FINAL

Work Plan
Site Inspections at IR Sites 30 and 31 and Expanded Site Inspection at IR Site 32

Naval Weapons Station Seal Beach Detachment Fallbrook
Fallbrook, California

December 2015

Prepared for:

Naval Facilities Engineering Command Southwest
1220 Pacific Highway
San Diego, CA 92132-5190

Prepared by:

CB&I Federal Services

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Review and Approval

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Acronyms and Abbreviations

AHA	activity hazard analysis
APP	Accident Prevention Plan
BAMP	Biological Avoidance and Minimization Plan
bgs	below ground surface
CAGC	coastal California gnatcatcher
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFS	CB&I Federal Services
DEH	Department of Environmental Health
Det.	Detachment
DHS	Department of Health Services
DON	Department of the Navy
DOT	Department of Transportation
DQO	Data Quality Objective
DTSC	Department of Toxic Substances Control
EMAX	EMAX Laboratories
ESI	expanded site inspection
HAZWOPER	Hazardous Waste Operations and Emergency Response
IAS	Initial Assessment Study
IDW	investigation-derived waste
IR	Installation Restoration
LBV	Least Bell's vireo
MCB	Marine Corps Base
mg/kg	milligrams per kilogram
msl	mean sea level
NACIP	Navy Assessment and Control of Installation Pollutants
NAD	Naval Ammunition Depot
NAVFAC SW	Naval Facilities Engineering Command Southwest
NAVWPNSTA	Naval Weapons Station
NEESA	Naval Energy and Environment Support Activity
NFESC	Naval Facilities Engineering Service Center
OSHA	Occupational Safety and Health Administration
PID	photoionization detector

PVC	polyvinyl chloride
QA	quality assurance
QC	quality control
RCRA	Resource Conservation and Recovery Act
RWQCB	Regional Water Quality Control Board
SAP	sampling and analysis plan
SI	site inspection
SKR	Stephens kangaroo rat
SSHP	Site-specific Safety and Health Plan
SVOC	semivolatile organic compound
SW	solid waste
SWFC	southwestern willow flycatcher
TES	Threatened or Endangered Species
UFP-QAPP	Uniform Policy for Quality Assurance Project Plans
USCS	Unified Soil Classification System
U.S. EPA	United States Environmental Protection Agency
VOC	volatile organic compound

Section 1 Introduction

Trevet has prepared this work plan to conduct Site Inspections (SI) at Installation Restoration (IR) Site 30 and IR Site 31 and an Expanded Site Inspection (ESI) at IR Site 32, located at Naval Weapons Station (NAVWPNSTA) Seal Beach Detachment (Det.) Fallbrook, California (Figure 1). This work plan details the field, laboratory, and reporting efforts associated with the SIs and ESI and includes a Sampling and Analysis Plan (SAP) as Appendix A. A Biological Avoidance and Minimization Plan (BAMP) has been developed for the proposed fieldwork at IR Sites 30, 31, and 32 and is included as Appendix B.

This work plan has been prepared on behalf of the United States Department of the Navy (DON) under Naval Facilities Engineering Command Southwest (NAVFAC SW) Contract Number N62473-10-D-4009, Task Order 0096. Trevet prepared this work plan under subcontract to CB&I Federal Services (CFS). The SIs/ESI will be performed in accordance with the National Oil and Hazardous Substances Contingency Plan; Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA); United States Environmental Protection Agency (U.S. EPA) guidance; and Navy policy. Regulatory agencies, including the California Department of Toxic Substances Control (DTSC) and the California Regional Water Quality Control Board (RWQCB) San Diego Region will provide oversight for the SIs/ESI activities.

1.1 Purpose

The purpose of the SI for IR Site 30 is to assess if polychlorinated biphenyls (PCBs) are present in soil at concentrations that pose a potential risk to human health and/or the environment in the area of a switch oil spill that occurred in 1984. If PCBs are not determined to be present in soil at the Site, then the Site will be recommended for closure with no further action. Otherwise, further investigation will be recommended.

The purpose of the SI for IR Site 31 is to evaluate whether there has been a significant release of lead related to disposal of neutralized battery electrolytes. There are two areas of investigation for IR Site 31; soil in the area of a former septic tank located adjacent to the old Battery Shop, former Building 203, and soil and potentially groundwater around the unlined sump and leach field area located adjacent to the new Battery Shop across the street. These areas are being investigated based on previous reported practices at the Site for disposing neutralized battery electrolytes. Data will be used to determine if lead is present at concentrations that potentially pose a risk to human health and/or the environment. If concentrations of lead at IR Site 31 are reported below the risk based screening levels and base-wide background level as listed in the SAP (Appendix A), then no further action will be recommended. Otherwise, further investigation will be recommended.

The purpose of the ESI at IR Site 32 is to further evaluate the extent of hexavalent chromium, metals, volatile organic compounds (VOCs), and SVOCs at the Paint Shop Building, as described below in Section 1.2.3. Hexavalent chromium was reported in a soil sample from boring IR32-SB03 at a concentration exceeding the residential human health screening criteria (ChaduxTt 2010). Other soil samples collected during the SI reported concentrations of lead and arsenic exceeding their respective residential screening criteria and the metal concentrations reported in the Background Study (SES-TECH 2012). Data from this ESI will be used to assess the extent to which hexavalent chromium is present at concentrations that pose a potential risk to human health or the environment and whether metals, SVOCs, and VOCs are reported at concentrations that pose a potential risk to human health or the environment. If concentrations of hexavalent chromium, metals, SVOCs, and VOCs at IR Site 32 are reported below the risk based screening levels and base-wide background levels (metals only) as listed in the SAP (Appendix A), then no further action will be recommended. Otherwise, further investigation will be recommended.

1.2 Summary

The following subsections summarize site conditions at IR Site 30, IR Site 31, and IR Site 32 at NAVWPNSTA Seal Beach Det. Fallbrook.

1.2.1 IR Site 30 – Switch Oil Spill in Building 230

IR Site 30 is located in the southeast end of former Building 230 (Figure 2). This IR Site was identified in an approximate area where previous documentation indicated that up to 16 ounces (1 pint) of potentially PCB-containing electric switch oil spilled onto the ground (NEESA 1985).

Based on aerial photos of the site, Building 230 was demolished sometime between 2002 and 2003 and the area is currently used as a recreational vehicle storage area (Figure 2). During the May 2014 site walk, it was noted that the original asphalt has been resurfaced and no visible sign of the previous removal action exists.

1.2.2 IR Site 31 – Battery Shop Disposal Areas (Former Building 203 and New Battery Shop)

IR Site 31 is comprised of the Battery Shop Disposal Areas at former Building 203 (the old Battery Shop) and the nearby new Battery Shop (Figure 3). From 1942 to 1955, electrolytes from car, truck, and forklift lead-acid batteries were neutralized and then discharged through floor drains into a septic tank located adjacent to former Building 203. Based on aerial photos, former Building 203 was demolished in 2012 or 2013 and the former building footprint area has been covered with gravel (Figure 3). A review of building plans indicated the septic tank is located near the east corner of former Building 203.

In 1955, the Battery Shop was moved across the street. From 1955 to 1983, approximately 4,000 gallons of neutralized battery electrolytes were disposed of through a floor drain system in the new Battery Shop to an unlined sump (identified as the neutralization well on building plans) located southwest of the building (Figure 3). The floor drains, a wash rack, and a shop sink were all connected to the subsurface drain line, which ran approximately 100 feet down slope and discharged to the unlined sump.

1.2.3 IR Site 32 – Paint Shop Building

IR Site 32, referred to as the Paint Shop disposal area, is located within a developed area near the main gate of the Base along Ammunition Road (Figure 1).

Starting in the mid-1950s, a small aboveground storage tank located on a concrete pad (Figure 4) was used to remove paint from various painting tools. The storage tank reportedly contained approximately 50 gallons of caustic soda that was drained to surface soils southeast of the Paint Shop Building every 6 months. This disposal practice, at the Paint Shop Building, was discontinued in 1983.

1.3 Objectives

The objective of the SI for IR Site 30 is to evaluate if PCBs are present in soil in the approximate area of the former switch oil spill (Figure 2), and if PCBs are present, to determine if PCBs present are at concentrations that potentially pose a risk to human health or the environment.

The objective of the SI for IR Site 31 is to evaluate if lead is present in soils in the area surrounding the septic tank located adjacent to former Building 203 and in soils and potentially groundwater around the sump and leach field area adjacent to the new Battery Shop. Additionally, the concentrations of lead and pH will be evaluated to assess if they are present at concentrations that potentially pose a risk to human health and/or the environment.

The objective of the ESI at IR Site 32 is to further delineate the lateral and vertical extent of hexavalent chromium, lead, and arsenic at the Site and to evaluate if hexavalent chromium, metals, VOCs, and SVOCs are present at concentrations that potentially pose a risk to human health and/or the environment.

1.4 Scope of Work

The scope of work for the SIs at IR Sites 30 and 31 and the ESI at IR Site 32 includes the collection of soil samples (and potentially groundwater samples at IR Site 31) to achieve the objectives discussed above. The data obtained during these SIs and the ESI will be collected using methods and procedures that produce a level of quality appropriate for screening-level risk assessments and future site management decisions. Details for each site are presented in Section 3.0 (Technical Approach). A BAMP was prepared to assess what effects, if any, the proposed

work may have on Threatened or Endangered Species (TES). It is expected that TES may be present at IR Site 31 but not at IR Sites 30 and 32. The BAMP concluded that the proposed work has no effects on TES (Appendix B). Prior to any subsurface work at any of the sites, a subsurface clearance for utilities will be conducted to ensure utilities are not affected by the fieldwork.

At IR Site 30, 15 soil borings will be advanced using a hand auger in the approximate area of the former switch oil spill. Two soil samples will be collected at different depths from each of the 15 different borings and analyzed for PCBs.

At IR Site 31, a survey and demarcation of TES near the site will be conducted to confirm that field activities will not adversely affect TES. A geophysical survey will be conducted to locate a former septic tank adjacent to former Building 203. Using a direct-push drill rig, 17 soil borings will be advanced, six near the septic tank adjacent to former Building 203, three within the footprint of former Building 203 (along the drain line), and eight in the sump and leach field area near the new Battery Shop. At each boring, soil samples will be collected from approximately 1, 3, 7, and 13 feet bgs and analyzed for lead and pH. Additionally, based on the laboratory analytical results obtained from soil sampling in the leach field area, a groundwater monitoring well may be installed in the leach field near the new Battery Shop. Groundwater is anticipated to be encountered during drilling at approximately 50 to 60 feet bgs. If installed, the groundwater well (if installed) will be sampled and analyzed for pH and lead.

A total of nine soil borings are planned at IR Site 32. Three soil borings will be advanced using a direct-push drill rig in a step-out pattern from previous soil boring location IR32SB-03 that was drilled during the initial SI (ChaduxTt 2010). One soil boring will be advanced at each of the approximate locations of former borings IRP-SS04 and IRP-SS10, and one boring will be placed along the southwest boundary of the Site. At each of these borings, soil samples will be collected from approximately 1, 5, 9, and 13 feet bgs. Additionally, three borings will be advanced near the approximate location of the former AST and samples will be collected from approximately 1 and 7 feet bgs. All of the samples will be analyzed for metals, hexavalent chromium, VOCs, PCBs, pH, and SVOCs.

Additional field activities will include surveying the location of a potential groundwater monitoring well at IR Site 31 and characterizing and managing investigation-derived waste (IDW) from all the sites.

Following receipt of validated analytical data, an SI/ESI Report will be prepared that will document the fieldwork conducted, tabulate the results, provide the validated data, and discuss findings and conclusions. The SI/ESI Report is not anticipated to include performance of a risk assessment; however, contaminants will be compared to base-wide background concentrations (for metals) as reported in the background study (SES-TECH 2012) and risk-based screening

values (for organic compounds) to assess potential impacts to human health and/or the environment.

1.5 Work Plan Organization

This work plan includes discussions of the site background, soil and groundwater investigation procedures, waste management, reporting, and project management activities conducted for the project. The SAP is included as Appendix A. This work plan is organized as follows:

- Section 1.0 Introduction
- Section 2.0 Site Descriptions
- Section 3.0 Technical Approach
- Section 4.0 Field Sampling Plan
- Section 5.0 Project Management Plan
- Section 6.0 References

Work performed in accordance with this work plan will be overseen by a California-licensed professional geologist or civil engineer. Following approval of the work plan by the DON and regulatory agencies and receipt of an authorization to proceed, the fieldwork will commence.

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Section 2 Site Descriptions

Naval Ammunition Depot (NAD) Fallbrook was commissioned in February 1942. The Depot's mission was to receive, store, and guard large quantities of explosives and ammunition, and to distribute and deliver them as needed to other installations. NAD Fallbrook was put on caretaker status in 1947 but was reactivated in 1950 with the onset of the Korean War. In 1958, NAD Fallbrook was designated an annex of NAD Seal Beach. In the 1960s, Det. Fallbrook's primary duty was to support the Pacific Marine Forces. It also stored, tested, and maintained several types of missiles. As of October 1, 1997, the installation's name changed to Det. Fallbrook, and the installation reported to the present NAVWPNSTA Seal Beach. Functions at the installation currently include inspecting, maintaining, and recertifying air-launched missiles, such as the Phoenix, Sidewinder, Maverick, and high-speed anti-radiation missiles. The installation has 190 magazines that store pyrotechnics, high explosives, fuses, detonators, and small arms. No active firing ranges are located within the installation (Malcolm Pirnie Inc. 2006). The following subsections describe NAVWPNSTA Seal Beach Det. Fallbrook IR Sites 30, 31 and 32, present a summary of the geologic and hydrogeologic conditions, and summarize the background and previous investigations at these sites.

2.1 Site Locations

NAVWPNSTA Seal Beach Det. Fallbrook is located approximately 53 miles north of San Diego, California, in northern San Diego County. It is approximately 9 miles inland from the Pacific Ocean and adjoins a portion of the eastern border of Marine Corps Base (MCB) Camp Pendleton. Elevations within the central part of the installation range from 300 to 840 feet above mean sea level (msl), and the topography is characterized by low hills and shallow westerly flowing drainages. The exception is the deeply incised Santa Margarita River channel located along the northern boundary of the installation that has a base elevation between 160 and 300 feet above msl. The installation occupies 8,852 acres and is secured by a chain-link fence. All of the IR sites discussed in this work plan are located within a developed area near the Ammunition Road entrance gate along the eastern boundary of the Installation (Figure 1).

IR Site 30 is located in the far southeast end of the former transportation garage, former Building 230. Building 230 was located approximately 400 feet to the northeast of the intersection between Ammunition Road and Tower Road; however; the Building has been demolished and a parking area for recreational vehicles currently occupies the site (Figure 2).

IR Site 31 is comprised of two areas. The first area consists of the septic tank area located adjacent to former Building 203, which is located approximately 1,000 feet to the northeast of the intersection between Ammunition Road and Tower Road. The second area consists of an unlined sump and associated leach field adjacent to the new Battery Shop, which is located

approximately 600 feet to the northeast of the intersection between Ammunition Road and Tower Road (Figure 1).

IR Site 32 is located to the southeast of Ammunition Road and approximately 1,500 feet to the northeast of the intersection between Ammunition Road and Tower Road (Figure 1).

2.2 Previous Investigations and Background

The DON has been investigating IR Sites 30, 31, and 32 at NAVWPNSTA Seal Beach Det. Fallbrook since 1985 when an Initial Assessment Study (IAS) was conducted (Naval Energy and Environment Support Activity [NEESA] 1985). This document included investigations at NAVWPNSTA Seal Beach and NAVWPNSTA Seal Beach Det. Fallbrook. Nine separate spill or disposal sites were investigated at NAVWPNSTA Seal Beach Det. Fallbrook during the IAS, including IR Sites 30, 31, and 32. An Addendum to the IAS was conducted in 1990 that documented proposed actions for IR Sites 30, 31, and 32 based on regulatory comments on the IAS (NEESA 1990).

2.2.1 IR Site 30 –Switch Oil Spill in Building 230

IR Site 30 is located in the southeast end of former Building 230 (Figure 2). This IR site was identified in an area where previous documentation indicated up to 16 ounces (1 pint), of potentially PCB-containing electric switch oil spilled onto the ground (NEESA 1985).

The spill was observed in February of 1984 in an area where approximately six electrical switches and several transformers were stored awaiting disposal by personnel at MCB Camp Pendleton. Three of the switches were labeled as containing PCBs, but it is unknown whether the spill was from these switches or if the oil that was spilled contained PCBs. Since the oil potentially contained PCBs, the oil-stained asphalt was removed and disposed of through the Defense Reutilization and Marketing Office (DRMO) in 1984 (NEESA 1985).

Based on aerial photos of the site, Building 230 was demolished sometime between 2002 and 2003 and the area is currently used as a recreational vehicle storage area (Figure 2). During the May 2014 site walk, it was noted that the original asphalt has been resurfaced and no visible sign of the previous removal action exists. Aerial photographs of IR Site 30 taken in 2002, 2003, and 2013 show changes in surface features over time (Figure 2). The photograph from 2002 shows the location of former Building 230. The photograph from 2003 shows Building 230 has been demolished and asphalt covers the former footprint. The photograph from 2013 shows the current site use, a recreational vehicle storage area.

The IAS (NEESA 1985) recommended no further action under the Navy Assessment and Control of Installation Pollutants (NACIP) program for IR Site 30 since the switch oil spill was stated to have been cleaned up, removing the potential threat to human health and/or the

environment. The U.S. EPA agreed with the recommendation in the IAS, but requested further documentation on the cleanup. The California Department of Health Services (DHS) did not agree with the no-further-action recommendation in the IAS and requested additional work be performed prior to site closure (NEESA 1985). An IAS Addendum was submitted in 1990 that recommended no additional work for the site; however, the U.S. EPA and DHS again requested additional information or work prior to agreeing with closing the site (NEESA 1990).

In October of 2014, the Navy requested IR Site 30 be closed with no further action through a Technical Memorandum (Appendix C). This request was based on volume of switch oil spilled, confirmation of removal action through personal interviews, the unknown location of spill, and relative size of the potential impact being small. In response to the Technical Memorandum, the Regional Board requested additional site characterization through an e-mail, which is included in Appendix C. The technical approach to further characterize the Site is included in Section 3.2.

2.2.2 IR Site 31 – Battery Shop Disposal Areas (Former Building 203 and New Battery Shop)

IR Site 31 is comprised of the Battery Shop Disposal Areas at both former Building 203 (the old Battery Shop) and the nearby new Battery Shop (Figure 3).

From 1942 to 1955, electrolytes from car, truck, and forklift lead-acid batteries were neutralized and then discharged to floor drains located in Building 203. During this time period, the lead-acid battery electrolyte was neutralized by adding ammonium hydroxide and water to the battery electrolyte. The floor drains were connected to a drain pipe which was connected to and drained into a septic tank. The location of the septic tank, as depicted on Figure 3, is estimated based on building plans for IR Site 31, but the exact location is unknown. During the discharge period (1942-1955), approximately 2,000 gallons of neutralized battery electrolytes were discharged in this manner (NEESA 1990). During the 1985 IAS on-site inspection, concrete around the floor drains within the building were observed to be deteriorated, indicating the battery electrolyte may not have been neutralized prior to discharging into the drains. Based on aerial photos, Building 203 was demolished in 2012 or 2013 and the former Building 203 footprint area has been covered with gravel (Figure 3).

In 1955, the Battery Shop was moved across the street the new Battery Shop location (Figure 3). From 1955 to 1983, approximately 4,000 gallons of neutralized battery electrolytes were disposed of to floor drains in the new Battery Shop. The floor drains, a wash rack, and a shop sink were connected to a subsurface drain line, which ran approximately 100 feet downslope and discharged to an unlined sump that was identified in building plans as neutralization well. The building plans also indicated a simple leach field consisting of two leach lines was connected to the neutralization well to discharge fluids to the site soils (Figure 3).

From 1955 to 1960, the lead-acid battery electrolytes were neutralized at the new Battery Shop using water and ammonium hydroxide. From 1960 to 1983, the lead-acid battery electrolytes were neutralized using water and baking soda. Since the summer of 1983, the maintenance of batteries has been conducted at NAVWPNSTA Seal Beach and disposal of the electrolyte mixture has been discontinued at the new Battery Shop.

The IAS recommended no further action under the Navy Assessment and Control of Installation Pollutants (NACIP) program for IR Site 31 because the site does not pose a potential threat to human health and/or to the environment. This recommendation was based on the anticipated precipitation of the soluble lead and bonding of lead within the soil, which reduces mobility. Both the U.S. EPA and the DHS disagreed with the no further action recommendation and recommended further work at the site (NEESA 1985).

An Addendum to the IAS (NEESA 1990) was prepared to document the proposed action for the sites at NAVWPNSTA Det. Fallbrook. The Addendum to the IAS stated the DON agreed with the U.S. EPA and the DHS's recommendations to conduct additional work at the site. This additional work included an SI to be conducted at both former Building 203 and the new Battery Shop. The SI for former Building 203 was recommended due to the possibility that battery electrolytes leaked from the septic tank and contaminated the surrounding soil. As recommended, an SI for the new Battery Shop is being conducted due to the possibility of battery electrolyte contamination in the soil near the unlined sump (NEESA 1990).

2.2.3 IR Site 32 – Paint Shop Building

IRP Site 32, referred to as the Paint Shop disposal area, is located within a developed area near the eastern boundary of the installation, southwest of the Ammunition Road entrance gate (Figure 1). The site is located on the south side of the Paint Shop Building and covers approximately 0.1 acre (80 by 50 feet). Two small buildings, a truck scale, and a storage building are located immediately west of the Paint Shop Building (Figure 4). The area south of the Paint Shop is a paved access area that extends approximately 25 feet laterally to a low (5-foot) descending embankment. The Fallbrook Creek drainage channel is located approximately 120 feet southeast and downslope of the site.

Starting in the mid-1950s, paint was removed from tools at the Paint Shop in a small aboveground storage tank that contained caustic soda. This tank was located along the southeastern external wall of the building. The tools with paint on them were lowered into the tank, removed, and hosed off on an area next to the tank. The tank was located on the southeastern side of the building. About every 6 months, the tank was drained via a 15- to 20-foot-long pipe. It was reported that the solution was drained to the hill behind the building until about 1977. At that time, a perforated seepage drum was placed at the pipe outfall, near the top of the hill. Solution was drained into the drum and then into the surrounding soil. This practice

was discontinued in 1983. The Paint Shop Building remains adjacent to the site and is currently used as a paint shop supporting Public Works operations. During the site walk in 2014, dried paint was observed along the slope of the hill behind the former Paint Shop Building and on a utility pole located adjacent to the building.

Previous investigations at the site included an IAS, the associated IAS Addendum, and an SI. The IAS (NEESA 1985) recommended no further action at IR Site 32 under the NACIP program, since the site does not pose a potential threat to human health and/or to the environment. The U.S. EPA and DHS disagreed with the recommendation, stating that a confirmation study is recommended in this area based on the frequency and relatively high volumes of waste discharged along with the chemical character of the waste. In the IAS Addendum (NEESA 1990), the DON agreed with the U.S. EPA and DHS recommendations for further work. The IAS Addendum concluded that an SI should be conducted at IR Site 32 due to the possibility of heavy metal contamination from the paint sludge.

Sampling in support of a Relative Risk Site Evaluation Model was conducted at IR Site 32 in September of 1995. Results from this sampling event indicate PCB-1260 was reported in the soil at 2,500 µg//kg and PCB-1254 was reported in the soil at 2,100 µg/kg at IR Site 32 (Bechtel 1996).

An SI was conducted at IR Site 32 to further assess impacts of previous disposal practices on the Site (ChaduxTt 2010). Twenty soil samples were collected as part of the SI and analyzed for VOCs, SVOCs, metals, and hexavalent chromium. Only two VOCs (m/p-xylene and toluene) were reported at the site but at concentrations well below human health risk-based screening criteria. SVOCs were not reported in any of the soil samples. Lead was reported in three samples (IRP32-SS02, IRP32-SS04, and IRP32-SB03; all at 0 and 2 feet bgs) at concentrations above the residential screening criteria of 80 milligrams per kilogram (mg/kg). Arsenic was reported in boring IR32-SS10 at concentrations exceeding the residential screening criteria and the base-wide background level. Hexavalent chromium was reported in one sample (IRP32-SB03 at 0 and 2 feet bgs) at a concentration of 23.6 mg/kg, which exceeded the residential human health screening criteria of 17 mg/kg (Figure 8). The data reported during the SI are included in Appendix D.

The SI recommended additional assessment at IR Site 32 to further evaluate the extent of hexavalent chromium around IRP32-SB03. The SI also recommended an ESI to further evaluate metals, VOCs, and SVOCs at IR Site 32 (ChaduxTt 2010). This work plan supports the ESI for IR Site 32.

2.2.4 Background Metals Study

A base-wide study of metal concentrations in natural soil at NAVWPNSTA Seal Beach Det. Fallbrook was conducted in 2012 (SES-TECH 2012). This investigation consisted of reviewing the geology of the installation and collecting samples of residual soil at 28 locations around NAVWPNSTA Seal Beach Det. Fallbrook representing the installation's four dominant parent rock types (gabbro, tonalite, granodiorite, and metavolcanics). No samples were collected on or within 1,000 feet of IR Sites 30, 31, or 32. The soil samples were analyzed using U.S. EPA Methods 6020 and 7471. Background metals concentrations were established at the 95-percent upper tolerance limits and are applicable to saprolitic soil derived from the weathering of the underlying bedrock. Table 1 shows the background metals concentrations for the grouping of the three dominant granitic rock types (gabbro, granodiorite, and tonalite) which underlie the installation. These background metals concentrations will be used to compare to metals concentrations from samples collected at the sites. The background values may not be applicable to alluvial or fill material that is not native to the sites.

2.3 Geology and Hydrogeology

The following subsections describe the regional and site-specific geologic and hydrogeologic conditions found at NAVWPNSTA Seal Beach Det. Fallbrook.

2.3.1 Regional Geology

NAVWPNSTA Seal Beach Det. Fallbrook is located in the western portion of the Peninsular Ranges geomorphic province. The province is dominated by the igneous, volcanic, and metamorphic rocks of the Peninsular Range batholith. Metasediments now preserved in the central and eastern Peninsular Range region include marbles, slates, schists, quartzites, and gneisses. Nearly flat-lying sedimentary formations unconformably overlie the granitic and metasedimentary bedrock in the coastal portions of the province, which include NAVWPNSTA Seal Beach Det. Fallbrook. Volcanic rocks are found locally within the central and, to a lesser extent, near the coastal areas of the province, such as the San Onofre Mountains of MCB Camp Pendleton (ChaduxTt 2010). Figure 5 shows the surface geology near IR Sites 30, 31, and 32 at NAVWPNSTA Seal Beach Det. Fallbrook.

2.3.2 Site Geology

Due to the relatively close proximity of the three IR sites to each other, the geology of each site is similar. IR Sites 30, 31, and 32 are located in a developed area within the Installation and are underlain by granitic bedrock mapped as primarily of granodiorite composition (Figure 5). The contact between tonalite and granodiorite the in this area is inferred; therefore, it is possible that the sites are underlain by either or a combination of the rock types.

Relatively thin layers of undocumented fill were mapped during the SI and also were observed in previous soil borings advanced at IR Site 32 (ChaduxTt 2010). The fill at IR Site 32 was logged to a maximum thickness of 4 feet near the top of the embankment and consisted of a light to medium brown silty sand or sandy silt. Fill observed in the lower pad area of IR Site 32 was observed to a depth of generally less than 2 feet. These soils were generally dry and loose in consistency. The underlying granodiorite consisted of light to medium grey or green silty sand that was dense in consistency, moderately weathered, and dry (ChaduxTt 2010).

2.3.3 Regional Hydrogeology

The general hydrologic setting for the northern portion of the Installation is dominated by the Santa Margarita River channel that defines the northern boundary of NAVWPNSTA Seal Beach Det. Fallbrook. All surface runoff from the northern portion of the installation flows into the Santa Margarita River, which is considered part of the Santa Margarita–Upper Ysidora Watershed (ChaduxTt 2010).

The central portion of the installation is characterized by first- and second-order ephemeral drainages associated with Fallbrook Creek. Fallbrook Creek traverses the community of Fallbrook and enters the Installation near the east gate at Ammunition Road. The creek flows west through the Installation and exits NAVWPNSTA Seal Beach Det. Fallbrook along the middle of the western boundary, entering MCB Camp Pendleton. The southern portion of the installation drains southward via first- and second-order ephemeral drainages that include Pilgrim Creek. Pilgrim Creek exits the Installation along the southern boundary and continues southward, where it eventually joins the San Luis Rey River Channel.

Although groundwater within the Installation is considered beneficial use by the California RWQCB, NAVWPNSTA Seal Beach Det. Fallbrook receives all of its potable water from the San Diego County Water Authority. Depths to water in three monitoring wells located at Buildings 230 and 232 on Ammunition Road were measured between 50 and 60 feet bgs in 2003 (Malcolm Pirnie Inc. 2006). These monitoring wells are adjacent to IR Site 30 and relatively close to IR Sites 31 and 32. Based on existing data from these wells, direction of groundwater flow was toward the southwest. The wells are located within the Fallbrook Creek drainage basin, 700 feet north of Fallbrook Creek.

2.3.4 Site Hydrogeology

Within the limits of the IR sites, groundwater is anticipated to be located at a depth of greater than 50 feet bgs, as shown during 2003 groundwater measurements at Building 230. During the SI, surface flow over bedrock was observed in the Fallbrook Creek channel (ChaduxTt 2010); however, this surface water is not anticipated to be affected during this SI/ESI. Groundwater is not anticipated to be contacted during advancement of soil borings due to the anticipated depth of groundwater (greater than 50 feet bgs) and relatively shallow depth of soil borings (maximum

depth of 15 feet bgs). During the potential installation of the groundwater monitoring well at IR Site 31, groundwater is anticipated to be contacted between 50 and 60 feet.

The SI for IR Site 32 documented one water well owned by Rainbow Municipal Water District (ID CA3710016), two water wells owned by the State of California (IDs CADW20000002578 and CADW20000002599), and one water well owned by the USGS (USGS3127337) within 1 mile of the site. The well owned by the Rainbow Municipal Water District is located approximately ½ to 1 mile northeast of the site. . The two wells owned by the State of California are located to the east and southeast at approximately ½ to 1 mile from the site. The fourth water well is owned by the USGS and is located ¼ to ½ mile south from the site (Figure 5).

2.4 Ecological and Environmental Setting

More than 80 percent of NAVWPNSTA Seal Beach Det. Fallbrook lands exist as natural open space because of the low-intensity land use of the installation. Seven different habitat types occur at the installation: coastal sage scrub, mixed chaparral, chamise chaparral, valley foothill riparian, annual grassland, fresh emergent wetlands, and eucalyptus. Fauna common to the installation include many mammals (kangaroo rats, voles, deer, mice, bats, ground squirrels, opossum, rabbits, and coyotes), reptiles (orange-throated whiptails, rattlesnakes, and horned lizards), and birds (owls, kites, quails, sparrows, kingbirds, and hawks).

Many federal TES have been documented or have the potential to occur at the installation, including the following (Tierra Data Inc. 2006):

- Coastal California gnatcatcher (CAGC) (*Polioptila californica californica*), threatened
- Least Bell's vireo (LBV) (*Vireo bellii pusillus*), endangered
- Southwestern willow flycatcher (SWFC) (*Empidonax trailli extimus*), endangered
- Stephens kangaroo rat (SKR) (*Dipodomys stephensi*), endangered
- Arroyo toad (*Bufo californicus*), endangered
- California red-legged frog (*Rana aurora draytonii*), threatened

CAGC is a non-migratory species that nests in coastal sage scrub and adjacent chaparral. The LBV usually arrives in southern California in mid-March through August or September and nests in riparian as well as coastal sage vegetation with patches of Mexican elderberry (*Sambucus mexicanus*). The SWFC also nests in riparian areas and occurs in southern California between mid-May through September or October. The SKR burrows in areas with low-lying perennial cover and bare ground, including coastal sage scrub, grassland, and chaparral. The arroyo toad uses wetland and upland areas during various parts of its life cycle; they are known to occur along the Santa Margarita River and may occur in suitable habitat at NAVWPNSTA Seal Beach

Det. Fallbrook. The California red-legged frog inhabits freshwater marshes, ponds, streams, lakes, and other quiet water bodies.

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Section 3 Technical Approach

This section provides a summary of the technical approach for the field investigation at IR Sites 30, 31, and 32.

3.1 Data Quality Objectives

Data quality objectives (DQOs) for data collection, analysis, and quality assurance/quality control (QA/QC) will be met by implementing field QA/QC procedures and by using various data evaluation processes. The SAP (Appendix A) provides the framework for evaluating existing data that may be used and defines the first stage of the QA requirements for data acquisition and assessment. The SAP and associated data tables have been developed in conformance with the Uniform Policy for Quality Assurance Project Plans (UFP-QAPP) Manual (U.S. EPA 2005).

The technical approach for this field investigation is based on the seven-step DQO development process established in the U.S. EPA guidelines (U.S. EPA 2006). The DQO process provides a mechanism to develop the technical assumptions used to design the field investigation. The Project DQOs are presented in Worksheets #10 and #11 of the SAP (Appendix A).

3.2 Description of Technical Approach

The technical approach for the SIs (IR Sites 30 and 31) and ESI (IR Site 32) is designed to meet the DQOs as presented in the SAP (Appendix A). The following technical approach is similar at each of the IR sites and is organized as follows:

- Prepare a BAMP to assess what effects, if any, the proposed work may have on TES. The BAMP will include the effects of planned field activities on TES at IR Sites 30, 31, and 32. TES are not expected to be identified at IR Site 30, 31, or 32. The BAMP is included as Appendix B.
- Prior to subsurface utility clearance, a subsurface operations permit will be submitted through the Navy Public Works Center. Dig Alert will be notified at least 48 hours prior to subsurface work to allow proper utility clearance by public utilities. Additionally, a private subsurface utility locator will conduct a geophysical survey to locate utilities at the proposed location of soil borings at each of the IR Sites.
- Soil borings will be advanced at IR Site 30 using a hand auger and at IR Sites 31 and 32 using a direct-push drill rig. Each of the soil borings will be logged in accordance with the USCS and soil samples will be collected from the soil borings to assess site contaminants.

- IDW will be characterized for disposal and will be disposed of at an approved facility in accordance with 40 Code of Federal Regulations 300 Subpart 440 (the CERCLA Off-Site Rule).
- Following field activities, an SI/ESI Report will be submitted documenting the fieldwork conducted, the tabulated results, the validated data, and discuss the findings and conclusions. The SI/ESI Report is not anticipated to include performance of a risk assessment; however, contaminants will be compared to background concentrations (for metals) and risk-based screening values (for organic compounds) to assess potential impacts to human health or the environment.

The following subsections discuss specific field activities to be conducted at each individual IR Site.

3.2.1 IR Site 30 –Switch Oil Spill in Building 230

The technical approach for IR Site 30 includes the following:

- Use geographical information system software to process historical aerial images to determine the approximate location of former Building 230.
- Advance 15 soil borings by hand auger to approximately 1 foot bgs to determine extent of PCBs in the soil at the site (if any). Nine of the hand augered borings will be located in the approximate area of the former switch oil spill, one boring will be located on each the north and south side of the building, one boring will be located in the drainage feature on the south side of the building, and 3 borings will be located to the east of former Building 230, just off the pavement (Figure 6). The 9 boring locations placed in the area of the documented spill will be determined by segmenting an approximately 30-foot- by 40-foot-wide area into 9 separate 10-foot by 13-foot grid cells. A boring will be advanced within each of the grids cells. Collect two soil samples within each of the 15 soil borings for a total of 30 samples. One sample will be collected immediately below the asphalt (from approximately 0-1 inch bgs) and the other sample will be collected at approximately 6 inches bgs. All soil samples will be analyzed for PCBs.

3.2.2 IR Site 31 – Battery Shop Disposal Areas (Former Building 203 and the New Battery Shop)

The technical approach for IR Site 31 includes the following:

- Conduct a geophysical survey at IR Site 31 to determine the location of the septic tank at former Building 203. The geophysical survey will also be conducted at all of the proposed sampling locations as part of utility clearance and avoidance.

- Advance 17 direct-push soil borings to a depth of approximately 13 feet bgs. Six of the borings are proposed to be located adjacent to Building 203 in the area of the former septic tank while three of the borings are proposed to be located in the footprint of former Building 203 along the former drain line. Additionally, eight of the borings are proposed to be located in the vicinity of the sump and leach field near the new Battery Shop (Figure 7).
- Collect four soil samples from each of the 17 soil borings. The soil samples will be collected at approximately 1, 3, 7, and 13 feet bgs. All soil samples will be analyzed for lead and pH.
- Potential Well Installation – Based on the results of the eight soil borings near the sump and leach field, the Navy may decide that installation of a monitoring well is warranted. This decision will be based on the results of soil sampling and will be made in consultation with regulatory agencies. If so, one 4-inch-diameter polyvinyl chloride (PVC) groundwater monitoring well will be installed in the leach field below the sump near the new Battery Shop (Figure 7). The well will be installed at approximately 70 feet bgs based on a water table depth of 60 feet bgs. A 20-foot screen will be placed to accommodate seasonal variation in groundwater elevation. Two rounds of groundwater sampling will be conducted. Samples will be analyzed for lead and pH using low-flow sampling methods per the SAP (Appendix A).

3.2.3 IR Site 32 – Paint Shop Building

The technical approach for IR Site 32 includes the following:

- Advance six direct-push soil borings to a depth of approximately 14 feet bgs to determine extent of contamination reported in SI and three direct push soil borings to a depth of approximately 7 feet bgs to investigate surface discharges reported in the area of the former AST. Three of the borings will be located in a step-out pattern near boring IRP32-SB03 to further delineate hexavalent chromium that was detected during the SI at sample location IRP32-SB03 at a concentration that exceeded the residential screening criteria. Two borings will be located adjacent to previous borings IR32-SS04 and IR32-SS02 to further delineate lead that was detected during the SI at these locations at concentrations exceeding the residential screening criteria. One boring will be located adjacent to sample location IR32-SS10 to further delineate arsenic that was detected during the SI at this location at a concentration that exceeded the residential screening criteria and the base-wide background level. One boring will be advanced along the southern border of the Site to further delineate the lead and arsenic concentrations detected at IR32-SS04 and IR32-SS10 at concentrations that exceeded the residential screening criteria and the base-wide background level. These locations will enable the further assessment of hexavalent

chromium, lead, and arsenic concentrations that were previously reported exceeding the residential screening criteria and the base-wide metal background concentration (Figure 8). Additionally, three borings will be located in the approximate area adjacent to the former AST to investigate surface discharges reported in the area of the former AST.

- Thirty samples will be collected at IR Site 32. Collect four samples at each of the borings which will be advanced to further characterize contaminants reported during the SI at approximately 1, 5, 9, and 13 feet bgs, for a total of 24 samples. Collect two samples at each of the borings that will be advanced to investigate surface discharges reported in the area of the former AST at depth of 1 and 7 feet bgs. Each sample will be analyzed for metals, hexavalent chromium, VOCs, PCBs, pH, and SVOCs.

3.3 Selection of Analytical Methods

The selection of soil and groundwater sample analytical methods is based on known contaminants at IR Sites 30, 31, and 32 and from historical site uses. Samples will be analyzed in accordance with the U. S. EPA Solid Waste (SW)-846 test methods, Update IV (U.S. EPA 2007) and the Naval IR Chemical Data Quality Manual (Naval Facilities Engineering Service Center [NFESC] 1999). The SAP (Appendix A) presents the sample methods, containers, preservation, volumes, and holding time requirements. Assessment and oversight, data, quality review, validation, and usability procedures are also specified in the SAP. Soil and groundwater samples will be analyzed by EMAX Laboratories (EMAX).

Soil samples collected from IR Site 30 will be analyzed for PCBs by U.S. EPA Method 8082A.

Soil and groundwater samples collected from IR Site 31 will be analyzed for lead by U.S. EPA Method 6020A, and pH by U.S. EPA Method 9045C (soil) or method SM-4500-HB (water[if well is installed]).

Soil samples collected from IR Site 32 will be analyzed for hexavalent chromium by U.S. EPA Method 7196A, metals by U.S. EPA Methods 6020A and 7471B, SVOCs by U.S. EPA Method 8270C, PCBs by U.S. EPA Method 8082, pH by U.S. EPA Method 9045D, and VOCs by U.S. EPA Method 8260B.

Section 4 Field Sampling Plan

This section describes the methodology for conducting the SI and ESI at IR Sites 30, 31, and 32 NAVWPNSTA Seal Beach Det. Fallbrook, including the methods and procedures for implementation during field operations.

4.1 Health and Safety

The fieldwork will be conducted in accordance with the Accident Prevention Plan (APP) prepared for this project (CFS 2014). The APP describes the safety requirements for investigation activities at the subject sites and includes a Site-specific Safety and Health Plan (SSHP) and activity hazard analysis (AHAs). As required, each fieldworker on this project will have undergone Occupational Safety and Health Administration (OSHA) 40-hour Hazardous Waste Operations and Emergency Response (HAZWOPER) training. A copy of the APP will be available on site during work activities. Prior to initiating fieldwork, all field personnel will be required to read the APP, SSHP, and AHAs. Health and safety meetings will be conducted with all on-site personnel each day of field activities.

4.2 Pre-Field Coordination

All field activities will be coordinated through the NAVWPNSTA Seal Beach Environmental Department. The primary point-of-contact is

- Margaret C. Wallerstein, Ph.D., NAVWPNSTA Seal Beach, (562) 626-7838 margaret.wallerstein.ctr@navy.mil

4.3 Permitting/Notice of Intent

Under CERCLA-regulated cleanups, no federal, state, or local permits are required for on-site investigations. Additionally, due to the anticipated depth to water at the site (greater than 50 feet bgs) and the shallow proposed total depth of the direct-push borings (maximum depth of approximately 14 feet bgs), soil boring information is not required to be provided to the County of San Diego Department of Environmental Health (DEH) and a soil boring permit is not required for the soil borings. Additionally, a drilling permit for installation of the groundwater monitoring well at IR Site 32 will not be submitted to the DEH. However, substantive requirements of the DEH for the construction of soil borings and groundwater monitoring wells will be followed during the SI/ESI fieldwork.

4.4 Biological Monitoring

Biological monitoring was performed at the IR Sites 30, 31, and 32 to determine if TES were present at the Sits and to determine if proposed Site activities will affect the potential TES. The BAMP indicated that the presence of the Coastal California Gnatcatcher, the Stephen's

Kangaroo Rat, the Least Bell's Vireo, and the Southwestern Willow Flycatcher have the potential to occur within the action area; however, none of them are anticipated to be currently present or be affected by proposed site activities. Additionally, an area at IR Site 31 has been indicated as coastal sage scrub but further assessment indicated the site contains a majority of disturbed area with non-native grasses with few coastal sage scrub shrubs within the Site.

Due to the potential for TES at the Site, breeding season restrictions for the Coastal California Gnatcatcher and Least Bell's Vireo was recommended in the BAMP. The Site activities are planned outside of the breeding season for these birds; however, the BAMP additionally stated that if activities are proposed to be conducted during the breeding season then pre-activity surveys by a biologist must be conducted to confirm no TES are present during Site activities.

Therefore, the BAMP concluded that although the potential of TES is present the proposed site activities, with the current schedule, have no effect of the TES in the area (Appendix B)

4.5 Geophysical Survey

A geophysical survey will be conducted adjacent to former Building 203 at IR Site 31 in an effort to locate the septic tank into which the old Battery Shop drain line emptied. The geophysical survey will use ground penetrating radar in an effort to locate anomalies associated with an underground storage tank. The data from the geophysical survey will refine the location and spacing of proposed borings adjacent to former Building 203 at IR Site 31.

4.6 Site Preparation

Proposed direct-push boring locations will be identified using global positioning system equipment and staked or marked on the ground with the proposed boring number. No proposed boring locations are located in concrete paved areas so concrete coring is not anticipated. However, soil borings planned in areas paved with asphalt will be cored to avoid transferring organic compounds from the asphalt to the subsurface.

A single IDW staging area will be used for all IR sites will be established prior to the initiating fieldwork. The staging area will be used to store IDW generated during field efforts. IDW will be stored in Department of Transportation (DOT) approved 55-gallon drums in a secondary containment structure.

4.7 Utility Survey and Clearance

Underground utility clearing will be completed before intrusive fieldwork at IR Sites 31, and 32. Prior to conducting any utility clearance, each boring location will be demarcated with white spray paint and/or flagging. Prior to subsurface utility clearance, a subsurface operations permit will be submitted through the Navy Public Works Center. DigAlert will be notified at least 48

hours prior to subsurface work to allow proper utility clearance by public utilities. Additionally, a private subsurface utility locator will conduct a geophysical survey to locate utilities at the proposed location of the soil borings at each of the IR sites.

The utility surveyor will approve each boring location by confirming no utilities are identified within a 5-foot radius around each of the proposed locations. If a utility is identified within 5 feet of the proposed location, the proposed location will be moved and the clearance procedures will be repeated.

4.8 Soil Borings

At IR Sites 31 and 32, direct-push borings will be advanced using a direct-push drill rig. Direct-push drill rigs use the static weight of the rig combined with a hydraulic percussion hammer to advance a drilling rod into the soil to the desired sampling depth. The soil borings at IR Site 30 will be advanced using a hand auger.

Soil samples will be collected from the direct-push borings at planned depths by removing the drive rod, attaching a sampler, and pushing the sampler to the desired sample depth. An acetate sleeve or stainless steel sleeves will be placed within the sampler prior to advancement to aid in sample preservation, collection, and packaging. Once the sampler is removed from the borehole, the acetate sleeve or stainless steel sleeves will be removed and cut (acetate only) at the desired sample depth, capped, labeled, and prepared for sample shipment. In between each boring location, the drill rods and sampler will be cleaned using the three-stage decontamination process described in more detail in SAP Worksheet #14 (Appendix A). Samples will be collected from the hand augered borings by collecting soil from the auger bucket at the desired depth interval (0.5 and 1 foot bgs).

The soil borings will be continuously sampled from the surface to the total depth of drilling. During soil sampling, soil will be screened for VOCs using a photoionization detector (PID). In addition, soil will be described in accordance with the USCS. Selected soil samples will be submitted to the analytical laboratory in the acetate or metal sleeves. Soil samples requiring VOC analyses will then be collected using the Encore® sampling methodology (requiring three 5-gram Encore® samples per sample per analysis). Procedures for collecting a sample using the Encore® method is described in Worksheet #14 of the SAP (Appendix A). Soil sample identifications are detailed in Worksheet #18 of the SAP (Appendix A). If bedrock is encountered while advancing a soil boring, the boring will be terminated at the refusal depth and the bedrock will not be sampled. A soil sample will be collected at the bedrock interface, if possible.

For the SI at IR Site 30, 15 hand auger borings are proposed to be advanced to a total depth of 1 foot bgs in the approximate area of the former switch oil spill (Figure 6). The boring locations

will be determined by processing historical aerial images into a geographical information system to determine the approximate coordinates of the former building. This information will then be used in the field and the southeast section of the former building location will be marked on the ground. A 30-foot by 40-foot grid broken into nine separate 10-foot by 13-foot cells will be used to collect systematically located samples (for 9 of the boring locations). The grid will start in the southeastern end of the former building. Additionally, one boring will be advanced on each the north and south side of the building, on boring will be advance in the low point of the drainage feature to the south of the building, and three borings will be advanced to the east of the former building in the soil adjacent to the pavement (Figure 6). Two soil samples are proposed to be collected from each soil boring, one from approximately 0-1 inch bgs and the other at approximately 6 inches bgs. All soil samples will be analyzed for PCBs.

For the SI at IR Site 31, 17 direct-push soil borings are proposed to be advanced to a depth of approximately 13 feet bgs. Six of the proposed borings will be located adjacent to former Building 203 in the area of the former septic tank while three of the borings will be advanced in the footprint of the former building, along the former drain line (Figure 7). Eight of the proposed borings will be located in the vicinity of the sump and leach field near the new Battery Shop (Figure 7). Four soil samples are proposed to be collected from each soil boring at approximately 1, 3, 7, and 13 feet bgs for a total of 68 samples collected at IR Site 31.

For the ESI at IR Site 32, six direct-push soil borings are proposed to be advanced to a depth of approximately 14 feet bgs to further characterize the extent of contaminants reported during the SI. Three of the borings will be located in a step-out pattern near boring IRP32-SB03. Additionally, two borings will be located adjacent to previous borings IR32-SS04 and IR32-SS10 and one boring will be located along the southern border of the Site. These locations will enable the further assessment of hexavalent chromium, lead, and arsenic concentrations that were previously reported exceeding the residential screening criteria and the base-wide metal background concentration (Figure 8). Four samples are proposed to be collected within each of these soil borings at approximately 1, 5, 9, and 13 feet bgs. Additionally, three borings will be advanced in the approximate area of the former AST to investigate reported surface releases in the area. Two samples will be collected from each of these borings at depths of 1 and 7 feet bgs. Therefore, a total of 30 samples will be collected at IR Site 32.

After each boring has been advanced to total depth and the samples have been collected, the borehole will be backfilled using bentonite chips to approximately 6 inches bgs. The bentonite chips will be hydrated with potable water and the surface at each boring will be completed to match the adjacent surface. The surface will be completed with native soil in unpaved areas, with cold-patch asphalt in asphalt-paved areas, and with concrete in concrete-paved areas.

4.9 Possible Groundwater Monitoring Well Installation and Sampling

Based on the results of the soil sampling conducted at IR Site 31, a single groundwater well may be installed. The decision to install the well and collect groundwater samples will be made by the Navy, in consultation with regulatory agencies. The groundwater monitoring well (if needed) is proposed to be installed within the leach field area of IR Site 31 located adjacent to the new Battery Shop. The groundwater monitoring well will be installed using hollow-stem auger drilling methods to a target depth of approximately 70 feet bgs. Groundwater is anticipated to be contacted at approximately 50 to 60 feet bgs during drilling.

Soil samples will be collected at 5-foot intervals during drilling for lithologic logging purposes only. Soil samples for laboratory analysis are not planned. Soil boring logs will be generated and will be included in the SI/ESI Report.

Once the water table is identified or the target total depth is reached (approximately 70 feet bgs), the driller will install a 4-inch- diameter monitoring well using Schedule 40 PVC casing and 20 feet of PVC screen with 0.020-inch machine-cut slots. Total depth of the well will be adjusted based on the depth of the water table. The screen will be set approximately 10 feet below the water table to allow for seasonal fluctuations in the water table depth. General well construction specifications are shown in Figure 9. A detailed discussion of monitoring well installation activities is provided in SAP Worksheet #14 (Appendix A).

4.9.1 Development

If installed, the new monitoring well will be developed after a minimum 24-hour waiting period. Development will consist of removing accumulated sand-sized sediment in the well by bailing and then pumping until the well has been developed. SAP Worksheet #14 (Appendix A) discusses this in further detail.

4.9.2 Sampling

If installed, the well will be sampled a minimum of 72 hours following development of the permanent monitoring well. The well will be sampled using a non-dedicated bladder pump and low-flow sampling methodologies. Prior to sampling, depth to groundwater will be measured from the top of the casing in each monitoring well using an electronic groundwater sounder. Further discussion of sampling procedures is provided in SAP Worksheet #14 (Appendix A). The second round of groundwater sampling will be performed approximately 6 months after the initial sampling.

4.10 Land Surveying

If installed, the permanent monitoring well at IR Site 31will be surveyed to establish its horizontal coordinates and elevation. The top of casing will be surveyed at a marked measuring reference, which will be the same location from which the depth-to-water measurements will be collected. The location will be surveyed by a California-licensed land surveyor. All elevations will be determined and reported to the nearest 0.01 foot, relative to the North American Vertical Datum 1988. The horizontal positions will be reported to the nearest 0.1 foot defined relative to the State Plane Coordinate System, North American Datum 1983.

4.11 Sample Analysis

Soil samples will be collected and analyzed from the soil borings at IR Sites 30, 31, and 32 using U.S. EPA SW-846, Update IV sampling guidelines (U.S. EPA 2007) and the samples will be analyzed in accordance with *Navy Installation Restoration Chemical Data Quality Manual* (NFESC 1999). The sample number and analytical suite proposed to be collected at each of the IR sites is presented below.

IR Site 30: 30 samples are proposed to be collected and analyzed for the following:

- PCBs by U.S. EPA test method 8082

IR Site 31: 68 soil samples and two groundwater samples (if collected) are proposed to be analyzed for the following:

- Lead by U.S. EPA Method 6020A
- pH by U.S. EPA Method 9045D (soil) or method SM-4500-HB (water)

IR Site 32: 30 samples are proposed to be analyzed for the following:

- Hexavalent chromium by U.S. EPA Method 7196A
- Metals and mercury by U.S. EPA Method 6020A and 7471B
- SVOCs by U.S. EPA Method 8270C
- PCBs by U.S. EPA Method 8082
- pH by U.S. EPA Method 9045D
- VOCs by U.S. EPA Method 8260B

Further information regarding analytical suites, sample methods, containers, preservatives volumes, and holding time requirements is provided in the SAP (Appendix A). All results will be compared to the residential soil screening levels listed in the U.S. EPA Region 9 Regional Screening Level table (U.S. EPA 2013) and ecological screening levels as further discussed in the SAP. The metals concentrations will initially be compared to background concentrations for

NAVWPNSTA Seal Beach Det. Fallbrook as reported in the background study (SES-TECH 2012) and shown in Table 1. If a metal analyte exceeds the background concentration, then the analyte will be compared to the lower of either the ecological screening level or U.S. EPA Region 9 Regional Screening Level.

4.12 Investigation-Derived Waste

All soil cuttings and IDW fluids will be containerized into DOT-approved, 55-gallon drums and placed in secondary containment for storage. The drums will be stored on site in a secured temporary IDW staging area to minimize the potential for unauthorized access, to the extent practicable. The containerized media may be sampled and analyzed for disposal profiling purposes. Alternatively, analytical results from site samples may be used for disposal profiling. After waste profiling is complete, the IDW will be transported to an approved facility in accordance with 40 Code of Federal Regulations 300 Subpart 440.

The appropriate disposal facility will be determined by the following hazardous classifications:

- Although not anticipated to be present, any soil or water classified as Resource Conservation and Recovery Act (RCRA) hazardous waste will be transported to a licensed treatment, storage, and disposal facility for treatment and disposal.
- Any soil or water classified as non-RCRA hazardous waste will be transported for disposal to a licensed facility in accordance with the CERCLA Off-Site Rule.
- Soil classified as nonhazardous waste, or inert, will be transported for disposal to a licensed landfill or soil treatment facility permitted to accept such waste in accordance with the CERCLA Off-Site Rule.
- Water classified as nonhazardous will be transported for disposal to a licensed treatment facility permitted to accept such waste in accordance with the CERCLA Off-Site Rule.

All waste manifests and profiles, along with analytical data and land disposal restrictions, will be routed through the NAVWPNSTA Seal Beach Det. Fallbrook Environmental Department for signature. Original copies of the manifest packages will be provided to the transporter for shipment. All wastes will be removed from the site within 90 days and will be transported via a licensed transporter.

4.13 Reporting and Data Submission

A SI/ESI Report will be submitted to regulatory agencies following the collection of soil samples and receipt of validated analytical data. The SI/ESI Report will document SI/ESI activities, summarize the results and findings, and present recommendations for follow-up actions. The SI/ESI Report will include site maps, site data in tabular format, a summary of variances from

this work plan (if necessary), and copies of waste manifests. A Draft SI/ESI Report will be submitted to the Navy, U.S. EPA, DTSC, and RWQCB for review. Comments on the draft version of the report will be addressed and a final report will be submitted.

In accordance with Environmental Work Instruction #6 (NAVFAC SW 2005), sample location coordinates, analytical results, and other applicable data collected during the field event will be submitted to the Naval Installation Restoration Information Solution database in the Naval Environmental Data Deliverable format.

Section 5 Project Management Plan

This section presents the site management structure, project organization, key personnel, and schedule.

5.1 Project Organization and Key Personnel

The project team consists of the CFS program manager and Trevet's project manager, field team lead, site health and safety officer, and QA manager. Descriptions of roles and responsibilities are provided here.

- The CFS program manager, Rich Wong, will provide overall project guidance and will facilitate interaction between the DON and subcontractors.
- Trevet's project manager, John Willis, will have overall responsibility for all aspects of the project and for communications between Trevet and the DON.
- The field team leader (to be determined), who will report to the project manager on a regular basis, will be responsible for the day-to-day operations and subcontractor oversight.
- The site safety and health officer (to be determined) will be responsible for oversight and review of all SSHPs, plan implementation, and policy conformance by all field personnel and subcontractors at the site.
- The QA manager, Gerald Tamashiro, is responsible for all contractual QA/QC requirements as well as in-house QA requirements for project deliverables and subcontractor work products.
- In-house senior staff will be responsible for conducting technical reviews to ensure that all documents are scientifically accurate, consistent, and complete prior to submittal to the DON.

A project organization chart is provided in SAP Worksheet #5 (Appendix A).

5.2 Project Schedule

The anticipated project schedule is presented in Worksheet #16 of the SAP (Appendix A). The SI/ESI fieldwork is anticipated to be conducted during winter of 2015/2016.

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Section 6 References

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Table

Table 1. Background Metals Concentrations

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Table 1. Background Metals Concentrations
Naval Weapons Station Seal Beach Detachment Fallbrook

Analyte	Background Threshold Value[1] (mg/kg)
Aluminum†	32,836
Antimony	<0.61 to 3.3*
Arsenic	2.856
Barium	363.5
Beryllium	0.466
Cadmium	0.199
Calcium†	6,828
Chromium	63.8
Cobalt	20.4
Copper	53.4
Iron†	30,800
Lead	6.836
Magnesium†	15,685
Manganese†	532.7
Molybdenum	--
Nickel	15
Potassium†	6,210
Selenium	0.608
Silver	0.0774
Sodium†	679.5
Strontium†	58.7
Thallium	0.606
Tin†	<1.2 to 55.7*
Vanadium	186.4
Zinc	228.2
Mercury	0.0186

Notes:
[1] - Background threshold values are based on 95% upper tolerance limits applicable to saprolitic soil derived from granitic rock (gabbro/granodiorite/tonalite) at Naval Weapons Station Seal Beach Detachment Fallbrook. Values from *Basewide Metals Background Soil Study* (SES-TECH 2012).
* - Asterisk indicates that the analyte was not detected above the reporting limit in the background study (SES-TECH 2012). Indicated values represent the range of reporting limits in the background study.

Abbreviations and Acronyms:
-- - not included in background study
† - analyte is not an EPA priority pollutant or CAM 17 metal
mg/kg - milligrams per kilogram

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Figures

Figure 1. Site Location Map
Figure 2. IR Site 30 Aerial Photographs and Site Features
Figure 3. IR Site 31 Aerial Photographs and Site Features
Figure 4. IR Site 32 Aerial Photographs and Site Features
Figure 5. Surface Geology and Hydrology
Figure 6. IR Site 30 Proposed Sample Locations
Figure 7. IR Site 31 Proposed Sample Locations
Figure 8. IR Site 32 Proposed Sample Locations
Figure 9. Well Construction Diagram

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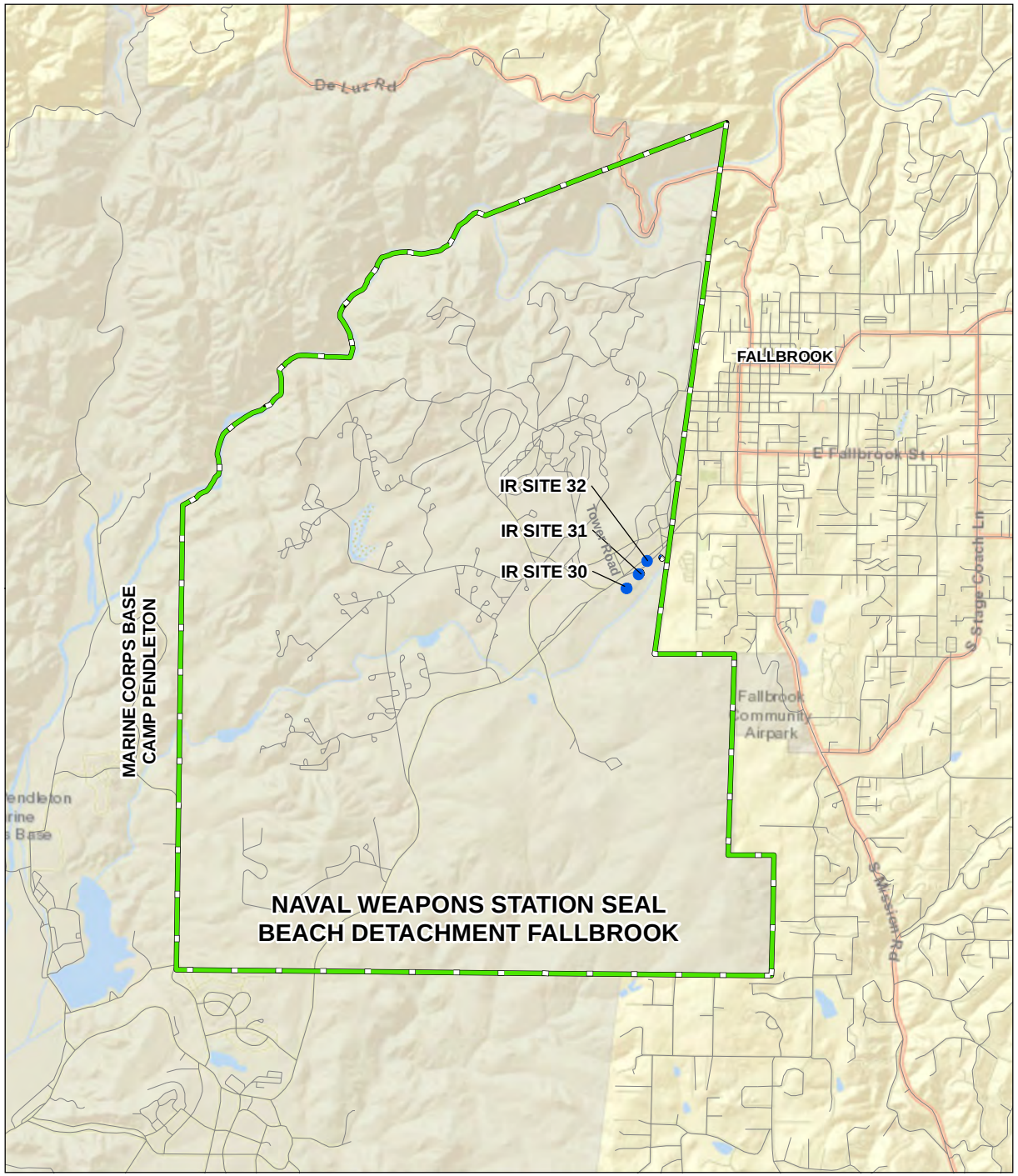
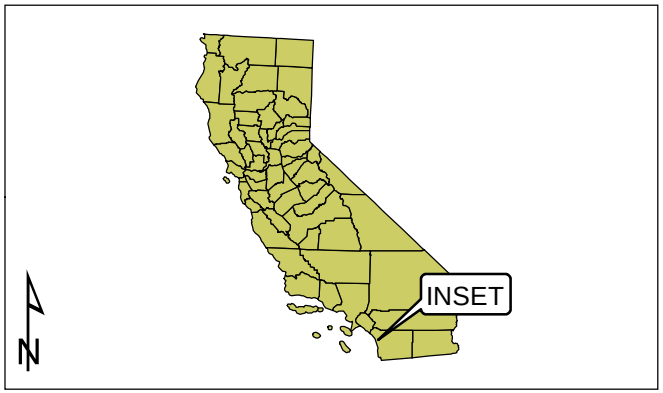
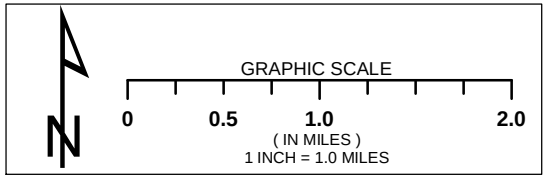




LEGEND

IR SITE BOUNDARY

NAVAL WEAPONS STATION SEAL BEACH DETACHMENT FALLBROOK



DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND

SAN DIEGO, CALIFORNIA

NAVAL WEAPONS STATION SEAL BEACH
DETACHMENT FALLBROOK
FALLBROOK, CALIFORNIA

FIGURE 1

SITE LOCATION MAP

TREVET

DATE: NOVEMBER 2015

CONTRACT NO.: N62473-10-D-4009
DELIVERY ORDER: 0096

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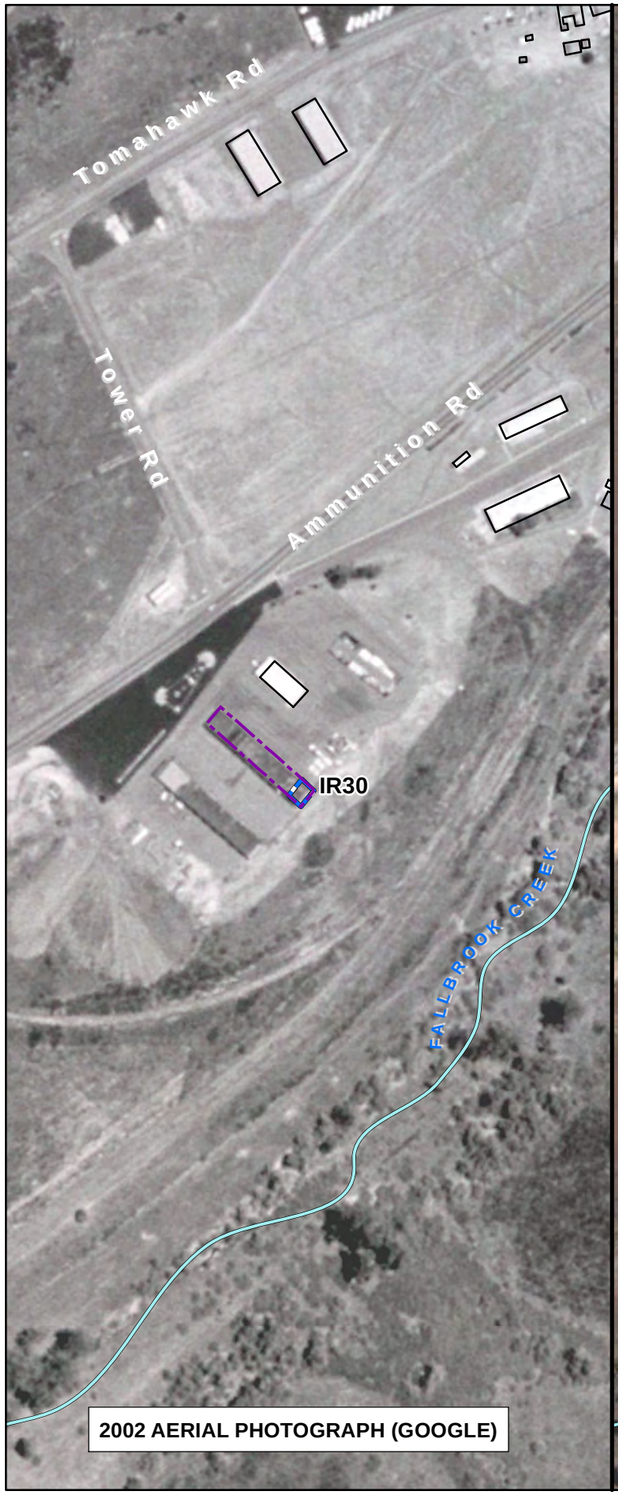
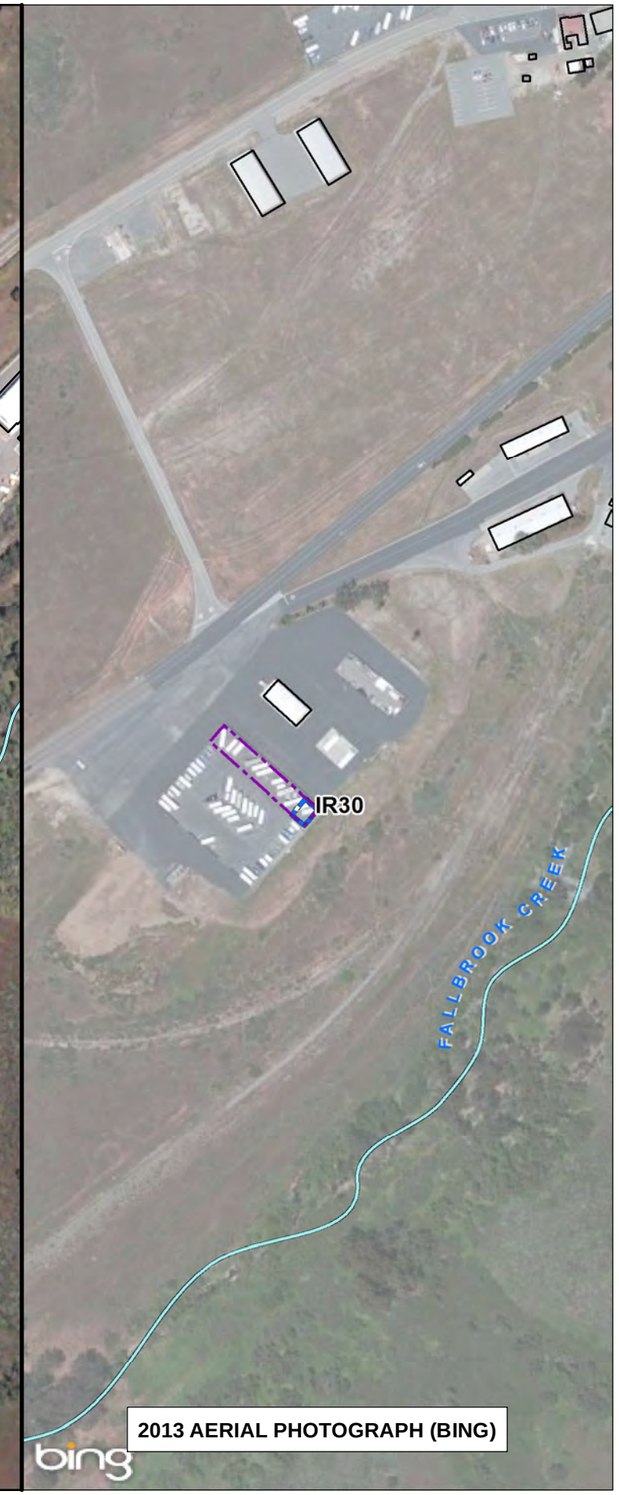


2002 AERIAL PHOTOGRAPH (GOOGLE)

2003 AERIAL PHOTOGRAPH (GOOGLE)



2013 AERIAL PHOTOGRAPH (BING)

LEGEND

- APPROXIMATE LOCATION OF SWITCH OIL SPILL
- BUILDING/STRUCTURE
- FORMER BUILDING 230 FOOTPRINT
- IR SITE 30 BOUNDARY

SOURCE:
GOOGLE AND BING MAPS AERIAL IMAGES
ENVIRONMENTAL SYSTEMS RESEARCH INSTITUTE
(ESRI) USA SPATIAL FEATURE CLASSES. NAD83 STATE
PLANE COORDINATE SYSTEM ZONE VI (FEET)

N

GRAPHIC SCALE

0 150 300 600

(IN FEET)
1 INCH = 300 FEET

DEPARTMENT OF THE NAVY
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ENGINEERING COMMAND

SAN DIEGO, CALIFORNIA

NAVAL WEAPONS STATION SEAL BEACH
DETACHMENT FALLBROOK
FALLBROOK, CALIFORNIA

FIGURE 2

IR SITE 30
AERIAL PHOTOGRAPHS AND SITE FEATURES

TREVET

DATE: NOVEMBER 2015

CONTRACT NO.: N62473-10-D-4009
DELIVERY ORDER: 0096

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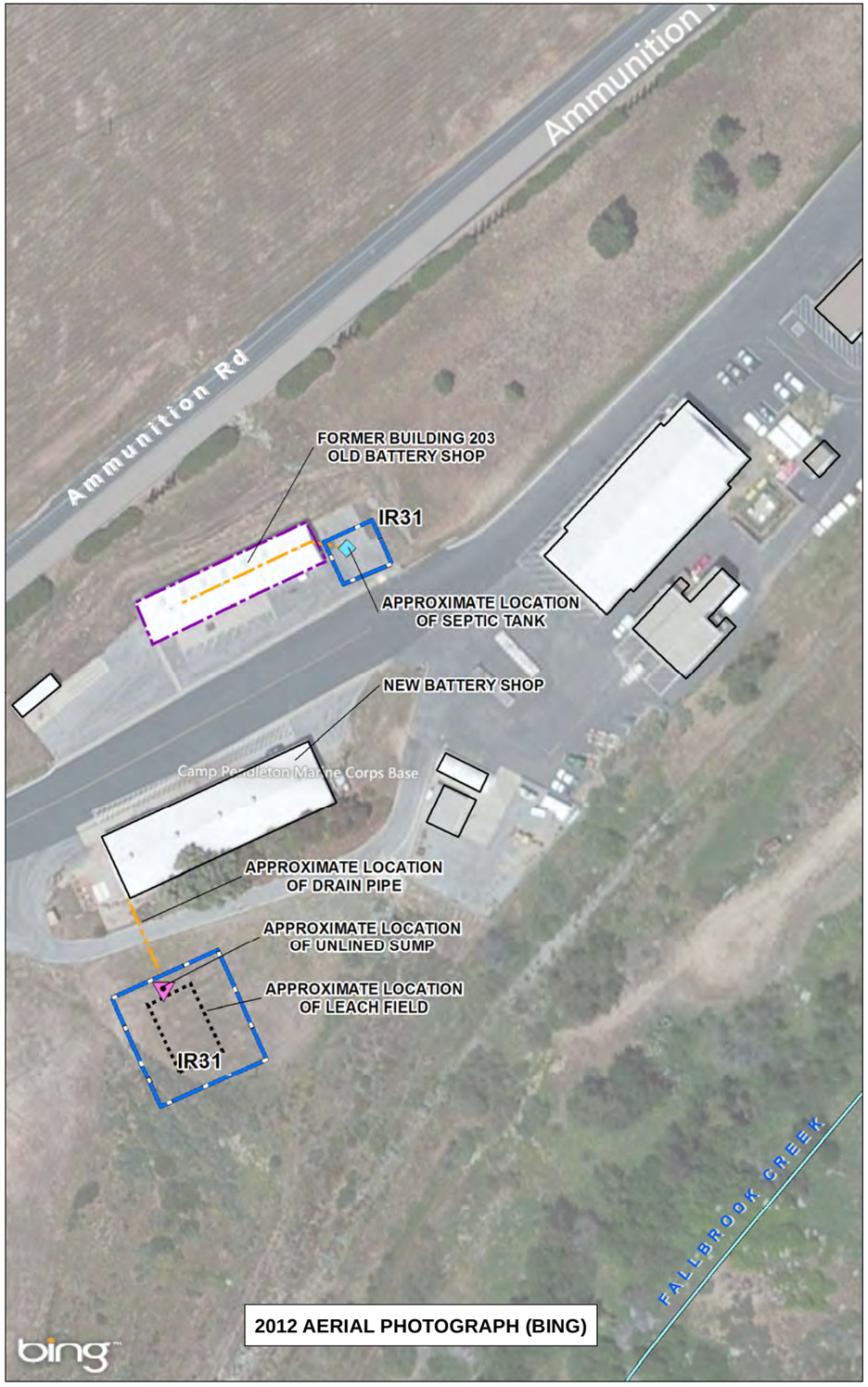
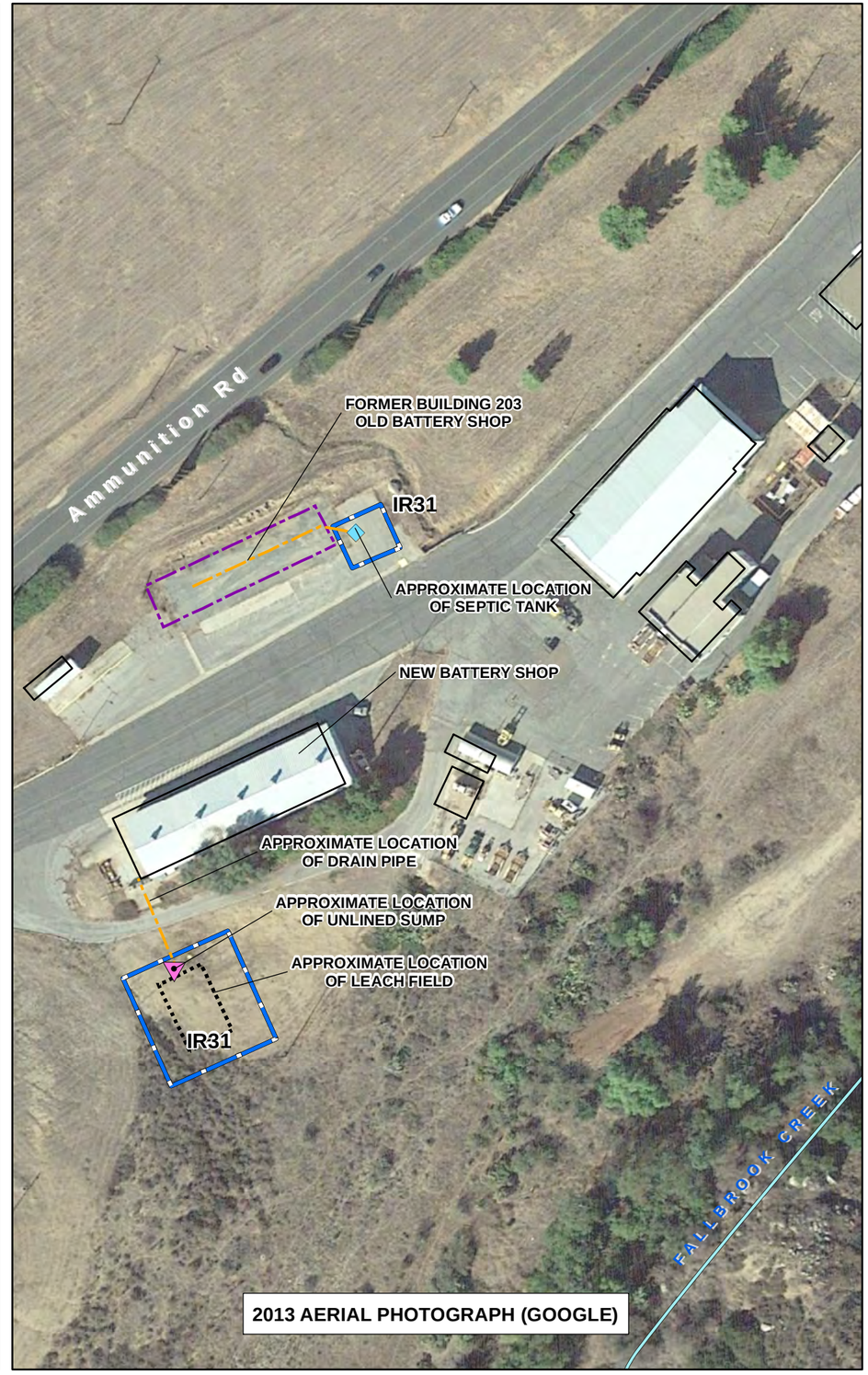


2012 AERIAL PHOTOGRAPH (BING)



2013 AERIAL PHOTOGRAPH (GOOGLE)

LEGEND

- APPROXIMATE LOCATION OF SEPTIC TANK
- APPROXIMATE LOCATION OF UNLINED SUMP
- APPROXIMATE LOCATION OF DRAIN PIPE
- APPROXIMATE LOCATION OF LEACH FIELD
- BUILDING/STRUCTURE
- FORMER BUILDING 203 FOOTPRINT
- APPROXIMATE IR SITE 31 BOUNDARY

SOURCE:
GOOGLE MAPS AERIAL IMAGE
ENVIRONMENTAL SYSTEMS RESEARCH INSTITUTE
(ESRI) USA SPATIAL FEATURE CLASSES. NAD83 STATE
PLANE COORDINATE SYSTEM ZONE VI (FEET)

N

GRAPHIC SCALE

0 50 100 200

(IN FEET)
1 INCH = 110 FEET

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SAN DIEGO, CALIFORNIA

NAVAL WEAPONS STATION SEAL BEACH
DETACHMENT FALLBROOK
FALLBROOK, CALIFORNIA

FIGURE 3

IR SITE 31
AERIAL PHOTOGRAPHS AND SITE FEATURES

TREVET

DATE: NOVEMBER 2015

CONTRACT NO.: N62473-10-D-4009
DELIVERY ORDER: 0096

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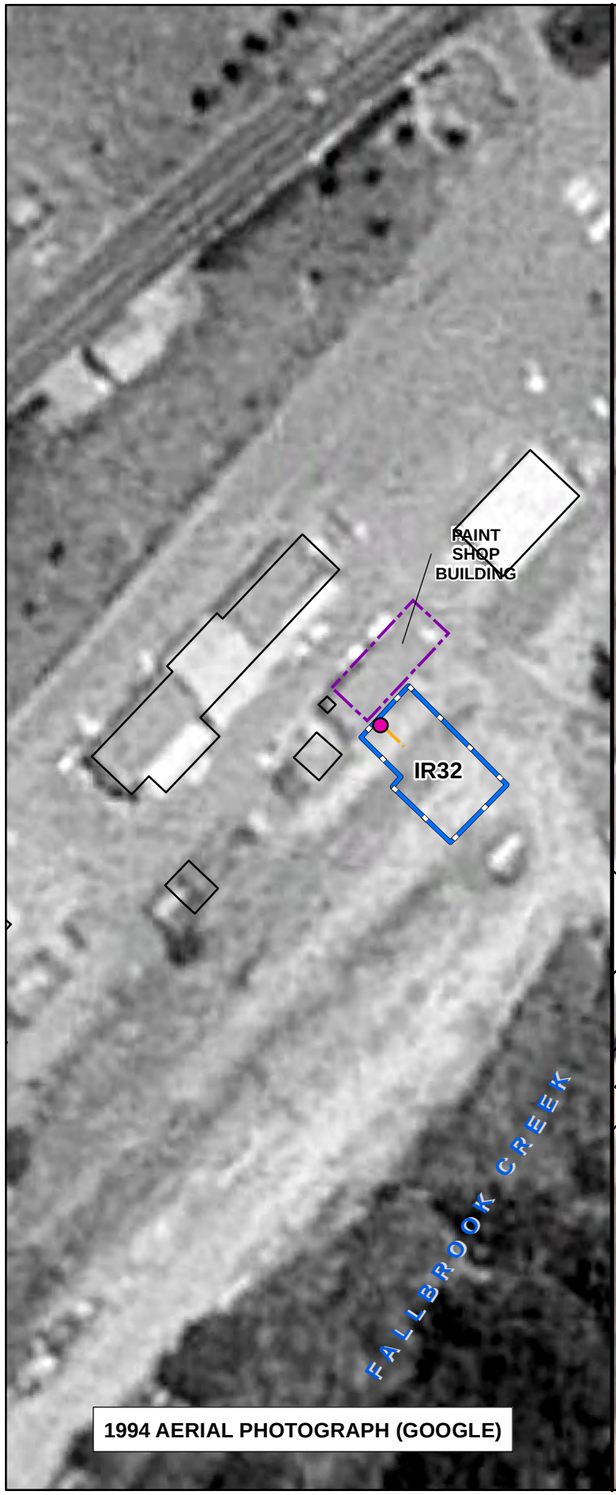

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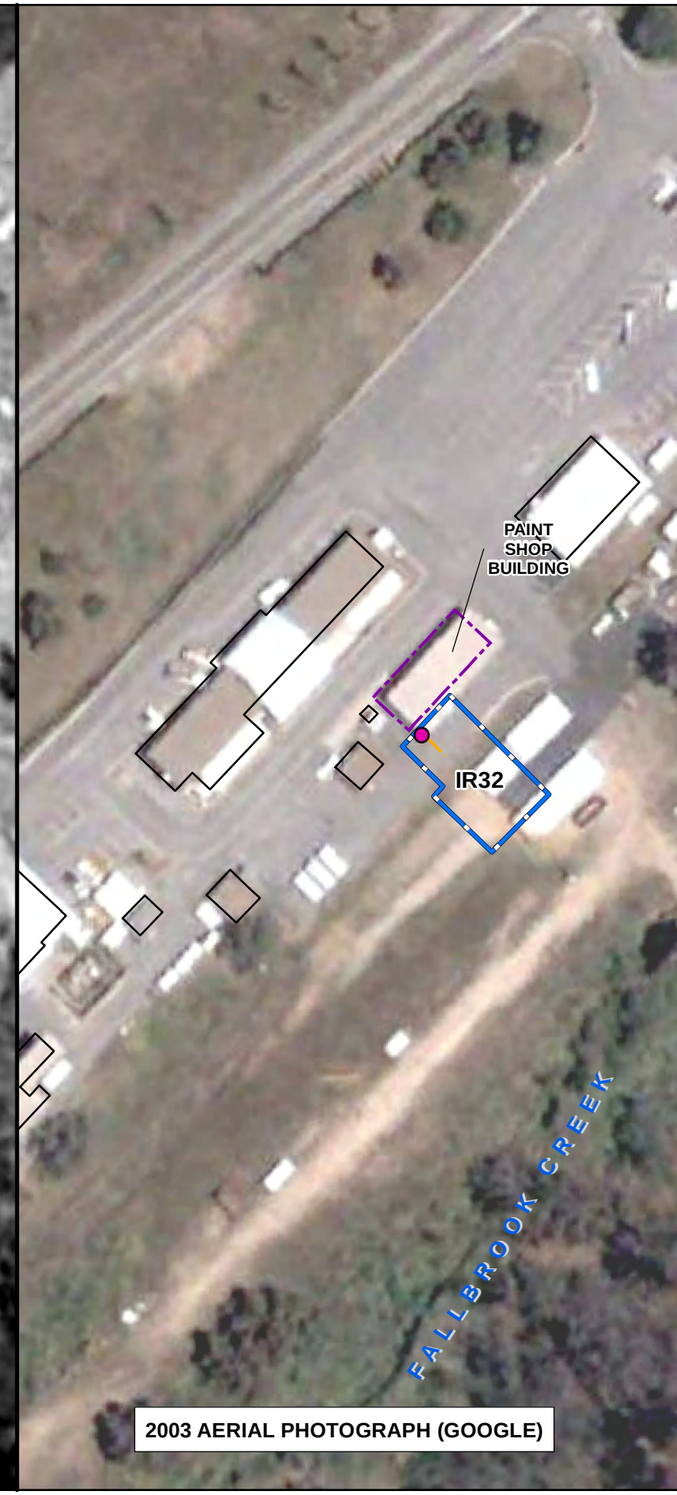

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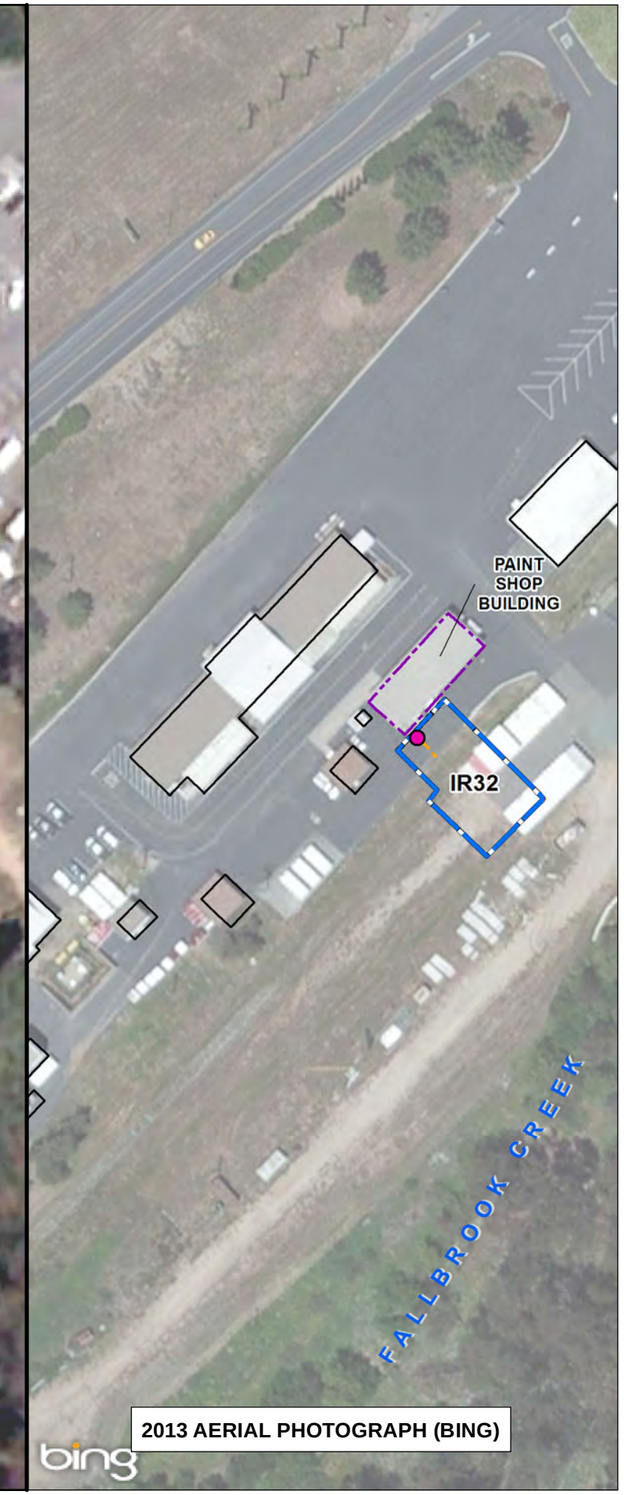

2013 AERIAL PHOTOGRAPH (BING)

LEGEND

- APPROXIMATE LOCATION OF FORMER AST
- APPROXIMATE LOCATION OF DRAIN PIPE
- BUILDING/STRUCTURE
- PAINT SHOP BUILDING FOOTPRINT
- APPROXIMATE IR SITE 32 BOUNDARY

NOTES:
AST - ABOVE GROUND STORAGE TANK

SOURCE:
GOOGLE MAPS AERIAL IMAGE
ENVIRONMENTAL SYSTEMS RESEARCH INSTITUTE (ESRI) USA SPATIAL FEATURE CLASSES. NAD83 STATE PLANE COORDINATE SYSTEM ZONE VI (FEET)

N

GRAPHIC SCALE
0 150 300 600
(IN FEET)
1 INCH = 300 FEET

DEPARTMENT OF THE NAVY
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SAN DIEGO, CALIFORNIA

NAVAL WEAPONS STATION SEAL BEACH
DETACHMENT FALLBROOK
FALLBROOK, CALIFORNIA

FIGURE 4

IR SITE 32
AERIAL PHOTOGRAPHS AND SITE FEATURES

TREVET

DATE: NOVEMBER 2015

CONTRACT NO.: N62473-10-D-4009
DELIVERY ORDER: 0096

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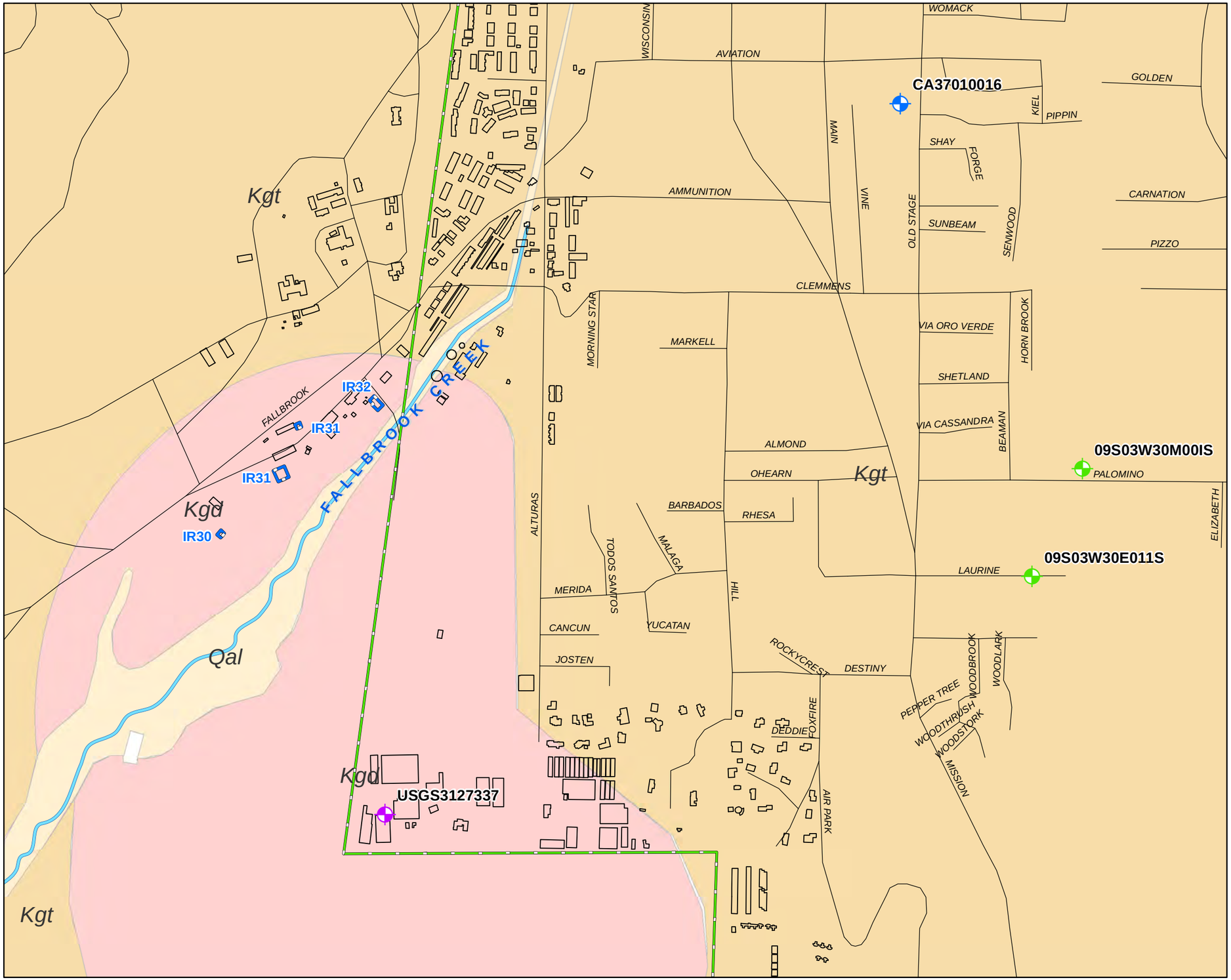

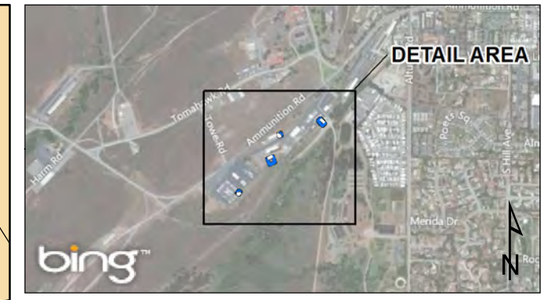

LEGEND

- WATER WELL OWNED BY RAINBOW WATER DISTRICT
- WATER WELL OWNED BY STATE OF CALIFORNIA
- WATER WELL OWNED BY USGS
- FALLBROOK CREEK
- BUILDING/STRUCTURE
- Kgt - TONALITE
- Kgd - GRANODIORITE
- Qal - ALLUVIUM
- APPROXIMATE IR SITE BOUNDARY
- NAVAL WEAPONS STATION SEAL BEACH DETACHMENT FALLBROOK

NOTE:
USGS - UNITED STATES GEOLOGIC SURVEY

SOURCE:
BING MAPS AERIAL IMAGE, DATE UNKOWN
ENVIRONMENTAL SYSTEMS RESEARCH INSTITUTE (ESRI) USA SPATIAL FEATURE CLASSES. NAD83 STATE PLANE COORDINATE SYSTEM ZONE VI (FEET)

GRAPHIC SCALE
0 350 700 1400
(IN FEET)
1 INCH = 700 FEET

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SAN DIEGO, CALIFORNIA

NAVAL WEAPONS STATION SEAL BEACH
DETACHMENT FALLBROOK
FALLBROOK, CALIFORNIA

FIGURE 5

SURFACE GEOLOGY AND HYDROLOGY

TREVET

DATE: NOVEMBER 2015

CONTRACT NO.: N62473-10-D-4009
DELIVERY ORDER: 0096

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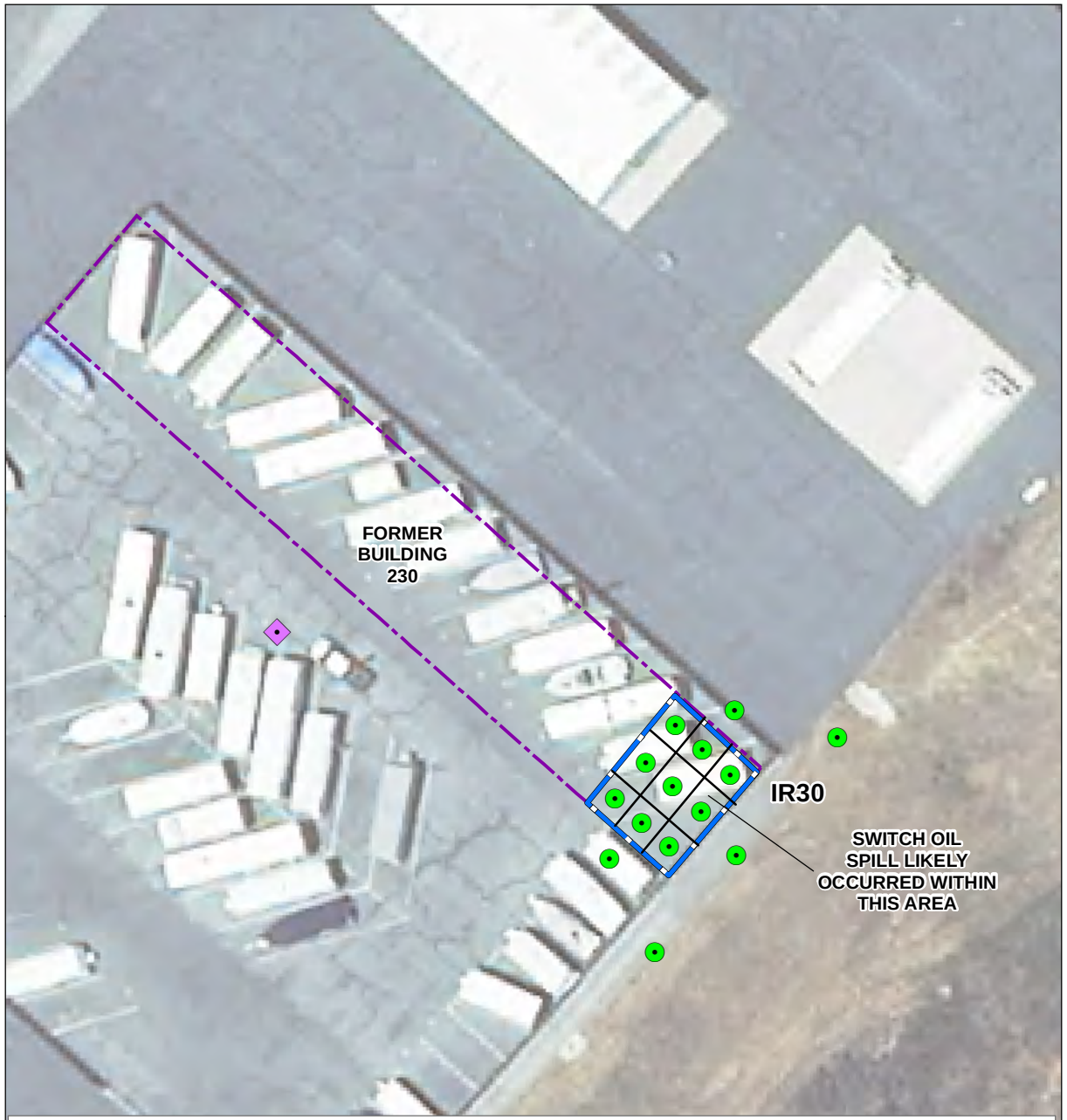

NOTE:
THE PA REPORT INDICATES THAT APPROXIMATELY ONE (1) PINT OF SWITCH OIL WAS SPILLED IN THE FAR SOUTHEAST PORTION OF FORMER BUILDING 230 AND THAT THE SWITCH OIL POTENTIALLY CONTAINED PCBS. AT THE TIME OF THE SPILL, THE STORAGE AREA HAD AN ASPHALT SURFACE. SUBSEQUENT TO THE SPILL THE STAINED ASPHALT WAS REMOVED, ALTHOUGH THE EXACT LOCATION OF THE SPILL/REMOVAL IS UNKNOWN.

LEGEND

- PROPOSED SOIL BORING LOCATION
- PROPOSED SOIL BORING LOCATION BASED ON TOPOGRAPHICAL LOW POINT
- SYSTEMATIC SAMPLING GRID
- FORMER BUILDING 230 FOOTPRINT
- POTENTIAL LOCATION OF SWITCH OIL SPILL

SOURCE:
BING MAPS STREET AND AERIAL IMAGE
ENVIRONMENTAL SYSTEMS RESEARCH INSTITUTE (ESRI) USA
SPATIAL FEATURE CLASSES, SANGIS SPATIAL FEATURE CLASSES

GRAPHIC SCALE
0 25 50 100
(IN FEET)
1 INCH = 50 FEET

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
SAN DIEGO, CALIFORNIA

NAVAL WEAPONS STATION SEAL BEACH
DETACHMENT FALLBROOK
FALLBROOK, CALIFORNIA

FIGURE 6

IR SITE 30
PROPOSED SAMPLE LOCATIONS

TREVET

DATE: NOVEMBER 2015

CONTRACT NO.: N62473-10-D-4009
DELIVERY ORDER: 0096

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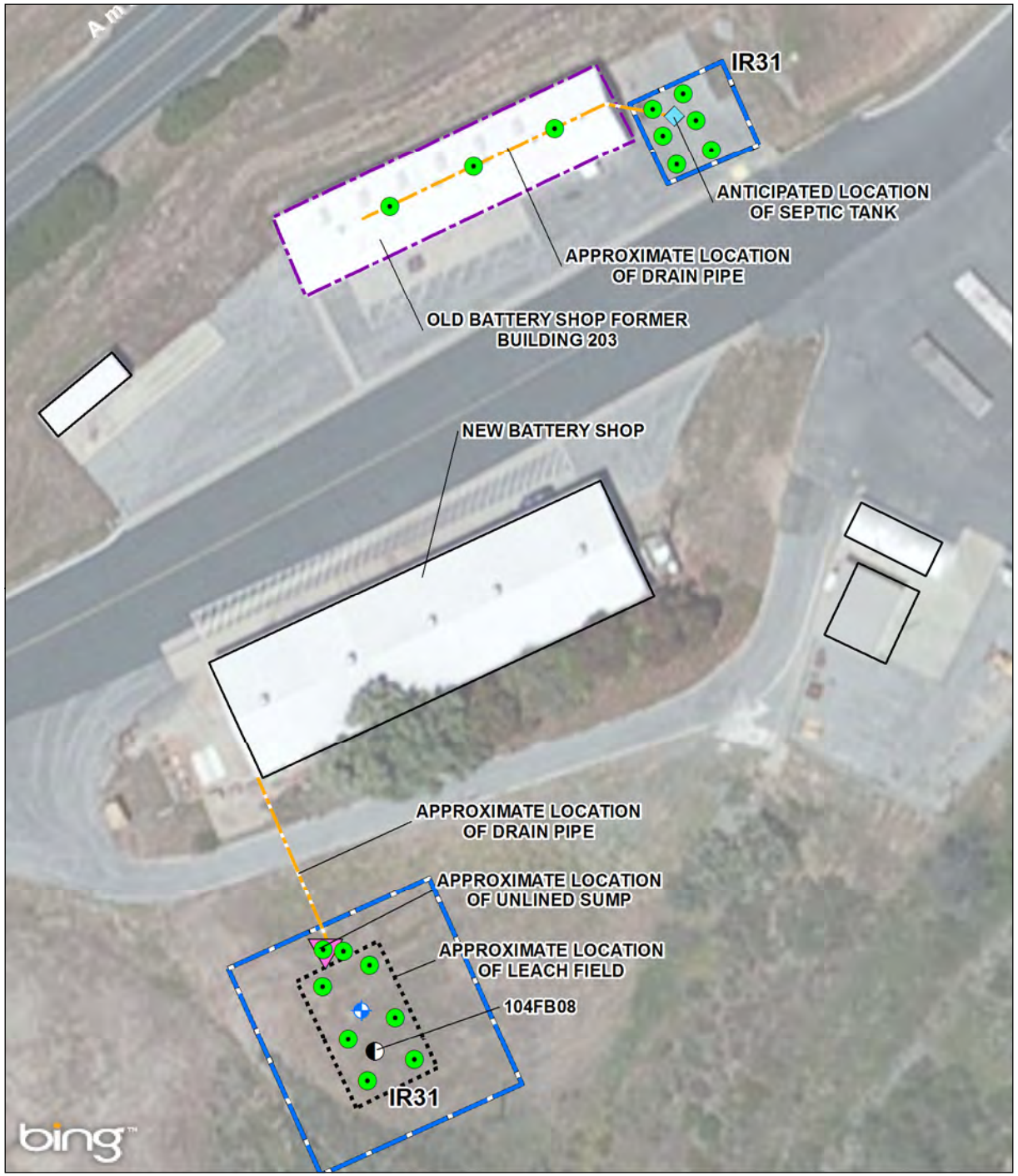

LEGEND

- PROPOSED SOIL BORING LOCATION
- PROPOSED GROUNDWATER MONITORING WELL LOCATION (IF INSTALLED)
- APPROXIMATE LOCATION OF UNLINED SUMP
- ANTICIPATED LOCATION OF SEPTIC TANK
- APPROXIMATE LOCATION OF PREVIOUS SOIL SAMPLE
- APPROXIMATE LOCATION OF DRAIN PIPE
- APPROXIMATE LOCATION OF LEACH FIELD
- BUILDING/STRUCTURE
- FORMER BUILDING 203 FOOTPRINT
- APPROXIMATE IR SITE 31 BOUNDARY

N

GRAPHIC SCALE

0 30 60 120

(IN FEET)
1 INCH = 60 FEET

DEPARTMENT OF THE NAVY
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SAN DIEGO, CALIFORNIA

NAVAL WEAPONS STATION SEAL BEACH
DETACHMENT FALLBROOK
FALLBROOK, CALIFORNIA

FIGURE 7

IR SITE 31
PROPOSED SAMPLE LOCATIONS

TREVET

DATE: NOVEMBER 2015

CONTRACT NO.: N62473-10-D-4009
DELIVERY ORDER: 0096

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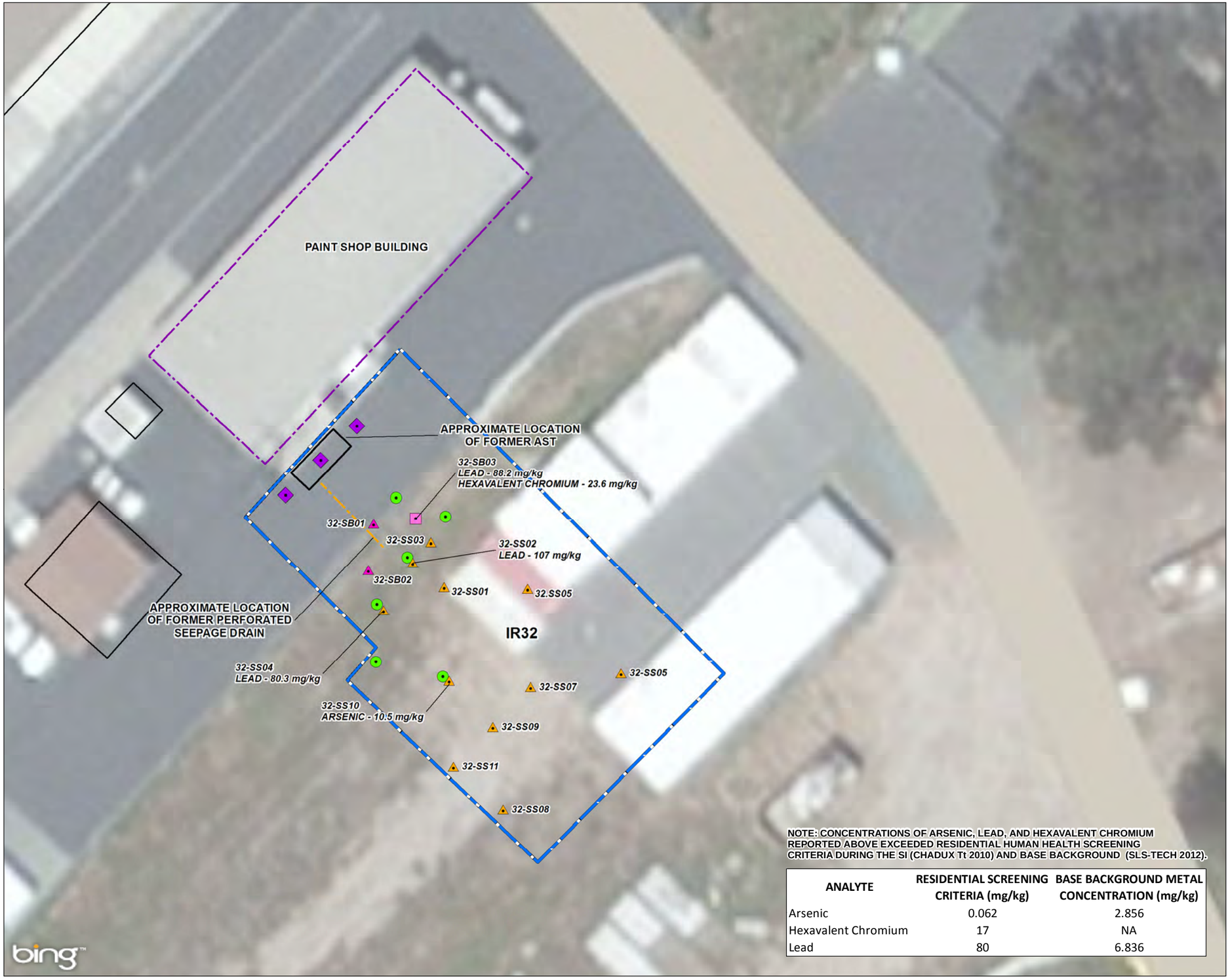

LEGEND

- PREVIOUS SURFACE SOIL SAMPLE LOCATION
- PREVIOUS SOIL BORING SAMPLE LOCATION
- PROPOSED STEP OUT SOIL BORING LOCATION (4 SAMPLES PROPOSED PER BORING)
- PROPOSED AST INVESTIGATION SOIL BORING LOCATION (2 SAMPLES PROPOSED PER BORING)
- FORMER SAMPLE LOCATION IRP32-SB03
- APPROXIMATE LOCATION OF DRAIN PIPE
- BUILDING/STRUCTURE
- PAINT SHOP BUILDING FOOTPRINT
- APPROXIMATE IR SITE 32 BOUNDARY

NOTES::
AST - ABOVEGROUND STORAGE TANK
IR - INSTALLATION RESTORATION
MG/KG - MILLIGRAMS PER KILORGRAM
NA - NOT APPLICABLE

SOURCE:
BING MAPS AERIAL IMAGE, DATE UNKOWN
ENVIRONMENTAL SYSTEMS RESEARCH INSTITUTE (ESRI) USA SPATIAL FEATURE CLASSES. NAD83 STATE PLANE COORDINATE SYSTEM ZONE VI (FEET)

N

GRAPHIC SCALE
0 10 20 40
(IN FEET)
1 INCH = 20 FEET

NOTE: CONCENTRATIONS OF ARSENIC, LEAD, AND HEXAVALENT CHROMIUM REPORTED ABOVE EXCEEDED RESIDENTIAL HUMAN HEALTH SCREENING CRITERIA DURING THE SI (CHADUX Tt 2010) AND BASE BACKGROUND (SLS-TECH 2012).

ANALYTE	RESIDENTIAL SCREENING CRITERIA (mg/kg)	BASE BACKGROUND METAL CONCENTRATION (mg/kg)
Arsenic	0.062	2.856
Hexavalent Chromium	17	NA
Lead	80	6.836

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NAVAL FACILITIES ENGINEERING COMMAND
SAN DIEGO, CALIFORNIA
NAVFAC Naval Facilities Engineering Command Pacific

NAVAL WEAPONS STATION SEAL BEACH
DETACHMENT FALLBROOK
FALLBROOK, CALIFORNIA

FIGURE 8

IR SITE 32
PROPOSED SAMPLE LOCATIONS

TREVET

DATE: NOVEMBER 2015

CONTRACT NO.: N62473-10-D-4009
DELIVERY ORDER: 0096

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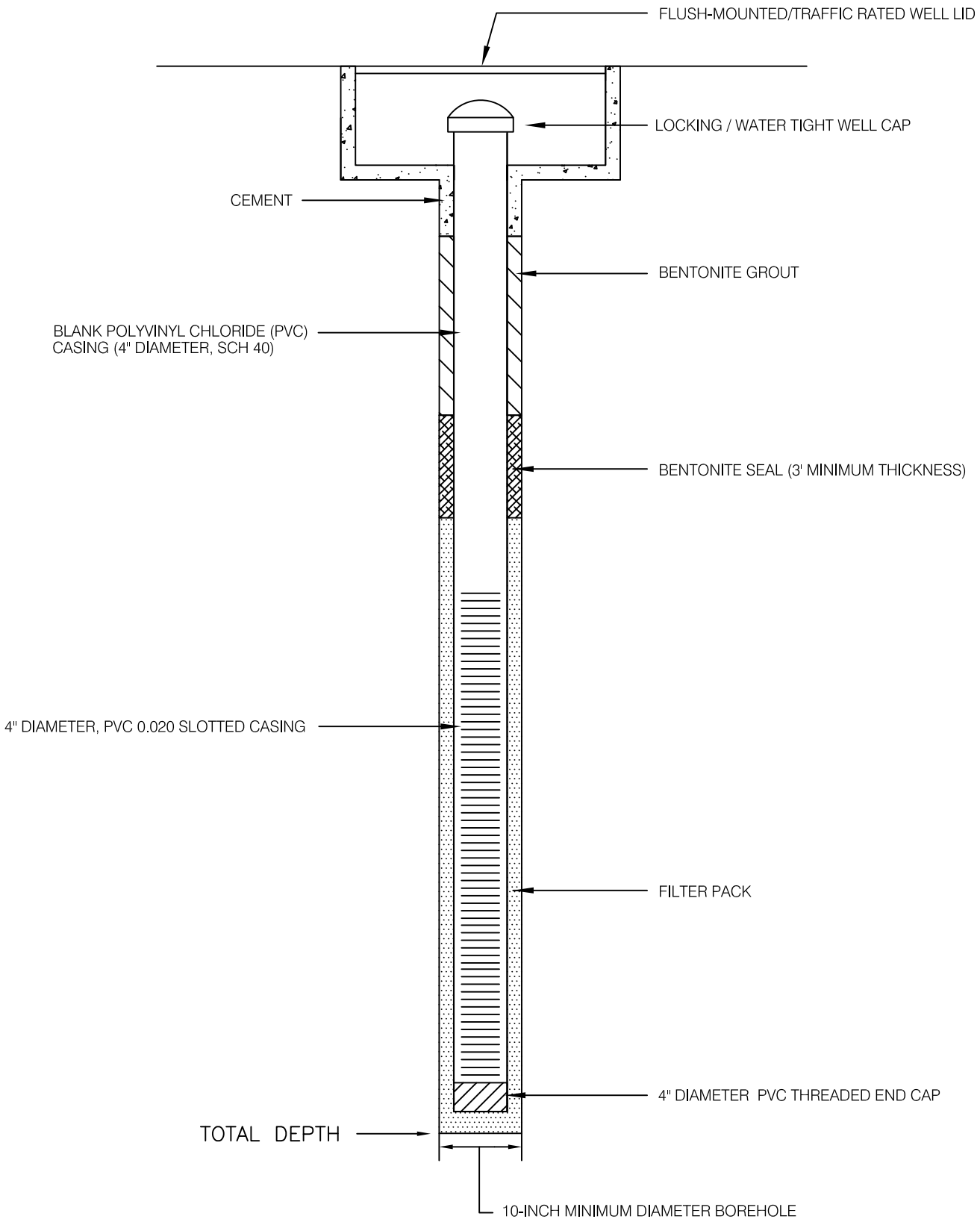

DRAWING NOT TO SCALE FOR REFERENCE PURPOSES ONLY

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND

SAN DIEGO, CALIFORNIA

TREVET

DATE: NOVEMBER 2015

CONTRACT NO.: N62473-10-D-4009
DELIVERY ORDER: 0096

NAVAL WEAPONS STATION SEAL BEACH
DETACHMENT FALLBROOK
FALLBROOK, CALIFORNIA

FIGURE 9

WELL CONSTRUCTION DIAGRAM

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Appendix A: Sampling and Analysis Plan

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FINAL

Appendix A
Sampling and Analysis Plan
Site Inspections at IR Sites 30 and 31 and Expanded Site Inspection at IR Site 32

Naval Weapon Station Seal Beach Detachment Fallbrook
Fallbrook, California

December 2015

Prepared for:

Naval Facilities Engineering Command Southwest
1220 Pacific Highway
San Diego, California 92123-5190

Prepared by:

CB&I Federal Services

Prepared under:
Contract Number: N62473-10-D-4009
Task Order Number: 0096
DCN: CBI-4009-0096-2324

In Coordination with:

9888 Carroll Centre Road, Suite 228
San Diego, California 92126

SAP Worksheet #1 — Title and Approval Page

Final
SAMPLING AND ANALYSIS PLAN
(Field Sampling Plan and Quality Assurance Project Plan)

December 2015

Site Inspection at IR Sites 30 and 31 and Expanded Site Inspection at IR Site 32
Naval Weapons Station Seal Beach Detachment Fallbrook
Fallbrook, California

Prepared for:
Naval Facilities Engineering Command Southwest
1220 Pacific Highway
San Diego, California 92132-5190

Prepared by:
CB&I Federal Services

Prepared under:
Contract Number: N62473-10-D-4009
Task Order Number: 0096
DCN: CBI-4009-0096-2324

In Coordination with:
Trevet
9888 Carroll Centre Road, Suite 228
San Diego, California 92126
(858) 578-8859

Reviewed By: Gerald Tamashiro
Quality Control Manager
Trevet
Date 12/4/15

Reviewed By: BOWERS.KENNETH.A.1230092474
Digitally signed by BOWERS.KENNETH.A.1230092474
DN: c=US, o=U.S. Government, ou=DoD, ou=PKI, ou=USN, cn=BOWERS.KENNETH.A.1230092474
Date: 2015.12.04 15:49:44 -05'00'
Ken Bowers
Navy Chemist
Date

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Executive Summary

Trevet has prepared this Sampling and Analysis Plan (SAP) to conduct Site Inspections (SIs) at Installation Restoration (IR) Sites 30 and 31 and an Expanded Site Inspection (ESI) at IR Site 32, which are all located within the Naval Weapons Station (NAVWPNSTA) Seal Beach Detachment (Det.) Fallbrook in Fallbrook, California (Figure A1). This SAP (Appendix A of the Work Plan) was prepared on behalf of CB&I Federal Services (CBI) under contract with the United States Department of the Navy, Naval Facilities Engineering Command Southwest (NAVFAC SW) under Contract No. N62473-10-D-4009, Task Order No. 0096.

This SAP will be used as a reference document by all field and laboratory personnel engaged in sampling and analysis for the project. The document will be provided to individuals listed in Worksheet #4. Included in this SAP are data quality objectives, field sampling procedures, QA/quality control requirements, and data collection methods that will be used during the project. This SAP is prepared in accordance with United States Environmental Protection Agency (U.S. EPA) requirements: *Uniform Federal Policy for Quality Assurance Project Plans* (IDQTF 2005) and *EPA Guidance for QA Project Plans* (U.S. EPA 2002a).

This SAP provides guidance on sampling, analysis, and quality assurance (QA) to assess the nature and extent chemicals of potential concern (COPCs) at the Sites from historical site uses.

The purpose of the SI at IR Site 30 is to determine if polychlorinated biphenyls (PCBs) are present in the approximate area of a switch oil spill that occurred in 1984 and if PCBs are present at concentrations that pose a potential risk to human health and/or the environment.

The purpose of the SI for IR Site 31 is to evaluate whether there has been a significant release of lead to soil adjacent to the drain pipe and the septic tank associated with former Building 203 (the old Battery Shop) and in the sump and leach field area adjacent to the nearby new Battery Shop, related to historic disposal of neutralized battery electrolytes. The data will be used to assess if lead is present at concentrations that pose a potential risk to human health and/or the environment.

The purpose of the ESI at IR Site 32 is to further delineate the lateral and vertical extent of hexavalent chromium, metals, polychlorinated biphenyls (PCBs), volatile organic compounds (VOCs), and SVOCs in soil at concentrations that pose a potential threat to human health (i.e., exceeded human health risk based screening level and background level), near the Paint Shop. PH will also be analyzed as a line of evidence in evaluating the potential transport of paint in the caustic soda solution. This page left intentionally blank.

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SAP Worksheets **Page #**

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Tables

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Attachments:

Attachment 1: Field Forms
Attachment 2: Analytical Laboratory Standard Operating Procedures
Attachment 3: Analytical Laboratory DOD ELAP Certification

Acronyms and Abbreviations

°C	degrees Celsius
µg/L	microgram per liter
µg/kg	microgram per kilogram
AOC	area of concern
bgs	below ground surface
CAS	Chemical Abstract Service
CBI	CB&I Federal Services
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
COPC	chemical of potential concern
COPEC	chemical of potential ecological concern
Det.	Detachment
DL	detection limit
DOT	Department of Transportation
DQO	data quality objective
DTSC	California Department of Toxic Substances Control
EMAX	EMAX Laboratories, Inc.
ESL	ecological screening level
FS	Feasibility Study
H&S	Health and Safety
IDW	investigation-derived waste
IR	Installation Restoration
LANL	Los Alamos National Laboratory
LCS	laboratory control sample
LDC	Laboratory Data Consultants, Inc.
LOD	limit of detection
LOQ	limit of quantitation
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
NAVFAC SW	Naval Facilities Engineering Command Southwest

Acronyms and Abbreviations (continued)

NAVWPNSTA	Naval Weapons Station
NIRIS	Naval Installation Restoration Information Solution
OSHA	Occupational Safety and Health Administration
PA	Preliminary Assessment
PARCC	precision, accuracy, representativeness, completeness, and comparability
PM	project manager
PRG	preliminary remediation goal
QA	quality assurance
QAO	quality assurance officer
QC	quality control
QCM	quality control manager
QL	quantitation limit
RCRA	Resource Conservation and Recovery Act
RI	Remedial Investigation
RPD	relative percent difference
RPM	remedial project manager
RSL	regional screening level
RWQCB	California Regional Water Quality Control Board
SAP	sampling and analysis plan
SI	Site Inspection
SLERA	screening-level ecological risk assessment
SOP	standard operating procedure
SVOC	semivolatile organic compound
TOC	total organic carbon
UFP-QAPP	Uniform Federal Policy Quality Assurance Project Plan
U.S. EPA	United States Environmental Protection Agency
VOC	volatile organic compound

SAP Worksheet #2 — SAP Identifying Information

Site Name/Number: IR Sites 30, 31, and 32
Contractor Name: CB&I Federal Services (CBI)
Contract Number: N62473-10-D-4009
Contract Title: Environmental Services for NAVFAC SW Footprint, San Diego, California.

Work Assignment Number (optional): Not Applicable

1. This Sampling and Analysis Plan (SAP) was prepared in accordance with the requirements of the *Uniform Federal Policy for Quality Assurance Project Plans (UFP-QAPP)* (IDQTF 2005), and *Guidance for Quality Assurance Project Plans* (U.S. EPA 2002a). In accordance with the requirements of contract number N62473-10-D-4009.

2. Identify regulatory program: Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA).

3. This is a project-specific SAP that supports the *Work Plan for SI's at IR Sites 30 and 31 along with an ESI at IR Site 32 at Naval Weapons Station Seal Beach Detachment Fallbrook in Fallbrook, California*.

4. List dates of scoping sessions that were held:

Scoping Session	Date
Meeting with Navy and Seal Beach Det. Fallbrook	May 7, 2014

5. List dates and titles of any SAP documents written for previous site work that are relevant to the current investigation.

Title	Date
Final Sampling and Analysis Plan (Field Sampling and/Quality Assurance Project Plan) Site Inspection for Installation Restoration Program Sites 32, 34b, 34d, and 34e and Munitions Response Program Sites UXO1, UXO2, UXO3, UXO4, UXO6, and UXO7, Naval Weapons Station Seal Beach Detachment Fallbrook, Fallbrook, California. December 5.	**December 2008**

6. List organizational partners (stakeholders) and connection with lead organization:

SAP Worksheet #2 (continued)

Organization Partners/Stakeholders	Connection
California Department of Toxic Substances Control (DTSC)	State Regulatory Agency
California Regional Water Quality Control Board (RWQCB), San Diego Region	State Regulatory Agency
NAVFAC SW	Navy
NAVWPNSTA Seal Beach Det. Fallbrook	Base

7. Lead organization: Navy

8. If any required information or SAP elements are not applicable to the project or are provided elsewhere, then note the omitted SAP elements and provide an explanation.

No SAP elements have been excluded from the document.

SAP Worksheet #2 (continued)

UFP-QAPP Worksheet #	Required Information	Crosswalk to Related Information
A. Project Management		
Documentation		
1	Title and Approval Page	
2	SAP Identifying Information	
3	Distribution List	
4	Project Personnel Sign-Off Sheet	
Project Organization		
5	Project Organizational Chart	
6	Communication Pathways	
7	Personnel Responsibilities and Qualifications Table	
8	Special Personnel Training Requirements Table	
Project Planning/Problem Definition		
9	Project Scoping Session Participants Sheet	
10	Problem Definition, Site History, and Background. Site Maps (historical and present)	
11	Site-Specific Project Quality Objectives	
12	Measurement Performance Criteria Table	
13	Sources of Secondary Data and Information Secondary Data Criteria and Limitations Table	
14	Summary of Project Tasks	
15	Reference Limits and Evaluation Table	
16	Project Schedule/Timeline Table	
B. Measurement Data Acquisition		
Sampling Tasks		
17	Sampling Design and Rationale	
18	Sampling Locations and Methods/Standard Operating Procedures (SOP) Requirements Table	
19	Analytical Methods/SOP Requirements Table	
20	Field Quality Control Sample Summary Table	
21	Project Sampling SOP References Table	
22	Field Equipment Calibration, Maintenance, Testing, and Inspection Table	
Analytical Tasks		
23	Analytical SOP References Table	
24	Analytical Instrument Calibration Table	
25	Analytical Instrument and Equipment Maintenance, Testing, and Inspection Table	
Sample Collection		
26	Sample Handling System	
27	Sample Custody Requirements	
Quality Control Samples		

SAP Worksheet #2 (continued)

UFP-QAPP Worksheet #	Required Information	Crosswalk to Related Information
28	Laboratory Quality Control Samples Table	
Data Management Tasks		
29	Project Documents and Records Table	
30	Analytical Services Table	
C. Assessment Oversight		
31	Planned Project Assessments Table	
32	Assessment Findings and Corrective Action	
33	Quality Assurance Management Reports Table	
D. Data Review		
34	Verification (Step I) Process Table	
35	Validation (Steps IIa and IIb) Process Table	
36	Validation (Steps IIa and IIb) Summary Table	
37	Usability Assessment	

SAP Worksheet #3 — Distribution List

QAPP Recipients	Title	Organization	Telephone Number	E-mail Address
Ann Colt	Remedial Project Manager (RPM)	NAVFAC SW	(619) 532-1156	ann.colt@navy.mil
Margaret Wallerstein	Activity Point of Contact	NAVWPNSTA Seal Beach	(562) 626-7838	margaret.wallerstein.ctr@navy.mil
Joseph Michalowski	Quality Assurance Officer (QAO)	NAVFAC SW	(619) 532-4125	joseph.michalowski@navy.mil
Diane Silva	Administrative Records Manager	NAVFAC SW	(619) 532-3676	diane.silva@navy.mil
Stephen Niou	State Project Manager (PM)	DTSC	(714) 484-5458	stephen.niou@dtsc.ca.gov
Beatrice Griffey	State PM	RWQCB	(619) 521-3342	beatrice.griffey@waterboards.ca.gov
Richard Wong	CB&I Program Manger	CB&I	(619) 446-4543	rich.wong@cbifederalservices.com
Amanda Elmore	CB&I PM	CB&I	(619) 446-4510	amanda.elmore@cbifederalservices.com
John Willis	Trevet PM	Trevet	(858) 578-8859	jwillis@trevetinc.com
Bob Breglio, PG	Technical Lead	Trevet	(619) 733-8538	bob@trevetinc.com
Gerald Tamashiro	Program Quality Control Manager (QCM)	Trevet	(714) 200-3826	gerald@trevetinc.com
Matt Fuller	Field Team Lead	Trevet	(858) 578-8859	mfuller@trevetinc.com
Jordana Bjorkman	Project Chemist	Trevet	(858) 578-8859	jscanlan@trevetinc.com
Ye Myint	PM (analytical services)	EMAX Laboratories, Inc. (EMAX)	(310) 618-8889	ymyint@emaxlabs.com
Andrew Kong	PM (data validation)	Laboratory Data Consultants, Inc. (LDC)	(760) 634-0437	akong@lab-data.com

PG - Professional Geologist
SD DEH – San Diego Department of Environmental Health

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SAP Worksheet #4 — Project Personnel Sign-Off Sheet

Project Personnel	Organization	Title	Signature	Date SAP Read
John Willis	Trevet	PM		
Matt Fuller	Trevet	Field Team Lead		
Ye Myint	EMAX	PM		
Andrew Kong	LDC	Data Validator		

Worksheet #4 will be completed after the final version of this SAP is submitted. The signed and dated version of Worksheet #4 will be maintained in Trevet's project file, as specified in SAP Worksheet #29.

EMAX – EMAX Laboratories, Inc.

LDC – Laboratory Data Consultants, Inc.

PM – Project Manager

SAP – Sampling and Analysis Plan

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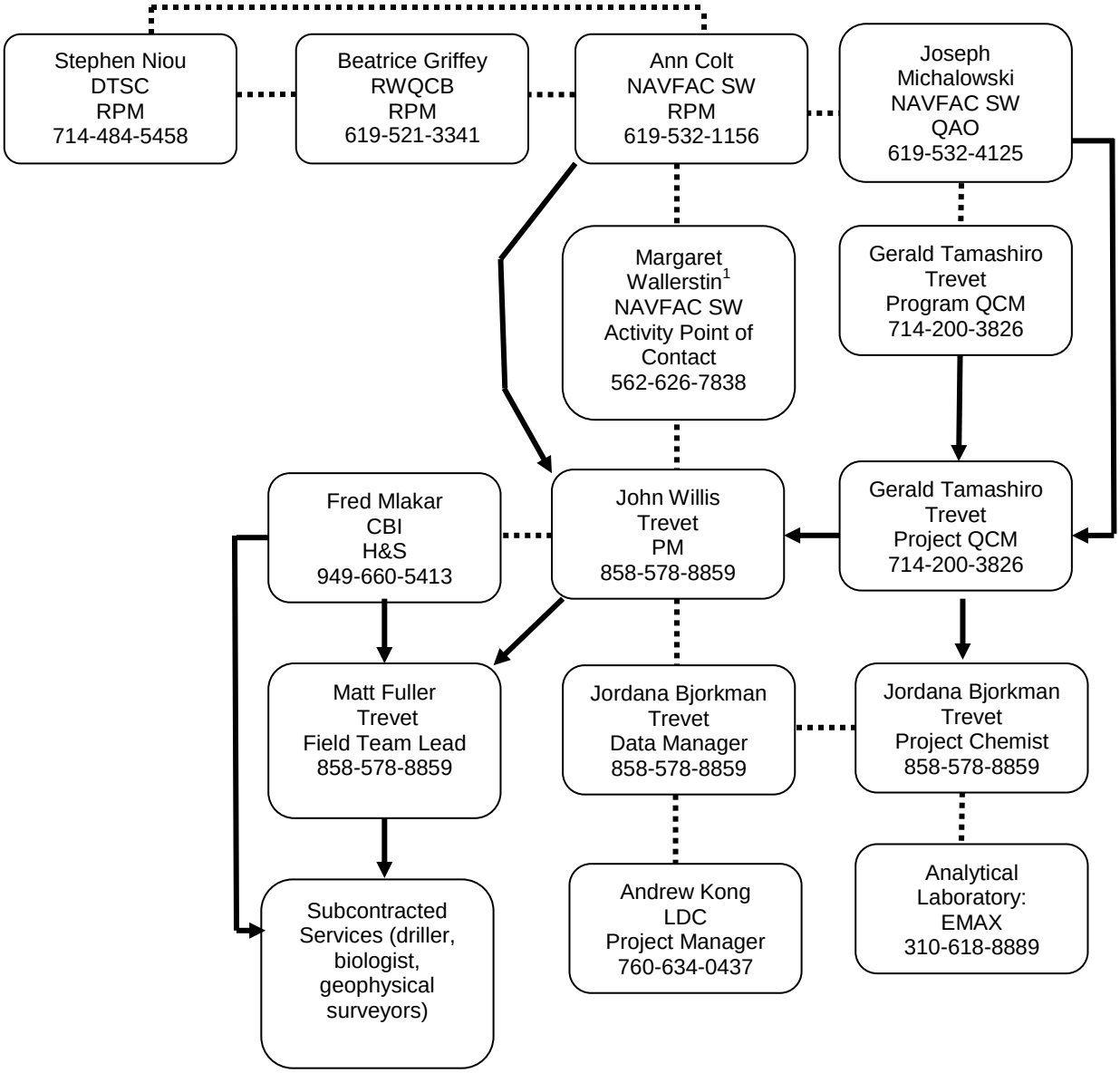
SAP Worksheet #5 — Project Organizational Chart



1 Ms. Margaret Wallerstein is not subordinate to Ms. Ann Colt but is shown on the second line because of space constraints.

EMAX – EMAX Laboratories, Inc.

H&S – Health and Safety

LDC – Laboratory Data Consultants, Inc.

NAVFAC SW – Naval Facilities Engineering Command Southwest

PM – Project Manager

QAO – Quality Assurance Officer

QCM – Quality Control Manager

RPM – Remedial Project Manager

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SAP Worksheet #6 — Communication Pathways

Communication Drivers	Responsible Affiliation	Name	Phone Number and/or E-mail	Procedure
Notification – field sampling activities	Trevet PM	John Willis	(858) 578-8859	One week prior to mobilization of field sampling teams, an e-mail or phone call to the NAVFAC SW RPM from the Trevet PM to confirm the sampling start date and duration.
Notification – laboratory notification and coordination	Trevet Project Chemist	Jordana Bjorkman	(858) 578-8859	One week prior to mobilization of field sampling team, phone call to EMAX from Trevet Project Chemist to coordinate sample supplies and courier pickup of samples.
Stop work	NAVFAC SW QAO	Joseph Michalowski	(619) 532-4125	If a quality issue arises that warrants a stop work order, an immediate phone call to the Trevet QCM from the NAVFAC SW QAO will occur, and a stop work order will be issued.
Stop work	NAVFAC SW RPM	Ann Colt	(619) 532-1156	If an issue arises that warrants a stop work order, an immediate phone call to the Trevet PM from the NAVFAC SW RPM will occur, and a stop work order will be issued.
Stop work	NAVFAC SW Safety Officer	Almario Erasquin	(619) 556-7938	If a safety issue arises that warrants a stop work order, an immediate phone call to the Trevet Health and Safety Officer from the NAVFAC SW Safety Officer will occur, and a stop work order will be issued.
Stop work	Trevet QCM	Gerald Tamashiro	(714) 200-3826	If a quality issue arises that warrants a stop work order, an immediate phone call from the Trevet QCM to the NAVFAC SW QAO will occur, and a stop work order will be issued.

SAP Worksheet #6 (continued)

Communication Drivers	Responsible Affiliation	Name	Phone Number and/or E-mail	Procedure
Stop work	CBI Health and Safety Officer	Fred Mlakar	(949) 660-5413	If a safety issue arises that warrants a stop work order, an immediate phone call from the CBI Health and Safety Officer to the NAVFAC SW Safety Officer will occur, and stop work order will be issued.
Notification – field change request	Trevet QCM	Gerald Tamashiro	(714) 200-3826	If a field change request is warranted, then a written Field Change Request will be e-mailed from the Trevet QCM to the NAVFAC SW RPM and the Trevet PM.
SAP Addendum	Trevet QCM	Gerald Tamashiro	(714) 200-3826	Changes to the SAP will require the Trevet QCM to prepare an addendum that will be approved by the NAVFAC SW RPM before field activities begin.
Daily chain-of-custody reports and shipping documentation	Trevet Field Team Lead	Matt Fuller	(858) 578-8859	At the end of each field sampling day, the chain-of-custody forms and shipping documentation (if applicable) will be submitted via fax or e-mail to the Trevet Project Chemist.
Analytical corrective actions	Trevet Project Chemist	Jordana Bjorkman	(858) 578-8859	The Trevet Project Chemist will immediately notify the Trevet PM in writing of any analytical procedures that were not performed in accordance with this SAP. The Trevet Project Chemist will complete documentation of the non-conformance and corrective actions to be taken. The Trevet QCM will verify that the corrective actions have been implemented. In the event of serious laboratory issues, the Trevet Project Chemist will contact the NAVFAC SW RPM who at their discretion may contact the Navy Chemist.

SAP Worksheet #6 (continued)

Communication Drivers	Responsible Affiliation	Name	Phone Number and/or E-mail	Procedure
Notification - release of analytical data	Trevet Project Chemist	Jordana Bjorkman	(858) 578-8859	The Trevet Project Chemist will review faxed/e-mailed data to verify that data quality is met as described in this SAP before the data are released. Analytical data will be released to the Trevet PM (or designee) after the Trevet Project Chemist has verified that the data are in accordance with the SAP requirements.

CBI – CB&I Federal Services
NAVFAC SW – Naval Facilities Engineering Command Southwest
PM – Project Manager
QAO – Quality Assurance Manager
QCM – Quality Control Manager
RPM – Remedial Project Manager
PG professional geologist

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SAP Worksheet #7 — Personnel Responsibilities and Qualifications Table

Name	Title/Role	Organizational Affiliation	Responsibilities	Education and Experience Qualifications (Optional)
Ann Colt	RPM	NAVFAC SW	• Performs project management for the Navy • Ensures that the project scope of work requirements are fulfilled • Oversees the project cost and schedule • Reviews and approves SAP • Authorizes the suspension of project execution if QA requirements are not adequately followed • Provides formal technical direction to the Trevet project team, as needed • Acts as lead interface with agencies	
Joseph Michalowski	QAO	NAVFAC SW	• Reviews and approves the SAP • Provides Navy oversight of Trevet Quality Assurance (QA) Program • Provides technical and administrative oversight of surveillance audit activities • Acts as point of contact for matters concerning QA and the Navy Laboratory QA Program • Coordinates training on matters pertaining to generation and maintenance of data quality • Authorizes the suspension of project execution if QA requirements are not adequately followed	

SAP Worksheet #7 – continued

Name	Title/Role	Organizational Affiliation	Responsibilities	Education and Experience Qualifications (Optional)
John Willis	PM	Trevet	• Coordinates work activities of subcontractors and ensures all personnel adhere to the administrative and technical requirements of the project • Monitors and reports the progress of work and ensures that the project deliverables are completed on time and within project budget • Monitors the budget and schedule and notifies the RPM of any changes that may require administrative actions • Ensures adherence to the quality requirements of the contract, project scope of work, and the quality control (QC) plans • Ensures that all work is conducted in accordance with the Work Plan. • Ensures that all work meets the requirements of the technical specifications and complies with applicable codes and regulations • Ensures that all work activities are conducted in a safe manner in accordance with the site-specific health and safety plan, *Safety and Health Requirements Manual* (EM-385-1-1) (USACE 2008), and all applicable OSHA (Occupational Safety and Health Administration) regulations • Serves as the primary contact with the Navy for actions and information related to the work, and includes appropriate Trevet technical personnel in the decision-making process • Coordinates satisfactory resolution and completion of evaluation and acceptance report for nonconformance reports	

SAP Worksheet #7 – continued

Name	Title/Role	Organizational Affiliation	Responsibilities	Education and Experience Qualifications (Optional)
Gerald Tamashiro	QCM	Trevet	• Establishes and maintains the Trevet Quality Program • Oversees QC, including construction and chemical data acquisition • Acts as a focal point for coordination for quality matters for all projects, and resolves quality issues • Suspends project activities if quality standards are not maintained • Interfaces with the Navy, including RPM, on quality-related items • Conducts field QC audits to ensure that project plans are being followed • Discusses and implements Navy technical direction letters related to quality topics with Trevet PM and field team	
Jordana Bjorkman	Project Chemist	Trevet	• Assists in the development of the SAP • Evaluates and selects a qualified subcontract laboratory • Ensures that sampling personnel have documented training on sampling procedures for specific project requirements • Supports projects as the technical lead for chemical data collection and analysis • Monitors performance of subcontract laboratory and data validator • Audits sample collection activities • Reviews laboratory data before using against the requirements in this SAP • Evaluates and selects a qualified data validation subcontractor • Reviews data validation reports • Prepares data quality assessment report to ensure the quality of the data meets the intended use of the data	

SAP Worksheet #7 – continued

Name	Title/Role	Organizational Affiliation	Responsibilities	Education and Experience Qualifications (Optional)
Matt Fuller	Field Team Lead	Trevet	• Ensures that all fieldwork is conducted in accordance with the work plan and SAP • Provides direction to field staff and subcontractors • Reports field information to Trevet PM and Project Chemist	
Ye Myint	Laboratory PM	EMAX	• Ensures laboratory results comply with SAP requirements and are submitted in accordance with the project schedule.	
Andrew Kong	PM	LDC	• Provides third-party validation of laboratory data.	

EMAX – EMAX Laboratories, Inc.
LDC – Laboratory Data Consultants, Inc.
NAVFAC SW – Naval Facilities Engineering Command Southwest
PM – Project Manager
QAO – Quality Assurance Manager
QC – Quality Control
QCM – Quality Control Manager
RPM – Remedial Project Manager
SAP – Sampling and Analysis Plan

SAP Worksheet #8 — Special Personnel Training Requirements Table

Project Function	Specialized Training by Title or Course Description	Training Provider	Training Date	Personnel/ Groups Receiving Training	Personnel Titles/ Organizational Affiliation	Location of Training Records/Certificates
No specialized training is required for this project.						

All field personnel who are present at the site are required to meet the health and safety training requirements of the *Code of Federal Regulations* (29 CFR 1910.120[e]). This includes current Hazardous Waste and Emergency Response Training (40-hour and 8-hour refresher), 30-hour OSHA (Occupational Safety and Health Administration) Construction Safety and Health training, and 40-hour U.S. Army Corps of Engineers EM-385-1-1 (USACE 2008) training. Copies of field personnel health and safety training records will be maintained in the Trevet project file.

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SAP Worksheet #9 — Project Scoping Session Participants Sheet

Project Name: SI for IR Site 30 and 31: ESI for IR Site 32 **Projected Date(s) of Sampling: D**rilling and sampling event during February 2015. **Project Manager**: John Willis	**Site Name: IR Sites 30, 31, and 32** **Site Location: NAVWPNSTA Seal Beach Det. Fallbrook**

Date of Session: May 7, 2013
Scoping Session Purpose: To discuss the groundwater investigation objectives, equipment use, and project schedule

Name	Title	Affiliation	Phone #	E-mail Address	Project Role
Ann Colt	RPM	NAVFAC SW	(619) 532-1156	ann.colt@navy.mil	Navy RPM
Margaret Wallerstein	Activity Point of Contact	NAVWPNSTA Seal Beach	(562) 626-7838	margaret.wallerstein.ctr@ navy.mil	Activity Point of Contact
Ryan Lockwood	NWS Fallbrook Natural Resources	NAVWPNSTA Seal Beach	(760) 731-3516	ryan.s.lockwood1.ctr@ navy.mil	NWS Fallbrook Natural Resources
Richard Wong	Program Manager	CBI	(619) 778-6122	richard.wong@cbifederal services.com	CB&I Program Manager
Amanda Elmore	PM	CBI	(619) 446-4510	amanda.elmore@cbifederal services.com	CB&I Project Manager
Brian White	Geologist	CBI	(619) 446-4510	brian.white@cbifederal services.com	CB&I Geologist/Alternate PM
John Willis	PM	Trevet	(858)578-8859	jwillis@trevetinc.com	Trevet PM
Bob Breglio	Geologist	Trevet	(858) 858-8859	bob@trevetinc.com	Technical Lead
Patrick Hamner	Geologist	Trevet	(858)578-8859	phamner@trevetinc.com	Staff Geologist
Matt Fuller	Scientist	Trevet	(858)578-8859	mfuller@trevetinc.com	Staff Scientist
Wendy Loeffler	Biologist	RECON	(619) 308-9333	wloeffler@recon-us.com	Biological Monitoring

9.1 Action Items

Participants discussed the following during the project scoping meeting:

- Proposed locations of direct push borings.
- Base and activity coordination.
- Proposed schedule for drilling and sampling activities.

SAP Worksheet #9 – continued

9.2 Consensus Decisions

The start date of the field activities will be based upon approval of the planning documents, the RPM's notice to proceed, and base operations approval. Currently, the initial sampling is planned for February 2015.

SAP Worksheet #10 — Conceptual Site Model

The following is a discussion of the problem definition, background, and previous investigations pertaining to IR Sites 30, 31, and 32 at NAVWPNSTA Seal Beach Det. Fallbrook, Fallbrook California (Figure A1). The problem definition presented below in Section 10.1 is essentially Step 1 of the of the data quality objective (DQO) criteria (U.S. EPA 2006). DQOs are discussed in detail in Worksheet #11.

10.1 Problem Definition

10.1.1 IR Site 30 - Switch oil Spill in Building 230

IR Site 30 is located in the southeast end of former Building 230 (Figure A2). This IR Site was identified in an area where potentially PCB containing switch oil spilled onto the ground. Previous documentation indicates that several ounces up to 16 ounces (1 pint) of switch oil spilled onto the ground (NEESA 1985). The spill was observed in February of 1984 in an area where approximately six electrical switches and several transformers were stored awaiting disposal by personnel at Marine Corps Base (MCB) Camp Pendleton. Three of the switches were labeled as containing PCBs but it is unknown whether the spill was from these switches or if the spilled oil contained PCBs. Since the oil potentially contained PCBs, the oil stained asphalt was removed and disposed of through the Defense Reutilization and Marketing Office (DRMO) later in 1984 (NEESA 1985). Although no further action was recommended for the Site in the IAS, comments from both the U.S. EPA and California Department of Health Services (DHS) stated further work or additional documentation on the removal of the asphalt is requested prior to agreeing that no further action is required for the Site.

In October of 2014, the Navy requested IR Site 30 be closed with no further action through a Technical Memorandum (Appendix C of the Work Plan). This request was based on volume of switch oil spilled, potential that the switch oil did not contain PCBs, confirmation of removal action through personal interviews, the unknown location of spill, and relative size of potential impact being small. In response to the Technical Memorandum, the Regional Board requested additional site characterization through an e-mail which is included in Appendix C of the Work Plan

Building 230 has since been demolished and the area has been converted into a RV storage area as shown on Figure A2.

SAP Worksheet #10 – continued

10.1.2 IR Site 31 – Battery Shop Disposal Areas (Buildings 203 and the New Battery Shop)

IR Site 31 is located in two separate areas which were identified based on documented Battery Shop disposal areas. One of the areas is east of former Building 203 and the other area is southeast of the new Battery Shop building (Figure A3). From 1942 to 1955, electrolytes from car, truck, and forklift lead acid batteries were disposed of by neutralizing the battery acid and discharging the solution to floor drains located in Building 203. During this time period, the lead acid battery electrolyte was neutralized by adding ammonium hydroxide and water to the battery electrolyte. The floor drains were connected to a drain pipe which further drained into a septic tank at Building 203. The location of the septic tank, as depicted in Figure A3, is estimated based on surface features of the Site but the actual location is unknown (during the field event, a geophysical evaluation of the site will be conducted to try and locate the septic tank). From 1942 through 1955 (the discharge period) approximately 2,000 gallons of neutralized battery electrolytes were discharged in this manner (NEESA 1990). During the Initial Assessment Study (IAS) on-site inspection, the concrete around the floor drains (within the building) were observed to be deteriorated which indicates the battery electrolyte may not have been neutralized prior to discharging to the drains. Building 203 has since been destroyed and the former Building 203 area is covered with gravel.

In 1955, the Battery Shop was moved across the street (Figure A3). From 1955 to 1983, approximately 4,000 gallons of neutralized battery electrolytes were disposed of to floor drains in the new Battery Shop building. The floor drains, a wash rack, and shop sink were connected to a subsurface drain line which ran approximately 100 feet downgradient and discharged to an unlined sump. From 1955 to 1960 the lead acid battery electrolytes were neutralized using water and ammonium hydroxide and from 1960 to 1983 the lead acid battery electrolytes were neutralized using water and baking soda. Since the summer of 1983, the maintenance of batteries has been conducted at NAVWPNSTA Seal Beach and disposal of the electrolyte mixture stopped at the Battery Shop. The building is still present and is currently being used as a maintenance shop.

The IAS for NAVWPNSTA Seal Beach Det. Fallbrook (NEESA 1985) and associated Addendum (NEESA 1990) indicated additional work in the form of a SI should be conducted at both former Buildings 203 and the new Battery Shop building to further investigate the former disposal practices of the battery electrolyte fluid at the Site.

SAP Worksheet #10 – continued

10.1.3 IR Site 32 – Paint Shop Building

IR Site 32, referred to as the Paint Shop disposal area, is located southwest of the Ammunition Road entrance gate adjacent to the Paint Shop building (Figure A4). From the mid-1950s to 1983, a small aboveground storage tank (6 foot by 3 foot by 4 foot) was located on the southeastern side of the building that contained approximately 50 gallons of caustic soda (sodium hydroxide) and was used as a dipping tank to remove paint from tools. As part of tank maintenance, the tank was drained approximately every 6 months via a pipe that extended approximately 20 feet from the tank towards the adjacent embankment, and Fallbrook Creek. From the mid 1950s to 1983, approximately 2,800 gallons of waste caustic soda solution with paint sludge were discharge to this area (NEESA 1990). During the May 14, 2014 site walk for this ESI, dried paint was observed in the exposed soil embankment and on a utility pole located to the east of the Paint Shop.

In 1996, soil sampling was conducted at IR Site 32 in support of a Relative Risk Site Evaluation Model (Bechtel 1996). During this sampling event, one of the shallow soil samples reported PCBs. An IAS was conducted for NAVWPNSTA Seal Beach which included IR Site 32 at Det. Fallbrook. The IAS recommended a SI should be conducted at IR Site 32 due to the possibility of heavy metal contamination from the paint sludge. In 2010, a SI was conducted to further assess impacts of previous disposal practices on the Site. Twenty soil samples were collected as part of the SI and analyzed for VOCs, SVOCs, metals, and hexavalent chromium. Only two VOCs (m/p-xylene and toluene) were reported at the site, but at concentrations below human health risk-based screening criteria. SVOCs were not reported in any of the soil samples. Lead was detected in three samples at concentrations slightly above the residential screening criterion of 80 mg/kg and above the base-wide background level. Arsenic was detected in one soil sample at a concentration that exceeded the residential and industrial human health screening criteria and the base-side background concentration. One sample (IRP32-SB03) reported hexavalent chromium at a concentration at a concentration of 23.6 mg/kg which exceeded the residential human health screening criterion (17 mg/kg). Based on the soil analytical results from the SI an ESI was recommended to further evaluate the lateral and vertical extent of detected contaminants at the Site.

10.2 Groundwater Quality and Beneficial Use

Although groundwater within Det. Fallbrook is considered beneficial use by the California Regional Water Quality Control Board, NAVWPNSTA Seal Beach Det. Fallbrook receives all of its potable water from the San Diego County Water Authority. Depths to water in three

SAP Worksheet #10 – continued

monitoring wells along Ammunition Road were measured between 50 and 60 feet bgs in 2003 during a underground storage tank investigation (Malcolm Pirnie Inc. 2006). These wells are adjacent to IR Site 30 and relatively close to IR Sites 31 and 32. The wells were installed during an underground storage tank investigation. Based on the data from these wells, direction of groundwater flow was toward the southwest. The wells are located within the Fallbrook Creek drainage basin, approximately 700 feet north of Fallbrook Creek.

Within the limits of the IR Sites, potable groundwater is anticipated to be located at a depth of between 50 and 100 feet, as shown during 2003 measurements (Malcolm Pirnie Inc. 2006). Additionally, seasonally perched groundwater may be contacted at shallower depths. It is anticipated that groundwater is also present in the alluvial soils along the bedrock-to-alluvium contact, adjacent to the channel. Groundwater collected as part of this SI for IR Site 31 is anticipated to be contacted at 50 feet due to the proximity to well mentioned above. During the SI, surface flow over bedrock was observed in the Fallbrook Creek channel (ChaduxTt 2010); however, this surface water is not anticipated to be impacted during this SI/ESI.

The SI for IR Site 32 documented four water supply wells within one mile of the Site. One of the wells is located approximately ½ to 1 mile northeast of the Site and is a public water supply well. Two of the wells are located to the east and southeast at approximately ½ to 1 mile away from the Site. The fourth water supply well is located ¼ to ½ mile south from the Site (ChaduxTt 2010).

10.3 Current and Future Land Use Considerations

The current land use at each of the IR Sites includes industrial use. The surface at IR Site 30 is asphalt and the area is currently being used as a recreational vehicle storage lot. The surface features at IR Site 31 include crushed rock in the boundary of former Building 203, an asphalt paved road and parking area adjacent to Building 203 and asphalt pavement adjacent to the new Battery Shop building. In the area to the east of the new Battery Shop building where the unlined sump is located, the surface area is soil with minimal vegetation. There is no specific current use for the Building 203 area while the new Battery Shop Building is currently used as a transportation shop. No changes to the current land use are planned for IR Site 31 at this time. The surface area at IR Site 32 includes asphalt roads, parking areas, and exposed soil located adjacent to the Paint Shop Building. Current uses of IR Site 32 consist of temporary parking. There are no changes to the site use planned for IR Site 32.

SAP Worksheet #10 – continued

10.4 Potential Exposure Pathways

The current nature and extent of impacts from past site uses on the environment at IR Sites 30 and 31 is currently unknown. The exposure pathway for IR Site 30 is limited due to asphalt covering; however, if the asphalt is removed (i.e. during construction) then the potential exposure routes are similar to IR Site 31 (discussed next). Potential exposure pathways for IR Site 31 appear to be from surface soil to the air in the form of dust, direct exposure to surface soil, and from surface soils to localized surface water (i.e., Fallbrook Creek). There is also a potential that groundwater may have been impacted at IR Site 31 due to the nature of the release (liquid into soil). If groundwater has been impacted, the exposure pathway to humans can be from direct exposure to groundwater.

The ESI at IR Site 32 is being conducted to further delineate the nature and extent of contaminants from historical site uses. During the Relative Risk Site Evaluation sampling, PCBs were reported in shallow soil at the site. During the initial SI, hexavalent chromium, lead, and arsenic were reported in shallow soil at a concentration that exceeded their respective residential risk-based screening level and base-wide background levels. Potential exposure pathways for IR Site 32 are similar to those mentioned above for IR Sites 30 and 31. These exposure routes being exposure from surface soil to air, direct exposure to surface soils, release from surface soils to local surface water. Impact to shallow groundwater is not anticipated due to observances at the site showing layers of paint in the surface soil indicating percolation into the substrate was limited.

Potential current human health exposure populations, based on current Site uses, consist of construction and industrial workers at IR Sites 30, 31 and 32.

Potential ecological receptors at the site include many mammals (kangaroo rats, voles, deer, mice, bats, ground squirrels, opossum, rabbits, and coyotes), reptiles (orange-throated whiptails, rattlesnakes, and horned lizards), and birds (owls, vireo, gnatcatchers, kites, quails, sparrows, kingbirds, and hawks).

10.5 Summary

The following bullets provide a summary of the conceptual site model for this SI/ESI to be conducted at the Sites in accordance with this SAP.

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IR Site 30: Switch Oil Spill in Building 230

- Up to 16 ounces of switch oil was spilled on the asphalt pavement within the southeast end of former Building 230. This switch oil may have contained PCBs.
- A removal of the stained asphalt was conducted in 1984.
- The current extent of PCBs (if any) within the soil underlying the former spill location, adjacent to the building, and in the drainage feature to the south of the building are unknown.
- The nearest domestic water well is approximately ¼ to ½ mile from IR Site 31.
- The exposure pathways are limited due to the asphalt covering; however, if asphalt is removed exposure pathway would be from surface soils, from soils to air, and from soils to surface water. The current potentially exposed human population consists of the industrial and construction worker if trenches are advanced or the soil is exposed at the Site.
- This purpose of this investigation is to determine if PCBs are present in soil at the Site at if they are present at concentrations that pose a potential risk to human health and the environment.

IR Site 31: Battery Shop Disposal Areas (Former Building 203 and the New Battery Shop)

- Approximately 2,000 gallons of neutralized lead acid battery electrolytes were discharged to a septic tank connected to Building 203.
- The location of the septic tank at former Building 203 is currently unknown.
- Building 203 has been demolished and removed.
- Approximately 4,000 gallons of neutralized lead acid battery electrolytes were discharged to an unlined sump located to the southeast of the new Battery Shop building.
- The building wash sink and wash rack were also connected to the drain line that discharged to the unlined sump located to the southeast of the new Battery Shop building.
- The exposure pathways for IR Site 31 include from surface soils, from soils to air, from soils to groundwater, from groundwater, and from soils to surface water. The current potentially exposed human population consists of industrial and construction workers at the Site.
- The nearest domestic water well is approximately ¼ to ½ mile from IR Site 31.

SAP Worksheet #10 – continued

- The purpose of this investigation is to evaluate whether there has been a significant release of lead related to disposal of neutralized battery electrolytes to soil and groundwater at the Site.

IR Site 32: Paint Shop Building

- Approximately 2,800 gallons of caustic soda with diluted paint was discharged to surface and near-surface soils to the southeast of the Paint Shop building.
- T**he** location of the discharge point is approximately to be 15 to 20 feet to the southeast of the Paint Shop building. The exact location is not known.
- A Relative Risk Site Evaluation Model data collection effort was conducted which included a sample from IR Site 32 that reported PCBs present in soil.
- A SI was conducted at IR Site 32 that concluded hexavalent chromium, lead, and arsenic are present at concentrations that pose a potential a risk to human health.
- The extent of hexavalent chromium, lead, PCB, nor arsenic at concentrations that potentially pose a risk to human health or the environment is not currently delineated.
- The nearest domestic water supply well is approximately ¼ to ½ mile away from IR Site 32.
- Exposure pathways at the Site include from surface soils, from soils to air, and from soils to surface water. The current potentially exposed human population consists of industrial and construction workers at the Site.
- The purpose of this investigation is to further assess the lateral and vertical extent of hexavalent chromium, metals, SVOCs, PCBs, pH, and VOCs at the Site to determine if these analytes are present at concentrations that pose a potential risk to human health or the environment.

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SAP Worksheet #11 — Project Quality Objectives/Systematic Planning Process Statements

The DQOs specify the project objectives, the data collection boundaries and limitations, the most appropriate type of data to collect, and the level of decision error that will be acceptable for the decision. The quality and quantity of data required to implement an environmental remedial action are also defined. The scope, level of detail, and verification for the design and planning documents may vary from project to project, depending on the project-specific conditions and the nature and complexity of the proposed activities. The project-specific DQOs, as defined through the seven-step process (U.S. EPA 2006), are as follows:

1. State the problem
2. Identify the goals of the study
3. Identify information inputs
4. Define the boundaries of the study
5. Develop the decision rules
6. Specify performance or acceptance criteria
7. Develop the plan for obtaining data

The DQOs are presented in the following sections. General discussions of each step of the DQO process are presented below.

11.1 State the Problem

11.1.1 IR Site 30 – Switch Oil Spill in Building 230

A release of several ounces of potentially PCB containing oil occurred in the far southeast end of former Building 230. The impacted asphalt was removed and replaced with new asphalt. Soil samples and notes on whether the soil below the asphalt was stained have not been found and it is assumed that no documentation was conducted regarding the clean up. Therefore, it is unknown if there is a potential risk to human health or the environment in the soil due to the release of potentially PCB containing switch oil.

11.1.2 IR Site 31 – Battery Shop Disposal areas (Former Building 203 and the New Battery Shop)

Neutralized electrolyte fluid from lead acid batteries was disposed of through floor drains which emptied into a septic tank at Building 203 and into an unlined sump and then to a leach field at the new Battery Shop building. No previous sampling has been conducted at the Site; therefore, it is unknown whether lead or pH are present at the Site at levels that are due to historical Site uses. However, due to previous disposal practices at the site, this project will include sampling

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for lead and pH to evaluate whether there has been a significant release of lead due to these activities.

11.1.3 IR Site 32 – Paint Shop Building

Tools used for painting (i.e., paint brushes, rollers, etc) were cleaned in a AST containing approximately 50 gallons of caustic soda, located to the southeast of the Paint Shop building. This AST was drained approximately every 6 months via a pipe that drained to the surface soil approximately 20 feet southeast of the tank, towards the adjacent embankment and Fallbrook Creek. The disposal practices resulted in a release of a paint sludge and caustic soda to the surface and subsurface soils at the Site. Additionally, PCB was reported from one sample collected at the site during sampling in support of a Relative Risk Site Evaluation Model (Bechtel 1996). A SI was conducted in 2010 that concluded hexavalent chromium, lead, and arsenic were present at the Site at concentrations that exceeded the residential risk-based screening level and base-side background levels. Additional assessment is needed to further assess the lateral and vertical extent of these analytes.

11.2 Identify the Goals of the Study

The primary decision questions for this investigation are:

1. Are PCBs present in soil at IR Site 30 at concentrations exceeding risk based screening levels, as presented in Worksheet #15?
2. Are lead and/or pH present at IR Site 31 in soil and groundwater at concentrations that exceed risk based screening levels and base-wide background levels (metals only), as presented in Worksheet #15?
3. Are hexavalent chromium, metals, SVOCs, PCBs, and VOCs present at within soil at IR Site 32 at concentrations that exceed risk based screening levels and base-wide background levels (metals only), as presented in Worksheet #15? Additionally, is pH present in the soil at levels that provide evidence to evaluate the potential transport of paint in the caustic soda solution?

11.3 Identify Information Inputs

Inputs necessary to resolve decision questions include the following information resources.

- Validated soil data collected during the SI (ChaduxTT 2010).
- Validated soil and groundwater data collected in accordance with this SAP.
- Lithologic information obtained from soil boring logs collected during this investigation.

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- Current and projected land use and associated exposure scenarios.
- Background metal concentrations from the Basewide Metals Background Soil Study Report (SES-Tech 2012) shown in Table 1.
- Region 9 RSLs, the California modified preliminary remediation goals (PRGs), and the Los Alamos National Laboratory Environmental Screening Level.

The analytical methods and analytes for each sampling matrix are listed on Worksheet #15.

11.4 Define the Boundaries of the Study

The lateral, vertical, and temporal study boundaries are defined below.

11.4.1 Lateral Boundaries

The lateral study boundaries are defined by the boundaries of the IR Sites.

11.4.2 Vertical Boundaries

The vertical boundaries of the investigation are based on the maximum proposed depth of the borings to be advanced. The maximum depth proposed for IR Site 30 is one foot bgs, for IR Site 31 is 13 feet bgs for soil and approximately 80 feet for groundwater (if needed), and for IR Site 32 is 14 feet bgs.

11.4.3 Temporal Boundaries

There are no temporal boundaries associated with the proposed activities at the Site. Reporting will be conducted in accordance with the project schedule included as Worksheet #16.

11.5 Develop the Decision Rules

1. If concentrations of PCB at IR Site 30 are reported below the risk based screening levels (as listed in Worksheet #15), then no further action will be recommended. Otherwise, further investigation will be recommended.
2. If concentrations of lead and/or pH at IR Site 31 are reported below the risk based screening levels and base-wide background levels (metals only) (as listed in Worksheet #15), then no further action will be recommended. Otherwise, a further investigation will be recommended.
3. If concentrations of hexavalent chromium, metals, PCBs, SVOCs, and VOCs at IR Site 32 are reported below the risk based screening levels and base-wide background levels (metals only) (as listed in Worksheet #15), then no further action will be recommended (the analysis of pH is being used at the site to evaluate the potential

SAP Worksheet #11 – continued

transport of paint in the caustic soda solution). Otherwise, further investigation will be recommended.

Note: Further investigation may include evaluation of whether sufficient data are available to determine if the concentrations pose a potential risk to human health and/or the environment and will be evaluated through discussions with project stakeholders.

11.6 Specify Performance or Acceptance Criteria

There are two types of decision errors: sampling design and measurement. Sampling design errors are a function of the selection of sample locations or analytical methods used to characterize the site to be studied. Measurement errors are a function of the procedures used to collect and analyze the samples. Decision errors will be limited by a careful evaluation of the data and adherence to established data collection procedures.

The sampling design error was controlled by careful planning. Initially, a geophysical survey will be conducted at the Building 203 area of IR Site 31. The geophysical survey is being conducted to locate the former septic tank which will determine the soil boring locations. Once all proposed boring locations are determined, a geophysical survey will be conducted at each site to locate subsurface utilities. The location of subsurface utilities may alter the final location of proposed soil borings and groundwater monitoring well.

The 12 hand auger borings at IR Site 30 will be located based on historical data suggesting the release was located in the far southeastern end of Building 230, historical aerial photographs that included Building 230 and a drainage feature to the south of the former building, geographical information system program which cross referenced historical building locations with current ground coordinates, and a systematically designed sampling grid to provide sample locations throughout the southeastern end of the building at equidistance's.

The 17 direct-push borings at IR Site 31 will be located based on results of the geophysical survey intended to determine the location of the septic tank and drain line at former Building 203. Two systematically designed sampling grids will be used to collect samples equidistance and throughout the anticipated area of release (one at former Building 2013 and one at the new Battery Shop area). Six of the nine borings advanced at former Building 203 will be located using the systematic sample grid which will be placed around the septic tank. Three of the nine borings will be advanced along the drain line in the footprint of the former building. The sample collected adjacent to the new Battery Shop building will be determined based on the location of the unlined sump. One boring will be located within the unlined sump, one boring will be located adjacent to the sump and the other borings will be advanced in the systematic sampling grid,

SAP Worksheet #11 – continued

downhill (to southeast) of the unlined sump. Following analysis of the collected soil samples, the Navy will evaluate whether a monitoring well is needed. If installed, the groundwater monitoring well will be located within the southeastern portion of the sample grid.

Three of the nine direct-push borings at IR Site 32 will be located in a step-out pattern from previous boring IR32-SB03. Two of the nine borings will be located near previous borings that reported lead or arsenic at concentrations exceeding the residential risk-based screening criteria (IR32-SS04 and IR32-SS10). One boring will be located along the southern boundary of the site to further evaluate the extent of contamination at the Site. Three borings will be installed on the southeast side of the building to evaluate the area of the former AST. During the May 2014 Site walk, asphalt patches were observed in the area of IR32-SB03. Using pre-surveyed coordinates, the boring location will be marked on the ground and is anticipated to be associated with the asphalt patch observed in the field.

Measurement errors that arise during the various steps of the sample-measurement process (i.e., sample collection, sample handling, sample preservation, sample analysis, data reduction, and data handling) are possible regardless of the sample design. Neither measurement errors nor variability can be eliminated, but they can be controlled by selecting appropriate procedures. The analytical methods, method reporting limits, and project-specific soil and groundwater screening criteria are discussed in Worksheet #15. Measurement error is further managed by using standard procedures, reviewing data records, and managing data quality.

11.7 Develop the Plan for Obtaining Data

The following sampling plan was developed to determine if previous activities at IR Sites 30, 31, and 32 impacted the soil and groundwater (IR Site 31 only) at a level that poses a potential risk to human health and/or the environment. Sampling locations and protocols were selected with concurrence from the Navy and regulatory agencies.

Further information on the project tasks is included in Worksheet #14 and further information on the sampling design and rationale are included in Worksheet #17. Additionally, Worksheet #18 lists each planned sample and analytical suite associated with each sample.

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SAP Worksheet #12 — Measurement Performance Criteria Table

Measurement Performance Criteria Table – Field QC Samples (Soil and Groundwater)

QC Sample	Analytical Group	Frequency	Data Quality Indicators	Measurement Performance Criteria	QC Sample Assessment Error[1]
Equipment blank	Inclusive of analytical group for the day's sampling event	1 per day	Accuracy	No Analyte > LOQ	S&A
Source Blank	All Analytes	1 per lot of water used to collect equipment blank samples (if non-dedicated sampling equipment is used)	Accuracy	No analyte>LOQ	S&A
Field Duplicate	Lead pH	10% of groundwater samples	Precision	RPD <25%	S
Matrix Spike / Matrix Spike Duplicate	All analytes	5% of Samples	Accuracy	See SAP Worksheet #28	A
Temperature Blank	All analytes	1 per sampling cooler	Representativeness	2 to 6ºC	S&A

Note: Field duplicates will not be collected for soil samples due to the heterogeneous nature of soil matrices.
A – analysis
QC – Quality control
LOQ – limit of quantification
RPD – Relative percent difference
S - sampling
VOCs – volatile organic compounds
> - greater than
ºC – degrees Celsius

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SAP Worksheet #13 — Secondary Data Criteria and Limitations Table

Secondary Data	Data Source (originating organization report title and date)	Data Generators (originating organization, data types, data generation/ collection dates)	How Data Will Be Used	Limitations on Data Use
Historical analytical data	*Summary of Results for the RRSEM Data Collection Effort.* Naval Weapons Station, Seal Beach, Fallbrook Annex. Fallbrook, California. February. (Bechtel 1996)	Bechtel Soil data for IR Site 32. Data collected and reported to support a Relative Risk Site Evaluation Model	Previous data will be used in Expanded Site Inspection Report and compared to data collected in accordance with this SAP to determine extent and level of contamination at the Site.	None
Historical analytical data	Final Site Inspections Report for Installation Restoration Program Sites 32, 34b, 34d, and 34e and Munitions Response Program Sites UX01, UX02, UX03, UX04, UX06, and UX07. (ChaduxTt 2010)	ChaduxTt. Soil data for IR Site 32. Data collected and reported as part of Site Inspection.	Previous data will be used in Expanded Site Inspection Report and compared to data collected in accordance with this SAP to determine extent and level of contamination at the Site.	None

Abbreviations and Acronyms:

IR – Installation Restoration
SI – Site Inspection
HHRA – Human-health risk assessment
SLERA – Screening-level ecological risk assessment

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SAP Worksheet #14 — Summary of Project Tasks

This worksheet summarizes the project tasks for this investigation.

14.1 Major Tasks

The following major tasks will be performed during this investigation.

- Permitting/Notice of Intent
- Biological Monitoring
- Geophysical Survey
- Site Preparation
- Utility Survey and Clearance
- Direct-Push Soil Borings
- Groundwater Monitoring Well Installation and Development
- Land Surveying
- Groundwater Sampling Procedures (IR Site 31 only)
- Sample Analysis
- Sample Packaging and Shipping
- Equipment Decontamination
- Investigation-derived waste (IDW) management
- Data management (including third-party validation)

Specific procedures to be followed during field activities are described in detail in the sections below. Stand-alone SOPs are not included.

14.2 Permitting/Notice of Intent

Information regarding the installation of the groundwater monitoring well at IR Site 31 will be submitted to the San Diego Department of Environmental Health (DEH) in the form of a monitoring well installation permit. Under CERCLA-regulated cleanups, no federal, state, or local permits are required for on-site investigations. However, the state has an interest in protecting groundwater from improper well installation. Therefore, monitoring well information will be provided before drilling begins and well construction details will be submitted after drilling is complete, but permit fees will not be paid.

14.3 Biological Monitoring

The planned biological monitoring is presented in a Biological Avoidance and Minimization Plan that is presented as Attachment B to the Work Plan.

SAP Worksheet #14 – continued

14.4 Geophysical Survey

A geophysical survey will be conducted using ground penetrating radar in an effort to locate anomalies associated with an underground storage tank and the drain pipe in the foundation of former Building 203. The data from the geophysical survey will determine the location and spacing of proposed borings adjacent to and within the foundation of Building 203 at IR Site 31.

14.5 Site Preparation

Proposed soil boring locations will be identified using global positioning system equipment and staked or marked on the ground with the proposed boring number. None of the proposed boring locations are located in concrete paved areas therefore concrete coring is not anticipated. Additionally, cutting or coring for soil boring locations in the asphalt-paved areas will not be necessary since the direct push machine will be able to break the asphalt so it can be removed prior to hand auguring.

An approved IDW staging area will be determined prior to the initiation of fieldwork. The staging area will be located within the vicinity of the Sites, have safe access for multiple vehicles, and will be located on asphalt. The staging area will be used to store IDW generated during field efforts and field equipment (drill rigs, decontamination station, and other field vehicles) that will be stored overnight.

14.6 Utility Survey and Clearance

Multiple underground utility clearances will be completed prior to intrusive fieldwork. Prior to conducting any utility clearance, each boring location will be demarcated with spray paint and each IR Site will be identified for Dig Alert by writing “USA” on the ground bordering the site. Prior to subsurface utility clearance, a subsurface operations permit will be submitted through PWC and Dig Alert will be notified at least 48 hours prior to subsurface work to allow proper utility clearance by public utility companies. Additionally, a private subsurface locator subcontractor will conduct a geophysical survey of the site to locate Site utilities and approve the proposed soil boring locations at each of the IR Sites.

The geophysical utility surveyor will approve each boring location by confirming no utilities are identified within a 5-foot radius around each of the proposed boring locations. If a utility is identified within 5 feet of the proposed boring location, the proposed location will be moved, and the clearance procedures will be repeated. Additionally, prior to advancing the direct push boring, the top 5 feet of each boring location will be physically cleared by advancing a hand

SAP Worksheet #14 – continued

auger to confirm there are no utilities present. Clearance of each boring location will be documented in the field logbook.

14.7 Soil Borings

Soil borings will be advanced using a combination of hand auger and a direct push drill rig at IR Sites 31 and 32. Soil borings at IR Site 30 will be advanced using a hand auger only due to the shallow depth of the samples.

Hand auger borings will use a metal t-handle attached to a 3 or 5 foot drive rod and a 3 inch wide metal auger. The t-handle will be manually turned to advance the auger into the soil. Prior to advancement of the auger the base rock will be removed from under the asphalt. Soil samples will be collected from the bottom of the auger at desired depths.

Direct push drill rigs use the static weight of the rig combined with a hydraulic percussion to advance a bore rod into the soil. The bore rod is used to advance a borehole to the desired sampling depth. Soil samples will be collected at desired depths by removing the drive rod, attaching a sample rod, and pushing the sample rod past the desired sample depth. An acetate sleeve or stainless steel sleeves will placed within the sample rod prior to advancement to aid in sample preservation, collection, and packaging. Once the sample rod is removed from the borehole, the acetate sleeve will be removed and cut at the desired sample depth, capped, labeled, and prepared for sample shipment.

In between each boring location, the drill rods and auger will be cleaned using a 3 stage decontamination process.

The following is a detailed description of the direct push soil sampling procedures.

1. The boring is advanced until the top of the desired sampling interval is reached.
2. A decontaminated direct push sampler equipped with acetate or stainless steel sleeve(s) is lowered into the borehole.
3. The direct push sampler will be pushed into the undisturbed soil/sediment by a hydraulic ram.
4. Once complete, the sampler is brought to ground surface and the acetate sleeve containing the soil sample will be removed from the sampler, capped, temporarily labeled, and delivered to the sample handling area.
5. If the analytical suite for the sample includes VOC analysis, skip to Step 9.

SAP Worksheet #14 – continued

6. Cut the portion of the acetate liner containing the soil sample from the target depth from the liner and retain as the analytical laboratory sample.

7. Cap the acetate liner or stainless steel sleeves with Teflon™ film and tight-fitting plastic end caps, properly label the sample, place into a resealable plastic bag, and place the sample in a cooler with ice. The orientation of the stainless steel sleeves and acetate liner (top vs. bottom of boring) will be marked with an arrow.

8. Record the sample number, date, time, and required analyses on the COC form and in the field logbook. All entries will be written in indelible blue or black ink.

9. If the sample is to be analyzed for VOCs, an Encore® sampling method will be followed as described below.

   – Holding the coring body, the plunger rod will be pushed down until the small o-ring rests against the tabs. This will assure that the plunger will move easily;

   – The locking lever on the Encore® T-handle will be depressed. The coring body, with the plunger end first, will be placed into the open end of the T-handle, aligning the slots of the coring body with the locking pins in the T-handle. The coring body will be twisted clockwise to lock the pins in the slots. The sampler will be checked to ensure that it is locked in place. The sampler will now be ready for use;

   – By holding the T-handle, the coring body will be pushed into the soil in the liner until the coring body is full. When full, the small o-ring will be centered in the T-handle viewing hole. The sampler will then be removed from the soil and any excess soil will be wiped from the coring body exterior;

   – The coring body will be capped while it is still on the T-handle. The cap should be pushed over the flat area of the ridge. To lock the cap in place, the cap will be pushed and twisted so that it seals the sampler;

   – The capped sampler will be removed by depressing the locking lever on the T-handle while twisting and pulling the sampler from the T-handle;

   – This procedure will be performed two more times for a total collection of three Encore® samplers per sample. The three Encore® samplers will then be placed into one of the aluminum bags the samplers came in and the bag labeled;

   – Place the aluminum bag containing the three Encore® Samplers into a resealable plastic bag and immediately place the bag in a cooler with ice.

SAP Worksheet #14 – continued

The sample number, date, time, and required analysis will be recorded on the COC form and in the field logbook. All entries will be written in indelible blue or black ink.

– If the sample requires additional analyses other than VOCs, process the acetate liner and/or stainless steel sleeves as described in Steps 6 through 8 above.

14.8 Groundwater Monitoring Well Installation and Development

Based on the results of the soil sampling at IR Site 31, a monitoring well may be installed at that IR Site. The groundwater monitoring well will be installed using hollow-stem auger drilling methods to the target depth of approximately 80 feet bgs, less if groundwater is contacted a shallower depths. Soil samples will be collected at 5-foot intervals during drilling using a split-spoon sampler for lithologic logging collection purposes only. No analytical soil samples are anticipated to be collected during drilling for monitoring well installation. A soil boring log will be generated in accordance with Unified Soil Classification System guidelines and will be submitted with the SI Report for IR Site 31.

Once the target total depth is reached (approximately 80 feet), the driller will install 4-inch-diameter monitoring well using Schedule 40 PVC casing and 20 feet of screen with 0.020-inch machine-cut slots. A 20-foot screen will be used to accommodate seasonal variations in groundwater levels. After the PVC well is inserted into the borehole, a filter pack consisting of #2/16 sand or similar will be placed from total depth to at least 2 feet above the top of the screened interval; with the measurement conducted after the well has been surged to settle the filter pack. A 3 foot minimum bentonite seal will be placed on top of the filter pack which will consist of bentonite pellets or chips that will be hydrated after installing into the well and allowed to set up over a minimum of 45 minutes prior to placing the bentonite grout seal. The bentonite grout seal will consist of a neat cement grout and will be placed in the borehole by the tremie method. The bentonite grout seal will be placed from above the bentonite pellets to the base of the surface completion (approximately 3 feet bgs). The surface completion will be placed above the bentonite grout seal and will consist of a concrete pad and a standpipe. From ground surface to approximately 2 feet bgs the borehole will be widened in a funnel shape using hand tools. The concrete pad will be built with 24 inches of concrete that is 4 inches thick on all sides of the standpipe. The concrete pad will be built to ensure surface drainage away from the standpipe. The standpipe will be placed in the borehole at approximately 2 feet bgs and extend to approximately 3 feet above ground surface. The remaining annulus between the PVC well casing

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and the steel standpipe will be sealed with neat cement placed from the surface (from ground surface to 2 feet bgs). A typical Monitoring well construction diagram is depicted in Figure A5.

Once the permanent monitoring well is constructed, a minimum period of 24 hours will be observed prior to well development. Development will begin by removing accumulated sand-sized sediment in the well by bailing. Bailing will continue until the water is free of sand-sized particles. Fine sediment will be removed from the well screen and filter pack with a surge block made of an inert material. The water in the well will be forced through the well screen and filter pack by quickly moving the surge block up and down within the screened interval for several minutes. Sediment loosened by surging will be removed from the well by placing a pump in the bottom of the well. The pump will be moved up and down through the screened interval as necessary. Pumping will continue until the water is visibly free from sediment and monitored groundwater parameters (temperature, pH, conductivity, dissolved oxygen, oxidation/reduction potential, and turbidity) stabilize, until the well goes dry, or until approximately three to five borehole volumes have been purged. If water has been added during drilling, then the volume of water added will be removed in addition to the development water. The well will then be allowed to stabilize communication with the groundwater for at least 72 hours prior to sampling.

The monitoring well will be sampled using a non-dedicated bladder pump and low-flow sampling methodologies.

14.9 Land Surveying

If installed, the monitoring well will be surveyed to establish the horizontal coordinates and elevations of top of casing and top of well vault. The top of casing will be surveyed at a pre-designated and marked location and will be the same location from which the depth-to-water measurements will be collected. This will allow for an accurate calculation of groundwater flow direction and gradient. Additionally, each direct push soil boring location for each of the Sites (IR Sites 30, 31, and 32) will be surveyed. Each location will be surveyed by a California-licensed land surveyor. All elevations will be determined and reported to the nearest 3.048 millimeters, relative to the North American Vertical Datum 1988. The horizontal positions will be reported to the nearest 30.48 millimeters defined relative to the State Plane Coordinate System, North American Datum 1983.

14.10 Groundwater Sampling Procedures

If a groundwater monitoring well is installed at IR Site 31, then groundwater samples will be collected from the well. The monitoring well will be sampled using a non-dedicated bladder

SAP Worksheet #14 – continued

pump and low-flow sampling methodologies. Low-flow sampling procedures will be conducted per U.S. EPA sampling guidelines (U.S. EPA 2002b) and as further described below.

Prior to sampling, the depth to groundwater will be measured from the top of the casing using an electronic groundwater sounder. Depth-to-groundwater measurement data, along with monitoring well elevation and top-of-casing elevation, will be used to calculate groundwater flow direction and gradient.

Disposable nitrile gloves will be worn during all purging and sampling activities. Nitrile gloves will be disposed of after the well is purged, and a new pair will be worn before each well is sampled to avoid possible cross-contamination.

A non-dedicated micro-bladder pump will be used to sample the newly installed monitoring well. New tubing will be dedicated to the monitoring well and will be used to connect the non-dedicated sample pump. The non-dedicated sample pump will be decontaminated prior to and after use in accordance with decontamination procedures discussed below. The non-dedicated sample pump will be installed with the pump inlet positioned at the midpoint of the well screen interval, unless the lithological boring log indicates there is a more suitable pump inlet position. The pump inlet depth measurement will be recorded on field forms.

Water quality parameters will be measured and recorded during purging to document stabilization. A water quality meter will be calibrated to the manufacturer's specifications using current standard solutions. Calibration results will be documented on field forms or in the field log book. A flow-through cell will be used to monitor the water quality parameters. Drawdown of the water level in the well will be monitored with a water level sounder per U.S. EPA 2002b guidelines.

Monitoring of well purging and sampling using the low-flow purging and sampling method are described below.

1. Arrive at the monitoring well and confirm the well identification number.
2. Open the traffic box or well vault.
3. Remove any standing water that may have accumulated.
4. Unlock the well.
5. Measure the depth to groundwater from the inner PVC casing reference point to the nearest 1 millimeter.
6. Record measurement on the field form or log book to the nearest 1 millimeter.

SAP Worksheet #14 – continued

7. Lower the portable bladder pump.
8. Attach the flow-through cell tubing and pressure hose to the sampling cap.
9. Begin pumping the well at 0.1 to 0.5 liters per minute (100 to 500 milliliters). Check the water level in the well, and measure the discharge rate of the pump by using a graduated cylinder every minute for the first 5 minutes. Ideally, the pumping rate should equal the well recharge rate with little or no water level drawdown in the well. The goal of low-flow purging is to not exceed 0.1 meter of drawdown during purging.
10. Measure and record the water level, discharge rate, and water quality indicator parameters in the well on the well sampling form (Attachment 1) every 3 to 5 minutes during purging.
11. Check the discharge tubing for air bubbles during the purging process. If bubbles are visible, pluck the tubing where the bubble is located to enable the bubble to pass through the tubing and into the flow-through cell.
12. During purging, monitor pH, temperature, turbidity, conductivity, oxidation/reduction potential, and dissolved oxygen approximately every 3 to 5 minutes with a calibrated water quality meter.
13. The groundwater should be purged until indicator parameters have stabilized. The well will be considered stabilized and ready for sample collection when the indicator parameters have stabilized for three consecutive readings, as follows:
    a. Consecutive reading within ± 1 millimeter for water level measurements
    b. Consecutive readings within ± 0.1 standard units for pH
    c. Consecutive readings within ± 1 degree Celsius (ºC) for temperature
    d. Consecutive readings within ± 10 percent for turbidity (when turbidity is greater than 10 nephelometric turbidity units, i.e., NTUs)
    e. Consecutive readings within ± 3 percent microSiemens per centimeter, i.e., µmhos/cm, for specific conductance
    f. Consecutive readings within ± 10 millivolts for oxidation/reduction potential
    g. Consecutive readings within ± 0.3 milligrams per liter (mg/L) for dissolved oxygen

    If stabilization is not occurring and the procedure has been strictly followed, then sample collection can take place once three (minimum) to six (maximum) casing volumes have been removed. Record the specific information during purging in the field logbook or on the well sampling form (Attachment 1).

SAP Worksheet #14 – continued

14. Once the water quality parameters have stabilized, disconnect the flow-through cell from the pump discharge tubing.
15. Collect samples for analysis first for lead then pH.
16. Do not allow containers with preservative to be overfilled to the point where overflow occurs, as overfilling may result in loss of preservative. If a vial containing preservative is overfilled and overflow occurs, then discard the sample and resample using a new preserved sample container.
17. Containers should be kept capped, except when they are being filled.
18. Affix a completed sample label to the sample container and cover with clear packaging tape. Section 27.2 of this SAP lists the required sample label information.
19. Wrap glass bottles in bubble-wrap packaging material, place into resealable bags, and place sample containers into a cooler containing double-bagged ice to prevent melting ice from contacting the sample containers.
20. Record sample number, time and date, and requested analysis on the chain-of-custody form.
21. Close and lock the well.

14.11 Sample Analysis

Soil samples will be collected and analyzed from the soil borings at IR Sites 30, 31, and 32 and a groundwater sample will be collected at the new groundwater monitoring well to be installed at IR Site 31 using established U.S. EPA SW-846, Update IV sampling guidelines (U.S. EPA 2007) and the samples will be analyzed in accordance with *Navy Installation Restoration Chemical Data Quality Manual* (NFESC 1999). The sample number and analytical suite proposed to be collected at each of the IR sites is presented below.

IR Site 30: 30 soil samples are proposed to be collected and analyzed for the following:

- PCBs by U.S. EPA test method 8082A

IR Site 31: 68 soil samples and potentially two groundwater samples (optional) are proposed to be collected and analyzed for the following:

- Lead by U.S. EPA test method 6020A
- pH by U.S. EPA Method 9045D (soil) or method SM-4500-HB (water)

IR Site 32: 30 soil samples are proposed to be collected and analyzed for the following:

- hexavalent chromium by U.S. EPA test method 7196A

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- Metals by U.S. EPA test method 6020A
- Mercury by U.S. EPA test method 7471B
- SVOCs by U.S. EPA test method 8270C
- PCBs by U.S. EPA Method 8082
- pH by U.S. EPA Method 9045D
- VOCs by U.S. EPA test method 5035/8260B

Further information regarding analytical suites, sample methods, containers, preservations, volumes, and holding time requirements can be reviewed in SAP Worksheets #11 and #17

14.12 Sample Packaging and Shipping

Immediately after sample collection, sample labels will be affixed to each sample container. SAP Worksheets #26 and #27 describe sample handling and custody requirements in greater detail. The samples will be packed with shock-absorbent materials, such as bubble wrap, to prevent movement or breakage of the sample containers during transport. A cooler will be filled with wet ice that will be double-bagged in resealable bags in order to meet temperature requirements of 4 ± 2 degrees Celsius. A temperature blank will accompany each cooler to be measured by the laboratory upon receipt. Cooler drain spouts (if present) will be taped from the inside and outside of the cooler to prevent leakage.

A chain-of-custody form will be placed in a resealable bag and inserted into the cooler, which will then be sealed with packaging tape. The cooler containing the environmental samples will either be picked up by a laboratory courier, or arrangements will be made to have the cooler delivered to the laboratory by an overnight delivery service. If an overnight delivery service is used, the package must be scheduled for priority overnight service to ensure that the temperature preservative requirement is not exceeded. Saturday deliveries will be coordinated with the laboratory.

14.13 Equipment Decontamination Procedures

All drilling augers and downhole drilling equipment used for the groundwater monitoring well installation will be steam cleaned on site using a pressure washer. The cleaning will be conducted inside a portable decontamination trailer and the water will be captured and disposed of as IDW. During groundwater sampling activities, decontamination procedures will not be required for the dedicated tubing. A three-phase decontamination process will be conducted on the direct-push drilling equipment (rods and drive points), hand auger equipment, the non-

SAP Worksheet #14 – continued

dedicated groundwater pump, and the depth-to-water indicator. The three-phase decontamination will be conducted by following these procedures:

1. **Wash with nonphosphate detergent and water solution.** This step will remove all visible contamination from the equipment. A bucket of suitable size, water diluted with nonphosphate detergent, and a brush will be used for this step. Dilute nonphosphate detergent as directed by the manufacturer.
2. **Rinse with potable water.** This step will rinse the detergent solution away from the equipment. A bucket of suitable size filled with water and a brush will be used for this step. Periodic changing of this water is required. Perform this rinse twice.
3. **Rinse with deionized/laboratory reagent-grade water.** This step will include double rinsing any detergent solution and potable water residues. Rinsing will include sprying the the equipment being cleaned with stainless steel Hudson-type sprayer or plastic squeeze bottle while holding the equipment over a bucket of suitable size.

All decontamination water will be containerized in Department of Transportation (DOT)-approved 55-gallon drums and stored at the IDW staging area.

14.14 IDW Management

All development water, purge water, and soil cuttings will be containerized into DOT-approved, 55-gallon drums and stored on site in a in a secured temporary IDW staging area to minimize the potential for unauthorized access, to the extent practicable.. The contained media will be sampled and analyzed for classification purposes and will be transported to an appropriate off-site disposal and/or treatment facility.

The appropriate disposal facility will be determined by the following hazardous classifications:

- Although not anticipated to be present, any soil or water classified as Resource Conservation and Recovery Act (RCRA) hazardous waste will be transported to a licensed treatment, storage, and disposal facility for treatment and disposal.
- Any soil or water classified as non-RCRA hazardous waste will be transported for disposal to a licensed landfill facility in accordance with the CERCLA Off-Site Rule.
- Soil classified as nonhazardous waste, or inert, will be transported for disposal to a licensed landfill or soil treatment facility permitted to accept such waste in accordance with the CERCLA Off-Site Rule.

SAP Worksheet #14 – continued

- Water classified as nonhazardous will be transported for disposal to a licensed treatment facility permitted to accept such waste in accordance with the CERCLA Off-Site Rule.

All waste manifests and profiles, along with analytical data and land disposal restrictions, will be routed through the DON for signature. Original copies of the manifest packages will be provided to the transporter for shipment. All wastes will be removed from the site within 90 days and will be transported via a licensed transporter.

14.15 Data Management

Data collected in the field is to be managed using the following procedures.

14.15.1 Field Logbooks

A permanently bound field logbook with consecutively numbered pages, used for sampling activities only, will be assigned to this project. All entries will be recorded in indelible ink. The logbook pages will be signed by the responsible sampler at the end of each workday, and any unused portions of the logbook pages will be crossed out, signed, and dated.

If it is necessary to transfer the logbook to another person, the person relinquishing the logbook will sign and date the last page used, and the person receiving the logbook will sign and date the next page to be used.

At a minimum, the logbook will contain the following information:

- Project name and location
- Date and time
- Personnel in attendance
- General weather information
- Work performed
- Field observations
- Sampling performed, including specific information such as location, type of sample, type of analysis, and sample identification
- Field analysis performed, including results, instrument checks, problems, and calibration records for field instruments
- Descriptions of deviations from this SAP

SAP Worksheet #14 – continued

- Problems encountered and corrective action taken
- Identification of field QC samples
- Verbal or written instructions
- Any other events that may affect the samples

Variances or changes to field activities will be documented in the field logbook. The field team lead or Trevet PM will review field logbooks for accuracy at the end of each field day.

14.15.2 Document Corrections

Project documentation will be changed or corrected by crossing out the erroneous item with a single line and initialing (by the person making the correction) and dating the correction. The original item, although erroneous, must remain legible beneath the cross-out line. The new information should be written clearly above the crossed-out item.

14.15.3 Data Collected in the Field

Data collected in the field will include soil descriptions made during drilling and groundwater monitoring parameters (i.e. temperature, pH, conductivity, dissolved oxygen, oxidation/reduction potential, and turbidity). Soil will be described in general accordance with the Unified Soil Classification System during drilling. The field geologist will record soil descriptions on a borehole log (included in Attachment 1). The boring log subsequently will be recorded in electronic format, and each log will be reviewed and signed by a professional geologist. Groundwater monitoring parameters will be recorded on a well sampling log (included in Attachment 1). Groundwater monitoring parameters, collected in accordance with Section 14.7, will be uploaded to Navy Installation Restoration Information Solution (NIRIS) website along with validated analytical data.

14.15.4 Data Validation

The analytical data validation component follows NAVFAC SW Environmental Work Instruction #1 (NAVFAC 2001). The analytical data will be sent to a third-party data validation company. The data validation prescribed for this project is 80 percent Level III and 20 percent Level IV. The flagging associated with a third-party data validation report will be entered into the database for each sample and used during data interpretation activities. The analytical data will be uploaded to the NAVFAC SW NIRIS website in accordance with NAVFAC SW Environmental Work Instruction #6 (NAVFAC 2005) after completion of the third-party data validation report.

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SAP Worksheet #15 — Reference Limits and Evaluation Table

The abbreviations below are used in each table heading in Worksheet #15. Additional notes and abbreviations may appear at the end of tables as needed.

- µg/L – micrograms per liter
- CAS – Chemical Abstract Service
- DL – detection limit
- LOD – limit of detection
- LOQ – limit of quantitation
- mg/L – milligrams per liter

SAP Worksheet 15 (continued)

Laboratory: EMAX Laboratory
Matrix: Groundwater
Analytical Group: pH –Method SM-4500-HB

Analyte	CAS Number	Project Screening Level [1] (µg/L)	Project Screening Level Reference	Project Quantitation Limit Goal (µg/L)	Laboratory-Specific (µg/L)		
					LOQ	LOD	DL
pH	12408-02-5	≤6.5 or ≥8.5	NA	0.1	0.1	0.1	0.1

NA – not applicable
[1] – The Project Screening Levels shown are based on the California EPA maximum contaminant level for drinking water.

SAP Worksheet 15 (continued)

Laboratory: EMAX Laboratory
Matrix: Groundwater
Analytical Group: Metals – U.S. EPA Method 6020A

Analyte	CAS Number	Project Screening Level [1] (µg/L)	Project Screening Level Reference	Project Quantitation Limit Goal (µg/L)	Laboratory-Specific (µg/L)		
					LOQ	LOD	DL
Lead	7439-92-1	1	LANL	1	1	0.1	0.05

Cal Modified PRG – California modified Preliminary Remediation Goal based on DTSC HHRA Note 3 (DTSC 2013)
DTSC – Department of Toxic Substances
ESL – Ecological Screening Level
HHRA – Human Health Risk Assessment
LANL – Los Alamos National Laboratory ESL (LANL 2012)
RSL - Regional Screening Level based on U.S. EPA Region 9 Tap water criteria (U.S. EPA 2014)
[1] – The Project Screening Levels shown are the lowest between the U.S. EPA RSLs (Tap water), DTSC HHRA Note 3 (Cal Modified PRG), and LANL minimum No Effect ESL

SAP Worksheet 15 (continued)

Laboratory: EMAX Laboratory
Matrix: Soil
Analytical Group: VOCs - U.S. EPA Method 8260B

Analyte	CAS Number	Project Screening Level [1] (µg/kg)	Project Screening Level Reference	Project Quantitation Limit Goal (µg/kg)	Laboratory-Specific (µg/kg)		
					LOQ	LOD	DL
1,1,1-Trichloroethane	71-55-6	260,000	LANL	5	5	1	0.5
1,1,2,2-Tetrachloroethane	79-34-5	600	RSL	5	5	1	0.5
1,1,2-Trichloroethane	79-00-5	1,100	RSL [2]	5	5	1	0.5
1,1-Dichloroethane	75-34-3	3,600	RSL	5	5	1	0.5
1,1-Dichloroethene	75-35-4	11,000	LANL	5	5	1	0.5
1,2,4-Trimethylbenzene	95-63-6	58,000	RSL	5	5	2	0.55
1,2-Dichloroethane	107-06-2	460	RSL	5	5	1	0.5
1,2-Dichloropropane	78-87-5	1,000	RSL	5	5	1	0.5
1,3,5-Trimethylbenzene	108-67-8	21,300	Cal Modified PRG	5	5	2	0.59
2-Butanone	78-93-3	360,000	LANL	10	10	5	2.5
2-Hexanone	591-78-6	360	LANL	10	10	5	2.9
4-Methyl-2-Pentanone	108-10-1	9,800	LANL	10	10	5	2.8
Acetone	67-64-1	1,200	LANL	10	10	5	3.1
Benzene	71-43-2	1,200	RSL	5	5	1	0.5
Bromodichloromethane	75-27-4	290	RSL	5	5	1	0.5
Bromoform	75-25-2	67,000	RSL	5	5	2	1
Bromomethane	74-83-9	6,800	RSL	10	10	5	1.8
Carbon disulfide	75-15-0	820	LANL	5	5	1	0.5

SAP Worksheet 15 (continued)

Laboratory: EMAX Laboratory
Matrix: Soil
Analytical Group: VOCs - U.S. EPA Method 8260B

Analyte	CAS Number	Project Screening Level [1] (µg/kg)	Project Screening Level Reference	Project Quantitation Limit Goal (µg/kg)	Laboratory-Specific (µg/kg)		
					LOQ	LOD	DL
Carbon tetrachloride	56-23-5	650	RSL	5	5	2	0.54
Chlorobenzene	108-90-7	2,400	LANL	5	5	1	0.5
Chloroethane	75-00-3	14,000,000	RSL	5	5	2	1.3
Chloroform	67-66-3	320	RSL	5	5	1	0.5
Chloromethane	74-87-3	110,000	RSL	5	5	2	1
cis-1,2-Dichloroethene	156-59-2	23,000	LANL	5	5	1	0.5
cis-1,3-Dichloropropene	542-75-6	1,800	RSL [3]	5	5	1	0.5
Dibromochloromethane	124-48-1	730	RSL	5	5	1	0.5
Ethylbenzene	100-41-4	5,800	RSL	5	5	1	0.5
Isopropyl benzene	98-82-8	1,900,000	RSL	5	5	2	0.64
m/p-Xylenes	136777-61-2	1,400	LANL [4]	10	10	2	1
Methylene chloride	75-09-2	2,600	LANL	10	10	5	2
n-Butylbenzene	104-51-8	580,000	Cal Modified PRG	5	5	2	0.7
n-Propylbenzene	103-65-1	3,300,000	RSL	5	5	2	0.65
o-Xylene	95-47-6	1,400	LANL	5	5	1	0.5
p-Isopropyltoluene	99-87-6	NVA	N/A	5	5	2	0.62
sec-Butylbenzene	135-98-8	450,000	Cal Modified PRG	5	5	2	0.67
Styrene	100-42-5	1,200	LANL	5	5	1	0.5
Tert-Butylbenzene	98-06-6	530,000	Cal Modified PRG	5	5	2	0.62

SAP Worksheet 15 (continued)

Laboratory: EMAX Laboratory
Matrix: Soil
Analytical Group: VOCs - U.S. EPA Method 8260B

Analyte	CAS Number	Project Screening Level [1] (µg/kg)	Project Screening Level Reference	Project Quantitation Limit Goal (µg/kg)	Laboratory-Specific (µg/kg)		
					LOQ	LOD	DL
Tetrachloroethene	127-18-4	180	LANL	5	5	1	0.5
Toluene	108-88-3	23,000	LANL	5	5	1	0.5
trans-1,2-Dichloroethene	156-60-5	23,000	LANL [5]	5	5	1	0.5
trans-1,3-Dichloropropene	10061-02-6	1,800	RSL	5	5	1	0.5
Trichloroethene	79-01-6	940	RSL	5	5	1	0.5
Vinyl chloride	75-01-4	59	RSL	5	5	2	1.4

Cal Modified PRG – California modified Preliminary Remediation Goal based on DTSC HHRA Note 3 (DTSC 2013)
DTSC – Department of Toxic Substances
ESL – Ecological Screening Level
HHRA – Human Health Risk Assessment
LANL – Los Alamos National Laboratory ESL (LANL 2012)
RSL - Regional Screening Level based on U.S. EPA Region 9 soil criteria (U.S. EPA 2014)
[1] – The Project Screening Levels shown are the lowest between the U.S. EPA RSLs (soil), DTSC HHRA Note 3 (Cal Modified PRG), and LANL minimum No Effect ESL
[2] – RSL value for 1,1,1-trichloroethane was used
[3]– RSL value for 1,3-dichloropropane was used
[4] – LANL value for total xylenes was used
[5] – LANL value for cis/trans-1,2-dichloroethene was used

SAP Worksheet 15 (continued)

Laboratory: EMAX Laboratory
Matrix: Soil
Analytical Group: SVOC – U.S. EPA Method 8270C

Analyte	CAS Number	Project Screening Level [1] (µg/kg)	Project Screening Level Reference	Project Quantitation Limit Goal (µg/kg)	Laboratory-Specific (µg/kg)		
					LOQ	LOD	DL
1,2,4,5-Tetrachlorobenzene	95-94-3	18,000	RSL	333	333	167	83
1,2,4-Trichlorobenzene	120-82-1	270 [c]	LANL	167	333	167	83
1,2-Dichlorobenzene	95-50-1	920	LANL	333	333	167	83
1,3-Dichlorobenzene	541-73-1	730	LANL	333	333	167	83
1,4-Dichlorobenzene	106-46-7	880	LANL	333	333	167	83
2,2-Oxybis (1-Chloropropane)	108-60-1	4,900	RSL	333	333	167	83
2,4,5-Trichlorophenol	95-95-4	6,200,000	RSL	333	333	167	91
2,4,6-Trichlorophenol	88-06-2	48,000	RSL	333	333	167	83
2,4-Dichlorophenol	120-83-2	180,000	RSL	333	333	167	83
2,4-Dimethylphenol	105-67-9	1,200,000	RSL	333	333	167	83
2,4-Dinitrophenol	51-28-5	120,000	RSL	667	667	167	86
2,4-Dinitrotoluene	121-14-2	1,700	RSL	333	333	167	83
2,6-Dichlorophenol	87-65-0	180,000	RSL [2]	333	333	167	83
2-Chloronaphthalene	91-58-7	6,300,000	RSL	333	333	167	83
2-Chlorophenol	95-57-8	390	LANL	333	333	167	83
2-Methylphenol	95-48-7	670	LANL	333	333	167	83
2-Nitroaniline	88-74-4	540	LANL	333	333	167	83
2-Nitrophenol	88-75-5	NVA	N/A	333	333	167	83
3,3'-Dichlorobenzidine	91-94-1	1,200	RSL	333	333	167	84

SAP Worksheet 15 (continued)

Laboratory: EMAX Laboratory
Matrix: Soil
Analytical Group: SVOC – U.S. EPA Method 8270C

Analyte	CAS Number	Project Screening Level [1] (µg/kg)	Project Screening Level Reference	Project Quantitation Limit Goal (µg/kg)	Laboratory-Specific (µg/kg)		
					LOQ	LOD	DL
3,3'-Dimethylbenzibine	119-93-7	48 [a]	RSL	167	667	167	130
3.4-Methylphenol	106-44-5	6,200,000	RSL	333	333	167	83
3-Nitroaniline	99-09-2	18,000	Cal Modified PRG	333	333	167	83
4,6-Dinitro-2-methylphenol	534-52-1	4,900	RSL	667	667	167	83
4-Bromophenyl-phenyl ether	101-55-3	NVA	N/A	333	333	167	90
4-Chloro-3-methylphenol	59-50-7	6,200,000	RSL	333	333	167	83
4-Chloroaniline	106-47-8	1,000	LANL	333	333	167	83
4-Chlorophenyl-phenyl ether	7005-72-3	NVA	N/A	333	333	167	83
4-Nitroaniline	100-01-6	27,000	RSL	333	333	167	120
4-Nitrophenol	100-02-7	NVA	N/A	667	667	167	106
5-Nitro-o-toluidine	99-55-8	59,000	RSL	333	333	167	106
A,A-Dimethylphenethylamine	122-09-8	NVA	N/A	NA	NA	NA	NA
Acenaphthene	83-32-9	250 [c]	LANL	167	333	167	83
Acetophenone	98-86-2	7,800,000	RSL	333	333	167	83
Aniline	62-53-3	93,000	RSL	667	667	330	167
Aramite	140-57-8	21,000	RSL	333	333	167	83
Benzo(a)anthracene	56-55-3	150 [b]	RSL	167	333	167	83
Benzo(a)pyrene	50-32-8	15 [a]	RSL	167	333	167	83
Benzo(b)fluoranthene	205-99-2	150[b]	RSL	167	333	167	86

SAP Worksheet 15 (continued)

Laboratory: EMAX Laboratory
Matrix: Soil
Analytical Group: SVOC – U.S. EPA Method 8270C

Analyte	CAS Number	Project Screening Level [1] (µg/kg)	Project Screening Level Reference	Project Quantitation Limit Goal (µg/kg)	Laboratory-Specific (µg/kg)		
					LOQ	LOD	DL
Benzo(g,h,i)perylene	191-24-2	24,000	LANL	333	333	167	87
Benzo(k)fluoranthene	207-08-9	380	Cal Modified PRG	333	333	167	83
Benzyl alcohol	100-51-6	120,000	LANL	333	333	167	83
bis(2-Chloroethoxy)methane	111-91-1	180,000	RSL	333	333	167	83
bis(2-Chloroethyl)ether	111-41-1	230 [c]	RSL	167	333	167	83
Bis(2-ethylhexyl)phthalate	117-81-7	20 [a]	LANL	167	333	167	115
Butylbenzylphthalate	85-68-7	90,000	LANL	333	333	167	83
Chlorobenzilate	510-15-6	4,800	RSL	333	333	167	83
Chrysene	218-01-9	2,400	LANL	333	333	167	83
Diallate	2303-16-4	8,700	RSL	333	333	167	100
Dibenzo(a,h)anthracene	53-70-3	15 [a]	RSL	167	333	167	83
Dibenzofuran	132-64-9	6,100	LANL	333	333	167	83
Diethylphthalate	84-66-2	100,000	LANL	333	333	167	83
Dimethylphthalate	131-11-3	10,000	LANL	333	333	167	83
Di-n-butylphthalate	84-74-2	11 [a]	LANL	167	333	167	97
Di-n-octylphthalate	117-84-0	910	LANL	333	333	167	97
Diphenylamine	122-39-4	10,000	LANL	333	333	167	153
Fluoranthene	205-99-2	10,000	LANL	333	333	167	126
Fluorene	191-24-2	3,700	LANL	333	333	167	83

SAP Worksheet 15 (continued)

Laboratory: EMAX Laboratory
Matrix: Soil
Analytical Group: SVOC – U.S. EPA Method 8270C

Analyte	CAS Number	Project Screening Level [1] (µg/kg)	Project Screening Level Reference	Project Quantitation Limit Goal (µg/kg)	Laboratory-Specific (µg/kg)		
					LOQ	LOD	DL
Hexachlorobenzene	118-74-1	79 [a]	LANL	167	333	167	83
Hexachlorobutadiene	87-68-3	6,800	RSL	333	333	167	83
Hexachlorocyclopentadiene	77-47-4	370,000	RSL	333	333	167	83
Hexachloroethane	67-72-1	13,000	RSL	333	333	167	83
Indeno(1,2,3-cd)pyrene	193-39-5	150 [b]	RSL	167	333	167	83
Isophorone	78-59-1	560,000	RSL	333	333	167	83
Kepone	143-50-0	21 [a]	LANL	1,330	3330	1330	667
Naphthalene	91-20-3	1,000	LANL	333	333	167	83
N-Nitroso-di-n-butylamine	924-16-3	94 [b]	RSL	167	333	167	83
N-Nitrosodimethylamine	62-75-9	2.3 [a]	RSL	167	333	167	83
N-Nitroso-di-n-propylamine	621-64-7	76 [a]	RSL	167	333	167	83
N-Nitrosomethylethylamine	10595-95-6	24 [a]	RSL	167	333	167	83
N-Nitrosopyrrolidine	930-55-2	250 [c]	RSL	167	333	167	83
O-toluidine	95-53-4	18,000	RSL [3]	333	333	167	83
Pentachlorobenzene	608-93-5	49,000	RSL	333	333	167	83
Pentachloroethane	76-01-7	5,900	RSL	333	333	167	83
Pentachloronitrobenzene	82-68-8	700	LANL	333	333	167	83
Pentachlorophenol	87-86-5	360 [c]	LANL	330	667	330	167
Phenanthrene	85-01-8	5,500	LANL	333	333	167	83

SAP Worksheet 15 (continued)

Laboratory: EMAX Laboratory
Matrix: Soil
Analytical Group: SVOC – U.S. EPA Method 8270C

Analyte	CAS Number	Project Screening Level [1] (µg/kg)	Project Screening Level Reference	Project Quantitation Limit Goal (µg/kg)	Laboratory-Specific (µg/kg)		
					LOQ	LOD	DL
Phenol	108-95-2	790	LANL	333	333	167	83
Pronamide	23950-58-5	4,600,000	RSL	333	333	167	83
Pyrene	129-00-0	10,000	LANL	333	333	167	160
Pyridine	110-86-1	78,000	RSL	13,333	13,333	667	333

Cal Modified PRG – California modified Preliminary Remediation Goal based on DTSC HHRA Note 3 (DTSC 2013)
DTSC – Department of Toxic Substances
ESL – Ecological Screening Level
HHRA – Human Health Risk Assessment
LANL – Los Alamos National Laboratory No Effect ESL (LANL 2012)
N/A – not applicable
NVA – No value available
RSL - Regional Screening Level based on U.S. EPA Region 9 Soil criteria (U.S. EPA 2014)
[1] – The Project Screening Levels shown are the lowest between the U.S. EPA RSLs (Soil), DTSC HHRA Note 3 (Cal Modified PRG), and LANL minimum Ecological Screening Levels (No Effect ESL)
[2] – RSL value for 2,4-dichlorophenol was used
[3] – RSL value for p-toluidine was used
[a] –The Project Screening Level is below the laboratory LOQ, LOD and DL. The DL presented is the lowest possible DL. Any uncertainty associated with analyte will be discussed in the data summary report.
[b] – The Project Screening Level is below the LOQ and LOD but at or above the DL. The laboratory will report analyte at estimated concentrations that are detected between the LOQ and DL. Any uncertainty associated with the analyte will be discussed in the data summary report.
[c] – The Project Screening Level is below the LOQ but at or above the LOD. The laboratory will report analyte at estimated concentrations that are detected between the LOD and LOQ. Any uncertainty associated with the analyte will be discussed in the data summary report.

SAP Worksheet 15 (continued)

Laboratory: EMAX Laboratory
Matrix: Soil
Analytical Group: Metals – U.S. EPA Method 6020A

Analyte	CAS Number	Project Screening Level [1] (mg/kg)	Project Screening Level Reference	Project Quantitation Limit Goal (mg/kg)	Laboratory-Specific (mg/kg)		
					LOQ	LOD	DL
Aluminum	7429-90-5	77,000	RSL	100	100	20	10
Antimony	7440-36-0	0.05 [a]	LANL	0.2	0.5	0.2	0.1
Arsenic	7440-38-2	2.9	Background	0.5	0.5	0.10	0.05
Barium	7440-39-3	364	Background	0.5	0.5	0.2	0.072
Beryllium	7440-41-7	2.5	LANL	0.5	0.5	0.1	0.05
Cadmium	7440-43-9	0.27 [c]	LANL	0.2	0.5	0.2	0.057
Calcium	7440-70-2	NVA	N/A	100	100	50	17
Chromium	7440-47-3	64	Background	0.5	0.5	0.1	0.05
Cobalt	7440-48-4	20.4	Background	0.5	0.5	0.1	0.05
Copper	7440-50-8	53.4	Background	0.5	0.5	0.2	0.1
Iron	7439-89-6	55,000	RSL	100	100	20	10
Lead	7439-92-1	14	LANL	0.5	0.5	0.1	0.05
Magnesium	7439-95-4	NVA	N/A	100	100	20	10
Manganese	7439-96-5	533	Background	0.5	0.5	0.3	0.153
Mercury	7439-97-6	0.0186 [b]	Background	0.02	0.1	0.02	0.01
Nickel	7440-02-0	15	Background	0.5	0.5	0.2	0.063
Potassium	7440-09-7	NVA	N/A	100	100	20	10

SAP Worksheet 15 (continued)

Laboratory: EMAX Laboratory
Matrix: Soil
Analytical Group: Metals – U.S. EPA Method 6020A

Analyte	CAS Number	Project Screening Level [1] (mg/kg)	Project Screening Level Reference	Project Quantitation Limit Goal (mg/kg)	Laboratory-Specific (mg/kg)		
					LOQ	LOD	DL
Selenium	7782-49-2	0.6	Background	0.5	0.5	0.1	0.5
Silver	7440-22-4	679	Background	0.5	0.5	0.1	0.05
Sodium	7440-23-5	NVA	N/A	100	100	20	10
Thallium	7440-28-0	0.6	Background	0.5	0.5	0.1	0.05
Vanadium	7440-62-2	186	Background	0.5	0.5	0.25	0.19
Zinc	7440-66-6	228	Background	2	2	1	0.683

Background – Background threshold values are from Basewide Metals Background Soil Study (SES-TECH 2012)
Cal Modified PRG – California modified Preliminary Remediation Goal based on DTSC HHRA Note 3 (DTSC 2013)
DTSC – Department of Toxic Substances
ESL – Ecological Screening Level
HHRA – Human Health Risk Assessment
LANL – Los Alamos National Laboratory ESL (LANL 2012)
N/A – not applicable
NVA – No value available
RSL - Regional Screening Level based on U.S. EPA Region 9 Soil criteria (U.S. EPA 2014)
[1] – The Project Screening Levels shown are the lowest between the U.S. EPA RSLs (Soil), DTSC HHRA Note 3 (Cal Modified PRG), LANL minimum No Effect ESL and Background
[a] –The Project Screening Level is below the laboratory LOQ, LOD and DL. The DL presented is the lowest possible DL. Any uncertainty associated with analyte will be discussed in the data summary report.
[b] – The Project Screening Level is below the LOQ and LOD but at or above the DL. The laboratory will report analyte at estimated concentrations that are detected between the LOQ and DL. Any uncertainty associated with the analyte will be discussed in the data summary report.
[c] – The Project Screening Level is below the LOQ but at or above the LOD. The laboratory will report analyte at estimated concentrations that are detected between the LOD and LOQ. Any uncertainty associated with the analyte will be discussed in the data summary report.

SAP Worksheet 15 (continued)

Laboratory: EMAX Laboratory
Matrix: Soil
Analytical Group: PCBs – U.S. EPA Method 8082

Analyte[1]	CAS Number	Project Screening Level (mg/kg)	Project Screening Level Reference	Project Quantitation Limit Goal (mg/kg)	Laboratory-Specific (mg/kg)		
					LOQ	LOD	DL
PCB-1016	12674-11-2	4.0	RSL	0.050	0.050	0.017	0.013
PCB-1221	11104-28-2	0.15	RSL	0.050	0.050	0.017	0.083
PCB-1232	11141-16-5	0.15	RSL	0.050	0.050	0.017	0.009
PCB-1242	53469-21-9	0.24	RSL	0.050	0.050	0.017	0.0093
PCB-1248	12672-29-6	0.24	RSL	0.050	0.050	0.017	0.0083
PCB-1254	11097-69-1	0.24	RSL	0.050	0.050	0.017	0.0083
PCB-1260	11096-82-5	0.24	RSL	0.050	0.050	0.017	0.0099

[1]PCB analytes are based on Aroclor levels. Identified as PCBs in this table not to confuse reader.
RSL - Regional Screening Level based on U.S. EPA Region 9 Soil criteria (U.S. EPA 2014)

SAP Worksheet 15 (continued)

Laboratory: EMAX Laboratory
Matrix: Soil
Analytical Group: Hexavalent Chromium – U.S. EPA Method 7196A

Analyte	CAS Number	Project Screening Level [1] (mg/kg)	Project Screening Level Reference	Project Quantitation Limit Goal (mg/kg)	Laboratory-Specific (mg/kg)		
					LOQ	LOD	DL
Hexavalent Chromium	18540-29-9	0.3	RSL	0.1	0.1	0.04	0.01

Cal Modified PRG – California modified Preliminary Remediation Goal based on DTSC HHRA Note 3 (DTSC 2013)
DTSC – Department of Toxic Substances
ESL – Ecological Screening Level
HHRA – Human Health Risk Assessment
LANL – Los Alamos National Laboratory No Effect ESL (LANL 2012)
RSL - Regional Screening Level based on U.S. EPA Region 9 Soil criteria (U.S. EPA 2014)
[1] – The Project Screening Levels shown are the lowest between the U.S. EPA RSLs (Soil), DTSC HHRA Note 3 (Cal Modified PRG), and LANL minimum No Effect ESL

Laboratory: EMAX Laboratory
Matrix: Soil
Analytical Group: pH – U.S. EPA Method 9045D

Analyte	CAS Number	Project Screening Level (mg/kg)	Project Screening Level Reference	Project Quantitation Limit Goal (mg/kg)	Laboratory-Specific (mg/kg)		
					LOQ	LOD	DL
pH	12408-02-5	NA	NA	NA	NA	NA	NA

N/A – not applicable

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SAP Worksheet #16 — Project Schedule/Timeline Table

The project schedule is included as Figure A6.

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SAP Worksheet #17 — Sampling Design and Rationale

The goal of the SIs at IR Sites 30 and 31 are to assess if past disposal practices resulted in concentrations of PCBs in the soil at IR Site 30 and lead and pH in soil and groundwater at IR Site 31 at concentrations that may pose a potential risk to human health and/or the environment. The goal of the ESI at IR Site 32 is to further assess the extent of hexavalent chromium, PCBs, metals, SVOCs, and VOCs at concentrations that pose a potential risk to human health and/or the environment and to review if pH provides a line of evidence in evaluating the potential transport of paint in the caustic soda solution.

The following summarizes the proposed sampling design for IR Sites 30.

- Utilize geographical information system software to process historical images to determine where the former Building 230 footprint would currently be located at IR Site 30.
- Conduct a geophysical survey at IR Site 31 to determine if subsurface utilities present a potential conflict with the proposed boring locations.
- Mark out the approximate boundary of the former Building 230 (southeast end only) on the ground using the post processed geographical information system locations (based on historical aerial photos). Mark an approximately 30 by 40 foot grid within the former southeast footprint of former Building 230 to systematically determine equidistant locations for the sample locations (as shown on Figure A2). The grid will start from the southeast corner of the building and extend 40 feet to the northeast and then 30 feet to the northwest. Segment the grid into nine cells and place a boring location within each cell. Place a boring location on both the north and south side of the building adjacent to the systematic grid, three borings on the east side of the building (in the soil adjacent to the asphalt), and one boring on the south side of the building in the low point of the drainage feature (Figure A2).
- Advance 15 hand auger borings to delineate the former switch oil spill and areas where cleaning of the ground may have distributed potential contaminants. Collect soil samples from the soil surface directly beneath the asphalt (0-1 inches below asphalt) and at approximately 6 inches below the soil surface. Each of the soil samples will be sent to the analytical laboratory and analyzed for PCBs.

The following summarizes the proposed sampling design for IR Sites 31.

- Conduct a geophysical survey in the area adjacent to Building 203 in an effort to locate the former septic tank and within the footprint of former Building 203 in an effort to locate the former drain line. The geophysical survey will also be conducted

SAP Worksheet 17 (continued)

at both Building 203 and the new Battery Shop to determine if subsurface utilities present a potential conflict with the proposed soil boring and monitoring well locations.

- Mark out the approximate boundary of the septic tank and leach field on the ground using the geophysical survey information. Mark an approximately 20 by 30 foot grid over the septic tank area adjacent to Building 203 to systematically determine equidistant locations for six of the sample locations using 10 feet by 10 feet cells (as shown on Figure A3). The other three samples at Building 203 will be placed along the drain line of the former building. The leach field soil boring locations will be determined using the same method; however, the grid cells will be divided into 10 feet by 10 feet cells and a 20 foot by 30 foot grid.
- Advance 17 direct-push soil borings to a depth of approximately 13 feet bgs. Six of the borings are proposed to be located adjacent to Building 203, in the area of the former septic tank. Three of the borings are proposed to be located along the drain line of the former Building 203. Eight of the borings are proposed to be located in the vicinity of the sump and leach field near the new Battery Shop building (Figure A3).
- Collect four soil samples within each of the 17 soil borings at approximately 1, 3, 7, and 13 feet bgs. All soil samples will be sent to the analytical laboratory and analyzed for lead and pH.
- (Optional) - Possible well installation and sampling. Based on the results of the soil sampling in the area of the leach field near the new Batter Shop building, the Navy may decide that installation of a monitoring well is warranted. In this event one 4-inch-diameter PVC groundwater monitoring well will be installed in the leach field below the sump. The well will be installed to approximately 80 feet bgs or shallower. Groundwater is anticipated to be contacted at 50 feet bgs and a 20-foot screen will be placed to accommodate seasonal variation in groundwater. Develop the groundwater monitoring well and sample the well using low-flow guidelines. The groundwater sample will be sent to the analytical laboratory and analyzed for lead and pH.

The following summarizes the proposed sampling design for IR Sites 32.

- Conduct a visual site inspection to locate asphalt patches from the initial SI. The location of previous boring IR32-SB03, IR32-SS04, and IR32-SS10 will be marked using survey coordinates and comparing the coordinates to previous asphalt patches in the surface of the Site. Once the previous boring locations are marked in the field, three proposed boring locations will be identified by using a triangular shaped step out pattern 6 feet from IR32-SB03, one boring will be located adjacent to IR32-SS04,

SAP Worksheet 17 (continued)

one boring will be located adjacent to IR32-SS10, one boring will be located along the southern boundary of the Site, and three borings will be located in the approximate location of the former AST.

- Conduct a geophysical survey at IR Site 32 to determine if subsurface utilities present a potential conflict with the proposed boring locations.
- Install 6 direct-push soil borings to a depth of approximately 14 feet bgs to further investigate results from the SI (Figure A4).
- Install 3 direct-push soil borings to a depth of approximately 7 feet bgs to investigate soil in the area of the former AST.
- Collect 4 samples at each of the 6 borings at approximately 1, 5, 9, and 13 feet bgs, for a total of 24 samples at the locations to further investigate results from the SI. Collect 2 samples at each of the 3 borings to investigate the area around the former AST at approximately 1 and 7 feet bgs. Each sample will be analyzed for hexavalent chromium, PCBs, pH, metals, SVOCs, and VOCs.

After each drill rod has been advanced to total depth and the samples have been collected, the borehole will be backfilled using bentonite chips to approximately 6” bgs. The bentonite chips will then be hydrated with potable water and the surface at each boring will be completed to match the adjacent surface. The surface will be completed with native soil in soil areas, with cold-patch asphalt in asphalt-paved areas, and with concrete in areas previous covered with concrete (concrete areas are not anticipated).

To assess if detected concentrations of COPCs pose a potential risk to human health and the environment, results will be compared to the lowest concentration of the Region 9 RSLs, the California modified preliminary remediation goal (PRG) or the Los Alamos National Laboratory Environmental Screening Level as shown in Worksheet #15. The metal concentrations will also be compared to background concentrations for NAVWPNSTA Seal Beach Det. Fallbrook as reported in the background study (SES-TECH 2012) and shown in Table 1.

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SAP Worksheet #18 — Sampling Locations/IDs, Sample Depths, Sample Analyses, and Sampling Procedures Table

Sampling Location/ ID Number	Matrix	Depth (feet bgs)	Analytical Group	Sampling SOP Reference
IR30-SB1-01	Soil	Surface[1]	PCBs	SAP Worksheet #14
IR30-SB1-02	Soil	0.5	PCBs	SAP Worksheet #14
IR30-SB2-03	Soil	Surface[1]	PCBs	SAP Worksheet #14
IR30-SB2-04	Soil	0.5	PCBs	SAP Worksheet #14
IR30-SB3-05	Soil	Surface[1]	PCBs	SAP Worksheet #14
IR30-SB3-06	Soil	0.5	PCBs	SAP Worksheet #14
IR30-SB4-07	Soil	Surface[1]	PCBs	SAP Worksheet #14
IR30-SB4-08	Soil	0.5	PCBs	SAP Worksheet #14
IR30-SB5-09	Soil	Surface[1]	PCBs	SAP Worksheet #14
IR30-SB5-10	Soil	0.5	PCBs	SAP Worksheet #14
IR30-SB6-11	Soil	Surface[1]	PCBs	SAP Worksheet #14
IR30-SB6-12	Soil	0.5	PCBs	SAP Worksheet #14
IR30-SB7-13	Soil	Surface[1]	PCBs	SAP Worksheet #14
IR30-SB7-14	Soil	0.5	PCBs	SAP Worksheet #14
IR30-SB8-15	Soil	Surface[1]	PCBs	SAP Worksheet #14
IR30-SB8-16	Soil	0.5	PCBs	SAP Worksheet #14
IR30-SB9-17	Soil	Surface[1]	PCBs	SAP Worksheet #14
IR30-SB9-18	Soil	0.5	PCBs	SAP Worksheet #14
IR30-SB10-19	Soil	Surface[1]	PCBs	SAP Worksheet #14
IR30-SB10-20	Soil	0.5	PCBs	SAP Worksheet #14
IR30-SB11-21	Soil	Surface[1]	PCBs	SAP Worksheet #14
IR30-SB11-22	Soil	0.5	PCBs	SAP Worksheet #14
IR30-SB12-23	Soil	Surface[1]	PCBs	SAP Worksheet #14
IR30-SB12-24	Soil	0.5	PCBs	SAP Worksheet #14
IR30-SB13-25	Soil	Surface[1]	PCBs	SAP Worksheet #14
IR30-SB13-26	Soil	0.5	PCBs	SAP Worksheet #14
IR30-SB14-27	Soil	Surface[1]	PCBs	SAP Worksheet #14

SAP Worksheet 18 (continued)

Sampling Location/ ID Number	Matrix	Depth (feet bgs)	Analytical Group	Sampling SOP Reference
IR30-SB14-28	Soil	0.5	PCBs	SAP Worksheet #14
IR30-SB15-29	Soil	Surface[1]	PCBs	SAP Worksheet #14
IR30-SB15-30	Soil	0.5	PCBs	SAP Worksheet #14
IR31-SB1-01	Soil	1	Lead and pH	SAP Worksheet #14
IR31-SB1-02	Soil	3	Lead and pH	SAP Worksheet #14
IR31-SB1-03	Soil	7	Lead and pH	SAP Worksheet #14
IR31-SB1-04	Soil	13	Lead and pH	SAP Worksheet #14
IR31-SB2-05	Soil	1	Lead and pH	SAP Worksheet #14
IR31-SB2-06	Soil	3	Lead and pH	SAP Worksheet #14
IR31-SB2-07	Soil	7	Lead and pH	SAP Worksheet #14
IR31-SB2-08	Soil	13	Lead and pH	SAP Worksheet #14
IR31-SB3-09	Soil	1	Lead and pH	SAP Worksheet #14
IR31-SB3-10	Soil	3	Lead and pH	SAP Worksheet #14
IR31-SB3-11	Soil	7	Lead and pH	SAP Worksheet #14
IR31-SB3-12	Soil	13	Lead and pH	SAP Worksheet #14
IR31-SB4-13	Soil	1	Lead and pH	SAP Worksheet #14
IR31-SB4-14	Soil	3	Lead and pH	SAP Worksheet #14
IR31-SB4-15	Soil	7	Lead and pH	SAP Worksheet #14
IR31-SB4-16	Soil	13	Lead and pH	SAP Worksheet #14
IR31-SB5-17	Soil	1	Lead and pH	SAP Worksheet #14
IR31-SB5-18	Soil	3	Lead and pH	SAP Worksheet #14
IR31-SB5-19	Soil	7	Lead and pH	SAP Worksheet #14
IR31-SB5-20	Soil	13	Lead and pH	SAP Worksheet #14
IR31-SB6-21	Soil	1	Lead and pH	SAP Worksheet #14
IR31-SB6-22	Soil	3	Lead and pH	SAP Worksheet #14
IR31-SB6-23	Soil	7	Lead and pH	SAP Worksheet #14
IR31-SB6-24	Soil	13	Lead and pH	SAP Worksheet #14

SAP Worksheet 18 (continued)

Sampling Location/ ID Number	Matrix	Depth (feet bgs)	Analytical Group	Sampling SOP Reference
IR31-SB7-25	Soil	1	Lead and pH	SAP Worksheet #14
IR31-SB7-26	Soil	3	Lead and pH	SAP Worksheet #14
IR31-SB7-27	Soil	7	Lead and pH	SAP Worksheet #14
IR31-SB7-28	Soil	13	Lead and pH	SAP Worksheet #14
IR31-SB8-29	Soil	1	Lead and pH	SAP Worksheet #14
IR31-SB8-30	Soil	3	Lead and pH	SAP Worksheet #14
IR31-SB8-31	Soil	7	Lead and pH	SAP Worksheet #14
IR31-SB8-32	Soil	13	Lead and pH	SAP Worksheet #14
IR31-SB9-33	Soil	1	Lead and pH	SAP Worksheet #14
IR31-SB9-34	Soil	3	Lead and pH	SAP Worksheet #14
IR31-SB9-35	Soil	7	Lead and pH	SAP Worksheet #14
IR31-SB9-36	Soil	13	Lead and pH	SAP Worksheet #14
IR31-SB10-37	Soil	1	Lead and pH	SAP Worksheet #14
IR31-SB10-38	Soil	3	Lead and pH	SAP Worksheet #14
IR31-SB10-39	Soil	7	Lead and pH	SAP Worksheet #14
IR31-SB10-40	Soil	13	Lead and pH	SAP Worksheet #14
IR31-SB11-41	Soil	1	Lead and pH	SAP Worksheet #14
IR31-SB11-42	Soil	3	Lead and pH	SAP Worksheet #14
IR31-SB11-43	Soil	7	Lead and pH	SAP Worksheet #14
IR31-SB11-44	Soil	13	Lead and pH	SAP Worksheet #14
IR31-SB12-45	Soil	1	Lead and pH	SAP Worksheet #14
IR31-SB12-46	Soil	3	Lead and pH	SAP Worksheet #14
IR31-SB12-47	Soil	7	Lead and pH	SAP Worksheet #14
IR31-SB12-48	Soil	13	Lead and pH	SAP Worksheet #14
IR31-SB13-49	Soil	1	Lead and pH	SAP Worksheet #14
IR31-SB13-50	Soil	3	Lead and pH	SAP Worksheet #14
IR31-SB13-51	Soil	7	Lead and pH	SAP Worksheet #14

SAP Worksheet 18 (continued)

Sampling Location/ ID Number	Matrix	Depth (feet bgs)	Analytical Group	Sampling SOP Reference
IR31-SB13-52	Soil	13	Lead and pH	SAP Worksheet #14
IR31-SB14-53	Soil	1	Lead and pH	SAP Worksheet #14
IR31-SB14-54	Soil	3	Lead and pH	SAP Worksheet #14
IR31-SB14-55	Soil	7	Lead and pH	SAP Worksheet #14
IR31-SB14-56	Soil	13	Lead and pH	SAP Worksheet #14
IR31-SB15-57	Soil	1	Lead and pH	SAP Worksheet #14
IR31-SB15-58	Soil	3	Lead and pH	SAP Worksheet #14
IR31-SB15-59	Soil	7	Lead and pH	SAP Worksheet #14
IR31-SB15-60	Soil	13	Lead and pH	SAP Worksheet #14
IR31-SB16-61	Soil	1	Lead and pH	SAP Worksheet #14
IR31-SB16-62	Soil	3	Lead and pH	SAP Worksheet #14
IR31-SB16-63	Soil	7	Lead and pH	SAP Worksheet #14
IR31-SB16-64	Soil	13	Lead and pH	SAP Worksheet #14
IR31-SB17-65	Soil	1	Lead and pH	SAP Worksheet #14
IR31-SB17-66	Soil	3	Lead and pH	SAP Worksheet #14
IR31-SB17-67	Soil	7	Lead and pH	SAP Worksheet #14
IR31-SB17-68	Soil	13	Lead and pH	SAP Worksheet #14
IR31-GW-01	Groundwater	75[a]	Lead and pH	SAP Worksheet #14
IR32-SB1-01	Soil	1	Hexavalent Chromium, Metals, PCBs, pH, SVOCs, and VOCs	SAP Worksheet #14
IR32-SB1-02	Soil	5	Hexavalent Chromium, Metals, PCBs, pH, SVOCs, and VOCs	SAP Worksheet #14
IR32-SB1-03	Soil	9	Hexavalent Chromium, Metals, PCBs, pH, SVOCs, and VOCs	SAP Worksheet #14
IR32-SB1-04	Soil	13	Hexavalent Chromium, Metals, PCBs, pH, SVOCs, and VOCs	SAP Worksheet #14
IR32-SB2-05	Soil	1	Hexavalent Chromium, Metals, PCBs, pH, SVOCs, and VOCs	SAP Worksheet #14

SAP Worksheet 18 (continued)

Sampling Location/ ID Number	Matrix	Depth (feet bgs)	Analytical Group	Sampling SOP Reference
IR32-SB2-06	Soil	5	Hexavalent Chromium, Metals, PCBs, pH, SVOCs, and VOCs	SAP Worksheet #14
IR32-SB2-07	Soil	9	Hexavalent Chromium, Metals, PCBs, pH, SVOCs, and VOCs	SAP Worksheet #14
IR32-SB2-08	Soil	13	Hexavalent Chromium, Metals, PCBs, pH, SVOCs, and VOCs	SAP Worksheet #14
IR32-SB3-09	Soil	1	Hexavalent Chromium, Metals, PCBs, pH, SVOCs, and VOCs	SAP Worksheet #14
IR32-SB3-10	Soil	5	Hexavalent Chromium, Metals, PCBs, pH, SVOCs, and VOCs	SAP Worksheet #14
IR32-SB3-11	Soil	9	Hexavalent Chromium, Metals, PCBs, pH, SVOCs, and VOCs	SAP Worksheet #14
IR32-SB3-12	Soil	13	Hexavalent Chromium, Metals, PCBs, pH, SVOCs, and VOCs	SAP Worksheet #14
IR32-SB4-13	Soil	1	Hexavalent Chromium, Metals, PCBs, pH, SVOCs, and VOCs	SAP Worksheet #14
IR32-SB4-14	Soil	5	Hexavalent Chromium, Metals, PCBs, pH, SVOCs, and VOCs	SAP Worksheet #14
IR32-SB4-15	Soil	9	Hexavalent Chromium, Metals, PCBs, pH, SVOCs, and VOCs	SAP Worksheet #14
IR32-SB4-16	Soil	13	Hexavalent Chromium, Metals, PCBs, pH, SVOCs, and VOCs	SAP Worksheet #14
IR32-SB5-17	Soil	1	Hexavalent Chromium, Metals, PCBs, pH, SVOCs, and VOCs	SAP Worksheet #14
IR32-SB5-18	Soil	5	Hexavalent Chromium, Metals, PCBs, pH, SVOCs, and VOCs	SAP Worksheet #14
IR32-SB5-19	Soil	9	Hexavalent Chromium, Metals, PCBs, pH, SVOCs, and VOCs	SAP Worksheet #14
IR32-SB5-20	Soil	13	Hexavalent Chromium, Metals, PCBs, pH, SVOCs, and VOCs	SAP Worksheet #14

SAP Worksheet 18 (continued)

Sampling Location/ ID Number	Matrix	Depth (feet bgs)	Analytical Group	Sampling SOP Reference
IR32-SB6-21	Soil	1	Hexavalent Chromium, Metals, PCBs, pH, SVOCs, and VOCs	SAP Worksheet #14
IR32-SB6-22	Soil	5	Hexavalent Chromium, Metals, PCBs, pH, SVOCs, and VOCs	SAP Worksheet #14
IR32-SB6-23	Soil	9	Hexavalent Chromium, Metals, PCBs, pH, SVOCs, and VOCs	SAP Worksheet #14
IR32-SB6-24	Soil	13	Hexavalent Chromium, Metals, PCBs, pH, SVOCs, and VOCs	SAP Worksheet #14
IR32-SB7-25	Soil	1	Hexavalent Chromium, Metals, PCBs, pH, SVOCs, and VOCs	SAP Worksheet #14
IR32-SB7-26	Soil	5	Hexavalent Chromium, Metals, PCBs, pH, SVOCs, and VOCs	SAP Worksheet #14
IR32-SB8-27	Soil	9	Hexavalent Chromium, Metals, PCBs, pH, SVOCs, and VOCs	SAP Worksheet #14
IR32-SB8-28	Soil	13	Hexavalent Chromium, Metals, PCBs, pH, SVOCs, and VOCs	SAP Worksheet #14
IR32-SB9-29	Soil	1	Hexavalent Chromium, Metals, PCBs, pH, SVOCs, and VOCs	SAP Worksheet #14
IR32-SB9-30	Soil	5	Hexavalent Chromium, Metals, PCBs, pH, SVOCs, and VOCs	SAP Worksheet #14

1 – sample will be collected in surface soils directly beneath asphalt.

a - Low-flow pump inlet will be placed at mid-screen interval (approximate) if entire well screen interval is submerged; otherwise, pump inlet will be placed at midpoint between static water level and well total depth unless geologic/lithologic logs indicate an area of higher hydraulic communication is present in the screened interval.

Bgs – below ground surface

PCBs – Polychlorinated Biphenyls

SAP Worksheet 18 (continued)

Sampling Location/ ID Number	Matrix	Depth (feet bgs)	Analytical Group	Sampling SOP Reference

SAP – Sampling and Analysis Plan
SVOCs – Semi Volatile Organic Compounds
VOCs – Volatile Organic Compounds

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SAP Worksheet #19 — Analytical Methods, Containers, Preservatives, and Holding Times Table

Matrix	Analytical Group	Analytical and Preparation Method	Containers (number, size, and type)	Preservation Requirements (chemical, temperature, etc.)	Maximum Holding Time (preparation/ analysis)
Groundwater	Lead	U.S. EPA Method 6020A EMAX-6020	One 250-mL polyethylene bottle	HNO_3 with pH<2 (Field filtered with 0.45 micron filter)	6 months
Groundwater	pH	SM-4500-HB EMAX-4500HB	One 250-mL polyethylene bottle	Cool, 2 to 6ºC	within 24 hours of receipt
Soil	Lead	U.S. EPA Method 6020A EMAX-6020	One 8-ounce jar or sleeve	Cool, 2 to 6ºC	6 months
Soil	pH	U.S. EPA Method 9045D EMAX-9045			As soon as possible
Soil	PCBs	U.S. EPA Method 8082A EMAX-8082	One 8-ounce jar or sleeve	Cool, 2 to 6ºC	14 days to extraction 40 days to analysis
Soil	VOCs	U.S. EPA Method 8260B EMAX-5035/8260	Three 5-gram Encore	Cool, 2 to 6ºC	48 hours
Soil	SVOCs	U.S. EPA Method 8270C EMAX-8270	One 8-ounce jar or sleeve		14 days to extraction 40 days to analysis
Soil	Metals	U.S. EPA Method 6020A EMAX-6020			6 months
Soil	Mercury	U.S. EPA Method 7471B EMAX-7471			28 days
Soil	Hexavalent Chromium	U.S. EPA Method 7196A EMAX-7196			30 days to extraction 24 hours to analysis

ºC – degrees Celsius
mL – milliliter
EMAX – Emax Laboratories, Inc.
HNO_3 – nitric acid
PCBs – Polychlorinated Biphenyls
SVOCs – Semi Volatile Organic Compounds
U.S. EPA – United States Environmental Protection Agency
VOCs – Volatile Organic Compounds

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SAP Worksheet #20 — Field Quality Control Sample Summary Table

Matrix	Analytical Group	Analytical/ Preparation SOP Reference	# of Primary Sampling Locations	# of Field Duplicates	# of Matrix Spike/Matrix Spike Duplicates	# of Field Blanks	# of Equip. Rinsates	# of Trip Blanks	Total # of Samples to Lab
IR Site 30									
Soil	PCBs	U.S. EPA Method 8082A EMAX-8082	30	0	2	0	1	0	33
IR Site 31									
Soil	Lead	U.S. EPA Method 6020A EMAX-6020	68	0	4	0	2	0	74
Soil	pH	U.S. EPA Method 9045D EMAX-9045	68	0	4	0	2	0	74
Groundwater	Lead	U.S. EPA Method 6020A EMAX-6020	1	1	1	1	1	0	5
Groundwater	pH	SM-4500-HB EMAX-4500HB	1	1	0	1	1	0	4
IR Site 32									
Soil	Hexavalent Chromium	U.S. EPA Method 7196A EMAX-7196	30	0	2	0	1	0	33
Soil	Metals	U.S. EPA Method 6020A EMAX-6020	30	0	2	0	1	0	33
Soil	PCBs	U.S. EPA Method 8082A EMAX-8082	30	0	2	0	1	0	33
Soil	pH	U.S. EPA Method 9045D EMAX-9045	30	0	2	0	1	0	33

SAP Worksheet 20 (continued)

Matrix	Analytical Group	Analytical/ Preparation SOP Reference	# of Primary Sampling Locations	# of Field Duplicates	# of Matrix Spike/Matrix Spike Duplicates	# of Field Blanks	# of Equip. Rinsates	# of Trip Blanks	Total # of Samples to Lab
Soil	Mercury	U.S. EPA Method 7471B EMAX-7471	30	0	2	0	1	0	33
Soil	SVOCs	U.S. EPA Method 8270C EMAX-8270	30	0	2	0	1	0	33
Soil	VOCs	U.S. EPA Method 5035/8260B EMAX-5035/8260	30	0	2	0	1	0	33

EMAX – EMAX Laboratories, Inc.
PCBs – Polychlorinated Biphenyls
SOP – Standard Operating Procedure
SVOCs – Semi Volatile Organic Compounds
U.S. EPA – United States Environmental Protection Agency
VOCs – Volatile Organic Compounds

SAP Worksheet #21 — Project Sampling SOP References Table

No stand-alone SOPs have been referenced in this SAP. All project-specific tasks and procedures are detailed within SAP Worksheet #14.

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SAP Worksheet #22 — Field Equipment Calibration, Maintenance, Testing, and Inspection Table

Field Equipment	Calibration Activity	Frequency	Acceptance Criteria	Corrective Action	Responsible Person	SOP Reference[1]	Comments
Photoionization detector	Calibration with isobutylene (100 parts per million)	Daily	Within manufacturer's recommended value	According to manufacturer's instructions	Site health and safety specialist	Manufacturer's instructions	
Water quality meter	Calibration with standards for pH, turbidity, specific conductance, oxidation reduction potential, and dissolved oxygen per manufacturers' recommendation	Daily	Within manufacturer's recommended value	According to manufacturer's instructions	Sampling personnel	Manufacturer's instructions	

1. SOP or SAP Section that describes the calibration/maintenance/testing/inspection procedures

SAP – Sampling and Analysis Plan

SOP – Standard Operating Procedures

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SAP Worksheet #23 — Analytical SOP References Table

Laboratory SOP Number	Title, Revision Date, and/or Number	Definitive or Screening Data	Matrix and Analytical Group	Instrument	Organization Performing Analysis	Modified for Project Work?(Y/N)	Laboratory SOP Compliant with QSM? (Y/N)
EMAX-8260	Volatile Organics by GC/MS, Revision 10, June, 2014	Definitive Data	Soil VOCs	GC/MS	EMAX	N	Y
EMAX-8270	Semivolatile Organics by GC/MS, Revision 6, July, 2014	Definitive Data	Soil SVOCs	GC/MS	EMAX	N	Y
EMAX-8082	Polychlorinated Biphenyls and Polychlorinated Terphenyls by Gas Chromatography, Revision 5. July 2014	Definitive Data	Soil PCBs	GC	EMAX	N	Y
EMAX-7196	Hexavalent Chromium (Colorimetric), Revision 4, Annual Review Date 11/08/2013	Definitive Data	Soil Hexavalent Chromium	Spectrophotometer	EMAX	N	Y
EMAX-SM-4500-HB	pH Measurement, Revision 3, January 2015	Definitive Data	Groundwater pH	Potentiometer	EMAX	N	Y
EMAX-9045	pH, Solid and Waste Sample, Revision 2, July 2014	Definitive Data	Soil pH	Potentiometer	EMAX	N	Y
EMAX-6020	Trace Metals by ICP-MS, Revision 8, July 2014	Definitive Data	Groundwater/ Soil Metals	ICP/MS	EMAX	N	Y
EMAX-7471B	Mercury in solid or Semisolid Waste, Revision 7, July 2014	Definitive Data	Soil Mercury	CVAA	EMAX	N	Y

Analytical Laboratory SOPs will be provided on CD ROM with the final version of the SAP as attachment 2.

EMAX- EMAX Laboratories, Inc.
GC – gas chromatograph
ICP - inductively coupled plasma
MS – mass spectrometer
N – No
PCBs – polychlorinated biphenyls
SVOCs – Semi Volatile Organic Compounds
Rev – Revision
QSM – Quality System Manual (DOD 2010)
Y - Yes

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SAP Worksheet #24 — Analytical Instrument Calibration Table

Instrument	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	Corrective Action (CA)	Person Responsible for CA	SOP Reference
GC/MS	ICAL	Initially; as needed	SPCCs: RF ≥ 0.1 for Bromoform, Chloromethane and 1,1-Dichloroethane. RF ≥ 0.3 for Chlorobenzene and 1,1,2,2-Tetrachloroethane. CCCs: Chloroform, 1,1-DCE, 1,2-DCP (dichloropropane), Ethylbenzene, Toluene and Vinyl Chloride. %RSD ≤ 30% and one option below: (1). linear- mean RSD for all analytes ≤ 15% (2). linear – least squares regression r ≥ 0.995, when RSD >15% (3). non-linear – COD > 0.990 (6 points will be used for second order; 7 points will be used for third).	If SPCC is non-compliant it could be due to standard degradation or active presence to active sites in the system. Correct the problem and repeat calibration. If CCC is non-compliant it could be due to system leaks, reactive column sites, or standard degradation. Correct the problem and recalibrate. If RSD is non-compliant, check for outlier and repeat that ICAL point; otherwise perform instrument troubleshooting, then repeat calibration.	EMAX Analyst	EMAX-8260

SAP Worksheet 24 (continued)

Instrument	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	Corrective Action (CA)	Person Responsible for CA	SOP Reference
GC/MS	ICV	After ICAL.	All analytes within ± 25% of expected value, except for the following compounds because of their erratic chromatographic behavior: Bromomethane, Chloroethane, Choromethane, Dichlorodifluoromethane within ± 35% of expected value.	If no data quality indicators are observed in the ICAL, it is indicative of standard degradation. Prepare a new standard and reanalyze ICV. Otherwise check and correct probable cause of problem and repeat ICAL.	EMAX Analyst	EMAX-8260
GC/MS	CCV	Daily. Before sample analysis and every 12 hours of analysis time.	SPCCs: Minimum RF same as ICAL. CCCs %Diff ≤ (when using RFs) or drift (when using least squares regression or non-linear calibration).	If SPCC is non-compliant it could be due to standard degradation or active presence to active sites in the system. Correct the problem and repeat calibration. If CCC is non-compliant it could be due to system leaks, reactive column sites, or standard degradation. Correct the problem and recalibrate.	EMAX Analyst	EMAX-8260

SAP Worksheet 24 (continued)

Instrument	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	Corrective Action (CA)	Person Responsible for CA	SOP Reference
GC/MS	ICAL	ICAL prior to sample analysis	SPCCs average RF ± 0.050 and %RSD for RFs for < 30% and one option below (1) linear – mean RSD for all analytes ≤15% (2) linear – least squares regression r ≥ 0.995, when RSD >15% (3) non-linear – COD r^2 > 0.990 (6 points shall be used for second order, 7 points shall be used for third	Locate the source of the problem. If expected RFs are not met, check for standard degradation or perform instrument adjustment and/or maintenance to correct the problem then repeat ICAL. If SPCC is non-compliant, it could be a result of standard degradation or active presence to active sites in the system. Correct the problem and repeat calibration. If CCC is non-compliant, it could be a result of system leaks, reactive column sites, or standard degradation. Correct the problem and recalibrate. If RSD is non-compliant, check for outlier and repeat that ICAL point; otherwise perform instrument troubleshooting and repeat calibration.	Analyst	EMAX-8270

SAP Worksheet 24 (continued)

Instrument	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	Corrective Action (CA)	Person Responsible for CA	SOP Referenc e
GC/MS	Second source calibration verification	Once after each ICAL	Value of second source for all analytes within ±25% of expected value (initial source).	Prepare fresh standard and reanalyze second source to rule out standard degradation or inaccurate injection. If problem persists, perform instrument adjustment and/or maintenance, and rerun ICAL and second source verification standard. If problem continues, new standards may need to be purchased, prepared, and analyzed.	Analyst	EMAX-8270
GC/MS	Second source calibration verification	Once after each ICAL	Value of second source for all analytes within ±25% of expected value (initial source).	Prepare fresh standard and reanalyze second source to rule out standard degradation or inaccurate injection. If problem persists, perform instrument adjustment and/or maintenance, and rerun ICAL and second source verification standard. If problem continues, new standards may need to be purchased, prepared, and analyzed.	Analyst	EMAX-8270

SAP Worksheet 24 (continued)

Instrument	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	Corrective Action (CA)	Person Responsible for CA	SOP Reference
GC/MS	Calibration Verification	Daily, before sample analysis, and every 12 hours of analysis time	RRF ≥ 0.050; and target analytes ≤ 20% difference (when using RFs) or drift (when using least squares regression or non-linear calibration).	If SPCC is non-compliant, it could be a result of standard degradation or active presence to active sites in the system. Correct the problem and repeat calibration. If CCC is non-compliant, it could be a result of system leaks, or reactive column sites or standard degradation. Correct the problem and recalibrate	Analyst	EMAX-8270
GC	ICAL	Initially, prior to sample analysis and as needed.	One of the options below: Option1: RSD for each analyte ≤20% Option 2: Linear least squares regression r≥0.995 Option 3: non-linear COD >0.99 (6 points shall be used for second order, 7 points shall be used for third order)	Locate the source of the problem. If expected RSD is not met, then check for standard degradation or perform instrument adjustment and/or maintenance to correct the problem and repeat ICAL.	Analyst	EMAX-8082
GC	Second source calibration verification (ICV)	After every ICAL	All analytes within established retention time windows. All analytes within ±20% of expected value from the ICAL.	Prepare fresh standard and re-analyze ICV to rule out standard degradation or inaccurate injection. If problem persists, then perform instrument adjustment and/or maintenance to correct the problem and repeat ICAL.	Analyst	EMAX-8082

SAP Worksheet 24 (continued)

Instrument	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	Corrective Action (CA)	Person Responsible for CA	SOP Reference
GC	Continuing calibration verification (CCV)	Daily before sample analysis, every 10 samples, and at the end of the analysis sequence	All project analytes within established retention time windows. All analytes within ±20% of expected value from the ICAL	Prepare fresh standard and re-analyze CCV to rule out standard degradation or inaccurate injection. If problem persists, then perform instrument adjustment and/or maintenance to correct the problem and repeat ICAL	Analyst	EMAX-8082
ICP/MS	Tune Check	Daily before ICAL.	±0.10 AMU (mass of isotope) <0.9 AMU full width resolution RSD of 4 replicates: ≤ 5%	Correct problem and repeat tune check	Analyst	EMAX-6020
ICP/MS	ICAL	Daily initial calibration prior to sample analysis	r≥0.995	Correct the problem and repeat the initial calibration	Analyst	EMAX-6020
ICP/MS	ICV	Daily after the initial calibration.	All analytes within ±10% of expected value RSD of replicate integrations: <5%	Correct the problem and repeat the initial calibration	Analyst	EMAX-6020

SAP Worksheet 24 (continued)

Instrument	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	Corrective Action (CA)	Person Responsible for CA	SOP Reference
ICP/MS	Low level Calibration Verification (LLICV/LLCCV)	LLICV: Daily after initial calibration LLCCV: At the end of the analysis sequence	All analytes with ±30% of expected value	Correct the problem and repeat the initial calibration	Analyst	EMAX-6020
ICP/MS	CCV	Daily before sample analysis, after every 10 samples and at the end of the analysis sequence.	All analytes within ±10% of expected value. RSD of replicate integrations <5%	Repeat calibration and reanalyze all samples since last successful calibration.	Analyst	EMAX-6020
ICP/MS	ICB/CCB	After every calibration verification	All target analytes <LOQ	Correct problem then reanalyze calibration blank and previous samples.	Analyst	EMAX-6020
ICP/MS	Interference Check Sample (ICSA/ICSAB)	Analyze at the beginning of each analytical run or once every 12 hours, whichever is more frequent	Within ±20% of expected value	Terminate analysis, correct the problem, reanalyze ICS, and reanalyze all affected samples.	Analyst	EMAX-6020

SAP Worksheet 24 (continued)

Instrument	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	Corrective Action (CA)	Person Responsible for CA	SOP Reference
CVAA	ICAL	Daily	r>= 0.995	Locate the source of the problem. Check for standard degradation or perform instrument adjustment and/or maintenance to correct the problem and then repeat initial Calibration	Analyst	EMAX-7471
CVAA	ICV	Once after each initial calibration	Value of all project analytes within 10% of true value.	Prepare fresh standard and re-analyze ICV to rule out standard degradation or inaccurate injection. If problem persist perform instrument adjustment and/or maintenance to correct the problem and repeat ICAL.	Analyst	EMAX-7471
CVAA	CCV	After every 10 field samples, and at the end of analysis sequence.	Value of all project analytes within 20% of true value.	Prepare fresh standard and re-analyze ICV to rule out standard degradation or inaccurate injection. If problem persist perform instrument adjustment and/or maintenance to correct the problem and repeat ICAL.	Analyst	EMAX-7471

SAP Worksheet 24 (continued)

Instrument	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	Corrective Action (CA)	Person Responsible for CA	SOP Reference
Spectrophotometer	ICAL	Initial daily calibration prior to sample analysis	r ≥ 0.995 for linear regression	Locate the source of the problem. If outliers exist, then prepare fresh calibration standards and repeat ICAL. If problem persist, then perform photometric linearity check. If maximum absorbance is non-compliant, then replace the spectrometer lamp and repeat the ICAL.	Analyst	EMAX-7196
Spectrophotometer	ICV	Once after each ICAL.	All analytes within ±15% of expected value	Prepare fresh standard and reanalyze ICV to rule out standard degradation or inaccurate injection. If problem persists, perform instrument adjustment and/or maintenance to correct the problem and repeat ICAL.	Analyst	EMAX-7196
Potentiometer	ICAL	Daily before sample analysis	Successful ICV	Clean the electrode and repeat calibration	Analyst	EMAX-9045 EMAX-4500HB
Potentiometer	ICV	After ICAL	+0.05 pH units of expected value	Use fresh buffer and repeat ICV. If problem persist, replace the probe and repeat ICAL	Analyst	EMAX-9045 EMAX-4500HB

SAP Worksheet 24 (continued)

Instrument	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	Corrective Action (CA)	Person Responsible for CA	SOP Referenc e

± - plus or minus
> - greater than
≥ – greater than or equal to
≤ – less than or equal to
CCC – criteria continuing concentration
CCV – continuing calibration verification
COD – coefficient of determination
GC – gas chromatography
IC – ion chromatography
ICAL – initial calibration
ICV – initial calibration verification
MS – mass spectrometry
r – linear regression
RF – response factor
RSD – relative standard deviation
SPCC – system performance check compound

SAP Worksheet #25 — Analytical Instrument and Equipment Maintenance, Testing, and Inspection Table

Instrument/ Equipment	Maintenance Activity	Testing Activity	Inspection Activity	Frequency	Acceptance Criteria	Corrective Action	Responsible Person	SOP Reference
GC/MS GC ICP/MS CVAA	Parameter setup	Physical check	Physical check	Initially; prior to DCC	Predeter-mined optimum parameter settings	Reset if incorrect	EMAX Analyst	EMAX-8260 EMAX-8270 EMAX-8082 EMAX-6020 EMAX-7471
GC/MS	Tune check	Instrument performance	Conformance to instrument tuning	Initially; prior to DCC	Compliance to ion abundance criteria	Repeat tune check to rule out stand-ard degradation or inaccurate injec-tion. If problem persists, retune the instrument and repeat tune check.	EMAX Analyst	EMAX-8260 EMAX-8270
ICP/MS	Tune check	Instrument performance	Conformance to instrument tuning	Initially; prior to DCC	Compliance to ion abun-dance criteria as specified by the method.	Repeat tune check to rule out stand-ard degradation or inaccurate injec-tion. If problem persists, retune instrument and repeat tune check.	EMAX Chemist	EMAX-6020

DCC – daily calibration check
GC – gas chromatograph
HRGC – high resolution gas chromatograph
HRMS – high resolution mass spectrometer
IC – ion chromatograph
ICP – inductively coupled plasma
MS – mass spectrometer

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SAP Worksheet #26 — Sample Handling System

Sample Handling System

Sample Collection, Packaging, and Shipment
Sample Collection (Personnel/Organization): Trevet Field Technician
Sample Packaging (Personnel/Organization): Trevet Field Technician
Coordination of Shipment (Personnel/Organization): Trevet Chemist
Type of Shipment/Carrier: EMAX courier or commercial carrier
Sample Receipt and Analysis
Sample Receipt (Personnel/Organization): EMAX sample custodian
Sample Custody and Storage (Personnel/Organization): EMAX sample custodian
Sample Preparation (Personnel/Organization): EMAX sample preparation group
Sample Determinative Analysis (Personnel/Organization): EMAX bench chemist
Sample Archiving
Field Sample Storage (No. of days from sample collection): 6 months
Sample Extract/Digestate Storage (No. of days from extraction/digestion): 120 days
Sample Disposal
Personnel/Organization: EMAX sample custodian
Number of Days from Analysis: 6 months for metals and 3 months for all other analyses (as per EMAX-SM03)

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SAP Worksheet #27 — Sample Custody Requirements Table

27.1 Sample Number

All samples (including field QC samples) submitted to the off-site analytical laboratory will be identified per the well identification, as shown on Worksheet #18. For example, the first soil sample collected from the first boring at IR Site 30 will be labeled with a sample identification of IR30-SB01-01. Duplicate samples will be identified with "Dup" following the well identification.

Trip blanks, equipment rinsates, and source blank samples will be identified as "TB" for trip blank, "ER" for equipment rinsate, and "SB" for source blank. These identifiers will be followed by the date in month/day/year format for the sample identification. For example, a trip blank collected on February 2, 2015 would have the identifier "TB 020215."

The sample identifications will be recorded in the field logbook and on the chain-of-custody form. A description of the sample (including the sample number, well identification number, sample depth, sample date, and time) will be recorded in the field logbook or on field log forms.

27.2 Sample Labeling

Sample labels are necessary to prevent misidentification of samples. Sample labels will be completed in indelible ink, affixed to sample containers when the sample is collected, and then covered with clear tape. Each sample label will contain the following information, at a minimum:

- Company name
- Project name/number
- Sample identification number
- Sample collection date (month/day/year)
- Time of collection (24-hour clock)
- Sampler's initials
- Analyses required
- Preservative (if any)

The following is an example of a sample label.

SAP Worksheet #27 – continued

TREVET Project:
Sampler:
Date: Time:
Sample ID:
Analysis: VOCs by U.S. EPA 8260B,
Preservative: HCl

27.3 Sample Handling and Shipping

Immediately after samples are collected and labeled, each sample will be wrapped in shock-absorbent material, such as bubble wrap, to prevent breakage of the sample containers. After wrapping in shock-absorbent material, the sample will be placed in a resealable plastic bag. The samples then will be stored and shipped in a cooler with ice to maintain a temperature of 4±2 ºC.

27.4 Field Documentation

All information pertinent to field sampling will be recorded in a field logbook in indelible ink to maintain the integrity and traceability of the samples. All samples will be properly labeled and custody sealed before they are transported to the laboratory. Completed chain-of-custody documentation will accompany the samples.

27.4.1 Chain of Custody

The field sampler is responsible for creating a chain-of-custody record where information about each sample collected in the field shall be entered. The chain-of-custody record is necessary to physically trace sample possession from the time of collection to ultimate disposition. Each chain-of-custody record will be signed as relinquished or received with each change of possession. The following information must be contained in the chain-of-custody:

- Project name and number
- Names of field samplers
- Sample identification number
- Date of sampling
- Local standard time of sample collection, using 24-hour clock notation
- Sample matrix
- Number and type of containers for each sample aliquot
- Type of analysis requested
- Preservation of sample containers (if applicable)
- Means of transmittal to the analytical laboratory or unusual circumstances

SAP Worksheet #27 – continued

- Special handling instructions
- Destination of samples
- Name, date, time, and signature of each individual releasing the shipping container
- Name, address, and individual to receive results

The "Laboratory Instructions/Comments" box in the chain-of-custody record will be used to communicate specific instructions to the analytical laboratory. Additional information relating to a specific sample may also be noted in the "Comments" line. In the event that more than one analytical laboratory will be used, different chain-of-custody forms will be made for each lab. The number of containers (i.e., coolers) intended to go to a specific analytical laboratory will be made clear on the chain-of-custody form under the block, "No. of Coolers Shipped." A copy of the chain-of-custody form is provided in Attachment 1.

27.4.2 Field Logbooks

A logbook will be maintained by the field sampler to summarize chronologically all field activities performed during the course of a given workday. The logbook is intended to provide interested parties, not present in the field at the time of data entry, with all the necessary information about field conditions in order to recreate the event that occurred during fieldwork. Logbooks are to be pre-bound with numbered pages and all entries must be made in indelible ink. To avoid tampering, the user shall draw a line across any unused space and initial to signify that no entries were made in those blank pages or spaces by the authorized user. Logbooks shall contain at least the following information:

- Date of entry and recorder's name
- Site location
- Sample location including distances to nearest fixed point(s) of reference
- Sample depth (bgs, if applicable)
- Sample matrix
- Sample appearance
- Volume of sample collected
- Field measurements (if applicable)
- Type of sampling equipment used
- Names of all individuals present during sampling
- Sample collection date and times, using 24-hour clock notation
- Sample identification numbers
- Type and number of sample containers used per sampling site
- Designation of QC samples (e.g., blanks, splits, or duplicates)

SAP Worksheet #27 – continued

A logbook is considered a legal document and is admissible as evidence in legal proceedings; therefore, entries made should be factual, detailed, and objective.

27.4.3 Document Corrections

Changes or corrections on any project documentation will be made by crossing out the erroneous item with a single line and initialing (by the person performing the correction) and dating the correction. The original item, although erroneous, must remain legible beneath the cross-out line. The new information should be written clearly above the crossed-out item.

SAP Worksheet #28 — Laboratory Quality Control Samples Table

Matrix:	Soil
Analytical Group:	VOCs
Analytical Method/SOP Reference:	U.S. EPA Method 8260B / EMAX-8260

QC Sample	Frequency / Number	Method / SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator	Measurement Performance Criteria
Method Blank	One per preparation batch	No analytes detected > ½ LOQ. For common laboratory contaminants, no analytes detected > LOQ.	Reprepare and reanalyze method blank and all samples processed with the contaminated blank.	EMAX Analyst	Bias	No analyte detected >½LOQ. For common laboratory contaminants, no analytes detected > LOQ..
LCS	One per preparation	QC acceptance criteria specified by DOD QSM Rev 4.2 (DOD 2010). See table on following page.	Reprepare and reanalyze the LCS and all samples in the associated preparatory batch for failed analytes if sufficient sample material is available.	EMAX Analyst	Accuracy	See table below.
Matrix Spike/ Matrix Spike Duplicate	One per preparation batch per 20 project samples	For matrix evaluation, use QC acceptance criteria specified by DOD QSM Rev 4.2 (DOD, 2010) See table on following page.	See table below, RPD≤ 30%	EMAX Analyst	Bias	See table below. RPD ≤ 30%

≤ - less than or equal to
LCS – laboratory control sample
LOQ – limit of quantitation
RPD – relative percent difference

SAP Worksheet #28 – continued

EPA 8260 Surrogate Recovery

Analyte	Soil
1,2-Dichloroethane-d4	71-136
4-Bromofluorobenzene	79-119
Dibromofluoromethane	78-119
Toluene-d8	85-116

Analyte	LCS (Solid)	RPD
1,1,1-Trichloroethane	70-135	< 30
1,1,2,2-Tetrachloroethane	55-130	< 30
1,1,2-Trichloroethane	60-125	< 30
1,1-Dichloroethane	75-125	< 30
1,1-Dichloroethene	65-135	< 30
1,2,4-Trimethylbenzene	65-135	< 30
1,2-Dichloroethane	70-125	< 30
1,2-Dichloropropane	70-120	< 30
1,3,5-Trimethylbenzene	65-135	< 30
2,2-Dichloropropane	65-135	< 30
2-Butanone	30-160	< 30
2-Hexanone	45-145	< 30
4-Methyl-2-pentanone	45-145	< 30
Acetone	20-160	< 30
Benzene	75-125	< 30
Bromodichloromethane	70-130	< 30
Bromoform	55-135	< 30
Bromomethane	30-160	< 30
Carbon disulfide	45-160	< 30
Carbon tetrachloride	65-135	< 30
Chlorobenzene	75-125	< 30

SAP Worksheet #28 – continued

Chlorodibromomethane	65-130	< 30
Chloroethane	40-155	< 30
Chloroform	70-125	< 30
Chloromethane	50-130	< 30
cis-1,2-Dichloroethene	65-125	< 30
cis-1,3-Dichloropropene	70-125	< 30
Ethylbenzene	75-125	< 30
Isopropylbenzene	75-130	< 30
m,p-Xylene	80-125	< 30
Methyl tert-butyl ether	NA	< 30
Methylene chloride	55-140	< 30
n-Butylbenzene	65-140	< 30
n-Propylbenzene	65-135	< 30
o-Xylene	75-125	< 30
p-Isopropyltoluene	75-135	< 30
sec-Butylbenzene	65-130	< 30
Styrene	75-125	< 30
tert-Butylbenzene	65-130	< 30
Tetrachloroethene	65-140	< 30
Toluene	70-125	< 30
trans-1,2-Dichloroethene	65-135	< 30
trans-1,3-Dichloropropene	65-125	< 30
Trichloroethene	75-125	< 30
Vinyl chloride	60-125	< 30

LCS – laboratory control sample
MS/MSD – matrix spike/matrix spike duplicate
N/A – not applicable
RPD – relative percent difference

SAP Worksheet #28 – continued

Matrix:	Soil
Analytical Group:	SVOCs
Analytical Method/SOP Reference:	U.S. EPA Method 8270C EMAX-8270

QC Sample	Frequency / Number	Method / SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator	Measurement Performance Criteria
Method Blank	One per preparation batch	No analytes detected > ½LOQ. For common laboratory contaminants, no analytes detected > LOQ. Blank result must not otherwise affect sample results.	Determine cause of contamination, then reprepare and reanalyze method blank and all samples processed with the non-conforming method blank.	EMAX Analyst	Accuracy Bias	No analytes detected > ½ LOQ. For common laboratory contaminants, no analytes detected > LOQ. Blank result must not otherwise affect sample results.
Surrogate	Every analytical sample	2 out of 3 acid and 2 out of 3 base neutral surrogates within QC limit (Table below)	Correct problem then reprepare and reanalyze all failed samples for failed surrogates in the associated preparatory batch if sufficient sample material is available. If obvious chromatographic interference with surrogate is present, reanalysis may not be necessary.	EMAX Analyst	Accuracy Bias	2 out of 3 acid and 2 out of 3 base neutral surrogates within QC limit (Table below)
LCS	One per sample preparation batch	See Table below	Re-prep and reanalyze LCS and all samples processed with the non-conforming LCS.	EMAX Analyst	Accuracy/Bias	See Table below
Matrix Spike/Matrix Spike Duplicate	Project designated sample matrix QC	See Table below	If result is indicative of matrix interference, discuss in case narrative. Otherwise check for	EMAX Analyst	Interferences: Accuracy Bias	See Table below

SAP Worksheet #28 – continued

Matrix:	Soil
Analytical Group:	SVOCs
Analytical Method/SOP Reference:	U.S. EPA Method 8270C EMAX-8270

QC Sample	Frequency / Number	Method / SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator	Measurement Performance Criteria
			possible source of error, and extract / reanalyze the sample.		Precision	

LCS – laboratory control sample
LOQ – limit of quantitation
QC – quality control

	EPA 8270 Surrogate Recovery
Analyte	**Solid**
2-Fluorobiphenyl	45-105
Terphenyl-d_{14}	30-125
2,4,6-Tribromophenol	35-125
2-Fluorophenol	35-105
Nitrobenzene-d_5	40-100
Phenol-d_5/d_6	35-100

SAP Worksheet #28 – continued

U.S. EPA 8270QC Limit Table

Analyte	Laboratory Control Sample	Matrix Spike	RPD
1,2,4-Trichlorobenzene	35-110	45-110	< 30
1,2-Dichlorobenzene	35-100	45-110	< 30
1,3-Dichlorobenzene	30-100	40-100	< 30
1,4-Dichlorobenzene	30-100	35-105	< 30
2,4,5-Trichlorophenol	50-110	50-110	< 30
2,4,6-Trichlorophenol	50-115	45-110	< 30
2,4-Dichlorophenol	50-105	45-110	< 30
2,4-Dimethylphenol	30-110	30-105	< 30
2,4-Dinitrophenol	15-140	15-130	< 30
2,4-Dinitrotoluene	50-120	50-115	< 30
2-Chloronaphthalene	50-105	45-105	< 30
2-Methylphenol	40-110	40-105	< 30
2-Nitroaniline	20-125	25-110	< 30
2-Nitrophenol	40-115	40-110	< 30
3,3'-Dichlorobenzidine	20-110	NA	< 30
3.4-Methylphenol	30-110	40-105	< 30
3-Nitroaniline	20-125	25-110	< 30
4,6-Dinitro-2-methylphenol	40-130	30-135	< 30
4-Bromophenyl-phenyl ether	50-115	45-110	< 30
4-Chloro-3-methylphenol	45-110	45-115	< 30
4-Chloroaniline	15-110	NA	< 30
4-Chlorophenyl-phenyl ether	50-110	45-110	< 30
4-Nitroaniline	35-120	45-120	< 30
4-Nitrophenol	NA	15-140	< 30
Acenaphthene	45-110	45-110	< 30
Benzo(a)anthracene	55-110	50-110	< 30
Benzo(a)pyrene	55-110	50-110	< 30
Benzo(b)fluoranthene	45-120	45-115	< 30
Benzo(g,h,i)perylene	40-125	40-125	< 30

SAP Worksheet #28 – continued

U.S. EPA 8270QC Limit Table

Analyte	Laboratory Control Sample	Matrix Spike	RPD
Benzo(k)fluoranthene	45-125	45-125	< 30
Benzyl alcohol	30-110	20-125	< 30
bis(2-Chloroethoxy)methane	45-105	45-110	< 30
bis(2-Chloroethyl)ether	35-110	40-105	< 30
Bis(2-ethylhexyl)phthalate	40-125	45-125	< 30
Butylbenzylphthalate	45-115	50-125	< 30
Chrysene	55-110	55-110	< 30
Dibenzo(a,h)anthracene	40-125	40-125	< 30
Diethylphthalate	40-120	50-115	< 30
Dimethylphthalate	25-125	50-110	< 30
Di-n-butylphthalate	35-125	55-110	< 30
Di-n-octylphthalate	35-135	40-130	< 30
Fluoranthene	55-115	55-115	< 30
Fluorene	50-110	50-110	< 30
Hexachlorobenzene	50-110	45-120	< 30
Hexachlorobutadiene	25-105	40-115	< 30
Hexachloroethane	30-100	35-110	< 30
Indeno(1,2,3-cd)pyrene	45-125	40-120	< 30
Isophorone	50-110	45-110	< 30
Naphthalene	40-100	40-105	< 30
N-Nitrosodimethylamine	25-110	20-115	< 30
N-Nitroso-di-n-propylamine	35-130	40-115	< 30
Pentachlorophenol	40-115	25-120	< 30
Phenanthrene	50-115	50-110	< 30
Pyrene	50-130	45-125	< 30

LCS – laboratory control sample
MS/MSD – matrix spike/matrix spike duplicate
N/A – not applicable
RPD – relative percent difference

SAP Worksheet #28 – continued

Matrix:	Soil
Analytical Group:	PCBs
Analytical Method/SOP Reference:	U.S. EPA Method 8082A EMAX-8082

QC Sample	Frequency / Number	Method / SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator	Measurement Performance Criteria
Method Blank	One per preparation batch	No analytes detected > ½LOQ and 1/10 the amount measured in any sample or 1/10 the regulatory limit (whichever is greater). For common laboratory contaminants, no analytes detected > LOQ. Blank result must not otherwise affect sample results.	Pre-prep and reanalyze method blank and lal samples processed with the contaminated blank	Analyst	Bias	No analytes detected > ½LOQ
LCS	One per preparation batch	See Table below.	Correct the problem, the reprepare and reanalyze LCS and all samples processed with the non-conforming LCS.	Analyst	Accuracy Bias	See Table below.
Surrogate Spike	Every sample, spiked sample, standard, and method blank	%R: 44-130%	Re-extract and re-analyze the sample	Analyst	Bias	%R: 44-130%

SAP Worksheet #28 – continued

Matrix:	Soil
Analytical Group:	PCBs
Analytical Method/SOP Reference:	U.S. EPA Method 8082A EMAX-8082

QC Sample	Frequency / Number	Method / SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator	Measurement Performance Criteria
Matrix Spike/Matrix Spike Duplicate	Project-designated sample in matrix QC. In general, 1:20 project samples.	See Table below.	If result is indicative of matrix interference, discuss in case narrative. Otherwise check for possible source of error, and extract / reanalyze the sample.	Analyst	Accuracy Bias Precision	See Table below..

LCS – laboratory control sample
LOQ – limit of quantitation
RL – reporting limit
RPD – relative percent difference

U.S. EPA 8082 QC Limit Table

Analyte	Laboratory Control Sample	Matrix Spike	Relative Percent Difference
PCB-1016	47-134	47-134	<30
PCB-1260	47-134	47-134	<30

SAP Worksheet #28 – continued

Matrix:	Groundwater/Soil
Analytical Group:	Metals
Analytical Method/SOP Reference:	U.S. EPA Method 6020A / EMAX-6020

QC Sample	Frequency / Number	Method / SOP QC Acceptance Limits	Corrective Action (CA)	Person(s) Responsible for CA	Data Quality Indicator	Measurement Performance Criteria
Method Blank	One per preparation batch	No analytes detected > ½ LOQ. Blank result must not otherwise affect sample results.	Determine cause of contamination, then re-prepare and reanalyze method blank and all samples processed with the nonconforming method blank.	EMAX Analyst	Bias	No analytes detected > ½ LOQ
Interference Check Solution (ICS-A and ICS-AB)	At the beginning of an analytical run and every 12 hours	Within ± 20% of true value	Terminate analysis, correct the problem, reanalyze ICS, and all affected samples	EMAX Analyst	Accuracy	Within ± 20% of true value
Internal Standard (IS)	ICV, LLICV, CCV, LLCCV, CCBs, MB, LCS, every sample	IS intensities > 70% from initial calibration blank IS intensity	Correct problem then reanalyze	EMAX Analyst	Accuracy	IS intensities > 70% from initial calibration blank IS intensity
LCS	One per preparation batch	Recovery of 80-120%	Re-prepare and reanalyze LCS and all samples processed with the nonconforming LCS.	EMAX Analyst	Accuracy	Recovery of 80-120%
MS/MSD	Project designated sample in matrix QC. In general, one per 20 project samples per matrix	Recovery of 75-125%; RPD 20%.	Evalue post spike and dilution test: • If parent sample result is “ND”, evaluate post spike. • If parent sample result is high (i.e., 4 times of spike concentrations) and post spike failed, evaluate dilution test	EMAX Analyst	Accuracy	Recovery of 75-125%; RPD 20%.

SAP Worksheet #28 – continued

Matrix:	Groundwater/Soil
Analytical Group:	Metals
Analytical Method/SOP Reference:	U.S. EPA Method 6020A / EMAX-6020

QC Sample	Frequency / Number	Method / SOP QC Acceptance Limits	Corrective Action (CA)	Person(s) Responsible for CA	Data Quality Indicator	Measurement Performance Criteria
Dilution Test	When MS fails	1:5 dilution must agree within ±10% of the original determination.	Evaluate. Discuss in case narrative.	Analyst	Accuracy	1:5 dilution must agree within ±10% of the original determination.
Post-digestion Spike	when MS recovery fails	%R within 80-120% of expected value	Correct the problem then reanalyze post digestion spike addition	Analyst	Accuracy	%R within 80-120% of expected value

± - plus or minus
% R – percent recovery
CCB – continuing calibration blank
CCV – continuing calibration verification
ICS – interference check solution
ICV – initial calibration verification
IS – internal standard
LCS – laboratory control sample
LLCCV – low level continuing calibration verification
LLICV – low level initial calibration verification
LOQ – limit of *quantitation*
MB – method blank
MS/MSD – matrix spike/matrix spike duplicate
QC – quality control
RPD – relative percent difference

SAP Worksheet #28 – continued

USEPA 6020A QC Limit Table

Analyte	LCS	Matrix Spike	RPD
Aluminum	80 - 120	75 - 120	50
Antimony	80 - 120	75 - 120	50
Arsenic	80 - 120	75 - 120	50
Barium	80 - 120	75 - 120	50
Beryllium	80 - 120	75 - 120	50
Cadmium	80 - 120	75 - 120	50
Calcium	80 - 120	75 - 120	50
Chromium	80 - 120	75 - 120	50
Cobalt	80 - 120	75 - 120	50
Copper	80 - 120	75 - 120	50
Iron	80 - 120	75 - 120	50
Lead	80 - 120	75 - 120	50
Magnesium	80 - 120	75 - 120	50
Manganese	80 - 120	75 - 120	50
Molybdenum	80 - 120	75 - 120	50
Nickel	80 - 120	75 - 120	50
Potassium	80 - 120	75 - 120	50
Selenium	80 - 120	75 - 120	50
Silver	80 - 120	75 - 120	50
Sodium	80 - 120	75 - 120	50
Thallium	80 - 120	75 - 120	50
Vanadium	80 - 120	75 - 120	50
Zinc	80 - 120	75 - 120	50
Mercury	80 - 120	75 - 120	50

SAP Worksheet #28 – continued

Matrix:	Soil
Analytical Group:	Hexavalent Chromium
Analytical Method/SOP Reference:	U.S. EPA Method 7196A EMAX-7196

QC Sample	Frequency / Number	Method / SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator	Measurement Performance Criteria
Method Blank	One per preparation batch	No analytes detected > ½ LOQ.	Reprepare and reanalyze method blank and all samples processed with the contaminated blank.	EMAX Analyst	Bias	No analyte detected > ½ LOQ
LCS	One per preparation batch	%R: 80-120%	Reprepare and reanalyze the LCS and all samples in the associated preparatory batch for failed analytes if sufficient sample material is available.	EMAX Analyst	Accuracy	%R: 80-120%
Interference and reducing agent check / MS/MSD	One per every 10 samples per matrix	%R: 85-115 RPD $\leq$ 20%	Dilute and analyze serial dilution test if concentration > 5 times of LOQ.	EMAX Analyst	Accuracy Bias	%R: 85-115 RPD $\leq$ 20%
Pre-digestion matrix spike soluble	One per preparation batch	%R: 85-115%, RPD $\leq$ 20%	Dilute and analyze serial dilution test if concentration > 5 times of LOQ. Otherwise, perform post-spike test.	EMAX Analyst	Accuracy Bias	%R: 85-115%, RPD $\leq$ 20%
Pre-digestion matrix spike insoluble	One per preparation batch	%R: 75-125%	Discuss in case narrative.	EMAX Analyst	Accuracy	%R: 75-125%

SAP Worksheet #28 – continued

Matrix:	Soil
Analytical Group:	Hexavalent Chromium
Analytical Method/SOP Reference:	U.S. EPA Method 7196A EMAX-7196

QC Sample	Frequency / Number	Method / SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator	Measurement Performance Criteria
Post- Spike	When MS/MSD fails	%R: 85-115%	Perform MSA .	EMAX Analyst	Accuracy Bias	%R: 85-115%
Serial Dilution Test	When matrix QC failed and sample concentration is 5 times the LOQ	Within ± 10% of the parent sample result	Perform MSA	EMAX Analyst	Bias	Within ± 10% of the parent sample result

SAP Worksheet #28 – continued

Matrix:	Soil
Analytical Group:	pH
Analytical Method/SOP Reference:	U.S. EPA Method 9045D/ EMAX-9045 SM 4500HB/ EMAX 4500HB

QC Sample	Frequency / Number	Method / SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator	Measurement Performance Criteria
Duplicate	One per every 10 samples per matrix	Results within ±0.1 pH unit	Reanalyze the sample and its duplicate once. If it still fails, re-calibrate using a fresh buffer solution and re-analyze	EMAX Analyst	Accuracy Bias	Results within ±0.1 pH unit

SAP Worksheet #28 – continued

Matrix:	Soil
Analytical Group:	Mercury
Analytical Method/SOP Reference:	U.S. EPA Method 7471B EMAX-7471

QC Sample	Frequency / Number	Method / SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator	Measurement Performance Criteria
Method Blank	One per preparation batch	No analytes detected > ½ LOQ. Blank result must not otherwise affect sample results.	Determine cause of contamination, then re-prepare and reanalyze method blank and all samples processed with the nonconforming method blank.	Analyst	Accuracy	No analytes detected > ½ LOQ
LCS	One per preparation batch	Recovery of 90-110%	Re-prepare and reanalyze LCS and all samples processed with the nonconforming LCS.	Analyst	Accuracy	Recovery of 90-110%
MS/MSD	Project designated sample in matrix QC. In general, 1:20 project samples.	Recovery of 80-120%; RPD 30%.	If result is indicative of matrix interference, discuss in case narrative. Otherwise check for possible source of error, and extract/reanalyze the sample.	Analyst	Accuracy Precision	Recovery of 80-120%; RPD 30%
Laboratory Duplicate	One per preparation batch	RPD ≤20%	Evaluate in consideration of other batch QC parameters and sample homogeneity. Re-prepare and reanalyze if no extenuating circumstances are found.	Analyst	Precision	RPD ≤20%

SAP Worksheet #29 — Project Documents and Records Table

Document	Where Maintained
SAP Worksheet #4 – Project Personnel Sign-Off Sheet	Trevet project file*
Field logbook	Trevet project file
Field forms	Trevet project file
Sample labels	EMAX**
chain-of-custody form	Trevet project file and EMAX
Supplies certification	Trevet project file
Shipping records	Trevet project file
Field audit and nonconformance reports	Trevet project file
Laboratory data package including:*** • Sample receipt and login • Laboratory internal chain-of-custody • Instrument calibration logs • Sample preparation logs • Sample analysis/run logs • Nonconformance reports including corrective actions	EMAX, Trevet project file, and NAVFAC SW Administrative Record
Data validation report***	Validator- LDC, Trevet project file, and NAVFAC SW Administrative Record

* Project files are maintained at Trevet's San Diego office located at 9888 Carroll Centre Road, Suite 228, San Diego, California 92126

** EMAX is located at 1835 W. 205th Street, Torrance, California 90501

*** Laboratory analytical data and field measurements (such as groundwater quality measurements including temperature, pH, conductivity, dissolved oxygen, oxidation/reduction potential, and turbidity) will be uploaded to NIRIS in accordance with EWI EVR.6, *Environmental Data Management and Required Electronic Delivery Standards* (NAVFAC SW 2005).

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SAP Worksheet #30 — Analytical Services Table

Matrix	Analytical Group	Sample Locations/ID Number	Analytical Method	Data Package Turnaround Time	Laboratory/Organization (name and address, contact person and telephone number)	Backup Laboratory/ Organization (name and address, contact person and telephone number)
Soil	VOCs	Worksheet #18	U.S. EPA 8260B	21 days	EMAX Laboratories 1835 W. 205th Street, Torrance, CA 90501 Contact: Ye Myint (310) 618-8889	Columbia Analytical Services 1317 S. 13th Avenue Kelso, WA 98626 Contact: Greg Salata (360) 577-7222
	SVOC	Worksheet #18	U.S. EPA 8270C			
	pH	Worksheet #18	U.S. EPA 9045D			
	Metals	Worksheet #18	U.S. EPA 6020A			
	Hexavalent Chromium	Worksheet #18	U.S. EPA 7196A			
	PCBs	Worksheet #18	U.S. EPA 8082A			
	Mercury	Worksheet #18	U.S. EPA 7471B			
Groundwater/soil	Lead	Worksheet #18	U.S. EPA 6020A			
	pH	Worksheet #18	U.S. EPA SM 4500-HB			

PCBs – plychlorinaetd biphenyls
SVOC s– semivolatile organic compounds
U.S. EPA – United States Enviornmetnla Protection Agency
VOCs – volatile organic compounds

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SAP Worksheet #31 — Planned Project Assessments Table

Assessment Type	Frequency	Internal or External	Organization Performing Assessment	Person(s) Responsible for Performing Assessment	Person(s) Responsible for Responding to Assessment Findings	Person(s) Responsible for Identifying and Implementing Corrective Action	Person(s) Responsible for Monitoring Effectiveness of Corrective Action
Field Readiness Review	Before mobilization for the project and before major phases of work are initiated	Internal	Trevet	PM, Trevet	PM, Trevet	PM, Trevet	QCM, Trevet
Field Sampling Surveillance	Once at the beginning of field sampling	Internal	Trevet	Chemist, Trevet	PM, Trevet	PM, Trevet	QCM and Chemist, Trevet
Data Review Surveillance	Once for project when duration less than 6 months	Internal	Trevet	Chemist, Trevet	Chemist, Trevet	Chemist, Trevet	QCM, Trevet
Management Review	Once	Internal	Trevet	QCM, Trevet	PM, Trevet	PM, Trevet	QCM, Trevet

QCM – Quality Control Manager
PM – Project Manager

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SAP Worksheet #32 — Assessment Findings and Corrective Action Responses

Assessment Type	Nature of Deficiencies Documentation	Individual(s) Notified of Findings	Timeframe of Notification	Nature of Corrective Action Response Documentation	Individual(s) Receiving CA Response	Timeframe for Response
Field Sampling Surveillance	Surveillance Report	Trevet PM	7 days after the inspection is complete	Corrective Action Report	PM and QCM, Trevet	5 days after notification
Data Review Surveillance	Surveillance Report	Trevet PM	7 days after the inspection is complete	Corrective Action Report	PM and QCM, Trevet	14 days after notification
Management Review	Surveillance Report	Trevet PM	7 days after the inspection is complete	Corrective Action Report	QCM, Trevet	14 days after notification

QCM – Quality Control Manager
PM – Project Manager

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SAP Worksheet #33 — QA Management Reports Table

Type of Report	Frequency	Projected Delivery Date(s)	Persons Responsible for Report Preparation	Report Recipient(s)
Field Sampling Surveillance Report	Once at start up of sampling	Within 7 days of first day of sampling.	Trevet Chemist	Trevet PM, Trevet QCM, and Trevet Project File
Data Review Surveillance Report	Once after all data generated and reviewed	Within 7 days of receipt of final validation report.	Trevet Chemist	Trevet PM, Trevet QCM, and Trevet Project File
Management Review Report	Once after management review is completed	Within 7 days of receipt of completion of field effort.	Trevet QCM	Trevet PM and Trevet Project File
Final Project Report	Following Agency concurrence with draft report	TBD	Trevet QCM	Trevet PM and Trevet Project File

QCM – quality control manager
PM – Project Manager
TBD – to be determined

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SAP Worksheet #34 — Verification (Step I) Process Table

Verification Input	Description	Internal/ External	Responsible for Verification (name, organization)
Field logbook	Field logbooks will be reviewed weekly and verified that the information is complete. The inspection will be documented in daily QC reports.	Internal	Field Team Lead, Trevet
chain-of-custody forms	Completed chain-of-custody forms will be reviewed daily and verified for completeness.	Internal	Field Team Lead, Trevet
Sample receipt	Receipt of samples by the laboratory will be verified the day following shipment for samples shipped via courier or commercial carrier.	Internal	Chemist, Trevet
Sample logins	Sample login information will be reviewed and verified for completeness in accordance with chain-of-custody forms.	Internal External	Chemist, Trevet Laboratory PM, EMAX
Laboratory data prior to release	Laboratory data will be reviewed and verified for completeness against analyses requested on chain-of-custody forms.	External	Laboratory PM, EMAX
Laboratory data due at turnaround time listed on chain-of-custody	Laboratory data will be verified that the analyses reported are consistent with the analytical suite requested on the chain-of-custody forms.	Internal	Chemist, Trevet
Laboratory data packages	All laboratory data packages will be verified for completeness by the laboratory performing the work. Data packages will then be reviewed by the project chemist for completeness. Subsequently, data packages will be evaluated externally by undergoing data validation.	External Internal External	Laboratory PM, EMAX Chemist, Trevet Third-party data validators, LDC
Field and electronic data	100% of manual entries will be reviewed against the hardcopy information and 10% of electronic uploads will be checked against the hardcopy.	Internal	Chemist, Trevet

EMAX – EMAX Laboratories, Inc.
LDC – Laboratory Data Consultants
PM – Project Manager

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SAP Worksheet #35 — Validation (Steps IIa and IIb) Process Table

Step IIa/IIb	Validation Input	Description	Responsible for Validation (name, organization)
IIa	Field logbook	Field logbooks will be reviewed weekly for accuracy associated with each sampling event. The inspection will be documented in daily QC reports.	PM, Trevet
IIa	chain-of-custody forms	chain-of-custody forms will be reviewed daily to ensure that project information, sample analyses requested, number of field QC samples collected, and percent level III or IV validation chosen is accurate and in accordance with the requirements in this SAP.	Chemist, Trevet
IIa	Sample receipt	Sample cooler will be checked for compliance with temperature and packaging requirements.	Laboratory sample custodian, EMAX
IIa	Sample logins	Sample login will be reviewed for accuracy against the chain-of-custody form.	Chemist, Trevet Laboratory PM, EMAX
IIa	Holding times	Analytical results will be reviewed to ensure analysis occurred within stated holding times.	Chemist, Trevet Laboratory PM, EMAX
IIa	Laboratory data prior to release	Laboratory data will be reviewed to ensure that the data is accurate and meets the requirements in this SAP.	Laboratory PM, EMAX
IIa	Laboratory data prior to release	100% of the data will comply with the method- and project-specific requirements; any deviations or failure to meet criteria will be documented for the project file.	Laboratory Analyst, EMAX
IIa	Laboratory data prior to release	100% of manual entries are free of transcription errors and manual calculations are accurate; computer calculations are spot-checked to verify program validity; data reported are compliant with method- and project-specific QC requirements; raw data and supporting materials are complete; spectral assignments are confirmed; descriptions of deviations from method or project requirements are documented; significant figures and rounding have been appropriately used; reported values include dilution factors; and results are reasonable.	Laboratory Peer Analyst, EMAX
IIa	Laboratory data prior to release	Data reported comply with method- and project-specific QC requirements; the reported information is complete; the information in the report narrative is complete and accurate; and results are reasonable.	Laboratory Supervisor, EMAX

SAP Worksheet #35 – continued

Step IIa/IIb	Validation Input	Description	Responsible for Validation (name, organization)
IIa	Laboratory data prior to release	Data reported comply with method- and project-specific QC; analytical methods are performed in compliance with approved SOPs. This review may be conducted after release of data since performed only on 10% of data.	Laboratory QA Manager, EMAX
IIa	Laboratory data due at turnaround time listed on chain-of-custody	Laboratory data will be reviewed to ensure that the data reported met the analyte list and limits listed in Worksheet #15.	Chemist, Trevet
IIa	Laboratory data packages	All laboratory data packages will be validated by the laboratory performing the work for technical accuracy before it is submitted.	Laboratory PM, EMAX
IIa	Laboratory data packages	Data packages will be reviewed for accuracy against the laboratory data that was faxed or e-mailed at the turnaround time listed on the chain-of-custody.	Chemist, Trevet
IIa	Laboratory data packages	Data packages will be evaluated externally by undergoing data validation.	Third-party data validator, LDC
IIb	Data validation reports	Data validation reports will be reviewed in conjunction with the project DQOs and data quality indicators.	Chemist, Trevet

DQOs- Data Quality Objectives
EMAX – EMAX Laboratories, Inc.
LDC – Laboratory Data Consultants
PM – Project Manager
QC – Quality Control

SAP Worksheet #36 — Analytical Data Validation (Steps IIa and IIb) Summary Table

Step IIa/IIb	Matrix	Analytical Group	Validation Criteria	Data Validator (title and organizational affiliation)
IIa	Groundwater	Lead / U.S. EPA 6020A pH / SM 4500-HB	CLP NFG*, U.S. EPA SW 846**, and this UFP-QAPP. U.S. EPA Level III for 80% of data and U.S. EPA Level IV for 20% of data	PM, LDC
IIb	Soil	VOCs / U.S. EPA 8260B SVOCs /U.S. EPA 8270C Metals / U.S. EPA 6020A Mercury / U.S. EPA 7471B Hexavalent Chromium / U.S. EPA 7196A PCBs / U.S. EPA 8082A Lead / U.S. EPA 6020A pH / U.S. 9045D	CLP NFG*, U.S. EPA SW 846**, and this UFP-QAPP. U.S. EPA Level III for 80% of data and U.S. EPA Level IV for 20% of data	PM, LDC

*U.S. EPA Contract Laboratory Program (CLP) National Functional Guidelines (NFG) for Organic Data Review, June 2008; and U.S. EPA CLP NFG for Inorganic Data Review, January 2010.

**U.S. EPA SW 846, Third Edition, Test Methods for Evaluation Solid Waste, update 1, July 1992; update IIA, August 1993; update II, September 1994; update IIB, January 1995; update III, December 1996; update IIIA, April 1998; update IV, January 2008.

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SAP Worksheet #37 — Usability Assessment

37.1 Measurement Quality Objectives for Chemical Data

The primary measurement quality objectives for this investigation relate to precision and accuracy, including detections and quantitation limits, for the analytical methods performed. All analytical results will be evaluated in accordance with precision, accuracy, representativeness, completeness, and comparability (PARCC) parameters to document the quality of the data and to ensure that the data are of sufficient quality to meet the project objectives. The following subsections describe each of the PARCC parameters and how they will be assessed within this project.

37.1.1 Precision

Precision is the degree of mutual agreement between individual measurements of the same property under similar conditions. Usually, combined field and laboratory precision is evaluated by collecting and analyzing field duplicates and then calculating the variance between the samples, typically as a relative percent difference (RPD).

$$RPD = \frac{|A - B|}{\frac{(A + B)}{2}} \text{ X } 100\%$$

where:

A = First duplicate concentration
B = Second duplicate concentration

Laboratory analytical precision is evaluated by analyzing laboratory duplicates or matrix spikes and matrix spike duplicates. Matrix spike and matrix spike duplicate samples will be generated for all analytes for this project. The results of the analysis of each matrix spike and matrix spike duplicate pair will be used to calculate an RPD for evaluating precision.

37.1.2 Accuracy

Field accuracy will be assessed by collecting and analyzing equipment rinsate, trip blank, and source water blank QC samples as appropriate. These QC samples will be used to evaluate the potential for target analytes to enter samples because of sampling processes.

A program of sample spiking will be conducted to evaluate laboratory accuracy. This program includes analysis of the matrix spikes and matrix spike duplicate samples, laboratory control samples (LCS), surrogate standards, and method blanks. Matrix spikes and matrix spike duplicate and LCS samples will be prepared and analyzed at a frequency of 5 percent for soil samples. Surrogate standards, where applicable, are added to every sample analyzed for organic

SAP Worksheet #37 – continued

constituents. The results of the spiked samples are used to calculate the percent recovery for evaluating accuracy.

$$\text{Percent Recovery} = \frac{S - C}{T} \text{ x } 100$$

where:

S = Measured spike sample concentration
C = Sample concentration
T = True or actual concentration of the spike

Results that fall outside of the accuracy goals will be further evaluated based on the results of other QC samples.

37.1.3 Representativeness

Representativeness expresses the degree to which sample data accurately and precisely represent the characteristics of a population, variations in a parameter at a sampling point, or an environmental condition. Representative data will be obtained for this project through careful selection of sampling locations and analytical parameters. Representative data will also be obtained through proper collection and handling of samples to avoid interference and minimize contamination.

Representativeness of data will be ensured through the consistent application of established field and laboratory procedures. Field blanks (if appropriate) and LCS will be evaluated for the presence of contaminants to aid in evaluating the representativeness of sample results. Data determined to be nonrepresentative, by comparison with existing data, will be used only if accompanied by appropriate qualifiers and limits of uncertainty.

37.1.4 Completeness

Completeness is a measure of the percentage of project-specific data that are valid. Valid data are obtained when samples are collected and analyzed in accordance with QC procedures outlined in this SAP and when none of the QC criteria that affect data usability is exceeded. When all data validation is complete, the percent completeness value will be calculated by dividing the number of useable sample results by the total number of sample results planned for this investigation and multiplied by 100.

Completeness will also be evaluated as part of the data quality assessment process. This evaluation will help determine whether any limitations are associated with the decisions to be made based on the data collected. The completeness goal for this project is 90 percent.

SAP Worksheet #37 – continued

37.1.5 Comparability

Comparability expresses the confidence with which one data set can be compared with another. Comparability of data will be achieved by consistently following standard field and laboratory procedures and by using standard measurement units in reporting analytical data.

37.1.6 Detection and Quantitation Limits

The limit of detection (LOD) is the minimum concentration of an analyte that can be reliably distinguished from background noise for a specific analytical method. The limit of quantitation (LOQ) represents the lowest concentration of an analyte that can be accurately and reproducibly quantified in a sample matrix. The LOQs are typically several times the method detection limit to allow for matrix effects. Analytical methods for this project have been selected so that the LOQs for each target analyte are below the project action limits listed in Worksheet #15, wherever practical.

37.2 Data Quality Assessment

After data are validated, the project chemist will review and assess field and laboratory quality control. The PARCC parameters will be determined as described in Section 37.1. Data validation reports will be reviewed and assessed for meeting DQOs. The project chemist will review the data validation reports for any deviations and qualify data. The following data qualifiers will be used:

J	-	Result is estimated
U	-	Analyte is not detected at or above the stated LOQ
R	-	Data are rejected
UJ	-	Analyte is not detected, but there is an uncertainty about the LOQ

Data qualifiers are used to indicate uncertainties associated with the data. The assigned qualifiers will be entered into the validation code field in the database. In addition, data will be assessed through the evaluation of the PARCC parameters.

The project chemist will prepare a data quality assessment report that will summarize the findings of the data assessment and discuss the usability of the data to be included in the report.

Data will be reported in tabular format to be included in the report. The electronic data in NEDD (i.e., NIRIS Electronic Data Deliverable) format will be submitted to the NIRIS database within 30 days of completion of validation, as described in Environmental Work Instruction #6, *Environmental Data Management and Required Electronic Delivery Standards* (NAVFAC SW

SAP Worksheet #37 – continued

2005). An e-mail confirmation received by Trevet will be forwarded to the project file. The DOD ELAP certification for EMAX Laboratories is included in Attachment 3.

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Figures

Figure A1. Site Location Map
Figure A2. IR Site 30 Proposed Sample Locations
Figure A3. IR Site 31 Proposed Sample Locations
Figure A4. IR Site 32 Proposed Sample Locations
Figure A5. Well Construction Diagram
Figure A6. Project Schedule

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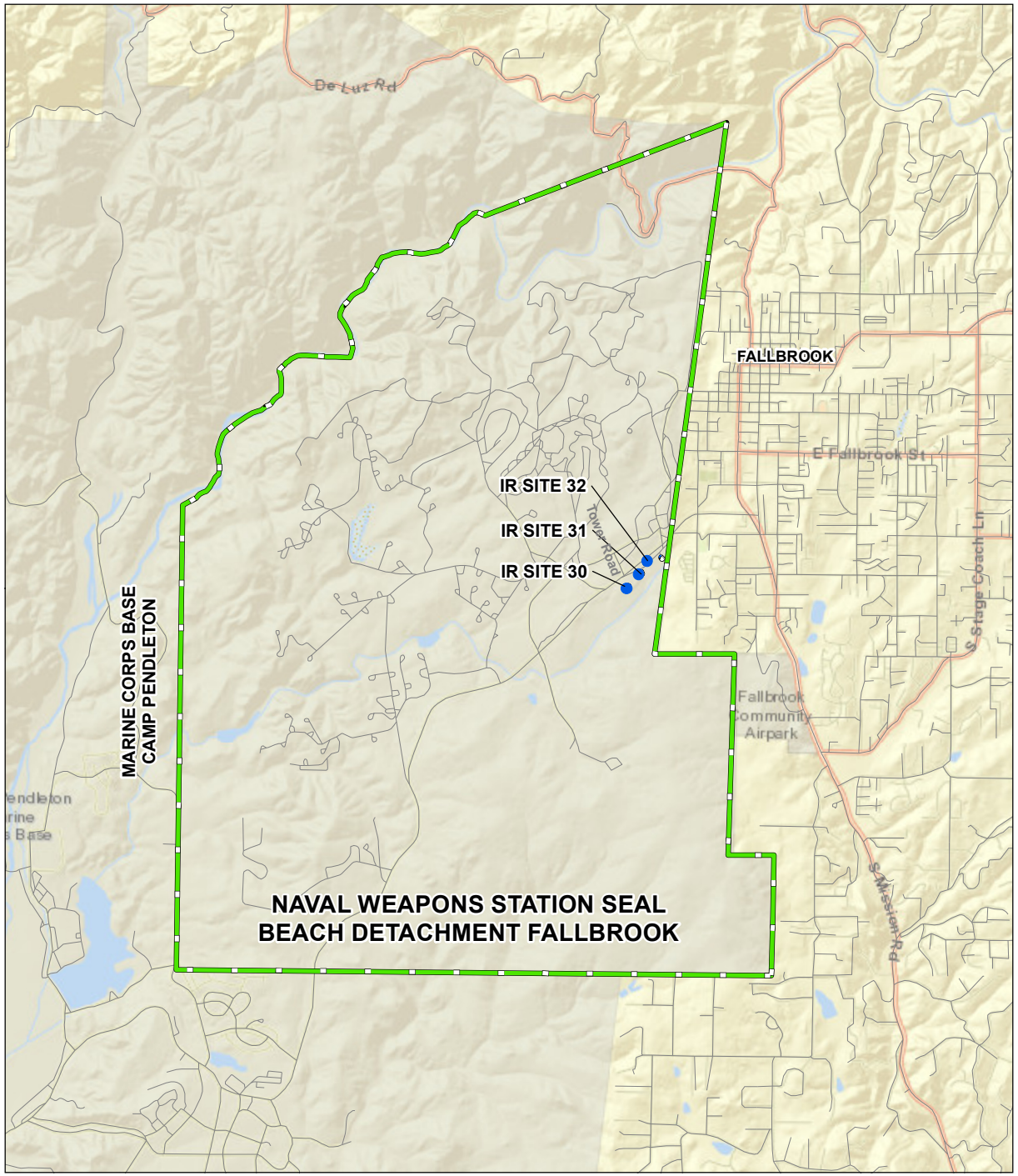

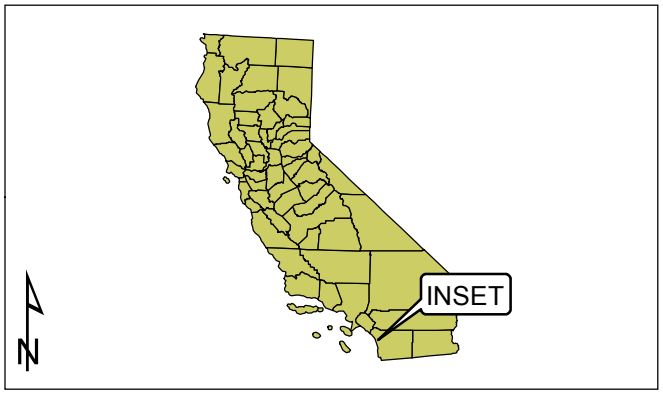

LEGEND

IR SITE BOUNDARY

NAVAL WEAPONS STATION SEAL BEACH DETACHMENT FALLBROOK

N

GRAPHIC SCALE

0 0.5 1.0 2.0

(IN MILES)

1 INCH = 1.0 MILES

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SAN DIEGO, CALIFORNIA

NAVFAC Naval Facilities Engineering Command NAVFAC SOUTHWEST

NAVAL WEAPONS STATION SEAL BEACH
DETACHMENT FALLBROOK
FALLBROOK, CALIFORNIA

FIGURE A1

SITE LOCATION MAP

TREVET

DATE: NOVEMBER 2015

CONTRACT NO.: N62473-10-D-4009
DELIVERY ORDER: 0096

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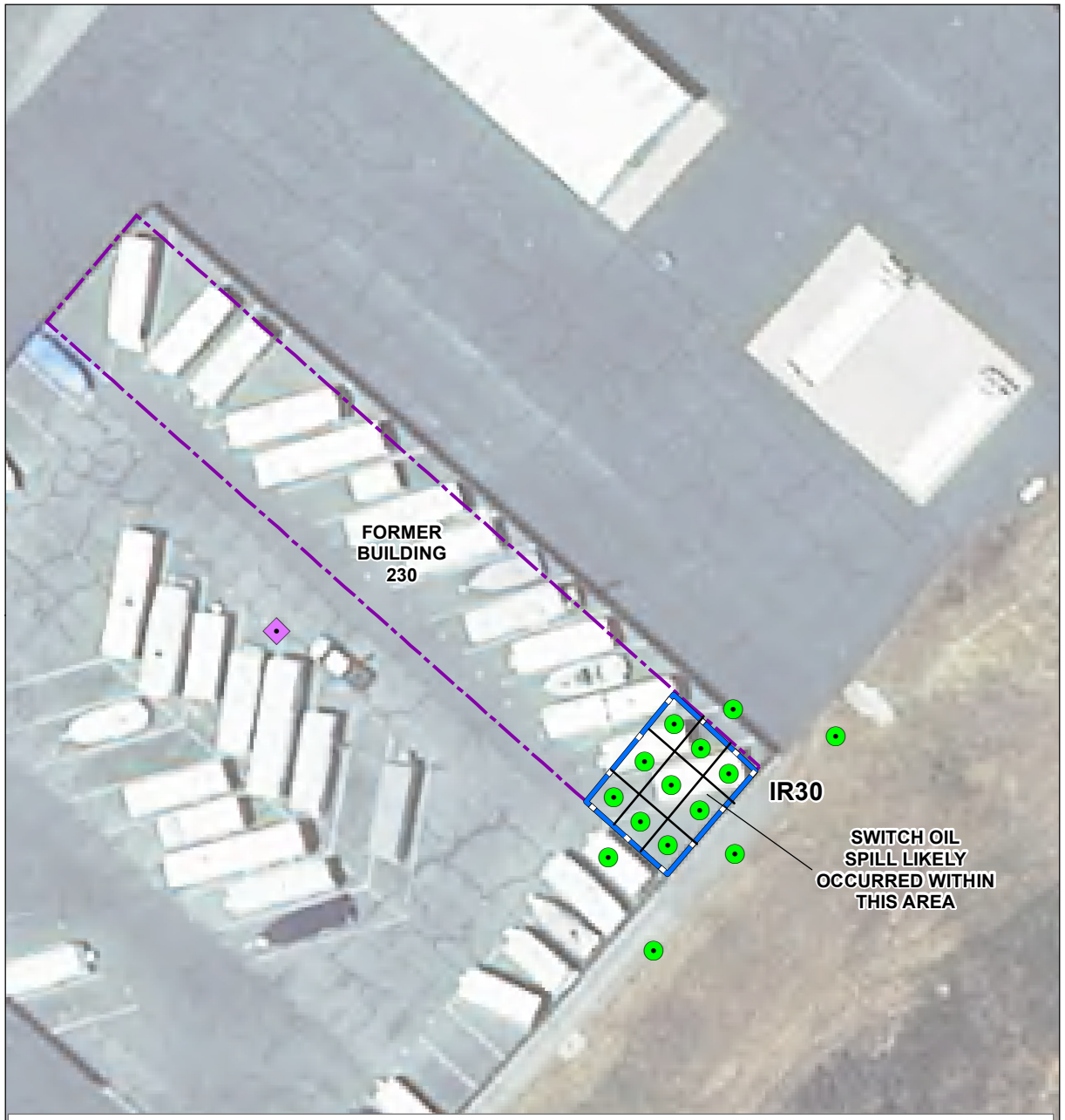

NOTE:
THE PA REPORT INDICATES THAT APPROXIMATELY ONE (1) PINT OF SWITCH OIL WAS SPILLED IN THE FAR SOUTHEAST PORTION OF FORMER BUILDING 230 AND THAT THE SWITCH OIL POTENTIALLY CONTAINED PCBS. AT THE TIME OF THE SPILL, THE STORAGE AREA HAD AN ASPHALT SURFACE. SUBSEQUENT TO THE SPILL THE STAINED ASPHALT WAS REMOVED, ALTHOUGH THE EXACT LOCATION OF THE SPILL/REMOVAL IS UNKNOWN.

LEGEND

- PROPOSED SOIL BORING LOCATION
- PROPOSED SOIL BORING LOCATION BASED ON TOPOGRAPHICAL LOW POINT
- SYSTEMATIC SAMPLING GRID
- FORMER BUILDING 230 FOOTPRINT
- POTENTIAL LOCATION OF SWITCH OIL SPILL

SOURCE:
BING MAPS STREET AND AERIAL IMAGE
ENVIRONMENTAL SYSTEMS RESEARCH INSTITUTE (ESRI) USA
SPATIAL FEATURE CLASSES, SANGIS SPATIAL FEATURE CLASSES

N

GRAPHIC SCALE
0 25 50 100
(IN FEET)
1 INCH = 50 FEET

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NAVAL WEAPONS STATION SEAL BEACH
DETACHMENT FALLBROOK
FALLBROOK, CALIFORNIA

FIGURE A2

IR SITE 30
PROPOSED SAMPLE LOCATIONS

TREVET

DATE: NOVEMBER 2015

CONTRACT NO.: N62473-10-D-4009
DELIVERY ORDER: 0096

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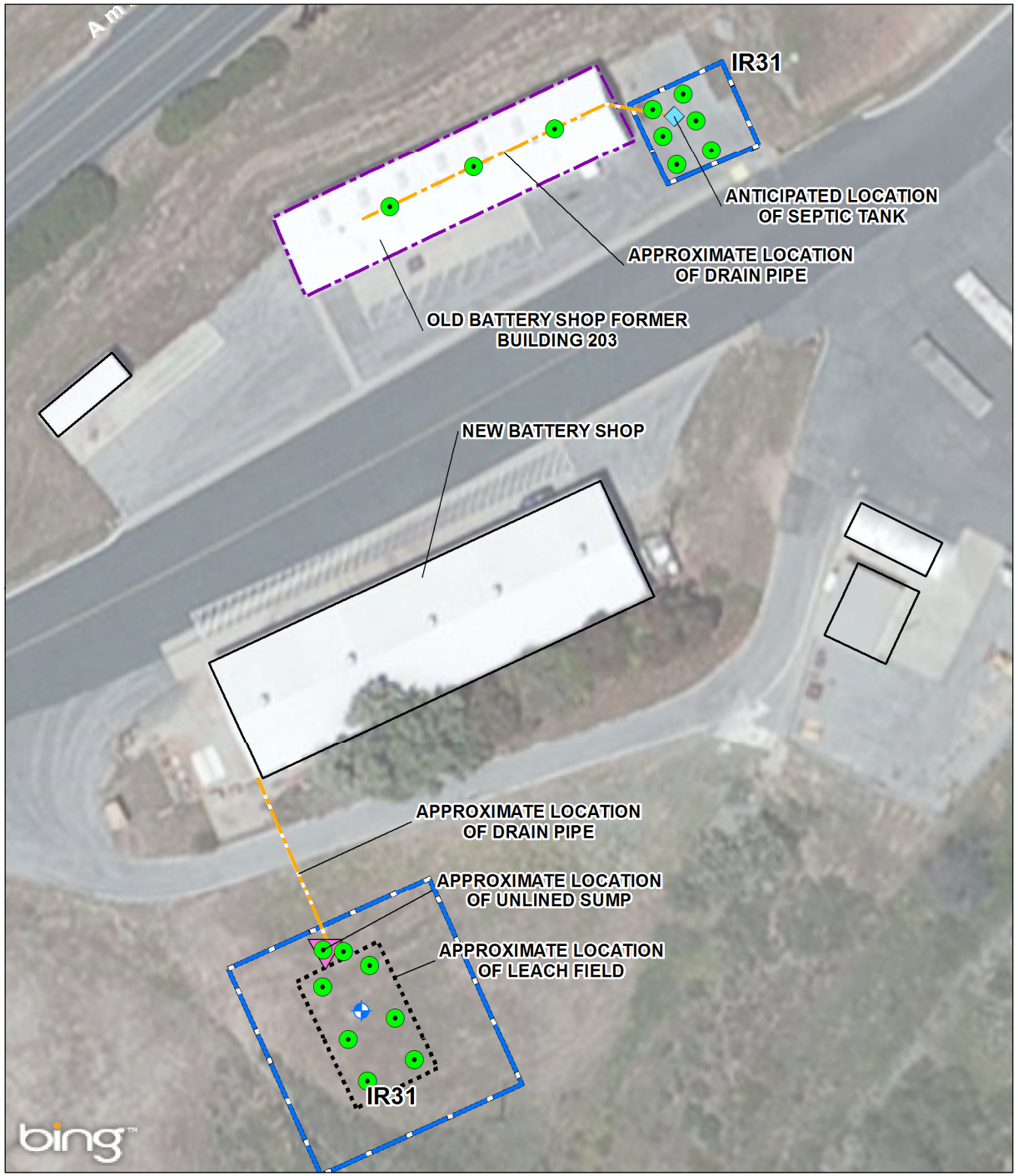

LEGEND

- PROPOSED SOIL BORING LOCATION
- PROPOSED GROUNDWATER MONITORING WELL LOCATION (IF INSTALLED)
- APPROXIMATE LOCATION OF UNLINED SUMP
- ANTICIPATED LOCATION OF SEPTIC TANK
- APPROXIMATE LOCATION OF DRAIN PIPE
- APPROXIMATE LOCATION OF LEACH FIELD
- BUILDING/STRUCTURE
- FORMER BUILDING 203 FOOTPRINT
- APPROXIMATE IR SITE 31 BOUNDARY

N

GRAPHIC SCALE

0 30 60 120

(IN FEET)
1 INCH = 60 FEET

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FIGURE A3

IR SITE 31
PROPOSED SAMPLE LOCATIONS

TREVET

DATE: NOVEMBER 2015

CONTRACT NO.: N62473-10-D-4009
DELIVERY ORDER: 0096

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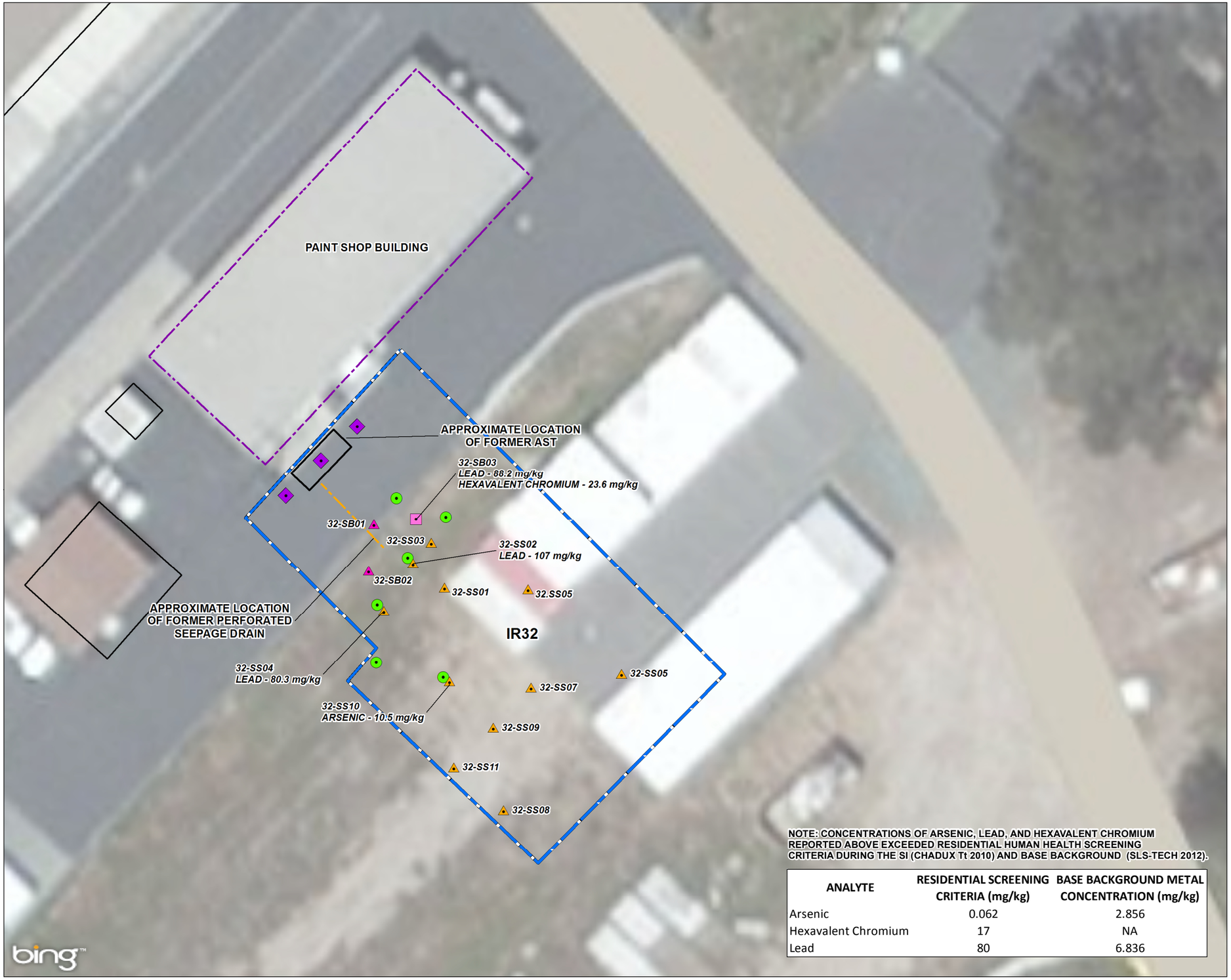

LEGEND

- PREVIOUS SURFACE SOIL SAMPLE LOCATION
- PREVIOUS SOIL BORING SAMPLE LOCATION
- PROPOSED STEP OUT SOIL BORING LOCATION (4 SAMPLES PROPOSED PER BORING)
- PROPOSED AST INVESTIGATION SOIL BORING LOCATION (2 SAMPLES PROPOSED PER BORING)
- FORMER SAMPLE LOCATION IRP32-SB03
- APPROXIMATE LOCATION OF DRAIN PIPE
- BUILDING/STRUCTURE
- PAINT SHOP BUILDING FOOTPRINT
- APPROXIMATE IR SITE 32 BOUNDARY

NOTES::
AST - ABOVEGROUND STORAGE TANK
IR - INSTALLATION RESTORATION
MG/KG - MILLIGRAMS PER KILORGRAM
NA - NOT APPLICABLE

SOURCE:
BING MAPS AERIAL IMAGE, DATE UNKOWN
ENVIRONMENTAL SYSTEMS RESEARCH INSTITUTE (ESRI) USA SPATIAL FEATURE CLASSES. NAD83 STATE PLANE COORDINATE SYSTEM ZONE VI (FEET)

N

GRAPHIC SCALE
0 10 20 40
(IN FEET)
1 INCH = 20 FEET

NOTE: CONCENTRATIONS OF ARSENIC, LEAD, AND HEXAVALENT CHROMIUM REPORTED ABOVE EXCEEDED RESIDENTIAL HUMAN HEALTH SCREENING CRITERIA DURING THE SI (CHADUX Tt 2010) AND BASE BACKGROUND (SLS-TECH 2012).

ANALYTE	RESIDENTIAL SCREENING CRITERIA (mg/kg)	BASE BACKGROUND METAL CONCENTRATION (mg/kg)
Arsenic	0.062	2.856
Hexavalent Chromium	17	NA
Lead	80	6.836

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FIGURE A4

IR SITE 32
PROPOSED SAMPLE LOCATIONS

TREVET

DATE: NOVEMBER 2015

CONTRACT NO.: N62473-10-D-4009
DELIVERY ORDER: 0096

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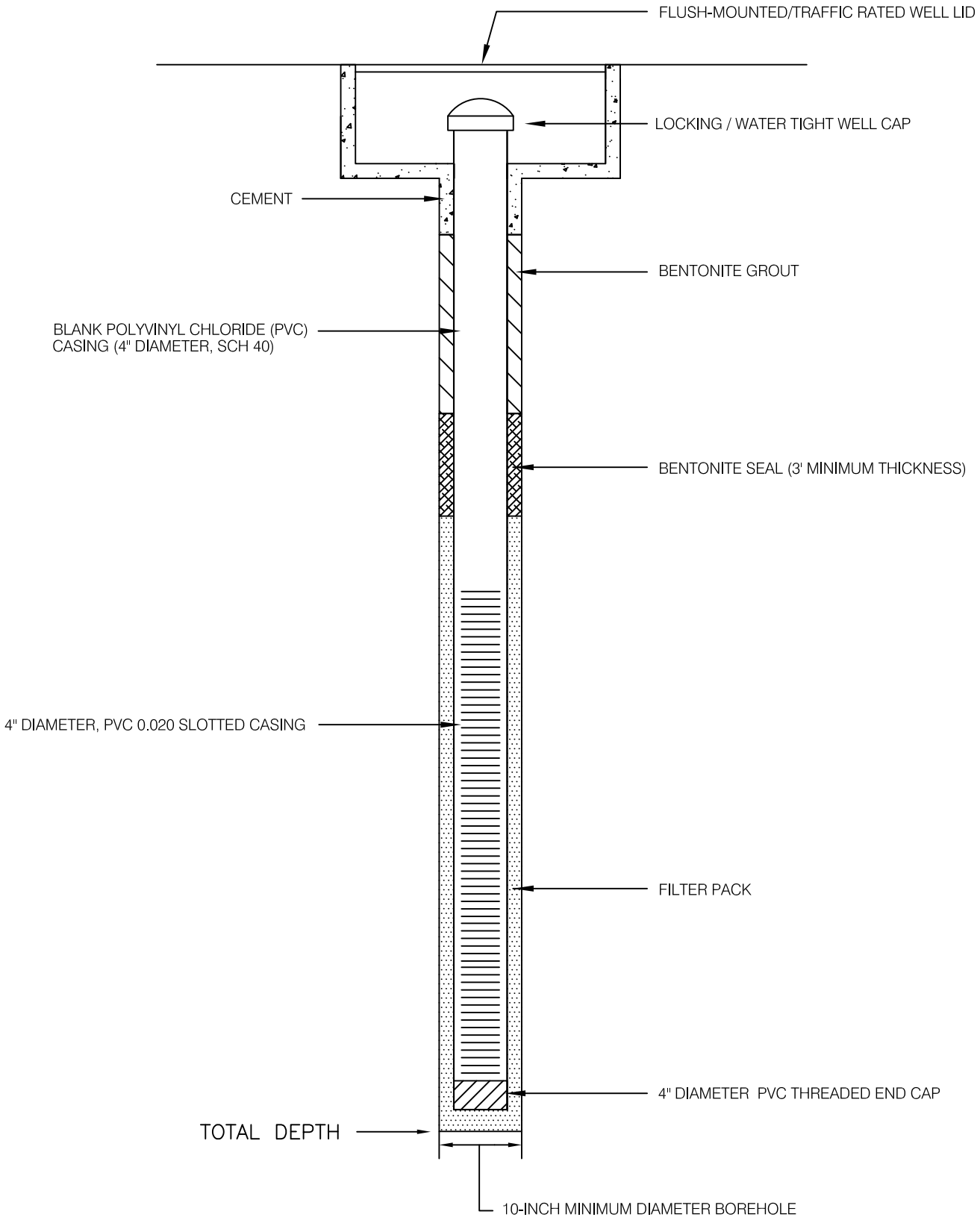

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SAN DIEGO, CALIFORNIA

TREVET

DATE: NOVEMBER 2015

CONTRACT NO.: N62473-10-D-4009
DELIVERY ORDER: 0096

NAVAL WEAPONS STATION SEAL BEACH
DETACHMENT FALLBROOK
FALLBROOK, CALIFORNIA

FIGURE A5

WELL CONSTRUCTION DIAGRAM

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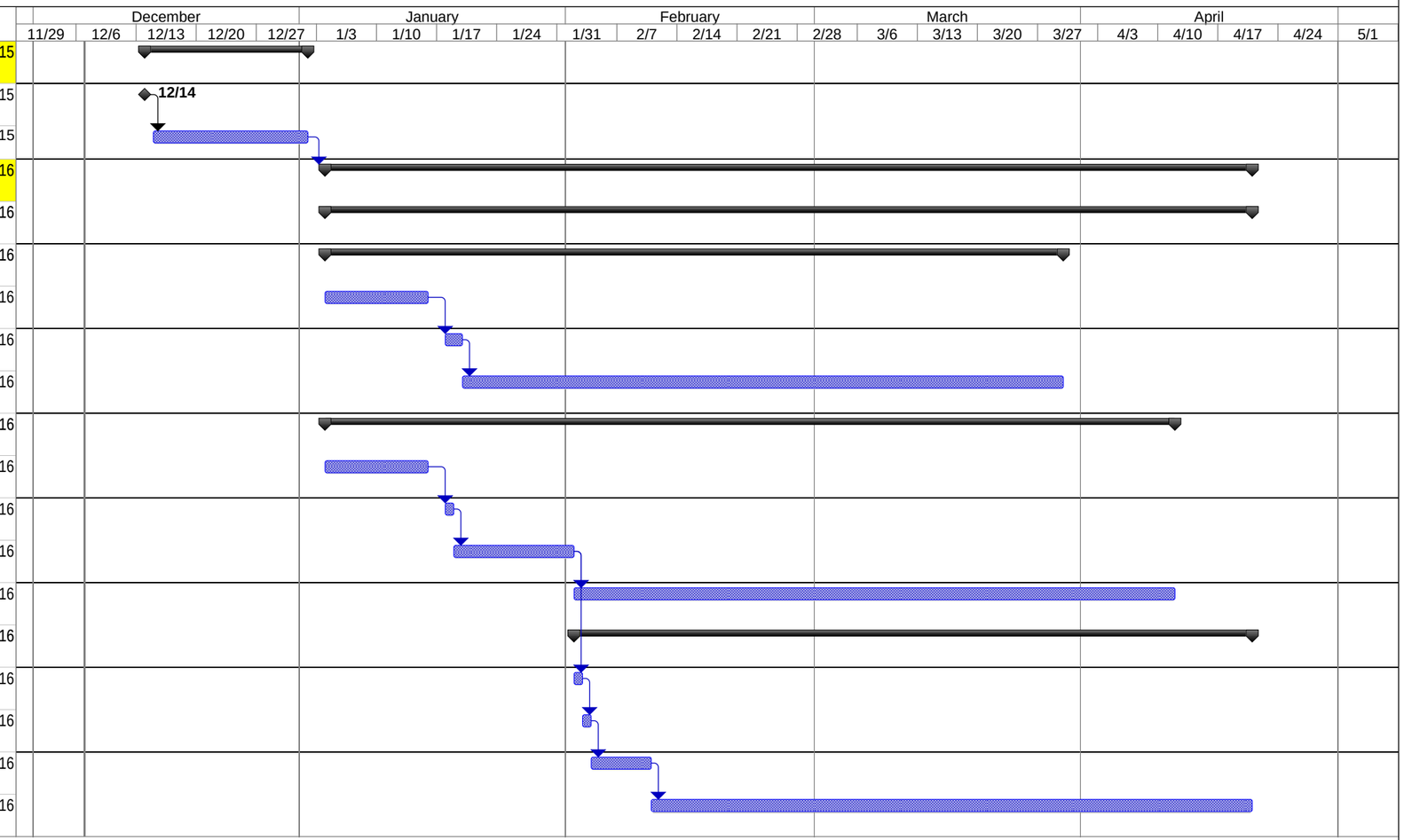
Figure A6 - Project Schedule

ID	Task Name	Duration	Start
1	IR Sites 30, 31, and 32 Work Plan	15 days	Mon 12/14/15
2	Final WP/SAP Issued	1 day	Mon 12/14/15
3	Agencies Review and Concurrence	14 days	Tue 12/15/15
4	IR Sites 30, 31, and 32 Field Work	78 days	Mon 1/4/16
5	Field Work	78 days	Mon 1/4/16
6	IR Site 30	62 days	Mon 1/4/16
7	Mobilization	10 days	Mon 1/4/16
8	Drilling/Sampling	2 days	Mon 1/18/16
9	Laboratory Analysis + Data Validation	50 days	Wed 1/20/16
10	IR Site 31	71 days	Mon 1/4/16
11	Mobilization	10 days	Mon 1/4/16
12	Geophysical Clearance	1 day	Mon 1/18/16
13	Drilling/Sampling	10 days	Tue 1/19/16
14	Laboratory Analysis + Data Validation	50 days	Tue 2/2/16
15	IR Site 32	57 days	Tue 2/2/16
16	Mobilization	1 day	Tue 2/2/16
17	Geophysical Clearance	1 day	Wed 2/3/16
18	Drilling/Sampling	5 days	Thu 2/4/16
19	Laboratory Analysis + Data Validation	50 days	Thu 2/11/16



Project: TO-0096 NWS Fallbrook
Date: Mon 12/7/15

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

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Table

Table 1. Background Metals Concentrations

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Table 1. Background Metals Concentrations
Naval Weapons Station Seal Beach Detachment Fallbrook

Analyte	Background Threshold Value[1] (mg/kg)
Aluminum†	32,836
Antimony	<0.61 to 3.3*
Arsenic	2.856
Barium	363.5
Beryllium	0.466
Cadmium	0.199
Calcium†	6,828
Chromium	63.8
Cobalt	20.4
Copper	53.4
Iron†	30,800
Lead	6.836
Magnesium†	15,685
Manganese†	532.7
Molybdenum	--
Nickel	15
Potassium†	6,210
Selenium	0.608
Silver	0.0774
Sodium†	679.5
Strontium†	58.7
Thallium	0.606
Tin†	<1.2 to 55.7*
Vanadium	186.4
Zinc	228.2
Mercury	0.0186

Notes:
[1] - Background threshold values are based on 95% upper tolerance limits applicable to saprolitic soil derived from granitic rock (gabbro/granodiorite/tonalite) at Naval Weapons Station Seal Beach Detachment Fallbrook. Values from *Basewide Metals Background Soil Study* (SES-TECH 2012).
* - Asterisk indicates that the analyte was not detected above the reporting limit in the background study (SES-TECH 2012). Indicated values represent the range of reporting limits in the background study.

Abbreviations and Acronyms:
-- - not included in background study
† - analyte is not an EPA priority pollutant or CAM 17 metal
mg/kg - milligrams per kilogram

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Attachment 1: Field Forms

Borehole Log
Field Calibration Form
Development Log
Well Sample Log
Chain-of-Custody Form

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Borehole Log

Project Name:	**Project Number:**	**Borehole ID:**
Borehole Location:	*Northing:* *Easting:*	Sheet: of
Drilling Company:	**Driller(s):**	
Drilling Equipment:	**Date Started:**	**Total Depth:** feet
Drilling Method:	**Date Finished:**	**Bedrock Depth:** feet
Drilling Fluid:	**Depth to Groundwater During Drilling:** feet	
Completion Information:	**Static Depth to Groundwater:** feet	
	Ground Elev.: feet (amsl)	**TOC Elevation:** feet (amsl)
	Logged By:	**Checked By:**

Depth (feet)	Samples				Field Analyses			Log		Lithologic Description	Remarks
	Location	Number	Type	Time	PID Sample (ppm)	PID Breathing Zone (ppm)	Additional Tests	Graphic	USCS		
2											
4											
6											
8											
10											
12											
14											
16											
18											
20											
22											
24											

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TEST PIT STRATIGRAPHY LOG

Project Name:	**Contractor:**	**Test Pit Designation:**
Project Number:		**Date Started:**
Client:	**Surface Elevation:**	**Date Completed:**
Location:	**Test Pit Method:**	**Technical Lead:**

Depth (m/ft)			***Soil Symbol, Primary Component, Secondary Components, Relative Density/Consistency, Grain Size/Plasticity, Gradation/Structure, Colour, Moisture Content, Supplementary Descriptors***	***Sample No.***	***Sample Interval***	***PID***	***Location:***
From	***At***	***To***					***Geologic Profile***

Completed by: _____ Date: _____

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Daily Calibration Log - PID

Job Number/Name: _____

Calibration gas/standard (ppm): ____Isobutylene 100 ppm_____

PID Serial Number	Date	Background (ppm)	Adjusted Background (ppm)	Initial Gas (ppm)	Cal'd Gas (ppm)	Initials

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TREVET

WELL DEVELOPMENT LOG

Well: _____ Project: _____ Method of Development: _____

Date: _____ Project No.: _____ Borehole Volume: _____

Personnel: _____ Boring Dia.: _____ Casing Dia.: _____ Total Depth: _____

Subcontractor: _____ Static Depth to Water (ft): _____ Time: _____

Time	Development		Depth to Water (feet)	Purged Volume (gallons)	pH (units)	Conductivity (µS/cm)	Temperature (°C)	Turbidity (NTU)	DO	Salinity	Comments (color, odor, sheen, etc.)
	Start	Stop									

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TREVET — Groundwater Sampling Field Data Sheet

Project Name: _____ Date: _____ By: _____

ject No.: _____ Checked by: _____ License #: _____

Monitoring Well ID: Site Location:

Casing Diameter: ☐ 2" ☐ 4" ☐ 6" ☐ Other Casing Material ☐ SCH 40-PVC ☐ Other: S. Steel

Total Depth (ft-TOC): (A) _____ LNAPL Observed ☐ Yes ☐ No DNAPL Observed ☐ Yes ☐ No

Depth to Water (ft-TOC): (B) _____ 2"/8¼"= 0.82 g/ft = (D) _____ LNAPL/DNAPL _____ (ft)

or Static Water Level (SWL) 4"/9" = 1.31 G/FT = (D) _____

A - B = C 4"/8¼" = 1.18 G/FT = (D) _____

Water Column Height (feet) (C) _____ 4"/10¼" = 1.56 G/FT = (D) _____ x 1.5 = (E) _____ Approx. Min.

Distance between TOC and ground surface = (+/-) 4"/12" = 1.96 G/FT = (D) (1 borehole volume) (1.5 borehole volume) Purge Vol.

Water Level Measurement Equip: ☐ Heron H. 01L 150' ☐ Water Line ☐ Heron Dipper T Cleaned _____

Purging Method/Equipment: ☐ 12-V Pump ☐ Grundflos Pump ☐ Quickie Bailer ☐ Hand Bailer Cleaned _____

Sampling Equipment: Bailer ☐ PVC ☐ SS ☐ Low Flow ☐ Pumps ☐ Dedicated/Non-dedicated ☐ Peristaltic Pump

ph/Temp/Conductivity Meter Type and ID _____ Decontamination Method: ☐ 3-Stage ☐ Other: _____

PURGING AND SAMPLING METHODOLOGIES – Well Recovery Type

☐ Method 1, remove 3 BV, sample after well recovers 80% of total purged drawdown.

☐ Method 2, remove 1 BV, test parameters until stable per SAM Manual, sample after well recovers 80% of total purged drawdown.

☐ Method 3, Low-flow - install pump at least 2 hours prior to start of purging. Follow detailed methodology in SAM Manual.
List date and time pump was installed: Date_____ Time_____

☐ Method 4, remove 1 BV, sample after 2 hours. **Note - if well recovers 80% of total purged drawdown, use another method.**

PURGING INFORMATION

Time (24 hr)	PURGE VOL. (gallons)	Depth to Water (feet)	Drawdown (feet)	pH	COND. (µS/cm)	TURBIDITY (NTU)	DO (mg/ℓ)	TEMP. (°C)	Comments (color, odor, sheen, etc.)

Depth to Water After Purging (ft) = _____(F) Total Purged Water: _____ (gal) Average pumping rate: _____(gpm)

Max. Drawdown: _____ (J) Time Finished Purging: _____

TIME (24 HR)	DEPTH TO WATER (ft)	RESIDUAL DRAWDOWN (ft)	PERCENT RECOVERY
T_1	G_1	H_1	I_1
T_2	G_2	H_2	I_2

SAMPLING INFORMATION

Sampling Method/equipment _____	PARAMETER	USEPA METHOD	CONTAINERS/VOLUME/TYPE (VOA/Glass/Plastic)	PRESERVATIVES
Sampled By: _____				
Sample Time: _____				
Sample ID:				

RECOVERY CALCULATIONS

$A - B = C$; $G_x - B = H_x$; $F - B = J$; $\left(1 - \frac{H_x}{j}\right) \times 100 = I_x$; $\frac{I_x - I_1}{T_x - T_1} x120 = \%$ recovery in 2 hrs.; 80% Recover = SWL + (0.2)(Maximum Drawdown)

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TREVET
9888 Carroll Centre Road, Suite 228
San Diego, CA 92126

CHAIN-OF-CUSTODY RECORD

COC NUMBER _____-_____
mmdd

PROJECT NAME	PURCHASE ORDER NO.
PROJECT LOCATION	PROJECT NO.
SAMPLER NAME	AIRBILL NUMBER
	PROJECT CONTACT PHONE NUMBER

ANALYSES REQUIRED

LABORATORY NAME
EMAX
(310) 618-8889

LABORATORY ID
(FOR LABORATORY)

SAMPLE ID	DATE COLLECTED	TIME COLLECTED	NO. OF CONTAINER	LEVEL 3	LEVEL 4	TYPE	TAT															**COMMENTS**

RELINQUISHED BY (Signature)	DATE	RECEIVED BY (Signature)
COMPANY	TIME	COMPANY
RELINQUISHED BY (Signature)	DATE	RECEIVED BY (Signature)
COMPANY	TIME	COMPANY
RELINQUISHED BY (Signature)	DATE	RECEIVED BY (Signature)
COMPANY	TIME	COMPANY

SAMPLE CONDITION UPON RECEIPT (FOR LABORATORY)
TEMPERATURE: _____ SAMPLE CONDITION: ☐INTACT ☐BROKEN
COOLER SEAL: ☐INTACT ☐BROKEN

SAMPLING COMMENT:

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Attachment 2: Analytical Laboratory Standard Operating Procedures

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Attachment 3: Analytical Laboratory DOD ELAP Certification

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Appendix B: Biological Avoidance and Minimization Plan

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FINAL Biological Avoidance and Minimization Plan for the Site Inspection at Installation Restoration Program Sites 30 and 31 and Expanded Site Inspection at Installation Restoration Program Site 32 on Naval Weapons Station Seal Beach Detachment Fallbrook, California

Prepared for
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October 10, 2014

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1.0 Introduction

This Biological Avoidance and Minimization Plan (BAMP) describes potential effects to federally listed threatened or endangered species that either occur or have the potential for presence during the Site Inspection (SI) at Installation Restoration Program (IR) Site 30 and IR Site 31, and an Expanded Site Inspection (ESI) at IR Site 32, located at Naval Weapons Station (NAVWPNSTA) Seal Beach Detachment (Det) Fallbrook, California (Figure 1).

The purpose of the SI and ESI is to characterize the nature and extent of soil contamination at IR Sites 30, 31, and 32. These sites have been grouped together because of the sites' similar contaminants, histories, and position in the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) response process. Soil contamination at these sites is thought to be associated with the deposition of chemicals on or below the ground surface as a result of spills or previous disposal practices. The SIs and ESI will characterize impacted soil at all three sites and ground water at IR Site 31 to evaluate the extent of chemicals of potential concern (COPC) to human health and/or chemicals of potential ecological concern (COPEC) in the environment.

IR Sites 30, 31, and 32 are located on NAVWPNSTA Seal Beach Det Fallbrook in northern San Diego County. NAVWPNSTA Seal Beach Det Fallbrook is approximately 9 miles inland from the Pacific Ocean and approximately 53 miles north of San Diego, California, and adjoins a portion of the eastern border of Marine Corps Base Camp Pendleton. Elevations within the central part of the installation range from 300 to 840 feet above mean sea level, and the topography is characterized by low hills and shallow west-flowing drainages. The exception is the deeply incised Santa Margarita River channel located along the northern boundary of the installation that has a base elevation between 160 and 300 feet above mean sea level. The installation occupies 8,852 acres and is secured by a chain-link fence. The location of the installation and IR Sites 30, 31, and 32 are shown on a United States Geological Survey (USGS) map in Figure 2.

A review of a number of resources was conducted to evaluate the potential for sensitive species to occur on the project area prior to the site visit. These resources included NAVWPNSTA Seal Beach Det Fallbrook vegetation community maps and sensitive species data (Fallbrook 2014), California Natural Diversity Database (CNDDB; State of California 2014), U.S. Fish and Wildlife Service (USFWS) sensitive species data (USFWS 2014), and associated abiotic data including soil type, slope, aspect, and

Project Location

NAVWPNSTA Seal Beach Detachment Fallbrook Boundary

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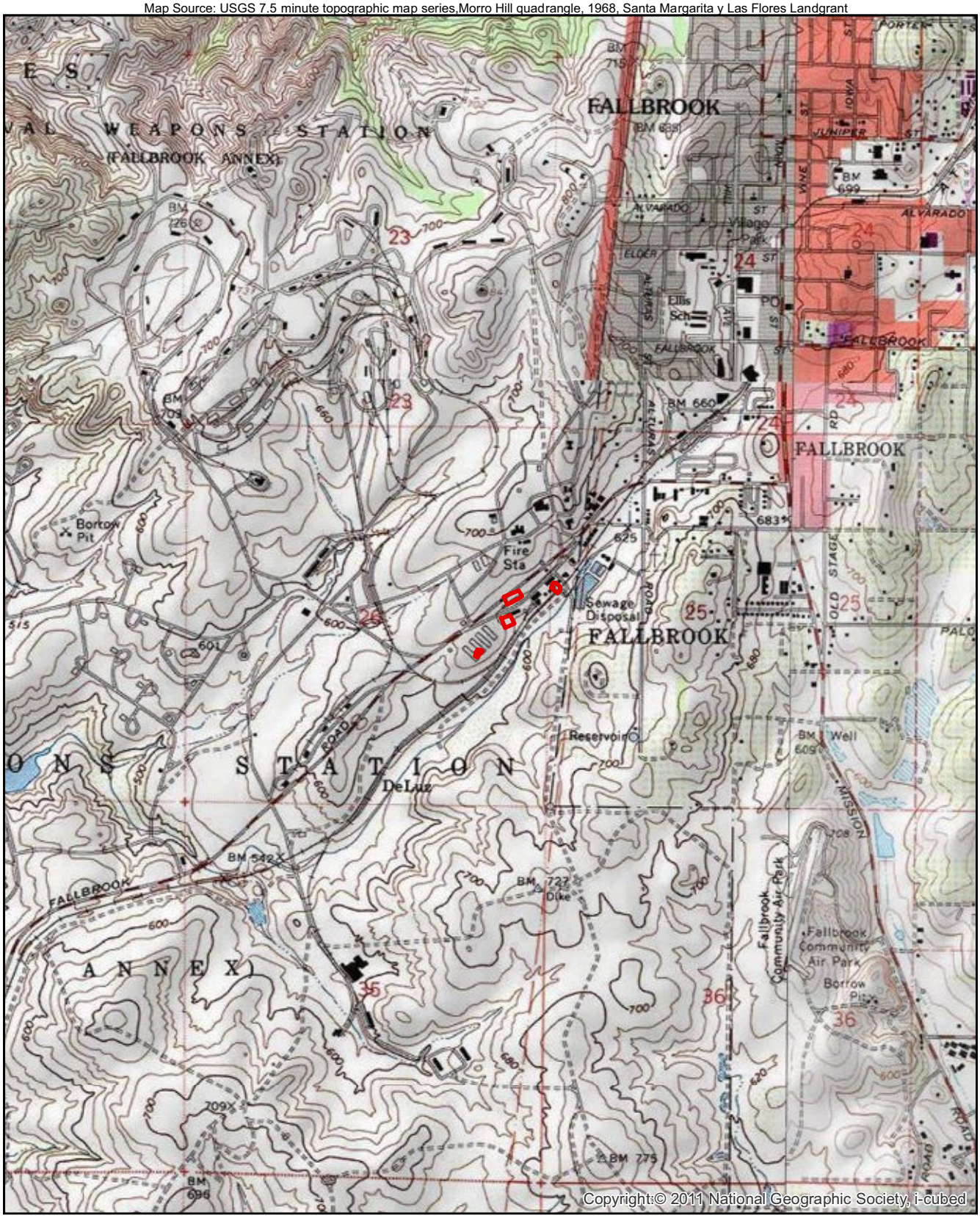
FIGURE 1

Regional Location

Map Source: USGS 7.5 minute topographic map series,Morro Hill quadrangle, 1968, Santa Margarita y Las Flores Landgrant



0 Feet 2,000

Project Boundaries

FIGURE 2

Project Location on USGS Map

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topography. Based on the results of this preliminary research, this BAMP was prepared to evaluate the following federally listed species or species proposed for federal listing:

- Coastal California gnatcatcher (*Polioptila californica californica*)
- Stephen's kangaroo rat (*Dipodomys stephensi*)
- Least bell's vireo (*Vireo pusillus bellii*)
- Southwestern willow flycatcher (*Empidonax traillii extimus*)

USFWS has designated critical habitat for all of these species. However, no critical habitat has been designated on NAVWPNSTA Seal Beach Det Fallbrook. Given the absence of critical habitat on NAVWPNSTA Seal Beach Det Fallbrook, this topic is not discussed further in this document.

It is intended that this BAMP will provide the information necessary to coordinate with the USFWS in the manner described in the U.S. Environmental Protection Agency's (EPA's) "CERCLA Compliance with other Laws Manual" (OSWER Directive 9234.1-02). This BAMP provides the best available scientific data for the above-listed species in the action area.

2.0 Proposed Action

This BAMP was prepared in conjunction with the work plan prepared by Trevet (2014) who will conduct an SI at IR Sites 30 and Site 31, and an ESI at IR Site 32 located at NAVWPNSTA Seal Beach Det Fallbrook, California.

The work plan was prepared on behalf of the United States Department of the Navy (DON), under Naval Facilities Engineering Command Southwest (NAVFAC SW) Contract Number N62473-10-D-4009, Task Order 0096. Trevet prepared the work plan under subcontract to CB&I Federal Services (CFS). The SIs and ESI will be performed in accordance with the National Oil and Hazardous Substances Contingency Plan; Comprehensive Environmental Response, CERCLA; U.S. EPA guidance; and Navy policy. Regulatory agencies, including the California Department of Toxic Substances Control (DTSC) and California Regional Water Quality Control Board, San Diego Region (RWQCB), will also provide oversight for the RI activities.

The scope of work for the SIs at IR Sites 30 and 31 and the ESI at IR Site 32 includes the collection of soil samples at all three sites and a groundwater sample from IR Site 31 to achieve the project objectives. The data obtained during these SIs and ESI will be collected using methods and procedures that produce a level of quality approach for screening level risk assessments and future site management decisions. Additional field activities will include surveying the location of the groundwater monitoring well at IR Site 31 and characterizing and managing investigation-derived waste (IDW) from all the sites.

2.1 IR Site 30 Objectives and Summary

The objective of the SI for IR Site 30 is to evaluate if polychlorinated biphenyls (PCBs) are present in soil in the area of the former switch oil spill at concentrations that potentially pose a risk to human health or the environment.

IR Site 30 is located in the far southeast end of the former transportation garage, Building 230. Building 230 was located approximately 400 feet to the northeast of the intersection between Ammunition Road and Tower Road (Figure 3). This IR Site was identified in an area where previous documentation indicated that up to 16 ounces (1 pint) of potentially hazardous electric switch oil spilled onto the ground (NEESA 1985).

Based on aerial photos of the site, Building 230 was demolished sometime between 2002 and 2003, and the area is currently used as a recreational vehicle storage area (see Figure 3). During the May 2014 site

walk, it was noted that the original asphalt has been resurfaced and no visible sign of the previous removal action exists. The current site use is a recreational vehicle storage area.

At IR Site 30, 12 soil borings will be advanced using a direct-push drill rig in the area of the former oil switch. Two soil samples will be collected at different depths from 12 different borings and analyzed for contaminants.

2.2 IR Site 31 Objectives and Summary

The objective of the SI for IR Site 31 is to evaluate if semi-volatile organic compounds (SVOCs) and metals are present in soils in the area surrounding the septic tank adjacent to Building 203 and in soils and groundwater around the sump and leach field area adjacent to Building 352. Additionally, the concentrations of SVOCs and metals will be evaluated to determine if they are present at concentrations that potentially pose a risk to human health and/or the environment.

IR Site 31 comprises two areas. The first area consists of the septic tank area located adjacent to former Building 203, which is located approximately 1,000 feet to the northeast of the intersection between Ammunition Road and Tower Road. The second area consists of an unlined sump and associated leach field adjacent to Building 352, which is located approximately 600 feet to the northeast of the intersection between Ammunition Road and Tower Road (see Figure 3).

Image Source: SanGIS (flown May 2012)

0 Feet 200

Action Area

IR Site Boundary

FIGURE 3

IR Sites 30, 31, and 32 Action Areas on Aerial Photograph

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At IR Site 31, a geophysical survey will be conducted to locate a former septic tank adjacent to Building 203. Using a direct-push drill rig, 17 soil borings will be advanced, nine near the septic tank near Building 203 and eight in the sump and leach field area near Building 352. Two soil samples will be collected from different depths within each boring and analyzed for SVOCs and metals. Additionally, a groundwater monitoring well will be installed in the leach field near Building 352. The groundwater will be sampled and analyzed for SVOCs and metals.

2.3 IR Site 32 Objectives and Summary

The objective of the ESI at IR Site 32 is to further delineate the lateral and vertical extent of hexavalent chromium adjacent to previous boring location IR32-SB03 and to determine if hexavalent chromium, metals, volatile organic compounds (VOCs), and SVOCs are present at concentrations that potentially pose a risk to human health and/or the environment.

IRP Site 32, referred to as the Paint Shop disposal area, is located within a developed area near the eastern boundary of the installation, southwest of the Ammunition Road entrance gate (see Figure 3). The site is actually located on the south side of Building 351 (the Paint Shop) and covers approximately 0.1 acre (80 by 50 feet). Two small buildings, 214 (truck scale) and 317 (storage), are located immediately west of Building 351 (see Figure 3). The area south of the Paint Shop is a paved access area that extends approximately 25 feet laterally to a low (5-foot) descending embankment. Fallbrook Creek drainage channel is located approximately 120 feet southeast and downgradient of the site.

At IR Site 32, six soil borings will be advanced using a direct-push drill rig in a step-out pattern from a previous soil boring location that was drilled during the initial SI (ChaduxTt 2010). Four soil samples at different depths (approximately 1, 5, 9, and 13 feet below ground surface) will be collected from each boring and analyzed for metals, hexavalent chromium, VOCs, and SVOCs.

2.4 Project Activities

The proposed project consists of conducting a geophysical survey at IR Site 31, preparing all IR sites for intrusive investigations, conducting soil borings at all IR sites, and taking ground water samples at IR Site 31. These are detailed in the work plan (Trevet 2014) and summarized below.

2.4.1 Geophysical Survey

A geophysical survey will be conducted adjacent to Building 203 at IR Site 31 in an effort to locate the septic tank into which the Building 203 drain line emptied. The geophysical survey will use ground-penetrating radar in an effort to locate anomalies associated with an underground storage tank. The data

from the geophysical survey will determine the location and spacing of proposed borings adjacent to Building 203 at IR Site 31.

2.4.2 Site Preparation for Intrusive Investigation

Proposed direct-push boring locations will be identified using global positioning system equipment and staked or marked on the ground with the proposed boring number. As no proposed boring locations are located in concrete paved areas, concrete coring is not anticipated. Additionally, cutting or coring for soil boring locations in the asphalt-paved areas will not be necessary since the direct-push drill rig should be able to advance past the asphalt.

An approved IDW staging area will be determined prior to the initiation of fieldwork. The staging area will be used to store IDW generated during field efforts. IDW will be stored in secondarily contained 55-gallon drums.

2.4.3 Direct-push Soil Borings

At all the IR sites, direct-push borings will be advanced using a direct-push drill rig. Direct-push drill rigs use the static weight of the rig combined with a hydraulic percussion to advance a bore rod into the soil. The bore rod is used to advance the borehole to the desired sampling depth.

Soil samples will be collected at desired depths by removing the drive rod, attaching a sample rod, and pushing the sample rod past the desired sample depth. An acetate sleeve or stainless steel sleeves will be placed within the sample rod prior to advancement to aid in sample preservation, collection, and packaging. Once the sample rod is removed from the borehole, the acetate sleeve or stainless steel sleeves will be removed and cut (acetate only) at the desired sample depth, capped, labeled, and prepared for sample shipment. In between each boring location, the drill rods will be cleaned using the three-stage decontamination process described in more detail in the work plan (Trevet 2014).

After each drill rod has been advanced to total depth and the samples have been collected, the borehole will be backfilled using bentonite chips to approximately 6 inches below ground surface (bgs). The bentonite chips will then be hydrated with potable water, and the surface at each boring will be completed to match the adjacent surface. The surface will be completed with native soil in soil areas, with cold-patch asphalt in asphalt-paved areas, and with concrete in areas previously covered with concrete.

2.4.3.1 IR Site 30

For the SI at IR Site 30, 12 direct-push soil borings are proposed to be advanced to a total depth of 1 foot bgs in the area of the former oil switch spill. The boring locations will be determined by processing historical aerial images into a geographical information system to determine the approximate coordinates of the former building. This information will then be used in the field, and the southeast section of the

former building location will be marked on the ground. A 12-foot by 6-foot grid will be used to collect systematically located samples. The grid will start in the southeastern corner of the former building. Two soil samples are proposed to be collected from each soil boring, one from approximately 0–1 inch bgs and the other at approximately 6 inches bgs. All soil samples will be analyzed for PCBs.

2.4.3.2 IR Site 31

For the SI at IR Site 31, 17 direct-push soil borings are proposed to be advanced to a depth of approximately 7 feet bgs. Nine of the proposed borings will be located adjacent to Building 203 in the area of the former septic tank. Eight of the proposed borings will be located in the vicinity of the sump and leach field near Building 352. Two soil samples are proposed to be collected within each soil boring, one at approximately 1 foot bgs and the other at approximately 6 feet bgs. All soil samples will be analyzed for SVOCs and metals.

2.4.3.3 IR Site 32

For the ESI at IR Site 32, six direct-push soil borings are proposed to be advanced to a depth of approximately 14 feet bgs. The proposed borings will be located in a step-out pattern near previous sample locations. Four samples are proposed to be collected within each soil boring at approximately 1, 5, 9, and 13 feet bgs, for a total of 24 samples. Each sample will be analyzed for metals, hexavalent chromium, VOCs, and SVOCs.

2.4.4 Groundwater Sampling at IR Site 31

One groundwater monitoring well is proposed to be installed within the leach field area of IR Site 31 located adjacent to Building 352. The groundwater monitoring well will be installed using hollow-stem auger drilling methods to a target depths of approximately 70 feet bgs. Groundwater is anticipated to be contacted at approximately 50 feet bgs during drilling.

Soil samples will be collected at 5-foot intervals during drilling for lithologic logging collection purposes. Once the target total depth is reached (approximately 70 feet bgs), the driller will install 4-inch-diameter monitoring well using Schedule 40 PVC casing and 20 feet of screen with 0.020-inch machine-cut slots to compensate for seasonal variations in groundwater levels.

2.4.5 Equipment Decontamination

Hand augers and all non-consumable equipment that comes into contact with sampling media during the sampling events will be decontaminated between borings.

All decontamination water will be containerized in Department of Transportation (DOT) approved 55-gallon drums and stored at the designated IDW staging area.

2.4.6 Investigation-derived Waste

All soil cuttings and IDW fluids will be containerized into DOT approved 55-gallon drums and placed in secondary containment for storage. The drums will be stored on-site in a designated IDW storage area. The containerized media may be sampled and analyzed for disposal profiling purposes. Alternatively, analytical results from site samples may be used for disposal profiling. After waste profiling is complete, the IDW will be transported to an Off-Site-Rule-approved facility in accordance with 40 Code of Federal Regulations 300 Subpart 440. All wastes will be removed from the site within 90 days and will be transported via a licensed transporter.

2.5 Proposed Action Impacts

As described above, the Proposed Action comprises several different components. Table 1 details the estimated disturbance to vegetation communities by project component. The total area of proposed disturbance will be revised following completion of the geophysical investigation, which will further refine the locations of the project activities.

TABLE 1
PROPOSED IMPACTS FOR THE REMEDIAL INVESTIGATION PROGRAM ACTION AREA

Project Component	IR Site 30 (square feet)	IR Site 31 (square feet)	IR Site 32 (square feet)	Total (square feet)
Groundwater Sampling (4” diameter)	--	0.09	--	0.09
Soil Sampling (6-17 bore augers, up to 4” diameter auger)	1.05	1.49	0.52	3.06
TOTAL PROJECT IMPACTS	**1.05**	**1.58**	**0.52**	**3.15**

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3.0 Avoidance and Minimization Measures

The Proposed Action includes minimization and mitigation measures designed to avoid and minimize direct and indirect harm or injury to federally listed species and their habitat. Based on the review of existing biological and natural resource data, the results of the site visit, and a review of the proposed activities, the following measures are proposed to avoid any impacts to sensitive biological resources within IR Sites 30, 31 and 32.

3.1 General Measures

The following would be implemented when conducting any of the project components:

1. The boundaries of all proposed project components will be clearly delineated with stakes, flagging, fencing, or other markers prior to any surface disturbing activities. All surface disturbances, vehicles, and equipment will be confined to the flagged areas. Access for staking and flagging will be by foot, not via vehicular access.
2. Prior to project initiation, an environmental worker education awareness program will be developed and implemented. The education program will include the following elements:
   - Description of all protection measures designed to reduce potential impacts to sensitive species
   - Function of flagging designating authorized work areas
   - Reporting procedures to be used if any sensitive species are encountered in the field.

3.2 Migratory Bird Treaty Act Specific Measures

All project-related activities must comply with the Migratory Bird Treaty Act (MBTA). Active nests (i.e., nests with eggs or chicks) are protected year-round by the MBTA. To protect active nests and migratory birds, the following will apply:

1. Structures must be surveyed for active nests and nesting migratory birds prior to project-related activities.
2. Project-related activities that will require removal of an active nest create disturbance to an active nest or cause a breeding bird to leave the nest for prolonged lengths of time are not permitted without NAVWPNSTA Seal Beach Det Fallbrook concurrence.
3. Trimming, removal, or disturbance of vegetation during the peak breeding season (15 February–31 August) requires a pre-activity survey by a qualified wildlife biologist to determine that active nests will not be affected.
4. All active nests within the project area must be reported to NAVWPNSTA Seal Beach Det Fallbrook.

3.3 Coastal California Gnatcatcher Species-specific Measures

To avoid impacts to this species at IR Sites 30, 31, and 32, the following measures are recommended:

1. All work should be timed to occur outside of the coastal California gnatcatcher's breeding season (15 February–30 August).
2. Any work that must be conducted near the coastal sage scrub habitat during the breeding season (15 February–30 August) should have a pre-activity survey completed by a qualified wildlife biologist to determine if this species is present.
5. All sightings of this species and active nests within the project area must be reported to NAVWPNSTA Seal Beach Det Fallbrook.

3.4 Least Bell's Vireo Species-specific Measures

To avoid impacts to this species at IR Sites 30, 31, and 32, the following measures are recommended:

3. All work should be timed to occur outside of the least Bell's vireo breeding season (1 April–31 July).
4. Any work that must be conducted near the riparian habitat during the breeding season (1 April–31 July) should have a pre-activity survey completed by a qualified wildlife biologist to determine if this species is present.
5. All sightings of this species and active nests within the project area must be reported to NAVWPNSTA Seal Beach Det Fallbrook.

4.0 Existing Conditions Including Federally Listed (and/or Proposed) Species or Critical Habitat, within the Action Area

The following description of the project area is based on geographic information system (GIS) data provided by NAVWPNSTA Seal Beach Det Fallbrook and the habitat assessments conducted by RECON biologists during biological surveys.

4.1 Topography and Soils

4.1.1 IR Site 30

IR Site 30 is located at the top of what appears to be a manufactured slope with no slope. A short steep slope exists to the southeast of the site with approximately 30-45 percent slopes and a height of 10 feet. This site is on an existing parking area with no exposed soils. Underneath the asphalt exists vista coarse sandy loams (USDA 1973).

Vista soils have little organic matter and have a slight increase in clay content at depth. These soils are derived from granodiorite or quartz diorite parent material and are on upland slopes (from 5 to 65 percent). The topsoil is typically a dark grayish-brown or dark brown sandy loam about 19 inches thick, with a dark brown and yellowish-brown subsoil extending to about 35 inches deep. This soil has moderately rapid permeability, medium runoff, and a moderate erosion hazard.

4.1.2 IR Site 31

IR Site 31 comprises two areas as described in Section 2.2. The area containing the septic tank, adjacent to Building 203, is within a developed area with generally flat terrain.

The area within the leach field, adjacent to Building 352, is on a slightly sloping hill with an approximate 5–10 percent slope that faces south. Soils within the two portions of the site are a combination of Vista coarse sandy loams and Fallbrook–Vista sandy loams (USDA 1973).

The Fallbrook soil series consists of well-drained, moderately deep to deep sandy loams that formed in material weathered in place from granodiorite. Fallbrook sandy loam, 15 to 30 percent slopes, eroded, is moderately steep and is 27–50 inches deep over rock. This soil is a well-drained, moderately deep sandy loam that develops from material weathered in place from granodiorite. Runoff is medium to rapid, permeability is moderate, and the erosion hazard is moderate to high.

4.1.3 IR Site 32

IR Site 32 is located within a developed area containing an existing structure and paved road at the top of a manufactured slope and an unpaved access road and staging area below that. The short steep slope within the site has an approximately 30–45 percent slope and is three to seven feet high. Soils within the site are a combination of Vista coarse sandy loams and Visalia sandy loams (USDA 1973).

Visalia sandy loams develop on alluvial fans and flood plains from granitic parent material. They typically have a very deep, dark grayish-brown topsoil with sandy loam texture from the surface to about 40 inches depth, and a loam texture from about 40 to 60 inches depth. This soil is moderately permeable, with slow runoff and a low erosion hazard. Flooding may occur for short periods.

4.2 Vegetation Communities

Only one plant community and one land cover type had been mapped by NAVWPNSTA Seal Beach Det Fallbrook (Fallbrook 2014) over IR Sites 30, 31, and 32 (Table 2,

Figure 4). The current biological survey was conducted by RECON Environmental, Inc. biologists Alex Fromer and Wendy Loeffler. A fire that occurred in May 2014 affected much of NAVWPNSTA Det Fallbrook, although no evidence of the fire was visible within any of the sites and the existing vegetation communities had not changed.

TABLE 2
VEGETATION COMMUNITIES AND LAND COVER TYPES WITHIN THE REMEDIAL INVESTIGATION PROGRAM ACTION AREA

Vegetation Community	IR Site 30 (acres)	IR Site 31 (acres)	IR Site 32 (acres)
Coastal Sage Scrub	0.0	0.52	0.0
Developed	0.17	0.66	0.39
TOTAL	**0.17**	**1.18**	**0.39**

4.2.1 IR Site 30

IR Site 30 is located within an existing asphalt parking lot currently used as a recreational vehicle storage area. The site had been mapped entirely as developed land, however a small portion of the action area to the southeast of the site supports ruderal vegetation dominated by non-native grasses. Based on the proposed project description no activities will be conducted within this ruderal area.

4.2.2 IR Site 31

IR Site 31 comprises two areas as described in Section 2.2. The area containing the septic tank, adjacent to Building 203, had been previously mapped as developed land (Fallbrook 2014). While the majority of

the area is developed, containing a large amount of asphalt, the portion of the action area immediately surrounding the asphalt patch contains ruderal vegetation dominated by non-native grasses.

Image Source: SanGIS (flown May 2012)

Action Area

2010 Vegetation

Coastal Sage Scrub

Developed

0 Feet 200

FIGURE 4

IR Sites 30, 31, and 32 Action Areas with Previously Mapped Vegetation Types

RECON

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The area within the leach field, adjacent to Building 352 had been previously mapped as primarily coastal sage scrub with a small portion of developed land (Fallbrook 2014). Based on the field survey conducted by RECON biologists, much of the area mapped as coastal sage scrub had become disturbed coastal sage scrub, dominated by non-native grasses with few native coastal sage scrub shrubs within the action area.

4.2.3 IR Site 32

IR Site 32 had been previously mapped as developed land (Fallbrook 2014). While much of the action area contains asphalt such as roads and parking areas, some portions of the evaluated action area support ruderal vegetation such as non-native grasses.

4.3 Description of Listed Species with the Potential to Occur within the Action Area

Based on known occurrences or presence of suitable habitat on or in the immediate vicinity of IR Sites 30, 31, and 32, this document evaluates the following federally listed species: coastal California gnatcatcher, Stephen's kangaroo rat, and least Bell's vireo. No designated critical habitat exists within, or in the vicinity of, the action area for IR Sites 30, 31, and 32. Locations of historical occurrences of these species are presented in Figure 5.

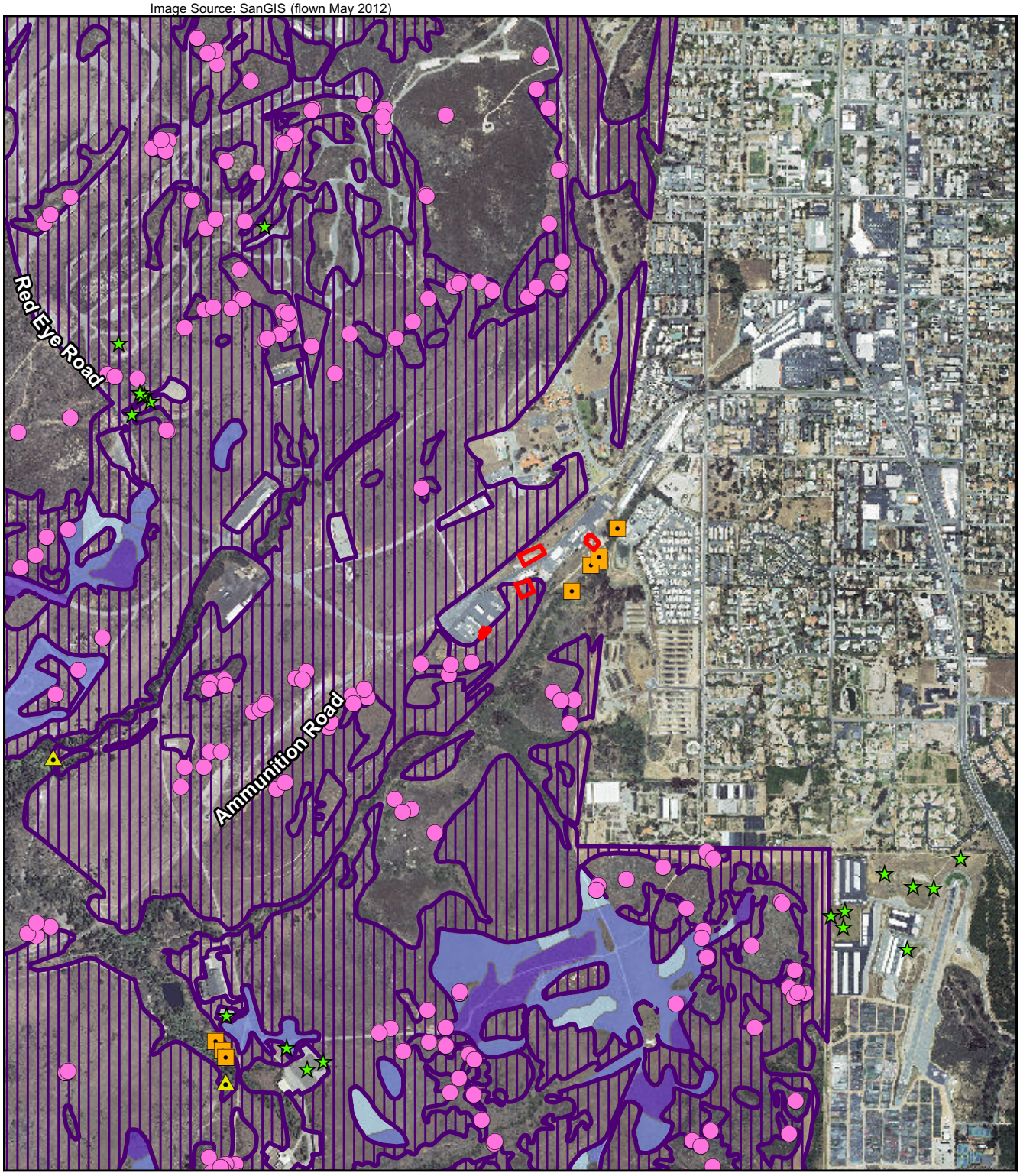
4.3.1 Coastal California Gnatcatcher

On March 30, 1993, the USFWS listed the coastal California gnatcatcher as threatened (USFWS 1993) pursuant to the federal Endangered Species Act (ESA) of 1973 as amended.

4.3.1.1 Life History

The coastal California gnatcatcher is a small slate-colored bird with a long, black tail that is edged and tipped with white, which it flicks erratically as it perches. The bird has a distinct kitten-like mewing call, which distinguishes the California gnatcatcher from the black-tailed gnatcatcher (*Polioptila melanura*) (Atwood and Bontrager 2001). During the breeding season, the male develops a black cap that distinguishes it from the female. The coastal California gnatcatcher is a nonmigratory songbird found on the coastal slopes of southern California. It ranges from Ventura County south to northwest Baja California, Mexico (Atwood 1990; Jones and Ramirez 1995). The breeding season of the coastal California gnatcatcher extends from late February through August with the peak of nesting occurring from mid-March through mid-May. The breeding territory size of the coastal California gnatcatcher ranges from 2 to 14 acres, with home ranges expanding from 13 to 39 acres during the non-breeding season (USFWS 1993). Nest parasitism by brown-headed cowbirds (*Molothrus ater*) has

Image Source: SanGIS (flown May 2012)



Action Area

Historic Occurrences

- Stephens' Kangaroo Rat
- Coastal California Gnatcatcher
- Least Bell's Vireo
- Southwestern Willow Flycatcher

SKR Occupied Habitat Density

- Medium
- Low
- Trace
- Suitable/Unoccupied SKR Habitat

0 Feet 1,500

FIGURE 5

IR Sites 30, 31, and 32 Action Areas and Threatened and Endangered Species Historic Occurrences

RECON

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been documented (Unitt 2004). Typically, there is a high rate of nest failure each breeding season. This is offset by rapid and persistent re-nesting efforts; a breeding pair may attempt to nest as many as ten times in a year, producing up to three successful broods in a season (Atwood and Bontrager 2001). There is evidence that this bird is also susceptible to nest predation by various animals such as snakes, coyotes (*Canis latrans*), fox, rodents, and other birds, such as western scrub-jays (*Aphelocoma californica*) (Atwood 1990).

The coastal California gnatcatcher is strongly associated with coastal sage scrub habitats below 820 feet in coastal areas and between 820 and 1,640 feet in inland areas (Atwood and Bolsinger 1992); however, not all types of coastal sage scrub communities are used or preferred. This bird appears to be most abundant in areas dominated by California sagebrush (*Artemisia californica*) and California buckwheat (*Eriogonum fasciculatum*) (Unitt 2004).The bird's numbers are generally low in coastal habitats dominated by black sage (*Salvia mellifera*), white sage (*Salvia apiana*), or lemonadeberry (*Rhus integrifolia*); in inland areas, habitats dominated by black sage may be used more regularly (Atwood and Bontrager 2001).

4.3.1.2 Distribution

Population estimates for the coastal California gnatcatcher vary. Atwood (1992) estimated that 1,811 to 2,291 pairs of coastal California gnatcatchers existed in 1992 throughout its range in southern California. In 1996, the USFWS estimated the population in San Diego County at 3,000 pairs, excluding pairs located on sites where habitat loss had already been approved (Atwood and Bontrager 2001). According to a 1999 population estimate in San Diego and other southern California counties, the USFWS estimated the population in San Diego at 1,917 pairs, Orange County at 643 pairs, Los Angeles County at 144 pairs, San Bernardino County at 27 pairs, and Ventura County at 4 pairs (Atwood and Bontrager 2001).

4.3.1.3 Occurrence within IR Sites 30, 31, and 32

Coastal California gnatcatcher has been historically observed within the vicinity of IR Sites 30, 31, and 32, approximately 265 feet southwest of IR Site 30 (see Figure 5; Fallbrook 2014). Project activities on IR Site 31 will occur within areas that support disturbed coastal sage scrub. There is a potential for this area to support foraging coastal California gnatcatcher; however, none of the disturbed coastal sage scrub proposed to be impacted by the project activities is of suitable quality to support nesting.

4.3.2 Stephen's Kangaroo Rat

The Stephens' kangaroo rat was federally listed as endangered on September 30, 1988 (USFWS 1988).

4.3.2.1 Life History

Stephens' kangaroo rat is one of 19 species of kangaroo rats in North America. Kangaroo rat characteristics include large heads with external cheek pouches, small front legs, large hind legs, and long tails. Stephens' kangaroo rat is medium-sized with dusky cinnamon overfur and white underfur. The tail is crested and bicolored with a white band. Stephens' kangaroo rats differ from other *Dipodomys* in their range by making use of sparse habitat that is not favorable to other members of its genus (USFWS 1997). Habitat for the Stephens' kangaroo rat includes open grasslands, fallow agricultural fields, and sparse coastal sage scrub vegetation types in areas with penetrable soils and a flat to fairly steep sloping topography at elevations of 180 to 4,100 feet (USFWS 1997). The majority of Stephens' kangaroo rat populations are located at elevations below 2,000 feet. Habitat for the Stephens' kangaroo rat varies in composition and density from place to place and season to season, although areas with dense grass cover are not suitable for Stephens' kangaroo rat (USFWS 1997). Filaree (*Erodium* sp.) frequently dominates the best Stephens' kangaroo rat habitat, especially during and shortly after the rainy season (RECON 1989). Stephens' kangaroo rats are nocturnal and forage at night for seeds and fresh vegetation. Stephens' kangaroo rats breed in late spring and early summer. Population densities for Stephens' kangaroo rat are variable depending on rainfall and location and can vary from year to year at individual locations. The reported population density range is from 3 to 23 individuals per acre during the summer and 2 to 6 individuals per acre in the winter (USFWS 1997). O'Farrell and Uptain (1989, as cited in USFWS 1997) report that the majority of Stephens' kangaroo rat populations are of low to medium density, with less than four individuals per acre. Home range sizes are smaller for female Stephens' kangaroo rat than male Stephens' kangaroo rat. Female home ranges tend not to overlap, and male home ranges often overlap the home ranges of neighboring females. Home range size ranges from 0.1 to 0.4 acre (USFWS 1997).

4.3.2.2 Distribution

Stephens' kangaroo rat historically ranged from southwestern San Bernardino County south through Riverside County into San Diego County. Stephens' kangaroo rat may no longer be extant in San Bernardino County (USFWS 1997). The entire range of Stephens' kangaroo rat is estimated to encompass 1,108 square miles, which is considered small when compared to range distributions of other rodents and species of kangaroo rats (USFWS 1997). Currently, there are three distinct regions that support Stephens' kangaroo rat populations: western Riverside County and western and central San Diego County.

4.3.2.3 Occurrence within IR Sites 30, 31, and 32

A small amount of potentially suitable habitat exists within the action areas for IR Sites 30, 31, and 32. However, Stephen's kangaroo rats are not known to occur within the vicinity of these sites, and no

potential kangaroo rat sign was observed during biological surveys. In addition, trapping within the vicinity of these sites conducted by NAVWPNSTA Det Fallbrook biologists reported negative capture data for Stephen's kangaroo rat (R. Lockwood, pers. comm. 2014). Based on these findings Stephen's kangaroo rat is not expected to occur within the action areas of IR Sites 30, 31, and 32 and this species will not be discussed again until Chapter 6, Conclusion.

4.3.3 Least Bell's Vireo

Least Bell's vireo was federally listed as an endangered species on May 2, 1986 (USFWS 1986).

4.3.3.1 Life History

Least Bell's vireo is a small, nondescript vireo, with generally gray plumage, rounded wings with pale white wing bars and narrow white eye rings. Juveniles are distinguished from adults by whiter plumage and more distinct wing bars. This species has a distinctive song and is most easily located through its vocalizations. Least Bell's vireo is a migratory songbird that winters in Baja California, Mexico, arriving in California from mid-March to April and departing for Baja California again in September (Brown 1993). Breeding season generally ranges from March through July. Nests are commonly located on branches approximately 1.5–5 feet above the ground (Brown 1993). Most pairs produce only one brood per season but have been documented to produce up to four in one season (Franzreb 1989). Least Bell's vireo is parasitized throughout its breeding range by brown-headed cowbirds, which are the cause of a substantial proportion of nest failures (Brown 1993).

These birds are restricted to dense riparian habitats that usually have a canopy of willows (*Salix* spp.) and an understory comprised of mule fat (*Baccharis* sp.), wild rose (*Rosa californica*), and other riparian species (Franzreb 1989). Least Bell's vireos select riparian areas with dense shrub cover and a well-developed understory for nesting. Degradation of riparian habitat due to invasion by exotic plants, grazing practices, and other causes have decreased the amount of available habitat for least Bell's vireo.

4.3.3.2 Distribution

Least Bell's vireo was historically common, ranging from near Red Bluff in Tehama County south through the Central Valley and the foothills of the Sierra Nevada. In the coastal region this bird ranged from Santa Clara County south to San Fernando in Baja California. Desert sites include Owens Valley, Death Valley, and oases in the Mojave Desert (Franzreb 1989).

After 1940, extensive habitat loss and nest parasitism by the brown-headed cowbird caused the population to decline, and this species has been extirpated from many historic areas, including the Central Valley (Franzreb 1989). It has been estimated that 95–97 percent of the riparian habitat within the floodplain of southern California has been lost due to flood control measures and development (Faber et al. 1989). In

1986 when least Bell's vireo was listed as endangered, the total population in California was estimated at 300 pairs, with the majority of the birds located in San Diego County. Following the listing, intensive brown-headed cowbird trapping programs were initiated and the population began to increase, showing exponential growth in some locations such as the Santa Margarita River, Tijuana River, and Prado Basin and Hidden Valley Drain on the Santa Ana River. The population of least Bell's vireo in California was estimated to be 1,346 pairs in 1996 (USFWS 1998).

Currently, least Bell's vireo is known from coastal Santa Barbara County south into Baja California. Least Bell's vireo is also present in the desert of San Diego County. Large populations are located on the Santa Margarita River in San Diego County and Prado Basin in western Riverside County (USFWS 1998). In 2001, over 940 least Bell's vireo pairs were recorded in San Diego County (Kus 2001).

4.3.3.3 Occurrence within IR Sites 30, 31, and 32

Least Bell's vireo is not known to occur within IR Sites 30, 31, and 32 and there is no suitable breeding or foraging habitat within the action areas of any of the sites. However, Least Bell's vireo have been detected within Fallbrook Creek drainage system approximately 100 feet to the south (see Figure 5, Fallbrook 2014).

4.3.4 Southwestern Willow Flycatcher

Southwestern willow flycatcher is federally listed as endangered in 1995 (USFWS 1995).

4.3.4.1 Life History

Willow flycatchers are in the Tyrannidae family and are one of ten species of *Empidonax* flycatchers in the United States. *Empidonax* flycatchers are difficult to distinguish visually but have distinctive songs. The southwestern willow flycatcher is generally paler than other willow flycatcher subspecies and also differs in morphology. Southwestern willow flycatchers are migrants, arriving on their breeding grounds in mid-May to early June (Garrett and Dunn 1981; Unitt 2004). The southwestern willow flycatcher migrates from its breeding range in August or September. Several subspecies of willow flycatcher migrate through southern California, with the most common migrant being *E. t. brewsteri* (Unitt 2004). It is virtually impossible to differentiate between subspecies of willow flycatcher during migration.

The southwestern willow flycatcher requires riparian habitat with willow thickets (Grinnell and Miller 1944). Understory species include mule fat and arrow weed (*Pluchea* sp.). Southwestern willow flycatchers also nest in areas with tamarisk (*Tamarix* spp.) and Russian olive (*Eleagnus angustifolia*) in areas where these species have replaced the native willow. Surface water is required at nesting sites. Estimated nesting habitat patch size varies from 0.2 to 1.5 acres. Nests are constructed in densely vegetated thickets with trees between 13 and 23 feet in height (Tibbitts et al. 1994; USFWS 1995).

4.3.4.2 Distribution

The southwestern willow flycatcher breeds in southern California, Arizona, New Mexico, southern Nevada, southern Utah, western Texas, northwestern Mexico, and possibly southwestern Colorado and winters in Mexico, Central America, and possibly northern South America (USFWS 1995). Historically common in all the lower-elevation riparian areas of southern California, the southwestern willow flycatcher was found in the Los Angeles Basin, San Bernardino/Riverside County area, and San Diego County (Unitt 2004). Southwestern willow flycatcher persists in the Colorado, Owens, Kern, Mojave, Santa Ana, Santa Margarita, San Luis Rey, Santa Clara, Santa Ynez, Sweetwater, and San Dieguito river systems and in San Timeteo, Pilgrim, and Temecula creeks. Currently, permanent populations of southwestern willow flycatchers are located on the Santa Inez River in Santa Barbara County, the Kern River in Kern County, the Prado Basin in Riverside County, and the Santa Margarita River and San Luis Rey River in San Diego County.

4.3.4.3 Occurrence on within IR Sites 30, 31, and 32

Southwestern willow flycatcher is not known to occur within IR Sites 30, 31, and 32, and there is no suitable breeding or foraging habitat within the action areas of any of the sites. Historically, the nearest willow flycatchers detected were along Fallbrook Creek in 2001 and 2002, approximately 0.81 mile from the sites (see Figure 5, Fallbrook 2014). The riparian area located within 100 feet is not known to support this species. This species is not expected to be impacted by the proposed action and will not be further discussed in this document until the conclusion.

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5.0 Assessment of Potential Effects

5.1 Coastal California Gnatcatcher

Coastal California gnatcatcher has the potential to occur within the coastal sage scrub south of IR Sites 30, 31, and 32.

5.1.1. Direct Effects

All project activities are proposed to be completed outside of coastal California gnatcatcher breeding season. As mentioned in Section 3.3, if the Proposed Action is to take place during the breeding season, any work conducted near the coastal sage scrub habitat should have a pre-activity survey completed by a qualified wildlife biologist to determine if this species is present. As such, no direct effects are anticipated to coastal California gnatcatcher.

5.1.2 Indirect Effects

No trimming or removal of vegetation is proposed for the project that could affect the quality of habitat for this species; thus no indirect effects are anticipated to coastal California gnatcatcher.

5.1.3 Effects Analysis

Based on the preceding analysis concerning the effects of the Proposed Action on coastal California gnatcatcher, it has been determined that the Proposed Action will have no effect on coastal California gnatcatcher. This determination represents the net effect of all positive and negative influences associated with the Proposed Action. They thus represent the overall finding concerning the need to consult, pursuant to Section 7 of the ESA.

5.2 Least Bell's Vireo

Least Bell's vireo has the potential to occur within the riparian woodland southeast of IR Sites 30 and 31 and south of IR Site 32.

5.2.1 Direct Effects

All project activities are proposed to be completed outside of least Bell's vireo breeding season. As mentioned in Section 3.4, if the Proposed Action is to take place during the breeding season, any work conducted near the riparian habitat should have a pre-activity survey completed by a qualified wildlife

biologist to determine if this species is present. As such, no direct effects are anticipated to least Bell's vireo.

5.2.2 Indirect Effects

No trimming or removal of vegetation is proposed for the project that could affect the quality of habitat for this species; thus no indirect effects are anticipated to least Bell's vireo.

5.2.3 Effects Analysis

Based on the preceding analysis concerning the effects of the Proposed Action on least Bell's vireo, it has been determined that the Proposed Action will have no effect on least Bell's vireo. This determination represents the net effect of all positive and negative influences associated with the Proposed Action. They thus represent the overall finding concerning the need to consult, pursuant to Section 7 of the ESA.

6.0 Conclusion

Based on the impacts outlined by the Proposed Action, the impact avoidance, minimization and compensation measures, and effects determinations are shown below for each of the potentially affected species.

No Effect

- Coastal California gnatcatcher based on the presence of low quality habitat; avoidance through the implementation of breeding season restrictions; and pre-activity surveys if any work must be conducted during the breeding season.
- Least Bell's vireo based on avoidance through the implementation of breeding season restrictions and pre-activity surveys if any work must be conducted during the breeding season.
- Southwestern willow flycatcher based on the lack of suitable breeding and foraging habitat

Stephens' kangaroo rat based on the lack of presence of kangaroo rat sign, potentially suitable habitat, and negative trapping data

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Appendix C: IR Site 30 Technical Memorandum and Regulatory Request for Additional Assessment

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CALIFORNIA
Water Boards

EDMUND G. BROWN JR.
GOVERNOR

MATTHEW RODRIQUEZ
SECRETARY FOR
ENVIRONMENTAL PROTECTION

California Regional Water Quality Control Board, San Diego Region

December 1, 2014

In reply refer to / attn:
T10000004372:BGriffey

Department of the Navy
Naval Facilities Engineering Command Southwest
Attn: Ms. Ann Colt
1220 Pacific Highway
San Diego, California 92132-5190

Subject: Technical Memorandum IR Site 30, Naval Weapons Station (NWS) Seal Beach Detachment Fallbrook Located in Fallbrook, California

Ms. Colt:

The "Technical Memorandum IR Site 30, Naval Weapons Station (NWS) Seal Beach Detachment Fallbrook Located in Fallbrook, California" (Tech Memo) prepared by Trevet, dated October 10, 2014, was received by the California Regional Water Quality Control Board, San Diego Region (San Diego Water Board) via email on October 10, 2014. The Installation Restoration Program (IRP) Site 30 (Site) involves potentially contaminated soil associated with the historical temporary storage of "oil switches", transformers, and "oil-containing items" in former Building 230 (a.k.a. Equipment Shelter 4). Additionally, former Building 230, which consisted of a covered shelter without side walls, was used as a "transportation garage." According to Tech Memo, Attachment 2, several patches of stained asphalt were present within and required removal from former Building 230. To date, documentation of the performed response action(s) and soil confirmation findings have not been provided as requested by the United States Environmental Protection Agency. In the Tech Memo, the Department of the Navy (Navy) requests site closure with the designation of a no further action (NFA) status.

Based on the IRP Site 30 information provided by the Navy, it is the San Diego Water Board's position that there is insufficient information regarding the nature, duration, and location of historical activities conducted in former Building 230 to support the proposed NFA Status. Additionally, information regarding the nature and extent of Site waste, Site conditions, and the performed historical response action(s), including potential soil contamination below the concrete slab and runoff of contaminants from the concrete slab to the surrounding soil, has not been submitted and are required to support the proposed NFA Status. It is the San Diego Water Board's position that additional environmental activities are warranted at IR Site 30 to address outstanding environmental issues. The San Diego Water Board's position was recently conveyed to the Navy staff and management during several phone conversations and meetings, and in several emails. The San Diego Water Board anticipates that the Navy will

issue an IRP Site 30 environmental work plan in the near future that will address outstanding environmental issues.

The San Diego Water Board appreciates Navy's time and efforts addressing potentially contaminated environmental media at IRP Site 30, and looks forward to continuing to assist the Navy with environmental issues at IRP Site 30 and other contaminated sites within Naval Weapons Station Seal Beach, Detachment Fallbrook boundaries. In the subject line of any response pertaining to IRP Site 30, please include the reference number T10000004372:BGriffey. For questions or comments, I may be reached by phone at (619) 521-3342, or by email at BGriffey@waterboards.ca.gov.

Respectfully,

Beatrice Griffey

Beatrice Griffey, M.Sc., PG
Engineering Geologist
Northern Cleanup Unit

BG:bdk:bg

cc:
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California Environmental Protection Agency
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Trevet
Attn: Messrs. Matt Fuller and Robert Breglio
9888 Carroll Centre Road, Suite 228
San Diego, California 92126

Tech Staff Info & Use	
GeoTracker ID	T10000004372

DEPARTMENT OF THE NAVY
NAVAL WEAPONS STATION SEAL BEACH
800 SEAL BEACH BOULEVARD
SEAL BEACH, CA 90740-5000

IN REPLY REFER TO:
5090
Ser 45W/0162
17 Oct 2014

California Environmental Protection Agency
Department of Toxic Substances Control
5796 Corporate Avenue
Cypress, CA 90630

Attention: Mr. Stephen Niou

Ladies and Gentlemen:

The enclosed is forwarded for your review. Please forward your response by November 17, 2014. Ms. Beatrice Griffey with the Regional Water Quality Control Board had requested as-built drawings of Building 230 where Site 30 is located. We have requested these drawings from Fallbrook Public Works and they will be forwarded to you as soon as they are available.

If you have any questions, please contact Dr. Margaret Wallerstein at (562) 626-7838.

Sincerely,

PEI-FEN TAMASHIRO
Installation Restoration Coordinator
By direction of the
Commanding Officer

Enclosure: 1. Technical Memorandum, IR Site 30 Naval Weapons Station Seal Beach Detachment Fallbrook, Fallbrook, CA, dated October 2014.

Copy to:
Naval Facilities Engineering Command
Southwest
Attention: Brenda Reese
1220 Pacific Highway
San Diego, CA 92132-5190

DEPARTMENT OF THE NAVY
NAVAL WEAPONS STATION SEAL BEACH
800 SEAL BEACH BOULEVARD
SEAL BEACH, CA 90740-5000

IN REPLY REFER TO:
5090
Ser 45W/0163
17 Oct 2014

San Diego Regional Water Quality Control Board
9174 Sky Park Court, Ste. 100
San Diego, CA 92123-4353

Attention: Ms. Beatrice Griffey

Ladies and Gentlemen:

The enclosed is forwarded for your review. Please forward your response by November 17, 2014. The Regional Water Quality Control Board had requested as-built drawings of Building 230 where Site 30 is located. We have requested these drawings from Fallbrook Public Works and they will be forwarded to you as soon as they are available.

If you have any questions, please contact Dr. Margaret Wallerstein at (562) 626-7838.

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9888 Carroll Centre Road, Suite 228 • San Diego, California 92126
T (858) 578-8859 • F (858) 578-8693
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TREVET

Technical Memorandum

Prepared For: U.S. Department of the Navy, Naval Facilities Engineering Command Southwest

Project Name: IR Site 30 Naval Weapons Station (NWS) Seal Beach Detachment Fallbrook located in Fallbrook, California.

Contract No: N62473-10-D-4009

DCN: CBI-4009-0096-1976

Date: October 2014

To: Ann Colt, RPM

From: John Willis, Project Manager

Subject: Request for closure of IR Site 30 with No Further Action

Prepared by: _____
Matt Fuller
Environmental Scientist

Reviewed by: _____
Robert A. Breglio, P.G. 7907
Principal Geologist

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1. Introduction

This Technical Memorandum documents the Navy's request for closure with No Further Action of IR Site 30 at Naval Weapons Station (NWS) Seal Beach Detachment Fallbrook located in Fallbrook, California (Figure 1). This technical memorandum was prepared for the Naval Facilities Engineering Command Southwest, under U.S. Department of the Navy Contract No. N62473-10-D-4009, Task Order Number 0103.

1.1 Background

IR Site 30 is located at the NWS Seal Beach Detachment Fallbrook and covers the area where approximately 1 pint of switch oil spilled onto the ground in the far southeast end of the former Building 230 footprint (Figure 2). The location shown on Figure 2 represents the Navy's best estimate of the possible location of the spill. It is anticipated that a spill of this quantity would create a stain on the asphalt paving approximately 4 feet in diameter. The spill was observed in February of 1984 in an area where approximately six switches and several transformers were stored awaiting disposal by personnel at Marine Corps Base Camp Pendleton (NEESA 1985). Three of the six switches were labeled as containing PCBs but it is unknown whether the spill was from these switches or if the oil spilled even contained PCBs (NEESA 1985). At the time of the spill, the garage area within former Building 230 was paved with asphalt and was used for the storage of oil-containing items. Since the oil potentially contained PCB, the oil stained asphalt was removed and disposed of through the Defense Reutilization and Marketing Office (DRMO) later in the year (NEESA 1990).

The Preliminary Assessment (PA) for NWS Seal Beach Detachment Fallbrook (NEESA 1985) recommended no further action under the Navy Assessment and Control of Installation Pollutants (NACIP) program since the spill was cleaned up removing the potential threat to human health or the environment. The United Stated Environmental Protection Agency agreed with the recommendation, however, requested further documentation on the cleanup. The California Department of Health Services did not agree with the no further action recommendation and requested additional work be performed prior to site closure (NEESA 1990).

Since 1984, Building 230 has been demolished, the area where former Building 230 once stood was repaved, and the area has been converted into a RV storage area. The newer asphalt in the former Building 230 footprint can be observed in aerial photos (Figure 2) in contrast to the asphalt that is located around the former Building 230 area.

2. Historical Document Review and Personal Interview

A historical document review and a personal interview were conducted in an effort to obtain additional data to support closure of the Site.

2.1 Historical Document Review

In July of 2014 a review of historical data was conducted at the Mary Wilson Public Library located in Seal Beach, California. Multiple documents regarding NWS Seal Beach Detachment Fallbrook were

identified; however, no additional information regarding IR Site 30 or the previous uses of the Building was located.

2.2 Personal Interview

In August of 2014, an interview (Attachment 2) was conducted with a Navy employee, Mr. Kevin Bourelle, who was onsite and involved in the removal action conducted in 1984. Mr. Bourelle confirmed that a removal of asphalt was conducted at the Site and that he was on-site during the asphalt removal. Mr. Bourelle also remembered the areas identified for removal were marked with white paint prior to removal and that he did not remember seeing any staining on the asphalt. Additionally, Mr. Bourelle did not remember the size or quantity of asphalt removed but did indicate that the removed asphalt was placed in drums for disposal (K. Bourelle, personal interview 2014).

3. Conclusions and Recommendations

During 1984, approximately 1 pint of switch oil was spilled on the asphalt in the far southeast end of former Building 230. This switch oil may have contained PCBs since some of the nearby switches had a label indicating that their oil contained PCBs. Later in the year, the stained asphalt was removed by the Navy and disposed of in drums. The location of the former spill is unknown aside from a statement in the PA indicating the spill occurred in the far southeast end of former Building 230.

The Navy is requesting closure with no further action because:

- The volume of switch oil that was documented as being spilled (approximately 1 pint) was relatively small.
- The switch oil potentially did not contain PCBs.
- It has been confirmed that a removal of the stained asphalt was conducted in 1984.
- The removal of the stained asphalt would have likely removed the bulk, if not all, of the spilled switch oil.
- The location of the spill area and asphalt removal is not precisely known.
- The area of potential impact is small.

4. References

Bourelle, Kevin. 2014. Personal Interview. August.

NEESA (Naval Energy and Environment Support Activity). 1985. Preliminary Assessment (*Initial Assessment Study) of Naval Weapons Station Seal Beach, California*. February.

——. 1990. *Addendum to the Preliminary Assessment (Initial Assessment Study) of Naval Weapons Station Seal Beach, California. Part II Fallbrook Annex*. August.

Attachment 1

Figure 1 and Figure 2

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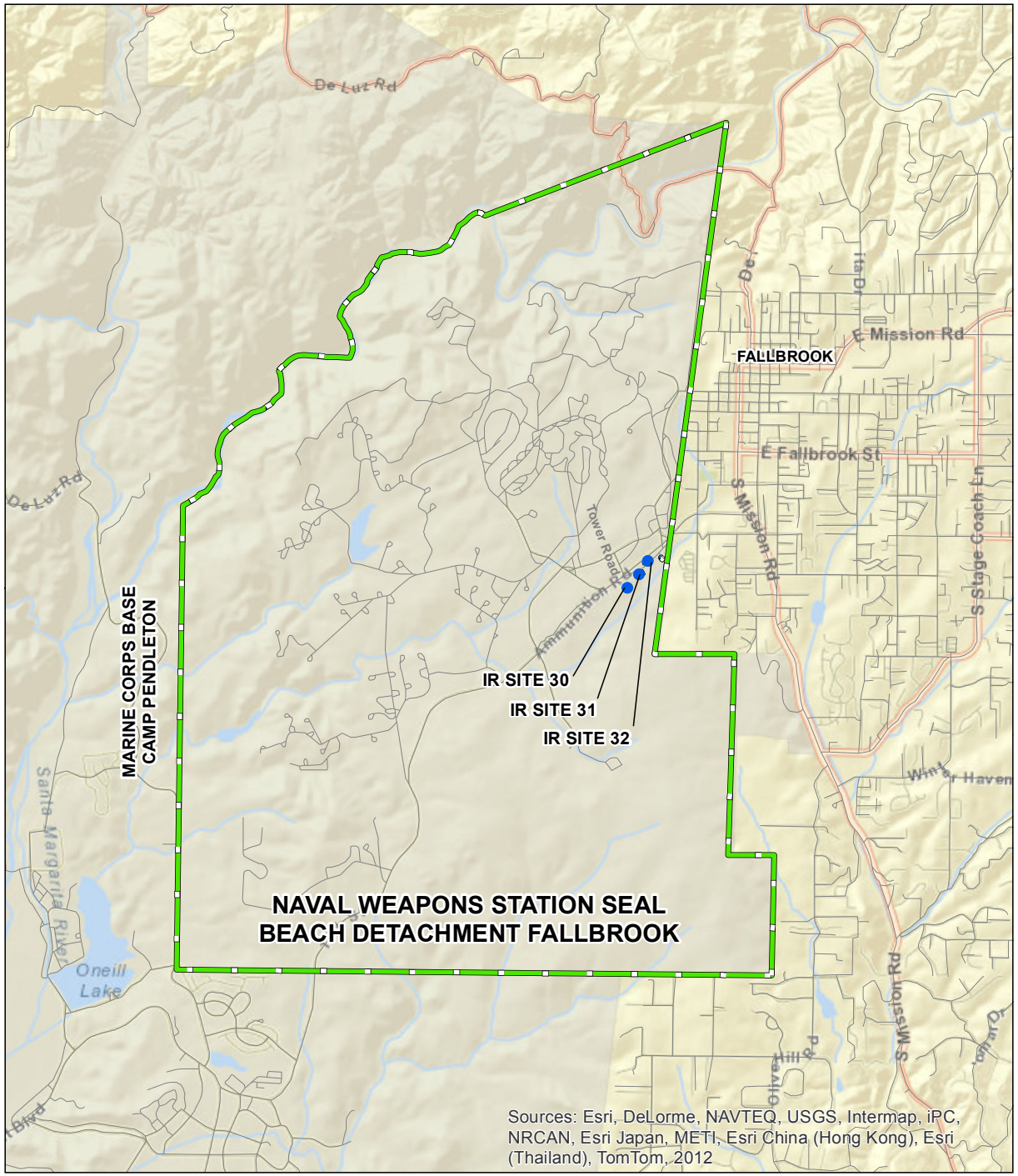
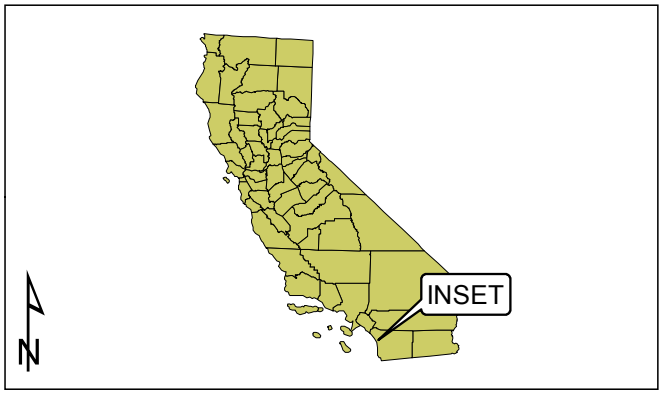
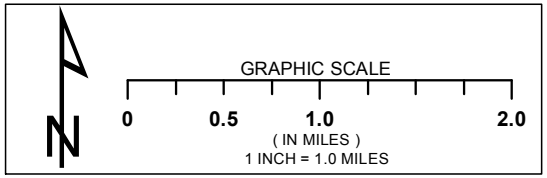




LEGEND

IR SITE BOUNDARY

NAVAL WEAPONS STATION SEAL BEACH DETACHMENT FALLBROOK



DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND

SAN DIEGO, CALIFORNIA

NAVAL WEAPONS STATION SEAL BEACH
DETACHMENT FALLBROOK
FALLBROOK, CALIFORNIA

FIGURE 1

SITE LOCATION MAP

TREVET

DATE: OCTOBER 2014

CONTRACT NO.: N62473-10-D-4009
DELIVERY ORDER: 0096

Path: N:\GIS_Projects\Fallbrook\Figs_WorkPlan_30-31-32_10-14\Fig1_site_10-14.mxd

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NOTE:
THE PA REPORT INDICATES THAT APPROXIMATELY ONE (1) PINT OF SWITCH OIL WAS SPILLED IN THE FAR SOUTHEAST PORTION OF FORMER BUILDING 230 AND THAT THE SWITCH OIL POTENTIALLY CONTAINED PCBS. AT THE TIME OF THE SPILL, THE STORAGE AREA HAD AN ASPHALT SURFACE. SUBSEQUENT TO THE SPILL THE STAINED ASPHALT WAS REMOVED, ALTHOUGH THE EXACT LOCATION OF THE SPILL/REMOVAL IS UNKNOWN.

LEGEND

FORMER BUILDING 230 FOOTPRINT

POTENTIAL LOCATION OF SWITCH OIL SPILL

SOURCE:
BING MAPS STREET AND AERIAL IMAGE
ENVIRONMENTAL SYSTEMS RESEARCH INSTITUTE (ESRI) USA
SPATIAL FEATURE CLASSES, SANGIS SPATIAL FEATURE CLASSES

N

GRAPHIC SCALE

0 25 50 100

(IN FEET)
1 INCH = 50 FEET

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND

SAN DIEGO, CALIFORNIA

NAVFAC Naval Facilities Engineering Command NAVFAC SOUTHWEST

NAVAL WEAPONS STATION SEAL BEACH
DETACHMENT FALLBROOK
FALLBROOK, CALIFORNIA

FIGURE 2

IR SITE 30

TREVET

DATE: OCTOBER 2014

CONTRACT NO.: N62473-10-D-4009
DELIVERY ORDER: 0096

Document Path: N:\GIS_Projects\Fallbrook\Figs_WorkPlan_30-31-32_10-14\Fig2_ir30_probor_10-14.mxd

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Attachment 2

Personal Interview of On-Site Worker during Removal: Kevin Bourelle

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Interview: Mr. Matt Fuller of Trevet Environmental conducted a personal interview with Mr. Kevin Bourelle of NWS Seal Beach Detachment Fallbrook.
Subject: A removal of stained asphalt at former Building 230 at NWS Seal Beach Detachment Fallbrook in 1984.
Date: August 22, 2014

Question	Answer
Were you on-site during asphalt removal at former Building 230 at NAS Fallbrook in February of 1984?	Yes.
Do you remember any staining on the asphalt?	No, I do recall removal areas being marked out with white paint.
Do you remember if there was soil or road base under the removed asphalt?	No
Do you remember if there was any staining on the soil or road base below the asphalt?	No
Do you remember how the asphalt was disposed of?	I recall it being drummed.
Do you remember if any soil samples were collected in the material below the removed asphalt?	No
Do you remember if there was any documentation for the removal?	No
Do you remember the approximate quantity of removed asphalt (size)?	No
Do you remember if there was any odor associated with the asphalt removal? Any odor in soil/road base?	No
Is there any additional information that you remember that may be useful?	Prior to demolition of that facility I also recall seeing the patches where asphalt was removed and I recall seeing some patched circular areas, maybe an inch in diameter within the floor space. I recall having a discussion with whomever I was with at the time regarding why it looked the way it did and what the area was formerly used for.

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Appendix D: IR Site 32 Data as Reported in the SI

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TABLE 7-1: SUMMARY OF SOIL ANALYTICAL RESULTS COMPARED WITH SCREENING CRITERIA FOR IRP SITE 32

Naval Weapons Station Seal Beach Detachment Fallbrook, Fallbrook, California

Sample depth from 0 to 10 feet below ground surface

Analyte	Detection Frequency	Minimum Detected Result	Maximum Detected Result	Location of Maximum Detected Result	Range of Detection Limits	Residential Screening Criteria	Number of Detections Above Residential Screening Criteria	Industrial Screening Criteria	Number of Detections Above Industrial Screening Criteria	Ecological Screening Criteria	Number of Detections Above Ecological Screening Criteria
Volatile Organic Compounds (mg/kg)											
M,P-XYLENE	1/20	0.0083 J	0.0083 J	IRP32-SS02	0.015 - 0.015	600	0	2,600	0	0.050	0
TOLUENE	1/20	0.0056 J	0.0056 J	IRP32-SS11	0.0052 - 0.0052	5,000	0	46,000	0	200	0
Semivolatile Organic Compounds (mg/kg)											
None Detected	0/ 20	ND	ND	-	-	-	-	-	-	-	-
Metals (mg/kg)											
ALUMINUM	20/20	6,800	14,000	IRP32-SS05	100 - 112	77,000	0	990,000	0	50.0	**20**
ANTIMONY	15/20	0.11 J	1.4 J	IRP32-SS02	1.0 - 1.1	30.0	0	380	0	0.27	**8**
ARSENIC	20/20	0.98 J	10.5	IRP32-SS10	5.0 - 5.6	0.062	**20**	0.24	**20**	10.0	**1**
BARIUM	20/20	88.9	278	IRP32-SB01	5.0 - 5.6	5,200	0	63,000	0	330	0
BERYLLIUM	18/20	0.11 J	0.31 J	IRP32-SB01	0.50 - 0.56	16.0	0	190	0	10.0	0
CADMIUM	13/20	0.11 J	0.34 J	IRP32-SS02	0.50 - 0.56	1.7	0	7.5	0	0.36	0
CALCIUM	20/20	1,520	6,560	IRP32-SS05	100 - 112	NC	-	NC	-	NC	-
CHROMIUM-HEXAVALENT	20/20	7.1	23.6	IRP32-SB03	2.0 - 2.2	17.0	**1**	37.0	0	0.40	**20**
CHROMIUM-TOTAL	20/20	7.1	23.6	IRP32-SB03	2.0 - 2.2	280	0	1,400	0	0.40	**20**
COBALT	20/20	5.6	9.5	IRP32-SB01	1.0 - 1.1	23.0	0	300	0	20.0	0
COPPER	20/20	8.5	23.3	IRP32-SS02	2.0 - 2.2	3,000	0	38,000	0	28.0	0
IRON	20/20	12,500 J	23,100 J	IRP32-SB03	100 - 112	55,000	0	720,000	0	200	**20**
LEAD	20/20	1.3 J	107	IRP32-SS02	2.0 - 2.2	80.0	**3**	320	0	11.0	**7**
MAGNESIUM	20/20	3,530	5,430	IRP32-SB01, IRP32-SS01	100 - 112	NC	-	NC	-	NC	-
MANGANESE	20/20	140	353	IRP32-SB01	2.5 - 2.8	1,800	0	23,000	0	220	**6**
MERCURY	5/20	0.068 J	0.30	IRP32-SB03	0.10 - 0.10	18.0	0	180	0	0.10	**4**
NICKEL	20/20	2.0	6.1	IRP32-SS09, IRP32-SS11	1.0 - 1.1	1,600	0	16,000	0	30.0	0
POTASSIUM	20/20	1,030	4,360	IRP32-SS04	100 - 112	NC	-	NC	-	NC	-
SELENIUM	9/20	0.10 J	0.18 J	IRP32-SB01	0.50 - 0.56	380	0	4,800	0	1.0	0
SILVER	2/20	0.12 J	0.17 J	IRP32-SS01	0.50 - 0.55	380	0	4,800	0	2.0	0
SODIUM	20/20	169	687	IRP32-SS05	100 - 112	NC	-	NC	-	NC	-
THALLIUM	20/20	0.11 J	0.66	IRP32-SS05	0.50 - 0.56	5.0	0	63.0	0	1.0	0
VANADIUM	20/20	31.9	83.2	IRP32-SB03	1.0 - 1.1	390	0	5,200	0	2.0	**20**

TABLE 7-1: SUMMARY OF SOIL ANALYTICAL RESULTS COMPARED WITH SCREENING CRITERIA FOR IRP SITE 32

Naval Weapons Station Seal Beach Detachment Fallbrook, Fallbrook, California

Sample depth from 0 to 10 feet below ground surface

Analyte	Detection Frequency	Minimum Detected Result	Maximum Detected Result	Location of Maximum Detected Result	Range of Detection Limits	Residential Screening Criteria	Number of Detections Above Residential Screening Criteria	Industrial Screening Criteria	Number of Detections Above Industrial Screening Criteria	Ecological Screening Criteria	Number of Detections Above Ecological Screening Criteria
Metals (mg/kg)											
ZINC	20/20	28.6	195	IRP32-SS02	10.0 - 11.2	23,000	0	100,000	0	46.0	**8**

Notes:
1. Data shown includes detected analytes in all soil samples. No QC or duplicate samples were identified.
2. Number of detections exceeding screening criteria is shown in bold.
3. Screening criteria sources are presented in Sections 6.1 (human-health) and 6.2 (ecological).
4. "Total" metals were measured at the Site. Given the uncertainties, total chromium was assessed by use of total and hexavalent chromium human health screening criteria.

-	Not applicable
IRP	Installation Restoration Program
J	Estimated value
mg/kg	Milligrams per kilogram
NC	No criteria
ND	None detected

TABLE 7-2: SOIL ANALYTICAL RESULTS EXCEEDING CRITERIA FOR IRP SITE 32

Naval Weapons Station Seal Beach Detachment Fallbrook, Fallbrook, California

Sample depth from 0 to 10 feet below ground surface

Analyte	Detected Concentration	Point ID	Sample ID	Sample Depth (feet)	Sample Collection Date	Laboratory Reporting Limit	Residential Screening Criteria	Industrial Screening Criteria	Ecological Screening Criteria
Metals (mg/kg)									
ALUMINUM	13,700	IRP32-SB01	IRP32-SB01(0-2)	0.00 - 2.00	11/19/08	104	77,000	990,000	**50.0**
ALUMINUM	13,200	IRP32-SB01	IRP32-SB01(4-6)	4.00 - 6.00	11/19/08	109	77,000	990,000	**50.0**
ALUMINUM	11,200	IRP32-SB01	IRP32-SB01(8-10)	8.00 - 10.00	11/19/08	104	77,000	990,000	**50.0**
ALUMINUM	12,800	IRP32-SB02	IRP32-SB02(0-2)	0.00 - 2.00	11/19/08	101	77,000	990,000	**50.0**
ALUMINUM	11,300	IRP32-SB02	IRP32-SB02(4-6)	4.00 - 6.00	11/19/08	103	77,000	990,000	**50.0**
ALUMINUM	9,570	IRP32-SB02	IRP32-SB02(8-10)	8.00 - 10.00	11/19/08	103	77,000	990,000	**50.0**
ALUMINUM	10,200	IRP32-SB03	IRP32-SB03(0-2)	0.00 - 2.00	11/19/08	101	77,000	990,000	**50.0**
ALUMINUM	12,400	IRP32-SB03	IRP32-SB03(4-6)	4.00 - 6.00	11/19/08	105	77,000	990,000	**50.0**
ALUMINUM	10,800	IRP32-SB03	IRP32-SB03(8-10)	8.00 - 10.00	11/19/08	107	77,000	990,000	**50.0**
ALUMINUM	11,300	IRP32-SS01	IRP32-SS01	0.00 - 2.00	11/19/08	101	77,000	990,000	**50.0**
ALUMINUM	9,420	IRP32-SS02	IRP32-SS02	0.00 - 2.00	11/19/08	101	77,000	990,000	**50.0**
ALUMINUM	6,800	IRP32-SS03	IRP32-SS03	0.00 - 2.00	11/19/08	100	77,000	990,000	**50.0**
ALUMINUM	9,340	IRP32-SS04	IRP32-SS04	0.00 - 2.00	11/19/08	101	77,000	990,000	**50.0**
ALUMINUM	14,000	IRP32-SS05	IRP32-SS05	0.00 - 2.00	11/19/08	104	77,000	990,000	**50.0**
ALUMINUM	8,180	IRP32-SS06	IRP32-SS06	0.00 - 2.00	11/19/08	104	77,000	990,000	**50.0**
ALUMINUM	8,030	IRP32-SS07	IRP32-SS07	0.00 - 2.00	11/19/08	104	77,000	990,000	**50.0**
ALUMINUM	10,300	IRP32-SS08	IRP32-SS08	0.00 - 2.00	11/20/08	102	77,000	990,000	**50.0**
ALUMINUM	10,200	IRP32-SS09	IRP32-SS09	0.00 - 2.00	11/20/08	105	77,000	990,000	**50.0**
ALUMINUM	10,500	IRP32-SS10	IRP32-SS10	0.00 - 2.00	11/20/08	112	77,000	990,000	**50.0**
ALUMINUM	11,600	IRP32-SS11	IRP32-SS11	0.00 - 2.00	11/20/08	104	77,000	990,000	**50.0**
ANTIMONY	0.45 J	IRP32-SB01	IRP32-SB01(0-2)	0.00 - 2.00	11/19/08	1.0	30.0	380	**0.27**
ANTIMONY	0.53 J	IRP32-SB02	IRP32-SB02(0-2)	0.00 - 2.00	11/19/08	1.0	30.0	380	**0.27**
ANTIMONY	0.61 J	IRP32-SB03	IRP32-SB03(0-2)	0.00 - 2.00	11/19/08	1.0	30.0	380	**0.27**
ANTIMONY	0.35 J	IRP32-SB03	IRP32-SB03(4-6)	4.00 - 6.00	11/19/08	1.1	30.0	380	**0.27**
ANTIMONY	1.4 J	IRP32-SS02	IRP32-SS02	0.00 - 2.00	11/19/08	1.0	30.0	380	**0.27**
ANTIMONY	0.75 J	IRP32-SS03	IRP32-SS03	0.00 - 2.00	11/19/08	1.0	30.0	380	**0.27**
ANTIMONY	0.61 J	IRP32-SS04	IRP32-SS04	0.00 - 2.00	11/19/08	1.0	30.0	380	**0.27**
ANTIMONY	0.47 J	IRP32-SS08	IRP32-SS08	0.00 - 2.00	11/20/08	1.0	30.0	380	**0.27**
ARSENIC	0.98 J	IRP32-SB01	IRP32-SB01(0-2)	0.00 - 2.00	11/19/08	5.2	**0.062**	**0.24**	10.0

TABLE 7-2: SOIL ANALYTICAL RESULTS EXCEEDING CRITERIA FOR IRP SITE 32 (Continued)

Naval Weapons Station Seal Beach Detachment Fallbrook, Fallbrook, California

Sample depth from 0 to 10 feet below ground surface

Analyte	Detected Concentration	Point ID	Sample ID	Sample Depth (feet)	Sample Collection Date	Laboratory Reporting Limit	Residential Screening Criteria	Industrial Screening Criteria	Ecological Screening Criteria
Metals (mg/kg)									
ARSENIC	1.4 J	IRP32-SB01	IRP32-SB01(4-6)	4.00 - 6.00	11/19/08	5.5	**0.062**	**0.24**	10.0
ARSENIC	1.1 J	IRP32-SB01	IRP32-SB01(8-10)	8.00 - 10.00	11/19/08	5.2	**0.062**	**0.24**	10.0
ARSENIC	1.6 J	IRP32-SB02	IRP32-SB02(0-2)	0.00 - 2.00	11/19/08	5.1	**0.062**	**0.24**	10.0
ARSENIC	1.1 J	IRP32-SB02	IRP32-SB02(4-6)	4.00 - 6.00	11/19/08	5.2	**0.062**	**0.24**	10.0
ARSENIC	1.4 J	IRP32-SB02	IRP32-SB02(8-10)	8.00 - 10.00	11/19/08	5.2	**0.062**	**0.24**	10.0
ARSENIC	1.8 J	IRP32-SB03	IRP32-SB03(0-2)	0.00 - 2.00	11/19/08	5.0	**0.062**	**0.24**	10.0
ARSENIC	1.2 J	IRP32-SB03	IRP32-SB03(4-6)	4.00 - 6.00	11/19/08	5.2	**0.062**	**0.24**	10.0
ARSENIC	2.4 J	IRP32-SB03	IRP32-SB03(8-10)	8.00 - 10.00	11/19/08	5.4	**0.062**	**0.24**	10.0
ARSENIC	1.3 J	IRP32-SS01	IRP32-SS01	0.00 - 2.00	11/19/08	5.0	**0.062**	**0.24**	10.0
ARSENIC	1.5 J	IRP32-SS02	IRP32-SS02	0.00 - 2.00	11/19/08	5.0	**0.062**	**0.24**	10.0
ARSENIC	1.6 J	IRP32-SS03	IRP32-SS03	0.00 - 2.00	11/19/08	5.0	**0.062**	**0.24**	10.0
ARSENIC	1.4 J	IRP32-SS04	IRP32-SS04	0.00 - 2.00	11/19/08	5.0	**0.062**	**0.24**	10.0
ARSENIC	1.8 J	IRP32-SS05	IRP32-SS05	0.00 - 2.00	11/19/08	5.2	**0.062**	**0.24**	10.0
ARSENIC	1.6 J	IRP32-SS06	IRP32-SS06	0.00 - 2.00	11/19/08	5.2	**0.062**	**0.24**	10.0
ARSENIC	2.3 J	IRP32-SS07	IRP32-SS07	0.00 - 2.00	11/19/08	5.2	**0.062**	**0.24**	10.0
ARSENIC	1.8 J	IRP32-SS08	IRP32-SS08	0.00 - 2.00	11/20/08	5.1	**0.062**	**0.24**	10.0
ARSENIC	2.3 J	IRP32-SS09	IRP32-SS09	0.00 - 2.00	11/20/08	5.2	**0.062**	**0.24**	10.0
ARSENIC	10.5	IRP32-SS10	IRP32-SS10	0.00 - 2.00	11/20/08	5.6	**0.062**	**0.24**	**10.0**
ARSENIC	2.6 J	IRP32-SS11	IRP32-SS11	0.00 - 2.00	11/20/08	5.2	**0.062**	**0.24**	10.0
CHROMIUM-HEXAVALENT	7.1	IRP32-SB01	IRP32-SB01(0-2)	0.00 - 2.00	11/19/08	2.1	17.0	37.0	**0.40**
CHROMIUM-HEXAVALENT	16.2	IRP32-SB01	IRP32-SB01(4-6)	4.00 - 6.00	11/19/08	2.2	17.0	37.0	**0.40**
CHROMIUM-HEXAVALENT	15.5	IRP32-SB01	IRP32-SB01(8-10)	8.00 - 10.00	11/19/08	2.1	17.0	37.0	**0.40**
CHROMIUM-HEXAVALENT	11.7	IRP32-SB02	IRP32-SB02(0-2)	0.00 - 2.00	11/19/08	2.0	17.0	37.0	**0.40**
CHROMIUM-HEXAVALENT	12.9	IRP32-SB02	IRP32-SB02(4-6)	4.00 - 6.00	11/19/08	2.1	17.0	37.0	**0.40**
CHROMIUM-HEXAVALENT	8.2	IRP32-SB02	IRP32-SB02(8-10)	8.00 - 10.00	11/19/08	2.1	17.0	37.0	**0.40**
CHROMIUM-HEXAVALENT	23.6	IRP32-SB03	IRP32-SB03(0-2)	0.00 - 2.00	11/19/08	2.0	**17.0**	37.0	**0.40**
CHROMIUM-HEXAVALENT	14.3	IRP32-SB03	IRP32-SB03(4-6)	4.00 - 6.00	11/19/08	2.1	17.0	37.0	**0.40**
CHROMIUM-HEXAVALENT	13.2	IRP32-SB03	IRP32-SB03(8-10)	8.00 - 10.00	11/19/08	2.2	17.0	37.0	**0.40**
CHROMIUM-HEXAVALENT	8.6	IRP32-SS01	IRP32-SS01	0.00 - 2.00	11/19/08	2.0	17.0	37.0	**0.40**

TABLE 7-2: SOIL ANALYTICAL RESULTS EXCEEDING CRITERIA FOR IRP SITE 32 (Continued)

Naval Weapons Station Seal Beach Detachment Fallbrook, Fallbrook, California

Sample depth from 0 to 10 feet below ground surface

Analyte	Detected Concentration	Point ID	Sample ID	Sample Depth (feet)	Sample Collection Date	Laboratory Reporting Limit	Residential Screening Criteria	Industrial Screening Criteria	Ecological Screening Criteria
Metals (mg/kg)									
CHROMIUM-HEXAVALENT	16.9	IRP32-SS02	IRP32-SS02	0.00 - 2.00	11/19/08	2.0	17.0	37.0	**0.40**
CHROMIUM-HEXAVALENT	14.5	IRP32-SS03	IRP32-SS03	0.00 - 2.00	11/19/08	2.0	17.0	37.0	**0.40**
CHROMIUM-HEXAVALENT	12.5	IRP32-SS04	IRP32-SS04	0.00 - 2.00	11/19/08	2.0	17.0	37.0	**0.40**
CHROMIUM-HEXAVALENT	8.4	IRP32-SS05	IRP32-SS05	0.00 - 2.00	11/19/08	2.1	17.0	37.0	**0.40**
CHROMIUM-HEXAVALENT	8.9	IRP32-SS06	IRP32-SS06	0.00 - 2.00	11/19/08	2.1	17.0	37.0	**0.40**
CHROMIUM-HEXAVALENT	8.7	IRP32-SS07	IRP32-SS07	0.00 - 2.00	11/19/08	2.1	17.0	37.0	**0.40**
CHROMIUM-HEXAVALENT	11.2	IRP32-SS08	IRP32-SS08	0.00 - 2.00	11/20/08	2.0	17.0	37.0	**0.40**
CHROMIUM-HEXAVALENT	10.6	IRP32-SS09	IRP32-SS09	0.00 - 2.00	11/20/08	2.1	17.0	37.0	**0.40**
CHROMIUM-HEXAVALENT	8.1	IRP32-SS10	IRP32-SS10	0.00 - 2.00	11/20/08	2.2	17.0	37.0	**0.40**
CHROMIUM-HEXAVALENT	12.4	IRP32-SS11	IRP32-SS11	0.00 - 2.00	11/20/08	2.1	17.0	37.0	**0.40**
CHROMIUM-TOTAL	7.1	IRP32-SB01	IRP32-SB01(0-2)	0.00 - 2.00	11/19/08	2.1	280	1,400	**0.40**
CHROMIUM-TOTAL	16.2	IRP32-SB01	IRP32-SB01(4-6)	4.00 - 6.00	11/19/08	2.2	280	1,400	**0.40**
CHROMIUM-TOTAL	15.5	IRP32-SB01	IRP32-SB01(8-10)	8.00 - 10.00	11/19/08	2.1	280	1,400	**0.40**
CHROMIUM-TOTAL	11.7	IRP32-SB02	IRP32-SB02(0-2)	0.00 - 2.00	11/19/08	2.0	280	1,400	**0.40**
CHROMIUM-TOTAL	12.9	IRP32-SB02	IRP32-SB02(4-6)	4.00 - 6.00	11/19/08	2.1	280	1,400	**0.40**
CHROMIUM-TOTAL	8.2	IRP32-SB02	IRP32-SB02(8-10)	8.00 - 10.00	11/19/08	2.1	280	1,400	**0.40**
CHROMIUM-TOTAL	23.6	IRP32-SB03	IRP32-SB03(0-2)	0.00 - 2.00	11/19/08	2.0	280	1,400	**0.40**
CHROMIUM-TOTAL	14.3	IRP32-SB03	IRP32-SB03(4-6)	4.00 - 6.00	11/19/08	2.1	280	1,400	**0.40**
CHROMIUM-TOTAL	13.2	IRP32-SB03	IRP32-SB03(8-10)	8.00 - 10.00	11/19/08	2.2	280	1,400	**0.40**
CHROMIUM-TOTAL	8.6	IRP32-SS01	IRP32-SS01	0.00 - 2.00	11/19/08	2.0	280	1,400	**0.40**
CHROMIUM-TOTAL	16.9	IRP32-SS02	IRP32-SS02	0.00 - 2.00	11/19/08	2.0	280	1,400	**0.40**
CHROMIUM-TOTAL	14.5	IRP32-SS03	IRP32-SS03	0.00 - 2.00	11/19/08	2.0	280	1,400	**0.40**
CHROMIUM-TOTAL	12.5	IRP32-SS04	IRP32-SS04	0.00 - 2.00	11/19/08	2.0	280	1,400	**0.40**
CHROMIUM-TOTAL	8.4	IRP32-SS05	IRP32-SS05	0.00 - 2.00	11/19/08	2.1	280	1,400	**0.40**
CHROMIUM-TOTAL	8.9	IRP32-SS06	IRP32-SS06	0.00 - 2.00	11/19/08	2.1	280	1,400	**0.40**
CHROMIUM-TOTAL	8.7	IRP32-SS07	IRP32-SS07	0.00 - 2.00	11/19/08	2.1	280	1,400	**0.40**
CHROMIUM-TOTAL	11.2	IRP32-SS08	IRP32-SS08	0.00 - 2.00	11/20/08	2.0	280	1,400	**0.40**
CHROMIUM-TOTAL	10.6	IRP32-SS09	IRP32-SS09	0.00 - 2.00	11/20/08	2.1	280	1,400	**0.40**
CHROMIUM-TOTAL	8.1	IRP32-SS10	IRP32-SS10	0.00 - 2.00	11/20/08	2.2	280	1,400	**0.40**

TABLE 7-2: SOIL ANALYTICAL RESULTS EXCEEDING CRITERIA FOR IRP SITE 32 (Continued)

Naval Weapons Station Seal Beach Detachment Fallbrook, Fallbrook, California

Sample depth from 0 to 10 feet below ground surface

Analyte	Detected Concentration	Point ID	Sample ID	Sample Depth (feet)	Sample Collection Date	Laboratory Reporting Limit	Residential Screening Criteria	Industrial Screening Criteria	Ecological Screening Criteria
Metals (mg/kg)									
CHROMIUM-TOTAL	12.4	IRP32-SS11	IRP32-SS11	0.00 - 2.00	11/20/08	2.1	280	1,400	**0.40**
IRON	19,000 J	IRP32-SB01	IRP32-SB01(0-2)	0.00 - 2.00	11/19/08	104	55,000	720,000	**200**
IRON	21,800 J	IRP32-SB01	IRP32-SB01(4-6)	4.00 - 6.00	11/19/08	109	55,000	720,000	**200**
IRON	21,000 J	IRP32-SB01	IRP32-SB01(8-10)	8.00 - 10.00	11/19/08	104	55,000	720,000	**200**
IRON	18,600 J	IRP32-SB02	IRP32-SB02(0-2)	0.00 - 2.00	11/19/08	101	55,000	720,000	**200**
IRON	18,700 J	IRP32-SB02	IRP32-SB02(4-6)	4.00 - 6.00	11/19/08	103	55,000	720,000	**200**
IRON	19,400 J	IRP32-SB02	IRP32-SB02(8-10)	8.00 - 10.00	11/19/08	103	55,000	720,000	**200**
IRON	15,600 J	IRP32-SB03	IRP32-SB03(0-2)	0.00 - 2.00	11/19/08	101	55,000	720,000	**200**
IRON	20,100 J	IRP32-SB03	IRP32-SB03(4-6)	4.00 - 6.00	11/19/08	105	55,000	720,000	**200**
IRON	23,100 J	IRP32-SB03	IRP32-SB03(8-10)	8.00 - 10.00	11/19/08	107	55,000	720,000	**200**
IRON	18,300 J	IRP32-SS01	IRP32-SS01	0.00 - 2.00	11/19/08	101	55,000	720,000	**200**
IRON	16,600 J	IRP32-SS02	IRP32-SS02	0.00 - 2.00	11/19/08	101	55,000	720,000	**200**
IRON	12,900 J	IRP32-SS03	IRP32-SS03	0.00 - 2.00	11/19/08	100	55,000	720,000	**200**
IRON	16,800 J	IRP32-SS04	IRP32-SS04	0.00 - 2.00	11/19/08	101	55,000	720,000	**200**
IRON	12,500 J	IRP32-SS05	IRP32-SS05	0.00 - 2.00	11/19/08	104	55,000	720,000	**200**
IRON	12,900 J	IRP32-SS06	IRP32-SS06	0.00 - 2.00	11/19/08	104	55,000	720,000	**200**
IRON	12,700 J	IRP32-SS07	IRP32-SS07	0.00 - 2.00	11/19/08	104	55,000	720,000	**200**
IRON	15,600	IRP32-SS08	IRP32-SS08	0.00 - 2.00	11/20/08	102	55,000	720,000	**200**
IRON	14,800	IRP32-SS09	IRP32-SS09	0.00 - 2.00	11/20/08	105	55,000	720,000	**200**
IRON	15,200	IRP32-SS10	IRP32-SS10	0.00 - 2.00	11/20/08	112	55,000	720,000	**200**
IRON	16,700	IRP32-SS11	IRP32-SS11	0.00 - 2.00	11/20/08	104	55,000	720,000	**200**
LEAD	56.8	IRP32-SB02	IRP32-SB02(0-2)	0.00 - 2.00	11/19/08	2.0	80.0	320	**11.0**
LEAD	88.2	IRP32-SB03	IRP32-SB03(0-2)	0.00 - 2.00	11/19/08	2.0	**80.0**	320	**11.0**
LEAD	11.3	IRP32-SS01	IRP32-SS01	0.00 - 2.00	11/19/08	2.0	80.0	320	**11.0**
LEAD	107	IRP32-SS02	IRP32-SS02	0.00 - 2.00	11/19/08	2.0	**80.0**	320	**11.0**
LEAD	71.8	IRP32-SS03	IRP32-SS03	0.00 - 2.00	11/19/08	2.0	80.0	320	**11.0**
LEAD	80.3	IRP32-SS04	IRP32-SS04	0.00 - 2.00	11/19/08	2.0	**80.0**	320	**11.0**
LEAD	13.7	IRP32-SS08	IRP32-SS08	0.00 - 2.00	11/20/08	2.0	80.0	320	**11.0**
MANGANESE	353	IRP32-SB01	IRP32-SB01(4-6)	4.00 - 6.00	11/19/08	2.7	1,800	23,000	**220**

TABLE 7-2: SOIL ANALYTICAL RESULTS EXCEEDING CRITERIA FOR IRP SITE 32 (Continued)

Naval Weapons Station Seal Beach Detachment Fallbrook, Fallbrook, California

Sample depth from 0 to 10 feet below ground surface

Analyte	Detected Concentration	Point ID	Sample ID	Sample Depth (feet)	Sample Collection Date	Laboratory Reporting Limit	Residential Screening Criteria	Industrial Screening Criteria	Ecological Screening Criteria
Metals (mg/kg)									
MANGANESE	294	IRP32-SB02	IRP32-SB02(4-6)	4.00 - 6.00	11/19/08	2.6	1,800	23,000	**220**
MANGANESE	323	IRP32-SB03	IRP32-SB03(4-6)	4.00 - 6.00	11/19/08	2.6	1,800	23,000	**220**
MANGANESE	253	IRP32-SB03	IRP32-SB03(8-10)	8.00 - 10.00	11/19/08	2.7	1,800	23,000	**220**
MANGANESE	229	IRP32-SS02	IRP32-SS02	0.00 - 2.00	11/19/08	2.5	1,800	23,000	**220**
MANGANESE	223	IRP32-SS04	IRP32-SS04	0.00 - 2.00	11/19/08	2.5	1,800	23,000	**220**
MERCURY	0.12	IRP32-SB02	IRP32-SB02(0-2)	0.00 - 2.00	11/19/08	0.10	18.0	180	**0.10**
MERCURY	0.30	IRP32-SB03	IRP32-SB03(0-2)	0.00 - 2.00	11/19/08	0.10	18.0	180	**0.10**
MERCURY	0.24	IRP32-SS02	IRP32-SS02	0.00 - 2.00	11/19/08	0.10	18.0	180	**0.10**
MERCURY	0.13	IRP32-SS03	IRP32-SS03	0.00 - 2.00	11/19/08	0.10	18.0	180	**0.10**
VANADIUM	54.2	IRP32-SB01	IRP32-SB01(0-2)	0.00 - 2.00	11/19/08	1.0	390	5,200	**2.0**
VANADIUM	70.9	IRP32-SB01	IRP32-SB01(4-6)	4.00 - 6.00	11/19/08	1.1	390	5,200	**2.0**
VANADIUM	68.3	IRP32-SB01	IRP32-SB01(8-10)	8.00 - 10.00	11/19/08	1.0	390	5,200	**2.0**
VANADIUM	48.7	IRP32-SB02	IRP32-SB02(0-2)	0.00 - 2.00	11/19/08	1.0	390	5,200	**2.0**
VANADIUM	56.1	IRP32-SB02	IRP32-SB02(4-6)	4.00 - 6.00	11/19/08	1.0	390	5,200	**2.0**
VANADIUM	71.9	IRP32-SB02	IRP32-SB02(8-10)	8.00 - 10.00	11/19/08	1.0	390	5,200	**2.0**
VANADIUM	39.8	IRP32-SB03	IRP32-SB03(0-2)	0.00 - 2.00	11/19/08	1.0	390	5,200	**2.0**
VANADIUM	62.2	IRP32-SB03	IRP32-SB03(4-6)	4.00 - 6.00	11/19/08	1.1	390	5,200	**2.0**
VANADIUM	83.2	IRP32-SB03	IRP32-SB03(8-10)	8.00 - 10.00	11/19/08	1.1	390	5,200	**2.0**
VANADIUM	45.2	IRP32-SS01	IRP32-SS01	0.00 - 2.00	11/19/08	1.0	390	5,200	**2.0**
VANADIUM	43.0	IRP32-SS02	IRP32-SS02	0.00 - 2.00	11/19/08	1.0	390	5,200	**2.0**
VANADIUM	32.9	IRP32-SS03	IRP32-SS03	0.00 - 2.00	11/19/08	1.0	390	5,200	**2.0**
VANADIUM	43.5	IRP32-SS04	IRP32-SS04	0.00 - 2.00	11/19/08	1.0	390	5,200	**2.0**
VANADIUM	32.3	IRP32-SS05	IRP32-SS05	0.00 - 2.00	11/19/08	1.0	390	5,200	**2.0**
VANADIUM	31.9	IRP32-SS06	IRP32-SS06	0.00 - 2.00	11/19/08	1.0	390	5,200	**2.0**
VANADIUM	32.0	IRP32-SS07	IRP32-SS07	0.00 - 2.00	11/19/08	1.0	390	5,200	**2.0**
VANADIUM	42.4	IRP32-SS08	IRP32-SS08	0.00 - 2.00	11/20/08	1.0	390	5,200	**2.0**
VANADIUM	37.4	IRP32-SS09	IRP32-SS09	0.00 - 2.00	11/20/08	1.1	390	5,200	**2.0**
VANADIUM	34.6	IRP32-SS10	IRP32-SS10	0.00 - 2.00	11/20/08	1.1	390	5,200	**2.0**
VANADIUM	43.7	IRP32-SS11	IRP32-SS11	0.00 - 2.00	11/20/08	1.0	390	5,200	**2.0**

TABLE 7-2: SOIL ANALYTICAL RESULTS EXCEEDING CRITERIA FOR IRP SITE 32 (Continued)

Naval Weapons Station Seal Beach Detachment Fallbrook, Fallbrook, California

Sample depth from 0 to 10 feet below ground surface

Analyte	Detected Concentration	Point ID	Sample ID	Sample Depth (feet)	Sample Collection Date	Laboratory Reporting Limit	Residential Screening Criteria	Industrial Screening Criteria	Ecological Screening Criteria
Metals (mg/kg)									
ZINC	47.7	IRP32-SB01	IRP32-SB01(8-10)	8.00 - 10.00	11/19/08	10.4	23,000	100,000	**46.0**
ZINC	76.9	IRP32-SB02	IRP32-SB02(0-2)	0.00 - 2.00	11/19/08	10.1	23,000	100,000	**46.0**
ZINC	118	IRP32-SB03	IRP32-SB03(0-2)	0.00 - 2.00	11/19/08	10.1	23,000	100,000	**46.0**
ZINC	56.9	IRP32-SB03	IRP32-SB03(4-6)	4.00 - 6.00	11/19/08	10.5	23,000	100,000	**46.0**
ZINC	52.8	IRP32-SS01	IRP32-SS01	0.00 - 2.00	11/19/08	10.1	23,000	100,000	**46.0**
ZINC	195	IRP32-SS02	IRP32-SS02	0.00 - 2.00	11/19/08	10.1	23,000	100,000	**46.0**
ZINC	132	IRP32-SS03	IRP32-SS03	0.00 - 2.00	11/19/08	10.0	23,000	100,000	**46.0**
ZINC	126	IRP32-SS04	IRP32-SS04	0.00 - 2.00	11/19/08	10.1	23,000	100,000	**46.0**

Notes:
1. Exceeded screening criterion is shown in bold.
2. Screening criteria sources are presented in Sections 6.1 (human-health) and 6.2 (ecological).
3. "Total" metals were measured at the Site. Given the uncertainties, total chromium was assessed by use of total and hexavalent chromium human health screening criteria.

ID Identification
IRP Installation Restoration Program
J Estimated value
mg/kg Milligrams per kilogram

Appendix E: Responses to Agency Comments

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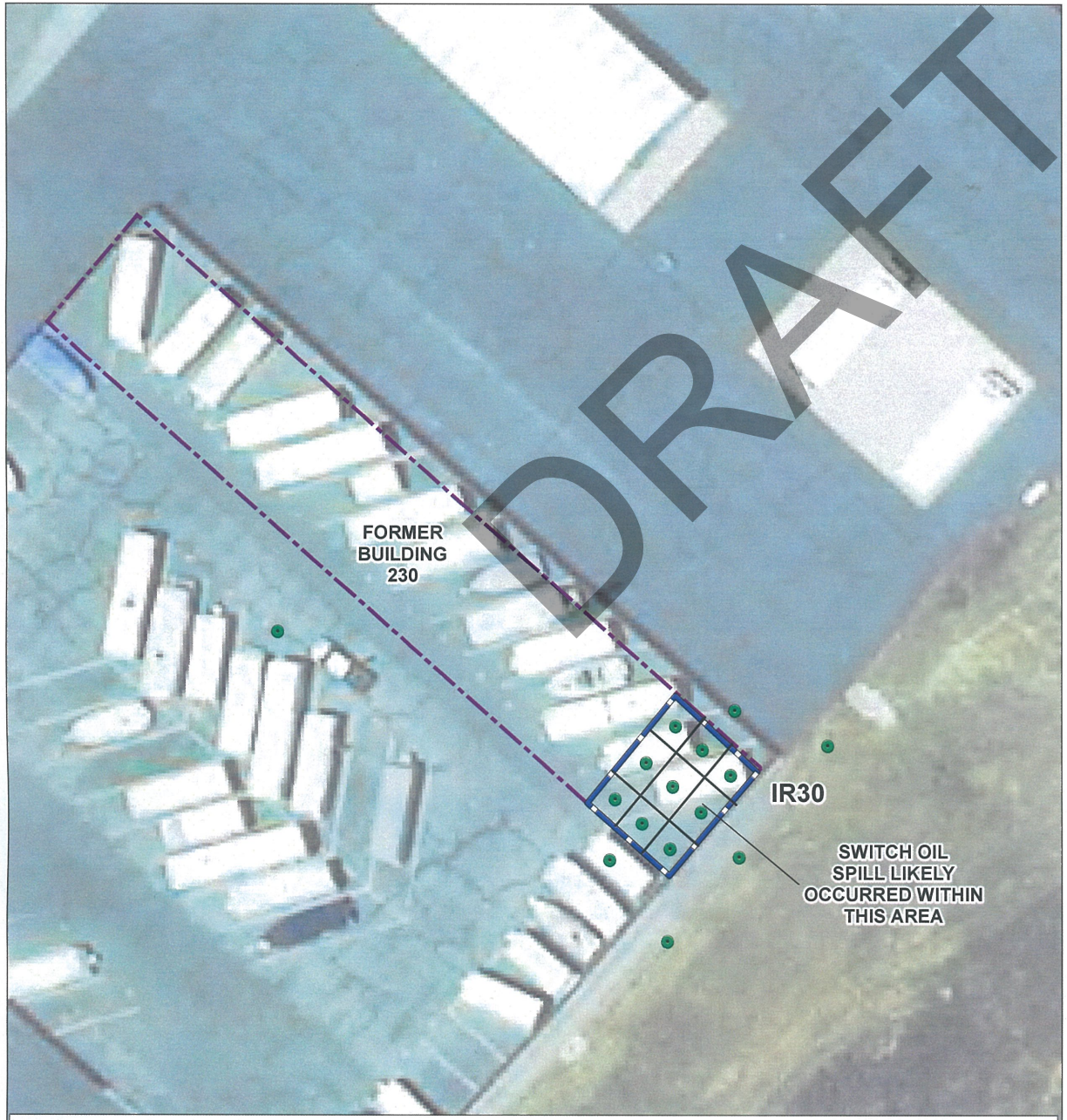
Document Title: Draft Work Plan, Site Inspections at IR Sites 30, 31, and Expanded Site Inspection at IR site 32, Naval Weapons Station Seal Beach Detachment Fallbrook.

Reviewer: Beatrice Griffey, M. Sc., P.E., Engineering Geologist, Northern Cleanup Unit, California Regional Water Quality Control Board, San Diego Region, Comment received by email.
Date: August 13, 2015

Comment No.	Specific Comments	Navy's Response
Site 30: T10000004372:BGriffey		
1.	The proposed activity to address surface contaminant runoff (2 soil borings) will not generate sufficient data to derive a defensible conclusion. The high level of uncertainty that exists at the Site regarding historical conditions and activities; seems to warrant at least an additional three borings (Total of five borings) along the asphalt surface edge where surface runoff most likely occurred at the Site. I believe that the soil data acquired from five borings in this area is sufficient to confirm whether or not surface contaminant runoff occurred in this area of the Site.	Through extensive discussions the Navy agrees to add three soil borings in the unpaved area adjacent to the southeast of former Building 230, to address the potential for contaminant runoff along the south-southeast end of the former building. This should provide sufficient data to determine if PCBs have impacted this area through surface runoff or other spillage.



NOTE:
THE PA REPORT INDICATES THAT APPROXIMATELY ONE (1) PINT OF SWITCH OIL WAS SPILLED IN THE FAR SOUTHEAST PORTION OF FORMER BUILDING 230 AND THAT THE SWITCH OIL POTENTIALLY CONTAINED PCBS. AT THE TIME OF THE SPILL, THE STORAGE AREA HAD AN ASPHALT SURFACE. SUBSEQUENT TO THE SPILL THE STAINED ASPHALT WAS REMOVED, ALTHOUGH THE EXACT LOCATION OF THE SPILL/REMOVAL IS UNKNOWN.

LEGEND

- PROPOSED SOIL BORING LOCATION
- SYSTEMATIC SAMPLING GRID
- FORMER BUILDING 230 FOOTPRINT
- POTENTIAL LOCATION OF SWITCH OIL SPILL

SOURCE:
BING MAPS STREET AND AERIAL IMAGE
ENVIRONMENTAL SYSTEMS RESEARCH INSTITUTE (ESRI) USA
SPATIAL FEATURE CLASSES, SANGIS SPATIAL FEATURE CLASSES

N

GRAPHIC SCALE
0 25 50 100
(IN FEET)
1 INCH = 50 FEET

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND

SAN DIEGO, CALIFORNIA
NAVFAC Naval Facilities Engineering Command NAVFAC SOUTHWEST

NAVAL WEAPONS STATION SEAL BEACH
DETACHMENT FALLBROOK
FALLBROOK, CALIFORNIA

FIGURE 6

IR SITE 30
PROPOSED SAMPLE LOCATIONS

TREVET

DATE: AUGUST 2015

CONTRACT NO.: N62473-10-D-4009
DELIVERY ORDER: 0096

Document Path: N:\GIS_Projects\Fallbrook\Figs_WorkPlan_30_31-32_8-15\Fig6_Ir30_probor_8-15.mxd

Document Title: Draft Work Plan, Site Inspections at IR Sites 30, 31, and Expanded Site Inspection at IR site 32, Naval Weapons Station Seal Beach Detachment Fallbrook.

Reviewer: Beatrice Griffey, M. Sc., P.E., Engineering Geologist, Northern Cleanup Unit, California Regional Water Quality Control Board, San Diego Region
Date: June 15, 2015

Comment No.	General Comments	Navy's Response
1.	The temporary investigation derived waste (IDW) staging location should be within a secured area to minimize the potential for unauthorized access to IDW to the maximum extent practicable.	Based on this comment, the designated IDW storage area as discussed in Section 4.12 will be revised to state "the drums will be stored on site in a secured temporary IDW staging area to minimize the potential for unauthorized access, to the extent practicable."
2.	Additional soil sampling activities may be warranted to ensure that the contamination encountered during this investigation is adequately characterized and extent determined. The proposed soil sampling plan involves the collection of soil samples at various locations and depths below grade surface (bgs) at three sites. Depending on investigation findings at each Site, the collection of additional soil samples may be warranted to adequately characterize and define the extent of encountered contamination to support a risk assessment and a no further action recommendation. Expanding this Draft Work Plan to include these activities as part of this investigation may be financially beneficial relative to conducting another investigation at a later date and should be considered.	Comment noted. Due to funding and contract constraints, no further changes to the sampling plan due to potential future sampling activities are planned at this time. It is more efficient financially to plan follow studies if conditions warrant it than it is to try to answer all questions up front.
3.	There appears to be a discrepancy in the characterization of the primary granitic bedrock underlying the Sites. According to Draft Report Subsection 2.3.2, the underlying bedrock is identified to be a tonalite yet according to Draft Report Figure 5 it is identified as a granodiorite. Please review the relevant figure and subsection, and in the response to comments (RTC), either provide the revised sections or figures, or clarification as to why the presented information in the Subsection 2.3.2 and Figure 5 are correct, whichever is appropriate.	The second sentence of the first paragraph in Section 2.3.2 will be revised to state IR Sites 30, 31, and 32 are located in a developed area within the Installation and are underlain by granitic bedrock mapped as primarily of granodiorite composition (Figure 5).

Document Title: Draft Work Plan, Site Inspections at IR Sites 30, 31, and Expanded Site Inspection at IR site 32, Naval Weapons Station Seal Beach Detachment Fallbrook.

Reviewer: Beatrice Griffey, M. Sc., P.E., Engineering Geologist, Northern Cleanup Unit, California Regional Water Quality Control Board, San Diego Region
Date: June 15, 2015

Comment No.	Specific Comments	Navy's Response
Site 30: T10000004372:BGriffey		
1.	Since the release area was paved with asphalt (Trevet, 2014), liquid releases on such a relatively impermeable surface may have preferentially flowed on top of the asphalt surface until reaching the surrounding native soil. Based on this potential transport mechanism at IR Site 30, a total of nine soil borings in native soil along the original Former Building 230 asphalt surface perimeter; three borings along the northeastern, southeastern, and southwestern surface; should be advanced at the Site. Depending on the area topography, perhaps a conclusion can be derived that it is unlikely that a surface liquid release would have flowed in a particular direction and therefore that area along the periphery of the asphalt surface does not warrant investigation. Currently, only two soil borings are proposed within the subject areas. In the RTC, please either provide the rationale as to why these areas of the Site do not warrant more intensive sampling or a revised soil sampling plan, whichever is appropriate.	Although the liquid release occurred on a relatively impermeable surface, the quantity of the spill was approximately 16 ounces, as reported in the IAS. This quantity would not indicate a large flow potential or distribution. The IAS stated that the spilled switch oil was cleaned up and the oil-stained asphalt was removed Therefore, the Navy does not believe there is a significant potential for PCBs to be present at the Site. Additionally, the minimal site slope that exists in the southeast portion of the former building footprint would direct the majority of surface flow to the northwest (towards the middle of the building). One boring was placed on the northeast of the building and the southwest of the spill area and outside the former building boundary to assess the potential for contamination in these areas from surface flow and the spread of contamination through potentially cracked asphalt. One boring was also added in the pavement southwest of the former building based on local topography, as discussed in the response to Site 30 Specific Comment 2. Due to the limited quantity of spilled oil, the very gently sloping nature of the Site, and documentation of removal of the stained asphalt the Navy does not believe more intensive sampling or a revision to the soil sampling plan is warranted at this time.

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Reviewer: Beatrice Griffey, M. Sc., P.E., Engineering Geologist, Northern Cleanup Unit, California Regional Water Quality Control Board, San Diego Region
Date: June 15, 2015

Comment No.	Specific Comments	Navy's Response
2.	Please provide the rationale for the proposed boring location to the southwest of "Former Building 230" notation in Figure 6. According to Figure 6, a soil boring is proposed approximately 150 feet from the southwest corner of former Building 230. In the RTC, please provide the rationale for this boring location.	As described in Section 3.2.1, "one sample on each the north and south side of the building and one sample in the drainage feature on the south side of the building to determine if cleaning of the area with water distributed any potential PCBs." The boring mentioned is located within the drainage swale on the south side of the building. This is the lowest point in the area that would likely have accumulated any contamination if surface flow occurred. As requested an annotation will be added to Figure 6 to indicate that the referenced boring location is based on that area being a topographic low point.
Comment No.	**Specific Comments**	**Navy's Response**
3.	The potential future human health exposure population for IR Site 30 should be expanded to include industrial workers. Currently only construction workers are considered as potentially exposed human population at the Site. Whereas this proposed human population is representative of current site conditions, the population should be expanded to include industrial workers so as to allow the Base to use this area for such purposes if warranted in the future. Based on the Site location within a relatively industrialized area of the Base, it seems highly probable that this potential change in land use may be necessary in the future.	Agreed. Section 10.4 of the Sampling and Analysis Plan will be revised to include industrial workers to the potentially exposed human population at IR Site 30.

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Reviewer: Beatrice Griffey, M. Sc., P.E., Engineering Geologist, Northern Cleanup Unit, California Regional Water Quality Control Board, San Diego Region
Date: June 15, 2015

Comment No.	Specific Comments	Navy's Response
Site 31: T10000004373:BGriffey		
1.	Historical activities of environmental concern conducted at IR Site 31 include the disposal of neutralized battery acid into a septic system at former Building 203 and an unlined sump system at Building 352. The proposed field activities involve sampling soil borings in the vicinity of the septic and sump systems. Based on the reported deteriorated condition of the Building 203 drain lines and concrete flooring around the drain lines (Naval Energy and Environmental Support Activity, 1985), it seems that soil sampling beneath both building foundations also is warranted to investigate the potential release of the acidic solution beneath the Buildings along the drain lines. In the RTC, please provide the proposed approach for investigating the condition of soil beneath the former and existing Building foundations.	In response to this comment the sampling plan for former Building 203 will be revised to include 3 borings within the footprint of former Building 203, along the former main 4 inch drain line, leaving 6 borings in the area of the former septic tank. The new battery shop building is currently active and used. Based on the building and leach field configuration, the greatest concentration of contaminants would be expected at the sump or in the leach field, and there is currently no reasonable pathway for exposure to workers at the building. If the samples from these areas do not indicate significant contamination, then it is reasonable to believe that sampling beneath the building foundation is not warranted. Conversely, if significant contamination is found, and further evaluation in an RI is recommended for the site, then evaluation of soil along the drain lines may be appropriate at that time.
2.	The former septic and sump system locations illustrated in a historical submittal figure (IT Corporation and CH2M Hill, 1991) seem to be potentially significantly different than that illustrated in the Draft Work Plan. Whereas, the San Diego Water Board is not aware of the accuracy of the information presented in the historical submittal, the subject figure is attached for your consideration to investigate these possible areas of concern as part of this effort as well. In the RTC, please provide either the rationale as to why these areas do not warrant investigation or a revised figure(s), whichever is appropriate.	The septic tank location shown in the work plan was estimated based on as built drawings that were reviewed at NWS Fallbrook, and on current surface site conditions. The sump location as presented within the work plan figures was visible during the Site walk and on the aerial photograph. It is the Navy's intention to conduct a geophysical evaluation of the site to try to locate the former septic tank and potential leach field. The precise locations of the borings advanced in the field will be based on results of the geophysical evaluation.

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Reviewer: Beatrice Griffey, M. Sc., P.E., Engineering Geologist, Northern Cleanup Unit, California Regional Water Quality Control Board, San Diego Region
Date: June 15, 2015

Comment No.	Specific Comments	Navy's Response
3.	The proposed sampling of soil at one foot bgs does not seem to be appropriate to investigate the condition of soil in the vicinity of subsurface septic and sump systems. A review of the current San Diego County standard of practice (SOP) for the installation of such systems suggest that the collection of soil at depths significantly greater than one foot bgs is required to investigate potential adverse effects of these systems. Based on the SOP, it seems that the appropriate shallowest depth to collect soil samples is three to five feet bgs. In the RTC, please either provide the rationale for collecting soil samples at one foot bgs or revised appropriate sections of the Draft Work Plan, whichever is appropriate.	A revision to the sampling plan in this work plan will be conducted to propose the collection of the shallowest samples from IR Site 31 at 3'below ground surface or refusal, as well as at 1' bgs. The shallow (1-foot) sample has been retained to allow the evaluation of current shallow soil exposure. The sampling program for borings at IR Site 31 now includes soil sampling at depths of 1, 3, 7, and 13 feet bgs based on changes in response to this comment and DTSC Site 31 Specific Comment 3.
4.	The proposed project screening levels (PSL) for soil and groundwater should be expanded to include pH. According to Draft Work Plan Sampling and Analysis Plan (SAP) Worksheet #15 a pH PSL is not applicable for soil or groundwater. Based on the nature of the discharged waste at the Site, battery acid, it seems that it is appropriate to include a pH PSL in the Draft Work Plan. In the RTC, please either provide the rationale as to why a pH PSL is not appropriate for the Site or revised appropriate portions of the Draft Work Plan, whichever is appropriate.	At this site pH data is being collected primarily not to evaluate pH as a contaminant in its own right, but as a line of evidence in evaluating the potential transport of lead. There are no U.S. EPA RSL, Cal Modified PRG, or LANL minimum Ecological Screening Levels (No effect ESLs) for pH in soil. In addition, the range of naturally occurring variation of pH in soil and groundwater is significant. No soil PSL has been proposed for pH. SAP worksheet #15 will be updated to include a PSL for pH of less than or equal to (≤) 6.5 or greater than or equal to (≥) 8.5 for groundwater. The footnote will also be revised to state this PSL range is based on California EPA MCL for drinking water.

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Reviewer: Beatrice Griffey, M. Sc., P.E., Engineering Geologist, Northern Cleanup Unit, California Regional Water Quality Control Board, San Diego Region
Date: June 15, 2015

Site 32; T10000002793:BGriffey		
1.	The proposed analytical plan needs to be expanded to include PCBs. The proposed analytical plan includes hexavalent chrome, metals, semivolatile organic compounds, and volatile organic compounds. Based on a historical investigation findings (Bechtel, 1996), an investigation of PCBs in soil also is warranted at the Site. In the RTC, please either provide the rational as to why the analytical plan does not need to be expanded, the time-frame within which the Navy expects to be able to investigate PCBs at IR Site 32, or the revised appropriate portions of the Draft Work Plan, whichever is appropriate.	After review of the Summary of Results for the RRSEM Data Collection Effort at Naval Weapons Station, Seal Beach, Fallbrook Annex (Bechtel 1996), the Navy has confirmed that PCBs were previously reported in the single shallow sample collected at the site under that program. In response to this comment PCB analysis has been added to the analytical suite for soil at IR Site 32.
2.	Additional soil sampling activities in the vicinity of the southwest corner of Building 351 are warranted to investigate the surface discharge in this area of the Site. It is reported that historical activities at the Site involved the surface discharge of caustic soda and paint sludge in the immediate vicinity of the caustic soda tank formerly located at the southwest corner of Building 351. Additionally, it was reported that "paint-sludge-colored soil" was observed in this area of the Site during a site visit (Naval Energy and Environmental Support Activity, 1985). To date, the condition of soil in this portion of the Site has not been investigated and seems warranted. In the RTC, please either provide the revised activities that address this portion of the Site, the rationale as to why this area of the Site does not warrant investigation, or the time-frame within which the Navy expects to be able to investigate this area of the Site, whichever is appropriate.	Our sampling program is biased towards the area in which the greatest contamination would be expected, and was reported during the SI. The quantity of paint sludge reported to have been spilled adjacent to the tank is unlikely to have been great, especially when compared to the quantity reportedly directly disposed of to nearby soil via the drain pipe. However, it appears this area was not investigated during the initial site inspection. Therefore, 3 soil borings will be added in the approximate area adjacent to the former above ground tank. Soil samples will be collected from 1' and 7' bgs and analyzed for PCBs, metals, hexavalent chromium, pH, VOCs, and SVOCs.

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Date: June 15, 2015

3.	The proposed PSL for soil should be expanded to include pH. According to Draft Work Plan SAP Worksheet #15 a pH PSL is not applicable for soil. Based on the nature of the discharged waste at the Site, caustic soda, it seems that it is appropriate to include a pH PSL in the Draft Work Plan. In the RTC, please either provide the rationale as to why a pH PSL is not appropriate for the Site or revised relevant portions of the Draft Work Plan, whichever is appropriate.	There are no U.S. EPA RSL, Cal Modified PRG, or LANL Ecological Screening Levels (No effect ESL) for pH. Therefore no soil PSL has been proposed for pH. However, pH will be added to the analyte list for soil samples at IR Site 32 as a line of evidence in evaluating the potential transport of paint in the caustic soda solution.

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Reviewer: Stephen Niou, P.E., Department of Toxic Substances Control, Brownfields and Environmental Restoration Program
Date: May 26, 2015

Comment No.	Specific Comment	Navy's Response
Site 30		
1.	Site 30: DTSC agrees with the proposed investigation method and the approach at the switch oil spill area. We recommend that the Navy consider collecting deeper soil samples if positive results are detected.	Comment noted. Historical documents indicate the switch oil spill that occurred at the Site was cleaned up and impacted asphalt was disposed of off-site; therefore, we do not anticipate encountering quantities of PCBs at the Site that would warrant the collection of deeper samples at this time. However, based on results of the soil samples collected during this SI, the Navy will recommend either no further action if PCBs are not detected or are detected at concentrations below the U.S. EPA Region 9 Regional Screening Levels, and further investigation or risk evaluation if PCBs are detected at or above the U.S. EPA Region 9 Regional Screening Levels. Therefore, no revisions to the document are planned at this time.

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Reviewer: Stephen Niou, P.E., Department of Toxic Substances Control, Brownfields and Environmental Restoration Program
Date: May 26, 2015

Site 31		
1.	At former Building 203 the work plan states that battery electrolytes solution was drained from floor drains to drain pipe and finally to a septic tank. However, the work plan does not specify how the solution was ultimately disposed of from the septic tank. Please include this information so that we may understand whether or not the proposed study at this building should be modified. In addition, we believe the location of the former septic tank will be very helpful to this study and recommend the search of historical data to assist in identifying its location.	It is not known how the solution was ultimately disposed of from the septic tank (i.e., whether or not there was a leach field associated with the septic tank or if the solution was pumped from the tank). Figures 3 and 7 show the proposed sample locations adjacent to the septic tank and in the area to the east of the septic tank. The sample locations were placed in these areas in case seepage had occurred from the tank (assuming downgradient flow) and in the area most likely to contain a leach field, if one exists. The exact location of the septic tank associated with Building 203 is not known. A geophysical survey is planned to be conducted prior to boring advancement that will provide more information of a potential leach field prior to sampling. Therefore, no revisions to the document are planned at this time based on this comment. However, the sample locations may be adjusted in the field based on the results of the geophysical survey. See also the response to Water Board Site 31 Specific Comment 2.
2.	With the possibility of installing a monitoring well in the leach field, DTSC recommends an additional soil boring be placed at the proposed groundwater monitoring well location as shown on Figure 7 to better characterize the subsurface soil in the leach field south of new battery shop for detecting lead in the soil.	Comment noted. The Navy believes the current sampling plan will be sufficient to determine if pH and lead are present at concentrations in the soil that pose a potential threat to human health and or the environment. Additionally, the soil borings proposed are located adjacent to the two leach lines as specified on the building plans. Therefore, no revisions to the document are planned at this time. However, if the soil data collected indicates that groundwater may have been affected and monitoring well installation is warranted, then a revision to the well installation process to include additional soil sample collection to further characterize subsurface soil in the leach field may be considered.

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Date: May 26, 2015

3.	The sampling depth for 17 direct-push soil borings proposed at Site 31 is described to be 7 feet bgs. At Site 32, the stated total depth of soil borings is 14 feet bgs. In light of the site is suspected of leaching lead potential to underlying groundwater and consistency purposes, DTSC recommends that total soil boring depth at Site 31 be extended to 14 feet bgs. Soil samples should be collected at 1', 7', and 13' bgs, respectively.	In response to this comment an additional deeper sample has been added to each of the 17 direct push soil borings proposed at Site 31 at a depth of up to 13' bgs, or shallower if refusal is encountered prior to 13' bgs. In addition, the sampling depth may be adjusted in the field to bias sampling towards soil that shows field indications of potential contamination, or to represent potential areas of preferential transport, such as the soil immediately underneath leach field backfill. This will add 17 additional soil samples to the sampling program.
Site 32		
1.	Site 32: DTSC concurs with the proposed approach to further assess the lateral and vertical extent of hexavalent chromium, metals, SVOCs, and VOCs at the site to determine if these chemicals are present at concentrations that may pose potential risks to human health and the environment. If results suggest health concerns, DTSC recommends further studies be conducted during the RI stage.	Comment noted. No changes to the current sampling plan were made based on this comment.