N00221_001372
MARE ISLAND
SSIC NO. 5090.3.A

Final

PETROLEUM CORRECTIVE ACTION PLAN DEFENSE REUTILIZATION AND MARKETING OFFICE SITE AND VICINITY

Former Mare Island Naval Shipyard,
Vallejo, California

August 2009

Prepared for

Department of the Navy
Base Realignment and Closure
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Prepared under

Environmental Multiple Award Contract N62473-08-D-8825
Contract Task Order 0005
CERCLA ARF Document Control Number WEST-8825-0005-0002

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Final

Petroleum Corrective Action Plan

Defense Reutilization and Marketing Office Site and Vicinity

Former Mare Island Naval Shipyard
Vallejo, California

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Contract Task Order: 0005
WDCN 5011

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ABBREVIATIONS AND ACRONYMS

APP	Accident Prevention Plan
ARAR	applicable or relevant and appropriate requirement
BCT	Base Realignment and Closure Cleanup Team
bgs	below ground surface
BMP	Best Management Practices
CAMU	Corrective Action Management Unit
CAT	Caterpillar
CDFG	California Department of Fish and Game
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CQCP	Construction Quality Control Plan
CTA	Crane Test Area
cy	cubic yard
DFW	definable feature of work
DON	Department of the Navy
DRMO	Defense Reutilization and Marketing Office
DTSC	Department of Toxic Substances Control
EMAC	Environmental Multiple Award Contract
EPA	U.S. Environmental Protection Agency
EPP	Environmental Protection Plan
ESL	Environmental Screening Level
EZ	exclusion zone
FSA	Fenced Scrapyard Area
GPS	Global Positioning System
HAZWOPER	Hazardous Waste Operations and Emergency Response
IA	Investigation Area
IR	Installation Restoration
IWTP	Industrial Wastewater Treatment Plant
MEC	munitions and explosives of concern
mg/kg	milligrams per kilogram
mg/m^3	milligrams per cubic meter
MINS	Mare Island Naval Shipyard
NAVFAC	Naval Facilities Engineering Command
NTCRA	Non-Time-Critical Removal Action
OSB	oil sump box

OSHA	Occupational Safety and Health Administration
PA/SI	Preliminary Assessment/Site Investigation
PCAP	Petroleum Corrective Action Plan
PCB	polychlorinated biphenyls
PPE	personal protective equipment
QC	quality control
RAP	Remedial Action Plan
RCRA	Resource Conservation and Recovery Act
RI	Remedial Investigation
ROD	Record of Decision
ROICC	Resident Officer in Charge of Construction
SAP	Sampling and Analysis Plan
SCAPS	Site Characterization and Analysis Penetrometer System
SHSP	Site-Specific Health and Safety Plan
SMHM	Salt Marsh Harvest Mouse
SVOC	semivolatile organic compound
SWPPP	Stormwater Pollution Prevention Plan
Tetra Tech	Tetra Tech EM, Inc.
TPH	total petroleum hydrocarbons
USA	Underground Service Alert
USFWS	U.S. Fish and Wildlife Service
VSFCD	Vallejo Sanitation and Flood Control District
Water Board	San Francisco Bay Regional Water Quality Control Board
WESTON	Weston Solutions, Inc.
WMP	Waste Management Plan

1. INTRODUCTION

This Petroleum Corrective Action Plan (PCAP) was prepared by Weston Solutions, Inc. (WESTON) for the U.S. Department of the Navy (DON), Naval Facilities Engineering Command Southwest under the Environmental Multiple Award Contract Number N62473-08-D-8825, Contract Task Order 0005. The corrective action will be implemented within an approximately 9.5 acre area located within, and in the vicinity of the former Defense Reutilization and Marketing Office (DRMO) located at the former Mare Island Naval Shipyard (MINS), Vallejo, California. The objective of this corrective action is to complete the actions necessary to obtain regulatory closure (i.e., "no further action" status) for petroleum hydrocarbons at the DRMO Site and Vicinity. This work is being managed by the DON Base Realignment and Closure Program Management Office West located in San Diego, California.

1.1 SITE LOCATION AND DESCRIPTION

The former MINS is located on a peninsula in Solano County, California, approximately 30 miles northeast of San Francisco as shown on Figure 1-1. The former MINS occupies approximately 3.5 square miles and is bordered by San Pablo Bay on the west, Carquinez Strait on the south, and the Napa River (Mare Island Strait) on the east. MINS was established by the U.S. Navy in 1854 and served as a Naval Shipyard until it was closed under the Base Realignment and Closure program in April 1996.

The DRMO Site and Vicinity area covers approximately 9.5 acres located near the intersection of Dump Road and Azuar Drive (Figure 1-2) within Installation Restoration (IR) Site 01 (historical fill areas) established under the Navy's Installation Restoration Program. This area was originally submerged land located off the historical shoreline of Mare Island. Filling of these areas began in the early 1900s with the construction of dikes; the areas between the dikes were later filled with dredge spoils from Mare Island Strait to raise the elevation above the tidal range of San Pablo Bay. A portion of the area was also used for disposal of Shipyard-related debris and eventually was developed in the 1930s and 1940s to support Shipyard operations. IR Site 01 was subsequently subdivided into Investigation Areas (IAs) H1, IA-H2, IA-B.1, IA-B.2, and open space within Transfer Parcel XVI.

The site includes portions of the former DRMO Fenced Scrapyard Area (FSA), a former Storage Yard and Crane Test Area (CTA) within IA-B.1, a portion of Transfer Parcel XVI (Open Space), and a portion of IA-B.2-2. The DRMO FSA was used for storage of transformers, batteries, and metal scrap, and also managed surplus material and scrap from the former MINS and other military facilities until it was closed in 1995. The DRMO FSA was excluded from the Eastern Early Transfer Parcel that was transferred to the City of Vallejo in 2000, and remains DON property. The portion of Transfer Parcel XVI within the corrective action area also remains property of the DON. The CTA was used by the former MINS as a storage yard and a load test area for Shipyard cranes to maintain their certification for use. The remaining portions of the site north of Dump Road (the CTA within IA-B.1) and east of Azuar Drive (IR16-B4 within IA-B.2-2) were included in the Eastern Early Transfer Parcel and are no longer owned by the DON.

This PCAP was developed based on information presented in the Total Petroleum Hydrocarbon (TPH) Technical Memorandum (CH2M HILL, 2009a), including but not limited to the site history, petroleum-impacted area boundaries, and contamination at the DRMO Site and Vicinity. This PCAP is intended to address only the extent of the contamination within DON property.

1.2 SITE INVESTIGATIONS RELATED TO PETROLEUM CONTAMINATION

Environmental conditions at the former MINS have been formally studied for many years. Nine investigations conducted between 1995 and 2008 are relevant to the characterization of petroleum contamination at the DRMO Site and Vicinity. Specifically, petroleum contamination in soil and groundwater was detected within and in the vicinity of the DRMO Site as documented during the following investigations:

- ***Basewide Preliminary Assessment/Site Investigation (PA/SI) (1995)***—The PA/SI addressed 95 Solid Waste Management Units and 34 other sites including the DRMO Site (PRC Environmental Management, Inc., 1995). The objectives of the PA/SI were to assess whether the sites being addressed were potentially contaminated and required further investigation, and to make recommendations for future action.

- ***Site Characterization and Analysis Penetrometer System (SCAPS) Investigation (1999-2000)***—The SCAPS investigation was conducted at IR Site 02 (Figure 1-3), at four former waste oil disposal sumps located approximately 1,600 feet west of the DRMO Site. The objectives of this investigation were "to thoroughly assess and delineate the extent and distribution of residual and free phase petroleum hydrocarbon contamination in the vicinity of the former waste oil sumps and to estimate the mass of the hydrocarbon contamination." These sumps reportedly received approximately 4.5 million gallons of waste oil and solvents before disposal there ended in the late 1960s (DON Public Works Center San Diego, 2000).

- ***IA-H2 Remedial Investigation (RI) (1999-2000)***—The RI was conducted to characterize conditions at IA-H2, including the area west of Azuar Drive from the IR01 storage yard and the former CTA (Figure 1-3) along Dump Road southward to about 5th Street (Tetra Tech EM, Inc. [Tetra Tech], 2000). The overall objectives of the RI were to determine whether releases from contamination associated with any releases, and conduct baseline human health and ecological risk assessments in order to determine whether an FS was necessary at any of the specific sites within IA-H2. Since the RI was conducted for IA-H2, the boundaries of the area have changed significantly because various portions of it have been transferred by the Navy to the City of Vallejo.

- ***Follow-up to the IA-H2 RI (2001)***—Following preparation of the IA-H2 RI Report, the RI addendum was issued. The purpose of the addendum was to describe "the nature and extent of the area of residual petroleum hydrocarbon nonaqueous-phase liquid (free product)" in subsurface soil at the DRMO Site and in the IR16-B4/Building 455 Area to the east of Azuar Drive (Figure 1-2), and underlying portions of both IA-H2 and IA-B." The addendum did not present new data but provides additional discussion of the physical nature of the free product, the vertical and lateral extent of the product, and possible sources of the product at the DRMO Site (Tetra Tech, 2001).

- ***IA-B RI (2002-2004)***—The overall goal IA-B RI was to collect additional information at four areas of environmental concern within IA-B to address remaining data gaps and conclude the site characterization phase for IA-B. The specific objectives of the RI were

to characterize the nature and extent of soil and groundwater contamination in the areas of concern and to quantify potential risks posed to human health and the environment. Three of the four areas included in the IA-B RI are located to the east and north of the DRMO Site, including IR01 (historical fill areas), the IR16-B4/Building 455 Area, and the former CTA. The investigation characterized the fill material and also evaluated the vertical and lateral extent of free phase hydrocarbons in the IR16-B4/Building 455 Area and the CTA (CH2M HILL, 2004a). The fourth area included in the IA-B RI is not a part of the DRMO Site and Vicinity.

- ***Railroad Track Corridor Investigation (2004)***—A number of railroad lines formerly ran along what was referred to as the "Railroad Track Corridor" between the northwestern Portion of the DRMO Site and Dump Road, immediately outside the FSA Boundary. Soil sampling and analysis were conducted with the objective of evaluating the extent of removal action activities required, if any, within the Railroad Track Corridor., to assist in the planning process for the DRMO FSA non-time-critical removal action (NTCRA) (CH2M HILL, 2004b). Based on the findings of the investigation, the Railroad Track Corridor was included in the overall removal action for the FSA portion of the DRMO Site (CH2M HILL, 2004c).

- ***NTCRA at the DRMO FSA (2005-2007)***—A NTCRA was completed at the DRMO FSA by the DON between August 2005 and February 2007 to remove munitions and explosives of concern (MEC) and soil contaminated with chemicals of potential concern (lead, polyaromatic hydrocarbons , pesticides, and polychlorinated biphenyls [PCBs]). Although the DON was addressing petroleum contamination in soil separately from other investigations and cleanup actions at the DRMO Site, sampling and analysis for TPH, as well as qualitative petroleum observations were performed during the NTCRA fieldwork (CH2M HILL, 2006 and WESTON, 2008). Following the NTCRA soil excavation activities, scattered occurrences of petroleum-related contamination were observed across the FSA in the form of seeps to the ground surface that formed small mounds of oil globules or rings of viscous product on the surface. Although concentrations of TPH as diesel were reported as high as 6,000 milligrams per kilogram (mg/kg) during the NTCRA, the observations of free-product occurrences suggest that the product is related

more to the heavier TPH-range organics found during the OSB Investigation noted below, than to site-wide TPH as diesel spills or leaks at the DRMO Site (CH2M HILL, 2009a). The lateral NTCRA excavation boundary is presented on Figure 1-2.

- ***Oil Sump Box Investigation (2005-2006)***—The purpose of the OSB investigation was to obtain field information to confirm the existence of the OSB, and aid in understanding the nature and extent of free product potentially originating from the OSB and migrating from the DRMO Site. The investigation focused primarily on the OSB, located approximately 50 feet north of Building 661 (Figure 1-2). The investigation confirmed the existence of the OSB and associated piping and identified the presence of free phase petroleum hydrocarbons along portions of Azuar Drive and Dump Road that were investigated. The OSB and associated perforated piping were removed during the OSB investigation along Azuar Drive. Analysis of soil and free product samples from both Azuar Drive and Dump Road were reported by the laboratory to have a hydrocarbon pattern resembling Bunker C Fuel (No. 6 Fuel Oil), which is a typical fuel found at many subsurface locations at MINS. Based on visual observations, free product was reported to be largely confined to the metal debris layer commonly encountered in the trenches (CH2M HILL, 2009a).

- ***Groundwater Investigation at the Former Crane Test Area (2006-2007)***—A groundwater investigation was completed in 2006-07 at the former Crane Test Area which occupies the majority of IA-B.1 (Figure 1-2). The objective of the investigation was to understand the hydrogeology and the nature and extent of groundwater contamination related to the two groundwater-bearing zones (shallow zone and deep zone). The highest concentrations of TPH as diesel and motor oil in both soil and groundwater were reported from the southwestern portion of the former CTA. Similarly, free product was also observed in the southwestern portion of the former CTA (CH2M HILL, 2008).

- ***Geophysical Survey and Follow-on TPH Investigation of the DRMO Site and Vicinity (2007-2009)***—The objectives of the follow-on investigation included 1) gathering

information needed to determine the lateral and vertical extent of free phase petroleum hydrocarbons, 2) determining the nature of scrap metal layers, 3) determining whether free phase petroleum hydrocarbons were present in soil along the abandoned sanitary sewer line north of Dump Road and whether this pipeline and its backfill could represent a preferential pathway for migration, and 4) gathering additional information about the composition of petroleum product present at the DRMO Site and Vicinity. The objective of the geophysical survey was to develop a map to show the lateral extent of large accumulations of metallic debris in the subsurface along and perpendicular to Azuar Drive and Dump Road. The Follow-on TPH Investigation concluded the physical characteristics of free phase petroleum hydrocarbons found beneath the DRMO Site and Vicinity have been generally consistent and referred to the product as a heavy fuel oil which is generally observed in fractures and root structures of fine-grained material located below bulk metal debris along Azuar Drive and Dump Road. Additionally, the former OSB was determined to be the probable source of contamination along the west side of Azuar Drive but not at all locations on the southeast side of Azuar Drive or along either side of Dump Road. The probable source of contamination along Dump Road is contributed to disposal, utility backfill, and release practices. Forensic analysis identified the petroleum product as a heavy fuel oil such as Bunker C, also known as No. 6 Fuel Oil. The geophysical survey indicated that scrap metal layers observed in subsurface soil along Azuar Drive and Dump Road are not laterally contiguous. (CH2M HILL, 2009a).

1.3 GEOLOGY AND HYDROLOGY

The ground surface at the DRMO Site and Vicinity is generally flat, with elevations ranging from approximately 12 to 14 feet above mean sea level. No permanent surface water features are present, but the site is prone to flooding during periods of heavy precipitation. Surface water runoff discharges to storm sewers located near the northern corner of the DRMO Site, which in turn discharge to a stormwater main.

Three principal geologic units have been identified at the site. From top to bottom these units are artificial fill material, unconsolidated natural deposits (Younger Bay Mud), and bedrock (the

Cretaceous Panoche Formation). Based on boring logs and test pits advanced in the area during historical investigations, the artificial fill material consists of two layers:

- Sand, gravel, silty clay, and debris extends from the ground surface to a depth of approximately 2 to 5 feet below ground surface (bgs), although debris is also found at deeper locations. Debris is primarily either metal or brick, but asphalt, concrete, timber, sawdust, wire, pipe, cable, and glass have also been found. This uppermost fill was placed between 1940 and the later construction of the DRMO Site. Aerial photographs dating from the late 1940s and early 1950s show that the DRMO Site and Vicinity had been fully developed by the 1950s.
- Fine-grained silts and clays, which are most likely, dredged material that was placed between 1911 and 1920. This fill material is approximately 4 to 7 feet thick and is found from approximately 2 to 10 feet bgs. Beneath the fill material is a thick sequence of naturally deposited, unconsolidated silty clay with interbedded sandy layers (commonly referred to as Younger Bay Mud) and extends to at least 28 feet bgs. The bedrock below these deposits consists of steeply dipping brown, orange, and tan arkosic sandstone, siltstone, and micaceous shale.

A single, shallow, unconfined water-bearing zone has been identified beneath the DRMO Site and Vicinity, extending from the water table at a depth of 2 to 6 feet bgs to a depth of at least 28 feet bgs. The water-bearing zone extends through the fill layer and into the underlying Younger Bay Mud. Groundwater flow is to the northwest and annual water table fluctuations of up to 3 feet have been observed. Groundwater does not appear to be influenced by tidal fluctuations. Two distinct water-bearing zones have been identified beneath the former CTA north of the DRMO Site, (Figure 1-2). One zone lies within a shallow soil debris layer, and a deeper zone lies within the Younger Bay Mud. The two zones are separated by a layer of silty clay ranging from 6 to 8 feet thick. Groundwater flow in the two zones is also to the northwest. Groundwater at the former MINS is considered non-potable.

1.4 CORRECTIVE ACTION OBJECTIVES

This corrective action is intended to facilitate regulatory closure (i.e., "no further action") for petroleum within the DRMO Site and Vicinity by removing free petroleum product and petroleum-impacted soils to meet Tier 2 screening levels. The Tier 2 screening levels were developed from the San Francisco Bay Regional Water Quality Control Board (Water Board) Tier 1 Environmental Screening Levels (ESLs) using the methodology summarized in the Tier 2 Risk Assessment Approach for Water Board Sites at Lennar Mare Island (CH2M HILL, 2009b).

The Tier 2 Screening levels for TPH sites on Mare Island are provided in the Technical Memorandum: *Tier 2 Risk Assessment Approach for Water Board Sites in the Eastern Early Transfer Parcel, Lennar Mare Island, Vallejo, California* (CH2M HILL, 2009b). The screening levels vary based on their proximity to wetland areas (greater than or less than 300 feet from wetlands) and depth bgs.

The screening levels for TPH as Bunker C to be used for the corrective action at the DRMO Site and Vicinity are provided in the following Table 1-1.

Table 1-1
Tier 2 Screening Levels – Industrial Standards

Reference Location from Wetlands	Depth bgs (feet)	TPH as Bunker C Concentration (mg/kg)[1]
<300 feet	0 to 3	2,500
	3 to 10	5,000
>300 feet	0 to 3	2,500
	3 to 10	5,000

Notes:

1 The selected value is the lowest for the petroleum hydrocarbon chain that comprise the portion of the carbon range as Bunker C. The petroleum hydrocarbon chain that represents the weathered Bunker C petroleum pattern typically found at the DRMO Site and Vicinity is C19 to C40. The technical memorandum does not provide thresholds for this specific carbon chain but provides these overlapping carbon chains: TPH middle distillates as C18 to C24; residual fuels as C9 to C70.

1.5 PROJECT DESCRIPTION

Implementation of the corrective action will consist of the excavation and removal of petroleum-impacted soil from the potential excavation areas owned by the DON (Figure 1-2). Excavated

soil will be direct loaded into off-road trucks and transported to the nearby IA-H1 for use as subgrade fill material for an engineered landfill cap under construction within the IA-H1 Containment Area. Free product petroleum encountered during the excavation will be collected and containerized for off-site disposal or recycling. Confirmation soil sampling of excavation bottoms and sidewalls will be performed at a Navy approved off-site laboratory. After Navy and regulator concurrence, the excavations will be backfilled utilizing non-impacted overburden soils and/or imported borrow fill. Since the exact lateral extent and depth of the petroleum-impacted soil may change based on visual indicators and/or confirmation sampling, additional impacted soil will be removed if required. Utilities within the planned excavation area will be isolated or bypassed to facilitate removal of impacted soil and free product within the utility corridors. The majority of removed utilities will not be replaced under this corrective action. Later utility upgrades are planned by others as part of the commercial and residential development activities for Mare Island. Roadways impacted by the excavation will be restored to asphalt surface (Azuar Drive) or compacted aggregate (Dump Road). A completion report will be prepared to document site activities and address compliance with the project objectives.

1.6 CORRECTIVE ACTION APPROACH

The corrective action approach for TPH at the DRMO Site and Vicinity involves the following activities:

- Site preparation, including implementation of erosion control and stormwater pollution prevention measures
- Traffic control measures
- Location and isolation of underground utilities
- Removal of utilities, petroleum-impacted soils and debris from the excavation areas, transportation, and placement within the IA-H1 Containment Area
- Confirmation sampling of excavation bottom and sidewalls
- Free product removal and disposal
- Groundwater removal and disposal, if necessary
- Backfilling of excavations with non-impacted overburden and imported clean soils
- Site restoration

1.7 REGULATORY STATUS

The DON is the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) lead federal agency for preparation and implementation of restoration activities at the DRMO Site and Vicinity. Investigation planning and review, remediation activities, and ongoing groundwater monitoring are coordinated by the Base Realignment and Closure Cleanup Team (BCT). The BCT consist of representatives from the Navy, the California Environmental Protection Agency Department of Toxic Substances Control (DTSC), the Water Board, the California Department of Fish and Game, and the U.S. Environmental Protection Agency (EPA).

Petroleum and petroleum-related constituents are not included in the definition of hazardous substances under the CERCLA [Section 101(14) of CERCLA, 42 United States Code Section 9601(14)]. Although petroleum is excluded from CERCLA, cleanup of petroleum contamination associated with underground storage tanks (USTs) is required under the corrective action requirements of Subtitle I of the Resource Conservation and Recovery Act (RCRA) [see 40 Code of Federal Regulations 280] and certain sites may be subject to Section 311 of the Clean Water Act (CWA). The State of California has delegated authority under both RCRA and CWA. Consequently, the petroleum impacted areas of the DRMO site will be evaluated under the California UST regulations, promulgated in 1994 (California Code of Regulations [CCR], 2005), which address releases of chemicals to soil and groundwater from USTs. While the petroleum-impacted areas found at the DRMO Site and Vicinity are not the result of UST leaks, they exist from the former OSB or other petroleum disposal activity. In these instances, the same regulations applied to UST sites are relevant and therefore will be used as guidance for these sites.

The authority of the Water Board to require corrective action at UST sites is set forth at CCR title 23, division 4, chapter 16. These regulations specifically define "corrective action" as "...any activity necessary to investigate and analyze the effects of an unauthorized release; propose a cost-effective plan to adequately protect human health, safety, and the environment and to restore or protect current and potential beneficial uses of water; and implement and evaluate the effectiveness of the activity(ies)..." (See CCR title 23 Section 2720). Furthermore, CCR, title 23 Section 2725(c) sets forth requirements for corrective action plans prepared by responsible parties and states that, "The regulatory agency shall concur with the corrective action

plan after determining that implementation of the plan will adequately protect human health, safety, and the environment and will restore and protect current or potential beneficial uses of water." This corrective action maximizes the cost effective removal of the petroleum-impacted soil and debris by consolidation of petroleum contaminated soil within the nearby IA-H1 Containment Area in coordination with completion of a RCRA Subtitle C equivalent and Subtitle D engineered cap currently under construction and scheduled for completion in late 2009. The IA-H1 Containment Area covers 72 acres and contains the former RCRA/Facility Landfill, Industrial Wastewater Treatment Plant and Impoundments, and the former Waste Oil Sumps (IR Site 02). In addition to the engineered cap currently being installed, a vertical groundwater barrier (slurry wall) and groundwater extraction trench were installed in late 2004, and has been operating since early 2005 to contain lateral migration of groundwater and/or leachate within the IA-H1 Containment Area. Extracted groundwater/leachate is transferred to the Vallejo Sanitation and Flood Control District (VSFCD) for further treatment.

The Remedial Action Plan (RAP)/Record of Decision (ROD)/Resource Conservation and Recovery Act (RCRA) Closure Plan for Investigation Area H1 (WESTON, 2006a) designated the Containment Area within IA-H1 as a Corrective Action Management Unit (CAMU)-like unit for the consolidation of excavated soil from 1) hot spots within IA-H1, 2) IR Site 16/B3 and IR Site 16/B5, and 3) the Marine Corps Firing Range, by applying the substantive CAMU regulations but not the procedural requirements. The Containment Area within IA-H1 was also designated by the IA-H1 RAP/ROD/RCRA Closure Plan as a CAMU-like unit for the consolidation of excavated soil from other Mare Island remediation sites. The consolidation within the IA-H1 Containment Area of excavated soil from other Mare Island remediation sites will be subject to review and approval by DTSC. Waste from other Mare Island remediation sites that may be deemed acceptable for consolidation within the IA-H1 Containment Area will meet the following acceptance criteria:

- It will be non-liquid.
- It will be not excessively volatile.
- It will not be excessively mobile (leachable).

The CAMU requirements are federal applicable or relevant and appropriate requirements (ARARs) for the IA-H1 Containment Area, where the petroleum contaminated soil from the

DRMO Site and Vicinity will be placed. These requirements are set forth in CCR Title 22, § 66264.552(c) and (e) and they allow for consolidation of wastes in a more cost-effective approach while still protecting human health and the environment. Placement of remediation wastes into or within a CAMU does not constitute land disposal of hazardous waste or creation of a unit subject to minimum technology requirements and, as such, is not subject to land disposal requirements.

Based on prior investigations and removal actions conducted within the DRMO Site and Vicinity, the petroleum-impacted soil and debris to be removed will meet the acceptance criteria for consolidation within the IA-H1 Containment Area. Specifically, all petroleum-impacted excavated soil and debris will be verified to contain no free-draining liquids prior to transport to the IA-H1 Containment Area. The main constituent has been verified to consist primarily of weathered Bunker C (No. 6 Fuel Oil) which is not excessively volatile. It has also been documented in previous investigations that the petroleum free phase product present within the DRMO Site and Vicinity is a high-viscosity material that is typically a semi-solid unless warmed by direct sunlight, therefore is not excessively mobile (CH2M HILL, 2009a).

Soil from the DRMO FSA and adjacent area between Dump Road and the FSA was previously excavated and consolidated within the IA-H1 Containment Area during a NTCRA performed in 2005-2007. Although TPH was analyzed for information purposes during the NTCRA, cleanup goals did not include TPH (WESTON, 2008). Removal of petroleum-impacted soil and debris not removed as part of the NTCRA is the focus of this corrective action. It is planned to consolidate the petroleum-impacted soil within the IA-H1 Containment Area in a similar manner as the soil excavated during the recent NTCRA for other contaminants.

1.8 SCHEDULE

Implementation of the corrective action field work is scheduled for completion by October 2009. A schedule for the project is presented as Figure 1-4.

1.9 PROJECT ORGANIZATION

The planned project organization and key personnel assignments for this corrective action are illustrated in Figure 1-5.

1.10 PETROLEUM CORRECTIVE ACTION PLAN ORGANIZATION

This PCAP is divided into the following sections and appendices:

- Section 1 – Introduction
- Section 2 – Evaluation of Corrective Action Methods
- Section 3 – Corrective Action Approach
- Section 4 – Project Requirements
- Section 5 – Field Activities
- Section 6 – Contingencies
- Section 7 – Corrective Action Completion Report
- Section 8 – References
- Appendix A – Sampling and Analysis Plan
- Appendix B – Accident Prevention Plan
  (includes the Site-Specific Health and Safety Plan)
- Appendix C – Construction Quality Control Plan
- Appendix D – Environmental Protection Plan
- Appendix E – Stormwater Pollution Prevention Plan
- Appendix F – Waste Management Plan
- Appendix G – Traffic Control Plan
- Appendix H – Responses to Comments

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2. EVALUATION OF CORRECTIVE ACTION METHODS

Source removal and in situ treatment methods were evaluated to implement this corrective action. Source removal involves excavation of petroleum-impacted soil/debris, disposal (consolidation at IA-H1 Containment Area), and restoration with suitable backfill soil. In situ treatment of soils includes technologies such as bioremediation, biosparging, or chemical oxidation. Source removal is favored over in situ treatment based on the following factors:

- Biological or chemical oxidation techniques would likely not be effective due to the chemical composition of the heavy-end fuel oil (Bunker C).
- Petroleum-impacted soils and associated debris removal by excavation would minimize the threats of potential contaminant migration to non-impacted areas and/or groundwater.
- Source removal (i.e. excavation) eliminates the need for design, implementation, and installation of a site-specific contamination treatment system, and subsequent operation and maintenance of the system.
- Source removal can be implemented in 2 to 3 months, allowing faster redevelopment or restoration. In situ treatment systems may take years or not be effective at all as noted above. Also, in situ techniques would also not remove the considerable subsurface debris associated with the petroleum contamination.
- Existing petroleum-impacted soils can be cost effectively consolidated within the nearby IA-H1 Containment Area undergoing closure. The IA-H1 Containment Area is a CAMU-like facility equipped with a perimeter groundwater extraction system and vertical barrier (slurry wall), and is being closed with an engineered horizontal cap.

Disadvantages of the source removal method over in situ methods include:

- Exposure of site workers and the environment to impacted soil, that without air monitoring and engineering controls, may pose nuisance dust and/or odor concerns.
- Excavation and loading activities will result in some minor impacts to normal traffic patterns since some excavation areas are under Azuar Drive and Dump Road.

- Transportation of impacted soil increases the risk of spill or release unless best management practices are followed during transport.

The disadvantages for source removal can be effectively mitigated using best management practices; therefore the source removal approach using excavation and consolidation at the IA-H1 Containment Area was selected as the appropriate corrective action approach for the DRMO Site and Vicinity.

2.1 DESCRIPTION OF THE SELECTED CORRECTIVE ACTION

The selected corrective action approach (source removal) will involve the use of an excavator and loader to remove and stage non-impacted overburden soils, followed by excavation of petroleum-impacted soils and direct loading into off-road haul trucks for transportation and disposal at the adjacent IA-H1 Containment Area, followed by confirmation sampling of excavation bottom and sidewalls, backfilling with non-impacted overburden and imported fill, and site restoration. The confirmation soil samples must meet the established Tier 2 screening levels for the site.

Delineation of the excavation areas and sample locations will be performed using global positioning system (GPS) technology. The estimated excavation area boundaries will be located with a handheld GPS unit with sub-meter accuracy. Confirmation samples from the excavation sidewalls and bottom will be submitted to a Navy approved off-site analytical laboratory for TPH as Bunker C analysis using EPA Method 8015B. If the confirmation samples indicate that remaining soils are below the Tier 2 screening levels, the excavation will be backfilled using non-impacted overburden soil and imported fill then compacted and graded to meet existing contours. If the confirmation results exceed the Tier 2 screening levels, the excavation will be expanded laterally within the DON property and/or vertically as required to achieve compliance with the Tier 2 screening levels. The final limits of the excavation will be mapped using a handheld GPS unit, and this information will be incorporated into a final report describing the corrective action activities.

2.2 ESTABLISHMENT OF TIER 2 SCREENING LEVELS

The project soil screening levels for TPH as Bunker C at the DRMO Site and Vicinity were established based on the Tier 2 Risk Assessment Approach (CH2M HILL, 2009b). The assumptions used in developing Tier 2 screening levels follow methods provided by the Water Board Technical Document *Screening for Environmental Concerns at Sites with Contaminated Soil and Groundwater* (Water Board, 2008). This document presents a tiered approach to conducting risk assessments. The Water Board document provides Tier 1 ESLs and guidance on modifying the Tier 1 ESLs to develop site-specific Tier 2 ESLs. Tier 1 ESLs were developed as the lowest screening values for contaminants of concern which pose a significant risk to human health or the environment assuming all possible exposure pathways. However, because some environmental and human health concerns considered in determining Tier 1 ESLs may not be applicable where exposure routes are not complete, soils that exceed Tier 1 levels do not necessarily pose a significant risk to human health or the environment.

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3. CORRECTIVE ACTION APPROACH

This section describes the excavation approach to address the petroleum-impacted areas within the DON property (Figure 3-1).

3.1 EXCAVATION APPROACH

The following steps will be implemented to perform the corrective action:

1. Potential excavation areas will be mapped using GPS and staked or otherwise marked in the field. Perimeter fencing will be erected where not already present to establish the exclusion zone. Subsurface utilities will be located and utilities (including stormwater piping) within the planned excavation area will be isolated and/or bypassed in coordination with the utility owner. A decontamination pad and other support facilities will be established.
2. Prior to excavation, utilities within the excavation area will be physically disconnected and/or cut/capped beyond the anticipated limits of excavation. Air monitoring stations for particulates will be established upwind and downwind of the excavation. Traffic detours will be set up when work impacts either Azuar Drive or Dump Road.
3. A small portion of the Industrial Wastewater Treatment Plant (IWTP) pipeline within Transfer Parcel XVI will be removed and flushed with three volumes of water prior to disposal. Rinsewater will be stored in steel tanks for sampling and disposal in accordance with the VSFCD discharge permit requirements, or other appropriate off-site facility.
4. Excavation will begin in areas with the highest observed levels of petroleum-impacted soil and debris, and extend outward to establish the lateral limits which will be confirmed with sampling. It is anticipated that the excavation sequence will be: 1) inside the DRMO FSA, 2) outside the DRMO FSA south of Dump Road, 3) Parcel XVI north of Dump Road, 4) Azuar Drive within DON property, and 5) Dump Road within DON property.
5. Overburden soil, which has been previously characterized as not impacted by petroleum (CH2M HILL, 2009a), will be removed and stockpiled for possible reuse as backfill. Overburden will be sampled at a frequency of one sample per 1,000 cubic yards as

prescribed in the "Recommended Fill Material Sampling Schedule" (DTSC, 2001). Overburden samples will be analyzed for metals, pesticides, PCBs, semivolatile organic compounds (SVOCs), and TPH as gasoline, diesel, and motor oil at a DON-approved laboratory. Overburden soil may be used as a backfill source if the screening levels as described in the SAP (Appendix A) are not exceeded and regulatory agency concurrence is received.

6. Petroleum-impacted soils and debris visually verified free of liquids will be direct loaded into off-road trucks and transported to the IA-H1 Containment Area for use as subgrade fill beneath the engineered cap. Saturated soils will be allowed to drain within the excavation area before loading. Based on previous site investigations and removal actions, further characterization of the petroleum-impacted soil prior to consolidation within the IA-H1 Containment Area will not be required.

7. Debris removed during the corrective action will be of a size and nature that after placement in the IA-H1 Containment Area can be compacted in one-foot thick intervals, with no substantial debris items visibly protruding from the compacted surface. Any debris which cannot meet this requirement or other requirements for the placement of soil/waste materials specified in the IA-H1 Final Remedial Design Plan (WESTON, 2007) will be removed from the IA-H1 Containment Area and stockpiled within the DRMO Site and Vicinity for recycling or disposal at an approved off-site facility.

8. Free phase petroleum liquids will be periodically removed from the excavation as required using a vacuum truck and placed into storage containers for later characterization for off-site disposal and/or recycling.

9. Air monitoring for particulates will be performed at the site boundary during excavation and backfill activities. Due to the potential for odors to create a nuisance outside the exclusion zone, a non-toxic biodegradable vapor suppression foam (Rusmar AC-645 Foam or equivalent) will be applied to the excavation surfaces as appropriate. Water will be applied to working areas and haul routes as required to minimize dust emissions.

10. Removal of groundwater may be required during soil excavation and/or backfilling activities. In either case, groundwater will be pumped to large portable steel tanks and

undergo sediment and residual petroleum removal before discharge to the VSFCD via a sanitary sewer line in accordance with discharge permit requirements.

11. Confirmation samples will be collected when removal of petroleum-impacted soil and debris is complete based on visual or field screening methods and will include one bottom sample for each 50 by 50-foot grid and one sidewall sample for each 50 linear feet of sidewall. Soil from each sampling location will be collected in an 8-ounce glass jar for analysis of TPH as Bunker C by EPA 8015B at a DON-approved laboratory.

12. If the confirmation soil sample results indicate that the remaining soils exceed the Bunker C screening level, the lateral and/or vertical extent of the excavation within the DON property will be expanded as required to meet the screening level. Additional confirmation soil samples will be collected to confirm any step-out excavation areas.

13. If the confirmation soil sample results indicate that the remaining soils meet the TPH as Bunker C screening level, the excavation will be backfilled and compacted after obtaining DON and regulatory concurrence using a combination of approved overburden soil and an off-site borrow source from selected Mare Island dredge ponds, or other borrow fill originating from elsewhere on or off Mare Island.

14. All backfill sources will be analyzed at a DON-approved laboratory for metals, TPH as gasoline, diesel, and motor oil, pesticides, PCBs, and SVOCs at a frequency prescribed in the "Recommended Fill Material Sampling Schedule" (DTSC, 2001). The results will be compared with the screening levels presented in the SAP (Appendix A).

15. A section of removed stormwater piping will be replaced; however, no other restoration of utilities removed during the excavation is anticipated. Restoration of Azuar Road will consist of replacement of the asphalt surface over compacted aggregate placed to pre-excavation grades. Restoration of Dump Road will consist of compacted aggregate road base over geotextile fabric.

16. After site activities have been completed, and ROICC approval is obtained, all remaining temporary facilities will be removed. A completion report describing the site activities and results will be prepared.

3.2 PETROLEUM-IMPACTED AREAS

The approximate lateral and vertical extent of petroleum-impacted areas were identified by the CH2M HILL Technical Memorandum (CH2M HILL, 2009). The petroleum-impacted areas within property owned by the DON are shown on Figure 3-1. The estimated in situ excavation volumes are listed in Table 3-1 below.

Table 3-1
Estimated Excavation Soil Volume at the DRMO and Vicinity

Excavation Area Location	Estimated In Situ Soil Volume (cubic yards)
Inside the DRMO FSA Outside the DRMO FSA South of Dump Road Azuar Drive Within DON Property	15,542
Parcel XVI Area North of Dump Road	20,200
Dump Road Within DON Property	7,832
Total Estimated In Situ Soil Volume	**43,574**

4. PROJECT REQUIREMENTS

This section delineates the project requirements for training and certification, sampling and analysis, health and safety, construction quality control (QC), environmental protection, stormwater pollution prevention, waste management, and traffic control.

4.1 TRAINING/CERTIFICATION REQUIREMENTS

All site personnel will have completed the basic 40-hour Hazardous Waste Operations and Emergency Response (HAZWOPER) course of instruction, and completed the 8-hour HAZWOPER refresher course within the last 12 months.

Subcontractors performing off-island transport of waste (including preparation of shipping papers, waste loading, and transportation for off-island disposal) will be trained in accordance with the requirements of the Department of Transportation HM-126F. Manifests will not be required for materials consolidated within the IA-H1 Containment Area.

4.2 SAMPLING AND ANALYSIS

Soil samples will be collected for excavation confirmation and to determine if soil is appropriate for use as backfill. The sampling and analysis requirements for the corrective action are detailed in the Sampling and Analysis Plan (SAP) (Appendix A).

The purpose of the SAP is to provide the procedures, quality assurance and QC requirements, and data gathering methods for field sampling. The SAP will be used by field and laboratory personnel as a reference document during sampling and analysis.

The following EPA analytical methods from *EPA Test Methods for Evaluating Solid Waste, Physical Chemical Methods, SW-846*, Third Edition and Final Updates (EPA, 1986) will be used to analyze samples during this project, as required:

Excavation Confirmation Sampling:

- TPH as Bunker C (EPA Method 8015B)

Backfill Sampling:

- Metals (EPA Method 6010B/7471A)
- SVOCs (EPA Methods 8270C)
- PCBs (EPA Method 8082)
- Pesticides (EPA Method 8081A)
- TPH as gasoline diesel, and motor oil (EPA Method 8015B)

Details on the screening level for TPH as Bunker C is provided in Section 1.4 of this PCAP. Screening levels for backfill are provided in the SAP (Appendix A). The sample collection and handling process and the QC requirements are also presented in the SAP.

The analytical laboratories selected to analyze samples for this project will be certified by the California Department of Health Services through the Environmental Laboratory Accreditation Program for all of the analytical methods required for the project. In addition, the laboratory must successfully complete the Naval Facilities Engineering Service Center Laboratory Evaluation Program prior to sampling activities and maintain current status throughout the duration of the project.

The SAP will be revised or amended should circumstances, such as a significant change in work scope, arise that may affect sampling. The modification process will be based on EPA guidelines, direction from the DON Quality Assurance Officer, and be in conjunction with *Environmental Work Instruction (EWI) #2, 3EN2.2, Review, Approval, Revision, and Amendment of SAPs* (Naval Facilities Engineering Command [NAVFAC], 2006).

4.3 HEALTH AND SAFETY

The Accident Prevention Plan (APP), including the Site-Specific Health and Safety Plan (SHSP) for the project is included as Appendix B in the DON and WESTON copies of the Final PCAP. The APP/SHSP contains general health and safety procedures as well as site-specific Activity Hazard Analysis. A summary of the air quality monitoring requirements is presented in the SHSP.

The air monitoring program will monitor the upwind and downwind air quality during excavation and earthmoving activities. The air monitoring requirements will ensure that activities associated with the air sampling program at the facility are performed in accordance with the requirements of 40 CFR, Part 53, for total suspended particulates. An air monitoring station will be positioned upwind and downwind at the site boundaries when soil disturbance activities are occurring. The air monitoring stations will utilize personal dust monitors to measure total particulates (real-time) and store the data in detail for subsequent retrieval by a computer. The interior cab of the excavator will also be monitored for particulate matter. The results of air quality sampling will be used to identify worker health and safety or air quality compliance concerns, and to determine if changes in site dust control procedures are required.

An air monitoring QC program will be implemented to ensure that collected data are accurate and precise in order to effectively characterize both the magnitude and variations in ambient conditions at the monitoring stations. Complete data regarding routine operations and QC aspects of the program, including all logbook notes, calibration forms, and certifications, will be maintained on file. All field materials, including field notes, operating logs, and calibration forms will be periodically compiled and reviewed.

4.4 CONSTRUCTION QUALITY CONTROL

A Construction Quality Control Plan (CQCP) is included as Appendix C to address construction-related definable features of work (DFWs) and ensure that the work performed is in compliance with the specifications. The DFWs are activities or tasks which are separate and distinct from other activities and require separate control activities. The CQCP establishes the procedures and methods to be implemented for the DFWs.

The purpose of the CQCP is to establish the specific procedures and methods for construction/remediation activities performed during excavation, transport, and restoration activities. The CQCP provides an effective QC system to ensure the quality of all work performed by WESTON and its subcontractor personnel.

The CQCP complies with the requirements of the following documents:

- *Contractor's Guide* (NAVFAC, 1999)
- *Guide Specification, NFGS-01450H* (NAVFAC, 2002a)
- *Guide Specification, NFGS-01330F* (NAVFAC, 2002b)

The CQCP is applicable to all construction operations and will be available in the project field office. All work activities will be conducted in accordance with this PCAP.

The Project CQCP will be implemented for the following DFWs:

- Site Setup and Erosion/Storm Water Pollution Prevention Plan (SWPPP) implementation
- Traffic Control
- Isolation of Utilities
- Petroleum-impacted Soil Excavation, Transport Placement, and Air Monitoring
- Confirmation Sampling
- Free Product Removal and Disposal
- Groundwater Removal and Disposal, as necessary
- Backfilling Operations
- Site Restoration

The Project QC Manager will institute and maintain a submittal register to track submittals from issue through approval. A list of required submittals will be developed and maintained throughout the duration of the project. The submittal register will be kept current by WESTON at the job site. Submittals will be scheduled, reviewed, certified, and managed in accordance with the *Guide Specification, NFGS-01330F* (NAVFAC, 2002b). Site restoration figures and specifications for backfill, asphalt replacement, and hydroseeding are included in Attachment 1 of the CQCP (Appendix C).

Submittals will be reviewed to ensure completeness, accuracy, and contract compliance and be approved by the Project QC Manager. Any submittals requiring modifications or changes will be returned to the originating organization for correction and then resubmitted for review and approval by the Project QC Manager prior to acceptance. Approval of the submittal will be indicated by signing and dating the submittal form. The Project QC Manager or designee will

perform a check to ensure that all materials and equipment have been tested, submitted, and approved during the preparatory phase of the QC inspections; no construction activities will be performed prior to the required approval of applicable submittals.

The Project QC Manager will ensure the performance of all tests specified or required by the project specifications and drawings to verify that control measures are adequate to provide a product conforming to contract specifications. General requirements for testing procedures to be implemented for this project are included in the project specifications. Any deficiencies will be reported to the Project Manager for corrective action.

An independent testing laboratory will provide any required laboratory services. The laboratory will be selected and qualified in accordance with applicable project requirements and accredited/certified as described in Section 4.2.

A licensed geotechnical company will be subcontracted to perform soil compaction testing during site restoration activities along Dump Road and Azuar Drive. The geotechnical testing company will be selected and qualified in accordance with applicable project requirements and licensed to perform the required work. Test reports will be obtained from the geotechnical company daily when activities requiring geotechnical testing are being performed.

After the start of field activities, the Project QC Manager will conduct QC meetings once every week or as required by the Resident Officer in Charge of Construction (ROICC). The meetings will be held at the project site, and will be attended by the Site Manager and Site Health and Safety Officer.

4.5 ENVIRONMENTAL PROTECTION

The environmental protection requirements for the project discussed in the Environmental Protection Plan (EPP), included as Appendix D, are summarized in this section. The primary focus of this plan is to prevent impacts to nearby non-tidal wetland habitat as a result of site activities. The planned excavation area north of Dump Road near the eastern boundary of IA-H1 within Transfer Parcel XVI is located near a small portion of the non-tidal wetland area known as Wetland A. The vegetation is this area is not populated with pickleweed, which is the preferred habitat for the Salt Marsh Harvest Mouse (SMHM), a Federal- and State-Listed

Endangered Species. However as a precaution, a silt fence will be installed along the boundary with the wetland area north of the excavation as a barrier to prevent SMHM from entering the work area.

The EPP addresses applicable environmental considerations and details the environmental compliance, waste management procedures, and the specific environmental regulatory, procedural, and training requirements associated with the corrective action activities. Major environmental considerations associated with the corrective action are addressed in the EPP and include the following:

- Airborne contaminants generated during earthmoving activities have potential health hazards will be addressed through engineering controls, and daily air monitoring, sampling, and analysis (detailed in the APP/SHSP).
- Stormwater management activities, Best Management Practices (BMPs), and plans for preventing uncontrolled runoff are described in the SWPPP (Appendix E).
- Management of wastes generated during the project is an important aspect of the planned field activities and is described in the Waste Management Plan (Appendix F).

4.6 STORMWATER POLLUTION PREVENTION

The SWPPP is included as Appendix E to present the measures to be implemented to minimize sediment and other pollutants in stormwater discharges during field activities at the project site. The SWPPP has two major objectives: 1) to identify the sources of sediments and other pollutants that might affect the quality of stormwater discharges and 2) to ensure that action is taken to reduce pollutants in stormwater discharges during construction activities. The SWPPP includes BMPs that address source reduction.

The plan complies with the substantive requirements of the National Pollutant Discharge Elimination System program, specifically the General Construction Activity Stormwater Permit program as set forth by the Water Board in August 1999 Resolution No. 99-08-Division of Water Quality. Regulated sites, including "site grading over 1 acre," are generally required to develop a SWPPP and a Stormwater Monitoring Sampling and Reporting Program. The BMPs presented in

the SWPPP describe the actions required to mitigate potential pollutant sources. The BMPs will focus on three main areas:

- Eliminate or reduce the movement of silt from the excavation area into stormwater runoff by preserving existing vegetation and through the use of silt fences, straw wattles, berms, and grading.
- Manage solid wastes to prevent contamination of stormwater runoff through the implementation of the Waste Management Plan (WMP) and the use of dumpsters to contain solid waste.
- Manage hazardous waste to prevent spills and decrease the potential for off-site discharge through implementation of the WMP, use of spill control measures, and use of procedures for hazardous materials storage and vehicle fueling.

BMPs will be implemented and inspected regularly to maintain stormwater quality at the site. The BMPs will be reviewed and updated if new hazards are introduced to the site. Although the excavation activities for the corrective action are planned to occur during the dry season, straw wattle will be placed across drainage swales to the north and south sides of Dump Road as a precaution against transport of contaminated sediments into the Wetland A and Wetland B non-tidal wetland areas.

4.7 WASTE MANAGEMENT

The Waste Management Plan is included in Appendix F to present the waste management requirements for this project. The WMP provides information on how wastes, including potentially hazardous wastes such as excavated contaminated soil, polyethylene liners, personal protective equipment (PPE), and decontamination water, will be managed and disposed. A secondary goal of the WMP is to ensure that waste minimization and recycling practices are followed, to the extent practical, which will reduce the volume of generated waste.

The purpose of the WMP is to identify the types and quantities of wastes expected to be generated. The transportation and disposition of any waste materials to appropriate off-island disposal facilities (for example recycling of free phase petroleum product) are also described in

the WMP. The WMP will be revised if the project scope is modified or if changes are made to applicable regulations.

There are several potential waste streams that may result from the corrective action activities at the site. Potential waste streams associated with the project activities can be categorized as follows:

- Excavated petroleum-impacted soil and debris
- Free product removed from the excavation
- Groundwater accumulation within the excavation
- Non-hazardous solid waste, such as trash, empty calibration gas canisters, etc.
- Used PPE (e.g. disposable gloves and coveralls, and so forth)
- Wastewater resulting from equipment and personnel decontamination
- Equipment-related waste; including engine oil, hydraulic fluid, grease, coolant, and fuel, oil, and air filters

The WMP discusses applicable waste management, transportation, and disposal requirements for each of the aforementioned waste streams. Waste management will be performed in accordance with all applicable regulatory requirements.

4.8 TRAFFIC CONTROL

The Traffic Control Plan is presented as Appendix G and describes the measures that will be taken to detour the normal traffic flow pattern around sections of Azuar Drive and Dump Road affected by soil excavation activities. Traffic control measures will be implemented in accordance with all applicable City, State, and Federal laws, statues, regulations or other applicable requirements including, but not limited to: the Department of Transportation, Federal Highway Administration's (2007) "*Manual on Uniform Traffic Control Devices for Streets and Highways*", the California Department of Transportation (2006a) "*Manual of Traffic Controls for Construction and Maintenance Work Zones*", the US Army Corps of Engineers *Safety and Health Manual EM 385-1-1*, and applicable Federal and California Occupational Safety and Health Administration (OSHA) regulations.

It is anticipated that Azuar Drive between A Street and Kansas Street will be affected by the site work. To the extent practical, detour of Azuar Drive will only be implemented during excavation

and/or site restoration within the Azuar Drive footprint and portions of IA-B.2 east of Azuar Drive to minimize impacts to the public. The detours will remain in place for the duration of excavation and restoration activities in this portion of Azuar Drive. Haul trucks will stay off public roads when transporting soil/debris from the excavation areas to the IA-H1 Containment Area. Dump Road only services the IA-H1 site and therefore closure of Dump Road will not cause any inconvenience to the general public. Access to IA-H1 will be maintained by routing traffic to the south and west of the DRMO when excavation is occurring within or adjacent to Dump Road.

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5. FIELD ACTIVITIES

This section describes the preparatory and field activities to be performed to implement the corrective action at the DRMO Site and Vicinity.

5.1 PREPARATORY ACTIVITIES

Preparatory work will include obtaining City of Vallejo grading and traffic control permits for work within Dump Road and Azuar Drive, a VSFCD permit for potential discharge of excavation groundwater to their collection system, marking and isolation of underground utilities, and setup of temporary facilities and site controls. A preconstruction meeting with Navy representatives will be conducted prior to mobilization. Topics will include construction milestones, sequence of field operations, health and safety, stormwater pollution prevention, environmental protection measures, soil sampling and analysis, and QC activities. Prior to beginning any new definable feature of work in the field, a preparatory phase QC meeting will be scheduled to discuss the task requirements and activity hazard analysis associated with that task. Details of the QC activities are presented in the CQCP (Appendix C).

5.1.1 Permits

Permits required to perform the corrective action will include obtaining a grading permit and approval of the traffic control plan from the City of Vallejo. Underground Service Alert (USA) will be notified to locate underground utilities prior to excavation activities; the USA ticket will be maintained active throughout the duration of intrusive site activities. A grading and excavation permit and an encroachment permit will be required from the City of Vallejo. A permit will also be required from VSFCD for discharge of any groundwater removed from the excavations. In addition a Notice of Intent will be submitted to the Water Board for implementation of the stormwater pollution prevention measures.

5.1.2 Utility Isolation

A number of underground utility lines are present in the anticipated excavation areas. The known utility lines and approximate locations where utilities will be isolated/disconnected and

cut/capped in accordance with utility requirements to support soil excavation activities are presented on Figure 5-1. Capping utilities will generally consist of grouting inside the pipeline two feet from the cut end and installing a three sided plywood form with two foot sides at the end of the pipe and filling the form with grout. The following is a summary of utility lines anticipated to be impacted by the excavation and their disposition:

- **Electrical**–A live 12KV electrical line supplying power to Building 505 runs along Azuar Drive and through the Crane Test Area. Island Energy has the capability to power Building 505 from an alternate source and will isolate and deenergize the electrical line within the Azuar Drive excavation areas north of the transformer located adjacent to the Building 831 parking area south of the DRMO FSA. This line will be removed but may require installation of a temporary bypass with the approval of Island Energy. A deactivated (disconnected) electrical line runs from Azuar Drive west through the Crane Test Area into IA-H1. Easement abandonment will be obtained from Island Energy to remove a portion of this electrical line within the anticipated excavation area.
- **Water**–A water line feeding IA-H1 is located under and adjacent to Dump Road west from the Azuar Drive intersection. This underground line will be removed and replaced with an aboveground polyethylene line for the duration of the corrective action. A water main running parallel to Azuar Drive adjacent to the DRMO will be isolated and removed. The Vallejo Water Department has indicated that any of their assets within the excavation area can be removed without replacement until later upgrades are installed.
- **Natural gas**–Abandoned gas lines are located in potential excavation areas along Azuar Drive north and east of Building 275. The gas line owner, Island Energy, has indicated that these lines can be removed without replacement.
- **Sewer**–One active manway located on Azuar Drive adjacent to the DRMO FSA is used to discharge extracted groundwater from the IA-H1 Containment Area via a temporary aboveground polyethylene transfer line. VSFCD has indicated that any of their assets within this portion of Azuar Drive can be removed without replacement. To allow for continued discharge to the VSFCD for the IA-H1 groundwater extraction system, an underground crossing will need to be installed if the manway is removed.

- **Storm Water**–A storm water line runs parallel to Azuar Drive adjacent to the DRMO. VSFCD has indicated that these lines will need to be replaced with a 12-inch polyvinyl chloride line to allow for drainage of stormwater until permanent upgrades are installed by others.
- **Telephone**–AT&T has a "deactivated line" that parallels the electric utility along Azuar Drive and turns to the west at Dump Road. AT&T has indicated that this line can be removed without replacement.
- **Industrial Wastewater**–The abandoned IWTP pipelines run along the length of Dump Road and Azuar Drive adjacent to the DRMO. A small portion of the IWTP pipeline within Transfer Parcel XVI will be removed and flushed with three volumes of water prior to disposal. Rinsewater will be stored in steel tanks for sampling and disposal in accordance with the VSFCD discharge permit requirements, or other appropriate off-site facility.
- **Salt Water Fire Main**–Navy drawings show a saltwater pipeline making a loop in the DRMO FSA. This line was not encountered during previous excavation work at the DRMO and may no longer exist. If present, it will be removed without replacement.

5.2 MOBILIZATION

Field personnel and equipment will be mobilized to the site upon approval of the PCAP and obtaining permits described in Section 5.1.1. Training and medical records for field personnel and support vehicle information (proof of current vehicle registration and insurance) will be maintained on file at the WESTON IA-H1 field office.

The following list of equipment is anticipated to be used during the corrective action field activities:

- Water truck
- Caterpillar (CAT) 345 excavator
- CAT 966 loader
- CAT D-6 dozer
- CAT 740 off-road haul trucks
- CAT 815 (20-ton) sheepsfoot compactor

- CAT 140H motor grader

Mobilization will also include health and safety awareness training and site orientation for field personnel. Habitat avoidance awareness training will also be provided for all site workers to avoid adverse impacts on SMHM habitat north of the work area. Portable restrooms will be provided and material staging areas will be established. Work control area will be established as follows; support zone, contamination reduction zone, and exclusion zone (EZ). Personnel entering the EZ will wear appropriate PPE as specified in the Accident Prevention Plan/Site-Specific Health and Safety Plan.

Concurrent with mobilization and site setup activities, isolation of utilities will be performed as described in Section 5.1.2, implementation of traffic controls will be as described in Appendix G, and implementation of environmental protection and stormwater pollution prevention measures will be as described in Appendices D and E, respectively.

5.3 EXCAVATION, TRANSPORTATION, AND DISPOSITION OF SOIL, DEBRIS, PRODUCT, AND GROUNDWATER

Petroleum-impacted soil and debris will be excavated and loaded for transport to IA-H1 for placement as subgrade material within the IA-H1 Containment Area. Petroleum contaminated soil from within the DRMO FSA was analyzed during the previous DRMO remedial activities and was determined to meet the acceptance criteria for the CAMU-like IA-H1 Containment Area described in Section 1.7 (WESTON, 2008). The petroleum-impacted soils associated with the current action are expected to be consistent with those already analyzed and approved for placement in the IA-H1 Containment Area from the DRMO Site. The petroleum constituents are also considered to be similar to the waste oil already present at the former waste oil sumps (IR Site 02) located within the IA-H1 Containment Area, therefore no further chemical characterization will be performed.

The anticipated lateral extent of the excavation area shown in Figure 1-2 is based on the Draft Final Technical Memorandum (CH2M HILL, 2009). However, the actual depth and lateral extent of the excavation will be based on visual observation of soils for evidence of petroleum contamination and the results of confirmation sampling. Petroleum contaminated soil located in

close proximity to buildings or other immovable structures will be removed to the maximum extent practicable, taking into account personnel safety and potential damage to the structures. Some petroleum contaminated soil and debris is located under an appreciable layer of overburden soil that shows no visible indication of contamination. In those cases, the overburden soil will be stockpiled and sampled for metals, pesticides, PCBs, SVOCs, and TPH as gasoline, diesel and motor oil. Representative samples will be collected at the frequency of one sample per 1,000 cubic yards as prescribed in the "Recommended Fill Material Sampling Schedule" (DTSC, 2001). Overburden soil may be used as a backfill source if results do not exceed the screening levels provided in the SAP (Appendix A) and reuse is approved by the regulatory agencies.

Unless conditions dictate otherwise, petroleum-impacted soil will be excavated in the following sequence:

1. Inside DRMO FSA west of Azuar Drive
2. Outside DRMO FSA south of Dump Road
3. Parcel XVI area north of Dump Road
4. DON property within Azuar Drive
5. DON property within Dump Road

Overburden soil will be excavated using a CAT 345 excavator and moved by a CAT 966 loader to a staging/stockpile location for analysis and possible reuse as backfill material. The excavation of overburden will occur in parallel strips with the length of each strip based on the reach of the excavator boom. After each strip is excavated to remove the overburden, the excavator operator will remove the deeper petroleum-impacted soil and debris and direct load into CAT 740 (40-ton capacity) off-road trucks for transport to the IA-H1 Containment Area over the route shown in Figure 5-2. The working face of the excavation will be sloped as dictated by site conditions to allow the trucks to be safely positioned near the excavator for loading. In the event that the soil is saturated with groundwater or free product, the material will be staged within the excavation along a bench created by removal of overburden, and the free liquids allowed to drain into the excavation before loading into the off-road trucks. Due to the potential for odors to create a nuisance outside the exclusion zone, a non-toxic biodegradable vapor suppression foam (Rusmar

AC-645 Foam or equivalent) will be sprayed onto the active excavation surfaces when nuisance odors are detectable in areas accessible by the public.

Debris present in soil removed from the DRMO and Vicinity, and placed within the IA-H1 Containment Area under the engineered cap, must be of a size and nature that after placement with soil in one foot thick compacted intervals, no substantial debris items may be visible protruding from the compacted surface. Any debris items which cannot be placed and/or compacted to meet this requirement shall be removed. Other applicable requirements for placement of soil/waste materials specified in the IA-H1 Final Remedial Design Plan shall also be met.

The truck route for petroleum-impacted material will proceed west from the excavation area to the IA-H1 Containment Area following a non-public haul road established just south of Dump Road. Care will be taken to not overload the haul trucks to avoid spillage. Water trucks will be used to provide dust control at the excavation site and the along the haul route to IA-H1. Water trucks will be refilled from a water tower established in IA-H1. An air monitoring station will be established at the site perimeter upwind and downwind of the work area during soil disturbance activities. Particulate dust will be evaluated using a real-time Mini-Ram instrument which records particulate concentrations at specified intervals for later download and recording. An action level of 1.5 milligram per cubic meter (mg/m^3) will be used to determine the effectiveness of dust control activities and to indicate when changes in the level of dust suppression activities are warranted. Additional details regarding air monitoring are provided in the Accident Prevention Plan/Site Health and Safety Plan (Appendix B).

Free product encountered during soil excavation activities will be removed using a vacuum truck and stored onsite in containers within a plastic-lined and bermed holding area pending characterization and disposal at a permitted offsite disposal facility. If free product is encountered on groundwater it will be removed using floating product skimmer pumps followed by absorbent booms. Free product will be sampled and managed as described in the Waste Management Plan (Appendix F).

Soil and debris from the excavation areas will be placed within the IA-H1 Containment Area and spread in one foot thick layers. No free liquids will be allowed. Soil with high moisture content

will be allowed to dry or blended with dryer material before compaction using six passes with a 20-ton sheepsfoot compactor. A minimum six inches of import soil from the dredge ponds approved for use as a borrow source for the IA-H1 Containment Area will be placed over the petroleum-impacted soil prior to final grading and smooth drum rolling for placement of the geosynthetic membrane.

If necessary, dewatering of accumulated groundwater will be performed before backfilling activities. Free product will be removed as previously described using floating product skimmer pumps and absorbent booms. Dewatering will then be performed by pumping water through a filter system. The filter system will consist of four 10-micron bag filters and two 1-micron cartridges operating in a series to remove sediment from the water. Following filtration, the groundwater will be pumped through Organophillic Clay Vessels for residual oil removal if necessary. The pre-treated water will be transferred to steel storage tanks for sampling and disposal in accordance with the VSFCD discharge requirements.

5.4 CONFIRMATION SOIL SAMPLING

Confirmation sampling will be performed in accordance with the specific requirements contained in the Sampling and Analysis Plan (Appendix A). Samples will be collected prior to backfilling of excavations to verify that all residual soil has met the applicable Tier 2 screening criteria based on depth below ground surface and distance from wetlands. One bottom sample will be collected for each 50 by 50 foot grid, and one sidewall sample will be collected for each 50 linear feet of sidewall. Sidewall confirmation samples will be collected at depths based on adjacent petroleum-impacted soil removed. If free product was present, the sidewall sample will be collected at a depth corresponding to the removed free product. If stained soil or odors were present, the sidewall sample will be collected at the corresponding depth. Samples will be analyzed by a Navy approved off-site laboratory utilizing EPA Method 8015B for TPH as Bunker C. Should the results of confirmation sampling indicate that the remaining soils exceed the Tier 2 screening levels, the lateral and/or vertical extent of the excavation will be expanded as required to meet the Tier 2 screening levels. When the Tier 2 screening level criteria has been met for a specific excavation area, the excavation will be backfilled upon concurrence from the Navy and regulatory agencies.

5.5 BACKFILL, COMPACTION, AND SITE RESTORATION

Acceptable backfill is considered to be general fill or crushed stone with a maximum size of 3-inch. Fill from the interior of Dredge Ponds 4M or 4S that has been previously sampled and approved for use as cover soil for the IA-H1 Containment Area may be utilized as backfill (and/or similar interior soil from Dredge Pond 2S that has also been similarly sampled for consideration as a backfill source, if needed). Overburden and any other imported borrow fill material will be tested for the appropriate chemical analyses to demonstrate that it meets acceptance requirements. Representative samples will be collected at the frequency prescribed in the "Recommended Fill Material Sampling Schedule" (DTSC, 2001), described in the SAP (Appendix A), and analyzed for metals, pesticides, PCBs, SVOCs, and TPH as gasoline, diesel and motor oil. Results will be compared to screening levels presented in the SAP (Appendix A). All sources of backfill material, including overburden, Mare Island sources, and import borrow fill, will be approved by the regulatory agencies before use as backfill.

Any significant groundwater present in the excavations (6 inches or greater) will be removed using a centrifugal pressure pump. Groundwater will be managed as noted in Section 5.3. The backfill material will be spread into the excavation in 12-inch lifts using a CAT D-6 dozer. Each layer of backfill will be compacted by making three 2-way passes using a 20-ton sheepsfoot compactor. In general the pre-excavation contours will be restored using the backfill material. However in the Parcel XVI area north of Dump Road, the elevation will be adjusted to provide a gradual slope to match the adjacent IA-H1 elevation to the west and the non-tidal wetland elevation to the north. After final grading, disturbed areas within Parcel XVI and the DRMO FSA will be hydroseeded with a mixture of mulch, fertilizer and the following seed mix:

- California brome (*Bromus carinatus)*—20 pounds per acre live seed
- Meadow barley (*Hordeum brachyantherum)*—10 pounds per acre live seed
- Blue wild rye (*Eleymus glaucaus)*—10 pounds per acre live seed

Within the roadway alignment for Azuar Drive, the general fill will be compacted using three 2-way passes performed with a 20-ton soil sheepsfoot compactor. Backfilling will be performed with import fill capable of achieving 90 percent compaction. The top 24 inches of Class II AB material (31 inches if on-island recycled aggregate is used) will be compacted to 95 percent soil

density. For safety reasons, only the top 4 feet will be tested for soil compaction. The final asphalt layer on Azuar Drive will consist of a 5.5-inch thick layer of asphaltic concrete Type B with a tack coat in accordance with the City of Vallejo Regulations and Standards Specifications for Public Improvements (City of Vallejo, 1992) and Section 39 of the California Department of Transportation (2006b) Standard Specifications.

For Dump Road, the compacted general fill will be brought to within 12 inches of the final road surface. A woven geotextile fabric (Mirafi 500X or equivalent) will be placed within one foot of the final surface and covered with 12 inches of compacted aggregate (Class II AB).

After all field activities have been completed and accepted by the Navy, all temporary facilities will be removed. Demobilization activities will include decontamination of equipment, removal of all equipment and materials, collection and disposal of all waste material, general housekeeping, and a final site inspection by the ROICC to verify that all work has been completed as contracted.

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6. CONTINGENCIES

Descriptions of contingencies that may be encountered during implementation of the corrective action are detailed below.

6.1 NON-TIDAL WETLAND

The potential excavation area within Transfer Parcel XVI is located near a small portion of a non-tidal wetland area known as Wetland A. If excavation of petroleum-impacted soil and debris is required to be extended into the non-tidal wetland area presented on Figure 1-2, the BCT, including California Department of Fish and Game (CDFG) and U.S. Fish and Wildlife Service (USFWS) will be contacted before work is continued and the following conservation will be implemented:

a. Excavation activities will be conducted when the non-tidal seasonal wetland area is dry.

b. A qualified biologist will conduct a Biological Resource Education Program briefing to all site personnel prior to entry into the non-tidal wetland area.

c. Prior to excavation work extending into the non-tidal wetland area, a qualified biologist will perform a visual reconnaissance in the vicinity of the planned non-tidal wetland work area to identify the presence of any SMHM, California Clapper Rails, or California Black Rails (Rails). If SMHM or Rails are observed, work will not proceed until the USFWS and DGF have been notified and the SMHM and or Rails have left the area on their own volition.

d. Vegetation in upland or non-tidal wetland areas that is greater than 50 feet from dense pickleweed vegetation will be cut using ride-on powered mowers or other equipment with the oversight of a qualified biologist to minimize potential cover for the SMHM within the work areas. Equipment and personnel will be limited to the areas where vegetation has been cut.

e. Dense pickleweed vegetation or vegetation within 50 feet of dense pickleweed vegetation will be cut or removed using non-mechanized tools under the oversight of a qualified biologist.

f. Silt fencing will be installed between areas of dense pickleweed vegetation and work sites immediately following vegetation removal to prevent entry of SMHM into cleared areas. The fencing will be trenched into the ground and backfilled to prevent SMHM from moving underneath the fencing. USFWS and CDFG will be required to review and approve the final design and proposed location of the fencing prior to installation. The USFWS-approved biological monitor will have the ability to make field adjustments to the location of the fencing depending on site-specific habitat conditions.

g. A USFWS-approved biological monitor will be present to monitor for SMHM (and Rails) each day during work activities in non-tidal wetland work areas. The biological monitor will also periodically (weekly) observe work within adjacent upland areas. The monitor will have the authority to stop work if deemed necessary for any reason to protect SMHM or Rails.

h. The biological monitor will monitor the silt fencing periodically (daily if work in the non-tidal area is affected) to ensure that it remains an effective barrier to prevent entry of SMHM into work areas. Maintenance of the fencing will be conducted as needed throughout the work period, including the habitat restoration work.

i. Prior to the initiation of work each day within non-tidal work areas, the biological monitor will thoroughly inspect the work area and adjacent habitat areas to determine if SMHM (or Rails) are present in the areas and will monitor throughout the day while work activities are occurring.

j. If a mouse of any species (or Rail) is observed, then work will not be initiated or will be stopped immediately by the biological monitor until the mouse (or Rail) leaves the work area on its own volition and the USFWS and CDFG are notified. If the mouse (or Rail) does not leave the work area, work will not be reinitiated until the USFWS and CDFG are contacted and have made a decision on how to proceed with work activities. The biological monitor will direct work activities accordingly.

k. Excavation and haul equipment will be confined to the access routes, designated staging areas, and designated excavation areas.

l. The equipment decontamination area will be located in the designated upland staging area away from the wetland habitat.

m. Upland routes containing non-native vegetation will be used as access routes to the excavation sites to the maximum extent practicable.

n. Any excavation within non-tidal wetlands will be backfilled and graded to an elevation to restore the area to pre-existing or better functions and values, including seeding with appropriate wetland species prior to the rainy season.

6.2 ADJACENT PROPERTY

As discussed in Section 1.1, portions of the DRMO Site and Vicinity are included within the Eastern Early Transfer Parcel that was transferred to the City of Vallejo in 2000 and are no longer owned by the DON. Although the DON is working with the adjacent property owners to coordinate removal of the petroleum-impacted areas presented on Figure 1-2, excavations under this corrective action will be performed only within the DON property boundaries.

The anticipated depth of petroleum-impacted soil to be removed along the property boundaries of Dump Road and Azuar Drive are presented on Figure 6-1. If the adjacent petroleum-impacted soil is not removed in conjunction with the DON property, excavations at the property boundary will be sloped 1:1 or as required to ensure stability and confirmation sampling will be performed. If mobile free phase petroleum is encountered within the neighboring property, a geomembrane will be installed during backfilling activities to prevent potential cross contamination. Figures 6-2 and 6-3 present the cross-sections and placement of a contingency barrier along Dump Road and Azuar Drive if the adjacent property is not excavated in sequence with the DON excavations.

6.3 SCHEDULE DELAYS

Petroleum-impacted soil and debris are anticipated to be placed within the IA-H1 Containment Area. Because the engineered cap within the Containment Area is scheduled to be completed by before 2010, excavated soil and debris from the DRMO and Vicinity must be placed and compacted by late October 2009 to meet the schedule. If the corrective action is delayed and

placement of soil and debris are not accomplished in time for the cap completion, the remaining soil and debris will be stockpiled for waste profiling to determine the appropriate off-site disposal requirements.

6.4 OVERBURDEN

Some petroleum-impacted soil and debris is located under an appreciable layer of overburden soil that shows no visible indication of contamination. In those cases, the overburden soil will be stockpiled and sampled for metals, pesticides, PCBs, SVOCs, and TPH as gasoline, diesel and motor oil. Representative samples will be collected at the frequency of one sample per 1,000 cubic yards as prescribed in the "Recommended Fill Material Sampling Schedule" (DTSC, 2001). Overburden soil may be used as a backfill source if results do not exceed the screening levels provided in the SAP (Appendix A) and reuse is approved by the regulatory agencies.

If the overburden soil is not acceptable for reuse as backfill, then the material will be consolidated within the IA-H1 Containment Area subject to review and approval by DTSC. As previously discussed in Section 1.7, waste from other Mare Island sites that may be deemed acceptable for consolidation within the IA-H1 Containment Area will meet the following acceptance criteria:

- It will be non-liquid.
- It will be not excessively volatile.
- It will not be excessively mobile (leachable).

7. CORRECTIVE ACTION COMPLETION REPORT

During implementation of the corrective action field activities, data will be recorded in daily reports, logs, and summary tables. Digital pictures will be taken during different stages of the corrective action including mobilization, excavation, sampling, site restoration, and demobilization. The completion report will include, but not be limited to, documenting the following activities:

- Excavation volumes (cubic yards of soil/debris removed from the DRMO Site and Vicinity)
- Excavation boundaries and confirmation sample locations
- Location and description of soil/debris placed within the IA-H1 Containment Area
- Volume and description of material disposed of or recycled at an off-site facility
- Decontamination activities

Analytical data will be compiled and presented in summary tables referencing the site specific Tier 2 and import soil screening levels. A draft version of the completion report will be submitted by the Navy to the Water Board and other BCT members for review. Comments on the draft version of the document will be addressed and a final completion report will be submitted.

In accordance with NAVFAC Southwest Environmental Work Instruction EWI #6, analytical data collected for the corrective action will be submitted to the Naval Installation Restoration Information Solution in the Naval Environmental Data Deliverable format. Sampling locations will be located using GPS in California State Plane coordinates.

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8. REFERENCES

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FIGURES

N00221_001372
MARE ISLAND

SENSITIVE RECORD

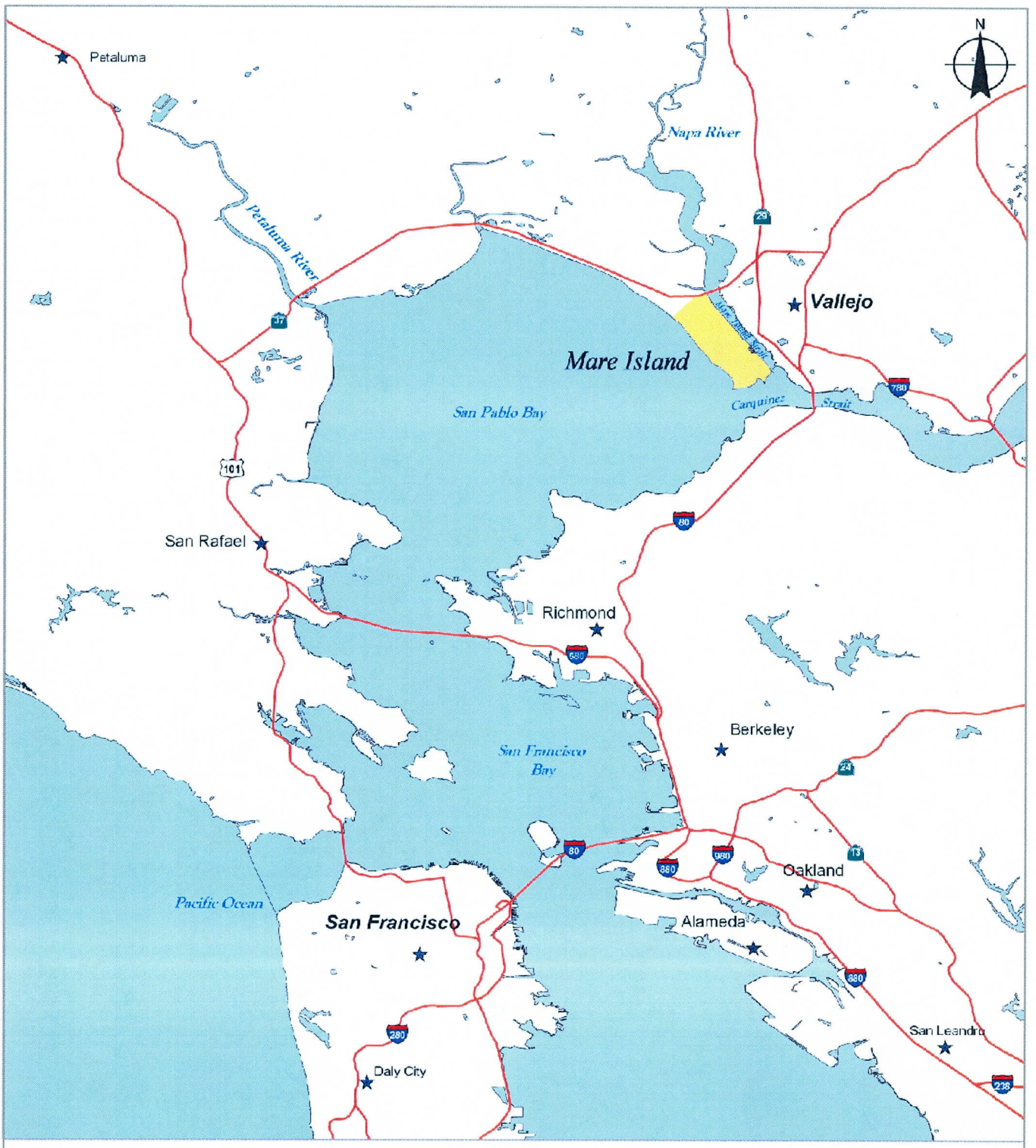
PORTIONS OF THIS RECORD ARE CONSIDERED SENSITIVE AND ARE NOT AVAILABLE FOR PUBLIC VIEWING

FIGURES 1-1 THROUGH 1-3

FOR ADDITIONAL INFORMATION, CONTACT:

DIANE C. SILVA, COMMAND RECORDS MANAGER, CODE EV33
NAVAL FACILITIES ENGINEERING COMMAND, SOUTHWEST
1220 PACIFIC HIGHWAY (NBSD BLDG. 3519)
SAN DIEGO, CA 92132

TELEPHONE: (619) 556-1280
E-MAIL: diane.silva@navy.mil

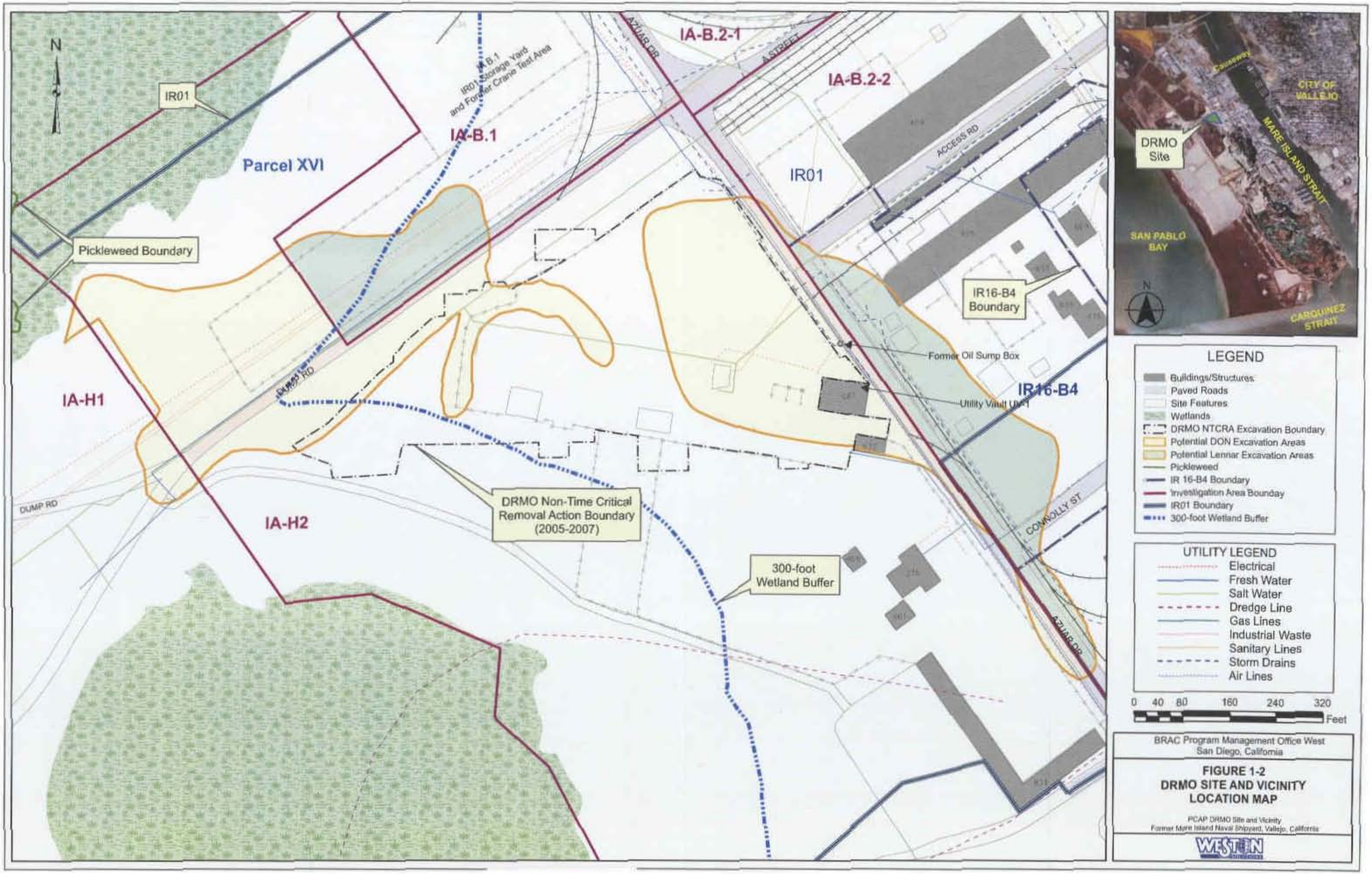


BRAC Program Management Office West
San Diego, California

FIGURE 1-1
MARE ISLAND VICINITY MAP

PCAP DRMO Site and Vicinity
Former Mare Island Naval Shipyard, Vallejo, California

SENSITIVE



SENSITIVE

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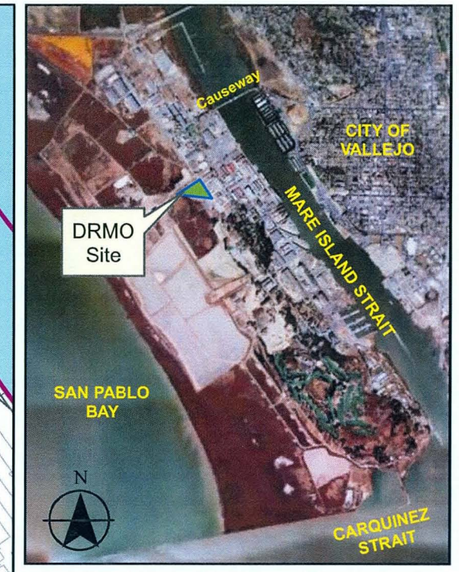


LEGEND

- Site Features
- Wetlands
- Water
- DRMO Site Boundary
- IA-H1 Containment Area
- IR02 Oil Sumps
- IR 16-B4 Boundary
- Investigation Area Bounday
- IR01 Boundary
- Railroad
- Fences

0 150 300 600 900 1,200 1,500 Feet

BRAC Program Management Office West
San Diego, California

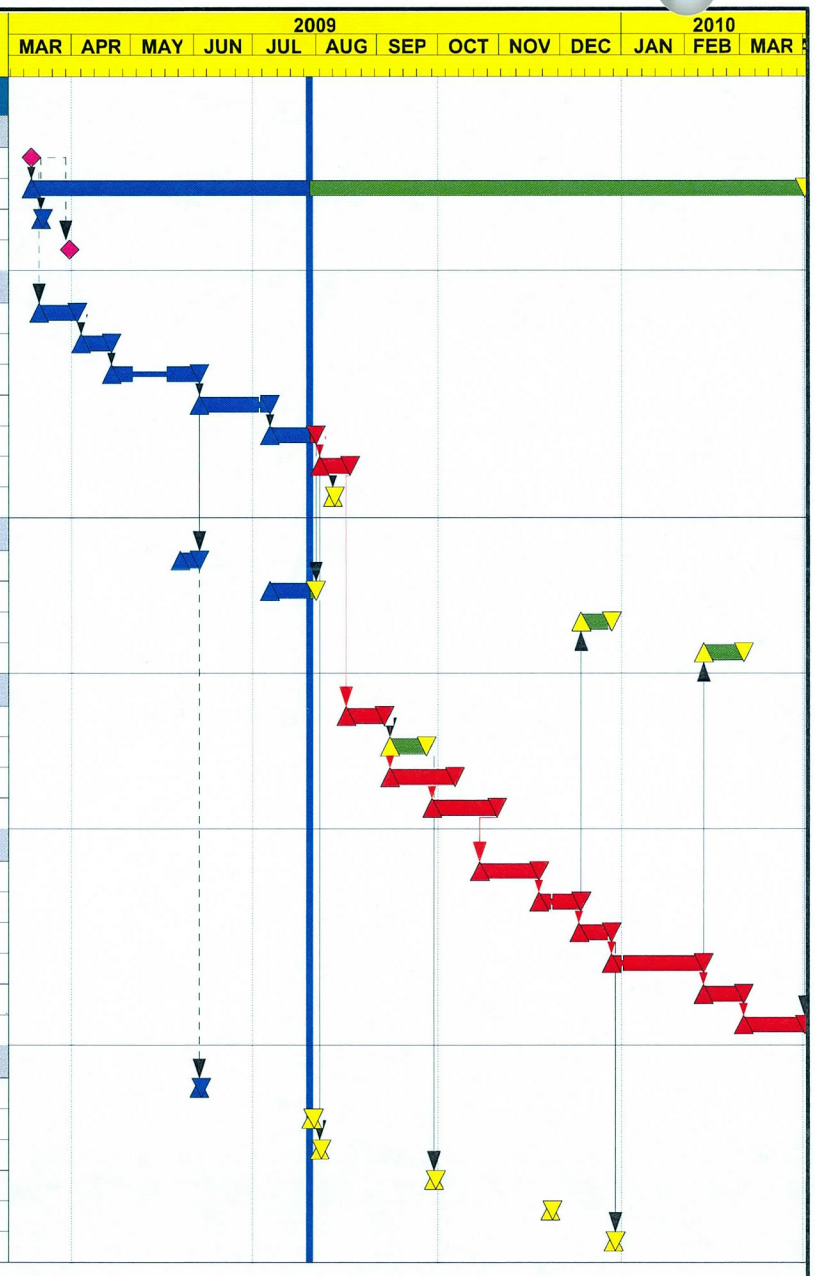
FIGURE 1-3
DRMO SITE AND VICINITY
TPH INVESTIGATION SITES

PCAP DRMO Site and Vicinity
Former Mare Island Naval Shipyard, Vallejo, California

WESTON SOLUTIONS

SENSITIVE

Activity ID	Activity Description	Orig Dur	% Comp	Early Start	Early Finish
Petroleum Corrective Action: DRMO Azuar/Dump Rd					
WE1: Project Management & Support					
WE1.0	EMAC PTO X016 Award	0	100	12MAR09A	
WE1.1	Project Management	276*	36	12MAR09A	01APR10
WE1.2	Kick-Off Meeting	1	100	17MAR09A	17MAR09A
WE1.10	Submittal of Bonds	0	100		30MAR09A
WE2: Petroleum Corrective Action Plan					
WE2.1	Prepare Internal Draft PCAP	30	100	16MAR09A	03APR09A
WE2.2	Navy Review of Internal Draft PCAP	15	100	06APR09A	20APR09A
WE2.3	Prepare Draft PCAP	18	100	21APR09A	03JUN09A
WE2.4	Agency Review of Draft PCAP	30	100	04JUN09A	08JUL09A
WE2.5	Prepare Final PCAP	21	86	09JUL09A	31JUL09
WE2.6	Agency Review/Concur Final PCAP	15	0	03AUG09	17AUG09
WE2.7	Submit PCAP Fact Sheet	1	0	10AUG09	10AUG09
WE3: Response to Comments					
WE3.1	RTCs on Internal Draft PCAP	7	100	26MAY09A	03JUN09A
WE3.2	RTCs on Draft PCAP	20	85	09JUL09A	31JUL09
WE3.3	RTCs on Internal Draft PCAP Completion Report	14	0	12DEC09	26DEC09
WE3.4	RTCs on Draft PCAP Completion Report	20	0	11FEB10	02MAR10
WE4: Implementation of the Final PCAP					
WE4.1	Excavation - Fenced Scrapyard Area/Parcel XVI	15	0	17AUG09	04SEP09
WE4.2	Backfill - Fenced Scrapyard Area/Parcel XVI	15	0	07SEP09	25SEP09
WE4.3	Excavation - Azuar/Dump Rd. Corridors	25	0	07SEP09	09OCT09
WE4.4	Backfill - Azuar/Dump Rd. Corridors	25	0	28SEP09	30OCT09
WE5: PCAP Completion Report					
WE5.1	Prepare Internal Draft Completion Report	30	0	22OCT09	20NOV09
WE5.2	Navy Review - Internal Draft Completion Report	20	0	21NOV09	11DEC09
WE5.3	Prepare Draft Completion Report	15	0	11DEC09	26DEC09
WE5.4	Agency Review - Draft Completion Report	45	0	27DEC09	10FEB10
WE5.5	Prepare Final Completion Report	20	0	11FEB10	02MAR10
WE5.6	Agency Review/Concur Final Completion Report	30	0	03MAR10	01APR10
WE6: Community Relations &Regulatory Interaction					
WE6.20	Regulatory Interaction - BCT Mtg.	1	100	04JUN09A	04JUN09A
WE6.11	Community Relations - RAB Mtg. 1	1	0	30JUL09*	30JUL09
WE6.21	BCT Technical Mtg. 1	1	0	03AUG09	03AUG09
WE6.22	BCT Technical Mtg. 2	1	0	29SEP09	29SEP09
WE6.12	Community Relations - RAB Mtg. 2	1	0	26NOV09*	26NOV09
WE6.23	BCT Technical Mtg. 3	1	0	28DEC09	28DEC09



Start Date 27FEB09
Finish Date 01APR10
Data Date 29JUL09

Early Bar
Progress Bar
Critical Activity

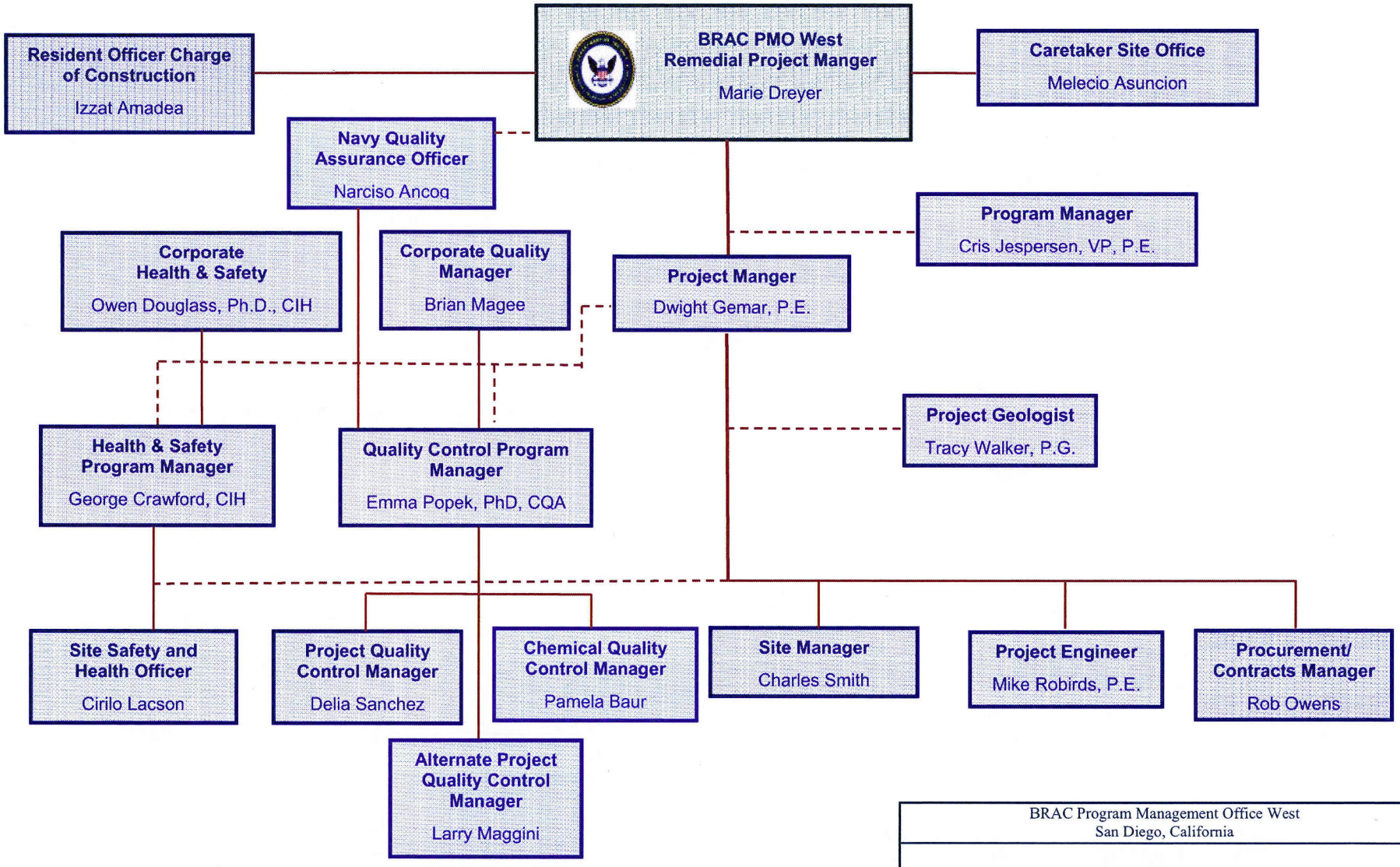
© Primavera Systems, Inc.

0709

Sheet 1 of 1

FIGURE 1-4
PROJECT SCHEDULE

Durations are calculated in calendar days (7-day weeks) except for field work which is in 5-day workweeks.



BRAC Program Management Office West
San Diego, California

FIGURE 1-5
PROJECT ORGANIZATION CHART

PCAP DRMO Site and Vicinity
Former Mare Island Naval Shipyard, Vallejo, California

WESTON SOLUTIONS

SENSITIVE RECORD

PORTIONS OF THIS RECORD ARE CONSIDERED SENSITIVE AND ARE NOT AVAILABLE FOR PUBLIC VIEWING

FIGURE 3-1 – EXTENT OF NAVY CORRECTIVE ACTION AREAS

FIGURES 5-1 AND 5-2

FIGURE 6-1 – DRMO SITE AND VICINITY POTENTIAL EXCAVATION AREAS ALONG DUMP ROAD AND AZUAR DRIVE

FOR ADDITIONAL INFORMATION, CONTACT:

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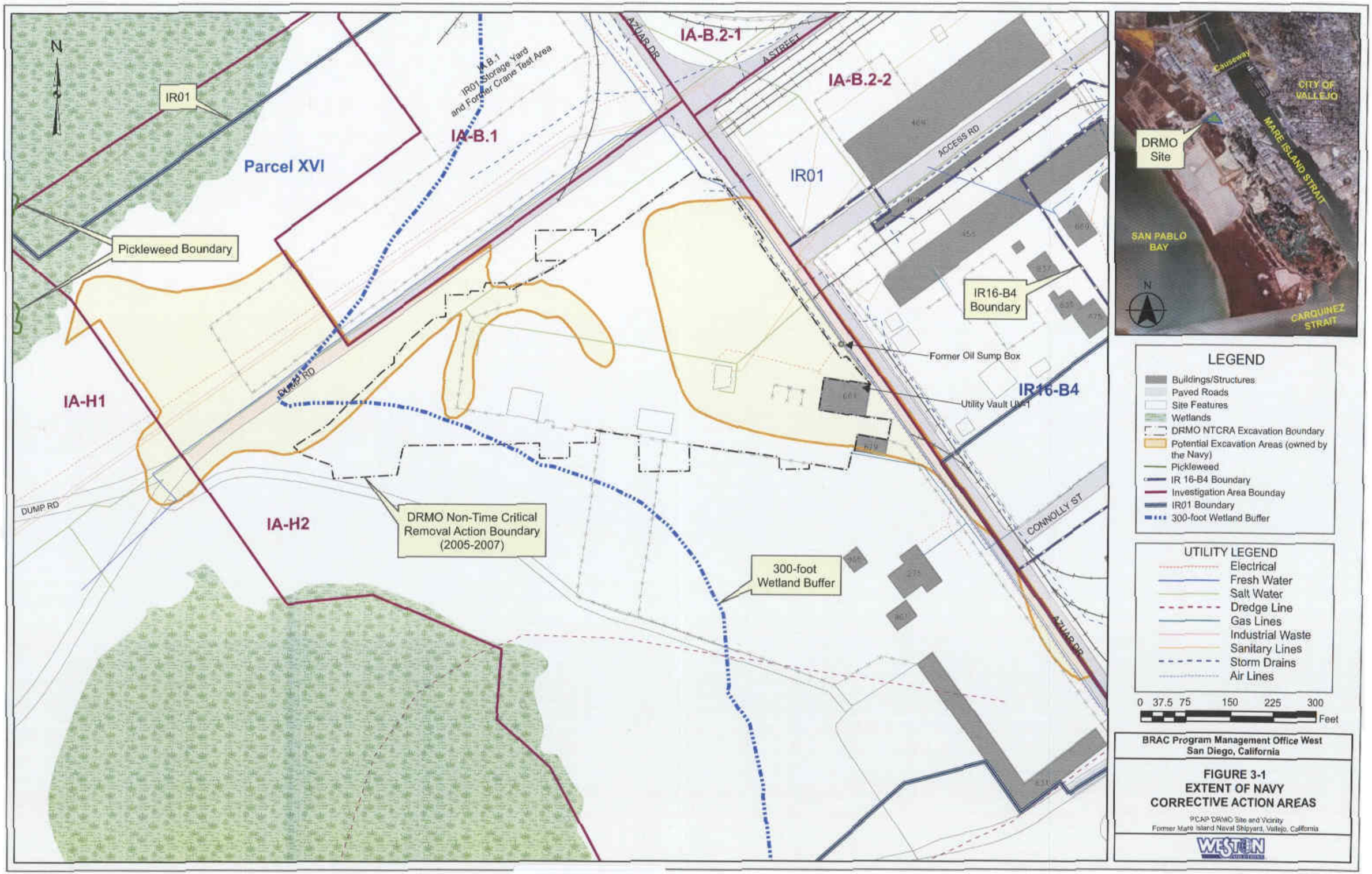
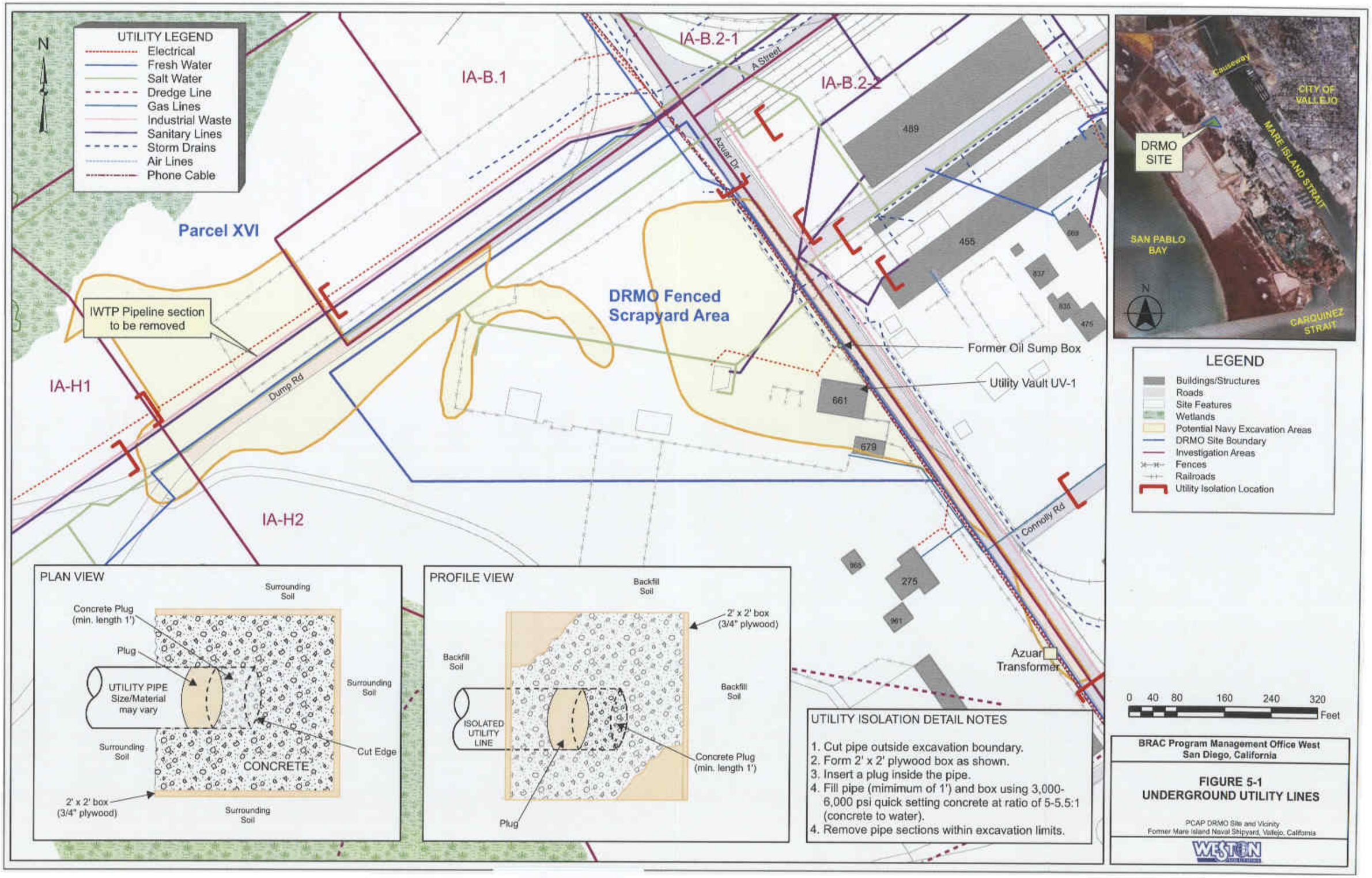
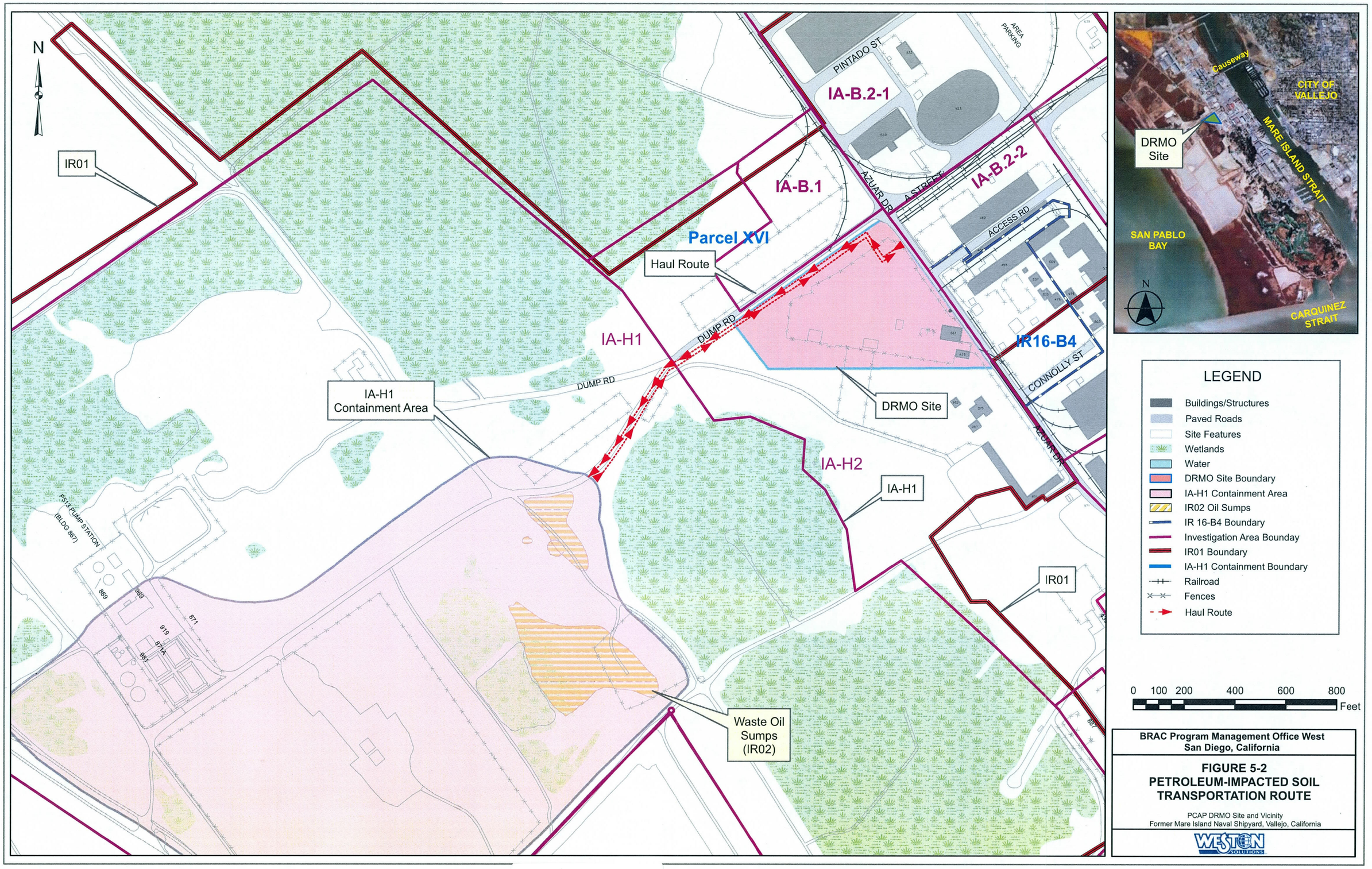
NAVAL FACILITIES ENGINEERING COMMAND, SOUTHWEST
1220 PACIFIC HIGHWAY (NBSD BLDG. 3519)
SAN DIEGO, CA 92132

TELEPHONE: (619) 556-1280
E-MAIL: diane.silva@navy.mil


N
IR01
Parcel XVI
Pickleweed Boundary
IA-H1
IA-H2
DUMP RD
IA-B.1
IR01 Storage Yard
and Former Crane Test Area
IA-B.2-1
A STREET
AZUAR DR
IA-B.2-2
IR01
ACCESS RD
IR16-B4
Boundary
Former Oil Sump Box
Utility Vault UV-1
IR16-B4
CONNOLLY ST
DRMO Non-Time Critical
Removal Action Boundary
(2005-2007)
300-foot
Wetland Buffer
Causeway
CITY OF
VALLEJO
MARE ISLAND STRAIT
DRMO
Site
SAN PABLO
BAY
CARQUINEZ
STRAIT
LEGEND
Buildings/Structures
Paved Roads
Site Features
Wetlands
DRMO NTCRA Excavation Boundary
Potential Excavation Areas (owned by the Navy)
Pickleweed
IR 16-B4 Boundary
Investigation Area Bounday
IR01 Boundary
300-foot Wetland Buffer
UTILITY LEGEND
Electrical
Fresh Water
Salt Water
Dredge Line
Gas Lines
Industrial Waste
Sanitary Lines
Storm Drains
Air Lines
0 37.5 75 150 225 300
Feet
BRAC Program Management Office West
San Diego, California
FIGURE 3-1
EXTENT OF NAVY
CORRECTIVE ACTION AREAS
PCAP DRMO Site and Vicinity
Former Mare Island Naval Shipyard, Vallejo, California
WESTON


UTILITY LEGEND
Electrical
Fresh Water
Salt Water
Dredge Line
Gas Lines
Industrial Waste
Sanitary Lines
Storm Drains
Air Lines
Phone Cable
N
Parcel XVI
IA-B.1
IA-B.2-1
IA-B.2-2
A Street
Azuar Dr
IA-H1
IA-H2
Dump Rd
Connolly Rd
IWTP Pipeline section to be removed
DRMO Fenced Scrapyard Area
Former Oil Sump Box
Utility Vault UV-1
Azuar Transformer
489
455
661
679
275
PLAN VIEW
Surrounding Soil
Concrete Plug (min. length 1')
Plug
UTILITY PIPE Size/Material may vary
Surrounding Soil
Cut Edge
CONCRETE
2' x 2' box (3/4" plywood)
Surrounding Soil
PROFILE VIEW
Backfill Soil
2' x 2' box (3/4" plywood)
Backfill Soil
Backfill Soil
ISOLATED UTILITY LINE
Concrete Plug (min. length 1')
Plug
UTILITY ISOLATION DETAIL NOTES
1. Cut pipe outside excavation boundary.
2. Form 2' x 2' plywood box as shown.
3. Insert a plug inside the pipe.
4. Fill pipe (mimimum of 1') and box using 3,000-6,000 psi quick setting concrete at ratio of 5-5.5:1 (concrete to water).
4. Remove pipe sections within excavation limits.
Causeway
CITY OF VALLEJO
MARE ISLAND STRAIT
DRMO SITE
SAN PABLO BAY
CARQUINEZ STRAIT
LEGEND
Buildings/Structures
Roads
Site Features
Wetlands
Potential Navy Excavation Areas
DRMO Site Boundary
Investigation Areas
Fences
Railroads
Utility Isolation Location
0 40 80 160 240 320
Feet
BRAC Program Management Office West
San Diego, California
FIGURE 5-1
UNDERGROUND UTILITY LINES
PCAP DRMO Site and Vicinity
Former Mare Island Naval Shipyard, Vallejo, California
WESTON

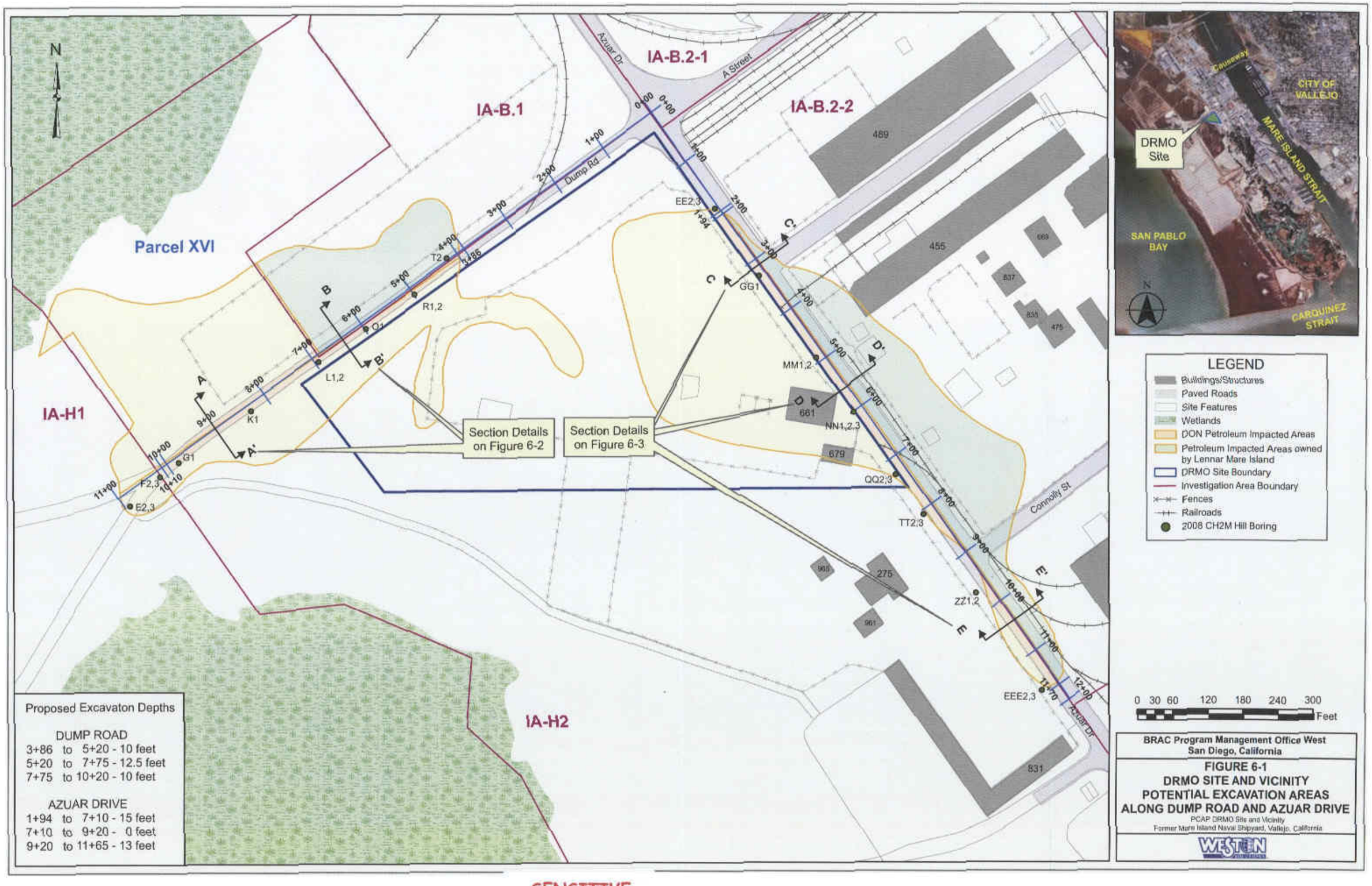


BRAC Program Management Office West
San Diego, California

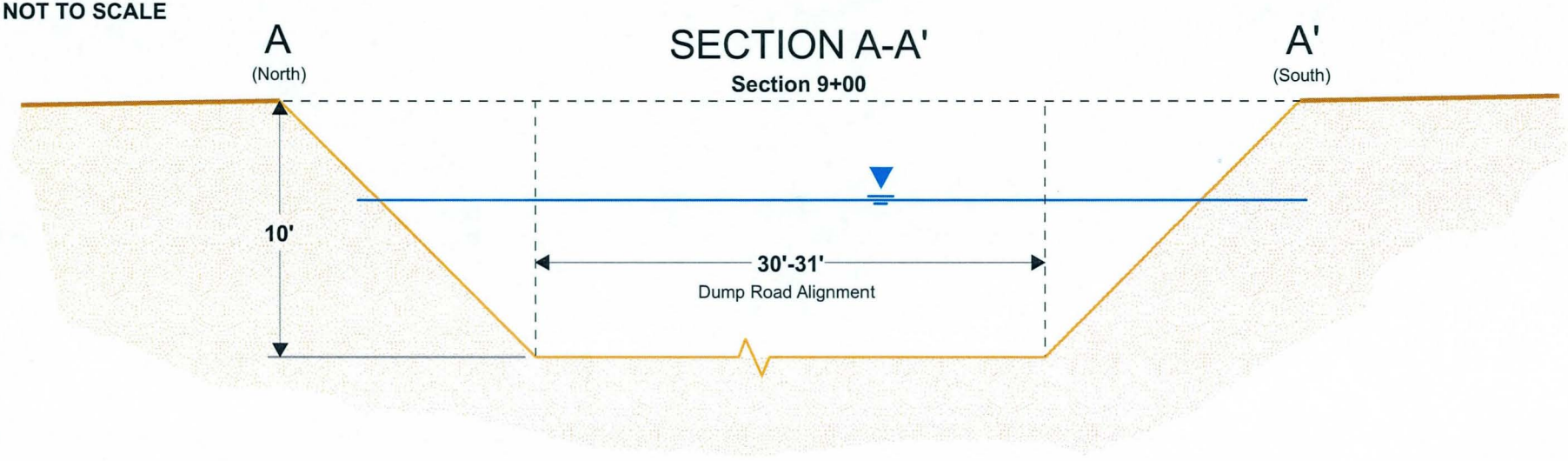
FIGURE 5-2
PETROLEUM-IMPACTED SOIL TRANSPORTATION ROUTE

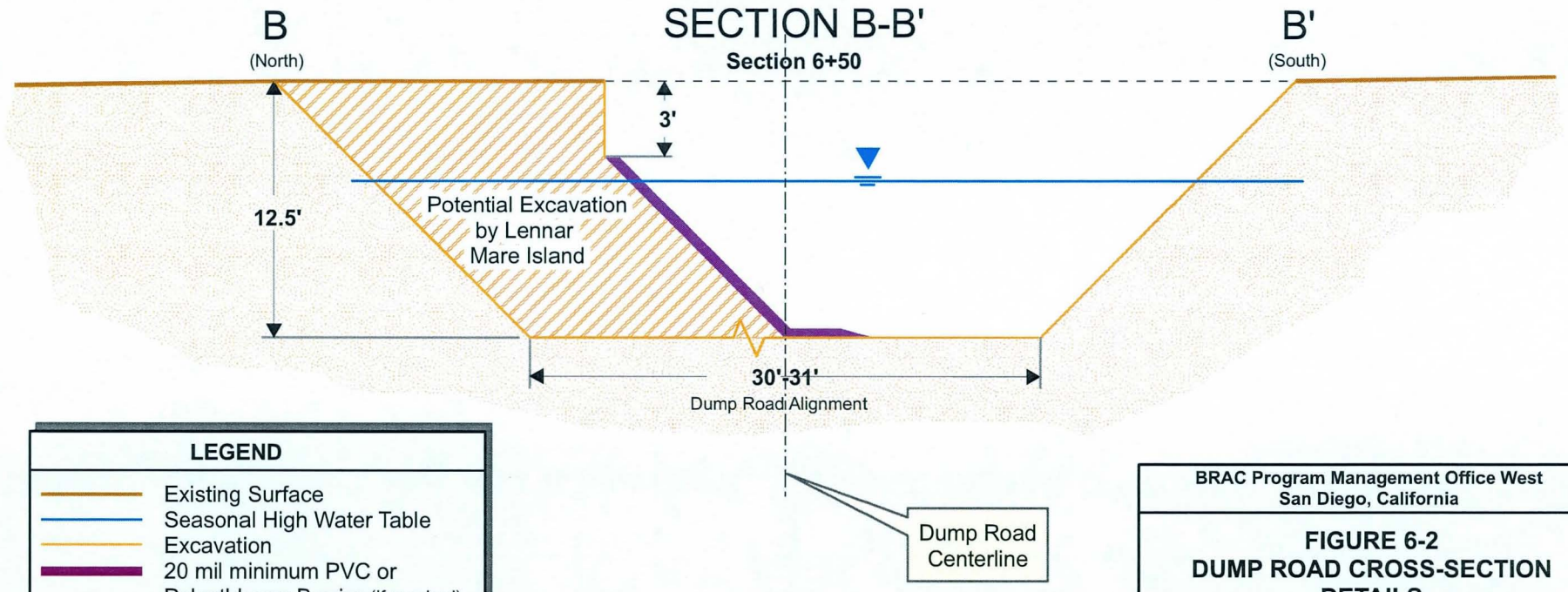
PCAP DRMO Site and Vicinity
Former Mare Island Naval Shipyard, Vallejo, California

WESTON SOLUTIONS


N
Parcel XVI
IA-H1
IA-H2
IA-B.1
IA-B.2-1
IA-B.2-2
Azuar Dr
A Street
Dump Rd
Connolly St
Section Details on Figure 6-2
Section Details on Figure 6-3
Proposed Excavaton Depths
DUMP ROAD
3+86 to 5+20 - 10 feet
5+20 to 7+75 - 12.5 feet
7+75 to 10+20 - 10 feet
AZUAR DRIVE
1+94 to 7+10 - 15 feet
7+10 to 9+20 - 0 feet
9+20 to 11+65 - 13 feet
Causeway
CITY OF VALLEJO
DRMO Site
MARE ISLAND STRAIT
SAN PABLO BAY
CARQUINEZ STRAIT
LEGEND
Buildings/Structures
Paved Roads
Site Features
Wetlands
DON Petroleum Impacted Areas
Petroleum Impacted Areas owned by Lennar Mare Island
DRMO Site Boundary
Investigation Area Boundary
Fences
Railroads
2008 CH2M Hill Boring
0 30 60 120 180 240 300 Feet
BRAC Program Management Office West
San Diego, California
FIGURE 6-1
DRMO SITE AND VICINITY
POTENTIAL EXCAVATION AREAS
ALONG DUMP ROAD AND AZUAR DRIVE
PCAP DRMO Site and Vicinity
Former Mare Island Naval Shipyard, Vallejo, California
WESTON

NOT TO SCALE





LEGEND

- Existing Surface
- Seasonal High Water Table
- Excavation
- 20 mil minimum PVC or Polyethlyene Barrier (If required)

Note: bgs = below ground surface.

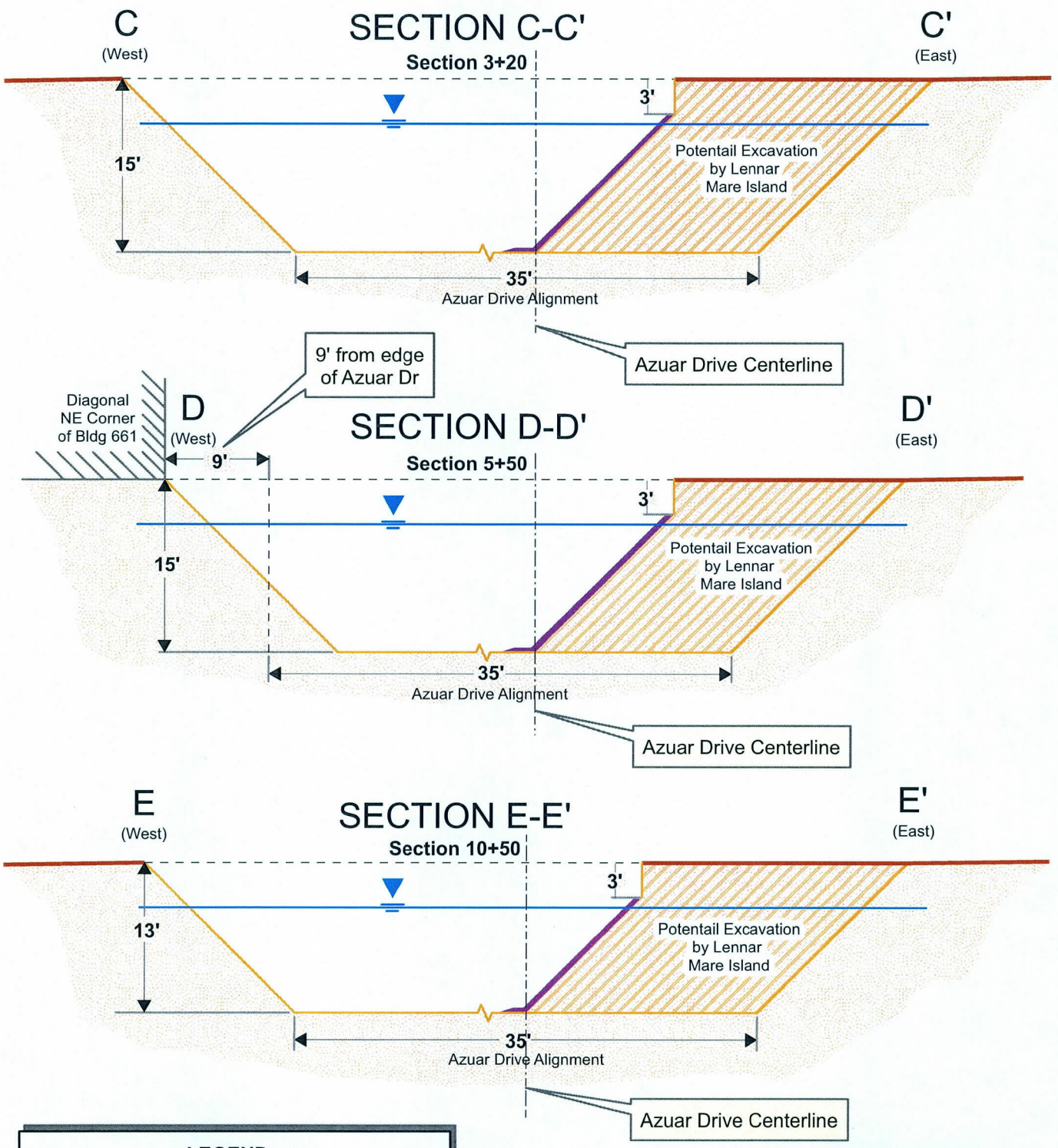
BRAC Program Management Office West
San Diego, California

FIGURE 6-2
DUMP ROAD CROSS-SECTION DETAILS

PCAP DRMO Site and Vicinity
Former Mare Island Naval Shipyard, Vallejo, California

WESTON SOLUTIONS

NOT TO SCALE



LEGEND

- Existing Surface
- Seasonal High Water Table
- Excavation
- 20 mil minimum PVC or Polyethlyene Barrier *(If required)*

Note: Water Table varies 2' to 6' bgs (below ground surface)

BRAC Program Management Office West
San Diego, California

FIGURE 6-3
AZUAR DRIVE CROSS-SECTION DETAILS

PCAP DRMO Site and Vicinity
Former Mare Island Naval Shipyard, Vallejo, California

WESTON SOLUTIONS

APPENDICES

APPENDIX A
SAMPLING AND ANALYSIS PLAN
(FIELD SAMPLING PLAN AND
QUALITY ASSURANCE PROJECT PLAN)

SAP WORKSHEET #1 -- TITLE AND APPROVAL PAGE
(UFP-QAPP Manual Section 2.1)

Appendix A to the Work Plan CERCLA Administrative Record File Number WEST-8825-0005-0002

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

July 2009

PETROLEUM CORRECTIVE ACTION PLAN
DEFENSE REUTILIZATION AND
MARKETING OFFICE SITE AND VICINITY
FORMER MARE ISLAND NAVAL SHIPYARD, VALLEJO, CALIFORNIA

Prepared for:

Naval Facilities Engineering Command Southwest
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Prepared under:

N62473-08-D-8825
Contract Task Order 0005

Review Signatures: Emma P. Popek Date: 7/29/2009
Emma Popek, PhD, CQA
Quality Control Program Manager
Weston Solutions, Inc.

Approval Signature: Narciso Ancog Date: 7/31/2009
Narciso Ancog
Quality Assurance Officer
Naval Facilities Engineering Command, Southwest

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EXECUTIVE SUMMARY

This Project Specific Sampling and Analysis Plan (Field Sampling Plan/Quality Assurance Project Plan) describes the sampling and quality control procedures to be performed as part of a removal action under the a petroleum corrective action at the Defense Reutilization and Marketing Office (DRMO) and Vicinity located at the former Mare Island Naval Shipyard (MINS), Vallejo, California. The work will be performed for the U.S. Department of Navy (DON) Base Realignment and Closure (BRAC) Program Management Office West under Naval Facilities Engineering Command Southwest (NAVFAC-SW) Environmental Multiple Award Contract Number N62473-08-D-8825, Contract Task Order (CTO) 0005.

Background

The former MINS is located on a peninsula in Solano County, California, approximately 30 miles northeast of San Francisco as shown on Figure 1. The former Naval facility occupies approximately 3.5 square miles and is bordered by San Pablo Bay on the west, Carquinez Strait on the south, and the Napa River (Mare Island Strait) on the east. MINS was established by the U.S. Navy in 1854 and served as a Naval Shipyard until it was closed under the BRAC program in April 1996.

The DRMO Site and Vicinity covers approximately 9.5 acres located near the intersection of Dump Road and Azuar Drive (Figure 2) within Installation Restoration (IR) Site 01 (Historic Landfill) established under the Navy's Installation Restoration (IR) Program. This area was originally submerged land located off the original shoreline of Mare Island. Filling of these areas began in the early 1900s with the construction of dikes; the areas between the dikes were later filled with dredge spoils from Mare Island Strait to raise the elevation above the tidal range of San Pablo Bay. A portion of the area was later used for disposal of Shipyard-related debris and eventually was developed in the 1930s and 1940s to support Shipyard operations.

The site includes portions of the former DRMO Fenced Scrapyard Area (FSA) within Investigation Area (IA) H2; a former Storage Yard and Crane Test Area (CTA) within IA-B.1; a portion of Transfer Parcel XVI (Open Space); and a portion of IA-B.2. The DRMO FSA was used for storage of transformers, batteries, and metal scrap, and also managed surplus material and scrap from the former MINS and other military facilities until it was closed in 1995.

Investigations conducted at the DRMO Site and Vicinity (Figure 3) have identified residual and free-phase heavy fuel oil and other petroleum hydrocarbon contamination along Azuar Drive and Dump Road. Historical investigations conducted in these areas include the following:

- A basewide Preliminary Assessment/Site Inspection, which included the DRMO Site (PRC Environmental Management [PRC], 1995)
- A Site Characterization and Analysis Penetrometer System investigation which included the former waste oil disposal sumps within IR Site 02 located south of the DRMO Site (Navy Public Works Center San Diego, 2000)
- An RI at IA-H2 which includes the DRMO Site and Vicinity (Tetra Tech, EM Inc. [Tetra Tech], 2000 and 2001)
- An Remedial Investigation at IA-B which includes the area east and north of the DRMO Site (CH2M HILL, 2002 and 2004a)
- An investigation conducted in 2004 at the Railroad Track Corridor formerly located within the DRMO Site (CH2M HILL, 2004b)
- A non-time critical removal action within the DRMO Site (CH2M HILL, 2006 and WESTON, 2008)

- An oil sump box (OSB) investigation which included areas along Azuar Drive and Dump Road (CH2M HILL, 2009a)
- A groundwater investigation within the CTA (CH2M HILL, 2008a)
- Geophysical survey and follow-on total petroleum hydrocarbon (TPH) investigation at the DRMO Site and vicinity (CH2M HILL, 2009a)

These investigations have defined the petroleum product as weathered Bunker C (No. 6 Fuel Oil) as well as the potential petroleum-impacted areas to be excavated (Figure 4). To facilitate regulatory closure at the DRMO Site and Vicinity, the DON has initiated a corrective action to address the petroleum contamination. The corrective action will remove petroleum-impacted soil and debris to be taken to the IA-H1 Containment Area for use as subgrade for the engineered cap. Excavated material appropriate for use at the Containment Area will not require additional sampling as described in Section 1.7 of the Petroleum Corrective Action Plan (PCAP). Any free-phase petroleum will be containerized and disposed or recycled as described in the PCAP.

Removal Action and Sampling

The objective of the petroleum corrective action is to facilitate regulatory closure (i.e., "no further action") for petroleum within the DRMO Site and Vicinity.

After the petroleum-impacted soil and debris have been removed, confirmation sampling will be performed on a 50 by 50-foot grid on the excavation bottom and vertical sidewalls. This type of systematic grid is the preferred sampling approach for delineating extent of contamination (U.S. Environmental Protection Agency [EPA], 1995) as it ensures that samples are evenly distributed across the affected areas. Confirmation samples will be analyzed for TPH as Bunker C and the results compared to Tier 2 screening levels for petroleum as summarized in the Tier 2 Risk Assessment Approach (CH2M HILL, 2009b). The screening criteria for confirmation sample results are provided on Worksheet Number 15 of this SAP.

Overburden Soil and Import Fill Sampling

Sampling of the overburden soil and import fill material will be performed as recommended in the California Environmental Protection Agency Department of Toxic Substances Control (DTSC) *Information Advisory for Clean Imported Fill Material* (DTSC, 2001) for metals, semivolatile organic compounds (SVOCs), pesticides, polychlorinated biphenyls (PCBs), and TPH as gasoline, diesel, and motor oil. The sampling frequency will be based on the area of individual borrow material as noted in the "Recommended Fill Material Sampling Schedule" (DTSC, 2001). The screening criteria for overburden soil and import fill sample results are provided on Worksheet Number 15 of this SAP.

SAP WORKSHEETS

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SAP WORKSHEET #3 -- DISTRIBUTION LIST 13
SAP WORKSHEET #4 -- PROJECT PERSONNEL SIGN-OFF SHEET 16
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Figure 2	DRMO Site and Vicinity Location Map
Figure 3	DRMO Site and Vicinity TPH Investigation Sites
Figure 4	DRMO Site and Vicinity Sampling Grid
Figure 5	Project Schedule
Figure 6	Chain-of-Custody Form

LIST OF ATTACHMENTS

Attachment 1	Standard Operating Procedures

This page is intentionally left blank.

ACRONYMS

AFCEE	Air Force Center for Engineering and the Environment
BRAC	Base Realignment and Closure
C&T	Curtis and Tompkins, Ltd.
CA	corrective action
CAS	Chemical Abstract Service
CCC	calibration check compounds
CCV	continuing calibration verification
CF	calibration factor
CLP	Contract Laboratory Program
CVAA	cold vapor atomic absorption
CTA	crane test area
CTO	Contract Task Order
DON	Department of Navy
DQI	data quality indicator
DRMO	Defense Reutilization and Marketing Office
DTSC	Department of Toxic Substances Control
ECD	electron capture detector
EDD	electronic data deliverable
ELAP	Environmental Laboratory Accreditation Program
EPA	U.S. Environmental Protection Agency
ESL	Environmental Screening Level
EWI	Environmental Work Instruction
FID	flame ionization detector
FSA	Fenced Storage Area
GC	gas chromatography
GC/MS	gas chromatography/mass spectrometry
HQ	hazard quotient
IA	Investigation Area
IC	initial calibration
ICP-ES	inductively coupled plasma-emission spectrometer
ICV	initial calibration verification
IR	Installation Restoration
LCS	laboratory control sample
MDL	method detection limit
MINS	Mare Island Naval Shipyard
mg/kg	milligram per kilogram
MS/MSD	matrix spike/matrix spike duplicate
NAVFAC-SW	Naval Facilities Engineering Command Southwest
NCR	Nonconformance Report
NEDD	Naval Electronic Data Deliverable
NELAP	National Environmental Laboratory Accreditation Program
NFECSW	Naval Facilities Engineering Command Center Southwest
NFGS	Naval Facilities Guide Specification
NIRIS	Naval Installation Restoration Information Solution
OSB	oil sump box
PCAP	Petroleum Corrective Action Plan
PCB	polychlorinated biphenyl
P.E.	Professional Engineer

ACRONYMS (Continued)

P.G.	Professional Geologist
PMO	Program Management Office
POC	point of contact
PRC	PRC Environmental Management, Inc.
QA	quality assurance
QAPP	Quality Assurance Project Plan
QC	quality control
QL	quantitation limit
RCRA	Resource Conservation and Recovery Act
RF	response factor
RI	Remedial Investigation
ROICC	Resident Officer in Charge of Construction
RPD	relative percent difference
RPM	Remedial Project Manager
RSD	relative standard deviation
SAP	Sampling and Analysis Plan
SOP	Standard Operating Procedure
SVOC	semivolatile organic compound
TBD	to be determined
Tetra Tech	Tetra Tech EM, Inc.
TPH	total petroleum hydrocarbon
TRV	toxicity reference value
UFP	Uniform Federal Policy
USACE	United States Army Corps of Engineers
VOC	volatile organic compounds
Water Board	San Francisco Bay Regional Water Quality Control Board
WESTON	Weston Solutions, Inc.

SAP WORKSHEET #2 -- SAP IDENTIFYING INFORMATION
(UFP-QAPP Manual Section 2.2.4)

Site Name/Number: DRMO Site and Vicinity
Contractor Name: Weston Solutions, Inc (WESTON)
Contract Number: N62473-08-D-8825
Contract Title: Environmental Multiple Award Contract
Work Assignment Number (optional): CTO 0005

1. This SAP was prepared in accordance with the requirements of the *Uniform Federal Policy for Quality Assurance Plans (UFP-QAPP)* (EPA, 2005) and *EPA Guidance for Quality Assurance Project Plans, EPA QA/G-5, QAMS* (EPA, 2002).

2. Identify regulatory program: Resource Conservation and Recovery Act and Clean Water Act

3. This SAP is a *project-specific* SAP.

4. List dates of scoping sessions that were held

Scoping Session	Date
No scoping sessions have been held to date	

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

Title	Date
CH2M HILL. *Draft Sampling and Analysis Plan for Investigation Area B, Lennar Mare Island, Vallejo, California.* March.	2002
CH2M HILL. *Final Sampling and Analysis Plan, Non-Time-Critical Removal Action for the Fenced Scrapyard Area of the Defense Reutilization and Marketing Office Site, Former Mare Island Naval Shipyard, Vallejo, California.* July 8.	2005
CH2M HILL. *Final Work Plan, Follow-on Total Petroleum Hydrocarbons Investigation, Fenced Scrapyard Area and Vicinity, Defense Reutilization and Marketing Office Site, Former Mare Island Naval Shipyard, Vallejo, California.*	2007
WESTON. *Final Addendum 1 to the Final Sampling and Analysis Plan (Field Sampling and Quality Assurance Project Plan) for Time-Critical Removal Action Installation Restoration Site 04, Installation Restoration Site 05, Parcel XVI Paint Waste Area, and Horse Stables Area, and Non-Time Critical Removal Action Defense Reutilization and Marketing Office Scrapyard, Former Mare Island Naval Shipyard, Vallejo, California.* September.	2007

6. List organizational partners (stakeholders) and connection with lead organization:
   - U.S. Department of Navy (DON)—lead organization
   - San Francisco Regional Water Quality Control Board (Water Board)—remedy selection; party to Federal Facilities Site Remediation Agreement
   - DTSC—remedy selection support; party to Federal Facilities Site Remediation Agreement
   - EPA—Comprehensive Environmental Response, Compensation and Liability Act support
   - City of Vallejo (redevelopment)

7. Lead organization is the DON
8. If any required SAP elements or required information are not applicable to the project or are provided elsewhere, then note the omitted SAP elements and provide an explanation for their exclusion below:

SAP elements that are not required for the project have been noted as "**Not Applicable**" on the UFP-QAPP Worksheet.

UFP-QAPP Worksheet #	Required Information	Crosswalk to Related Information
A. Project Management		
Documentation		
1	Title and Approval Page	
2	Table of Contents 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	**Not Applicable**
Project Planning/ Problem Definition		
9	Project Planning Session Documentation (including Data Needs tables) Project Scoping Session Participants Sheet	**Not Applicable**
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	**Not Applicable**
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/ SOP Requirements Table Sample Location Map(s)	
19	Analytical Methods/SOP Requirements Table	
20	Field Quality Control Sample Summary Table	
21	Project Sampling SOP References Table Sampling SOPs	
22	Field Equipment Calibration, Maintenance, Testing, and Inspection Table	**Not Applicable**
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, Documentation Collection, Tracking, Archiving and Disposal Sample Handling Flow Diagram	
27	Sample Custody Requirements, Procedures/SOPs Sample Container Identification	

UFP-QAPP Worksheet #	Required Information	Crosswalk to Related Information
	Example Chain-of-Custody Form and Seal	
Quality Control Samples		
28	QC Samples Table Screening/Confirmatory Analysis Decision Tree	
Data Management Tasks		
29	Project Documents and Records Table	
30	Analytical Services Table Analytical and Data Management SOPs	
C. Assessment Oversight		
31	Planned Project Assessments Table Audit Checklists	
32	Assessment Findings and Corrective Action Responses Table	
33	QA 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
(UFP-QAPP Manual Section 2.3.1)

Name of SAP Recipients	Title/Role	Organization	Telephone Number (Optional)	E-mail Address or Mailing Address	Document Control Number (Optional)
Marie Dreyer	Base Realignment and Closure (BRAC) Remedial Program Manager (RPM)	Navy BRAC Program Management Office (PMO) West	(619) 532-0904	1455 Frazee Road, Suite 900 San Diego, CA 92108 marie.dreyer@navy.mil	
Michael Bloom	BRAC Environmental Coordinator	Navy BRAC PMO West	(619) 532-0967	1455 Frazee Road, Suite 900 San Diego, CA 92108 michael.s.bloom@navy.mil	
Narciso Ancog	NFECSW Quality Assurance (QA) Officer	Naval Facilities Engineering Command – Southwest (NFECSW)	(619) 532-3046	1220 Pacific Hwy, Bldg 131 San Diego, CA 92132 narciso.ancog@navy.mil	
Melecio Asuncion	Caretake Site Office	NFECSW	(510) 772-7639	410 Palm Avenue, Building 1 San Francisco, CA 94130-1806 Melecio.asuncion@navy.mil	
Izzat Amadea	Resident Officer in Charge of Construction (ROICC)	NFECSW	(510) 749-5947	2450 Saratoga Street, Suite 200 Alameda, CA 94501 izzat.amadea@navy.mil	
Carolyn D'Almeida	Project Manager	EPA Region 9	(415) 972-3150	75 Hawthorne Street, 9th Floor San Francisco, CA 94105 dalmeida.carolyn@epamail.epa.gov	

Name of SAP Recipients	Title/Role	Organization	Telephone Number (Optional)	E-mail Address or Mailing Address	Document Control Number (Optional)
Janet Naito	Project Manager	DTSC	(510) 540-3883	700 Heinz Avenue, Suite 200 Berkeley, CA 94710 jnaito@dtsc.ca.gov	
Paisha Jorgensen	Project Manager	Water Board	(510) 622-2756	1515 Clay Street, Suite 1400 Oakland, CA 94612 pjorgensen@waterboards.ca.gov	
Emma Popek, PhD	Quality Control (QC) Program Manager	WESTON	(925) 948-2664	1340 Treat Boulevard, Suite 210 Walnut Creek, CA 94598-1025 emma.popek@westonsolutions.com	
Dwight Gemar, P.E.	Project Manager	WESTON	(707) 562-3352	750 Dump Road Vallejo, CA 94592 dwight.gemar@westonsolutions.com	
Tracy Walker, P.G.	Project Geologist	WESTON	(925) 948-2652	1340 Treat Boulevard, Suite 210 Walnut Creek, CA 94598-1025 tracy.walker@westonsolutions.com	
Charles Smith	Site Manager	WESTON	(707) 562-3262	750 Dump Road Vallejo, CA 94592 charlie.smith@westonsolutions.com	
Cirilo Lacson	Site Health and Safety Manager	WESTON	(707) 562-6534	750 Dump Road Vallejo, CA 94592 cirilo.lacson@westonsolutions.com	

Name of SAP Recipients	Title/Role	Organization	Telephone Number (Optional)	E-mail Address or Mailing Address	Document Control Number (Optional)
Tara Fitzgerald	Project Chemist	WESTON	(925) 948-2458	1340 Treat Boulevard, Suite 210 Walnut Creek, CA 94598-1025 tara.fitzgeral@westonsolutions.com	
Delia Sanchez	Project Quality Control Manager	WESTON	(707) 562-3266	750 Dump Road Vallejo, CA 94592 delia.sanchez@westonsolutions.com	
Micah Smith	Project Manager	Curtis and Tompkins, Ltd.	(510) 204-2224	2323 Fifth Street Berkeley, CA 94710 Micah.smith@ctberk.com	
Linda Rauto	Project Manager	Laboratory Data Consultants, Inc.	(760) 634-0437	7750 El Camino Real, Suite 2L Carlsbad, CA 92009 lrauto@lab-data.com	

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SAP WORKSHEET #4 -- PROJECT PERSONNEL SIGN-OFF SHEET
(UFP-QAPP Manual Section 2.3.2)

Name	Organization/Title/Role	Telephone Number (optional)	Signature/email receipt	SAP Section Reviewed	Date SAP Read
Emma Popek, PhD	WESTON QC Program Manager	(925) 948-2664			
Cirilo Lacson	WESTON Health and Safety Officer/Sampler	(707) 562-6534			
Charles Smith	WESTON Site Manager	(707) 562-3262			
Delia Sanchez	WESTON Project QC Manager	(707) 562-3266			
Tara Fitzgerald	WESTON Project Chemist	(925) 948-2658			
Micah Smith	Curtis and Tompkins, Ltd. (C&T) Analytical Laboratory Project Manager	(510) 204-2224			
Linda Rauto	Laboratory Data Consultants, Inc.	(760) 634-0437			

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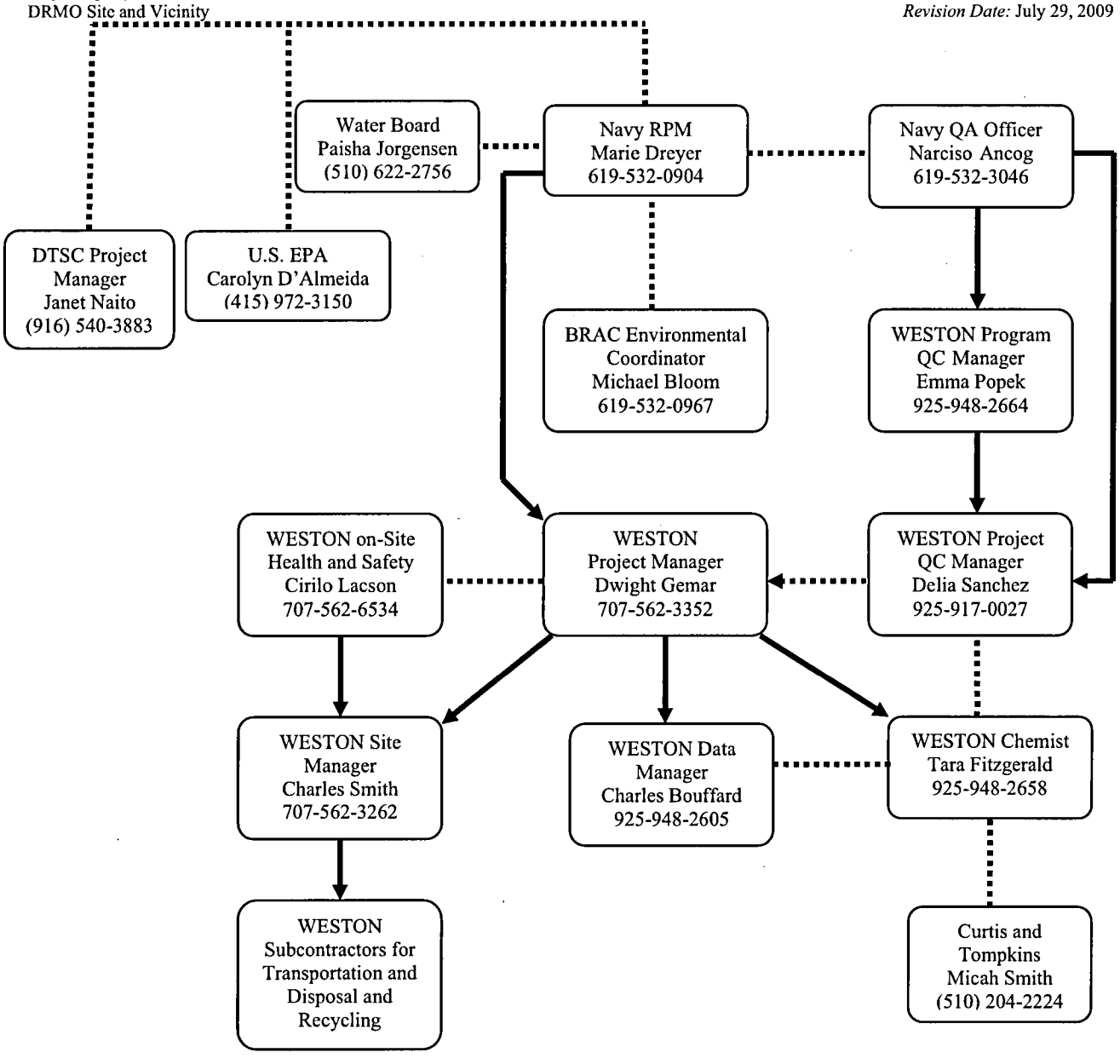

Lines of Authority: ⟶
Lines of Communication: ┅┅┅┅┅┅

SAP WORKSHEET #5—PROJECT TEAM ORGANIZATION CHART
(UFP-QAPP Manual Section 2.4.1)

Sampling and Analysis Plan, Petroleum Corrective Action Plan
Defense Reutilization and Marketing Office Site and Vicinity
Former Mare Island Naval Shipyard, Vallejo, California

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SAP WORKSHEET #6 -- COMMUNICATION PATHWAYS
(UFP-QAPP Manual Section 2.4.2)

Communication Drivers	Responsible Affiliation	Name	Phone Number and/or e-mail	Procedure
Approval of SAP modifications	WESTON	Emma Popek	(925) 948-2664	Verbal followed by written from E. Popek (WESTON) prior to implementing proposed modification(s)
Changes or delays in field work	WESTON	Dwight Gemar	(707) 562-3264	Verbal followed by written/electronic from D. Gemar (WESTON) as soon as changes are anticipated
Approval of SAPs; SAP modifications, Stop-Work Order (quality issues)	NFECSW	Nars Ancog	(619) 532-3046	Verbal followed by written/electronic from N. Ancog (NFECSW) to Emma Popek (WESTON); immediate notification; subsequent corrective action required
Stop-Work Order (quality issues)	WESTON	Emma Popek	(925) 948-2664	Verbal followed by written/electronic from E. Popek (WESTON) to D. Gemar (WESTON); immediate notification; subsequent corrective action required

Communication Drivers	Responsible Affiliation	Name	Phone Number and/or e-mail	Procedure
Stop-Work Order (health & safety issues)	WESTON	Cirilo Lacson	(707) 562-6534	Verbal followed by written from C. Lacson (WESTON) to D. Gemar (WESTON) and subcontractor(s); immediate notification, subsequent corrective action required
Analytical data quality issues (critical)	Curtis and Tompkins	Micah Smith	(510) 204-2224	Verbal followed by electronic from M. Smith (C&T) to E. Popek (WESTON) who will verbally/ electronically advise N. Ancog (NFECSW)
Unanticipated security events or community relations contact	WESTON	Charles Smith	(707) 562-3262	Immediate verbal notification from C. Smith (WESTON) to D. Gemar (WESTON) and M. Dreyer (BRAC PMO)
Delays in submitting final project deliverables or other reporting	WESTON	Dwight Gemar	(619) 532-0902	Verbal followed by written/electronic from D. Gemar (WESTON) to M. Dreyer (BRAC PMO) as soon as delays are anticipated

SAP WORKSHEET #7 -- PERSONNEL RESPONSIBILITIES AND QUALIFICATIONS TABLE

(UFP-QAPP Manual Section 2.4.3)

Name	Title/Role	Organizational Affiliation	Responsibilities	Education and/or Experience Qualifications (Optional)
Marie Dreyer	BRAC Remedial Program Manager	Navy BRAC Program Management Office West	Receive and review project deliverables, including meeting minutes, Petroleum Corrective Action Plan, Response to Comments, and other inspection reports and/or logs as specified in the Statement of Work.	
Narciso Ancog	NFECSW Quality Assurance Officer	NFECSW	Provide government oversight of the WESTON QA Program; provide quality-related directives; provide technical and administrative oversight of WESTON surveillance audit activities; act as a point of contact for all matters concerning QA and the Navy Laboratory QA Program; coordinate training on matters pertaining to data generation and maintenance of quality of data. May suspend the project execution if quality requirements are not adequately followed.	
Izzat Amadea	Resident Officer in Charge of Construction	NFECSW	Provide and maintain site access for field activities; coordinate ingress/egress to secure locations as required.	
Emma Popek	Quality Control Program Manager	WESTON	Oversee the technical aspects of the project activities, including the filing system development and maintenance, document preparation, laboratory analysis and chemical data management; review all documentation before submitted to the DON and verify that all comments from the DON and regulatory agencies are incorporated and any issues resolved.	

Name	Title/Role	Organizational Affiliation	Responsibilities	Education and/or Experience Qualifications (Optional)
Dwight Gemar	Project Manager	WESTON	Point of contact (POC) with DON; manage all technical and financial aspects of the project, including review, approval and tracking of project costs; schedule control; prepare monthly progress reports and weekly updates to the RPM; prepare daily production and QC reports; and oversee project documentation and report closeout activities.	
Charles Smith	Site Manager	WESTON	Provide daily oversight for a field crew comprising craft labor and specialty subcontractors; manage these activities in accordance with the approved plans and design documents.	
Cirilo Lacson	Site Health and Safety Officer	WESTON	Conduct daily tailgate safety briefings for all personnel on the site and oversee the activities of both WESTON and subcontractor personnel, perform safety inspections of all tools and equipment delivered to the site.	
Delia Sanchez	Project Quality Control Manager	WESTON	Coordinate, schedule, and document the three-phases of control (preliminary, initial and follow-up); review subcontractor submittals for compliance with specifications; maintain submittal register and processes submittals with NFECSW; prepare and submit inspection documentation, Daily QC and Production Reports, and analytical test results; develop and enforce corrective actions for work that does not meet specifications; maintain a rework items list and track deficiencies.	
Charles Bouffard	Database Manager	WESTON	Receive reviewed analytical data from data validation subcontractor; confirm compliance with contractual specifications; load analytical datasets; generate summary reports and loadable Naval electronic data deliverables.	

Name	Title/Role	Organizational Affiliation	Responsibilities	Education and/or Experience Qualifications (Optional)
Tara Fitzgerald	Project Chemist	WESTON	Perform sample collection and logging as directed by the WESTON Project Manager; interface with analytical laboratory and data validation company; prepare analytical tables for in-field review.	

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SAP WORKSHEET #8 -- SPECIAL PERSONNEL TRAINING REQUIREMENTS TABLE
(UFP-QAPP Manual Section 2.4.4)

All WESTON personnel participating in on-site activities meet (at minimum) 29 CFR 1910.120 Hazardous Waste Operations and Emergency Response (HAZWOPER) training requirements and hold current certification. The WESTON Site Health and Safety Officer maintains a copy of this certification for each individual at the work site. **No special training requirements for this project.**

Project Function	Specialized Training By Title or Description of Course	Training Provider	Training Date	Personnel / Groups Receiving Training	Personnel Titles / Organizational Affiliation	Location of Training Records / Certificates[1]

Not Applicable

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SAP WORKSHEET #9 -- PROJECT SCOPING SESSION PARTICIPANTS SHEET
(UFP-QAPP Manual Section 2.5.1)

The *Draft Final Technical Memorandum, Total Petroleum Hydrocarbons at the Defense Reutilization and Marketing Office Site and Vicinity, Former Mare Island Naval Shipyard, Vallejo, California* (CH2M HILL, 2009a) was prepared to summarize information from previous investigations necessary to address preparation of a Petroleum Corrective Action Plan; therefore, scoping sessions have not been necessary for preparation of this SAP.

Project Name:
Projected Date(s) of Sampling:
Project Manager:
Site Name:
Site Location:

Date of Session: There have been no project scoping meetings to date.
Scoping Session Purpose:

Name	Title	Affiliation	Phone #	E-mail Address	Project Role

Not Applicable

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SAP WORKSHEET #10 -- PROBLEM DEFINITION
(UFP-QAPP Manual Section 2.5.2)

Site Description/Background

The DRMO Site and Vicinity area covers approximately 9.5 acres located near the intersection of Dump Road and Azuar Drive (Figure 2) within Installation Restoration (IR) Site 01 (historical fill areas) established under the Navy's Installation Restoration Program. This area was originally submerged land located off the historical shoreline of Mare Island. Filling of these areas began in the early 1900s with the construction of dikes; the areas between the dikes were later filled with dredge spoils from Mare Island Strait to raise the elevation above the tidal range of San Pablo Bay. A portion of the area was also used for disposal of Shipyard-related debris and eventually was developed in the 1930s and 1940s to support Shipyard operations. IR Site 01 was subsequently subdivided into Investigation Areas (IAs) H1, IA-H2, IA-B.1, IA-B.2, and open space within Transfer Parcel XVI.

The site includes portions of the former DRMO Fenced Scrapyard Area (FSA), a former Storage Yard and Crane Test Area (CTA) within IA-B.1, a portion of Transfer Parcel XVI (Open Space), and a portion of IA-B.2-2. The DRMO FSA was used for storage of transformers, batteries, and metal scrap, and also managed surplus material and scrap from the former MINS and other military facilities until it was closed in 1995. The DRMO FSA was excluded from the Eastern Early Transfer Parcel that was transferred to the City of Vallejo in 2000, and remains DON property. The portion of Transfer Parcel XVI within the corrective action area also remains property of the DON. The CTA was used by the former MINS as a storage yard and a load test area for Shipyard cranes to maintain their certification for use. The remaining portions of the site north of Dump Road (the CTA within IA-B.1) and east of Azuar Drive (IR16-B4 within IA-B.2-2) were included in the Eastern Early Transfer Parcel and are no longer owned by the DON.

Previous Investigations

This SAP was developed based on information presented in the TPH Technical Memorandum (CH2M HILL, 2009a), including but not limited to the site history, petroleum-impacted area boundaries, and contamination at the DRMO Site and Vicinity. As documented in the TPH Technical Memorandum, investigations conducted at the DRMO Site and Vicinity (Figure 3) have identified residual and free-phase petroleum hydrocarbon contamination along Azuar Drive and Dump Road. Historical investigations conducted in these areas include the following:

- A basewide Preliminary Assessment/Site Inspection, which included the DRMO Site (PRC, 1995)
- A Site Characterization and Analysis Penetrometer System investigation which included the former waste oil disposal sumps within IR Site 02 located south of the DRMO Site (Navy Public Works Center San Diego, 2000)
- A Remedial Investigation (RI) at IA-H2 which includes the DRMO Site and Vicinity (Tetra Tech, 2000 and 2001)
- An RI at IA-B which includes the area east and north of the DRMO Site (CH2M HILL, 2002 and 2004a)
- An investigation conducted in 2004 at the Railroad Track Corridor formerly located within the DRMO Site (CH2M HILL, 2004b)
- A non-time critical removal action within the DRMO Site (CH2M HILL, 2006 and WESTON, 2008)

- An OSB investigation which included areas along Azuar Drive and Dump Road (CH2M HILL, 2009a)
- A groundwater investigation within the CTA (CH2M HILL, 2008a)
- Geophysical survey and follow-on TPH investigation at the DRMO Site and Vicinity (CH2M HILL, 2009a)

These investigations have defined the petroleum product in the area as primarily weathered Bunker C (No. 6 Fuel Oil) as well as the potential areas of petroleum-impacted soil to be excavated within the DON property boundaries (Figure 4).

Geology and Hydrogeology

The ground surface at the DRMO Site and Vicinity is generally flat, with elevations ranging from approximately 12 to 14 feet above mean sea level. No permanent surface water features are present, but the site is prone to flooding during periods of heavy precipitation. Surface water runoff discharges to storm sewers located near the northern corner of the DRMO Site, which in turn discharge to a stormwater main.

Three principal geologic units have been identified at the site. From top to bottom these units are artificial fill material, unconsolidated natural deposits (Younger Bay Mud), and bedrock (the Cretaceous Panoche Formation). Based on boring logs and test pits advanced in the area during historical investigations, the artificial fill material consists of two layers:

- Sand, gravel, silty clay, and debris extends from the ground surface to a depth of approximately 2 to 5 feet below ground surface (bgs), although debris is also found at deeper locations. Debris is primarily either metal or brick, but asphalt, concrete, timber, sawdust, wire, pipe, cable, and glass have also been found. This uppermost fill was placed between 1940 and the later construction of the DRMO Site. Aerial photographs dating from the late 1940s and early 1950s show that the DRMO Site and Vicinity had been fully developed by the 1950s.
- Fine-grained silts and clays, which are most likely dredged material that was placed between 1911 and 1920. This fill material is approximately 4 to 7 feet thick and is found from approximately 2 to 10 feet bgs. Beneath the fill material is a thick sequence of naturally deposited, unconsolidated silty clay with interbedded sandy layers (commonly referred to as Younger Bay Mud) and extends to at least 28 feet bgs. The bedrock below these deposits consists of steeply dipping brown, orange, and tan arkosic sandstone, siltstone, and micaceous shale.

A single, shallow, unconfined water-bearing zone has been identified beneath the DRMO Site and Vicinity, extending from the water table at a depth of 2 to 6 feet bgs to a depth of at least 28 feet bgs. The water-bearing zone extends through the fill layer and into the underlying Younger Bay Mud. Groundwater flow is to the northwest and annual water table fluctuations of up to 3 feet have been observed. Groundwater does not appear to be influenced by tidal fluctuations. Two distinct water-bearing zones have been identified beneath the former CTA north of the DRMO Site, (Figure 2). One zone lies within a shallow soil debris layer, and a deeper zone lies within the Younger Bay Mud. The two zones are separated by a layer of silty clay ranging from 6 to 8 feet thick. Groundwater flow in the two zones is also to the northwest. Groundwater at the former MINS is considered non-potable.

Project Objective

This corrective action is intended to facilitate regulatory closure (i.e., "no further action") for petroleum within the DRMO Site and Vicinity by excavating free petroleum product and

petroleum-impacted soils until the residual soil TPH concentrations meet or are below the Tier 2 screening levels. The project soil screening levels for TPH as Bunker C were established based on the Tier 2 Risk Assessment Approach (CH2M HILL, 2009b). The assumptions used in developing Tier 2 screening levels follow methods provided by the Water Board Technical Document *Screening for Environmental Concerns at Sites with Contaminated Soil and Groundwater* (Water Board, 2008). This document presents a tiered approach to conducting risk assessments. The Water Board document provides Tier 1 Environmental Screening Levels (ESLs) and guidance on modifying the Tier 1 ESLs to develop site-specific Tier 2 ESLs (CH2M HILL, 2009b). Tier 1 ESLs were developed as the lowest screening values for contaminants of concern which pose a significant risk to human health or the environment assuming all possible exposure pathways. However, because some environmental and human health concerns considered in determining Tier 1 ESLs may not be applicable where exposure routes are not complete, soils that exceed Tier 1 levels do not necessarily pose a significant risk to human health or the environment. The screening level for the contaminant of concern, TPH as Bunker C, is presented in Worksheet #15.

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SAP WORKSHEET #11 -- PROJECT QUALITY OBJECTIVES/SYSTEMATIC PLANNING PROCESS STATEMENTS
(UFP-QAPP Manual Section 2.6.1)

Petroleum Corrective Action Plan – Defense Reutilization and Marketing Office Site and Vicinity
STEP 1: State the Problem
Free-phase petroleum product and petroleum-impacted soil at the DRMO Site and Vicinity require removal to facilitate regulatory closure of the area.
STEP 2: Identify the Goal of the Study
1. What are the concentrations of the contaminant of concern, TPH as Bunker C, at the excavation bottom and sidewalls? 2. What are the concentration of chemicals in the overburden soil and borrow fill source?
STEP 3: Identify Information Inputs
1. Bunker C concentrations (dry weight) in confirmation samples 2. Tier 2 Screening Levels for the Eastern Early Transfer Parcel (CH2M HILL, 2009b)—presented on SAP Worksheet #15 3. Results of overburden and import fill analyses 4. Mare Island background metals values 5. Tier 1 Shallow Soil Screening Levels (groundwater is not a current or potential drinking water resource) for Commercial/Industrial Land Use (Water Board, 2008)—presented on SAP Worksheet #15 Decisions will be made upon review of chemical data collected in the course of the project activities. Based on results from previous investigations, the following analyses will be performed on samples as described in Step 7: • Target Analyte List Metals (without minerals) —EPA Methods 6010B/7471A • Semivolatile Organic Compounds (SVOCs)—EPA Method 8270C • Organochlorine pesticides—EPA Method 8081A • Polychlorinated biphenyls (PCBs)—EPA Method 8082 • TPH as gasoline—EPA Method 8015B/5035 • TPH as diesel, motor oil, and Bunker C—EPA Method 8015B
STEP 4: Define the Boundaries of the Study
Boundaries of the study will represent the spatial limits of the excavation following removal of petroleum-impacted soil. The temporal boundaries of the study are provided in Figure 5 following the SAP text.

Petroleum Corrective Action Plan – Defense Reutilization and Marketing Office Site and Vicinity

STEP 5: Develop the Analytical Approach

Action levels

Confirmation sample results for Bunker C will be screened against the Tier 2 Screening Levels for the Eastern Early Transfer Parcel (CH2M HILL, 2009b) as presented in SAP Worksheet #15.

Overburden and import borrow fill results will be screened against Mare Island background metals values and Tier 1 Environmental Screening Levels for Shallow Soil (groundwater is not a current or potential drinking water resource) at Commercial/Industrial Land Sites (Water Board, 2008) as presented in SAP Worksheet #15.

Decision Rules

1. If TPH as Bunker C results in confirmation samples exceed the screening criteria presented on SAP Worksheet #15, then additional petroleum-impacted soil may be removed in the affected grids as directed by the DON; otherwise the grid excavation will be considered complete.
2. If overburden and import borrow fill results are below the screening criteria presented on SAP Worksheet #15, then the overburden and import fill source may be used for backfill; otherwise another source of backfill will be identified and sampled if additional backfill is required.

STEP 6: Specify Performance or Acceptance Criteria

Sampling for this project is not statistically-based. Data from the removal confirmation could over- or under-estimate potential risks to ecological and human receptors. In general, if risk is over-estimated (false positive), then a possible consequence is unnecessary additional fieldwork that may itself have detrimental impacts to the existing environment or expose subsurface contamination to the surface. If risk is under-estimated, a possible consequence is to fail to conclude that remedial action is required and the environment may continue to be detrimentally impacted in the future.

Petroleum Corrective Action Plan – Defense Reutilization and Marketing Office Site and Vicinity
STEP 7: Develop the Plan for Obtaining Data
Confirmation: Excavations will be conducted within the lateral limits presented on Figure 4. A systematic grid is the preferred sampling approach for delineating extent of contamination (EPA, 1995) as it ensures that samples are evenly distributed across the affected area. Following petroleum removal, a 50 by 50-foot grid will be used as presented on Figure 4 to guide sample collection. A confirmation grab sample will be collected at the center of each grid and on the center of the sidewall for grids on the outer extents of the removal area. Sidewall confirmation samples will be collected at depths based on adjacent petroleum-impacted soil removed. If free product was present, the sidewall sample will be collected at a depth corresponding to the removed free product. If stained soil or odors were present, the sidewall sample will be collected at the corresponding depth. Confirmation samples will be analyzed for the petroleum contaminant of concern (TPH as Bunker C). If the action levels are exceeded and overexcavation is determined necessary, the overexcavation will be performed to one feet below the initial excavation bottom within a new grid of the same size as the initial exceedance in the approximate center of the overexcavated area. Overexcavations will not extend to areas of pickleweed without consultation with the DON.
Overburden and Import Borrow Fill: Overburden soil and import borrow fill sources will be sampled at the frequency prescribed in the DTSC *Information Advisory for Clean Imported Fill Material* (DTSC, 2001). Overburden and borrow fill samples will be analyzed for metals, SVOCs, pesticides, PCBs, and TPH as gasoline, diesel, and motor oil.

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SAP WORKSHEET #12 -- MEASUREMENT PERFORMANCE CRITERIA TABLE
(UFP-QAPP Manual Section 2.6.2)

Measurement Performance Criteria Table—Field QC Samples

QC Sample	Analytical Group[1]	Frequency	Data Quality Indicators (DQIs)	Measurement Performance Criteria	QC Sample Assesses Error for Sampling (S), Analytical (A) or both (S&A)
Temperature blanks	Metals, SVOCs, Pesticides, PCBs, and TPH	Each cooler	Representativeness	From 2 to 6 degrees Celsius	S
Trip Blank	Volatile Organic Compounds (VOCs)	Not required for this project	Representativeness	From 2 to 6 degrees Celsius	S
Equipment Blank	Metals, SVOCs, Pesticides, PCBs, and TPH	Not required for this project	Representativeness	From 2 to 6 degrees Celsius	S
Proficiency testing samples	Not Applicable	Not required for this project	Accuracy	From 2 to 6 degrees Celsius	A
Field Duplicate	Metals	10% (1/10)	Overall Precision	Relative Percent Difference ≤ 50 when both concentrations are 5X greater than RL	S&A
	SVOC	10% (1/10)	Overall Precision	Relative Percent Difference ≤ 50 when both concentrations are 5X greater than RL	S&A
	Pesticides	10% (1/10)	Overall Precision	Relative Percent Difference ≤ 50 when both concentrations are 5X greater than RL	S&A
	PCBs	10% (1/10)	Overall Precision	Relative Percent Difference ≤ 50 when both concentrations are 5X greater than RL	S&A
	TPH	10% (1/10)	Overall Precision	Relative Percent Difference ≤ 50 when both concentrations are 5X greater than RL	S&A

Measurement Performance Criteria Table—Field QC Samples

QC Sample	Analytical Group[1]	Frequency	Data Quality Indicators (DQIs)	Measurement Performance Criteria	QC Sample Assesses Error for Sampling (S), Analytical (A) or both (S&A)
Matrix Spike/Matrix Spike Duplicate (MS/MSD)	Metals	5% (1/20)	Overall Precision	Relative Percent Difference ≤ 50 when spike concentrations > 5X sample concentration	S&A
	SVOC	5% (1/20)	Overall Precision	Relative Percent Difference ≤ 50 when spike concentrations > 5X sample concentration	S&A
	Pesticides	5% (1/20)	Overall Precision	Relative Percent Difference ≤ 50 when spike concentrations > 5X sample concentration	S&A
	PCBs	5% (1/20)	Overall Precision	Relative Percent Difference ≤ 50 when spike concentrations > 5X sample concentration	S&A
	TPH	5% (1/20)	Overall Precision	Relative Percent Difference ≤ 50 when spike concentrations > 5X sample concentration	S&A
Matrix Spike	Metals	5% (1/20)	Accuracy	Recovery is within laboratory control limits	S&A
	SVOC	5% (1/20)	Accuracy	Recovery is within laboratory control limits	S&A
	Pesticides	5% (1/20)	Accuracy	Recovery is within laboratory control limits	S&A
	PCBs	5% (1/20)	Accuracy	Recovery is within laboratory control limits	S&A
	TPH	5% (1/20)	Accuracy	Recovery is within laboratory control limits	S&A

Notes:
1 If information varies within an analytical group, separate by individual analyte.

SAP WORKSHEET #13 -- SECONDARY DATA CRITERIA AND LIMITATIONS TABLE

(UFP-QAPP Manual Section 2.7)

No data from other sources will be used.

Secondary Data	Data Source (originating organization, report title and date)	Data Generator(s) (originating organization, data types, data generation / collection dates)	How Data Will Be Used	Limitations on Data Use

Not Applicable

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SAP WORKSHEET #14 -- SUMMARY OF PROJECT TASKS
(UFP-QAPP Manual Section 2.8.1)

Field Activities

The following steps will be implemented in the field to perform the corrective action within the DRMO Site and Vicinity:

Pre-excavation Activities:

1. Potential excavation areas shown in Figure 4 will be mapped using a global positioning system and staked or otherwise marked in the field. Perimeter fencing will be erected where not already present to establish the exclusion zone. Subsurface utilities will be located and utilities (including stormwater piping) within the planned excavation area will be isolated and/or bypassed in coordination with the utility owner. A decontamination pad and other support facilities will be established.
2. Prior to excavation, utilities within the excavation area will be physically disconnected and/or cut/capped beyond the anticipated limits of excavation. Air monitoring stations for particulates will be set up upwind and downwind of the excavation. Traffic detours will be established when work impacts either Azuar Drive or Dump Road.
3. A small portion of the Industrial Wastewater Treatement Plant pipeline within Transfer Parcel XVI will be removed and flushed with three volumes of water prior to disposal. Rinsewater will be stored before discharge to the Vallejo Sanitation and Flood Control District via a sanitary sewer line in accordance with the discharge permit requirements.

Excavation Activities:

1. Excavation will begin in areas with the highest observed levels of petroleum-impacted soil and debris, and extend outward to establish the lateral limits. It is anticipated that the excavation sequence will be: 1) inside the DRMO FSA, 2) outside the DRMO FSA south of Dump Road, 3) Parcel XVI north of Dump Road, 4) Azuar Drive within DON property, and 5) Dump Road within DON property.
2. Overburden soil which has been previously characterized (CH2M HILL, 2009a) as not impacted by petroleum will be removed and stockpiled for sampling and potential use as backfill.
3. Petroleum-impacted soils and debris visually verified free of liquids will be direct loaded into off-road trucks and transported to the IA-H1 Containment Area for use as subgrade fill beneath the engineered cap. Saturated soils will be allowed to drain within the excavation area before loading. The material will be placed and compacted in accordance with design requirements for the IA-H1 Containment Area cap. Based on previous site investigations and removal actions, further characterization of the petroleum-impacted soil prior to consolidation within the IA-H1 Containment Area will not be required.
4. Free-phase petroleum liquids will be periodically removed from the excavation as required using a vacuum truck and placed into storage containers for waste profiling to identify off-site disposal and/or recycling requirements.
5. Air monitoring for particulates will be performed at the site boundary during excavation and backfill activities. Due to the potential for odors to create a nuisance outside the exclusion zone, a non-toxic biodegradable vapor suppression foam (Rusmar AC-645 Foam or equivalent) will be applied to the excavation areas as appropriate. Water will be applied to working areas and haul routes as required to minimize dust emissions.

6. Removal of groundwater may be required during soil excavation and/or backfilling activities. In either case, groundwater will be pumped to large portable steel tanks and undergo sediment and residual petroleum removal before discharge to the Vallejo Sanitation and Flood Control District via a sanitary sewer line in accordance with discharge permit requirements.

Sampling Activities:

1. Confirmation samples will be collected when removal of petroleum-impacted material is complete based on visual observations. Confirmation sampling will include one grab bottom sample for each 50 by 50-foot grid and one sidewall sample for each 50 linear feet of sidewall. Sidewall confirmation samples will be collected at depths based on adjacent petroleum-impacted soil removed. If free product was present, the sidewall sample will be collected at a depth corresponding to the removed free product. If stained soil or odors were present, the sidewall sample will be collected at the corresponding depth. Soil from each sampling location will be collected from the excavator bucket using a disposable trowel to place soil from the center of the bucket into an 8-ounce glass jar for analysis of TPH as Bunker C by EPA 8015B at an off-site, DON-approved laboratory.
2. Overburden and import backfill sources will be sampled for metals, SVOCs, pesticides, PCBs, and TPH as diesel and motor oil using a disposable trowel to place the grab sample into a 16-ounce glass jar at each sampling location. Overburden and import backfill sources will also be sampled for TPH as gasoline using En Core® samplers to collect 3 5-gram aliquots at each sampling location. The frequency required for sampling these sources will be as prescribed in the "Recommended Fill Material Sampling Schedule" (DTSC, 2001) provided in SAP Worksheet #17.

Backfilling/Restoration Activities:

1. If the confirmation soil sample results indicate that the remaining soil exceeds the Bunker C screening level, the lateral and/or vertical extent of the excavation will be expanded 25 feet from the sampling location if within DON property boundaries as necessary to meet the screening level. Confirmation soil samples will be collected from all step-out excavation areas.
2. If the confirmation soil sample results indicate that the remaining soils meet the Bunker C screening level, the excavation will be backfilled and compacted (after obtaining DON and regulatory concurrence) using a combination of staged overburden soil and an approved off-site borrow source from selected Mare Island dredge ponds, or other borrow fill originating from elsewhere on or off Mare Island.
3. A section of removed stormwater piping will be replaced; however, no other restoration of utilities removed during the excavation is anticipated. Restoration of Azuar Road will consist of replacement of the asphalt surface over compacted aggregate placed to pre-excavation grades. Restoration of Dump Road will consist of compacted aggregate road base over geotextile fabric.
4. After site activities have been completed, and ROICC approval is obtained, all remaining temporary facilities will be removed.

Analytical Tasks

There are no analytical tasks to be performed in the field. Analytical tasks to be performed in the laboratory are as specified on SAP Worksheets #23, #24, and #25.

Data Management

All analytical data generated by the laboratory will be reviewed prior to reporting to assure their validity. This internal laboratory data review process will consist of data reduction, three levels of documented review, and reporting. Review processes will be documented using appropriate checklist forms, or logbooks that will be signed and dated by the reviewer.

Data Reduction

Data reduction involves the mathematical or statistical calculations used by the laboratory to convert raw data to the reported data. Reduction of analytical data will be performed by laboratory as specified in each of the appropriate analytical methods and laboratory Standard Operating Procedures (SOPs). For each method, all raw data results will be recorded using method-specific forms or a standardized output from each of the various instruments.

All data calculations will be verified and initialed by personnel both generating and approving them. All raw and electronic data, notebook references, supporting documentation and correspondence will be assembled, packaged, and stored for a minimum of 7 years for future use. All reports will be held client confidential. If Curtis and Tompkins, Ltd. is unable to store project-related data for 10 years, then it is their responsibility to contact WESTON to make alternative arrangements.

Laboratory Data Verification and Review

Curtis and Tompkins, Ltd. will have the primary responsibility for the correctness and completeness of data. Each step of this verification and review process will involve the evaluation of data quality based on both the results of the QC data and the professional judgment of those conducting the review. This application of technical knowledge and experience to the evaluation of data is essential in ensuring that data of known quality are generated consistently. All data generated and reduced will follow well-documented in-house protocols.

Level 1. Technical (Peer) Data Review—Analysts will review the quality of their work based on an established set of guidelines, including the QC criteria established in each method, in this QC Plan and as stated within the Curtis and Tompkins, Ltd. QA Manual. This review will, at a minimum, ensure that the following conditions have been met:

- Sample preparation information is correct and complete
- Analysis information is correct and complete
- Appropriate SOPs have been followed
- Calculations are verified
- There are no data transposition errors
- Analytical results are correct and complete
- QC samples are within established control limits
- Blanks and laboratory control samples are within appropriate QC limits
- Special sample preparation and analytical requirements have been met
- Documentation is complete; for example, any anomalies and holding times have been documented and forms have been completed

Level 2. Technical Data Review—This review will be performed by a supervisor or data review specialist whose function is to provide an independent review of data packages. This review will

also be conducted according to an established set of guidelines and will be structured to verify the following finding of Level 1 data review:

- All appropriate Curtis and Tompkins, Ltd. SOPs have been followed
- Calibration data are scientifically sound, appropriate to the method, and completely documented
- QC samples are within established guidelines
- Qualitative identification of contaminants is correct
- Manual integrations are justified and properly documented
- Quantitative results and calculations are correct
- Data are qualified correctly
- Documentation is complete; for example, any anomalies and holding times have been documented and appropriate forms have been completed
- Data are ready for incorporation into the final report
- The data package is complete and is in compliance with contract requirements

The Level 2 review will be structured so that all calibration data and QC sample results are reviewed and all of the analytical results from at least 10% of the samples are checked back to the sample preparation and analytical bench sheets. If no problems are found with the data package, the review will be considered complete.

If any problems are found with the data package, an additional 10% of the sample results will be checked back to the sample preparatory and analytical bench sheets. This cycle will then be repeated until either no errors are found in the data set checked or until all data have been checked. All errors and corrections noted will be documented.

Level 3. Administrative (QA) Data Review—The Curtis and Tompkins, Ltd. QA Manager will review 10% of all data packages. This review should be similar to the review as provided in Level 2 except that it will provide a total overview of the data package to ensure its consistency and compliance with project requirements. All errors noted will be corrected and documented.

Data Reporting

This section details the requirements for data reporting and data package formats to be provided by Curtis and Tompkins, Ltd.

Hard copy deliverables—All relevant raw data and documentation, including (but not limited to) logbooks, data sheets, electronic files, final reports, etc., will be maintained by Curtis and Tompkins, Ltd. for at least seven years. WESTON will be notified 30 days before disposal of any relevant laboratory records.

WESTON will maintain copies of all Chain-of-Custody forms (example provided as Figure 6) until receipt of the Curtis and Tompkins, Ltd. report. Laboratory reports will be logged in upon receipt and filed in chronological order. Ninety percent of the data will be Level III and ten percent will be Level IV. The required level will be identified on the Chain-of-Custody form.

Electronic Deliverables

The electronic data deliverable (EDD) will be in EnviroData® format file format for delivery to WESTON. Curtis and Tompkins, Ltd. will certify that the EDD and the hard copy reports are identical. Both the EDD and the hard copy will present results to two or three significant figures as follows:

- For inorganic results, two significant figures will be used for results that are less than 10, and three significant figures will be used for results that are greater than 10.
- For organic results, one significant figure will be used for results that are less than 10, and two significant figures will be used for results that are greater than 10.

The EDD for each sample delivery group will be due at the same time as the hard copy, 14 days after the last sample of the sample delivery group has been delivered to the laboratory.

Field information (date and time collected, sample identification, etc.) will be entered directly into the Envirodata® database from the Chain-of-Custody form or uploaded from electronic files generated in the field.

All EDDs will be stored by WESTON in a format capable of entry into Naval Installation Restoration Information Solution (NIRIS) database in the Naval Electronic Data Deliverable (NEDD) format.

Data Validation

Data validation will be conducted an independent data validation company as required by the NAVFAC-SW Environmental Work Instruction (EWI) #3 (2001a). The data validation company will have the following qualifications:

- A minimum of five years of experience in the environmental data validation business
- Prior experience on Navy Remedial Action Contracts or Compreshensive Environmental Response, Compensation, and Liability Act projects
- Navy data validation experience
- Active peer review program

Data validation personnel must have the following qualifications:

- Data Reviewer—Bachelor of Science degree or higher in chemistry or related field with five years of combined experience with approximately two years in data validation and two years conducting laboratory analysis in an environmental laboratory using the EPA-approved methods being validated.
- Peer Reviewer—Bachelor of Science degree or higher in chemistry or related field with five years of combined experience with approximately two years in data validation and three years conducting laboratory analysis in an environmental laboratory using the EPA-approved methods being validated.

The validation will be according to the EPA National Functional Guidelines for Organic Data Review (EPA, 1999b), National Functional Guidelines for Inorganic Data Review (EPA, 2002), and NAVFAC-SW EWI #1 (2001b), and the QC criteria specified in this document. Ninety percent of the data will be validated at Level III and 10 percent at Level IV.

Project Closeout—WESTON will closeout the project as required in the basic contract and in compliance with the closeout procedures of the NAVFAC Construction Quality Management Program P-445 and Naval Facilities Guide Specification (NFGS) Specification NFGS-01770. As part of this step any remaining validated electronic data remaining to be loaded into the NIRIS database in the NEDD format in adherence with NAVFAC-SW EWI #6 will be uploaded. Mr. Charles Bouffard, the Database Manager, who is trained in the NIRIS/NEDD SOPs and has access to the NIRIS web site, will be responsible for electronic data tracking, storage, and archiving. Ms. Tara Fitzgerald, the Project Chemist, will be responsible for hardcopy data tracking, storage, and archiving.

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SAP WORKSHEET #15 -- REFERENCE LIMITS AND EVALUATION TABLE
(UFP-QAPP Manual Section 2.8.1)

Excavation confirmation samples will be analyzed and screened for TPH as Bunker C only. Overburden and import fill samples will be analyzed and screened against the remaining analytes and criteria provided in this SAP Worksheet (metals, PCBs, pesticides, SVOCs, and TPH as gasoline, diesel, and motor oil).

Matrix: Soil
Analytical group: Metals

Analyte	Chemical Abstract Service Number	Project Action Limit[1] (mg/kg)	Project Action Limit Reference[2]	Project Quantitation Limit Goal (mg/kg)	Laboratory-specific[3] (mg/kg)	
					QLs	MDLs
Aluminum	7429-90-5	NA	NA	10	10	1.3
Antimony	7440-36-0	8.5	Background	3	3	0.15
Arsenic	7440-38-2	36	Background	0.25	0.25	0.068
Barium	7440-39-3	1,500	Tier 1	0.5	0.5	0.05
Beryllium	7440-41-7	8	Tier 1	0.1	0.1	0.0074
Cadmium	7440-43-9	5.2	Background	0.25	0.25	0.047
Chromium	16065-83-1	140	Background	0.5	0.5	0.032
Cobalt	7440-48-4	80	Tier 1	1	1	0.038
Copper	7440-50-8	120	Background	0.25	0.25	0.054
Lead	7439-92-1	59	Background	0.25	0.25	0.056
Magnesium	7439-95-4	NA	NA	25	25	1.3
Manganese	7439-96-5	1,600	Background	0.25	0.25	0.033
Mercury	7487-94-7	2	Background	0.02	0.02	0.0063
Molybdenum	7439-98-7	40	Tier 1	0.25	0.25	0.065
Nickel	7440-02-0	130	Background	0.25	0.25	0.045
Selenium	7782-49-2	10	Tier 1	0.5	0.5	0.1
Silver	7440-22-4	40	Tier 1	0.25	0.25	0.036
Thallium	7440-28-0	16	Tier 1	0.5	0.5	0.11
Vanadium	7440-62-2	190	Background	0.25	0.25	0.034
Zinc	7440-66-6	230	Background	1.25	1.25	0.17

Matrix: Soil
Analytical group: PCBs and Pesticides

Analyte	Chemical Abstract Service Number	Project Action Limit[1] (mg/kg)	Project Action Limit Reference[2]	Project Quantitation Limit Goal (mg/kg)	Laboratory-specific[3] (mg/kg)	
					QLs	MDLs
Aroclor 1016	12674-11-2	0.74	Tier 1	0.012	0.012	0.003
Aroclor 1221	11104-28-2	0.74	Tier 1	0.024	0.024	0.008
Aroclor 1232	11141-16-5	0.74	Tier 1	0.012	0.012	0.0039
Aroclor 1242	53469-21-9	0.74	Tier 1	0.012	0.012	0.0028
Aroclor 1248	12672-29-6	0.74	Tier 1	0.012	0.012	0.0021
Aroclor-1254	11097-69-1	0.74	Tier 1	0.012	0.012	0.003
Aroclor-1260	11096-82-5	0.74	Tier 1	0.012	0.012	0.0011
4,4'-DDD	72-54-8	10	Tier 1	0.0033	0.0033	0.00073
4,4'-DDE	72-55-9	4	Tier 1	0.0033	0.0033	0.00061
4,4'-DDT	50-29-3	4	Tier 1	0.0033	0.0033	0.00071
Aldrin	309-00-2	0.13	Tier 1	0.0017	0.0017	0.00026
Alpha-BHC	319-84-6	NA	NA	0.0017	0.0017	0.00027
Alpha-Chlordane	5103-71-9	1.7	Tier 1	0.0017	0.0017	0.00029
Chlordane (technical)	57-74-9	1.7	Tier 1	0.03	0.03	0.0086
Beta-BHC	319-85-7	NA	NA	0.0017	0.0017	0.00047
Dieldrin	60-57-1	0.0023[4]	Tier 1	0.0033	0.0033	0.00052
Endosulfan I	959-98-8	0.0046	Tier 1	0.0017	0.0017	0.00027
Endosulfan II	33213-65-9	0.0046	Tier 1	0.0033	0.0033	0.00061
Endosulfan Sulfate	1031-07-8	NA	NA	0.0033	0.0033	0.00059
Endrin	72-20-8	0.00065[4]	Tier 1	0.0033	0.0033	0.00056
Endrin Aldehyde	7421-93-4	NA	NA	0.0033	0.0033	0.00085
Endrin Ketone	53494-70-5	NA	NA	0.0033	0.0033	0.0008
Gamma-BHC (Lindane)	58-89-9	0.0098	Tier 1	0.0017	0.0017	0.0003
Gamma-Chlordane	5103-74-2	1.7	Tier 1	0.0017	0.0017	0.0003
Heptachlor	76-44-8	0.013	Tier 1	0.0017	0.0017	0.00027
Heptachlor epoxide	1024-57-3	0.014	Tier 1	0.0017	0.0017	0.00029
Methoxychlor	72-43-5	19	Tier 1	0.017	0.017	0.0031
Toxaphene	8001-35-2	0.00042[4]	Tier 1	0.60	0.60	0.02

Matrix: Soil
Analytical group: SVOCs

Analyte	Chemical Abstract Service Number	Project Action Limit[1] (mg/kg)	Project Action Limit Reference[2]	Project Quantitation Limit Goal (mg/kg)	Laboratory-specific[3] (mg/kg)	
					QLs	MDLs
1,2,4-Trichlorobenzene	120-82-1	7.6	Tier 1	0.33	0.33	0.043
1,2-Dichlorobenzene	95-50-1	1.6	Tier 1	0.33	0.33	0.058
1,3-Dichlorobenzene	541-73-1	7.4	Tier 1	0.33	0.33	0.063
1,4-Dichlorobenzene	106-46-7	1.8	Tier 1	0.33	0.33	0.067
2-Methylnaphthalene	91-57-6	0.25	Tier 1	0.067	0.067	0.001
2,4,5-Trichlorophenol	95-95-4	0.18[4]	Tier 1	0.33	0.33	0.078
2,4,6-Trichlorophenol	88-06-2	10	Tier 1	0.33	0.33	0.084
2,4-Dichlorophenol	120-83-2	3	Tier 1	0.33	0.33	0.063
2,4-Dimethylphenol	105-67-9	0.74	Tier 1	0.33	0.33	0.065
2,4-Dinitrophenol	51-28-5	0.42[4]	Tier 1	0.67	0.67	0.15
2,4-Dinitrotoluene	121-14-2	0.86	Tier 1	0.33	0.33	0.032
2,6-Dinitrotoluene	606-20-2	NA	NA	0.33	0.33	0.035
2-Chloronaphthalene	91-58-7	NA	NA	0.33	0.33	0.042
2-Chlorophenol	95-57-8	0.12[4]	Tier 1	0.33	0.33	0.094
2-Methyl-4,6-dinitrophenol	534-52-1	NA	NA	0.67	0.67	0.16
2-Methylphenol	95-48-7	NA	NA	0.33	0.33	0.096
2-Nitroaniline	88-74-4	NA	NA	0.67	0.67	0.078
2-Nitrophenol	88-75-5	NA	NA	0.67	0.67	0.087
3,3'-Dichlorobenzidine	91-94-1	2.4	Tier 1	0.67	0.67	0.18
3-Nitroaniline	99-09-2	NA	NA	0.67	0.67	0.16
4-Bromophenyl Phenyl Ether	101-55-3	NA	NA	0.33	0.33	0.027
4-Chloro-3-methylphenol	59-50-7	NA	NA	0.33	0.33	0.056
4-Chloroaniline	106-47-8	0.053[4]	Tier 1	0.33	0.33	0.055
4-Chlorophenyl Phenyl Ether	7005-72-3	NA	NA	0.33	0.33	0.032
4-Methylphenol	106-44-5	NA	NA	0.33	0.33	0.1
4-Nitroaniline	100-01-6	NA	NA	0.67	0.67	0.058
4-Nitrophenol	100-02-7	NA	NA	0.67	0.67	0.092
Acenaphthene	83-32-9	19	Tier 1	0.067	0.067	0.001
Acenaphthylene	208-96-8	13	Tier 1	0.067	0.067	0.001

Analyte	Chemical Abstract Service Number	Project Action Limit[1] (mg/kg)	Project Action Limit Reference[2]	Project Quantitation Limit Goal (mg/kg)	Laboratory-specific[3] (mg/kg)	
					QLs	MDLs
Anthracene	120-12-7	2.8	Tier 1	0.067	0.067	0.0013
Benz(a)anthracene	56-55-3	1.3	Tier 1	0.067	0.067	0.001
Benzo(a)pyrene	50-32-8	0.13	Tier 1	0.067	0.067	0.0093
Benzo(b)fluoranthene	205-99-2	1.3	Tier 1	0.067	0.067	0.0013
Benzo(g,h,i)perylene	191-24-2	27	Tier 1	0.067	0.067	0.0012
Benzoic acid	65-85-7	NA	NA	1.7	1.7	0.52
Benzo(k)fluoranthene	207-08-9	1.3	Tier 1	0.067	0.067	0.001
Benzyl alcohol	100-51-6	NA	NA	0.33	0.33	0.093
Bis(2-chloroethoxy)methane	111-91-1	NA	NA	0.33	0.33	0.064
Bis(2-chloroethyl)ether	111-44-4	0.16[4]	Tier1	0.33	0.33	0.071
Bis(2-chloroisopropyl)ether	108-60-1	0.077[4]	Tier 1	0.33	0.33	0.077
Bis(2-ethylhexyl)phthalate	117-81-7	120	Tier 1	0.33	0.33	0.035
Butyl Benzyl Phthalate	85-68-7	NA	NA	0.33	0.33	0.026
Chrysene	218-01-9	23	Tier 1	0.067	0.067	0.001
Dibenz(a,h)anthracene	53-70-3	0.21	Tier 1	0.067	0.067	0.001
Diethyl Phthalate	84-66-2	0.035[4]	Tier 1	0.33	0.33	0.036
Dimethyl Phthalate	131-11-3	0.035[4]	Tier 1	0.33	0.33	0.037
Di-n-butyl Phthalate	84-74-2	NA	NA	0.33	0.33	0.036
Di-n-octyl Phthalate	117-84-0	NA	NA	0.33	0.33	0.029
Fluoranthene	206-44-0	40	Tier 1	0.067	0.067	0.001
Fluorene	86-73-7	8.9	Tier 1	0.067	0.067	0.001
Hexachlorobenzene	118-74-1	1.3	Tier 1	0.33	0.33	0.024
Hexachlorobutadiene	87-68-3	4.6	Tier 1	0.33	0.33	0.056
Hexachlorocyclopentadiene	77-47-4	NA	NA	0.67	0.67	0.095
Hexachloroethane	67-72-1	41	Tier 1	0.33	0.33	0.07
Indeno(1,2,3-cd)pyrene	193-39-5	2.1	Tier 1	0.067	0.067	0.001
Isophorone	78-59-1	NA	NA	0.33	0.33	0.066
Naphthalene	91-20-3	2.8	Tier 1	0.067	0.067	0.001
Nitrobenzene	98-95-3	NA	NA	0.33	0.33	0.056
N-Nitrosodi-n-propylamine	621-64-7	NA	NA	0.33	0.33	0.089

Analyte	Chemical Abstract Service Number	Project Action Limit[1] (mg/kg)	Project Action Limit Reference[2]	Project Quantitation Limit Goal (mg/kg)	Laboratory-specific[3] (mg/kg)	
					QLs	MDLs
N-Nitrosodiphenylamine	86-30-6	NA	NA	0.33	0.33	0.029
Pentachlorophenol	87-86-5	5	Tier 1	0.67	0.67	0.17
Phenanthrene	85-01-8	11	Tier 1	0.067	0.067	0.001
Phenol	108-95-2	3.9	Tier 1	0.33	0.33	0.092
Pyrene	129-00-0	85	Tier 1	0.067	0.067	0.001

Matrix: Soil
Analytical group: Total Petroleum Hydrocarbons (TPH)

Analyte	Chemical Abstract Service Number	Project Action Limit[1] (mg/kg)		Project Action Limit Reference[2]	Project Quantitation Limit Goal (mg/kg)	Laboratory-specific[3] (mg/kg)	
						QLs	MDLs
Gasoline	NA	180		Tier 1	1	1	0.082
Diesel	NA	180		Tier 1	1	1	0.32
Motor Oil	NA	2,500		Tier 1	5	5	1.3
Bunker C <300 feet from wetland[4]	NA	0-3 feet bgs	2,500	Tier 2	5	5	1.6
		3-10 feet bgs	5,000				
Bunker C >300 feet from wetland[4]	NA	0-3 feet bgs	2,500				
		3-10 feet bgs	5,000				

Notes:

1 Project action limits for shallow soil (<3 meters below ground surface) with the exception of background metals and where noted.

2 Tier 1 Environmental Screening Levels for shallow soil (<3 meters below ground surface) for commercial/industrial land use where groundwater is not a current or potential drinking water resource (Water Board, 2008). Tier 2 Environmental Screening Levels for commercial/industrial land use at the Eastern Early Transfer Parcel (CH2M HILL, 2009b).

3 Curtis and Tompkins, Ltd.

4 Although, the quantitation limit for dieldrin, endrin, toxaphene, 2,4,5-trichlorophenol, 2,4-dinitrophenol, 2-chlorophenol, 4-chloroaniline, bis(2-chloroethyl)ether, bis(2-chloroisopropyl)ether, diethyl phthalate, and dimethyl phthalate is above one of the project action limit, results are reported as detected if found above the method detection limit which is either approaching, at or lower than the project action limit. The referenced methods to be employed for sample analysis utilize proven laboratory techniques which provide for full analysis including many analytes which is more useful for project decisions being used for this corrective action.

bgs below ground surface
MDL method detection limit
mg/kg milligrams per kilogram
NA not applicable
QL quantitation limit

SAP WORKSHEET #16 -- PROJECT SCHEDULE / TIMELINE TABLE (OPTIONAL FORMAT)
(UFP-QAPP Manual Section 2.8.2)

The project schedule is provided in FIGURE 5 following the SAP text.

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SAP WORKSHEET #17 -- SAMPLING DESIGN AND RATIONALE
(UFP-QAPP Manual Section 3.1.1)

CONFIRMATION SAMPLING

Following removal of petroleum-impacted soil and debris, confirmation sampling will be performed at the exposed excavation bottom and sidewalls based on a 50 by 50-foot grid. A systematic grid was choosen as the preferred sampling approach as it ensures that samples are evenly distributed across the area of concern to properly delineate the extent of contamination (EPA, 1995). Figure 4 presents the anticipated petroleum-impacted areas to be excavated with the sampling grid. Sampling within each grid will be performed using the excavator bucket to scrape soil from the surface of the area to be sampled. A disposable trowel will be used to collect a sample from the middle of the soil lifted in the excavator bucket. Sidewall sampling will be performed in the same manner midway vertically within the excavation wall. Sidewall confirmation samples will be collected at depths based on adjacent petroleum-impacted soil removed. If free product was present, the sidewall sample will be collected at a depth corresponding to the removed free product. If stained soil or odors were present, the sidewall sample will be collected at the corresponding depth. Confirmation samples will be analyzed for TPH as Bunker C.

If overexcavation is performed, additional sampling for Bunker C in the overexcavation areas will be performed in coordination with the DON and regulatory agencies. Overexcavations and additional sample analysis will be performed by direction of the DON and in coordination with the regulatory agencies.

OVERBURDEN AND IMPORT BACKFILL

Overburden soil and import backfill material will be sampled and analyzed for metals, SVOCs, pesticides, PCBs, and TPH as gasoline, diesel, and motor oil following the recommendations of the DTSC *Information Advisory for Clean Imported Fill Material* (DTSC, 2001). As detailed in the guidance sampling schedule, one sample will be collected from every 1,000 cubic yard stockpile of overburden soil. Import sources will be sampled at the frequency specified in the sampling schedule which is based on the size of the individual borrow area as shown in the table below.

Area of Individual Borrow Source	Sampling Requirements
2 acres or less	Minimum of 4 samples
2 to 4 acres	Minimum of 1 sample every ½ acre
4 to 10 acres	Minimum of 8 samples
Greater than 10 acres	Minimum of 8 locations with 4 subsamples per location

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SAP WORKSHEET #18 -- SAMPLING LOCATIONS AND METHODS/SOP REQUIREMENTS TABLE
(UFP-QAPP Manual Section 3.1.1)

Sampling Location/Number	Matrix	Depth (in)	Analytical group[1]	Number of samples	Sampling SOP Reference[2]
BOTTOM GRID SAMPLES					
A07- 001	Soil	TBD	TPH-extractables	1	WESTON SOP 102
A08- 002	Soil	TBD	TPH-extractables	1	WESTON SOP 102
B06- 003	Soil	TBD	TPH-extractables	1	WESTON SOP 102
B07- 004	Soil	TBD	TPH-extractables	1	WESTON SOP 102
B08- 005	Soil	TBD	TPH-extractables	1	WESTON SOP 102
C07- 006	Soil	TBD	TPH-extractables	1	WESTON SOP 102
C08- 007	Soil	TBD	TPH-extractables	1	WESTON SOP 102
C09- 008	Soil	TBD	TPH-extractables	1	WESTON SOP 102
FD1- 009	Soil	TBD	TPH-extractables	1 (duplicate of C09-008)	WESTON SOP 102
C12- 010	Soil	TBD	TPH-extractables	1	WESTON SOP 102
D07- 011	Soil	TBD	TPH-extractables	1	WESTON SOP 102
D08- 012	Soil	TBD	TPH-extractables	1 (MS/MSD)	WESTON SOP 102
D09- 013	Soil	TBD	TPH-extractables	1	WESTON SOP 102
D10- 014	Soil	TBD	TPH-extractables	1	WESTON SOP 102
D11- 015	Soil	TBD	TPH-extractables	1	WESTON SOP 102
D12- 016	Soil	TBD	TPH-extractables	1	WESTON SOP 102
D13- 017	Soil	TBD	TPH-extractables	1	WESTON SOP 102
E07- 018	Soil	TBD	TPH-extractables	1	WESTON SOP 102
E08- 019	Soil	TBD	TPH-extractables	1	WESTON SOP 102
E09- 020	Soil	TBD	TPH-extractables	1	WESTON SOP 102
E10- 021	Soil	TBD	TPH-extractables	1	WESTON SOP 102
E11- 022	Soil	TBD	TPH-extractables	1	WESTON SOP 102
FD2- 023	Soil	TBD	TPH-extractables	1 (duplicate of E11-022)	WESTON SOP 102

Sampling Location/Number	Matrix	Depth (in)	Analytical group[1]	Number of samples	Sampling SOP Reference[2]
E12- 024	Soil	TBD	TPH-extractables	1	WESTON SOP 102
E13- 025	Soil	TBD	TPH-extractables	1	WESTON SOP 102
F07- 026	Soil	TBD	TPH-extractables	1	WESTON SOP 102
F08- 027	Soil	TBD	TPH-extractables	1	WESTON SOP 102
F09- 028	Soil	TBD	TPH-extractables	1	WESTON SOP 102
F10- 029	Soil	TBD	TPH-extractables	1	WESTON SOP 102
F11- 030	Soil	TBD	TPH-extractables	1	WESTON SOP 102
F12- 031	Soil	TBD	TPH-extractables	1	WESTON SOP 102
G06- 032	Soil	TBD	TPH-extractables	1	WESTON SOP 102
G07- 033	Soil	TBD	TPH-extractables	1	WESTON SOP 102
G08- 034	Soil	TBD	TPH-extractables	1	WESTON SOP 102
FD3- 035	Soil	TBD	TPH-extractables	1 (duplicate of G08-034)	WESTON SOP 102
G09- 036	Soil	TBD	TPH-extractables	1	WESTON SOP 102
G10- 037	Soil	TBD	TPH-extractables	1	.ESTON SOP 102
G11- 038	Soil	TBD	TPH-extractables	1 (MS/MSD)	WESTON SOP 102
H06- 039	Soil	TBD	TPH-extractables	1	WESTON SOP 102
H07- 040	Soil	TBD	TPH-extractables	1	WESTON SOP 102
H08- 041	Soil	TBD	TPH-extractables	1	WESTON SOP 102
H09- 042	Soil	TBD	TPH-extractables	1	WESTON SOP 102
H10- 043	Soil	TBD	TPH-extractables	1	WESTON SOP 102
H11- 044	Soil	TBD	TPH-extractables	1	WESTON SOP 102
I07- 045	Soil	TBD	TPH-extractables	1	WESTON SOP 102
FD4- 046	Soil	TBD	TPH-extractables	1 (duplicate of I07-045)	WESTON SOP 102
I08- 047	Soil	TBD	TPH-extractables	1	WESTON SOP 102
I09- 048	Soil	TBD	TPH-extractables	1	WESTON SOP 102

Sampling Location/Number	Matrix	Depth (in)	Analytical group[1]	Number of samples	Sampling SOP Reference[2]
I10- 049	Soil	TBD	TPH-extractables	1	WESTON SOP 102
I11- 050	Soil	TBD	TPH-extractables	1	WESTON SOP 102
J08- 051	Soil	TBD	TPH-extractables	1	WESTON SOP 102
FD5- 052	Soil	TBD	TPH-extractables	1 (duplicate of J08-051)	WESTON SOP 102
J09- 053	Soil	TBD	TPH-extractables	1	WESTON SOP 102
J10- 054	Soil	TBD	TPH-extractables	1	WESTON SOP 102
J11- 055	Soil	TBD	TPH-extractables	1	WESTON SOP 102
K08- 056	Soil	TBD	TPH-extractables	1	WESTON SOP 102
K09- 057	Soil	TBD	TPH-extractables	1	WESTON SOP 102
K10- 058	Soil	TBD	TPH-extractables	1	WESTON SOP 102
L07- 059	Soil	TBD	TPH-extractables	1	WESTON SOP 102
FD6- 060	Soil	TBD	TPH-extractables	1 (duplicate of L07-059)	WESTON SOP 102
L08- 061	Soil	TBD	TPH-extractables	1	WESTON SOP 102
L09- 062	Soil	TBD	TPH-extractables	1	WESTON SOP 102
M07- 064	Soil	TBD	TPH-extractables	1 (MS/MSD)	WESTON SOP 102
M08- 065	Soil	TBD	TPH-extractables	1	WESTON SOP 102
N06- 066	Soil	TBD	TPH-extractables	1	WESTON SOP 102
N07- 067	Soil	TBD	TPH-extractables	1	WESTON SOP 102
N08- 068	Soil	TBD	TPH-extractables	1	WESTON SOP 102
N09- 069	Soil	TBD	TPH-extractables	1	WESTON SOP 102
N10- 070	Soil	TBD	TPH-extractables	1	WESTON SOP 102
O06- 071	Soil	TBD	TPH-extractables	1	WESTON SOP 102
O07- 072	Soil	TBD	TPH-extractables	1	WESTON SOP 102
P07- 073	Soil	TBD	TPH-extractables	1	WESTON SOP 102
Q07- 074	Soil	TBD	TPH-extractables	1	WESTON SOP 102

Sampling Location/Number	Matrix	Depth (in)	Analytical group[1]	Number of samples	Sampling SOP Reference[2]
R07- 075	Soil	TBD	TPH-extractables	1	WESTON SOP 102
R08- 076	Soil	TBD	TPH-extractables	1	WESTON SOP 102
S08- 077	Soil	TBD	TPH-extractables	1	WESTON SOP 102
FD7- 078	Soil	TBD	TPH-extractables	1 (duplicate of S08-077)	WESTON SOP 102
S09- 079	Soil	TBD	TPH-extractables	1	WESTON SOP 102
T04- 080	Soil	TBD	TPH-extractables		WESTON SOP 102
T05- 081	Soil	TBD	TPH-extractables	1	WESTON SOP 102
U04- 082	Soil	TBD	TPH-extractables	1	WESTON SOP 102
U05- 083	Soil	TBD	TPH-extractables	1	WESTON SOP 102
U06- 084	Soil	TBD	TPH-extractables	1	WESTON SOP 102
U07- 085	Soil	TBD	TPH-extractables	1	WESTON SOP 102
U08- 086	Soil	TBD	TPH-extractables	1	WESTON SOP 102
U09- 087	Soil	TBD	TPH-extractables	1	WESTON SOP 102
FD8- 088	Soil	TBD	TPH-extractables	1 (duplicate of U09-087)	WESTON SOP 102
V04- 089	Soil	TBD	TPH-extractables	1	WESTON SOP 102
V05- 090	Soil	TBD	TPH-extractables	1	WESTON SOP 102
V06- 091	Soil	TBD	TPH-extractables	1 (MS/MSD)	WESTON SOP 102
V07- 092	Soil	TBD	TPH-extractables	1	WESTON SOP 102
V08- 093	Soil	TBD	TPH-extractables	1	WESTON SOP 102
V09- 094	Soil	TBD	TPH-extractables	1	WESTON SOP 102
V10- 095	Soil	TBD	TPH-extractables	1	WESTON SOP 102
W04- 096	Soil	TBD	TPH-extractables	1	WESTON SOP 102
W05- 097	Soil	TBD	TPH-extractables	1	WESTON SOP 102
W06- 098	Soil	TBD	TPH-extractables	1	WESTON SOP 102
FD9- 099	Soil	TBD	TPH-extractables	1 (duplicate of W06-098)	WESTON SOP 102

Sampling Location/Number	Matrix	Depth (in)	Analytical group[1]	Number of samples	Sampling SOP Reference[2]
W07- 100	Soil	TBD	TPH-extractables	1	WESTON SOP 102
W08- 101	Soil	TBD	TPH-extractables	1	WESTON SOP 102
W09- 102	Soil	TBD	TPH-extractables	1	WESTON SOP 102
W10- 103	Soil	TBD	TPH-extractables	1	WESTON SOP 102
W11- 104	Soil	TBD	TPH-extractables	1	WESTON SOP 102
X04- 105	Soil	TBD	TPH-extractables	1	WESTON SOP 102
X05- 106	Soil	TBD	TPH-extractables	1	WESTON SOP 102
X06- 107	Soil	TBD	TPH-extractables	1	WESTON SOP 102
X07- 108	Soil	TBD	TPH-extractables	1	WESTON SOP 102
X08- 109	Soil	TBD	TPH-extractables	1	WESTON SOP 102
FD10- 110	Soil	TBD	TPH-extractables	1 (duplicate of X08-109)	WESTON SOP 102
X09- 111	Soil	TBD	TPH-extractables	1 (MS/MSD)	WESTON SOP 102
X10- 112	Soil	TBD	TPH-extractables	1	WESTON SOP 102
X11- 113	Soil	TBD	TPH-extractables	1	WESTON SOP 102
Y05- 114	Soil	TBD	TPH-extractables	1	WESTON SOP 102
Y06- 115	Soil	TBD	TPH-extractables	1	WESTON SOP 102
Y07- 116	Soil	TBD	TPH-extractables	1	WESTON SOP 102
Y08- 117	Soil	TBD	TPH-extractables	1	WESTON SOP 102
Y09- 118	Soil	TBD	TPH-extractables	1	WESTON SOP 102
Y10- 119	Soil	TBD	TPH-extractables	1	WESTON SOP 102
Y11- 120	Soil	TBD	TPH-extractables	1	WESTON SOP 102
FD11- 121	Soil	TBD	TPH-extractables	1 (duplicate of Y11-120)	WESTON SOP 102
Z07- 122	Soil	TBD	TPH-extractables	1	WESTON SOP 102
Z08- 123	Soil	TBD	TPH-extractables	1	WESTON SOP 102
Z09- 124	Soil	TBD	TPH-extractables	1	WESTON SOP 102

Sampling Location/Number	Matrix	Depth (in)	Analytical group[1]	Number of samples	Sampling SOP Reference[2]
Z10- 125	Soil	TBD	TPH-extractables	1	WESTON SOP 102
Z11- 126	Soil	TBD	TPH-extractables	1	WESTON SOP 102
AA08- 127	Soil	TBD	TPH-extractables	1	WESTON SOP 102
AA09- 128	Soil	TBD	TPH-extractables	1 (MS/MSD)	WESTON SOP 102
FD12- 129	Soil	TBD	TPH-extractables	1 (duplicate of AA09-128)	WESTON SOP 102
AA10- 130	Soil	TBD	TPH-extractables	1	WESTON SOP 102
AA11- 131	Soil	TBD	TPH-extractables	1	WESTON SOP 102
AA12- 132	Soil	TBD	TPH-extractables	1	WESTON SOP 102
BB10- 133	Soil	TBD	TPH-extractables	1	WESTON SOP 102
BB11- 134	Soil	TBD	TPH-extractables	1	WESTON SOP 102
BB12- 135	Soil	TBD	TPH-extractables	1	WESTON SOP 102
CC11- 136	Soil	TBD	TPH-extractables	1	WESTON SOP 102
CC12- 137	Soil	TBD	TPH-extractables	1	WESTON SOP 102
DD13- 138	Soil	TBD	TPH-extractables	1	WESTON SOP 102
EE14- 139	Soil	TBD	TPH-extractables	1	WESTON SOP 102
FD13- 140	Soil	TBD	TPH-extractables	1 (duplicate of EE14-139	WESTON SOP 102
GG17- 141	Soil	TBD	TPH-extractables	1 (MS/MSD)	WESTON SOP 102
GG18- 142	Soil	TBD	TPH-extractables	1	WESTON SOP 102
HH18- 143	Soil	TBD	TPH-extractables	1	WESTON SOP 102
HH19- 144	Soil	TBD	TPH-extractables	1	WESTON SOP 102
II19- 145	Soil	TBD	TPH-extractables	1	WESTON SOP 102
SIDEWALL GRID SAMPLES					
B06-SW-N- 146	Soil	TBD	TPH-extractables	1	WESTON SOP 102
C06-SW-N- 147	Soil	TBD	TPH-extractables	1	WESTON SOP 102
D07-SW-N- 148	Soil	TBD	TPH-extractables	1	WESTON SOP 102

Sampling Location/Number		Matrix	Depth (in)	Analytical group[1]	Number of samples	Sampling SOP Reference[2]
FD14-SW-	149	Soil	TBD	TPH-extractables	1 (duplicate of D07-SW-N-148)	WESTON SOP 102
E07-SW-N-	150	Soil	TBD	TPH-extractables	1	WESTON SOP 102
F06-SW-N-	151	Soil	TBD	TPH-extractables	1	WESTON SOP 102
G06-SW-N-	152	Soil	TBD	TPH-extractables	1	WESTON SOP 102
H05-SW-N-	153	Soil	TBD	TPH-extractables	1	WESTON SOP 102
H06-SW-E-	154	Soil	TBD	TPH-extractables	1	WESTON SOP 102
I07-SW-E-	155	Soil	TBD	TPH-extractables	1	WESTON SOP 102
J08-SW-E-	156	Soil	TBD	TPH-extractables	1	WESTON SOP 102
K08-SW-N-	157	Soil	TBD	TPH-extractables	1 (MS/MSD)	WESTON SOP 102
L07-SW-N-	158	Soil	TBD	TPH-extractables	1	WESTON SOP 102
M06-SW-N-	159	Soil	TBD	TPH-extractables	1	WESTON SOP 102
FD15-SW-	160	Soil	TBD	TPH-extractables	1 (duplicate of M06-SW-N-159)	WESTON SOP 102
N06-SW-N-	161	Soil	TBD	TPH-extractables	1	WESTON SOP 102
O05-SW-N-	162	Soil	TBD	TPH-extractables	1	WESTON SOP 102
O06-SW-E-	163	Soil	TBD	TPH-extractables	1	WESTON SOP 102
P06-SW-N-	165	Soil	TBD	TPH-extractables	1	WESTON SOP 102
Q06-SW-N-	166	Soil	TBD	TPH-extractables	1	WESTON SOP 102
R07-SW-NE-	167	Soil	TBD	TPH-extractables	1	WESTON SOP 102
S08-SW-E-	168	Soil	TBD	TPH-extractables	1	WESTON SOP 102
S09-SW-SE-	169	Soil	TBD	TPH-extractables	1	WESTON SOP 102
R09-SW-SE-	170	Soil	TBD	TPH-extractables	1	WESTON SOP 102
FD16-SW-	171	Soil	TBD	TPH-extractables	1 (duplicate of R09-SW-SE-170)	WESTON SOP 102
R08-SW-W-	172	Soil	TBD	TPH-extractables	1	WESTON SOP 102
Q07-SW-S-	173	Soil	TBD	TPH-extractables	1	WESTON SOP 102
P07-SW-S-	174	Soil	TBD	TPH-extractables	1 (MS/MSD)	WESTON SOP 102

Sampling Location/Number		Matrix	Depth (in)	Analytical group[1]	Number of samples	Sampling SOP Reference[2]
O07-SW-S	175	Soil	TBD	TPH-extractables	1	WESTON SOP 102
O08-SW-E-	176	Soil	TBD	TPH-extractables	1	WESTON SOP 102
N09-SW-E	177	Soil	TBD	TPH-extractables	1	WESTON SOP 102
N10-SW-E	178	Soil	TBD	TPH-extractables	1	WESTON SOP 102
FD17-SW	179	Soil	TBD	TPH-extractables	1 (duplicate of N10-SW-E-178)	WESTON SOP 102
N11-SW-SE-	180	Soil	TBD	TPH-extractables	1	WESTON SOP 102
M11-SW-W-	181	Soil	TBD	TPH-extractables	1	WESTON SOP 102
M10-SW-W-	182	Soil	TBD	TPH-extractables	1	WESTON SOP 102
M09-SW-W-	183	Soil	TBD	TPH-extractables	1	WESTON SOP 102
N08-SW-W-	184	Soil	TBD	TPH-extractables	1	WESTON SOP 102
FD18-SW-	185	Soil	TBD	TPH-extractables	1 (duplicate of N08-SW-W-184)	WESTON SOP 102
M08-SW-SE	186	Soil	TBD	TPH-extractables	1	WESTON SOP 102
L09-SW-SE-	187	Soil	TBD	TPH-extractables	1	WESTON SOP 102
K10-SW-SE-	188	Soil	TBD	TPH-extractables	1	WESTON SOP 102
J11-SW-SE-	189	Soil	TBD	TPH-extractables	1	WESTON SOP 102
I12-SW-S-	190	Soil	TBD	TPH-extractables	1 (MS/MSD)	WESTON SOP 102
H12-SW-S-	191	Soil	TBD	TPH-extractables	1	WESTON SOP 102
G12-SW-S-	192	Soil	TBD	TPH-extractables	1	WESTON SOP 102
FD19-SW-	193	Soil	TBD	TPH-extractables	1 (duplicate of G12-SW-S-192)	WESTON SOP 102
F12-SW-SE-	194	Soil	TBD	TPH-extractables	1	WESTON SOP 102
E13-SW-SE-	195	Soil	TBD	TPH-extractables	1	WESTON SOP 102
D14-SW-S-	196	Soil	TBD	TPH-extractables	1	WESTON SOP 102
C13-SW-W-	197	Soil	TBD	TPH-extractables	1	WESTON SOP 102
C12-SW-W-	198	Soil	TBD	TPH-extractables	1	WESTON SOP 102
C11-SW-NW-	199	Soil	TBD	TPH-extractables	1	WESTON SOP 102

Sampling Location/Number		Matrix	Depth (in)	Analytical group[1]	Number of samples	Sampling SOP Reference[2]
D11-SW-NW-	200	Soil	TBD	TPH-extractables	1	WESTON SOP 102
D10-SW-SW-	201	Soil	TBD	TPH-extractables	1	WESTON SOP 102
C10-SW-SW-	202	Soil	TBD	TPH-extractables	1	WESTON SOP 102
C09-SW-SW-	203	Soil	TBD	TPH-extractables	1	WESTON SOP 102
B08-SW-SW-	204	Soil	TBD	TPH-extractables	1	WESTON SOP 102
A08-SW-SE-	205	Soil	TBD	TPH-extractables	1	WESTON SOP 102
A08-SW-W-	206	Soil	TBD	TPH-extractables	1	WESTON SOP 102
A07-SW-W-	208	Soil	TBD	TPH-extractables	1	WESTON SOP 102
A06-SW-NW-	209	Soil	TBD	TPH-extractables	1 (MS/MSD)	WESTON SOP 102
T04-SW-NW-	210	Soil	TBD	TPH-extractables	1	WESTON SOP 102
U04-SW-N-	211	Soil	TBD	TPH-extractables	1	WESTON SOP 102
FD20-SW-	212	Soil	TBD	TPH-extractables	1 (duplicate of U04-SW-N-211)	WESTON SOP 102
V04-SW-N-	213	Soil	TBD	TPH-extractables	1	WESTON SOP 102
W04-SW-N-	214	Soil	TBD	TPH-extractables	1	WESTON SOP 102
X04-SW-NE-	215	Soil	TBD	TPH-extractables	1	WESTON SOP 102
Y05-SW-NE-	216	Soil	TBD	TPH-extractables	1	WESTON SOP 102
Z06-SW-NE-	217	Soil	TBD	TPH-extractables	1	WESTON SOP 102
Z07-SW-NE-	218	Soil	TBD	TPH-extractables	1	WESTON SOP 102
AA08-SW-NE-	219	Soil	TBD	TPH-extractables	1	WESTON SOP 102
BB09-SW-NE-	220	Soil	TBD	TPH-extractables	1	WESTON SOP 102
BB10-SW-NE-	221	Soil	TBD	TPH-extractables	1	WESTON SOP 102
CC11-SW-NE-	222	Soil	TBD	TPH-extractables	1	WESTON SOP 102
DD12-SW-NE-	223	Soil	TBD	TPH-extractables	1	WESTON SOP 102
DD13-SW-NE-	224	Soil	TBD	TPH-extractables	1	WESTON SOP 102
EE13-SW-NE	225	Soil	TBD	TPH-extractables	1	WESTON SOP 102

Sampling Location/Number		Matrix	Depth (in)	Analytical group[1]	Number of samples	Sampling SOP Reference[2]
EE14-SW-NE-	226	Soil	TBD	TPH-extractables	1	WESTON SOP 102
FD21-SW-	227	Soil	TBD	TPH-extractables	1 (duplicate of EE14-SW-NE-226)	WESTON SOP 102
FF15-SW-NE-	228	Soil	TBD	TPH-extractables	1	WESTON SOP 102
GG17-SW-NE-	229	Soil	TBD	TPH-extractables	1	WESTON SOP 102
HH18-SW-NE-	230	Soil	TBD	TPH-extractables	1	WESTON SOP 102
II19-SW-NE-	231	Soil	TBD	TPH-extractables	1	WESTON SOP 102
II19-SW-S-	232	Soil	TBD	TPH-extractables	1	WESTON SOP 102
HH19-SW-SW-	233	Soil	TBD	TPH-extractables	1	WESTON SOP 102
GG18-SW-SW-	234	Soil	TBD	TPH-extractables	1	WESTON SOP 102
GG17-SW-SW-	235	Soil	TBD	TPH-extractables	1	WESTON SOP 102
GG16-SW-SW-	236	Soil	TBD	TPH-extractables	1	WESTON SOP 102
FF15-SW-SW-	237	Soil	TBD	TPH-extractables	1	WESTON SOP 102
FD22-SW-	238	Soil	TBD	TPH-extractables	1 (duplicate of FF15-SW-SW-237)	WESTON SOP 102
EE14-SW-SW-	239	Soil	TBD	TPH-extractables	1	WESTON SOP 102
DD13-SW-SW-	240	Soil	TBD	TPH-extractables	1	WESTON SOP 102
CC12-SW-S-	241	Soil	TBD	TPH-extractables	1	WESTON SOP 102
BB12-SW-S-	242	Soil	TBD	TPH-extractables	1	WESTON SOP 102
AA12-SW-S-	243	Soil	TBD	TPH-extractables	1	WESTON SOP 102
Z12-SW-S-	244	Soil	TBD	TPH-extractables	1	WESTON SOP 102
Y11-SW-S-	245	Soil	TBD	TPH-extractables	1 (MS/MSD)	WESTON SOP 102
X11-SW-S-	246	Soil	TBD	TPH-extractables	1	WESTON SOP 102
W11-SW-SW-	247	Soil	TBD	TPH-extractables	1	WESTON SOP 102
V11-SW-SW-	248	Soil	TBD	TPH-extractables	1	WESTON SOP 102
FD23-SW-	249	Soil	TBD	TPH-extractables	1 (duplicate of V11-SW-SW-248)	WESTON SOP 102
U10-SW-W-	250	Soil	TBD	TPH-extractables	1	WESTON SOP 102

Sampling Location/Number		Matrix	Depth (in)	Analytical group[1]	Number of samples	Sampling SOP Reference[2]
U09-SW-W-	251	Soil	TBD	TPH-extractables	1	WESTON SOP 102
U08-SW-W-	252	Soil	TBD	TPH-extractables	1	WESTON SOP 102
T07-SW-W-	253	Soil	TBD	TPH-extractables	1	WESTON SOP 102
T06-SW-W-	254	Soil	TBD	TPH-extractables	1	WESTON SOP 102
T05-SW-W-	255	Soil	TBD	TPH-extractables	1	WESTON SOP 102
FD24-SW-	256	Soil	TBD	TPH-extractables	1 (duplicate of T05-SW-W-255)	WESTON SOP 102
DRMO-OB-	001[3]	Soil	0-0.5	Metals, PCBs, Pesticides, SVOCs, TPH-extractables, TPH-purgeables	1[3]	WESTON SOP 102 and 103
IMPORT-CA-	001[3]	Soil	0-0.5	Metals, PCBs, Pesticides, SVOCs, TPH-extractables, TPH-purgeables	1[3]	WESTON SOP 102 and 103

Notes:

1 Excavation confirmation samples will be analyzed for TPH-extractables as Bunker C.

2 WESTON SOP 102 and 103 are provided as Attachment 1 at the end of this SAP.

3 Additional backfill samples will be performed for overburden and import soil analyses as required based on the stockpiles/area to be sampled (DTSC, 2001).

TBD (to be determined) The depth of the final excavation and sidewall sampling depths cannot be determined until the excavation is being performed. Sampling depths will be documented during sample collection on chain-of-custody forms provided with the sample to the analytical laboratory. Copies of all chain-of-custody forms will be included in the corrective action completion report.

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SAP WORKSHEET #19 -- ANALYTICAL SOP REQUIREMENTS TABLE
(UFP-QAPP Manual Section 3.1.1)

Matrix	Analytical Group	Analytical and Preparation Method / SOP Reference	Containers (number, size, and type)	Sample volume (units)	Preservation Requirements (chemical, temperature, light protected)	Maximum Holding Time[1] (preparation / analysis)
Soil	Metals	EPA 3050, 6010B, & 7471A/C&T Trace Metals SOP Section 4 and 5	One 8-oz glass jar	200 grams	4°C	6 months; 28 days for mercury
Soil	SVOCs	EPA 3540C & 8270C/C&T Semivolatile Organics SOP Section 8				14 days/ 40 days
Soil	Pesticides	EPA 3540C & 8081A/C&T Semivolatile Organics SOP Section 3				
Soil	PCBs	EPA 3540C & 8082/C&T Semivolatile Organics SOP Section 3				
Soil	TPH-purgeables	EPA 5035 & 8015B/C&T Volatile Organics SOP Section 7	3 En Core® samplers	5 grams	4°C	48 hours
Soil	TPH-extractables	EPA 3540C, 3630C, & 8015B/C&T Semivolatile Organics SOP Section 5	One 8-oz glass jar	200 grams	4°C	14 days /40 days

Notes:
1 Maximum holding time is calculated from the time the sample is collected to the time the sample is prepared/extracted.

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SAP WORKSHEET #20 -- FIELD QUALITY CONTROL SAMPLE SUMMARY TABLE
(UFP-QAPP Manual Section 3.1.1)

Matrix	Analytical Group	No. of Sampling Locations	No. of Field Duplicates	No. of MS/ MSDs	No. of Field Blanks[1]	No. of Equip. Blanks[1]	No. of VOA Trip Blanks[2]	No. of Proficiency Test Samples	Total No. of Samples to Lab
Soil	Metals	TBD	TBD	TBD	Not Required	None	None	None	TBD
Soil	PCBs	TBD	TBD	TBD	Not Required	None	None	None	TBD
Soil	Pesticides	TBD	TBD	TBD	Not Required	None	None	None	TBD
Soil	SVOCs	TBD	TBD	TBD	Not Required	None	None	None	TBD
Soil	TPH-purgeables	TBD	TBD	TBD	Not Required	None	None	None	TBD
Soil	TPH-extractables (diesel and motor oil)	TBD	TBD	TBD	Not Required	None	None	None	TBD
Soil	TPH-extractables (Bunker C)	233	24	12	Not Required	None	None	None	257 (not including backfill samples)

Notes:

1 Equipment and field blanks are not required as only disposable sampling equipment will be used.
2 VOA trip blanks are not required as water samples are not planned to be collected for this project.

TBD (to be determined) The quantity of samples required from the overburden soil and import soil borrow areas cannot be determined until the amount of overburden material and borrow import soil source is identified. Once the overburden soil is quantified and an import soil source is identified the number of samples will be determined as noted in SAP Worksheet #17 (DTSC, 2001). The quantity of samples analyzed from the overburden and import borrow soil source will be documented in the corrective action completion report.

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SAP WORKSHEET #21 -- PROJECT SAMPLING SOP REFERENCES TABLE
(UFP-QAPP Manual Section 3.1.2)

The SOPs relevant to the project sampling are listed in Worksheet 21 and attached to the SAP. Sampling will be conducted with disposable sampling equipment thus eliminating the need for equipment decontamination. Supplies will be inspected prior to sampling as described in the Contractor Quality Conrol Plan, which is Appendix C to the PCAP. Sample handling and custody are detailed in Worksheet 27.

Reference Number	Title, Revision Date and / or Number	Originating Organization of Sampling SOP	Equipment Type	Modified for Project Work? (Y/N)	Comments
102	Sampling for Semivolatile Organic and Inorganic Compounds, Rev. 0, October 2007	WESTON	Disposable scoops	No	Provided as Attachment 1
103	Sampling for Volatile Organic Compounds, Rev. 0, October 2007	WESTON	En Core® Sampler	No	Provided as Attachment 1

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SAP WORKSHEET #22 -- FIELD EQUIPMENT CALIBRATION, MAINTENANCE, TESTING, AND INSPECTION TABLE
(UFP-QAPP Manual Section 3.1.2.4)

This Worksheet does not apply as there will be no field equipment calibration, maintenance, testing, and inspection for the duration of this project.

Field Equipment	Activity[1]	Frequency	Acceptance Criteria	Corrective Action	Resp. Person	SOP Reference[2]	Comments

Not Applicable

[1] Activities may include: calibration, verification, testing, maintenance.

[2] Specify the appropriate reference letter or number from the Project Sampling SOP References table (Worksheet #21).

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SAP WORKSHEET #23 -- ANALYTICAL SOP REFERENCES TABLE
(UFP-QAPP Manual Section 3.2.1)

Lab SOP Number	Title, Revision Date, and / or Number	Definitive or Screening Data	Matrix and Analytical Group	Instrument	Organization Performing Analysis	Modified for Project Work?[1] (Y/N)
C&T Trace Metals SOP Section 4	Method 6010B: ICP Metals Analysis/ Revision 9	Definitive	Soil/Metals	Inductively-Coupled Atomic Emission Spectrometer	Curtis and Tompkins, Ltd.	No
C&T Trace Metals SOP Section 5	Method 7471A: Hg Analysis in Soil Samples/Revision 12	Definitive	Soil/Metals	Cold Vapor Atomic Absorption	Curtis and Tompkins, Ltd.	No
C&T Semivolatile Organics SOP Section 3	Organochlorine Pesticides by EPA 8081A & 608/ Revision 11	Definitive	Soil/Pesticides	Gas Chromatograph with Electron Capture Detector	Curtis and Tompkins, Ltd.	No
C&T Semivolatile Organics SOP Section 3	Polychlorinated Biphenyls by EPA 8082 & 608/Revision 7	Definitive	Soil/Polychlorinated Biphenyls	Gas Chromatograph with Electron Capture Detector	Curtis and Tompkins, Ltd.	No
C&T Semivolatile Organics SOP Section 8	SVOCs by GCMS Methods 8270C & 625/ Revision 9	Definitive	Soil/Semivolatile Organic Compounds	Gas Chromatograph with Mass Spetrometer	Curtis and Tompkins, Ltd.	No
C&T Volatile Organics SOP Section 7	TPH/Purgeables (gasoline)	Definitive	Soil/Total Petroleum Hydrocarbons-Purgeables	Gas Chromatograph with Flame Ionization Detector	Curtis and Tompkins, Ltd.	No
C&T Semivolatile Organics SOP Section 5[2]	TPH/Extractables (diesel and motor oil)	Definitive	Soil/Total Petroleum Hydrocarbons-Extractables	Gas Chromatograph with Flame Ionization Detector	Curtis and Tompkins, Ltd.	No

Notes:
1 If yes, then specify the modification that has been made. Note that any analytical SOP modification made relative to project specific needs must be reviewed and approved by the Navy QA Officer.
2 TPH as Bunker C is an extractable petroleum hydrocarbon and will be analyzed following the C&T Semivolatile Organics SOP Section 5 titled "TPH/Extractables (diesel and motor oil).

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SAP WORKSHEET #24 -- ANALYTICAL INSTRUMENT CALIBRATION TABLE
(UFP-QAPP Manual Section 3.2.2)

Instrument	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	Corrective Action (CA)	Person Responsible for CA[1]	SOP Reference[2]
Cold Vapor Atomic Absorption (CVAA)	Initial Calibration (IC) three-point calibration and blank	Prior to sample analysis	Correlation Coefficient > 0.99	Check connections, bake-out cell, perform leak tests, adjust argon flow, inspect systems for problems, repeat IC	CVAA Analyst	C&T Trace Metals SOP Section 5
	Second Source Initial Calibration Verification (ICV)	Once per IC	Less than 10% difference from IC	Check connections, bake-out cell, perform leak tests, adjust argon flow, inspect systems for problems, repeat ICV		
	Continuing Calibration Verification (CCV)	After every 10 samples and at the end of the run sequence	Less than 10% difference from IC	Check connections, bake-out cell, perform leak tests, adjust argon flow, inspect systems for problems, reanalyze previous 10 samples		
	Calibration Blank	After IC, before CCV calibration, after every 10 samples and at the end of the run sequence	All target analytes not detected above the required quantitation	Bake-out cell, adjust argon flow Prepare and analyze blank again, re-calibrate the instrument		

Instrument	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	Corrective Action (CA)	Person Responsible for CA[1]	SOP Reference[2]
Inductively Coupled Plasma-Atomic Emission Spectrometer (ICP-ES)	IC	Prior to sample analysis	Passes if the ICV passes	Inspect the system for problems, change the nebulizer, adjust the aerosol flow, check connections, check aspiration flow and repeat IC	ICP-ES Analyst	C&T Trace Metals SOP Section 5
	Second Source ICV	Once per IC	Less than 10% differences from IC for all target analytes	Inspect the system for problems, check connections, check aspiration flow, check connections, check the argon flow/mass flow controller and repeat ICV		
	CCV	Following IC, after every 10 samples and at the end of the run sequence	Less than 10% differences from IC for all target analytes	Inspect the system for problems, check connections, check aspiration flow, check connections, check the argon flow/mass flow controller, reanalyze CCV and previous 10 samples		
	Calibration Blank	After IC, before CCV calibration, after every 10 samples and at the end of the run sequence	All target analytes not detected above three times the instrument detection limit	Inspect the system for problems, check connections, prepare and analyze blank again, re-calibrate the instrument		

Instrument	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	Corrective Action (CA)	Person Responsible for CA[1]	SOP Reference[2]
Gas Chromato-graph (GC)/ Electron Capture Detector (ECD)	Five Point IC for target analytes	Prior to sample analysis	Target analyte calibration factor (CF) or response factor (RF) relative standard deviation (RSD) less than or equal to 20%[a] Mean CF or RF RSD less than or equal to 20%	Inspect the system for problems, check connections, recondition column, change the column, perform leak test, bake out the detector, clean the injection port and repeat IC	GC Analyst	C&T Semivolatile Organics SOP Section 3
	Second-Source Calibration Verification	Once per five-point IC	Less than 20% difference for most target analytes, 25% for difficult compounds	Inspect the system for problems, check connections, perform leak test, bake out the detector, clean the injection port and repeat calibration verification		
	Daily Calibration Verification	Before sample analysis and every 10 samples or every 12 hours, as specified by the method	Less than 15% difference for all target analytes	Inspect the system for problems, check connections, perform leak test, bake out the detector, clean the injection port and repeat IC		
	Retention Time Window Study	Establish initially, verify during daily calibrations	Within ± 3 standard deviations of each analyte retention time from the initial study	Inspect the system for problems, check connections, perform leak test, clean the injection port and re-evaluate analyte identification		

Instrument	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	Corrective Action (CA)	Person Responsible for CA[1]	SOP Reference[2]
GC/ECD (Continued)	(Pesticides) DDT and Endrin Breakdown Check	Daily prior to analysis of samples and every 10 samples	Degradation ≤15%	Inspect the system for problems, check connections, perform leak test, clean the injection port and repeat breakdown check	GC Analyst	C&T Semivolatile Organics SOP Section 3
	Method Blank	Once per preparation batch	No analytes detected above the required quantitation limits	Inspect the system for problems, check connections, perform leak test, bake out the detector, clean the injection port and re-analyze method blank and all samples processed with the contaminated blank.		
Gas Chromato-graph/Mass Spectrometer (GC/MS)	Five-Point Initial Calibration for target analytes	Prior to sample analysis	%RSD ≤ 30% or r>0.995 RRF > 0.05	Inspect the system for problems, clean the ion source, change the column, bake out instrument, recondition column, check connections, perform leak tests and repeat IC	GC/MS Analyst	C&T Semivolatile Organics SOP Section 8
	Second-Source Calibration Verification	Once per five-point IC	Less than 25% difference for all target analytes and Calibration Check Compounds (CCCs)	Inspect the system for problems, clean the ion source, bake out instrument, recondition column, check connections, perform leak tests and repeat CV		

Instrument	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	Corrective Action (CA)	Person Responsible for CA[1]	SOP Reference[2]
GC/MS (Continued)	Daily Calibration Verification	Before sample analysis and every 12 hours sample time	Less than 20% difference for all target analytes and CCCs	Inspect the system for problems, clean the ion source, bake out instrument, recondition column, check connections, perform leak tests and repeat daily calibration	GC/MS Analyst	C&T Semivolatile Organics SOP Section 8
	Check mass spectral ion intensities (tuning procedure) using DFTPP	Prior to IC and calibration verification	Must meet the methods requirements before samples are analyzed	Re-tune instrument and verify the tune acceptability		
	Method Blank	One per analytical preparation batch	No analytes detected above the required quantitation limit	Inspect the system for problems, clean the ion source, change the column bake out instrument, recondition column, check connections, perform leak tests and re-analyze method blank and all samples processed with the contaminated blank.		

Instrument	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	Corrective Action (CA)	Person Responsible for CA[1]	SOP Reference[2]
GC/Flame Ionization Detector (FID)	Five-Point IC for target analytes	Prior to sample analysis	%RSD ≤ 20%	Inspect the system for problems, clean the ion source, recondition column, change the column, service the purge and trap device, perform leak tests, and repeat IC	GC/FID Analyst	C&T Volatile Organics SOP Section 7
	Second-Source ICV	Once per five-point IC	Less than 25% difference	Inspect the system for problems, clean the ion source, perform leak tests, bake out the purge and trap device, and repeat CV		
	Daily CCV	Before sample analysis and every 10 samples or every 12 hours, as specified by the method	Less than 15% difference	Inspect the system for problems, clean the ion source, perform leak tests, bake out the purge and trap device and repeat CV		
	Method Blank	One per analytical preparation batch	No analytes detected above the required quantitation limit	Inspect the system for problems, clean the ion source, perform leak tests, bake out the purge and trap device, and then re-extract and re-analyze method blank and all samples analyzed with the contaminated blank.		

Instrument	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	Corrective Action (CA)	Person Responsible for CA[1]	SOP Reference[2]
GC/FID	Five-Point IC for target analytes	Prior to sample analysis	%RSD ≤ 20%	Inspect the system for problems, clean the ion source, recondition column, change the column, perform leak tests, and repeat IC	GC/FID Analyst	C&T Semivolatile Organics SOP Section 5
	Second-Source CCV	Once per five-point IC	Less than 25% difference	Inspect the system for problems, clean the ion source, perform leak tests, and repeat CV		
	Daily CCV	Before sample analysis and every 10 samples or every 12 hours, as specified by the method	Less than 15% difference	Inspect the system for problems, clean the ion source, perform leak tests, and repeat CV		
	Method Blank	One per analytical preparation batch	No analytes detected above the required quantitation limit	Inspect the system for problems, clean the ion source, perform leak tests, and then re-extract and re-analyze method blank and all samples analyzed with the contaminated blank.		

Notes:
1 Name or title of responsible person may be used.
2 Specify the appropriate reference letter or number from the Analytical SOP References table (Worksheet #23).

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SAP WORKSHEET #25 -- ANALYTICAL INSTRUMENT AND EQUIPMENT MAINTENANCE, TESTING, AND INSPECTION TABLE

(UFP-QAPP Manual Section 3.2.3)

Instrument/ Equipment	Maintenance Activity	Testing Activity	Inspection Activity	Frequency	Acceptance Criteria	Corrective Action	Respon-sible Person[1]	SOP Reference[2]
CVAA	Replace disposables, bake out cell	Calibration	Check connection, bake-out cell, and perform leak tests	As Required	Analysis of acceptable calibration criteria (SAP Worksheet #24&28)	Inspect the system for problems, adjust argon flow	CVAA Analyst	C&T Trace Metals SOP Section 5
ICP-ES	Replace disposables, Clean nebulizer	Calibration/ Interference Check Samples	Check connections, check aspiration flow, check the argon flow/mass flow controller	As Required	Analysis of acceptable calibration criteria (SAP Worksheet #24&28)	Inspect the system for problems, change the nebulizer, adjust the aerosol flow	ICP-ES Analyst	C&T Trace Metals SOP Section 5
GC/ECD	Replace disposables, bake out instrument, recondition column	Calibration/ Breakdown Check for Pesticides	Check connections, bake out instrument, recondition column, and perform leak tests	As Required	Analysis of acceptable calibration criteria (SAP Worksheet #24&28)	Inspect the system for problems, change the column, bake out the detector, clean the injection port	GC/ECD Analyst	C&T Semi-volatile Organics SOP Section 3

Instrument/ Equipment	Maintenance Activity	Testing Activity	Inspection Activity	Frequency	Acceptance Criteria	Corrective Action	Respon-sible Person[1]	SOP Reference[2]
GC/MS	Replace disposables, bake out instrument, recondition column	Instrument Tune/ Calibration	Check connections, bake out the instrument, recondition column and perform leak tests	As Required	Analysis of acceptable calibration criteria (SAP Worksheet #24&28)	Inspect the system for problems, clean the ion source, change the column	GC/MS Analyst	C&T Semi-volatile Organics SOP Section 8
GC/FID	Replace disposables, bake out purge and trap and instrument, recondition column, rinse and soak column with appropriate solvent	Instrument Calibration	Check connections, bake out purge and trap and instrument, recondition column and perform leak tests	As Required	Analysis of acceptable calibration criteria (SAP Worksheet #24&28)	Inspect the system for problems, clean the ion source, change the column, service the purge and trap device	GC/FID Analyst	C&T Semi-volatile Organics SOP Section 5 and Volatiles Section 7

Notes:
1 Name or title of responsible person may be used.
2 Specify the appropriate reference letter or number from the Analytical SOP References table (Worksheet #23).

SAP WORKSHEET #26 -- SAMPLE HANDLING SYSTEM
(UFP-QAPP Manual Appendix A)

Sample Handling System
SAMPLE COLLECTION, PACKAGING, AND SHIPMENT
Sample Collection (Personnel/Organization): Project QC Manager Delia Sanchez/WESTON
Sample Packaging (Personnel/Organization): Project QC Manager Delia Sanchez/WESTON
Coordination of Shipment (Personnel/Organization): Project QC Manager Delia Sanchez/WESTON
Type of Shipment/Carrier: Laboratory courier pickup
SAMPLE RECEIPT AND ANALYSIS
Sample Receipt (Personnel/Organization): Operations/Curtis and Tompkins, LTD
Sample Custody and Storage (Personnel/Organization): Operations/Curtis and Tompkins, LTD
Sample Preparation (Personnel/Organization): Operations/Curtis and Tompkins, LTD
Sample Determinative Analysis (Personnel/Organization): Operations/Curtis and Tompkins, LTD
SAMPLE ARCHIVING
Field Sample Storage (No. of days from sample collection): 45 days for organic analyses/6 months for inorganic analyses
Sample Extract/Digestate Storage (No. of days from extraction/digestion): 45 days for organic analysis extracts/6 months for inorganic analysis digestates
Biological Sample Storage (No. of days from sample collection): Not applicable
SAMPLE DISPOSAL
Personnel/Organization: Sample Control/Curtis and Tompkins, LTD
Number of Days from Analysis: Six weeks

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SAP WORKSHEET #27 – SAMPLE CUSTODY REQUIREMENTS TABLE
(UFP-QAPP Manual Section 3.3.3)

SAMPLE NUMBERING

Samples will be uniquely designated using a numbering system that identifies a sampling point and a sample. The numbering system will be as follows: grid identification followed by a consecutive sample number as shown in Worksheet 18. Field duplicate samples will not be identified on the Chain-of-Custody as being duplicate samples. Their identity will be concealed from the laboratory by using a make-up sample number such as X-31; X-32, X-33.

SAMPLE LABELING

Sample labels will be filled out with indelible ink and affixed to each sample container. Non-waterproof sample labels will be covered with clear tape; waterproof polyester labels will not require protection with clear tape. Sample containers will be placed in resealable plastic bags to protect the sample from moisture during transportation to the laboratory. Each sample container will be labeled with the following information:

1. Project name
2. Location
3. Sample identification number
4. Sample collection date (month/day/year)
5. Time of collection (24-hour clock)
6. Sampler's initials
7. Preservative used
8. Analysis to be performed

SAMPLE CUSTODY

Samples will be shipped to the laboratory under a Chain-of-Custody form (Figure 6). In addition to providing a custody exchange record for the samples, the Chain-of-Custody form serves as a formal request for sample analyses. The Chain-of-Custody record lists each sample, the required analyses, and the individuals or entities performing the sample collection, shipment, and receipt. Custody seals will not be used for samples transported from the site by laboratory courier.

Sample custody will be the responsibility of the WESTON field crew from the time of sample collection until the samples are accepted by the laboratory courier service for delivery to the laboratory or until the samples are accepted for shipment by a commercial courier. Thereafter, the laboratory performing the analysis will maintain custody.

The Chain-of-Custody record will be the controlling document to assure that sample custody is maintained. Sampling personnel will initiate the Chain-of-Custody record in the field upon collecting a sample using preprinted forms. Each time the sample custody is transferred, the former custodian will sign the Chain-of-Custody on the "Relinquished By" line, and the new custodian will sign the Chain-of-Custody on the "Received By" line. The date, time, and the name of their project or company affiliation will accompany each signature.

Curtis and Tompkins, Ltd. will be provide a courier to Mare Island for sample pickup; however, if samples require shipping, the waybill number or courier name will be recorded on the Chain-of-Custody when a commercial courier is used. In this case, the shipping container will be secured with two custody seals, thereby allowing for custody to be maintained by the shipping personnel until receipt of the laboratory. At a minimum the Chain-of-Custody record will include the following information:

- Project name
- Sampling location
- Name and signature of sampler
- Laboratory name
- Sample identification
- Sample date and time of collection
- Number and type of containers
- Analysis requested
- Preservative used (if applicable)
- Sample type
- Signature of individuals involved in custody transfer, including the date and time of transfer
- Airbill number (if applicable)
- Project contact and phone number

The completed Chain-of-Custody records will be distributed as follows:

- One copy retained by the WESTON sample coordinator for inclusion in the project files
- The original sent to the analytical laboratory with the sample shipment

After the laboratory receives the samples, the laboratory sample custodian will inventory each shipment before signing and note on the Cooler Receipt Form any discrepancy in the number of samples, temperature of the cooler or broken samples. The laboratory will immediately notify WESTON personnel of any problems identified with the shipped samples in order to determine the appropriate course of action.

The laboratory may initiate an internal Chain-of-Custody form that will track the sample within the various areas of the laboratory. The relinquishing signature of the sample custodian and the custody acceptance signature of the laboratory personnel transfer custody of the sample. This procedure is followed each time a sample changes hands. The laboratory will archive the samples and maintain their custody as required by the contract or until further notification from WESTON, at which time the samples will either be returned to the project for disposal or disposed of by the laboratory.

SAMPLE PACKING AND SHIPMENT

Samples will be typically picked up by a laboratory courier service, sample containers in resealing bags will be placed over bags with ice in a manner that prevents breakage while maintaining a cooler temperature of 4 degrees Celsius, plus or minus 2 degrees Celsius. Buble wrap may be used to protect sample containers. At the time of packing, a temperature blank will be placed in every cooler with samples. The Chain-of-Custody form will be completed and signed by the laboratory courier as the custody is transferred from WESTON to the laboratory. The cooler will then be released to the courier for transportation to the laboratory.

FIELD DOCUMENTS AND RECORDS

A Field Logbook with consecutively numbered pages will be assigned to this project. All entries will be recorded in indelible ink. At the end of each workday, the responsible sampler will cross out, sign, and date any unused portions of the logbook page last used. 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 Field Logbook will contain the following information:

- Project name and location

- Date and time
- Personnel in attendance
- General weather information
- Field observations
- Sampling performed, including specifics such as location and sample identificaiton, the sampling procedure used and time of collection
- Descriptions of deviations from this SAP
- Problems encountered and corrective action taken
- Identification of field QC samples
- Verbal or written instructions received from the Project Manager, Project QC Manager, or the DON
- Any other events that may affect the samples

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SAP WORKSHEET #28 -- LABORATORY QC SAMPLES TABLE
(UFP-QAPP Manual Section 3.4)

Matrix	**Soil**
Analytical Group	**Metals**
Analytical Method/SOP Reference	**EPA Method 6010B&7471A/C&T Trace Metals SOP Sections 4 & 5**

QC Sample	Frequency/ Number	Method / SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for CA	Data Quality Indicator (DQI)	Measurement Performance Criteria
Method Blank	1/20	No detections above required quantitation limit	Reanalyze blank, correct problem, prepare and analyze the method blank and all associated samples	ICP-ES or CVAA Analyst	Sensitivity/ Accuracy	No target compounds > QL
Laboratory Control Sample(LCS)	1/20	80-120% Recovery	Reanalyze, correct problem, prepare and analyze all associated samples		Accuracy	Aluminum 73-120%R Magnesium 78-120%R all others 80-120%R
MS/MSD	1/20	Within laboratory control limits	Reanalyze, if still outside control limits and LCS is within acceptance limits no action		Precision/ Accuracy	Aluminum 30-165%R/38 RPD Antimony 5-120%R/31 RPD Arsenic 65-120%R/24 RPD Barium 40-141%R/31 RPD Beryllium 75-120%R/21 RPD Cadmium 63-120%R/20 RPD Chromium 52-128%R/25 RPD Cobalt 50-120%R/26 RPD Copper 38-149%R/28 RPD Lead 49-124%R/31 RPD

Matrix	**Soil**
Analytical Group	**Metals**
Analytical Method/SOP Reference	**EPA Method 6010B&7471A/C&T Trace Metals SOP Sections 4 & 5**

QC Sample	Frequency/ Number	Method / SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for CA	Data Quality Indicator (DQI)	Measurement Performance Criteria
MS/MSD (continued)	1/20	Within laboratory control limits	Reanalyze, if still outside control limits and LCS is within acceptance limits no action	ICP-ES or CVAA Analyst	Precision/ Accuracy	Magnesium 10-173%R/33 RPD Manganese 43-147%R/27 RPD Mercury 64-138%R/27 RPD Molybdenum 62-120%R/20 RPD Nickel 34-148%R/30 RPD Selenium 63-120%R/20 RPD Silver 66-120%R/20 RPD Thallium 57-120%R/20 RPD Vanadium 41-146%R/24 RPD Zinc 25-159%R/33 RPD
Original Sample/Laboratory Duplicate	1/20	Relative Percent Difference 20	Reanalyze, no action if other laboratory QC with acceptance limits		Precision	< 50% when sample concentration is > 5X QL

SAP WORKSHEET #28 -- LABORATORY QC SAMPLES TABLE (CONTINUED)

Matrix	**Soil**
Analytical Group	**Pesticides**
Analytical Method/SOP Reference	**EPA Method 8081A/C&T Semivolatile Organics SOP Section 3**

QC Sample	Frequency/ Number	Method / SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for CA	DQI	Measurement Performance Criteria
Method Blank	1/20 Samples	No detections above required quantitation limit	Reanalyze blank, correct problem, prepare and analyze the method blank and all associated samples	GC/ECD Analyst	Sensitivity/ Accuracy	No target compounds > QL
LCS	1/20 Samples	70-130% advisory limits or per laboratory control limits	Reanalyze, correct problem, prepare and analyze all associated samples		Accuracy	Gamma-BHC 45-121%R Heptachlor 39-127%R Aldrin 43-120%R Dieldrin 43-126%R Endrin 30-130%R 4,4'-DDT 41-133%R
MS/MSD	1/20 Samples	Recovery within laboratory control limits; relative percent difference ≤50	Reanalyze, if still outside control limits and LCS is within acceptance limits no action		Precision/ Accuracy	Gamma-BHC 41-132%R/34 RPD Heptachlor 40-130%R/39 RPD Aldrin 45-122%R/32 RPD Dieldrin 45-130%R/34 RPD Endrin 42-139%R/40 RPD 4,4'-DDT 30-139%R/42 RPD
Surrogate Standards	Every Sample	70-130% advisory limits or per laboratory control limits	Prepare again and/or reanalyze correct problem		Accuracy	TCMX 44-126%R Decachlorobiphenyl 38-139%R

SAP WORKSHEET #28 -- LABORATORY QC SAMPLES TABLE (CONTINUED)

Matrix	**Soil**
Analytical Group	**PCBs**
Analytical Method/SOP Reference	**EPA Method 8082/ C&T Semivolatile Organics SOP Section 3**

QC Sample	Frequency/ Number	Method / SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for CA	DQI	Measurement Performance Criteria
Method Blank	1/20 Samples	No detections above required quantitation limit	Reanalyze blank, correct problem, prepare and analyze the method blank and all associated samples	GC/ECD Analyst	Sensitivity/ Accuracy	No target compounds > QL
LCS	1/20 Samples	70-130% advisory limits or per laboratory control limits	Reanalyze, correct problem, prepare and analyze all associated samples		Accuracy	Aroclor-1016 76-140%R Aroclor-1260 77-141%R
MS/MSD	1/20 Samples	Recovery within laboratory control limits; relative percent difference ≤50	Reanalyze, if still outside control limits and LCS is within acceptance limits no action		Precision/ Accuracy	Aroclor-1016 63-153%R/ 28 RPD Aroclor-1260 47-145%R/ 30 RPD
Surrogate Standards	Every Sample	70-130% advisory limits or per laboratory control limits	Prepare again and/or reanalyze correct problem		Accuracy	TCMX 68-136%R Decachlorobiphenyl 52-140%R

SAP WORKSHEET #28 -- LABORATORY QC SAMPLES TABLE (CONTINUED)

Matrix	**Soil**
Analytical Group	**SVOCs**
Analytical Method/SOP Reference	**EPA Method 8270C/ C&T Semivolatile Organics SOP Section 8**

QC Sample	Frequency/ Number	Method / SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for CA	DQI	Measurement Performance Criteria
Method Blank	1/20 Samples	No detections above required quantitation limit	Reanalyze blank, correct problem, prepare and analyze the method blank and all associated samples	GC/MS Analyst	Sensitivity/ Accuracy	No target compounds > QL
LCS	1/20 Samples	70-130% advisory limits or per laboratory control limits	Reanalyze, correct problem, prepare and analyze all associated samples		Accuracy	Phenol 37-120%R 2-Chlorophenol 44-120%R 1,4-Dichlorobenzene 51-120%R n-Nitroso-di-n-propylamine 26-120%R 1,2,4-Trichlorobenzene 46-120%R 4-Chloro-3-methylphenol 48-120%R Acenaphthene 50-120%R 4-Nitrophenol 39-120%R 2,4-Dinitrotoluene 50-120%R Pentachlorophenol 26-120%R Pyrene 47-120%R

Matrix	**Soil**
Analytical Group	**SVOCs**
Analytical Method/SOP Reference	**EPA Method 8270C/ C&T Semivolatile Organics SOP Section 8**

QC Sample	Frequency/ Number	Method / SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for CA	DQI	Measurement Performance Criteria
MS/MSD	1/20 Samples	Recovery within laboratory control limits; relative percent difference ≤50	Reanalyze, if still outside control limits and LCS is within acceptance limits no action	GC/MS Analyst	Precision/ Accuracy	Phenol 42-120%R/ 34 RPD 2-Chlorophenol 45-120%R/ 34 RPD 1,4-Dichlorobenzene 50-120%R/ 33 RPD n-Nitroso-di-n-propylamine 35-120%R/ 41 RPD 1,2,4-Trichlorobenzene 47-120%R/ 33 RPD 4-Chloro-3-methylphenol 48-120%R/ 33 RPD Acenaphthene 49-120%R/ 32 RPD 4-Nitrophenol 36-120%R/ 40 RPD 2,4-Dinitrotoluene 48-120%R/ 33 PRD Pentachlorophenol 21-120%R/ 48 PRD Pyrene 40-120%R/ 33 RPD

Matrix	**Soil**
Analytical Group	**SVOCs**
Analytical Method/SOP Reference	**EPA Method 8270C/ C&T Semivolatile Organics SOP Section 8**

QC Sample	Frequency/ Number	Method / SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for CA	DQI	Measurement Performance Criteria
Surrogate Standards	Every Sample	Within method requirements	Check for leaks, Prepare again and/or reanalyze	GC/MS Analyst	Accuracy	2-Fluorophenol 35-120%R Phenol-d5 37-120%R 2,3,6-Tribromophenol 30-120%R Nitrobenzene-d5 47-120%R 2-Fluorobiphenyl 52-120%R Terphenyl-d14 45-120%R
Internal Standards	Every Sample	50 to 150%	Prepare again and/or reanalyze correct problem		Accuracy	50-150%R

SAP WORKSHEET #28 -- LABORATORY QC SAMPLES TABLE (CONTINUED)

Matrix	**Soil**
Analytical Group	**TPH**
Analytical Method/SOP Reference	**EPA Method 8015B/ C&T Semivolatile Organics SOP Section 5 and Volatiles Section 7**

QC Sample	Frequency/ Number	Method / SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for CA	DQI	Measurement Performance Criteria
Method Blank	1/20 Samples	No detections above required quantitation limit	Reanalyze blank, correct problem, prepare and analyze the method blank and all associated samples	GC/FID Analyst	Sensitivity/ Accuracy	No target compounds > QL
LCS	1/20 Samples	70-130% advisory limits or per laboratory control limits	Reanalyze, correct problem, prepare and analyze all associated samples		Accuracy	Gasoline 73-120%R Diesel 53-128%R Bunker C 50-140%R
MS/MSD	1/20 Samples	Recovery within laboratory control limits; relative percent difference ≤50	Reanalyze, if still outside control limits and LCS is within acceptance limits no action		Precision/ Accuracy	Gasoline 29-120%R/37 RPD Diesel 29-152%R/45 RPD Bunker C 29-152%R/45 RPD
Surrogate Standards	Every Sample	Within method requirements	Prepare again and/or reanalyze correct problem		Accuracy	Gasoline (Volatiles): Trifluorotoluene 54-152%R Bromofluorobenzene 50-152%R Diesel, Motor Oil, Bunker C (Semivolatiles): o-Terphenyl 53-133%R Hexocosane 45-135%R

SAP WORKSHEET #29 -- PROJECT DOCUMENTS AND RECORDS TABLE
(UFP-QAPP Manual Section 3.5.1)

Document	Where Maintained
Field notes/logbook	Project file
Chain-of-Custody form	NAVFAC-SW Administrative record, project files and laboratory
Hardcopy analytical data (laboratory raw data packages)	NAVFAC-SW Administrative record, project files and laboratory
Audit assessment checklists/report	Not applicable for this project
Laboratory corrective actions forms/reports	Project files and laboratory
Laboratory equipment calibration logs	Project files and laboratory
Sample preparation logs	Project files and laboratory
Run logs	Project files and laboratory
Sample disposal records	Laboratory
Validation reports	NAVFAC-SW Administrative record, project files and Laboratory Data Consultants, Inc.

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SAP WORKSHEET #30 -- ANALYTICAL SERVICES TABLE
(UFP-QAPP Manual Section 3.5.2.3)

Matrix	Analytical Group	Sample Locations/ID Number	Analytical Method	Data Package Turnaround Time	Laboratory / Organization[1] (name and address, contact person and telephone number)	Backup Laboratory / Organization (name and address, contact person and telephone number)
Soil	Metals	See SAP Worksheet #18	EPA Method 6010B/7471A	14 calendar days	Curtis and Tompkins, Ltd 2323 Fifth Street, Berkeley, CA 94710; Micah Smith 510-204-2224	TestAmerica 880 Riverside Parkway, West Sacramento, CA 95605; Nilo Ligi 916-374-4427
Soil	PCBs	See SAP Worksheet #18	EPA Method 8082	14 calendar days	Curtis and Tompkins, Ltd 2323 Fifth Street, Berkeley, CA 94710; Micah Smith 510-204-2224	TestAmerica 880 Riverside Parkway, West Sacramento, CA 95605; Nilo Ligi 916-374-4427
Soil	Pesticides	See SAP Worksheet #18	EPA Method 8081B	14 calendar days	Curtis and Tompkins, Ltd 2323 Fifth Street, Berkeley, CA 94710; Micah Smith 510-204-2224	TestAmerica 880 Riverside Parkway, West Sacramento, CA 95605; Nilo Ligi 916-374-4427
Soil	SVOCs	See SAP Worksheet #18	EPA Method 8270C	14 calendar days	Curtis and Tompkins, Ltd 2323 Fifth Street, Berkeley, CA 94710; Micah Smith 510-204-2224	TestAmerica 880 Riverside Parkway, West Sacramento, CA 95605; Nilo Ligi 916-374-4427
Soil	TPH as gasoline, diesel, and motor oil	See SAP Worksheet #18	EPA Method 8015B/5035	14 calendar days	Curtis and Tompkins, Ltd 2323 Fifth Street, Berkeley, CA 94710; Micah Smith 510-204-2224	TestAmerica 880 Riverside Parkway, West Sacramento, CA 95605; Nilo Ligi 916-374-4427
Soil	TPH as Bunker C	See SAP Worksheet #18	EPA Method 8015B	14 calendar days	Curtis and Tompkins, Ltd 2323 Fifth Street, Berkeley, CA 94710; Micah Smith 510-204-2224	TestAmerica 880 Riverside Parkway, West Sacramento, CA 95605; Nilo Ligi 916-374-4427

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SAP WORKSHEET #31 -- PLANNED PROJECT ASSESSMENTS TABLE
(UFP-QAPP Manual Section 4.1.1)

Assessment Type	Frequency	Internal or External	Organization Performing Assessment	Person(s) Responsible for Performing Assessment (title and organizational affiliation)	Person(s) Responsible for Responding to Assessment Findings (title and organizational affiliation)	Person(s) Responsible for Identifying and Implementing Corrective Actions (CA) (title and organizational affiliation)	Person(s) Responsible for Monitoring Effectiveness of CA (title and organizational affiliation)
Preparatory Phase Inspection[1]	1 prior to initiation of field activities	Internal	WESTON	Program QC Manager, WESTON	Project QC Manager, WESTON	Project Chemist and QC Program Manager, WESTON	Program QC Manager, WESTON
Field Sampling Technical Systems Audit (TSA)	1 at onset of sampling activities	Internal	WESTON	Program QC Manager, WESTON	Project QC Manager, WESTON	Project Chemist and QC Program Manager, WESTON	Program QC Manager, WESTON
Field Documentation Review	Daily	Internal	WESTON	Project QC Manager, WESTON	Site Manager, WESTON	Project Chemist and QC Program Manager, WESTON	Project QC Manager, WESTON

Notes:

1 The Preparatory Phase Inspection is documented in meeting minutes and provided with the Daily QC Report. The Daily QC Report and meeting minutes are provided to the CSO and ROICC the day following the date each activity/meeting is performed. The Preparatory Phase Inspection is attended by the internal project team including but not limited to the DON and WESTON team members. The Preparatory Phase Inspection includes the following items:

a. Review of the plans and specifications
b. Approval of the submittals
c. Review of supplies and materials
d. Review of any preliminary work and/or testing
e. Review of the schedule

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SAP WORKSHEET #32 -- ASSESSMENT FINDINGS AND CORRECTIVE ACTION RESPONSES
(UFP-QAPP Manual Section 4.1.2)

Assessment Type	Nature of Deficiencies Documentation	Individual(s) Notified of Findings (name, title, organization)	Timeframe of Notification	Nature of Corrective Action Response Documentation	Individual(s) Receiving Corrective Action Response (name, title, organization)	Timeframe for Response
Field Documentation Review	Daily QC Report	WESTON Project Manager, Dwight Gemar/DON Remedial Project Manager, Marie Dreyer	1 Working Day	Follow-up inspection report documented in Daily QC Report	WESTON Site Manager Charles Smith/WESTON Project QC Manager Delia Sanchez	2 Working Day
Field Sampling Audit (TSA)	Daily QC Report	WESTON, Project Manager, Dwight Gemar/DON Remedial Project Manager, Marie Dreyer	1 Working Day	Follow-up inspection report documented in Daily QC Report	WESTON Project QC Manager Delia Sanchez/ WESTON, Program QC Manager, Emma Popek	2 Working Day

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SAP WORKSHEET #33 -- QA MANAGEMENT REPORTS TABLE
(UFP QAPP Manual Section 4.2)

Type of Report	Frequency (daily, weekly monthly, quarterly, annually, etc.)	Projected Delivery Date(s)	Person(s) Responsible for Report Preparation (title and organizational affiliation)	Report Recipient(s) (title and organizational affiliation)
Daily QC Reports[1]	1 per day of analytical sampling	Daily	WESTON Project QC Manager Delia Sanchez	DON ROICC

Notes:

1 The Daily QC Report includes the following items:
   a. Preparatory Phase Inspection checklist as listed in SAP Worksheet #31
   b. Follow-up Phase Inspection checklist which includes a review of the following items:
      i. Sample collection, labeling, and packaging
      ii. Chain-of-custody documentation
      iii. Quality control sample frequency
      iv. Sampling supplies

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SAP WORKSHEET #34 -- VERIFICATION (STEP I) PROCESS TABLE
(UFP-QAPP Manual Section 5.2.1)

Verification Input	Description	Internal/ External	Responsible for Verification (name, organization)
Chain-of-Custody Forms (Figure 6)	Chain-of-Custody forms will be reviewed internally upon their completion and verified against the packed sample coolers they represent. The shipper's signature on the Chain-of-Custody should be initialed by the reviewer, a copy of the Chain-of-Custody retained in the project file, and the original and remaining copies taped inside the cooler for shipment.	Internal	WESTON Project QC Manager
Audit Reports (TSA)	Upon report completion, a copy of all audit reports will be placed in the project file. If corrective actions are required, a copy of the documented corrective action taken will be attached to the appropriate audit report in the project file. At the beginning of each week, and at the completion of the site work, project file audit reports will be reviewed internally to ensure that all appropriate corrective actions have been taken and that corrective action reports are attached. If corrective actions have not been taken, the project manager will be notified to ensure action is taken.	Internal	WESTON Program QC Manager
Field Notes/Field Logbook	Field notes will be reviewed internally and placed in the project file. A copy of the field notes will be attached to the final report.	Internal	WESTON Project QC Manager
Laboratory data	All laboratory data packages will be verified internally by the laboratory performing the work for completeness and technical accuracy prior to submittal. All received data packages will be verified externally according to the data validation procedures specified by the subcontractor quality systems requirements.	Internal/ External	WESTON Project Chemist/Laboratory Data Consultants, Inc. Project Manager

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SAP WORKSHEET #35 -- VALIDATION (STEPS IIA AND IIB) PROCESS TABLE

(UFP-QAPP Manual Section 5.2.2) (Figure 37 UFP-QAPP Manual) (Table 9 UFP-QAPP Manual)

Step IIa / IIb[1]	Validation Input	Description	Responsible for Validation (name, organization)
IIa	Sampling locations, field procedures and field documentation (Chain-of-Custody, Field Logbook, sample labels)	Sampling and Analysis Plan; field documentation	Project QC Manager Delia Sanchez, WESTON
IIa	Sampling methods; analytical methods; analytes	Standard Operating Procedures; Sampling and Analysis Plan	Project QC Manager Delia Sanchez, WESTON
IIa and IIb	Case narrative; communication logs	Analytical Data Package	Project Chemist Tara Fitzgerald, WESTON; Linda Rauto, Laboratory Data Consultants, Inc.
IIa and IIb	Chain-of-Custody; sample condition upon receipt; holding time	Analytical Data Package	Project Chemist Tara Fitzgerald, WESTON; Linda Rauto, Laboratory Data Consultants, Inc.
IIa and IIb	Identification of field and laboratory QC samples; identification of individual QC results	Analytical Data Package	Project Chemist Tara Fitzgerald, WESTON; Linda Rauto, Laboratory Data Consultants, Inc.
IIa and IIb	Definition of laboratory data qualifiers	Analytical Data Package	Project Chemist Tara Fitzgerald, WESTON; Linda Rauto, Laboratory Data Consultants, Inc.
IIa	Electronic data deliverables	Analytical Data Package	Database Manager Charles Bouffard, WESTON
IIb	Instrument calibration reports	Analytical Data Package	Linda Rauto, Laboratory Data Consultants, Inc.
IIb	Laboratory preparation sheets	Analytical Data Package	Linda Rauto, Laboratory Data Consultants, Inc.
IIb	Sample and QC sample raw data	Analytical Data Package	Linda Rauto, Laboratory Data Consultants, Inc.
IIa and IIb	Reports of sample results	Analytical Data Package	Project Chemist Tara Fitzgerald, WESTON; Linda Rauto, Laboratory Data Consultants, Inc.
IIa	Standard traceability	Analytical Data Package	Linda Rauto, Laboratory Data Consultants, Inc.
IIa	Laboratory corrective action reports	Analytical Data Package	Linda Rauto, Laboratory Data Consultants, Inc.

[1] IIa=compliance with methods, procedures, and contracts [see Table 10, page 117, UFP-QAPP manual, V.1, March 2005.]
IIb=comparison with measurement performance criteria in the SAP [see Table 11, page 118, UFP-QAPP manual, V.1, March 2005]

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SAP WORKSHEET #36 –ANALYTICAL DATA VALIDATION (STEPS IIA AND IIB) SUMMARY TABLE
(UFP-QAPP Manual Section 5.2.2.1)

Step IIa / IIb	Matrix	Analytical Group	Validation Criteria[1]	Data Validator (title and organizational affiliation)
IIa/IIb	Soil	Metals	EPA Methods 6010B/7471A and Department of Defense Quality Systems Manual[2]	Project Manager/Laboratory Data Consultants, Inc. 1 month from receipt of full data package
IIa/IIb	Soil	SVOCs	EPA Method 8270C and Department of Defense Quality Systems Manual[2]	Project Manager/Laboratory Data Consultants, Inc. 1 month from receipt of full data package
IIa/IIb	Soil	Pesticides	EPA Method 8081A and Department of Defense Quality Systems Manual[2]	Project Manager/Laboratory Data Consultants, Inc. 1 month from receipt of full data package
IIa/IIb	Soil	PCBs	EPA Method 8082 and Department of Defense Quality Systems Manual[2]	Project Manager/Laboratory Data Consultants, Inc. 1 month from receipt of full data package
IIa/IIb	Soil	TPH	EPA Method 8015B and Department of Defense Quality Systems Manual[2]	Project Manager/Laboratory Data Consultants, Inc. 1 month from receipt of full data package

Notes:
1 The Contract Laboratory Program National Functional Guidelines will be used as a procedural reference only.
2 Department of Defense Quality Systems Manual for Environmental Laboratories, Version 4.1 (2009) Criteria.

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SAP WORKSHEET #37 – USABILITY ASSESSMENT
(UFP-QAPP Manual Section 5.2.3)

Summarize the usability assessment process and all procedures, including interim steps and any statistics, equations, and computer algorithms that will be used: The data usability process includes assessments completed during data validation on laboratory and field data quality indicators which are measured through the precision, accuracy, representativeness, comparability, and completeness parameters as discussed below.

Precision: Results of all laboratory duplicates for both aroclors/pesticides and mercury will be presented separately in tabular format for TPH as Bunker C. For each duplicate pair, the relative percent difference (RPD) will be calculated for each analyte whose original and duplicate values are both greater than or equal to the quantitation limit. The RPDs will be checked against the measurement performance criteria presented on SAP Worksheet #12. The RPDs exceeding criteria will be identified on the validation tables. Additionally, the RPD of each analyte will be averaged across all duplicate pairs whose original and duplicate values are both greater than or equal to the quantitation limit, and the combined overall average RPD for TPH as Bunker C will be calculated for the laboratory duplicates. A discussion will follow summarizing the results of the laboratory precision Any conclusions about the precision of the analyses will be drawn and any limitations on the use of the data will be described in the validation report and summarized in the Final PCAP Completion Report

Accuracy/Bias Contamination: Results for all laboratory method blanks and instrument blanks will be presented in tabular format for TPH as Bunker C analysis in the validation report. The TPH as Bunker C results will be checked against the measurement performance criteria presented on Worksheet #12. Results for TPH as Bunker C that exceed criteria will be identified on the tables. A discussion will follow summarizing the results of the laboratory accuracy/bias. Any conclusions about the accuracy/bias of the analyses based on contamination will be drawn and any limitations on the use of the data will be described in the validation report and summarized in the Final PCAP Completion Report.

Overall Accuracy/Bias: The results for the Second Source Initial Calibration Verification will be presented in tabular format to compare these results to the sample batch they apply to. These results will be compared to the requirements listed on SAP Worksheet #24. A discussion will follow summarizing overall accuracy/bias. Any conclusions about the overall accuracy/bias of the analyses will be drawn and any limitations on the use of the data will be described in the validation report and in the Final PCAP Completion Report.

Sensitivity: Results for laboratory blanks will be presented for all detected TPH as Bunker C in tabular format. The results for each analyte will be checked against the measurement performance criteria presented on Worksheet #12 and cross-checked against the quantitation limits presented on Worksheet #15. Results for analytes that exceed criteria will be identified on the tables. A discussion will follow summarizing the results of the laboratory sensitivity. Any conclusions about the sensitivity of

the analyses will be drawn and any limitations on the use of the data will be described in the validation report and in the Final PCAP Completion Report.

Representativeness: Representativeness will be measured qualitatively. Errors in sample collection, packaging, preservation, or Chain-of-Custody procedures may result in samples being judged non-representative. Laboratory procedures for sampling handling, preparation, and analysis procedures may also result in samples being judged non-representative. Samples that were either collected or handled inappropriately or exceeded their holding time by two times the criteria will be potentially deemed not representative and additional analysis and/or sampling may be performed. Errors in field processes will be noted in the Daily QC Report and extended to the validation report if necessary for sample issues. Laboratory process failures will be noted in the data package summary and carried forward in the data validation report and the Final PCAP Completion Report if necessary.

Comparability: Sampling and analysis for confirmation samples are being performed as previously prescribed in field activities performed at the DRMO Site and Vicinity. The TPH as Bunker C results collected during this corrective action will be compared to previously collected data to assess the overall comparability.

Completeness: A completeness check will be performed for all laboratory data. Complete data must meet all acceptable criteria including those discussed in the above indicators. Completeness will be measured using the following equation:

$$\text{Completeness} = \frac{\text{Acceptable Results}}{\text{Total Results}} \times 100\%$$

Describe the evaluation procedures used to assess overall measurement error associated with the project: Measurement error will be assessed using the data quality indicators and include a combined overall assessment of the results compared to the analytical objectives to identify total measurement error.

Identify the personnel responsible for performing the usability assessment: WESTON Project QC Manager and WESTON Project Chemist will be responsible for performing the usability assessment with QC support from the WESTON Program QC Manager.

Describe the documentation that will be generated during usability assessment and how usability assessment results will be presented so that they identify trends, relationships (correlations), and anomalies: The usability assessment will be documented in data validation summary reports, which will be generated for each sample delivery group. The overall data usability will be documented from the validated data and discussed in the Petroleum Corrective Action Completion Report.

Reconciliation: Each of the Project Quality Objectives presented on Worksheet #12 will be compared to the usable data to determine if the objectives were met. Based on the results of the data reconciliation, the quality of the data will be determined. The data quality determined combined with the usability of the data will be used to determine if the project quality objectives were met and whether project action limits were exceeded. The Petroleum Corrective Action Completion Report will include a summary of the data reconciliation with the objectives as well as conclusions and any limitations on data usability.

FIGURES

N00221_001372
MARE ISLAND

SENSITIVE RECORD

PORTIONS OF THIS RECORD ARE CONSIDERED SENSITIVE AND ARE NOT AVAILABLE FOR PUBLIC VIEWING

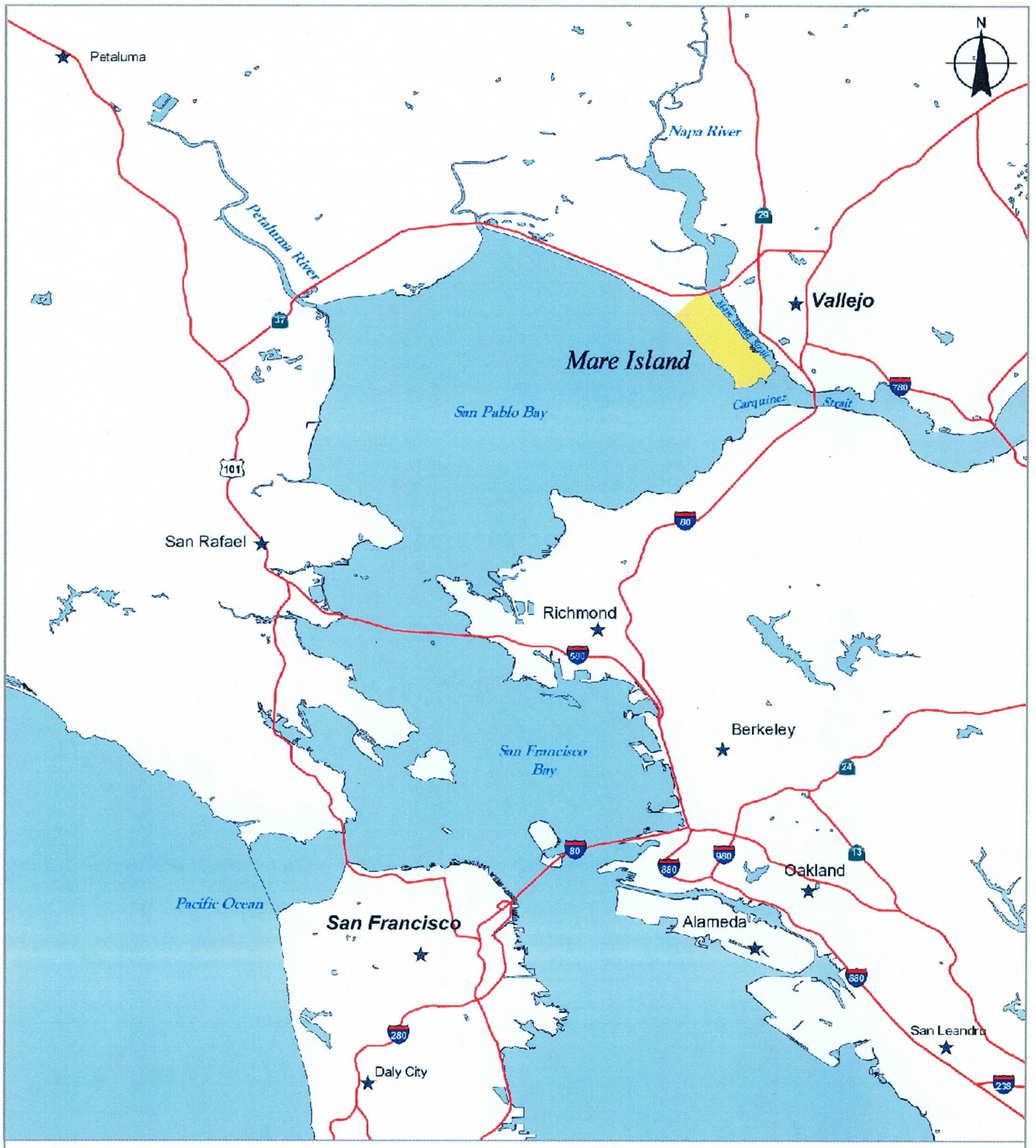
FIGURES 1 THROUGH 4

FOR ADDITIONAL INFORMATION, CONTACT:

DIANE C. SILVA, COMMAND RECORDS MANAGER, CODE EV33
NAVAL FACILITIES ENGINEERING COMMAND, SOUTHWEST
1220 PACIFIC HIGHWAY (NBSD BLDG. 3519)
SAN DIEGO, CA 92132

TELEPHONE: (619) 556-1280
E-MAIL: diane.silva@navy.mil

SENSITIVE



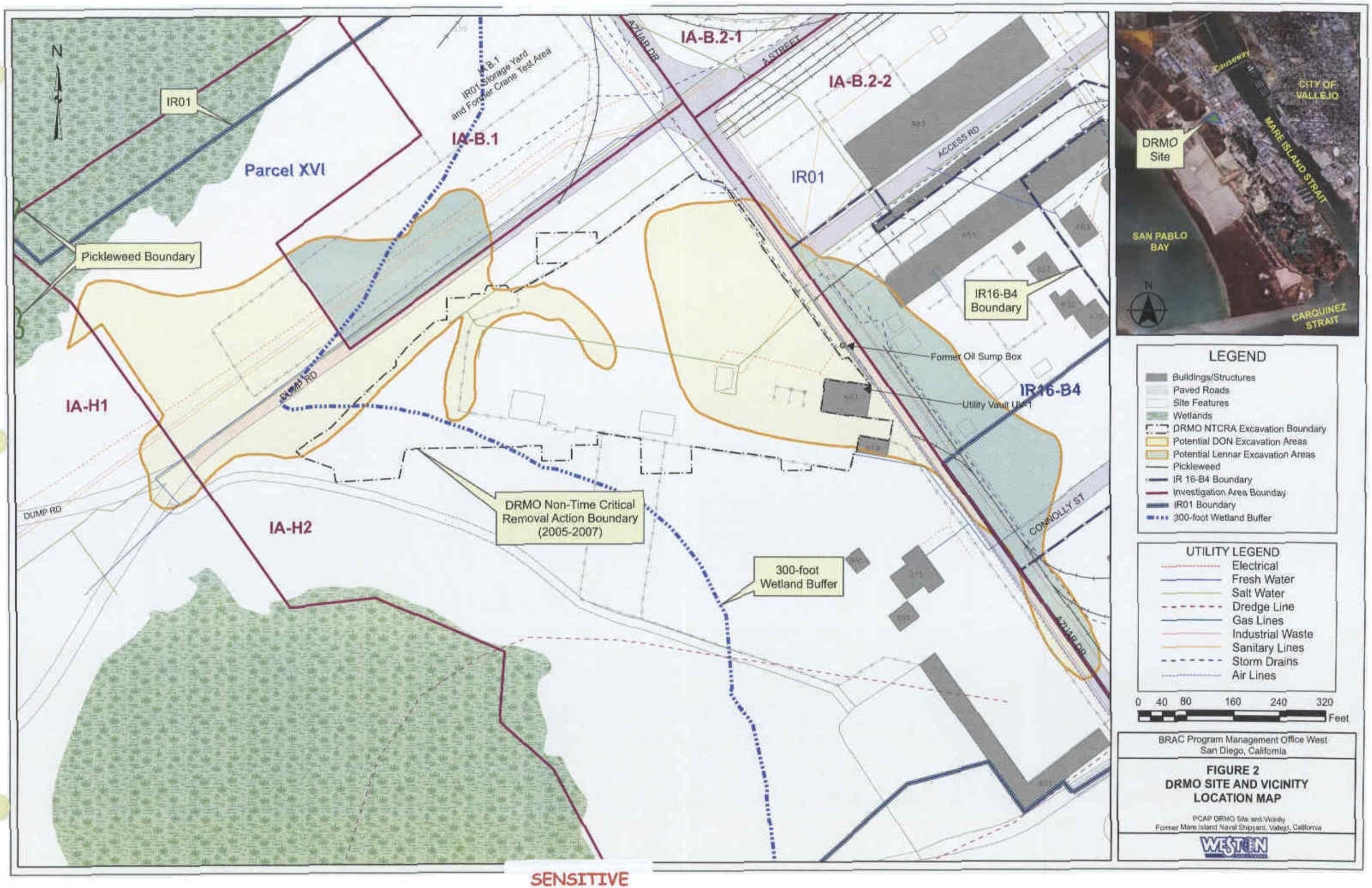
BRAC Program Management Office West
San Diego, California

FIGURE 1
MARE ISLAND VICINITY MAP

PCAP DRMO Site and Vicinity
Former Mare Island Naval Shipyard, Vallejo, California

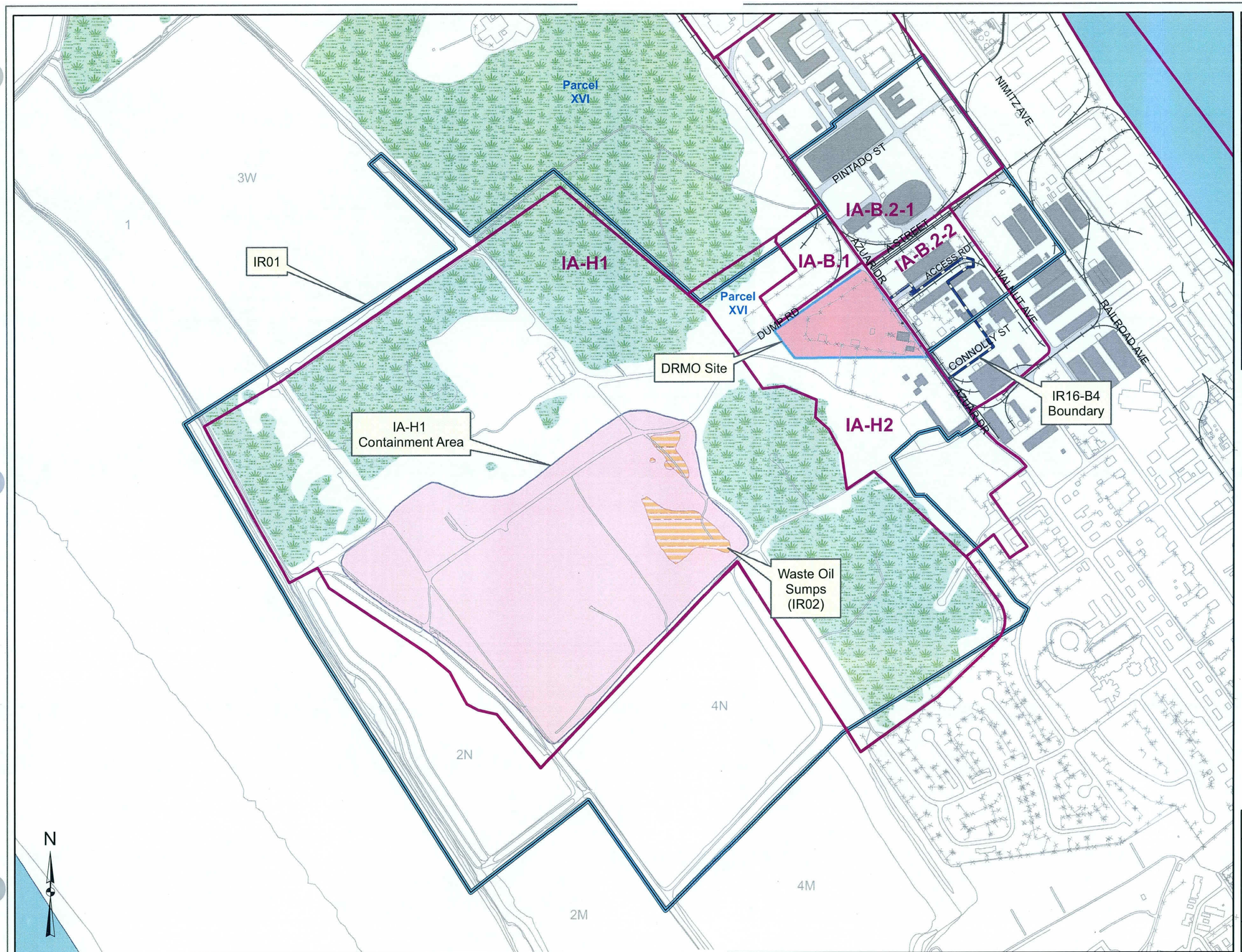
SENSITIVE

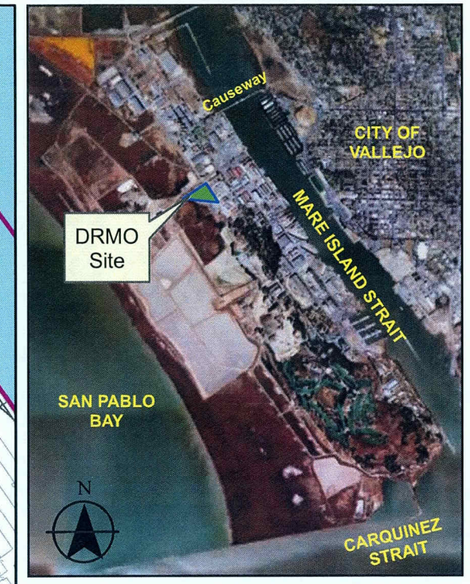
SENSITIVE



SENSITIVE

SENSITIVE





LEGEND

- Site Features
- Wetlands
- Water
- DRMO Site Boundary
- IA-H1 Containment Area
- IR02 Oil Sumps
- IR 16-B4 Boundary
- Investigation Area Bounday
- IR01 Boundary
- Railroad
- Fences

0 150 300 600 900 1,200 1,500 Feet

BRAC Program Management Office West
San Diego, California

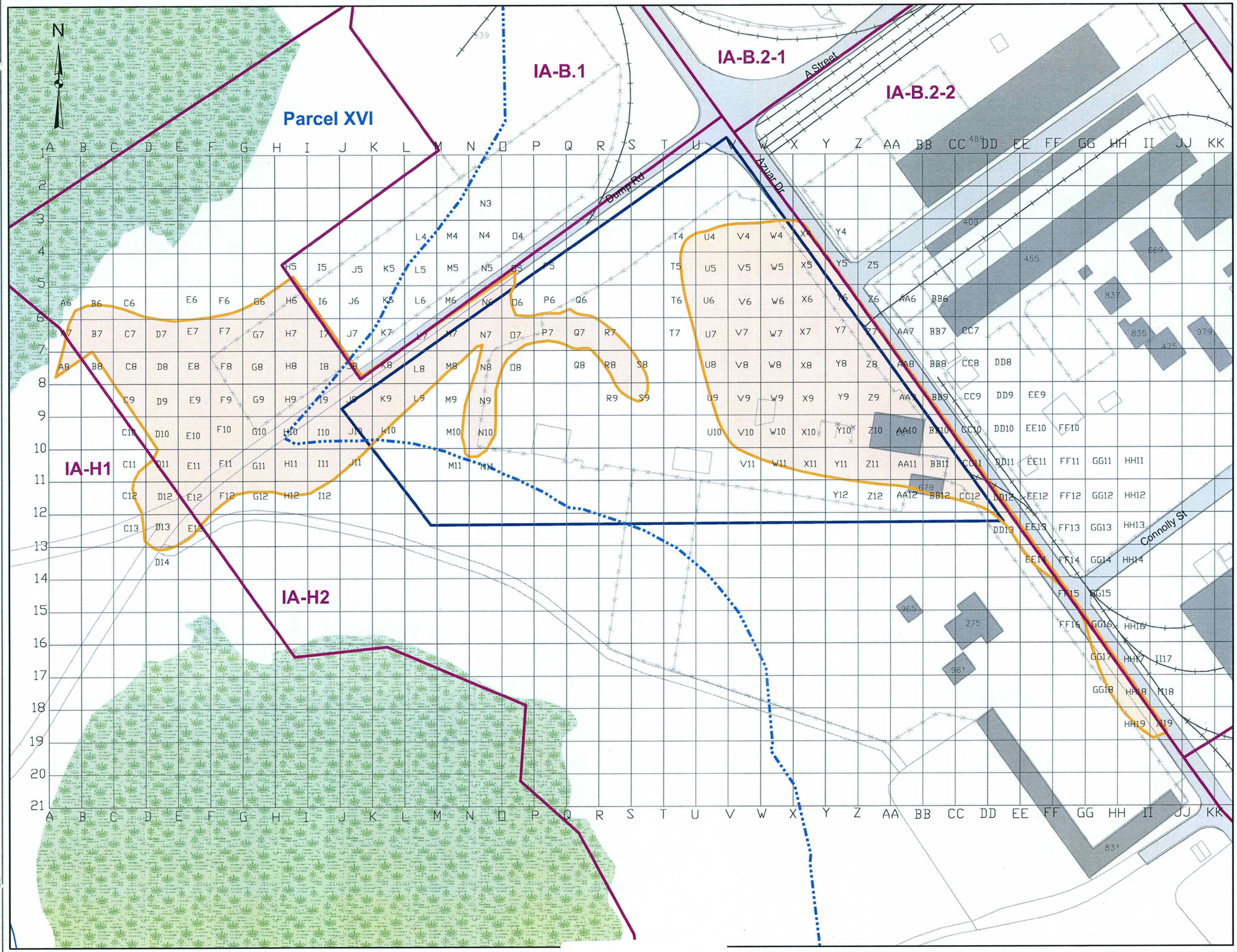
FIGURE 3
DRMO SITE AND VICINITY
TPH INVESTIGATION SITES

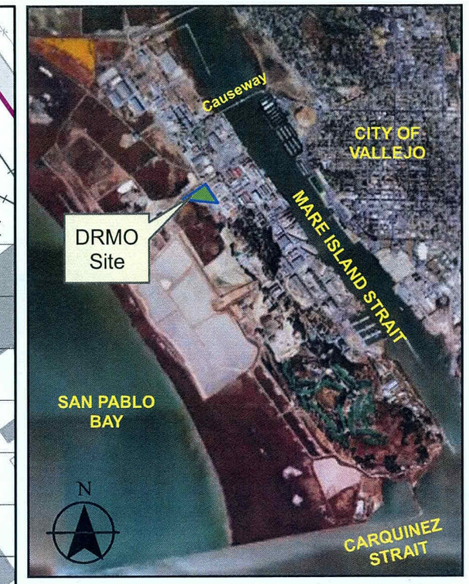
PCAP DRMO Site and Vicinity
Former Mare Island Naval Shipyard, Vallejo, California

WESTON SOLUTIONS

SENSITIVE

SENSITIVE





LEGEND

- Buildings/Structures
- Paved Roads
- Site Features
- Wetlands
- Potential Excavation Areas (owned by the Navy)
- 50-foot Sampling Grids
- DRMO Site Boundary
- Investigation Area Boundary
- Fences
- Railroads
- 300-foot Wetland Buffer

0 50 100 200 300 Feet

BRAC Program Management Office West
San Diego, California

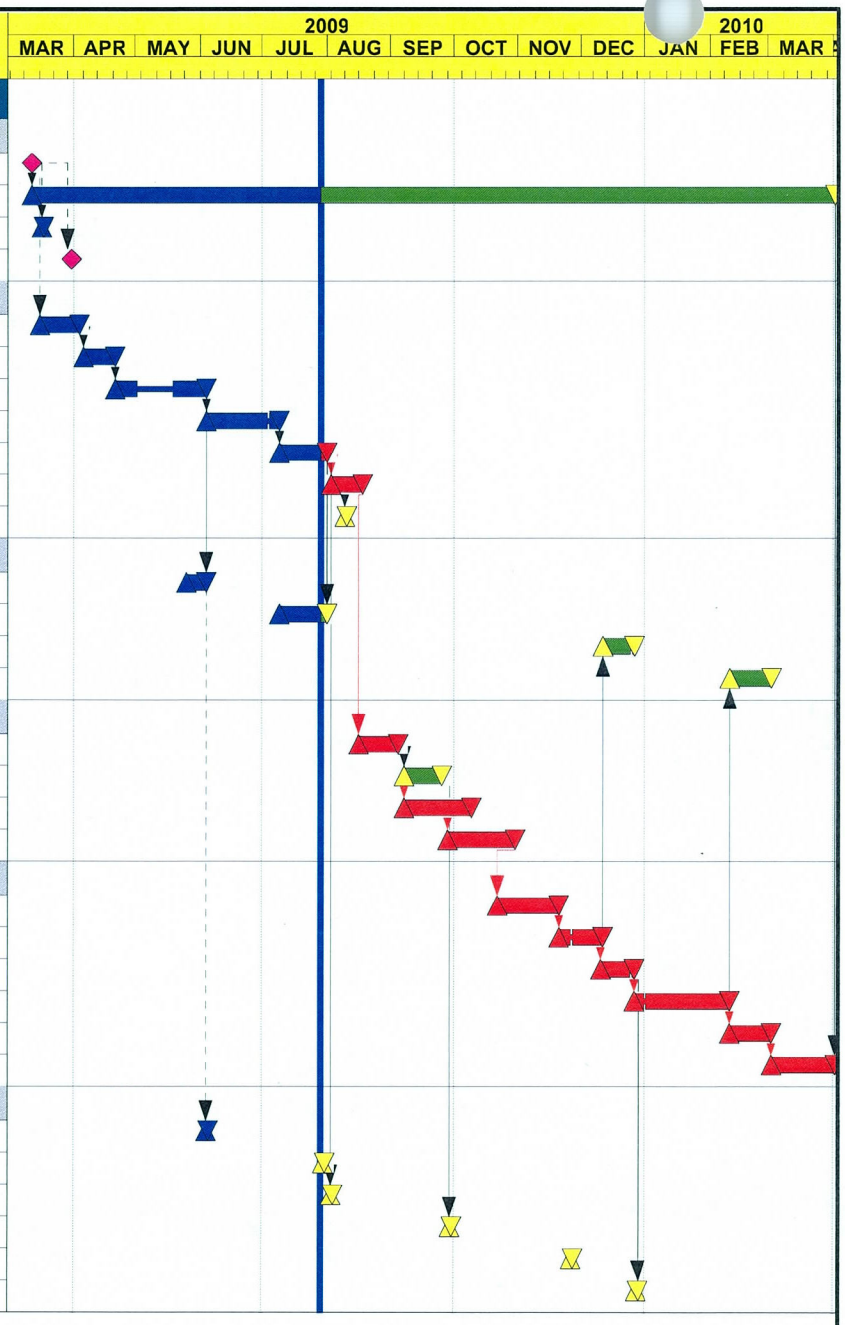
FIGURE 4
DRMO SITE AND VICINITY SAMPLING GRID

PCAP DRMO Site and Vicinity
Former Mare Island Naval Shipyard, Vallejo, California

WESTON SOLUTIONS

SENSITIVE

Activity ID	Activity Description	Orig Dur	% Comp	Early Start	Early Finish
Petroleum Corrective Action: DRMO Azuar/Dump Rd					
WE1: Project Management & Support					
WE1.0	EMAC PTO X016 Award	0	100	12MAR09A	
WE1.1	Project Management	276*	36	12MAR09A	01APR10
WE1.2	Kick-Off Meeting	1	100	17MAR09A	17MAR09A
WE1.10	Submittal of Bonds	0	100		30MAR09A
WE2: Petroleum Corrective Action Plan					
WE2.1	Prepare Internal Draft PCAP	30	100	16MAR09A	03APR09A
WE2.2	Navy Review of Internal Draft PCAP	15	100	06APR09A	20APR09A
WE2.3	Prepare Draft PCAP	18	100	21APR09A	03JUN09A
WE2.4	Agency Review of Draft PCAP	30	100	04JUN09A	08JUL09A
WE2.5	Prepare Final PCAP	21	86	09JUL09A	31JUL09
WE2.6	Agency Review/Concur Final PCAP	15	0	03AUG09	17AUG09
WE2.7	Submit PCAP Fact Sheet	1	0	10AUG09	10AUG09
WE3: Response to Comments					
WE3.1	RTCs on Internal Draft PCAP	7	100	26MAY09A	03JUN09A
WE3.2	RTCs on Draft PCAP	20	85	09JUL09A	31JUL09
WE3.3	RTCs on Internal Draft PCAP Completion Report	14	0	12DEC09	26DEC09
WE3.4	RTCs on Draft PCAP Completion Report	20	0	11FEB10	02MAR10
WE4: Implementation of the Final PCAP					
WE4.1	Excavation - Fenced Scrapyard Area/Parcel XVI	15	0	17AUG09	04SEP09
WE4.2	Backfill - Fenced Scrapyard Area/Parcel XVI	15	0	07SEP09	25SEP09
WE4.3	Excavation - Azuar/Dump Rd. Corridors	25	0	07SEP09	09OCT09
WE4.4	Backfill - Azuar/Dump Rd. Corridors	25	0	28SEP09	30OCT09
WE5: PCAP Completion Report					
WE5.1	Prepare Internal Draft Completion Report	30	0	22OCT09	20NOV09
WE5.2	Navy Review - Internal Draft Completion Report	20	0	21NOV09	11DEC09
WE5.3	Prepare Draft Completion Report	15	0	11DEC09	26DEC09
WE5.4	Agency Review - Draft Completion Report	45	0	27DEC09	10FEB10
WE5.5	Prepare Final Completion Report	20	0	11FEB10	02MAR10
WE5.6	Agency Review/Concur Final Completion Report	30	0	03MAR10	01APR10
WE6: Community Relations &Regulatory Interaction					
WE6.20	Regulatory Interaction - BCT Mtg.	1	100	04JUN09A	04JUN09A
WE6.11	Community Relations - RAB Mtg. 1	1	0	30JUL09*	30JUL09
WE6.21	BCT Technical Mtg. 1	1	0	03AUG09	03AUG09
WE6.22	BCT Technical Mtg. 2	1	0	29SEP09	29SEP09
WE6.12	Community Relations - RAB Mtg. 2	1	0	26NOV09*	26NOV09
WE6.23	BCT Technical Mtg. 3	1	0	28DEC09	28DEC09



Start Date 27FEB09
Finish Date 01APR10
Data Date 29JUL09

Early Bar
Progress Bar
Critical Activity

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0709

Sheet 1 of 1

FIGURE 5
PROJECT SCHEDULE

Durations are calculated in calendar days (7-day weeks) except for field work which is in 5-day workweeks.

Chain-of-Custody Form

Project Number:	Project Name:					No. of Containers	Request for Analysis											Chain of Custody Number:
Sampler's *(Signature)*																		Page ___of___
Field Sample ID	Date	Time	Comp.	Grab	Sample Location (Station ID)													Additional Requirements

Reliquished by: *(Signature and affiliation)*	Date and Time:	Received by: (Signature and affiliation)	Date and Time:
Reliquished by: *(Signature and affiliation)*	Date and Time:	Received by: (Signature and affiliation)	Date and Time:
Reliquished by: *(Signature and affiliation)*	Date and Time:	Received by: (Signature and affiliation)	Date and Time:

Samples were filtered in the field for dissolved metal analysis
P. O. Number:
Data package:
Turnaround time:

For Laboratory Use Only

BRAC Program Management Office West
San Diego, California

FIGURE 6
CHAIN-OF-CUSTODY FORM

PCAP DRMO Site and Vicinity
Former Mare Island Naval Shipyard, Vallejo, California

ATTACHMENT 1
STANDARD OPERATING PROCEDURES

Standard Operating Procedure 102

Sampling for Semivolatile Organic and Inorganic Compounds

Revision 0

26 October 2007

Prepared by

Weston Solutions, Inc.

Approval Signature: Emma P. Popek **Date:** October 26, 2007

Emma P. Popek, PhD, CQA

Weston Solutions, Inc.

QC Program Manager

STANDARD OPERATING PROCEDURE 102—SAMPLING FOR SEMIVOLATILE ORGANIC AND INORGANIC COMPOUNDS

1. GENERAL APPROACH

This SOP describes sampling for semivolatile organic compounds (SVOCs) and inorganic compounds, including metals. Samples of surface soil are usually collected with disposable implements and placed in glass jars. Samples of subsurface soil are retrieved with hand or powers augers, with direct push techniques, or by placing boreholes. Soil is brought to the surface from discrete depths in liners placed inside the augers, direct push rods, or split spoon samplers used in borehole drilling with hollow stem augers.

2. SUPPLIES AND EQUIPMENT

To sample soil for SVOC and inorganic compound analysis, we need the following supplies and equipment:

- Sample containers for surface soil sampling: pre-cleaned 2-ounce, 4-ounce, or 8-ounce jars and lids
- Sample containers for subsurface soil sampling: stainless steel or brass core barrel liners 6 inches in length with plastic caps
- Sample labels
- PTFE sheets (if liners are used)
- Stainless steel spatulas, disposable plastic scoops or wooden tongue depressors
- Steel trowels or shovels

- Decontamination supplies, if equipment is decontaminated between samples
- Chain-of-Custody (COC) Forms
- Disposable sampling gloves
- Safety glasses and other appropriate personal protective equipment (PPE)
- Paper towels
- Pens
- Field logbook
- Sample packaging and shipping supplies

3. SURFACE SOIL

To sample surface soil, we follow these steps:

1. Identify the sampling point in the field as required by the Sampling and Analysis Plan (SAP).
2. Wear disposable gloves, safety glasses, and other appropriate PPE while sampling.
3. Use a decontaminated shovel or trowel to remove the turf at the proposed sampling location, if necessary.
4. Remove loose debris and exposed soil from the top 1 to 2 inches.
5. Collect a sample for volatile organic analysis (VOC) first, if required by the SAP.
6. Collect a soil sample into a glass jar using a disposable sampling scoop or a decontaminated stainless steel spatula. Remove stones, twigs, grass, and other extraneous material. Fill the jar to the top with firmly packed soil.
7. Tightly cap the jar; label it and place on ice.

8. As required by the SAP, collect a field duplicate sample as close as possible to the location of the primary sample.

9. As required by the SAP, collect an additional jar for matrix spike (MS)/matrix spike duplicate (MSD) analysis as close as possible to the location of the primary sample. Clearly identify this sample on the label as "MS" and "MSD."

10. Document the sampling locations in the field logbook; fill out the COC Form.

11. Decontaminate non-disposable equipment between each sampling points.

12. Pack samples for shipment.

13. Ship the samples to the laboratory at soon as possible and by the fastest available delivery service.

The same procedure applies to sampling from the excavator bucket. Direct excavator operator to bring a bucket of soil from each sampling point. Once the operator brings the full bucket to the ground surface, collect a sample from an undisturbed portion of soil in the bucket following the above-described steps.

4. SUBSURFACE SOIL

To sample subsurface soil with a split-spoon sampler, we follow these steps:

1. Wear disposable gloves, safety glasses, and other appropriate PPE while decontaminating sampling supplies and while sampling.
2. Decontaminate the liners and the split spoon according to the SAP requirements.
3. Identify the sampling point in the field as required by SAP.

4. Drill to the desired depth and retrieve the auger. Attach the split spoon sampler with 3 liners inside to the sampling rod and insert into the boring. Drive the split spoon sampler further down the borehole according to ASTM Method D1586.
5. Retrieve the split spoon sampler from the borehole and open it.
6. If sampling for VOC is required, use an airtight coring device and quickly collect samples from the ends of the middle liner. Cap the lower liner with PTFE sheet and plastic caps, label it, and place on ice.
7. If sampling VOCs is not required, select a liner with the most recovery or from a specific depth, cap and label it, and place on ice. Use only the middle or the lower liner.
8. Discard the soil in the upper liner containing sluff (cavings) with soil cuttings as IDW.
9. Document the sampling locations in the field logbook; fill out the COC Form.
10. Decontaminate the split spoon and other non-disposable equipment between sampling points.
11. Pack the samples for shipment.
12. Ship the samples to the laboratory at soon as possible and by the fastest available delivery service.

For this type of sampling, the collection of additional sample volumes for MS/MSD analysis is not possible. The liners, however, usually contain enough soil for the analysis of the sample itself and for MS/MSD analysis. In this case, we designate one of the field samples as "MS/MSD" on the COC form. Collocated field duplicates are usually collected as the middle and the lower liners from the same depth interval or occasionally by placing another borehole next to the location of the primary sampling point.

Because different analyses need a different weight of soil, one sample container may be sufficient for all of the required analysis. The SAP should specify how many sample containers should be collected. Collecting excessive soil volumes increases the cost of sampling and shipping.

Standard Operating Procedure 103

Sampling for Volatile Organic Compounds

Revision 0

26 October 2007

Prepared by

Weston Solutions, Inc.

Approval Signature: Emma P. Popek **Date:** October 26, 2007

Emma P. Popek, PhD, CQA

Weston Solutions, Inc.

QC Program Manager

STANDARD OPERATING PROCEDURE 103—SAMPLING FOR VOLATILE ORGANIC COMPOUNDS

1. GENERAL APPROACH

This SOP describes sampling for volatile organic compounds (VOCs) and inorganic compounds, including metals. Volatile organic compounds, which have the boiling points below 200°C, include the following classes of compounds:

- Aromatic and halogenated hydrocarbons and solvents
- Volatile petroleum fuels and solvents (naphtha, gasolines, jet fuels, mineral spirits)
- Ketones
- Acetates
- Nitriles
- Acrylates
- Ethers
- Sulfides
- Organic lead compounds (tetraethyl and tetramethyl lead)

2. SAMPLING WITH AIRTIGHT CORING DEVICES

Sampling into airtight coring devices works best for relatively cohesive yet uncemented soils. This technique is not applicable for soils that contain gravel or rocks or are too hard (cemented) for the device barrel to be pushed into the soil. Soil that is too sandy or is excessively wet will allow easy penetration with the barrel, however if it is not sufficiently consolidated, it may fall out of the barrel before it is capped.

To sample with airtight coring devices (En Core™ or equivalent), we must have access to exposed soil, which may be the ground surface, the bottom and sidewalls of an excavation, the stockpile face or side, or soil in the excavator bucket. We may also apply this technique for sampling of subsurface soil brought to the ground level in a split spoon liner.

3. SUPPLIES AND EQUIPMENT

To sample with the En Core™ coring device, we need the following supplies:

- En Core™ airtight sampling device or equivalent
- En Core™ T-handle sampling tool or equivalent
- Sample containers for dry weight determination and labels
- Stainless steel spatulas, disposable plastic scoops, or wooden tongue depressors
- Chain-of-Custody (COC) Forms
- Disposable sampling gloves
- Safety glasses and other appropriate personal protective equipment (PPE)
- Paper towels
- Pens
- Field logbook
- Sample packaging and shipping supplies

4. SOIL SAMPLING

These steps will be followed when sampling for VOC analysis with the En Core™ sampling devices:

1. Wear disposable gloves, safety glasses, and other appropriate personal protective equipment while sampling.
2. Identify the sampling point in the field as required by the Sampling and Analysis Plan (SAP).
3. With a scoop or a spoon remove the upper 2 to 3 inches of exposed soil.
4. Holding the En Core™ coring device with the T-handle up and the cartridge down, insert the sampling device into the freshly exposed soil. Look down the viewing hole to make sure the plunger o-ring is visible, indicating that the cartridge is full. If the o-ring is not visible, apply more pressure to fill up the cartridge. Withdraw the sampling device from soil, and with a spatula remove excess soil from the bottom of the barrel to make the soil surface flush with the walls of the barrel. Wipe the barrel with a paper towel to remove soil from the external surface.
5. Cap the cartridge while it is still on the T-handle. Push or twist cap on until the groves are seated over the ridge of the coring body.
6. Disconnect the capped sampler by pushing the locking lever down on T-handle, and twisting and pulling the sampler from T-handle. Lock the plunger by rotating plunger rod until the wings rest against the tabs. Fill out the label with the sample information on the original En Core™ sampler bag and place the cartridge into the bag.
7. Collect three En Core™ samples for each sampling point as close as possible to each other.

8. As required by the SAP, collect a field duplicate sample into three En Core™ samplers as unhomogenized split samples obtained as close as possible to the location of the primary sample.

9. Store the En Core™ sampler bags in a cooler with ice until it can be delivered to the laboratory or packaged for shipment.

10. Ship the samples to the laboratory at soon as possible and by the fastest available delivery service.

APPENDIX B
ACCIDENT PREVENTION PLAN
(Internal Document Only)

APPENDIX C
CONSTRUCTION QUALITY CONTROL PLAN

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ABBREVIATIONS AND ACRONYMS

ANSI	American National Standards Institute
APP	Accident Prevention Plan
ASQC	American Society for Quality Control
CFR	Code of Federal Regulations
CQCP	Construction Quality Control Plan
CQMP	Construction Quality Management Plan
CTO	Contract Task Order
DCN	Document Control Number
DFW	definable feature of work
DON	Department of the Navy
DRMO	Defense Reutilization Marketing Office
EMAC	Environmental Multiple Awards Contract
IA	Investigation Area
NAVFAC-SW	Naval Facilities Engineering Command Southwest
OSHA	Occupational Safety and Health Administration
PCAP	Petroleum Corrective Action Plan
PM	Project Manager
QA	quality assurance
QAO	Quality Assurance Officer
QC	quality control
QCPM	Quality Control Program Manager
RFI	Request for Information
ROICC	Resident Officer in Charge of Construction
RPM	Remedial Project Manager
SAP	Sampling and Analysis Plan
SHSP	Site-Specific Health and Safety Plan
SOW	Statement of Work
WESTON	Weston Solutions, Inc.

1 INTRODUCTION

This Project Construction Quality Control Plan (CQCP) was prepared for the Department of the Navy (DON) Naval Facilities Engineering Command Southwest (NAVFAC-SW) Environmental Multiple Awards Contract (EMAC) No. N62473-08-D-8825 (NAVFAC-SW, 2008a) Contract Task Order (CTO) 0005, and is based on the policies and procedures defined in the *Weston Solutions Quality Management Manual* (Weston Solutions, Inc. [WESTON], 2004). The WESTON Quality Management Manual was prepared using requirements found in the American National Standards Institute standard American National Standards Institute (ANSI)/American Society for Quality Control (ASQC) Standard ANSI/ASQC E4-2004 titled "Specifications and Guidelines for Quality Systems for Environmental Data Collection and Environmental Technology Programs" (ANSI/ASQC, 2004). In addition, this CQCP is based on the requirements of the following government documents:

- EMAC No. N62473-08-D-8825
- Unified Facilities Guide Specifications (UFGS), UFGS-01 45 02, NAVFAC Quality Control (QC) (NAVFAC, 2008b)
- Construction Quality Management Program, NAVFAC P-445 (NAVFAC, 2000)
- EMAC Program Construction Quality Management Plan (CQMP) (WESTON, 2008)

1.1 PROJECT OBJECTIVE

This corrective action is intended to facilitate regulatory closure (i.e., "no further action") for petroleum within the Defense Reutilization Marketing Office (DRMO) Site and Vicinity by removing free petroleum product and petroleum-impacted soils. The contaminant of concern at the site is Bunker C (No. 6 Fuel Oil). An estimated 43,500 cubic yards of petroleum-impacted soil from the potential excavation areas within DON property identified in Figure 1-2 of the Petroleum Corrective Action Plan (PCAP) are planned to be removed. Excavated soil will be transported to the adjacent Investigation Area (IA) H1 Containment Area for use a subgrade fill material under the engineered landfill cap. Confirmation soil sampling of the excavation surface and sidewalls will be performed at a DON approved off-site laboratory. Excavations will be backfilled utilizing both non-impacted overburden soil and imported borrow fill. Since the exact

lateral and vertical extents of petroleum-impacted soil may change based on visual indicators and/or confirmation sampling, additional petroleum-impacted soil will be removed if required to obtain closure. This Project CQCP provides an effective QC system to ensure the quality of all work performed by WESTON and its subcontractor personnel meet the project requirements necessary to fully execute the work.

1.2 PROJECT SCOPE

This Project CQCP is provided as Appendix C to the PCAP and is applicable to all field operations which include the following tasks:

- Site setup and erosion/stormwater pollution prevention implementation
- Traffic control
- Isolation of utilities
- Petroleum-impacted soil excavation, transport, and placement at IA-H1
- Air monitoring
- Confirmation sampling
- Free phase oil removal and disposal
- Groundwater removal and disposal, if applicable
- Backfilling operations
- Site restoration

Attachment 1 includes the applicable specifications and drawings for some of the tasks listed above, including excavation, backfilling, and site restoration activities.

2 QUALITY CONTROL ORGANIZATION

A central element for controlling quality is to establish a QC organization that is independent of those persons actually performing the work. The organization is responsible for the implementation of the procedures outlined in the CQMP, specifically, for observing, measuring, recording, and documenting the work performed and for controlling the quality by providing timely feedback to those persons actually performing the work. Feedback, in the form of documented inspections, tests, or other evaluations, is necessary in order to provide approval or disapproval of an activity based on pre-selected standards. Work that is disapproved must be corrected or redone before subsequent work can be implemented.

The primary functions of the QC organization are to ensure that work is completed within the project requirements, without deficiency, and to the satisfaction of the client. To that extent, the focus of the QC organization is to ensure that staff with the adequate and appropriate qualifications and training, as well as the appropriate procedures, are in place from the inception of the project through its completion. An organizational chart showing the reporting relationships of the project operation and QC personnel is provided in Figure C-1.

The qualifications, duties, responsibilities, and authorities for each person assigned a quality management function are provided in Section 3 of this plan.

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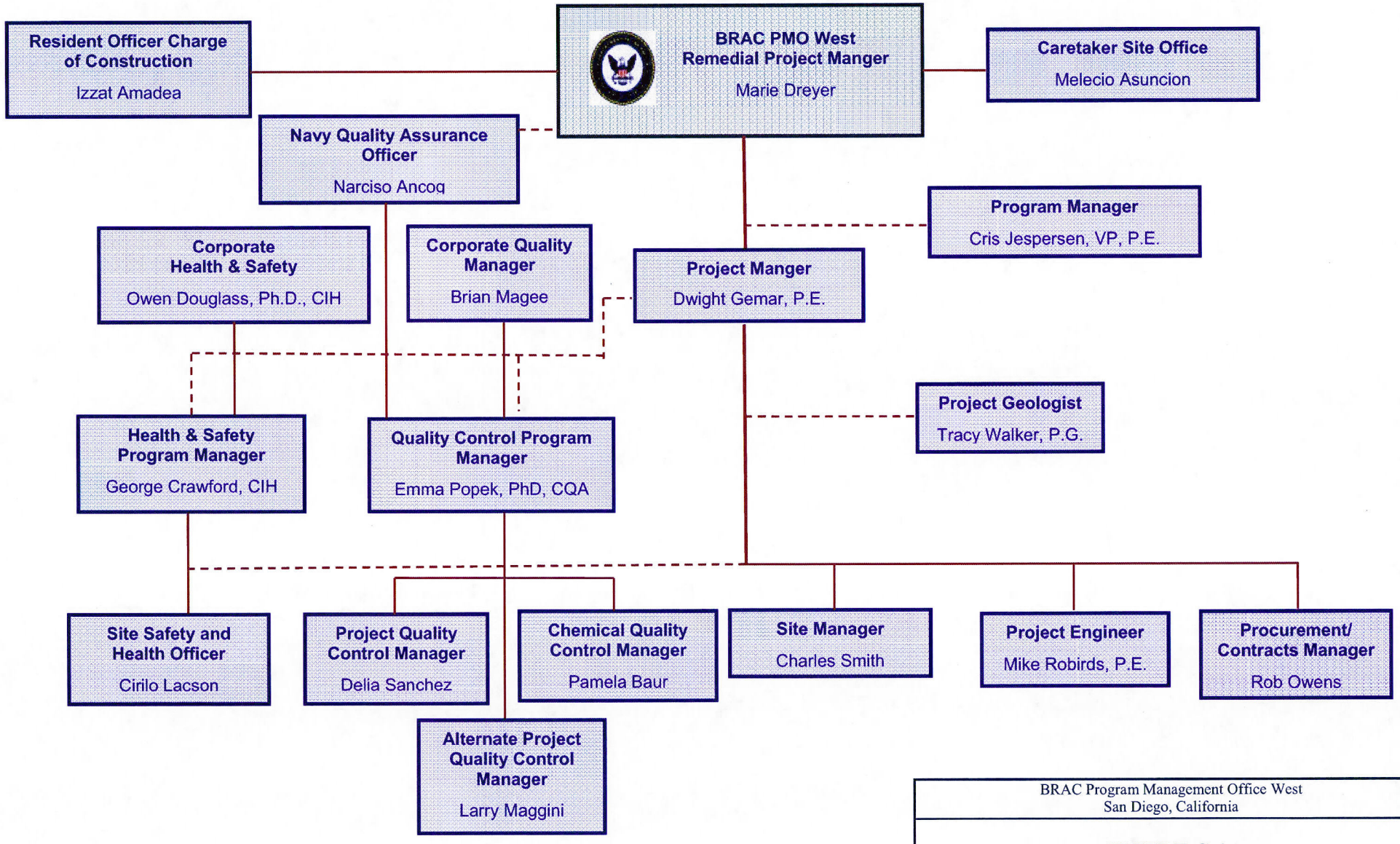

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San Diego, California

FIGURE C-1
PROJECT ORGANIZATION CHART

PCAP DRMO Site and Vicinity
Former Mare Island Naval Shipyard, Vallejo, California

WESTON SOLUTIONS

3 RESPONSIBILITIES OF PROGRAM AND PROJECT PERSONNEL

The qualifications, responsibilities, and authorities of key personnel assigned a quality management function are described in the following subsections.

3.1 DON QUALITY ASSURANCE OFFICER

The DON Quality Assurance Officer (QAO) provides government oversight of the WESTON Quality Assurance (QA) Program and quality-related directives; conducts technical and administrative oversight of WESTON surveillance audit activities; acts as a point of contact for all matters concerning QA and the DON Laboratory QA Program; and coordinates training on matters pertaining to data generation and data quality maintenance.

Their authority includes approving the Sampling and Analysis Plan and suspending project execution if QA requirements are not adequately followed.

3.2 PROGRAM MANAGER

The Program Manager will provide the leadership and technical/management capabilities to successfully manage the program. The Program Manager has the authority to negotiate and sign contracts and to commit WESTON's resources to the execution of projects. The Program Manager is the primary program-level point of contact for coordination with the DON.

The Program Manager has the following responsibilities:

- Establishing and/or executing program administrative matters, controls, policy matters, and levels of authority, responsibility, and communication.
- Ensuring compliance with all applicable Federal, State, local, Department of Defense, and DON regulations and policies as well as contract terms and conditions.
- Monitoring quality control and controlling project costs.
- Assigning personnel consistent with contract requirements.
- Understanding and enforcing the Comprehensive Environmental Response, Compensation, and Liability Act, Resource Conservation and Recovery Act, Toxic

Substances Control Act, Clean Water Act, Clean Air Act and other Federal statutes, their state counterparts and all other applicable or relevant and appropriate requirements.

The Program Manager will have an undergraduate degree in engineering or physical science and a minimum of six years of experience managing a large task order contract with multiple concurrent projects at multiple locations. The Program Manager will have at a minimum four years of experience as a senior manager or engineer working with environmental restoration studies and remedial action project. In addition, the Program Manager will be a professional engineer or a registered geologist in at least one state of the United States. The Program Manager will have the authority to stop work if contract requirements are not met.

3.3 PROJECT MANAGER

The Project Manager (PM) is the single point of contact for the project. The PM is responsible for the management and execution of activities according to the approved statement of work (SOW) and approved PCAP, as well as all federal, state, and local laws and regulations. This includes coordinating the activities of the groups, subcontractors, or teams working on the project.

The PM's specific responsibilities will include the following:

- Completing the construction activities in accordance with the contract specifications and drawings and approved planning documents.
- Ensuring that the work is conducted in a safe and environmentally sound manner (this includes ensuring coordination between the Project Health and Safety Manager and the Site Safety and Health Officer).
- Maintaining close communication and coordination with the client for the duration of the project.
- Preparing the required reports and submitting them to the client in a timely manner.
- Immediately notifying the client of problems with construction or safety and health procedures.
- Ensuring that site personnel follow the approved procedures presented in the site-specific project plans or in this CQCP.

The PM has the authority to stop work on any part of the job if it is found to be noncompliant with contract specifications or project plans. Further, the PM is authorized to institute corrective actions, as necessary, and to implement these changes, with client approval, in accordance with the provisions of the contract. The groups, subcontractors, and teams working on the project report to the PM and act at their direction.

3.4 SITE MANAGER

The Site Manager reports to the PM and is responsible for supervising the implementation of all field activities. They provides direct supervision of field staff and together with the Project QC Manager are responsible for ensuring that all personnel adhere to the requirements of the CQMP. Subcontractors will also report to the Site Manager and act at their direction. The Site Manager has the authority to stop work if it is found to be noncompliant with contract specifications or project plans.

3.5 QUALITY CONTROL PROGRAM MANAGER

The Quality Control Program Manager (QCPM) reports to the Corporate Quality Manager on quality issues. The QCPM or designee is responsible for conducting systematic reviews of the project progress and reporting the results to the Program Manager and PM. The QCPM is responsible for independently confirming the adequacy and improvement of program and project quality implementation at all levels. Confirmation includes approving plans and inspecting the work and work documentation to assess how effectively the CQMP is being implemented.

The QCPM has the authority to stop work on any part of the job if it is found to be noncompliant with contract specifications or project plans. They also have the authority to recommend corrective actions to the PM and to require that a schedule for corrective action implementation be established.

3.6 PROJECT QUALITY CONTROL MANAGER

The Project QC Manager reports to the QC Program Manager regarding quality issues. In the event the Project QC Manager assigned to this project is unavailable and cannot be on-site, the Alternate Project QC Manager will serve as Project QC Manager for this project. The Alternate

QC Manager will have the same responsibilities and duties as the Project QC Manger. The Project QC Manager may delegate some of their quality management responsibilities to another qualified person such as the Alternate QC Manager with prior approval from the QC Program Manager and the PM.

The Project QC Manager has the following duties:

- Is on the site at all times during progress of the work, with complete authority to take any action necessary to ensure conformance with the contract requirements. In the event of the Project QC Manager's absence, an alternate will be on-site.
- Conduct daily inspection of work performed for compliance with plans and specifications.
- Certify that all materials and equipment delivered/installed during the project comply with contract plans and specifications.
- Certify daily that all work performed on and off the construction site conforms to plans and specifications of the project.
- Report any deficiencies and corrective actions taken.
- Supervise and coordinate the inspections and tests made by WESTON and subcontractors.
- Assure that the project QC organization is adequately staff and the QC staff is adequately trained to perform all the detailed inspections and testing required in the plans and specifications.
- Maintain an approved copy of this CQCP on file at the job site, complete with revisions.
- Maintain at the job site an up-to-date submittal register.
- Maintain at the job site a Testing Plan and Log showing the status of all tests required in the contract; ensure that all tests are performed and results reported; indicate whether test results show the item tested conforms to the requirements.
- Maintain at the job site the up-to-date QC Rework Items List.
- Perform or document the daily health and safety inspections on the Daily Quality Control Reports.

The Project QC Manager has the authority to stop specific work activities related to or affected by noncompliant conditions until actions can be taken to correct the noncompliant condition or prevent it from affecting related or subsequent work, and has the authority to act for WESTON in quality matters related to construction and remediation activities. The Project QC Manager will not have job-related responsibilities other than QC unless specifically permitted in the particular project specification.

The Project QC Manager has the following qualifications:

- A minimum of three years of working experience in the construction industry, preferably in environmental construction.
- Demonstrable expertise in the construction techniques and processes required for the project (for example excavation techniques).
- Working knowledge of applicable federal, state, and local laws, regulations, and guidance.
- Formal education and training in construction quality management.
- Completion of the United States Army Corps of Engineers course titled "Quality Management for Contractors" or its equivalent, renewed every 5 years.

3.7 CHEMICAL QUALITY CONTROL MANAGER

The Chemical QC Manager implements the contract requirements for chemical data collection and QC; prepares the Sampling and Analysis Plans (SAPs); serves as the WESTON point of contact with the DON QAO; audits field sampling activities and laboratory performance; approves the selection of analytical subcontract laboratories and data validation companies; approves project-specific SAPs. The Chemical QC Manager has the authority to stop work if the requirements for chemical data quality are not observed.

The Chemical QC Manager is an individual with a degree in chemistry or related science; at least 6 years of experience in all aspects of environment chemical data collection for DON contracts; and a trained laboratory auditor.

3.8 PROGRAM HEALTH AND SAFETY MANAGER

The Program Health and Safety Manager, a Certified Industrial Hygienist, will provide overall direction to the development, implementation, and oversight of safety and health-related aspects of the project. Their responsibilities will include reviewing and approving the Accident Prevention Plan(APP)/Site-Specific Health and Safety Plan (SHSP) and providing additional safety and health direction and auditing as needed to ensure that the project meets contract requirements and provisions of 29 Code of Federal Regulations (CFR) Occupational Safety and Health Administration (OSHA) 1910 (General Industry Standards) and OSHA 1926 (Construction Standards), in particular 1910.120/1926.65, Hazardous Waste Site Work and Emergency Response Standards.

The Program Health and Safety Manager has the authority to stop work for any safety and health-related issues. They also have the authority, with notification to the PM, to modify safety protocols and authorize revisions of the APP/SHSP for client concurrence.

3.9 SITE SAFETY AND HEALTH OFFICER

The responsibilities and authorities of the Site Safety and Health Officer are as follows:

- Evaluate each feature of work for safety and health risks.
- Ensure that periodic safety audits are conducted.
- Interpret air monitoring/air sampling data to upgrade/downgrade personal protective measures.
- Ensure compliance with specified safety and health requirements, federal, state, and OSHA regulations, and pertinent aspects of the APP/SHSP.
- Consult with and coordinate any modifications to the APP/SHSP with the Program Health and Safety Manager and the client.
- Conduct accident investigations and prepare accident reports.
- Review results of daily QC inspections.
- Recommend corrective actions in coordination with site management and the Program Health and Safety Manager for identified deficiencies and oversee the corrective actions.

The Site Health and Safety Manager is authorized to stop work if unacceptable safety and health conditions exist and to take appropriate measures to reestablish and maintain safe working conditions. The Site Health and Safety Manager may not change the APP/SHSP or protocols without the approval of the Project Health and Safety Manager and acceptance by the client, when appropriate.

3.10 SUBCONTRACTORS AND VENDORS

The subcontractors for the DRMO Site and Vicinity corrective action will include an analytical laboratory, analytical data validator, waste transporters, waste disposal facilities, and potentially a paving subcontractor. The subcontractors are required to provide labor, material, and equipment necessary to conduct their respective services as directed by the Site Manager. Subcontractors and vendors will be required to conform to this CQCP and the requirements of all approved procedures, technical specifications, and contract provisions.

The subcontractor's QC inspectors are responsible for field inspection of their construction, services, and operating activities. WESTON will monitor, oversee, and make onsite observations and inspections of work in progress to determine if the subcontractor's work is proceeding in accordance with this CQCP.

Subcontractor personnel are responsible for maintaining a daily log of the project activities they perform and for providing information needed to complete the Quality Control Daily Report. All inspection records, including inspection reports, deficiency reports, and inspections of corrective actions, will be documented by the Project QC Manager.

3.11 CERTIFICATIONS AND REGISTRATIONS

As applicable, personnel assigned to review, approve, and/or certify the design of architectural, structural, mechanical, electrical, civil, or other engineering features of the work will be registered to practice in their particular professional field in the state of California.

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4 DELEGATION OF QC AUTHORITY

The QC Program Manager delegates QC authority to the Project QC Manager through a "Letter of Designation". The letter describes the responsibilities of the QC Manager and delegates the authority to stop work that is not in compliance with the contract. The "Letter of Designation" for the Project QC Manager and alternate are provided in Attachment 2.

As necessary, the Project QC Manager may issue letters of designation to other various QC representatives outlining duties, authorities, and responsibilities.

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5 MEETINGS

5.1 KICK-OFF/PRECONSTRUCTION MEETING

Prior to start of site work, a preconstruction kickoff meeting with the Remedial Project Manager (RPM) and Resident Officer in Charge of Construction (ROICC) will be conducted. The purpose of this meeting is to develop a mutual understanding of the QC details, including forms to be used, administration of onsite and offsite work, coordination of the field activities, production, and the Project QC Manager duties with the ROICC. At a minimum, the WESTON personnel required to attend the meeting will include the PM, Site Manager, Site Safety and Health Officer, and Project QC Manager. WESTON will prepare and distribute meeting minutes.

5.2 QC MEETINGS

After the start of field activities, the Project QC Manager will conduct QC meetings at a frequency of once per week or as required by the ROICC. The meetings will be held at the project site, and will be generally be attended by the ROICC, Project Manager, Project QC Manager, Site Manager and Site Safety and Health Officer. The Project QC Manager will notify the ROICC at least 48 hours in advance of each meeting. The following will be accomplished at each meeting:

(a) Review the minutes of the previous meeting

(b) Review the schedule and field work activities

  (1) Work or testing accomplished since last meeting

  (2) Rework items identified since last meeting

  (3) Rework items completed since last meeting

(c) Review the status of submittals

  (1) Submittals reviewed and approved since last meeting

  (2) Submittals required in the near future

(d) Review the work to be accomplished in the following two weeks and documentation required. Schedule the three phases of control and testing.

(1) Establish completion date for rework items

(2) Required preparatory phases inspections

(3) Required initial phases inspections

(4) Required follow-up phases inspections

(5) Required testing

(6) Status of offsite work or testing

(7) Required documentation

(e) Resolve QC and production problems

(f) Address items that may require revisions to this CQCP

6 THREE PHASES OF CONTROL

This section describes the procedures for the three phases of control that WESTON will implement on this project. Inspection procedures described in this section are based on the requirements of the *NAVFAC Guide Specification NFGS-01451A* (NAVFAC, 2002a).

6.1 DEFINABLE FEATURES OF WORK

This section describes the Definable Features of Work (DFWs) for all field activities, including that of subcontractors and suppliers, the inspection process, and the required meetings to ensure compliance with the contract. The DFWs establish the measures required to verify both the quality of work performed and compliance with specified requirements; and include inspecting materials and workmanship before, during, and after each DFW. The DFWs for this project are:

- Site Setup and Erosion/Stormwater Pollution Prevention Implementation
- Traffic control
- Isolation of utilities
- Petroleum-impacted Soil Excavation, Transport Placement, and Air Monitoring
- Confirmation Sampling
- Free Product Removal and Disposal
- Groundwater Removal and Disposal, as necessary
- Backfilling Operations
- Site Restoration

The QC organization will implement a three-phase control system for each DFW performed (i.e., preparatory, initial, and follow-up phases). Attachment 3 includes checklists for the daily follow-up inspection phases. A fourth and final (completion) inspection will also be conducted. Safety is equal in importance and is given equal emphasis with quality and production for each phase of every construction activity. Each QC phase is discussed separately in the following subsections.

6.2 PREPARATORY PHASE

A preparatory inspection will be performed prior to beginning any work on any DFW. The preparatory inspection will include the following activities:

- Reviewing the appropriate activity hazard analysis to ensure that safety requirements are met.
- Reviewing each paragraph of applicable specifications or variances identified by WESTON to the client.
- Reviewing the contract/project plans and SOW.
- Verifying that materials and/or equipment have been submitted and approved, and if required, have been tested.
- Verifying that provisions have been made to provide the required QC inspections and testing.
- Examining the work area to ensure that required preliminary work has been completed and is in compliance with the contract.
- Examining the required materials, equipment, and sample work to ensure that they are on-hand, conform to approved shop drawings or submitted data, and are properly stored.
- Discussing procedures for constructing the work, including elimination of repetitive deficiencies.
- Documenting the tolerances and workmanship standards for the phase of work being inspected.
- Verifying that the client has accepted the portion of the plan for the work to be performed.

The client will be notified at least 48 hours in advance of beginning the required activities of the preparatory phase. A meeting will be conducted by the Project QC Manager and attended by appropriate QC personnel and the work leader(s) responsible for the DFW. The results of the preparatory phase inspection will be documented in separate meeting minutes prepared by the Project QC Manager and attached to the Daily Production and Quality Control Report.

6.3 INITIAL PHASE

An initial inspection will be performed at the beginning of the implementation of a DFW. This inspection will include the following activities:

- Checking preliminary work to ensure that it is in compliance with contract/project requirements.

- Verifying required control inspection and testing and compliance with the contract/project.
- Verifying that acceptable workmanship levels meet standards.
- Resolving differences or conflicts in work scope or with contract specifications, etc.
- Performing a safety check to include compliance with the SHSP and activity hazard analysis.

A meeting will be conducted by the Project QC Manager and attended by the appropriate QC personnel and the work leader(s) responsible for the DFW. The results of the initial phase inspection will be documented on the Daily Quality Control Report prepared by the Project QC Manager.

The initial phase will be repeated for each new crew to work on-site or any time acceptable specified quality standards are not being met or are revised.

6.4 FOLLOW-UP PHASE

Daily checks will be performed to ensure continuing compliance with contract requirements, including efficiency of operations, control testing, and corrective action implementation until completion of the DFW. The follow-up inspection will consist of the following checks:

- Ensure that work for each activity is in compliance with the contract/project requirements.
- Maintain the quality of workmanship required.
- Ensure that testing is performed by approved laboratory.
- Ensure that all rework items are being corrected.
- Perform safety inspections.
- The follow-up inspection activities will be documented in the Daily Quality Control Report and in the daily follow-up checklists provided as Attachment 3.

6.5 INSPECTION DOCUMENTATION

Inspections will be recorded in the checklists provided as Attachment 3 and in the Daily Quality Control Report (also in Attachment 3), and the information generated by inspections will be used to document and track deficiencies and corrective actions, where necessary. The Project QC

Manager will review the completed documents. Documents will be maintained on-site and will be available for DON review.

7 PROCEDURES FOR SUBMITTALS

WESTON is responsible for total management of construction, remediation, and engineering consulting work that is conducted under this project. This responsibility includes scheduling, reviewing, certifying, and managing submittals.

WESTON is also responsible for ensuring that certifications provided by others (e.g., vendors and subcontractors) are accurate and in compliance with the contract requirements. The procedures for field submittals discussed in the following subsections meet the requirements of the NAVFAC *Guide Specification NFGS-01330F* (NAVFAC, 2002b).

All submittals will be submitted to the DON and project personnel as determined by the Submittal Register Engineering Form 4025 provided in Attachment 3. Each submittal will have a unique document control number. All possible attempts will be made to schedule submittals to allow for sufficient review and approval time. However, certain submittals may require accelerated processing to maintain the construction schedule.

7.1 REVIEW AND PROCESSING OF SUBMITTALS THAT DO NOT REQUIRE DON APPROVAL

Material submitted for review by the Project QC Manager will indicate that it either conforms to or does not conform to established requirements. The Project QC Manager will advise each submitter of the review and update the submittal log to indicate status.

Conforming submittals will be transmitted to project and DON personnel as determined by the distribution schedule. Non-conforming submittals will be returned to the submitter for correction, resolution of comments, and re-submittal.

7.2 REVIEW AND PROCESSING OF SUBMITTALS THAT REQUIRE DON APPROVAL

Material submitted to the DON will be signed by the PM to indicate that it conforms to requirements. Submittals will be reviewed by the Program Health and Safety Manager, Chemical Quality Control Manager, or Project QC Manager. Submittals prepared by WESTON will then

be transmitted to the DON in accordance with the project distribution schedule for review and approval. Upon completion of review, the ROICC or DON RPM will either return the transmittal sheet to the Project QC Manager for further action, or accept the submittal as complete. Non-conforming submittals may be returned to the submitter for correction, resolution of comments, and re-submittal, if required.

7.3 REVISED SUBMITTALS

Revised submittals will be logged, reviewed, and processed in a manner identical with the initial submittal.

7.4 DATA REVIEW/CERTIFICATION

WESTON will review each field submittal for contract compliance. WESTON will use technical reviewers in the appropriate area of expertise to review submittals for technical validity. The Project QC Manager or designated alternate will be responsible for reviewing data submittals for compliance with the contract requirements, drawings, and specifications. The Project QC Manager will review and certify the correctness of Daily Quality Control Report; invoices; and the completion of work under each CTO.

The approval by the Project QC Manager will serve as certification of compliance. Submittals that comply with the contract will be forwarded to the client. Submittals that do not comply with the contract will be returned to the originator for correction.

7.5 TRANSMITTAL FORM

A Transmittal Form shown in Attachment 3 or cover letter will accompany each submittal. Each transmittal will be identified with:

- The Contract and CTO number
- Name and address of the submitting organization
- Date of submittal
- Description of item being submitted, including reference to specification section

The Transmittal Form will be checked and approved by the PM, the Project QC Manager or their designated alternates. The form will be signed and dated, certifying that the accompanying submittal complies with contract requirements.

7.6 SUBMITTALS OF VENDORS AND SUBCONTRACTORS

For review, certification, and management of submittals from vendors and subcontractors, the procedures contained within the WESTON *Procurement Procedures Manual* (WESTON, 2007) will be implemented. This manual contains the procurement procedures of WESTON and constitutes the WESTON procurement system. It defines the authority, responsibility, and basic requirements to be followed when procuring supplies and services, and ensures that sound business practices are adopted and implemented; fair and reasonable costs are sought and obtained; delivery requirements are met; and that user satisfaction is achieved. The PM or designee is responsible for identifying technical and schedule requirements for subcontractors and for overseeing subcontractor performance.

7.7 DOCUMENT CONTROL AND FILING SYSTEM

All project documents, including the PCAP, SAP, Site-Specific Health and Safety Plan, and supporting reports, will be tracked using a document control numbering (DCN) system. The Project QC Manager will be responsible for ensuring that the PM establishes a DCN system and that a DCN log is maintained for the project.

All project documents and submittals will be filed according to a system using the project file index presented in Attachment 4. The project filing index categorizes project submittals by type.

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8 TESTING PROCEDURES

The requirements for testing facility qualification and testing procedures tracking are described in the following sections.

8.1 TESTING—OTHER THAN CHEMICAL SAMPLING AND ANALYSIS

Geotechnical compaction testing will be performed only during site restoration of Azuar Drive. Chemical testing will be performed as described in the Sampling and Analysis Plan (Appendix A of the PCAP).

8.2 DOCUMENTATION

Test reports and a Testing Plan and Log shown in Attachment 3 will be submitted to the DON RPM and ROICC. Pertinent specifications, location where tests were taken, and the sequential control number identifying the test will be recorded. At a minimum, test records will include the following information:

- Date
- Name of person performing the test and recording the data
- Identification of test methods and equipment used
- Results of the test
- Verification of acceptability of test results
- Actions taken to correct deficiencies

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9 QUALITY CONTROL CERTIFICATION

Daily Quality Control Reports in the form shown in Attachment 3 contain the following certification statement:

"On behalf of the contractor, I certify that this report is complete and correct and the equipment and material used and work performed during this reporting period are in compliance with the contract requirements to the best of my knowledge, except as noted in this report".

The Daily Quality Control Report will be signed by the Project QC Manager. The Project QC Manager will also certify that the As-Built drawings and invoices are correct and that the work for which payment is requested is in compliance with contract requirements.

Upon completion of work, the Project QC Manager will furnish a certificate attesting that "the work has been completed, inspected, tested and is in compliance with the Contract".

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10 COMPLETION INSPECTIONS

At the completion of any DFW or project site work, the Project QC Manager will conduct a Punch-Out Inspection of the work. The work will be inspected for conformance to plans, specifications, quality, workmanship, and completeness. An itemized punch list will be compiled that includes a summary of any work not properly completed, inferior workmanship, and work not conforming to plans and specifications. This list will be included with the QC documentation and submitted to the client with an estimated date for correction of each deficiency. Following correction of work, if required, a second inspection will be conducted by the Project QC Manager to ensure that deficiencies have been corrected. When deficiencies have been corrected and verified by the Project QC Manager, the client will be notified and a Pre-Final Inspection scheduled.

The Pre-Final Inspection, conducted by the ROICC Construction Management Team, will verify that the work has been completed as planned and that the project can demobilize. A "pre-Final Inspection Punch List" may be developed as a results of this inspection. WESTON will correct all outstanding items within the agreed timeframe. The Final Inspection, performed by the government, will be scheduled with a 14-day notice.

The inspections and corrective actions will be completed within the schedule stated for completion of the entire work or its increments, if the project is divided into increments by separate completion dates.

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11 DAILY REPORTING

Current records of QC operations, activities, and tests performed, including the work of subcontractors and suppliers, will be maintained. Documents generated as a result of the implementation of the CQMP will be maintained and will undergo review and approval.

A master file of QC documents will be maintained at the project site. The master file may include the following documents:

- Meeting Minutes, Conference Notes, and Confirmation Notes
- Submittal Register (Attachment 3)
- Inspection Checklists (Attachment 3)
- Contractor Production Report (Attachment 3)
- Daily Quality Control Report (Attachment 3)
- Testing Plan and Log (Attachment 3)
- Request for Information (Attachment 3)
- Rework Items List (Attachment 3)
- Project Plans
- Record (As-Built) Drawings

11.1 DAILY PRODUCTION AND QC REPORT

The Project QC Manager will issue a Daily Production and Quality Control Report in the format shown in Attachment 3 when work is performed on-site. This report will use the terminology consistent with the production schedule and will include the following information:

- Weather conditions encountered and any delays.
- Test and/or control activities performed with results. The control phase will be identified (preparatory, initial, follow-up, or final). Deficiencies will be noted along with corrective action.
- Material, supplies, and equipment received with a statement as to their acceptability and storage.
- Submittals reviewed, with contract reference, by whom, and action taken.

- Sampling information, including the description of samples being taken, calibration procedures performed on field monitoring equipment, problems identified for sampling and/or analysis, and corrective actions taken.

The original of this report will be furnished to the ROICC/RPM on the first workday following the date covered by the report. Reports need not be submitted for days during which no field work is performed. At a minimum, one report will be prepared and submitted for every 7 days of no work and on the last day of a no-work period. All calendar days will be accounted for throughout the life of the contract. The first report following a day of no work will summarize work for that day only. Reports will be signed and dated by the Project QC Manager and the Site Manager, and will include copies of test reports and reports prepared by assistant QC personnel.

11.2 REQUEST FOR INFORMATION

In case there is a change in conditions or unanticipated event is encountered, WESTON will submit a Request for Information (RFI) (Attachment 3) to the ROICC for obtaining a clarification and authorization for further action. If an answer to the RFI clearly indicates that a scope modification is warranted, then this modification will be processed through a Request for Proposal mechanism.

11.3 REWORK ITEMS LIST

The Project QC Manager will maintain a list of work that does not comply with the contract, identifying items that need to be reworked, the date the item was discovered, and the date the item was corrected. Reworked items corrected on the same day will not be recorded in the list.

The Rework Items List (Attachment 3) will be submitted to the DON with the last Daily Production and Quality Control Report for each month. WESTON is responsible for including on this list items identified by the ROICC or the designated representative.

12 DEFICIENCIES AND CORRECTIVE ACTIONS

There are several mechanisms to identify services or activities that do not comply with the contract requirements. These mechanisms may include the following actions:

- Inspections
- Tests
- QA audits
- Notification(s) from the appropriate parties

In each case, noncompliance issues will be specifically identified in documents generated as a result of implementing the project-specific plans, the CQMP, and the CDQMP. It will be the responsibility of the Project QC Manager to notify the appropriate parties of the noncompliance and to ensure that corrective action is taken as soon as possible.

The Project QC Manager has the authority and responsibility to stop work affected by the noncompliance condition until action can be taken to correct the noncompliance condition or prevent it from affecting related or subsequent work. The Project QC Manager may, based on discretion, require that the work be retested and/or reinspected, if necessary, to confirm or disprove the noncompliance condition.

The Project QC Manager may not permit any subsequent work to continue if that work is, or may be, affected by the noncompliance condition until one of the following events take place:

- The work is retested and/or reinspected and found to be in compliance.
- The work is redone and subsequently retested and/or reinspected and found to be in compliance.

12.1 DOCUMENTING DEFICIENCIES AND CORRECTIVE ACTIONS

As deficiencies are noted, they will be properly recorded and the Project QC Manager will maintain the following documentation to track deficiencies and corrective actions:

- Deficiencies and corrective actions will be noted on the Daily Production and Quality Control Report.
- Deficiencies will be evaluated for root causes to eliminate recurring problems.

13 NOTIFICATION OF CHANGES TO PROCEDURES

Where possible, after acceptance of the project-specific plans or the CQMP, the client will be notified in writing a minimum of seven calendar days prior to any proposed change. Proposed changes are subject to acceptance by the client.

There may be occasions when a seven-day notification is not possible (e.g., unexpected absence of personnel due to injury or illness). On these occasions, the client will be notified within 72 hours of the change (a note on the Daily Production and Quality Control Report may be sufficient, depending on client requirements).

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14 AUDITS

Audits may be conducted on a routine basis to ensure compliance with the project and the contract requirements. Audits will verify that the procedures outlined in the project-specific plans or the CQMP are being conducted as stated. Site safety and health audits will follow the procedures outlined in the SHSP.

The following personnel, or their designated alternates, will be responsible to conduct audits in the area stated (if additional plans are required by a project, the personnel responsible to audit the plans will be identified in the project-specific plans):

PERSONNEL RESPONSIBLE TO CONDUCT AUDIT	REQUIREMENTS DOCUMENT
Project QC Manager	CQCP
Program Health and Safety Manager	Accident Prevention Plan
Chemical QC Manager	CQCP, Sampling and Analysis Plan

In some cases, the auditor may designate an alternate to conduct the audit. For example, a representative of the WESTON geosciences group may be identified to conduct an audit to ensure compliance with drilling requirements because this person is more familiar with these quality requirements than the Project QC Manager.

The frequency of audits will be established and provided in the project-specific plans. Audit findings will be summarized using the Project QA Audit Checklist presented in Attachment 5. The following information will be included with the Audit Summary Report:

- Area of concern
- Corrective action
- Responsible person
- PM approval of corrective action (i.e., within SOW, etc.)
- Documentation
- Schedule for corrective action

Ongoing audits will target problem areas identified in previous audits to ensure continued compliance.

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15 REFERENCES

American National Standards Institute/American Society for Quality Control (ANSI/ASQC). 2004. "Standard ANSI/ASQC E4-2004, Specifications and Guidelines for Quality Systems for Environmental Data Collection and Environmental Technology Programs."

International Organization for Standardization (ISO). 2005. *ISO 17025, General Requirements for the Competence of Calibration and Testing Laboratories.*

Naval Facilities Engineering Command (NAVFAC). 2000. *Construction Quality Management Program, NAVFAC P-445.*

NAVFAC Washington. 2002b. *Guide Specification, NFGS-01330G, Submittal Procedures.*

NAVFAC-Southwest. 2008a. *Environmental Multiple Awards Contract No. N62473-08-D-8825.*

NAVFAC. 2008b. *United Facilities Guide Specifications (UFGS) UFGS-01 45 02 NAVFAC, Quality Control.* April.

Weston Solutions, Inc. (WESTON). 2004. *WESTON's Quality Management Manual.* March.

WESTON. 2007. *Procurement Procedures Manual.* July.

WESTON. 2008. *Program Construction Quality Management Plan Environmental Multiple Award Contract.* April.

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ATTACHMENTS

ATTACHMENT 1
PROJECT SPECIFICATIONS AND DRAWINGS

DEFENSE REUTILIZATION AND MARKETING OFFICE (DRMO)
SITE AND VICINITY PETROLEUM CORRECTIVE ACTION
THE FORMER MARE ISLAND NAVAL SHIPYARD, VALLEJO, CALIFORNIA

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TECHNICAL SPECIFICATIONS

DIVISION 2 – SITEWORK SPECIFICATIONS

Section Number	Title
02125	Erosion and Sediment Control
02200	Earthwork
02221	Waste Excavation and Relocation
02223	Fill and Aggregate Materials
02750	Asphalt Concrete Pavement
02921	Seeding

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SECTION 02125

EROSION AND SEDIMENT CONTROL

PART 1 GENERAL

1.01 DESCRIPTION OF WORK

A. Provide all materials and promptly take all actions necessary to achieve effective erosion and sediment control in accordance with all applicable local, State, and Federal enforcing agency guidelines and these specifications.

B. This specification shall be considered minimum requirements for erosion and sediment control and shall not relieve the Contractor of the responsibility to actively take all steps necessary to control soil erosion and sediment in all areas associated with the work. Provide a "Competent Person" to implement, supervise, and inspect all erosion and sediment control work. The Project QC Manager will confirm satisfactory implementation of the work.

C. Repair and/or replace any materials damaged by erosion or covered with sediment.

D. Temporary erosion and sediment control features shall be maintained until no longer needed as determined by the Project QC Manager or until permanent erosion and sediment control measures are installed/established.

1.02 RELATED SECTIONS

A. Section 02200 – Earthwork

B. Section 02221 – Waste Excavation and Relocation

C. Section 02921 – Seeding

1.03 COMPLIANCE WITH REGULATIONS

A. All soil erosion and sediment control measures shall be constructed and maintained in accordance with State of California Department of Transportation (Caltrans) Construction Site Best Management Practices (BMP) Manual (March, 2003). Where Caltran's BMPs and these specifications differ, the most stringent requirement shall apply.

B. The PCAP Stormwater Pollution Prevention Plan (Appendix E of the PCAP) also contains Caltran's BMPs and other pertinent erosion and sediment control guidelines which shall be followed.

1.04 PHASED CONSTRUCTION

A. Partially completed portions shall be protected from erosion during down periods when no activity is taking place.

B. Completed portions located upstream of uncompleted portions shall be protected at all times from erosion and/or sediment deposition.

PART 2 MATERIALS

2.01 SILT FENCE

Silt fence shall be a woven geotextile material attached to a wooden post and anchored as shown on the Drawings. Temporary silt fences shall be placed on the natural ground at the toe of fill slopes, in ditches around soil stockpiles or in drainage courses where water run-off is expected.

2.02 BALES OR STRAW WATTLE

Straw Bales or straw wattle shall be anchored to the ground by stakes or rods driven through the bales into the ground to prevent water from flowing under them.

2.03 SEEDING AND FERTILIZING

All seeding and fertilizing products (including seed, fertilizer, mulch, straw, and water) and procedures shall conform to Section 02921 of these specifications.

PART 3 EXECUTION

3.01 GENERAL

A. Conduct earthwork and excavation activities in such a manner to fit the topography, soil type, and condition.

B. Minimize the area being disturbed and the duration of exposure to erosion elements such that only one month's work is exposed at any given time.

C. Stabilize disturbed soil if conducted during the rainy season, October 15 to April 15, or as determined necessary by the Project QC Manager.

D. Retain on-site, sediment that was generated on-site.

E. Prevent silt and sediment from migrating downstream in the event it cannot be prevented from entering the watercourse.

F. Prevent silt and sediment from entering any watercourse if soil erosion cannot be prevented.

G. Limit the surface area of erodible material exposed by clearing and grubbing.

H. Where erosion is likely to be a problem, clearing and grubbing operations shall be scheduled and performed such that grading operations and permanent erosion and sediment control features can follow immediately thereafter, if the work conditions permit, otherwise, erosion and sediment control measures may be required between successive construction stages.

3.02 TEMPORARY EROSION AND SEDIMENT CONTROL

A. Temporary erosion and sediment control measures shall be used to correct conditions that develop during construction and lead to soil erosion and deposition of waterborne sediments, that are needed prior to installation of permanent erosion and sediment control features, or that are needed temporarily to control erosion and/or sediment that develops during normal construction practices, but are not associated with permanent control features for the work.

B. Temporary erosion and sediment control devices shall be installed and maintained prior to initial land disturbance activities, and shall be maintained until satisfactory completion or establishment of permanent erosion control measures.

C. Coordinate the installation of temporary erosion and sedimentation control provisions contained herein with the permanent erosion control features to ensure economical, effective and continuous erosion and sediment control throughout the construction and post-construction period.

D. Silt fences, barriers, temporary sedimentation basins, and other temporary measures shall be maintained until no longer required. At that time, the items shall be removed. All temporary items and devices must be removed prior to final demobilization from the site.

E. All erosion and sediment control devices shall be inspected at least weekly, after each rainfall occurrence, and cleaned out and repaired, as necessary.

3.03 TEMPORARY EROSION AND SEDIMENT CONTROL DEVICES

A. Silt Fences

1. Silt fences are temporary linear sediment barriers made of permeable, woven geotextile fabric attached to wooden post. They are designed to intercept and reduce the velocity of suspended silt particles in runoff water.

2. Temporary silt fences are placed down slope of exposed disturbed soil areas below the toe of exposed and/or erodible slopes, around

temporary stockpiles, and along streams and channels. Temporary silt fences should be anchored as indicated on the Drawings.

3. Silt fences shall be maintained in a satisfactory condition for the duration of the work, or until removal is authorized by the Project QC Manager. The silt accumulation at the fences shall be removed and placed on-site as directed by the Project QC Manager.

B. Straw Bales

1. Straw bales are temporary measures to control erosion and retain the suspended silt particles in the runoff water leaving disturbed areas. Bales shall have (5) cubic feet or more of material.

2. Straw bales shall be embedded in the ground 4 to 6 inches to prevent water flowing under them. The bales should be anchored securely to the ground by stakes or rods driven through the bales into the ground. Bales shall be removed after they have served their purpose, as determined by the Project QC Manager.

3. Straw bales shall be maintained in good condition by replacing broken or damage bales immediately after damage occurs. Normal debris clean out will be considered routine maintenance.

4. Straw bales shall be used at the toe of fill slopes, in ditches, or other areas where siltation, erosion, or water run-off is a problem.

5. Bales shall be placed so that the predominant direction of the straw stalk is oriented perpendicular to the surface water flow direction.

C. Straw Wattles

1. Straw wattles are also temporary measures to control erosion and are used similarly to straw bales.

2. Straw wattles shall be manufactured from rice straw and be wrapped in tubular plastic netting. Straw wattles shall be nine inches in diameter (+/- one inch), twenty-five feet long (+/- 0.5 feet) and weigh approximately 35 pounds (+/- 10%).

3. Straw wattles shall be placed on contour and staked with 18 or 24 inch wood stakes at four foot on center. The ends of adjacent Straw wattles shall be abutted to each other snugly.

D. Temporary Diversion Berms

1. A temporary diversion berm is constructed of compacted soil, with or without a shallow ditch, as needed.

2. These diversion berms are used temporarily to prevent excessive erosion until permanent controls are installed.

3. A temporary diversion berm shall be constructed by compacted soil, with a minimum width of 24 inches at the top and a minimum height of 12 inches with or without a shallow ditch. Side slopes shall be three horizontal to one vertical (3H:1V) or less. The minimum longitudinal (crest) slope is 1 percent; while the maximum is 5 percent.

3.04 PERMANENT EROSION AND SEDIMENT CONTROL

A. Incorporate all permanent erosion control features into the work at the earliest practicable time as outlined in the Contractor's accepted Construction Schedule, or as land disturbance for each segment of the work has been completed.

B. Restore the Site to its original contours, unless otherwise shown on the Drawings, or as directed by the Project QC Manager.

C. Road footprint areas shall be paved or restored as shown on the Drawings once backfilling activities have been completed.

D. When final grades have been established, all bare soil, unless otherwise required by the specifications, shall be seeded, fertilized, and mulched in an effort to restore the area to a protection condition. Areas that are not successfully stabilized with vegetation within a reasonable time after seeding shall be reseeded.

E. Specified permanent vegetation shall be established at the first appropriate season following establishment of final grading in each section of the Site.

F. Permanent vegetative cover activities shall comply with local soil and water conservation guidelines

G. Where permanent vegetative cover cannot be immediately established (due to season or other circumstances), temporary vegetative cover shall be provided.

3.05 PERMANENT EROSION AND SEDIMENT CONTROL DEVICES

A. Permanent Vegetation: All references to permanent vegetation, unless noted otherwise, shall relate to establishing permanent vegetative cover and be in accordance with Part 2 of this Section.

B. All temporary measures must remain in-place until the permanent vegetation is established, as described above. Inspect and maintain/repair/replace all temporary measures, after every storm event and at least weekly, until the permanent vegetation is established, as described above.

END OF THIS SECTION

SECTION 02200

EARTHWORK

PART 1 GENERAL

1.01 SCOPE

A. Furnish all labor, materials, tools, and equipment necessary for the satisfactory performance of earthwork as shown on the Drawings and/or as specified herein.

B. Earthwork includes, but is not limited to backfill and compaction of excavated areas.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. Section 02125 – Sediment and Erosion Control

B. Section 02221 – Waste Excavation and Relocation

C. Section 02223 – Fill and Aggregate Materials

D. Drawing 1 through Drawing 6

E. Petroleum Corrective Action Plan

1.03 QUALITY ASSURANCE

A. Placement and compaction of site grading and fill materials, along with performance of associated earthwork, will be subject to continuous inspection by the Project QC Manager.

B. Quality control testing procedures for fill materials are included in Section 02223 – Fill Materials.

C. Quality control testing procedures for compaction testing are included in this specification.

PART 2 MATERIALS

Not used.

PART 3 EXECUTION

3.01 GENERAL

A. Fill materials shall not be placed over standing water or on surfaces which is excessively moist, dry, cracked, rutted, or loose.

B. Imported backfill materials shall be graded to provide proper drainage. Appropriate erosion and sedimentation control measures shall be installed around any stockpiles.

C. Fill shall be placed in horizontal lifts of uniform thickness. Placement of a subsequent lift shall not be initiated until placement of the preceding lift is complete.

D. Make gradual grade changes. Blend slope into surrounding areas.

E. Employ a placement method which does not disturb or damage other completed work.

F. Backfilling or compaction will not be performed when weather conditions or the condition of materials are such that work cannot be performed satisfactorily.

G. Wet materials shall not be used as backfill containing moisture in excess of the amount necessary for satisfactory placement or compaction.

H. Prior to use, dry backfill materials not having sufficient moisture will be moisture conditioned to obtain satisfactory placement or compaction.

I. Effective dust control shall be maintained by sprinkling water or using calcium chloride or other dust suppressants.

J. Fill shall be placed in horizontal lifts of uniform thickness. Placement of a subsequent lift shall not be initiated until placement of the preceding lift is complete.

3.02 EXCAVATION

A. Excavation activities shall be conducted in accordance with Section 02225 Waste Excavation and Relocation.

B. Final grading shall match the existing surroundings.

C. Final grading along Azuar Drive shall have a 2% crowned slope.

3.03 GRADING

A. Final grading shall be performed in such manner as to provide proper drainage from the project site. Finished grades shall be pitched to drain away from structures completed under this project, as indicated on the Drawings or other project documents. In no case shall drainage from the project site be so altered or controlled as to result in damage, or the potential for damage, to adjacent land or to any portion of the work from erosion or flooding.

3.04 COMPACTION REQUIREMENTS

A. Each lift of material shall be no greater than 12-inches for General Fill and no greater than 10-inches for Class II AB or recycled AB material, compacted using a 20-ton soil compactor and conducting a minimum of three 2-way passes or other approved so as to secure a dense, stable, and uniformly compacted layer.

B. Previously placed or new materials shall be moistened by sprinkling, if required, to ensure proper bond and compaction. No compaction shall be done when the material is too wet. If the compacted surface of the fill layer is determined to be too smooth to provide an adequate bond with the succeeding layer, the surface shall be scarified by harrowing or by some other approved method before placement of the succeeding layer.

C. If at any time the degree of compaction does not meet the specifications, operations shall be halted. Areas found deficient in degree of compaction shall be recompacted and regraded, if required.

3.05 COMPACTION TESTING REQUIREMENTS

A. Compaction testing will be required only in backfilled areas within road footprints.

B. Compaction of Class II AB subgrade for the top 2.5 feet in paved areas shall be no less than 95% of the maximum dry density as determined by test method California 216E.

C. Compaction of general fill between 2.5 to 4 feet below ground surface in paved areas shall be no less than 90% of the maximum dry density as determined by test method California 216E.

D. Compaction testing shall be conducting using test method California 216E. Compaction testing shall be conducted at a minimum of 1 test per lift, per 100 linear feet.

E. Compaction tests which do not meet the required compaction, shall be re-worked and re-tested until the required compaction is achieved. Additional material lifts will not placed until the compaction requirements are met

END OF SECTION

SECTION 02221

WASTE EXCAVATION AND RELOCATION

PART 1 GENERAL

1.01 DESCRIPTION OF WORK

A. Furnish all labor, materials, equipment, tools and appurtenances required to complete the work of this Section.

B. All work shall comply with all applicable codes, ordinances, rules, regulations and laws of local, State, and Federal authorities having jurisdiction.

C. The work includes, but is not limited to:

1. Removal of the impacted soils from the DRMO site and vicinity petroleum corrective action.

2. Placement of waste and cover materials removed from the excavation areas within the Containment Area.

3. Compaction of impacted soils in the Containment Area.

1.02 RELATED SECTIONS

A. Section 02100 – Site Preparation

B. Section 02200 – Earthwork

C. Section 02223 – Fill and Aggregate Materials

D. WESTON's *Final Investigation Area H1 Remedial Design Plan (Design Plan), November 2006*

1.03 DEFINITIONS

A. Waste: Waste, debris, and contaminated soil are the end product of past operations that took place in the area.

B. Waste, debris, and contaminated soil, which are excavated may be relocated and placed in areas requiring fill to attain subgrade elevations, as shown on the Drawings.

1.04 HEALTH AND SAFETY REQUIREMENTS

A. Work shall be performed in compliance with all applicable health and safety regulations and in accordance with the Site-Specific Health and Safety Plan.

B. All personnel associated with intrusive activities shall be trained in accordance with OSHA HAZWOPER (29 CFR 1910.120) and be familiar with the Site-Specific Health and Safety Plan.

PART 2 MATERIALS

Not Used

PART 3 EXECUTION

3.01 PREPARATION OF EXCAVATION AREAS

A. Identify required lines, grades, contours and datum.

B. Protect benchmarks and existing structures from excavation equipment and vehicular traffic.

C. Air monitoring shall be conducted within and around all areas of exposed waste in accordance with the Site-Specific Health and Safety Plan. All operations shall cease and all personnel shall be evacuated if the action levels area exceeded as defined in the Site-Specific Health and Safety Plan.

3.02 EXCAVATION

A. Maintain excavation area dry. Grade top perimeter of excavation to prevent surface water from draining into the exaction.

B. Excavation

1. In excavation areas, excavate to the depths required in the Drawings and PCAP.

2. Collect confirmation samples from side walls and bottom of excavation as required in the PCAP.

3. Continue excavating at 1 to 2 ft depths and laterally as required until confirmation samples are acceptable.

4. Excavation depths, lateral extents, and confirmation sampling shall comply with the requirements of the PCAP.

C. The Project QC Manager shall be notified in advance of the excavation so that the excavated area can be observed.

D. The Project QC Manager shall be notified of unexpected subsurface conditions and work will be discontinued in the area until notified to resume by the Project QC Manager.

3.03 PLACEMENT OF EXCAVATED WASTE

A. Place excavated waste and soils within the IA-H1 Containment Area requiring subgrade fill as indicated on the Drawings.

B. Excavated waste and soils shall not be placed until the subgrade has been inspected in place and favorably reviewed by the Project QC Manager. Haul trucks shall be routed and positioned during delivery and unloading to avoid the tires coming into contact with the DRMO waste materials.

C. Spread debris and waste, as necessary, and cover with other on-site soil requiring disposal, or clean off-site borrow soils, to achieve a consistency to satisfy the compaction requirements described in Part 3 herein.

D. Large debris and waste materials shall be cut, shredded, or crushed into pieces no greater than 24-inches in any dimension, and, as necessary, spread and covered with other on-site soil requiring disposal, or clean off-site borrow soils, to achieve the compaction described in Part 3 herein. Large incompressible debris, not including stumps, trunks, or other large land clearing debris, may be buried in the IA-H1 Containment Area with approval of the engineer of record.

E. Debris present in soil removed from the DRMO and Vicinity, and placed within the IA-H1 Containment Area under the engineered cap, must be of a size and nature that after placement with soil in one foot thick compacted intervals, no substantial debris items may be visible protruding from the compacted surface. Any debris items which cannot be placed and/or compacted to meet this requirement shall be removed. Other applicable requirements for placement of soil/waste materials specified in the IA-H1 Final Remedial Design Plan shall also be met.

3.04 COMPACTION OF EXCAVATED WASTE AND SOILS

A. Prior to waste placement in areas requiring fill, compact areas in accordance with Section 02200 of the IA-H1 Remedial Design Plan specifications. Waste placement shall not be performed on an area that has not been compacted.

B. Excavated waste and debris can be blended with on-site or off-site soils, and shall be placed in loose lifts and compacted in accordance with Section 02200 of the IA-H1 Remedial Design Plan specifications. The

compacted surface shall appear smooth and stable. Areas which exhibit an unstable condition, such as excessive pumping, movement, or sloughing during compaction, shall be reworked and compacted as necessary. The compacted surface of each shall be approved by the Project QC Manager prior to placement of additional lifts.

C. The compacted waste shall meet the compaction requirements for the foundation layer in accordance with Section 02223 of the IA-H1 Remedial Design Plan specifications.

3.05 DECONTAMINATION

A. All equipment used for the excavation, stockpiling, and/or conveyance of waste materials shall undergo decontamination prior to final demobilization from the site.

B. Personnel shall dry decontaminate any parts of the equipment that came in contact with potentially contaminated materials (bucket, tracks, tires, etc.) using shovels, brooms, etc. to remove gross contamination.

C. Once the large dirt clods have been removed, the equipment shall be washed using a low-volume, high pressure washer to ensure all visible contamination is removed.

D. In accordance with the Site-Specific Health and Safety Plan, personnel involved with decontamination procedures shall wear modified level D PPE with tyvek. When using the pressure washer, personnel shall use a face shield and rain suit, as deemed necessary by the Site-Specific Health and Safety Officer.

E. Waste Management

1. Solids removed during decontamination shall be periodically removed, consolidated, and placed with the contaminated soil within the IA-H1 Containment Area, under the geosynthetic liner system.

2. Liquids generated will be collected from the low sump location and placed in a suitable container. The liquids shall be sampled for Vallejo Sanitation and Flood Control criteria and discharged with the VSFCD system as permitted.

END OF SECTION

SECTION 02223

FILL AND AGGREGATE MATERIALS

PART 1 GENERAL

1.01 SCOPE

A. Furnish all labor, materials, tools, and equipment necessary for the satisfactory performance of the fill and aggregate materials as shown on the Drawings and/or as specified herein.

B. Work specified under this section includes acquisition, placement, grading, and compaction of backfill, fill, and aggregate materials, and other related and incidental work within the designated areas.

C. General fill materials include material used to backfill excavation in non-road areas and excavations on roads below aggregate materials as shown on the Drawings. Aggregate materials will be used underneath road footprints as shown on the Drawings.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. Section 02200 – Earthwork

B. Section 02221 – Waste Excavation and Relocation

C. Drawings 1 to 6

D. PCAP

1.03 QUALITY CONTROL

The Project QC Manager shall inspect compaction of each lift of backfill and fill placed into the DRMO Site and Vicinity excavations and perform compaction testing when required in accordance with the Construction Quality Control Plan (CQCP) Plan (Appendix C of the PCAP). Any areas that do not meet the requirements specified herein shall be reworked until acceptable results are obtained.

PART 2 MATERIALS

2.01 GENERAL

A. WESTON will investigate and identify on-site and off-site borrow sources for backfill and fill materials covered under this section. All borrow material stockpiles will be maintained in a stable configuration.

B. All fill and aggregate materials shall be free of wood, trash, broken concrete, masonry rubble, and all deleterious and objectionable materials which may be degradable or which cannot be properly compacted. Backfill materials shall not contain rock fragments greater than the maximum dimensions specified herein, as appropriate for intended use. Backfill materials shall have physical properties such that they can be readily spread and compacted.

2.02 GENERAL FILL

A. Uses:

1. Excavations outside roads and Excavations within roads and below 2.5 feet below final grade: General Fill for backfilling.

B. Source: General fill material shall be from an on-site or off-site borrow source approved by the Project QC Manager.

C. General fill shall be material free of debris or excess organic material, with a maximum particle size after placement and compaction of no greater than 3-inches.

D. The following geotechnical tests will be required at a minimum of 1 set of tests per source. Additional tests will be required if there are material changes in the import source.

Method	Test Name
California Test 202	Grain-size Distribution
California Test 216E	Relative Density

E. The following chemical analyses shall be taken at a frequency as specified in the "Recommended Fill Material Sampling Schedule" provided in the *Information Advisory Clean Imported Fill Material* (DTSC, 2001) for any off-site borrow sources. Sampling frequency and acceptance criteria for import soil is specified in the Sampling and Analysis Plan (Appendix A of the PCAP). Exceptions to these criteria must be approved in writing from DTSC.

Analytical Parameter	Analytical Method
TPH	EPA 8015B
Metals	EPA 6010B/7471A
Pesticides	EPA 8081A
SVOCs	EPA 8270C
PCBs	EPA 8082

2.03 ROAD BEDDING

Class II AB aggregate material or Recycled Aggregate Base material shall be used and shall be a graded mineral product meeting the following requirements. Testing for gradation shall be on an interval of 1 per source. Test in accordance with California Test 202:

US Standard Sieve	Percent Passing by Weight
1 inch	100
¾ inch	90-100
No. 4	35-60
No. 30	10-30
No. 200	2-9

PART 3 EXECUTION

3.01 Materials specified herein shall be placed in accordance with Section 02220.

END OF SECTION

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SECTION 02750

ASPHALT CONCRETE PAVEMENT

PART 1 GENERAL

This section covers the asphalt concrete pavement requirements for final restoration of Azuar Drive. Paving products and execution shall be in accordance with the Drawings, this section, The City of Vallejo Regulations and Standard Specifications (City of Vallejo, 1992) and Caltrans Standard Specifications (Caltrans, 2006), unless otherwise indicated.

1.01 SCOPE INCLUDES

A. Prime coat

B. Tack coat

C. Asphalt concrete paving

D. Asphalt concrete overlay

E. Adjusting manholes, valves, monument covers and other structures to grade

F. Slurry seal

1.02 RELATED SECTIONS

A. Section 02200 Earthwork

B. Section 02223 Fill and Aggregate Materials

C. City of Vallejo Regulations and Standard Specifications for Public Improvements (1992)

D. Standard Specifications (Caltrans, 2006)

1.03 RELATED DOCUMENTS

A. ASTM

1. D979: Practice for Sampling Bituminous Paving Mixtures

2. D1073: Specification for Fine Aggregate for Bituminous Paving Mixtures

3. D1188: Test Method for Bulk Specific Gravity and Density of Compacted Bituminous Mixtures Using Paraffin-Coated Specimens

4. D2041: Test Method for Theoretical Maximum Specific Gravity and Density of Bituminous Paving Mixtures

5. D2726: Test Method for Bulk Specific Gravity and Density of Non-Absorptive Compacted Bituminous Mixtures

6. D2950: Test Method for Density of Bituminous Concrete in Place by Nuclear Method

7. D3549: Test Method for Thickness or Height of Compacted Bituminous Paving Mixture Specimens

8. D3666: Specifications for Minimum Requirements for Agencies Testing and Inspecting Bituminous Paving Mixtures

B. CALTRANS STANDARD SPECIFICATIONS

1. Section 39: Asphalt Concrete

2. Section 88: Engineering Fabrics

3. Section 92: Asphalts

4. Section 93: Liquid Asphalts

5. Section 94: Asphaltic Emulsions

6. Section 37: Bituminous Seals

1.04 DEFINITIONS

A. ASTM: American Society for Testing and Materials

1.05 QUALITY ASSURANCE

A. Testing Agency: Owner's Representative will engage a qualified independent testing agency to perform field inspections and tests and to prepare test reports. Testing agency will conduct and interpret tests and state in each report whether tested work complies with or deviates from specified requirements.

B. Additional testing, at Contractor's expense, will be performed to determine compliance of corrected work with specified requirements.

C. Thickness of Asphalt Concrete: In-place compacted thickness of asphalt courses will be determined according to ASTM D 3549.

D. Surface Smoothness: Finished surface of each asphalt course will be tested for compliance with smoothness tolerances.

E. In-Place Density: Samples of uncompacted paving mixtures and compacted pavement will be secured by testing agency according to ASTM D979.

1. Reference maximum theoretical density will be determined by averaging results from 4 samples of hot-mix asphalt-paving mixture delivered daily to site, prepared according to ASTM D2041, and compacted according to job-mix specifications.

2. In-place density of compacted pavement may be determined by testing core samples according to ASTM D 1188 or ASTM D2726.

a) One core sample may be taken for every 1000 sq. yd. or less of installed pavement, but in no case will fewer than 3 cores be taken.

b) Field density of in-place compacted pavement may also be determined by nuclear method according to ASTM D2950 and correlated with ASTM D 1188 or ASTM D2726.

1.06 SUBMITTALS

A. Job-Mix Designs-Certificates signed by manufacturers certifying that each asphalt concrete mix complies with requirements.

B. Material Certificates-Certificates signed by manufacturers certifying that each material complies with requirements.

1.07 PROJECT CONDITIONS

A. Environmental Limitations:

1. Prime Coat: Minimum surface temperature of 60°F at application

2. Tack Coat: Minimum surface temperature of 60°F at application

3. Slurry Seal: Minimum atmospheric temperature of 50°F at application

4. Asphalt Base Course: Minimum surface temperature of 40°F and rising at application

5. Asphalt Surface Course: Minimum surface temperature of 60°F at application
6. Reinforcing Fabric: Air temperature is 50°F and rising and pavement temperature is 40°F and rising.

PART 2 MATERIALS

2.01 ASPHALT CONCRETE

A. Caltrans Standard Specifications Section 39, Type B with bituminous binder of steam refined paving asphalt of AR-4000 penetration, ¾ inch maximum medium grading for aggregate. The surface coarse asphalt shall be ½ inch aggregate.

B. Asphalt Materials:

1. Asphalt: Caltrans Standard Specification Section 92, steam refined paving asphalt, Grade AR 4000.

2. Prime Coat: Caltrans Standard Specification Section 92, MC-250.

3. Tack Coat: Caltrans Standard Specification Section 93, SS-1.

4. Aggregates: Conform to Caltrans Standard Specification Section 39-2.02.

C. Storing, Proportioning and Mixing Materials: Caltrans Standard Specification Section 39.

D. Pavement Reinforcing Fabric: Caltrans Standard Specification Section 88.

E. Sand: ASTM D 1073, Grade No. 2 or 3.

F. Paint – Paint shall conform to Section 91 of the Standard Specifications.

1. White Traffic Paint shall be 250 (volume organic compound) Pervo No. 5940 or approved equal.

2. Yellow Traffic Pain shall be 250 V.O.C. Pervo No. 5941 or approved equal.

G. Pavement Markers shall conform to Standard Specification Section 85.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that subgrade is dry and in suitable condition to support paving and imposed loads.

B. Proof-roll subbase using heavy, pneumatic-tired rollers to locate areas that are unstable or that require further compaction.

C. Notify Owner's Representative in writing of any unsatisfactory conditions. Do not begin paving until these conditions have been satisfactorily corrected.

3.02 SURFACE PREPARATION FOR AGGREGATE BASE MATERIALS

A. General: Immediately before placing asphalt materials remove loose and deleterious material from substrate surfaces and ensure that prepared subgrade is ready to receive paving according to the Caltrans Standard Specification Section 39-4.01.

B. Prime Coat: Apply uniformly over surface of compacted-aggregate base according to the Caltrans Standard Specification Section 39-4.02. Apply enough material to penetrate and seal, but not flood, surface. Allow prime coat to cure for 24 hours minimum.

1. If prime coat is not entirely absorbed within 8 hours after application, spread excess prime coat with hand tools and broadcast sand over surface to blot excess asphalt. Use just enough sand to prevent pickup under traffic. Remove loose sand by sweeping before pavement is placed and after volatiles have evaporated.

2. Protect primed substrate from damage until ready to receive paving.

C. Tack Coat: Apply uniformly to all vertical surfaces against which asphalt concrete is to be placed, including existing surfaces of previously constructed asphalt or portland cement concrete paving and to surfaces abutting or projecting into new asphalt pavement, according to the Caltrans Standard Specification Section 39-4.02.

1. Allow tack coat to cure undisturbed before paving.

2. Avoid smearing or staining adjoining surfaces, appurtenances, and surroundings. Remove spillages and clean affected surfaces.

D. Slurry Seal: Apply slurry seal coat in accordance with Caltrans Standard Specifications Section 37 to all existing and new asphalt concrete paving.

1. Slurry seal shall be Type 1 applied at a rate of 12 pounds per cubic yard and as directed by City of Vallejo.

2. Mask adjoining surfaces and areas, including curb faces.

   a) Take all other necessary precautions as required to prevent over-spray and splatter of the slurry seal material on the adjacent surfaces or areas.

   b) In the event the precautions taken are not adequate, clean all traces of over-spray and splatter from all surfaces.

3. After slurry seal has been applied, allow ample time for drying before traffic is permitted on the pavement or paint striping is applied.

3.03 SURFACE PREPARATION FOR PAVEMENT AT ASPHALT CONCRETE OVERLAYS

A. Pavement Irregularities: Level with asphalt concrete, Type B, No. 4 maximum.

A. Pavement Cracks:

1. Less than ¼-inch wide: Clean of all dirt by compressed air jet, spray and seal with RS-1 asphaltic emulsion.

2. Wider than ¼-inch: Clean of all dirt by compressed air jet, spray and seal with RS-1 asphaltic emulsion and skin patch.

B. Clean surface of all material, such as leaves, dirt, sand, gravel, water and vegetation prior to applying binder of paving asphalt to existing surface.

3.04 PAVEMENT REINFORCING FABRIC

A. Protect from exposure to ultraviolet rays until placed.

B. Reject rolls with broken or damaged cores, or factory wrinkled fabric that prevents wrinkle free placement.

C. Place with binder of paving asphalt in accordance with Section 39-4.03 of Caltrans Standard Specifications.

3.05 ASPHALT CONCRETE SPREADING AND COMPACTING EQUIPMENT

A. Spreading Equipment: Caltrans Standard Specification Section 39-5.01.

B. Compaction Equipment: Caltrans Standard Specification Section 39-5.02.

3.06 ASPHALT CONCRETE PLACEMENT

A. Place, spread and compact asphalt concrete to required grade, cross section, and thickness according to the Caltrans Standard Specification Sections 39-6.01, 39-6.02 and 39-6.03.

B. Promptly correct surface irregularities in paving course behind paver. Use suitable hand tools to remove excess material forming high spots. Fill depressions with hot asphalt to prevent segregation of mix; use suitable hand tools to smooth surface.

3.07 JOINTS

A. Construct joints to ensure continuous bond between adjoining paving sections according to the Caltrans Standard Specification Sections 39-6.01 and 39-6.02.

1. Construct joints free of depressions with same texture and smoothness as other sections of asphalt course.

2. Clean contact surfaces and apply tack coat.

3. Offset longitudinal joints in successive courses a minimum of 6 inches.

4. Offset transverse joints in successive courses a minimum of 24 inches.

5. Compact joints as soon as asphalt concrete will bear roller weight without excessive displacement.

3.8 COMPACTION

A. General: Begin compaction as soon as placed hot-mix paving will bear roller weight without excessive displacement. Compact according to the Caltrans Standard Specification Sections 39-6.01 and 39-6.03.

B. Compaction Requirements: Average Density to be 92 percent of reference maximum theoretical density according to ASTM D 2041, but not less than 90 percent nor greater than 96 percent.

C. Finish Rolling: Finish roll paved surfaces to remove roller marks while asphalt is still warm.

D. Edge Shaping: While surface is being compacted and finished, trim edges of pavement to proper alignment. Bevel edges while still hot, with back of rake

or smooth iron. Compact thoroughly using tamper or other satisfactory method.

E. Repairs: Remove paved areas that are defective or contaminated with foreign materials and replace with fresh asphalt. Compact by rolling to specified density and surface smoothness.

F. Protection: After final rolling, do not permit vehicular traffic on pavement until it has cooled and hardened. Erect barricades to protect paving from traffic until mixture has cooled enough not to become marked.

3.9 ADJUSTING MANHOLES, VALVES, MONUMENT COVERS AND OTHER STRUCTURES TO GRADE

A. Remove pavement, using vertical cuts, as needed to remove frame and provide for concrete collar. Do not damage adjacent pavement.

1. Circular Covers: Cut circle with radius 6 inches larger than cover and concentric with cover.

2. Rectangular Covers: Cut rectangle 6 inches larger than cover on all sides.

B. Install grade rings or blocking as needed to raise cover to finish grade.

C. Pour concrete collar:

1. Bottom of Collar: Top of existing collar or 6 inches below top of proposed collar, whichever is at a higher elevation.

2. Top of Collar: Bottom of existing asphalt pavement.

3. Apply tack coat to all exposed surfaces.

4. Fill excavation with asphalt concrete and, while still hot, compact flush with adjacent surface.

3.10 INSTALLATION TOLERANCES

A. Asphalt Pavement:

1. Course thickness and surface smoothness within the tolerances Caltrans in the Caltrans Standard Specification Sections 39-6.01, 39-6.02 and 39-6.03.

2. Total Thickness: Not less than indicated.

B. Trench Patch:

1. Compacted surface: Within 0.01 foot of adjacent pavement.

2. Do not create ponding.

C. Adjust Covers:

1. Compacted surface: Up to 0.01 foot higher, and no lower, than adjacent pavement.

2. Do not create ponding.

END OF SECTION

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SECTION 02921

SEEDING

PART 1 GENERAL

1.01 SCOPE

A. Furnish all labor, materials, tools, equipment necessary for the satisfactory performance of hydroseeding work as indicated in the PCAP.

B. Hydroseeding work shall consist of hydroseeding all non-paved or roadway areas.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. Section 02200 – Earthwork

B. Petroleum Corrective Action Plan

1.03 SUBMITTALS

A. Product Data and Certificates

1. Mulch
2. Fertilizer
3. Seed Mix
4. Straw
5. Tackifier

B. Actual seed bag tags from seed bags delivered.

C. Actual plant tags from plants delivered.

1.04 DELIVERY, STORAGE, AND HANDLING

A. Delivery: Protect products from drying out and from contamination during delivery, on-site storage, and handling.

B. Storage: If storage on-site is required, store in cool, dry locations away from contaminants.

C. Handling: Do not drop or dump materials from vehicles.

D. Pressure wash the hydroseeding equipment on the outside and flush out the inside prior to introducing the slurry mixture to avoid introduction of contaminants such as turf seed.

1.05 TIME RESTRICTIONS AND PLANTING CONDITIONS

A. Do not plant when the ground is frozen, snow covered, muddy, or when air temperature exceeds 90 degrees Fahrenheit.

PART 2 MATERIALS

2.01 SEED:

Provide seed mix as specified below of the latest season's crop delivered in original sealed packages, bearing producer's guaranteed analysis for percentages of mixtures, purity, germination, weedseed content, and inert material. Label in conformance with AMS Seed Act and applicable state seed laws. Wet, moldy, or otherwise damaged seed will be rejected. Field mixes will be acceptable when field mix is performed on site in the presence of the engineer of record. Substitutions to the seed palette shall only be allowed with prior authorization from the engineer of record.

Table 1 - Seed Palette for Erosion Control

Common Name	Scientific Name	Application Rate (pounds per live seed/ per acre)
California brome	*Bromus carinatus*	20
Meadow Barley	*Hordeum brachyantherum*	10
Blue wild rye	*Eleymus glaucus*	10
	TOTAL	40

2.02 VEGETATIVE COVER SOIL PREPARATION

The engineer of record will be responsible for vegetative cover soil preparation. The final graded area will be scarified a maximum of 6 inches to allow hydroseeding.

2.03 MULCH

Mulch shall be free from noxious weeds, mold, and other deleterious materials. Mulch materials shall consist of wood cellulose fiber and shall be of such quality that it shall disperse uniformly in a slurry when mixed with water.

2.04 FERTILIZER

Fertilizer shall have a chemical analysis of 16% nitrogen, 20% phosphoric acid, and 0% water soluble potash (16-20-0).

PART 3 EXECUTION

3.01 PREPARATION

Provide soil preparation including topdressing of all newly graded finished earth surfaces, unless indicated otherwise, and at all areas inside or outside the limits of construction that are disturbed by the Contractor's operations.

3.02 SEEDING

A. Seed Application Method - Seeding method shall be hydroseeding for all areas which are currently vegetated.

B. Hydroseeding

1. First, mix water and fiber. Mulch shall be applied as part of the hydroseeding operation. Mulch shall be added at 1500-1800 pounds, dry weight, per acre. Then add and mix seed and fertilizer to produce a homogeneous slurry. Fertilizer application rate shall be 300 lbs/acre. The time period for the seed to be held in the slurry shall not exceed 24 hours.

2. Seed shall be mixed to ensure uniform broadcasting at the rate of 40 pounds pure live seed per acre.

3. When hydraulically sprayed on the ground using a blower-type spreader, or other approved method, material shall form a blotter like cover impregnated uniformly with grass seed. Spread with one application with no second application of mulch.

C. Adhesive Tackifier

Tackifier shall be applied at the rate recommended by the manufacturer, using hydraulic equipment suitable for thoroughly mixing with water. A uniform mixture shall be applied over the areas covered by straw only. The tackifier shall be applied as soon as straw is spread to hold in place. Sunlight shall not be completely excluded from penetrating to the ground surface.

D. Protection of Turf Areas

Following seeding, protect area against foot traffic, vehicle traffic, and other use.

END OF SECTION

N00221_001372
MARE ISLAND

SENSITIVE RECORD

PORTIONS OF THIS RECORD ARE CONSIDERED SENSITIVE AND ARE NOT AVAILABLE FOR PUBLIC VIEWING

DRAWINGS 1 AND 2

FOR ADDITIONAL INFORMATION, CONTACT:

DIANE C. SILVA, COMMAND RECORDS MANAGER, CODE EV33
NAVAL FACILITIES ENGINEERING COMMAND, SOUTHWEST
1220 PACIFIC HIGHWAY (NBSD BLDG. 3519)
SAN DIEGO, CA 92132

TELEPHONE: (619) 556-1280
E-MAIL: diane.silva@navy.mil

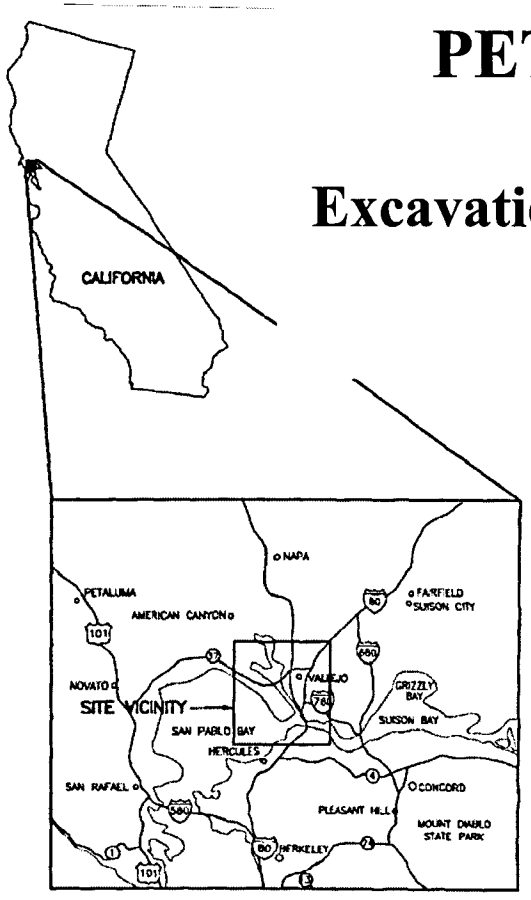
MARE ISLAND

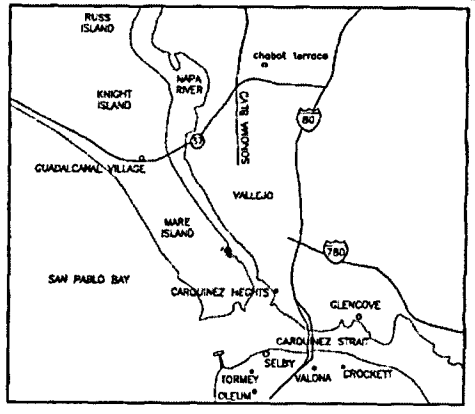
PETROLEUM CORRECTION ACTION PLAN

Excavation along Azuar Drive and Dump Road

Mare Island, Vallejo, California

APRIL 2009





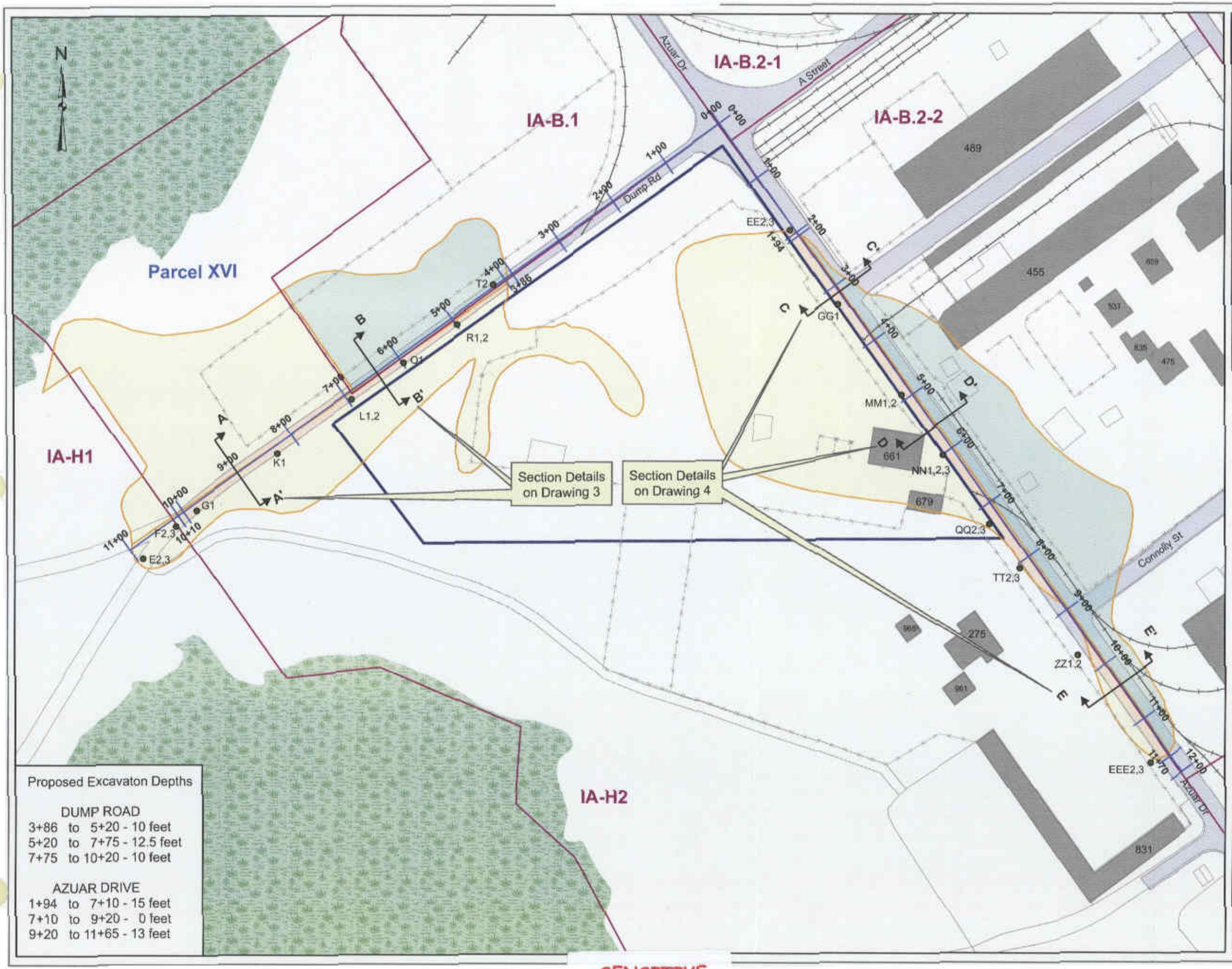
SHEET INDEX

Dwg-1	Title Sheet
Dwg-2	Potential Excavation Areas
Dwg-3	Dump Road Cross-Section Details
Dwg-4	Azuar Drive Cross-Section Details
Dwg-5	Site Restoration Details
Dwg-6	Underground Utility lines

WESTON SOLUTIONS
1340 Treat Blvd
Suite 210
Walnut Creek, CA 94597

DRAWING 1
TITLE SHEET

SENSITIVE



Proposed Excavaton Depths

DUMP ROAD
3+86 to 5+20 - 10 feet
5+20 to 7+75 - 12.5 feet
7+75 to 10+20 - 10 feet

AZUAR DRIVE
1+94 to 7+10 - 15 feet
7+10 to 9+20 - 0 feet
9+20 to 11+65 - 13 feet

LEGEND
- Buildings/Structures
- Paved Roads
- Site Features
- Wetlands
- DON Petroleum Impacted Areas
- Petroleum Impacted Areas owned by Lennar Mare Island
- DRMO Site Boundary
- Investigation Area Boundary
- Fences
- Railroads
- 2008 CH2M Hill Boring

0 30 60 120 180 240 300 Feet

BRAC Program Management Office West
San Diego, California

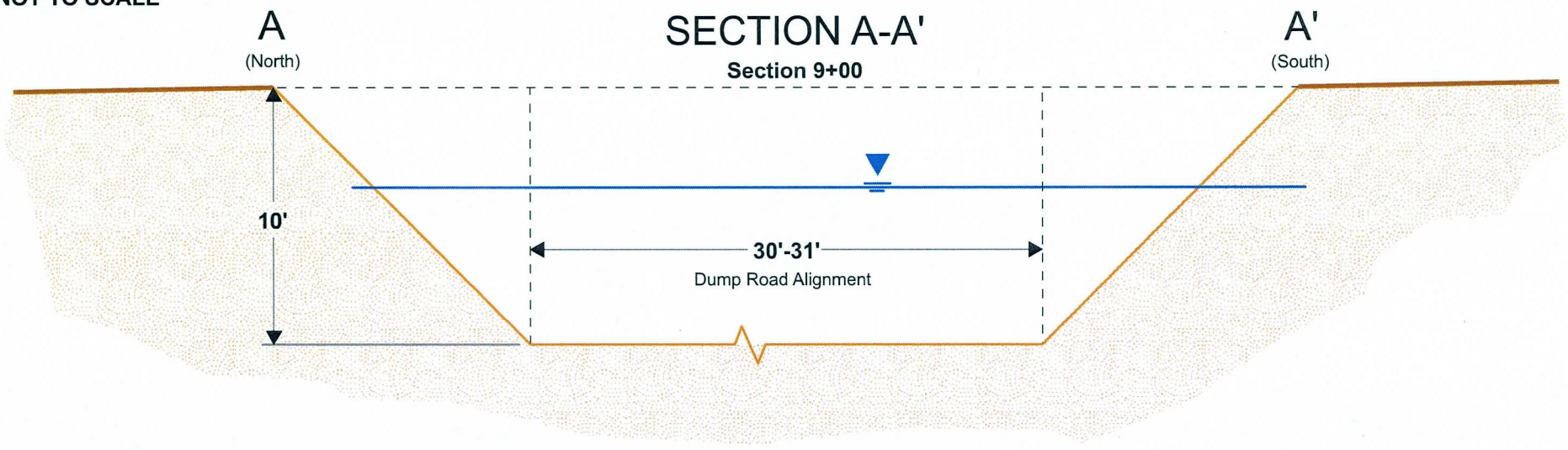
DRAWING 2
DRMO SITE AND VICINITY
POTENTIAL EXCAVATION AREAS
ALONG DUMP ROAD AND AZUAR DRIVE

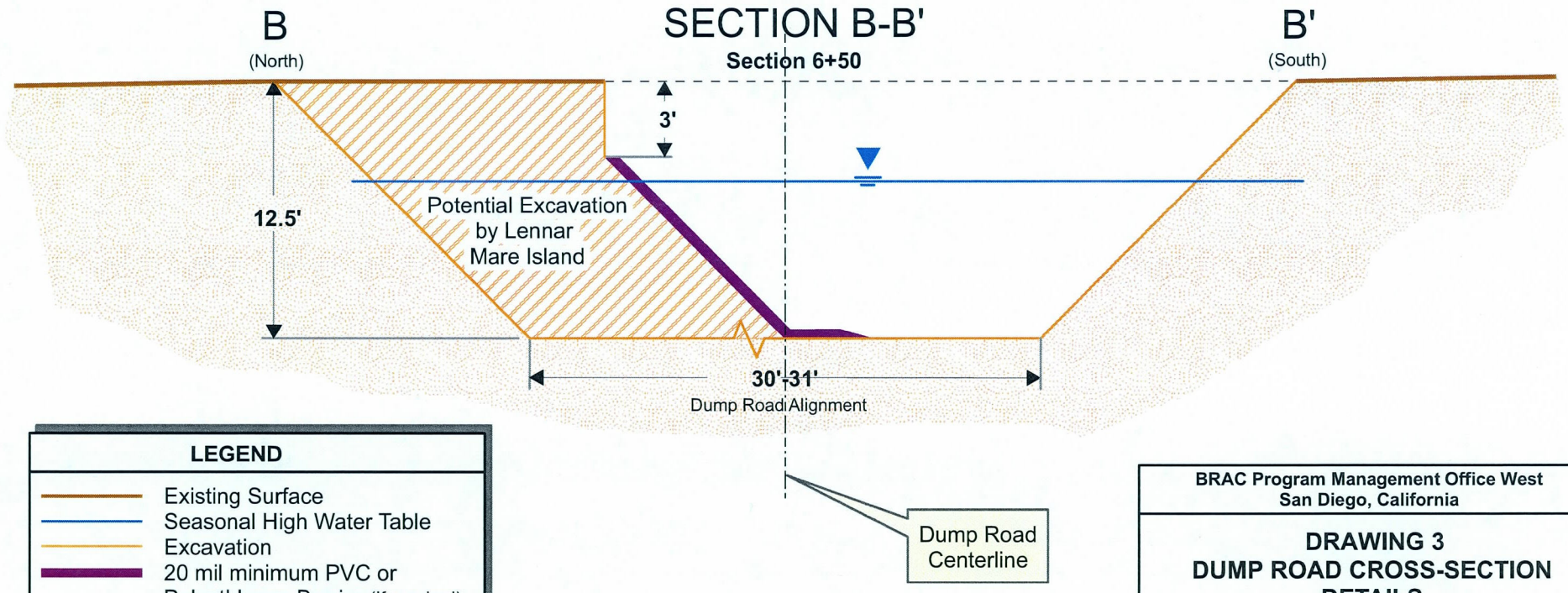
PCAP DRMO Site and Vicinity
Former Mare Island Naval Shipyard, Vallejo, California

WESTON

SENSITIVE

NOT TO SCALE





LEGEND

- Existing Surface
- Seasonal High Water Table
- Excavation
- 20 mil minimum PVC or Polyethlyene Barrier (If required)

Note: bgs = below ground surface.

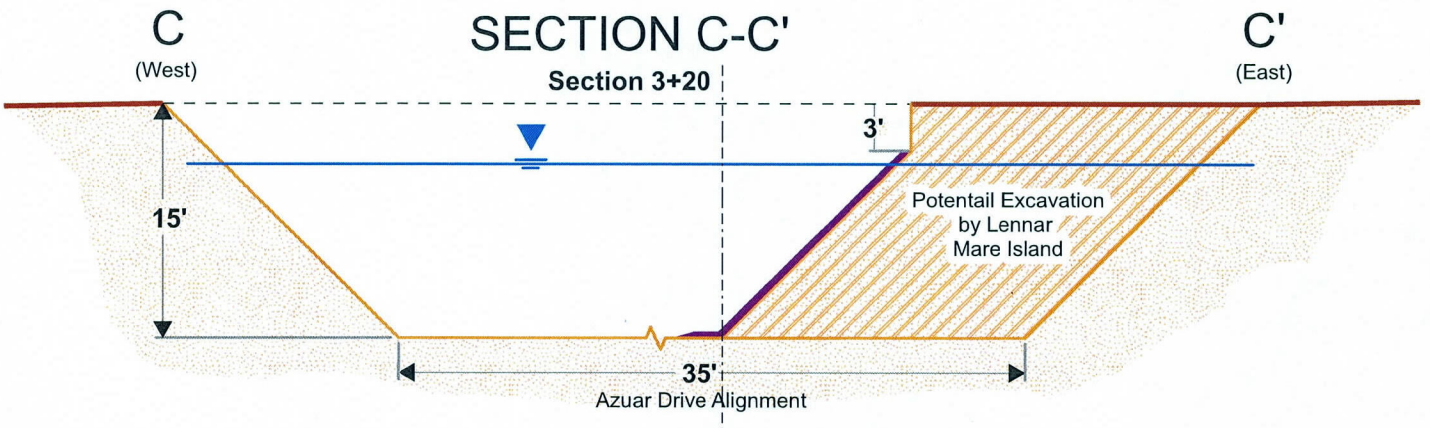
BRAC Program Management Office West
San Diego, California

DRAWING 3
DUMP ROAD CROSS-SECTION DETAILS

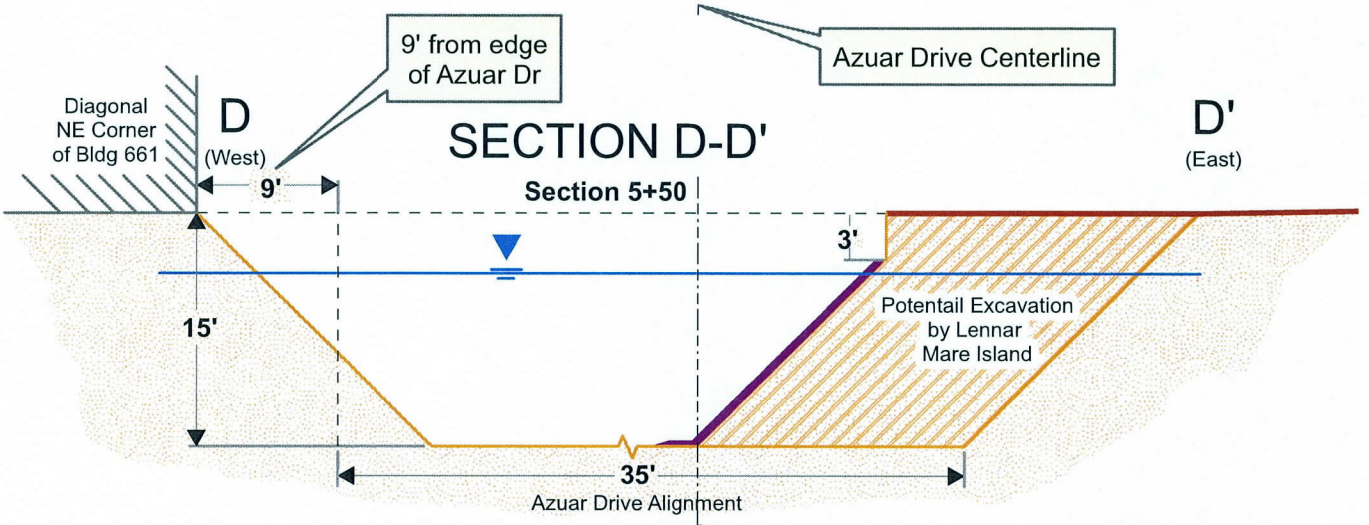
PCAP DRMO Site and Vicinity
Former Mare Island Naval Shipyard, Vallejo, California

WESTON SOLUTIONS

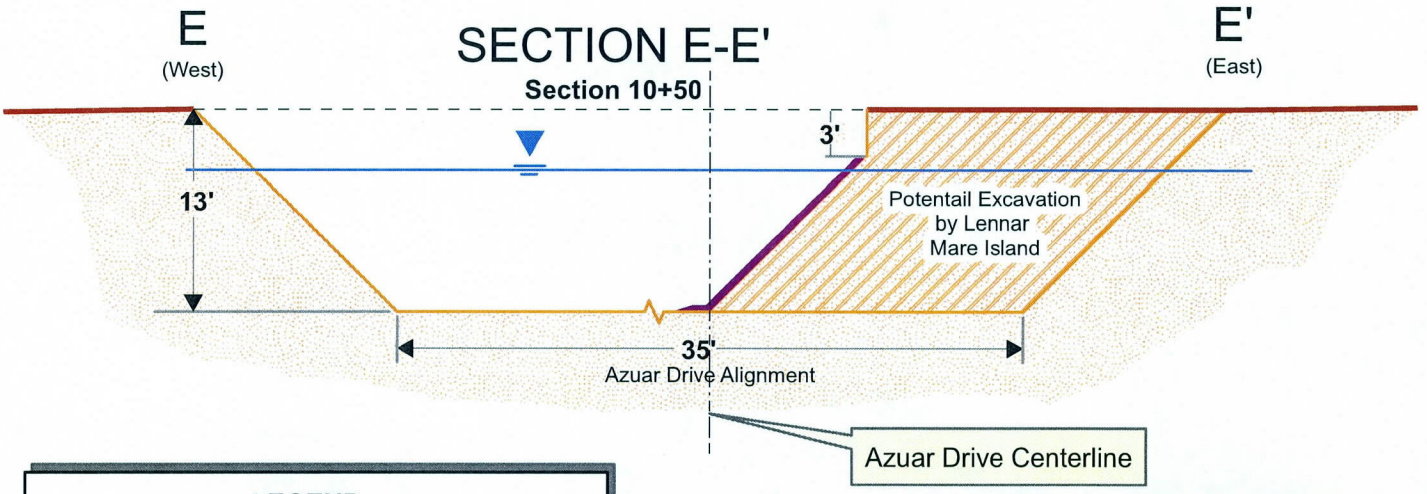
NOT TO SCALE



Azuar Drive Centerline



Azuar Drive Centerline



Azuar Drive Centerline

LEGEND

- Existing Surface
- Seasonal High Water Table
- Excavation
- 20 mil minimum PVC or Polyethlyene Barrier *(If required)*

Note: Water Table varies 2' to 6' bgs (below ground surface)

BRAC Program Management Office West
San Diego, California

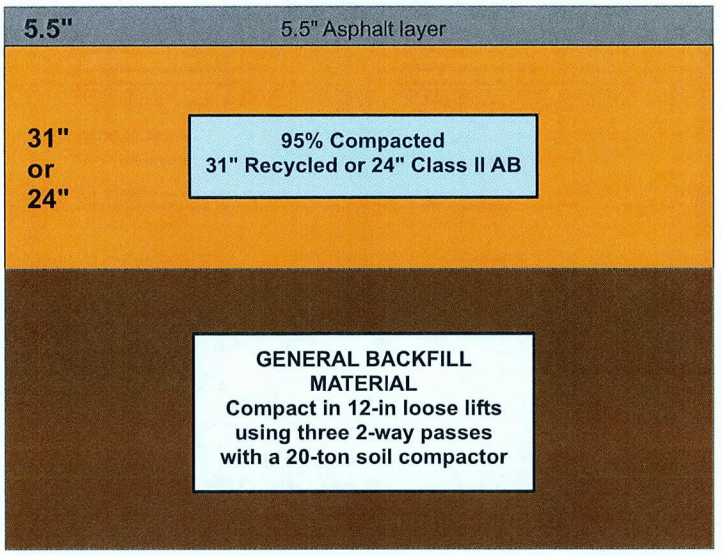
DRAWING 4
AZUAR DRIVE CROSS-SECTION DETAILS

PCAP DRMO Site and Vicinity
Former Mare Island Naval Shipyard, Vallejo, California

WESTON SOLUTIONS

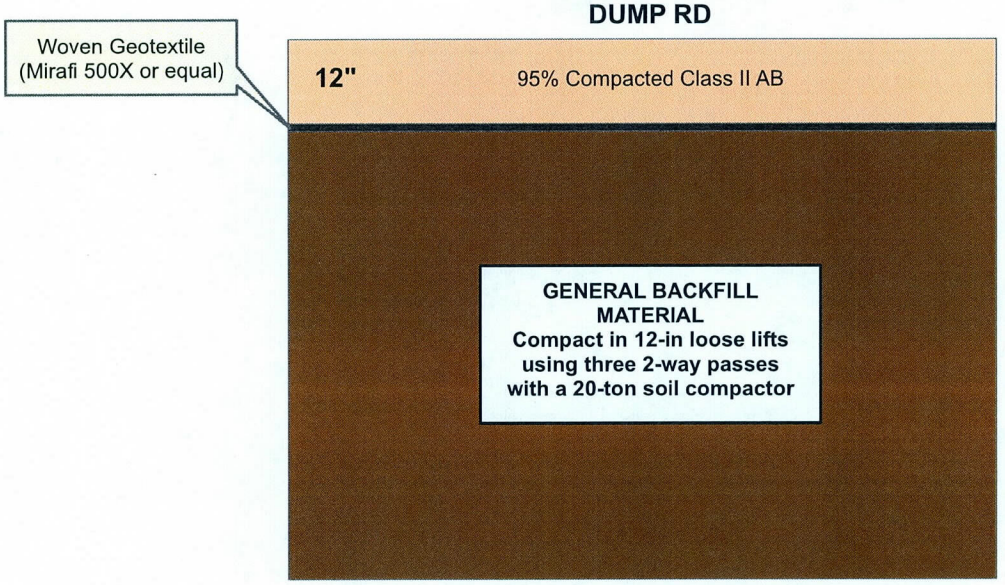
DETAIL A

SITE RESTORATION
AZUAR DR



DETAIL B

SITE RESTORATION
DUMP RD



BRAC Program Management Office West
San Diego, California

DRAWING 5
SITE RESTORATION DETAILS

PCAP DRMO Site and Vicinity
Former Mare Island Naval Shipyard, Vallejo, California

WESTON SOLUTIONS

N00221_001372
MARE ISLAND

SENSITIVE RECORD

PORTIONS OF THIS RECORD ARE CONSIDERED SENSITIVE AND ARE NOT AVAILABLE FOR PUBLIC VIEWING

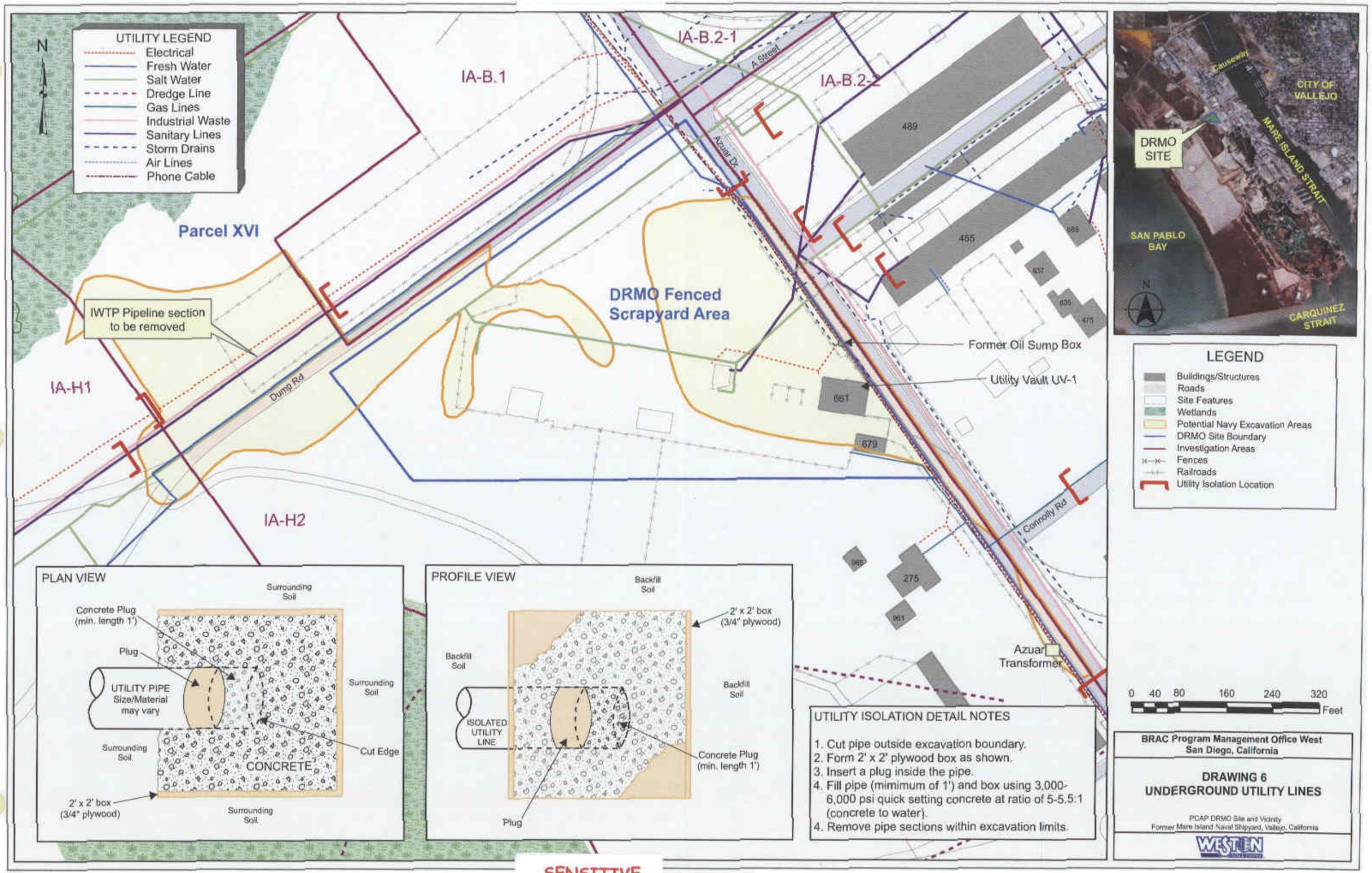
DRAWING 6 – UNDERGROUND UTILITY LINES

FOR ADDITIONAL INFORMATION, CONTACT:

DIANE C. SILVA, COMMAND RECORDS MANAGER, CODE EV33
NAVAL FACILITIES ENGINEERING COMMAND, SOUTHWEST
1220 PACIFIC HIGHWAY (NBSD BLDG. 3519)
SAN DIEGO, CA 92132

TELEPHONE: (619) 556-1280
E-MAIL: diane.silva@navy.mil

SENSITIVE



SENSITIVE

ATTACHMENT 2
LETTERS OF DESIGNATION

Weston Solutions, Inc.
1340Treat Boulevard
Suite 210
Walnut Creek, California 94597-7580
www.westonsolutions.com

Construction Quality Management
Environmental Multiple Award Contract (EMAC)
Contract Number N62473-08-D-8825, CTO No. 0005
Project Quality Control Manager
Letter of Designation April 1, 2009

Dear Ms. Sanchez:

This letter serves to assign to you the responsibilities of Project Quality Control (QC) Manager for the Petroleum Corrective Action for the DRMO Site and Vicinity to be performed under Contract Task Order 0005 for the above-referenced contract. In the role of Project QC Manager you will have the responsibilities as described in the EMAC Program Construction Quality Management Plan (CQMP) Section 2.2. You will perform the QC functions following the requirements of the Program CQMP and the site-specific Construction QC Plan (CQCP). You are granted the following authorities:

- Authority to immediately stop any segment of work which does not comply with the contract plans and specifications, and direct the removal and replacement of any defective work.
- Authority to remove any individual from site who fails to perform work in a skillful, safe, and workmanlike manner or whose work does not comply with the contract plans and specifications.
- QC Manager has no authority to deviate from plans and specifications without prior approval, in writing, from the Contracting Officer or designated representative.

You will have the following responsibilities:

- Conduct daily inspection of work performed each day for compliance with plans and specifications.
- Certify daily that all materials and equipment delivered/installed in the work comply with contract plans and specifications. Certify daily that all work performed on the construction site and off the construction site conforms to plans and specifications. Report and deficiencies and remedial action planned and taken.
- Supervise and coordinate the inspection and tests by the members of the Quality Control Organization including subcontractors.
- Assure QC staff is adequate to meet its responsibilities.

- Insure that all tests required are performed and the results reported. Indicate whether test results show the item tested conforms to contract requirements or not. Ensure corrective work achieves acceptable test results.
- Maintain at the job site a testing plan showing status of all tests required by the contracts.
- Ensure that the Contractor's Quality Control Organization is adequately staffed with qualified personnel to perform all the detailed inspections and testing specified in the plans and specifications.
- Maintain a copy of the approved QC Plan on file at the job site complete with up-to-date approved revisions/filled-in log of submittals.
- Maintain at the job site an up-to-date QC Submittal Status Log showing status of all submittals required by the contract.
- Maintain at the job site an up-to-date Noncompliance Check-Off List (Log of Deficiencies) on all nonconforming work.
- Assure that As-Built Drawings are kept current by showing all deviations made from the contract on a daily basis.

In this capacity you will report directly to me and will administer the established requirements for the project that are documented in the CQCP.

Sincerely yours,
Weston Solutions, Inc.

Emma P. Popek

Emma P. Popek, Ph.D., CQA
Program QC Manager

Weston Solutions, Inc.
1340Treat Boulevard
Suite 210
Walnut Creek, California 94597-7580
www.westonsolutions.com

Construction Quality Management
Environmental Multiple Award Contract (EMAC)
Contract Number N62473-08-D-8825, CTO No. 0005
Project Quality Control Manager
Letter of Designation April 24, 2009

Dear Mr. Maggini:

This letter serves to assign to you the responsibilities of Alternate Project Quality Control (QC) Manager for the Petroleum Corrective Action for the DRMO Site and Vicinity to be performed under Contract Task Order 0005 for the above-referenced contract. As an alternate you may be required to serve as Project QC Manager and will have the responsibilities as described in the EMAC Program Construction Quality Management Plan (CQMP) Section 2.2. You will perform the QC functions following the requirements of the Program CQMP and the site-specific Construction QC Plan (CQCP). You are granted the following authorities:

- Authority to immediately stop any segment of work which does not comply with the contract plans and specifications, and direct the removal and replacement of any defective work.
- Authority to remove any individual from site who fails to perform work in a skillful, safe, and workmanlike manner or whose work does not comply with the contract plans and specifications.
- QC Manager has no authority to deviate from plans and specifications without prior approval, in writing, from the Contracting Officer or designated representative.

You will have the following responsibilities:

- Conduct daily inspection of work performed each day for compliance with plans and specifications.
- Certify daily that all materials and equipment delivered/installed in the work comply with contract plans and specifications. Certify daily that all work performed on the construction site and off the construction site conforms to plans and specifications. Report and deficiencies and remedial action planned and taken.
- Supervise and coordinate the inspection and tests by the members of the Quality Control Organization including subcontractors.

- Assure QC staff is adequate to meet its responsibilities.
- Insure that all tests required are performed and the results reported. Indicate whether test results show the item tested conforms to contract requirements or not. Ensure corrective work achieves acceptable test results.
- Maintain at the job site a testing plan showing status of all tests required by the contracts.
- Ensure that the Contractor's Quality Control Organization is adequately staffed with qualified personnel to perform all the detailed inspections and testing specified in the plans and specifications.
- Maintain a copy of the approved QC Plan on file at the job site complete with up-to-date approved revisions/filled-in log of submittals.
- Maintain at the job site an up-to-date QC Submittal Status Log showing status of all submittals required by the contract.
- Maintain at the job site an up-to-date Noncompliance Check-Off List (Log of Deficiencies) on all nonconforming work.
- Assure that As-Built Drawings are kept current by showing all deviations made from the contract on a daily basis.

In this capacity you will report directly to me and will administer the established requirements for the project that are documented in the CQCP.

Sincerely yours,
Weston Solutions, Inc.

Emma P. Popek

Emma P. Popek, Ph.D., CQA
Program QC Manager

ATTACHMENT 3
FIELD FORMS

WESTON TRANSMITTAL FORM

TO:

Date:	Job No.: N62473-08-D-8825, CTO No. 0005
Attn.:	
Re:	
File No:	

WE ARE SENDING YOU:

☐ Attached ☐ Under Separate Cover

☐ Prints	☐ Plans	☐ Samples
☐ Specifications	☐ Copy of Letter	☐ Change Order
☐ Shop Drawings	☐ Reports	☐ Other

Copies	Date	No.	Description

WE ARE TRANSMITTING as checked below:

☐ For Approval	☐ For Your Use	____ Copies for Approval
☐ As Requested	☐ Returned After Loan to Us	____ Copies for Distribution
☐ For Review and Comment	☐ Other (explain)	____ Corrected Prints

Signed: _____ **Date:** _____

Weston Solutions, Inc.

REMARKS:

COPY TO:

WHEN RETURNING check below, as appropriate:

☐ Approved	☐ Rejected	____ Copies for Approval
☐ Approved as Corrected	☐ Submit	____ Copies for Distribution
☐ Revise and Resubmit	☐ Other (explain)	____ Corrected Prints

REMARKS:

Signed: _____ **Date:** _____

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CONTRACTOR QUALITY CONTROL REPORT

	Y-Yes, N-No, Blank-Not Applicable		
PREPARATORY	THE PLANS AND SPECS HAVE BEEN REVIEWED		
	THE SUBMITTALS HAVE BEEN APPROVED		
	MATERIALS COMPLY WITH APPROVED SUBMITTALS		
	MATERIALS ARE STORED PROPERLY		
	PRELIMINARY WORK WAS DONE CORRECTLY		
	TESTING PLAN HAS BEEN REVIEWED		
	WORK METHOD AND SCHEDULE DISCUSSED		
INITIAL	PRELIMINARY WORK WAS DONE CORRECTLY		Testing performed and who performed the test
	SAMPLE HAS BEEN PREPARED/APPROVED		
	WORKMANSHIP IS SATISFACTORY		
	TEST RESULTS ARE ACCEPTABLE		
	WORK IN COMPLIANCE WITH THE CONTRACT		
FOLLOW UP	WORK COMPLIES WITH CONTRACT AS APPROVED IN INITIAL PHASE		Testing performed and who performed the test

REWORK ITEMS IDENTIFIED

REMARKS:

On behalf of the contractor, I certify that the report is complete and correct and the equipment and material used and work performed during this reporting period are in compliance with contract requirements to the best of my knowledge except as noted in this report.

Authorized QC Manager at Site Date

Delia Sanchez

GOVERNMENT QUALITY ASSURANCE REPORT

QUALITY ASSURANCE REPRESENTATIVE'S REMARKS AND/OR EXCEPTIONS TO THE REPORT:

This page is intentionally left blank.

SUBMITTAL REGISTER

CONTRACT NUMBER: N62473-08-D-8825, CTO No. 0005

TITLE AND LOCATION: Petroleum Corrective Action Plan for DRMO Site and Vicinity, Former Mare Island Naval Shipyard, Vallejo, CA

CONTRACTOR: Weston Solutions, Inc. 1340 Treat Blvd #210, Walnut Creek, CA 94597 (925) 948-2600

ACTIVITY NO	TRANSMITTAL NO	SPEC SECT	DESCRIPTION OF ITEMS SUBMITTED	PARAGRAPH #		CONTRACTOR SCHEDULE DATES			CONTRACTOR ACTION		APPROVING AUTHORITY						REMARKS
						SUBMIT	APPR NEEDED BY	MATERIAL NEEDED BY		DATE SUBMITTED				ACTION CODE	DATE COMMENTS SENT TO CONTRACTOR		
(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)		(M)	(N)	(O)	(P)	(Q)	(R)
	1	Contract	Internal Draft PCAP, including Accident Prevention Plan to Navy			4/3/2009	4/20/2009										
	2	Contract	RTCs for Navy Comments on Internal PCAP			4/21/2009	5/20/2009										
	3	Contract	Draft PCAP to Navy and BCT			5/27/2009	6/25/2009										
	4	Contract	RTCs to Comments on Draft PCAP			6/26/2009	7/10/2009										
	5	Contract	Final PCAP to Navy and BCT			7/13/2009	8/12/2009										
	6	Contract	Internal Draft PCAP Completion Report to Navy			11/21/2009	12/11/2009										
	7	Contract	RTCs to Comments on Draft PCAP Completion Report			12/11/2009	12/26/2009										
	8	Contract	Draft PCAP Completion Report to BCT and Navy			12/26/2009	1/26/2010										
	9	Contract	Final PCAP Completion Report to Navy and BCT			2/16/2010	3/17/2010										
	10	Contract	Kick-Off Meeting Minutes			within 7 days of meeting											
	11		Daily Production Report			daily											
	12		Daily QC Report			daily											
	13		Testing Plan and Log			monthly											

SUBMITTAL REGISTER

CONTRACT NUMBER: N62473-08-D-8825, CTO No. 0005

TITLE AND LOCATION: Petroleum Corrective Action Plan for DRMO Site and Vicinity, Former Mare Island Naval Shipyard, Vallejo, CA

CONTRACTOR: Weston Solutions, Inc. 1340 Treat Blvd #210, Walnut Creek, CA 94597 (925) 948-2600

ACTIVITY NO	TRANSMITTAL NO	SPEC SECT	DESCRIPTION OF ITEMS SUBMITTED	PARAGRAPH #		CONTRACTOR SCHEDULE DATES			CONTRACTOR ACTION		APPROVING AUTHORITY						
						SUBMIT	APPR NEEDED BY	MATERIAL NEEDED BY		DATE SUBMITTED				ACTION CODE	DATE COMMENTS SENT TO CONTRACTOR		REMARKS
(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)		(M)	(N)	(O)	(P)	(Q)	(R)
	14		QC Meeting Agendas			weekly											
	15		QC Meeting Minutes			weekly											
	16		Preparatory QC Phase Meeting Agenda/Minutes			when conducted											

DRMO SITE AND VICINITY

SITE SETUP AND EROSION/SWPPP - DAILY FOLLOW-UP QUALITY CONTROL INSPECTION FORM

Project Name:	DRMO Site and Vicinity	**Date:**	
Project Number:	12954.010.0005	**Inspector:**	
Definable Feature of Work	Site Setup and Erosion/SWPPP implementation		
Specification / Document	PCAP		

Inspections:

(Provide explanatory notes below if the answer to any of the following questions is "no". List any remedial action taken.)

		PCAP Section	Yes/No/NA
1	Has the Notice of Intent been issued to the to the San Francisco Bay Regional Water Quality Control Board?		
2	Has a Notice of Intent receipt letter been received from the San Francisco Bay Regional Water Quality Control Board and has it been filed on-site?		
3	Has an Underground Service Alert dig permit been obtained and have all the known utilities been identified?		
4	Has support zone been set up (break area, portalets, trash bin, etc)?		
5	Has the exclusion zone been established and defined by a visible barrier (i.e. fencing and signage)?		
6	Has the contamination reduction zone been set up including fire extinguisher, first aid kit, etc.?		
7	Have stormwater/erosion controls (silt fence) been installed along excavations near wetlands?		
8	Have stormwater/erosion controls (straw wattle) been installed in existing ditches or swales?		
9	Have all necessary personnel undergone all the applicable training and briefings?		
10	Have all the heavy equipment been inspected for use on-site?		
11	Have the excavation grid areas been identified and/or marked in the field prior to excavation?		

NOTES and COMMENTS:

Inspector Signature

Date

This page is intentionally left blank.

DRMO SITE AND VICINITY
TRAFFIC CONTROL - DAILY FOLLOW-UP QUALITY CONTROL INSPECTION FORM

Project Name:	DRMO Site and Vicinity	**Date:**	
Project Number:	12954.010.0005	**Inspector:**	
Definable Feature of Work	Traffic Control		
Specification / Document	PCAP		

Inspections:

(Provide explanatory notes below if the answer to any of the following questions is "no". List any remedial action taken.)

		PCAP Section	Yes/No/NA
1	**Road Closures** - Has a Traffic Control Plan and Encroachment Permit been prepared and approved by the City of Vallejo?		
2	**Road Closures** - If excavation is occuring within Azuar Dr or Dump Rd, are the necessary barricades and signage installed each day per the permit requirements?		
3	**Haul Route to IA H1** - Are off-road trucks transporting petroleum-impacted soil following the approved haul route from DRMO Site and Vicnity to the IA H1 Containment Area?		
4	**Import Haul Route** - If backfill soil is being imported, are the trucks following the approved haul route?		
5	**Traffic Route** - For deliveries, import soil, or other commercial traffic is WESTON scheduling this to minimize traffic congestion during commute hours?		
6	**Parking** - Are personnel parking in designated areas and maintaining the streets clear of parked vehicles?		

NOTES and COMMENTS:

Inspector Signature

Date

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DRMO SITE AND VICINITY
UTILITY ISOLATION - DAILY FOLLOW-UP QUALITY CONTROL INSPECTION FORM

Project Name:	DRMO Site and Vicinity	**Date:**	
Project Number:	12954.010.0005	**Inspector:**	
Definable Feature of Work	Utility Isolation		
Specification / Document	PCAP		

Inspections:

(Provide explanatory notes below if the answer to any of the following questions is "no". List any remedial action taken.)

		PCAP Section	Yes/No/NA
1	**Electrical** - Has USA and/or utility company marked out the electrical lines using stakes or paint in the field?		
2	**Electrical** - Has Island Energy approved the location where the utility is to be isolated and is temporary overhead bypass installed?		
3	**Electrical** - Have emergency contacts been established for this utility?		
4	**Electrical** - Has Weston FLD-034 attachment A - Underground Locating and Marking Checklist, Attachment B – Underground utilities Management Checklist, Attachment C – Utilities Research Options, and Attachment D – Sources of Information been filled out and reviewed?		
5	**Electrical** - Has the 12 kV electrical line supplying power to Building 505 (along Azuar Dr and through Crane Test Area) been isolated and physically disconnected by Island Energy and verified by WESTON personnel?		
6	**Electrical** - Has the 12 kV electrical line been isolated and capped in accordance with the PCAP?		
7	**Water** - Has USA and/or utility company marked out the water line along Azuar Dr and Dump Rd using stakes or paint in the field?		
8	**Water** - Has the Utility Company approved the location where the utility is to be isolated? Note that water line will not be replaced.		
9	**Water** - Have emergency contacts been established for this utility?		
10	**Water** - Has Weston FLD-034 attachment A - Underground Locating and Marking Checklist, Attachment B – Underground utilities Management Checklist, Attachment C – Utilities Research Options, and Attachment D – Sources of Information been filled out and reviewed?		
11	**Water** - Has the water line been isolated and capped in accordance with the PCAP?		
12	**Gas Line** - Has USA and/or utility company marked out the gas line using stakes or paint in the field?		
13	**Gas Line** - Has the Utility Company approved the location where the utility is to be isolated? Note that the gas line will not be replaced.		
14	**Gas Line** - Have emergency contacts been established for this utility?		
15	**Gas Line** - Has Weston FLD-034 attachment A - Underground Locating and Marking Checklist, Attachment B – Underground utilities Management Checklist, Attachment C – Utilities Research Options, and Attachment D – Sources of Information been filled out and reviewed?		
16	**Gas Line** - Has the gas line been isolated and capped in accordance with the PCAP?		
17	**Sanitary Line** - Has USA and/or utility company marked out the sanitary line using stakes or paint in the field?		
18	**Sanitary Line** -Has the Utility Company approved the location where the utility is to be isolated? Note that the manway will not be replaced but a line will be installed to service the IA-H1 groundwater extraction system.		
19	**Sanitary Line** - Have emergency contacts been established for this utility?		
20	**Sanitary Line** - Has Weston FLD-034 attachment A - Underground Locating and Marking Checklist, Attachment B – Underground utilities Management Checklist, Attachment C – Utilities Research Options, and Attachment D – Sources of Information been filled out and reviewed?		
21	**Sanitary Line** - Has a Competent Person been identified for this task?		
22	**Sanitary Line** - Has the sanitary line been isolated and capped in accordance with the PCAP?		
23	**Storm Water Line** - Has USA and/or utility company marked out the storm water line using stakes or paint in the field?		
24	**Storm Water Line** - Has the Utility Company approved the location where the utility is to be isolated? Note that the storm water line will be replaced after excavation.		
25	**Storm Water Line** - Have emergency contacts been established for this utility?		
26	**Storm Water Line** - Has Weston FLD-034 attachment A - Underground Locating and Marking Checklist, Attachment B – Underground utilities Management Checklist, Attachment C – Utilities Research Options, and Attachment D – Sources of Information been filled out and reviewed?		
27	**Storm Water Line** - Has the temporary storm water line been replaced as per the PCAP?		

DRMO SITE AND VICINITY
UTILITY ISOLATION - DAILY FOLLOW-UP QUALITY CONTROL INSPECTION FORM

Project Name:	DRMO Site and Vicinity	**Date:**	
Project Number:	12954.010.0005	**Inspector:**	
Definable Feature of Work	Utility Isolation		
Specification / Document	PCAP		

Inspections:

(Provide explanatory notes below if the answer to any of the following questions is "no". List any remedial action taken.)

28	**IWTP Line** - Has USA and/or utility company marked out the storm water line using stakes or paint in the field?		
29	**IWTP Line** - Has the Utility Company approved the location where the utility is to be isolated? Note that the IWTP line will not be replaced.		
30	**IWTP Line** - Have emergency contacts been established for this utility?		
31	**IWTP Line** - Has Weston FLD-034 attachment A - Underground Locating and Marking Checklist, Attachment B – Underground utilities Management Checklist, Attachment C – Utilities Research Options, and Attachment D – Sources of Information been filled out and reviewed?		
32	**IWTP Line** - Has a Competent Person been identified for this task?		
33	**IWTP Line** - Has the IWTP line been isolated and capped in accordance with the PCAP?		
34	**Salt Water Line** - Has USA and/or utility company marked out the storm water line using stakes or paint in the field?		
35	**Salt Water Line** - Has the Utility Company approved the location where the utility is to be isolated? Note that the salt water line will not be replaced.		
36	**Salt Water Line** - Have emergency contacts been established for this utility?		
37	**Salt Water Line** - Has Weston FLD-034 attachment A - Underground Locating and Marking Checklist, Attachment B – Underground utilities Management Checklist, Attachment C – Utilities Research Options, and Attachment D – Sources of Information been filled out and reviewed?		
38	**Salt Water Line** - Has the salt water line been isolated and capped in accordance with the PCAP?		

NOTES and COMMENTS:

Inspector Signature

Date

DRMO SITE AND VICINITY
EXCAVATION, TRANSPORT, PLACEMENT, AND AIR MONITORING - DAILY FOLLOW-UP QUALITY CONTROL INSPECTION FORM

Project Name:	DRMO Site and Vicinity	**Date:**	
Project Number:	12954.010.0005	**Inspector:**	
Definable Feature of Work	Excavation, Transport, Placement, and Air Monitoring		
Specification / Document	PCAP		

Inspections:

(Provide explanatory notes below if the answer to any of the following questions is "no". List any remedial action taken.)

		SECTION	Yes/No/NA
1	Has the Excavation Permit been received from the City of Vallejo for excavation within Azuar Drive and Dump Road?		
2	Is an air monitoring station (PDRs) set up upwind and downwind at the perimeter each day that excavation activities are ongoing (weather permitting)?		
3	Is a PDR set up inside the excavator cab (and rotated daily amongst various heavy equipment) to monitor particulate dust?		
4	Are personnel wearing the correct PPE (Level D for operators inside closed equipment and Modified Level D for ground personnel)?		
5	Have the known utilities planned to be removed been identified and isolated? If so, have these activities been documented?		
6	Is the excavation proceeding laterally in accordance with the staked excavation extents (50-ft grids) per the PCAP?		
7	Are the excavation horizontal limit extents being documented?		
8	Are the excavation vertical limit extents being documented?		
9	If free product is encountered, is the oil being recovered and stored properly?		
10	Are dust control measures ongoing to ensure dust levels are minimized?		
11	Are the trucks following the approved haul route?		
12	Are trucks being loaded (not overloaded) to avoid spillage along the haul road?		
13	If the excavated materials are saturated with liquids, is the soil being allowed to drain or conditioned (mixed with dry soil) to prevent free liquids to be transported to IA H1?		
14	Has the Industrial Waste piping removed from Parcel XVI been triple rinsed and the rinsate sampled and disposed per requirements of the VSFCD?		
15	Is the material placed within the IA H1 Containment Area in accordance with the requirements of the Work Plan (any debris must be of a size and nature that after placement with soil in one foot thick compacted intervals; no substantial debris items may be visible protruding from the compacted surface; any debris items which cannot be placed and/or compacted to meet this requirement shall be removed) and the IA H1 Design Plan (spread in 1-ft lift and making six 2-way passes with a 20-ton soil compactor)?		
16	Is traffic control in place (if excavation is ongoing on Dump Rd and Azuar Dr)?		

NOTES and COMMENTS:

Inspector Signature

Date

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DRMO Site and Vicinity
CONFIRMATION SAMPLING -
DAILY FOLLOW-UP QUALITY CONTROL INSPECTION FORM

Project Name:	DRMO Site and Vicinity	**Date:**	
Project Number:	12954.010.0005	**Inspector:**	
Definable Feature of Work	Confirmation Sampling		
Specification / Document	PCAP, SAP		

Inspections:
(Provide explanatory notes below if the answer to any of the following questions is "no". List any remedial action taken.)

		Section	Yes / No / NA
1	Have the initial excavation activities been completed (lateral and vertical) in accordance with the PCAP?		
2	Are sampling supplies (jars, scoops, etc) on-site?		
3	Are sampling personnel wearing the correct PPE (Modified Level D)?		
4	Are the samples being collected on a 50-foot grid at the grid centers (bottom) in accordance with the Work Plan?		
5	Are sidewall samples being collected along the perimeter of the excavation using the 50-ft grid system and immediately above the water table?		
6	Are samples being analyzed for TPH in accordance with the SAP?		
7	Are field duplicates being collected at a frequency of 10%?		
8	Are MS/MSD's being collected a frequency of 5%?		
9	Are sample labels, chain-of-custody, and Log Book properly completed with all applicable information?		
10	Are the sample locations GPS'ed or navigated to a known location with the GPS unit?		
11	Are the samples properly packaged for laboratory pickup (bagged in zip lock bags, iced, etc.)?		

NOTES and COMMENTS:

Inspector Signature

Date

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DRMO SITE AND VICINITY
FREE PRODUCT REMOVAL AND DISPOSAL - DAILY FOLLOW-UP QUALITY CONTROL INSPECTION FORM

Project Name:	DRMO Site and Vicinity	**Date:**	
Project Number:	12954.010.0005	**Inspector:**	
Definable Feature of Work	Free Product Removal and Disposal		
Specification / Document	PCAP		

Inspections:
(Provide explanatory notes below if the answer to any of the following questions is "no". List any remedial action taken.)

		PCAP Section	Yes/No/NA
1	Is free product removed (if required) being transferred into a Vac Truck and/or to an approved, clean storage container?		
2	Are the containers labeled to identify contents?		
3	Is the container free of leaks or other deficiencies?		
4	Has the oil been sampled in accordance with the disposal facility requirements?		
5	Have the oil sample results been summarized and has a waste profile been prepared?		
6	Has the waste profile been provided to the Navy for review and approval?		
7	Does each oil shipment have a manifest signed by the Navy for transport?		
8	Are records on file for the waste disposal?		

NOTES and COMMENTS:

Inspector Signature

Date

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DRMO SITE AND VICINITY
GROUNDWATER REMOVAL AND DISPOSAL - DAILY FOLLOW-UP QUALITY CONTROL INSPECTION FORM

Project Name:	DRMO Site and Vicinity	**Date:**	
Project Number:	12954.010.0005	**Inspector:**	
Definable Feature of Work	Groundwater Removal and Disposal		
Specification / Document	PCAP		

Inspections:
(Provide explanatory notes below if the answer to any of the following questions is "no". List any remedial action taken.)

		PCAP Section	Yes/No/NA
1	Is groundwater removed (if required) being transferred to an approved, clean storage container?		
2	Has the groundwater been sampled (one sample per container) in accordance with the VSFCD requirements?		
3	Has the analytical data been summarized and forwarded to VSFCD for review?		
4	Has a discharge permit been issued by VSFCD?		
5	Has the water been discharged at the approved discharge point?		
6	Has the volume of water been documented for VSFCD billing purposes?		

NOTES and COMMENTS:

Inspector Signature

Date

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DRMO SITE AND VICINITY
SITE RESTORATION (GENERAL BACKFILL) - DAILY FOLLOW-UP QUALITY CONTROL INSPECTION FORM

Project Name:	DRMO Site and Vicinity	**Date:**	
Project Number:	12954.010.0005	**Inspector:**	
Definable Feature of Work	Site Restoration (General Backfill)		
Specification / Document	PCAP		

Inspections:
(Provide explanatory notes below if the answer to any of the following questions is "no". List any remedial action taken.)

		Section	Yes / No / NA
1	Are the confirmation sample results below the applicable cleanup criteria?		
2	Has WESTON received approval to backfill the excavation?		
3	Has the backfill material been sampled at a frequency of one composite sample per 5,000 cy for TPH, VOCs, SVOCs, PCBs, pesticides, and metals?		
4	Does the backfill material meet the applicable criteria and has it been approved for backfilling purposes?		
5	Is air monitoring being set up in accordance with the Work Plan?		
6	Are dust control measures in place to minimize dust emissions?		
7	If the backfill material is being imported from off-site, is the approved haul route being used?		
8	Is backfilling being conducted by spreading the material in 1-foot loose lifts and compacted by making three 2-way passes using a 20-ton compactor?		
9	Is the site being backfilled and restored to the approved grades?		
10	Has the site been cleaned of all materials mobilized for this project?		

NOTES and COMMENTS:

Inspector Signature

Date

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DRMO SITE AND VICINITY
SITE RESTORATION (AZUAR DR) - DAILY FOLLOW-UP QUALITY CONTROL INSPECTION FORM

Project Name:	DRMO Site and Vicinity	**Date:**	
Project Number:	12954.010.0005	**Inspector:**	
Definable Feature of Work	Site Restoration - Road Restoration (Azuar Dr)		
Specification / Document	PCAP		

Inspections:

(Provide explanatory notes below if the answer to any of the following questions is "no". List any remedial action taken.)

		Section	Yes / No / NA
1	Has the Site Restoration (General Backfill) been completed to a depth of 24 inches below grade (or 31 inches if recycled AB is used) and compacted using three 2-way passes with a 20-ton minimum sheepsfoot soil compactor?		
2	Has Class II AB material (or recycled AB) been used for the subbase layer right before the asphalt layer (24-inch if Class II AB or 31 inches if recycled AB) and compacted to 95% relative density?		
3	Has compaction testing been conducted for each lift and at a frequency of one test per lift per 100 linear feet?		
4	Have all compaction testing been conducted and passed the required densities?		
5	Has the existing asphalt been neatly saw cut and extraneous materials removed?		
6	Are paving materials being installed in accordance with PCAP specifications?		
7	Is the paving workmanship acceptable (no cracks, low points, etc)?		
8	Is striping conducted in accordance with PCAP specifications?		

NOTES and COMMENTS:

Inspector Signature

Date

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DRMO SITE AND VICINITY
SITE RESTORATION (DUMP RD) - DAILY FOLLOW-UP QUALITY CONTROL INSPECTION FORM

Project Name:	DRMO Site and Vicinity	**Date:**	
Project Number:	12954.010.0005	**Inspector:**	
Definable Feature of Work	Site Restoration - Road Restoration (Dump Road)		
Specification / Document	PCAP		

Inspections:

(Provide explanatory notes below if the answer to any of the following questions is "no". List any remedial action taken.)

		Section	Yes / No / NA
1	Has the initial Site Restoration (General Backfill) backfill been conducted to a depth of 12 inches below final grade and compacted using three 2-way passes with a 20-ton soil compactor?		
2	Has geotextile been placed along the footprint of the road alignment over the prepared subgrade in accordance with the design specifications?		
3	Has Class II AB material been placed over the geotextile (min 12 inches) and compacted to 95% relative density?		
4	Has compaction testing been conducted at a frequency of one test per lift per 100 linear feet?		
5	Have all compaction testing been conducted and passed the required densities?		
6	Has the final surface of Dump Road restoration been inspected for conformance with design grade?		

NOTES and COMMENTS:

Inspector Signature

Date

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CONTRACTOR PRODUCTION REPORT

(ATTACH ADDITIONAL SHEETS IF NECESSARY)

		DATE
CONTRACT NO	TITLE AND LOCATION	REPORT NO
CONTRACTOR	SITE MANAGER	

AM WEATHER	PM WEATHER	MIN TEMP (F)	MAX TEMP (F)	PRECIP (IN)

WORK PERFORMED TODAY

WORK LOCATION AND DESCRIPTION	EMPLOYEE NAME	NUMBER	TRADE	HRS

JOB SAFETY					
	WAS A JOB SAFETY MEETING HELD THIS DATE?	☐ YES	☐ NO	TOTAL WORK HOURS ON JOB SITE, THIS DATE, INCL CON'T SHEETS	
	WERE THERE ANY LOST TIME ACCIDENTS THIS DATE? (If YES attach copy of completed OSHA report)	☐ YES	☐ NO	CUMULATIVE TOTAL OF WORK HOURS FROM PREVIOUS REPORT	
	WAS CRANE/MANLIFT/TRENCHING/SCAFFOLD/HV ELEC/HIGH WORK/ HAZMAT WORK DONE? (If YES attach statement or checklist showing inspection performed.)	☐ YES	☐ NO	CUMULATIVE TOTAL OF SUBCONTRACTOR WORK HOURS	
				CUMULATIVE TOTAL OF SUBCONTRACTOR WORK HOURS FROM PREVIOUS REPORT	
	WAS HAZARDOUS MATERIAL/WASTE RELEASED INTO THE ENVIRONMENT? (If YES attach description of incident and proposed action.)	☐ YES	☐ NO	TOTAL WORK HOURS FROM START OF CONSTRUCTION	

LIST SAFETY ACTIONS TAKEN TODAY/SAFETY INSPECTIONS CONDUCTED ☒ SAFETY REQUIREMENTS HAVE BEEN MET.

EQUIPMENT/MATERIAL RECEIVED TODAY TO BE INCORPORATED IN JOB (INDICATE SCHEDULE ACTIVITY NUMBER)

Submittal #	Description of Equipment/Material Received

Owner	Description of Construction Equipment Used Today	Model and Make	Hours Idle	Hours Used	Reason for Idle

SUBCONTRACTOR(S)

SUB NAME		NUMBER OF SUB WORKERS		START TIME		END TIME		PO NUMBER	
	UOM	QTY INSTALLED	TASK DESCRIPTION						
SUB NAME	R	NUMBER OF SUB WORKERS		START TIME		END TIME		PO NUMBER	
	UOM	QTY INSTALLED	TASK DESCRIPTION						
SUB NAME		NUMBER OF SUB WORKERS		START TIME		END TIME		PO NUMBER	
	UOM	QTY INSTALLED	TASK DESCRIPTION						
SUB NAME		NUMBER OF SUB WORKERS		START TIME		END TIME		PO NUMBER	
	UOM	QTY INSTALLED	TASK DESCRIPTION						
SUB NAME		NUMBER OF SUB WORKERS		START TIME		END TIME		PO NUMBER	
	UOM	QTY INSTALLED	TASK DESCRIPTION						
SUB NAME		NUMBER OF SUB WORKERS		START TIME		END TIME		PO NUMBER	
	UOM	QTY INSTALLED	TASK DESCRIPTION						
SUB NAME		NUMBER OF SUB WORKERS		START TIME		END TIME		PO NUMBER	
	UOM	QTY INSTALLED	TASK DESCRIPTION						

VISITORS

NAME	TITLE	COMPANY/AGENCY	PURPOSE OF VISIT

Tasks Performed Today:

CONTRACTOR/SITE MANAGER

DATE

TESTING PLAN AND LOG

CONTRACT NUMBER N62473-08-D-8825, CTO No. 0005	PROJECT TITLE AND LOCATION Petroleum Corrective Action Plan for DRMO Site and Vicinity, Former Mare Island Naval Shipyard	CONTRACTOR: Weston Solutions, Inc. 1340 Treat Blvd, Suite 210, Walnut Creek, CA

SPECIFICATION SECTION AND PARAGRAPH NUMBER	Frequency Or Quantity	TEST REQUIRED	ACCREDITED/ APPROVED LAB		SAMPLED BY	TESTED BY	LOCATION OF TEST		DATE COMPLETED	DATE FORWARDED TO CONTR. OFF.	REMARKS
			YES	NO/NA			ON SITE	OFF SITE			

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REQUEST FOR INFORMATION (RFI) TRANSMITTAL AND REPLY

RFI # CTO No. 005-001

The RFI system is intended to provide an effective and formal mechanism for responding to contractor's requests for information. It is not an authority to proceed with additional work. If the contractor considers the RFI response a change condition, written notice to the ROICC is required in accordance with contractor provisions.

From: Construction Contractor
To:

Subj:

Ref:

(Explanation section)

Request response by:

_____ _____
Project Manager Project QC Manager

From: RPM
To: ROICC SF Bay Area

Recommendation:

_____
_____
_____
_____
_____

From: ROICC SF Bay Area
To: Construction Contractor

Reply:

_____
_____
_____

Clarification only (no additional time or cost)_____

_____
ROICC

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REWORK ITEMS LIST			
N62473-08-D-8825, CTO No. 0005			
Project Name: Petroleum Corrective Action Plan for DRMO Site and Vicinity, Former Mare Island Naval Shipyard, Vallejo, CA			
Item Description	Identified by	Date Identified	Date Corrected
1.			
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ATTACHMENT 4
PROJECT FILING INDEX

Project File Index

For Environment Multiple Award Contract No. N62473-08-D-8825

0.0 Project File Index

1.0 Contract

12954.10.1.1 Proposal and Pre-award Documents: RFP, RFP modifications, proposal, proposal modifications, pre-proposal meetings.

12954.10.1.2 Prime Contract Documents: Signed contract, purchase order, authorization letters, amendments, government agency funding documents.

12954.10.1.3 Subcontract Documents

12954.10.1.4 Project Closeout Documents

2.0 Communications (Chronological)

12954.10.2.1 Client (to and from)

12954.10.2.2 Weston Solutions, Inc. (WESTON) internal

12954.10.2.3 Communications Subcontractors

12954.10.2.4 Communications Legal

12954.10.2.5 Regulatory agencies (to and from)

3.0 Financial

12954.10.3.1 Planning: Pricing work sheets, computer input sheets, profit plan, revisions.

12954.10.3.2 Monitoring and Control: Weekly details, transfer forms, master file changes, project closeouts, requisitions and purchase orders for materials and supplies.

Project File Index

For Environment Multiple Award Contract No. N62473-08-D-8825

12954.10.3.3 Billing: Prebilling analyses, invoices, payments, accounts receivable, copies of memoranda/letters relative to payments, subcontractor invoices, billing backup information.

12954.10.3.4 Financial Pre-Bills

12954.10.3.5 Weekly Details

12954.10.3.6 Subcontract Invoices

12954.10.3.7 ETC Worksheets

4.0 Project Progress Surveillance and Control

12954.10.4.1 Project Task Descriptions: Objectives, deliverables, schedule, budget.

12954.10.4.2 Project Status: Manpower projections and schedules, expense projections, project status reports, subcontractor progress reports.

5.0 Quality Assurance/Quality Control and Safety

12954.10.5.1 Quality Plans

12954.10.5.2 Quality Audits, Satisfaction Surveys

12954.10.5.3 Health and Safety Plans

12954.10.5.4 Health and Safety Audits and Surveillance

12954.10.5.5 Transportation and Disposal

Project File Index

For Environment Multiple Award Contract No. N62473-08-D-8825

6.0 Data and Information

12954.10.6.1 Data/Information Plans, Field Survey Plans, Sampling and Evaluation Plan(s)

12954.10.6.2 Analytical Data

12954.10.6.3 Photographs, Video Tapes, Field Notebooks: Other subheadings as appropriate for water quality data, air data, treatability studies, surveys, maps, descriptive material.

7.0 Scientific Calculations, Evaluations, and Designs

8.0 Conceptual Calculations, Evaluations, and Designs

9.0 Design Engineering

10.0 Construction Management

11.0 Design and Construct

12.0 – 17.0 Future Expansion

18.0 Review Documents: Draft reports, comment/response documents, review prints.

19.0 Final Deliverables: Camera ready copy, originals, copies of final reports, as-built plans and specifications, the final product of the project.

Project File Index

For Environment Multiple Award Contract No. N62473-08-D-8825

20.0 Reference Materials: Bibliographies, hard copies if appropriate, books, pamphlets, reports, publications.

ATTACHMENT 5
WESTON PROJECT QA AUDIT CHECKLIST

PROJECT QA AUDIT CHECKLIST

WORK ORDER NO.:	**CLIENT:**				
CSM:	**PROJECT TITLE:**				
PM:	**PROJ. QC REPRESENTATIVE:**				
AUDIT COMPLETED BY:	**PERSONS INTERVIEWED:**				
	GRADE				
QUALITY CHECKS/REQUIREMENTS	**A**	**B**	**C**	**NA***	**Comments**
Proposal					
Project Risk Level (from Worksheet)					
Environ. Regulatory Impact Checklist					
Profitability Worksheet completed					
Proposal Signed as per Signature Authority					
Project Opening/Setup					
Written Client Authorization – Indicate form of authorization under Comments					
Project Opening Meeting documented					
Project Instructions/Project Plan – Includes scope, budget, schedule, deliverables/ milestones, applicable regulations, plan for exceeding client expectations					
Technical and subcontractor responsibilities documented and communicated					
Document control (filing) system implemented					
Health and Safety Plan completed					
QAPP, Quality Mgmt Plan, CQCP, or discipline-specific QC Plan(s)					
Project Implementation					
Monthly Project Status Review meetings documented. Must address estimates-to-complete, earned value, DSO, scope creep, contract mods.					
Status meetings held with project staff (note how often)					
Field equipment inspected or tested before use (and documented)					
Equipment has been calibrated and calibration information is evident to user					
Frequent client communication (note how often)					
Documented reviews on all deliverables, following QC requirements					
Verification of quality of products or services procured per QC Plan. By whom?					
Solicited client satisfaction/engagement feedback (via survey or interview)					

PROJECT QA AUDIT CHECKLIST

QUALITY CHECKS/REQUIREMENTS	A	B	C	NA*	Comments
Project Closeout					
Completed project Closeout QA Checklist (including project summary and lessons learned)					

Grade Definitions: A = Full compliance; B = Approaches but does not meet requirement; C = Deficient
* Must have explanation for any item marked NA.
** Desk Reference for QC of Work Products.

LESSONS LEARNED, BEST PRACTICES, AND GENERAL COMMENTS

CORRECTIVE ACTIONS	DUE DATE
1.	
2.	
3.	
4.	
5.	
6.	
7.	
8.	

APPENDIX D
ENVIRONMENTAL PROTECTION PLAN

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LIST OF TABLES

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ABBREVIATIONS AND ACRONYMS

BMP	Best Management Practice
BRAC	Base Realignment and Closure
CDFG	California Department of Fish and Game
CSO	Caretaker Site Office
DON	Department of the Navy
DRMO	Defense Reutilization and Marketing Office
DTSC	Department of Toxic Substances Control
EPA	U.S. Environmental Protection Agency
EPP	Environmental Protection Plan
FSA	fenced scrapyard area
IA	Investigation Area
MINS	Mare Island Naval Shipyard
OES	State Office of Emergency Services
PCAP	Petroleum Corrective Action Plan
ROICC	U.S. Navy Resident Officer in Charge of Construction
RPM	Remedial Project Manager
SMHM	Salt Marsh Harvest Mouse
SSHO	Site Safety and Health Officer
SWPPP	Stormwater Pollution Prevention Plan
USFWS	U.S. Fish and Wildlife Service
WESTON	Weston Solutions, Inc.

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1 INTRODUCTION

1.1 PURPOSE AND SCOPE

This Environmental Protection Plan (EPP) has been prepared to outline abatement, control and mitigation measures to be used to protect the environment during the petroleum corrective action activities at Defense Reutilization and Marketing Office (DRMO) Site and Vicinity, located at the former Mare Island Naval Shipyard (MINS), Vallejo, California. This plan addresses the environmental protection requirements for the Petroleum Corrective Action being executed under the U.S. Department of the Navy (DON) Naval Facilities Engineering Command Southwest, Environmental Multiple Award Contract No. N62473-08-D-8825, Contract Task Order No. 0005.

This EPP details environmental compliance procedures as well as regulatory, procedural, and training requirements associated with field activities conducted during the corrective action. The Project Manager is responsible to verify that all project personnel are aware of the compliance requirements in this EPP. This document will be updated if the scope changes or environmental regulations are revised.

1.2 SITE DESCRIPTION

The DRMO Site and Vicinity area covers approximately 9.5 acres located near the intersection of Dump Road and Azuar Drive (Figure D-1) within Installation Restoration (IR) Site 01 (historical fill areas) established under the Installation Restoration Program. This area was originally submerged land located off the original shoreline of Mare Island. Filling of these areas began in the early 1900s with the construction of dikes; the areas between the dikes were later filled with dredge spoils from Mare Island Strait to raise the elevation above the tidal range of San Pablo Bay. IR Site 01 has been subdivided into Investigation Areas (IAs) H1, IA-H2, IA-B.1, IA-B.2, and open space within Transfer Parcel XVI.

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N00221_001372
MARE ISLAND

SENSITIVE RECORD

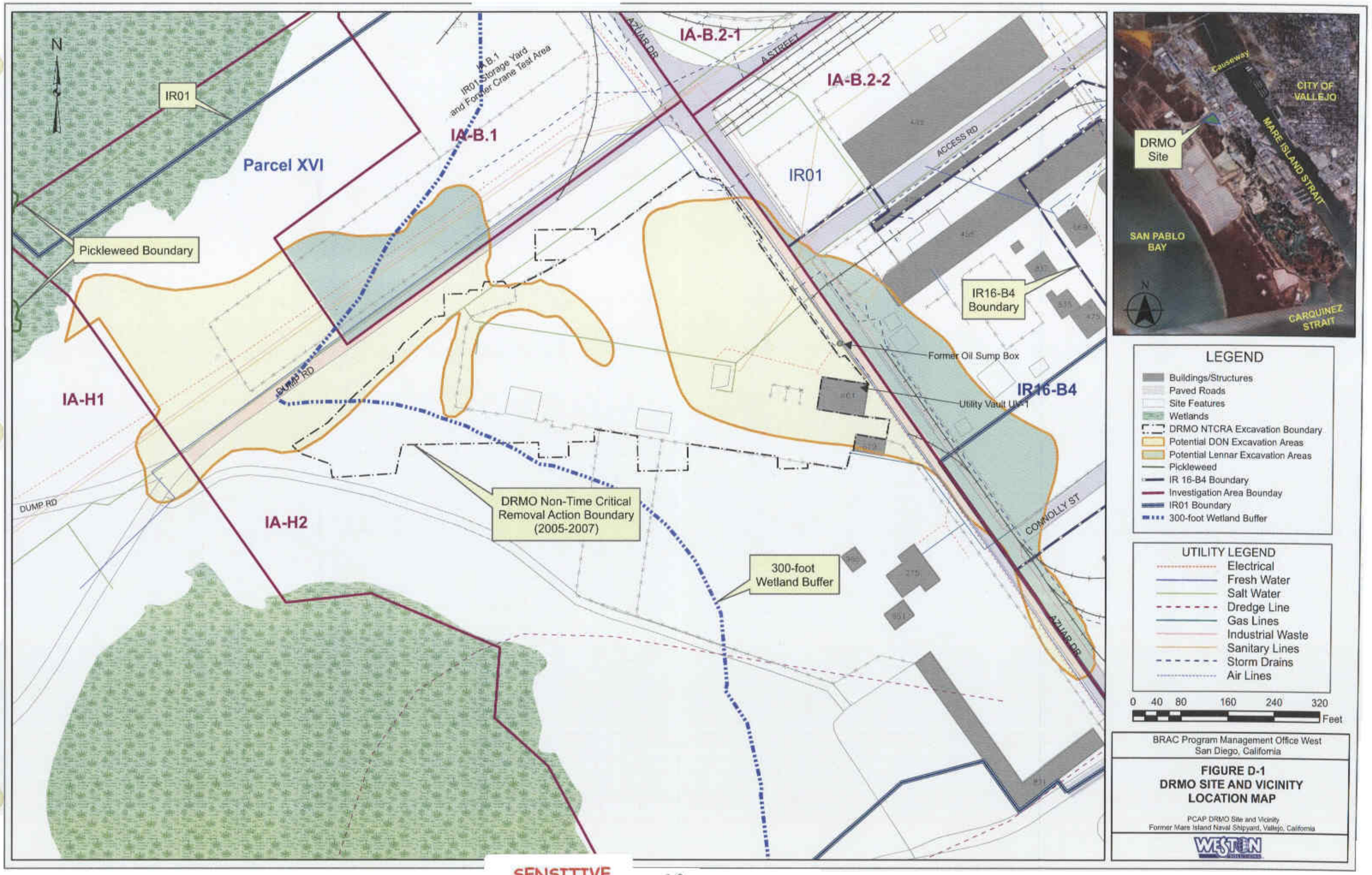
PORTIONS OF THIS RECORD ARE CONSIDERED SENSITIVE AND ARE NOT AVAILABLE FOR PUBLIC VIEWING

FIGURE D-1 – DRMO SITE AND VICINITY LOCATION MAP

FOR ADDITIONAL INFORMATION, CONTACT:

DIANE C. SILVA, COMMAND RECORDS MANAGER, CODE EV33
NAVAL FACILITIES ENGINEERING COMMAND, SOUTHWEST
1220 PACIFIC HIGHWAY (NBSD BLDG. 3519)
SAN DIEGO, CA 92132

TELEPHONE: (619) 556-1280
E-MAIL: diane.silva@navy.mil


N
IR01
Parcel XVI
Pickleweed Boundary
IA-H1
DUMP RD
IA-H2
IR01 Storage Yard and Former Crane Test Area
IA-B.1
AZUAR DR
A STREET
IA-B.2-1
IA-B.2-2
IR01
ACCESS RD
IR16-B4 Boundary
Former Oil Sump Box
Utility Vault UV-1
IR16-B4
DRMO Non-Time Critical Removal Action Boundary (2005-2007)
300-foot Wetland Buffer
CONNOLLY ST
Causeway
CITY OF VALLEJO
MARE ISLAND STRAIT
DRMO Site
SAN PABLO BAY
CARQUINEZ STRAIT
LEGEND
Buildings/Structures
Paved Roads
Site Features
Wetlands
DRMO NTCRA Excavation Boundary
Potential DON Excavation Areas
Potential Lennar Excavation Areas
Pickleweed
IR 16-B4 Boundary
Investigation Area Bounday
IR01 Boundary
300-foot Wetland Buffer
UTILITY LEGEND
Electrical
Fresh Water
Salt Water
Dredge Line
Gas Lines
Industrial Waste
Sanitary Lines
Storm Drains
Air Lines
0 40 80 160 240 320
Feet
BRAC Program Management Office West
San Diego, California
FIGURE D-1
DRMO SITE AND VICINITY
LOCATION MAP
PCAP DRMO Site and Vicinity
Former Mare Island Naval Shipyard, Vallejo, California
WESTON

1.3 SITE HISTORY AND CONDITION

A detailed description of history and condition of the DRMO Site and Vicinity is provided in Section 1.2 of the Petroleum Corrective Action Plan (PCAP).

1.4 CORRECTIVE ACTION

The corrective action is intended to obtain regulatory closure, i.e., "no further action" for the DRMO Site and Vicinity by removing soil and debris contaminated with petroleum hydrocarbons. The corrective action involves the following activities:

- Site setup and erosion/stormwater pollution prevention measures
- Traffic control measures
- Location and isolation of underground utilities
- Petroleum-impacted soil and debris excavation, transport and placement within the Investigation Area H1 Containment Area, and air monitoring
- Confirmation sampling
- Free product removal and disposal
- Groundwater removal and disposal, if necessary
- Backfilling operations
- Site restoration

1.5 PROTECTION OF SELECTED FEATURES

Based on existing site conditions and location, the following environmental resources have been identified as requiring environmental protection during the remedial construction phase:

- Land Resources—Excavation of soil is proposed for this project. Existing conditions in areas outside of the intended remedy will be preserved. Conditions in the area of the completed remedy will be restored in accordance with approved plans for the site.

- Air Quality—Dust may be generated during earthwork activities at the site. The effectiveness of controls, water spray and vapor suppression foam as needed, will be monitored using real time monitoring.

- Water Quality—Surface water quality will be maintained throughout the construction and post-construction phases of the project through implementation of proper erosion controls and monitoring.

- Spill Prevention and Response—Provisions will be made to respond to spills that could adversely affect the environment.

1.6 PLAN IMPLEMENTATION

1.6.1 Project Organization

WESTON Solutions, Inc. (WESTON), the prime contractor, is responsible for implementing the corrective action activities. The DON is the lead agency for the corrective action. The San Francisco Bay Regional Water Quality Control Board and the California Environmental Protection Agency Department of Toxic Substances Control (DTSC) have regulatory oversight. The regulatory agencies will be provided a review and comment period on the PCAP.

The Project Manager and Site Manager, as supported by the Project Quality Control Manager will be responsible for implementing and monitoring compliance with this EPP. The Project Construction Quality Control Plan provides additional details on the project organization. Contact information for key project personnel is included in Table D-1.

1.6.2 Training

WETSON employees will be instructed on the contents of this EPP, as will all of the foremen for subcontractors working on the site. Training will include instruction on detection and prevention of pollution on-site as well as procedures for responding to potential spills or pollution, should they occur. Employees will also be instructed on the installation and maintenance of site erosion controls.

TABLE D-1
KEY PROJECT TEAM MEMBERS

Position (Note: one person may hold multiple positions)	Contact	Contact Number
WESTON Pacific Federal Division Manager	Cris Jespersen	925-948-2662
WESTON Pacific Federal Division Safety Officer	Mike Stuart	505-837-6566
WESTON Project Certified Industrial Hygienist / Program Health and Safety Manager	George Crawford, CIH	610-701-7406
WESTON Project Manager	Dwight Gemar, P.E.	707-562-3352 office 925-899-4674 mobile
WESTON Site Manager	Charles Smith	707-562-3262 office 925-209-9263 mobile
WESTON Site Safety and Health Officer	Cirilo Lacson	707-562-6534 office 707-529-3963 mobile
WESTON Quality Control Manager	Delia Sanchez	707-562-3215 office 925-917-0027 mobile
WESTON Project Geologist	Tracy Walker. P.G.	925-948-2652 925-570-9906 mobile
WESTON Project Engineer	Mike Robirds. P.E.	925-948-2613 office 916-521-3161 mobile
Federal Agency Representatives	EPA: Carolyn D'Almeida	415-972-3150
State Agency Representatives	DTSC: Janet Naito	510-540-3883
	Water Board: Paisha Jorgensen	510-622-2756
DON BRAC Environmental Coordinator	Michael Bloom	619-532-0967
DON Remedial Project Manager (RPM)	Marie Dreyer	619-532-0904
DON Resident Officer in Charge of Construction (ROICC)	Izzat Amadea	510-749-5947 office 510-755-5876 mobile
Caretaker Site Office (CSO)	Melecio Asuncion	415-743-4721 office 510-772-7639 mobile

Notes:

BRAC	Base Realignment and Closure
CIH	Certified Industrial Hygienist
CSO	Caretaker Site Office
DTSC	Department of Toxic Substances Control
EPA	U.S. Environmental Protection Agency
P.E.	Professional Engineer
P.G.	Professional Geologist
ROICC	DON Resident Officer in Charge of Construction
RPM	DON Remedial Project Manager
Water Board	San Francisco Bay Area Regional Water Quality Control Board

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2 LAND RESOURCES

WESTON will conduct a preconstruction survey before on-site removal activities begin. The survey will document the condition of existing vegetation and identify the land resources to be preserved within the authorized work areas. WESTON will locate and mark the existing utilities within the authorized work and staging areas.

2.1 HISTORICAL, ARCHEOLOGICAL, AND CULTURAL RESOURCES

There are no historical, archeological, or cultural resources currently identified within the work area since the site was originally off-shore marsh prior to activities associated with shipyard activities. If such resources are found, then the Remedial Project Manager (RPM) will be notified, work in the area will be stopped, and WESTON and all contractors working under WESTON will record, report, and preserve the finds in accordance with federal regulations covering the Protection of Archeological Resources.

2.2 EXISTING VEGETATION

Once the excavation activities are completed, disturbed areas will be backfilled, restored, and re-vegetated, where necessary. Restoration efforts will address erosion and sedimentation controls.

2.3 FISH AND WILDLIFE/THREATENED, ENDANGERED, AND SENSITIVE SPECIES

Impacts to wildlife habitat located in the vicinity of the site will be minimized by limiting the area of actual construction to the site and controlling runoff from the site.

The Salt Marsh Harvest Mouse (SMHM) (*Reithrodontomys raviventris*), present on the former MINS, is fully protected and listed as endangered under the California Endangered Species Act, and listed as endangered under the federal Endangered Species Act. The SMHM requires special protection against disturbance and destruction. Pickleweed *(Salicomia virginica)* dominated non-tidal wetlands and pickleweed-dominated upland areas adjacent to non-tidal wetlands serve as habitat to the SMHM. The SMHM is known to be highly cover dependent, i.e., it will not frequent areas devoid of cover from raptors and other predators.

Existing wetland vegetation is present near the northwest extent of the work area. A field survey of this area confirmed that the vegetation does not include pickleweed. Since pickleweed is not present in the work areas associated with the removal action, the project is not anticipated to impact the SMHM.

If the excavation is advanced into the non-tidal wetlands, the California Department of Fish and Game (CDFG) and U.S. Fish and Wildlife Service (USFWS) will be contacted before work is continued and the following conservation measures will be implemented:

a. Excavation activities will be conducted when the non-tidal seasonal wetland area is dry.

b. A qualified biologist will conduct a Biological Resource Education Program briefing to all site personnel prior to entry into the non-tidal wetland area.

c. Prior to excavation work extending into the non-tidal wetland area, a qualified biologist will perform a visual reconnaissance in the vicinity of the planned non-tidal wetland work area to identify the presence of any SMHM, California Clapper Rails, or California Black Rails (Rails). If SMHM or Rails are observed, work will not proceed until the USFWS and DGF have been notified and the SMHM and or Rails have left the area on their own volition.

d. Vegetation in upland or non-tidal wetland areas that is greater than 50 feet from dense pickleweed vegetation will be cut using ride-on powered mowers or other equipment with the oversight of a qualified biologist to minimize potential cover for the SMHM within the work areas. Equipment and personnel will be limited to the areas where vegetation has been cut.

e. Dense pickleweed vegetation or vegetation within 50 feet of dense pickleweed vegetation will be cut or removed using non-mechanized tools under the oversight of a qualified biologist.

f. Silt fencing will be installed between areas of dense pickleweed vegetation and work sites immediately following vegetation removal to prevent entry of SMHM into cleared areas. The fencing will be trenched into the ground and backfilled to prevent SMHM from moving underneath the fencing. USFWS and CDFG will be required to review and approve the final design and proposed location of the fencing prior to installation. The

USFWS-approved biological monitor will have the ability to make field adjustments to the location of the fencing depending on site-specific habitat conditions.

g. A USFWS-approved biological monitor will be present to monitor for SMHM (and Rails) each day during work activities in non-tidal wetland work areas. The biological monitor will also periodically (weekly) observe work within adjacent upland areas. The monitor will have the authority to stop work if deemed necessary for any reason to protect SMHM or Rails.

h. The biological monitor will monitor the silt fencing periodically (daily if work in the non-tidal area is affected) to ensure that it remains an effective barrier to prevent entry of SMHM into work areas. Maintenance of the fencing will be conducted as needed throughout the work period, including the habitat restoration work.

i. Prior to the initiation of work each day within non-tidal work areas, the biological monitor will thoroughly inspect the work area and adjacent habitat areas to determine if SMHM (or Rails) are present in the areas and will monitor throughout the day while work activities are occurring.

j. If a mouse of any species (or Rail) is observed, then work will not be initiated or will be stopped immediately by the biological monitor until the mouse (or Rail) leaves the work area on its own volition and the USFWS and CDFG are notified. If the mouse (or Rail) does not leave the work area, work will not be reinitiated until the USFWS and CDFG are contacted and have made a decision on how to proceed with work activities. The biological monitor will direct work activities accordingly.

k. Excavation and haul equipment will be confined to the access routes, designated staging areas, and designated excavation areas.

l. The equipment decontamination area will be located in the designated upland staging area away from the wetland habitat.

m. Upland routes containing non-native vegetation will be used as access routes to the excavation sites to the maximum extent practicable.

n. Any excavation within non-tidal wetlands will be backfilled and graded to an elevation to restore the area to pre-existing or better functions and values, including seeding with appropriate wetland species prior to the rainy season.

Nevertheless, project orientation will include a discussion of the special protection requirements for the SMHM and its habitat. Existing vegetation along the wetland/work area boundary will be mowed as part of the mobilization task and the wetland/work area boundary delineated using silt fencing. Silt fencing will be installed as a barrier to the SMHM in accordance with the Stormwater Pollution Prevention Plan (SWPPP) (Appendix E of the PCAP).

2.4 UTILITIES, BENCHMARKS MONUMENTS, AND WELLS

WESTON will locate and mark all utilities, benchmarks, monuments, and wells within the authorized work and staging area. Utilities, benchmarks, monuments, and wells that are scheduled to remain in service will be protected. Newly installed utilities, benchmarks, monuments, and wells, if any, will be protected from damage.

2.5 SITE ACCESS CONTROL

Access control at the site will consist of blocking access roads leading to restricted or hazardous areas. Safety fences and/or barriers will be used around the perimeter of excavations to prevent access to these areas, as needed.

A sign-in sheet will be used for non-WESTON personnel obtaining access to the site. Visitors will be permitted at the site only with the permission of the Site Safety and Health Officer (SSHO) or their representative.

2.6 MOBILIZATION AND DEMOBILIZATION

As part of mobilization, existing vegetation within the planned work area will be mowed and the boundaries of wetlands adjacent to the work areas will be delineated using silt fencing.

During mobilization and demobilization, extra care will be taken to ensure that all equipment is moved in and out safely. As the job progresses, traffic will be monitored to ensure that it moves smoothly and safely to and from the project site.

2.7 RECYCLING AND WASTE PREVENTION MEASURES

WESTON will implement recycling, waste-prevention, waste minimization, and energy conservation measures into daily operations at the site. Emphasis will be placed on prevention of waste product accumulation; but whenever waste is generated, efforts will be implemented to minimize the quantity. Vehicles and heavy equipment will be shut down when not in operation. Efforts will be made to recycle materials; for example, free product removed from excavations will be sent to a treatment facility for recycling if possible.

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3 AIR QUALITY

The Bay Area Air Quality Management District regulations specify standards for fugitive dust emissions and particulate matter emissions. Dust control measures may be implemented within the area during the field activities for alleviation or prevention of dust nuisance. A street sweeper may be used, if necessary, during backfill soil hauling activities to minimize the amount of soil tracked onto paved roadways. Vapor suppression foam (Rusmar AC-645 Foam or equivalent) will be used as needed during excavation to control nuisance odor. Air monitoring will be performed as described in the Site Health and Safety Plan (Appendix B of the PCAP, Attachment A).

Limited noise will be produced by project equipment and vehicles used at the site during construction operations. However, the noise levels are not expected to cause concern to surrounding populations based on the proposed truck traffic routes (described in the PCAP).

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4 WATER QUALITY

Precautions will be taken to provide for the environmental integrity of surface water and groundwater resources around the project site. WESTON will control the use and disposal of fuels, oils, bitumen, or other harmful materials both on and off the base premises. Special measures will be taken to prevent these materials from polluting surface water or groundwater resources. Water used in on-site processes (decontamination and dust suppression) will not be allowed to re-enter a surface water resource if it will adversely affect water resources.

4.1 CRITICAL PROTECTED AREAS

Areas identified as wetlands are near the work activities (Figure D-1). These areas are sensitive to pollution from chemical and hazardous materials spills. WESTON will take every precaution to prevent the discharge or runoff of hazardous materials into these wetlands. Provisions are in place to respond to spills as noted in Section 5.0 and in the SWPPP (Appendix E of the PCAP).

4.2 STORMWATER POLLUTION PREVENTION

Because excavation activities will be conducted during the dry season and on relatively flat terrain, the potential for erosion or contaminated soil transport offsite is low. However, to prevent surface water runoff from impacting surface water features, various Best Management Practices (BMPs) will be implemented during the corrective action activities to minimize the potential for release of contaminants during construction. Specific BMPs to be instituted and established to protect surface water bodies and to control surface water runoff for the project are detailed in the SWPPP (Appendix E of the PCAP). Installation of silt fencing or straw wattle is one of the primary BMPs to be used.

The silt fencing or straw wattle will be used to reduce the transport of soil from the construction areas and to reduce runoff velocities in the event of a storm. Silt fences or straw wattle will be placed in locations between areas of soil disturbance and wetland and/or drainage ditch features. Standard strength filter fabric fencing or straw wattle will be used in areas downslope from the construction zone, where sedimentation of surface water features is possible. Silt fences will be removed when they have served their useful purpose, but not before the upslope area has been

permanently stabilized. After installation, silt fences will be inspected during and immediately after each prolonged rainfall event; necessary repairs will be made immediately. Silt fencing will remain in place until the affected area is stabilized and re-vegetation efforts, where necessary, are deemed successful.

5 SPILL PREVENTION, CONTROL, AND COUNTERMEASURES

The Site Manger, Charles Smith, is the WESTON-designated person responsible for managing, implementing, and maintaining the spill prevention, control, and countermeasures described below. Personnel working on this project will be made aware of proper equipment operating techniques and inspection procedures to minimize an accidental release of fuels, and proper care will be taken during refueling.

5.1 SUMMARY OF POTENTIAL SPILL SOURCES

The primary contaminant of concern at the DRMO Site and Vicinity is petroleum hydrocarbons. Additional potential spill sources are fuels, oils and other materials used in accomplishing the corrective action.

5.2 DESIGNATED AREAS

Storage, handling, and transferring of hazardous and potentially hazardous material will occur in designated areas where response equipment will be readily available.

5.2.1 Fueling Areas

Fueling of vehicles and large equipment will occur in designated fueling areas with appropriate spill response equipment. All refueling operations for large construction equipment will be conducted in a designated area at least 100 feet from any surface water bodies. Refueling operations will be supervised at all times and appropriate spill control equipment will be available on-site in the event of a release.

Small construction-related equipment such as generators, saws, pumps, and other small portable equipment may be refueled at the point of use but only if the proper spill containment equipment is readily available.

5.2.2 Material-Staging Areas

Material may be delivered to the project site and staged at designated lay-down areas pending access for construction or relocation to the construction site. All known hazardous materials (for

example, fuels and oils) to be used during construction activities will be stored in secondary containment in a central area at least 100 feet from any surface waters.

5.2.3 Equipment-Staging Areas

Construction equipment will be parked when not in use in designated equipment staging areas. Fuel storage tanks, if used, will have full secondary containment. The project site will be fenced and secured when not occupied.

5.2.4 Decontamination Areas

Decontamination facilities for equipment and personnel will be staged in designated areas as required for the work. All trucks and construction equipment will be decontaminated before leaving the site if required. Decontamination wash water, if generated, will be collected and drummed or stored in a temporary steel storage tank for later testing and disposal.

5.2.5 Waste-Storage Areas

Excavated soil and debris will be direct loaded into off-road trucks and transported to the nearby IA-H1 for use a subgrade fill material for an engineered landfill cap under construction within the IA-H1 Containment Area. Other solid wastes generated on-site will be placed in containers and stored at designated staging area(s) within the work area and will be disposed of in accordance with the California State Solid Waste General Provisions as well as local and federal regulations. Potential hazardous or toxic wastes will not be co-mingled with general solid wastes.

Chemical wastes are not anticipated to be generated on-site; however, if produced they will be collected in corrosion-resistant, compatible containers. All collection drums will be labeled, monitored and stored in a designated waste-storage area.

If hazardous wastes, other than petroleum-impacted soil and debris, are generated, they will be characterized and disposed of in accordance with federal, state, and local laws and regulations.

5.3 SPILL PREVENTION AND CONTAINMENT

5.3.1 Potential Spill Sources

Fueling Areas—Portable construction equipment will be fueled using a funnel or hand pump with absorbent materials available for incidental spills. Larger equipment will be fueled within designated fueling areas with an easily accessible spill-response kit.

Material-Storage Areas—Construction materials will be stored within designated material staging area(s).

Equipment-Staging Areas—Fuel tanks will have full secondary containment. Small leaks associated with equipment will be controlled and contained with absorbent materials.

Decontamination Areas—Leaks or spills from drums in the decontamination area will be cleaned up as needed. Wash water, if used, will be collected and drummed or added to a temporary steel tank.

Waste-Storage Area—Leaks or spills from drums in the waste-storage area will be contained within impervious secondary containment, i.e., a bermed area lined with plastic sheeting or a spill pallet.

5.4 SPILL RESPONSE

Initial actions and spill control are the key steps in effective spill response. Initial actions include ensuring the safety of nearby workers and the public, as appropriate, and notifying designated spill response personnel. During the control phase, responders organize the scene and mobilize equipment to control hazards and effect cleanup. The steps are described in further detail below.

5.4.1 Initial Actions

If a spill occurs, immediate action must be taken to ensure the safety of nearby personnel. Emergency services will be immediately contacted if anyone is seriously injured. Any area contaminated by a spill must be blocked to traffic to prevent the spread or further contamination of the area and people. The SSHO or their representative will be notified immediately.

5.4.2 Spill Control

The worst-case scenario includes complete failure of gasoline or diesel fuel tanks on the excavation equipment or trucks. First response is to control all sources of ignition, e.g., flame, spark, heat sources, and assess the immediate threat to human health and the environment. The second task is to shut off fuel valves, if possible, to prevent the spread of fuel. The third task is to control the spread of contaminants to surface water and groundwater resources, typically using absorbent booms or earthen berms. After the spill has been controlled, potential excavation of the impacted area may be necessary.

If the fuel spill cannot be cleaned up without injury to workers, the following actions should be taken based on the size and nature of the spill:

- Restrict all sources of ignition
- Ensure that all workers shut down and secure their equipment if time permits
- Evacuate everyone to a location upwind of the spill if warranted by the type of release

5.5 NOTIFICATION AND REPORTING

The Site Manager will contact the required federal state, and local authorities in addition to notifying the CSO, ROICC, and RPM of any spills requiring spill-response activities. Personnel will be contacted in the sequence provided in the list, which follows. If that person is not available, the next person on the list will be notified.

Caretaker Site Office	Melecio Asuncion	415-743-4721 office 510-772-7639 mobile
DON Resident Officer in Charge of Construction	Izzat Amadea	510-749-5947 office 510-755-5876 mobile
DON Remedial Project Manager	Marie Dreyer	619 532-0904

A summary of the reporting requirements is provided below:

Notify the fire department (911) immediately to report the incident and give the following information to the dispatcher.

- Name, stock number, manufacturer, and amount of material spilled; location and source of spill
- Name and phone number of individual reporting the spill, number of people injured, if any
- Any other pertinent information, for example potential hazards

Control the source if control measures can be performed safely. Contain the release if containment measures can be performed safely. Restrict access to unauthorized personnel and report to the senior fire officer when the fire department arrives, and assist as necessary. Conduct a roll call to ensure that all employees are accounted for and none are trapped in the affected area. Follow approved procedures for proper waste disposal.

5.5.1 Federal Requirements

WESTON is required to report any spill of oil, petroleum product, hazardous substance, or hazardous waste that meeting the following criteria:

- It violates water quality standards
- It produces a visible sheen on surface waters
- It causes a sludge or emulsion to form on the water or exceeds reportable quantity

If one or more of the criteria are met, notify the National Response Hotline (1-800-424-8802) immediately. The EPA Regional Administrator must also be notified within 15 days of a spill or release that requires activation of the spill controls and countermeasures, or of a fire, explosion, or spill of any amount that reached the navigable waters of the United States. If the release of more than 1,000 gallons of oil reaches navigable waters of the United States, or if two spills reportable under the Federal Water Pollution Control Act occur within a 12-month period, a written report must be submitted to the EPA Regional Administrator within 60 days.

5.5.2 California State Requirements

Any release of oil or hazardous material or a spill or release of any material that may impose an environmental risk must be reported to the State Office of Emergency Services (OES). The OES can handle the following situations:

- Oil or hazardous material spills
- Suspicious substance incidents
- Vessel accidents
- Air, water, or land discharges from unknown sources
- Any situation that poses a health risk
- Any situation that poses an environmental risk
- Natural disasters

5.5.3 Local Requirements

The local emergency repose number (911) should be called if a release or spill of oil or gasoline poses a fire or explosion hazard.

5.5.4 External Notification List

Agency and Responsibility Pone Numbers:

- National Response Center (1-800-424-8802) – Report spills to water that violate water quality criteria, cause a sheen, or exceed the reportable quantity.
- State Office of Emergency Services, OES (1-800-852-7550) – Report oil or hazardous materials spills to land or water.
- Local Fire and Emergency Services (911 or Vallejo Fire Department at 1-707-552-3285) – Report spills with fire or explosion potential.

A Spill/Release form from the California Environmental Protection Agency and OES should be filled out for any reportable releases of oil, petroleum products, hazardous chemicals, or hazardous waste.

APPENDIX E
STORMWATER POLLUTION PREVENTION PLAN

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ABBREVIATIONS AND ACRONYMS

°F	degrees Fahrenheit
BMP	Best Management Practice
DON	Department of the Navy
DRMO	Defense Reutilization Marketing Office
FSA	Fenced Scrapyard Area
IA	Investigation Area
MINS	Mare Island Naval Shipyard
PCAP	Petroleum Corrective Action Plan
SWPPP	Stormwater Pollution Prevention Plan
WESTON	Weston Solutions, Inc.

1 CERTIFICATION

I certify under a penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to ensure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, to the best of my knowledge and belief, the information submitted is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Preparer's Signature	8-3-09 Date
Claudette Altamirano Preparer's Name	Sr. Technical Manager Preparer's Title

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2 INTRODUCTION

This stormwater pollution prevention plan (SWPPP) has been prepared to address stormwater pollution prevention during the removal of petroleum-impacted soil and debris to be performed at the Defense Reutilization and Marketing Office (DRMO) Site and Vicinity located at the former Mare Island Naval Shipyard (MINS), Vallejo, California (Figure E-1). This plan is provided as Appendix E to the Petroleum Corrective Action Plan (PCAP) being executed under Naval Facilities Engineering Command Southwest, Environmental Multiple Award Contract No. N62473-08-D-8825, Contract Task Order No. 0005.

This SWPPP presents the measures to be implemented to minimize sediment and other pollutants in stormwater discharges during corrective action activities at the DRMO Site and Vicinity (Figure E-2). The project will consist of the following field activities:

- Site setup and erosion/SWPPP implementation
- Traffic control
- Isolation of utilities
- Petroleum-impacted soil excavation, transport placement, and air monitoring
- Confirmation sampling
- Free product removal and disposal
- Groundwater removal and disposal, as necessary
- Backfillingoperations
- Site restoration

This SWPPP has two major objectives: 1) to help identify the sources of sediment and other pollutants that may affect the quality of stormwater discharges, and 2) to describe and ensure the implementation of practices to reduce sediment and other pollutants in stormwater discharges during construction activities. Attachment 1 to this SWPPP includes Best Management Practices (BMPs) that address source reduction (California Stormwater Quality Association, 2003).

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N00221_001372
MARE ISLAND

SENSITIVE RECORD

PORTIONS OF THIS RECORD ARE CONSIDERED SENSITIVE AND ARE NOT AVAILABLE FOR PUBLIC VIEWING

FIGURES E-1 AND E-2

FOR ADDITIONAL INFORMATION, CONTACT:

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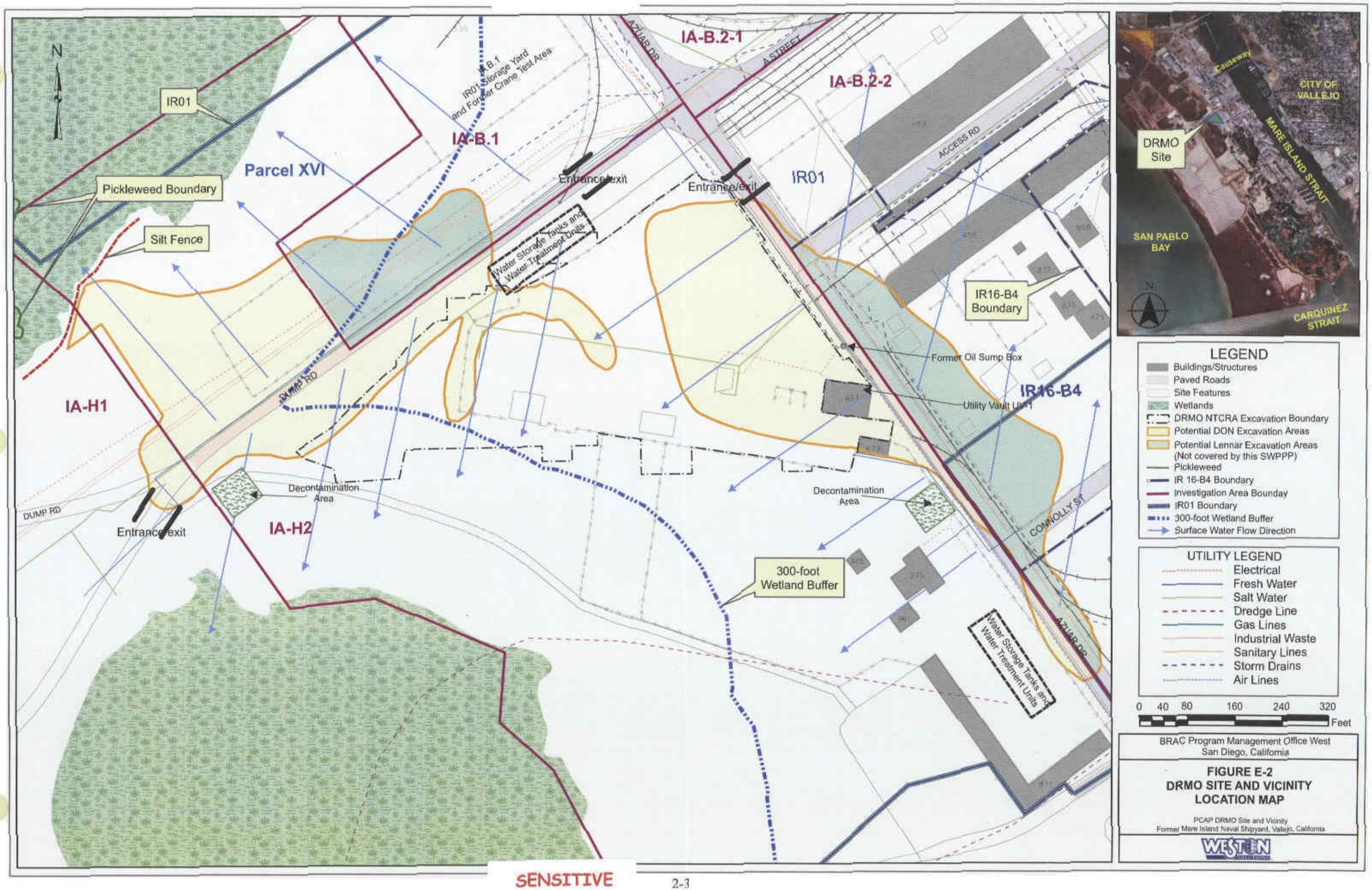
BRAC Program Management Office West
San Diego, California

FIGURE E-1
MARE ISLAND VICINITY MAP

PCAP DRMO Site and Vicinity
Former Mare Island Naval Shipyard, Vallejo, California


N
IR01
Pickleweed Boundary
Silt Fence
Parcel XVI
IA-B.1
IR01 Storage Yard and Former Crane Test Area
IA-B.2-1
A STREET
AZUAR DR
IA-B.2-2
ACCESS RD
IR01
Entrance/exit
Entrance/exit
Water Storage Tanks and Water Treatment Units
IR16-B4 Boundary
Former Oil Sump Box
Utility Vault UV-1
IR16-B4
IA-H1
DUMP RD
Decontamination Area
Decontamination Area
DUMP RD
Entrance/exit
IA-H2
300-foot Wetland Buffer
CONNOLLY ST
AZUAR DR
Water Storage Tanks and Water Treatment Units
Causeway
CITY OF VALLEJO
MARE ISLAND STRAIT
DRMO Site
SAN PABLO BAY
CARQUINEZ STRAIT
LEGEND
Buildings/Structures
Paved Roads
Site Features
Wetlands
DRMO NTCRA Excavation Boundary
Potential DON Excavation Areas
Potential Lennar Excavation Areas (Not covered by this SWPPP)
Pickleweed
IR 16-B4 Boundary
Investigation Area Bounday
IR01 Boundary
300-foot Wetland Buffer
Surface Water Flow Direction
UTILITY LEGEND
Electrical
Fresh Water
Salt Water
Dredge Line
Gas Lines
Industrial Waste
Sanitary Lines
Storm Drains
Air Lines
0 40 80 160 240 320
Feet
BRAC Program Management Office West
San Diego, California
FIGURE E-2
DRMO SITE AND VICINITY
LOCATION MAP
PCAP DRMO Site and Vicinity
Former Mare Island Naval Shipyard, Vallejo, California
WESTON

This plan has been prepared to comply with the substantive requirements of the National Pollutant Discharge Elimination System program, specifically the General Construction Activity Stormwater Permit program, as set forth by the California Regional Water Quality Control Board in August 1999, Resolution No. 99-08-Division of Water Quality. This is hereafter referred to as the General Permit. Regulated sites, including "site grading over 1 acre," are generally required to develop a SWPPP and a Stormwater Monitoring Sampling, and Reporting Program. The total area that may be disturbed by the petroleum corrective action activities includes the entire eight-acre site, therefore a SWPPP is required. Attachment 2 includes the project Stormwater Management Plan Inspection Checklist. Attachment 3 includes a copy of the Notice of Intent submitted to the San Francisco Bay Regional Water Quality Control Board and the SWPPP Checklist which provides the General Permit requirements and where those requirements are addressed within this SWPPP. A copy of the complete General Permit will be maintained in the project files on-site.

Elements included in this SWPPP are as follows:

- Site Description—Section 3
- BMPs to be Implemented for Construction Activities—Section 4
- BMPs to be Implemented for Erosion and Sediment Control—Section 5
- Non-Stormwater Management—Section 6.1
- Waste Management and Disposal—Section 6.2
- Implementation of Other Approved Plans—Section 6.3
- Post-Construction Control—Section 6.4
- Site Inspections and Monitoring—Section 6.5
- Responsible Personnel—Section 6.6
- Compliance—Section 6.7
- Stormwater Pollution Prevention Plan Review and Modifications—Section 6.8

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3 SITE DESCRIPTION

The following section describes the physical setting, including weather at the site, in addition to a brief discussion of construction activities and potential pollution sources.

3.1 SITE LOCATION

The former MINS is located on a peninsula in Solano County, California, approximately 30 miles northeast of San Francisco as shown on Figure E-1. The former MINS facility occupies approximately 3.5 square miles and is bordered by San Pablo Bay on the west, Carquinez Strait on the south, and the Napa River (Mare Island Strait) on the east. MINS was established by the Department of the Navy (DON) in 1854 and served as a Naval Shipyard until it was closed under the Base Realignment and Closure program in April 1996.

The former DRMO Scrapyard is an 8 acre area located in the southwest corner of the intersection of Dump Road and Azuar Drive (Figure E-2). The site includes a 4.6-acre Fenced Scrapyard Area (FSA) that was developed for use as a scrapyard in 1942 or 1943. Historical uses of the DRMO FSA included storage of transformers, batteries, and metal scrap; storage of pesticides for maintenance purposes; bailing of paper; and possible handling of petroleum oils. The scrapyard also managed surplus material and scrap from MINS and other military facilities until mid-1995, when remaining inventory was removed. The DRMO site was excluded from the Eastern Early Transfer Parcel that was transferred to the City of Vallejo in 2000, and currently remains the responsibility of the Navy Base Realignment and Closure Program Management Office West. The site also includes portions of Dump Road and Azuar Drive on the north and west sides of the DRMO. The west side of the Crane Test Area is also planned to be a part of this removal action.

3.2 CLIMATE AND PRECIPITATION

Since 1970, monthly average temperatures on Mare Island have exhibited a seasonal pattern ranging from an average low of 48 degrees Fahrenheit (°F), to an average high of 73°F.

The closest long-term precipitation gauge is located at Mare Island, COOP ID 045333. The average annual rainfall at that location was a mean of 19.78 inches per year. Most precipitation

typically occurs during the months of November through March, while summers are relatively dry.

Table E-1
Mean Monthly Rainfall Amounts (inches)
Mare Island, California

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
4.63	2.63	2.50	1.40	0.11	0.20	0.06	0.04	0.15	1.53	3.27	3.24

Annual Mean = 19.78 inches
Source: Western Regional Climate Center, 2009

3.3 EXISTING STORMWATER CONVEYANCE SYSTEM

The runoff coefficient for the site is 0.36 as detailed in Attachment 4. The closest surface water is a marsh habitat approximately 300 feet to the west of the DRMO Site. Mare Island Strait is approximately 2,000 feet to the east. The proposed excavation areas are generally divided into the following areas, which are described below. Post-construction imperviousness will be restored to the existing levels with the exception of a portion of Dump Road where is asphalt paving will be replaced with base rock. Therefore, there the post-construction run-off coefficient will be 0.32.

Fenced Scrapyard Area—The ground surface is generally flat, with elevations ranging from approximately 12 to 14 feet above mean sea level. Surface water drainage infiltrates into the subsurface within the FSA which is 1.5 feet below the surrounding grade. Areas outside the FSA flow from upland areas to non-tidal wetlands to the west.

Azuar Drive and Area to the Northeast—Azuar Drive is paved and is one of the main access roads at Mare Island. The surface runoff along Azuar Drive runs off to either sides of the road and generally follows the road alignment to the intersection with Dump Road, then flows toward the non-tidal wetlands to the west.

Dump Road and Area to the Northwest—A portion of Dump Road is paved. The road provides access to only the WESTON site office and Investigation Area (IA) H1. Surface runoff

along Dump Road runs off to either sides of the road. The runoff along the south side of Dump Road discharges to the south and the runoff along the north discharges to the north.

Crane Test Area—The Crane Test Area is a generally flat area that is mostly paved. Run-off generally discharges to the north.

Although excavation activities are scheduled for the dry summer months, hay bales, straw wattles, or silt fence will be installed at the existing drainage for each site during excavation activities, backfill, and site restoration to prevent the migration of soil or sediments away from the site. Additional information is presented in Section 3.4.

3.4 CONSTRUCTION ACTIVITIES

3.4.1 Excavation of Contaminated Soil

Construction activities at this site include excavation of contaminated soil as part of the petroleum corrective action. Petroleum-impacted soil and debris will be excavated and loaded for transport to IA-H1 for placement as subgrade material within the IA-H1 Containment Area. The anticipated lateral extent of the excavation area shown in Figure E-2 is based on the Draft Final Technical Memorandum (CH2M HILL, 2009). However, the actual depth and lateral extent of the excavation will be based on visual evidence of petroleum contamination. Petroleum-impacted soil located in close proximity to buildings or other immovable structures will be removed to the maximum extent practicable, taking into account personnel safety and potential damage to the structures. Petroleum-impacted soil and debris may be located under an appreciable layer of overburden soil that shows no visible indication of contamination. In those cases, the overburden soil may be stockpiled, sampled, and used for backfill soil as outlined in the Sampling and Analysis Plan provided as Appendix A to the PCAP. Alternately, the overburden may be transported to the IA-H1 Containment Area for placement as subgrade beneath the engineered cap.

Erosion sediment controls will be in place before excavation begins at each of the sites. Petroleum-impacted soil and debris will be excavated using a CAT 330 excavator and be loaded directly into CAT 740 (40-ton capacity) off-road trucks for transport to the IA-H1 Containment Area. The working face of the excavation will be sloped 1:1 or as dictated by site conditions to

allow the trucks to be safely positioned near the excavator for loading. The truck route will proceed west from the DRMO to the IA-H1 Containment Area following a haul road established just south of Dump Road (see Figure 5-2 in the PCAP). Care will be taken to not overload the haul trucks to avoid spillage. Since IA-H1 requirements prohibit the disposal of liquid waste, free product encountered during soil excavation activities will be removed when necessary using a vacuum truck and stored in portable steel tanks pending recycling or waste characterization as described further in the Waste Management Plan provided as Appendix F to the PCAP. Soil saturated with groundwater will be allowed to gravity drain prior to loading for transport to IA-H1. If necessary, dewatering of accumulated groundwater will be performed before backfilling activities. Free product will be removed as previously described using floating product skimmer pumps and absorbent booms. Dewatering will then be performed by pumping water through a filter system. The filter system will consist of four 10-micron bag filters and two 1-micron cartridges operating in a series to remove sediment from the water. Following filtration, the groundwater will be pumped through Organophillic Clay Vessels for residual oil removal if necessary. The pre-treated water will be transferred to steel storage tanks for sampling and disposal in accordance with the Vallejo sanitation and Flood Control District discharge requirements.

Water trucks will be used to provide dust control at the excavation site and the along the haul route to IA-H1. Water trucks will be refilled from a water tower established in IA-H1. An air monitoring station will be established upwind and downwind at the site perimeter during soil disturbance activities.

Confirmation sampling will be performed in accordance with the requirements provided in the Sampling and Analysis Plan (Appendix A of the PCAP). Samples will be collected prior to backfilling for verification that the removal objectives have been met.

Upon receipt of confirmation sample data below the screening criteria and regulatory agency approval, clean borrow fill and potential overburden soil will be used to backfill for the excavations. Fill will be brought to the site by dump trucks and staged onsite. Azuar Drive will be re-paved in accordance with the City of Vallejo requirements. Dump Road will be completed using aggregate base material.

Active construction area BMPs will be implemented in accordance with BMPs included in Attachment 1.

3.4.2 Post-Construction Activities

Acceptable backfill is considered to be general fill or crushed stone with a maximum size of 3-inch. Overburden and any other imported borrow fill material will be tested for the appropriate chemical analyses to demonstrate that it meets acceptance requirements. All sources of backfill material, including overburden, Mare Island sources, and import borrow fill, will be approved by the regulatory agencies before use as backfill.

Each layer of backfill will be compacted by making three 2-way passes using a 20-ton sheepsfoot compactor. In general the pre-excavation contours will be restored using the backfill material. However in the Parcel XVI area north of Dump Road, the elevation will be adjusted to provide a gradual slope to match the adjacent IA-H1 elevation to the west and the non-tidal wetland elevation to the north. The pre-construction surface water runoff pathways will be restored. After final grading, disturbed areas within Parcel XVI and the DRMO FSA will be hydroseeded with a mixture of mulch, fertilizer and the following seed mix:

- California brome (*Bromus carinatus)*—20 pounds per acre live seed
- Meadow barley (*Hordeum brachyantherum)*—10 pounds per acre live seed
- Blue wild rye (*Eleymus glaucaus)*—10 pounds per acre live seed

Within the roadway alignment for Azuar Drive, the general fill will be compacted using three 2-way passes performed with a 20-ton soil sheepsfoot compactor. Backfilling will be performed with import fill capable of achieving 90 percent compaction. The top 24 inches of Class II AB material (31 inches if on-island recycled aggregate is used) will be compacted to 95 percent soil density. For safety reasons, only the top 4 feet will be tested for soil compaction. The final asphalt layer on Azuar Drive will consist of a 5.5-inch thick layer of asphaltic concrete Type B with a tack coat in accordance with the City of Vallejo Regulations and Standards Specifications for Public Improvements (City of Vallejo, 1992) and Section 39 of the California Department of Transportation (2006b) Standard Specifications.

For Dump Road, the compacted general fill will be brought to within 12 inches of the final road surface. A woven geotextile fabric (Mirafi 500X or equivalent) will be placed within one foot of the final surface and covered with 12 inches of compacted aggregate (Class II AB).

After all field activities have been completed and accepted by the Navy, all temporary facilities will be removed. Demobilization activities will include decontamination of equipment, removal of all equipment and materials, collection and disposal of all waste material, general housekeeping, and a final site inspection by the ROICC to verify that all work has been completed as contracted.

3.5 CONSTRUCTION SEQUENCE AND SCHEDULE

The construction sequence will be provided by Weston Solutions, Inc. (WESTON) and approved by the DON prior to beginning any excavation. The field work for this work is tentatively scheduled to begin July 2009 and be completed by October 2009. The detailed project schedule is included as Figure 1-4 in the PCAP. Because the project duration is estimated be less than one year, annual project reporting is not anticipated to be required for this project. If the project extends beyond July 2010, the requirements in the General Permit will be re-evaluated to determine compliance requirements are met regarding annual reporting.

The phased construction activities will generally follow the process of petroleum-impacted soil excavation, transport of excavated soil to the IA-H1 Containment Area, confirmation sampling, backfilling, and site restoration. Stormwater Drainage and Construction BMPs, will be developed based on actual site conditions and will be updated if necessary as work progresses.

3.6 SOURCE IDENTIFICATION

Hazardous materials used during construction will include gasoline, diesel fuel, motor oil, hydraulic fluid, and various lubricants. Acutely hazardous materials will not be used or stored on site during construction. There are no feasible alternatives to motor fuels and oils for operating construction equipment.

The petroleum-impacted soil to be excavated from the DRMO Site and Vicinity are a potential source of pollution. Free product consisting of weathered Bunker C fuel oil or similar products

within excavations is also anticipated. Excavated material will be immediately loaded onto off-road dump trucks for transport to the IA-H1 Containment Area. Stockpiling of excavated soil within the site is not anticipated. Small volumes of hazardous materials will be temporarily stored on site inside fuel and lubrication service trucks during equipment servicing and maintenance activities.

There is minimal potential for environmental impacts from hazardous material incidents during construction. The most likely incident would involve minor spills or drips of diesel or hydraulic oil associated with the use of large earthmoving equipment. A spill of recovered Bunker C or other free product removed from the excavation could also be a source of release. Recovered free product will be stored in a steel container inside a bermed area. Impacts from such incidents will be mitigated by thoroughly cleaning up minor spills as soon as they occur. An incident involving a service vehicle or refueling truck release would present the worst-case scenario for release of hazardous materials. In the case of a large spill of hazardous material, the area would be immediately bermed and/or contained, followed by blocking of any nearby storm drain inlets to prevent off-site release. The spill would be reviewed by the Site Manager to determine if the DON and any regulatory agencies require notification as described in Section 5.5 of the Environmental Protection Plan (Appendix D of the PCAP).

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4 BEST MANAGEMENT PRACTICES TO BE IMPLEMENTED FOR CONSTRUCTION ACTIVITIES

The following section summarizes BMPs for construction activities that may cause pollution. Attachment 1 provides detailed construction implementation descriptions for these activities. Construction activity reference numbers (such as WM-4) can be found in parentheses behind the BMP section headers below. Additional BMPs may be developed as necessary prior to each construction phase. The BMPs for construction activities that may pollute the stormwater focus on the following potential pollutant sources:

- Contaminated fine-grained soil (silt) from the excavation suspended in stormwater runoff
- Hazardous waste including fuel, oil, and lubricant spills
- Solid waste from construction activities

Good housekeeping and maintenance practices are key factors in reducing potential off-site migration of pollution. These practices will include elimination of brush, litter, or other items including solid waste that may clog drainage devices and pathways or enter the stormwater flow within the excavation areas. In addition, sediment trapping/filtering devices will be maintained to ensure that sediment clogging does not take place and to ensure the required level of effectiveness. Good housekeeping and maintenance at the site also requires employee participation and requires specific training and control systems. The following BMPs will be implemented at the site and are essential to maintain site control of potential pollution sources.

4.1 SPILL PREVENTION AND CONTROL (WM-4)

Work at the site will be conducted under specific procedures developed by WESTON, included in the Accident Prevention Plan, Environmental Protection Plan, and Waste Management Plan provided as PCAP Appendices B, D and F, respectively. These documents are maintained on-site and outline the specific steps the Site Manager will follow in the case of a spill or release.

4.2 SOLID WASTE MANAGEMENT (WM-5)

All construction waste shall be maintained in approved containers in designated areas located throughout the site. Removed debris will be direct-loaded onto trucks and transported to the

IA-H1 Containment Area for disposal. Stockpiles are not anticipated to be necessary for this project. Specific procedures to handle all types of waste expected at the site have been developed by WESTON and are included in the Waste Management Plan. The plan will be maintained at the site.

4.3 HAZARDOUS WASTE MANAGEMENT AND CONTAMINATED SOIL MANAGEMENT (WM-6 AND WM-7)

The excavated petroleum-impacted soil and debris will be direct loaded for disposal at the IA-H1 Containment Area. Soil stockpiles are not anticipated to be necessary at the site. Other potentially hazardous waste materials include removed free petroleum product. Free product will be stored in a portable tank. Specific procedures to handle all types of waste expected at the site have been developed by WESTON and are included in the Waste Management Plan. The plan will be maintained at the site.

4.4 LIQUID WASTE MANAGEMENT (WM-10)

Other liquid wastes that may be generated during this project include accumulated groundwater in excavations and waste water. Accumulated groundwater may be necessary to be removed in order to allow backfilling and compaction operations. Groundwater and waste water will be discharged under a Vallejo Sanitation Flood and Control District permit.

4.5 PAVING AND GRINDING OPERATIONS (NS-3)

Site restoration activities will include re-paving of Azuar Drive. Paving operations will be conducted in a manner to prevent the discharge of paving contaminants.

4.6 VEHICLE AND EQUIPMENT CLEANING (NS-8)

Heavy equipment and vehicles will require decontamination at the end of the project prior to demobilization. Decontamination activities will be conducted in a controlled area where wash water can be managed within the IA-H1.

4.7 VEHICLE AND HEAVY EQUIPMENT FUELING (NS-9)

4.7.1 Diesel Fuel

During construction activities, diesel fuel will be delivered and pumped directly into the equipment. Fueling will occur in designated areas, which are located away from drainage courses, to prevent the run-on of stormwater and the runoff of spills. If a spill occurs during on-site fueling activities, the individual noting the spill will be responsible for contacting the WESTON Site Manager, who will notify the DON, who in turn is responsible for notifying regulatory authorities as necessary, and managing the cleanup and removal of any potentially contaminated media in accordance with regulations.

4.7.2 Gasoline and Vehicle-Related Lubricants

Gasoline used for passenger vehicles and trucks will be obtained from off-site filling stations. If any spill occurs during on-site fueling activities, the personnel fueling vehicles and trucks will be responsible for contacting the WESTON Site Manager for cleanup and removal of contaminated soils.

All heavy equipment and vehicles are inspected at the beginning and end of each workday for oil, lubricant, and other fluid leaks. Leaking equipment will be repaired or removed from service and small leaks will be cleaned up immediately. Excessive greasing of components will be avoided, and accumulated grease will be wiped off. Any rags contaminated with grease will be properly disposed of off-site. All oil and lubricant supplies will be securely stored in 55-gallon drums or bins in the heavy equipment and maintenance area to prevent an uncontrolled discharge of spilled materials.

4.8 VEHICLE AND EQUIPMENT MAINTENANCE (NS-10)

4.8.1 Heavy Equipment

In the event that a spill associated with heavy equipment oil changes and maintenance (diesel, hydraulic fluid, or gas leak) occurs, the WESTON Site Manager will be notified, the spill area will be decontaminated, and any contaminated material will be containerized and stored in the heavy equipment and maintenance area until proper off-site disposal.

4.8.2 Site Vehicles

Oil changes and maintenance for site vehicles will normally be performed by off-site mechanics.

5 BEST MANAGEMENT PRACTICES TO BE IMPLEMENTED FOR EROSION AND SEDIMENTATION CONTROL

BMPs for erosion and sediment control are presented in Attachment 1 and will be referenced and implemented (as necessary) during construction activities. BMP reference numbers are be found in parentheses behind the BMPs as indicated in the section headers below.

5.1 CONSTRUCTION SEQUENCE/SCHEDULING (EC-1)

Grading construction will be sequenced to minimize the amount and duration of soil exposed to erosion by wind, rain, runoff, and vehicle tracking.

5.2 PRESERVATION OF EXISTING VEGETATION (EC-2)

To the extent possible excavation activities will be conducted such that vegetation removal or disturbance is limited.

5.3 HYDROSEEDING (EC-4)

Following final backfill and grading of non-road surfaces located on the north and south side of Dump Road and within the Fenced Scrapyard Area, WESTON will hydroseed this area using native grasses as specified in the CQCP. Hydroseeding will be conducted once backfilling and grading activities have been completed.

5.4 EARTH DIKES AND DRAINAGE SWALES (EC-9)

The field work activities are planned for the non-rainy reason. However, in the event rain is forecasted while operations are ongoing, it may be necessary to construct drainage swales and/or earth dikes to divert run-on or run-off.

5.5 DUST (WIND EROSION) CONTROLS (WE-1)

Dust control measures will be used to stabilize soil from wind erosion and to reduce dust generated from the following construction activities: excavation activities, stockpile management, and sediment tracking onto paved roads. A 3,800-gallon water truck will be used

for dust control. The source of water for the truck will be from elevated tanks at the IA-H1 site near Dump Road. In addition to wet suppression (watering), preventative measures to be used for dust control include minimizing disturbed surface areas, limiting on-site vehicular traffic and speed, and controlling the number and activity of vehicles on the site at a given time. During high wind conditions, work will continue unless air monitoring results show that dust suppression measures cannot effectively control dust emissions. Wind speeds above 25 miles per hour may require re-evaluation of dust management including but not limited to increasing the volume of water to control dust suppression, reducing vehicle speed, or temporarily suspending operations.

5.6 SILT FENCE AND FIBER ROLLS (SE-1 AND SE-5)

Straw wattles, hay bales, or silt fence will be installed across drainage swales leading to nearby non-tidal wetlands as sediment trapping/filtering devices downgradient of all disturbed areas where stormwater runoff may occur.

5.7 SAND BAG BARRIER (SE-8)

Although not specifically anticipated, WESTON may install sand bags as a barrier or to divert surface runoff within the project site.

6 MANAGEMENT AND COMPLIANCE

The following sections describe non-stormwater management, waste management and disposal, implementation of other plans, post-construction controls, site inspections and monitoring, responsible personnel, compliance, and SWPPP review and modifications.

6.1 NON-STORMWATER MANAGEMENT

Management of non-stormwater discharges will be implemented as part of this SWPPP. In addition to wet/dry season observations, weekly inspections of the grading, vegetative cover, roads, and stormwater/erosion control structures (including secondary containment structures) will be conducted. Any authorized or unauthorized non-stormwater discharges, if observed, will be documented on the appropriate form in Attachment 2 of this SWPPP.

6.2 WASTE MANAGEMENT AND DISPOSAL

Residuals and wastes are generated by construction and site operation activities. Waste management involves the following four steps:

1. Characterization
2. Handling and storage
3. Transportation
4. Disposal or recycling as appropriate

The Waste Management Plan provides detailed information on the above steps. The most important step, with regards to maintaining compliance with the SWPPP, is handling and storage. In order to reduce the potential for and severity of hazardous material spills, hazardous materials and wastes will be stored within lined secondary containment. Portable spill pallets may be used for larger containers such as drums.

If a spill or leak is discovered, it must be immediately cleaned up and the source of the leak repaired. The Project Manager, Site Manager, and Site Safety and Health Officer will be notified of all spills and releases to determine if they are reportable to regulatory agencies and, if necessary, to notify the DON of the spill. The Site Manager will determine what additional

BMPs will need to be implemented to prevent future spills. If a spill occurs and threatens to contaminate stormwater generated at the site, monitoring and sampling must be conducted as described in Section 6.5.

6.3 IMPLEMENTATION OF OTHER APPROVED PLANS

Several site-specific management plans approved by WESTON and the DON have been implemented to provide a framework by which the construction and site operations are executed. These plans describe the methods that will be used to execute, integrate, and coordinate emergency response procedures, control quality, address safety and health, and generally perform the work in a sound manner.

6.4 POST-CONSTRUCTION CONTROLS

BMPs to be implemented during post-construction work include, but are not limited to, grading during backfilling activities and re-paving.

6.5 SITE INSPECTIONS AND MONITORING

All stormwater pollution prevention measures and BMPs will be inspected weekly prior to the rainy season and before (prediction of) and following (measurement of) each rain event of 0.25 inches or more per 24 hours. This inspection will allow for evaluation of the BMPs currently employed in preventing the release of pollutants. All inspections will be performed by trained personnel, and the appropriate forms from Attachment 2 will be completed. Inspections at a minimum will be documented to note the date of the inspection, the individual(s) who performed the inspection, and the observations. A list of trained inspectors is included in Section 6.6. Any BMP inadequacies shall be recorded and modified and upgraded or repaired as soon as possible. All completed inspection forms shall be retained at the WESTON office for a minimum of 3 years.

If visual monitoring indicates that there has been a breach, malfunction, leakage, or spill of potentially contaminated media, water sampling will be conducted. If a discharge were to occur as a result of a breach of an associated BMP, the monitoring/sampling point would be located as close as practicable to the point nearest where the breach occurred.

6.6 RESPONSIBLE PERSONNEL

The individuals, who comprise the Pollution Prevention Team and are responsible for implementing and making any necessary revisions to this SWPPP, are the following personnel:

Name	Title	Responsibility
Claudette Altamirano	Regulatory Specialist	Preparation of SWPPP and selection of BMPs. Revisions to the SWPPP.
Charles Smith	Site Manager	Implementation of construction SWPPP, maintaining inspection and monitoring records, reporting, and regulatory notification.
Delia Sanchez	Project Quality Control Manager	Implementation of inspection and monitoring activities of the SWPPP and BMPs.
Charles Smith	Site Manager	Trained Inspectors
Delia Sanchez	Project Quality Control Manager	
Mark Major	Site Superintendent	

All personnel involved with the ongoing monitoring and maintenance of the SWPPP will attend a training class held by the Site Manager, or their designee, before the beginning of the soil excavation phase of construction. The Site Manager will maintain a file of the training documentation. The SWPPP will be reviewed as it relates to the various responsibilities for personnel implementation and awareness.

6.7 COMPLIANCE

WESTON and the subcontractors will implement and comply with the program set forth within this SWPPP. Within 30 days of any noncompliance, WESTON and/or the Subcontractors will correct or submit a schedule for necessary corrections. Written certification that the corrections were undertaken will be issued to the DON upon completion of the activities.

6.8 STORMWATER POLLUTION PREVENTION PLAN REVIEW AND MODIFICATIONS

WESTON will amend this SWPPP, if deemed necessary, to address changes in the physical condition of the site or to maintain compliance in areas where this SWPPP was determined inadequate.

7 REFERENCES

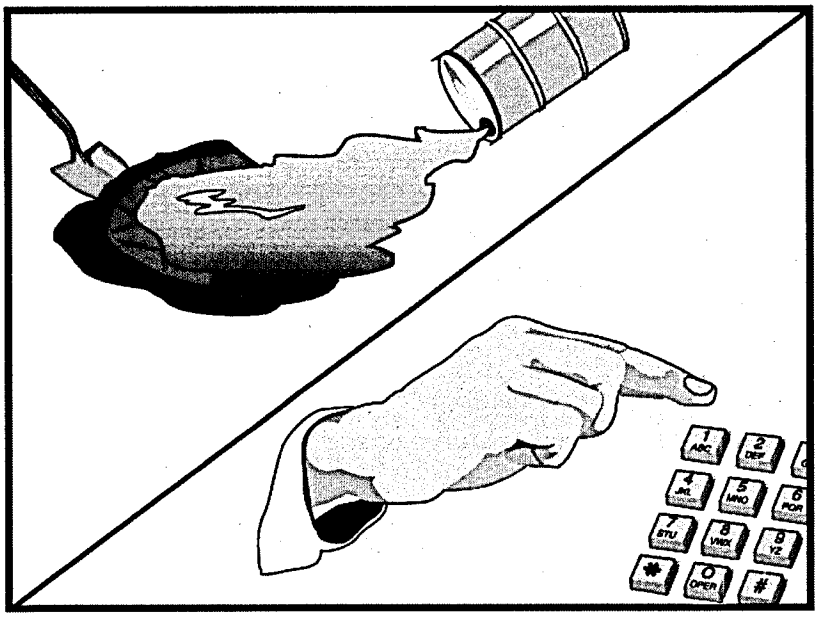
California Stormwater Quality Association. 2003. "Stormwater Best Management Practices Handbook." Available at http://www.cabmphandbooks.com.

CH2M HILL. 2009. *Draft Final Technical Memorandum, Total Petroleum Hydrocarbons at the Defense Reutilization and Marketing Office Site and Vicinity, Former Mare Island Naval Shipyard, Vallejo, California.* March.

Western Regional Climate Center. 2009. "Period of Record General Climate Summary – Precipitation." Available at http://www.wrcc.dri.edu/cgi-bin.

ATTACHMENT 1
BEST MANAGEMENT PRACTICES

Spill Prevention and Control WM-4



Objectives

EC	Erosion Control	
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	☑

Legend:

☑ **Primary Objective**

☒ **Secondary Objective**

Targeted Constituents

Sediment	☑
Nutrients	☑
Trash	☑
Metals	☑
Bacteria	
Oil and Grease	☑
Organics	☑

Potential Alternatives

None

Description and Purpose

Prevent or reduce the discharge of pollutants to drainage systems or watercourses from leaks and spills by reducing the chance for spills, stopping the source of spills, containing and cleaning up spills, properly disposing of spill materials, and training employees.

This best management practice covers only spill prevention and control. However, WM-1, Materials Delivery and Storage, and WM-2, Material Use, also contain useful information, particularly on spill prevention. For information on wastes, see the waste management BMPs in this section.

Suitable Applications

This BMP is suitable for all construction projects. Spill control procedures are implemented anytime chemicals or hazardous substances are stored on the construction site, including the following materials:

- Soil stabilizers/binders
- Dust palliatives
- Herbicides
- Growth inhibitors
- Fertilizers
- Deicing/anti-icing chemicals

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- Fuels
- Lubricants
- Other petroleum distillates

Limitations

- In some cases it may be necessary to use a private spill cleanup company.
- This BMP applies to spills caused by the contractor and subcontractors.
- Procedures and practices presented in this BMP are general. Contractor should identify appropriate practices for the specific materials used or stored onsite

Implementation

The following steps will help reduce the stormwater impacts of leaks and spills:

Education

- Be aware that different materials pollute in different amounts. Make sure that each employee knows what a "significant spill" is for each material they use, and what is the appropriate response for "significant" and "insignificant" spills.
- Educate employees and subcontractors on potential dangers to humans and the environment from spills and leaks.
- Hold regular meetings to discuss and reinforce appropriate disposal procedures (incorporate into regular safety meetings).
- Establish a continuing education program to indoctrinate new employees.
- Have contractor's superintendent or representative oversee and enforce proper spill prevention and control measures.

General Measures

- To the extent that the work can be accomplished safely, spills of oil, petroleum products, substances listed under 40 CFR parts 110,117, and 302, and sanitary and septic wastes should be contained and cleaned up immediately.
- Store hazardous materials and wastes in covered containers and protect from vandalism.
- Place a stockpile of spill cleanup materials where it will be readily accessible.
- Train employees in spill prevention and cleanup.
- Designate responsible individuals to oversee and enforce control measures.
- Spills should be covered and protected from stormwater runon during rainfall to the extent that it doesn't compromise clean up activities.
- Do not bury or wash spills with water.

- Store and dispose of used clean up materials, contaminated materials, and recovered spill material that is no longer suitable for the intended purpose in conformance with the provisions in applicable BMPs.
- Do not allow water used for cleaning and decontamination to enter storm drains or watercourses. Collect and dispose of contaminated water in accordance with WM-10, Liquid Waste Management.
- Contain water overflow or minor water spillage and do not allow it to discharge into drainage facilities or watercourses.
- Place proper storage, cleanup, and spill reporting instructions for hazardous materials stored or used on the project site in an open, conspicuous, and accessible location.
- Keep waste storage areas clean, well organized, and equipped with ample cleanup supplies as appropriate for the materials being stored. Perimeter controls, containment structures, covers, and liners should be repaired or replaced as needed to maintain proper function.

Cleanup

- Clean up leaks and spills immediately.
- Use a rag for small spills on paved surfaces, a damp mop for general cleanup, and absorbent material for larger spills. If the spilled material is hazardous, then the used cleanup materials are also hazardous and must be sent to either a certified laundry (rags) or disposed of as hazardous waste.
- Never hose down or bury dry material spills. Clean up as much of the material as possible and dispose of properly. See the waste management BMPs in this section for specific information.

Minor Spills

- Minor spills typically involve small quantities of oil, gasoline, paint, etc. which can be controlled by the first responder at the discovery of the spill.
- Use absorbent materials on small spills rather than hosing down or burying the spill.
- Absorbent materials should be promptly removed and disposed of properly.
- Follow the practice below for a minor spill:
  - Contain the spread of the spill.
  - Recover spilled materials.
  - Clean the contaminated area and properly dispose of contaminated materials.

Semi-Significant Spills

- Semi-significant spills still can be controlled by the first responder along with the aid of other personnel such as laborers and the foreman, etc. This response may require the cessation of all other activities.

- Spills should be cleaned up immediately:
  - Contain spread of the spill.
  - Notify the project foreman immediately.
  - If the spill occurs on paved or impermeable surfaces, clean up using "dry" methods (absorbent materials, cat litter and/or rags). Contain the spill by encircling with absorbent materials and do not let the spill spread widely.
  - If the spill occurs in dirt areas, immediately contain the spill by constructing an earthen dike. Dig up and properly dispose of contaminated soil.
  - If the spill occurs during rain, cover spill with tarps or other material to prevent contaminating runoff.

Significant/Hazardous Spills

- For significant or hazardous spills that cannot be controlled by personnel in the immediate vicinity, the following steps should be taken:
  - Notify the local emergency response by dialing 911. In addition to 911, the contractor will notify the proper county officials. It is the contractor's responsibility to have all emergency phone numbers at the construction site.
  - Notify the Governor's Office of Emergency Services Warning Center, (916) 845-8911.
  - For spills of federal reportable quantities, in conformance with the requirements in 40 CFR parts 110,119, and 302, the contractor should notify the National Response Center at (800) 424-8802.
  - Notification should first be made by telephone and followed up with a written report.
  - The services of a spills contractor or a Haz-Mat team should be obtained immediately. Construction personnel should not attempt to clean up until the appropriate and qualified staffs have arrived at the job site.
  - Other agencies which may need to be consulted include, but are not limited to, the Fire Department, the Public Works Department, the Coast Guard, the Highway Patrol, the City/County Police Department, Department of Toxic Substances, California Division of Oil and Gas, Cal/OSHA, etc.

Reporting

- Report significant spills to local agencies, such as the Fire Department; they can assist in cleanup.
- Federal regulations require that any significant oil spill into a water body or onto an adjoining shoreline be reported to the National Response Center (NRC) at 800-424-8802 (24 hours).

Use the following measures related to specific activities:

Vehicle and Equipment Maintenance

- If maintenance must occur onsite, use a designated area and a secondary containment, located away from drainage courses, to prevent the runon of stormwater and the runoff of spills.
- Regularly inspect onsite vehicles and equipment for leaks and repair immediately
- Check incoming vehicles and equipment (including delivery trucks, and employee and subcontractor vehicles) for leaking oil and fluids. Do not allow leaking vehicles or equipment onsite.
- Always use secondary containment, such as a drain pan or drop cloth, to catch spills or leaks when removing or changing fluids.
- Place drip pans or absorbent materials under paving equipment when not in use.
- Use absorbent materials on small spills rather than hosing down or burying the spill. Remove the absorbent materials promptly and dispose of properly.
- Promptly transfer used fluids to the proper waste or recycling drums. Don't leave full drip pans or other open containers lying around
- Oil filters disposed of in trashcans or dumpsters can leak oil and pollute stormwater. Place the oil filter in a funnel over a waste oil-recycling drum to drain excess oil before disposal. Oil filters can also be recycled. Ask the oil supplier or recycler about recycling oil filters.
- Store cracked batteries in a non-leaking secondary container. Do this with all cracked batteries even if you think all the acid has drained out. If you drop a battery, treat it as if it is cracked. Put it into the containment area until you are sure it is not leaking.

Vehicle and Equipment Fueling

- If fueling must occur onsite, use designate areas, located away from drainage courses, to prevent the runon of stormwater and the runoff of spills.
- Discourage "topping off" of fuel tanks.
- Always use secondary containment, such as a drain pan, when fueling to catch spills/ leaks.

Costs

Prevention of leaks and spills is inexpensive. Treatment and/ or disposal of contaminated soil or water can be quite expensive.

Inspection and Maintenance

- Inspect and verify that activity–based BMPs are in place prior to the commencement of associated activities. While activities associated with the BMP are under way, inspect weekly during the rainy season and of two-week intervals in the non-rainy season to verify continued BMP implementation.
- Inspect BMPs subject to non-stormwater discharge daily while non-stormwater discharges occur.

- Keep ample supplies of spill control and cleanup materials onsite, near storage, unloading, and maintenance areas.
- Update your spill prevention and control plan and stock cleanup materials as changes occur in the types of chemicals onsite.

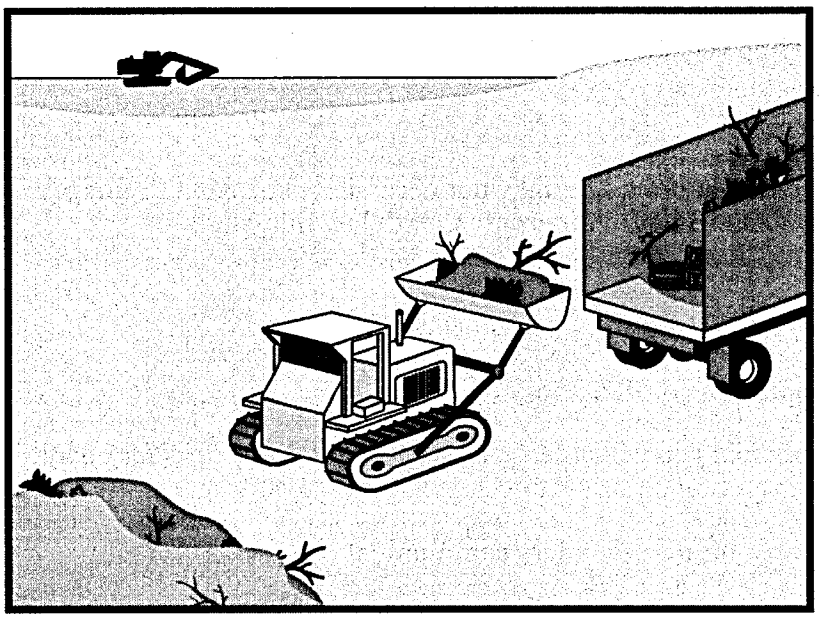
References

Blueprint for a Clean Bay: Best Management Practices to Prevent Stormwater Pollution from Construction Related Activities; Santa Clara Valley Nonpoint Source Pollution Control Program, 1995.

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

Stormwater Management for Construction Activities; Developing Pollution Prevention Plans and Best Management Practice, EPA 832-R-92005; USEPA, April 1992.

Solid Waste Management WM-5



Objectives

EC	Erosion Control	
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	☑

Legend:

☑ **Primary Objective**

☒ **Secondary Objective**

Targeted Constituents

Sediment	☑
Nutrients	☑
Trash	☑
Metals	☑
Bacteria	
Oil and Grease	☑
Organics	☑

Potential Alternatives

None

Description and Purpose

Solid waste management procedures and practices are designed to prevent or reduce the discharge of pollutants to stormwater from solid or construction waste by providing designated waste collection areas and containers, arranging for regular disposal, and training employees and subcontractors.

Suitable Applications

This BMP is suitable for construction sites where the following wastes are generated or stored:

- Solid waste generated from trees and shrubs removed during land clearing, demolition of existing structures (rubble), and building construction
- Packaging materials including wood, paper, and plastic
- Scrap or surplus building materials including scrap metals, rubber, plastic, glass pieces and masonry products
- Domestic wastes including food containers such as beverage cans, coffee cups, paper bags, plastic wrappers, and cigarettes
- Construction wastes including brick, mortar, timber, steel and metal scraps, pipe and electrical cuttings, non-hazardous equipment parts, styrofoam and other materials used to transport and package construction materials

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- Highway planting wastes, including vegetative material, plant containers, and packaging materials

Limitations

Temporary stockpiling of certain construction wastes may not necessitate stringent drainage related controls during the non-rainy season or in desert areas with low rainfall.

Implementation

The following steps will help keep a clean site and reduce stormwater pollution:

- Select designated waste collection areas onsite.
- Inform trash-hauling contractors that you will accept only watertight dumpsters for onsite use. Inspect dumpsters for leaks and repair any dumpster that is not watertight.
- Locate containers in a covered area or in a secondary containment.
- Provide an adequate number of containers with lids or covers that can be placed over the container to keep rain out or to prevent loss of wastes when it is windy.
- Plan for additional containers and more frequent pickup during the demolition phase of construction.
- Collect site trash daily, especially during rainy and windy conditions.
- Remove this solid waste promptly since erosion and sediment control devices tend to collect litter.
- Make sure that toxic liquid wastes (used oils, solvents, and paints) and chemicals (acids, pesticides, additives, curing compounds) are not disposed of in dumpsters designated for construction debris.
- Do not hose out dumpsters on the construction site. Leave dumpster cleaning to the trash hauling contractor.
- Arrange for regular waste collection before containers overflow.
- Clean up immediately if a container does spill.
- Make sure that construction waste is collected, removed, and disposed of only at authorized disposal areas.

Education

- Have the contractor's superintendent or representative oversee and enforce proper solid waste management procedures and practices.
- Instruct employees and subcontractors on identification of solid waste and hazardous waste.
- Educate employees and subcontractors on solid waste storage and disposal procedures.

- Hold regular meetings to discuss and reinforce disposal procedures (incorporate into regular safety meetings).
- Require that employees and subcontractors follow solid waste handling and storage procedures.
- Prohibit littering by employees, subcontractors, and visitors.
- Minimize production of solid waste materials wherever possible.

Collection, Storage, and Disposal

- Littering on the project site should be prohibited.
- To prevent clogging of the storm drainage system, litter and debris removal from drainage grates, trash racks, and ditch lines should be a priority.
- Trash receptacles should be provided in the contractor's yard, field trailer areas, and at locations where workers congregate for lunch and break periods.
- Litter from work areas within the construction limits of the project site should be collected and placed in watertight dumpsters at least weekly, regardless of whether the litter was generated by the contractor, the public, or others. Collected litter and debris should not be placed in or next to drain inlets, stormwater drainage systems, or watercourses.
- Dumpsters of sufficient size and number should be provided to contain the solid waste generated by the project.
- Full dumpsters should be removed from the project site and the contents should be disposed of by the trash hauling contractor.
- Construction debris and waste should be removed from the site biweekly or more frequently as needed.
- Construction material visible to the public should be stored or stacked in an orderly manner.
- Stormwater runon should be prevented from contacting stored solid waste through the use of berms, dikes, or other temporary diversion structures or through the use of measures to elevate waste from site surfaces.
- Solid waste storage areas should be located at least 50 ft from drainage facilities and watercourses and should not be located in areas prone to flooding or ponding.
- Except during fair weather, construction and highway planting waste not stored in watertight dumpsters should be securely covered from wind and rain by covering the waste with tarps or plastic.
- Segregate potentially hazardous waste from non-hazardous construction site waste.
- Make sure that toxic liquid wastes (used oils, solvents, and paints) and chemicals (acids, pesticides, additives, curing compounds) are not disposed of in dumpsters designated for construction debris.

- For disposal of hazardous waste, see WM-6, Hazardous Waste Management. Have hazardous waste hauled to an appropriate disposal and/or recycling facility.
- Salvage or recycle useful vegetation debris, packaging and surplus building materials when practical. For example, trees and shrubs from land clearing can be used as a brush barrier, or converted into wood chips, then used as mulch on graded areas. Wood pallets, cardboard boxes, and construction scraps can also be recycled.

Costs

All of the above are low cost measures.

Inspection and Maintenance

- Inspect and verify that activity–based BMPs are in place prior to the commencement of associated activities. While activities associated with the BMP are under way, inspect weekly during the rainy season and of two-week intervals in the non-rainy season to verify continued BMP implementation.
- Inspect BMPs subject to non-stormwater discharge daily while non-stormwater discharges occur
- Inspect construction waste area regularly.
- Arrange for regular waste collection.

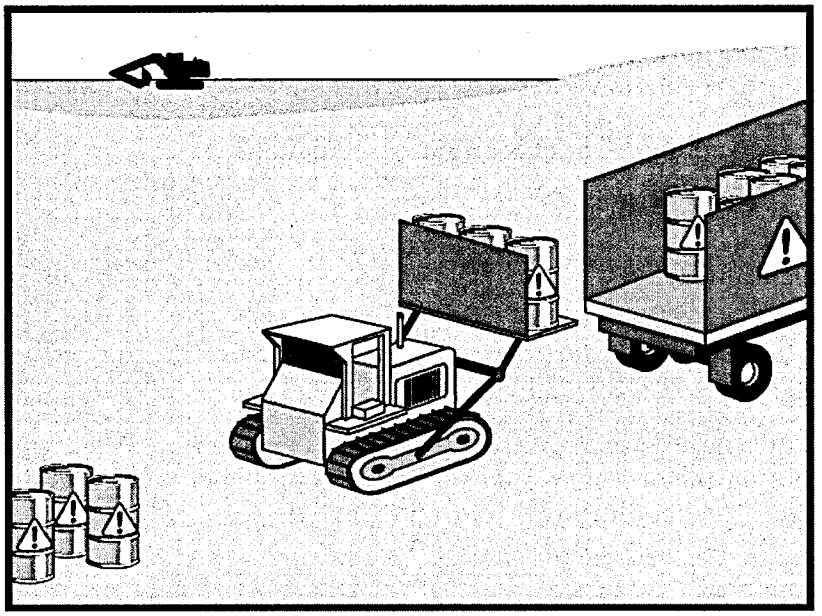
References

Processes, Procedures and Methods to Control Pollution Resulting from All Construction Activity, 430/9-73-007, USEPA, 1973.

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

Stormwater Management for Construction Activities; Developing Pollution Prevention Plans and Best Management Practice, EPA 832-R-92005; USEPA, April 1992.

Hazardous Waste Management WM-6



Objectives

EC	Erosion Control	
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	☑

Legend:

☑ **Primary Objective**

☒ **Secondary Objective**

Targeted Constituents

Sediment	
Nutrients	☑
Trash	☑
Metals	☑
Bacteria	☑
Oil and Grease	☑
Organics	☑

Potential Alternatives

None

Description and Purpose

Prevent or reduce the discharge of pollutants to stormwater from hazardous waste through proper material use, waste disposal, and training of employees and subcontractors.

Suitable Applications

This best management practice (BMP) applies to all construction projects. Hazardous waste management practices are implemented on construction projects that generate waste from the use of:

- Petroleum Products
- Concrete Curing Compounds
- Palliatives
- Septic Wastes
- Stains
- Wood Preservatives
- Asphalt Products
- Pesticides
- Acids
- Paints
- Solvents
- Roofing Tar
- Any materials deemed a hazardous waste in California, Title 22 Division 4.5, or listed in 40 CFR Parts 110, 117, 261, or 302

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In addition, sites with existing structures may contain wastes, which must be disposed of in accordance with federal, state, and local regulations. These wastes include:

- Sandblasting grit mixed with lead-, cadmium-, or chromium-based paints
- Asbestos
- PCBs (particularly in older transformers)

Limitations

- Hazardous waste that cannot be reused or recycled must be disposed of by a licensed hazardous waste hauler.
- Nothing in this BMP relieves the contractor from responsibility for compliance with federal, state, and local laws regarding storage, handling, transportation, and disposal of hazardous wastes.
- This BMP does not cover aerially deposited lead (ADL) soils. For ADL soils refer to WM-7, Contaminated Soil Management.

Implementation

The following steps will help reduce stormwater pollution from hazardous wastes:

Material Use

- Wastes should be stored in sealed containers constructed of a suitable material and should be labeled as required by Title 22 CCR, Division 4.5 and 49 CFR Parts 172, 173, 178, and 179.
- All hazardous waste should be stored, transported, and disposed as required in Title 22 CCR, Division 4.5 and 49 CFR 261-263.
- Waste containers should be stored in temporary containment facilities that should comply with the following requirements:
  - Temporary containment facility should provide for a spill containment volume equal to 1.5 times the volume of all containers able to contain precipitation from a 25 year storm event, plus the greater of 10% of the aggregate volume of all containers or 100% of the capacity of the largest tank within its boundary, whichever is greater.
  - Temporary containment facility should be impervious to the materials stored there for a minimum contact time of 72 hours.
  - Temporary containment facilities should be maintained free of accumulated rainwater and spills. In the event of spills or leaks, accumulated rainwater and spills should be placed into drums after each rainfall. These liquids should be handled as a hazardous waste unless testing determines them to be non-hazardous. Non-hazardous liquids should be sent to an approved disposal site.
  - Sufficient separation should be provided between stored containers to allow for spill cleanup and emergency response access.

- Incompatible materials, such as chlorine and ammonia, should not be stored in the same temporary containment facility.
- Throughout the rainy season, temporary containment facilities should be covered during non-working days, and prior to rain events. Covered facilities may include use of plastic tarps for small facilities or constructed roofs with overhangs.

- Drums should not be overfilled and wastes should not be mixed.
- Unless watertight, containers of dry waste should be stored on pallets.
- Do not over-apply herbicides and pesticides. Prepare only the amount needed. Follow the recommended usage instructions. Over application is expensive and environmentally harmful. Apply surface dressings in several smaller applications, as opposed to one large application. Allow time for infiltration and avoid excess material being carried offsite by runoff. Do not apply these chemicals just before it rains. People applying pesticides must be certified in accordance with federal and state regulations.
- Paint brushes and equipment for water and oil based paints should be cleaned within a contained area and should not be allowed to contaminate site soils, watercourses, or drainage systems. Waste paints, thinners, solvents, residues, and sludges that cannot be recycled or reused should be disposed of as hazardous waste. When thoroughly dry, latex paint and paint cans, used brushes, rags, absorbent materials, and drop cloths should be disposed of as solid waste.
- Do not clean out brushes or rinse paint containers into the dirt, street, gutter, storm drain, or stream. "Paint out" brushes as much as possible. Rinse water-based paints to the sanitary sewer. Filter and reuse thinners and solvents. Dispose of excess oil-based paints and sludge as hazardous waste.
- The following actions should be taken with respect to temporary contaminant:
  - Ensure that adequate hazardous waste storage volume is available.
  - Ensure that hazardous waste collection containers are conveniently located.
  - Designate hazardous waste storage areas onsite away from storm drains or watercourses and away from moving vehicles and equipment to prevent accidental spills.
  - Minimize production or generation of hazardous materials and hazardous waste on the job site.
  - Use containment berms in fueling and maintenance areas and where the potential for spills is high.
  - Segregate potentially hazardous waste from non-hazardous construction site debris.
  - Keep liquid or semi-liquid hazardous waste in appropriate containers (closed drums or similar) and under cover.

- Clearly label all hazardous waste containers with the waste being stored and the date of accumulation.
- Place hazardous waste containers in secondary containment.
- Do not allow potentially hazardous waste materials to accumulate on the ground.
- Do not mix wastes.
- Use all of the product before disposing of the container.
- Do not remove the original product label; it contains important safety and disposal information.

Waste Recycling Disposal

- Select designated hazardous waste collection areas onsite.
- Hazardous materials and wastes should be stored in covered containers and protected from vandalism.
- Place hazardous waste containers in secondary containment.
- Do not mix wastes, this can cause chemical reactions, making recycling impossible and complicating disposal.
- Recycle any useful materials such as used oil or water-based paint.
- Make sure that toxic liquid wastes (used oils, solvents, and paints) and chemicals (acids, pesticides, additives, curing compounds) are not disposed of in dumpsters designated for construction debris.
- Arrange for regular waste collection before containers overflow.
- Make sure that hazardous waste (e.g., excess oil-based paint and sludge) is collected, removed, and disposed of only at authorized disposal areas.

Disposal Procedures

- Waste should be disposed of by a licensed hazardous waste transporter at an authorized and licensed disposal facility or recycling facility utilizing properly completed Uniform Hazardous Waste Manifest forms.
- A Department of Health Services certified laboratory should sample waste to determine the appropriate disposal facility.
- Properly dispose of rainwater in secondary containment that may have mixed with hazardous waste.
- Attention is directed to "Hazardous Material", "Contaminated Material", and "Aerially Deposited Lead" of the contract documents regarding the handling and disposal of hazardous materials.

Education

- Educate employees and subcontractors on hazardous waste storage and disposal procedures.
- Educate employees and subcontractors on potential dangers to humans and the environment from hazardous wastes.
- Instruct employees and subcontractors on safety procedures for common construction site hazardous wastes.
- Instruct employees and subcontractors in identification of hazardous and solid waste.
- Hold regular meetings to discuss and reinforce hazardous waste management procedures (incorporate into regular safety meetings).
- The contractor's superintendent or representative should oversee and enforce proper hazardous waste management procedures and practices.
- Make sure that hazardous waste is collected, removed, and disposed of only at authorized disposal areas.
- Warning signs should be placed in areas recently treated with chemicals.
- Place a stockpile of spill cleanup materials where it will be readily accessible.
- If a container does spill, clean up immediately.

Costs

All of the above are low cost measures.

Inspection and Maintenance

- Inspect and verify that activity–based BMPs are in place prior to the commencement of associated activities. While activities associated with the BMP are under way, inspect weekly during the rainy season and of two week intervals in the non-rainy season to verify continued BMP implementation.
- Inspect BMPs subject to non-stormwater discharge daily while non-stormwater discharges occur
- Hazardous waste should be regularly collected.
- A foreman or construction supervisor should monitor onsite hazardous waste storage and disposal procedures.
- Waste storage areas should be kept clean, well organized, and equipped with ample cleanup supplies as appropriate for the materials being stored.
- Perimeter controls, containment structures, covers, and liners should be repaired or replaced as needed to maintain proper function.
- Hazardous spills should be cleaned up and reported in conformance with the applicable Material Safety Data Sheet (MSDS) and the instructions posted at the project site.

- The National Response Center, at (800) 424-8802, should be notified of spills of federal reportable quantities in conformance with the requirements in 40 CFR parts 110, 117, and 302. Also notify the Governors Office of Emergency Services Warning Center at (916) 845-8911.
- A copy of the hazardous waste manifests should be provided.

References

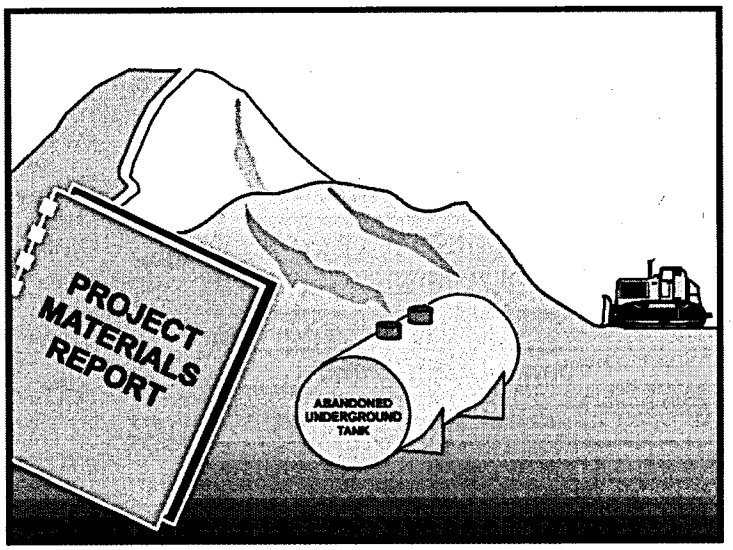
Blueprint for a Clean Bay: Best Management Practices to Prevent Stormwater Pollution from Construction Related Activities; Santa Clara Valley Nonpoint Source Pollution Control Program, 1995.

Processes, Procedures and Methods to Control Pollution Resulting from All Construction Activity, 430/9-73-007, USEPA, 1973.

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

Stormwater Management for Construction Activities; Developing Pollution Prevention Plans and Best Management Practice, EPA 832-R-92005; USEPA, April 1992.

Contaminated Soil Management WM-7



Objectives

EC	Erosion Control	
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	☑

Legend:

☑ **Primary Objective**

☒ **Secondary Objective**

Description and Purpose

Prevent or reduce the discharge of pollutants to stormwater from contaminated soil and highly acidic or alkaline soils by conducting pre-construction surveys, inspecting excavations regularly, and remediating contaminated soil promptly.

Suitable Applications

Contaminated soil management is implemented on construction projects in highly urbanized or industrial areas where soil contamination may have occurred due to spills, illicit discharges, aerial deposition, past use and leaks from underground storage tanks.

Limitations

Contaminated soils that cannot be treated onsite must be disposed of offsite by a licensed hazardous waste hauler. The presence of contaminated soil may indicate contaminated water as well. See NS-2, Dewatering Operations, for more information.

The procedures and practices presented in this BMP are general. The contractor should identify appropriate practices and procedures for the specific contaminants known to exist or discovered onsite.

Implementation

Most owners and developers conduct pre-construction environmental assessments as a matter of routine. Contaminated soils are often identified during project planning and development with known locations identified in the plans, specifications and in the SWPPP. The contractor should review applicable reports and investigate appropriate call-outs in the plans, specifications, and

Targeted Constituents

Sediment	
Nutrients	☑
Trash	☑
Metals	☑
Bacteria	☑
Oil and Grease	☑
Organics	☑

Potential Alternatives

None

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SWPPP. Recent court rulings holding contractors liable for cleanup costs when they unknowingly move contaminated soil highlight the need for contractors to confirm a site assessment is completed before earth moving begins.

The following steps will help reduce stormwater pollution from contaminated soil:

- Conduct thorough, pre-construction inspections of the site and review documents related to the site. If inspection or reviews indicated presence of contaminated soils, develop a plan before starting work.
- Look for contaminated soil as evidenced by discoloration, odors, differences in soil properties, abandoned underground tanks or pipes, or buried debris.
- Prevent leaks and spills. Contaminated soil can be expensive to treat and dispose of properly. However, addressing the problem before construction is much less expensive than after the structures are in place.
- The contractor may further identify contaminated soils by investigating:
  - Past site uses and activities
  - Detected or undetected spills and leaks
  - Acid or alkaline solutions from exposed soil or rock formations high in acid or alkaline forming elements
  - Contaminated soil as evidenced by discoloration, odors, differences in soil properties, abandoned underground tanks or pipes, or buried debris.
  - Suspected soils should be tested at a certified laboratory.

Education

- Have employees and subcontractors complete a safety training program which meets 29 CFR 1910.120 and 8 CCR 5192 covering the potential hazards as identified, prior to performing any excavation work at the locations containing material classified as hazardous.
- Educate employees and subcontractors in identification of contaminated soil and on contaminated soil handling and disposal procedures.
- Hold regular meetings to discuss and reinforce disposal procedures (incorporate into regular safety meetings).

Handling Procedures for Material with Aerially Deposited Lead (ADL)

- Materials from areas designated as containing (ADL) may, if allowed by the contract special provisions, be excavated, transported, and used in the construction of embankments and/or backfill.
- Excavation, transportation, and placement operations should result in no visible dust.
- Caution should be exercised to prevent spillage of lead containing material during transport.

- Quality should be monitored during excavation of soils contaminated with lead.

Handling Procedures for Contaminated Soils

- Minimize onsite storage. Contaminated soil should be disposed of properly in accordance with all applicable regulations. All hazardous waste storage will comply with the requirements in Title 22, CCR, Sections 66265.250 to 66265.260.
- Test suspected soils at an approved certified laboratory.
- Work with the local regulatory agencies to develop options for treatment or disposal if the soil is contaminated.
- Avoid temporary stockpiling of contaminated soils or hazardous material.
- Take the following precautions if temporary stockpiling is necessary:
  - Cover the stockpile with plastic sheeting or tarps.
  - Install a berm around the stockpile to prevent runoff from leaving the area.
  - Do not stockpile in or near storm drains or watercourses.
- Remove contaminated material and hazardous material on exteriors of transport vehicles and place either into the current transport vehicle or into the excavation prior to the vehicle leaving the exclusion zone.
- Monitor the air quality continuously during excavation operations at all locations containing hazardous material.
- Procure all permits and licenses, pay all charges and fees, and give all notices necessary and incident to the due and lawful prosecution of the work, including registration for transporting vehicles carrying the contaminated material and the hazardous material.
- Collect water from decontamination procedures and treat or dispose of it at an appropriate disposal site.
- Collect non-reusable protective equipment, once used by any personnel, and dispose of at an appropriate disposal site.
- Install temporary security fence to surround and secure the exclusion zone. Remove fencing when no longer needed.
- Excavate, transport, and dispose of contaminated material and hazardous material in accordance with the rules and regulations of the following agencies (the specifications of these agencies supersede the procedures outlined in this BMP):
  - United States Department of Transportation (USDOT)
  - United States Environmental Protection Agency (USEPA)
  - California Environmental Protection Agency (CAL-EPA)

- California Division of Occupation Safety and Health Administration (CAL-OSHA)
- Local regulatory agencies

Procedures for Underground Storage Tank Removals

- Prior to commencing tank removal operations, obtain the required underground storage tank removal permits and approval from the federal, state, and local agencies that have jurisdiction over such work.
- To determine if it contains hazardous substances, arrange to have tested, any liquid or sludge found in the underground tank prior to its removal.
- Following the tank removal, take soil samples beneath the excavated tank and perform analysis as required by the local agency representative(s).
- The underground storage tank, any liquid or sludge found within the tank, and all contaminated substances and hazardous substances removed during the tank removal and transported to disposal facilities permitted to accept such waste.

Water Control

- All necessary precautions and preventive measures should be taken to prevent the flow of water, including ground water, from mixing with hazardous substances or underground storage tank excavations. Such preventative measures may consist of, but are not limited to, berms, cofferdams, grout curtains, freeze walls, and seal course concrete or any combination thereof.
- If water does enter an excavation and becomes contaminated, such water, when necessary to proceed with the work, should be discharged to clean, closed top, watertight transportable holding tanks, treated, and disposed of in accordance with federal, state, and local laws.

Costs

Prevention of leaks and spills is inexpensive. Treatment or disposal of contaminated soil can be quite expensive.

Inspection and Maintenance

- Inspect and verify that activity–based BMPs are in place prior to the commencement of associated activities. While activities associated with the BMP are under way, inspect weekly during the rainy season and of two-week intervals in the non-rainy season to verify continued BMP implementation.
- Arrange for contractor's Water Pollution Control Manager, foreman, and/or construction supervisor to monitor onsite contaminated soil storage and disposal procedures.
- Monitor air quality continuously during excavation operations at all locations containing hazardous material.
- Coordinate contaminated soils and hazardous substances/waste management with the appropriate federal, state, and local agencies.

- Implement WM-4, Spill Prevention and Control, to prevent leaks and spills as much as possible.

References

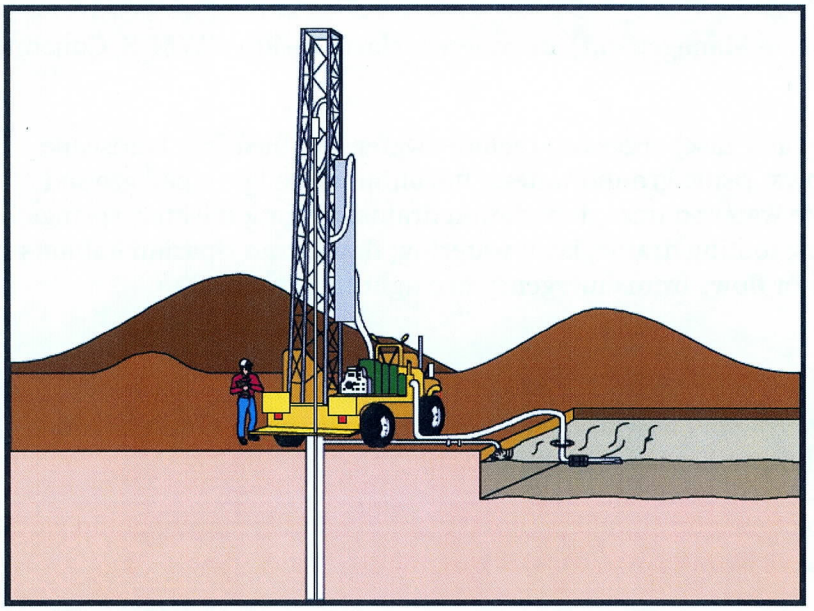
Blueprint for a Clean Bay: Best Management Practices to Prevent Stormwater Pollution from Construction Related Activities; Santa Clara Valley Nonpoint Source Pollution Control Program, 1995.

Processes, Procedures and Methods to Control Pollution Resulting from All Construction Activity, 430/9-73-007, USEPA, 1973.

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

Stormwater Management for Construction Activities; Developing Pollution Prevention Plans and Best Management Practice, EPA 832-R-92005; USEPA, April 1992.

Liquid Waste Management WM-10



Objectives

EC	Erosion Control	
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	☑

Legend:

☑ **Primary Objective**

☒ **Secondary Objective**

Targeted Constituents

Sediment	☑
Nutrients	☑
Trash	☑
Metals	☑
Bacteria	
Oil and Grease	☑
Organics	

Potential Alternatives

None

Description and Purpose

Liquid waste management includes procedures and practices to prevent discharge of pollutants to the storm drain system or to watercourses as a result of the creation, collection, and disposal of non-hazardous liquid wastes.

Suitable Applications

Liquid waste management is applicable to construction projects that generate any of the following non-hazardous by-products, residuals, or wastes:

- Drilling slurries and drilling fluids
- Grease-free and oil-free wastewater and rinse water
- Dredgings
- Other non-stormwater liquid discharges not permitted by separate permits

Limitations

- Disposal of some liquid wastes may be subject to specific laws and regulations or to requirements of other permits secured for the construction project (e.g., NPDES permits, Army Corps permits, Coastal Commission permits, etc.).
- Liquid waste management does not apply to dewatering operations (NS-2 Dewatering Operations), solid waste management (WM-5, Solid Waste Management), hazardous

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wastes (WM-6, Hazardous Waste Management), or concrete slurry residue (WM-8, Concrete Waste Management).

- Typical permitted non-stormwater discharges can include: water line flushing; landscape irrigation; diverted stream flows; rising ground waters; uncontaminated pumped ground water; discharges from potable water sources; foundation drains; irrigation water; springs; water from crawl space pumps; footing drains; lawn watering; flows from riparian habitats and wetlands; and discharges or flows from emergency fire fighting activities.

Implementation

General Practices

- Instruct employees and subcontractors how to safely differentiate between non-hazardous liquid waste and potential or known hazardous liquid waste.
- Instruct employees, subcontractors, and suppliers that it is unacceptable for any liquid waste to enter any storm drainage device, waterway, or receiving water.
- Educate employees and subcontractors on liquid waste generating activities and liquid waste storage and disposal procedures.
- Hold regular meetings to discuss and reinforce disposal procedures (incorporate into regular safety meetings).
- Verify which non-stormwater discharges are permitted by the statewide NPDES permit; different regions might have different requirements not outlined in this permit.
- Apply NS-8, Vehicle and Equipment Cleaning for managing wash water and rinse water from vehicle and equipment cleaning operations.

Containing Liquid Wastes

- Drilling residue and drilling fluids should not be allowed to enter storm drains and watercourses and should be disposed of.
- If an appropriate location is available, drilling residue and drilling fluids that are exempt under Title 23, CCR § 2511(g) may be dried by infiltration and evaporation in a containment facility constructed in conformance with the provisions concerning the Temporary Concrete Washout Facilities detailed in WM-8, Concrete Waste Management.
- Liquid wastes generated as part of an operational procedure, such as water-laden dredged material and drilling mud, should be contained and not allowed to flow into drainage channels or receiving waters prior to treatment.
- Liquid wastes should be contained in a controlled area such as a holding pit, sediment basin, roll-off bin, or portable tank.
- Containment devices must be structurally sound and leak free.
- Containment devices must be of sufficient quantity or volume to completely contain the liquid wastes generated.

- Precautions should be taken to avoid spills or accidental releases of contained liquid wastes. Apply the education measures and spill response procedures outlined in WM-4, Spill Prevention and Control.

- Containment areas or devices should not be located where accidental release of the contained liquid can threaten health or safety or discharge to water bodies, channels, or storm drains.

Capturing Liquid Wastes

- Capture all liquid wastes that have the potential to affect the storm drainage system (such as wash water and rinse water from cleaning walls or pavement), before they run off a surface.

- Do not allow liquid wastes to flow or discharge uncontrolled. Use temporary dikes or berms to intercept flows and direct them to a containment area or device for capture.

- Use a sediment trap (SE-3, Sediment Trap) for capturing and treating sediment laden liquid waste or capture in a containment device and allow sediment to settle.

Disposing of Liquid Wastes

- A typical method to handle liquid waste is to dewater the contained liquid waste, using procedures such as described in NS-2, Dewatering Operations, and SE-2, Sediment Basin, and dispose of resulting solids per WM-5, Solid Waste Management.

- Methods of disposal for some liquid wastes may be prescribed in Water Quality Reports, NPDES permits, Environmental Impact Reports, 401 or 404 permits, and local agency discharge permits, etc. Review the SWPPP to see if disposal methods are identified.

- Liquid wastes, such as from dredged material, may require testing and certification whether it is hazardous or not before a disposal method can be determined.

- For disposal of hazardous waste, see WM-6, Hazardous Waste Management.

- If necessary, further treat liquid wastes prior to disposal. Treatment may include, though is not limited to, sedimentation, filtration, and chemical neutralization.

Costs

Prevention costs for liquid waste management are minimal. Costs increase if cleanup or fines are involved.

Inspection and Maintenance

- Inspect and verify that activity–based BMPs are in place prior to the commencement of associated activities. While activities associated with the BMP are under way, inspect weekly during the rainy season and of two-week intervals in the non-rainy season to verify continued BMP implementation.

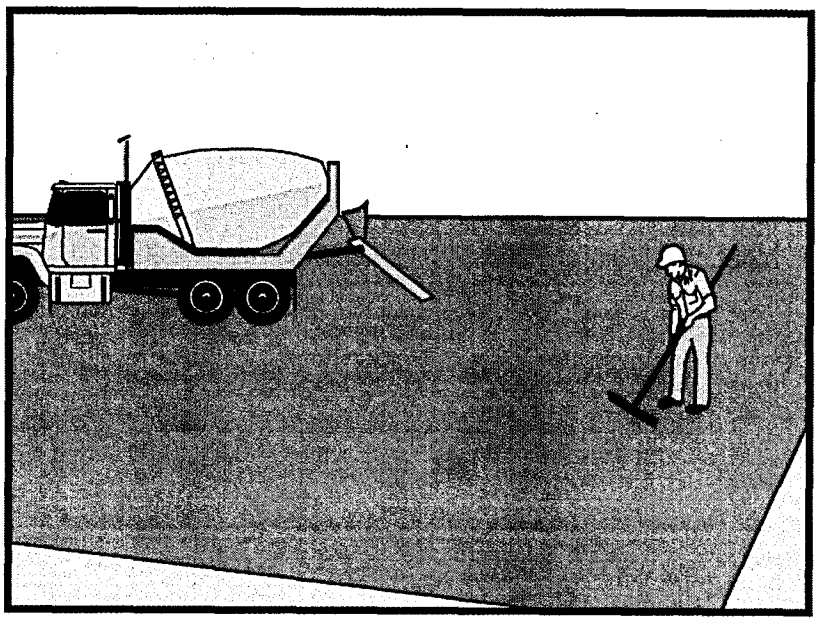
- Inspect BMPs subject to non-stormwater discharge daily while non-stormwater discharges occur.

- Remove deposited solids in containment areas and capturing devices as needed and at the completion of the task. Dispose of any solids as described in WM-5, Solid Waste Management.
- Inspect containment areas and capturing devices and repair as needed.

References

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

Paving and Grinding Operations NS-3



Objectives

EC	Erosion Control	
SE	Sediment Control	
TR	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	☑
WM	Waste Management and Materials Pollution Control	☒

Legend:

☑ **Primary Objective**

☒ **Secondary Objective**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	☑
Organics	

Potential Alternatives

None

Description and Purpose

Prevent or reduce the discharge of pollutants from paving operations, using measures to prevent runon and runoff pollution, properly disposing of wastes, and training employees and subcontractors.

Suitable Applications

These procedures are implemented where paving, surfacing, resurfacing, or sawcutting, may pollute stormwater runoff or discharge to the storm drain system or watercourses.

Limitations

- Finer solids are not effectively removed by filtration systems.
- Paving opportunities may be limited during wet weather.

Implementation

General

- Avoid paving during the wet season when feasible.
- Reschedule paving and grinding activities if rain is in the forecast.
- Train employees and sub-contractors in pollution prevention and reduction.
- Store materials away from drainage courses to prevent stormwater runon (see WM-1, Material Delivery and Storage).

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- Protect drainage courses, particularly in areas with a grade, by employing BMPs to divert runoff or to trap and filter sediment.
- If paving involves an onsite mixing plant, follow the stormwater permitting requirements for industrial activities.
- Stockpile material removed from roadways away from drain inlets, drainage ditches, and watercourses, These materials should be stored consistent with WM-3, Stockpile Management.
- Disposal of PCC and AC waste should be in conformance with WM-8, Concrete Waste Management.

Saw Cutting, Grinding, and Pavement Removal

- Shovel or vacuum saw-cut slurry and remove from site. Cover or barricade storm drains during saw cutting to contain slurry.
- When paving involves AC, the following steps should be implemented to prevent the discharge of grinding residue, uncompacted or loose AC, tack coats, equipment cleaners, or unrelated paving materials:
  - AC grindings, pieces, or chunks used in embankments or shoulder backing must not be allowed to enter any storm drains or watercourses. Install silt fence until structure is stabilized or permanent controls are in place. Examples of temporary perimeter controls can be found in EC-9, Earth Dikes and Drainage Swales; SE-1, Silt Fence; or SE-5, Fiber Rolls.
  - Collect and remove all broken asphalt and recycle when practical. Old or spilled asphalt must be recycled or disposed.
  - Any AC chunks and pieces used in embankments must be placed above the water table and covered by at least 1 ft of material.
- Do not allow saw-cut slurry to enter storm drains or watercourses. Residue from grinding operations should be picked up by means of a vacuum attachment to the grinding machine, should not be allowed to flow across the pavement, and should not be left on the surface of the pavement. See also WM-8, Concrete Waste Management, and WM-10, Liquid Waste Management.
- Dig out activities should not be conducted in the rain.
- Collect dig out material by mechanical or manual methods. This material may be recycled for use as shoulder backing or base material.
- If dig out material cannot be recycled, transport the material back to an approved storage site.

Asphaltic Concrete Paving

- If paving involves asphaltic cement concrete, follow these steps:

- Do not allow sand or gravel placed over new asphalt to wash into storm drains, streets, or creeks. Vacuum or sweep loose sand and gravel and properly dispose of this waste by referring to WM-5, Solid Waste Management.

- Old asphalt must be disposed of properly. Collect and remove all broken asphalt from the site and recycle whenever possible.

Portland Cement Concrete Paving

- Do not wash sweepings from exposed aggregate concrete into a storm drain system. Collect and return to aggregate base stockpile or dispose of properly.

- Allow aggregate rinse to settle. Then, either allow rinse water to dry in a temporary pit as described in WM-8, Concrete Waste Management, or pump the water to the sanitary sewer if allowed by the local wastewater authority.

Sealing Operations

- During chip seal application and sweeping operations, petroleum or petroleum covered aggregate must not be allowed to enter any storm drain or water courses. Apply temporary perimeter controls until structure is stabilized.

- Drainage inlet structures and manholes should be covered with filter fabric during application of seal coat, tack coat, slurry seal, and fog seal.

- Seal coat, tack coat, slurry seal, or fog seal should not be applied if rainfall is predicted to occur during the application or curing period.

Paving Equipment

- Leaks and spills from paving equipment can contain toxic levels of heavy metals and oil and grease. Place drip pans or absorbent materials under paving equipment when not in use. Clean up spills with absorbent materials rather than burying. See NS-10, Vehicle and Equipment Maintenance, WM-4, Spill Prevention and Control, and WM-10, Liquid Waste Management.

- Substances used to coat asphalt transport trucks, and asphalt spreading equipment should not contain soap and should be non-foaming and non-toxic.

- Use only non-toxic substances to coat asphalt transport trucks and asphalt spreading equipment.

- Paving equipment parked onsite should be parked over plastic to prevent soil contamination.

- Clean asphalt coated equipment offsite whenever possible. When cleaning dry, hardened asphalt from equipment, manage hardened asphalt debris as described in WM-5, Solid Waste Management. Any cleaning onsite should follow NS-8, Vehicle and Equipment Cleaning.

Thermoplastic Striping

- Thermoplastic striper and pre-heater equipment shutoff valves should be inspected to ensure that they are working properly to prevent leaking thermoplastic from entering drain inlets, the stormwater drainage system, or watercourses.
- Pre-heaters should be filled carefully to prevent splashing or spilling of hot thermoplastic. Leave six inches of space at the top of the pre-heater container when filling thermoplastic to allow room for material to move when the vehicle is deadheaded.
- Do not pre-heat, transfer, or load thermoplastic near drain inlets or watercourses.
- Clean truck beds daily of loose debris and melted thermoplastic. When possible, recycle thermoplastic material.

Raised/Recessed Pavement Marker Application and Removal

- Do not transfer or load bituminous material near drain inlets, the stormwater drainage system, or watercourses.
- Melting tanks should be loaded with care and not filled to beyond six inches from the top to leave room for splashing when vehicle is deadheaded.
- When servicing or filling melting tanks, ensure all pressure is released before removing lids to avoid spills.
- On large-scale projects, use mechanical or manual methods to collect excess bituminous material from the roadway after removal of markers.

Costs

- All of the above are low cost measures.

Inspection and Maintenance

- Inspect and verify that activity-based BMPs are in place prior to the commencement of associated activities. While activities associated with the BMP are under way, inspect weekly during the rainy season and at two-week intervals in the non-rainy season to verify continued BMP implementation.
- Keep ample supplies of drip pans or absorbent materials onsite.
- Inspect and maintain machinery regularly to minimize leaks and drips.

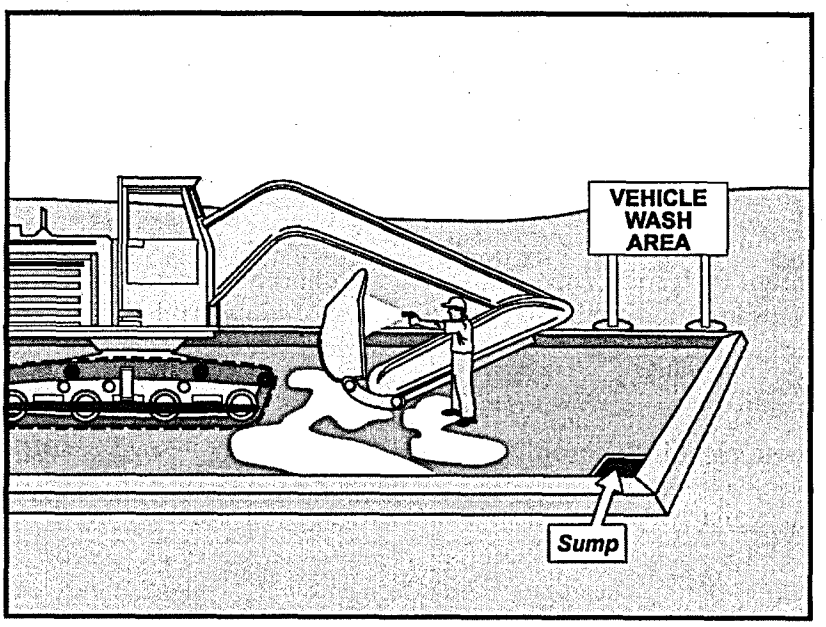
References

Blueprint for a Clean Bay: Best Management Practices to Prevent Stormwater Pollution from Construction Related Activities; Santa Clara Valley Nonpoint Source Pollution Control Program, 1995.

Hot Mix Asphalt-Paving Handbook AC 150/5370-14, Appendix I, U.S. Army Corps of Engineers, July 1991.

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

Vehicle and Equipment Cleaning NS-8



Objectives

EC	Erosion Control	
SE	Sediment Control	
TR	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	☑
WM	Waste Management and Materials Pollution Control	

Legend:

☑ **Primary Objective**

☒ **Secondary Objective**

Targeted Constituents

Sediment	☑
Nutrients	☑
Trash	
Metals	
Bacteria	
Oil and Grease	☑
Organics	☑

Potential Alternatives

None

Description and Purpose

Vehicle and equipment cleaning procedures and practices eliminate or reduce the discharge of pollutants to stormwater from vehicle and equipment cleaning operations. Procedures and practices include but are not limited to: using offsite facilities; washing in designated, contained areas only; eliminating discharges to the storm drain by infiltrating the wash water; and training employees and subcontractors in proper cleaning procedures.

Suitable Applications

These procedures are suitable on all construction sites where vehicle and equipment cleaning is performed.

Limitations

Even phosphate-free, biodegradable soaps have been shown to be toxic to fish before the soap degrades. Sending vehicles/equipment offsite should be done in conjunction with TR-1, Stabilized Construction Entrance/Exit.

Implementation

Other options to washing equipment onsite include contracting with either an offsite or mobile commercial washing business. These businesses may be better equipped to handle and dispose of the wash waters properly. Performing this work offsite can also be economical by eliminating the need for a separate washing operation onsite.

If washing operations are to take place onsite, then:

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- Use phosphate-free, biodegradable soaps.
- Educate employees and subcontractors on pollution prevention measures.
- Do not permit steam cleaning onsite. Steam cleaning can generate significant pollutant concentrates.
- Cleaning of vehicles and equipment with soap, solvents or steam should not occur on the project site unless resulting wastes are fully contained and disposed of. Resulting wastes should not be discharged or buried, and must be captured and recycled or disposed according to the requirements of WM-10, Liquid Waste Management or WM-6, Hazardous Waste Management, depending on the waste characteristics. Minimize use of solvents. Use of diesel for vehicle and equipment cleaning is prohibited.
- All vehicles and equipment that regularly enter and leave the construction site must be cleaned offsite.
- When vehicle and equipment washing and cleaning must occur onsite, and the operation cannot be located within a structure or building equipped with appropriate disposal facilities, the outside cleaning area should have the following characteristics:
  - Located away from storm drain inlets, drainage facilities, or watercourses
  - Paved with concrete or asphalt and bermed to contain wash waters and to prevent runon and runoff
  - Configured with a sump to allow collection and disposal of wash water
  - No discharge of wash waters to storm drains or watercourses
  - Used only when necessary
- When cleaning vehicles and equipment with water:
  - Use as little water as possible. High-pressure sprayers may use less water than a hose and should be considered
  - Use positive shutoff valve to minimize water usage
  - Facility wash racks should discharge to a sanitary sewer, recycle system or other approved discharge system and must not discharge to the storm drainage system, watercourses, or to groundwater

Costs

Cleaning vehicles and equipment at an offsite facility may reduce overall costs for vehicle and equipment cleaning by eliminating the need to provide similar services onsite. When onsite cleaning is needed, the cost to establish appropriate facilities is relatively low on larger, long-duration projects, and moderate to high on small, short-duration projects.

Inspection and Maintenance

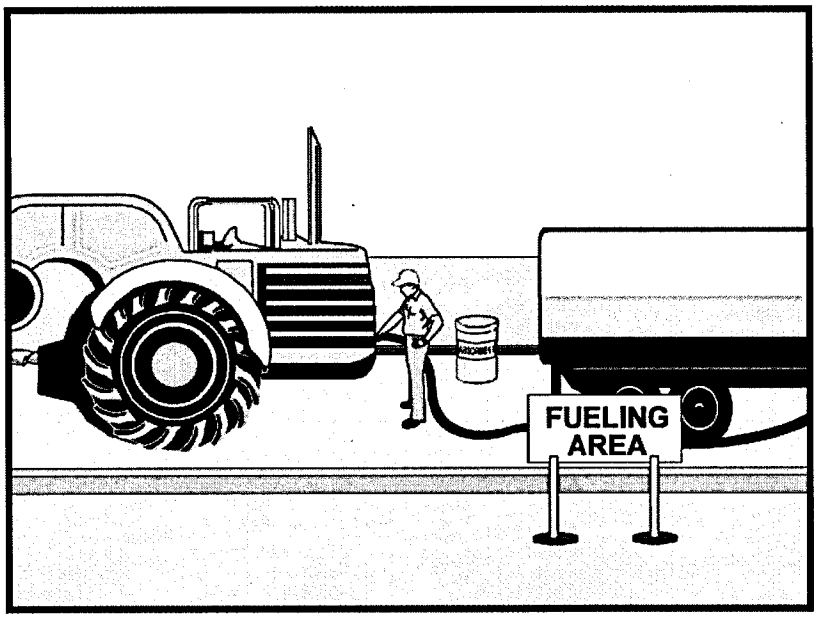
- Inspect and verify that activity-based BMPs are in place prior to the commencement of associated activities. While activities associated with the BMP are under way, inspect weekly during the rainy season and at two-week intervals in the non-rainy season to verify continued BMP implementation.
- Inspect BMPs subject to non-stormwater discharges daily while non-stormwater discharges occur.
- Inspection and maintenance is minimal, although some berm repair may be necessary.
- Monitor employees and subcontractors throughout the duration of the construction project to ensure appropriate practices are being implemented.
- Inspect sump regularly and remove liquids and sediment as needed.
- Prohibit employees and subcontractors from washing personal vehicles and equipment on the construction site.

References

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

Swisher, R.D. Surfactant Biodegradation, Marcel Decker Corporation, 1987.

Vehicle and Equipment Fueling NS-9



Objectives

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Legend:

☑ **Primary Objective**

☒ **Secondary Objective**

Targeted Constituents

Sediment	
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	☑
Organics	

Potential Alternatives

None

Description and Purpose

Vehicle equipment fueling procedures and practices are designed to prevent fuel spills and leaks, and reduce or eliminate contamination of stormwater. This can be accomplished by using offsite facilities, fueling in designated areas only, enclosing or covering stored fuel, implementing spill controls, and training employees and subcontractors in proper fueling procedures.

Suitable Applications

These procedures are suitable on all construction sites where vehicle and equipment fueling takes place.

Limitations

Onsite vehicle and equipment fueling should only be used where it is impractical to send vehicles and equipment offsite for fueling. Sending vehicles and equipment offsite should be done in conjunction with TR-1, Stabilized Construction Entrance/ Exit.

Implementation

- Use offsite fueling stations as much as possible. These businesses are better equipped to handle fuel and spills properly. Performing this work offsite can also be economical by eliminating the need for a separate fueling area at a site.
- Discourage "topping-off" of fuel tanks.

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- Absorbent spill cleanup materials and spill kits should be available in fueling areas and on fueling trucks, and should be disposed of properly after use.
- Drip pans or absorbent pads should be used during vehicle and equipment fueling, unless the fueling is performed over an impermeable surface in a dedicated fueling area.
- Use absorbent materials on small spills. Do not hose down or bury the spill. Remove the adsorbent materials promptly and dispose of properly.
- Avoid mobile fueling of mobile construction equipment around the site; rather, transport the equipment to designated fueling areas. With the exception of tracked equipment such as bulldozers and large excavators, most vehicles should be able to travel to a designated area with little lost time.
- Train employees and subcontractors in proper fueling and cleanup procedures.
- When fueling must take place onsite, designate an area away from drainage courses to be used. Fueling areas should be identified in the SWPPP.
- Dedicated fueling areas should be protected from stormwater runon and runoff, and should be located at least 50 ft away from downstream drainage facilities and watercourses. Fueling must be performed on level-grade areas.
- Protect fueling areas with berms and dikes to prevent runon, runoff, and to contain spills.
- Nozzles used in vehicle and equipment fueling should be equipped with an automatic shutoff to control drips. Fueling operations should not be left unattended.
- Use vapor recovery nozzles to help control drips as well as air pollution where required by Air Quality Management Districts (AQMD).
- Federal, state, and local requirements should be observed for any stationary above ground storage tanks.

Costs

- All of the above measures are low cost except for the capital costs of above ground tanks that meet all local environmental, zoning, and fire codes.

Inspection and Maintenance

- Vehicles and equipment should be inspected each day of use for leaks. Leaks should be repaired immediately or problem vehicles or equipment should be removed from the project site.
- Keep ample supplies of spill cleanup materials onsite.
- Immediately clean up spills and properly dispose of contaminated soil and cleanup materials.

References

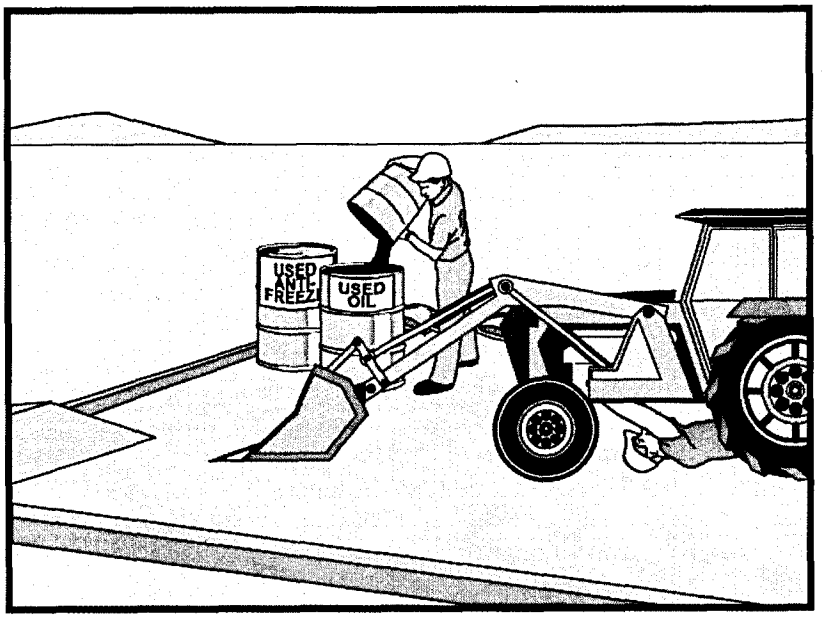
Blueprint for a Clean Bay: Best Management Practices to Prevent Stormwater Pollution from Construction Related Activities; Santa Clara Valley Nonpoint Source Pollution Control Program, 1995.

Coastal Nonpoint Pollution Control Program: Program Development and Approval Guidance, Working Group Working Paper; USEPA, April 1992.

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

Stormwater Management for Construction Activities, Developing Pollution Prevention Plans and Best Management Practices, EPA 832-R-92005; USEPA, April 1992.

Vehicle & Equipment Maintenance NS-10



Objectives

EC	Erosion Control	
SE	Sediment Control	
TR	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	☑
WM	Waste Management and Materials Pollution Control	

Legend:

☑ **Primary Objective**

☒ **Secondary Objective**

Targeted Constituents

Sediment	
Nutrients	☑
Trash	☑
Metals	
Bacteria	
Oil and Grease	☑
Organics	☑

Potential Alternatives

None

Description and Purpose

Prevent or reduce the contamination of stormwater resulting from vehicle and equipment maintenance by running a "dry and clean site". The best option would be to perform maintenance activities at an offsite facility. If this option is not available then work should be performed in designated areas only, while providing cover for materials stored outside, checking for leaks and spills, and containing and cleaning up spills immediately. Employees and subcontractors must be trained in proper procedures.

Suitable Applications

These procedures are suitable on all construction projects where an onsite yard area is necessary for storage and maintenance of heavy equipment and vehicles.

Limitations

Onsite vehicle and equipment maintenance should only be used where it is impractical to send vehicles and equipment offsite for maintenance and repair. Sending vehicles/equipment offsite should be done in conjunction with TR-1, Stabilized Construction Entrance/Exit.

Outdoor vehicle or equipment maintenance is a potentially significant source of stormwater pollution. Activities that can contaminate stormwater include engine repair and service, changing or replacement of fluids, and outdoor equipment storage and parking (engine fluid leaks). For further information on vehicle or equipment servicing, see NS-8, Vehicle and Equipment Cleaning, and NS-9, Vehicle and Equipment Fueling.

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NS-10 Vehicle & Equipment Maintenance

Implementation

- Use offsite repair shops as much as possible. These businesses are better equipped to handle vehicle fluids and spills properly. Performing this work offsite can also be economical by eliminating the need for a separate maintenance area.
- If maintenance must occur onsite, use designated areas, located away from drainage courses. Dedicated maintenance areas should be protected from stormwater runon and runoff, and should be located at least 50 ft from downstream drainage facilities and watercourses.
- Drip pans or absorbent pads should be used during vehicle and equipment maintenance work that involves fluids, unless the maintenance work is performed over an impermeable surface in a dedicated maintenance area.
- Place a stockpile of spill cleanup materials where it will be readily accessible.
- All fueling trucks and fueling areas are required to have spill kits and/or use other spill protection devices.
- Use adsorbent materials on small spills. Remove the absorbent materials promptly and dispose of properly.
- Inspect onsite vehicles and equipment daily at startup for leaks, and repair immediately.
- Keep vehicles and equipment clean; do not allow excessive build-up of oil and grease.
- Segregate and recycle wastes, such as greases, used oil or oil filters, antifreeze, cleaning solutions, automotive batteries, hydraulic and transmission fluids. Provide secondary containment and covers for these materials if stored onsite.
- Train employees and subcontractors in proper maintenance and spill cleanup procedures.
- Drip pans or plastic sheeting should be placed under all vehicles and equipment placed on docks, barges, or other structures over water bodies when the vehicle or equipment is planned to be idle for more than 1 hour.
- For long-term projects, consider using portable tents or covers over maintenance areas if maintenance cannot be performed offsite.
- Consider use of new, alternative greases and lubricants, such as adhesive greases, for chassis lubrication and fifth-wheel lubrication.
- Properly dispose of used oils, fluids, lubricants, and spill cleanup materials.
- Do not place used oil in a dumpster or pour into a storm drain or watercourse.
- Properly dispose of or recycle used batteries.
- Do not bury used tires.
- Repair leaks of fluids and oil immediately.

Listed below is further information if you must perform vehicle or equipment maintenance onsite.

Safer Alternative Products

- Consider products that are less toxic or hazardous than regular products. These products are often sold under an "environmentally friendly" label.
- Consider use of grease substitutes for lubrication of truck fifth-wheels. Follow manufacturers label for details on specific uses.
- Consider use of plastic friction plates on truck fifth-wheels in lieu of grease. Follow manufacturers label for details on specific uses.

Waste Reduction

Parts are often cleaned using solvents such as trichloroethylene, trichloroethane, or methylene chloride. Many of these cleaners are listed in California Toxic Rule as priority pollutants. These materials are harmful and must not contaminate stormwater. They must be disposed of as a hazardous waste. Reducing the number of solvents makes recycling easier and reduces hazardous waste management costs. Often, one solvent can perform a job as well as two different solvents. Also, if possible, eliminate or reduce the amount of hazardous materials and waste by substituting non-hazardous or less hazardous materials. For example, replace chlorinated organic solvents with non-chlorinated solvents. Non-chlorinated solvents like kerosene or mineral spirits are less toxic and less expensive to dispose of properly. Check the list of active ingredients to see whether it contains chlorinated solvents. The "chlor" term indicates that the solvent is chlorinated. Also, try substituting a wire brush for solvents to clean parts.

Recycling and Disposal

Separating wastes allows for easier recycling and may reduce disposal costs. Keep hazardous wastes separate, do not mix used oil solvents, and keep chlorinated solvents (like,-trichloroethane) separate from non-chlorinated solvents (like kerosene and mineral spirits). Promptly transfer used fluids to the proper waste or recycling drums. Don't leave full drip pans or other open containers lying around. Provide cover and secondary containment until these materials can be removed from the site.

Oil filters can be recycled. Ask your oil supplier or recycler about recycling oil filters.

Do not dispose of extra paints and coatings by dumping liquid onto the ground or throwing it into dumpsters. Allow coatings to dry or harden before disposal into covered dumpsters.

Store cracked batteries in a non-leaking secondary container. Do this with all cracked batteries, even if you think all the acid has drained out. If you drop a battery, treat it as if it is cracked. Put it into the containment area until you are sure it is not leaking.

Costs

All of the above are low cost measures. Higher costs are incurred to setup and maintain onsite maintenance areas.

NS-10 Vehicle & Equipment Maintenance

Inspection and Maintenance

- Inspect and verify that activity-based BMPs are in place prior to the commencement of associated activities. While activities associated with the BMP are under way, inspect weekly during the rainy season and at two-week intervals in the non-rainy season to verify continued BMP implementation.
- Inspect BMPs subject to non-stormwater discharges daily while non-stormwater discharges occur.
- Keep ample supplies of spill cleanup materials onsite.
- Maintain waste fluid containers in leak proof condition.
- Vehicles and equipment should be inspected on each day of use. Leaks should be repaired immediately or the problem vehicle(s) or equipment should be removed from the project site.
- Inspect equipment for damaged hoses and leaky gaskets routinely. Repair or replace as needed.

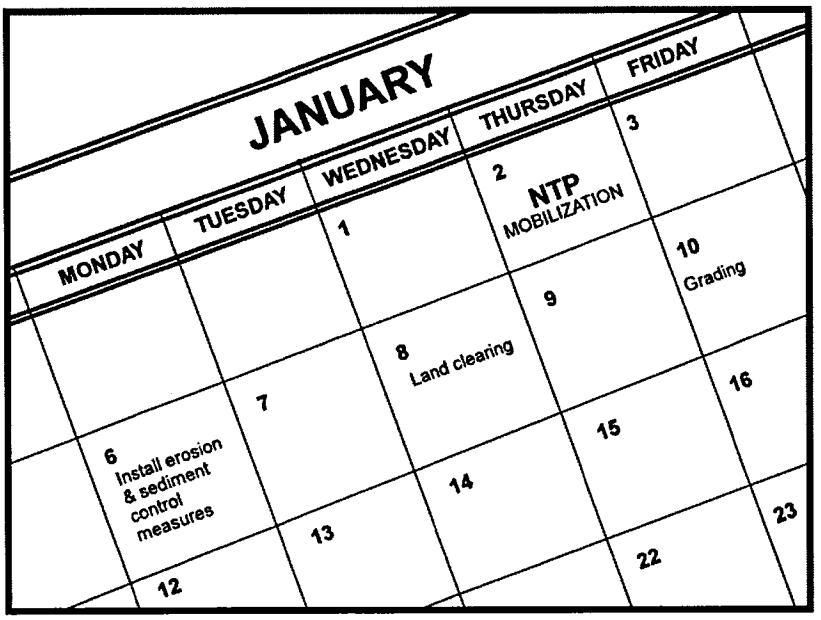
References

Blueprint for a Clean Bay: Best Management Practices to Prevent Stormwater Pollution from Construction Related Activities; Santa Clara Valley Nonpoint Source Pollution Control Program, 1995.

Coastal Nonpoint Pollution Control Program; Program Development and Approval Guidance, Working Group, Working Paper; USEPA, April 1992.

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

Scheduling EC-1



Objectives

EC	Erosion Control	☑
SE	Sediment Control	☒
TR	Tracking Control	☒
WE	Wind Erosion Control	☒
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	

Legend:

☑ **Primary Objective**

☒ **Secondary Objective**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

None

Description and Purpose

Scheduling is the development of a written plan that includes sequencing of construction activities and the implementation of BMPs such as erosion control and sediment control while taking local climate (rainfall, wind, etc.) into consideration. The purpose is to reduce the amount and duration of soil exposed to erosion by wind, rain, runoff, and vehicle tracking, and to perform the construction activities and control practices in accordance with the planned schedule.

Suitable Applications

Proper sequencing of construction activities to reduce erosion potential should be incorporated into the schedule of every construction project especially during rainy season. Use of other, more costly yet less effective, erosion and sediment control BMPs may often be reduced through proper construction sequencing.

Limitations

- Environmental constraints such as nesting season prohibitions reduce the full capabilities of this BMP.

Implementation

- Avoid rainy periods. Schedule major grading operations during dry months when practical. Allow enough time before rainfall begins to stabilize the soil with vegetation or physical means or to install sediment trapping devices.

- Plan the project and develop a schedule showing each phase of construction. Clearly show how the rainy season relates to soil

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disturbing and re-stabilization activities. Incorporate the construction schedule into the SWPPP.

- Include on the schedule, details on the rainy season implementation and deployment of:
  - Erosion control BMPs
  - Sediment control BMPs
  - Tracking control BMPs
  - Wind erosion control BMPs
  - Non-stormwater BMPs
  - Waste management and materials pollution control BMPs
- Include dates for activities that may require non-stormwater discharges such as dewatering, sawcutting, grinding, drilling, boring, crushing, blasting, painting, hydro-demolition, mortar mixing, pavement cleaning, etc.
- Work out the sequencing and timetable for the start and completion of each item such as site clearing and grubbing, grading, excavation, paving, foundation pouring utilities installation, etc., to minimize the active construction area during the rainy season.
  - Sequence trenching activities so that most open portions are closed before new trenching begins.
  - Incorporate staged seeding and re-vegetation of graded slopes as work progresses.
  - Schedule establishment of permanent vegetation during appropriate planting time for specified vegetation.
- Non-active areas should be stabilized as soon as practical after the cessation of soil disturbing activities or one day prior to the onset of precipitation.
- Monitor the weather forecast for rainfall.
- When rainfall is predicted, adjust the construction schedule to allow the implementation of soil stabilization and sediment treatment controls on all disturbed areas prior to the onset of rain.
- Be prepared year round to deploy erosion control and sediment control BMPs. Erosion may be caused during dry seasons by un-seasonal rainfall, wind, and vehicle tracking. Keep the site stabilized year round, and retain and maintain rainy season sediment trapping devices in operational condition.
- Apply permanent erosion control to areas deemed substantially complete during the project's defined seeding window.

Costs

Construction scheduling to reduce erosion may increase other construction costs due to reduced economies of scale in performing site grading. The cost effectiveness of scheduling techniques should be compared with the other less effective erosion and sedimentation controls to achieve a cost effective balance.

Inspection and Maintenance

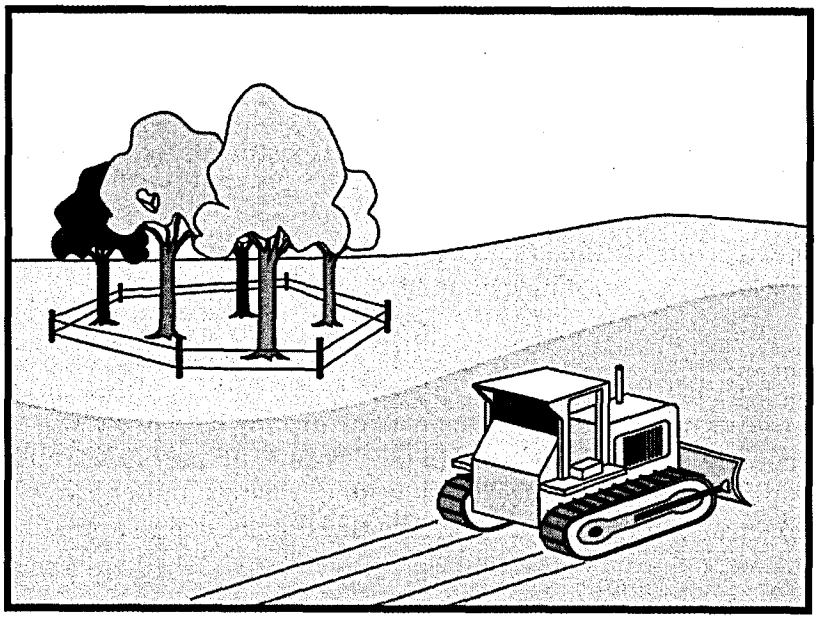
- Verify that work is progressing in accordance with the schedule. If progress deviates, take corrective actions.
- Amend the schedule when changes are warranted.
- Amend the schedule prior to the rainy season to show updated information on the deployment and implementation of construction site BMPs.

References

Stormwater Quality Handbooks Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

Stormwater Management for Construction Activities Developing Pollution Prevention Plans and Best Management Practices (EPA 832-R-92-005), U.S. Environmental Protection Agency, Office of Water, September 1992.

Preservation Of Existing Vegetation EC-2



Objectives

EC	Erosion Control	☑
SE	Sediment Control	
TR	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	

Legend:

☑ **Primary Objective**

☒ **Secondary Objective**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

None

Description and Purpose

Carefully planned preservation of existing vegetation minimizes the potential of removing or injuring existing trees, vines, shrubs, and grasses that protect soil from erosion.

Suitable Applications

Preservation of existing vegetation is suitable for use on most projects. Large project sites often provide the greatest opportunity for use of this BMP. Suitable applications include the following:

- Areas within the site where no construction activity occurs, or occurs at a later date. This BMP is especially suitable to multi year projects where grading can be phased.
- Areas where natural vegetation exists and is designated for preservation. Such areas often include steep slopes, watercourse, and building sites in wooded areas.
- Areas where local, state, and federal government require preservation, such as vernal pools, wetlands, marshes, certain oak trees, etc. These areas are usually designated on the plans, or in the specifications, permits, or environmental documents.
- Where vegetation designated for ultimate removal can be temporarily preserved and be utilized for erosion control and sediment control.

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EC-2 Preservation Of Existing Vegetation

Limitations

- Requires forward planning by the owner/developer, contractor, and design staff.
- Limited opportunities for use when project plans do not incorporate existing vegetation into the site design.
- For sites with diverse topography, it is often difficult and expensive to save existing trees while grading the site satisfactory for the planned development.

Implementation

The best way to prevent erosion is to not disturb the land. In order to reduce the impacts of new development and redevelopment, projects may be designed to avoid disturbing land in sensitive areas of the site (e.g., natural watercourses, steep slopes), and to incorporate unique or desirable existing vegetation into the site's landscaping plan. Clearly marking and leaving a buffer area around these unique areas during construction will help to preserve these areas as well as take advantage of natural erosion prevention and sediment trapping.

Existing vegetation to be preserved on the site must be protected from mechanical and other injury while the land is being developed. The purpose of protecting existing vegetation is to ensure the survival of desirable vegetation for shade, beautification, and erosion control. Mature vegetation has extensive root systems that help to hold soil in place, thus reducing erosion. In addition, vegetation helps keep soil from drying rapidly and becoming susceptible to erosion. To effectively save existing vegetation, no disturbances of any kind should be allowed within a defined area around the vegetation. For trees, no construction activity should occur within the drip line of the tree.

Timing

- Provide for preservation of existing vegetation prior to the commencement of clearing and grubbing operations or other soil disturbing activities in areas where no construction activity is planned or will occur at a later date.

Design and Layout

- Mark areas to be preserved with temporary fencing. Include sufficient setback to protect roots.
  - Orange colored plastic mesh fencing works well.
  - Use appropriate fence posts and adequate post spacing and depth to completely support the fence in an upright position.
- Locate temporary roadways, stockpiles, and layout areas to avoid stands of trees, shrubs, and grass.
- Consider the impact of grade changes to existing vegetation and the root zone.
- Maintain existing irrigation systems where feasible. Temporary irrigation may be required.
- Instruct employees and subcontractors to honor protective devices. Prohibit heavy equipment, vehicular traffic, or storage of construction materials within the protected area.

Costs

There is little cost associated with preserving existing vegetation if properly planned during the project design, and these costs may be offset by aesthetic benefits that enhance property values. During construction, the cost for preserving existing vegetation will likely be less than the cost of applying erosion and sediment controls to the disturbed area. Replacing vegetation inadvertently destroyed during construction can be extremely expensive, sometimes in excess of $10,000 per tree.

Inspection and Maintenance

During construction, the limits of disturbance should remain clearly marked at all times. Irrigation or maintenance of existing vegetation should be described in the landscaping plan. If damage to protected trees still occurs, maintenance guidelines described below should be followed:

- Verify that protective measures remain in place. Restore damaged protection measures immediately.
- Serious tree injuries shall be attended to by an arborist.
- Damage to the crown, trunk, or root system of a retained tree shall be repaired immediately.
- Trench as far from tree trunks as possible, usually outside of the tree drip line or canopy. Curve trenches around trees to avoid large roots or root concentrations. If roots are encountered, consider tunneling under them. When trenching or tunneling near or under trees to be retained, place tunnels at least 18 in. below the ground surface, and not below the tree center to minimize impact on the roots.
- Do not leave tree roots exposed to air. Cover exposed roots with soil as soon as possible. If soil covering is not practical, protect exposed roots with wet burlap or peat moss until the tunnel or trench is ready for backfill.
- Cleanly remove the ends of damaged roots with a smooth cut.
- Fill trenches and tunnels as soon as possible. Careful filling and tamping will eliminate air spaces in the soil, which can damage roots.
- If bark damage occurs, cut back all loosened bark into the undamaged area, with the cut tapered at the top and bottom and drainage provided at the base of the wood. Limit cutting the undamaged area as much as possible.
- Aerate soil that has been compacted over a trees root zone by punching holes 12 in. deep with an iron bar, and moving the bar back and forth until the soil is loosened. Place holes 18 in. apart throughout the area of compacted soil under the tree crown.
- Fertilization
  - Fertilize stressed or damaged broadleaf trees to aid recovery.
  - Fertilize trees in the late fall or early spring.

- Apply fertilizer to the soil over the feeder roots and in accordance with label instructions, but never closer than 3 ft to the trunk. Increase the fertilized area by one-fourth of the crown area for conifers that have extended root systems.

- Retain protective measures until all other construction activity is complete to avoid damage during site cleanup and stabilization.

References

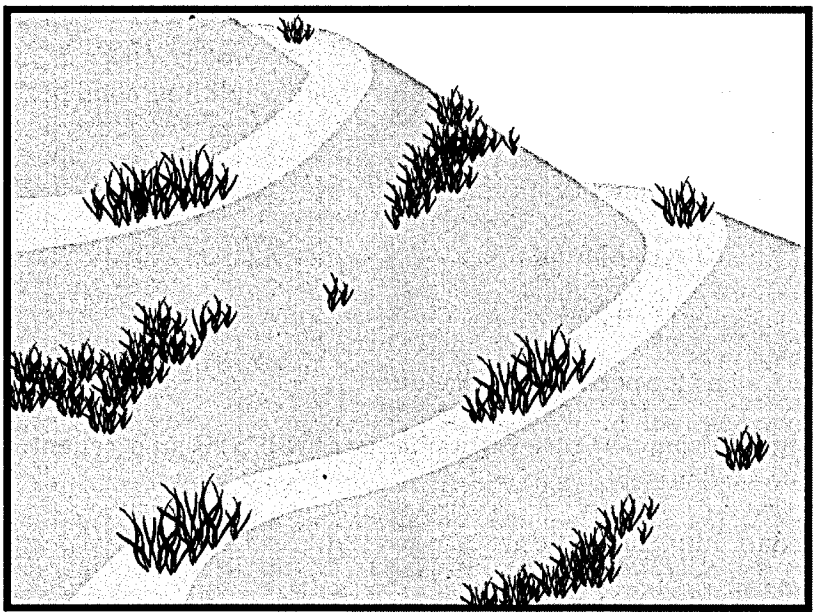
County of Sacramento Tree Preservation Ordinance, September 1981.

Stormwater Quality Handbooks Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

Stormwater Management of the Puget Sound Basin, Technical Manual, Publication #91-75, Washington State Department of Ecology, February 1992.

Water Quality Management Plan for The Lake Tahoe Region, Volume II, Handbook of Management Practices, Tahoe Regional Planning Agency, November 1988.

Hydroseeding EC-4



Objectives

EC	Erosion Control	☑
SE	Sediment Control	
TR	Tracking Control	
WE	Wind Erosion Control	☒
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	

Legend:

☑ **Primary Objective**

☒ **Secondary Objective**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

EC-3 Hydraulic Mulch

EC-5 Soil Binders

EC-6 Straw Mulch

EC-7 Geotextiles and Mats

EC-8 Wood Mulching

Description and Purpose

Hydroseeding typically consists of applying a mixture of wood fiber, seed, fertilizer, and stabilizing emulsion with hydro-mulch equipment, to temporarily protect exposed soils from erosion by water and wind.

Suitable Applications

Hydroseeding is suitable for soil disturbed areas requiring temporary protection until permanent stabilization is established, and disturbed areas that will be re-disturbed following an extended period of inactivity.

Limitations

- Hydroseeding may be used alone only when there is sufficient time in the season to ensure adequate vegetation establishment and coverage to provide adequate erosion control. Otherwise, hydroseeding must be used in conjunction with mulching (i.e., straw mulch).
- Steep slopes are difficult to protect with temporary seeding.
- Temporary seeding may not be appropriate in dry periods without supplemental irrigation.
- Temporary vegetation may have to be removed before permanent vegetation is applied.
- Temporary vegetation is not appropriate for short term inactivity.

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Implementation

In order to select appropriate hydroseeding mixtures, an evaluation of site conditions shall be performed with respect to:

- Soil conditions
- Site topography
- Season and climate
- Vegetation types
- Maintenance requirements
- Sensitive adjacent areas
- Water availability
- Plans for permanent vegetation

The local office of the U.S.D.A. Natural Resources Conservation Service (NRCS) is an excellent source of information on appropriate seed mixes.

The following steps shall be followed for implementation:

- Avoid use of hydroseeding in areas where the BMP would be incompatible with future earthwork activities and would have to be removed.
- Hydroseeding can be accomplished using a multiple step or one step process. The multiple step process ensures maximum direct contact of the seeds to soil. When the one step process is used to apply the mixture of fiber, seed, etc., the seed rate shall be increased to compensate for all seeds not having direct contact with the soil.
- Prior to application, roughen the area to be seeded with the furrows trending along the contours.
- Apply a straw mulch to keep seeds in place and to moderate soil moisture and temperature until the seeds germinate and grow.
- All seeds shall be in conformance with the California State Seed Law of the Department of Agriculture. Each seed bag shall be delivered to the site sealed and clearly marked as to species, purity, percent germination, dealer's guarantee, and dates of test. The container shall be labeled to clearly reflect the amount of Pure Live Seed (PLS) contained. All legume seed shall be pellet inoculated. Inoculant sources shall be species specific and shall be applied at a rate of 2 lb of inoculant per 100 lb seed.
- Commercial fertilizer shall conform to the requirements of the California Food and Agricultural Code. Fertilizer shall be pelleted or granular form.
- Follow up applications shall be made as needed to cover weak spots and to maintain adequate soil protection.
- Avoid over spray onto roads, sidewalks, drainage channels, existing vegetation, etc.

Costs

Average cost for installation and maintenance may vary from as low as $300 per acre for flat slopes and stable soils, to $1600 per acre for moderate to steep slopes and/or erosive soils.

Hydroseeding		Installed Cost per Acre
High Density	Ornamentals	$400 - $1600
	Turf Species	$350
	Bunch Grasses	$300 - $1300
Fast Growing	Annual	$350 - $650
	Perennial	$300 - $800
Non-Competing	Native	$300 - $1600
	Non-Native	$400 - $500
Sterile	Cereal Grain	$500

Source: Caltrans Guidance for Soil Stabilization for Temporary Slopes, Nov. 1999

Inspection and Maintenance

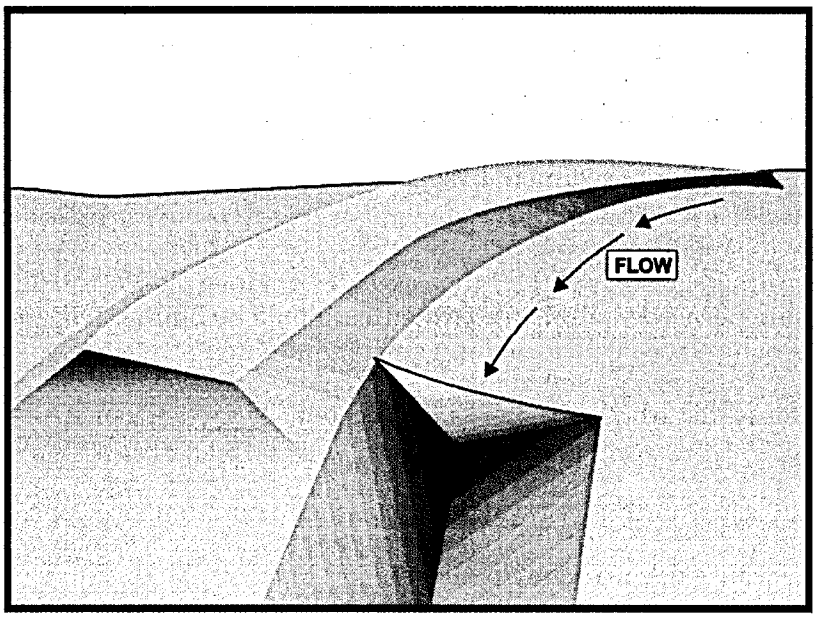
- Inspect BMPs prior to forecast rain, daily during extended rain events, after rain events, weekly during the rainy season, and at two-week intervals during the non-rainy season.
- Areas where erosion is evident shall be repaired and BMPs re-applied as soon as possible. Care should be exercised to minimize the damage to protected areas while making repairs, as any area damaged will require re-application of BMPs.
- Where seeds fail to germinate, or they germinate and die, the area must be re-seeded, fertilized, and mulched within the planting season, using not less than half the original application rates.
- Irrigation systems, if applicable, should be inspected daily while in use to identify system malfunctions and line breaks. When line breaks are detected, the system must be shut down immediately and breaks repaired before the system is put back into operation.
- Irrigation systems shall be inspected for complete coverage and adjusted as needed to maintain complete coverage.

References

Stormwater Quality Handbooks Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

Guidance Document: Soil Stabilization for Temporary Slopes, State of California Department of Transportation (Caltrans), November 1999.

Earth Dikes and Drainage Swales EC-9



Objectives

EC	Erosion Control	☑
SE	Sediment Control	
TR	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	

Legend:

☑ **Primary Objective**

☒ **Secondary Objective**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

None

Description and Purpose

An earth dike is a temporary berm or ridge of compacted soil used to divert runoff or channel water to a desired location. A drainage swale is a shaped and sloped depression in the soil surface used to convey runoff to a desired location. Earth dikes and drainage swales are used to divert off site runoff around the construction site, divert runoff from stabilized areas and disturbed areas, and direct runoff into sediment basins or traps.

Suitable Applications

Earth dikes and drainage swales are suitable for use, individually or together, where runoff needs to be diverted from one area and conveyed to another.

- Earth dikes and drainage swales may be used:
  - To convey surface runoff down sloping land
  - To intercept and divert runoff to avoid sheet flow over sloped surfaces
  - To divert and direct runoff towards a stabilized watercourse, drainage pipe or channel
  - To intercept runoff from paved surfaces
  - Below steep grades where runoff begins to concentrate
  - Along roadways and facility improvements subject to flood drainage

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- At the top of slopes to divert runon from adjacent or undisturbed slopes
- At bottom and mid slope locations to intercept sheet flow and convey concentrated flows
- Divert sediment laden runoff into sediment basins or traps

Limitations

Dikes should not be used for drainage areas greater than 10 acres or along slopes greater than 10 percent. For larger areas more permanent drainage structures should be built. All drainage structures should be built in compliance with local municipal requirements.

- Earth dikes may create more disturbed area on site and become barriers to construction equipment.
- Earth dikes must be stabilized immediately, which adds cost and maintenance concerns.
- Diverted stormwater may cause downstream flood damage.
- Dikes should not be constructed of soils that may be easily eroded.
- Regrading the site to remove the dike may add additional cost.
- Temporary drains and swales or any other diversion of runoff should not adversely impact upstream or downstream properties.
- Temporary drains and swales must conform to local floodplain management requirements.
- Earth dikes/drainage swales are not suitable as sediment trapping devices.
- It may be necessary to use other soil stabilization and sediment controls such as check dams, plastics, and blankets, to prevent scour and erosion in newly graded dikes, swales, and ditches.

Implementation

The temporary earth dike is a berm or ridge of compacted soil, located in such a manner as to divert stormwater to a sediment trapping device or a stabilized outlet, thereby reducing the potential for erosion and offsite sedimentation. Earth dikes can also be used to divert runoff from off site and from undisturbed areas away from disturbed areas and to divert sheet flows away from unprotected slopes.

An earth dike does not itself control erosion or remove sediment from runoff. A dike prevents erosion by directing runoff to an erosion control device such as a sediment trap or directing runoff away from an erodible area. Temporary diversion dikes should not adversely impact adjacent properties and must conform to local floodplain management regulations, and should not be used in areas with slopes steeper than 10%.

Slopes that are formed during cut and fill operations should be protected from erosion by runoff. A combination of a temporary drainage swale and an earth dike at the top of a slope can divert runoff to a location where it can be brought to the bottom of the slope (see EC-11, Slope Drains). A combination dike and swale is easily constructed by a single pass of a bulldozer or grader and

compacted by a second pass of the tracks or wheels over the ridge. Diversion structures should be installed when the site is initially graded and remain in place until post construction BMPs are installed and the slopes are stabilized.

Diversion practices concentrate surface runoff, increasing its velocity and erosive force. Thus, the flow out of the drain or swale must be directed onto a stabilized area or into a grade stabilization structure. If significant erosion will occur, a swale should be stabilized using vegetation, chemical treatment, rock rip-rap, matting, or other physical means of stabilization. Any drain or swale that conveys sediment laden runoff must be diverted into a sediment basin or trap before it is discharged from the site.

General

- Care must be applied to correctly size and locate earth dikes, drainage swales. Excessively steep, unlined dikes, and swales are subject to erosion and gully formation.
- Conveyances should be stabilized.
- Use a lined ditch for high flow velocities.
- Select flow velocity based on careful evaluation of the risks due to erosion of the measure, soil types, overtopping, flow backups, washout, and drainage flow patterns for each project site.
- Compact any fills to prevent unequal settlement.
- Do not divert runoff onto other property without securing written authorization from the property owner.
- When possible, install and utilize permanent dikes, swales, and ditches early in the construction process.
- Provide stabilized outlets.

Earth Dikes

Temporary earth dikes are a practical, inexpensive BMP used to divert stormwater runoff. Temporary diversion dikes should be installed in the following manner:

- All dikes should be compacted by earth moving equipment.
- All dikes should have positive drainage to an outlet.
- All dikes should have 2:1 or flatter side slopes, 18 in. minimum height, and a minimum top width of 24 in. Wide top widths and flat slopes are usually needed at crossings for construction traffic.
- The outlet from the earth dike must function with a minimum of erosion. Runoff should be conveyed to a sediment trapping device such as a Sediment Trap (SE-3) or Sediment Basin (SE-2) when either the dike channel or the drainage area above the dike are not adequately stabilized.

- Temporary stabilization may be achieved using seed and mulching for slopes less than 5% and either rip-rap or sod for slopes in excess of 5%. In either case, stabilization of the earth dike should be completed immediately after construction or prior to the first rain.
- If riprap is used to stabilize the channel formed along the toe of the dike, the following typical specifications apply:

Channel Grade	Riprap Stabilization
0.5-1.0%	4 in. Rock
1.1-2.0%	6 in. Rock
2.1-4.0%	8 in. Rock
4.1-5.0%	8 in. -12 in. Riprap

- The stone riprap, recycled concrete, etc. used for stabilization should be pressed into the soil with construction equipment.
- Filter cloth may be used to cover dikes in use for long periods.
- Construction activity on the earth dike should be kept to a minimum.

Drainage Swales

Drainage swales are only effective if they are properly installed. Swales are more effective than dikes because they tend to be more stable. The combination of a swale with a dike on the downhill side is the most cost effective diversion.

Standard engineering design criteria for small open channel and closed conveyance systems should be used (see the local drainage design manual). Unless local drainage design criteria state otherwise, drainage swales should be designed as follows:

- No more than 5 acres may drain to a temporary drainage swale.
- Place drainage swales above or below, not on, a cut or fill slope.
- Swale bottom width should be at least 2 ft
- Depth of the swale should be at least 18 in.
- Side slopes should be 2:1 or flatter.
- Drainage or swales should be laid at a grade of at least 1 percent, but not more than 15 percent.
- The swale must not be overtopped by the peak discharge from a 10-year storm, irrespective of the design criteria stated above.
- Remove all trees, stumps, obstructions, and other objectionable material from the swale when it is built.
- Compact any fill material along the path of the swale.

- Stabilize all swales immediately. Seed and mulch swales at a slope of less than 5 percent, and use rip-rap or sod for swales with a slope between 5 and 15 percent. For temporary swales, geotextiles and mats (EC-7) may provide immediate stabilization.
- Irrigation may be required to establish sufficient vegetation to prevent erosion.
- Do not operate construction vehicles across a swale unless a stabilized crossing is provided.
- Permanent drainage facilities must be designed by a professional engineer (see the local drainage design criteria for proper design).
- At a minimum, the drainage swale should conform to predevelopment drainage patterns and capacities.
- Construct the drainage swale with a positive grade to a stabilized outlet.
- Provide erosion protection or energy dissipation measures if the flow out of the drainage swale can reach an erosive velocity.

Costs

- Cost ranges from $15 to $55 per ft for both earthwork and stabilization and depends on availability of material, site location, and access.
- Small dikes: $2.50 - $6.50/linear ft; Large dikes: $2.50/yd^3.
- The cost of a drainage swale increases with drainage area and slope. Typical swales for controlling internal erosion are inexpensive, as they are quickly formed during routine earthwork.

Inspection and Maintenance

- Inspect BMPs prior to forecast rain, daily during extended rain events, after rain events, weekly during the rainy season, and at two-week intervals during the non-rainy season.
- Inspect BMPs subject to non-stormwater discharges daily while non-stormwater discharges occur.
- Inspect ditches and berms for washouts. Replace lost riprap, damaged linings or soil stabilizers as needed.
- Inspect channel linings, embankments, and beds of ditches and berms for erosion and accumulation of debris and sediment. Remove debris and sediment and repair linings and embankments as needed.
- Temporary conveyances should be completely removed as soon as the surrounding drainage area has been stabilized or at the completion of construction

References

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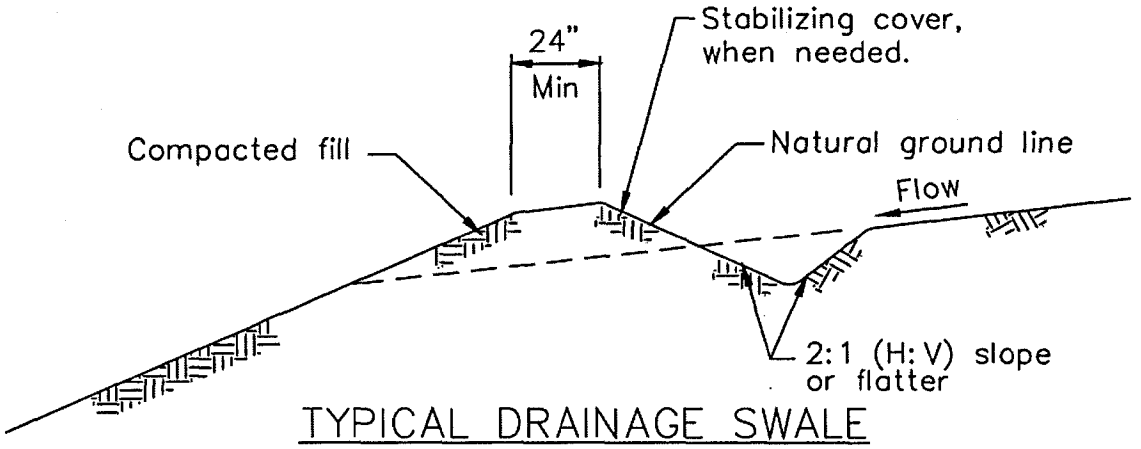
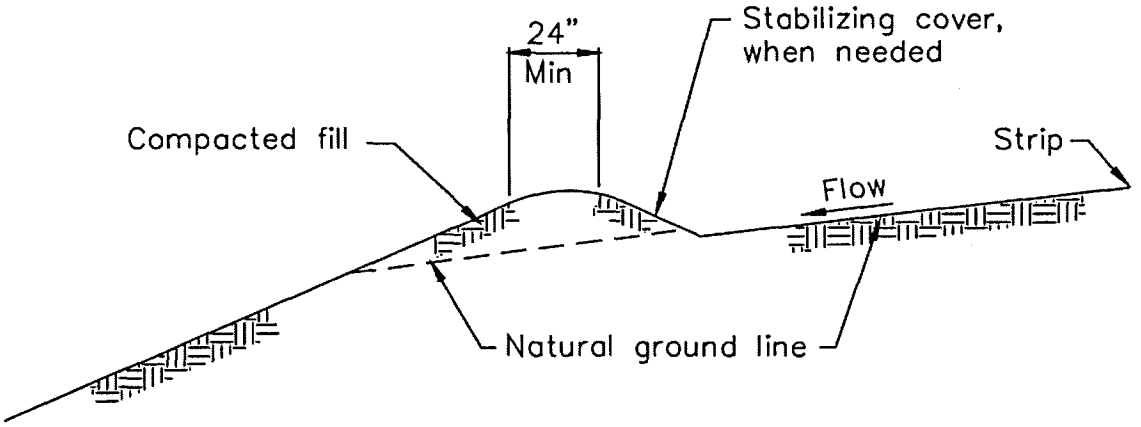


TYPICAL DRAINAGE SWALE
NOT TO SCALE

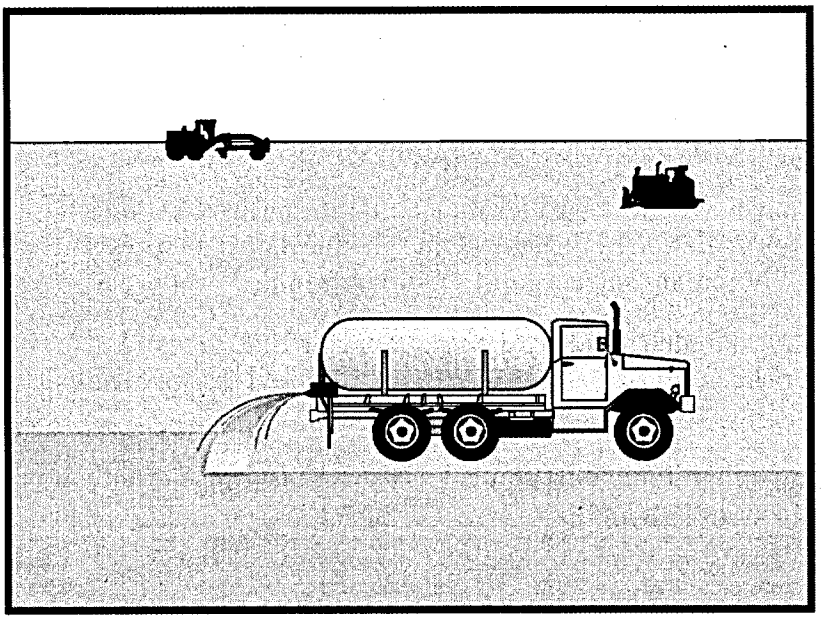
NOTES:

1. Stabilize inlet, outlets and slopes.
2. Properly compact the subgrade.



TYPICAL EARTH DIKE
NOT TO SCALE

Wind Erosion Control WE-1



Objectives

EC	Erosion Control	
SE	Sediment Control	☒
TC	Tracking Control	
WE	Wind Erosion Control	☑
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	

Legend:

☑ **Primary Objective**

☒ **Secondary Objective**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

None

Description and Purpose

Wind erosion or dust control consists of applying water or other dust palliatives as necessary to prevent or alleviate dust nuisance generated by construction activities. Covering small stockpiles or areas is an alternative to applying water or other dust palliatives.

Suitable Applications

Wind erosion control BMPs are suitable during the following construction activities:

- Construction vehicle traffic on unpaved roads
- Drilling and blasting activities
- Sediment tracking onto paved roads
- Soils and debris storage piles
- Batch drop from front-end loaders
- Areas with unstabilized soil
- Final grading/site stabilization

Limitations

- Watering prevents dust only for a short period and should be applied daily (or more often) to be effective.
- Over watering may cause erosion.

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- Oil or oil-treated subgrade should not be used for dust control because the oil may migrate into drainageways and/or seep into the soil.
- Effectiveness depends on soil, temperature, humidity, and wind velocity.
- Chemically treated sub grades may make the soil water repellant, interfering with long-term infiltration and the vegetation/re-vegetation of the site. Some chemical dust suppressants may be subject to freezing and may contain solvents and should be handled properly.
- Asphalt, as a mulch tack or chemical mulch, requires a 24-hour curing time to avoid adherence to equipment, worker shoes, etc. Application should be limited because asphalt surfacing may eventually migrate into the drainage system.
- In compacted areas, watering and other liquid dust control measures may wash sediment or other constituents into the drainage system.

Implementation

General

California's Mediterranean climate, with short wet seasons and long hot dry seasons, allows the soils to thoroughly dry out. During these dry seasons, construction activities are at their peak, and disturbed and exposed areas are increasingly subject to wind erosion, sediment tracking and dust generated by construction equipment.

Dust control, as a BMP, is a practice that is already in place for many construction activities. Los Angeles, the North Coast, and Sacramento, among others, have enacted dust control ordinances for construction activities that cause dust to be transported beyond the construction project property line.

Recently, the State Air Resources Control Board has, under the authority of the Clean Air Act, started to address air quality in relation to inhalable particulate matter less than 10 microns (PM-10). Approximately 90 percent of these small particles are considered to be dust. Existing dust control regulations by local agencies, municipal departments, public works department, and public health departments are in place in some regions within California.

Many local agencies require dust control in order to comply with local nuisance laws, opacity laws (visibility impairment) and the requirements of the Clean Air Act. The following are measures that local agencies may have already implemented as requirements for dust control from contractors:

- Construction and Grading Permits: Require provisions for dust control plans.
- Opacity Emission Limits: Enforce compliance with California air pollution control laws.
- Increase Overall Enforcement Activities: Priority given to cases involving citizen complaints.
- Maintain Field Application Records: Require records of dust control measures from contractor;
- Stormwater Pollution Prevention Plan: (SWPPP): Integrate dust control measures into SWPPP.

Dust Control Practices

Dust control BMPs generally stabilize exposed surfaces and minimize activities that suspend or track dust particles. The following table shows dust control practices that can be applied to site conditions that cause dust. For heavily traveled and disturbed areas, wet suppression (watering), chemical dust suppression, gravel asphalt surfacing, temporary gravel construction entrances, equipment wash-out areas, and haul truck covers can be employed as dust control applications. Permanent or temporary vegetation and mulching can be employed for areas of occasional or no construction traffic. Preventive measures would include minimizing surface areas to be disturbed, limiting onsite vehicle traffic to 15 mph, and controlling the number and activity of vehicles on a site at any given time.

SITE CONDITION	DUST CONTROL PRACTICES								
	Permanent Vegetation	Mulching	Wet Suppression (Watering)	Chemical Dust Suppression	Gravel or Asphalt	Silt Fences	Temporary Gravel Construction Entrances/Equipment Wash Down	Haul Truck Covers	Minimize Extent of Disturbed Area
Disturbed Areas not Subject to Traffic	X	X	X	X	X				X
Disturbed Areas Subject to Traffic			X	X	X		X		X
Material Stock Pile Stabilization			X	X		X			X
Demolition			X				X	X	
Clearing/ Excavation			X	X		X			X
Truck Traffic on Unpaved Roads			X	X	X		X	X	
Mud/Dirt Carry Out					X		X		

Additional preventive measures include:

- Schedule construction activities to minimize exposed area (EC-1, Scheduling).
- Quickly stabilize exposed soils using vegetation, mulching, spray-on adhesives, calcium chloride, sprinkling, and stone/gravel layering.
- Identify and stabilize key access points prior to commencement of construction.
- Minimize the impact of dust by anticipating the direction of prevailing winds.
- Direct most construction traffic to stabilized roadways within the project site.
- Water should be applied by means of pressure-type distributors or pipelines equipped with a spray system or hoses and nozzles that will ensure even distribution.
- All distribution equipment should be equipped with a positive means of shutoff.
- Unless water is applied by means of pipelines, at least one mobile unit should be available at all times to apply water or dust palliative to the project.

- If reclaimed waste water is used, the sources and discharge must meet California Department of Health Services water reclamation criteria and the Regional Water Quality Control Board requirements. Non-potable water should not be conveyed in tanks or drain pipes that will be used to convey potable water and there should be no connection between potable and non-potable supplies. Non-potable tanks, pipes, and other conveyances should be marked, "NON-POTABLE WATER - DO NOT DRINK."
- Materials applied as temporary soil stabilizers and soil binders also generally provide wind erosion control benefits.
- Pave or chemically stabilize access points where unpaved traffic surfaces adjoin paved roads.
- Provide covers for haul trucks transporting materials that contribute to dust.
- Provide for wet suppression or chemical stabilization of exposed soils.
- Provide for rapid clean up of sediments deposited on paved roads. Furnish stabilized construction road entrances and vehicle wash down areas.
- Stabilize inactive construction sites using vegetation or chemical stabilization methods.
- Limit the amount of areas disturbed by clearing and earth moving operations by scheduling these activities in phases.

For chemical stabilization, there are many products available for chemically stabilizing gravel roadways and stockpiles. If chemical stabilization is used, the chemicals should not create any adverse effects on stormwater, plant life, or groundwater.

Costs

Installation costs for water and chemical dust suppression are low, but annual costs may be quite high since these measures are effective for only a few hours to a few days.

Inspection and Maintenance

- Inspect and verify that activity-based BMPs are in place prior to the commencement of associated activities. While activities associated with the BMP are under way, inspect weekly during the rainy season and at two-week intervals in the non-rainy season to verify continued BMP implementation.
- Check areas protected to ensure coverage.
- Most dust control measures require frequent, often daily, or multiple times per day attention.

References

Best Management Practices and Erosion Control Manual for Construction Sites, Flood Control District of Maricopa County, Arizona, September 1992.

California Air Pollution Control Laws, California Air Resources Board, 1992.

Caltrans, Standard Specifications, Sections 10, "Dust Control"; Section 17, "Watering"; and Section 18, "Dust Palliative".

Prospects for Attaining the State Ambient Air Quality Standards for Suspended Particulate Matter (PM10), Visibility Reducing Particles, Sulfates, Lead, and Hydrogen Sulfide, California Air Resources Board, April 1991.

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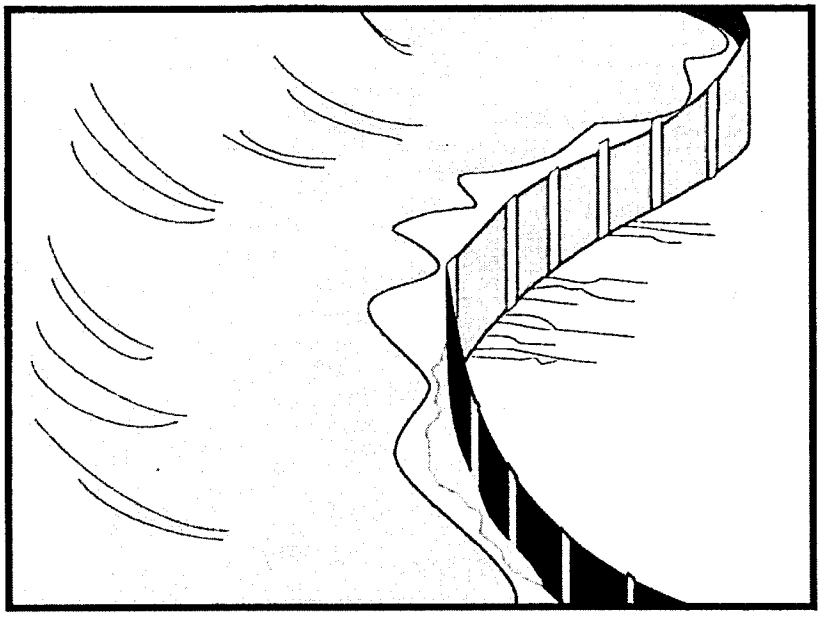
Silt Fence

SE-1



Objectives

EC	Erosion Control	
SE	Sediment Control	☑
TR	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	

Legend:

☑ **Primary Objective**

☒ **Secondary Objective**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

SE-5 Fiber Rolls

SE-6 Gravel Bag Berm

SE-8 Sandbag Barrier

SE-9 Straw Bale Barrier

Description and Purpose

A silt fence is made of a filter fabric that has been entrenched, attached to supporting poles, and sometimes backed by a plastic or wire mesh for support. The silt fence detains sediment-laden water, promoting sedimentation behind the fence.

Suitable Applications

Silt fences are suitable for perimeter control, placed below areas where sheet flows discharge from the site. They should also be used as interior controls below disturbed areas where runoff may occur in the form of sheet and rill erosion. Silt fences are generally ineffective in locations where the flow is concentrated and are only applicable for sheet or overland flows. Silt fences are most effective when used in combination with erosion controls. Suitable applications include:

- Along the perimeter of a project.
- Below the toe or down slope of exposed and erodible slopes.
- Along streams and channels.
- Around temporary spoil areas and stockpiles.
- Below other small cleared areas.

Limitations

- Do not use in streams, channels, drain inlets, or anywhere flow is concentrated.

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- Do not use in locations where ponded water may cause flooding.
- Do not place fence on a slope, or across any contour line. If not installed at the same elevation throughout, silt fences will create erosion.
- Filter fences will create a temporary sedimentation pond on the upstream side of the fence and may cause temporary flooding. Fences not constructed on a level contour will be overtopped by concentrated flow resulting in failure of the filter fence.
- Improperly installed fences are subject to failure from undercutting, overlapping, or collapsing.
  - Not effective unless trenched and keyed in.
  - Not intended for use as mid-slope protection on slopes greater than 4:1 (H:V).
  - Do not allow water depth to exceed 1.5 ft at any point.

Implementation

General

A silt fence is a temporary sediment barrier consisting of filter fabric stretched across and attached to supporting posts, entrenched, and, depending upon the strength of fabric used, supported with plastic or wire mesh fence. Silt fences trap sediment by intercepting and detaining small amounts of sediment-laden runoff from disturbed areas in order to promote sedimentation behind the fence.

Silt fences are preferable to straw bale barriers in many cases. Laboratory work at the Virginia Highway and Transportation Research Council has shown that silt fences can trap a much higher percentage of suspended sediments than can straw bales. While the failure rate of silt fences is lower than that of straw bale barriers, there are many instances where silt fences have been improperly installed. The following layout and installation guidance can improve performance and should be followed:

- Use principally in areas where sheet flow occurs.
- Don't use in streams, channels, or anywhere flow is concentrated. Don't use silt fences to divert flow.
- Don't use below slopes subject to creep, slumping, or landslides.
- Select filter fabric that retains 85% of soil by weight, based on sieve analysis, but that is not finer than an equivalent opening size of 70.
- Install along a level contour, so water does not pond more than 1.5 ft at any point along the silt fence.
- The maximum length of slope draining to any point along the silt fence should be 200 ft or less.
- The maximum slope perpendicular to the fence line should be 1:1.

- Provide sufficient room for runoff to pond behind the fence and to allow sediment removal equipment to pass between the silt fence and toes of slopes or other obstructions. About 1200 ft^2 of ponding area should be provided for every acre draining to the fence.
- Turn the ends of the filter fence uphill to prevent stormwater from flowing around the fence.
- Leave an undisturbed or stabilized area immediately down slope from the fence where feasible.
- Silt fences should remain in place until the disturbed area is permanently stabilized.

Design and Layout

Selection of a filter fabric is based on soil conditions at the construction site (which affect the equivalent opening size (EOS) fabric specification) and characteristics of the support fence (which affect the choice of tensile strength). The designer should specify a filter fabric that retains the soil found on the construction site yet that it has openings large enough to permit drainage and prevent clogging. The following criteria is recommended for selection of the equivalent opening size:

1. If 50 percent or less of the soil, by weight, will pass the U.S. Standard Sieve No. 200, select the EOS to retain 85 % of the soil. The EOS should not be finer than EOS 70.
2. For all other soil types, the EOS should be no larger than the openings in the U.S. Standard Sieve No. 70 except where direct discharge to a stream, lake, or wetland will occur, then the EOS should be no larger than Standard Sieve No. 100.

To reduce the chance of clogging, it is preferable to specify a fabric with openings as large as allowed by the criteria. No fabric should be specified with an EOS smaller than U.S. Standard Sieve No. 100. If 85% or more of a soil, by weight, passes through the openings in a No. 200 sieve, filter fabric should not be used. Most of the particles in such a soil would not be retained if the EOS was too large and they would clog the fabric quickly if the EOS were small enough to capture the soil.

The fence should be supported by a plastic or wire mesh if the fabric selected does not have sufficient strength and bursting strength characteristics for the planned application (as recommended by the fabric manufacturer). Filter fabric material should contain ultraviolet inhibitors and stabilizers to provide a minimum of six months of expected usable construction life at a temperature range of 0 °F to 120 °F.

- Layout in accordance with attached figures.
- For slopes steeper than 2:1 (H:V) and that contain a high number of rocks or large dirt clods that tend to dislodge, it may be necessary to install additional protection immediately adjacent to the bottom of the slope, prior to installing silt fence. Additional protection may be a chain link fence or a cable fence.
- For slopes adjacent to sensitive receiving waters or Environmentally Sensitive Areas (ESAs), silt fence should be used in conjunction with erosion control BMPs.

Materials

- Silt fence fabric should be woven polypropylene with a minimum width of 36 in. and a minimum tensile strength of 100 lb force. The fabric should conform to the requirements in ASTM designation D4632 and should have an integral reinforcement layer. The reinforcement layer should be a polypropylene, or equivalent, net provided by the manufacturer. The permittivity of the fabric should be between 0.1 sec^{-1} and 0.15 sec^{-1} in conformance with the requirements in ASTM designation D4491.

- Wood stakes should be commercial quality lumber of the size and shape shown on the plans. Each stake should be free from decay, splits or cracks longer than the thickness of the stake or other defects that would weaken the stakes and cause the stakes to be structurally unsuitable.

- Staples used to fasten the fence fabric to the stakes should be not less than 1.75 in. long and should be fabricated from 15 gauge or heavier wire. The wire used to fasten the tops of the stakes together when joining two sections of fence should be 9 gauge or heavier wire. Galvanizing of the fastening wire will not be required.

- There are new products that may use prefabricated plastic holders for the silt fence and use bar reinforcement instead of wood stakes. If bar reinforcement is used in lieu of wood stakes, use number four or greater bar. Provide end protection for any exposed bar reinforcement.

Installation Guidelines

Silt fences are to be constructed on a level contour. Sufficient area should exist behind the fence for ponding to occur without flooding or overtopping the fence.

- A trench should be excavated approximately 6 in. wide and 6 in. deep along the line the proposed silt fence.

- Bottom of the silt fence should be keyed-in a minimum of 12 in.

- Posts should be spaced a maximum of 6 ft apart and driven securely into the ground a minimum of 18 in. or 12 in. below the bottom of the trench.

- When standard strength filter fabric is used, a plastic or wire mesh support fence should be fastened securely to the upslope side of posts using heavy–duty wire staples at least 1 in. long. The mesh should extend into the trench. When extra-strength filter fabric and closer post spacing are used, the mesh support fence may be eliminated. Filter fabric should be purchased in a long roll, and then cut to the length of the barrier. When joints are necessary, filter cloth should be spliced together only at a support post, with a minimum 6 in. overlap and both ends securely fastened to the post.

- The trench should be backfilled with compacted native material.

- Construct silt fences with a setback of at least 3 ft from the toe of a slope. Where a silt fence is determined to be not practicable due to specific site conditions, the silt fence may be constructed at the toe of the slope, but should be constructed as far from the toe of the slope as practicable. Silt fences close to the toe of the slope will be less effective and difficult to maintain.

- Construct the length of each reach so that the change in base elevation along the reach does not exceed 1/3 the height of the barrier; in no case should the reach exceed 500 ft.

Costs

- Average annual cost for installation and maintenance (assumes 6 month useful life): $7 per lineal foot ($850 per drainage acre). Range of cost is $3.50 - $9.10 per lineal foot.

Inspection and Maintenance

- Inspect BMPs prior to forecast rain, daily during extended rain events, after rain events, weekly during the rainy season, and at two-week intervals during the non-rainy season.
- Repair undercut silt fences.
- Repair or replace split, torn, slumping, or weathered fabric. The lifespan of silt fence fabric is generally 5 to 8 months.
- Silt fences that are damaged and become unsuitable for the intended purpose should be removed from the site of work, disposed of, and replaced with new silt fence barriers.
- Sediment that accumulates in the BMP must be periodically removed in order to maintain BMP effectiveness. Sediment should be removed when the sediment accumulation reaches one-third of the barrier height. Sediment removed during maintenance may be incorporated into earthwork on the site or disposed at an appropriate location.
- Silt fences should be left in place until the upstream area is permanently stabilized. Until then, the silt fence must be inspected and maintained.
- Holes, depressions, or other ground disturbance caused by the removal of the silt fences should be backfilled and repaired.

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National Management Measures to Control Nonpoint Source Pollution from Urban Areas, United States Environmental Protection Agency, 2002.

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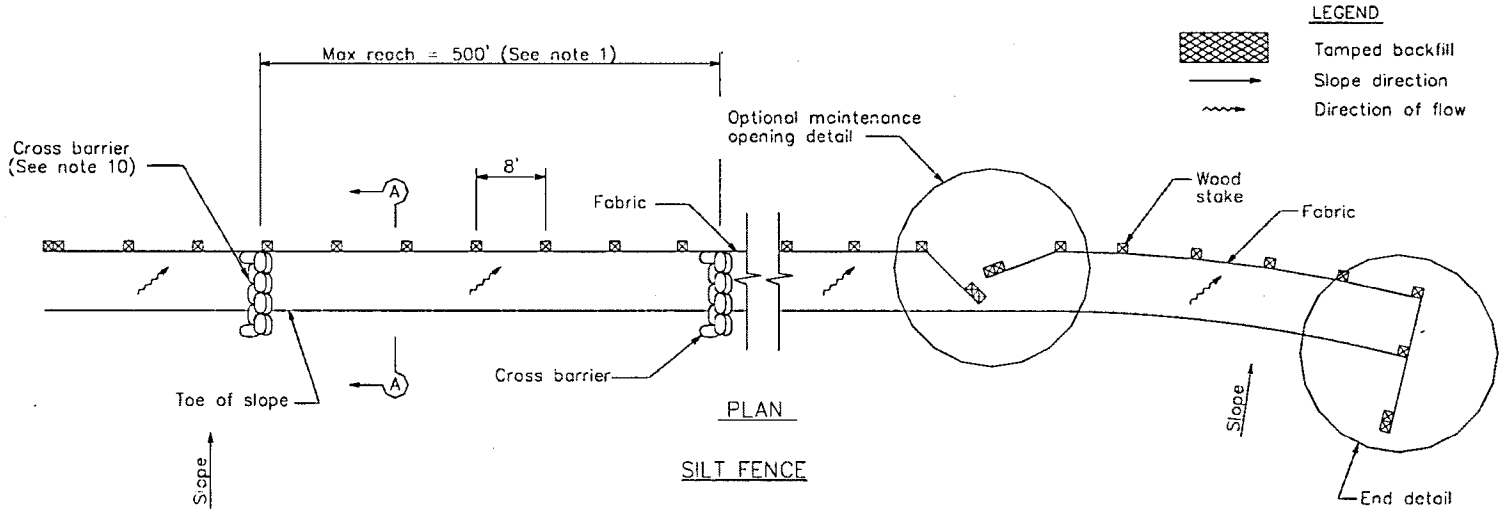
Silt Fence

SE-1

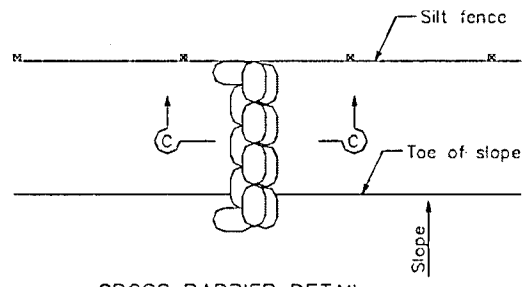


PLAN

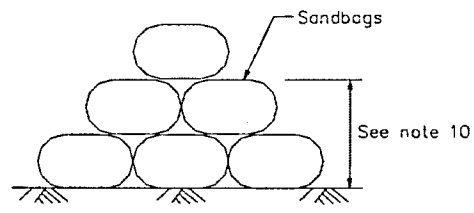
SILT FENCE

NOTES

1. Construct the length of each reach so that the change in base elevation along the reach does not exceed 1/3 the height of the linear barrier, in no case shall the reach length exceed 500'.
2. The last 8'-0" of fence shall be turned up slope.
3. Stake dimensions are nominal.
4. Dimension may vary to fit field condition.
5. Stakes shall be spaced at 8'-0" maximum and shall be positioned on downstream side of fence.
6. Stakes to overlap and fence fabric to fold around each stake one full turn. Secure fabric to stake with 4 staples.
7. Stakes shall be driven tightly together to prevent potential flow-through of sediment at joint. The tops of the stakes shall be secured with wire.
8. For end stake, fence fabric shall be folded around two stakes one full turn and secured with 4 staples.
9. Minimum 4 staples per stake. Dimensions shown are typical.
10. Cross barriers shall be a minimum of 1/3 and a maximum of 1/2 the height of the linear barrier.
11. Maintenance openings shall be constructed in a manner to ensure sediment remains behind silt fence.
12. Joining sections shall not be placed at sump locations.
13. Sandbag rows and layers shall be offset to eliminate gaps.

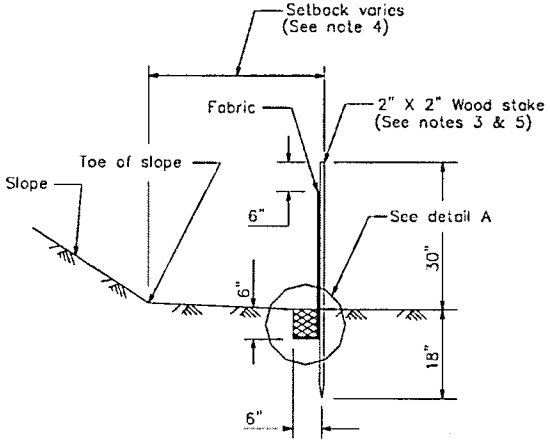


CROSS BARRIER DETAIL

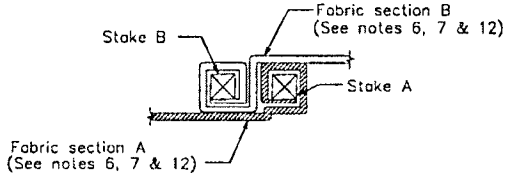


SECTION C-C

SE-1 Silt Fence



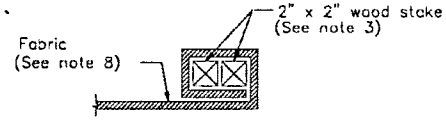
SECTION A–A



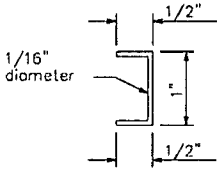
JOINING SECTION DETAIL (TOP VIEW)

LEGEND

- Tamped backfill
- Slope direction
- Direction of flow

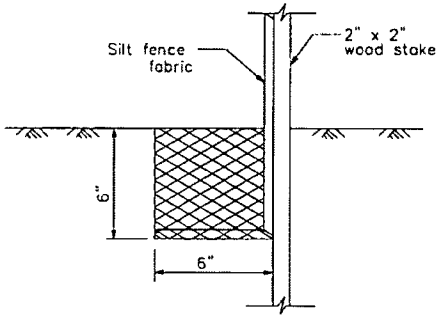


END STAKE DETAIL (TOP VIEW)

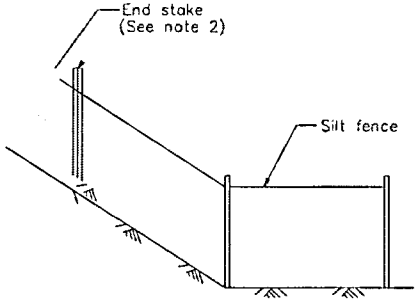


STAPLE DETAIL

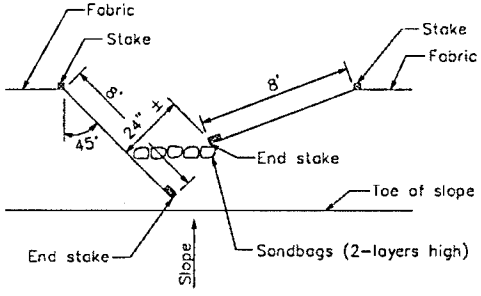
(SEE NOTE 9)



DETAIL A



END DETAIL

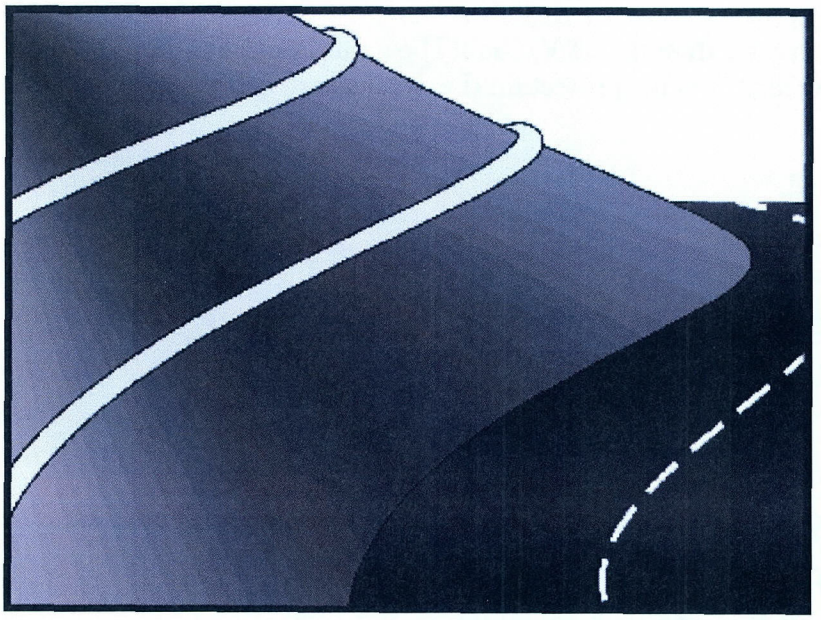


OPTIONAL MAINTENANCE OPENING DETAIL

(SEE NOTE 11)

Fiber Rolls

SE-5



Objectives

EC	Erosion Control	☒
SE	Sediment Control	☑
TR	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	

Legend:

☑ **Primary Objective**

☒ **Secondary Objective**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

SE-1 Silt Fence

SE-6 Gravel Bag Berm

SE-8 Sandbag Barrier

SE-9 Straw Bale Barrier

Description and Purpose

A fiber roll consists of straw, flax, or other similar materials bound into a tight tubular roll. When fiber rolls are placed at the toe and on the face of slopes, they intercept runoff, reduce its flow velocity, release the runoff as sheet flow, and provide removal of sediment from the runoff. By interrupting the length of a slope, fiber rolls can also reduce erosion.

Suitable Applications

Fiber rolls may be suitable:

- Along the toe, top, face, and at grade breaks of exposed and erodible slopes to shorten slope length and spread runoff as sheet flow
- At the end of a downward slope where it transitions to a steeper slope
- Along the perimeter of a project
- As check dams in unlined ditches
- Down-slope of exposed soil areas
- Around temporary stockpiles

Limitations

- Fiber rolls are not effective unless trenched

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- Fiber rolls at the toe of slopes greater than 5:1 (H:V) should be a minimum of 20 in. diameter or installations achieving the same protection (i.e. stacked smaller diameter fiber rolls, etc.).
- Difficult to move once saturated.
- If not properly staked and trenched in, fiber rolls could be transported by high flows.
- Fiber rolls have a very limited sediment capture zone.
- Fiber rolls should not be used on slopes subject to creep, slumping, or landslide.

Implementation

Fiber Roll Materials

- Fiber rolls should be either prefabricated rolls or rolled tubes of erosion control blanket.

Assembly of Field Rolled Fiber Roll

- Roll length of erosion control blanket into a tube of minimum 8 in. diameter.
- Bind roll at each end and every 4 ft along length of roll with jute-type twine.

Installation

- Locate fiber rolls on level contours spaced as follows:
  - Slope inclination of 4:1 (H:V) or flatter: Fiber rolls should be placed at a maximum interval of 20 ft.
  - Slope inclination between 4:1 and 2:1 (H:V): Fiber Rolls should be placed at a maximum interval of 15 ft. (a closer spacing is more effective).
  - Slope inclination 2:1 (H:V) or greater: Fiber Rolls should be placed at a maximum interval of 10 ft. (a closer spacing is more effective).
- Turn the ends of the fiber roll up slope to prevent runoff from going around the roll.
- Stake fiber rolls into a 2 to 4 in. deep trench with a width equal to the diameter of the fiber roll.
  - Drive stakes at the end of each fiber roll and spaced 4 ft maximum on center.
  - Use wood stakes with a nominal classification of 0.75 by 0.75 in. and minimum length of 24 in.
- If more than one fiber roll is placed in a row, the rolls should be overlapped, not abutted.

Removal

- Fiber rolls are typically left in place.

- If fiber rolls are removed, collect and dispose of sediment accumulation, and fill and compact holes, trenches, depressions or any other ground disturbance to blend with adjacent ground.

Costs

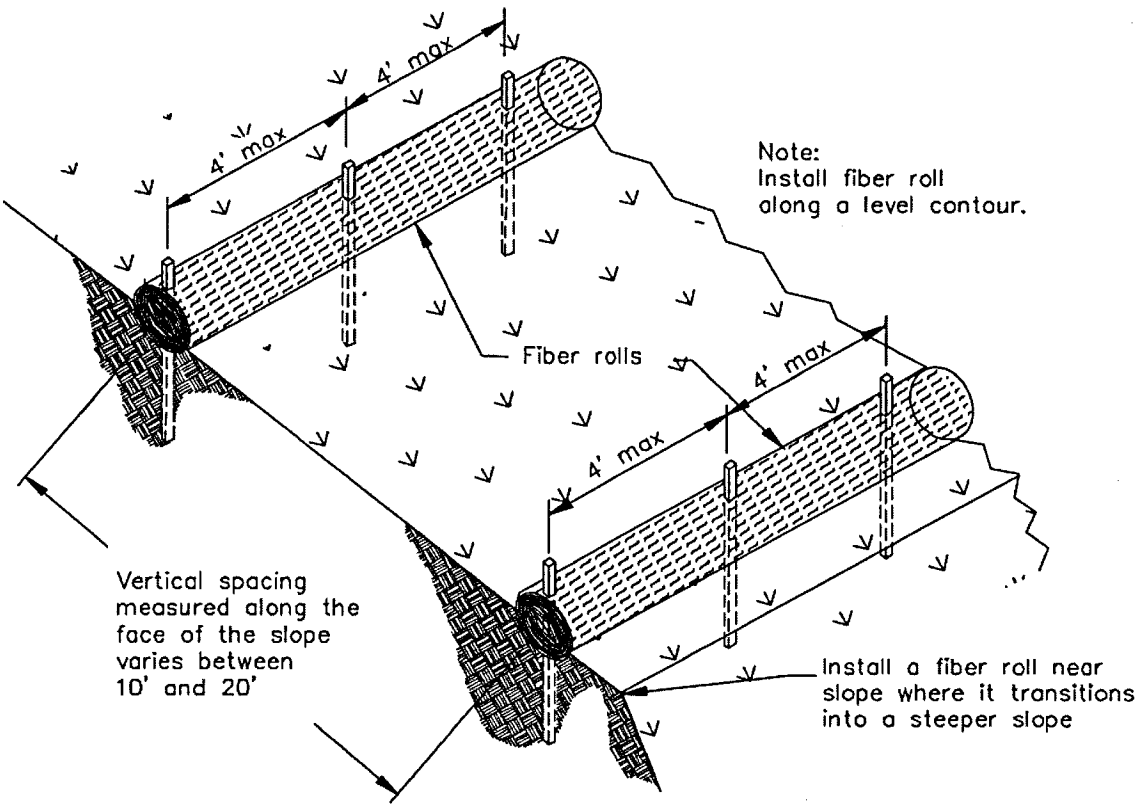
Material costs for fiber rolls range from $20 - $30 per 25 ft roll.

Inspection and Maintenance

- Inspect BMPs prior to forecast rain, daily during extended rain events, after rain events, weekly during the rainy season, and at two-week intervals during the non-rainy season.
- Repair or replace split, torn, unraveling, or slumping fiber rolls.
- If the fiber roll is used as a sediment capture device, or as an erosion control device to maintain sheet flows, sediment that accumulates in the BMP must be periodically removed in order to maintain BMP effectiveness. Sediment should be removed when sediment accumulation reaches one-half the designated sediment storage depth, usually one-half the distance between the top of the fiber roll and the adjacent ground surface. Sediment removed during maintenance may be incorporated into earthwork on the site of disposed at an appropriate location.
- If fiber rolls are used for erosion control, such as in a mini check dam, sediment removal should not be required as long as the system continues to control the grade. Sediment control BMPs will likely be required in conjunction with this type of application.

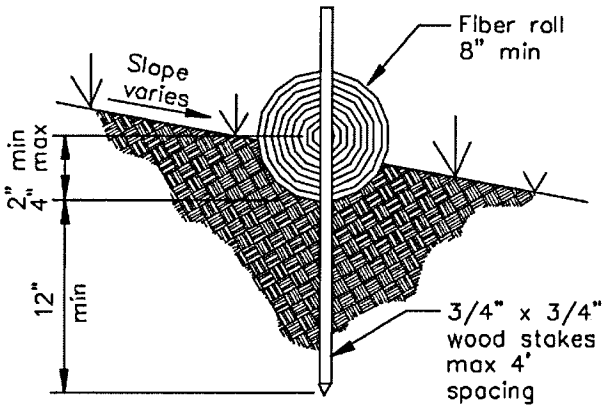
References

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.



TYPICAL FIBER ROLL INSTALLATION

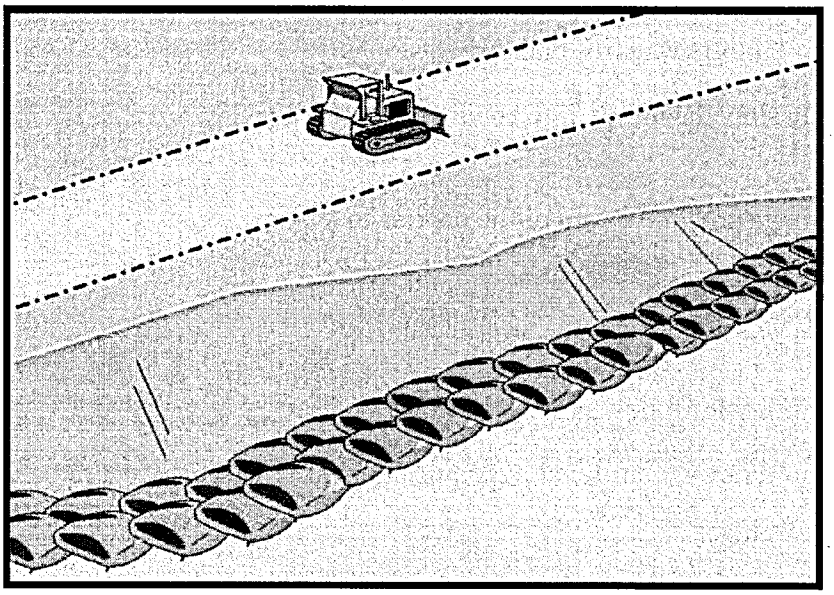
N.T.S.



ENTRENCHMENT DETAIL

N.T.S.

Sandbag Barrier SE-8



Objectives

EC	Erosion Control	☒
SE	Sediment Control	☑
TR	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	

Legend:

☑ **Primary Objective**

☒ **Secondary Objective**

Description and Purpose

A sandbag barrier is a series of sand-filled bags placed on a level contour to intercept sheet flows. Sandbag barriers pond sheet flow runoff, allowing sediment to settle out.

Suitable Applications

Sandbag barriers may be suitable:

- As a linear sediment control measure:
  - Below the toe of slopes and erodible slopes
  - As sediment traps at culvert/pipe outlets
  - Below other small cleared areas
  - Along the perimeter of a site
  - Down slope of exposed soil areas
  - Around temporary stockpiles and spoil areas
  - Parallel to a roadway to keep sediment off paved areas
  - Along streams and channels
- As linear erosion control measure:
  - Along the face and at grade breaks of exposed and erodible slopes to shorten slope length and spread runoff as sheet flow

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

SE-1 Silt Fence

SE-5 Fiber Rolls

SE-6 Gravel Bag Berm

SE-9 Straw Bale Barrier

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- At the top of slopes to divert runoff away from disturbed slopes
- As check dams across mildly sloped construction roads

Limitations

- It is necessary to limit the drainage area upstream of the barrier to 5 acres.
- Degraded sandbags may rupture when removed, spilling sand.
- Installation can be labor intensive.
- Barriers may have limited durability for long-term projects.
- When used to detain concentrated flows, maintenance requirements increase.
- Burlap should not be used for sandbags.

Implementation

General

A sandbag barrier consists of a row of sand-filled bags placed on a level contour. When appropriately placed, a sandbag barrier intercepts and slows sheet flow runoff, causing temporary ponding. The temporary ponding provides quiescent conditions allowing sediment to settle. While the sand-filled bags are porous, the fine sand tends to quickly plug with sediment, limiting the rate of flow through the barrier. If a porous barrier is desired, consider SE-1, Silt Fence, SE-5, Fiber Rolls, SE-6, Gravel Bag Berms, or SE-9, Straw Bale Barriers. Sandbag barriers also interrupt the slope length and thereby reduce erosion by reducing the tendency of sheet flows to concentrate into rivulets which erode rills, and ultimately gullies, into disturbed, sloped soils. Sandbag barriers are similar to ground bag berms, but less porous.

Design and Layout

- Locate sandbag barriers on a level contour.
  - Slopes between 20:1 and 2:1 (H:V): Sandbags should be placed at a maximum interval of 50 ft (a closer spacing is more effective), with the first row near the slope toe.
  - Slopes 2:1 (H:V) or steeper: Sandbags should be placed at a maximum interval of 25 ft (a closer spacing is more effective), with the first row placed near the slope toe.
- Turn the ends of the sandbag barrier up slope to prevent runoff from going around the barrier.
- Allow sufficient space up slope from the barrier to allow ponding, and to provide room for sediment storage.
- For installation near the toe of the slope, consider moving the barrier away from the slope toe to facilitate cleaning. To prevent flow behind the barrier, sandbags can be placed perpendicular to the barrier to serve as cross barriers.
- Drainage area should not exceed 5 acres.

- Stack sandbags at least three bags high.
- Butt ends of bags tightly.
- Overlapp butt joints of row beneath with each successive row.
- Use a pyramid approach when stacking bags.
- In non-traffic areas
  - Height = 18 in. maximum
  - Top width = 24 in. minimum for three or more layer construction
  - Side slope = 2:1 or flatter
- In construction traffic areas
  - Height = 12 in. maximum
  - Top width = 24 in. minimum for three or more layer construction.
  - Side slopes = 2:1 or flatter.

Materials

- ***Sandbag Material:*** Sandbag should be woven polypropylene, polyethylene or polyamide fabric, minimum unit weight of 4 ounces/yd^2, Mullen burst strength exceeding 300 lb/in^2 in conformance with the requirements in ASTM designation D3786, and ultraviolet stability exceeding 70% in conformance with the requirements in ASTM designation D4355. Use of burlap may not acceptable in some jurisdictions.
- ***Sandbag Size:*** Each sand-filled bag should have a length of 18 in., width of 12 in., thickness of 3 in., and mass of approximately 33 lbs. Bag dimensions are nominal, and may vary based on locally available materials.
- ***Fill Material:*** All sandbag fill material should be non-cohesive, Class 1 or Class 2 permeable material free from clay and deleterious material.

Costs

Sandbag barriers are more costly, but typically have a longer useful life than other barriers. Empty sandbags cost $0.25 - $0.75. Average cost of fill material is $8 per yd^3. Pre-filled sandbags are more expensive at $1.50 - $2.00 per bag.

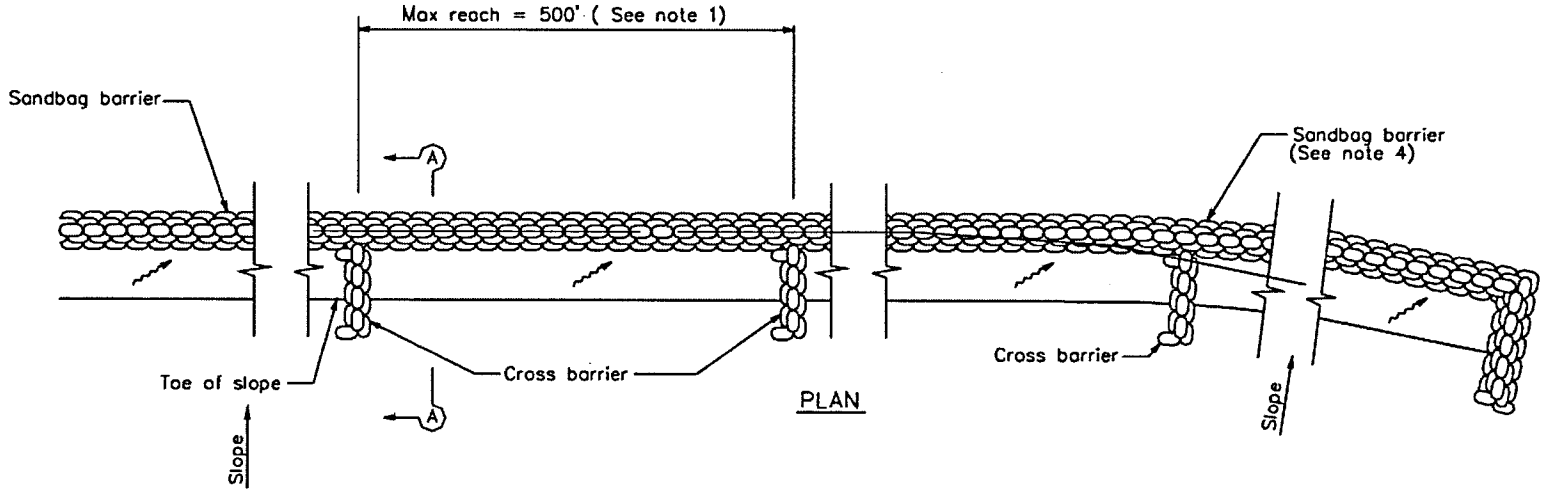
Inspection and Maintenance

- Inspect BMPs prior to forecast rain, daily during extended rain events, after rain events, weekly during the rainy season, and at two-week intervals during the non-rainy season.
- Sandbags exposed to sunlight will need to be replaced every two to three months due to degradation of the bags.
- Reshape or replace sandbags as needed.

- Repair washouts or other damage as needed.
- Sediment that accumulates in the BMP must be periodically removed in order to maintain BMP effectiveness. Sediment should be removed when the sediment accumulation reaches one-third of the barrier height. Sediment removed during maintenance may be incorporated into earthwork on the site or disposed at an appropriate location.
- Remove sandbags when no longer needed. Remove sediment accumulation, and clean, re-grade, and stabilize the area.

References

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

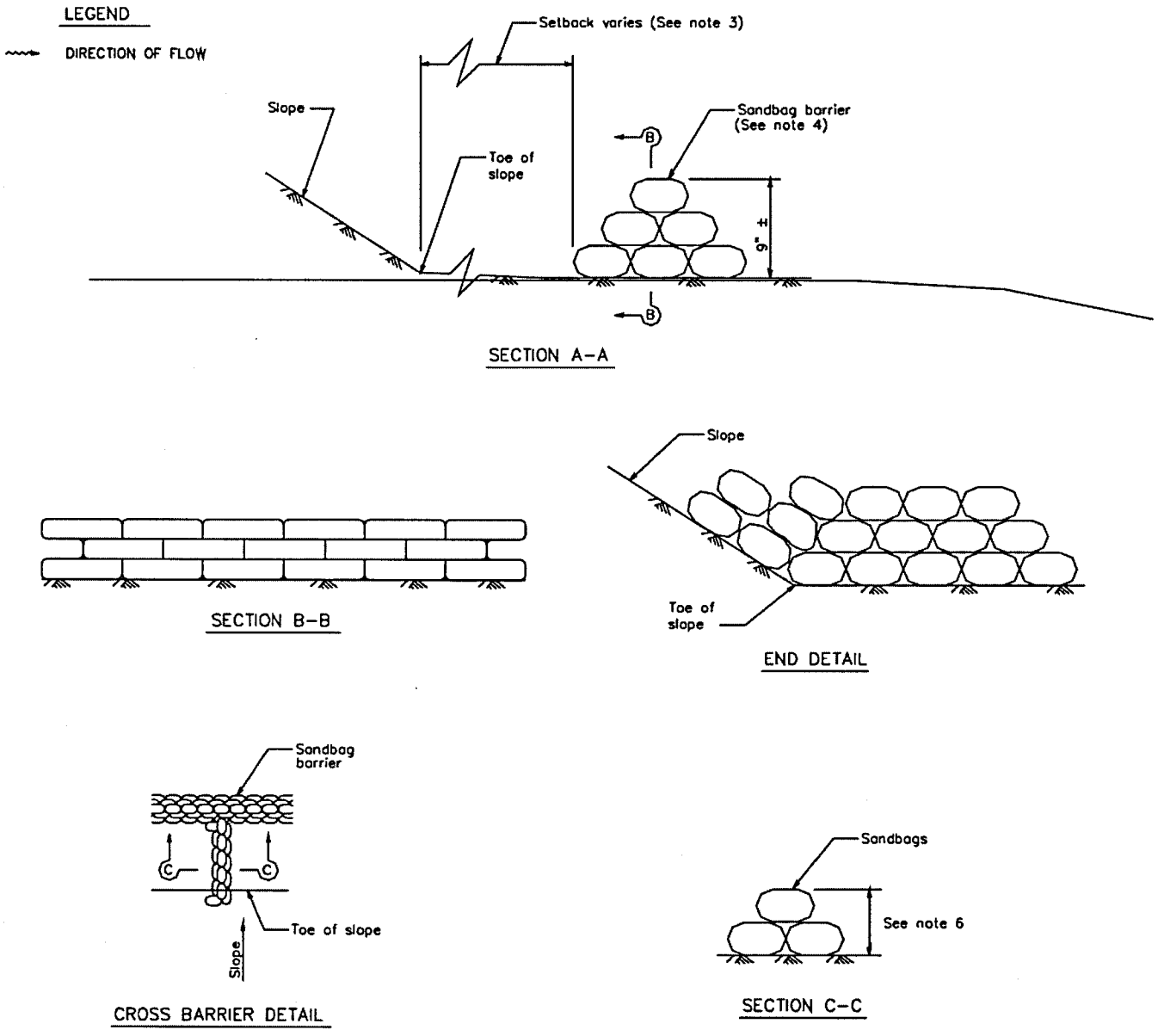


SANDBAG BARRIER

NOTES

1. Construct the length of each reach so that the change in base elevation along the reach does not exceed 1/2 the height of the linear barrier. In no case shall the reach length exceed 500'.
2. Place sandbags tightly.
3. Dimension may vary to fit field condition.
4. Sandbag barrier shall be a minimum of 3 bags high.
5. The end of the barrier shall be turned up slope.
6. Cross barriers shall be a min of 1/2 and a max of 2/3 the height of the linear barrier.
7. Sandbag rows and layers shall be staggered to eliminate gaps.

SE-8 Sandbag Barrier



ATTACHMENT 2
SITE INSPECTION AND
MONITORING REPORTING FORMS

STORMWATER MANAGEMENT PLAN INSPECTION CHECKLIST

DRMO Site and Vicinity, Former Mare Island Naval Shipyard, Vallejo, California

Name/Title of Inspector: _____

Date of Inspection: _____ **Time of Inspection:** _____ **AM/PM**

Type of Inspection: Pre-Precipitation/Post-Precipitation

Weather Conditions: _____

Start of Rainfall (Date/Time): _____

End of Rainfall (Date/Time): _____

Total Recorded Precipitation: _____ **inches**

---

1. Description of Area with Potential to Contribute to Stormwater Runoff (include location of area, BMPs in place, type of maintenance or construction activity, condition of stormwater discharge structures):

_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____

2. Describe changes to the Stormwater Control Structures, if different than the SWPPP.

_____
_____
_____

3. Are other BMPs in place adequate, properly maintained, or implemented?

4. Are additional BMPs required to control stormwater pollution runoff?

5. Recommended corrective actions for SWPPP/stormwater control system:

6. Comments:

BMPS FOR DRMO SITE AND VICINITY
FORMER MARE ISLAND, VALLEJO, CALIFORNIA

Inspected by:_____ Y= YES N = NO Date:_____

ITEMS	IN PLACE	ADEQUATE	NEEDS IMPROVEMENT
Straw wattle across swales every 100 feet of ditches or swales.			
Silt fence and straw wattle along wetland boundaries within 300 feet of excavations			
Bagged/Drummed Material and Container Storage Area			
General Grading to Prevent Ponding			

I certify that the above inspection report was performed by myself and is correct and accurate to the best of my knowledge.

_____ _____

Inspector Signature Date

ATTACHMENT 3
NOTICE OF INTENT AND
SWPPP COMPLIANCE CHECKLIST

Attachment 2

State Water Resources Control Board

NOTICE OF INTENT

TO COMPLY WITH THE TERMS OF THE
GENERAL PERMIT TO DISCHARGE STORM WATER
ASSOCIATED WITH CONSTRUCTION ACTIVITY (WQ ORDER No. 99-08-DWQ)

I. NOI STATUS (SEE INSTRUCTIONS)

MARK ONLY ONE ITEM 1. ☐ New Construction 2. ☐ Change of Information for WDID#

II. PROPERTY OWNER

Name	Contact Person		
NAVFAC Southwest	Marie Dreyer		
Mailing Address: 1455 Frazee Road, Suite 900	Title: Remedial Project Manager		
City: San Diego	State: CA	Zip: 92108-4310	Phone: (619) 532-0904

Owner Type (*check one*) 1.[ ] Private Individual 2.[ ]Business 3.[ ]Municipal 4.[ ]State 5.[ ]Federal 6.[ ]Other

III. DEVELOPER/CONTRACTOR INFORMATION

Developer/Contractor	Contact Person		
Weston Solutions, Inc.	Dwight Gemar		
Mailing Address: 1340 Treat Blvd, Suite 210	Title: Senior Project Manager		
City: Walnut Creek	State: CA	Zip: 94597	Phone: (925) 948-2600

IV. CONSTRUCTION PROJECT INFORMATION

Site/Project Name	Site Contact Person		
Defense Reutilization and Marketing Office Site and Vicinity	Dwight Gemar		
Physical Address/Location: Intersection of Azuar Drive & A Street	Latitude: 38.103 °	Longitude: 122.28 °	County: Solano
City (or nearest City): Vallejo	Zip: 94590	Site Phone Number: (707) 562-3352	Emergency Phone Number: (925) 899-4674

A. Total size of construction site area: 20 Acres

B. Total area to be disturbed: 8.9 Acres (% of total 44%)

C. Percent of site imperviousness (including rooftops):
Before Construction: 50% %
After Construction: 50% %

D. Tract Number(s): NA, NA

E. Mile Post Marker: NA

F. Is the construction site part of a larger common plan of development or sale?
☐ YES ☒ NO

G. Name of plan or development: NA

H. Construction commencement date: 07 / 27 / 09

I. % of site to be mass graded: 44%

J. Projected construction dates:
Complete grading: 10 / 09 / 09 Complete project: 02 / 24 / 10

K. Type of Construction (Check all that apply):
1. ☐ Residential 2. ☐ Commercial 3. ☐ Industrial 4. ☐ Reconstruction 5. ☐ Transportation
6. ☐ Utility Description: _____ 7. ☐ Other (Please List): Environmental Cleanup

V. BILLING INFORMATION

SEND BILL TO:	Name	Contact Person	
☐ OWNER (as in II. above)	Weston Solutions, Inc.	Dwight Gemar	
☒ DEVELOPER (as in III. above)	Mailing Address: 1340 Treat Blvd., Suite 210	Phone/Fax: (925) 948-2600	
☐ OTHER (enter information at right)	City: Walnut Creek	State: CA	Zip: 94597

VI. REGULATORY STATUS

A. Has a local agency approved a required erosion/sediment control plan? ☐ YES ☒ NO

Does the erosion/sediment control plan address construction activities such as infrastructure and structures? ☒ YES ☐ NO

Name of local agency: _____ Phone: _____

B. Is this project or any part thereof, subject to conditions imposed under a CWA Section 404 permit of 401 Water Quality Certification? ☐ YES ☒ No

If yes, provide details: _____

VII. RECEIVING WATER INFORMATION

A. Does the storm water runoff from the construction site discharge to (Check all that apply):

1. ☒ **Indirectly to waters of the U.S.**
2. ☐ **Storm drain system - Enter owner's name:** _____
3. ☐ **Directly to waters of U.S. (e.g. , river, lake, creek, stream, bay, ocean, etc.)**

B. Name of receiving water: (river, lake, creek, stream, bay, ocean): _____

VIII. IMPLEMENTATION OF NPDES PERMIT REQUIREMENTS

A. STORM WATER POLLUTION PREVENTION PLAN (SWPPP) (check one)

☒ A SWPPP has been prepared for this facility and is available for review: Date Prepared: 04 / 02 / 09 Date Amended: ___/___/___

☐ A SWPPP will be prepared and ready for review by (enter date): ___/___/___

☒ A tentative schedule has been included in the SWPPP for activities such as grading, street construction, home construction, etc.

B. MONITORING PROGRAM

☒ A monitoring and maintenance schedule has been developed that includes inspection of the construction BMPs before anticipated storm events and after actual storm events and is available for review.

If checked above: A qualified person has been assigned responsibility for pre-storm and post-storm BMP inspections to identify effectiveness and necessary repairs or design changes ☒ YES ☐ NO

Name: Charles Smith Phone: (707) 562-3262

C. PERMIT COMPLIANCE RESPONSIBILITY

A qualified person has been assigned responsibility to ensure full compliance with the Permit, and to implement all elements of the Storm Water Pollution Prevention Plan including:

1. Preparing an annual compliance evaluation ☒ YES ☐ NO

Name: Claudette Altamirano Phone: (925) 948-2661

2. Eliminating all unauthorized discharges ☒ YES ☐ NO

IX. VICINITY MAP AND FEE (must show site location in relation to nearest named streets, intersections, etc.)

Have you included a vicinity map with this submittal? ☒ YES ☐ NO

Have you included payment of the annual fee with this submittal? ☒ YES ☐ NO

X. CERTIFICATIONS

"I certify under penalty of law that this document and all attachments were prepared under my direction and supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine or imprisonment. In addition, I certify that I have read the entire General Permit, including all attachments, and agree to comply with and be bound by all of the provisions, requirements, and prohibitions of the permit, including the development and implementation of a Storm Water Pollution Prevention Plan and a Monitoring Program Plan will be complied with."

Printed Name: _____

Signature: _____ **Date:** _____

Title: _____

State Water Resources Control Board

Division of Water Quality
1001 I Street • Sacramento, California 95814 • (916) 341-5537
Mailing Address: P.O. Box 100 • Sacramento, California • 95812-0100
FAX (916) 341-5543 • Internet Address: http://www.swrcb.ca.gov

Dan Skopec
ting Secretary for Environmental Protection

Arnold Schwarzenegger
Governor

The energy challenge facing California is real. Every Californian needs to take immediate action to reduce energy consumption. For a list of simple ways you can reduce demand and cut your energy costs, see our website at http://www.swrcb.ca.gov.

To SWPPP Checklist users:

This checklist is being provided as an aid to those unfamiliar in the preparation of a SWPPP. It is a comprehensive list of issues a SWPPP preparer must consider during the development of the document. Many sites, especially small construction sites, will not need to address some of the listed items because they are not relevant to the site, the construction activities planned, or the construction materials used. This list allows the preparer to consider the applicability of the item to the specific circumstances of the site, and then determine to what extent the item should be addressed in the SWPPP. The items in the checklist are derived from Sections A, B, and C of the Construction General Permit, and the specific permit section is listed in the second column.

The use of this checklist does not guarantee compliance with the General Construction Storm Water Permit. Additionally, using the checklist to generate a SWPPP is not a substitute for knowledge of the permit requirements, the checklist serves as a **guidance** document only. A site specific SWPPP must be combined with proper and timely installation of the BMPs, thorough and frequent inspections, maintenance, and documentation.

STORM WATER POLLUTION PREVENTION PLAN AND MONITORING PROGRAM CHECKLIST

GENERAL CONSTRUCTION ACTIVITIES STORM WATER PERMIT
ORDER NO. 99-08-DWQ
NPDES PERMIT NO. CAS000002

Construction site name: Defense Reutilization and Marketing Office (DRMO) Site and Vicinity

Date Prepared: _____ WDID _____

Contact Information _____

Section A. Storm Water Pollution Prevention Plan (SWPPP)				
	Permit Section	**Page Number[1]**	**Not Applicable N/A**	**Implementation Date[2]**
Vicinity Map (graphic)	***A.5.a.1***	Figure E-1		
Major roadways, geographic features or landmarks	A.5.a.1	Figure E-1, E-2		
Site perimeter	A.5.a.1	Figure E-2, E-3		
Geographic features	A.5.a.1	Figure E-2, E-3		
General topography	A.5.a.1	Figure E-2, E-3		
Site Map (graphic) (can modify Parcel Map)	***A.5.a.2***	Figure E-2, E-3		
Site perimeter	A.5.a.2	Figure E-2, E-3		
Existing and proposed buildings, lots, and roadways	A.5.a.2	Figure E-2, E-3		
Storm water collection and discharge points	A.5.a.2	Section 3.3		
General topography before and after construction	A.5.a.2	Figure E-2, E-3		
Anticipated discharge location(s)	A.5.a.2	Section 3.3		
Drainage patterns	A.5.a.2	Section 3.3		
Relevant drainage areas	A.5.a.2	Section 3.3		
Temporary on-site drainage	A.5.a.2	NA		
Drainage (graphic)	***A.5.b.1***	Section 3.3		
Drainage patterns	A.5.b.1	Section 3.3		
Slopes after major grading	A.5.b.1	Section 3.3		
Calculations for storm water run-on	A.5.b.1	Section 3.3, Attachment 4		
BMPs that divert off-site drainage from going through site	A.5.b.1	Section 5.3		
Storm Water Inlets (graphic)	***A.5.b.2***	Section 3		
Drainage patterns to storm water inlets or receiving water	A.5.b.2	Section 3.3		
BMPs that protect storm water inlets or receiving water	A.5.b.2	Section 3.6		

[1] Indicate the page number where the information is located in your SWPPP. If the information is not applicable to your site, construction activities, or construction materials, check the N/A box. Your SWPPP does not have to address items which are not applicable to your situation.
[2] Date that the BMP will be installed on the site

Section A. Storm Water Pollution Prevention Plan (SWPPP)				
	Permit Section	Page Number[1]	Not Applicable N/A	Implementation Date[2]
Site History/Past Site Usage (Real Estate Broker Disclosure may be sufficient)	***A.5.b.3***	Section 3.1		
Description of toxic materials treated, stored, or spilled on site	A.5.b.3	Section 3.1		
BMPs that minimize contact of contaminants with storm water	A.5.b.3	Section 4		
Location of Areas Designated for: (graphic)	***A.5.b.4***	Section 4		
Soil or waste storage	A.5.b.4	Section 4.2, Section 4.3		
Vehicle storage & service	A.5.b.4	Section 4.6, Section 4.7, Section 4.8		
Construction material loading, unloading, and access	A.5.b.4	Section 4.2		
Equipment storage, cleaning, maintenance	A.5.b.4	Section 4.8		
BMP Descriptions for: (graphic or narrative)	***A.5.b.5***	Section 4		
Waste handling and disposal areas	A.5.b.5	Section 4.2, Section 4.3		
On-site storage and disposal of construction materials and waste	A.5.b.5	Section 4.2, Section 4.3		
BMPs to minimize exposure of storm water to construction materials, equipment, vehicles, waste	A.5.b.5	Section 4.2, Section 4.3		
Post Construction BMPs	***A.5.b.6 See A. 10***	Section 6.4		
Additional Information	***A.5. c***	NA		
Description of other pollutant sources and BMPs that cannot be shown graphically	A.5.c.1	Section 3.6, Section 4, Section 4.1		
Pre-construction control practices	A.5.c.1	Section 3.3		
Inventory of materials and activities that may pollute storm water	A.5.c.2	Section 3.6		
BMPs to reduce/eliminate potential pollutants listed in the inventory	A.5.c.2	Section 4		
Runoff coefficient (before & after)	A.5.c.3	Section 3.3, Attachment 4		
Percent impervious (before & after)	A.5.c.3	Section 3.3, Attachment 4		
Copy of the NOI and WDID #	A.5.c.4	Attachment 3		
Construction activity schedule	A.5.c.5	Section 3.5		
Contact information	A.5.c.6	Section 6.6		

Section A. Storm Water Pollution Prevention Plan (SWPPP)

	Permit Section	Page Number[1]	Not Applicable N/A	Implementation Date[2]
EROSION CONTROL	**A.6**	Section 5		
The SWPPP shall include: (graphic)	***A.6.a-c***	Section 5		
Areas of vegetation on site	A.6.a.1	Figure E-2 Figure E-3		
Areas of soil disturbance that will be stabilized during rainy season	A.6.a.2	NA		
Areas of soil disturbance which will be exposed during any part of the rainy season	A.6.a.3	NA		
Construction phase / BMP sequencing schedule including supplemental pre-rain action plan for erosion control measures	A.6.a.4	Section 5		
BMPs for erosion control	A.6.b	Section 5		
BMPs to control wind erosion	A.6.c	Section 5.4		
SEDIMENT CONTROL	**A.8**			
Description/Illustration of BMPs to prevent increase of sediment load in discharge	A.8	Section 5.5		
Construction phase / BMP sequencing schedule including supplemental pre-rain action plan for sediment control measures	A.8	Section 5.1		
NON-STORM WATER	**A.9**			
Description of non-storm water discharges to receiving waters	A.9	Section 6.1		
Locations of discharges	A.9	Section 6.1		
Description of BMPs	A.9	Section 6.1, Section 6.2		
Name and phone number of qualified person responsible for non-storm water management	A.9	Section 6.6		
POST-CONSTRUCTION	**A.10**			
Description and location of BMPs	A.10	Section 6.4		
Operation/Maintenance of BMPs after project completion (including funding)	A.10	Section 6.4		
MAINTENANCE, INSPECTIONS, AND REPAIR	**A.11**	Section 6.6		
Name and phone number of qualified person responsible for inspections	A.11	Section 6.6		
Inspection checklist: date, weather, inadequate BMPs, visual observations of BMPs, corrective action, inspector's name, title, signature	A.11.a-f	Section 6.5, Attachment 2		
OTHER REQUIREMENTS	**A.12-16**			
Documentation of all training	A.12	Section 6.6		
List of Contractors/Subcontractors	A.13	Section 6.6		

Section A. Storm Water Pollution Prevention Plan (SWPPP)				
	Permit Section	Page Number[1]	Not Applicable N/A	Implementation Date[2]
Section B. Monitoring and Reporting Requirements				
Description of site inspection plans	B.3	Section 6.3, Section 6.5, Attachment 2		
Compliance certification (annually 7/1) if project is under active construction	B.4	NA		
Noncompliance reporting	B.5	Section 6.7		
Records of all inspections; compliance certifications; noncompliance reports, etc. should be kept for at least three years	B.6	Section 6.5		
Monitoring program for sediment contribution from direct discharges to impaired water bodies	B.7	NA		
Monitoring program for pollutants not visually detectable in storm water (non-visible pollutants)	B.8	NA		
Section C. Standard Provisions for Construction Activities				
Signed Certification for SWPPP, reports, amendments, etc. Who is authorized to sign and by what authority has the duly authorized representative been assigned?	C.9,10	Section 1		
Location of General Permit and SWPPP on site during construction activities	C. 17	Attachment 3		

Notes:

ATTACHMENT 4
RUNOFF COEFFICIENT CALCULATIONS

Runoff Coefficients for Underdeveloped Areas

	Extreme	High	Normal	Low
Relief	0.28 – 0.35	0.20 – 0.28	0.14 – 0.20	0.08 – 0.14
	Steep, rugged terrain with average slopes above 30%	Hilly, with average slopes of 10-30%	Rolling, with average slopes of 5-10%	Relatively flat land, with average slopes of 0-5%
Soil Filtration	0.12 – 0.16	0.08 – 0.12	0.06 – 0.08	0.04 – 0.06
	No effective soil cover, either rock or then soil mantle of negligible infiltration capacity	Slow to take up water, clay or shallow loam soils of low infiltration capacity, imperfectly or poorly drained	Normal; well drained light or medium textured soils, sandy loams, silt and silt loams	High; deep sand or other soil that takes up water readily, very light well drained soils
Vegetal Cover	0.12 – 0.16	0.08 – 0.12	0.16 – 0.08	0.04 – 0.06
	No effective plant cover, bare or very sparse cover	Poor to fair; clean cultivation crops, or poor natural cover, less than 20% of drainage area over good cover	Fair to good; about 50% of area in good grassland or woodland, not more than 50% of area in cultivated crops	Good to excellent; about 90% of drainage area in good grassland, woodland or equivalent cover
Surface Storage	0.10 – 0.12	0.08 – 0.10	0.06 – 0.08	0.04 – 0.06
	Negligible surface depression few and shallow; drainage ways steep and small, no marshes	Low; well defined system of small drainage ways; no ponds or marshes	Normal; considerable surface depression storage; lakes and pond marshes	High; surface storage, high; drainage system not sharply defined; large flood plain storage or large number of ponds or marshes

Given An undeveloped watershed consisting of:

1) Normal, rolling terrain with average slopes of 5%
2) Normal, well drained light or medium textured soils
3) Poor to fair, poor natural cover
4) Normal, surface depressions with lakes, and pond marshes

Solution:

Relief	0.08
Soil Infiltration	0.12
Vegetal Cover	0.08
Surface Storage	0.08

Find The runoff coefficient, C, for the above watershed **C = 0.36**

APPENDIX F
WASTE MANAGEMENT PLAN

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2 WASTE MINIMIZATION PRACTICES 2-1

3 HANDLING, TRANSPORTATION, AND CONSOLIDATION OF EXCAVATED SOIL 3-1

4 HANDLING AND DISPOSAL OF GENERAL SOLID WASTE 4-1

5 HANDLING AND DISPOSAL OF FREE PRODUCT 5-1

6 HANDLING AND DISPOSAL OF GROUNDWATER AND WATER ASSOCIATED WITH DECONTAMINATION 6-1

7 HANDLING OF WASTE MATERIALS FROM A POTENTIAL SPILL 7-1

8 RECORDKEEPING 8-1

9 REFERENCES 9-1

LIST OF TABLES

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Table F-2 Vallejo Sanitation and Flood Control District Acceptance Criteria 6-3

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ABBREVIATIONS AND ACRONYMS

CAMU	Corrective Action Management Unit
CCR	California Code of Regulations
CFR	Code of Federal Regulations
DON	Department of the Navy
DOT	Department of Transportation
DRMO	Defense Reutilization and Marketing Office
DTSC	Department of Toxic Substances Control
EPP	Environmental Protection Plan
IA	Investigation Area
LDR	Land Disposal Restriction
MINS	Mare Island Naval Shipyard
PCAP	Petroleum Corrective Action Plan
PPE	personal protective equipment
RCRA	Resource Conservation and Recovery Act
TSDF	treatment, storage, or disposal facility
VSFCD	Vallejo Sanitation Flood Control District
WESTON	Weston Solutions, Inc.
WMP	Waste Management Plan

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1 NATURE AND PURPOSE OF PLAN

This Waste Management Plan (WMP) has been prepared to address the waste practices to be performed for the petroleum corrective action at the Defense Reutilization and Marketing Office (DRMO) Site and Vicinity located at the former Mare Island Naval Shipyard (MINS), Vallejo, California, The work is being performed for the U.S. Department of Navy (DON) Naval Facilities Engineering Command Southwest under Contract Number N62473-08-D-8825, Contract Task Order No. 0005.

This WMP addresses several waste streams and handling issues, including:

- Waste minimization practices
- Handling, transportation, and disposal of excavated soil
- Handling and disposal of general solid waste
- Handling and disposal of free product
- Handling and disposal of groundwater and water associated with decontamination
- Handling of waste materials from a potential spill
- Record keeping

Associated with waste management are the activities related to spill control and response. These topics are covered in the Environmental Protection Plan and the Stormwater Pollution Prevention Plan, included as Appendix D and E, respectively to the Petroleum Corrective Action Plan (PCAP).

This WMP addresses on-site and off-site operations, including work by subcontractors and suppliers. The plan identifies personnel, procedures, controls, records, and forms to be used during the project to ensure that wastes generated during the corrective action are minimized, collected, and disposed of properly.

The Project Manager is responsible to verify that all project personnel are aware of the compliance requirements in this plan. This document will be updated if the scope changes or waste regulations are revised.

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2 WASTE MINIMIZATION PRACTICES

The anticipated waste streams that will be collected by WESTON at the work site include the following:

- Excavated petroleum-impacted soil
- General solid waste, including trash, miscellaneous debris and used personal protection equipment (PPE)
- Free-phase petroleum product
- Groundwater and waste water

Additional waste may be generated in the event of a spill or release; however, spill control measures will be in place to prevent such an occurrence.

WESTON will minimize production of waste through reuse or recycling whenever feasible; for example, free product removed as part of the corrective action will be recycled, if feasible. WESTON will also minimize the quantity of materials, such as fuel, lubricants and detergents, brought onto the work site and will avoid the use of other chemicals whenever possible.

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3 HANDLING, TRANSPORTATION, AND CONSOLIDATION OF EXCAVATED SOIL

Soil from the DRMO Site and Vicinity that is contaminated with petroleum hydrocarbons will be transported to the Investigation Area (IA) H1 Containment Area for consolidation with other wastes. If dewatering is required, the soil will first be temporarily staged within benched portions of the excavation. Soil will be transported using off-road dump trucks along non-public roads to the IA-H1 Containment Area using the haul routes presented in Figure 5-2 of the PCAP. Care will be taken to not overload the trucks to avoid incidental spillage along the haul road. Any small discharge of soil that may occur along a haul route will be promptly scraped and loaded for transport to the IA-H1 Containment Area. Truck crossing signs and stop signs for cross-traffic will be posted at the intersection of the haul route and the IA-H1 access road during soil transport activities, as required.

Debris present in soil removed from the DRMO and Vicinity, and placed within the IA-H1 Containment Area under the engineered cap, must be of a size and nature that after placement with soil in one foot thick compacted intervals, no substantial debris items may be visible protruding from the compacted surface. Any debris items which cannot be placed and/or compacted to meet this requirement shall be removed. Other applicable requirements for placement of soil/waste materials specified in the IA-H1 Final Remedial Design Plan shall also be met. Other debris encountered during the corrective action is anticipated to include a small portion of the Industrial Wastewater Treatment Plant pipeline which will be removed and flushed with three volumes of water prior to disposal.

The 72-acre IA-H1 Containment Area is located west of the DRMO site. The IA-H1 Containment Area includes the former Resource Conservation and Recovery Act (RCRA)/Facility Landfill, Industrial Wastewater Treatment Plant, and Waste Oil Sumps (Installation Restoration Site 02). Contaminated soil and inert debris from other remediation sites on Mare Island have recently been consolidated adjacent to the RCRA Interim Status Landfill within the IA-H1 Containment Area. This consolidation activity is being performed in coordination with installation of an engineered cap over the IA-H1 Containment Area to

implement final closure and in compliance with waste acceptance criteria from the Final Remedial Action Plan/Record of Decision RCRA Closure Plan for IA-H1 (WESTON, 2006).

In October 2004 a time-critical removal action/interim remedial action was completed at IA-H1 according to the provisions of a Final Action Memorandum/Interim Remedial Action Plan (WESTON, 2004). The purpose of the time-critical removal action was to construct a Containment Barrier consisting of a slurry wall and a groundwater collection trench around the perimeter of the RCRA/Facility Landfill, the former industrial waste treatment plan, and adjacent disposal areas. The 72-acre encircled area is referred to as the Containment Area.

Excavated soil from the DRMO has been previously characterized and transported to IA-H1 for incorporation as subgrade for an engineered cap system within the IA-H1 Containment Area (WESTON, 2008). The IA-H1 containment barrier prevents the lateral migration of groundwater from the area. The engineered cap system will prevent exposure of human or ecological receptors to materials in the subgrade beneath the cap. Soil transported from the DRMO Site and Vicinity will be discharged from the off-road haul trucks within the IA-H1 Containment Area. The soil will then be spread in one-foot loose lifts and compacted using a 20-ton minimum sheepsfoot compactor. A method specification of six two-way passes with the compactor will be used to ensure adequate compaction.

Because the waste is not being shipped off-site or on public roads, manifests will not be required for consolidation of wastes within the IA-H1 Containment Area.

4 HANDLING AND DISPOSAL OF GENERAL SOLID WASTE

General solid waste will be produced as a result of work site operations. Waste materials are likely to include wastepaper, food and beverage containers, used PPE (provided it is not known to require management as a hazardous waste), and miscellaneous construction materials. As discussed in Section 2, efforts will be made to minimize contractor-generated waste. More importantly, other waste streams will not be commingled with general solid waste.

General solid waste will be containerized in plastic refuge bags and place in a roll-off box or debris box provided by a local waste hauler. The waste will be transported by a local hauler for disposal at a licensed off-site disposal landfill.

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5 HANDLING AND DISPOSAL OF FREE PRODUCT

Free product encountered during excavation will be removed with a vacuum truck and the recovered oil will be transferred to a temporary storage tank for characterization. Floating product skimmer and booms will be used to remove the free product, and care will be taken to minimize the amount of water removed with the product. Free product will be stored in steel tanks located within a lined and bermed area for secondary containment.

Free product will be recycled if possible. If necessary for recycling or for disposal purposes, the waste will be profiled for disposal at an appropriate and licensed treatment and/or disposal facility.

Wastes sent off site for disposal or recycling will be done so in accordance with the Department of Transportation (DOT) Hazardous Material Transportation regulations of 49 Code of Federal Regulations (CFR), Parts 171 through 177, and 40 CFR, Part 262, Subpart B, and 22 California Code of Regulations (CCR), Section 66262, which involve packaging, placarding, labeling, and manifesting requirements, and with appropriate Land Disposal Restriction (LDR) certification notices per 40 CFR, Part 268, and 22 CCR, Section 66268. Personnel having the required DOT training will perform all DOT functions. In addition, all transporter and disposal contractors will be subject to the contractor qualification process. All waste will be transported using a California hazardous waste manifest.

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6 HANDLING AND DISPOSAL OF GROUNDWATER AND WATER ASSOCIATED WITH DECONTAMINATION

Groundwater and water associated with decontamination activities will be discharged to VSFCD provided it meets VSFCD discharge requirements. When necessary, groundwater will be extracted from excavations prior to backfill using vacuum trucks and temporarily stored in portable steel tanks for sampling. If free product is encountered on groundwater it will be removed using floating product skimmer pumps followed by absorbent booms as described in Section 5. Once free project is removed, dewatering will be performed as required by pumping the groundwater to storage tanks through a filter system. The filter system will consist of four 10-micron bag filters and two 1-micron cartridges operating in a series to remove sediment from the water. Following filtration, the groundwater may also be pumped through Organophillic Clay Vessels for residual oil removal and to ensure that the discharge requirements have been met.

Water that is generated by decontamination activities will also be stored in steel tanks. Stored water and groundwater will be sampled in accordance with the VSFCD requirements. Table F-1 presents the sampling and analysis requirements and Table F-2 presents the acceptance criteria for discharging to the VSFCD system. After verifying that permit discharge limits are met, the water will be drained or pumped to a sanitary sewer manhole that discharges to VSFCD. In the unlikely event that permit limits are not met, the water will be transported to an appropriate treatment and disposal facility for final disposition.

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Table F-1
Summary of Permit Sampling and Analytical Requirements

Target Analytes	Analytical Method	Sample Container
pH	EPA Method 150.1	1 L amber
Oil & Grease	EPA Method 1664A	1 L amber w/ HCl
Total Cyanide	SM4500-CN	1 L polyethylene w/ NaOH
Total Phenolics	EPA Method 420.1	1 L amber w/ H_2SO_4
VOCs	EPA Method 624	3 X 40-mL VOA
TPH-gasoline	EPA Method 8015	3 X 40-mL VOA
SVOCs	EPA Method 625	1 L amber
Total Metals[1]	EPA Method 200.7/245.1	500 mL polyethylene w/ HNO_3
Biological Oxygen Demand	SM5210B (formerly EPA Method 405.1)[3]	1 L polyethylene
Total Suspended Solids	SM2540D (formerly EPA Method 160.2)[3]	250 mL polyethylene
Total Identifiable Chlorinated Hydrocarbons[2]	EPA Method 608 (Organochlorine Pesticides)	1 L amber
	EPA Method 608 (Polychlorinated Biphenyls)	1 L amber
TPH-diesel & motor oil	EPA Method 8015	1 L amber

Notes:

1 Metals include arsenic, beryllium, cadmium, chromium (total), copper, lead, mercury, nickel, selenium, silver, and zinc.

2 Total identifiable chlorinated hydrocarbons are defined as pesticides and PCBs which include the following analytes: aldrin, alpha-BHC, beta-BHC, gamma-BHC (Lindane), delta-BHC, Chlordane, 4,4'-DDD, 4,4'-DDE, 4,4'-DDT, dieldrin, endosulfan I, endosulfan II, endosulfan sulfate, endrin, endrin aldehyde, endrin ketone, heptachlor, heptachlor epoxide, methoxychlor, toxaphene, Aroclor 1016, Aroclor 1221, Aroclor 1232, Aroclor 1242, Aroclor 1248, Aroclor 1254, and Aroclor 1260.

3 Revisions to 40 CFR 136 and 40 CFR 141 were published by the EPA on March 12, 2007. These revisions, known as the Method Update Rule that became effective 30 days after their publication, constitute approval of newly developed methods and the withdrawal of outdated methods. The equivalent procedures have the same or similar technology to those methods being withdrawn; except they are published by another organization, such as American Society of Testing and Materials or Standard Methods.

CFR Code of Federal Regulations
EPA U.S. Environmental Protection Agency
HCl hydrochloric acid
HNO_3 nitric acid
H_2SO_4 sulfuric acid
L liter
mL milliliter
NaOH sodium hydroxide
SVOC semivolatile organic compound
TPH total petroleum hydrocarbons
VOC volatile organic compound

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Table F-2
Vallejo Sanitation and Flood Control District Acceptance Criteria

Parameter	Daily Average (milligrams/Liter)	Instantaneous Maximum (milligrams/Liter)
Arsenic	0.04	0.08
Beryllium	0.01	0.02
Cadmium	0.02	0.04
Chromium (total)	0.10	0.20
Copper	0.50	1.00
Lead	0.50	1.00
Mercury	0.005	0.02
Nickel	0.50	1.00
Selenium	0.02	0.04
Silver	0.75	2.00
Zinc	1.00	2.00
Total Cyanide	0.10	0.80
Total Phenolics	2.00	4.00
Petroleum Based Oil & Grease	100	100
Total Identifiable Chlorinated Hydrocarbons	0.01	0.01
pH	6.0 - 9.0 pH units at all times	

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7 HANDLING OF WASTE MATERIALS FROM A POTENTIAL SPILL

Spill response is addressed primarily in the accompanying Environmental Protection Plan (EPP), Appendix D of the PCAP. Pertinent details fro the EPP are provided herein that specifically relate to waste management procedures.

The procedure for spill response will include containing and clean-up of the spill, contacting emergency spill response personnel, and investigating and reporting the spill. The Site Manager will contact the required federal state, and local authorities in addition to notifying the Caretaker Site Office, DON Resident Officer in Charge of Construction, and DON Remedial Project Manager of any spills requiring spill-response activities. Personnel will be contacted in the sequence provided in the list. If that person is not available, the next person on the list will be notified.

Caretaker Site Office	Melecio Asuncion	415-743-4721 office 510-772-7639 mobile
Resident Officer in Charge of Construction	Izzat Amadea	510-749-5947 office 510-755-5876 mobile
Remedial Project Manager	Marie Dreyer	619 532-0904

Fuel or hydraulic fluid spills are not anticipated during field operations. However, WESTON will have oil-absorbing materials on-site to capture any spills of this type that may occur. In the event that fuel or hydraulic fluid reaches the ground surface, workers will quickly isolate the area of the spill and shovel affected soil into a waste container such as a drum or super-sack. Visual observation of a sheen or discoloration will be used as the guide in removing impacted soil. Such soil will be characterized and managed for proper disposal.

Spill-control materials will be stored for ready use in weather-proof spill kits located adjacent to the work site.

Fire extinguishers will be located in company vehicles and all heavy equipment located on the work site.

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8 RECORDKEEPING

Documentation requirements apply to all waste managed during project activities. Field records will be kept of all waste generation activities. All pages of the field data record log will be signed and dated by the supervising field leader who is entering the data. In addition, the following information will be recorded in the log:

- Description of waste generating activities
- Location of waste generation (including depth, if applicable)
- Type and volume of waste
- Date and time of generation
- Description of any waste sampling
- Name of person recording information
- Name of Site Manager at time of generation

All hazardous waste transported from the former MINS will be accompanied by a Hazardous Waste Manifest. DON personnel will be responsible for reviewing and signing all waste documentation, including waste profiles, manifests, and Land Disposal Restriction (LDR) notifications (manifest packages). Prior to signing the manifest, the designated DON official will ensure that pre-transport requirements of packaging, labeling, marking, and placarding are met according to 40 CFR, Parts 262.30 through 262.33, and 49 CFR, Parts 100 through 178.

The DON will sign and retain appropriate copies of the manifests; the remaining copies will be given to the transporter. Copies of the completed manifests will be returned to the DON's signatory official for the facility's recordkeeping requirements. Copies of all manifests for waste transported from the MINS site as part of the DRMO Site and Vicinity corrective action will also be kept by WESTON in the project files.

A LDR form will accompany the shipment of hazardous waste to the disposal facility. The facility will be notified prior to the waste being sent. The following items must accompany the notification and are included in one of the following facility-specific forms:

- U.S. Environmental Protection Agency Hazardous Waste Generator identification number
- Manifest number, including state disposal application number
- Waste profile data
- Corresponding concentration-based or technology-based treatment standards will be identified if the waste is also land disposal restricted

9 REFERENCES

Weston Solutions, Inc. (WESTON). 2004. *Final Action Memorandum/Interim Remedial Action Plan, Containment Barrier and Extraction Trench Time-Critical Removal Action Investigation Area H1, Mare Island, Vallejo, California.* February.

WESTON. 2006. *Remedial Action Plan/Record of Decision/Resource Conservation and Recovery Act Closure Plan for Investigation Area H1.*

WESTON. 2007. *Final Investigation Area H1 Remedial Design Plan, Mare Island, Vallejo, California.* January.

WESTON. 2008. *Final Non-Time-Critical Removal Action Completion Report, Defense Reutilization and Marketing Office, Former Mare Island Naval Shipyard, Vallejo, California.* August.

APPENDIX G
TRAFFIC CONTROL PLAN

TABLE OF CONTENTS

1. INTRODUCTION 1-1

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2. TRANSPORTATION/CIRCULATION 2-1

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2.2 ANALYSIS OF POTENTIAL IMPACTS 2-1

2.3 TRAFFIC ROUTES 2-4

2.4 TRAFFIC SAFETY MEASURES 2-5

3. REFERENCES 3-1

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Figure G-2 Azuar Drive Traffic Route Map 2-2

Figure G-3 Dump Road Traffic Route Map 2-3

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ABBREVIATIONS AND ACRONYMS

DRMO	Defense Reutilization and Marketing Office
IA	Investigation Area
MINS	Mare Island Naval Shipyard
TCP	Traffic Control Plan
WESTON	Weston Solutions, Inc.

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1 INTRODUCTION

This Traffic Control Plan (TCP) has been prepared to support vehicular control related to the corrective action to be performed at the Defense Reutilization and Marketing Office (DRMO) Site and Vicinity (Figure G-1) located at the former Mare Island Naval Shipyard (MINS), Vallejo, California. This plan addresses the traffic control requirements for the corrective action to be executed under Naval Facilities Engineering Command Southwest, Environmental Multiple Award Contract No. N62473-08-D-8825, Contract Task Order No. 0005.

This TCP describes the measures that will be taken to detour the normal traffic flow pattern around sections of Azuar Drive and Dump Road affected by soil excavation activities. Traffic control measures will be implemented in accordance with all applicable City, State, and Federal laws, statues, regulations or other requirements including, but not limited to the City of Vallejo Public Works Department encroachment permit, the Department of Transportation Federal Highway Administration's (2007) *Manual on Uniform Traffic Control Devices for Streets and Highways*, the California Department of Transportation (2006) *Manual of Traffic Controls for Construction and Maintenance Work Zones,* the U.S. Army Corps of Engineers *Safety and Health Manual EM 385-1-1*, and applicable Federal and California Occupational Safety and Health Administration regulations.

1.1 CITY OF VALLEJO ENCROACHMENT PERMIT

It is anticipated that an application for an encroachment permit will be submitted to the City of Vallejo for any excavation work within Azuar Drive and Dump Road. A licensed construction zone traffic control subcontractor will prepare the appropriate traffic control maps for the permit application and will install and maintain the required barricades and signage during implementation of the corrective action activities.

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N00221_001372
MARE ISLAND

SENSITIVE RECORD

PORTIONS OF THIS RECORD ARE CONSIDERED SENSITIVE AND ARE NOT AVAILABLE FOR PUBLIC VIEWING

FIGURE G-1 – DRMO SITE AND VICINITY LOCATION MAP

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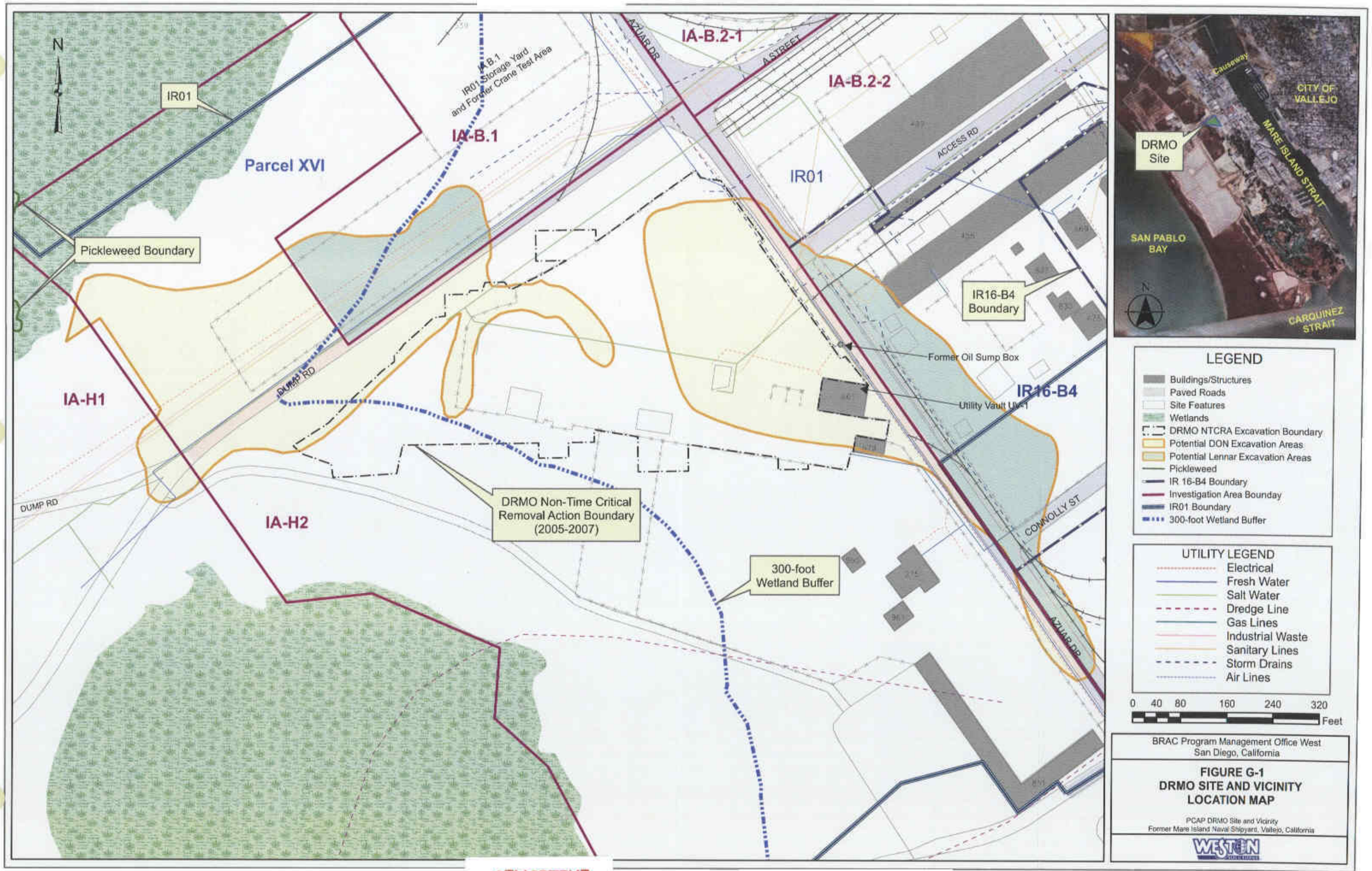
N
IR01
Parcel XVI
Pickleweed Boundary
IA-H1
IA-H2
DUMP RD
IA-B.1
IR01 Storage Yard and Former Crane Test Area
AZUAR DR
A STREET
IA-B.2-1
IA-B.2-2
ACCESS RD
IR01
IR16-B4 Boundary
Former Oil Sump Box
Utility Vault UV-1
IR16-B4
CONNOLLY ST
DRMO Non-Time Critical Removal Action Boundary (2005-2007)
300-foot Wetland Buffer
Causeway
CITY OF VALLEJO
MARE ISLAND STRAIT
DRMO Site
SAN PABLO BAY
CARQUINEZ STRAIT
LEGEND
Buildings/Structures
Paved Roads
Site Features
Wetlands
DRMO NTCRA Excavation Boundary
Potential DON Excavation Areas
Potential Lennar Excavation Areas
Pickleweed
IR 16-B4 Boundary
Investigation Area Bounday
IR01 Boundary
300-foot Wetland Buffer
UTILITY LEGEND
Electrical
Fresh Water
Salt Water
Dredge Line
Gas Lines
Industrial Waste
Sanitary Lines
Storm Drains
Air Lines
0 40 80 160 240 320
Feet
BRAC Program Management Office West
San Diego, California
FIGURE G-1
DRMO SITE AND VICINITY
LOCATION MAP
PCAP DRMO Site and Vicinity
Former Mare Island Naval Shipyard, Vallejo, California
WESTON

2 TRANSPORTATION/CIRCULATION

Site haul truck routes, major roadways on Mare Island, and detour routes that are expected during specific project activities are discussed in this section.

2.1 DESCRIPTION OF ENVIRONMENTAL SETTING

The Traffic Route Maps (Figure G-2 and G-3) show major roadways, haul truck route and traffic detour routes along Dump Road and Azuar Drive. Section 2.3 of this TCP provides turn-by-turn directions for the traffic detours.

2.2 ANALYSIS OF POTENTIAL IMPACTS

It is anticipated that Azuar Drive between A Street and Kansas Street will be affected by the site work. To the extent practical, detour of Azuar Drive will only be implemented during excavation and/or site restoration within the Azuar Drive footprint and portions of IA-B.2 east of Azuar Drive to minimize impacts to the public. During closure of Azuar Drive traffic will be rerouted to Walnut Avenue as shown on Figure G-2. The detours will remain in place for the duration of excavation and restoration activities in this portion of Azuar Drive. Haul trucks will stay off public roads when transporting soil/debris from the excavation areas to the IA-H1 Containment Area or when hauling import fill from the dredge ponds.

Dump Road only services the IA-H1 site and therefore closure of Dump Road will not cause any inconvenience to the general public. When excavation is occurring within or adjacent to Dump Road, access to IA-H1 will be maintained by routing site vehicles to the south and west of the DRMO along an existing gravel road as shown on Figure G-3.

Site workers will enter and leave Mare Island using either the Mare Island Causeway or Highway 37, and will proceed to the construction site office at IA-H1. During the project, workers will use an estimated average of 15 vehicle trips per day. Site and personnel vehicles will be parked in designated areas within the support area.

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SENSITIVE RECORD

PORTIONS OF THIS RECORD ARE CONSIDERED SENSITIVE AND ARE NOT AVAILABLE FOR PUBLIC VIEWING

FIGURES G-2 AND G-3

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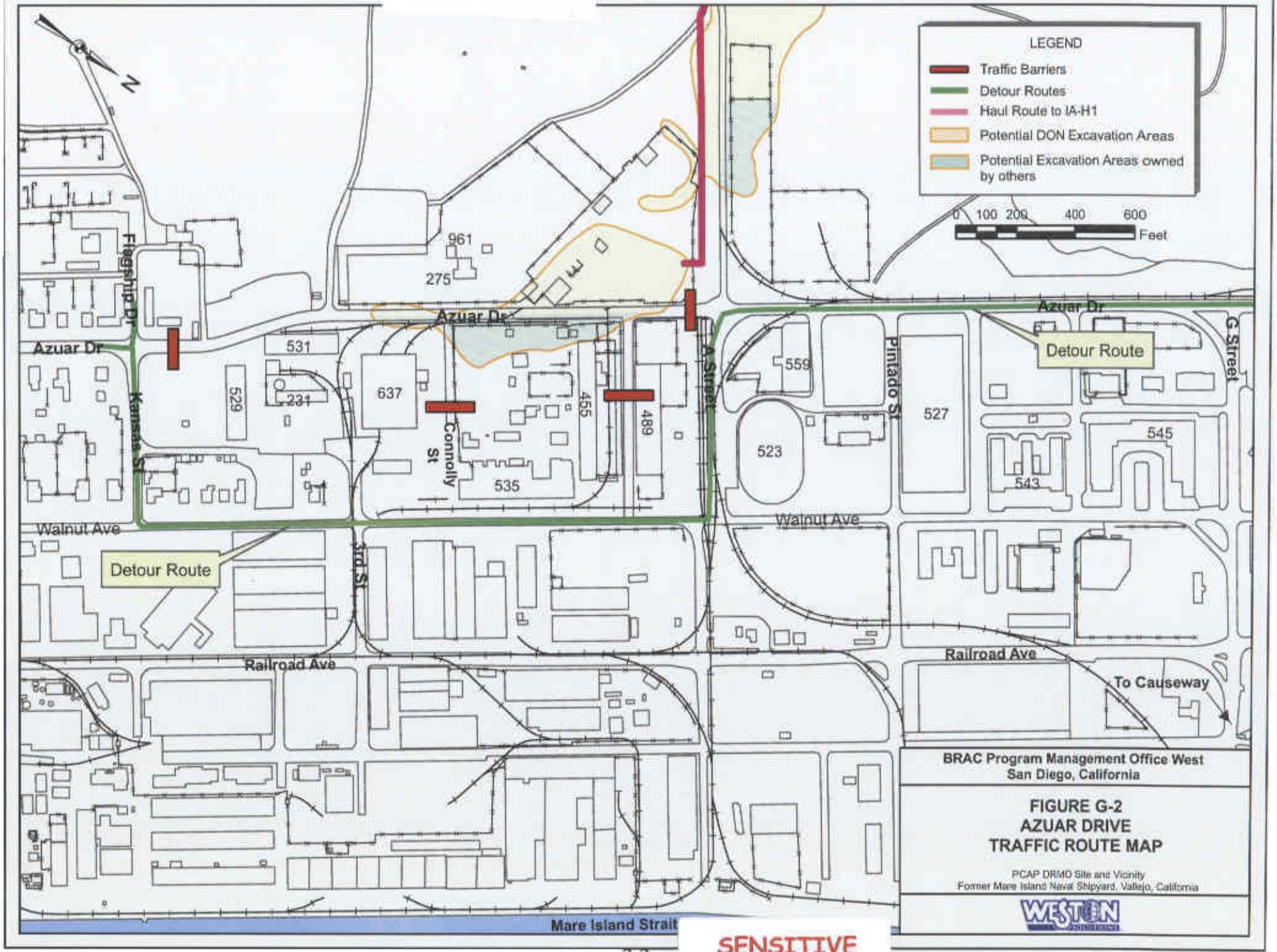

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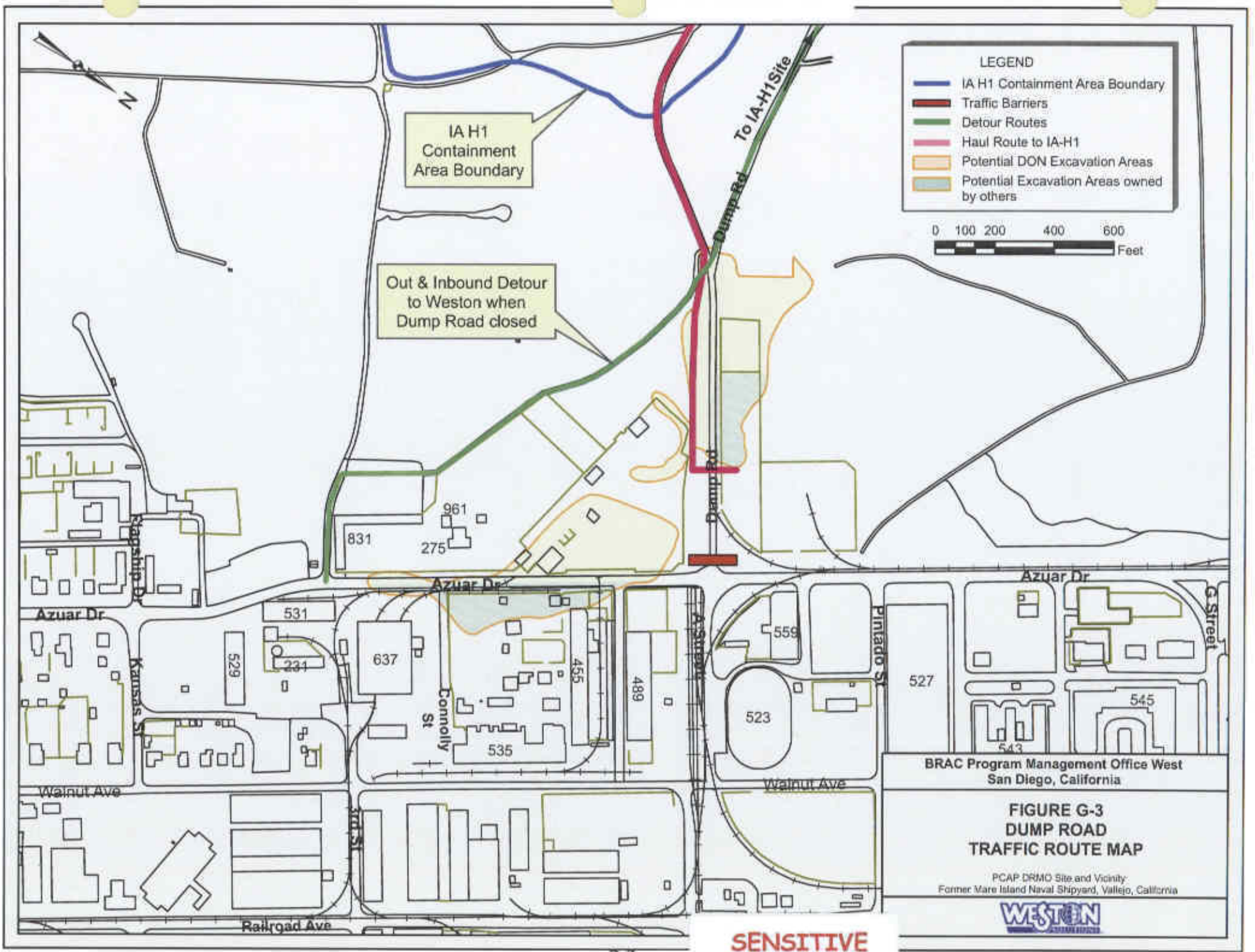

SENSITIVE

Heavy construction equipment such as front-end loaders, excavators, haul trucks, and other support vehicles will remain at the site for the duration of the field activities after initial mobilization, with the exception of off-road dump trucks used to transport excavated soil to the IA-H1 Containment Area or to haul backfill soil from the dredge ponds. Three off-road haul trucks (40-ton capacity each) will be used to transport soil from the sites using non-public roads routes through areas that are restricted to the public by fencing or other controls.

Import backfill soil may also be imported from other off-site sources. Trucks transporting import backfill soil via Mare Island public roads will be restricted from residential areas. Truck traffic on public roads hauling import soil will be limited to the hours of 8:00 am to 4:30 pm to avoid peak commuting hours.

2.3 TRAFFIC ROUTES

Large trucks delivering heavy equipment or off-island import soil will access Mare Island via Highway 37 and proceed to the site via Walnut Avenue, G Street and Azuar Drive. Turn-by-turn directions for these deliveries are as follows:

- Exit Highway 37 at Mare Island exit traveling southbound on Walnut Avenue
- Continue South on Walnut to G Street on Mare Island.
- Turn right (west) on G Street for 1 block
- Turn left (south) on Azuar Drive to Dump Road

Site construction activities along Azuar Drive will require the closure of the following public roads (Figure G-2):

- Azuar Drive between Flagship Drive/Kansas Street and A Street
- Connolly Street at Building 637, and
- Un-named street between Buildings 455 and 489

Traffic along Azuar Drive will be detoured to Walnut Avenue as shown on Figure G-2. Site construction activities within or along Dump Road will require the closure of Dump Road at Azuar Drive (Figure G-3). This segment of Dump Road only services the WESTON site office.

Access to the WESTON office will be detoured from Azuar Drive south and west of Building 831 as shown on Figure G-3.

2.4 TRAFFIC SAFETY MEASURES

Safe access around the work areas will be maintained during construction activities. A licensed subcontractor will furnish, erect, and maintain the necessary measures such as fences, barricades, signs, and other devices to safely detour public vehicular traffic in accordance with requirements of the City of Vallejo encroachment permit. Additional protective measures will be implemented as necessary to prevent hazardous conditions to the public or site personnel. On-street parking will be prohibited for all vehicles associated with construction activities at the site in order to maintain normal access and clear lanes. All traffic control activities will conform to the applicable specifications of the State of California *Manual of Traffic Controls for Construction and Maintenance Work Zones* (California Department of Transportation, 2006) and will be approved by the Resident Officer in Charge of Construction.

3 REFERENCES

California Department of Transportation. 2006. *Manual of Traffic Control for Construction and Maintenance Work Zones*. September.

Department of Transportation Federal Highway Administration. 2007. *Manual on Uniform Traffic Control Devices for Streets and Highways*. December.

APPENDIX H
RESPONSES TO COMMENTS

Responses to Regulatory Agency Comments

on the ***Draft Petroleum Corrective Action Plan***

Defense Reutilization and Marketing Office Site and Vicinity

Former Mare Island Naval Shipyard, Vallejo, California

dated June 2009

Comment No.	Comment Location Reference	Comment	Response
General Comments from Carolyn d'Almeida, U.S. Environmental Protection Agency (EPA), dated July 9, 2009			
1	General	The EPA defers to the state for formal comments, however, wanted to ask how the Navy's removal action schedule coordinates with the work to be done on the Lennar side. The projects should be done in conjunction to minimize disruption of traffic flow.	To minimize traffic impediments, the Navy is working with Lennar Mare Island (LMI) to coordinate cleanup efforts at the Defense Reutilization and Marketing Office (DRMO) Site and Vicinity. The Navy's Traffic Control Plan (TCP) was submitted as Appendix G to the Draft Petroleum Corrective Action Plan (PCAP) Report in June 2009. The TCP was also submitted to the City of Vallejo for concurrence. LMI is required to submit a separate work plan to address their property on Azuar Drive. Once LMI submits their work plan, the Navy will make every attempt to coordinate with LMI and the City of Vallejo to minimize impacts to traffic on Azuar Drive.
General Comments from Paisha Jorgensen, PG, California Regional Water Quality Control Board (Water Board), San Francisco Bay Region, dated July 8, 2009			
1	General	This Petroleum Corrective Action Plan (PCAP) only proposed excavating total petroleum hydrocarbon (TPH)-impacted soil and free product on Navy property. The excavations are planned to stop at the property lines (i.e. centerlines of Dump Road and Azuar Drive), regardless of the continued presence of petroleum-impacted soil and free product. If the Navy does not plan to remove petroleum-impacted soil and free product until screening criteria have been met, the Navy must provide a plan to segregate impacted soil from clean backfill in order to prohibit recontamination of clean backfill.	Section 6, Contingencies, has been added to the PCAP to address installation of a geomembrane if mobile free phase petroleum is encountered in neighboring property boundaries during backfilling activities. The previous Sections 6 and 7 have been renumbered as Sections 7 and 8, respectively.

Comment No.	Comment Location Reference	Comment	Response
2	General	The Navy proposes using the industrial/commercial Tier II Screening Levels developed for the Eastern Early Transfer Parcel (EETP) on Mare Island as the cleanup levels for this corrective action. Cleanup of petroleum-impacted soil only to industrial/commercial levels requires the implementation of land use controls. The Water Board will not consider closure of the petroleum issues at the DRMO without a deed restriction (i.e. Land Use Covenant) limiting sensitive uses of the property.	A Land Use Covenant (LUC) will not be invoked for this site since a LUC is a covenant prepared based on work performed under the Comprehensive Environmental Response, Compensation, and Liability Act. With the exception of Transfer Parcel XVI which is designated for reuse as open space, the remaining areas within this petroleum corrective action are designated for "commercial/industrial" reuse. The site may require institutional controls which will be in the form of a deed restriction/notification, as warranted.
3	General	The PCAP proposes using a combination of staged overburden soil and an approved offsite borrow source from selected Mare Island dredge ponds, or other borrow fill originating from elsewhere on or off Mare Island. All backfill sources (including overburden) must be sampled for metals, semivolatile organic compounds (SVOCs), pesticides, polychlorinated biphenyls (PCBs), and total petroleum hydrocarbons (TPH) as gasoline, diesel, and motor oil. If overburden or dredge pond soil has been fully characterized during a previous investigation, the Water Board will consider reviewing this data. All backfill soil sources shall be sampled at a frequency described in the Department of Toxic Substances Control guidance "Information Advisory – Clean Imported Fill Material".	The last sentence in the second paragraph of Section 5.3 has been modified as follows: "In those cases, the overburden soil will be stockpiled and sampled for metals, pesticides, PCBs, SVOCs, and TPH as gasoline, diesel and motor oil. Representative samples will be collected at the frequency of one sample per 1,000 cubic yards as prescribed in the "Recommended Fill Material Sampling Schedule" (DTSC, 2001). Overburden soil may be used as a backfill source if results do not exceed the screening levels provided in the SAP (Appendix A) and reuse is approved by the regulatory agencies." The following has been added as the last sentence in the first paragraph of Section 5.5: "All sources of backfill material, including overburden, Mare Island sources, and import borrow fill, will be approved by the regulatory agencies before use as backfill."

Comment No.	Comment Location Reference	Comment	Response
4	General	Other than the lateral frequency, this PCAP does not present rationale for locating sidewall confirmation samples. Sidewall confirmation samples should be collected at depths based to adjacent soil impacts. If free product was present, the sidewall sample should be collected at a depth corresponding to the removed free product. If stained soil or odors are/were present, the sidewall sample should be collected at a corresponding depth. If no evidence of soil impacts are present, the sample should be collected at the vertical midpoint of the sidewall. In addition, please detail a path forward if sidewall samples along the property boundary with the EETP do not meet screening criteria.	Section 5.4 of the PCAP and Appendix A (SAP Worksheets #11 and #14) have been revised to include the following: "Sidewall confirmation samples will be collected at depths based on adjacent petroleum-impacted soil removed. If free product was present, the sidewall sample will be collected at a depth corresponding to the removed free product. If stained soil or odors were present, the sidewall sample will be collected at the corresponding depth." Please see response to Water Board general comment number 1 which addresses installation of a geomembrane to prevent potential cross contamination in areas where mobile free phase petroleum is observed in neighboring property boundaries.
5	General	Import fill screening criteria presented in Sampling and Analysis Plan (SAP) Worksheet #15 is incomplete. Only screening criteria for select metals, pesticides, SVOCs, and TPH carbon ranges (Bunker C) are presented. While Note 1 of Worksheet #15 indicates that compounds detected in import fill will be evaluated on an individual basis, the Water Board prefers to establish screening criteria for all foreseeable analytes prior to the initiation of field work.	SAP Worksheets #11 and #15 have been revised to include Tier 1 Shallow Soil Screening Levels for Commercial/Industrial Land Use (Water Board, 2008) for all analytes, with the exception of metals and Bunker C. For metals with a Mare Island background/ambient value, the background value will be used as the screening level. The screening level for Bunker C confirmation soil samples will be the Tier 2 screening levels (CH2M HILL, 2009).

Comment No.	Comment Location Reference	Comment	Response
Specific Comments from Paisha Jorgensen, PG, Water Board, dated July 8, 2009			
1	Appendix A, Worksheet #11	The two questions listed in Step 2 of Worksheet #11 do not "identify the goal of the study", as required by the SAP.	Step 2 of SAP Worksheet #11 is part of the data quality objective process which provides the study questions which must be answered by the sampling and analysis for drawing conclusions from those findings in Step 5. No change in the wording is necessary.
2	Appendix C, Drawings 3 and 4	These drawings indicate that the Navy intends to excavate beneath the entire widths of Dump Road and Azuar Drive. Based on figures and text presented earlier in this report, it appears that the Navy only intends to excavate up to the property boundaries (the centerlines of Dump Road and Azuar Drive). Please resolve this discrepancy.	Drawings 3 and 4 have been revised to clarify the Navy excavation areas.
Comments from Janet Naito, Department of Toxic Substances Control (DTSC), dated July 7, 2009			
1	General	DTSC defers to the Water Board with respect to the adequacy of the investigation, the appropriateness of the screening levels, and the ability of the proposed cleanup plan to address the petroleum hydrocarbon contamination in soil and groundwater. DTSC also, with one exception, defers to the Water Board to ensure that the proposed cleanup plan will meet all federal, state and local requirements during implementation. This exception is the disposal of excavated materials into the H 1 landfill. As you are aware, DTSC is overseeing the implementation of the Remedial Action Plan/Record of Decision/Closure Plan for the H1 Landfill.	Responses to DTSC comments have been incorporated as noted in the following responses.

Comment No.	Comment Location Reference	Comment	Response
2	Section 5.3	In order to meet the requirements under the approved Remedial Action Plan/Record of Decision/RCRA Closure Plan, DTSC and Navy staff have discussed the types of soil and debris and could be disposed in the H1 Landfill. Section 5.3, Paragraph 5 that begins with "It is anticipated that the .... " should be modified as follows: Debris present in soil removed from the DRMO and Vicinity, and placed within the IA-H1 Containment Area under the engineered cap, must be of a size and nature that after placement with soil in one foot thick compacted intervals, no substantial debris items may be visible protruding from the compacted surface. Any debris items which cannot be placed and/or compacted to meet this requirement shall be removed. Other applicable requirements for placement of soil/waste materials specified in the IA-H1 Final Remedial Design Plan shall also be met.	The 5th paragraph of Section 5.3 has been revised to read as follows: "Debris present in soil removed from the DRMO and Vicinity, and placed within the IA-H1 Containment Area under the engineered cap, must be of a size and nature that after placement with soil in one foot thick compacted intervals, no substantial debris items may be visible protruding from the compacted surface. Any debris items which cannot be placed and/or compacted to meet this requirement shall be removed. Other applicable requirements for placement of soil/waste materials specified in the IA-H1 Final Remedial Design Plan shall also be met." This paragraph has also been added to Section 3 of the Waste Management Plan, Appendix F.
3	General	The H1 Landfill will be closed this year. In order to accomplish this, the excavated soil/debris must be placed and compacted by the end of September 2009. If this cannot occur, then alternative disposal arrangements must be made for the soil/debris excavated or to be excavated after this date. Therefore, the PCAP must include a contingency for disposal of excavated soil/debris at an offsite disposal facility.	Section 6 has been added to the PCAP to address contingencies, including waste profiling to determine off-site disposal requirements, if necessary, due to schedule constraints associated with closure of the IA-H1 Containment Area. However, based on the remaining activities required for completion of the engineered cap it is anticipated that waste placement can continue until late October 2009 which allows for sufficient time to complete the work at the DRMO Site and Vicinity.

Comment No.	Comment Location Reference	Comment	Response
4	General	Other excavations may be occurring concurrently at Mare Island. It would be useful for the PCAP to indicate the steps being taken to ensure that the closure of Azuar Drive and Dump Roads to implement the cleanup will not significantly impact the ability of parties to move excavated soil proposed for disposal in the H1 Landfill from other areas on Mare Island to the H1 Landfill.	Potential concurrent excavation activities at the Paint Waste Area and Installation Restoration (IR) Site 05 will not be impacted by the road closures.
5	General	DTSC notes that although petroleum hydrocarbons are excluded from the definition of hazardous substances under CERCLA, petroleum hydrocarbons are hazardous materials and may be regulated under California Health and Safety Code Chapter 6.5.	Comment noted.

Comment No.	Comment Location Reference	Comment	Response
6	General	The excavation area defined by the Navy under this PCAP does not extend onto property owned by others. DTSC would prefer if the remedy encompassed the full extent of contamination, regardless of property ownership. If the remedy does not, DTSC recommends that the PCAP include additional details regarding the following: a. Excavation shoring plans, especially along the property boundary with other entities, to ensure 1) that contamination will not be driven downward during this process, 2) that all contamination on the Navy property is removed until the screening levels are attained, and 3) that excavation walls will be stable during the excavation. b. Sequencing and coordination of the excavation on the Navy property with the excavation on the portion of the impacted soils not on the Navy property. c. Actions proposed to ensure that recontamination of cleaned up areas does not occur and adjacent areas on property not owned by the Navy may not be cleaned up on the same schedule. d. Sequencing and coordination of excavations proposed in Azuar and Dump roads to minimize disruption to residents and tenants who may use Azuar Drive and/or Dump Road.	As noted in response to Water Board general comment number 1, Section 6 (Contingencies) has been added to the PCAP to address sequencing and coordinate efforts with property owners. a. The following sentences have been included in the second paragraph of Section 6.2: "If the adjacent petroleum-impacted soil is not removed in conjunction with the DON property, excavations at the property boundary will be sloped 1:1 or as required to ensure stability and confirmation sampling will be performed. If mobile free phase petroleum is encountered within the neighboring property, a geomembrane will be installed during backfilling activities to prevent potential cross contamination." b. See response to EPA general comment number 1 and DTSC general comment number 4. c. See response to a, above. d. See response to EPA general comment number 1 and DTSC general comment number 4. Additionally, closure of Dump Road is not anticipated to impact residents or tenants.

Comment No.	Comment Location Reference	Comment	Response
7	Section 5.1.2	If the utility lines that will be removed could have contained hazardous substances or materials, it would be useful for the PCAP to explain how these lines would be cleaned, tested and disposed.	IR Site 14, the industrial wastewater treatment plant (IWTP) pipeline, is the only known utility within the DRMO Site and Vicinity known to have contained hazardous materials. A small portion of the pipeline within Transfer Parcel XVI requires removal and flushing prior to disposal. The seventh bullet of Section 5.1.2 has been revised to read as follows: "A small portion of the IWTP pipeline within Transfer Parcel XVI will be removed and flushed with three volumes of water prior to disposal. Rinsewater will be stored in steel tanks for sampling and disposal in accordance with the VSFCD discharge permit requirements, or other appropriate off-site facility." In addition, PCAP Section 3.1 and Section 3 of the Waste Management Plan (Appendix F) have been revised to address removal of the IWTP pipeline section.
8	Section 5.5	Please verify that Dredge Ponds 2S and 4N sediments have been approved for use as backfill. If not, reference to these ponds as a source of backfill material should be removed.	Dredge Ponds 2S and 4N have not been approved for backfill at the DRMO Site and Vicinity. As noted in response to Water Board general comment number 3, the following has been added as the last sentence in the first paragraph of Section 5.5: "All sources of backfill material, including overburden, Mare Island sources, and import borrow fill, will be approved by the regulatory agencies before use as backfill."

Comment No.	Comment Location Reference	Comment	Response
9	Section 7 (Previous Section 6.0)	DTSC requests a copy of this report and a schedule for its submittal. DTSC further requests that the following information regarding disposal of excavated material within the H1 landfill be included in the report. a. Cubic yardage of soil/debris disposed in the H1 landfill and figure showing where it was placed within the H1 landfill. b. Certification that the material met the requirements for disposal within the H1 landfill. c. Description of the nature and amount of debris or other materials from the excavation(s) requiring offsite disposal. Please clarify the amount of material disposed of at each offsite disposal facility used to dispose or, if appropriate, recycle this material. This should include a discussion regarding any decontamination of the debris required prior to offsite disposal.	As stated in the second paragraph of Section 7, the BCT will receive a copy of the draft report for comment and the final report will incorporate the responses. Section 7 of the PCAP has been clarified to include the information as requested for items a and c. For item b please note that based on the IA-H1 acceptance criteria, the "no free liquids" will be the relevant criterion as the waste is not anticipated to be "excessively volatile" or "excessively leachable" based on the nature of Bunker C (Fuel Oil No. 6).

Comment No.	Comment Location Reference	Comment	Response
10	Appendix D, Section 2.3	The California Department of Fish and Game (DFG) staff conducted a site visit for the area proposed for excavation under this PCAP. They should be consulted to determine if avoidance and/or minimization measures are required to address potential sensitive habitats and species. The PCAP currently specifies mowing of the grasslands. This is of concern since the Navy's biological assessment for another area indicates that the salt marsh harvest mouse utilizes grasslands adjacent to pickleweed areas. See page 20 of the Navy's Biological Assessment for IR05 and Paint Waste Area. The PCAP should incorporate avoidance and minimization measures suggested by DFG and the U.S. Fish and Wildlife Service (USFWS) staff for other areas into this project. DFG staff have requested avoidance measures for the California Clapper Rail and the California Black Rail, in addition to measures for the Salt Marsh Harvest Mouse (SMHM) and general avoidance and minimization measures for birds for other project areas. Based upon the site walk conducted, DTSC anticipates similar measures being identified for the DRMO area.	Excavation on the north side of Dump Road is not anticipated to extend into the grassy portion of the neighboring wetland. However, Section 6.1 has been added to the PCAP to address this potential contingency. This section reads as follows: "The potential excavation area within Transfer Parcel XVI is located near a small portion of a non-tidal wetland area known as Wetland A. If excavation of petroleum-impacted soil and debris is required to be extended into the non-tidal wetland area presented on Figure 1-2, the BCT, including California Department of Fish and Game (CDFG) and U.S. Fish and Wildlife Service (USFWS) will be contacted before work is continued and the following conservation measures will be implemented: ▪ Excavation activities will be conducted when the non-tidal seasonal wetland area is dry. ▪ A qualified biologist will conduct a Biological Resource Education Program briefing to all site personnel prior to entry into the non-tidal wetland area.

Comment No.	Comment Location Reference	Comment	Response
10 (Continued)			▪ Prior to excavation work extending into the non-tidal wetland area, a qualified biologist will perform a visual reconnaissance in the vicinity of the planned non-tidal wetland work area to identify the presence of any SMHM, California Clapper Rails, or California Black Rails (Rails). If SMHM or Rails are observed, work will not proceed until the USFWS and DGF have been notified and the SMHM and or Rails have left the area on their own volition. ▪ Vegetation in upland or non-tidal wetland areas that is greater than 50 feet from dense pickleweed vegetation will be cut using ride-on powered mowers or other equipment with the oversight of a qualified biologist to minimize potential cover for the SMHM within the work areas. Equipment and personnel will be limited to the areas where vegetation has been cut. ▪ Dense pickleweed vegetation or vegetation within 50 feet of dense pickleweed vegetation will be cut or removed using non-mechanized tools under the oversight of a qualified biologist.

Comment No.	Comment Location Reference	Comment	Response
10 (Continued)			▪ Silt fencing will be installed between areas of dense pickleweed vegetation and work sites immediately following vegetation removal to prevent entry of SMHM into cleared areas. The fencing will be trenched into the ground and backfilled to prevent SMHM from moving underneath the fencing. USFWS and CDFG will be required to review and approve the final design and proposed location of the fencing prior to installation. The USFWS-approved biological monitor will have the ability to make field adjustments to the location of the fencing depending on site-specific habitat conditions. ▪ A USFWS-approved biological monitor will be present to monitor for SMHM (and Rails) each day during work activities in non-tidal wetland work areas. The biological monitor will also periodically (weekly) observe work within adjacent upland areas. The monitor will have the authority to stop work if deemed necessary for any reason to protect SMHM or Rails. ▪ The biological monitor will monitor the silt fencing periodically (daily if work in the non-tidal area is affected) to ensure that it remains an effective barrier to prevent entry of SMHM into work areas. Maintenance of the fencing will be conducted as needed throughout the work period, including the habitat restoration work.

Comment No.	Comment Location / Reference	Comment	Response
10 (Continued)			▪ Prior to the initiation of work each day within non-tidal work areas, the biological monitor will thoroughly inspect the work area and adjacent habitat areas to determine if SMHM (or Rails) are present in the areas and will monitor throughout the day while work activities are occurring. ▪ If a mouse of any species (or Rail) is observed, then work will not be initiated or will be stopped immediately by the biological monitor until the mouse (or Rail) leaves the work area on its own volition and the USFWS and CDFG are notified. If the mouse (or Rail) does not leave the work area, work will not be reinitiated until the USFWS and CDFG are contacted and have made a decision on how to proceed with work activities. The biological monitor will direct work activities accordingly. ▪ Excavation and haul equipment will be confined to the access routes, designated staging areas, and designated excavation areas. ▪ The equipment decontamination area will be located in the designated upland staging area away from the wetland habitat. ▪ Upland routes containing non-native vegetation will be used as access routes to the excavation sites to the maximum extent practicable.

Comment No.	Comment Location Reference	Comment	Response
10 (Continued)			▪ Any excavation within non-tidal wetlands will be backfilled and graded to an elevation to restore the area to pre-existing or better functions and values, including seeding with appropriate wetland species prior to the rainy season. Section 2.3 of Appendix D has also been revised to include the above contingency.

Sources:

California Department of Fish and Game (CDFG). 2009. Memorandum from Tami Nakahara (CDFG) to Janet Naito (Department of Toxic Substances Control) regarding *Draft Petroleum Corrective Action Plan Defense Reutilization and Marketing Office Site and Vicinity Former Mare Island Naval Shipyard, Vallejo, California.* (Site: 201208). July 28.

California Regional Water Quality Control Board, San Francisco Bay Region. 2008. *Screening for Environmental Concerns at Sites with Contaminated Soil and Groundwater.* May.

CH2MHILL. 2009. "Technical Memorandum: Tier 2 Risk Assessment Approach for Water Board Sites in the Eastern Early Transfer Parcel, Lennar Mare Island, Vallejo, California." April 9.

U.S. Environmental Protection Agency. 2009. "Regional Screening Levels for Chemical Contaminants at Superfund Sites." April. Available online at http://www.epa.gov/region09/superfund/prg/

U.S. Fish and Wildlife Service (USFWS). 2009. Memorandum 81420-2008-F-1844 from Susan K. Moore (USFWS) to Anthony Megliola (Department of the Navy). "Subject Endangered Species Consultation for the Proposed Installation Restoration Site 05 and the Paint Waste Area at the Former Mare Island Naval Shipyard, Vallejo, Solano County, California." June 23.

WESTON. 2007. *Final Investigation Area H1 Remedial Design Plan, Mare Island, Vallejo, California.* January.