality Instrument:	YSI	556 MPS	GTHR 012	Pump Controller:	Geotech	geoconrol PRO	1563
Turbidity Meter:	Hach	21002	GTHR013	Pump:	Geotech	geocontrol PRO	1563	PID:	RAE	MultiRAE	C103111

Signature/Sampler:

Capacity of Casing (gal/linear feet): 1"-0.041; 2"-0.16; 4"-0.65; 6"-1.47; 8"-2.61; 10"-4.08

* Per the Installation-Wide Field Sampling Plan, well purging should be considered complete when three successive readings of all of the indicator parameters stabilize to within the tolerances indicated in this form. For turbidity and dissolved oxygen stabilization two criteria are given; well purging should be considered complete whichever of these two criteria occurs first.

°C = degree Celsius; DO = dissolved oxygen; in = inch; mV = millivolts; PID = photoionization detector
bgs = below ground surface; ft = foot; LNAPL = light nonaqueous phase liquid; NTU = nephelometric turbidity unit; ppmv = part per million by volume
btoc = below top of casing; ml/min = milliliters per minute; uS/cm = microsiemens per centimeter; ORP = oxidation reduction potential; VOC = volatile organic compound

ORP measurements recorded in the field have been corrected and are also reported against the standard hydrogen electrode (SHE) applying the following formula:

$ORP_{(sample)} = ORP_{(field)} + CF$; CF = Eh(Zobell's-theor) - Eh(Zobell's-ref.) ; Eh(Zobell's-theor) = 430 - 2.3(T-25) - 0.0038(T-25)2 ; Eh(Zobell's-ref.) = -1.3(T)+260.5

Groundwater/Porewater Purge and Sample Log

CH2MHILL

Project: Banana Patch Site Characterization		Site:	Banana Patch
Project No: 495560		Well ID:	TW-005
Field Crew: A. Nelson, W. Irish		Date:	5/30/2014

Screen Interval (ft bgs):	19 to 29 ■ bgs ☐ btoc	Climatic Conditions:	☐ sunny ☐ cloudy ■ partially cloudy ☐ rainy
Well Diameter (in):	1.5	Purge Method:	☐ peristaltic ☐ bailer ☐ waterra ☐ submersible ■ bladder
PID reading (ppmv):	0.6 (at top of casing)	Pump Intake Depth (ft bgs):	23.5
Water Level Indicator:	■ Oil/Water Probe ☐ Water Level Meter	Ground Surface to TOC (ft):	0.5
	☐ Probe (PROBE) ☐ Tape (TAPE)	Length of Saturated Zone (ft):	12.81
Total Well Depth (ft/in bgs)	30.02 360.24	Pump Rate (ml/min):	230-250
Depth to Water (ft/in bgs):	17.21 206.52	Casing Volume (gal):	1.2
Liquid in Well:	■ WATER (W) ☐ LNAPL (L)	Sampling Method: VOCs	■ Bladder Pump
	☐ DNAPL (D) ☐ DRY (Y)	Sampling Method: nonVOCs	■ Bladder Pump ☐ Peristaltic Pump
Depth to LNAPL (ft bgs):	None	Sampling Depth (ft bgs):	23.50

Field Parameters

Time	Depth to Water (ft bgs)	Purge Rate (ml/min)	Liters Removed	Turbidity (NTU)	Temp (°C)	DO (mg/L)	Cond. (uS/cm)	Salinity (ppt)	pH	ORP (mV) field	ORP (mV) corrected	Comments
Requirements for Parameter Stabilization*				NTU	± 1°	±10% or <1 mg/L	± 3%	NA	± 0.1	± 10 mV	NA	
	Start pump											
1435												
1441	17.22	230	0.92	114	25.52	2.95	755	0.36	7.02	-1.2	223.1	
1445	17.25	230	1.15	60.9	25.0	4.47	669	0.32	7.00	17.0	241.4	
1450	17.26	230	1.15	35.1	25.0	5.09	649	0.31	7.03	21.9	246.3	
1455	17.26	250	1.25	25.1	25.09	5.51	641	0.31	7.02	26.8	251.2	
1500	17.27	250	1.25	24.1	25.07	5.56	638	0.31	7.02	30.0	254.4	

Sample, Development, or Purge Water Information

Color	Clear	IDW Disposal Method	Analytical Laboratory: Accutest
Odor	None	Reinfiltration Next to Well	
Turbidity	Moderate		Transported via: ☐ Hand ■ Overnight

Laboratory Analysis (No. of Bottles)

■ VOCs SW8260C ■ GRO SW8260 ■ RRO SW8015D ■ Metals SW6010 (Field Filtered? ■ Y ☐ N)

☐ PAHs SW8270C-SIM ■ DRO SW8015D ■ Pesticides SW8081A ■ Herbicides SW8151

☐ PCBs SW8082 See COC

Laboratory Sample

	Sample ID	Sample Date	Sample Time	Total No. of Bottles
Normal Sample	FASC-TW005-0514	5/30/2014	1500	3 VOAs, 6 amber L, 1 poly
Field Duplicate	--	--	--	--
Matrix Spike	--	--	--	--
Matrix Spike Duplicate	--	--	--	--

Notes:

Equipment used:		Make	Model	SN		Make	Model	SN		Make	Model	SN
	Water Level Indicator:	Geotech		GTHR007	Water Quality Instrument:	YSI	556 MPS	GTHR 010	Pump Controller:	Geotech	geoconrol PRO	1374
	Turbidity Meter:	Hach	2100P	GTHR014	Pump:	Geotech	geocontrol PRO	1374	PID:	RAE	MultiRAE	C103107

Signature/Sampler:

Capacity of Casing (gal/linear feet): 1"-0.041; 2"-0.16; 4"-0.65; 6"-1.47; 8"-2.61; 10"-4.08

* Per the Installation-Wide Field Sampling Plan, well purging should be considered complete when three successive readings of all of the indicator parameters stabilize to within the tolerances indicated in this form.
For turbidity and dissolved oxygen stabilization two criteria are given; well purging should be considered complete whichever of these two criteria occurs first.

°C = degree Celsius; DO = dissolved oxygen; in = inch; mV = millivolts; PID = photoionization detector
bgs = below ground surface; ft = foot; LNAPL = light nonaqueous phase liquid; NTU = nephelometric turbidity unit; ppmv = part per million by volume
btoc = below top of casing; ml/min = milliliters per minute; uS/cm = microsiemens per centimeter; ORP = oxidation reduction potential; VOC = volatile organic compound

ORP measurements recorded in the field have been corrected and are also reported against the standard hydrogen electrode (SHE) applying the following formula:

$ORP_{(sample)} = ORP_{(field)} + CF$; CF = Eh(Zobell's-theor) - Eh(Zobell's-ref.) ; Eh(Zobell's-theor) = 430 - 2.3(T-25) - 0.0038(T-25)2 ; Eh(Zobell's-ref.) = -1.3(T)+260.5

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Groundwater/Porewater Purge and Sample Log

Project:	Banana Patch Site Characterization	Site:	Banana Patch
Project No:	495560	Well ID:	TW-006
Field Crew:	A. Nelson, W. Irish	Date:	5/30/2014

Screen Interval (ft bgs):	20 to 30 ■ bgs ☐ btoc	Climatic Conditions:	■ sunny ☐ cloudy ☐ partially cloudy ☐ rainy
Well Diameter (in):	1.5	Purge Method:	☐ peristaltic ☐ bailer ☐ waterra ☐ submersible ■ bladder
PID reading (ppmv):	0.0 (at top of casing)	Pump Intake Depth (ft bgs):	21
Water Level Indicator:	■ Oil/Water Probe ☐ Water Level Meter	Ground Surface to TOC (ft):	0.5
	☐ Probe (PROBE) ☐ Tape (TAPE)	Length of Saturated Zone (ft):	7.94
Total Well Depth (ft/in bgs)	25.02 300.24	Pump Rate (ml/min):	250
Depth to Water (ft/in bgs):	17.08 204.96	Casing Volume (gal):	0.7
Liquid in Well:	■ WATER (W) ☐ LNAPL (L)	Sampling Method – VOCs	■ Bladder Pump
	☐ DNAPL (D) ☐ DRY (Y)	Sampling Method – nonVOCs	■ Bladder Pump ☐ Peristaltic Pump
Depth to LNAPL (ft bgs):	None	Sampling Depth (ft bgs):	21.00

Field Parameters

Time	Depth to Water (ft bgs)	Purge Rate (ml/min)	Liters Removed	Turbidity (NTU)	Temp (°C)	DO (mg/L)	Cond. (uS/cm)	Salinity (ppt)	pH	ORP (mV) field	ORP (mV) corrected	Comments
Requirements for Parameter Stabilization*				NTU	± 1°	±10% or <1 mg/L	± 3%	NA	± 0.1	± 10 mV	NA	
	Start pump											
1035												
1040	17.41	250	1.25	35.0	29.0	2.48	3240	1.56	6.82	-67.2	156.2	
1045	17.55	250	1.25	13.3	28.15	1.04	2960	1.44	6.77	-76.0	147.5	
1050	17.60	250	1.25	6.73	27.95	0.67	2740	1.33	6.73	-80.6	142.9	
1055	17.61	250	1.25	3.80	27.90	0.30	2538	1.23	6.71	-81.6	142.0	

Sample, Development, or Purge Water Information

Color	Clear	IDW Disposal Method: Reinfiltration Next to Well	Analytical Laboratory: Accutest
Odor	None		
Turbidity	Low		Transported via: ☐ Hand ■ Overnight
Laboratory Analysis (No. of Bottles)	■ VOCs SW8260C ■ GRO SW8260 ■ RRO SW8015D ■ Metals SW6010 (Field Filtered? ■ Y ☐ N) ☐ PAHs SW8270C-SIM ■ DRO SW8015D ■ Pesticides SW8081A ■ Herbicides SW8151 ☐ PCBs SW8082 See COC		

Laboratory Sample

	Sample ID	Sample Date	Sample Time	Total No. of Bottles
Normal Sample	FASC-TW006-0514	5/30/2014	1100	3 VOAs, 6 amber L, 1 poly
Field Duplicate	--	--	--	--
Matrix Spike	--	--	--	--
Matrix Spike Duplicate	--	--	--	--

Notes:

Equipment used:		Make	Model	SN
	Water Level Indicator:	Geotech		GTHR007
	Water Quality Instrument:	YSI	556 MPS	GTHR 010
	Pump Controller:	Geotech	geoconrol PRO	1374
	Turbidity Meter:	Hach	2100P	GTHR014
	Pump:	Geotech	geocontrol PRO	1374
	PID:	RAE	MultiRAE	C103107

Signature/Sampler:

Capacity of Casing (gal/linear feet): 1"-0.041; 2"-0.16; 4"-0.65; 6"-1.47; 8"-2.61; 10"-4.08

* Per the Installation-Wide Field Sampling Plan, well purging should be considered complete when three successive readings of all of the indicator parameters stabilize to within the tolerances indicated in this form. For turbidity and dissolved oxygen stabilization two criteria are given; well purging should be considered complete whichever of these two criteria occurs first.

°C = degree Celsius; DO = dissolved oxygen; in = inch; mV = millivolts; PID = photoionization detector
bgs = below ground surface; ft = foot; LNAPL = light nonaqueous phase liquid; NTU = nephelometric turbidity unit; ppmv = part per million by volume
btoc = below top of casing; ml/min = milliliters per minute; uS/cm = microsiemens per centimeter; ORP = oxidation reduction potential; VOC = volatile organic compound

ORP measurements recorded in the field have been corrected and are also reported against the standard hydrogen electrode (SHE) applying the following formula:

$ORP_{(sample)} = ORP_{(field)} + CF$; CF = Eh(Zobell's-theor) - Eh(Zobell's-ref.) ; Eh(Zobell's-theor) = 430 - 2.3(T-25) - 0.0038(T-25)2 ; Eh(Zobell's-ref.) = -1.3(T)+260.5

Groundwater/Porewater Purge and Sample Log

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Project:	Banana Patch Site Characterization	Site:	Banana Patch
Project No:	495560	Well ID:	TW-007
Field Crew:	A. Nelson, W. Irish	Date:	5/30/2014

Screen Interval (ft bgs):	20 to 25 ■ bgs ☐ btoc	Climatic Conditions:	■ sunny ☐ cloudy ☐ partially cloudy ☐ rainy
Well Diameter (in):	1.0	Purge Method:	☐ peristaltic ☐ bailer ☐ waterra ☐ submersible ■ bladder
PID reading (ppmv):	0.0 (at top of casing)	Pump Intake Depth (ft bgs):	22
Water Level Indicator:	■ Oil/Water Probe ☐ Water Level Meter	Ground Surface to TOC (ft):	2
	☐ Probe (PROBE) ☐ Tape (TAPE)	Length of Saturated Zone (ft):	7.67
Total Well Depth (ft/in bgs)	25.00 300	Pump Rate (ml/min):	150
Depth to Water (ft/in bgs):	17.33 btoc 207.96	Casing Volume (gal):	0.3
Liquid in Well:	■ WATER (W) ☐ LNAPL (L)	Sampling Method — VOCs	■ Bladder Pump
	☐ DNAPL (D) ☐ DRY (Y)	Sampling Method — nonVOCs	■ Bladder Pump ☐ Peristaltic Pump
Depth to LNAPL (ft bgs):	None	Sampling Depth (ft bgs):	22.00

Field Parameters

Time	Depth to Water (ft bgs)	Purge Rate (ml/min)	Liters Removed	Turbidity (NTU)	Temp (°C)	DO (mg/L)	Cond. (uS/cm)	Salinity (ppt)	pH	ORP (mV) field	ORP (mV) corrected	Comments
Requirements for Parameter Stabilization*				NTU	± 1°	±10% or <1 mg/L	± 3%	NA	± 0.1	± 10 mV	NA	
	Start pump											
0950	17.34	--		--	--	--	--	--	--	--	--	Slow recharge rate
0955	18.01	--		--	--	--	--	--	--	--	--	pump set to 150 ml/min
1000	18.28	150	0.75	60.5	26.17	1.25	1266	0.61	5.97	-32.3	191.8	
1005	18.53	150	0.75	61.1	26.10	0.90	1316	0.64	5.74	-29.9	194.2	
1010	18.72	150	0.75	37.7	25.98	0.80	1339	0.65	5.79	-35.7	188.4	
1015	18.77	150	0.75	18.3	25.80	0.74	1325	0.65	5.80	-40.4	183.7	

Sample, Development, or Purge Water Information

Color	Clear/Yellow	IDW Disposal Method	Reinfiltration Next to Well	Analytical Laboratory:	Accutest
Odor	None				
Turbidity	Low			Transported via:	☐ Hand ■ Overnight
Laboratory Analysis (No. of Bottles)	■ VOCs SW8260C ■ GRO SW8260 ■ RRO SW8015D ■ Metals SW6010 (Field Filtered? ■ Y ☐ N) ☐ PAHs SW8270C-SIM ■ DRO SW8015D ■ Pesticides SW8081A ■ Herbicides SW8151 ☐ PCBs SW8082 See COC				

Laboratory Sample

	Sample ID	Sample Date	Sample Time	Total No. of Bottles
Normal Sample	FASC-TW007-0514	5/30/2014	1018	3 VOAs, 6 amber L, 1 poly
Field Duplicate	--	--	--	--
Matrix Spike	--	--	--	--
Matrix Spike Duplicate	--	--	--	--

Notes: Only normal sample collected. Recharge rate too slow to collect MS/MSD.

Equipment used:

	Make	Model	SN		Make	Model	SN		Make	Model	SN
Water Level Indicator:	Geotech	Interface	GTHR007	Water Quality Instrument:	YSI	556 MPS	GTHR 012	Pump Controller:	Geotech	geoconrol PRO	GTHR 041
Turbidity Meter:	Hach	2100P	GTHR013	Pump:	Geotech	geocontrol PRO	GTHR 041	PID:	RAE	MultiRAE	C103111

Signature/Sampler:

Capacity of Casing (gal/linear feet): 1"-0.041; 2"-0.16; 4"-0.65; 6"-1.47; 8"-2.61; 10"-4.08

* Per the Installation-Wide Field Sampling Plan, well purging should be considered complete when three successive readings of all of the indicator parameters stabilize to within the tolerances indicated in this form.
For turbidity and dissolved oxygen stabilization two criteria are given; well purging should be considered complete whichever of these two criteria occurs first.

°C = degree Celsius; DO = dissolved oxygen; in = inch; mV = millivolts; PID = photoionization detector
bgs = below ground surface; ft = foot; LNAPL = light nonaqueous phase liquid; NTU = nephelometric turbidity unit; ppmv = part per million by volume
btoc = below top of casing; ml/min = milliliters per minute; uS/cm = microsiemens per centimeter; ORP = oxidation reduction potential; VOC = volatile organic compound

ORP measurements recorded in the field have been corrected and are also reported against the standard hydrogen electrode (SHE) applying the following formula:

$ORP_{(sample)} = ORP_{(field)} + CF$; CF = Eh(Zobell's-theor) - Eh(Zobell's-ref.) ; Eh(Zobell's-theor) = 430 - 2.3(T-25) - 0.0038(T-25)2 ; Eh(Zobell's-ref.) = -1.3(T)+260.5

Groundwater/Porewater Purge and Sample Log

CH2MHILL

Project:	Banana Patch Site Characterization	Site:	Banana Patch
Project No:	495560	Well ID:	TW-008
Field Crew:	A. Nelson, W. Irish	Date:	5/29/2014

Screen Interval (ft bgs):	17.0 27 ■ bgs ☐ btoc	Climatic Conditions:	■ sunny ☐ cloudy ☐ partially cloudy ☐ rainy
Well Diameter (in):	1.5	Purge Method:	☐ peristaltic ☐ bailer ☐ waterra ☐ submersible ■ bladder
PID reading (ppmv):	0.0 (at top of casing)	Pump Intake Depth (ft bgs):	27
Water Level Indicator:	■ Oil/Water Probe ☐ Water Level Meter	Ground Surface to TOC (ft):	3.32
	☐ Probe (PROBE) ☐ Tape (TAPE)	Length of Saturated Zone (ft):	12.12
Total Well Depth (ft/in bgs)	30.04 360.48	Pump Rate (ml/min):	100-250
Depth to Water (ft/in bgs):	17.92 215.04	Casing Volume (gal):	1.1
Liquid in Well:	■ WATER (W) ☐ LNAPL (L)	Sampling Method — VOCs	■ Bladder Pump
	☐ DNAPL (D) ☐ DRY (Y)	Sampling Method — nonVOCs	■ Bladder Pump ☐ Peristaltic Pump
Depth to LNAPL (ft bgs):	None	Sampling Depth (ft bgs):	27.00 depth adjusted due to recovery rate

Field Parameters

Time	Depth to Water (ft bgs)	Purge Rate (ml/min)	Liters Removed	Turbidity (NTU)	Temp (°C)	DO (mg/L)	Cond. (uS/cm)	Salinity (ppt)	pH	ORP (mV) field	ORP (mV) corrected	Comments
Requirements for Parameter Stabilization*				NTU	± 1°	±10% or <1 mg/L	± 3%	NA	± 0.1	± 10 mV	NA	
	Start pump											
1605	18.13											Very slow recharge rate.
1610	19.08	250	1.25	64.0	24.55	0.93	1554	0.76	5.82	-93.3	130.7	Pump was adjusted to approximately 100 mL/min during sampling to allow well to recover
1615	20.91	250	1.25	65.0	26.27	0.81	1570	0.76	5.55	-109.4	114.6	
1620	21.51	200	1.00	64.3	26.32	0.83	1613	0.79	5.73	-111.2	112.8	
1625	23.45	150	0.75	63.1	26.43	0.78	1623	0.80	5.67	-117.1	106.9	Well purged dry

Sample, Development, or Purge Water Information

Color	Clear/Yellow	IDW Disposal Method	Reinfiltration Next to Well	Analytical Laboratory:	Accutest
Odor	None				
Turbidity	Low			Transported via:	☐ Hand ■ Overnight

Laboratory Analysis (No. of Bottles):
■ VOCs SW8260C ■ GRO SW8260 ■ RRO SW8015D ■ Metals SW6010 (Field Filtered? ■ Y ☐ N)
☐ PAHs SW8270C-SIM ■ DRO SW8015D ■ Pesticides SW8081A ■ Herbicides SW8151
☐ PCBs SW8082 See COC

Laboratory Sample

	Sample ID	Sample Date	Sample Time	Total No. of Bottles
Normal Sample	FASC-TW008-0514	5/29/2014	1632	3 VOAs, 6 amber L, 1 poly
Field Duplicate	--	--	--	--
Matrix Spike	--	--	--	--
Matrix Spike Duplicate	--	--	--	--

Notes: Only normal sample collected. Recharge rate too slow to collect MS/MSD.

Equipment used:

	Make	Model	SN		Make	Model	SN		Make	Model	SN
Water Level Indicator:	Geotech		GTHR007	Water Quality Instrument:	YSI	556 MPS	GTHR 012	Pump Controller:	Geotech	geoconrol PRO	1563
Turbidity Meter:	Hach	2100P	GTHR014	Pump:	Geotech	geocontrol PRO	1563	PID:	RAE	MultiRAE	C103107

Signature/Sampler:

Capacity of Casing (gal/linear feet): 1"-0.041; 2"-0.16; 4"-0.65; 6"-1.47; 8"-2.61; 10"-4.08

* Per the Installation-Wide Field Sampling Plan, well purging should be considered complete when three successive readings of all of the indicator parameters stabilize to within the tolerances indicated in this form.
For turbidity and dissolved oxygen stabilization two criteria are given; well purging should be considered complete whichever of these two criteria occurs first.

°C = degree Celsius; DO = dissolved oxygen; in = inch; mV = millivolts; PID = photoionization detector
bgs = below ground surface; ft = foot; LNAPL = light nonaqueous phase liquid; NTU = nephelometric turbidity unit; ppmv = part per million by volume
btoc = below top of casing; ml/min = milliliters per minute; uS/cm = microsiemens per centimeter; ORP = oxidation reduction potential; VOC = volatile organic compound

ORP measurements recorded in the field have been corrected and are also reported against the standard hydrogen electrode (SHE) applying the following formula:

$ORP_{(sample)} = ORP_{(field)} + CF$; CF = Eh(Zobell's-theor) - Eh(Zobell's-ref.) ; Eh(Zobell's-theor) = 430 - 2.3(T-25) - 0.0038(T-25)2 ; Eh(Zobell's-ref.) = -1.3(T)+260.5

Groundwater/Porewater Purge and Sample Log

CH2MHILL

Project:	Banana Patch Site Characterization	Site:	Banana Patch
Project No:	495560	Well ID:	TW-009
Field Crew:	A. Nelson, W. Irish	Date:	5/29/2014

Screen Interval (ft bgs):	17 to 27 ■ bgs ☐ btoc	Climatic Conditions:	■ sunny ☐ cloudy ☐ partially cloudy ☐ rainy
Well Diameter (in):	1.5	Purge Method:	☐ peristaltic ☐ bailer ☐ waterra ☐ submersible ■ bladder
PID reading (ppmv):	0.0 (at top of casing)	Pump Intake Depth (ft bgs):	25
Water Level Indicator:	■ Oil/Water Probe ☐ Water Level Meter	Ground Surface to TOC (ft):	1.77
	☐ Probe (PROBE) ☐ Tape (TAPE)	Length of Saturated Zone (ft):	9.72
Total Well Depth (ft/in bgs)	30.01 360.12	Pump Rate (ml/min):	250
Depth to Water (ft/in bgs):	20.29 243.48	Casing Volume (gal):	0.9
Liquid in Well:	■ WATER (W) ☐ LNAPL (L)	Sampling Method — VOCs	■ Bladder Pump
	☐ DNAPL (D) ☐ DRY (Y)	Sampling Method — nonVOCs	■ Bladder Pump ☐ Peristaltic Pump
Depth to LNAPL (ft bgs):	None	Sampling Depth (ft bgs):	25.00

Field Parameters

Time	Depth to Water (ft bgs)	Purge Rate (ml/min)	Liters Removed	Turbidity (NTU)	Temp (°C)	DO (mg/L)	Cond. (uS/cm)	Salinity (ppt)	pH	ORP (mV) field	ORP (mV) corrected	Comments
Requirements for Parameter Stabilization*				NTU	± 1°	±10% or <1 mg/L	± 3%	NA	± 0.1	± 10 mV	NA	
	Start pump											
1050	20.40	--		--	--	--	--	--	--	--	--	
1055	20.40	250	1.25	28.3	25.73	19.4	984	0.48	7.00	-90.0	134.2	
1100	20.41	250	1.25	23.3	25.57	13.5	969	0.47	7.00	-91.1	133.1	
1105	20.45	250	1.25	16.2	25.24	11.1	937	0.46	7.02	-93.5	130.8	
1110	20.45	250	1.25	15.6	25.22	10.9	929	0.45	7.01	-92.7	131.6	
1115	20.45	250	1.25	13.0	25.15	10.6	918	0.45	6.98	-91.6	132.7	

Sample, Development, or Purge Water Information

Color	Clear	IDW Disposal Method: Reinfiltration Next to Well	Analytical Laboratory: Accutest
Odor	None		
Turbidity	Low		Transported via: ☐ Hand ■ Overnight

Laboratory Analysis (No. of Bottles): ■ VOCs SW8260C ■ GRO SW8260 ■ RRO SW8015D ■ Metals SW6010 (Field Filtered? ■ Y ☐ N) ☐ PAHs SW8270C-SIM ■ DRO SW8015D ■ Pesticides SW8081A ■ Herbicides SW8151 ☐ PCBs SW8082 See COC

Laboratory Sample

	Sample ID	Sample Date	Sample Time	Total No. of Bottles
Normal Sample	FASC-TW009-0514	5/29/2014	1120	3 VOAs, 6 amber L, 1 poly
Field Duplicate	--	--	--	--
Matrix Spike	--	--	--	--
Matrix Spike Duplicate	--	--	--	--

Notes:

Equipment used:

	Make	Model	SN		Make	Model	SN		Make	Model	SN
Water Level Indicator:	Geotech	Interface	GTHR006	Water Quality Instrument:	YSI	556 MPS	GTHR 010	Pump Controller:	Geotech	geoconrol PRO	1374
Turbidity Meter:	Hach	2100P	GTHR014	Pump:	Geotech	geocontrol PRO	1374	PID:	RAE	MultiRAE	C103111

Signature/Sampler:

Capacity of Casing (gal/linear feet): 1"-0.041; 2"-0.16; 4"-0.65; 6"-1.47; 8"-2.61; 10"-4.08

* Per the Installation-Wide Field Sampling Plan, well purging should be considered complete when three successive readings of all of the indicator parameters stabilize to within the tolerances indicated in this form. For turbidity and dissolved oxygen stabilization two criteria are given; well purging should be considered complete whichever of these two criteria occurs first.

°C = degree Celsius; DO = dissolved oxygen; in = inch; mV = millivolts; PID = photoionization detector
bgs = below ground surface; ft = foot; LNAPL = light nonaqueous phase liquid; NTU = nephelometric turbidity unit; ppmv = part per million by volume
btoc = below top of casing; ml/min = milliliters per minute; uS/cm = microsiemens per centimeter; ORP = oxidation reduction potential; VOC = volatile organic compound

ORP measurements recorded in the field have been corrected and are also reported against the standard hydrogen electrode (SHE) applying the following formula:

$ORP_{(sample)} = ORP_{(field)} + CF$; CF = Eh(Zobell's-theor) - Eh(Zobell's-ref.) ; Eh(Zobell's-theor) = 430 - 2.3(T-25) - 0.0038(T-25)2 ; Eh(Zobell's-ref.) = -1.3(T)+260.5

Groundwater/Porewater Purge and Sample Log

CH2MHILL

Project:	Banana Patch Site Characterization	Site:	Banana Patch
Project No:	495560	Well ID:	TW-010
Field Crew:	A. Nelson, W. Irish	Date:	5/29/2014

Screen Interval (ft bgs):	17 to 27 ■ bgs ☐ btoc	Climatic Conditions:	■ sunny ☐ cloudy ☐ partially cloudy ☐ rainy
Well Diameter (in):	1.5	Purge Method:	☐ peristaltic ☐ bailer ☐ waterra ☐ submersible ■ bladder
PID reading (ppmv):	0.0 (at top of casing)	Pump Intake Depth (ft bgs):	20.5
Water Level Indicator:	■ Oil/Water Probe ☐ Water Level Meter	Ground Surface to TOC (ft):	0
	☐ Probe (PROBE) ☐ Tape (TAPE)	Length of Saturated Zone (ft):	2.51
Total Well Depth (ft/in bgs)	21.75 261	Pump Rate (ml/min):	50-100
Depth to Water (ft/in bgs):	19.24 230.88	Casing Volume (gal):	0.2
Liquid in Well:	■ WATER (W) ☐ LNAPL (L)	Sampling Method — VOCs	■ Bladder Pump
	☐ DNAPL (D) ☐ DRY (Y)	Sampling Method — nonVOCs	■ Bladder Pump ☐ Peristaltic Pump
Depth to LNAPL (ft bgs):	None	Sampling Depth (ft bgs):	20.50

Field Parameters

Time	Depth to Water (ft bgs)	Purge Rate (ml/min)	Liters Removed	Turbidity (NTU)	Temp (°C)	DO (mg/L)	Cond. (uS/cm)	Salinity (ppt)	pH	ORP (mV) field	ORP (mV) corrected	Comments
Requirements for Parameter Stabilization*				NTU	± 1°	±10% or <1 mg/L	± 3%	NA	± 0.1	± 10 mV	NA	
	Start pump											
1415	20.44	--		--	--	--	--	--	--	--	--	
1420	20.98	100	5.00	28.4	29.6	5.58	1632	0.75	7.80	-3.7	220.3	
1425	21.01	75	3.75	24.54	30.01	5.16	1640	0.75	7.82	-3.6	220.4	
1430	21.52	50	2.50	23.5	28.85	5.75	1607	0.75	7.75	-6.9	217.1	
1435	21.75	50	2.50	--	--	--	--	--	--	--	--	Purged dry

Sample, Development, or Purge Water Information

Color	Start Cloudy; Finish Clear	IDW Disposal Method: Reinfiltration Next to Well	Analytical Laboratory: Accutest
Odor	None		
Turbidity	High to Low		Transported via: ☐ Hand ■ Overnight
Laboratory Analysis (No. of Bottles)	■ VOCs SW8260C ■ GRO SW8260 ■ RRO SW8015D ■ Metals SW6010 Field Filtered? ■ Y ☐ N ☐ PAHs SW8270C-SIM ■ DRO SW8015D ■ Pesticides SW8081A ■ Herbicides SW8151 ☐ PCBs SW8082 See COC		

Laboratory Sample

	Sample ID	Sample Date	Sample Time	Total No. of Bottles
Normal Sample	FASC-TW010-0614	6/2/2014	1150	3 VOAs, 5 amber L, 1 poly
Field Duplicate	--	--	--	--
Matrix Spike	--	--	--	--
Matrix Spike Duplicate	--	--	--	--

Notes: Sample not collected following purge because well was purged dry. Returned to collect sample on 6/2/2014.

Equipment used:

	Make	Model	SN		Make	Model	SN		Make	Model	SN
Water Level Indicator:	Geotech	Interface	GTHR006	Water Quality Instrument:	YSI	556 MPS	GTHR 010	Pump Controller:	Geotech	geoconrol PRO	1374
Turbidity Meter:	Hach	2100P	GTHR013	Pump:	Geotech	geocontrol PRO	1374	PID:	RAE	MultiRAE	C103107 (5/29/2014) C103111 (6/2/2014)

Signature/Sampler:

Capacity of Casing (gal/linear feet): 1"-0.041; 2"-0.16; 4"-0.65; 6"-1.47; 8"-2.61; 10"-4.08

* Per the Installation-Wide Field Sampling Plan, well purging should be considered complete when three successive readings of all of the indicator parameters stabilize to within the tolerances indicated in this form. For turbidity and dissolved oxygen stabilization two criteria are given; well purging should be considered complete whichever of these two criteria occurs first.

°C = degree Celsius; DO = dissolved oxygen; in = inch; mV = millivolts; PID = photoionization detector
bgs = below ground surface; ft = foot; LNAPL = light nonaqueous phase liquid; NTU = nephelometric turbidity unit; ppmv = part per million by volume
btoc = below top of casing; ml/min = milliliters per minute; uS/cm = microsiemens per centimeter; ORP = oxidation reduction potential; VOC = volatile organic compound

ORP measurements recorded in the field have been corrected and are also reported against the standard hydrogen electrode (SHE) applying the following formula:

$ORP_{(sample)} = ORP_{(field)} + CF$; CF = Eh(Zobell's-theor) - Eh(Zobell's-ref.) ; Eh(Zobell's-theor) = 430 - 2.3(T-25) - 0.0038(T-25)2 ; Eh(Zobell's-ref.) = -1.3(T)+260.5

Groundwater/Porewater Purge and Sample Log

CH2MHILL

Project:	Banana Patch Site Characterization	Site:	Banana Patch
Project No:	495560	Well ID:	TW-011
Field Crew:	A. Nelson, W. Irish	Date:	5/29/2014

Screen Interval (ft bgs):	5 to 15 ■ bgs ☐ btoc	Climatic Conditions:	■ sunny ☐ cloudy ☐ partially cloudy ☐ rainy
Well Diameter (in):	1.5	Purge Method:	☐ peristaltic ☐ bailer ☐ waterra ☐ submersible ■ bladder
PID reading (ppmv):	0.0 (at top of casing)	Pump Intake Depth (ft bgs):	12
Water Level Indicator:	■ Oil/Water Probe ☐ Water Level Meter	Ground Surface to TOC (ft):	3.5-inches
	☐ Probe (PROBE) ☐ Tape (TAPE)	Length of Saturated Zone (ft):	6.16
Total Well Depth (ft/in bgs)	15.00 btoc 180	Pump Rate (ml/min):	350
Depth to Water (ft/in bgs):	8.84 btoc 106.08	Casing Volume (gal):	0.6
Liquid in Well:	■ WATER (W) ☐ LNAPL (L)	Sampling Method — VOCs	■ Bladder Pump
	☐ DNAPL (D) ☐ DRY (Y)	Sampling Method — nonVOCs	■ Bladder Pump ☐ Peristaltic Pump
Depth to LNAPL (ft bgs):	None	Sampling Depth (ft bgs):	12.00 btoc

Field Parameters

Time	Depth to Water (ft bgs)	Purge Rate (ml/min)	Liters Removed	Turbidity (NTU)	Temp (°C)	DO (mg/L)	Cond. (uS/cm)	Salinity (ppt)	pH	ORP (mV) field	ORP (mV) corrected	Comments
Requirements for Parameter Stabilization*				NTU	± 1°	±10% or <1 mg/L	± 3%	NA	± 0.1	± 10 mV	NA	
	Start pump											
1200	8.92	--		--	--	--	--	--	--	--	--	Turbidity meter error message through first 2 readings. Meter started working normally after 2nd reading.
1205	8.93	350	17.50	--	22.99	0.80	1364	0.75	6.12	41.5	265.5	
1210	8.92	350	17.50	--	22.94	0.63	1536	0.81	5.75	38.8	262.8	
1215	8.93	350	17.50	6.31	22.86	0.55	1659	0.88	5.53	35.7	259.6	
1220	8.92	350	17.50	6.53	22.86	0.52	1692	0.89	5.77	31.5	255.4	
1225	8.93	350	17.50	4.03	22.82	0.48	1734	0.92	5.79	30.3	254.2	
1230	8.93	350	17.50	5.09	22.79	0.45	1743	0.92	5.80	22.7	246.6	

Sample, Development, or Purge Water Information

Color	Clear	IDW Disposal Method: Reinfiltration Next to Well	Analytical Laboratory: Accutest
Odor	None		
Turbidity	Low		Transported via: ☐ Hand ■ Overnight

Laboratory Analysis (No. of Bottles): ■ VOCs SW8260C ■ GRO SW8260 ■ RRO SW8015D ■ Metals SW6010 (Field Filtered? ■ Y ☐ N) ☐ PAHs SW8270C-SIM ■ DRO SW8015D ■ Pesticides SW8081A ■ Herbicides SW8151 ☐ PCBs SW8082 See COC

Laboratory Sample

	Sample ID	Sample Date	Sample Time	Total No. of Bottles
Normal Sample	FASC-TW011-0514	5/29/2014	1235	3 VOAs, 6 amber L, 1 poly
Field Duplicate	FASC-TW111-0514	5/29/2014	1310	3 VOAs, 6 amber L, 1 poly
Matrix Spike	--	--	--	--
Matrix Spike Duplicate	--	--	--	--

Notes: Sample not collected following purge because well was purged dry. Returned to collect sample.

Equipment used:

	Make	Model	SN		Make	Model	SN		Make	Model	SN
Water Level Indicator:	Geotech	Interface	GTHR007	Water Quality Instrument:	YSI	556 MPS	GTHR 012	Pump Controller:	Geotech	geoconrol PRO	1563
Turbidity Meter:	Hach	2100P	GTHR013	Pump:	Geotech	geocontrol PRO	1563	PID:	RAE	MultiRAE	C103107

Signature/Sampler:

Capacity of Casing (gal/linear feet): 1"-0.041; 2"-0.16; 4"-0.65; 6"-1.47; 8"-2.61; 10"-4.08

* Per the Installation-Wide Field Sampling Plan, well purging should be considered complete when three successive readings of all of the indicator parameters stabilize to within the tolerances indicated in this form.
For turbidity and dissolved oxygen stabilization two criteria are given; well purging should be considered complete whichever of these two criteria occurs first.

°C = degree Celsius; DO = dissolved oxygen; in = inch; mV = millivolts; PID = photoionization detector
bgs = below ground surface; ft = foot; LNAPL = light nonaqueous phase liquid; NTU = nephelometric turbidity unit; ppmv = part per million by volume
btoc = below top of casing; ml/min = milliliters per minute; uS/cm = microsiemens per centimeter; ORP = oxidation reduction potential; VOC = volatile organic compound

ORP measurements recorded in the field have been corrected and are also reported against the standard hydrogen electrode (SHE) applying the following formula:

$ORP_{(sample)} = ORP_{(field)} + CF$; CF = Eh(Zobell's-theor) - Eh(Zobell's-ref.) ; Eh(Zobell's-theor) = 430 - 2.3(T-25) - 0.0038(T-25)2 ; Eh(Zobell's-ref.) = -1.3(T)+260.5

CH2MHILL

Groundwater/Porewater Purge and Sample Log

Project:	Banana Patch Site Characterization	Site:	Banana Patch
Project No:	495560	Well ID:	TW-012 (existing monitoring well installed by others)
Field Crew:	A. Nelson, W. Irish	Date:	5/30/2014

Screen Interval (ft bgs):	17 to 30 ■ bgs ☐ btoc	Climatic Conditions:	■ sunny ☐ cloudy ☐ partially cloudy ☐ rainy
Well Diameter (in):	3.0	Purge Method:	☐ peristaltic ☐ bailer ☐ waterra ☐ submersible ■ bladder
PID reading (ppmv):	0.0 (at top of casing)	Pump Intake Depth (ft bgs):	23.6
Water Level Indicator:	■ Oil/Water Probe ☐ Water Level Meter	Ground Surface to TOC (ft):	0
	☐ Probe (PROBE) ☐ Tape (TAPE)	Length of Saturated Zone (ft):	13.08
Total Well Depth (ft/in bgs)	30.20 btoc 362.4	Pump Rate (ml/min):	350
Depth to Water (ft/in bgs):	17.12 btoc 205.44	Casing Volume (gal):	4.8
Liquid in Well:	■ WATER (W) ☐ LNAPL (L)	Sampling Method — VOCs	■ Bladder Pump
	☐ DNAPL (D) ☐ DRY (Y)	Sampling Method — nonVOCs	■ Bladder Pump ☐ Peristaltic Pump
Depth to LNAPL (ft bgs):		Sampling Depth (ft bgs):	23.60

Field Parameters

Time	Depth to Water (ft bgs)	Purge Rate (ml/min)	Liters Removed	Turbidity (NTU)	Temp (°C)	DO (mg/L)	Cond. (uS/cm)	Salinity (ppt)	pH	ORP (mV) field	ORP (mV) corrected	Comments
Requirements for Parameter Stabilization*				NTU	± 1°	±10% or <1 mg/L	± 3%	NA	± 0.1	± 10 mV	NA	
	Start pump											
1620	--	--		--	--	--	--	--	--	--	--	
1628	17.7	350	7.00	64.4	27.26	1.03	885	0.41	6.29	-53.5	170.8	
1630	17.7	350	17.50	48.0	26.99	0.74	874	0.41	6.32	-42.0	182.3	
1635	17.7	350	17.50	40.8	26.71	0.83	867	0.41	6.33	-34.8	189.5	
1640	17.7	350	17.50	33.9	26.71	0.94	869	0.41	6.31	-30.0	194.3	
1645	17.7	350	17.50	32.8	26.65	1.05	870	0.41	6.34	-30.0	194.3	

Sample, Development, or Purge Water Information

Color	Clear	IDW Disposal Method	Analytical Laboratory: Accutest
Odor	None	Reinfiltration Next to Well	
Turbidity	Low		Transported via: ☐ Hand ■ Overnight

Laboratory Analysis (No. of Bottles):
■ VOCs SW8260C ■ GRO SW8260 ■ RRO SW8015D ■ Metals SW6010 (Field Filtered? ■ Y ☐ N)
☐ PAHs SW8270C-SIM ■ DRO SW8015D ■ Pesticides SW8081A ■ Herbicides SW8151
☐ PCBs SW8082 See COC

Laboratory Sample

	Sample ID	Sample Date	Sample Time	Total No. of Bottles
Normal Sample	FASC-MW012-0514	5/30/2014	1645	3 VOAs, 6 amber L, 1 poly
Field Duplicate	--	--	--	--
Matrix Spike	--	--	--	--
Matrix Spike Duplicate	--	--	--	--

Notes: Sample not collected following purge because well was purged dry. Returned to collect sample.

Equipment used:

	Make	Model	SN		Make	Model	SN		Make	Model	SN
Water Level Indicator:	Geotech	Interface	GTHR006	Water Quality Instrument:	YSI	556 MPS	GTHR 012	Pump Controller:	Geotech	geoconrol PRO	1563
Turbidity Meter:	Hach	2100P	GTHR014	Pump:	Geotech	geocontrol PRO	1563	PID:	RAE	MultiRAE	C103107

Signature/Sampler:

Capacity of Casing (gal/linear feet): 1"-0.041; 2"-0.16; 4"-0.65; 6"-1.47; 8"-2.61; 10"-4.08

* Per the Installation-Wide Field Sampling Plan, well purging should be considered complete when three successive readings of all of the indicator parameters stabilize to within the tolerances indicated in this form. For turbidity and dissolved oxygen stabilization two criteria are given; well purging should be considered complete whichever of these two criteria occurs first.

°C = degree Celsius; DO = dissolved oxygen; in = inch; mV = millivolts; PID = photoionization detector
bgs = below ground surface; ft = foot; LNAPL = light nonaqueous phase liquid; NTU = nephelometric turbidity unit; ppmv = part per million by volume
btoc = below top of casing; ml/min = milliliters per minute; uS/cm = microsiemens per centimeter; ORP = oxidation reduction potential; VOC = volatile organic compound

ORP measurements recorded in the field have been corrected and are also reported against the standard hydrogen electrode (SHE) applying the following formula:

$ORP_{(sample)} = ORP_{(field)} + CF$; CF = Eh(Zobell's-theor) - Eh(Zobell's-ref.) ; Eh(Zobell's-theor) = 430 - 2.3(T-25) - 0.0038(T-25)2 ; Eh(Zobell's-ref.) = -1.3(T)+260.5

Appendix F
Laboratory Reports

Because of the large file size, this Appendix will be distributed on CDs with the hard copies.

Appendix G
Data Quality Evaluation

Data Quality Evaluation Report

This report contains the Data Quality Evaluation for soil, water, and waste samples collected as part of the site characterization of the Banana Patch property in Oahu, Hawaii, for the Honolulu Authority for Rapid Transportation (HART) in support of the Honolulu Rail Transit Project (HRTP). The report evaluates whether the analytical data obtained in the investigation are of sufficient quality and quantity to accomplish the project objectives.

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Contents

Tables

Abbreviations and Acronyms

Accutest	Accutest Laboratory Inc., San Jose, California
DL	Detection limit
FD	field duplicate
HART	Honolulu Authority for Rapid Transportation
HDOH	State of Hawaii Department of Health
HRTP	Honolulu Rail Transit Project
IS	Incremental Sampling
LCS	laboratory control sample
MS	matrix spike
MSD	matrix spike duplicate
PAH	polynuclear aromatic hydrocarbons
PARCC	precision, accuracy, representativeness, completeness and comparability
PCB	polychlorinated biphenyl
QA	quality assurance
QC	quality control
RL	reporting limit
RSD	relative standard deviation
SDG	sample delivery group
SVOC	semi-volatile organic compounds
TCLP	toxicity characteristic leaching procedure
TPH-d	total petroleum hydrocarbons, diesel-range organics
TPH-g	total petroleum hydrocarbons, gasoline-range organics
TPH-o	total petroleum hydrocarbons, oil-range organics
Work Plan	*Site Characterization for Banana Patch Property, Pearl City, Oahu, Hawaii*
USEPA	*U.S. Environmental Protection Agency*
VOC	volatile organic compounds

1.0 Introduction

This Data Quality Evaluation Report contains an assessment of the quality and usability of analytical data from environmental soil, water, and waste samples collected at the Banana Patch property in Oahu, Hawaii, for the Honolulu Authority for Rapid Transportation (HART) in support of the Honolulu Rail Transit Project (HRTP).

The analytical work was conducted in accordance with the project-specific *Site Characterization for Banana Patch Property, Pearl City, Oahu, Hawaii (*Work Plan*)* (CH2M HILL, 2014). This Work Plan contains all aspects of the project activities.

1.1 Analytical Laboratories

Accutest Laboratory Inc., San Jose, California (Accutest) was the laboratory performing all sample analyses except for the analysis of herbicides, which was subcontracted to the Accutest Laboratory in southern Florida.

1.2 Analytical Methods

After collection, the samples were packed and shipped by overnight carrier to Accutest for analysis. The following methods were used for sample analysis:

- Total petroleum hydrocarbons, diesel-range organics (TPH-d) by U.S. Environmental Protection Agency (USEPA) Method SW8015D
- Total petroleum hydrocarbons, oil-range organics (TPH-o) by USEPA Method SW8015D
- Total petroleum hydrocarbons, gasoline-range organics (TPH-g) by USEPA Method SW8260C
- Volatile organic compounds (VOCs) by USEPA Method SW8260C
- Organochlorine pesticides by USEPA Method SW8081A
- Herbicides by USEPA Method SW8151A
- Polychlorinated biphenyls (PCBs) by USEPA method SW8082
- Polynuclear aromatic hydrocarbons (PAHs) by USEPA Method SW8270-SIM
- Metals by USEPA Methods SW6010B or SW6020
- Mercury by USEPA Methods SW7470A or SW7471A

Eight sample delivery groups (SDG) were evaluated for data quality. Table 1 provides a listing of the SDGs, sample identifications, and collection and analysis chronology associated with the project samples.

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2.0 Field Sample Collection

This fieldwork was conducted between May 17, 2014, and June 5, 2014. Using Incremental Sampling (IS) techniques, 29 soil samples were collected with three sets of field duplicates (FD) and triplicate quality assurance/quality control (QA/QC) samples. There were also 14 discreet soil samples. There were 17 soil samples analyzed for toxicity characteristic leaching procedure (TCLP) parameters. There were 12 water samples, with one water FD.

All soil samples collected using the IS approach were collected in accordance with the guidance provided in the State of Hawaii Department of Health (HDOH) *Technical Guidance Manual for the Implementation of the Hawai'i State Contingency Plan* (HDOH, 2009).

Matrix spike/matrix spike duplicates (MS/MSDs) were collected and analyzed in accordance with the Work Plan, with 9 soil MS/MSDs and two water MS/MSDs. Equipment blanks were collected only when all disposable or dedicated equipment was not used. Table 2 includes a summary of the field samples collected by date.

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3.0 Data Review and Validation Process

3.1 Data Validation Definition

All analytical data from this investigation were evaluated as described in the Work Plan, and 100 percent of definitive analytical results were validated. The assessment of definitive data includes a review of the following laboratory summary forms as defined in the Work Plan:

- The chain-of-custody documentation
- Holding time
- Surrogate spikes
- Method blanks and field blanks
- Laboratory control samples (LCS)
- MS/MSDs
- FD precision and IS precision
- Case narrative review and other method-specific criteria

3.2 Overall Data Validation Findings

An overall summary of definitive data sample results and the reasons each were flagged is presented in Table 3. The information in Table 3 is presented so that each flag applied to a method/matrix/analyte is shown. In addition, a statistical evaluation of the results are provided so that the percentage of results impacted by a specific data quality condition or flag, with respect to the total results available for any target analyte/matrix, is shown. Only out-of-control conditions noted during the data validation are discussed in Table 3 and in the following subsections.

3.3 Results Detected Between the Detection Limit and Reporting Limit

Analytes that were detected at concentrations greater than the detection limit (DL), but less than the reporting limit (RL), were qualified as “J” per the Work Plan to reflect the uncertainty associated with concentrations of analytical data between the DL and the RL. Non-detected sample results were reported to the DL.

3.4 Holding Time

There were 14 soil samples analyzed for TPH-d and TPH-o that exceeded the extraction holding time by 1 to 2 days each. All results were detections and are considered to be estimated concentrations, flagged “J.” Table 4 shows the out of control results of holding time.

3.5 Matrix Spike and Matrix Spike Duplicates

There were a number of MS/MSD recovery or precision issues that required sample data qualification. The out of control results reflect both high and low bias depending on the sample. The samples include VOCs, semi-volatile organic compounds (SVOCs), pesticides, herbicides, PCB, and metals. There are out-of-control MS/MSD recoveries; however, results were not qualified because the sample concentration was significantly greater than the spike concentration and sample results were not qualified. Table 5 shows the out-of-control results of MS/MSDs where results are qualified as estimated concentrations and flagged “J” or “UJ.”

3.6 Surrogate Spikes

The surrogate spikes for a number of pesticide and SVOC samples were out of control. All out-of-control surrogate results were bias high, only detected results were flagged with a "J." When surrogate spikes are out of control, re-analysis of the samples was performed to confirm the condition. In some cases, samples may have been diluted to the point where accurate recovery of surrogates was not possible. When this occurred, no flag was applied to the results. Table 6 includes data qualified because of out-of-control surrogate recovery.

3.7 Laboratory Control Samples

LCSs were in control overall. There were a number of SVOC and VOC compounds in soil samples qualified as estimated concentrations due to out-of-control LCSs. These results were flagged with a "J" for detected results and "UJ" for nondetected results.

When an LCS was out of control with a high bias and the associated sample result did not detect that compound, results were not flagged. All results qualified from LCS failure are shown in Table 7.

3.8 Confirmation Precision

If sample results for pesticides or herbicides exceeded a 40 percent difference between the primary column and the confirmation column, results were qualified as estimated concentrations and flagged J. All results qualified from confirmation precision are shown in Table 7.

Also shown in Table 7 are the out-of-control results of the relative standard deviation (RSD) between IS collections of FDs and triplicates sets. Of the three sets collected, almost all results showed RSDs of less than 35 percent. The IS RSD chart below presents IS results where the RSD was greater than 35 percent. Data were flagged only when the RSD exceeded 50 percent, possibly representing soil/sediment heterogeneities, uneven distribution of specific chemical constituents, or both. The flagged results of lead and pentachlorophenol are shown in Table 7.

IS Relative Standard Deviation

Analyte	FASC-DU4A-0514	FASC-DU204A-0514	FASC-DU304A-0514	**%RSD**
4,4'-DDT	53.8	38.6	80.8	37
Pyrene	180	353	192	40
Pentachlorophenol	1.9	9.7	21	88
Analyte	FASC-DU6A-0514	FASC-DU206A-0514	FASC-DU306A-0514	**%RSD**
Lead	118	227	74.5	56
Analyte	SBSD-DU9-0514	SBSD-DU209-0514	SBSD-DU309-0514	**%RSD**
Lead	45.1	12.1	11.9	83
Phenanthrene	56	27.2	32.7	40

Note: Replicate samples were collected within the shallow sampling interval/sampling unit within DU4 (0 to 0.5 feet bgs), DU6 (0 to 5 feet bgs), and DU9 (0 to 0.5 feet bgs).

3.9 Blank Contamination

The laboratory and field blanks were generally free of contamination at concentrations greater than the RL. In some cases, contaminant concentrations less than the RL were noted but no flag was applied. Due to blank contamination greater than the RL, 12 heptachlor results in water samples were qualified and flagged

"B." Table 9 presents the qualified results. Overall, the analytes detected in blanks were consistent with normal laboratory and field operations and do not negatively impact the use of the data for project objectives.

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4.0 Summary of Precision, Accuracy, Representativeness, Comparability, and Completeness

The quality of the field sampling efforts and laboratory results were evaluated for compliance with project data quality objectives through a review of overall precision, accuracy, representativeness, comparability, and completeness (PARCC). Procedures used to assess PARCC are in accordance with the respective analytical methods and the Work Plan requirements.

4.1 Precision

Matrix precision from MS/MSDs was in control overall. Matrix precision is also evaluated through the results of discreet FDs and IS FD and triplicate sample collection. The precision results of discreet FDs are in control while the IS FD and triplicate samples are in control overall.

Laboratory precision is acceptable as shown by the repeated overall in-control performance (accuracy) of the LCSs. The method and matrix precision are acceptable overall.

4.2 Accuracy

Matrix accuracy from MS/MSDs have some out of control results but overall are in control. The accuracy of LCSs are in control overall. Calibrations were in control. The laboratory and matrix accuracy are acceptable overall.

4.3 Representativeness

Sample data are representative of the site conditions at the time of sample collection. All samples were properly stored and preserved. Analytical data are reported from an analysis within the project-specified hold-time. The results of laboratory and field blanks were generally at concentrations less than the RLs.

4.4 Appropriateness of Reporting limits

This project was designed to allow risk-based decisions to be made based on the results of common USEPA-approved analytical methodologies. Detection limits achieved are the best possible based on sample variables.

4.5 Comparability

All samples were reported in industry-standard units. Analytical protocols for the methods were followed. Results obtained are comparable to industry standards in that collection and analytical techniques followed approved, documented procedures.

4.6 Completeness

All results are usable for project objectives. The completeness objective of 90 percent for soil and 95 percent for water was met. Project completeness data are summarized in Table 10.

4.7 Conclusions

The data generated from sample analyses are of sufficient quality and quantity necessary for accomplishing project objectives. Sample results accurately indicate the presence and/or absence of target analyte contamination at sampled locations. Samples were collected and analyzed as specified in the project Work Plan.

Sample results are believed to be representative of site conditions at the time of collection. Results obtained are comparable to industry standards in that collection and analytical techniques followed approved, documented procedures. All results are reported in industry standard units. The results of laboratory and field blanks were generally at concentrations less than the RLs. The results obtained for associated sample/analyses reflect the best achievable data for the site-specific conditions.

5.0 References

CH2M HILL. 2014. *Site Characterization for Banana Patch Property, Pearl City, Oahu, Hawaii.* May.

State of Hawaii Department of Health (HDOH). 2009 (and subsequent updates). *Technical Guidance Manual for the Implementation of the Hawai'i State Contingency Plan*. November.

U.S. Environmental Protection Agency (USEPA). 1997. *SW-846 Test Methods for Evaluating Solid Waste, Latest Update*. June.

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TABLE 1

Sample Chronology – Data Summary

Laboratory	SDG	Sample ID	Method	Sample Date	Receive Date	Extract Date	Analysis Date
ACTS	ACTO_C3416	FASC-DU3A-0514	SW8151A	5/19/2014	5/22/2014	5/29/2014	6/3/2014
		FASC-DU3B-0514	SW8151A	5/19/2014	5/22/2014	5/29/2014	6/3/2014
		FASC-DU3C-0514	SW8151A	5/19/2014	5/22/2014	5/29/2014	6/2/2014
		SBSD-DU10-0514	SW8151A	5/17/2014	5/22/2014	5/29/2014	6/2/2014
		SBSD-DU209-0514	SW8151A	5/20/2014	5/22/2014	5/29/2014	6/2/2014
		SBSD-DU309-0514	SW8151A	5/20/2014	5/22/2014	5/29/2014	6/2/2014
		SBSD-DU8-0514	SW8151A	5/17/2014	5/22/2014	5/29/2014	6/2/2014
		SBSD-DU9-0514	SW8151A	5/20/2014	5/22/2014	5/29/2014	6/2/2014
	ACTO_C3420	FASC-DU206A-0514	SW8151A	5/20/2014	5/23/2014	5/29/2014	6/3/2014
		FASC-DU306A-0514	SW8151A	5/20/2014	5/23/2014	5/29/2014	6/3/2014
		FASC-DU6A-0514	SW8151A	5/20/2014	5/23/2014	5/29/2014	6/3/2014
		FASC-DU6B-0514	SW8151A	5/20/2014	5/23/2014	5/29/2014	6/3/2014
		FASC-DU6C-0514	SW8151A	5/20/2014	5/23/2014	5/29/2014	6/3/2014
		FASC-DU6D-0514	SW8151A	5/20/2014	5/23/2014	5/29/2014	6/3/2014
	ACTO_C3422	FASC-DU1NA-0514	SW8151A	5/23/2014	5/24/2014	6/2/2014	6/4/2014
		FASC-DU1SA-0514	SW8151A	5/22/2014	5/24/2014	6/2/2014	6/4/2014
		FASC-DU1SB-0514	SW8151A	5/22/2014	5/24/2014	6/2/2014	6/4/2014
		FASC-DU204A-0514	SW8151A	5/23/2014	5/24/2014	6/2/2014	6/4/2014
		FASC-DU304A-0514	SW8151A	5/23/2014	5/24/2014	6/2/2014	6/4/2014
		FASC-DU4A-0514	SW8151A	5/23/2014	5/24/2014	6/2/2014	6/4/2014
		FASC-DU5A-0514	SW8151A	5/21/2014	5/24/2014	6/2/2014	6/4/2014
		FASC-DU5A-0514MS	SW8151A	6/2/2014	6/2/2014	6/2/2014	6/4/2014
		FASC-DU5A-0514SD	SW8151A	6/2/2014	6/2/2014	6/2/2014	6/4/2014
		FASC-DU5B-0514	SW8151A	5/21/2014	5/24/2014	6/2/2014	6/4/2014
		FASC-DU5C-0514	SW8151A	5/21/2014	5/24/2014	6/2/2014	6/4/2014
		FASC-DU5D-0514	SW8151A	5/21/2014	5/24/2014	6/2/2014	6/4/2014
	ACTO_C3425	FADS-DU6D1-0514	SW8151A	5/23/2014	5/28/2014	6/2/2014	6/4/2014
		FADS-DUD2-0514	SW8151A	5/23/2014	5/28/2014	6/2/2014	6/4/2014
	ACTO_C3425	FASC-DU2A-0514	SW8151A	5/22/2014	5/28/2014	6/2/2014	6/4/2014
		FASC-DU2B-0514	SW8151A	5/22/2014	5/28/2014	6/2/2014	6/4/2014
		FASC-DU2C-0514	SW8151A	5/22/2014	5/28/2014	6/2/2014	6/4/2014
	ACTO_C3431	BKSC-DU7-0514	SW8151A	5/28/2014	5/30/2014	6/5/2014	6/6/2014
		FADS-DU6D3-0514	SW8151A	5/28/2014	5/30/2014	6/5/2014	6/6/2014
		FASC-DU1NB-0514	SW8151A	5/28/2014	5/30/2014	6/5/2014	6/6/2014
		FASC-DU1NC-0514	SW8151A	5/28/2014	5/30/2014	6/5/2014	6/6/2014

TABLE 1

Sample Chronology – Data Summary

Laboratory	SDG	Sample ID	Method	Sample Date	Receive Date	Extract Date	Analysis Date
ACTS	ACTO_C3431	FASC-DU1NC-0514MS	SW8151A	6/5/2014	6/5/2014	6/5/2014	6/6/2014
		FASC-DU1NC-0514SD	SW8151A	6/5/2014	6/5/2014	6/5/2014	6/6/2014
		FASC-DU1SC-0514	SW8151A	5/28/2014	5/30/2014	6/5/2014	6/6/2014
	ACTO_C3437	FASC-TW002-0514	SW8151A	5/30/2014	6/3/2014	6/5/2014	6/6/2014
		FASC-TW003-0514	SW8151A	5/30/2014	6/3/2014	6/5/2014	6/6/2014
		FASC-TW004-0514	SW8151A	6/2/2014	6/3/2014	6/5/2014	6/6/2014
		FASC-TW005-0514	SW8151A	5/30/2014	6/3/2014	6/5/2014	6/6/2014
		FASC-TW006-0514	SW8151A	5/30/2014	6/3/2014	6/5/2014	6/6/2014
		FASC-TW007-0514	SW8151A	5/30/2014	6/3/2014	6/5/2014	6/6/2014
		FASC-TW008-0514	SW8151A	5/30/2014	6/3/2014	6/5/2014	6/6/2014
		FASC-TW010-0514	SW8151A	6/2/2014	6/3/2014	6/5/2014	6/6/2014
		FASC-TW012-0514	SW8151A	5/30/2014	6/3/2014	6/5/2014	6/6/2014
	ACTO_C3437	FASC-TW001-0514	SW8151A	5/29/2014	6/3/2014	6/5/2014	6/6/2014
		FASC-TW001-0514MS	SW8151A	6/5/2014	6/5/2014	6/5/2014	6/6/2014
		FASC-TW001-0514SD	SW8151A	6/5/2014	6/5/2014	6/5/2014	6/6/2014
		FASC-TW009-0514	SW8151A	5/29/2014	6/3/2014	6/5/2014	6/6/2014
		FASC-TW011-0514	SW8151A	5/29/2014	6/3/2014	6/5/2014	6/6/2014
		FASC-TW111-0514	SW8151A	5/29/2014	6/3/2014	6/5/2014	6/6/2014
	ACTO_C3443	FASC-TW004-EB-0614	SW8151A	6/3/2014	6/6/2014	6/9/2014	6/10/2014
		FASC-TW004-EB-0614EBMS	SW8151A	6/9/2014	6/9/2014	6/9/2014	6/10/2014
		FASC-TW004-EB-0614EBSD	SW8151A	6/9/2014	6/9/2014	6/9/2014	6/10/2014
	ACTS_C3416	FASC-DU3A-0514	D2216	5/19/2014	5/22/2014		5/29/2014
		FASC-DU3A-0514	SW6010C	5/19/2014	5/22/2014	5/30/2014	5/31/2014
		FASC-DU3A-0514	SW7471A	5/19/2014	5/22/2014	5/31/2014	5/31/2014
		FASC-DU3A-0514	SW8015D	5/19/2014	5/22/2014	5/27/2014	5/28/2014
		FASC-DU3A-0514	SW8081A	5/19/2014	5/22/2014	5/27/2014	5/27/2014
		FASC-DU3A-0514	SW8082	5/19/2014	5/22/2014	5/27/2014	5/28/2014
		FASC-DU3A-0514	SW8270D	5/19/2014	5/22/2014	5/27/2014	5/28/2014
		FASC-DU3A-0514MS	SW6010C	5/30/2014	5/30/2014	5/30/2014	5/31/2014
		FASC-DU3A-0514MS	SW7471A	5/30/2014	5/31/2014	5/31/2014	5/31/2014
		FASC-DU3A-0514SD	SW6010C	5/30/2014	5/30/2014	5/30/2014	5/31/2014
		FASC-DU3A-0514SD	SW7471A	5/30/2014	5/31/2014	5/31/2014	5/31/2014
		FASC-DU3B-0514	D2216	5/19/2014	5/22/2014		5/28/2014
		FASC-DU3B-0514	D2216	5/19/2014	5/28/2014		5/28/2014
		FASC-DU3B-0514	SW6010C	5/19/2014	5/22/2014	5/30/2014	5/31/2014

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Sample Chronology – Data Summary

Laboratory	SDG	Sample ID	Method	Sample Date	Receive Date	Extract Date	Analysis Date
ACTS	ACTS_C3416	FASC-DU3B-0514	SW7471A	5/19/2014	5/22/2014	5/31/2014	5/31/2014
		FASC-DU3B-0514	SW8015D	5/19/2014	5/22/2014	5/27/2014	5/28/2014
		FASC-DU3B-0514	SW8081A	5/19/2014	5/22/2014	5/27/2014	5/27/2014
		FASC-DU3B-0514	SW8082	5/19/2014	5/22/2014	5/27/2014	5/28/2014
		FASC-DU3B-0514	SW8260C	5/19/2014	5/22/2014		5/28/2014
		FASC-DU3B-0514	SW8270D	5/19/2014	5/22/2014	5/27/2014	5/28/2014
		FASC-DU3C-0514	D2216	5/19/2014	5/22/2014		5/28/2014
		FASC-DU3C-0514	SW6010C	5/19/2014	5/22/2014	5/30/2014	5/31/2014
		FASC-DU3C-0514	SW7471A	5/19/2014	5/22/2014	5/31/2014	5/31/2014
		FASC-DU3C-0514	SW8015D	5/19/2014	5/22/2014	5/27/2014	5/28/2014
		FASC-DU3C-0514	SW8081A	5/19/2014	5/22/2014	5/27/2014	5/27/2014
		FASC-DU3C-0514	SW8082	5/19/2014	5/22/2014	5/27/2014	5/28/2014
		FASC-DU3C-0514	SW8260C	5/19/2014	5/22/2014		5/28/2014
		FASC-DU3C-0514	SW8270D	5/19/2014	5/22/2014	5/27/2014	5/28/2014
		SBSD-DU10-0514	D2216	5/17/2014	5/22/2014		5/29/2014
		SBSD-DU10-0514	SW6010C	5/17/2014	5/22/2014	5/30/2014	5/31/2014
		SBSD-DU10-0514	SW7471A	5/17/2014	5/22/2014	5/31/2014	5/31/2014
		SBSD-DU10-0514	SW8015D	5/17/2014	5/22/2014	5/27/2014	5/29/2014
		SBSD-DU10-0514	SW8081A	5/17/2014	5/22/2014	5/27/2014	5/27/2014
		SBSD-DU10-0514	SW8082	5/17/2014	5/22/2014	5/27/2014	5/28/2014
		SBSD-DU10-0514	SW8270D	5/17/2014	5/22/2014	5/27/2014	5/28/2014
		SBSD-DU209-0514	D2216	5/20/2014	5/22/2014		5/29/2014
		SBSD-DU209-0514	SW6010C	5/20/2014	5/22/2014	5/30/2014	5/31/2014
		SBSD-DU209-0514	SW7471A	5/20/2014	5/22/2014	5/31/2014	5/31/2014
		SBSD-DU209-0514	SW8015D	5/20/2014	5/22/2014	5/27/2014	5/28/2014
		SBSD-DU209-0514	SW8081A	5/20/2014	5/22/2014	5/27/2014	5/27/2014
		SBSD-DU209-0514	SW8082	5/20/2014	5/22/2014	5/27/2014	5/28/2014
		SBSD-DU209-0514	SW8270D	5/20/2014	5/22/2014	5/27/2014	5/28/2014
		SBSD-DU309-0514	D2216	5/20/2014	5/22/2014		5/29/2014
		SBSD-DU309-0514	D2216	5/20/2014	5/29/2014		5/29/2014
		SBSD-DU309-0514	SW6010C	5/20/2014	5/22/2014	5/30/2014	5/31/2014
		SBSD-DU309-0514	SW7471A	5/20/2014	5/22/2014	5/31/2014	5/31/2014
		SBSD-DU309-0514	SW8015D	5/20/2014	5/22/2014	5/27/2014	5/29/2014
		SBSD-DU309-0514	SW8081A	5/20/2014	5/22/2014	5/27/2014	5/27/2014
		SBSD-DU309-0514	SW8082	5/20/2014	5/22/2014	5/27/2014	5/28/2014

TABLE 1

Sample Chronology – Data Summary

Laboratory	SDG	Sample ID	Method	Sample Date	Receive Date	Extract Date	Analysis Date
ACTS	ACTS_C3416	SBSD-DU309-0514	SW8270D	5/20/2014	5/22/2014	5/27/2014	5/28/2014
		SBSD-DU8-0514	D2216	5/17/2014	5/22/2014		5/29/2014
		SBSD-DU8-0514	SW6010C	5/17/2014	5/22/2014	5/30/2014	5/31/2014
		SBSD-DU8-0514	SW7471A	5/17/2014	5/22/2014	5/31/2014	5/31/2014
		SBSD-DU8-0514	SW8015D	5/17/2014	5/22/2014	5/27/2014	5/28/2014
		SBSD-DU8-0514	SW8081A	5/17/2014	5/22/2014	5/27/2014	5/27/2014
		SBSD-DU8-0514	SW8082	5/17/2014	5/22/2014	5/27/2014	5/28/2014
		SBSD-DU8-0514	SW8270D	5/17/2014	5/22/2014	5/27/2014	5/28/2014
		SBSD-DU9-0514	D2216	5/20/2014	5/22/2014		5/29/2014
		SBSD-DU9-0514	SW6010C	5/20/2014	5/22/2014	5/30/2014	5/31/2014
		SBSD-DU9-0514	SW7471A	5/20/2014	5/22/2014	5/31/2014	5/31/2014
		SBSD-DU9-0514	SW8015D	5/20/2014	5/22/2014	5/27/2014	5/28/2014
		SBSD-DU9-0514	SW8081A	5/20/2014	5/22/2014	5/27/2014	5/27/2014
		SBSD-DU9-0514	SW8082	5/20/2014	5/22/2014	5/27/2014	5/28/2014
		SBSD-DU9-0514	SW8270D	5/20/2014	5/22/2014	5/27/2014	5/28/2014
	ACTS_C3416	FASC-DU3A-0514	SW6010C	5/19/2014	5/22/2014	6/6/2014	6/9/2014
		FASC-DU3B-0514	SW6010C	5/19/2014	5/22/2014	6/6/2014	6/9/2014
		SBSD-DU10-0514	SW6010C	5/17/2014	5/22/2014	6/6/2014	6/9/2014
		SBSD-DU9-0514	SW6010C	5/20/2014	5/22/2014	6/6/2014	6/9/2014
	ACTS_C3420	FASC-DU206A-0514	D2216	5/20/2014	5/23/2014		5/29/2014
		FASC-DU206A-0514	SW6010C	5/20/2014	5/23/2014	5/30/2014	5/31/2014
		FASC-DU206A-0514	SW7471A	5/20/2014	5/23/2014	5/31/2014	5/31/2014
		FASC-DU206A-0514	SW8015D	5/20/2014	5/23/2014	5/28/2014	5/30/2014
		FASC-DU206A-0514	SW8081A	5/20/2014	5/23/2014	5/28/2014	5/28/2014
		FASC-DU206A-0514	SW8082	5/20/2014	5/23/2014	5/28/2014	5/29/2014
		FASC-DU206A-0514	SW8260C	5/20/2014	5/23/2014		5/29/2014
		FASC-DU206A-0514	SW8270D	5/20/2014	5/23/2014	5/28/2014	5/28/2014
		FASC-DU306A-0514	D2216	5/20/2014	5/23/2014		5/29/2014
		FASC-DU306A-0514	SW6010C	5/20/2014	5/23/2014	5/30/2014	5/31/2014
		FASC-DU306A-0514	SW7471A	5/20/2014	5/23/2014	5/31/2014	5/31/2014
		FASC-DU306A-0514	SW8015D	5/20/2014	5/23/2014	5/28/2014	5/30/2014
		FASC-DU306A-0514	SW8081A	5/20/2014	5/23/2014	5/28/2014	5/28/2014
		FASC-DU306A-0514	SW8082	5/20/2014	5/23/2014	5/28/2014	5/29/2014
		FASC-DU306A-0514	SW8260C	5/20/2014	5/23/2014		5/29/2014
		FASC-DU306A-0514	SW8270D	5/20/2014	5/23/2014	5/28/2014	5/28/2014

TABLE 1

Sample Chronology – Data Summary

Laboratory	SDG	Sample ID	Method	Sample Date	Receive Date	Extract Date	Analysis Date
ACTS	ACTS_C3420	FASC-DU6A-0514	D2216	5/20/2014	5/23/2014		5/28/2014
		FASC-DU6A-0514	SW6010C	5/20/2014	5/23/2014	5/30/2014	5/31/2014
		FASC-DU6A-0514	SW7471A	5/20/2014	5/23/2014	5/31/2014	5/31/2014
		FASC-DU6A-0514	SW8015D	5/20/2014	5/23/2014	5/28/2014	5/30/2014
		FASC-DU6A-0514	SW8081A	5/20/2014	5/23/2014	5/28/2014	5/28/2014
		FASC-DU6A-0514	SW8082	5/20/2014	5/23/2014	5/28/2014	5/29/2014
		FASC-DU6A-0514	SW8260C	5/20/2014	5/23/2014		5/29/2014
		FASC-DU6A-0514	SW8270D	5/20/2014	5/23/2014	5/28/2014	5/28/2014
		FASC-DU6B-0514	D2216	5/20/2014	5/23/2014		5/29/2014
		FASC-DU6B-0514	SW6010C	5/20/2014	5/23/2014	5/30/2014	5/31/2014
		FASC-DU6B-0514	SW7471A	5/20/2014	5/23/2014	5/31/2014	5/31/2014
		FASC-DU6B-0514	SW8015D	5/20/2014	5/23/2014	5/28/2014	5/30/2014
		FASC-DU6B-0514	SW8081A	5/20/2014	5/23/2014	5/28/2014	5/28/2014
		FASC-DU6B-0514	SW8082	5/20/2014	5/23/2014	5/28/2014	5/29/2014
		FASC-DU6B-0514	SW8260C	5/20/2014	5/23/2014		5/29/2014
		FASC-DU6B-0514	SW8270D	5/20/2014	5/23/2014	5/28/2014	5/28/2014
		FASC-DU6C-0514	D2216	5/20/2014	5/23/2014		5/29/2014
		FASC-DU6C-0514	SW6010C	5/20/2014	5/23/2014	5/30/2014	5/31/2014
		FASC-DU6C-0514	SW7471A	5/20/2014	5/23/2014	5/31/2014	5/31/2014
		FASC-DU6C-0514	SW8015D	5/20/2014	5/23/2014	5/28/2014	5/30/2014
		FASC-DU6C-0514	SW8081A	5/20/2014	5/23/2014	5/28/2014	5/28/2014
		FASC-DU6C-0514	SW8082	5/20/2014	5/23/2014	5/28/2014	5/29/2014
		FASC-DU6C-0514	SW8260C	5/20/2014	5/23/2014		5/29/2014
		FASC-DU6C-0514	SW8270D	5/20/2014	5/23/2014	5/28/2014	5/28/2014
		FASC-DU6D-0514	D2216	5/20/2014	5/23/2014		5/29/2014
		FASC-DU6D-0514	SW6010C	5/20/2014	5/23/2014	5/30/2014	5/31/2014
		FASC-DU6D-0514	SW7471A	5/20/2014	5/23/2014	5/31/2014	5/31/2014
		FASC-DU6D-0514	SW8015D	5/20/2014	5/23/2014	5/28/2014	5/31/2014
		FASC-DU6D-0514	SW8081A	5/20/2014	5/23/2014	5/28/2014	5/28/2014
		FASC-DU6D-0514	SW8082	5/20/2014	5/23/2014	5/28/2014	5/29/2014
		FASC-DU6D-0514	SW8260C	5/20/2014	5/23/2014		5/29/2014
		FASC-DU6D-0514	SW8270D	5/20/2014	5/23/2014	5/28/2014	5/28/2014
		FASC-LNAPL01-0514	SW8015D	5/21/2014	5/23/2014	5/27/2014	5/28/2014
		FASC-LNAPL01-0514	SW8260C	5/21/2014	5/23/2014		5/27/2014
	ACTS_C3420	FAWC-DU60106AB-0514	D2216	5/20/2014	5/23/2014		6/5/2014

TABLE 1

Sample Chronology – Data Summary

Laboratory	SDG	Sample ID	Method	Sample Date	Receive Date	Extract Date	Analysis Date
ACTS	ACTS_C3420	FAWC-DU60106AB-0514	D2216	5/20/2014	6/5/2014		6/5/2014
		FAWC-DU60106AB-0514	SW8015D	5/20/2014	5/23/2014	6/5/2014	6/5/2014
		FAWC-DU60106C-0514	D2216	5/20/2014	5/23/2014		6/5/2014
		FAWC-DU60106C-0514	SW8015D	5/20/2014	5/23/2014	6/5/2014	6/5/2014
		FAWC-DU60712AB-0514	D2216	5/20/2014	5/23/2014		6/5/2014
		FAWC-DU60712AB-0514	SW8015D	5/20/2014	5/23/2014	6/5/2014	6/5/2014
		FAWC-DU60712C-0514	D2216	5/20/2014	5/23/2014		6/5/2014
		FAWC-DU60712C-0514	SW8015D	5/20/2014	5/23/2014	6/5/2014	6/5/2014
		FAWC-DU60712C-0514MS	SW8015D	5/20/2014	6/5/2014	6/5/2014	6/5/2014
		FAWC-DU60712C-0514SD	SW8015D	5/20/2014	6/5/2014	6/5/2014	6/5/2014
	ACTS_C3420	FASC-DU6A-0514	SW6010C	5/20/2014	5/23/2014	6/6/2014	6/10/2014
		FASC-DU6B-0514	SW6010C	5/20/2014	5/23/2014	6/6/2014	6/10/2014
		FASC-DU6D-0514	SW6010C	5/20/2014	5/23/2014	6/6/2014	6/10/2014
	ACTS_C3422	FASC-DU1NA-0514	D2216	5/23/2014	5/24/2014		6/2/2014
		FASC-DU1NA-0514	SW6010C	5/23/2014	5/24/2014	6/2/2014	6/3/2014
		FASC-DU1NA-0514	SW7471A	5/23/2014	5/24/2014	5/31/2014	5/31/2014
		FASC-DU1NA-0514	SW8015D	5/23/2014	5/24/2014	5/29/2014	6/3/2014
		FASC-DU1NA-0514	SW8081A	5/23/2014	5/24/2014	5/30/2014	6/3/2014
		FASC-DU1NA-0514	SW8082	5/23/2014	5/24/2014	5/30/2014	6/3/2014
		FASC-DU1NA-0514	SW8270D	5/23/2014	5/24/2014	5/29/2014	5/30/2014
		FASC-DU1SA-0514	D2216	5/22/2014	5/24/2014		6/2/2014
		FASC-DU1SA-0514	SW6010C	5/22/2014	5/24/2014	6/2/2014	6/3/2014
		FASC-DU1SA-0514	SW7471A	5/22/2014	5/24/2014	5/31/2014	5/31/2014
		FASC-DU1SA-0514	SW8015D	5/22/2014	5/24/2014	5/29/2014	6/3/2014
		FASC-DU1SA-0514	SW8081A	5/22/2014	5/24/2014	5/30/2014	6/3/2014
		FASC-DU1SA-0514	SW8082	5/22/2014	5/24/2014	5/30/2014	6/3/2014
		FASC-DU1SA-0514	SW8270D	5/22/2014	5/24/2014	5/29/2014	5/30/2014
		FASC-DU1SA-0514MS	SW8081A	5/30/2014	5/30/2014	5/30/2014	6/3/2014
		FASC-DU1SA-0514SD	SW8081A	5/30/2014	5/30/2014	5/30/2014	6/3/2014
		FASC-DU1SB-0514	D2216	5/22/2014	5/24/2014		6/2/2014
		FASC-DU1SB-0514	SW6010C	5/22/2014	5/24/2014	6/2/2014	6/3/2014
		FASC-DU1SB-0514	SW7471A	5/22/2014	5/24/2014	5/31/2014	5/31/2014
		FASC-DU1SB-0514	SW8015D	5/22/2014	5/24/2014	5/29/2014	6/3/2014
		FASC-DU1SB-0514	SW8081A	5/22/2014	5/24/2014	5/30/2014	6/3/2014
		FASC-DU1SB-0514	SW8082	5/22/2014	5/24/2014	5/30/2014	6/3/2014

TABLE 1

Sample Chronology – Data Summary

Laboratory	SDG	Sample ID	Method	Sample Date	Receive Date	Extract Date	Analysis Date
ACTS	ACTS_C3422	FASC-DU1SB-0514	SW8260C	5/22/2014	5/24/2014		5/31/2014
		FASC-DU1SB-0514	SW8270D	5/22/2014	5/24/2014	6/4/2014	6/4/2014
		FASC-DU204A-0514	D2216	5/23/2014	5/24/2014		6/2/2014
		FASC-DU204A-0514	SW6010C	5/23/2014	5/24/2014	6/2/2014	6/3/2014
		FASC-DU204A-0514	SW7471A	5/23/2014	5/24/2014	5/31/2014	5/31/2014
		FASC-DU204A-0514	SW8015D	5/23/2014	5/24/2014	5/29/2014	6/3/2014
		FASC-DU204A-0514	SW8081A	5/23/2014	5/24/2014	5/30/2014	6/3/2014
		FASC-DU204A-0514	SW8082	5/23/2014	5/24/2014	5/30/2014	6/3/2014
		FASC-DU204A-0514	SW8270D	5/23/2014	5/24/2014	5/29/2014	5/30/2014
		FASC-DU304A-0514	D2216	5/23/2014	5/24/2014		6/2/2014
		FASC-DU304A-0514	SW6010C	5/23/2014	5/24/2014	6/2/2014	6/3/2014
		FASC-DU304A-0514	SW7471A	5/23/2014	5/24/2014	5/31/2014	5/31/2014
		FASC-DU304A-0514	SW8015D	5/23/2014	5/24/2014	5/29/2014	6/3/2014
		FASC-DU304A-0514	SW8081A	5/23/2014	5/24/2014	5/30/2014	6/3/2014
		FASC-DU304A-0514	SW8082	5/23/2014	5/24/2014	5/30/2014	6/3/2014
		FASC-DU304A-0514	SW8270D	5/23/2014	5/24/2014	5/29/2014	5/30/2014
		FASC-DU304A-0514MS	SW8082	5/30/2014	5/30/2014	5/30/2014	6/3/2014
		FASC-DU304A-0514SD	SW8082	5/30/2014	5/30/2014	5/30/2014	6/3/2014
		FASC-DU4A-0514	D2216	5/23/2014	5/24/2014		6/2/2014
		FASC-DU4A-0514	SW6010C	5/23/2014	5/24/2014	6/2/2014	6/3/2014
		FASC-DU4A-0514	SW7471A	5/23/2014	5/24/2014	5/31/2014	5/31/2014
		FASC-DU4A-0514	SW8015D	5/23/2014	5/24/2014	5/29/2014	6/3/2014
		FASC-DU4A-0514	SW8081A	5/23/2014	5/24/2014	5/30/2014	6/3/2014
		FASC-DU4A-0514	SW8082	5/23/2014	5/24/2014	5/30/2014	6/3/2014
		FASC-DU4A-0514	SW8270D	5/23/2014	5/24/2014	5/29/2014	5/30/2014
		FASC-DU5A-0514	D2216	5/21/2014	5/24/2014		6/2/2014
		FASC-DU5A-0514	SW6010C	5/21/2014	5/24/2014	6/2/2014	6/3/2014
		FASC-DU5A-0514	SW7471A	5/21/2014	5/24/2014	5/31/2014	5/31/2014
		FASC-DU5A-0514	SW8015D	5/21/2014	5/24/2014	5/29/2014	5/30/2014
		FASC-DU5A-0514	SW8081A	5/21/2014	5/24/2014	5/30/2014	6/3/2014
		FASC-DU5A-0514	SW8082	5/21/2014	5/24/2014	5/30/2014	6/3/2014
		FASC-DU5A-0514	SW8260C	5/21/2014	5/24/2014		5/30/2014
		FASC-DU5A-0514	SW8270D	5/21/2014	5/24/2014	5/29/2014	5/30/2014
		FASC-DU5A-0514MS	SW7471A	5/31/2014	5/31/2014	5/31/2014	5/31/2014
		FASC-DU5A-0514SD	SW7471A	5/31/2014	5/31/2014	5/31/2014	5/31/2014

TABLE 1

Sample Chronology – Data Summary

Laboratory	SDG	Sample ID	Method	Sample Date	Receive Date	Extract Date	Analysis Date
ACTS	ACTS_C3422	FASC-DU5B-0514	D2216	5/21/2014	5/24/2014		6/2/2014
		FASC-DU5B-0514	SW6010C	5/21/2014	5/24/2014	6/2/2014	6/3/2014
		FASC-DU5B-0514	SW7471A	5/21/2014	5/24/2014	5/31/2014	5/31/2014
		FASC-DU5B-0514	SW8015D	5/21/2014	5/24/2014	5/29/2014	6/3/2014
		FASC-DU5B-0514	SW8081A	5/21/2014	5/24/2014	5/30/2014	6/3/2014
		FASC-DU5B-0514	SW8082	5/21/2014	5/24/2014	5/30/2014	6/3/2014
		FASC-DU5B-0514	SW8260C	5/21/2014	5/24/2014		5/30/2014
		FASC-DU5B-0514	SW8270D	5/21/2014	5/24/2014	5/29/2014	5/30/2014
		FASC-DU5C-0514	D2216	5/21/2014	5/24/2014		6/2/2014
		FASC-DU5C-0514	SW6010C	5/21/2014	5/24/2014	6/2/2014	6/3/2014
		FASC-DU5C-0514	SW7471A	5/21/2014	5/24/2014	5/31/2014	5/31/2014
		FASC-DU5C-0514	SW8015D	5/21/2014	5/24/2014	5/29/2014	5/30/2014
		FASC-DU5C-0514	SW8081A	5/21/2014	5/24/2014	5/30/2014	6/3/2014
		FASC-DU5C-0514	SW8082	5/21/2014	5/24/2014	5/30/2014	6/3/2014
		FASC-DU5C-0514	SW8260C	5/21/2014	5/24/2014		5/31/2014
		FASC-DU5C-0514	SW8270D	5/21/2014	5/24/2014	5/29/2014	5/30/2014
		FASC-DU5D-0514	D2216	5/21/2014	5/24/2014		6/2/2014
		FASC-DU5D-0514	SW6010C	5/21/2014	5/24/2014	6/2/2014	6/3/2014
		FASC-DU5D-0514	SW7471A	5/21/2014	5/24/2014	5/31/2014	5/31/2014
		FASC-DU5D-0514	SW8015D	5/21/2014	5/24/2014	5/29/2014	6/3/2014
		FASC-DU5D-0514	SW8081A	5/21/2014	5/24/2014	5/30/2014	6/3/2014
		FASC-DU5D-0514	SW8082	5/21/2014	5/24/2014	5/30/2014	6/3/2014
		FASC-DU5D-0514	SW8260C	5/21/2014	5/24/2014		5/31/2014
		FASC-DU5D-0514	SW8270D	5/21/2014	5/24/2014	5/29/2014	5/30/2014
	ACTS_C3422	FAWC-DU50106AB-0514	D2216	5/21/2014	5/24/2014		6/5/2014
		FAWC-DU50106AB-0514	SW8015D	5/21/2014	5/24/2014	6/5/2014	6/6/2014
		FAWC-DU50106C-0514	D2216	5/21/2014	5/24/2014		6/5/2014
		FAWC-DU50106C-0514	SW8015D	5/21/2014	5/24/2014	6/5/2014	6/6/2014
		FAWC-DU50712AB-0514	D2216	5/21/2014	5/24/2014		6/5/2014
		FAWC-DU50712AB-0514	SW8015D	5/21/2014	5/24/2014	6/5/2014	6/6/2014
		FAWC-DU50712C-0514	D2216	5/21/2014	5/24/2014		6/5/2014
		FAWC-DU50712C-0514	SW8015D	5/21/2014	5/24/2014	6/5/2014	6/6/2014
		FAWC-DU51318AB-0514	D2216	5/21/2014	5/24/2014		6/5/2014
		FAWC-DU51318AB-0514	SW8015D	5/21/2014	5/24/2014	6/5/2014	6/6/2014
		FAWC-DU51318C-0514	D2216	5/21/2014	5/24/2014		6/5/2014

TABLE 1

Sample Chronology – Data Summary

Laboratory	SDG	Sample ID	Method	Sample Date	Receive Date	Extract Date	Analysis Date
ACTS	ACTS_C3422	FAWC-DU51318C-0514	SW8015D	5/21/2014	5/24/2014	6/5/2014	6/6/2014
		FAWC-DU51924AB-0514	D2216	5/21/2014	5/24/2014		6/5/2014
		FAWC-DU51924AB-0514	SW8015D	5/21/2014	5/24/2014	6/5/2014	6/6/2014
		FAWC-DU51924C-0514	D2216	5/21/2014	5/24/2014		6/5/2014
		FAWC-DU51924C-0514	SW8015D	5/21/2014	5/24/2014	6/5/2014	6/6/2014
		FAWC-DU52530AB-0514	D2216	5/21/2014	5/24/2014		6/5/2014
		FAWC-DU52530AB-0514	SW8015D	5/21/2014	5/24/2014	6/5/2014	6/6/2014
		FAWC-DU52530C-0514	D2216	5/21/2014	5/24/2014		6/5/2014
		FAWC-DU52530C-0514	SW8015D	5/21/2014	5/24/2014	6/5/2014	6/6/2014
	ACTS_C3422	FASC-DU1SA-0514	SW6010C	5/22/2014	5/24/2014	6/10/2014	6/11/2014
		FASC-DU1SB-0514	SW6010C	5/22/2014	5/24/2014	6/10/2014	6/11/2014
		FASC-DU4A-0514	SW6010C	5/23/2014	5/24/2014	6/10/2014	6/11/2014
		FASC-DU5A-0514	SW6010C	5/21/2014	5/24/2014	6/6/2014	6/10/2014
		FASC-DU5B-0514	SW6010C	5/21/2014	5/24/2014	6/6/2014	6/10/2014
		FASC-DU5C-0514	SW6010C	5/21/2014	5/24/2014	6/6/2014	6/10/2014
		FASC-DU5D-0514	SW6010C	5/21/2014	5/24/2014	6/6/2014	6/10/2014
	ACTS_C3425	FASC-DU2A-0514	D2216	5/22/2014	5/28/2014		5/29/2014
		FASC-DU2A-0514	SW6010C	5/22/2014	5/28/2014	6/2/2014	6/3/2014
		FASC-DU2A-0514	SW7471A	5/22/2014	5/28/2014	6/2/2014	6/3/2014
		FASC-DU2A-0514	SW8015D	5/22/2014	5/28/2014	5/30/2014	5/31/2014
		FASC-DU2A-0514	SW8081A	5/22/2014	5/28/2014	5/30/2014	6/2/2014
		FASC-DU2A-0514	SW8082	5/22/2014	5/28/2014	5/30/2014	6/2/2014
		FASC-DU2A-0514	SW8270D	5/22/2014	5/28/2014	6/2/2014	6/2/2014
		FASC-DU2B-0514	SW6010C	5/22/2014	5/28/2014	6/2/2014	6/3/2014
		FASC-DU2B-0514	SW7471A	5/22/2014	5/28/2014	6/2/2014	6/3/2014
		FASC-DU2B-0514	SW8015D	5/22/2014	5/28/2014	5/30/2014	5/31/2014
		FASC-DU2B-0514	SW8081A	5/22/2014	5/28/2014	5/30/2014	6/2/2014
		FASC-DU2B-0514	SW8082	5/22/2014	5/28/2014	5/30/2014	6/2/2014
		FASC-DU2B-0514	SW8270D	5/22/2014	5/28/2014	6/2/2014	6/2/2014
		FASC-DU2C-0514	SW6010C	5/22/2014	5/28/2014	6/2/2014	6/3/2014
		FASC-DU2C-0514	SW7471A	5/22/2014	5/28/2014	6/2/2014	6/3/2014
		FASC-DU2C-0514	SW8015D	5/22/2014	5/28/2014	5/30/2014	5/31/2014
		FASC-DU2C-0514	SW8081A	5/22/2014	5/28/2014	5/30/2014	6/2/2014
		FASC-DU2C-0514	SW8082	5/22/2014	5/28/2014	5/30/2014	6/2/2014
		FASC-DU2C-0514	SW8270D	5/22/2014	5/28/2014	6/2/2014	6/2/2014

TABLE 1

Sample Chronology – Data Summary

Laboratory	SDG	Sample ID	Method	Sample Date	Receive Date	Extract Date	Analysis Date
ACTS	ACTS_C3425	FADS-DU6D1-0514	D2216	5/23/2014	5/28/2014		5/29/2014
		FADS-DU6D1-0514	SW6010C	5/23/2014	5/28/2014	5/30/2014	5/31/2014
		FADS-DU6D1-0514	SW7471A	5/23/2014	5/28/2014	5/31/2014	5/31/2014
		FADS-DU6D1-0514	SW8015D	5/23/2014	5/28/2014	5/29/2014	5/29/2014
		FADS-DU6D1-0514	SW8081A	5/23/2014	5/28/2014	5/29/2014	5/30/2014
		FADS-DU6D1-0514	SW8082	5/23/2014	5/28/2014	5/29/2014	5/30/2014
		FADS-DU6D1-0514	SW8260C	5/23/2014	5/28/2014		5/30/2014
		FADS-DU6D1-0514	SW8270D	5/23/2014	5/28/2014	5/29/2014	5/29/2014
		FADS-DUD2-0514	D2216	5/23/2014	5/28/2014		5/29/2014
		FADS-DUD2-0514	SW6010C	5/23/2014	5/28/2014	5/30/2014	5/31/2014
		FADS-DUD2-0514	SW7471A	5/23/2014	5/28/2014	5/31/2014	5/31/2014
		FADS-DUD2-0514	SW8015D	5/23/2014	5/28/2014	5/29/2014	5/29/2014
		FADS-DUD2-0514	SW8081A	5/23/2014	5/28/2014	5/29/2014	5/30/2014
		FADS-DUD2-0514	SW8082	5/23/2014	5/28/2014	5/29/2014	5/30/2014
		FADS-DUD2-0514	SW8260C	5/23/2014	5/28/2014		5/30/2014
		FADS-DUD2-0514	SW8270D	5/23/2014	5/28/2014	5/29/2014	5/29/2014
		FASC-DU2B-0514	D2216	5/22/2014	5/28/2014		5/29/2014
		FASC-DU2B-0514	SW8260C	5/22/2014	5/28/2014		5/30/2014
		FASC-DU2C-0514	D2216	5/22/2014	5/28/2014		5/29/2014
		FASC-DU2C-0514	SW8260C	5/22/2014	5/28/2014		5/30/2014
	ACTS_C3425	FASC-DU2A-0514	SW6010C	5/22/2014	5/28/2014	6/10/2014	6/11/2014
		FASC-DU2B-0514	SW6010C	5/22/2014	5/28/2014	6/10/2014	6/11/2014
		FASC-DU2C-0514	SW6010C	5/22/2014	5/28/2014	6/10/2014	6/11/2014
	ACTS_C3431	BKSC-DU7-0514	D2216	5/28/2014	5/30/2014		6/3/2014
		BKSC-DU7-0514	SW6010C	5/28/2014	5/30/2014	6/5/2014	6/6/2014
		BKSC-DU7-0514	SW7471A	5/28/2014	5/30/2014	6/4/2014	6/5/2014
		BKSC-DU7-0514	SW8015D	5/28/2014	5/30/2014	6/3/2014	6/3/2014
		BKSC-DU7-0514	SW8081A	5/28/2014	5/30/2014	6/3/2014	6/4/2014
		BKSC-DU7-0514	SW8082	5/28/2014	5/30/2014	6/3/2014	6/3/2014
		BKSC-DU7-0514	SW8270D	5/28/2014	5/30/2014	6/3/2014	6/3/2014
		BKSC-DU7-0514MS	SW8270D	6/3/2014	6/3/2014	6/3/2014	6/3/2014
		BKSC-DU7-0514SD	SW8270D	6/3/2014	6/3/2014	6/3/2014	6/3/2014
		FADS-DU6D3-0514	SW6010C	5/28/2014	5/30/2014	6/5/2014	6/6/2014
		FADS-DU6D3-0514	SW7471A	5/28/2014	5/30/2014	6/4/2014	6/5/2014
		FADS-DU6D3-0514	SW8015D	5/28/2014	5/30/2014	6/4/2014	6/5/2014

TABLE 1

Sample Chronology – Data Summary

Laboratory	SDG	Sample ID	Method	Sample Date	Receive Date	Extract Date	Analysis Date
ACTS	ACTS_C3431	FADS-DU6D3-0514	SW8081A	5/28/2014	5/30/2014	6/3/2014	6/4/2014
		FADS-DU6D3-0514	SW8082	5/28/2014	5/30/2014	6/3/2014	6/3/2014
		FADS-DU6D3-0514	SW8270D	5/28/2014	5/30/2014	6/3/2014	6/3/2014
		FASC-DU1NB-0514	SW6010C	5/28/2014	5/30/2014	6/5/2014	6/6/2014
		FASC-DU1NB-0514	SW7471A	5/28/2014	5/30/2014	6/4/2014	6/5/2014
		FASC-DU1NB-0514	SW8015D	5/28/2014	5/30/2014	6/3/2014	6/3/2014
		FASC-DU1NB-0514	SW8081A	5/28/2014	5/30/2014	6/3/2014	6/4/2014
		FASC-DU1NB-0514	SW8082	5/28/2014	5/30/2014	6/3/2014	6/3/2014
		FASC-DU1NB-0514	SW8270D	5/28/2014	5/30/2014	6/3/2014	6/3/2014
		FASC-DU1NB-0514MS	SW6010C	6/5/2014	6/5/2014	6/5/2014	6/6/2014
		FASC-DU1NB-0514SD	SW6010C	6/5/2014	6/5/2014	6/5/2014	6/6/2014
		FASC-DU1NC-0514	SW6010C	5/28/2014	5/30/2014	6/5/2014	6/6/2014
		FASC-DU1NC-0514	SW7471A	5/28/2014	5/30/2014	6/4/2014	6/5/2014
		FASC-DU1NC-0514	SW8015D	5/28/2014	5/30/2014	6/3/2014	6/3/2014
		FASC-DU1NC-0514	SW8081A	5/28/2014	5/30/2014	6/3/2014	6/4/2014
		FASC-DU1NC-0514	SW8082	5/28/2014	5/30/2014	6/3/2014	6/3/2014
		FASC-DU1NC-0514	SW8270D	5/28/2014	5/30/2014	6/3/2014	6/3/2014
		FASC-DU1NC-0514MS	SW7471A	6/3/2014	6/4/2014	6/4/2014	6/5/2014
		FASC-DU1NC-0514MS	SW8015D	6/3/2014	6/3/2014	6/3/2014	6/5/2014
		FASC-DU1NC-0514MS	SW8081A	6/3/2014	6/3/2014	6/3/2014	6/4/2014
		FASC-DU1NC-0514MS	SW8082	6/3/2014	6/3/2014	6/3/2014	6/3/2014
		FASC-DU1NC-0514MS	SW8270D	6/3/2014	6/3/2014	6/3/2014	6/3/2014
		FASC-DU1NC-0514SD	SW7471A	6/3/2014	6/4/2014	6/4/2014	6/5/2014
		FASC-DU1NC-0514SD	SW8015D	6/3/2014	6/3/2014	6/3/2014	6/5/2014
		FASC-DU1NC-0514SD	SW8081A	6/3/2014	6/3/2014	6/3/2014	6/4/2014
		FASC-DU1NC-0514SD	SW8082	6/3/2014	6/3/2014	6/3/2014	6/4/2014
		FASC-DU1NC-0514SD	SW8270D	6/3/2014	6/3/2014	6/3/2014	6/3/2014
		FASC-DU1SC-0514	SW6010C	5/28/2014	5/30/2014	6/5/2014	6/6/2014
		FASC-DU1SC-0514	SW7471A	5/28/2014	5/30/2014	6/4/2014	6/5/2014
		FASC-DU1SC-0514	SW8015D	5/28/2014	5/30/2014	6/3/2014	6/3/2014
		FASC-DU1SC-0514	SW8081A	5/28/2014	5/30/2014	6/3/2014	6/3/2014
		FASC-DU1SC-0514	SW8082	5/28/2014	5/30/2014	6/3/2014	6/3/2014
		FASC-DU1SC-0514	SW8270D	5/28/2014	5/30/2014	6/3/2014	6/3/2014
	ACTS_C3431	FADS-DU6D3-0514	D2216	5/28/2014	5/30/2014		6/3/2014
		FADS-DU6D3-0514	SW8260C	5/28/2014	5/30/2014		6/3/2014

TABLE 1

Sample Chronology – Data Summary

Laboratory	SDG	Sample ID	Method	Sample Date	Receive Date	Extract Date	Analysis Date
ACTS	ACTS_C3431	FASC-DU1NB-0514	D2216	5/28/2014	5/30/2014		6/3/2014
		FASC-DU1NB-0514	D2216	5/28/2014	6/3/2014		6/3/2014
		FASC-DU1NB-0514	SW8260C	5/28/2014	5/30/2014		6/3/2014
		FASC-DU1NC-0514	D2216	5/28/2014	5/30/2014		6/3/2014
		FASC-DU1NC-0514	SW8260C	5/28/2014	5/30/2014		6/3/2014
		FASC-DU1NC-0514MS	SW8260C	5/28/2014	6/3/2014		6/3/2014
		FASC-DU1NC-0514SD	SW8260C	5/28/2014	6/3/2014		6/3/2014
		FASC-DU1SC-0514	D2216	5/28/2014	5/30/2014		6/3/2014
		FASC-DU1SC-0514	SW8260C	5/28/2014	5/30/2014		6/3/2014
	ACTS_C3437	FASC-TW002-0514	SW6010C	5/30/2014	6/3/2014	6/4/2014	6/5/2014
		FASC-TW002-0514	SW7470A	5/30/2014	6/3/2014	6/3/2014	6/4/2014
		FASC-TW002-0514	SW8015D	5/30/2014	6/3/2014	6/3/2014	6/4/2014
		FASC-TW002-0514	SW8081A	5/30/2014	6/3/2014	6/4/2014	6/4/2014
		FASC-TW002-0514	SW8082	5/30/2014	6/3/2014	6/4/2014	6/5/2014
		FASC-TW002-0514	SW8260C	5/30/2014	6/3/2014		6/5/2014
		FASC-TW003-0514	SW6010C	5/30/2014	6/3/2014	6/4/2014	6/5/2014
		FASC-TW003-0514	SW7470A	5/30/2014	6/3/2014	6/3/2014	6/4/2014
		FASC-TW003-0514	SW8015D	5/30/2014	6/3/2014	6/3/2014	6/4/2014
		FASC-TW003-0514	SW8081A	5/30/2014	6/3/2014	6/4/2014	6/4/2014
		FASC-TW003-0514	SW8082	5/30/2014	6/3/2014	6/4/2014	6/5/2014
		FASC-TW003-0514	SW8260C	5/30/2014	6/3/2014		6/5/2014
		FASC-TW004-0514	SW6010C	6/2/2014	6/3/2014	6/4/2014	6/5/2014
		FASC-TW004-0514	SW7470A	6/2/2014	6/3/2014	6/3/2014	6/4/2014
		FASC-TW004-0514	SW8015D	6/2/2014	6/3/2014	6/3/2014	6/4/2014
		FASC-TW004-0514	SW8081A	6/2/2014	6/3/2014	6/4/2014	6/4/2014
		FASC-TW004-0514	SW8082	6/2/2014	6/3/2014	6/4/2014	6/5/2014
		FASC-TW004-0514	SW8260C	6/2/2014	6/3/2014		6/5/2014
		FASC-TW005-0514	SW6010C	5/30/2014	6/3/2014	6/4/2014	6/5/2014
		FASC-TW005-0514	SW7470A	5/30/2014	6/3/2014	6/3/2014	6/4/2014
		FASC-TW005-0514	SW8015D	5/30/2014	6/3/2014	6/3/2014	6/4/2014
		FASC-TW005-0514	SW8081A	5/30/2014	6/3/2014	6/4/2014	6/4/2014
		FASC-TW005-0514	SW8082	5/30/2014	6/3/2014	6/4/2014	6/5/2014
		FASC-TW005-0514	SW8260C	5/30/2014	6/3/2014		6/5/2014
		FASC-TW006-0514	SW6010C	5/30/2014	6/3/2014	6/4/2014	6/5/2014
		FASC-TW006-0514	SW7470A	5/30/2014	6/3/2014	6/3/2014	6/4/2014

TABLE 1

Sample Chronology – Data Summary

Laboratory	SDG	Sample ID	Method	Sample Date	Receive Date	Extract Date	Analysis Date
ACTS	ACTS_C3437	FASC-TW006-0514	SW8015D	5/30/2014	6/3/2014	6/3/2014	6/4/2014
		FASC-TW006-0514	SW8081A	5/30/2014	6/3/2014	6/4/2014	6/4/2014
		FASC-TW006-0514	SW8082	5/30/2014	6/3/2014	6/4/2014	6/5/2014
		FASC-TW006-0514	SW8260C	5/30/2014	6/3/2014		6/5/2014
		FASC-TW007-0514	SW6010C	5/30/2014	6/3/2014	6/4/2014	6/5/2014
		FASC-TW007-0514	SW7470A	5/30/2014	6/3/2014	6/3/2014	6/4/2014
		FASC-TW007-0514	SW8015D	5/30/2014	6/3/2014	6/3/2014	6/4/2014
		FASC-TW007-0514	SW8081A	5/30/2014	6/3/2014	6/4/2014	6/4/2014
		FASC-TW007-0514	SW8082	5/30/2014	6/3/2014	6/4/2014	6/5/2014
		FASC-TW007-0514	SW8260C	5/30/2014	6/3/2014		6/5/2014
		FASC-TW008-0514	SW6010C	5/30/2014	6/3/2014	6/4/2014	6/5/2014
		FASC-TW008-0514	SW7470A	5/30/2014	6/3/2014	6/3/2014	6/4/2014
		FASC-TW008-0514	SW8015D	5/30/2014	6/3/2014	6/3/2014	6/5/2014
		FASC-TW008-0514	SW8081A	5/30/2014	6/3/2014	6/4/2014	6/4/2014
		FASC-TW008-0514	SW8082	5/30/2014	6/3/2014	6/4/2014	6/5/2014
		FASC-TW008-0514	SW8260C	5/30/2014	6/3/2014		6/6/2014
		FASC-TW010-0514	SW6010C	6/2/2014	6/3/2014	6/4/2014	6/5/2014
		FASC-TW010-0514	SW7470A	6/2/2014	6/3/2014	6/3/2014	6/4/2014
		FASC-TW010-0514	SW8015D	6/2/2014	6/3/2014	6/3/2014	6/5/2014
		FASC-TW010-0514	SW8081A	6/2/2014	6/3/2014	6/4/2014	6/4/2014
		FASC-TW010-0514	SW8082	6/2/2014	6/3/2014	6/4/2014	6/5/2014
		FASC-TW010-0514	SW8260C	6/2/2014	6/3/2014		6/5/2014
		FASC-TW012-0514	SW6010C	5/30/2014	6/3/2014	6/4/2014	6/5/2014
		FASC-TW012-0514	SW7470A	5/30/2014	6/3/2014	6/3/2014	6/4/2014
		FASC-TW012-0514	SW8015D	5/30/2014	6/3/2014	6/3/2014	6/5/2014
		FASC-TW012-0514	SW8081A	5/30/2014	6/3/2014	6/4/2014	6/4/2014
		FASC-TW012-0514	SW8082	5/30/2014	6/3/2014	6/4/2014	6/5/2014
		FASC-TW012-0514	SW8260C	5/30/2014	6/3/2014		6/5/2014
		TB053014	SW8260C	5/30/2014	6/3/2014		6/6/2014
	ACTS_C3437	FASC-TW001-0514	SW6010C	5/29/2014	6/3/2014	6/4/2014	6/4/2014
		FASC-TW001-0514	SW7470A	5/29/2014	6/3/2014	6/3/2014	6/4/2014
		FASC-TW001-0514	SW8015D	5/29/2014	6/3/2014	6/3/2014	6/5/2014
		FASC-TW001-0514	SW8081A	5/29/2014	6/3/2014	6/4/2014	6/4/2014
		FASC-TW001-0514	SW8082	5/29/2014	6/3/2014	6/4/2014	6/5/2014
		FASC-TW001-0514	SW8260C	5/29/2014	6/3/2014		6/4/2014

TABLE 1

Sample Chronology – Data Summary

Laboratory	SDG	Sample ID	Method	Sample Date	Receive Date	Extract Date	Analysis Date
ACTS	ACTS_C3437	FASC-TW001-0514MS	SW6010C	6/4/2014	6/4/2014	6/4/2014	6/4/2014
		FASC-TW001-0514MS	SW7470A	6/3/2014	6/3/2014	6/3/2014	6/4/2014
		FASC-TW001-0514MS	SW8015D	6/3/2014	6/3/2014	6/3/2014	6/5/2014
		FASC-TW001-0514MS	SW8081A	6/4/2014	6/4/2014	6/4/2014	6/5/2014
		FASC-TW001-0514MS	SW8082	6/4/2014	6/4/2014	6/4/2014	6/5/2014
		FASC-TW001-0514MS	SW8260C	6/4/2014	6/4/2014		6/4/2014
		FASC-TW001-0514SD	SW6010C	6/4/2014	6/4/2014	6/4/2014	6/4/2014
		FASC-TW001-0514SD	SW7470A	6/3/2014	6/3/2014	6/3/2014	6/4/2014
		FASC-TW001-0514SD	SW8015D	6/3/2014	6/3/2014	6/3/2014	6/5/2014
		FASC-TW001-0514SD	SW8081A	6/4/2014	6/4/2014	6/4/2014	6/5/2014
		FASC-TW001-0514SD	SW8082	6/4/2014	6/4/2014	6/4/2014	6/5/2014
		FASC-TW001-0514SD	SW8260C	6/4/2014	6/4/2014		6/4/2014
		FASC-TW009-0514	SW6010C	5/29/2014	6/3/2014	6/4/2014	6/4/2014
		FASC-TW009-0514	SW7470A	5/29/2014	6/3/2014	6/3/2014	6/4/2014
		FASC-TW009-0514	SW8015D	5/29/2014	6/3/2014	6/3/2014	6/5/2014
		FASC-TW009-0514	SW8081A	5/29/2014	6/3/2014	6/4/2014	6/4/2014
		FASC-TW009-0514	SW8082	5/29/2014	6/3/2014	6/4/2014	6/5/2014
		FASC-TW009-0514	SW8260C	5/29/2014	6/3/2014		6/4/2014
		FASC-TW011-0514	SW6010C	5/29/2014	6/3/2014	6/4/2014	6/5/2014
		FASC-TW011-0514	SW7470A	5/29/2014	6/3/2014	6/3/2014	6/4/2014
		FASC-TW011-0514	SW8015D	5/29/2014	6/3/2014	6/3/2014	6/5/2014
		FASC-TW011-0514	SW8081A	5/29/2014	6/3/2014	6/4/2014	6/4/2014
		FASC-TW011-0514	SW8082	5/29/2014	6/3/2014	6/4/2014	6/5/2014
		FASC-TW011-0514	SW8260C	5/29/2014	6/3/2014		6/4/2014
		FASC-TW111-0514	SW6010C	5/29/2014	6/3/2014	6/4/2014	6/5/2014
		FASC-TW111-0514	SW7470A	5/29/2014	6/3/2014	6/3/2014	6/4/2014
		FASC-TW111-0514	SW8015D	5/29/2014	6/3/2014	6/3/2014	6/5/2014
		FASC-TW111-0514	SW8081A	5/29/2014	6/3/2014	6/4/2014	6/4/2014
		FASC-TW111-0514	SW8082	5/29/2014	6/3/2014	6/4/2014	6/5/2014
		FASC-TW111-0514	SW8260C	5/29/2014	6/3/2014		6/6/2014
		TB052914	SW8260C	5/29/2014	6/3/2014		6/4/2014
	ACTS_C3443	FASC-DU4B-0614	D2216	6/5/2014	6/6/2014		6/10/2014
		FASC-DU4B-0614	SW6010C	6/5/2014	6/6/2014	6/9/2014	6/11/2014
		FASC-DU4B-0614	SW7471A	6/5/2014	6/6/2014	6/9/2014	6/10/2014
		FASC-DU4B-0614MS	D2216	6/9/2014	6/10/2014		6/10/2014

TABLE 1

Sample Chronology – Data Summary

Laboratory	SDG	Sample ID	Method	Sample Date	Receive Date	Extract Date	Analysis Date
ACTS	ACTS_C3443	FASC-DU4B-0614MS	SW6010C	6/9/2014	6/9/2014	6/9/2014	6/11/2014
		FASC-DU4B-0614SD	SW6010C	6/9/2014	6/9/2014	6/9/2014	6/11/2014
		FASC-DU4-EB-0614	SW6010C	6/5/2014	6/6/2014	6/6/2014	6/10/2014
		FASC-DU4-EB-0614	SW7470A	6/5/2014	6/6/2014	6/9/2014	6/9/2014
		FASC-TB-0614	SW8260C	6/5/2014	6/6/2014		6/9/2014
		FASC-TW004-EB-0614	SW6010C	6/3/2014	6/6/2014	6/6/2014	6/10/2014
		FASC-TW004-EB-0614	SW7470A	6/3/2014	6/6/2014	6/9/2014	6/9/2014
		FASC-TW004-EB-0614	SW7470A	6/3/2014	6/9/2014	6/9/2014	6/9/2014
		FASC-TW004-EB-0614	SW8015D	6/3/2014	6/6/2014	6/6/2014	6/7/2014
		FASC-TW004-EB-0614	SW8081A	6/3/2014	6/6/2014	6/6/2014	6/6/2014
		FASC-TW004-EB-0614	SW8082	6/3/2014	6/6/2014	6/6/2014	6/7/2014
		FASC-TW004-EB-0614	SW8260C	6/3/2014	6/6/2014		6/9/2014
		FASC-TW004-EB-0614	SW8270D	6/3/2014	6/6/2014	6/9/2014	6/9/2014

TABLE 2

Sample Summary by Chain of Custody – Data Summary

CoC Number	Sample Date	Matrix	Sample ID / QAQC Type	SDG	Laboratory
C34168RV1					
	19-May-14	SOIL	FASC-DU3A-0514 / N	ACTO_C34168R_V1	ACTS
			FASC-DU3B-0514 / N	ACTO_C34168R_V1	ACTS
			FASC-DU3C-0514 / N	ACTO_C34168R_V1	ACTS
	17-May-14		SBSD-DU10-0514 / N	ACTO_C34168R_V1	ACTS
	20-May-14		SBSD-DU209-0514 / N	ACTO_C34168R_V1	ACTS
			SBSD-DU309-0514 / N	ACTO_C34168R_V1	ACTS
	17-May-14		SBSD-DU8-0514 / N	ACTO_C34168R_V1	ACTS
	20-May-14		SBSD-DU9-0514 / N	ACTO_C34168R_V1	ACTS
C34168TV1					
	19-May-14	WATER	FASC-DU3A-0514 / N	ACTS_C34168T_v1	ACTS
			FASC-DU3B-0514 / N	ACTS_C34168T_v1	ACTS
	17-May-14		SBSD-DU10-0514 / N	ACTS_C34168T_v1	ACTS
	20-May-14		SBSD-DU9-0514 / N	ACTS_C34168T_v1	ACTS
C34168V1					
	19-May-14	SOIL	FASC-DU3A-0514 / N	ACTS_C34168_V1	ACTS
	30-May-14		FASC-DU3A-0514MS / MS	ACTS_C34168_V1	ACTS
			FASC-DU3A-0514SD / SD	ACTS_C34168_V1	ACTS
	19-May-14		FASC-DU3B-0514 / N	ACTS_C34168_V1	ACTS
			FASC-DU3C-0514 / N	ACTS_C34168_V1	ACTS
	17-May-14		SBSD-DU10-0514 / N	ACTS_C34168_V1	ACTS
	20-May-14		SBSD-DU209-0514 / N	ACTS_C34168_V1	ACTS
			SBSD-DU309-0514 / N	ACTS_C34168_V1	ACTS
	17-May-14		SBSD-DU8-0514 / N	ACTS_C34168_V1	ACTS
	20-May-14		SBSD-DU9-0514 / N	ACTS_C34168_V1	ACTS
C34207BV1					
	20-May-14	SOIL	FAWC-DU60106AB-0514 / N	ACTS_C34207B_v1	ACTS
			FAWC-DU60106C-0514 / N	ACTS_C34207B_v1	ACTS
			FAWC-DU60712AB-0514 / N	ACTS_C34207B_v1	ACTS
			FAWC-DU60712C-0514 / N	ACTS_C34207B_v1	ACTS
			FAWC-DU60712C-0514MS / MS	ACTS_C34207B_v1	ACTS
			FAWC-DU60712C-0514SD / SD	ACTS_C34207B_v1	ACTS

TABLE 2

Sample Summary by Chain of Custody – Data Summary

CoC Number	Sample Date	Matrix	Sample ID / QAQC Type	SDG	Laboratory
C34207RV1					
	20-May-14	SOIL	FASC-DU206A-0514 / N	ACTO_C34207R_V1	ACTS
			FASC-DU306A-0514 / N	ACTO_C34207R_V1	ACTS
			FASC-DU6A-0514 / N	ACTO_C34207R_V1	ACTS
			FASC-DU6B-0514 / N	ACTO_C34207R_V1	ACTS
			FASC-DU6C-0514 / N	ACTO_C34207R_V1	ACTS
			FASC-DU6D-0514 / N	ACTO_C34207R_V1	ACTS
C34207TV1					
	20-May-14	WATER	FASC-DU6A-0514 / N	ACTS_C34207T_v1	ACTS
			FASC-DU6B-0514 / N	ACTS_C34207T_v1	ACTS
			FASC-DU6D-0514 / N	ACTS_C34207T_v1	ACTS
C34207V2					
	20-May-14	SOIL	FASC-DU206A-0514 / N	ACTS_C34207_V2	ACTS
			FASC-DU306A-0514 / N	ACTS_C34207_V2	ACTS
			FASC-DU6A-0514 / N	ACTS_C34207_V2	ACTS
			FASC-DU6B-0514 / N	ACTS_C34207_V2	ACTS
			FASC-DU6C-0514 / N	ACTS_C34207_V2	ACTS
			FASC-DU6D-0514 / N	ACTS_C34207_V2	ACTS
	21-May-14		FASC-LNAPL01-0514 / N	ACTS_C34207_V2	ACTS
C34221BV1					
	21-May-14	SOIL	FAWC-DU50106AB-0514 / N	ACTS_C34221B_V1	ACTS
			FAWC-DU50106C-0514 / N	ACTS_C34221B_V1	ACTS
			FAWC-DU50712AB-0514 / N	ACTS_C34221B_V1	ACTS
			FAWC-DU50712C-0514 / N	ACTS_C34221B_V1	ACTS
			FAWC-DU51318AB-0514 / N	ACTS_C34221B_V1	ACTS
			FAWC-DU51318C-0514 / N	ACTS_C34221B_V1	ACTS
			FAWC-DU51924AB-0514 / N	ACTS_C34221B_V1	ACTS
			FAWC-DU51924C-0514 / N	ACTS_C34221B_V1	ACTS
			FAWC-DU52530AB-0514 / N	ACTS_C34221B_V1	ACTS
			FAWC-DU52530C-0514 / N	ACTS_C34221B_V1	ACTS
C34221RV1					
	23-May-14	SOIL	FASC-DU1NA-0514 / N	ACTO_C34221R_v1	ACTS
	22-May-14		FASC-DU1SA-0514 / N	ACTO_C34221R_v1	ACTS

TABLE 2

Sample Summary by Chain of Custody – Data Summary

CoC Number	Sample Date	Matrix	Sample ID / QAQC Type	SDG	Laboratory
C34221RV1					
	22-May-14	SOIL	FASC-DU1SB-0514 / N	ACTO_C34221R_v1	ACTS
	23-May-14		FASC-DU204A-0514 / N	ACTO_C34221R_v1	ACTS
			FASC-DU304A-0514 / N	ACTO_C34221R_v1	ACTS
			FASC-DU4A-0514 / N	ACTO_C34221R_v1	ACTS
	21-May-14		FASC-DU5A-0514 / N	ACTO_C34221R_v1	ACTS
	02-Jun-14		FASC-DU5A-0514MS / MS	ACTO_C34221R_v1	ACTS
			FASC-DU5A-0514SD / SD	ACTO_C34221R_v1	ACTS
	21-May-14		FASC-DU5B-0514 / N	ACTO_C34221R_v1	ACTS
			FASC-DU5C-0514 / N	ACTO_C34221R_v1	ACTS
			FASC-DU5D-0514 / N	ACTO_C34221R_v1	ACTS
C34221TV1					
	22-May-14	WATER	FASC-DU1SA-0514 / N	ACTS_C34221T_V1	ACTS
			FASC-DU1SB-0514 / N	ACTS_C34221T_V1	ACTS
	23-May-14		FASC-DU4A-0514 / N	ACTS_C34221T_V1	ACTS
	21-May-14		FASC-DU5A-0514 / N	ACTS_C34221T_V1	ACTS
			FASC-DU5B-0514 / N	ACTS_C34221T_V1	ACTS
			FASC-DU5C-0514 / N	ACTS_C34221T_V1	ACTS
			FASC-DU5D-0514 / N	ACTS_C34221T_V1	ACTS
C34221V1					
	23-May-14	SOIL	FASC-DU1NA-0514 / N	ACTS_C34221_V1	ACTS
	22-May-14		FASC-DU1SA-0514 / N	ACTS_C34221_V1	ACTS
	30-May-14		FASC-DU1SA-0514MS / MS	ACTS_C34221_V1	ACTS
			FASC-DU1SA-0514SD / SD	ACTS_C34221_V1	ACTS
	22-May-14		FASC-DU1SB-0514 / N	ACTS_C34221_V1	ACTS
	23-May-14		FASC-DU204A-0514 / N	ACTS_C34221_V1	ACTS
			FASC-DU304A-0514 / N	ACTS_C34221_V1	ACTS
	30-May-14		FASC-DU304A-0514MS / MS	ACTS_C34221_V1	ACTS
			FASC-DU304A-0514SD / SD	ACTS_C34221_V1	ACTS
	23-May-14		FASC-DU4A-0514 / N	ACTS_C34221_V1	ACTS
	21-May-14		FASC-DU5A-0514 / N	ACTS_C34221_V1	ACTS
	31-May-14		FASC-DU5A-0514MS / MS	ACTS_C34221_V1	ACTS
			FASC-DU5A-0514SD / SD	ACTS_C34221_V1	ACTS
	21-May-14		FASC-DU5B-0514 / N	ACTS_C34221_V1	ACTS

TABLE 2

Sample Summary by Chain of Custody – Data Summary

CoC Number	Sample Date	Matrix	Sample ID / QAQC Type	SDG	Laboratory
C34221V1					
	21-May-14	SOIL	FASC-DU5C-0514 / N	ACTS_C34221_V1	ACTS
			FASC-DU5D-0514 / N	ACTS_C34221_V1	ACTS
C34253AV1					
	23-May-14	SOIL	FADS-DU6D1-0514 / N	ACTS_C34253A_V1	ACTS
			FADS-DUD2-0514 / N	ACTS_C34253A_V1	ACTS
	22-May-14		FASC-DU2B-0514 / N	ACTS_C34253A_V1	ACTS
			FASC-DU2C-0514 / N	ACTS_C34253A_V1	ACTS
C34253BV1					
	23-May-14	SOIL	FADS-DU6D1-0514 / N	ACTO_C34253B_v1	ACTS
			FADS-DUD2-0514 / N	ACTO_C34253B_v1	ACTS
C34253RV1					
	22-May-14	SOIL	FASC-DU2A-0514 / N	ACTO_C34253R_v1	ACTS
			FASC-DU2B-0514 / N	ACTO_C34253R_v1	ACTS
			FASC-DU2C-0514 / N	ACTO_C34253R_v1	ACTS
C34253TV1					
	22-May-14	WATER	FASC-DU2A-0514 / N	ACTS_C34253T_V1	ACTS
			FASC-DU2B-0514 / N	ACTS_C34253T_V1	ACTS
			FASC-DU2C-0514 / N	ACTS_C34253T_V1	ACTS
C34253V1					
	22-May-14	SOIL	FASC-DU2A-0514 / N	ACTS_C34253_v1	ACTS
			FASC-DU2B-0514 / N	ACTS_C34253_v1	ACTS
			FASC-DU2C-0514 / N	ACTS_C34253_v1	ACTS
C34315AV1					
	28-May-14	SOIL	FADS-DU6D3-0514 / N	ACTS_C34315A_V1	ACTS
			FASC-DU1NB-0514 / N	ACTS_C34315A_V1	ACTS
			FASC-DU1NC-0514 / N	ACTS_C34315A_V1	ACTS
			FASC-DU1NC-0514MS / MS	ACTS_C34315A_V1	ACTS
			FASC-DU1NC-0514SD / SD	ACTS_C34315A_V1	ACTS
			FASC-DU1SC-0514 / N	ACTS_C34315A_V1	ACTS

TABLE 2

Sample Summary by Chain of Custody – Data Summary

CoC Number	Sample Date	Matrix	Sample ID / QAQC Type	SDG	Laboratory
C34315RV1					
	28-May-14	SOIL	BKSC-DU7-0514 / N	ACTO_C34315R_v1	ACTS
			FADS-DU6D3-0514 / N	ACTO_C34315R_v1	ACTS
			FASC-DU1NB-0514 / N	ACTO_C34315R_v1	ACTS
			FASC-DU1NC-0514 / N	ACTO_C34315R_v1	ACTS
	05-Jun-14		FASC-DU1NC-0514MS / MS	ACTO_C34315R_v1	ACTS
			FASC-DU1NC-0514SD / SD	ACTO_C34315R_v1	ACTS
	28-May-14		FASC-DU1SC-0514 / N	ACTO_C34315R_v1	ACTS
C34315V1					
	28-May-14	SOIL	BKSC-DU7-0514 / N	ACTS_C34315_V1	ACTS
	03-Jun-14		BKSC-DU7-0514MS / MS	ACTS_C34315_V1	ACTS
			BKSC-DU7-0514SD / SD	ACTS_C34315_V1	ACTS
	28-May-14		FADS-DU6D3-0514 / N	ACTS_C34315_V1	ACTS
			FASC-DU1NB-0514 / N	ACTS_C34315_V1	ACTS
	05-Jun-14		FASC-DU1NB-0514MS / MS	ACTS_C34315_V1	ACTS
			FASC-DU1NB-0514SD / SD	ACTS_C34315_V1	ACTS
	28-May-14		FASC-DU1NC-0514 / N	ACTS_C34315_V1	ACTS
	03-Jun-14		FASC-DU1NC-0514MS / MS	ACTS_C34315_V1	ACTS
			FASC-DU1NC-0514SD / SD	ACTS_C34315_V1	ACTS
	28-May-14		FASC-DU1SC-0514 / N	ACTS_C34315_V1	ACTS
C34370RV1					
	30-May-14	WATER	FASC-TW002-0514 / N	ACTO_C34370R_v1	ACTS
			FASC-TW003-0514 / N	ACTO_C34370R_v1	ACTS
	02-Jun-14		FASC-TW004-0514 / N	ACTO_C34370R_v1	ACTS
	30-May-14		FASC-TW005-0514 / N	ACTO_C34370R_v1	ACTS
			FASC-TW006-0514 / N	ACTO_C34370R_v1	ACTS
			FASC-TW007-0514 / N	ACTO_C34370R_v1	ACTS
			FASC-TW008-0514 / N	ACTO_C34370R_v1	ACTS
	02-Jun-14		FASC-TW010-0514 / N	ACTO_C34370R_v1	ACTS
	30-May-14		FASC-TW012-0514 / N	ACTO_C34370R_v1	ACTS
C34370V1					
	30-May-14	WATER	FASC-TW002-0514 / N	ACTS_C34370_v1	ACTS
			FASC-TW003-0514 / N	ACTS_C34370_v1	ACTS

TABLE 2

Sample Summary by Chain of Custody – Data Summary

CoC Number	Sample Date	Matrix	Sample ID / QAQC Type	SDG	Laboratory
C34370V1					
	02-Jun-14	WATER	FASC-TW004-0514 / N	ACTS_C34370_v1	ACTS
	30-May-14		FASC-TW005-0514 / N	ACTS_C34370_v1	ACTS
			FASC-TW006-0514 / N	ACTS_C34370_v1	ACTS
			FASC-TW007-0514 / N	ACTS_C34370_v1	ACTS
			FASC-TW008-0514 / N	ACTS_C34370_v1	ACTS
	02-Jun-14		FASC-TW010-0514 / N	ACTS_C34370_v1	ACTS
	30-May-14		FASC-TW012-0514 / N	ACTS_C34370_v1	ACTS
			TB053014 / TB	ACTS_C34370_v1	ACTS
C34371RV1					
	29-May-14	WATER	FASC-TW001-0514 / N	ACTO_C34371R_V1	ACTS
	05-Jun-14		FASC-TW001-0514MS / MS	ACTO_C34371R_V1	ACTS
			FASC-TW001-0514SD / SD	ACTO_C34371R_V1	ACTS
	29-May-14		FASC-TW009-0514 / N	ACTO_C34371R_V1	ACTS
			FASC-TW011-0514 / N	ACTO_C34371R_V1	ACTS
			FASC-TW111-0514 / FD	ACTO_C34371R_V1	ACTS
C34371V1					
	29-May-14	WATER	FASC-TW001-0514 / N	ACTS_C34371_v1	ACTS
	03-Jun-14		FASC-TW001-0514MS / MS	ACTS_C34371_v1	ACTS
	04-Jun-14		FASC-TW001-0514MS / MS	ACTS_C34371_v1	ACTS
	03-Jun-14		FASC-TW001-0514SD / SD	ACTS_C34371_v1	ACTS
	04-Jun-14		FASC-TW001-0514SD / SD	ACTS_C34371_v1	ACTS
	29-May-14		FASC-TW009-0514 / N	ACTS_C34371_v1	ACTS
			FASC-TW011-0514 / N	ACTS_C34371_v1	ACTS
			FASC-TW111-0514 / FD	ACTS_C34371_v1	ACTS
			TB052914 / TB	ACTS_C34371_v1	ACTS
C34432RV1					
	03-Jun-14	WATER	FASC-TW004-EB-0614 / EB	ACTO_C34432R_V1	ACTS
	09-Jun-14		FASC-TW004-EB-0614EBMS / MS	ACTO_C34432R_V1	ACTS
			FASC-TW004-EB-0614EBSD / SD	ACTO_C34432R_V1	ACTS
C34432V1					
	05-Jun-14	SOIL	FASC-DU4B-0614 / N	ACTS_C34432_V1	ACTS
	09-Jun-14		FASC-DU4B-0614MS / MS	ACTS_C34432_V1	ACTS

TABLE 2

Sample Summary by Chain of Custody – Data Summary

CoC Number	Sample Date	Matrix	Sample ID / QAQC Type	SDG	Laboratory
C34432V1					
	09-Jun-14	SOIL	FASC-DU4B-0614SD / SD	ACTS_C34432_V1	ACTS
	05-Jun-14	WATER	FASC-DU4-EB-0614 / EB	ACTS_C34432_V1	ACTS
			FASC-TB-0614 / TB	ACTS_C34432_V1	ACTS
	03-Jun-14		FASC-TW004-EB-0614 / EB	ACTS_C34432_V1	ACTS

QAQC Type

N = normal environmental sample
FD = field duplicate
MS = matrix spike
SD = spike duplicate
TB = trip blank
EB = equipment blank
AB = ambient blank
FB = field blank

TABLE 3

Site Completeness by Analyte – Flagging Statistics

Matrix	Method	Analyte					Number of Samples	
SOIL								
	SW6010C							
		Arsenic					35	
Validation Flag Category:		Matrix	1	J	Flags		(2.86%)	for Matrix spike recovery less than lower limit
Validation Flag Category:		Matrix	1	J	Flags		(2.86%)	for Matrix spike recovery greater than upper limit
Validation Flag Category:		Matrix	1	J	Flags		(2.86%)	for Matrix spike duplicate recovery criteria less than lower limit
		Cadmium					35	
Validation Flag Category:		Matrix	1	J	Flags		(2.86%)	for Matrix spike recovery less than lower limit
		Lead					35	
Validation Flag Category:		Confirmation	6	J	Flags		(17.14%)	for Confirmation Precision Exceeded
		Selenium					35	
Validation Flag Category:		Matrix	1	J	Flags		(2.86%)	for Matrix spike recovery less than lower limit
Validation Flag Category:		Matrix	1	J	Flags		(2.86%)	for Matrix spike duplicate recovery criteria less than lower limit
		Silver					35	
Validation Flag Category:		Matrix	1	UJ	Flags		(2.86%)	for Matrix spike RPD criteria exceedance
Validation Flag Category:		Matrix	1	UJ	Flags		(2.86%)	for Matrix spike recovery less than lower limit
Validation Flag Category:		Matrix	1	J	Flags		(2.86%)	for Matrix spike recovery greater than upper limit
Validation Flag Category:		Matrix	1	J	Flags		(2.86%)	for Matrix spike duplicate recovery criteria greater than upper limit
	SW8015D							
		Motor Oil					49	
Validation Flag Category:		HoldingTime	14	J	Flags		(28.57%)	for Holding time exceeded

TABLE 3
Site Completeness by Analyte – Flagging Statistics

Matrix	Method	Analyte					Number of Samples	
SOIL								
	SW8015D							
		TPH-Diesel					49	
Validation Flag Category:		HoldingTime	14	J	Flags	(28.57%)		for Holding time exceeded
	SW8081A							
		4,4'-DDD					34	
Validation Flag Category:		Confirmation	1	J	Flags	(2.94%)		for Confirmation Precision Exceeded
Validation Flag Category:		Matrix	1	UJ	Flags	(2.94%)		for Matrix spike recovery less than lower limit
Validation Flag Category:		Matrix	1	UJ	Flags	(2.94%)		for Matrix spike duplicate recovery criteria less than lower limit
		4,4'-DDE					34	
Validation Flag Category:		Matrix	1	J	Flags	(2.94%)		for Matrix spike recovery less than lower limit
Validation Flag Category:		Matrix	1	J	Flags	(2.94%)		for Matrix spike duplicate recovery criteria less than lower limit
Validation Flag Category:		SurrogateRecovery	1	J	Flags	(2.94%)		for Surrogate recovery greater than upper limit
		4,4'-DDT					34	
Validation Flag Category:		SurrogateRecovery	1	J	Flags	(2.94%)		for Surrogate recovery greater than upper limit
		Aldrin					34	
Validation Flag Category:		Matrix	1	UJ	Flags	(2.94%)		for Matrix spike duplicate recovery criteria less than lower limit
		alpha-BHC					34	
Validation Flag Category:		Matrix	1	UJ	Flags	(2.94%)		for Matrix spike duplicate recovery criteria less than lower limit
		Chlordane					34	
Validation Flag Category:		SurrogateRecovery	2	J	Flags	(5.88%)		for Surrogate recovery greater than upper limit

TABLE 3

Site Completeness by Analyte – Flagging Statistics

Matrix	Method	Analyte	Number of Samples					
SOIL								
	SW8081A							
		delta-BHC	34					
Validation Flag Category:		Matrix	1	UJ	Flags	(2.94%)	for	Matrix spike duplicate recovery criteria less than lower limit
		Dieldrin	34					
Validation Flag Category:		Confirmation	1	J	Flags	(2.94%)	for	Confirmation Precision Exceeded
Validation Flag Category:		Matrix	1	J	Flags	(2.94%)	for	Matrix spike recovery greater than upper limit
Validation Flag Category:		SurrogateRecovery	1	J	Flags	(2.94%)	for	Surrogate recovery greater than upper limit
		Heptachlor epoxide	34					
Validation Flag Category:		Matrix	1	UJ	Flags	(2.94%)	for	Matrix spike recovery greater than upper limit
Validation Flag Category:		Matrix	1	UJ	Flags	(2.94%)	for	Matrix spike duplicate recovery criteria greater than upper limit
Validation Flag Category:		SurrogateRecovery	2	J	Flags	(5.88%)	for	Surrogate recovery greater than upper limit
	SW8082							
		Aroclor-1016	34					
Validation Flag Category:		Matrix	1	UJ	Flags	(2.94%)	for	Matrix spike recovery greater than upper limit
Validation Flag Category:		Matrix	1	UJ	Flags	(2.94%)	for	Matrix spike duplicate recovery criteria greater than upper limit
		Aroclor-1260	34					
Validation Flag Category:		Matrix	1	UJ	Flags	(2.94%)	for	Matrix spike recovery greater than upper limit
Validation Flag Category:		Matrix	1	UJ	Flags	(2.94%)	for	Matrix spike duplicate recovery criteria greater than upper limit
	SW8151A							

TABLE 3

Site Completeness by Analyte – Flagging Statistics

Matrix	Method	Analyte	Number of Samples					
SOIL								
	SW8151A							
		2,4,5-T	34					
Validation Flag Category: Matrix			1	UJ	Flags	(2.94%)	for	Matrix spike RPD criteria exceedance
Validation Flag Category: Matrix			2	UJ	Flags	(5.88%)	for	Matrix spike recovery less than lower limit
Validation Flag Category: Matrix			1	UJ	Flags	(2.94%)	for	Matrix spike duplicate recovery criteria less than lower limit
		2,4-DB	34					
Validation Flag Category: Matrix			1	UJ	Flags	(2.94%)	for	Matrix spike RPD criteria exceedance
Validation Flag Category: Matrix			2	UJ	Flags	(5.88%)	for	Matrix spike recovery greater than upper limit
Validation Flag Category: Matrix			1	UJ	Flags	(2.94%)	for	Matrix spike duplicate recovery criteria greater than upper limit
		Dicamba	34					
Validation Flag Category: Matrix			1	UJ	Flags	(2.94%)	for	Matrix spike RPD criteria exceedance
Validation Flag Category: Matrix			1	UJ	Flags	(2.94%)	for	Matrix spike duplicate recovery criteria less than lower limit
		Dichloroprop	34					
Validation Flag Category: Matrix			1	UJ	Flags	(2.94%)	for	Matrix spike RPD criteria exceedance
Validation Flag Category: Matrix			1	UJ	Flags	(2.94%)	for	Matrix spike recovery less than lower limit
		Dinoseb	34					
Validation Flag Category: Confirmation			7	J	Flags	(20.59%)	for	Confirmation Precision Exceeded
		Pentachlorophenol	34					
Validation Flag Category: Confirmation			9	J	Flags	(26.47%)	for	Confirmation Precision Exceeded
Validation Flag Category: Matrix			2	J	Flags	(5.88%)	for	Matrix spike recovery less than lower limit
Validation Flag Category: Matrix			1	J	Flags	(2.94%)	for	Matrix spike duplicate recovery criteria less than lower limit
	SW8260C							

TABLE 3

Site Completeness by Analyte – Flagging Statistics

Matrix	Method	Analyte					Number of Samples	
SOIL								
	SW8260C							
		1,1-DCE					21	
Validation Flag Category:		Matrix	1	UJ	Flags	(4.76%)		for Matrix spike recovery less than lower limit
Validation Flag Category:		Matrix	1	UJ	Flags	(4.76%)		for Matrix spike duplicate recovery criteria less than lower limit
		Bromomethane					21	
Validation Flag Category:		LaboratoryControlSample	4	UJ	Flags	(19.05%)		for LCS recovery less than lower control limit
Validation Flag Category:		Matrix	1	UJ	Flags	(4.76%)		for Matrix spike recovery less than lower limit
Validation Flag Category:		Matrix	1	UJ	Flags	(4.76%)		for Matrix spike duplicate recovery criteria less than lower limit
		Styrene					21	
Validation Flag Category:		LaboratoryControlSample	9	UJ	Flags	(42.86%)		for LCS recovery less than lower control limit
	SW8270D							
		1-Methylnaphthalene					34	
Validation Flag Category:		LaboratoryControlSample	1	J	Flags	(2.94%)		for LCS recovery greater than upper control limit
		Acenaphthene					34	
Validation Flag Category:		LaboratoryControlSample	2	J	Flags	(5.88%)		for LCS recovery greater than upper control limit
		Benzo (a) anthracene					34	
Validation Flag Category:		SurrogateRecovery	1	J	Flags	(2.94%)		for Surrogate recovery greater than upper limit
		Benzo (a) pyrene					34	
Validation Flag Category:		SurrogateRecovery	1	J	Flags	(2.94%)		for Surrogate recovery greater than upper limit

TABLE 3

Site Completeness by Analyte – Flagging Statistics

Matrix	Method	Analyte					Number of Samples	
SOIL								
	SW8270D							
		Benzo (b) fluoranthene					34	
Validation Flag Category:		SurrogateRecovery	1	J	Flags	(2.94%)		for Surrogate recovery greater than upper limit
		Benzo (g,h,i) perylene					34	
Validation Flag Category:		SurrogateRecovery	1	J	Flags	(2.94%)		for Surrogate recovery greater than upper limit
		Benzo (k) fluoranthene					34	
Validation Flag Category:		SurrogateRecovery	1	J	Flags	(2.94%)		for Surrogate recovery greater than upper limit
		Chrysene					34	
Validation Flag Category:		LaboratoryControlSample	7	J	Flags	(20.59%)		for LCS recovery greater than upper control limit
Validation Flag Category:		SurrogateRecovery	1	J	Flags	(2.94%)		for Surrogate recovery greater than upper limit
		Dibenzo (a,h) anthracene					34	
Validation Flag Category:		SurrogateRecovery	1	J	Flags	(2.94%)		for Surrogate recovery greater than upper limit
		Fluoranthene					34	
Validation Flag Category:		LaboratoryControlSample	7	J	Flags	(20.59%)		for LCS recovery greater than upper control limit
		Fluorene					34	
Validation Flag Category:		LaboratoryControlSample	1	J	Flags	(2.94%)		for LCS recovery greater than upper control limit
		Indeno (1,2,3-c,d) pyrene					34	
Validation Flag Category:		LaboratoryControlSample	1	UJ	Flags	(2.94%)		for LCS recovery less than lower control limit
Validation Flag Category:		LaboratoryControlSample	10	J	Flags	(29.41%)		for LCS recovery less than lower control limit
Validation Flag Category:		SurrogateRecovery	1	J	Flags	(2.94%)		for Surrogate recovery greater than upper limit

TABLE 3

Site Completeness by Analyte – Flagging Statistics

Matrix	Method	Analyte		Number of Samples				
SOIL								
	SW8270D							
		Phenanthrene		34				
Validation Flag Category:		LaboratoryControlSample	7	J	Flags	(20.59%)	for	LCS recovery greater than upper control limit
		Pyrene		34				
Validation Flag Category:		LaboratoryControlSample	7	J	Flags	(20.59%)	for	LCS recovery greater than upper control limit
Validation Flag Category:		Matrix	1	J	Flags	(2.94%)	for	Matrix spike recovery less than lower limit
Validation Flag Category:		Matrix	1	J	Flags	(2.94%)	for	Matrix spike duplicate recovery criteria less than lower limit
Validation Flag Category:		SurrogateRecovery	1	J	Flags	(2.94%)	for	Surrogate recovery greater than upper limit
WATER								
	SW8081A							
		Dieldrin		13				
Validation Flag Category:		Confirmation	1	J	Flags	(7.69%)	for	Confirmation Precision Exceeded
		Heptachlor		13				
Validation Flag Category:		Blank	12	B	Flags	(92.31%)	for	Laboratory blank contamination greater than the RL
Validation Flag Category:		Matrix	1	J	Flags	(7.69%)	for	Matrix spike duplicate recovery criteria less than lower limit
		Heptachlor epoxide		13				
Validation Flag Category:		Confirmation	5	J	Flags	(38.46%)	for	Confirmation Precision Exceeded

TABLE 3

Site Completeness by Analyte – Flagging Statistics

Matrix	Method	Analyte	Number of Samples

Note: The total number of validation flags may exceed the actual number of samples if multiple flags were applied to the same sample. Consequently, the percentage of total flags (flags applied/number of samples) may exceed 100 percent.

* The most severe flag for each analyte becomes the final validation flag.

Qualifier Description:

B = The analyte was found in an associated blank, as well as in the sample.

J = The analyte was positively identified, the quantitation is an estimate.

UJ = The analyte was not detected, the quantitation is an estimate.

TABLE 4

Holding Times – Qualified Data

Method	Matrix	Sample ID	Analyte	Holding Time	Result	Holding Time Qualifier	Final Flag*
SW8015D	SOIL	FAWC-DU50106AB-0514					
			Motor Oil	15 Days	683 MG/KG	J	J
			TPH-Diesel	15 Days	102 MG/KG	J	J
SW8015D	SOIL	FAWC-DU50106C-0514					
			Motor Oil	15 Days	57.7 MG/KG	J	J
			TPH-Diesel	15 Days	9.65 MG/KG	J	J
SW8015D	SOIL	FAWC-DU50712AB-0514					
			Motor Oil	15 Days	1550 MG/KG	J	J
			TPH-Diesel	15 Days	180 MG/KG	J	J
SW8015D	SOIL	FAWC-DU50712C-0514					
			Motor Oil	15 Days	47 MG/KG	J	J
			TPH-Diesel	15 Days	6.97 MG/KG	J	J
SW8015D	SOIL	FAWC-DU51318AB-0514					
			Motor Oil	15 Days	1600 MG/KG	J	J
			TPH-Diesel	15 Days	161 MG/KG	J	J
SW8015D	SOIL	FAWC-DU51318C-0514					
			Motor Oil	15 Days	3020 MG/KG	J	J
			TPH-Diesel	15 Days	545 MG/KG	J	J
SW8015D	SOIL	FAWC-DU51924AB-0514					
			Motor Oil	15 Days	1460 MG/KG	J	J
			TPH-Diesel	15 Days	159 MG/KG	J	J
SW8015D	SOIL	FAWC-DU51924C-0514					
			Motor Oil	15 Days	222 MG/KG	J	J
			TPH-Diesel	15 Days	20.7 MG/KG	J	J
SW8015D	SOIL	FAWC-DU52530AB-0514					
			Motor Oil	15 Days	671 MG/KG	J	J
			TPH-Diesel	15 Days	73.2 MG/KG	J	J

TABLE 4

Holding Times – Qualified Data

Method	Matrix	Sample ID	Analyte	Holding Time	Result	Holding Time Qualifier	Final Flag*
SW8015D	SOIL	FAWC-DU52530C-0514					
			Motor Oil	15 Days	237 MG/KG	J	J
			TPH-Diesel	15 Days	21.8 MG/KG	J	J
SW8015D	SOIL	FAWC-DU60106AB-0514					
			Motor Oil	16 Days	1200 MG/KG	J	J
			TPH-Diesel	16 Days	105 MG/KG	J	J
SW8015D	SOIL	FAWC-DU60106C-0514					
			Motor Oil	16 Days	1150 MG/KG	J	J
			TPH-Diesel	16 Days	94 MG/KG	J	J
SW8015D	SOIL	FAWC-DU60712AB-0514					
			Motor Oil	16 Days	2200 MG/KG	J	J
			TPH-Diesel	16 Days	265 MG/KG	J	J
SW8015D	SOIL	FAWC-DU60712C-0514					
			Motor Oil	16 Days	297 MG/KG	J	
			TPH-Diesel	16 Days	22.6 MG/KG	J	J

* The most severe flag for each analyte becomes the final validation flag.

Qualifier Description:

J = The analyte was positively identified, the quantitation is an estimate.

Criteria:

HTp>UCL = Holding time exceeded

TABLE 5

Matrix Spike Precision/Accuracy – Qualified Data

Method	Matrix	Sample ID	Analyte	Result	MS/MSD Qualifier*	MS Recovery	Criteria
SW6010C	SOIL		**Arsenic**				
		FASC-DU1NB-0514		5 MG/KG	J	%R = 144.3 LCL=75 UCL=12	MS>UCL
		FASC-DU3A-0514		7.9 MG/KG	J	%R = 20 LCL=75 UCL=125	MS<LCL
		FASC-DU3A-0514		7.9 MG/KG	J	%R = 63.4 LCL=75 UCL=125	SD<LCL
SW6010C	SOIL		**Cadmium**				
		FASC-DU3A-0514		1 MG/KG	J	%R = 58 LCL=75 UCL=125	MS<LCL
SW6010C	SOIL		**Selenium**				
		FASC-DU3A-0514		1.8 MG/KG	J	%R = 54 LCL=75 UCL=125	MS<LCL
		FASC-DU3A-0514		1.8 MG/KG	J	%R = 67.5 LCL=75 UCL=125	SD<LCL
SW6010C	SOIL		**Silver**				
		FASC-DU1NB-0514		1.4 MG/KG	J	%R = 172.3 LCL=75 UCL=12	MS>UCL
		FASC-DU1NB-0514		1.4 MG/KG	J	%R = 163.6 LCL=75 UCL=12	SD>UCL
		FASC-DU3A-0514		0.043 MG/KG	UJ	%R = 54 LCL=75 UCL=125	MS<LCL
		FASC-DU3A-0514		0.043 MG/KG	UJ	MSRPD = 33.85 Limit =30	MSRPD
SW8081A	SOIL		**4,4'-DDD**				
		FASC-DU1NC-0514		0.7 UG/KG	UJ	%R = 68 LCL=74 UCL=134	MS<LCL
		FASC-DU1NC-0514		0.7 UG/KG	UJ	%R = 63 LCL=74 UCL=134	SD<LCL
SW8081A	SOIL		**4,4'-DDE**				
		FASC-DU1NC-0514		32.5 UG/KG	J	%R = 49 LCL=73 UCL=131	MS<LCL
		FASC-DU1NC-0514		32.5 UG/KG	J	%R = 38 LCL=73 UCL=131	SD<LCL
SW8081A	SOIL		**Aldrin**				
		FASC-DU1NC-0514		0.4 UG/KG	UJ	%R = 72 LCL=74 UCL=124	SD<LCL
SW8081A	SOIL		**alpha-BHC**				
		FASC-DU1SA-0514		15 UG/KG	UJ	%R = 66 LCL=70 UCL=127	SD<LCL
SW8081A	SOIL		**delta-BHC**				
		FASC-DU1SA-0514		16 UG/KG	UJ	%R = 63 LCL=69 UCL=132	SD<LCL
SW8081A	SOIL		**Dieldrin**				
		FASC-DU1SA-0514		316 UG/KG	J	%R = 135 LCL=45 UCL=132	MS>UCL
SW8081A	SOIL		**Heptachlor epoxide**				
		FASC-DU1SA-0514		20 UG/KG	UJ	%R = 163 LCL=79 UCL=127	MS>UCL
		FASC-DU1SA-0514		20 UG/KG	UJ	%R = 150 LCL=79 UCL=127	SD>UCL
SW8081A	WATER		**Heptachlor**				

TABLE 5

Matrix Spike Precision/Accuracy – Qualified Data

Method	Matrix	Sample ID	Analyte	Result	MS/MSD Qualifier*	MS Recovery	Criteria
		FASC-TW001-0514		0.014 UG/L	J	%R = 56 LCL=58 UCL=137	SD<LCL
SW8082	SOIL		**Aroclor-1016**				
		FASC-DU304A-0514		66 UG/KG	UJ	%R = 235 LCL=46 UCL=116	MS>UCL
		FASC-DU304A-0514		66 UG/KG	UJ	%R = 237 LCL=46 UCL=116	SD>UCL
SW8082	SOIL		**Aroclor-1260**				
		FASC-DU304A-0514		66 UG/KG	UJ	%R = 381 LCL=44 UCL=128	MS>UCL
		FASC-DU304A-0514		66 UG/KG	UJ	%R = 370 LCL=44 UCL=128	SD>UCL
SW8151A	SOIL		**2,4,5-T**				
		FASC-DU1NC-0514		0.9 UG/KG	UJ	%R = 19 LCL=55 UCL=147	MS<LCL
		FASC-DU1NC-0514		0.9 UG/KG	UJ	%R = 13 LCL=55 UCL=147	SD<LCL
		FASC-DU5A-0514		0.8 UG/KG	UJ	%R = 8 LCL=55 UCL=147	MS<LCL
		FASC-DU5A-0514		0.8 UG/KG	UJ	MSRPD = 156.76 Limit =50	MSRPD
SW8151A	SOIL		**2,4-DB**				
		FASC-DU1NC-0514		17 UG/KG	UJ	%R = 150 LCL=51 UCL=137	MS>UCL
		FASC-DU1NC-0514		17 UG/KG	UJ	MSRPD = 58.87 Limit =50	MSRPD
		FASC-DU5A-0514		15 UG/KG	UJ	%R = 9841 LCL=51 UCL=13	MS>UCL
		FASC-DU5A-0514		15 UG/KG	UJ	%R = 9880 LCL=51 UCL=13	SD>UCL
SW8151A	SOIL		**Dicamba**				
		FASC-DU5A-0514		1.3 UG/KG	UJ	MSRPD = 61.26 Limit =50	MSRPD
		FASC-DU5A-0514		1.3 UG/KG	UJ	%R = 39 LCL=51 UCL=146	SD<LCL
SW8151A	SOIL		**Dichloroprop**				
		FASC-DU1NC-0514		17 UG/KG	UJ	%R = 47 LCL=65 UCL=154	MS<LCL
		FASC-DU1NC-0514		17 UG/KG	UJ	MSRPD = 61.33 Limit =50	MSRPD
SW8151A	SOIL		**Pentachlorophenol**				
		FASC-DU1NC-0514		1.9 UG/KG	J	%R = 35 LCL=54 UCL=140	MS<LCL
		FASC-DU1NC-0514		1.9 UG/KG	J	%R = 36 LCL=54 UCL=140	SD<LCL
		FASC-DU5A-0514		2.6 UG/KG	J	%R = 50 LCL=54 UCL=140	MS<LCL
SW8260C	SOIL		**1,1-DCE**				
		FASC-DU1NC-0514		15 UG/KG	UJ	%R = 65 LCL=76 UCL=123	MS<LCL
		FASC-DU1NC-0514		15 UG/KG	UJ	%R = 64 LCL=76 UCL=123	SD<LCL
SW8260C	SOIL		**Bromomethane**				
		FASC-DU1NC-0514		31 UG/KG	UJ	%R = 77 LCL=82 UCL=124	MS<LCL

TABLE 5

Matrix Spike Precision/Accuracy – Qualified Data

Method	Matrix	Sample ID	Analyte	Result	MS/MSD Qualifier*	MS Recovery	Criteria
SW8270D	SOIL	FASC-DU1NC-0514	**Pyrene**	31 UG/KG	UJ	%R = 75 LCL=82 UCL=124	SD<LCL
		BKSC-DU7-0514		233 UG/KG	J	%R = 51 LCL=67 UCL=108	MS<LCL
		BKSC-DU7-0514		233 UG/KG	J	%R = 60 LCL=67 UCL=108	SD<LCL

* The most severe flag for each analyte becomes the final validation flag.

Qualifier Description:

J = The analyte was positively identified, the quantitation is an estimate.

UJ = The analyte was not detected, the quantitation is an estimate.

Criteria:

MS<LCL = Matrix spike recovery less than lower limit

MS>UCL = Matrix spike recovery greater than upper limit

MSRPD = Matrix spike RPD criteria exceedance

SD<LCL = Matrix spike duplicate recovery criteria less than lower limit

SD>UCL = Matrix spike duplicate recovery criteria greater than upper limit

TABLE 6

Surrogate Recovery – Qualified Data

Method	Matrix	Sample ID	Analyte	Result	Surrogate Qualifier*	Surrogate Recovery	Criteria
SW8081A	SOIL		**4,4'-DDE**				
		FASC-DU1SB-0514		86.2 UG/KG	J	%R=175 LCL=53 UCL=145	Sur>UCL
SW8081A	SOIL		**4,4'-DDT**				
		FASC-DU1SB-0514		90.4 UG/KG	J	%R=175 LCL=53 UCL=145	Sur>UCL
SW8081A	SOIL		**Chlordane**				
		FASC-DU1SB-0514		2740 UG/KG	J	%R=175 LCL=53 UCL=145	Sur>UCL
		FASC-DU6D-0514		2100 UG/KG	J	%R=183 LCL=53 UCL=145	Sur>UCL
SW8081A	SOIL		**Dieldrin**				
		FASC-DU1SB-0514		959 UG/KG	J	%R=175 LCL=53 UCL=145	Sur>UCL
SW8081A	SOIL		**Heptachlor epoxide**				
		FASC-DU1SB-0514		27.8 UG/KG	J	%R=175 LCL=53 UCL=145	Sur>UCL
		FASC-DU6D-0514		84.1 UG/KG	J	%R=183 LCL=53 UCL=145	Sur>UCL
SW8270D	SOIL		**Benzo (a) anthracene**				
		FADS-DU6D1-0514		7.2 UG/KG	J	%R=148 LCL=51 UCL=146	Sur>UCL
SW8270D	SOIL		**Benzo (a) pyrene**				
		FADS-DU6D1-0514		15.7 UG/KG	J	%R=148 LCL=51 UCL=146	Sur>UCL
SW8270D	SOIL		**Benzo (b) fluoranthene**				
		FADS-DU6D1-0514		15.4 UG/KG	J	%R=148 LCL=51 UCL=146	Sur>UCL
SW8270D	SOIL		**Benzo (g,h,i) perylene**				
		FADS-DU6D1-0514		17.3 UG/KG	J	%R=148 LCL=51 UCL=146	Sur>UCL
SW8270D	SOIL		**Benzo (k) fluoranthene**				
		FADS-DU6D1-0514		18.2 UG/KG	J	%R=148 LCL=51 UCL=146	Sur>UCL
SW8270D	SOIL		**Chrysene**				
		FADS-DU6D1-0514		10.5 UG/KG	J	%R=148 LCL=51 UCL=146	Sur>UCL
SW8270D	SOIL		**Dibenzo (a,h) anthracene**				
		FADS-DU6D1-0514		4.7 UG/KG	J	%R=148 LCL=51 UCL=146	Sur>UCL

TABLE 6

Surrogate Recovery – Qualified Data

Method	Matrix	Sample ID	Analyte	Result	Surrogate Qualifier*	Surrogate Recovery	Criteria
SW8270D	SOIL		**Indeno (1,2,3-c,d) pyrene**				
		FADS-DU6D1-0514		16.9 UG/KG	J	%R=148 LCL=51 UCL=146	Sur>UCL
SW8270D	SOIL		**Pyrene**				
		FADS-DU6D1-0514		7 UG/KG	J	%R=148 LCL=51 UCL=146	Sur>UCL

* The most severe flag for each analyte becomes the final validation flag.

Qualifier Description:

J = The analyte was positively identified, the quantitation is an estimate.

Criteria:

Sur>UCL = Surrogate recovery greater than upper limit

TABLE 7

Laboratory Control Sample – Qualified Data

Method	Matrix	Sample ID / QAQC Type	Analyte	Result	LCS Qualifier*	LCS Recovery	Criteria
SW8260C	SOIL		**Bromomethane**				
		FADS-DU6D3-0514 / N		35 UG/KG	UJ	%R = 81 LCL=82 UCL=124	LCS<LCL
		FASC-DU1NB-0514 / N		27 UG/KG	UJ	%R = 81 LCL=82 UCL=124	LCS<LCL
		FASC-DU1NC-0514 / N		31 UG/KG	UJ	%R = 81 LCL=82 UCL=124	LCS<LCL
		FASC-DU1SC-0514 / N		31 UG/KG	UJ	%R = 81 LCL=82 UCL=124	LCS<LCL
SW8260C	SOIL		**Styrene**				
		FADS-DU6D1-0514 / N		17 UG/KG	UJ	%R = 80 LCL=83 UCL=122	LCS<LCL
		FADS-DUD2-0514 / N		19 UG/KG	UJ	%R = 80 LCL=83 UCL=122	LCS<LCL
		FASC-DU1SB-0514 / N		15 UG/KG	UJ	%R = 80 LCL=83 UCL=122	LCS<LCL
		FASC-DU2B-0514 / N		14 UG/KG	UJ	%R = 80 LCL=83 UCL=122	LCS<LCL
		FASC-DU2C-0514 / N		19 UG/KG	UJ	%R = 80 LCL=83 UCL=122	LCS<LCL
		FASC-DU5A-0514 / N		14 UG/KG	UJ	%R = 80 LCL=83 UCL=122	LCS<LCL
		FASC-DU5B-0514 / N		13 UG/KG	UJ	%R = 80 LCL=83 UCL=122	LCS<LCL
		FASC-DU5C-0514 / N		13 UG/KG	UJ	%R = 80 LCL=83 UCL=122	LCS<LCL
		FASC-DU5D-0514 / N		19 UG/KG	UJ	%R = 80 LCL=83 UCL=122	LCS<LCL
SW8270D	SOIL		**1-Methylnaphthalene**				
		FADS-DU6D3-0514 / N		11.8 UG/KG	J	%R = 98 LCL=49 UCL=96	LCS>UCL
SW8270D	SOIL		**Acenaphthene**				
		FADS-DU6D3-0514 / N		3 UG/KG	J	%R = 107 LCL=51 UCL=102	LCS>UCL
		FASC-DU2B-0514 / N		58.4 UG/KG	J	%R = 107 LCL=51 UCL=102	LCS>UCL
SW8270D	SOIL		**Chrysene**				
		BKSC-DU7-0514 / N		149 UG/KG	J	%R = 117 LCL=79 UCL=111	LCS>UCL
		FADS-DU6D3-0514 / N		93.2 UG/KG	J	%R = 117 LCL=79 UCL=111	LCS>UCL
		FASC-DU1NB-0514 / N		102 UG/KG	J	%R = 117 LCL=79 UCL=111	LCS>UCL
		FASC-DU1NC-0514 / N		22.7 UG/KG	J	%R = 117 LCL=79 UCL=111	LCS>UCL
		FASC-DU1SC-0514 / N		6.5 UG/KG	J	%R = 117 LCL=79 UCL=111	LCS>UCL
		FASC-DU2B-0514 / N		969 UG/KG	J	%R = 117 LCL=79 UCL=111	LCS>UCL
		FASC-DU2C-0514 / N		50 UG/KG	J	%R = 117 LCL=79 UCL=111	LCS>UCL
SW8270D	SOIL		**Fluoranthene**				
		BKSC-DU7-0514 / N		192 UG/KG	J	%R = 113 LCL=70 UCL=109	LCS>UCL
		FADS-DU6D3-0514 / N		104 UG/KG	J	%R = 113 LCL=70 UCL=109	LCS>UCL

TABLE 7

Laboratory Control Sample – Qualified Data

Method	Matrix	Sample ID / QAQC Type	Analyte	Result	LCS Qualifier*	LCS Recovery	Criteria
		FASC-DU1NB-0514 / N		180 UG/KG	J	%R = 113 LCL=70 UCL=109	LCS>UCL
		FASC-DU1NC-0514 / N		40.4 UG/KG	J	%R = 113 LCL=70 UCL=109	LCS>UCL
		FASC-DU1SC-0514 / N		9.9 UG/KG	J	%R = 113 LCL=70 UCL=109	LCS>UCL
		FASC-DU2B-0514 / N		1850 UG/KG	J	%R = 113 LCL=70 UCL=109	LCS>UCL
		FASC-DU2C-0514 / N		75.2 UG/KG	J	%R = 113 LCL=70 UCL=109	LCS>UCL
SW8270D	SOIL		**Fluorene**				
		FADS-DU6D3-0514 / N		2.7 UG/KG	J	%R = 112 LCL=52 UCL=105	LCS>UCL
SW8270D	SOIL		**Indeno (1,2,3-c,d) pyrene**				
		FADS-DU6D1-0514 / N		16.9 UG/KG	J	%R = 71 LCL=72 UCL=122	LCS<LCL
		FADS-DUD2-0514 / N		1.3 UG/KG	UJ	%R = 71 LCL=72 UCL=122	LCS<LCL
		FASC-DU1NA-0514 / N		106 UG/KG	J	%R = 71 LCL=72 UCL=122	LCS<LCL
		FASC-DU1SA-0514 / N		54.3 UG/KG	J	%R = 71 LCL=72 UCL=122	LCS<LCL
		FASC-DU204A-0514 / N		71.7 UG/KG	J	%R = 71 LCL=72 UCL=122	LCS<LCL
		FASC-DU304A-0514 / N		51.6 UG/KG	J	%R = 71 LCL=72 UCL=122	LCS<LCL
		FASC-DU4A-0514 / N		46.7 UG/KG	J	%R = 71 LCL=72 UCL=122	LCS<LCL
		FASC-DU5A-0514 / N		89.3 UG/KG	J	%R = 71 LCL=72 UCL=122	LCS<LCL
		FASC-DU5B-0514 / N		143 UG/KG	J	%R = 71 LCL=72 UCL=122	LCS<LCL
		FASC-DU5C-0514 / N		102 UG/KG	J	%R = 71 LCL=72 UCL=122	LCS<LCL
		FASC-DU5D-0514 / N		20.3 UG/KG	J	%R = 71 LCL=72 UCL=122	LCS<LCL
SW8270D	SOIL		**Phenanthrene**				
		BKSC-DU7-0514 / N		98 UG/KG	J	%R = 110 LCL=55 UCL=104	LCS>UCL
		FADS-DU6D3-0514 / N		126 UG/KG	J	%R = 110 LCL=55 UCL=104	LCS>UCL
		FASC-DU1NB-0514 / N		50.7 UG/KG	J	%R = 110 LCL=55 UCL=104	LCS>UCL
		FASC-DU1NC-0514 / N		23.5 UG/KG	J	%R = 110 LCL=55 UCL=104	LCS>UCL
		FASC-DU1SC-0514 / N		3.7 UG/KG	J	%R = 110 LCL=55 UCL=104	LCS>UCL
		FASC-DU2B-0514 / N		1060 UG/KG	J	%R = 110 LCL=55 UCL=104	LCS>UCL
		FASC-DU2C-0514 / N		19.7 UG/KG	J	%R = 110 LCL=55 UCL=104	LCS>UCL
SW8270D	SOIL		**Pyrene**				
		BKSC-DU7-0514 / N		233 UG/KG	J	%R = 115 LCL=67 UCL=108	LCS>UCL
		FADS-DU6D3-0514 / N		128 UG/KG	J	%R = 115 LCL=67 UCL=108	LCS>UCL
		FASC-DU1NB-0514 / N		139 UG/KG	J	%R = 115 LCL=67 UCL=108	LCS>UCL
		FASC-DU1NC-0514 / N		36.9 UG/KG	J	%R = 115 LCL=67 UCL=108	LCS>UCL

TABLE 7

Laboratory Control Sample – Qualified Data

Method	Matrix	Sample ID / QAQC Type	Analyte	Result	LCS Qualifier*	LCS Recovery	Criteria
		FASC-DU1SC-0514 / N		7.4 UG/KG	J	%R = 115 LCL=67 UCL=108	LCS>UCL
		FASC-DU2B-0514 / N		1690 UG/KG	J	%R = 115 LCL=67 UCL=108	LCS>UCL
		FASC-DU2C-0514 / N		66.2 UG/KG	J	%R = 115 LCL=67 UCL=108	LCS>UCL

* The most severe flag for each analyte becomes the final validation flag.

QAQC Type

N = Normal Environmental Sample
FD = Field Duplicate

Qualifier Description:

J = The analyte was positively identified, the quantitation is an estimate.
UJ = The analyte was not detected, the quantitation is an estimate.

Criteria:

LCS<LCL = LCS recovery less than lower control limit
LCS>UCL = LCS recovery greater than upper control limit

TABLE 8

Confirmation Analysis – Qualified Data

Method	Matrix	Sample ID	Analyte	Result	Confirmation Qualifier*	Criteria
SW6010C	SOIL		**Lead**			
		FASC-DU206A-0514		227 MG/KG	J	CF>RPD
		FASC-DU306A-0514		74.5 MG/KG	J	CF>RPD
		FASC-DU6A-0514		118 MG/KG	J	CF>RPD
		SBSD-DU209-0514		12.1 MG/KG	J	CF>RPD
		SBSD-DU309-0514		11.9 MG/KG	J	CF>RPD
		SBSD-DU9-0514		45.1 MG/KG	J	CF>RPD
SW8081A	SOIL		**4,4'-DDD**			
		FADS-DU6D3-0514		3.1 UG/KG	J	CF>RPD
SW8081A	SOIL		**Dieldrin**			
		BKSC-DU7-0514		6.9 UG/KG	J	CF>RPD
SW8081A	WATER		**Dieldrin**			
		FASC-TW010-0514		0.0023 UG/L	J	CF>RPD
SW8081A	WATER		**Heptachlor epoxide**			
		FASC-TW003-0514		0.0076 UG/L	J	CF>RPD
		FASC-TW005-0514		0.0053 UG/L	J	CF>RPD
		FASC-TW007-0514		0.0078 UG/L	J	CF>RPD
		FASC-TW009-0514		0.0063 UG/L	J	CF>RPD
		FASC-TW010-0514		0.0047 UG/L	J	CF>RPD
SW8151A	SOIL		**Dinoseb**			
		FASC-DU1SA-0514		21.5 UG/KG	J	CF>RPD
		FASC-DU1SB-0514		57.1 UG/KG	J	CF>RPD
		FASC-DU206A-0514		53.8 UG/KG	J	CF>RPD
		FASC-DU304A-0514		19.6 UG/KG	J	CF>RPD
		FASC-DU306A-0514		47.5 UG/KG	J	CF>RPD
		FASC-DU3B-0514		22.7 UG/KG	J	CF>RPD

TABLE 8

Confirmation Analysis – Qualified Data

Method	Matrix	Sample ID	Analyte	Result	Confirmation Qualifier*	Criteria
		FASC-DU6C-0514		58.6 UG/KG	J	CF>RPD
SW8151A	SOIL		**Pentachlorophenol**			
		FASC-DU204A-0514		9.7 UG/KG	J	CF>RPD
		FASC-DU2C-0514		1.4 UG/KG	J	CF>RPD
		FASC-DU304A-0514		21 UG/KG	J	CF>RPD
		FASC-DU306A-0514		5.3 UG/KG	J	CF>RPD
		FASC-DU3B-0514		3.8 UG/KG	J	CF>RPD
		FASC-DU4A-0514		1.9 UG/KG	J	CF>RPD
		FASC-DU5D-0514		1.1 UG/KG	J	CF>RPD
		FASC-DU6A-0514		4.8 UG/KG	J	CF>RPD
		FASC-DU6D-0514		13.2 UG/KG	J	CF>RPD

* The most severe flag for each analyte becomes the final validation flag.

Qualifier Description:

J = The analyte was positively identified, the quantitation is an estimate.

Criteria:

CF>RPD = Confirmation Precision Exceeded

TABLE 9

Blank Contamination – Qualified Data

Method	Matrix	Analyte / Sample ID	Result	Blank Contamination Qualifier*	Criteria	Comments
SW8081A	WATER	**Heptachlor**				
		FASC-TW001-0514	0.014 UG/L	B	LB>RL	blank target = 0.013UG/L
		FASC-TW002-0514	0.02 UG/L	B	LB>RL	blank target = 0.013UG/L
		FASC-TW003-0514	0.02 UG/L	B	LB>RL	blank target = 0.013UG/L
		FASC-TW004-0514	0.016 UG/L	B	LB>RL	blank target = 0.013UG/L
		FASC-TW005-0514	0.017 UG/L	B	LB>RL	blank target = 0.013UG/L
		FASC-TW006-0514	0.017 UG/L	B	LB>RL	blank target = 0.013UG/L
		FASC-TW007-0514	0.019 UG/L	B	LB>RL	blank target = 0.013UG/L
		FASC-TW009-0514	0.018 UG/L	B	LB>RL	blank target = 0.013UG/L
		FASC-TW010-0514	0.019 UG/L	B	LB>RL	blank target = 0.013UG/L
		FASC-TW011-0514	0.013 UG/L	B	LB>RL	blank target = 0.013UG/L
		FASC-TW012-0514	0.017 UG/L	B	LB>RL	blank target = 0.013UG/L
		FASC-TW111-0514	0.011 UG/L	B	LB>RL	blank target = 0.013UG/L

Blank target = concentration of field or laboratory blank.

* The most severe flag for each analyte becomes the final validation flag.

Qualifier Description:

B = The analyte was found in an associated blank, as well as in the sample.

Criteria:

LB>RL = Laboratory blank contamination greater than the RL

TABLE 10

Site Completeness by Analyte – Qualified Data

			Number of Occurrences									
Method	**Analyte**	**Units**	**Analyses**	**Detects**	**Non-detects**	**Blank Flags**	**J Flags**	**M Flags**	**Contractor R Flags**	**Total R Flags**	**Contractor Percent Completeness**	**Overall Percent Completeness**
D2216	Percent Moisture	PERCENT	0	53							100	100
SW6010C	Arsenic	MG/KG	35	34	1		18				100	100
SW6010C	Barium	MG/KG	35	35							100	100
SW6010C	Cadmium	MG/KG	35	33	2		28				100	100
SW6010C	Chromium	MG/KG	35	35							100	100
SW6010C	Lead	MG/KG	35	35			6				100	100
SW6010C	Selenium	MG/KG	35	35			11				100	100
SW6010C	Silver	MG/KG	35	30	5		21				100	100
SW6010C	Chromium-TCLP	MG/L	17	5	12		5				100	100
SW6010C	Lead-TCLP	MG/L	9	5	4		3				100	100
SW6010C	Arsenic	UG/L	13	6	7		6				100	100
SW6010C	Barium	UG/L	13	13			13				100	100
SW6010C	Cadmium	UG/L	13	9	4		8				100	100
SW6010C	Chromium	UG/L	13	3	10		3				100	100
SW6010C	Lead	UG/L	13		13						100	100
SW6010C	Selenium	UG/L	13	12	1		11				100	100
SW6010C	Silver	UG/L	13	3	10		3				100	100
SW7470A	Mercury	UG/L	13		13						100	100
SW7471A	Mercury	MG/KG	35	35			1				100	100
SW8015D	Motor Oil	MG/KG	49	49			14				100	100
SW8015D	TPH-Diesel	MG/KG	49	48	1		37				100	100
SW8015D	Motor Oil	MG/L	13	5	8		5				100	100
SW8015D	TPH-Diesel	MG/L	13	8	5		5				100	100
SW8081A	4,4'-DDD	UG/KG	34	2	32		3				100	100
SW8081A	4,4'-DDE	UG/KG	34	22	12		17				100	100
SW8081A	4,4'-DDT	UG/KG	34	20	14		11				100	100
SW8081A	Aldrin	UG/KG	34		34		1				100	100
SW8081A	alpha-BHC	UG/KG	34		34		1				100	100
SW8081A	beta-BHC	UG/KG	34		34						100	100

TABLE 10

Site Completeness by Analyte – Qualified Data

Method	Analyte	Units	Analyses	Detects	Non-detects	Blank Flags	J Flags	M Flags	Contractor R Flags	Total R Flags	Contractor Percent Completeness	Overall Percent Completeness
			Number of Occurrences									
SW8081A	Chlordane	UG/KG	34	26	8		13				100	100
SW8081A	delta-BHC	UG/KG	34		34		1				100	100
SW8081A	Dieldrin	UG/KG	34	18	16		10				100	100
SW8081A	Endosulfan I	UG/KG	34		34						100	100
SW8081A	Endosulfan II	UG/KG	34		34						100	100
SW8081A	Endosulfan sulfate	UG/KG	34		34						100	100
SW8081A	Endrin	UG/KG	34	1	33		1				100	100
SW8081A	Endrin aldehyde	UG/KG	34		34						100	100
SW8081A	gamma-BHC (Lindane)	UG/KG	34		34						100	100
SW8081A	Heptachlor	UG/KG	34	1	33		1				100	100
SW8081A	Heptachlor epoxide	UG/KG	34	13	21		14				100	100
SW8081A	Methoxychlor	UG/KG	34		34						100	100
SW8081A	Toxaphene	UG/KG	34		34						100	100
SW8081A	4,4'-DDD	UG/L	13		13						100	100
SW8081A	4,4'-DDE	UG/L	13		13						100	100
SW8081A	4,4'-DDT	UG/L	13		13						100	100
SW8081A	Aldrin	UG/L	13	2	11		1				100	100
SW8081A	alpha-BHC	UG/L	13		13						100	100
SW8081A	beta-BHC	UG/L	13		13						100	100
SW8081A	Chlordane	UG/L	13	1	12		1				100	100
SW8081A	delta-BHC	UG/L	13		13						100	100
SW8081A	Dieldrin	UG/L	13	8	5		6				100	100
SW8081A	Endosulfan I	UG/L	13		13						100	100
SW8081A	Endosulfan II	UG/L	13		13						100	100
SW8081A	Endosulfan sulfate	UG/L	13		13						100	100
SW8081A	Endrin	UG/L	13		13						100	100
SW8081A	Endrin aldehyde	UG/L	13		13						100	100
SW8081A	gamma-BHC (Lindane)	UG/L	13		13						100	100
SW8081A	Heptachlor	UG/L	13	13		11	2				100	100

TABLE 10

Site Completeness by Analyte – Qualified Data

Method	Analyte	Units	Analyses	Detects	Non-detects	Blank Flags	J Flags	M Flags	Contractor R Flags	Total R Flags	Contractor Percent Completeness	Overall Percent Completeness
			Number of Occurrences									
SW8081A	Heptachlor epoxide	UG/L	13	6	7		5				100	100
SW8081A	Methoxychlor	UG/L	13		13						100	100
SW8081A	Toxaphene	UG/L	13		13						100	100
SW8082	Aroclor-1016	UG/KG	34		34		1				100	100
SW8082	Aroclor-1221	UG/KG	34		34						100	100
SW8082	Aroclor-1232	UG/KG	34		34						100	100
SW8082	Aroclor-1242	UG/KG	34		34						100	100
SW8082	Aroclor-1248	UG/KG	34	1	33						100	100
SW8082	Aroclor-1254	UG/KG	34		34						100	100
SW8082	Aroclor-1260	UG/KG	34	8	26		8				100	100
SW8082	Aroclor-1016	UG/L	13		13						100	100
SW8082	Aroclor-1221	UG/L	13		13						100	100
SW8082	Aroclor-1232	UG/L	13		13						100	100
SW8082	Aroclor-1242	UG/L	13		13						100	100
SW8082	Aroclor-1248	UG/L	13		13						100	100
SW8082	Aroclor-1254	UG/L	13		13						100	100
SW8082	Aroclor-1260	UG/L	13		13						100	100
SW8151A	2,4,5-T	UG/KG	34		34		2				100	100
SW8151A	2,4,5-TP (Silvex)	UG/KG	34		34						100	100
SW8151A	2,4-D	UG/KG	34		34						100	100
SW8151A	2,4-DB	UG/KG	34		34		2				100	100
SW8151A	Dalapon	UG/KG	34		34						100	100
SW8151A	Dicamba	UG/KG	34		34		1				100	100
SW8151A	Dichloroprop	UG/KG	34		34		1				100	100
SW8151A	Dinoseb	UG/KG	34	14	20		14				100	100
SW8151A	MCPA	UG/KG	34		34						100	100
SW8151A	MCPP	UG/KG	34		34						100	100
SW8151A	Pentachlorophenol	UG/KG	34	28	6		18				100	100
SW8151A	2,4,5-T	UG/L	13		13						100	100

TABLE 10

Site Completeness by Analyte – Qualified Data

			Number of Occurrences									
Method	**Analyte**	**Units**	**Analyses**	**Detects**	**Non-detects**	**Blank Flags**	**J Flags**	**M Flags**	**Contractor R Flags**	**Total R Flags**	**Contractor Percent Completeness**	**Overall Percent Completeness**
SW8151A	2,4,5-TP (Silvex)	UG/L	13		13						100	100
SW8151A	2,4-D	UG/L	13		13						100	100
SW8151A	2,4-DB	UG/L	13		13						100	100
SW8151A	Dalapon	UG/L	13		13						100	100
SW8151A	Dicamba	UG/L	13		13						100	100
SW8151A	Dichloroprop	UG/L	13		13						100	100
SW8151A	Dinoseb	UG/L	13		13						100	100
SW8151A	MCPA	UG/L	13		13						100	100
SW8151A	MCPP	UG/L	13		13						100	100
SW8151A	Pentachlorophenol	UG/L	13	5	8		3				100	100
SW8260C	1,1,1,2-Tetrachloroethane	UG/KG	21		21						100	100
SW8260C	1,1,1-TCA	UG/KG	21		21						100	100
SW8260C	1,1,2,2-Tetrachloroethane	UG/KG	21		21						100	100
SW8260C	1,1,2-TCA	UG/KG	21		21						100	100
SW8260C	1,1-DCA	UG/KG	21		21						100	100
SW8260C	1,1-DCE	UG/KG	21		21		1				100	100
SW8260C	1,1-Dichloropropene	UG/KG	21		21						100	100
SW8260C	1,2,3-Trichlorobenzene	UG/KG	21		21						100	100
SW8260C	1,2,3-Trichloropropane	UG/KG	21		21						100	100
SW8260C	1,2,4-Trichlorobenzene	UG/KG	21		21						100	100
SW8260C	1,2,4-Trimethylbenzene	UG/KG	21		21						100	100
SW8260C	1,2-DCA	UG/KG	21		21						100	100
SW8260C	1,2-DCB	UG/KG	21		21						100	100
SW8260C	1,2-Dibromo-3-chloropropane	UG/KG	21		21						100	100
SW8260C	1,2-Dichloropropane	UG/KG	21		21						100	100
SW8260C	1,3,5-Trimethylbenzene	UG/KG	21		21						100	100
SW8260C	1,3-DCB	UG/KG	21		21						100	100
SW8260C	1,3-Dichloropropane	UG/KG	21		21						100	100
SW8260C	1,4-DCB	UG/KG	21		21						100	100

TABLE 10

Site Completeness by Analyte – Qualified Data

			Number of Occurrences									
Method	Analyte	Units	Analyses	Detects	Non-detects	Blank Flags	J Flags	M Flags	Contractor R Flags	Total R Flags	Contractor Percent Completeness	Overall Percent Completeness
SW8260C	2,2-Dichloropropane	UG/KG	21		21						100	100
SW8260C	2-Chlorotoluene	UG/KG	21		21						100	100
SW8260C	2-Hexanone	UG/KG	21		21						100	100
SW8260C	4-Chlorotoluene	UG/KG	21		21						100	100
SW8260C	Acetone	UG/KG	21		21						100	100
SW8260C	Benzene	UG/KG	21		21						100	100
SW8260C	Bromobenzene	UG/KG	21		21						100	100
SW8260C	Bromochloromethane	UG/KG	21		21						100	100
SW8260C	Bromodichloromethane	UG/KG	21		21						100	100
SW8260C	Bromoform	UG/KG	21		21						100	100
SW8260C	Bromomethane	UG/KG	21		21		4				100	100
SW8260C	Carbon tetrachloride	UG/KG	21		21						100	100
SW8260C	Chlorobenzene	UG/KG	21		21						100	100
SW8260C	Chloroethane	UG/KG	21		21						100	100
SW8260C	Chloroform	UG/KG	21		21						100	100
SW8260C	Chloromethane	UG/KG	21		21						100	100
SW8260C	cis-1,2-DCE	UG/KG	21		21						100	100
SW8260C	cis-1,3-Dichloropropene	UG/KG	21		21						100	100
SW8260C	Dibromochloromethane	UG/KG	21		21						100	100
SW8260C	Dibromomethane	UG/KG	21		21						100	100
SW8260C	Dichlorodifluoromethane	UG/KG	21		21						100	100
SW8260C	Di-Isopropyl ether	UG/KG	21		21						100	100
SW8260C	EDB	UG/KG	21		21						100	100
SW8260C	Ethyl tert-Butyl Ether	UG/KG	21		21						100	100
SW8260C	Ethylbenzene	UG/KG	21		21						100	100
SW8260C	Hexachlorobutadiene	UG/KG	21		21						100	100
SW8260C	Isopropylbenzene	UG/KG	21		21						100	100
SW8260C	MEK (2-Butanone)	UG/KG	21		21						100	100
SW8260C	Methyl tert-butyl ether (MTBE)	UG/KG	21		21						100	100

TABLE 10

Site Completeness by Analyte – Qualified Data

Method	Analyte	Units	Analyses	Detects	Non-detects	Blank Flags	J Flags	M Flags	Contractor R Flags	Total R Flags	Contractor Percent Completeness	Overall Percent Completeness
			Number of Occurrences									
SW8260C	Methylene chloride	UG/KG	21		21						100	100
SW8260C	MIBK (Methyl isobutyl ketone)	UG/KG	21		21						100	100
SW8260C	Naphthalene	UG/KG	21		21						100	100
SW8260C	n-Butylbenzene	UG/KG	21		21						100	100
SW8260C	n-Propylbenzene	UG/KG	21		21						100	100
SW8260C	p-Isopropyltoluene	UG/KG	21		21						100	100
SW8260C	sec-Butylbenzene	UG/KG	21		21						100	100
SW8260C	Styrene	UG/KG	21		21		9				100	100
SW8260C	TCE	UG/KG	21		21						100	100
SW8260C	Tert Butyl Alcohol	UG/KG	21		21						100	100
SW8260C	Tert-Amyl Methyl Ether	UG/KG	21		21						100	100
SW8260C	tert-Butylbenzene	UG/KG	21		21						100	100
SW8260C	Tetrachloroethene	UG/KG	21		21						100	100
SW8260C	Toluene	UG/KG	21		21						100	100
SW8260C	TPH-Gasoline	UG/KG	22	1	21		1				100	100
SW8260C	trans-1,2-DCE	UG/KG	21		21						100	100
SW8260C	trans-1,3-Dichloropropene	UG/KG	21		21						100	100
SW8260C	Trichlorofluoromethane	UG/KG	21		21						100	100
SW8260C	Vinyl chloride	UG/KG	21		21						100	100
SW8260C	Xylene (total)	UG/KG	21		21						100	100
SW8260C	1,1,1,2-Tetrachloroethane	UG/L	13		13						100	100
SW8260C	1,1,1-TCA	UG/L	13		13						100	100
SW8260C	1,1,2,2-Tetrachloroethane	UG/L	13		13						100	100
SW8260C	1,1,2-TCA	UG/L	13		13						100	100
SW8260C	1,1-DCA	UG/L	13		13						100	100
SW8260C	1,1-DCE	UG/L	13		13						100	100
SW8260C	1,1-Dichloropropene	UG/L	13		13						100	100
SW8260C	1,2,3-Trichlorobenzene	UG/L	13		13						100	100
SW8260C	1,2,3-Trichloropropane	UG/L	13		13						100	100

TABLE 10

Site Completeness by Analyte – Qualified Data

Method	Analyte	Units	Analyses	Detects	Non-detects	Blank Flags	J Flags	M Flags	Contractor R Flags	Total R Flags	Contractor Percent Completeness	Overall Percent Completeness
			Number of Occurrences									
SW8260C	1,2,4-Trichlorobenzene	UG/L	13		13						100	100
SW8260C	1,2,4-Trimethylbenzene	UG/L	13		13						100	100
SW8260C	1,2-DCA	UG/L	13		13						100	100
SW8260C	1,2-DCB	UG/L	13		13						100	100
SW8260C	1,2-Dibromo-3-chloropropane	UG/L	13		13						100	100
SW8260C	1,2-Dichloropropane	UG/L	13		13						100	100
SW8260C	1,3,5-Trimethylbenzene	UG/L	13		13						100	100
SW8260C	1,3-DCB	UG/L	13		13						100	100
SW8260C	1,3-Dichloropropane	UG/L	13		13						100	100
SW8260C	1,4-DCB	UG/L	13		13						100	100
SW8260C	2,2-Dichloropropane	UG/L	13		13						100	100
SW8260C	2-Chlorotoluene	UG/L	13		13						100	100
SW8260C	2-Hexanone	UG/L	13		13						100	100
SW8260C	4-Chlorotoluene	UG/L	13		13						100	100
SW8260C	Acetone	UG/L	13	1	12		1				100	100
SW8260C	Benzene	UG/L	13		13						100	100
SW8260C	Bromobenzene	UG/L	13		13						100	100
SW8260C	Bromochloromethane	UG/L	13		13						100	100
SW8260C	Bromodichloromethane	UG/L	13		13						100	100
SW8260C	Bromoform	UG/L	13		13						100	100
SW8260C	Bromomethane	UG/L	13		13						100	100
SW8260C	Carbon tetrachloride	UG/L	13		13						100	100
SW8260C	Chlorobenzene	UG/L	13		13						100	100
SW8260C	Chloroethane	UG/L	13		13						100	100
SW8260C	Chloroform	UG/L	13		13						100	100
SW8260C	Chloromethane	UG/L	13		13						100	100
SW8260C	cis-1,2-DCE	UG/L	13		13						100	100
SW8260C	cis-1,3-Dichloropropene	UG/L	13		13						100	100
SW8260C	Dibromochloromethane	UG/L	13		13						100	100

TABLE 10

Site Completeness by Analyte – Qualified Data

			Number of Occurrences									
Method	**Analyte**	**Units**	**Analyses**	**Detects**	**Non-detects**	**Blank Flags**	**J Flags**	**M Flags**	**Contractor R Flags**	**Total R Flags**	**Contractor Percent Completeness**	**Overall Percent Completeness**
SW8260C	Dibromomethane	UG/L	13		13						100	100
SW8260C	Dichlorodifluoromethane	UG/L	13		13						100	100
SW8260C	Di-Isopropyl ether	UG/L	13		13						100	100
SW8260C	EDB	UG/L	13		13						100	100
SW8260C	Ethyl tert-Butyl Ether	UG/L	13		13						100	100
SW8260C	Ethylbenzene	UG/L	13		13						100	100
SW8260C	Hexachlorobutadiene	UG/L	13		13						100	100
SW8260C	Isopropylbenzene	UG/L	13		13						100	100
SW8260C	MEK (2-Butanone)	UG/L	13		13						100	100
SW8260C	Methyl tert-butyl ether (MTBE)	UG/L	13		13						100	100
SW8260C	Methylene chloride	UG/L	13		13						100	100
SW8260C	MIBK (Methyl isobutyl ketone)	UG/L	13		13						100	100
SW8260C	Naphthalene	UG/L	13		13						100	100
SW8260C	n-Butylbenzene	UG/L	13		13						100	100
SW8260C	n-Propylbenzene	UG/L	13		13						100	100
SW8260C	p-Isopropyltoluene	UG/L	13		13						100	100
SW8260C	sec-Butylbenzene	UG/L	13		13						100	100
SW8260C	Styrene	UG/L	13		13						100	100
SW8260C	TCE	UG/L	13		13						100	100
SW8260C	Tert Butyl Alcohol	UG/L	13		13						100	100
SW8260C	Tert-Amyl Methyl Ether	UG/L	13		13						100	100
SW8260C	tert-Butylbenzene	UG/L	13		13						100	100
SW8260C	Tetrachloroethene	UG/L	13		13						100	100
SW8260C	Toluene	UG/L	13		13						100	100
SW8260C	TPH-Gasoline	UG/L	13	1	12						100	100
SW8260C	trans-1,2-DCE	UG/L	13		13						100	100
SW8260C	trans-1,3-Dichloropropene	UG/L	13		13						100	100
SW8260C	Trichlorofluoromethane	UG/L	13	1	12						100	100
SW8260C	Vinyl chloride	UG/L	13		13						100	100

TABLE 10

Site Completeness by Analyte – Qualified Data

Method	Analyte	Units	Analyses	Detects	Non-detects	Blank Flags	J Flags	M Flags	Contractor R Flags	Total R Flags	Contractor Percent Completeness	Overall Percent Completeness
			Number of Occurrences									
SW8260C	Xylene (total)	UG/L	13		13						100	100
SW8270D	1-Methylnaphthalene	UG/KG	34	2	32		2				100	100
SW8270D	2-Methylnaphthalene	UG/KG	34	1	33		1				100	100
SW8270D	Acenaphthene	UG/KG	34	5	29		5				100	100
SW8270D	Acenaphthylene	UG/KG	34	3	31		3				100	100
SW8270D	Anthracene	UG/KG	34	17	17		17				100	100
SW8270D	Benzo (a) anthracene	UG/KG	34	32	2		3				100	100
SW8270D	Benzo (a) pyrene	UG/KG	34	32	2		2				100	100
SW8270D	Benzo (b) fluoranthene	UG/KG	34	32	2		2				100	100
SW8270D	Benzo (g,h,i) perylene	UG/KG	34	32	2		7				100	100
SW8270D	Benzo (k) fluoranthene	UG/KG	34	32	2		2				100	100
SW8270D	Chrysene	UG/KG	34	32	2		9				100	100
SW8270D	Dibenzo (a,h) anthracene	UG/KG	34	22	12		10				100	100
SW8270D	Fluoranthene	UG/KG	34	32	2		19				100	100
SW8270D	Fluorene	UG/KG	34	2	32		2				100	100
SW8270D	Indeno (1,2,3-c,d) pyrene	UG/KG	34	32	2		16				100	100
SW8270D	Naphthalene	UG/KG	34	1	33		1				100	100
SW8270D	Phenanthrene	UG/KG	34	30	4		20				100	100
SW8270D	Pyrene	UG/KG	34	32	2		19				100	100

Appendix H
Technical Review Comments and HDOH Concurrence

Neil Abercrombie
GOVERNOR OF HAWAII

LINDA ROSEN, M.D., M.P.H
DIRECTOR OF HEALTH

STATE OF HAWAII
DEPARTMENT OF HEALTH
P.O. Box 3378
HONOLULU, HAWAII 96801-3378

In reply, please refer to:
File: EHA/HEER Office
2014-511-LMB

October 16, 2014

Mr. Michael Tauchen
Lead Permits and Hazardous Materials Coordinator
Honolulu Authority for Rapid Transportation
Ali'i Place
1099 Alakea Street, Suite 2300
Honolulu, HI 96813

Facility/Site: Honolulu High-Capacity Transit Corridor

Subject: Review of *Environmental Site Characterization for Banana Patch Properties, Pearl City, Oahu, Hawaii,* dated July 11, 2014

Dear Mr. Tauchen:

The Hawaii Department of Health (HDOH) Hazard Evaluation and Emergency Response (HEER) Office has reviewed the referenced report and feels that, overall this is a good report with valuable content, including detailed figures, data tables, an Environmental Hazard Evaluation (EHE), and Environmental Hazard Management Plan (EHMP). An impressive amount of site data were collected and compiled in a very short amount of time. However, some revision is required in order to adequately manage contamination during construction activities in the Pearl Highlands Station area. Tabulated comments are attached for your consideration. Primary concerns include:

- Clarify that contaminated media must be properly contained, stored, labeled, and tracked. Soil stockpiles should be covered and labeled. Soil will not be reused outside the Pearl Highlands Station work area (avoid using "onsite/offsite" verbiage).
- Management of debris is discussed in Section 6, but there are additional requirements that need to be discussed (for example, the type and size of debris that can remain in place in accordance with SHWB regulations). To avoid rework or other penalties, coordinate with SHWB to ensure all regulations are closely followed, and communicate these requirements to the site workers.
- Beyond what is discussed in this document, further regulatory supervision is required, including oversight of cesspool closures, work in/near the streams, and well closures. Additional regulatory agencies may have interest in these issues

and it is the responsibility of the Honolulu Authority for Rapid Transportation to properly notify these agencies and manage these requirements.

Should there be any questions, please do not hesitate to contact me at 586-4353. Thank you very much for your time and consideration in this matter.

Sincerely,

Lynn M Bailey

Lynn M. Bailey
Brownfields Voluntary Cleanup Program Specialist
Hazard Evaluation and Emergency Response Office
State of Hawaii Department of Health

Enclosure

Section	Location	Note
General		There was no discussion of whether wells were closed or left in place. This closure information should include the historical "stick up" wells. If wells are left in place, there must be information in the EHMP on how contractors will protect them during grading and what they will do if a well is compromised (repair, closure method, notifications, etc.). If wells were already closed, please provide information about who was notified and include documentation.
General		Several sections state there was no gross contamination in the soil. However, LNAPL was present in groundwater at one well. Somewhere within this report, please clarify that the well was not drilled during this project and so no soil came from this borehole.
1.2		HRS 128 and HAR 11-453 don't really apply to "identification, reporting, and responding to releases". They are applicable if you are storing large quantities of reportable materials. HRS 508-C deals with LUCs. The Clean Water Branch and/or Waste Water Branch should review this document to determine which of the regulatory requirements of the last four bullets are applicable and to ensure their interests are addressed appropriately.
2.2	First paragraph	Global change: The words "onsite" and "offsite" are used throughout the document. Since the entire rail corridor has been called the "Site" in other documents, it is critical this document replace "Onsite" with "Within the Pearl Highlands Station work area". It should also be clarified that this soil will not be reused outside the Pearl Highlands station work area.
3.1	2nd paragraph, last sentence	If accurate, change "no active or buried" to "no active or inactive buried". However, Section 4.1 describes an abandoned pipe discovered during trenching.
3.5		The original plan was to base triplicate sample locations on area, not the volume of sample in the core (per Dr. Brewer, May 8, 2014). In the meeting we decided triplicate samples at DU-1 and 3 (now DUs 4, 6 and 5) would be collected from 0-5 ft bgs. Triplicate samples from what was then DUs 2, 4, 5 (Now DUs 1S, 1N, 2, and 3) would be collected from 6 to 10 ft. bgs, and one triplicate would be collected from what was then DU6 (is now DU7). Please clarify, within Sections 3.5 where, how deep, and how many replicates were collected (also applies to Sections 3.6 and 3.7).
3.5, 4.2.1	DU4	Should this be 0.5 to 3 feet bgs?
3.5		Sections 3.6 and 3.7 have text confirming that IS processing was done at the laboratory. Please add text to Section 3.5 confirming that this processing was done and briefly describe what it entailed.
3.5		HDOH recommends IS, rather than discrete, confirmation samples be collected after the cesspools are removed.
3.8		Note in the text that Wells TW-003 and TW-012 (according to table 3-3) were screened well below the capillary fringe and most likely would not show physical signs of NAPL, but should detect dissolved-phase contamination. Also note that existing well TW-012 sampled the same aquifer as the newly installed wells, rather than the deeper aquifer associated with the DLNR production wells (this would make a difference in the required screening criteria).
3.10	Bullets	Should "duplicates" be "triplicates"?

Section	Location	Note
4.1	Bullets	The soil stockpiles that were present on site during the June sampling event were not covered or marked. How will this soil be differentiated from soil graded from the various DUs?
4.1		During the trenching, portions of drums and abandoned pipelines were discovered. Were these reported as a release (See HDOH comments to work plan)? If so, please provide release ID. If not, please explain why not. Also, the "potentially abandoned concrete pipe" was found in DU3, where only limited or no excavation is planned. It is in HARTs best interest to determine the pipe contents prior to construction.
4.6		Stream bed results discussions should also include detections listed on the table and not screened (example, TPH-o). Additionally, please add the following text to this section, "Although the chromium and lead levels do exceed the NOAA sediment PEC and TEC, the concentrations found in the stream are below natural background levels for soil in Hawaii." Natural background lead in fines could easily approach 100 mg/kg in volcanic soil and sediment derived from the soil. Based on the data there is no reason to further evaluate lead in the sediment in portions of the stream that will be channelized.Based on the data there is no reason to further evaluate lead in the sediment in portions of the stream that will be channelized. Soil in the upland area that exceeds the HDOH Tier 1 EAL of 200 mg/kg for lead should be managed in a manner that prevents erosion and runoff into the stream bed.
4.6		Discuss how the laboratory findings for the sediment sample from DU-10, that state, "Dilution required due to matrix interference (dark and viscous extract; high concentration of non-target hydrocarbons)." Is this related to anything that was observed in the field, such as NAPL or asphalt?
4.7		Either this section, or section 3.8 should discuss whether samples were filtered.
6	throughout	Besides what is stated in Section 6, additional regulatory oversight is required. Include information about requirements for cesspool closures, oversight of work in the streams, and well closures. Additional regulatory agencies may have interest in these issues and it is the responsibility of HART to properly notify and manage these requirements. Also applies to EHMP and recommendations discussions in Section 7.
6	throughout	Management of debris is discussed in this section. There are additional requirements not discussed here (for example, the size of debris that can remain in place). To avoid rework or other penalties, coordinate with SHWB to ensure all regulations are closely followed. Also applies to EHMP and recommendations discussions in Section 7.
6	throughout	This section must specify how the contaminated soil and groundwater will be managed on site. This includes discussions on how the media will be contained/stored, tracked, and marked to avoid mishandling. Consider referring to the appropriate sections of the programmatic EHMP. The post-construction EHMP will include information on the final disposition and maps of contaminated media remaining on the Pearl Highlands Station property. Also applies to EHMP and recommendations discussions in Section 7

Section	Location	Note
6.2	Last paragraph	This sentence reads, "Soil that is removed from the Site (any DU) and is planned for reuse in residential offsite areas will require additional sampling to meet the requirements of pre-characterization of soil intended for offsite reuse (i.e. one sample per 200 cubic yards of soil)." In order to clarify that any soil taken for reuse from this area must be sampled, change to, "....planned for reuse anywhere other than within the Pearl Highlands Station footprint..." Also applies to EHMP and recommendations discussions in Section 7.
6.2.1, 6.2.2, 6.2.3	throughout	Good that LUCs will be applied to restrict land use to C/I where soil is left in place, but remove all text stating "in residential areas." Clarify all text so workers know that 1) "Onsite"= within Pearl Highlands Station footprint, 2) Any soil reused outside of Pearl Highlands Station footprint must be sampled and found "clean" (refer to Feb 2014 Programmatic EHMP and Corr 12-500-lmb). Also applies to EHMP and recommendations discussions in Section 7
7		Note that before it will be determined no restrictions apply to specific areas, confirmation sampling may be required.
7.3	Bullets	After the first bullet, add a new bullet estimating the square footage of the DU that could not be sampled due to stockpiles in the west and equipment storage in the east. These gaps may apply to additional contaminants, not just LNAPL.
7.3	Bullets	After the second bullet, add a new bullet describing the dimension of the large void in DU6 left by the removed building. Explain the data gap from the shallower SUs. This is somewhat discussed in section 4.1 but should be detailed here, as well.
	Figure 4-3. Soil Data	The TPH, PAHs and lead in surface soil samples are typical of urban background, especially along roadsides. The deeper TPH and PAHs could be related to asphalt or oil in the original fill material. The concentrations of lead reported are typical of roadside impacts from pre-1970s era auto exhaust, not that high but not suitable for residential exposure. The TPH is mainly a gross contamination issue. It doesn't pose a significant leaching concern even though it slightly exceeds the leaching based action level and is initially flagged in the EHE for leaching (inferred for DUs 2, 5 and 6; TPH too heavy and groundwater not significantly impacted).
	Figure 4-4. Sediment Data	The cadmium data for DU9 and DU10 in Figure 4-4 are incorrect. According to the lab report (and Table 2) the concentration of cadmium was 0.54 mg/kg in the DU-9 sample and 1.0 mg/kg in the DU-10 sample. The reported concentration of lead in the DU-9 sample is correct (45.1 mg/kg), but the reported concentration of lead in the DU-10 sample should be 17.5 mg/kg, not 45.1 mg/kg as indicated in the figure.
	Figure 4-5. Groundwater Data	If groundwater samples were not filtered prior to testing, the heptachlor is probably related to chlordane detected in shallow soils in most of the DUs (low ppm levels but below EALs) . The presence of organochlorine pesticides suggests that there was sediment in the samples. Runoff into the stream should be controlled during future development to minimize the movement of chlordane into aquatic habitats.
	Appendix G, Section 3.8	Briefly describes the RSDs based on triplicate results, but again, very little information about the locations of the triplicates or what the results mean for the DU where the samples were collected.

HDOH REVIEW COMMENTS
Site Characterization Report for Banana Patch, Revision 0 (2014)

The following responses been prepared to address HDOH HEER Office comments on the Site Characterization Report for Banana Patch Properties, Rev 0.

Section	Location	HDOH Comment	Response to Comment	HDOH Follow-Up Comment	Response to Comment
General		There was no discussion of whether wells were closed or left in place. This closure information should include the historical "stick up" wells. If wells are left in place, there must be information in the EHMP on how contractors will protect them during grading and what they will do if a well is compromised (repair, closure method, notifications, etc.). If wells were already closed, please provide information about who was notified and include documentation.	Temporary wells will need to be removed/abandoned. Two potential production wells were also observed within DU1 and DU6. The well within DU6 was buried during demolition of a structure within TMK96003012. This well will need to be located and together with the other well within DU1, properly abandoned in coordination with DLNR Commission on Water Resource Management (CWRM). No other cesspools or wells were closed or abandoned by HART. Stick up wells observed on the property were installed by geotechnical drillers. These wells do not extend deeper than 10 feet and were filled with water to determine the rate of percolation for geotechnical testing. These will be removed and filled during future construction activities.	Clarify within text that all wells will be closed in accordance with TGM Section 6.2.5. Also state what HART will do if wells are compromised prior to closure (repair, closure method, notifications, etc.).	The text will clarify that wells will be abandoned in accordance with TGM Section 6.2.5. Because groundwater beneath the Pearl Highlands Work Area is not a source of drinking water, the wells will be abandoned in accordance with Option 3 of Section 6.2.5.2 of the TGM. Each well will be pulled out and the open hole backfilled with soil and/or bentonite. In the event that the well can't be removed or breaks during removal, the well casing (and open hole) will be backfilled with hydrated bentonite and left in place. This is believed to be an appropriate method because no leaching or gross contamination concerns exist in the portion of the Pearl Highlands Work Area where no excavation is planned during future construction and soil will remain in place, except for a small portion of DU3 where LNAPL was found. This portion of DU3 will be further investigated/remediated in the future, removing any potential source of LNAPL and potentially impacted soil. Soil within areas/depth interval where leaching concerns exist are all within decision units (DU5 and DU6) where soil (and therefore wells) will be removed and either reused onsite with a minimum of 3 feet clean cover or properly disposed of at an off-site permitted facility during future construction activities. For those wells that are compromised, HART is not planning to conduct any repair because all the wells will be abandoned (as described above). Groundwater contamination above the commercial/industrial (C/I) EALs is limited to organochlorine pesticides and, marginally, selenium and silver. No on-site source was found for these constituents (i.e., no exceedances of EALs in soil [with the exception of a very marginal exceedance of the residential EAL for heptachlor epoxide in surface soil within DU4]). Therefore, it is believed that groundwater contamination is from past regional pesticides and termiticides agricultural/residential applications, and future groundwater monitoring at the Pearl Highlands Work Area is not necessary.

Section	Location	HDOH Comment	Response to Comment	HDOH Follow-Up Comment	Response to Comment
General		Several sections state there was no gross contamination in the soil. However, LNAPL was present in groundwater at one well. Somewhere within this report, please clarify that the well was not drilled during this project and so no soil came from this borehole.	Section 5.2.1 states that "*…gross contamination concerns in soil at the Site are limited to the area in the vicinity of the steel-cased well where LNAPL was encountered within DU3*"; also, Section 7.1.7 in Conclusions and Recommendations states that "*Based on the site investigation data, it is concluded that potential gross contamination, direct exposure, leaching, and ecotoxicity concerns exist in soil and/or groundwater in the flat area of the Site. ……..Gross contamination concerns in native soil are present in DU3 under residential, C/I, and construction workers scenarios because of presence of LNAPL.*" Text at the end of Section 3.8 will be modified for clarification to indicate that the well was not installed during this project and that no soil samples were collected from the borehole, as follows: "In addition to groundwater samples, one discrete sample (sample ID, FASC-LNAPL01-0514) containing an oil-like substance was collected using a bailer from an existing 5-inch-diameter, thin-walled, steel-cased well that was found about 12 feet upgradient of TW-001 (see Figure 3-3). This well was already present within the Pearl Highlands Station work area at the time of the investigation and no drilling or soil sampling activities were conducted at this location. The LNAPL discrete sample was analyzed for TPH-g, TPH-d, and TPH-o, and was estimated to be oil because of the high concentration (505,000 milligrams per kilogram [mg/kg]) of TPH-o.	Key phrase in this comment = "In the soil". The groundwater sections and summaries clearly stated there was gross contamination in DU 3. It is NOT clear how soil from TW-001, and maybe TW-002 as well as other DU-3 borings, exhibited no signs of gross contamination.	Because of the high viscosity and very low/leachability of oil (and TPH-o), it would not be surprising if the presence of limited volume of oil in the steel-cased well resulted in no or limited impact to soil and groundwater surrounding the well. However, the conclusions and recommendations acknowledge the potential for gross contamination of soil in the vicinity of where LNAPL was observed on groundwater. Additional text will be included in sections 5, 6, and 7 to further discuss and clarify this issue. Finally, as described in Section 7.2 of the report, additional delineation and remedial activities in this small portion of the DU3 can be conducted during future construction activities to remove LNAPL and grossly contaminated soil potentially remaining in the area to the extent practicable.
1.2		HRS 128 and HAR 11-453 don't really apply to "identification, reporting, and responding to releases". They are applicable if you are storing large quantities of reportable materials. HRS 508-C deals with LUCs. The Clean Water Branch and/or Waste Water Branch should review this document to determine which of the regulatory requirements of the last four bullets are applicable and to ensure their interests are addressed appropriately.	The list will be revised to make specific reference to HRS 128D, HAR 11-451 for identification, reporting, and responding to releases associated with pre-existing contamination and for Contractor releases during construction. Reference to 11-453 was made as it may apply to storage and reporting requirements for chemicals stored in reportable quantities and subsequently released by Contractors from larger areas such as Casting Yards or laydown areas. Additional clarification will be added. This section will be shared with the HDOH Clean Water and Waste Water Branches for input.	None	NA

Section	Location	HDOH Comment	Response to Comment	HDOH Follow-Up Comment	Response to Comment
2.2	First paragraph	Global change: The words "onsite" and "offsite" are used throughout the document. Since the entire rail corridor has been called the "Site" in other documents, it is critical this document replace "Onsite" with "Within the Pearl Highlands Station work area". It should also be clarified that this soil will not be reused outside the Pearl Highlands station work area.	The word "onsite" will be replaced with "within the Pearl Highlands Work Area". The sentence will be clarified to read: "Existing fill material and native soil may be reused within the Pearl Highlands Work Area. Fill material and soil that meet HDOH Tier 1 EALs for unrestricted use may be reused and/or disposed offsite. Debris and fill material that do not meet inert fill criteria will be disposed offsite."	Clarify throughout the document that soil exceeding Tier 1 EALs will be reused within the Pearl Highlands Work Area or properly disposed (not reused outside the Banana Patch).	It will be further clarified throughout the document that soil exceeding Tier 1 EALs will be reused within the Pearl Highlands Work Area or properly disposed of at a permitted facility. No soil exceeding unrestricted use EALs will be reused outside of the Pearl Highlands Work Area.
3.1	2nd paragraph, last sentence	If accurate, change "no active or buried" to "no active or inactive buried". However, Section 4.1 describes an abandoned pipe discovered during trenching.	The sentence will be revised to read: "No active or inactive buried utility lines were identified by either the Hawaii One Call Utility Locating Center or by the third-party utility surveyor in the areas where soil borings or test pits were planned. However, an abandoned pipe was identified during trenching (see Section 4.1)."	None	NA
3.5		The original plan was to base triplicate sample locations on area, not the volume of sample in the core (per Dr. Brewer, May 8, 2014). In the meeting we decided triplicate samples at DU-1 and 3 (now DUs 4, 6 and 5) would be collected from 0-5 ft bgs. Triplicate samples from what was then DUs 2, 4, 5 (Now DUs 1S, 1N, 2, and 3) would be collected from 6 to 10 ft. bgs, and one triplicate would be collected from what was then DU6 (is now DU7). Please clarify, within Sections 3.5 where, how deep, and how many replicates were collected (also applies to Sections 3.6 and 3.7).	Table 3-2 identifies the number of replicate samples collected from the various DUs (replicates approximately 10 percent of the total samples). Sample depths will be added to Table 3-2. Additional clarification and justification for the DUs and vertical intervals will be provided in the text sections 3.5, 3.6, and 3.7.	None	NA
3.5, 4.2.1	DU4	Should this be 0.5 to 3 feet bgs?	Surface and shallow subsurface soil were evaluated independently for construction worker exposure scenarios. Therefore, 0-0.5 foot bgs and 0-3 feet bgs intervals were evaluated.	0-3 feet and 0.5- 3 feet are not used consistently throughout the document (other discussions on DU-4, as well as discussions about all other DUs). Check all sections, verify which is accurate, and correct accordingly. Make sure the document reflects what actually happened in the field.	The 0-0.5 foot bgs and 0-3 feet bgs soil sampling intervals were evaluated only within DU4. At all other DUs the surface and shallow subsurface soil sampling intervals were consistently 0-0.5 foot bgs and 0.5-3 feet bgs.
3.5		Sections 3.6 and 3.7 have text confirming that IS processing was done at the laboratory. Please add text to Section 3.5 confirming that this processing was done and briefly describe what it entailed.	Additional text will be added to confirm that IS processing was performed at the laboratory and to clarify that stream bed samples were required to be analyzed 'wet' due the excessive amount of time required to dry the samples.	None	NA

Section	Location	HDOH Comment	Response to Comment	HDOH Follow-Up Comment	Response to Comment
3.5		HDOH recommends IS, rather than discrete, confirmation samples be collected after the cesspools are removed.	The analytical results for the discrete samples collected from around the cesspools did not identify the cesspool as a source of contamination and it does not appear that the cesspool was used to dispose of contaminants. Consequently, barring any new evidence of contamination identified within the cesspool during removal, additional samples are not anticipated to be required following cesspool removal with DU6. Instead, the soil will be handled similar to other soil generated within DU6.	None	NA
		Note in the text that Wells TW-003 and TW-012 (according to table 3-3) were screened well below the capillary fringe and most likely would not show physical signs of NAPL, but should detect dissolved-phase contamination. Also note that existing well TW-012 sampled the same aquifer as the newly installed wells, rather than the deeper aquifer associated with the DLNR production wells (this would make a difference in the required screening criteria).	TW-003 was installed at boring location B13. As noted in the boring log for B13, very poor soil recovery was obtained between 15 and 25 feet bgs. The first water bearing interval was observed between 25.5 and 28 feet bgs. Since the original plan was to install temporary wells with 5-foot screens and because of the uncertainties related to poor soil recovery between 15 and 25 feet bgs, the field team made the decision to install the screen of the well where saturated soil was observed in the core. Because of presence of clay at depths where the water table was expected (e.g., 10-15 feet bgs), it is also possible that the shallow aquifer is semi-confined and groundwater in most wells installed at the site is subject to slight upward gradients. Because of the large presence of clay, the field team later decided to install 10-foot screen at other wells. A note will be added that water sampled from TW-012 was from the same shallow aquifer as the other temporary wells. No visual evidence of LNAPL was observed in soil borings and TPH concentrations in soil generally below saturation limits also suggest that LNAPL is limited. However, because LNAPL was measured within the 5-inch, steel-cased well, the general reference to gross contamination in soil was made to recognize that LNAPL on groundwater may likely be present in soil in the vicinity.	None	NA

Section	Location	HDOH Comment	Response to Comment	HDOH Follow-Up Comment	Response to Comment
3.10	Bullets	Should "duplicates" be "triplicates"?	The bullet will be revised to read: Field replicate (duplicate and triplicate) precision	There is some confusion about results. Section 5.2.1.1 states that, "LNAPL (0.2 foot) was identified as present within a thin walled 5-inch steel-cased well located in DU3 (Figure 3-3), and in a temporary well (0.02 foot in well TW-001) located within DU3, approximately 12 feet downgradient (south) of the steel well." The TW-001 LNAPL was also discussed in other places in the document. Section 4.7 states that TW-001 had 148 ug/L TPH-g; Table 4-5 states that TW-001 was non-detect for TPH-g and the detection was in well TW-002. Figure 4-5 also seems to show the detection in TW-002, not TW-001. There is no mention of this detection in Table 5-2. Table 5-2 also fails to mention TPH in GW in DUs 2, 3, and 4 and does not discuss DU-4 at all.	The text throughout the document will be modified to clarify that a limited amount of LNAPL was found in the thin-walled, steel-cased well located about 12 feet upgradient of TW-001. Also at TW-001, after collecting a LNAPL sample for analysis, no LNAPL was observed during subsequent measurements in this well. Although very limited (0.02 foot) LNAPL was measured in TW-001 during groundwater sampling before sample collection, no LNAPL or sheen was observed in the groundwater sample, no odor or staining was observed on the interface probe, and no LNAPL was detected at this well during gauging conducted the day after installation. This suggests a false detection during groundwater sampling. Data included in Table 4-5 and Figure 4-5 are correct. The text will be revised to be consistent with tables and figures, reporting no detection for TPH-g in TW-001 and 148 ug/L in TW-002. TPH groundwater exceedances are not included in Table 5-2 because this table includes only exceedances of applicable Tier 1 EALs (EALs for sites where drinking water is not threatened and concentrations are below these action levels). However, introductory text of Section 5.2 is not completely clear on this regard and will be modified as follows: *"This section evaluates potential hazards associated with COPC concentrations in soil and groundwater at Site. All results exceeding the applicable HDOH Tier 1 EALs were carried over to Tier 2 for the EHE of different exposure scenarios/hazards. This EHE is subdivided in two subsections to evaluate soil and groundwater against the appropriate hazard-specific EALs. After Tier 1 evaluation conducted in Section 4, where analytical results were compared against the unrestricted Tier 1 (lowest) EALs to select the COPCs, those compounds exceeding the Tier 1 EALs for sites within 150 meters of surface water bodies and where drinking water is not threatened (HDOH, Fall 2011) were carried over to Tier 2 evaluation. During the Tier 2 evaluation, results were compared against hazard-specific EALs to evaluate the potential exposure scenarios."*
4.1	Bullets	The soil stockpiles that were present on site during the June sampling event were not covered or marked. How will this soil be differentiated from soil graded from the various DUs?	The soil stockpiles were being temporarily stored on site for use on a different area of the project nearby. These soil stockpiles have since been removed and used offsite for H1/H2 grading work associated with the cantilever column.	None	NA
4.1		During the trenching, portions of drums and abandoned pipelines were discovered. Were these reported as a release (See HDOH comments to work plan)? If so, please provide release ID. If not, please explain why not. Also, the "potentially abandoned concrete pipe" was found in DU3, where only limited or no excavation is planned. It is in HARTs best interest to determine the pipe	Partial drums and the abandoned pipeline were not reported as releases because a release or threat of release of a hazardous substance was not identified. During the site walk, a street sweeper was observed along with several other types of debris including buckets, partial drums, and tanks. At that time, the OSC indicated that insufficient information had been gathered to determine if a release of a hazardous substance had occurred. Accordingly, the presence of a partial drum within the trench without any evidence of contents within or	Okay per Curtis.	Comment noted. Thank you for checking.

Section	Location	HDOH Comment	Response to Comment	HDOH Follow-Up Comment	Response to Comment
		contents prior to construction.	around the drum did not appear to indicate that a release of a hazardous substance had occurred. Given that the pipe appeared to be made of concrete, it may be an abandoned drain or water line. The pipe was trending in the direction of the depression within DU6. However, the pipe was not identified within trenches excavated within DU6 so it is possible that the pipe terminates prior to the depression within DU6. The pipe was located deeper than 8 feet in an area where little future excavation would be completed. Therefore, it did not appear practical to try to track out the location of the pipe. If necessary, this can be done in conjunction with other grading work planned for the area.		
4.6		Stream bed results discussions should also include detections listed on the table and not screened (example, TPH-o). Additionally, please add the following text to this section, "Although the chromium and lead levels do exceed the NOAA sediment PEC and TEC, the concentrations found in the stream are below natural background levels for soil in Hawaii." Natural background lead in fines could easily approach 100 mg/kg in volcanic soil and sediment derived from the soil. Based on the data there is no reason to further evaluate lead in the sediment in portions of the stream that will be channelized.Based on the data there is no reason to further evaluate lead in the sediment in portions of the stream that will be channelized. Soil in the upland area that exceeds the HDOH Tier 1 EAL of 200 mg/kg for lead should be managed in a manner that prevents erosion and runoff into the stream bed.	Additional discussion will be added to include detections for which NOAA sediment criteria do not exist, e.g., TPH-o.	Also add this text.	The sentence will be added at the end of Section 4.6.

Section	Location	HDOH Comment	Response to Comment	HDOH Follow-Up Comment	Response to Comment
4.6		Discuss how the laboratory findings for the sediment sample from DU-10, that state, "Dilution required due to matrix interference (dark and viscous extract; high concentration of non-target hydrocarbons)." Is this related to anything that was observed in the field, such as NAPL or asphalt?	NAPL or asphalt were not observed in the sediment samples during collection. Sample dilution was most likely done because of the heavy hydrocarbon detection of residual range TPH at 400 ppm. However, PAH compounds were relatively low and would not be expected in high concentration associated with residual range TPH. Thick and dark, viscous extract could be due to the presence of motor oil or some other heavy weight oil, but no evidence of LNAPL was observed on site during sample collection. The 400 ppm is enough to impact analysis but potentially low enough not to be noted in the field as presence of LNAPL.	None	NA
4.7		Either this section, or section 3.8 should discuss whether samples were filtered.	Text will be added to indicate that 0.45 micron filters were used prior to collection of samples for dissolved metals analysis.	None	NA
6	throughout	Besides what is stated in Section 6, additional regulatory oversight is required. Include information about requirements for cesspool closures, oversight of work in the streams, and well closures. Additional regulatory agencies may have interest in these issues and it is the responsibility of HART to properly notify and manage these requirements. Also applies to EHMP and recommendations discussions in Section 7.	2 cesspools within DU6 were found to contain no residual sludge and filled by Kiewit. These cesspools will be excavated again during construction of the Pearl Highlands Garage and Station. Additional cesspools were observed in DU1. Additional investigation will be conducted to identify the location of cesspools and wells associated with existing residential structures. Large capacity cesspools will be coordinated with HDOH Waste Water Branch. Small capacity cesspools will be pumped/excavated to remove any sludge and then filled but are not anticipated to require separate coordination with HDOH unless there is evidence of contamination. Work conducted within and around the stream is being coordinated with the Army Corps of Engineers and HDOH CWB. Well closures for production wells will be coordinated with DLNR CWRM. The intent of this Site Characteristic Report and EHMP is to identify the requirements for handling potentially contaminated media. While mention will be made to the additional regulatory requirements for cesspool closures, work within the stream, and well closures, cannot be covered adequately in this document to identify all other regulatory requirements, particularly those for which separate coordination is required.	None	NA

Section	Location	HDOH Comment	Response to Comment	HDOH Follow-Up Comment	Response to Comment
6	throughout	Management of debris is discussed in this section. There are additional requirements not discussed here (for example, the size of debris that can remain in place). To avoid rework or other penalties, coordinate with SHWB to ensure all regulations are closely followed. Also applies to EHMP and recommendations discussions in Section 7.	Debris displaced or removed during construction will be recycled or disposed. In areas where little excavation is planned, debris is not planned to be removed. Much of the debris appears to have been deposited/buried prior to 1993. According to the SHWB, fill deposited prior to 1993 by others predates Solid Waste Management regulations and there may not be a regulatory requirement for removal/disposal. HART will coordinate with the HDOH SHWB to discuss the requirements.	None	NA
6	throughout	This section must specify how the contaminated soil and groundwater will be managed on site. This includes discussions on how the media will be contained/stored, tracked, and marked to avoid mishandling. Consider referring to the appropriate sections of the programmatic EHMP. The post-construction EHMP will include information on the final disposition and maps of contaminated media remaining on the Pearl Highlands Station property. Also applies to EHMP and recommendations discussions in Section 7.	Text will be revised to include reference to the Programmatic EHE-EHMP. However, since the site has been characterized, some of the requirements included in the Programmatic EHE-EHMP may not be necessary. For example, since all soil within DU5 has been characterized as having reuse restrictions, limiting stockpiles to 100 cubic yards, lining the bottom and covering with plastic sheeting may not be necessary as long as BMPs are in place to prevent migration/dispersion of contaminants. Post-construction EHE-EHMP will document the remaining contamination and restrictions.	None	NA
6.2	Last paragraph	This sentence reads, "Soil that is removed from the Site (any DU) and is planned for reuse in residential offsite areas will require additional sampling to meet the requirements of pre- characterization of soil intended for offsite reuse (i.e. one sample per 200 cubic yards of soil)." In order to clarify that any soil taken for reuse from this area must be sampled, change to, "....planned for reuse anywhere other than within the Pearl Highlands Station footprint..." Also applies to EHMP and recommendations discussions in Section 7.	The sentence will be revised as suggested.	Ensure this is changed globally	The report will be checked to make this change throughout the text.

Section	Location	HDOH Comment	Response to Comment	HDOH Follow-Up Comment	Response to Comment
6.2.1, 6.2.2, 6.2.3	throughout	Good that LUCs will be applied to restrict land use to C/I where soil is left in place, but remove all text stating "in residential areas." Clarify all text so workers know that 1) "Onsite"= within Pearl Highlands Station footprint, 2) Any soil reused outside of Pearl Highlands Station footprint must be sampled and found "clean" (refer to Feb 2014 Programmatic EHMP and Corr 12-500-lmb). Also applies to EHMP and recommendations discussions in Section 7.	Text will be revised to replace "onsite" with "within the Pearl Highlands Work Area" per previous comments.	None	NA
7		Note that before it will be determined no restrictions apply to specific areas, confirmation sampling may be required.	A note will be added to indicate that confirmation sampling may be required prior to removal of land use restrictions.	None	NA
7.3	Bullets	After the first bullet, add a new bullet estimating the square footage of the DU that could not be sampled due to stockpiles in the west and equipment storage in the east. These gaps may apply to additional contaminants, not just LNAPL.	The estimated square footage of the areas that could not be sampled will be added to the bullets. However, the lack of coverage in these areas is not anticipated to be a significant data gap.	None	NA
7.3	Bullets	After the second bullet, add a new bullet describing the dimension of the large void in DU6 left by the removed building. Explain the data gap from the shallower SUs. This is somewhat discussed in section 4.1 but should be detailed here, as well.	A new bullet will be added to identify the dimension of the depression in DU6 and the data gap from the shallower SUs.	None	NA
	Figure 4-3. Soil Data	The TPH, PAHs and lead in surface soil samples are typical of urban background, especially along roadsides. The deeper TPH and PAHs could be related to asphalt or oil in the original fill material. The concentrations of lead reported are typical of roadside impacts from pre-1970s era auto exhaust, not that high but not suitable for residential exposure. The TPH is mainly a gross contamination issue. It doesn't pose a significant leaching concern even though it slightly exceeds the leaching based action level and is initially flagged in the EHE for leaching (inferred for DUs 2, 5 and 6; TPH too heavy and groundwater not significantly impacted).	This information will be added to the text to provide relevant context and potential sources for the TPH, PAH, and lead exceedences per the comment.	None	NA

Section	Location	HDOH Comment	Response to Comment	HDOH Follow-Up Comment	Response to Comment
	Figure 4-4. Sediment Data	The cadmium data for DU9 and DU10 in Figure 4-4 are incorrect. According to the lab report (and Table 2) the concentration of cadmium was 0.54 mg/kg in the DU-9 sample and 1.0 mg/kg in the DU-10 sample. The reported concentration of lead in the DU-9 sample is correct (45.1 mg/kg), but the reported concentration of lead in the DU-10 sample should be 17.5 mg/kg, not 45.1 mg/kg as indicated in the figure.	The figure will be revised to reflect the correct analytical results.	None	NA
	Figure 4-5. Groundwater Data	If groundwater samples were not filtered prior to testing, the heptachlor is probably related to chlordane detected in shallow soils in most of the DUs (low ppm levels but below EALs). The presence of organochlorine pesticides suggests that there was sediment in the samples. Runoff into the stream should be controlled during future development to minimize the movement of chlordane into aquatic habitats.	Groundwater samples were filtered for metals analysis but not for other analyses. BMPs to control runoff are currently in place above the ordinary high water mark and are anticipated to be maintained throughout construction. Future construction plans include geotextile and vegetated berms along the stream bank.	None	NA
	Appendix G, Section 3.8	Briefly describes the RSDs based on triplicate results, but again, very little information about the locations of the triplicates or what the results mean for the DU where the samples were collected.	Additional discussion will be included to discuss the RSDs on triplicate results and the relative location of normal, duplicate, and triplicate samples.	None	NA

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In reply, please refer to:
File: 2015-020-lmb

January 13, 2015

Mr. Michael Tauchen
Honolulu Authority for Rapid Transportation
Ali'i Place
1099 Alakea Street, Suite 2300
Honolulu, HI 96813

Facility/Site: Honolulu High-Capacity Transit Corridor

Subject: Concurrence with *Site Characterization for Banana Patch Properties, Pearl City, Oahu, Hawaii*

Dear Mr. Tauchen:

The Hawaii Department of Health (HDOH) Hazard Evaluation and Emergency Response Office and Solid and Hazardous Waste Branch have reviewed the responses to comments dated January 12, 2014 and have no comments at this time. Please ensure all comments are fully incorporated and submit the finalized document to HDOH at your earliest convenience.

Should new information concerning on-site contamination become available, please notify the HEER Office as soon as possible. Should there be any questions, please do not hesitate to contact me at 586-4353. Thank you very much for your time and consideration in this matter.

Sincerely,

Lynn M Bailey

Lynn M. Bailey
Brownfields Voluntary Cleanup Program Specialist
Hazard Evaluation and Emergency Response Office
State of Hawaii Department of Health