REVISED
REMEDIAL DESIGN AND IMPLEMENTATION PLAN
LENDRUM COURT
PRESIDIO OF SAN FRANCISCO, CALIFORNIA

THE PRESIDIO TRUST
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TRC Project No. 229649

May 2016

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May 26, 2016

Prepared for

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ACRONYMS

AB	Aggregate Base
ADMMP	Air and Dust Monitoring and Mitigation Plan
BMPs	best management practices
CCR	Construction Completion Report
CD	compact disc
CEQA	California Environmental Quality Act
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CGP	Construction General Permit
CHG	California Registered Certified Hydrogeologist
CI	Construction Inspector
CM	Construction Manager
COCs	chemicals of concern
CQA	Construction Quality Assurance
CQAP	Construction Quality Assurance Plan
CRP	Community Relations Plan
cy	cubic yards
DG	Decomposed granite
DTSC	California Environmental Protection Agency Department of Toxic Substances Control
EKI	Erler & Kalinowski, Inc.
FS	Factor of Safety
RAW	Removal Action Work Plan
HASP	Health and Safety Plan
ICs	Institutional Controls
IS	Initial Study
LUCs	Land Use Controls
MEC	Munitions or Explosives of Concern
MOA	Memorandum of Agreement
NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System
NPS	National Park Service
OMMP	Operations, Monitoring, and Maintenance Plan
PAHs	polycyclic aromatic hydrocarbons
PE	California Registered Professional Engineer

PG	California Registered Professional Geologist
PI	Plasticity Index
PM	particulate matter
Presidio	Presidio of San Francisco
RAOs	remedial action objectives
RCRA	Resource Conservation and Recovery Act
RDIP	Remedial Design Implementation Plan
RWQCB	Regional Water Quality Control Board
Site	Lendrum Court
SMP	Soil Management Plan
SWRCB	State Water Resources Control Board
TCDD	2,3,7,8-tetrachlorodibenzo-p-dioxin
TEQ	toxic equivalency
TPZ	Tree Protection Zone
Trust	Presidio Trust
VMP	Vegetation Management Plan

1.0 INTRODUCTION

TRC Solutions (TRC) on behalf Presidio Trust (Trust) has prepared this Draft Revised Remedial Design Implementation Plan (RDIP), which describes processes and procedures to implement remedial actions at Lendrum Court (Site), within the Presidio of San Francisco, California (Presidio) (Figure 1). Shallow soil at the Site is impacted by polycyclic aromatic hydrocarbons (PAHs), heavy metals, and dioxins and furans. The *Removal Action Work Plan* (RAW) prepared by TRC on behalf of the Trust was approved by the lead oversight agency, California Environmental Protection Agency, Department of Toxic Substance Control (DTSC) on August 5, 2015. The RAW evaluated several remedial alternative mitigation strategies and selected *consolidation, capping, with land use controls and post-remediation monitoring*, as the preferred remedy.

In the RAW, TRC proposed remediation of the Site in two phases: Phase 1, the Landscaped Area, and Phase 2, the historic forest. TRC submitted a Phase 1 Remedial Design Implementation Plan (Phase 1 RDIP) to DTSC in July 2015; revised appendices were submitted August 5, 2015. The Phase 1 RDIP was approved by DTSC in a letter dated August 12, 2015. However, construction activities for Phase 1, originally slated for fall 2015, were postponed due a variety of factors. As a result, remedial activities for both Phase 1 and Phase 2 will now be performed under a single mobilization in the spring through fall of 2016. This Revised RDIP therefore includes the design plans for the concurrent completion of both phases (Figure 2).

1.1 OBJECTIVES OF REMEDIAL DESIGN IMPLEMENTATION PLAN

The objectives of this Revised RDIP are to present the technical and operational plans and engineering designs for implementation of the selected remedy for the Site. This Revised RDIP will be used in conjunction with remedial design drawings and technical specifications to implement and construct the remedial action at Lendrum Court.

1.2 PROJECT OVERVIEW

The remedial actions described in this Revised RDIP are in accordance with the selected remedy presented in the approved RAW for Lendrum Court, prepared by TRC on behalf of the Trust (TRC, 2015b).

1.2.1 Site Location

Lendrum Court is a small residential neighborhood located in the northwest corner of the Presidio, north of Doyle Drive, in the North Fort Scott Area (Figure 1). Army-era debris and incinerator ash are present in subsurface soils in the areas surrounding Buildings 1257, 1258, 1259, 1278, 1279, 1280, and 1282. The area generally slopes to the northeast (with a moderate to steep drop in elevation) in a series of terraces, likely graded as building pads for the residential units and parking lot area. The sloping areas between the terraces are generally landscaped with grass and shrubs. The northeastern slope, behind buildings 1259, 1278, and 1279, consists of historic forest with a thick understory of small statured trees and shrubs.

1.2.2 Remedial Unit

Several phases of site investigation were conducted at the Site in response to tenant complaints of glass fragments in soil surrounding the residential buildings. These investigations identified a soil layer containing debris beneath much of the Lendrum Court area, where bits of glass and debris had been brought to the surface as a result of gopher activity. The layer, where present, is first encountered at depths of approximately 0.5 to 2.5 feet beneath overburden soil in the central part of Lendrum Court and is exposed at the ground surface in the area of the historic forest east of Building 1278. The debris thickness varies from approximately 3 inches to 5 feet over an approximate 2.4 acre area (Figure 3).

The chemicals of concern (COCs) in soil identified in the RAW (TRC, 2015b) that pose a potential risks to human health and/or the environment are listed below:

Soil Description	Polycyclic Aromatic Hydrocarbons (PAHs)	Metals	Dioxins/Furans
Debris Filled Area	Benzo[a]pyrene Benzo[a]pyrene Equivalents Dibenzo[a,h]anthracene	Arsenic Barium Copper Lead Zinc	2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD) toxic equivalency (TEQ)

Outside Debris Fill Area	None	Lead	TCDD TEQ

1.2.3 Selected Remedial Action

The RAW provided an analysis of remedial alternatives for Lendrum Court (TRC, 2015b) and identified waste consolidation and capping with land use controls (LUCs) and post-remediation monitoring as the preferred remedy. This alternative combines multiple remedial technologies including; removal and/or consolidation of Army-era debris and incinerator ash from the shallow sub-surface soil, placement of a protective soil cover layer with a foundation of gopher wire to mitigate future rodent activity, implementation of Institutional Controls (ICs) through the use of LUCs, and implementation of a post-remediation Operations, Maintenance, and Monitoring Plan (OMMP) to provide guidance for future care of monitor the capped portions of the Site.

The RAW proposed remediation of the site in two phases, Phase 1 (Landscaped Area) and Phase 2 (Historic Forest). However, the remedial construction activities for both phases will now be conducted concurrently under one mobilization. This Revised RDIP addresses contamination mitigation measures within the vicinity of the buildings surrounding Lendrum Court (formerly the Phase 1 area) and the historic forest behind the buildings (formerly the Phase 2 area), as shown on Figure 2. The Site areas requiring LUCs will be based on the estimated extent of soil containing COCs at concentrations above Site cleanup levels. Contaminated material that cannot be consolidated within the capped area limits will be excavated, characterized, and transported off-site for disposal at a licensed landfill facility. Confirmation samples will be collected from areas designated for clean closure to confirm that COCs are not present above Site cleanup levels.

Construction activities will be conducted in a manner to avoid and/or mitigate potential impacts to the Site's ecological resources.

1.3 REPORT ORGANIZATION

This Revised RDIP has been prepared in accordance with the DTSC's Guidance Document *Environmental Oversight Agreement* (DTSC RDIP Guidance; DTSC, 2004). The remainder of this Revised RDIP is organized as follows:

- Section 2: Remedial Action – Provides a more detailed description of remedial actions to be implemented at the Site.
- Section 3: Remedial Design – Provides details on design elements of the remedial action and describes the planned activities required to implement the remedy at the Site, including project requirements, design basis, and construction requirements.
- Section 4: Long-Term Monitoring – Provides details on long-term cap inspection activities.
- Section 5: Land Use Controls – Identifies the limits of the remediation area and outlines site-specific restrictions and requirements associated with the future operation and maintenance of the Site. Provides details on preserving the integrity of the cap and limits future land use activities.
- Section 6: Project Documentation, Reporting, and Schedule – Provides an overview of documentation, reporting, and scheduling activities to be performed during remedial action implementation.
- Section 7: References – Provides a list of documents referenced in this Revised RDIP.

Supporting figures, tables, and appendices are included at the end of this Revised RDIP.

2.0 REMEDIAL ACTION

The following subsection describes the remedial action and implementation approach for Lendrum Court. LUCs will be implemented as described in the *California Environmental Quality Act Initial Study* (CEQA IS: Appendix G of the RAW; TRC 2015b).

2.1 DESCRIPTION OF REMEDIAL ACTION OBJECTIVES (RAOS)

Considering the current and planned future land use and the Presidio-Wide Cleanup Levels Document, the RAOs for Lendrum Court are:

- **Protection of human health and the environment consistent with the intended future land use:** As required by the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), the remedial alternatives considered must be protective of human health and the environment. Protection of human health and the environment can be met in several ways, including cleanup of COCs to meet the applicable Site-specific Lendrum Court cleanup levels or using LUCs to prevent exposure to COCs.

- **Cost-effective cleanup of the site:** Cost-effectiveness is an objective addressed by identifying remedial alternatives that meet all remedial objectives for the least cost. In

practice, not all remedial alternatives meet all remedial objectives equally; therefore, the most cost-effective alternative is not necessarily the least cost alternative.

- **Compliance with ARARs:** Remedial alternatives are evaluated for their ability to meet chemical-, location-, and action-specific requirements that include specific regulations or advisories applicable to the Presidio.

2.2 DESCRIPTION OF REMEDIAL ACTION AND IMPLEMENTATION APPROACH

The selected remedial action at the Site includes excavation and disposal of organic-rich topsoil, re-grading and compaction of contaminated soil and debris, and capping in place; in support of this effort the project also involves site preparation, securing existing utilities and roadways, and site restoration activities. The following presents an outline of the project activities and sequencing of work activities to implement the remedy for the Site:

SITE PREPARATION:

- Mobilization of construction personnel, field equipment, and materials to the Site.
- Stake and delineate work areas, and equipment and soil stockpile staging areas.
- Establish traffic flow routes.
- Establish Site security, which will include placement of fencing and gates to restrict access to work areas.
- Clear and grub existing vegetation. With the exception of the tree located in the parking lot island, all trees located in the landscaped area were removed on July 29, 2015. Vegetative clearance in the historic forest area began on February 22, 2016. With the exception of five trees and three toyon shrubs, all trees in the historic forest area with the potential to be affected by remedial construction were removed and mulched.
- Delineate tree protection zones (TPZ), which will extend radially 20 feet from the trunk of trees and 10 feet from the trunks of toyon shrubs within or near remedial construction areas that are intended to be retained during remedial construction.
- Site demolition to include removal of designated hard scape areas such as concrete patios, stairways, and asphalt walkways, as designated on project plans.
- Secure and safeguard existing utilities that occur within work areas; utilities will be protected in-place.
- Establish lines of communication between stakeholders.

ENVIRONMENTAL PROTECTION and PUBLIC SAFETY:

- Public outreach and communication in conformance with the approved Community Outreach Plan for Lendrum Court (TRC 2015a).
- Establish storm water management Best Management Practices (BMPs) and set up dust monitoring stations. Implementation of erosion control measures in substantial conformance with California's General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities (General Permit) Order No. 2009-0009-DWQ [National Pollutant Discharge Elimination System (NPDES) No. CAS000002] as amended by Orders 2010-0014-DWQ and 2012-006-DWQ issued by the State Water Resources Control Board (SWRCB).
- Establish dust and naturally occurring asbestos (NOA) monitoring stations and perform monitoring.
- Installation of dust mitigation engineering controls established in accordance with BMPs used at the Presidio, including taping of windows nearby to the work zones, covering exposed soils or spraying exposed soils with an all-natural, biodegradable dust control product (e.g., Posi-Cube), establishing surface water runoff and erosion controls, and regular street sweeping of paved roads.
- Installation of temporary exclusion fencing around the active work areas.
- Establishment of traffic control signage and devices as needed at points of entry to public roadways.
- Implement procedures for protection of cultural resources, including the confirmed historical training trenches located within the historic forest area.

REMEDY IMPLEMENTATION - Top Soil Excavation, Waste Consolidation, and Capping:

- Excavate the organic-rich topsoil, which is estimated to extend 4 to 6 inches below existing grade.
- Characterize, transport, and dispose of the excavated organic-rich top soil material to permitted disposal facilities.
- Removal of impacted soil from areas designated for clean closure and consolidation of waste to areas designated to be capped; this step will involve the handling of potential hazardous waste materials; material handling must minimize the creation of dust or placement of soil stockpiles that may result in materials escaping the designate work areas.

- Stockpiling, characterization, transport, and disposal of excess excavated material to approved landfills.
- Re-grading and compaction of the excavated surface to form the –sub grade layer (i.e., rough grade) for the cap. The soil borrow for the cap construction is native soil material from Lawrence Berkeley National Laboratory, which is classified as gravelly loam.
- Confirmation Soil Sampling and Analytical Testing:
    - Sampling and testing of the soil during excavation to confirm that remedial cleanup levels are attained in clean closure areas.
    - Sampling stockpiles of excavated material for disposal.
- Construct protective soil cap:
    - Install protective gopher wire across area designated for soil capping. The gopher wire must be covered by a minimum of 1.5 feet of clean imported cap material.
    - Place and test compact borrow soil over area designated for capping. Soil to be placed and compacted in 8-inch lifts per recommendation of Geotechnical Engineer (GE).
    - The tree located within the island of Lendrum Court is intended to be retained during remedial construction. Within the island area, cap construction will consist of removing existing surficial plant litter, placement of gopher wire, and placement of mulch on top of the gopher wire. Cap design around this tree is presented in Detail 1 on Sheet C-113 (Appendix A) and discussed in Appendix I.
    - As indicated on Figure 4, four trees and three toyon shrubs located within the proposed soil cap will be preserved during construction. Cap construction within the modified TPZ for these trees and shrubs will consist of excavating 6 to 8 inches of surficial soil utilizing hand tools, air spades, or small track-mounted equipment and constructing the cap in accordance with the standard specifications for soil cap construction at the site (i.e., placement of 1.5 feet of clean imported soil underlain by gopher wire).
    - On the backside of Buildings 1259, 1278, and 1279 (i.e., east side of Buildings 1259 and 1278 and northeast side of Building 1279; beneath the second story decks), aggregate base (AB) pads will serve as the protective cap. As shown in Detail 1 on Sheet C-119, the cap in this area will consist of 6-inches of

compacted AB placed on top of 6-inches of clean imported soil and underlain with gopher wire and geotextile fabric. The AB pads will be bordered by a one-foot wide, 6-inch deep layer of ¾-inch gravel to minimize the potential for erosion caused by downspouts discharging onto the AB pads.

SITE RESTORATION and PROJECT CLOSE OUT:

- Construction of hardscape elements (patios, sidewalks, building drainage curbs, and pathways).
- Construction of irrigation system to support revegetation of project area.
  - Planting in accordance with the Trust's Management Plan (PTMP; Trust, 2002), landscaping plans for Lendrum Court, and Planting Plans for the area east of Buildings 1279, 1278, and 1259. The landscaping plans and planting plans for Lendrum Court are in the process of being finalized and will be submitted to DTSC in early June 2016 as a separate submittal.
- Contractor demobilization, which will involve the removal of construction equipment and materials from the project site.
- Prepare Construction Completion Report, and obtain Owner and Regulatory agency approval that project has been completed to design specifications.

POST-CLOSURE OPERATIONS AND MAINTENANCE:

- Upon completion of the construction phase, the following plans and regulations will be implemented for the site:
  - Post-Closure Operations Maintenance and Monitoring Plan; and
  - Land use controls for the capped area of the Lendrum Court site and the capped portion of the incinerator area.

In addition to the project plans and specifications, several support documents are included as appendices to this RDIP. The support documents include;

- Construction Storm Water Pollution Protection Plan (Appendix C).
- Project-specific Health and Safety Plan (Appendix D).
- Construction Air and Dust Monitoring and Mitigation Plan (Appendix E).
- Construction Quality Assurance Plan (Appendix F).
- Confirmation Soil Sampling and Analysis Plan (Appendix G).
- Project Schedule (Appendix H).

- Memorandum on Tree Preservation (Appendix I).

3.0 REMEDIAL DESIGN

This section describes the various elements of the remedial design for the Site, which is shown on Figures 4 and 5. Key elements of the remedial design include: top soil removal by excavation, consolidation and compaction of contaminated soil and debris to designated capping areas, re-grading and compaction of waste soil to form foundation (sub-grade) for placement of the soil cap, placement of gopher wire above sub-grade, placement of 18-inches of compacted clean soil to form soil cap, re-vegetation of soil cap, placement of erosion control measures to protect final grades from potential soil erosion, and requirements for site access and site management. Remedial design drawings and technical specifications for the project are included in Appendix A. Excavation, compaction, and re-grading activities, including earthwork adjacent to existing structures, will be conducted in accordance with the recommendations presented in the Geotechnical Evaluation (Appendix B of this RDIP).

3.1 PROJECT REQUIREMENTS

The remedial action will be conducted in an area adjacent to residential housing units and natural resources, including established trees and adjacent forest. As such, several project constraints exist to protect sensitive areas. The Lendrum Court remedial design plans have been constructed to account for the following items which are summarized below and presented in Table 1:

- Public safety and community outreach;
- Cultural resources;
- Environmental controls (i.e., dust, stormwater and erosion controls);
- Slope stability and site grading;
- Irrigation and landscape improvements; and
- Protection of natural resources.

3.2 DESIGN BASIS

This section describes the various elements of the remedial design for the remedial action area, which is shown of Figure 2. Remedial design drawings and technical specifications are included in Appendix A. Soil excavation, compaction, and re-grading activities, including earthwork adjacent to existing structures, will be conducted in accordance with the recommendations presented in the Geotechnical Evaluation (Appendix B).

3.2.1 Limits of Work

The project limits are shown on Figure 2. This area encompasses (1) the residential and historic forest areas of the site, where Army-Era incinerator waste is present and the cap will be constructed, (2) the areas west of Building 1258, northwest of Building 1257, south and east of building 1259, south of Lendrum Court, and along the toe of the soil cap in the historic forest where clean closure activities will be conducted, and (3) the adjacent areas for supporting construction operations, including staging and storage areas (shown on Figures 6 and 7).

3.2.2 Grading Approach and Plans

The final grading elevations for Lendrum Court are designed to be stable, promote surface water runoff, and support vegetation as the landscaped portion of the neighborhood. The grades were developed considering: (1) surrounding topography, (2) existing waste fill, (3) slope stability requirements, (4) constructability requirements for the rough grade and final cover, (5) minimum required gradients for adequate drainage, (6) protection of natural and cultural resources, (7) preparation for post-construction reforestation objectives, (8) assessment of existing erosion channels and (9) avoiding excavations into serpentinite bedrock, as practicable.

The existing grade, rough grade, and final grades are presented on Sheets C-101, C-105, and C-106 (Appendix A), respectively. Beyond the above criteria, specific elements of the grading plans include:

- Realignment of the asphalt concrete/aggregate base (AC/AB) path, located in the northwestern portion of the Site;
- Demolition and reconstruction of the curb in front of Buildings 1259 and 1278 to create an additional parking space;
- New concrete patios and sidewalks that will serve as a cap;
- AB pads behind Buildings 1259, 1278 and 1279;
- Alternative cap feature around the tree that is located within the island near the north end of Lendrum Court and is to be retained;
- Cap conformance with the serpentinite bedrock outcrop, located in the southern portion of the Landscape Area near the intersection of Lendrum Court and Armistead Road (described in Section 3.3.2.6);
- Landscape features including a new decomposed granite (DG) path and raised planter boxes; and
- Consideration of cultural resources in the vicinity of the proposed cap.

3.2.3 Geotechnical Evaluation

Existing site soil conditions have been investigated and evaluated by TRC and the findings and recommendations are presented in Geotechnical Evaluation (Appendix B). The Geotechnical Evaluation includes: a discussion of existing geological and site soil conditions, evaluation of potential geological hazards, the results of a slope stability analysis, and earthwork recommendations. The recommendations presented in the Geotechnical Evaluation were used to develop the remedial design and are reflected in the design drawings and specifications. Throughout the project, the Contractor will implement construction activities in accordance with the recommendations in the Geotechnical Evaluation report. A summary of the primary considerations and recommendations presented in the Geotechnical Evaluation are outlined below in the following subsections.

3.2.3.1 Existing Site Conditions

Site conditions were evaluated based on a review of available documents and observations from a field investigations performed by TRC on April 23, 2015 and January 20, 2016. The April 2015 field investigation consisted of a surface reconnaissance and a subsurface exploration program using hand auger drilling equipment. A summary of the primary observations is provided below:

- Subsurface conditions at the Site generally consisted of medium stiff to stiff lean clay soil. The clay soil included varying amounts of sand and gravel. Some debris, such a glass fragments, was observed in the soils.
- Laboratory testing was performed to evaluate the natural moisture content of 17 soil samples by Method ASTM D2216.
- A Plasticity Index (PI) test was performed on two representative lean clay soil samples (Method ASTM D4318). The tests resulted in PIs of 17 and 18, indicating low to moderate plasticity and expansive potential of the near surface soils.
- During the April 23, 2015 field investigation, samples were collected to evaluate the extent to which NOA was present in overburden soils. Based on the results of the evaluation, NOA concentrations were reported to be below detection limits in seven of the eight composite samples. The single detection was reported as less than 0.25% Chrysotile, which is considered low for a short-term construction project. The analytical results of this investigation are presented and discussed in the Air and Dust Monitoring and Mitigation Plan (ADMMP, Appendix E).

During the investigation on January 20, 2016, TRC conducted additional surface reconnaissance and subsurface investigation activities near the bedrock outcrop at Lendrum Court and Armistead Road using a hand shovel. A summary of the observations from this investigation are provided below:

- The extent of the serpentinite bedrock outcrop within the top 6 inches of overburden soil was mapped. The extent of the bedrock outcrop is shown on Figures 4 and 5.
- Samples of overburden soils were collected from areas where overburden soil thickness was less than 6 inches to evaluate the presence of lead in preparation for clean closure activities. Based on the analytical results, four of the five soil samples exhibited concentrations of lead exceeding the residential screening level of 80 mg/kg. Results of the soil investigation are discussed in more detail in the Confirmation Sampling and Analysis Plan (Appendix G).
- Samples of suspected fractured serpentinite bedrock were collected from the outcrop and from the historic forest area for analysis of NOA. Based on the analytical results, asbestos concentrations ranged from 0.01% to 0.89% in the four out of five samples with results reported above detection limits. Results from the sampling activities are presented in the ADMMP (Appendix E).

3.2.3.2 Geologic Hazards

The Geotechnical Evaluation discusses the potential for the Site to be effected by geological hazards including: fault ruptures, ground shaking, liquefaction, dry seismic settlement, lateral spreading, and landslides. The Site is located in an area of high seismicity, therefore, the Site could experience strong shaking during a seismic event. However, based on current information, TRC's professional opinion is that there is a low risk of fault rupture, liquefaction, dry seismic settlement, lateral spreading, or landslides at the Site during a seismic event. If a seismic event were to result in formation of sags, reversal of drainage gradients, slumping or cracking of the soil cap, then maintenance will be required to re-establish positive flow off of the Site and or repair breaches in the cap.

3.2.3.3 Earthwork Recommendations

Earthwork activities during remedial construction at the Site will include: site preparation and clearing; excavation; consolidation and compaction; re-grading; and cap placement. A summary of the primary recommendations pertaining to the remedial design are provided below:

- Prior to re-grading surfaces, exposed surface soils in the areas to receive fill should be scarified to a maximum depth of 6 inches, moisture conditioned, and compacted.

- Disturbance of bedrock at the site should be avoided to the extent practicable.
- Side slopes of excavations in building and pavement areas should be sloped at inclinations no greater than 3H:1V (horizontal:vertical).
- Subdrains should be installed as directed by engineer in any areas where seepage is observed.
- Fill should be placed in lifts no greater than eight-inch lifts in uncompacted thickness.
- Soil at depths greater than 18 inches below final grade should be compacted to a minimum of 90 percent relative compaction at optimum moisture content.
- Import fill material for use in the soil cap should be inorganic and have a PI between 10 and 20. TRC's objective is to identify a source of import soil that contains no rocks or lumps larger than 3-inch in diameter; however, rocks or lumps up to 6-inch in diameter are permitted (Appendix B). Additionally, no more than 15 percent of the rocks or lumps should exceed 2½-inch in diameter.

With the exception of bedrock outcroppings, the maximum inclination of the final soil cap will be 1½H:1V; however, a maximum slope of 2½H:1V is preferred. A representative from TRC's geotechnical group should observe and test the geotechnical aspects of the grading and earthwork for general conformance with the recommendations detailed in the Geotechnical Evaluation (Appendix B).

3.2.3.4 Slope Stability Analysis

Static and seismic slope stability analyses were performed for the proposed slopes. For this analysis, stability was expressed as a factor of safety (FS) that is calculated for static and seismic conditions. The stability of the proposed fill slope was evaluated using the computer program Slope/W (released 2012) and the following input parameters: slope geometry, soil layer thickness, soil type, soil unit weights, soil strength parameters, and groundwater conditions.

The slope stability analyses indicate the FS for static and seismic conditions at 1.74 and 1.22, respectively. These FS exceed the minimum FS values for static and seismic conditions recommended by The Southern California Earthquake Center for proposed developments at 1.5 and 1.15, respectively, (DMG SP 117A, 2008). Based on the Geotechnical Evaluation, the final grades presented in the design drawings (Appendix A) are acceptable.

3.2.4 Surface Water Management

The proposed remediation activities are scheduled for the summer and fall 2016, which is considered the dry season. As such, significant storm events are not anticipated during this phase of work. Regardless, stormwater BMPs discussed in the SWPPP (Appendix C) will be implemented prior to construction. Before the rainy season, gutters and downspouts for the buildings located within the Site would be inspected, cleaned, and repaired, as needed, and crushed rock will be placed beneath downspout exits to promote energy dissipation.

For the first year following construction, monitoring will be performed in substantial conformance with the State Water Resources Control Board (SWRCB) General Permit (discussed in Section 3.3.1.1.), where monitoring activities will occur: (1) quarterly, and (2) before and after each 24-hour rain event of 0.5 inches or more. In the second year, monitoring (cap inspections only) will be performed quarterly and will be discontinued at the end of the second winter season, after which only long-term monitoring as required by the Site OMMP will continue.

3.3 CONSTRUCTION REQUIREMENTS

3.3.1 Pre-Construction Activities

Pre-construction activities include development of project plans, specifications, and support documents (presented as appendices of this RDIP), establishing administrative and engineered project controls, obtaining regulatory and stakeholder approvals, and providing public outreach and education regarding implementation of remedial actions at Lendrum Court.

3.3.1.1 Regulatory Approvals

Prior to construction, the Trust will ensure all necessary approvals have been received from DTSC, the state lead regulatory agency for remedial actions at the Site. The following key components of the remedial action have received approval:

- The Lendrum Court RAW (TRC, 2015b), submitted to DTSC on July 30, 2015, was approved by DTSC on August 5, 2015. The approval was confirmed in a letter from DTSC to the Trust dated August 12, 2015.
- The Lendrum Court CEQA IS (RAW Appendix G; TRC 2015b) was approved as part of the RAW on August 5, 2015.

- The Phase I RDIP (TRC, 2015c), submitted to DTSC on July 24, 2015, with revised appendices submitted August 5, 2015, was approved by DTSC in a letter dated August 12, 2015.

This Revised RDIP will receive approval from DTSC prior to commencement of field activities in the area east of Buildings 1279, 1278, and 1259.

During execution of the remedial action, the Trust will implement erosion control and storm water management measures in substantial conformance with the National Pollutant Discharge Elimination System (NPDES) Construction General Permit (CGP) for Storm Water Discharges Associated with Construction Activity, Order No. 2009-0009-DWQ, NPDES No. CAS000002 as amended by 2010-0014-DWQ and 2012-006-DWQ. This CGP, enforced by the State Water Resources Control Board (SWRCB), regulates pollutant discharges in surface or storm water associated with construction activities. TRC has prepared a SWPPP for the remedial construction at Lendrum Court, which is presented in Appendix C of this Revised RDIP. Two addendums to the SWPPP have been prepared: Addendum No. 1 for the soil stockpile south of Building 1347 (near the intersection of Kobbe and Greenough Avenues in the Presidio) and Addendum No. 2 for vegetation clearance activities, which will take place prior to remedial construction. Both SWPPP addendums are provided as attachments to the SWPPP in Appendix C. The Contractor will perform construction in accordance with the SWPPP; however, as a federal agency implementing a remedial action under CERCLA, the Trust will not submit a Notice of Intent (NOI) for coverage under the State of California's CGP. The goal of the Trust is to complete grading activities and installation of site stabilization measures prior to the wet weather season, which begins approximately around October 1. In the event that work extends past October 1, 2016, additional BMPs will be employed to prior to wet weather or predicted storms. Prior to the start of construction, the Trust will:

- Notify DTSC two (2) weeks prior to commencing with construction activities;
- Conduct a project kickoff meeting attended by the Trust, U.S. Army, DTSC, and other stakeholders to coordinate remedial construction activities;
- Obtain an excavation permit from the Trust;
- Review and approve the Contractor's submittals; and
- Provide a schedule that shows coordination with other concurrent construction activities in the vicinity of the Site.

Any conditions, restrictions, and/or requirements imposed by the above activities will be incorporated by addendum into the scope of remedial activities described in this Revised RDIP.

3.3.1.2 Protection of Resources

A reconnaissance-level survey of the Site was conducted by H.T. Harvey & Associates on April 2 and 3, 2015 to (1) assess existing biotic habitats and general wildlife communities, (2) assess the Site for its potential to support special-status plant and animal species and their habitats, and (3) identify potential jurisdictional habitats, such as Waters of the U.S./State and riparian habitat. Prior to conducting fieldwork, H. T. Harvey & Associates ecologists collected and reviewed information concerning threatened, endangered, and other special-status species and habitats of concern from several sources.

The results of the survey indicated that no special-status plant species have the potential to occur on the Site. H.T. Harvey & Associates' analysis concluded that one special-status animal species, the olive-sided flycatcher, could potentially utilize the Site for breeding, but remedial activities would not have a substantial adverse effect on regional populations (Appendix G of the RAW; TRC 2015b).

The Site is located along the Pacific Flyway for birds, therefore, migratory birds have the potential to be present at the Site. If vegetation removal/clearing and grubbing were to occur during the bird breeding season (February 1st through August 31st), birds could be nesting and nests could be either physically disturbed/destroyed or indirectly disturbed by remedial activities. Any tree removal or vegetation clearance required during bird nesting season will be preceded by a pre-construction nest survey to ensure compliance with the Migratory Bird Treaty Act and California Fish and Game Code. If active nests are found, an appropriate buffer (typically 300 feet for raptors and 100 feet for non-raptors) will be established around active nests.

H.T. Harvey & Associates performed a tree survey within the residential area of the site on April 8, 2015. Results of the tree survey included: species, diameter at breast height and coordinate data. All trees within the residential area were removed on July 29, 2015, with the exception of the tree located within the island near the north end of Lendrum Court. On November 19, 2015, HortScience, Inc. conducted an additional tree survey to observe the health of trees in the historic forest area and assess the potential to be affected by the proposed remedial construction. H.T. Harvey & Associates performed a survey of the native understory shrubs at the Site on November 23, 2015. Based on the results of these surveys, HortScience, Inc. and H.T. Harvey & Associates provided recommendations for the preservation of several healthy trees and shrubs, presented in the Memorandum on Tree Preservation, presented in Appendix I. Using these recommendations and the proposed grading plan, a final list of trees and toyons designated for preservation was developed. The locations of these trees and shrubs are shown on Figure 4.

In accordance with the recommendations presented in the Memorandum on Tree Preservation, site clearing activities began on February 22, 2016. During the removal, all vegetation within the proposed grading area was removed, with the exception of four trees and three toyons agreed upon for retention. These trees and shrubs will be protected throughout remedial construction through the use of TPZs. Following remedial construction, the area will be reforested in accordance with the Planting Plan. The Trust and its Contractor(s) will monitor implementation of the remedial action and continue to identify natural resources to be protected following established Trust protocols and procedures. These protocols and procedures will be discussed at a pre-construction kickoff meeting.

3.3.1.3 Health and Safety

A project-specific Health and Safety Plan (HASP) for implementation of the remedial action at the Site is presented in Appendix D. Within the specifications included in the Contract Documents for remedial construction, the Trust will require the Contractor to prepare a HASP as part of project submittals and develop and implement health and safety protocols that, at a minimum, conform to the general requirements of Federal and State Occupational Safety and Health Administration standards for hazardous waste operations. The Contractor will take responsibility for all job-site safety issues, safety orders, laws and regulations, training, and medical monitoring of personnel. The Contractor's HASP will reflect a commitment to exercise extreme care when handling or disposing of materials or substances that are identified as hazardous substances.

A copy of the Contractor's HASP will be available within the work area at all times and will apply to all personnel working at or visiting the Site, including, but not limited to, the Contractor's employees, suppliers, vendors, truck drivers, and the Trust's representatives. The Contractor's Project Health and Safety Representative will verify that site workers and visitors are in compliance with applicable health and safety requirements, and take action to ensure compliance where deficiencies are identified.

3.3.1.4 Traffic, Pedestrian, and Parking Management

Access by residents to parking areas and their homes will be maintained throughout the construction. Parking may be periodically restricted in the North Fort Scott neighborhood to support construction activities. Site workers will not be permitted to park non-construction vehicles within the neighborhood.

All roads in the vicinity of the site would remain accessible to the public throughout the duration of the project. Access and haul routes for the project are shown on Figure 6. The contractor will mobilize equipment and workers to the project staging area, which would be fenced to exclude the public. Access to the Site will be established from the staging area (located at the overlook and parking area at the junction of Lendrum Court and Lincoln Boulevard) and the storage area (located on the South side of Armistead Road) (Figure 7) via the existing Lendrum Court roadway and a proposed temporary access road for smaller motorized equipment, located southwest of Building 1259.

Traffic control signage and devices would be established at points of entry to public roadways, and flaggers would be utilized, as necessary, to control traffic during peak transit hours. At a minimum, traffic control staff will be employed on all haul days to coordinate traffic in the local area. Figure 7 presents a Traffic and Signage Plan, which shows the location of signs that will be posted during construction. Additional signage and/or flagmen will be intermittently used to coordinate access to specific areas of the Site during construction. The segment of the asphalt pedestrian path located northwest of Building 1257 will be intermittently closed during construction. The portion of the pedestrian path located beyond the limits of the site will remain accessible to the public by a detour route via Armistead Road and Lendrum Court. During periods of closure, signage will be posted as shown in Figure 7.

Informational signs for the project will be prepared by the Trust and posted at appropriate locations within the project area.

3.3.1.5 Air and Dust Mitigation and Monitoring Plan

Construction activities associated with implementation of remediation at the Site will involve equipment and vehicles traveling over dirt surfaces, and soil removal and handling. These activities generate dust in the form of particulate matter (PM). To mitigate fugitive emissions of PM and maintain acceptable levels of PM in air at the perimeter of the Site, the Contractor will implement standard BMPs in accordance with the ADMMP, included as Appendix E. The ADMMP also includes methods for stationary NOA sampling that will be conducted during earthwork in the vicinity of the bedrock outcrop at Lendrum Court and Armistead Road. The ADMMP describes the strategies for dust management and air monitoring during remedial construction activities at the Site and identifies protocols to achieve the following objectives:

- Identify action levels intended to be protective of public and worker health;

- Assess the need for and effectiveness of dust control measures;
- Document air quality during onsite earthmoving activities; and
- Identify BMPs for dust mitigation during remedial construction at the Site.

Action levels presented in the ADMMP for maximum concentrations of respirable particulate matter, lead, PAHs, and dioxins/furans are intended to be protective of adverse health impacts to workers and nearby off-site receptors. BMPs for dust control are expected to mitigate the risks of inhalation, ingestion, and skin contact with particulate matter and target compounds. Recommendations for baseline and construction air monitoring are detailed in the ADMMP.

3.3.1.6 Public Outreach

On behalf of the Trust, TRC prepared a *Community Relations Plan for Lendrum Court* as a supplement to the *Community Relations Plan (CRP), Presidio of San Francisco, California*, which was published in 2001 to describe the communication program being implemented at the Presidio. Key elements of the 2001 CRP include support and involvement of the Presidio Restoration Advisory Board (RAB); public meetings, workshops, and presentations; public comment periods; factsheets, newsletters and media outreach; and information repositories. The *Community Relations Plan for Lendrum Court* was approved by DTSC on May 19, 2015 (TRC, 2015a).

The *Community Relations Plan for Lendrum Court* describes the communication plan for exchanging information between the Trust and the public, including neighborhood groups and the greater Presidio community, during the investigation and cleanup activities at Lendrum Court in the Presidio of San Francisco, California. The goal of this plan is to promote communication, cooperation, and understanding between the Trust, who is responsible for the cleanup activities, and the public, who are affected by these activities. Moreover, the Plan is prepared to ensure that interested parties and the general public receive accurate, timely, and pertinent information, and are provided an opportunity to comment on and share their concerns about the environmental remediation activities at Lendrum Court. The Lendrum Court Community Involvement Program includes:

- Notification via email to neighbors of the North Fort Scott, Lendrum Court and Pilots Row neighborhoods regarding Trust and DTSC activities relative to site cleanup.
- Continued community meetings and presentations updating the public on the status of site investigation and remediation activities.

- Posting of key regulatory communications, reports, and public meeting minutes on the Trust's website.
- A minimum public comment period of 30 days for the remedy selection document.
- Maintenance of a publically accessible website to keep the public informed about Lendrum Court and to post available documents including reports, DTSC comments on cleanup-related documents, meeting summaries, and presentations; the website address is: http://www.presidio.gov/about/Pages/Lendrum-Court-Remediation.aspx.

In addition, targeted signage and flyers detailing project purpose, closure areas, detour routes, alternative parking areas, and contact information for the project will be available in several areas around the project area.

3.3.1.7 Cultural Resources

Cultural resources at the site include a series of historic training trenches to the north-northeast of Buildings 1278 and 1279. Although previously considered drainage features, a Trust cultural resource specialist identified these features as trenches while walking the site. Their historical use as training trenches was confirmed through historic aerial photographs and historic documents (Presidio of San Francisco Archive Search Report). There are other known trenches of this type on the Presidio, and the Army conducted a Presidio-wide survey of all historic trenches, including those at Lendrum Court, to prepare the Archive Search Report (US Army, 2003).

The trenches at the site have been surveyed and documented; however, the Trust's preference is to preserve the general appearance of the historic trench features in this area. As such, efforts were made to design the grades so that the topographic resemblance of the historic trenches are maintained where possible, while still adhering to the standard specifications for soil cap design at the site (i.e., placement of 1.5 feet of clean imported soil underlain by gopher wire). Consultation with the Trust's archaeological staff indicates that the proposed grading plan will maintain the general appearance of the historic trenches while also fulfilling the Site's remedial objectives. Prior to construction, the extent of the trenches will be delineated on-site to minimize secondary construction impacts, such as equipment traffic, temporary stockpiling, etc., in these areas. The current extent of the trenches is shown on Figures 3, 4, and 5.

3.3.1.8 Utility Evaluation

Prior to construction activities, the construction areas will be marked with white paint according to Underground Services Alert (USA) requirements, and USA will be notified at least three business

days (i.e., 72 hours) prior to the start of excavation or demolition activities at the Site. The USA ticket will be maintained as long as work continues at the site and will be updated, as necessary. In addition, The Contractor will also obtain a Dig Permit from the Trust Permitting Department prior to any excavation or demolition activities. The locations of underground utilities, including storm drains, water, sewer and gas lines, will be confirmed prior to excavating in the vicinity of these utilities.

All existing utilities identified at the Site will be protected in place during construction. Temporary water and gas outages may be required for safety purposes. Overhead electrical and communication lines will require protection during tree work or movement of large construction equipment in the vicinity of these utilities. Storm drain inlets will be protected during all construction activities, as specified in the SWPPP (Appendix C). Utility access boxes and manholes will be elevated, as necessary, to conform to final grades.

3.3.2 Construction Activities

The following sections describe the construction activities that must be completed prior to remediation of Lendrum Court. Construction activities will be conducted in compliance with applicable regulations. This includes but is not limited to California Code of Regulations Title 17, Section 93105, California Code of Regulations Title 8, Section 5192, and applicable DTSC guidance.

3.3.2.1 Temporary Facilities, Exclusion Zones, and Fencing

The Trust will hire a qualified General Contractor licensed to perform earthwork and handle hazardous materials to implement the remedy. The Contractor will supply a trailer to be installed at the staging area shown on Figure 7 or at a location agreed to by the Trust. Temporary utility services required for the project will be provided by the Contractor though coordination with Trust Permitting Department and submittal of a Utility Service Application. Trust utility services may include temporary water, sewer, and electricity during construction or for landscaping and/or forestry irrigation. Additionally, the Contractor will mobilize, maintain, and regularly service temporary sanitary facilities that will be sufficient for the project crew, including the Trust representatives and other stakeholders.

Remediation work at the Site will be performed in a single mobilization to reduce overall construction time. Prior to the start of construction activities in a given portion of the Site, the post and cable fencing that was installed as a temporary measure to deter pedestrian traffic will be

replaced by more prominent construction fencing to restrict access. Warning signs will be posted on the protective fencing to notify the public of construction activities. Project staging or storage areas, including areas of temporary soil stockpiles, will be fenced to exclude the public. Temporary soil stockpiles will be covered to prevent wind or water erosion. Within the fenced areas, the Contractor will establish an appropriate exclusion zone, decontamination zone, and support zone. These zones will be detailed in the Contractor's HASP.

3.3.2.2 Decontamination Activities

All vehicles, equipment, and personnel will be decontaminated prior to exiting established exclusion zones. Contaminants such as accumulated soil, dust, and other contamination from equipment will be removed at the decontamination station(s). Onsite management and off-site disposal of decontamination wastes, such as wash water and contaminated protective equipment used by onsite personnel, will be described in the Contractor HASP. A Decontamination Plan will be prepared by the Contractor for the proposed soil removal activities as part of submittals and will describe specific procedures to be used during soil removal activities to reduce the potential for contaminants to be transported off-site. Rumble strips or a tire washing facility will be established to ensure that vehicles leaving the site and staging areas do not carry soil onto public roads. In addition, all equipment and tools used at the site will be cleaned of all soil, plant parts, and other potentially harmful materials prior to being brought onto the Site.

3.3.2.3 Construction Quality Assurance (CQA)

A Construction Quality Assurance (CQA) program provides definition of the materials and procedures to be used during construction and assures regulatory agencies that construction materials will be tested, installed, and monitored in accordance with the design plans and technical specifications, accepted civil engineering practices, and applicable CQA requirements.

On behalf of the Trust, TRC has prepared a Construction Quality Assurance Plan (CQAP), which is presented in Appendix F. The purpose of the CQAP is to:

- Provide clarification as to the roles and responsibilities of participating parties, structure of meetings to be held during construction, and general inspection and documentation procedures;
- Establish procedures that will assure work activities are performed in accordance with the project design to achieve performance requirements; and
- Include requirements for construction procedures, CQA oversight, field and laboratory

testing.

3.3.2.4 Construction Monitoring

Construction monitoring activities will be performed to facilitate Site safety. Specific monitoring programs that will be employed during construction include monitoring for munitions and explosives of concern (MEC), natural resources, cultural resources, and dust. Pre- and post-construction dust monitoring is discussed in Sections 3.3.1.5., and MEC and natural resource monitoring is detailed below.

3.3.2.4.1 Munitions and Explosives of Concern (MEC)

All personnel will be trained in the identification of MEC or potential MEC using pictures and information presented in the HASP or other appropriate training resources (Appendix D, Attachment L). During daily tailgate safety meetings, personnel will be reminded of the need to be vigilant about monitoring work zones for MEC. If a MEC or potential MEC is discovered during the construction activities, the Contractor will cease work in the affected area, remove personnel from the affected area, and contact the Trust Project Manager. The Project Manager will contact the following authorities in the order shown:

1.) Trust Safety and Occupational Health Manager; and
2.) U.S. Army.

The Trust Project Manager will coordinate with the US Army, in accordance with the Memorandum of Agreement (MOA) between the Trust and the Army (Trust and DOD, 1999). The Contractor will resume work only upon authorization from the Trust.

3.3.2.4.2 Natural Resource Monitoring

Migratory birds, trees, and other vegetative resources have been identified as the natural resources that exist or have the potential to exist at the Site. To mitigate impacts to natural resources, the following construction monitoring protocols will be implemented during remedial construction:

- Migratory Birds – The bird breeding season for the Site is from February 1st through August 31st (Appendix G of the RAW; TRC 2015b).
- As discussed in Section 3.3.1.2, initial vegetation clearing activities began February 22, 2016.

- If additional vegetation clearance is performed during bird breeding season, a pre-construction nesting survey will be performed prior to tree removal or vegetation clearance. Removal of trees will be coordinated with Trust forestry and natural resource staff to avoid potential disruption to nesting or migrating birds.
- Excluding the four trees and three toyon shrubs to be retained, remaining vegetation will be controlled to keep it 6 inches in height or less throughout the limits of work to avoid creating areas attractive to birds for nesting.

As discussed in Section 3.3.1.2, most of the trees in the proposed construction area have been removed to facilitate remedial construction activities. Trees removed from the site were mulched, and the mulch was spread across the site as a soil stabilization measure.

Four trees and three toyons located within the proposed construction area were retained and are to be protected in place during construction activities. TPZs, which extend radially 20 feet from the trunk of the tree or 10 feet from the center of a shrub, will be implemented around these threes and toyon shrubs. Additionally, TPZs will also be implemented for a number of trees and toyons near the remedial area boundary, which have the potential to be affected by excavation and grading activities. Cap construction within the TPZs will consist of excavating no more than 6 to 8 inches of surficial soil utilizing hand tools, air spades, or small track-mounted equipment and constructing the cap in accordance with the standard specifications for soil cap construction at the site (i.e., placement of 1.5 feet of clean imported soil underlain by gopher wire). The only exception to this approach is for the tree located within the island near the north end of Lendrum Court, where an alternative cap feature will be constructed. All work performed within a TPZ will be overseen by an arborist.

Other vegetation removed during clearing and grubbing activities will be off hauled as green waste. Following remedial actions, vegetation will planted in the soil capped areas in accordance with the Vegetation Management Plan (VMP; Trust and NPS, 2001) and consist of a mix of native and landscape plants. Where practicable, planting elements of the conceptual landscape plan for Lendrum Court will be retained.

3.3.2.4.3 Cultural Resource Monitoring

Cultural resources at the site include a series of historic training trenches north-northeast of Buildings 1278 and 1279, as shown on Figures 3, 4, and 5. As discussed in Section 3.3.1.7, efforts were made to design the proposed grades so that the topographic resemblance of the historic trenches are generally left intact, while still adhering to the standard specifications for soil cap

construction at the site (i.e., placement of 1.5 feet of clean imported soil underlain by gopher wire). Construction activities will be coordinated with the Trust's cultural resources personnel and conducted in a manner that minimizes impacts to the trenches.

Excavation activities will be conducted in accordance with the Trust's "Unanticipated Discovery Protocol." In the event that archaeological resources—including but not limited to historical artifacts, building materials, fabrics, or human remains—are unearthed during excavation activities, construction activities will be halted. The Contractor will notify the Trust's archaeology staff. The potential archaeological resources will then be protected in place and avoided pending further direction from the Trust.

3.3.2.5 Excavation, Waste Consolidation and Grading

Excavation, consolidation and grading will alter the current site topography in some areas and result in development of new site topography, which may affect surface drainage. The current and final grades at the Site are shown on Figures 2 and 5, respectively. Additionally, the rough grade (i.e., ground surface elevation prior to cap placement) is shown on Figure 4.

In the areas designated as clean closure areas (shown on Figure 5), soil will be excavated and consolidated within the areas designated for capping. Confirmation soil samples will be collected from the clean closure areas as described in the Confirmation Sampling and Analysis Plan (CSAP), which is presented in Appendix G. To the extent specified in the CSAP, excavation will continue in the clean closure areas until confirmation samples indicate that remaining soil meets remedial goals for clean closure.

Excavation will be accomplished using front-end loaders, bulldozers, or backhoes, where equipment usage will depend on site grades, access, and equipment restriction zones. The excavated material will be placed in areas identified for consolidation of impacted soils or stockpiled for future consolidation or disposal off-site. The Contractor will prepare and maintain staging facilities for stockpiling excavated contaminated soil, concrete and/or asphalt debris. These stockpiles may be unlined in areas yet to be excavated, but will be covered with weighted plastic (Visqueen®) at the end of each work day or as needed to control dust. Additionally, stockpiles outside of the excavation area will be lined with heavy plastic. Contaminated soil stockpiles will not be sited within any of the identified exclusion zones (e.g., TPZs) or outside of the limits of the site boundary or the established staging area, which are shown on Figures 2 and 7, respectively. Adequate runoff control measures will also be implemented as described in the SWPPP (Appendix C). Stockpiling activities will not take place on rainy days or immediately prior to predicted precipitation. The Trust will

require the Contractor, through the specifications included in the Contract Documents for Lendrum Court, to prepare a Soil Management Plan (SMP) as part of project submittals and develop and implement soil management protocols. The Contractor's SMP will address excavation, stockpiling, loading, and transportation of contaminated soil as well as storage of waste material generated by the contractor during construction. The Contractor will be responsible for transport and disposal of solid waste generated during remedial activities in accordance with the pertinent sections of Title 27 of the California Code of Regulations, which addresses proper management of solid wastes.

Soils stockpiled for off-site disposal will be transferred to the haul trucks using front-end loaders. All vehicles carrying waste will be tarped before leaving the Site. For design purposes, TRC has assumed that 18 cubic yards (cy) capacity dump trucks would be used to transport soil for off-site disposal. Excavation activities at the Site will be performed intermittently over an estimated 24-week construction period. Excavated asphalt and organic-rich soil will be hauled off-site to a landfill licensed to receive the material, and miscellaneous excavated debris will be recycled as practicable.

Prior to hauling off-site, the soils deemed unfit for onsite consolidation would be characterized for purposes of selecting appropriate landfills for disposal. The Trust currently is planning to dispose of Class I non-Resource Conservation and Recovery Act (RCRA) waste from the Site at Buttonwillow Landfill, in Kern County. Class II and Class III waste is planned to be disposed at Potrero Hills Landfill, in Solano County. If additional or alternate landfills are selected for off-site disposal after a contractor has been selected for the remedial action, the Trust would notify DTSC of the alternate landfill prior to transport of material off-site. Disposal will be documented with appropriate manifests, weight tickets, and bills of lading. These documents will be scanned and included in the construction completion report (CCR) on a compact disc (CD).

In addition to facilitating the logistics of stockpile management and soil confirmation sampling, the Contractor will develop the specific strategy to be employed to manage water encountered during earthwork activities (groundwater is not expected at this Site) as part of the Contractor's means and methods; however, the Contractor will be required to use a strategy and techniques consistent with protection of natural resources. Throughout construction, the Contractor will implement all activities in accordance with recommendations presented in the Geotechnical Evaluation (Appendix B).

Irrigation lines will be placed as shallow as reasonable for their protection and respective size. Although it is preferred that irrigation lines be placed within the clean cap soil, some irrigation lines

may need to be placed beneath the cap (i.e., within the contaminated soil and debris). If this is necessary, the irrigation lines will be installed within a corridor of clean fill, as practicable.

As discussed in Section 3.3.2.2, vehicles, equipment, and personnel will be decontaminated prior to exiting the Site or staging areas.

3.3.2.6 Engineered Soil Cover Construction

In the landscaped area, the cap will include both hardscape and vegetated soil caps. Hardscape areas include: building foundations, asphalt roadways and paths, concrete sidewalks, building drainage curbs and patios (Figure 5). In planned open space areas and the historic forest, a soil cap constructed of clean imported soil will be constructed over the in-situ and consolidated contaminated soil and debris. The soil cap will be vegetated and/or reforested to limit future potential for erosion. The cap will also consist of a protective gopher wire mesh placed at its base to prevent gophers from bringing waste materials to the surface. The gopher wire will serve as a demarcation between the soil cap and the layer of contaminated soil and debris. Cap construction within the traffic island of Lendrum Court will consist of removal of existing surficial plant litter and placement of gopher wire overlain by mulch.

Soil used for backfill will be sourced from Lawrence Berkeley National Laboratory, located in Berkeley, California. The soil meets the physical and chemical requirements set for in the Geotechnical Evaluation (Appendix B). Management of backfill soil during construction will be described in the Soil Management Plan (SMP), which will be prepared by the Contractor. This plan will address receiving, stockpiling, transporting and grading of clean backfill material. The LBNL soil slated for backfill will be primarily stockpiled in the Presidio near the intersection of Kobbe Avenue and Greenough Avenue, south of Building 1347. Clean soil for the cap may be temporarily stored in unlined stockpiles within the staging area, but will be covered with weighted plastic at the end of each work day. The plastic cover will serve to reduce dust leaving the Site and to prevent contact of rain water with the stockpiled soil. Storm water management practices for the soil stockpile are included as Addendum No. 1 to the SWPPP, included in Appendix C.

The final grading plan for the Site is presented on Figure 5. With the exception of bedrock outcroppings, the maximum inclination of the final soil cap will be 1½ H:1V; however, a maximum slope of 2½ H:1V is preferred. Prior to placement of capping materials (i.e., soil cap or pavement), exposed surface soils will be scarified to a maximum depth of 6 inches, moisture conditioned, and compacted in accordance with the recommendations presented in the Geotechnical Evaluation Report (Appendix B). The finished compacted subgrade should be firm and non-yielding under

the weight of compaction equipment. Testing for geotechnical conformance is described in the technical specifications and CQA Plan (Appendix A and F, respectively).

A serpentine bedrock outcrop is located near the intersection of Lendrum Court and Armistead Road. In areas where the thickness of overburden soil is less than 6 inches, the contaminated overburden soils will be scraped off the bedrock surface, and bedrock in these areas will remain exposed. Bedrock overburden will be removed through surgical excavation utilizing small excavators, hand tools, and if necessary a wet-vac. All efforts will be utilized to reduce impact with the bedrock itself and work will be performed in substantial compliance with all local, state, and federal regulations. In areas where the overburden thickness is between 6 inches to 1.5 feet, the overburden soils will be scraped down to the surface of the bedrock, and clean soil will be used to construct a soil cap that conforms to the portion of the bedrock surface that will be left exposed. In its current configuration, the relatively small area where the overburden is less than 6 inches thick (i.e., the less than 800 square-foot area where bedrock that will be left exposed following remedial construction), bedrock is partially exposed and overburden consists of a thin layer of contaminated soil that has eroded from further up the slope and organic plant litter that has fallen over the years. Due to the naturally steep slopes of the bedrock outcrop, proposed surrounding vegetation, and general limited access to this area, it is unlikely that local residents will come in contact with the exposed bedrock. As such, no long-term adverse effect are anticipated as a result of exposing a small area of the serpentine bedrock formation at the site.

As discussed in Section 3.3.2.5, irrigation lines will preferentially be placed within the clean cap soil to prevent exposure to contaminated soils or debris during irrigation system maintenance and repair. Irrigation system features are described in Section 3.3.3.4, and construction of the system will be coordinated with Trust maintenance crews. The soil cap would be vegetated with a mix of native and landscape plants, as detailed in Section 3.3.3.4. Soil may be amended during placement or prior to planting as needed to support vegetation.

During construction of the cap, a land surveyor will collect elevation data of the post-excavation graded topography, which will be incorporated into an as-built survey.

3.3.2.7 Dust Mitigation and Monitoring

Dust Mitigation and Monitoring was discussed in Section 3.3.1.5, and the ADMMP is presented in Appendix E.

3.3.2.8 Storm Water Pollution Prevention Plan and Erosion Control Measures

Storm water management and erosion control was discussed in Section 3.2.4, and the construction SWPPP is presented in Appendix C. SWPPP inspections and maintenance will be performed for two years following site remediation to monitor the for soil erosion and performance of the protective cap.

3.3.2.8.1 Construction Best Management Practices

The SWPPP, included in Appendix C of this Revised RDIP, may be modified to include specific construction BMPs to be employed by the Contractor during construction. However, it is anticipated that the Contractor will install and maintain the following BMPs during earthwork activities:

- Temporary cover on exposed soil slopes.
- Weed-free straw waddles along the top of slopes, along slope contours, and along the base of the soil stockpile edge facing Kobbe Avenue.
- Silt fencing along the project perimeter to address soil erosion and prevent off-site migration.
- Geotextile-covered k-rail barriers around the soil stockpile and geotextile fabric under and over the soil stockpile south of Building 1347.
- Other soil stabilization measures that include use of binders, straw, biodegradable mats, and other methods as necessary, taking into consideration the soil conditions and slope.
- Sediment tracking controls such as tire sweeping/washing and road sweeping; dust control including vehicle speed restrictions and the use of water on access routes; and drainage inlet protection as needed, including sand bags around drainage inlets and filter fabric within inlets.

The Contractor's decontamination requirements, as described in this RDIP, will also provide sediment tracking controls. Storm drains in the vicinity of the access routes will be equipped with drainage inlet protection.

Dust control practices will be implemented as described in Section 3.3.1.5. Stockpile management will also include dust control measures consistent with this RDIP and will require daily covering of stockpiles with plastic sheeting.

Non-stormwater BMPs and stockpile management will be implemented in accordance with the SWPPP to address materials and equipment storage and handling within the limits of work.

3.3.2.8.2 Post-Construction Best Management Practices

Following placement of fill material and grading activities, the Contractor will winterize the Site by installing the following erosion control measures:

- Weed-free erosion control blankets, hydroseed, hydromulch, and/or erosion control mulch on exposed soil slopes.
- Weed-free straw waddles along slope contours.

During final site stabilization, the Contractor will vegetate and/or reforest the slopes in accordance with the drawings and specifications. The CQA personnel will monitor the planting operation. The Trust's Forestry Manager, landscape architects, and natural resource staff will direct planting as appropriate.

3.3.3 Post-Construction Activities

Post-construction activities include the tasks required to finalize the remedial action, restore the Site to stable conditions, and prepare the Site for long-term operation and monitoring of the remedy and restoration activities following construction. These activities include: demobilization of the contractor's construction equipment, facilities, and site controls; restoration of vegetation and installation of post-construction best management practices; and implementation of the soil cap OMMP.

3.3.3.1 Winterization

Winterization measures will be implemented to manage storm water and control erosion during the rainy season. Site winterization will occur following grading, consolidation and capping activities and prior to re-landscaping. BMPs such as placing crushed rock under gutter downspouts to promote energy dissipation and the use of straw waddle at the toe of a slope to control erosion will be implemented as directed in the SWPPP (Appendix C). Following significant winter storm events, the soil cap will be inspected for damage.

3.3.3.2 Demobilization

The Contractor(s) will demobilize from the Site in the following sequence of operations:

- Clean project area and adjacent areas, if impacted, of debris and materials used and generated during the remedial action.

- Install winterization stormwater management and erosion control measures, as identified in the SWPPP (Appendix C).
- Remove temporary gates, fences, barricades and signage.
- Remove temporary facilities, including trailers, decontamination pads, parking areas, etc.
- Repair roadways or objects damaged by remediation activities.
- Repair any utilities damage during construction activities.

Prior to the Contractor's demobilization activities, the Trust will perform a final walk through of the Site with the DTSC and the Contractor. A punch list of remaining activities will be prepared for the Contractor to implement during the demobilization phase of the project.

3.3.3.3 Site Stabilization

After remedial construction is completed at the Site, soil on disturbed and backfilled areas will be stabilized in accordance with the final site design (Appendix A). Measures to stabilize the soil will include using binders, straw, biodegradable mats, and other methods as necessary, taking into account the nature of the soil and slope. Site restoration will involve revegetation of new soil slopes consistent with the VMP. Stormwater BMPs detailed in the SWPPP (Appendix C) may be integrated with the site restoration to address erosion control during the plant establishment period.

3.3.3.4 Vegetation Plan and Erosion Control

The Contractor will install erosion and sediment migration control measures in accordance with the SWPPP (Appendix C). The Trust will monitor post-construction erosion on exposed soil surfaces and graded slopes. Installation of BMPs may include:

- Native mulch;
- Straw ground cover;
- Erosion control blankets;
- Straw waddles;
- All-natural and biodegradable soil protection products (e.g., Posi-Cube); and
- Re-vegetation in accordance with the planting plans.

Sterile, weed-free rice straw products will be used where straw ground cover, erosion control blankets, and/or straw waddles are proposed.

An irrigation system will be installed at the Site and will consist of drip lines for trees and large shrubs, temporary stick up sprinkler heads for landscape plants, and quick couplers. Once landscape

plants are established, the stick up sprinkler heads would be cut down. The quick couplers will allow for future spot watering as part of implementing the Cap OMMP.

Site restoration activities, including re-vegetation in accordance with the VMP, will be implemented following completion of remedial actions. An irrigation system will be installed, and erosion control measures implemented. Soil will be amended during cap placement or prior to planting, as needed to support vegetation. Vegetation planted at the Site would include both native and non-native landscape plants. The planting plans are presented in Appendix A.

3.3.3.4.1 Vegetation Phase Monitoring

The Trust or its subcontractor will conduct inspections of plantings within the landscaped areas of the Site. Monitoring will vary from once to twice per month to assess the overall effectiveness of the Site erosion control measures and health of the plantings during the first wet season. As the plant establishment improves through the summer and based on observed field conditions, monitoring frequency will decline to quarterly during the summer months. Field observations may require removal, modification, or maintenance of the erosion control features installed to maintain graded slopes during the plant establishment phase. The Trust will maintain a record of the inspections and any corrective actions implemented during this phase of site restoration monitoring.

Following the substantial establishment of vegetation, it is expected that site erosion control measures will not be maintained, as the restored vegetation will serve to minimize erosion on the slopes. Site inspections will be performed periodically, with more frequent inspections during the winter/wet season than during the summer/dry season. Formal inspections will cease once the Site has achieved the desired conditions. Monitoring activities for the two years following remedial construction are discussed in Section 3.2.6. After two years, only long-term monitoring as required by the Site OMMP will continue (Section 4.0).

4.0 LONG-TERM MONITORING PROGRAM

Long-term monitoring and maintenance of the cover system would be performed in accordance with the Cap OMMP to ensure ongoing compliance with RAOs. Annual SWPPP inspections will be conducted in perpetuity. To verify that remedial measures implemented at the Site continue to meet all RAOs, DTSC will review remedial performance every five years. The Five-Year Review will address remedial performance at the Site. The major elements to be evaluated and technically assessed during the Five-Year Review include:

- Cap integrity;

- Storm water and erosion control;
- Tree and plant health; and
- Irrigation system performance.

The first five-year review will be completed in 2021.

5.0 LAND USE CONTROLS

LUCs are ICs that provide a legal framework governing future land use, preserve the integrity of the cover, provide soil management requirements, restrict use of cap areas for the growing of crops, and health and safety protocols for operations and maintenance work that may penetrate the Cap (including both hardscape or soil cover areas).

The Trust has prepared a Land Use Controls Master Reference Report (LUCMRR; EKI, 2006) to serve as the implementation and enforcement plan to ensure that the LUCs in place in Area B of the Presidio are maintained to protect public health and the environment.

Whenever the Trust transfers real property that is subject to LUCs and resource use restrictions to another federal agency, the transfer documents shall require that the federal transferee include the LUCs, and applicable resource use restrictions in its resource use plan or equivalent resource use mechanism. The Trust shall advise the recipient federal agency of all obligations contained in the decision documents, including the obligation that a State Land Use Covenant will be executed and recorded pursuant to 22 CCR Section 67391.1 in the event the federal agency transfers the property to a non-federal agency.

If at any point, the Trust is given authority to transfer real property subject to resource use restrictions and LUCs to a non-federal entity, it will provide information to that entity in the draft deed and transfer documents regarding necessary resource use restrictions and LUCs, including the obligation that a State Land Use Covenant will be executed and recorded pursuant to 22 CCR Section 67391.1. The signed deed will include LUCs and resource use restrictions equivalent to those contained in the State Land Use Covenant and applicable decision documents.

The Trust will provide notice to DTSC and the Regional Water Quality Control Board (RWQCB) at least six (6) months prior to any transfer or sale of any site within the Presidio so that DTSC and the RWQCB can be involved in discussions to ensure that appropriate provisions are included in the transfer terms or conveyance documents to maintain effective LUCs. If it is not possible for the facility to notify DTSC and the RWQCB at least six months prior to any transfer or sale, then

the facility will notify DTSC and RWQCB as soon as possible but no later than 60 days prior to the transfer or sale of any property subject to LUCs. In addition to the land transfer notice and discussion provisions above, the Trust further agrees to provide DTSC and the RWQCB with similar notice, within the same time frames, as to federal-to-federal transfer of property. The Trust shall provide a copy of the executed deed or transfer documents to DTSC and the RWQCB.

The LUCs will also restrict groundwater use in the immediate area only if COC concentrations in groundwater are above regulatory drinking water levels, restrict uncontrolled irrigation on the surface and restrict digging through the constructed cap that is inconsistent with standard operations and maintenance. Protocols for cover maintenance and intrusive work within and below the cover will be outlined in a site-specific OMMP, which will be proposed to DTSC for DTSC's approval. A LUCMRR addendum will be prepared for the site and submitted to DTSC for approval. Following DTSC approval, the LUCMRR addendum will be incorporated into the Trust LUCMRR (EKI, 2006).

6.0 PROJECT DOCUMENTATION, REPORTING, AND SCHEDULE

The following sections identify the means and methods for documentation, reporting, and scheduling the Lendrum Court remedial action.

6.1 PROJECT DOCUMENTATION

Project documentation will be recorded, maintained, and disseminated in accordance with the CQA Plan, which is presented as Appendix F. The project-designated CQA Manager will store, maintain, and distribute project documents.

6.2 CONSTRUCTION COMPLETION REPORT

The CCR will summarize and present data collected during the remedial actions, including:

- Detailed summary of the remedial action completed.
- Tabulated air and dust monitoring field forms and analytical data.
- Tabulated confirmation soil sample analytical data.
- A visitor contact log maintained by the Contractor.
- As-built site drawings.
- Copies of any laboratory analytical reports and chain-of-custody records.
- Summary tables of any waste manifests and supporting waste disposal information.
- Photographic documentation of the field work.

- The CQA report will include support documents as appendices to demonstrate compliance with the CQA plan.

A draft of the CCR will be provided to the Trust and DTSC for review and comment, prior to final submittal of the CCR. The final CCR will be signed and stamped by a California Registered Professional Engineer (PE).

6.3 PRESIDIO-WIDE CLEANUP LEVEL OBJECTIVES

The soil cleanup levels for Lendrum Court are based on the criteria established in the Cleanup Level Document (EKI, 2002). The Cleanup Level Document presents cleanup levels for soil, sediment, groundwater, and surface water that are protective of human health and ecological habitat at the Presidio. The cleanup levels were developed under DTSC guidance and are anticipated to be applied to new decision documents for the Presidio. These cleanup levels are presented in Table 2.

Confirmation samples collected during excavation will be compared against Presidio-wide cleanup levels to ensure that remediation goals are met and the soil with COCs in excess of remediation standards is removed from the areas not being capped.

6.4 SCHEDULE

The remediation contractor is scheduled to mobilize to the Site in May 2016, with the remedial action work expected to require approximately six months and be complete by November 2016. Revegetation and restoration work may be completed concurrently with remediation and will likely extend up to 3 months after remedial construction is complete.

Project updates will be provided to DTSC on a weekly basis. The project schedule, including contractor mobilization and field work, is included as Appendix H of this RDIP. The CCR will be submitted to DTSC within four months of completion of all construction-related activities, including site stabilization, landscape, and erosion control activities.

7.0 REFERENCES

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TRC, 2015a. *Community Relations Plan for Lendrum Supplement to the Community Relations Plan for the Presidio of San Francisco, California*. May 19.

TRC, 2015b. *Removal Action Work Plan, Lendrum Court, Presidio of San Francisco, California.* July.

TRC, 2015c. *Final Phase 1 Remediation Design and Implementation Plan, Lendrum Court, Presidio of San Francisco, California*. July.

US Army, 2013. *Archive Search Report, Presidio of San Francisco, California*.

TABLES

TABLE 1
DESIGN ELEMENTS AND PROPOSED DESIGN CRITERIA FOR REMEDIAL CONSTRUCTION
Lendrum Court
Presidio of San Francisco, California

Design Elements	Design Criteria and Assumptions

Limits of Work	• The limits of work are shown on Revised RDIP Figures 1 and 2. This area encompasses:
	  • The area of Army-era incinerator waste debris.
	  • The immediately adjacent landscape zones, contiguous to waste debris areas but not adjacent to landscape improvement projects implemented independently by the Presidio Trust Planning department (Trust Planning) along Armistead Road.
	  • The area containing aerial deposited lead (ADL) immediately adjacent to Highway 101, identified as cells J1 through J4 in the Remedial Investigation (RI) Report.
	  ▪ This area will be remediated independently from the Army-era incinerator waste debris.
	  ▪ Remediation will be coordinated with Caltrans and DTSC, and interim measures will be implemented as necessary.

Limits of the Constructed Cap	• The extent of the constructed cap will be limited to the areas where debris has been identified or soil samples contained COCs above screening levels in the Remedial Investigation (RI), as the Site's grades allow. This area is shown on Figures 4 and 5 of the Revised RDIP.
	• Isolated debris and areas where soil samples exceed the upper confidence limit (UCL) for lead, but are not collocated with Army-era debris, will be addressed by spot excavations and consolidation of waste/soil into the area of the constructed cap.
	  • The areas for clean closure include the area on the west side of Building 1258, the area northwest of Building 1257, the area north of Building 1279, the area northwest of Building 1278, the areas east and south of Building 1259, the areas south of Lendrum Court, and the bedrock outcrop located at the intersection of Lendrum Court and Armistead Road.
	• Approximate limits of the constructed cap include:
	  • Approximately 50 to 100 feet north of Building 1279 and east of Buildings 1259, 1278, and 1279;
	  • Hardscape edges of Lendrum Court;
	  • AC path realignment at the northwestern edge of the Site;
	  • The southernmost footpath to access of Building 1280; and
	  • The front (west side) of Buildings 1257 and 1258. Remedial investigation results suggest that the landscape areas from the front (west side) of Buildings 1257 and 1258 to Armistead Road will not require a cap, but a cap would be required on the other three sides (i.e., north, south and east sides) of these two buildings.
	• Cover will not be placed in areas where bedrock outcrops are visible or are less than 6 inches below ground surface. The estimated area where serpentinite bedrock is less than 6 inches below ground surface is shown on Revised RDIP Figures 4 and 5.

TABLE 1
DESIGN ELEMENTS AND PROPOSED DESIGN CRITERIA FOR REMEDIAL CONSTRUCTION
Lendrum Court
Presidio of San Francisco, California

Design Elements	Design Criteria and Assumptions

Grading Approach and Plans
• Cover slope stability and grades
• Cover thickness in residential/landscape area
• Import source material
• Cultural resources
• Plans for re-vegetation of site and retention of existing vegetation
	• Cap thicknesses will vary based on protection of tree roots, human receptors, and existing and proposed grades.
	• Cover Slope Stability
	  • With the exception of bedrock outcroppings, preference for slopes no steeper than 1.5H:1V (horizontal:vertical) and a maximum inclination of 2.5H:1V.
	  • Soil compaction ranges as specified in the Geotechnical Evaluation, which is included as Appendix B of the Revised RDIP.
	  • Protective soil cap construction to include:
	  • Installation of protective gopher wire across area designated for soil capping. The gopher wire will be covered by a minimum of 1.5 feet of cap material below final grades.
	  • Placement and testing of compacted borrow soil over area designated for capping. Soil to be placed using maximum 8-inch lifts and compacted to specified relative density of 85 to 90%.
	  • The tree located within the island of Lendrum Court is intended to be retained during remedial construction. Within the island area, cap construction will consist of removing existing surficial plant litter, placement of gopher wire, and placement of mulch on top of the gopher wire.
	  • Several trees and shrubs within the historic forest area are intended to be preserved during remedial construction. These trees are shown on Figure 4. Cap construction within the modified TPZ will consist of excavating 6 to 8 inches utilizing hand tools or small track mounted equipment and placing 1.5 feet of clean imported soil underlain by gopher wire.
	  • Cultural resources at the site include historical training trenches. Grades were designed so that the topographic resemblance of the historic trenches are maintained where possible, while still adhering to the standard specifications for soil cap design at the site (i.e., placement of 1.5 feet of clean imported soil underlain by gopher wire).
	On the backside of Buildings 1259, 1278, and 1279, aggregate base (AB) pads will serve as the protective cap. The cap in these areas will consist of 6-inches of compacted AB placed on top of 6-inches of clean imported soil and underlain with gopher wire and geotextile fabric. The AB pads will be bordered by a one-foot wide, 6-inch deep layer of ¾-inch gravel to minimize the potential for erosion caused by downspouts discharging onto the AB pads.

Grading Approach and Plans (continued)
• Cover slope stability and grades
• Cover thickness in residential/landscape area
• Import source material
• Plans for re-vegetation of site and retention of existing vegetation
	• Import Source
	  • The soil borrow for the cap construction is native soil material from Lawrence Berkeley National Labs, which is classified as gravelly loam.
	  • Import soil may be amended during placement or prior to planting as needed to support new vegetation.
	  • The import soil will be mixed with specified amounts of sand, gypsum, and green waste, according to the Trust's horticultural criteria for landscape soils.
	• Final Planting Plans
	  • With the exception of the trees listed above, trees within the remedial construction area will not be retained.
	  • With the exception of the toyon shrubs listed above, existing shrubs in landscaped area will be removed as needed to construct a cap.
	  • Trust Planning will provide final plant palette for landscaped area.
	  • At proposed new tree locations, a 2-ft by 2-ft by 3-ft deep area will be excavated and backfilled with clean soil. No gopher wire will be placed within these cleared areas.
	  • Areas outside the cap will be designed by Trust Planning.
	
	Guidance Documents/References:
	• *EKI Remedial Investigation (May, 2015)*
	• *Revised RDIP Figures and Design Drawings (Appendix A)*
	• *North Fort Scott Site Improvements – Phase I (RHAA, 12/11/2014)*

TABLE 1
DESIGN ELEMENTS AND PROPOSED DESIGN CRITERIA FOR REMEDIAL CONSTRUCTION
Lendrum Court
Presidio of San Francisco, California

Design Elements	Design Criteria and Assumptions

Conformance with RHAA Conceptual Landscape Plan (8/6/2014)	• To the extent practical, retain grading, surfacing, and planting elements of the conceptual landscape plan identified in the RHAA conceptual design drawings dated August 6, 2014 (notes added 11/5/2014).
	  • Footpath across site is to be constructed of decomposed granite (DG), (2) be 5 feet wide, and (3) have an approximately 2% cross slope toward Lendrum Court for drainage purposes.
	  • Asphalt Concrete (AC) Path: Realignment of AC path to the west to serve as western boundary of the debris fill remedial cover.
	  • Trails and paths do not need to be ADA compliant, but overly steep grades should be avoided where possible.
	  • Several sets of stairs are shown on the conceptual plan. The following stairs will be designed and constructed as part of remedial construction:
	  ▪ Stairs at the southern end of the DG path are assumed to be DG box steps; and
	  ▪ Demolition and replacement of the existing concrete stairs near the northwestern boundary of the Site that connect the AC Path and Lendrum Court.
	Trust Planning to provide additional direction if there are further requirements for these steps.
	• Steps adjacent to concrete patios, patio screens, and other fencing associated with patios to be completed by others.
	• Design for concrete patios will be identical to those presented in other North Fort Scott Area designs, Park Planning to provide electronic versions of these files to optimize design efficiency.
	• Final grading plans for the site will be evaluated to determine if the proposed graded bench for raised planter will fit as shown in the conceptual design. If space is available, raised planters will be installed by Trust Planning as a community garden.
	• Trees and shrubs listed above in the Grading Approach and Plans section will be retained during remedial construction.
	• Other than the realignment of the AC path and existing patios, all existing hardscape to remain.

Irrigation	• Trust Planning design documents for the other North Fort Scott community landscape shall be used as a guide for the Lendrum court irrigation design.
	  • Trees and large shrubs will be irrigated with drip lines
	  • Other areas will be irrigated with stick up sprinkler heads that are tied off and cut down once landscape plants are established
	• The depth of the irrigations lines will be as shallow as is reasonable for their respective size and protection.
	• Irrigation lines will be placed within the cap material as practicable.
	• Irrigation lines not within the cap will be placed in a clean corridor as practicable.
	• Quick disconnect couplers will be installed to allow future spot watering as part of cap OM&M.

Final SWPPP and Erosion Control Measures	• Site will be covered with erosion control blankets and straw wattles in substantive conformance with RWQCB General Construction Permit requirements. • SWPPP inspection and maintenance will be completed by the Presidio Trust Remediation department (Trust Remediation) or its representative(s) for two years following site remediation. OM&M inspections by Trust Remediation or its representative(s) will be conducted as outlined below under Operations & Maintenance.

Public Safety
• Laydown and staging areas
• Construction timing and phasing
• Community outreach
• Dust mitigation
	• A Community Relations Plan for Lendrum Court Improvements, a supplement to the Community Relations Plan for the Presidio of San Francisco, was approved by DTSC on May 19, 2015. The purpose of this plan is to keep the community informed of ongoing and planned activities and receive feedback.
	  • Adjacent neighbors within 100 feet of the work area will be included as affected parties.
	  • Tenant relocation will not be required to implement the work.
	  • Public meetings will be held to present the results of the RI, discuss the RAW, and prior to initiation of field activities.
	• Approximate staging and laydown areas were identified in the RAW, which was distributed for public comment. The area near the intersection of Lincoln Boulevard and Lendrum Court will be used for contractor staging, as shown on Figure 7 of the RDIP. Backfill soils from Lawrence Berkeley National Laboratory will be stocked in the area south of Building 1347.
	• Construction work times will be established in coordination with stakeholders, and the residential nature of the Site will be taken into consideration.
	• A site-specific Storm Water Pollution Protection Plan (SWPPP) that includes consideration of erosion controls and a site-specific Air and Dust Monitoring and Mitigation Plan (ADMMP) have been prepared to maintain a safe environment for workers and residents during remedial construction. These plans are included as appendices to the RDIP (Appendix C and E, respectively).

TABLE 1
DESIGN ELEMENTS AND PROPOSED DESIGN CRITERIA FOR REMEDIAL CONSTRUCTION
Lendrum Court
Presidio of San Francisco, California

Design Elements	Design Criteria and Assumptions

Utilities
• Protection of existing utilities
• Construction of new utilities
	• All existing utilities at the site will be protected in place during construction.
	  • Overhead electrical and communication lines will need protection during tree work or movement of large construction equipment occurring in the vicinity of these overhead utilities.
	  • Underground water and gas lines will need to be confirmed prior to excavation in the vicinity, and temporary outages may be required for safety purposes.
	  • Underground storm drain and sewer lines will need to be confirmed prior to excavation in the vicinity. Drain inlets will be protected during all construction activities as specified in the SWPPP.
	  • If grading increases the elevations at utility access boxes and manholes, access boxes and/or manholes will be elevated to match the new grades.
	• Construction of the irrigation system to be coordinated with Trust maintenance crews.
	• Fire hydrants in the work area will be made available for use during construction for dust control, and a water meter will be provided by Trust Utility Department.

TABLE 2
SOIL CLEANUP LEVELS FOR CHEMICALS OF CONCERN
Lendrum Court
Presidio of San Francisco, California

Chemicals of Concern	Chemical of Concern for Landscaped/ Residential Area? [a]	Chemical of Concern for Historic Forest/Recreational Area? [b]	Applicable Cleanup Levels [c] Human Health Soil PRGs	Recreational	Ecological PRGs		Background Level		Regional Background / Ambient Levels [d]	Site-Specific Cleanup Levels	
			Residential		Buffer Zone	Special-Status	Serpentinite Lithology	Colma Formation		Landscaped / Residential Area[e]	Historic Forest / Recreational Area[f]
			(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)
Metals											
Arsenic	Yes	No	0.36	0.88	64	10	5.4	6.2	11	6.2	--
Barium	Yes	No	5,000	12,000	500	320	230	180	1,500	500	--
Copper	Yes	No	--	--	120	30	85	49	76	120	--
Lead	Yes	Yes	80	180	300	160	66	7.5	48	80	160
Zinc	Yes	No	22,000	52,000	50	4	160	79	150	160	--
Polycyclic Aromatic Hydrocarbons (PAHs)											
Benzo(a)pyrene	Yes	No	0.046	0.11	40	30	--	--	0.92 to 1.5	0.046	--
Benzo(a)pyrene equivalent	Yes	No	0.046	0.11	40	30	--	--	0.92 to 1.5	0.046	--
Dibenzo(a)anthracene	Yes	No	0.046	0.11	40	30	--	--	0.92 to 1.5	0.046	--
Dioxin and Furans (values are in pg/g)											
TCDD TEQ	Yes	Yes	3.5	8.2	--	--	--	--	7 to 20	3.5	8.2

Abbreviations:
-- = not available / applicable
mg/kg = milligrams per kilogram
pg/g = picograms per gram
TCDD TEQ = 2,3,7,8-tetrachlorodibenzo-p-dioxin toxic equivalency

Footnotes:

[a] Chemicals of Concern as listed in EKI's Table 6A provided in Appendix A.

[b] Chemicals of Concern as listed in EKI's Table 6B provided in Appendix A.

[c] Applicable cleanup levels from the following sources:
Table 7-2 of EKI's 2002 (with updates through 2013) *Development of Presidio-Wide Cleanup Levels for Soil, Sediment, Groundwater, and Surface Water* . Presidio of San Francisco
Lead Residential: Office of Environmental Health Hazard Assessment's (OEHHA) September 2009 *Revised California Human Health Screening Levels for Lead* .
Lead Recreational: March 18, 2015 Personal Communication between Eileen Fanelli, TRC, and Department of Toxic Substances Control.
TCDD TEQ Human Health Soil PRGs: MACTEC's 2007 *Technical Memorandum, Human Health Soil Preliminary Remediation Goals and Toxic Equivalency Values for Dioxins and Furans Presidio of San Francisco, California.*

[d] Regional background and ambient levels from the following sources:
Arsenic: D.J. Duverge's 2011 *Establishing Background Arsenic in Soil of the Urbanized San Francisco Bay Region,* Master of Science in Geosciences.
Metals: Upper Estimate Regional Background from Table 4-Comparison of Background Values to Other Background Estimates from Lawrence Berkeley National Laboratory (LBNL) 2009 *Analysis of Background Distributions of Metals in the Soil at Lawrence Berkeley National Laboratory*
PAHs: ENVIRON et. al. 2002 *Background Levels of Polycyclic Aromatic Hydrocarbons in Northern California Surface Soil* . D. Diamond, D. Baskin, D. Brown, L. Lund, J. Najita, and I Javandel, June 2002 Revised April 2009
TCDD TEQ: California Department of Food and Agriculture (CDFA) 2004 *Evaluation of Heavy Metals and Dioxin in Inorganic Commercial Fertilizers.*

[e] The cleanup levels for the landscaped/residential areas are the lower of the residential and ecological buffer zone. If the applicable residential human health or ecological buffer-zone cleanup level is less than the background level, the greater of the two background threshold levels was selected as the cleanup level.

[f] The cleanup levels for the Historic Forest/recreational area are the lower of the residential and ecological buffer zone. If the applicable recreational human health or ecological special-status cleanup level is less than the background level, the greater of the two background threshold levels was selected as the cleanup level.

TABLE 3
ESTIMATED MATERIAL QUANTITIES FOR REMEDIAL CONSTRUCTION
Lendrum Court
Presidio of San Francisco, California

Activity	Description	Unit	Approximate Quantity (a.)
Remedial Grading			
Alternate Access Route	Located behind Building 1259 per design drawings. Remove vegetation, install filter fabric and a 4-inch layer of gravel base to serve as access route.	SF	1700
Clearing & Grubbing (Vegetation Removal)	Remove all vegetative materials from areas to be graded or excavated. Transport and dispose of vegetative materials at an appropriate off-site facility, where vegetation shall be disposed of as green waste.	ACRE	1.75
Rough Grading	Grade the site to planned remedial elevations and prep surface for cap construction. Includes excavation, consolidation, compaction and grading of soils across the site. Project phasing shall be coordinated with this activity to reduce the amount of temporarily stockpiled material.	CY	3,040
Remedial Excavation	Excavate and stockpile for disposal the top 4 to 6 inches of material or any other material unsuitable for reuse or that can not be consolidated elsewhere onsite.	CY	1,415
Hotspot Removal	Excavate soil from hotspot area that is designated for clean closure (in front of building 1258).	CY	80
Asphalt Pavement Demolition/Curbing	Demolish, load, transport, and dispose of existing asphalt in areas where excavation or grading work will be required. Recycle where possible, else legally dispose of asphalt pavement at an off-site landfill.	SF	400
Patio and Sidewalk Demolition	Demolish, load, transport, and dispose of concrete patios and sidewalks in areas where excavation will be required. Recycle where possible, else legally dispose of materials at an off-site landfill.	SF	580
Off-Site Disposal	Load off contaminated materials to trucks for disposal	TON	3,825
Soil Cap Placement			
Load and Haul Trust-Furnished Import Fill (b.)	Load and haul Trust-supplied excavated, dried, and screened soil to areas requiring import fill on-site from Barnard Avenue.	TON	6,435

TABLE 3
ESTIMATED MATERIAL QUANTITIES FOR REMEDIAL CONSTRUCTION
Lendrum Court
Presidio of San Francisco, California

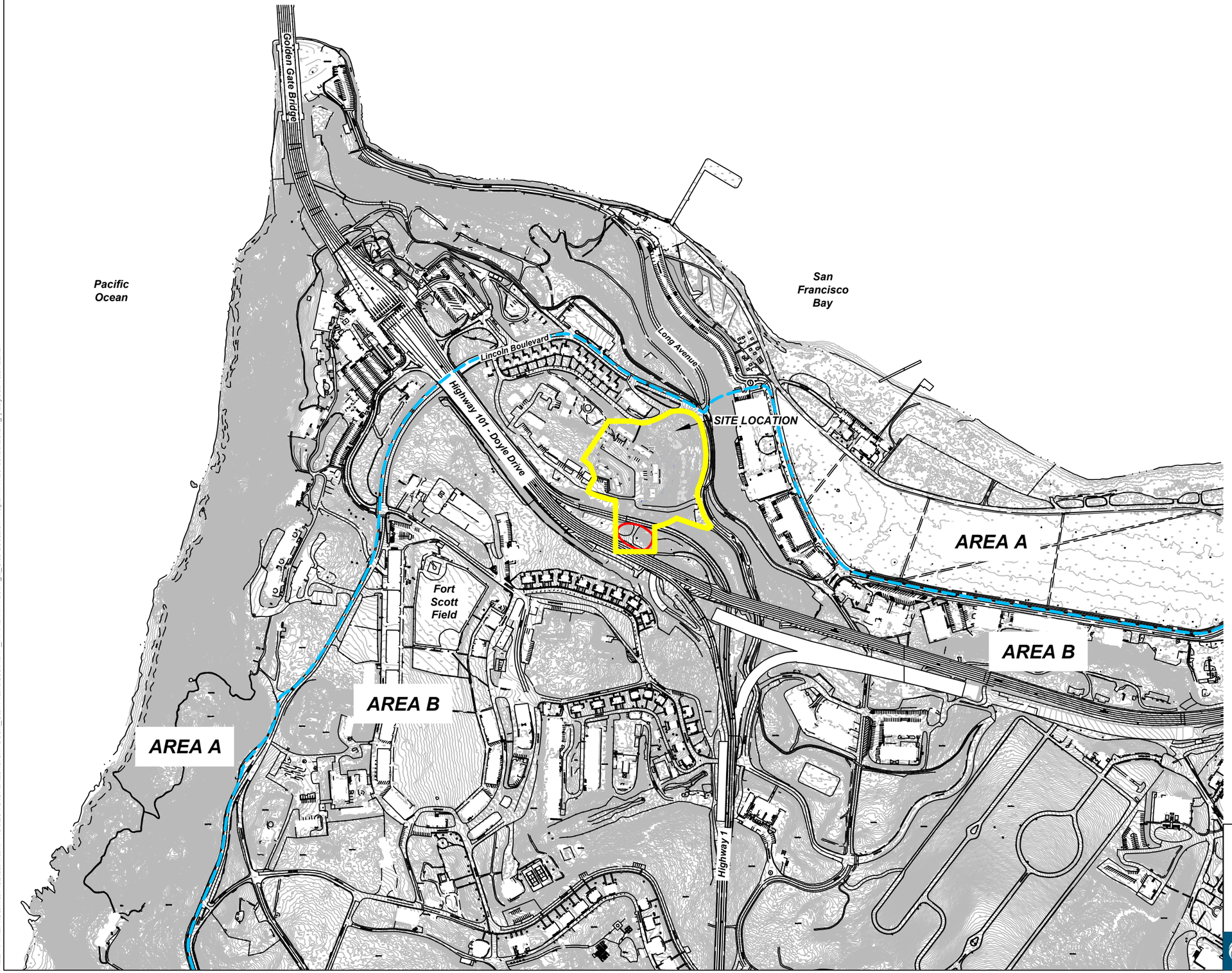
Activity	Description	Unit	Approximate Quantity (a.)
Gopher Wire	Sixteen-gauge gopher wire consisting of 0.5"x0.5" galvanized welded wire coated in PVC. Gopher wire to be used as the base of the constructed cap in all landscape areas.	SF	84,000
Finish Grading	Fine grade and finish areas to final planned grades.	ACRE	1.75
Hardscape Cap Placement			
Asphalt Foot Path	Install an asphalt foot path as shown on the design drawings (2.5 inch AC over 6 inch AB).	SF	600
Asphalt Road	Install an asphalt road as shown on the design drawings.	SF	103
Curbing	Install curbing as shown on the design drawings.	LF	25
New Patios	Install new concrete patios as shown on the design drawings.	SF	2,530
New Sidewalks	Supply and install new concrete sidewalks/paths as shown on the design drawings.	SF	300
Concrete Slabs	Install concrete slabs with AB subgrade behind Buildings 1279, 1278, and 1259 as shown on the design drawings.	SF	1,725
Concrete Drains	Install concrete drains adjacent to buildings in the Phase 1 area as shown on the Drawings.	LF	205
Gravel for Drain Discharge Areas	Import and placement of 3/4-inch gravel/drain rock for drain discharge areas in the Phase 1 area.	SF	640
Landscape Features			
DG Path	Install 6-inch DG material into path and stairs as shown on the design drawings.	SF	2,000
Irrigation System	Install an irrigation system per the design drawings and technical specifications, where construction activities and materials would include: trenching, materials, bedding, joints, fittings, timers, electricity, electric connects, backfilling, and compaction.	SF	56,000
Landscape Planting	Install landscape plants as shown on drawings.	ACRE	1.5
Historic Forest Planting	Install forest trees and plants as shown on drawings.	ACRE	0.25
Site Stabilization Materials			
Straw	across all exposed soil	SF	76,000
Erosion Control Blankets	across all exposed soil	SF	76,000

TABLE 3
ESTIMATED MATERIAL QUANTITIES FOR REMEDIAL CONSTRUCTION
Lendrum Court
Presidio of San Francisco, California

Activity	Description	Unit	Approximate Quantity (a.)
Site Stabilization Materials (continued)			
Fiber Rolls (Straw Wattle)	Located as directed in the SWPPP (9-inch diameter)	LF	3,500

Abbreviations:
AB = Asphalt Base
CY = Cubic Yards
DG = Decomposed Granite
LF = Linear Feet
SF = Square Feet
SWPPP = Stormwater Pollution Prevention Plan
TPZ = Tree Protection Zone

FIGURES



LEGEND

- Lendrum Court area
- Approximate former incinerator area
- Area A / B boundary

N

SCALE (FEET)

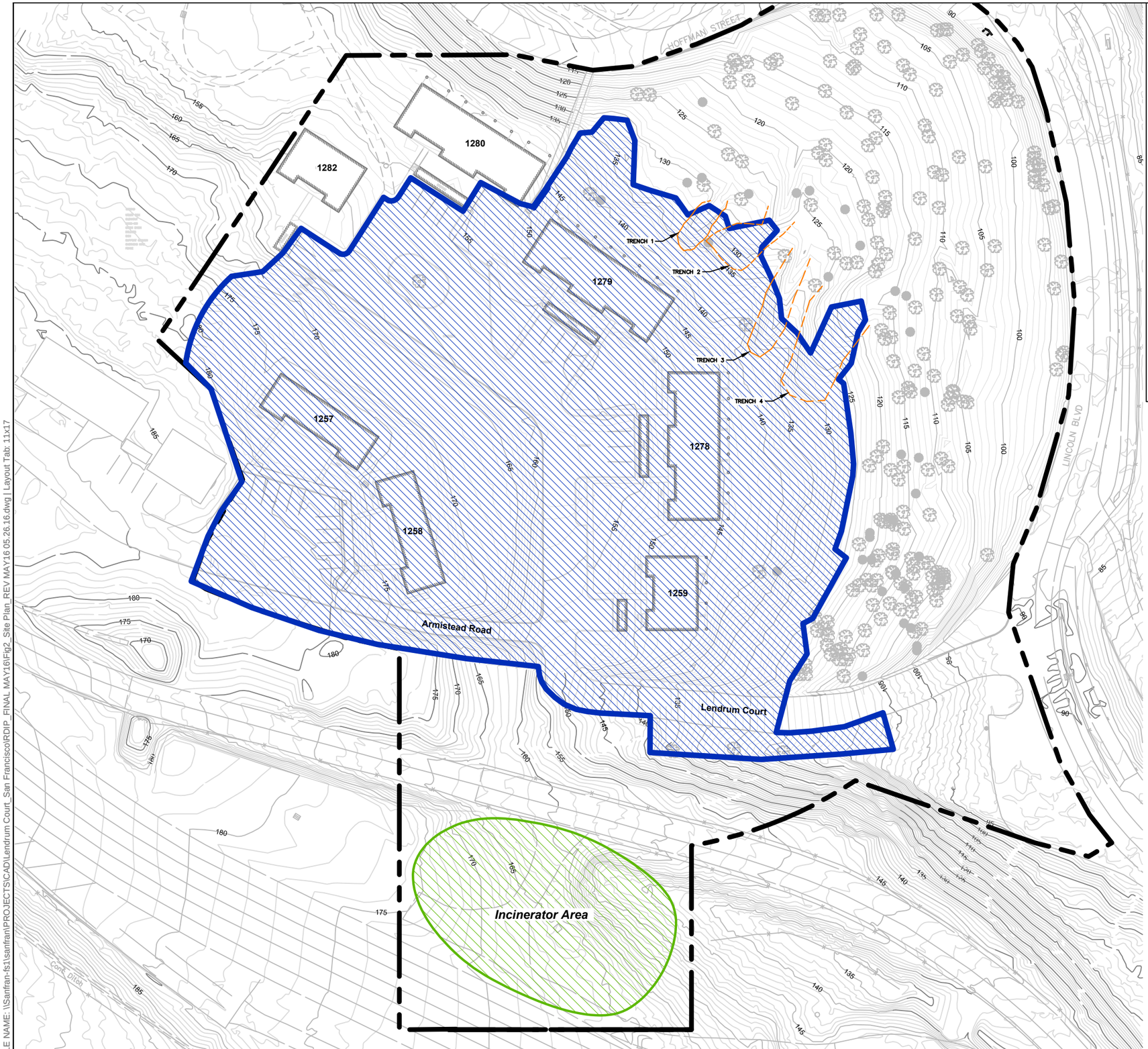
0 500 1,000

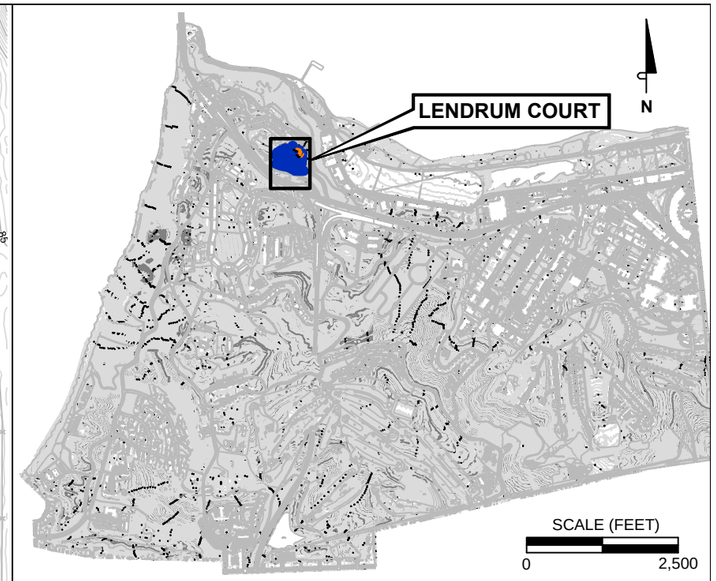
SITE LOCATION MAP
May 26, 2016

Lendrum Court and Incinerator Area
The Presidio Trust
San Francisco, California

TRC | 229649 | **FIGURE 1**

FILE NAME: \\Sanfran-fs1\sanfran\PROJECTS\CAD\Lendrum Court_San Francisco\RDIP_FINAL_MAY16\Fig1_Site Location Map1 MAY16 05.26.16.dwg | Layout Tab: 11x17





LEGEND

- Approximate site boundary
- Approximate location of historic World War I trench
- Approximate extent of remedial action area
- Protective in current configuration
- Existing contour elevation
- Site tree to be preserved during remedial construction
- Toyon (Heteromeles Arbutifolia) to be preserved during remedial construction

N

SCALE (FEET)

0 70 140

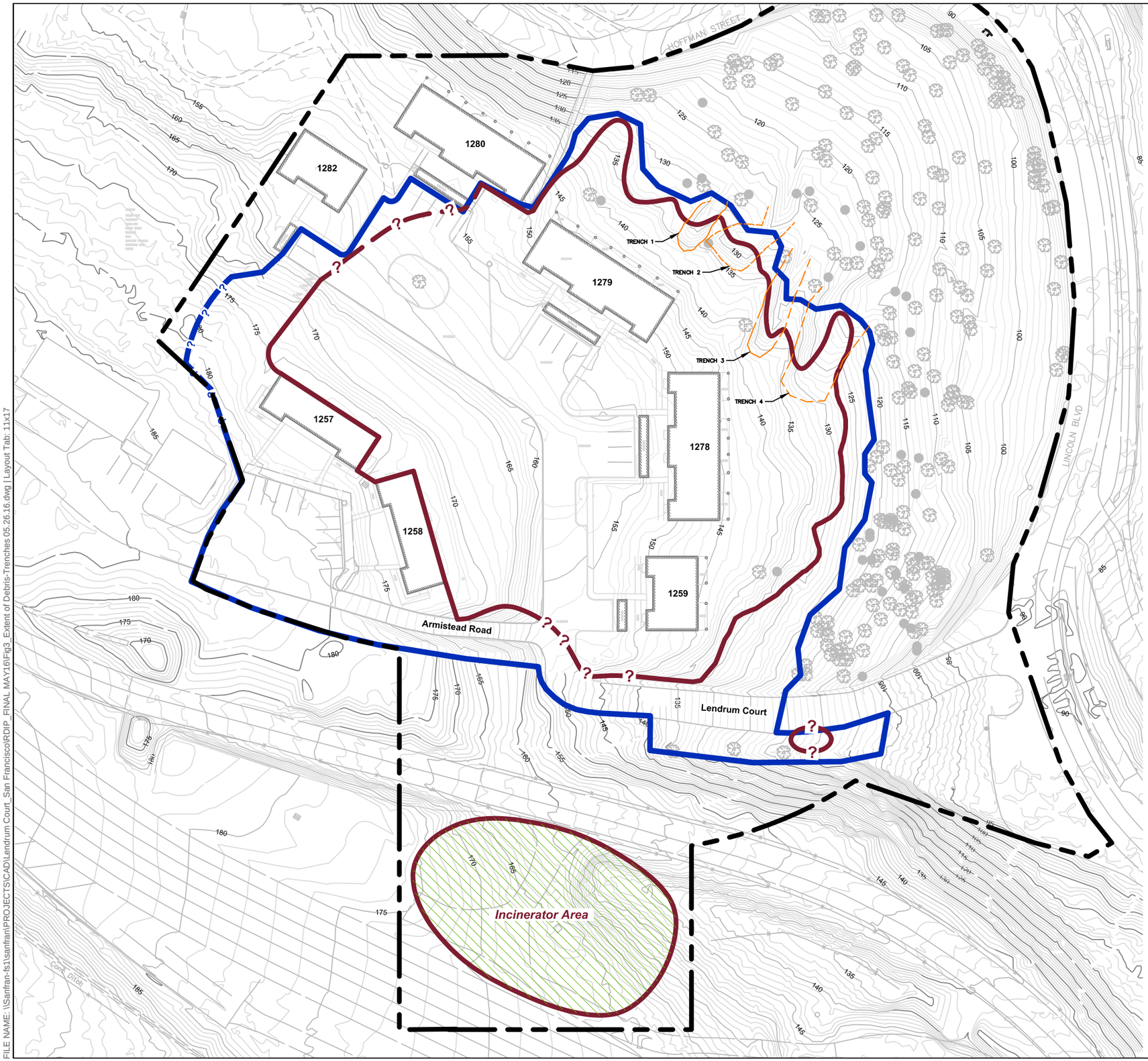
SOURCE: Base plan by Towill, October 29-November 4, 2015

SITE PLAN
May 26, 2016

Lendrum Court and Incinerator Area
The Presidio Trust
San Francisco, California

TRC 229649 **FIGURE 2**

FILE NAME: \\Sanfran-fs1\sanfran\PROJECTS\CAD\Lendrum Court_San Francisco\RDIP_FINAL_MAY16\Fig2_Site Plan_REV MAY16 05.26.16.dwg | Layout Tab: 11x17



LEGEND

- Approximate site boundary
- Approximate extent of debris, queried where uncertain
  NOTE: Extent of debris outline from EKI, Inc. (April 2015) Remedial Investigation Summary Report
- Approximate location of historic World War I trench
- Approximate extent of remedial action area
- Protective in current configuration
- Existing contour elevation
- Site tree to be preserved during remedial construction
- Toyon (Heteromeles Arbutifolia) to be preserved during remedial construction

N

SCALE (FEET)

0 70 140

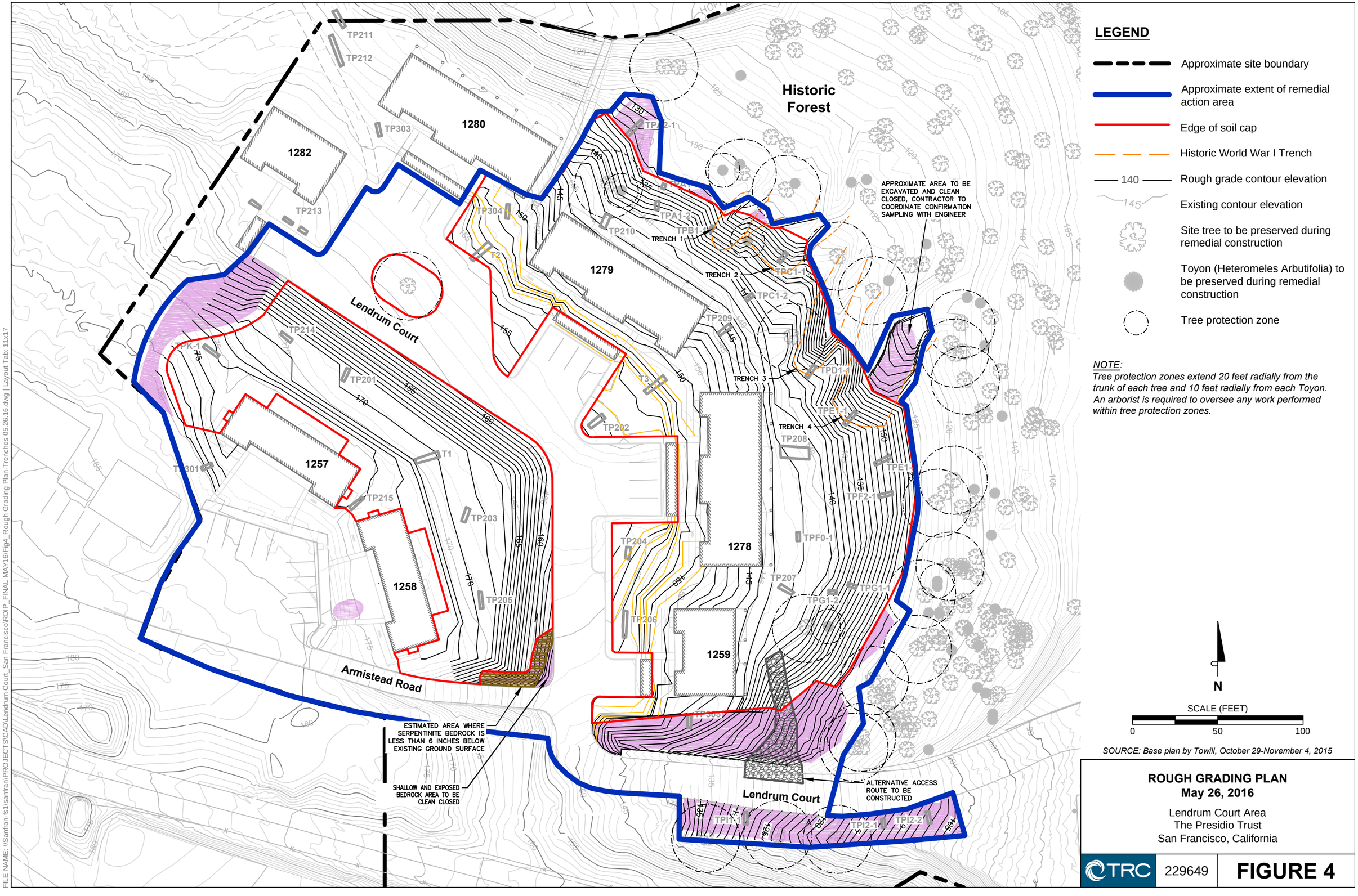
SOURCE: Base plan by Towill, October 29-November 4, 2015

EXTENT OF DEBRIS
May 26, 2016

Lendrum Court and Incinerator Area
The Presidio Trust
San Francisco, California

TRC 229649 **FIGURE 3**

FILE NAME: \\Sanfran-fs1\sanfran\PROJECTS\CAD\Lendrum Court_San Francisco\RDIP_FINAL_MAY16\Fig3_Extent of Debris-Trenches 05.26.16.dwg | Layout Tab: 11x17



LEGEND

- Approximate site boundary
- Approximate extent of remedial action area
- Edge of soil cap
- Historic World War I Trench
- 140 — Rough grade contour elevation
- 145 — Existing contour elevation
- Site tree to be preserved during remedial construction
- Toyon (Heteromeles Arbutifolia) to be preserved during remedial construction
- Tree protection zone

NOTE:
Tree protection zones extend 20 feet radially from the trunk of each tree and 10 feet radially from each Toyon. An arborist is required to oversee any work performed within tree protection zones.

N

SCALE (FEET)
0 50 100

SOURCE: Base plan by Towill, October 29-November 4, 2015

ROUGH GRADING PLAN
May 26, 2016

Lendrum Court Area
The Presidio Trust
San Francisco, California

TRC 229649 **FIGURE 4**

FILE NAME: \\Sanfran-fs1\sanfran\PROJECTS\CAD\Lendrum Court_San Francisco\RDIP_FINAL_MAY16\Fig4_Rough Grading Plan-Trenches 05.26.16.dwg | Layout Tab: 11x17

LEGEND

- Approximate site boundary
- Approximate remedial action area
- Historic World War I Trench
- 140 — Final grade contour elevation
- 145 — Existing contour elevation
- Approximate limits of cap
- Approximate areas of building that serve as cap
- Areas of asphalt, pavement and hardscape that serve as cap
- Approximate areas to be excavated and clean closed
- New concrete patios, sidewalks and stairs
- New decomposed granite path
- New asphalt path/roadway
- New aggregate base cap
- Site tree to be preserved during remedial construction
- Toyon (Heteromeles Arbutifolia) to be preserved during remedial construction
- Tree protection zone

NOTE:
Tree protection zones extend 20 feet radially from the trunk of each tree and 10 feet radially from each Toyon. An arborist is required to oversee any work performed within tree protection zones.

N

SCALE (FEET)

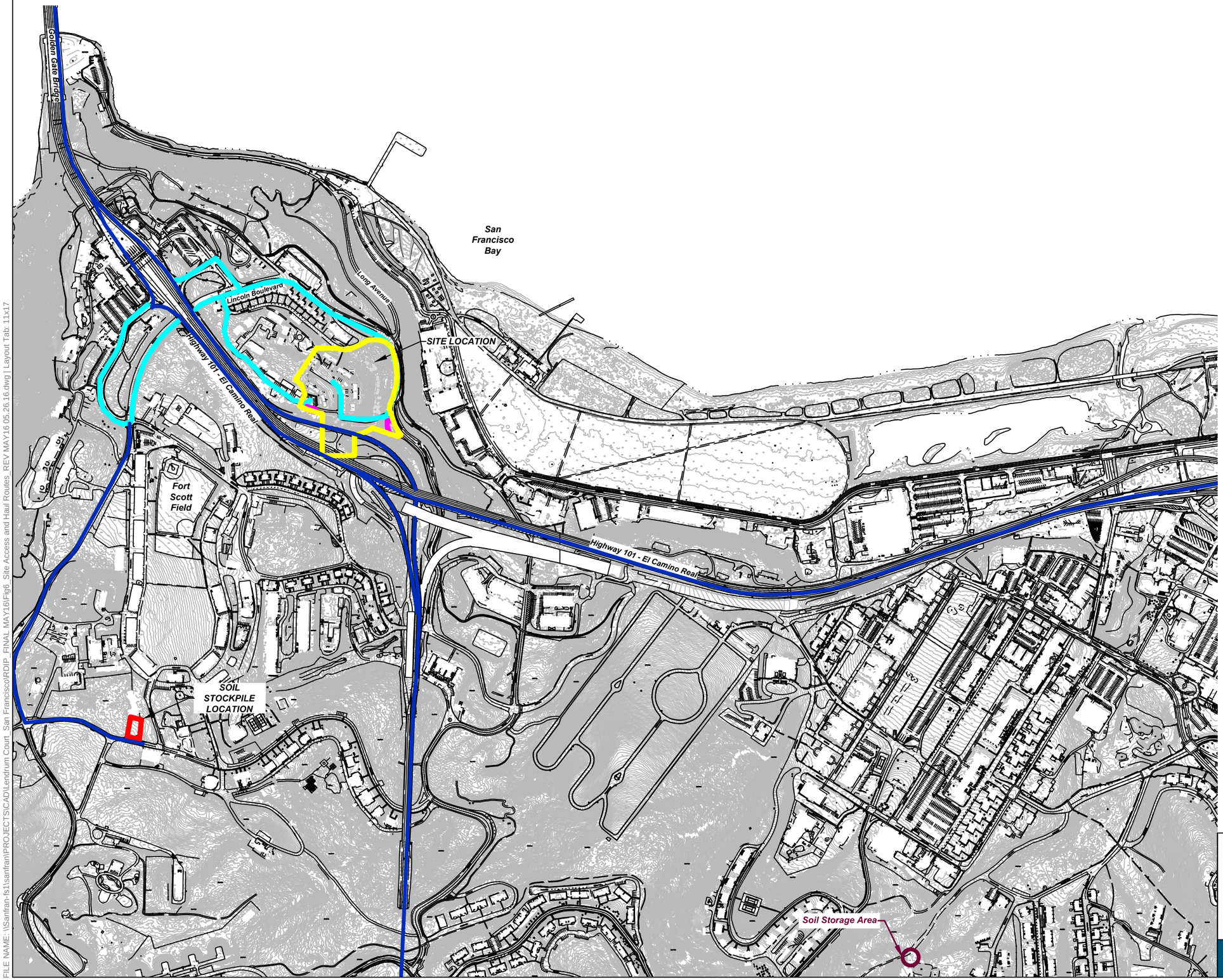
0 50 100

SOURCE: Base plan by Towill, October 29-November 4, 2015

FINAL GRADING PLAN
May 26, 2016
Lendrum Court Area
The Presidio Trust
San Francisco, California

TRC | 229649 | **FIGURE 5**

FILE NAME: \\Sanfran-fs1\sanfran\PROJECTS\CAD\Lendrum Court_San Francisco\RDIP_FINAL MAY16\Fig5_Final Grading Plan-Trenches 05.26.16.dwg | Layout Tab: 11x17



LEGEND

- Potential truck haul route for soil import and export
- Proposed staging/storage area
- Proposed site access routes

N

SCALE (FEET)

0 600 1,200

SITE ACCESS AND HAUL ROUTES
May 26, 2016

Lendrum Court and Incinerator Area
The Presidio Trust
San Francisco, California

TRC | 229649 | **FIGURE 6**

FILE NAME: \\Sanfran-fs1\sanfran\PROJECTS\CAD\Lendrum Court_San Francisco\RDIP_FINAL_MAY16\Fig6_Site Access and Haul Routes_REV MAY16 05.26.16.dwg | Layout Tab: 11x17

LEGEND

- Approximate site boundary
- 145 — Existing contour elevation
- Site tree to be preserved during remedial construction
- Toyon (Heteromeles Arbutifolia) to be preserved during remedial construction
- Construction fencing

NOTE: Construction fencing to be established around active work areas throughout the duration of the project and shall move as necessary to secure the site.

- PATH CLOSED DURING CONSTRUCTION — Custom pedestrian warning sign provided by contractor
- Traffic sign placement (shown facing left)
- CAUTION — SC15 (CA)
- TRUCKS ENTERING EXITING — C44 (CA)

NOTE: Traffic signs from California Manual on Uniform Traffic Control Devices - Temporary Traffic Control, 2012 Edition.

SOURCE: Base plan by Towill, October 29-November 4, 2015

TRAFFIC, SIGNAGE, LAYDOWN AND STAGING AREA PLAN
May 26, 2016

Lendrum Court and Incinerator Area
The Presidio Trust
San Francisco, California

TRC | 229649 | **FIGURE 7**

FILE NAME: \\Sanfran-fs1\sanfran\PROJECTS\CAD\Lendrum Court_San Francisco\RDIP_FINAL_MAY16\Fig7_Laydown and Staging Areas_REV MAY16 05.26.16.dwg | Layout Tab: 11x17

APPENDIX A
DESIGN DRAWINGS AND TECHNICAL PROVISIONS
LENDRUM COURT
PRESIDIO OF SAN FRANCISCO, CALIFORNIA

May 26, 2016

Prepared for

THE PRESIDIO TRUST
103 Montgomery Street, P.O. Box 29052
San Francisco, California 94129-0052

Prepared By

Warren Chamberlain, PG, CHG, PE
Principal Engineer

Justin Hanzel-Durbin
Senior Engineer/Project Manager

TRC
9685 Research Drive
Irvine, California 92618
(949) 727-9336

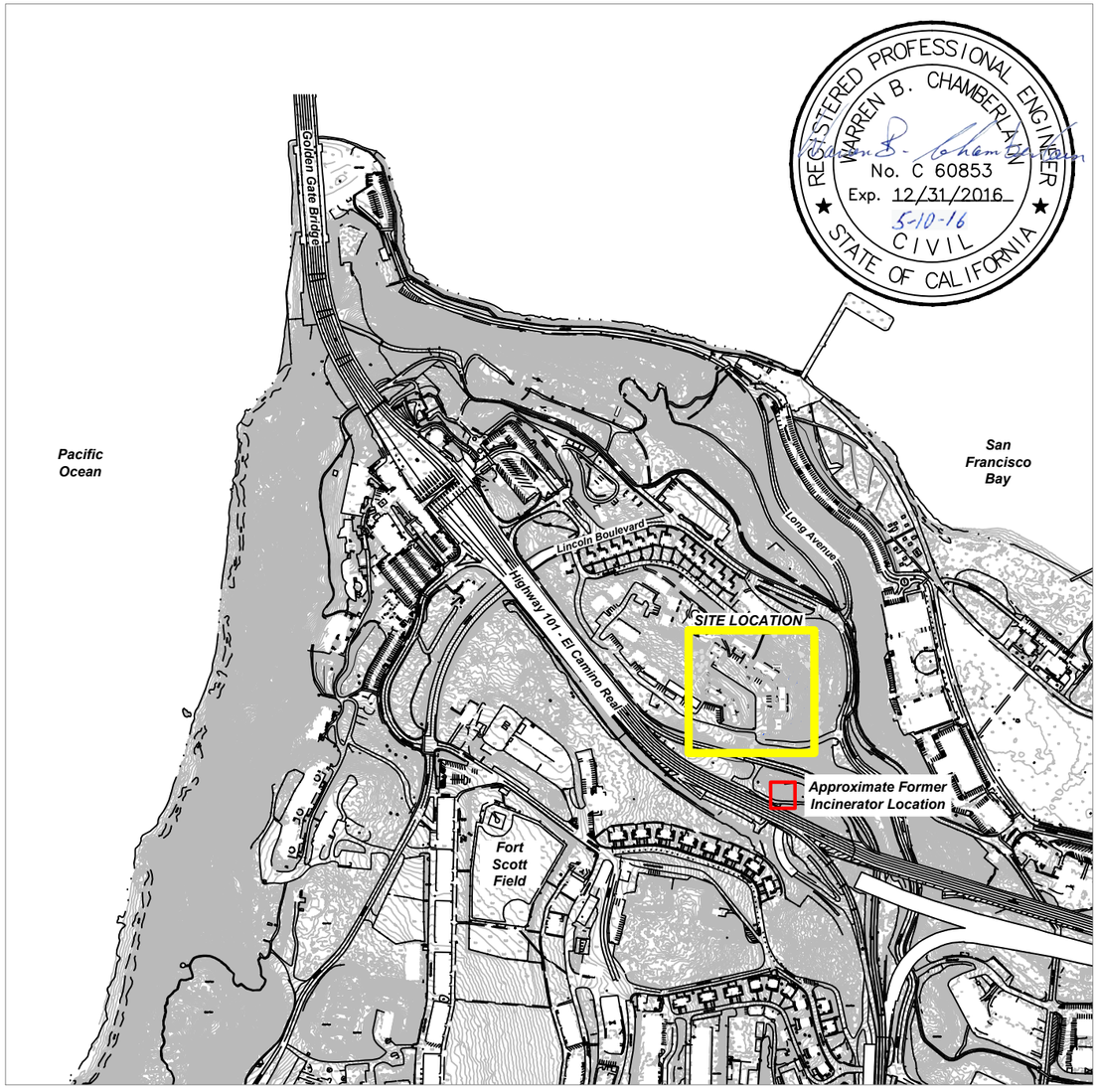
CONSTRUCTION DRAWINGS

LENDRUM COURT AREA
THE PRESIDO TRUST
SAN FRANCISCO, CALIFORNIA

OWNER	PRESIDIO TRUST
CONSULTANT	TRC SOLUTIONS, INC
CONTRACTOR	ENGINEERING/REMEDIATION RESOURCE GROUP, INC.

INDEX OF DRAWINGS

REGISTERED PROFESSIONAL ENGINEER
WARREN B. CHAMBERLAIN
No. C 60853
Exp. 12/31/2016
5-10-16
CIVIL
STATE OF CALIFORNIA



REV	DATE	DESCRIPTION	DESIGN BY	CHK'D BY
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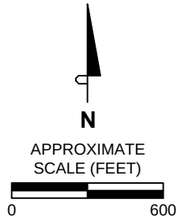
A	1/21/16	60% Design Drawing	J H-D	WBC



Lendrum Court Area
The Presidio Trust
San Francisco, California

DRAWING INDEX
SITE LOCATION MAP

TRC	229649	REV B	SHEET G-001

FILE NAME: \\Sanfran-fs1\sanfran\PROJECTS\CAD\Lendrum Court_San Francisco\Phase II\G-001_Title Sheet-PII 5.11.16.dwg | Layout Tab: G-001

GENERAL SCOPE OF WORK

- MOBILIZATION
- SITE PREPARATION, INCLUDING CLEARING AND GRUBBING, AND DEMOLITION, AS NEEDED
- CONSTRUCTION OF ALTERNATE SITE ACCESS
- EXCAVATION AND STOCKPILING OF UPPER 4-6 INCHES OF MATERIAL UNSUITABLE FOR REUSE
- REMEDIAL GRADING AND WASTE CONSOLIDATION
- HAULING OF EXCAVATED MATERIAL IDENTIFIED AS UNSUITABLE FOR REUSE TO APPROVED LANDFILLS
- CONSTRUCTION OF SITE CAP
  - PLACEMENT OF A MESH AND/OR GEOTEXTILE BARRIER TO CONTROL BURROWING ANIMALS
  - PLACEMENT OF 1.5 FEET OF CLEAN SOIL FILL (CAP)
  - CONSTRUCTION OF HARDSCAPE ELEMENTS
  - CONSTRUCTION OF IRRIGATION SYSTEM
- INSTALLATION OF ENGINEERING CONTROLS IN ACCORDANCE WITH BEST MANAGEMENT PRACTICES (BMPS) USED AT THE PRESIDIO, INCLUDING TAPING OF NEARBY WINDOWS FACING THE WORK ZONES, COVERING AND/OR ESTABLISHING MISTING SYSTEMS AROUND THE WORK AREA, SURFACE WATER RUNOFF AND EROSION CONTROLS, AND MEANS OF KEEPING SOIL OFF PAVED ROADS
- INSTALLATION OF TEMPORARY EXCLUSION FENCING AROUND THE ACTIVE WORK AREAS
- ESTABLISHMENT OF TRAFFIC CONTROL SIGNAGE AND DEVICES, AS NEEDED, AT POINTS OF ENTRY TO PUBLIC ROADWAYS
- DUST MONITORING (TO BE PERFORMED BY OTHERS)
- STOCKPILE PROFILE SAMPLING OF EXCAVATED MATERIAL FOR DISPOSAL
- PLANTING IN ACCORDANCE WITH THE PRESIDIO TRUST'S MANAGEMENT PLAN (PTMP) AND ASSOCIATED LANDSCAPE DESIGN DOCUMENTS

GENERAL NOTES

1. THE CONTRACTOR SHALL BE RESPONSIBLE FOR REPAIRING DAMAGE TO EXISTING ROADWAYS AND PARKING AREAS CAUSED BY CONSTRUCTION ACTIVITIES. REPAIRS SHALL BE IN KIND OR BETTER THAN EXISTING CONDITIONS AND TO THE SATISFACTION OF THE OWNER REPRESENTATIVE AT NO ADDITIONAL COST TO THE PRESIDIO TRUST. CONTRACTOR WILL DOCUMENT EXISTING CONDITIONS OF SITE ROADWAYS PRIOR TO START OF CONSTRUCTION.

2. APPROXIMATE LOCATION OF KNOWN UTILITIES ARE SHOWN ON THE PLANS. THE CONTRACTOR SHALL VERIFY UTILITY LOCATIONS AND NOTIFY THE RESPECTIVE UTILITY COMPANIES FOR FIELD LOCATION AND VERIFICATION PRIOR TO ALL CONSTRUCTION. THE CONTRACTOR SHALL VERIFY LOCATIONS AND ELEVATIONS OF ALL EXISTING PIPES AND BURIED UTILITIES. THE ENGINEER ASSUMES NO RESPONSIBILITY FOR THE COMPLETENESS OR ACCURACY OF ITS DELINEATION OF EXISTING UNDERGROUND UTILITIES THAT MAY BE ENCOUNTERED, BUT WHICH ARE NOT SHOWN ON THE PLAN. WHERE EXISTING UTILITY ELEVATIONS ARE IDENTIFIED, THE CONTRACTOR SHALL VERIFY ELEVATIONS IN THE FIELD AT THE LOCATION INDICATED. CONTRACTOR SHALL NOTIFY UNDERGROUND SERVICE ALERT (USA) A MINIMUM OF 3 BUSINESS DAYS PRIOR TO CONSTRUCTION ACTIVITIES.

3. THE CONTRACTOR SHALL OBTAIN AN EXCAVATION PERMIT AND PROVIDE THE TRUST WITH A MINIMUM OF 2 BUSINESS DAYS NOTIFICATION PRIOR TO THE START OF CONSTRUCTION ACTIVITIES.

4. THE CONTRACTORS SHALL PROVIDE TRAFFIC AND PEDESTRIAN ACCESS AROUND THE CONSTRUCTION SITE AT ALL TIMES. ACCESS SHALL BE COORDINATED WITH AND APPROVED BY THE PRESIDIO TRUST.

5. NO MATERIAL SHALL BE STOCKPILED OR LEFT OUTSIDE THE PERIMETER FENCE AT ANY TIME DURING CONSTRUCTION.

6. PRIOR TO COMMENCING WORK, THE CONTRACTOR SHALL REVIEW THE LIMITS AND TYPES OF WORK TO BE PERFORMED WITH THE ENGINEER IN THE FIELD.

7. SITE TOPOGRAPHY AND SITE FEATURES PROVIDED BY PRESIDIO TRUST, AS PERFORMED BY PLS SURVEYS, INC. UNDER SUBCONTRACT TO EKI, INC. ON OCTOBER 2014 AND TOWILL, OCTOBER 29-NOVEMBER 4, 2105. SURVEY CONTROL POINTS FOR THE WORK INCLUDE ALL OF THOSE IDENTIFIED IN THE TABLE FOUND ON DRAWINGS C-101. COORDINATES ARE BASED ON NORTH AMERICAN DATUM OF 1983 (NAD 83), CALIFORNIA STATE PLANE - ZONE 3 - U.S. SURVEY FEET. ELEVATIONS ARE BASED ON NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD 88) - U.S. SURVEY FEET.

8. SEE CONTRACT SPECIAL PROVISIONS AND TECHNICAL SPECIFICATIONS FOR ADDITIONAL INFORMATION REGARDING SITE CONDITIONS AND REQUIREMENTS OF WORK.

9. EXCAVATION ACTIVITIES WILL BE OBSERVED BY BIOLOGICAL AND CULTURAL RESOURCE MONITORS AND ARBORISTS AS NECESSARY. PRIOR TO CONDUCTING EXCAVATION ACTIVITIES, THE CONTRACTOR SHALL MEET WITH THE ENGINEER AND MONITORS TO ESTABLISH PROTOCOLS FOR WORKING AROUND BIOLOGICAL AND CULTURAL RESOURCES, TREES, AND TEMPORARILY HALTING EXCAVATION IF NEEDED TO PROTECT RESOURCES.

10. THE CONTRACTOR SHALL REVIEW AND CONDUCT WORK IN ACCORDANCE WITH RECOMMENDATIONS PRESENTED IN THE GEOTECHNICAL EVALUATION (APPENDIX B OF THE REMEDIAL DESIGN IMPLEMENTATION PLAN (RDIP), TRC 2015) UNLESS OTHERWISE DIRECTED BY THE TRUST.

SYMBOLS AND ABBREVIATIONS

- ECTC TYPE 4 EROSION CONTROL BLANKET ANCHORING PATTERN A, SEE DETAIL 2, C-114
- ECTC TYPE 4 EROSION CONTROL BLANKET ANCHORING PATTERN B, SEE DETAIL 2, C-114
- GRAVEL SPREAD BELOW ROOF GUTTER DOWNSPOUTS
- TRUCK HAUL ROUTE
- SITE ACCESS ROUTES
- STRAW WATTLE
- AREA TO BE DEMOLISHED AND REMOVED
- PROPOSED STRUCTURE AREAS
- FENCELINE
- SF — SILT FENCE
- STORM DRAIN INLET PROTECTION
- STABILIZED CONSTRUCTION ENTRANCE OR EXIT

- E — HIGH VOLTAGE
- SS — SANITARY SEWER
- GAS — GAS
- SD — STORM SEWER
- W — WATER
- SL — STREET LIGHTS
- TV — TELECOM
- (E) EXISTING
- (N) NEW
- SITE TREE
- SITE TOYON

REGISTERED PROFESSIONAL ENGINEER
WARREN B. CHAMBERLAIN
No. C 40853
Exp. 12/31/2016
5-10-16
CIVIL
STATE OF CALIFORNIA

REV	DATE	DESCRIPTION	DESIGN BY	CHK'D BY
B	3/25/16	100% Design Drawing	J H-D	WBC
A	1/21/16	60% Design Drawing	J H-D	WBC

Lendrum Court Area
The Presidio Trust
San Francisco, California

NOTES, LEGEND AND ABBREVIATIONS

TRC | 229649 | REV B | SHEET G-002

LEGEND

Utility line locations:

- Gas
- High voltage
- Sanitary sewer
- Storm sewer
- Street lights
- Telecomm
- Water
- Site Tree
- Site Toyon

REGISTERED PROFESSIONAL ENGINEER
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NOTES:

1. SITE FEATURES AND TOPOGRAPHY PROVIDED BY PRESIDIO TRUST AS PERFORMED BY PLS SURVEYS, INC. UNDER SUBCONTRACT TO EKI, INC. ON OCTOBER 2014 AND TOWILL, OCTOBER 29-NOVEMBER 4, 2015.
2. ALL COORDINATES ARE REPORTED IN U. S. SURVEY FEET.
3. HORIZONTAL COORDINATES ARE REFERENCED TO THE NORTH AMERICAN DATUM OF 1983, CALIFORNIA COORDINATE SYSTEM ZONE 3, (2007.0).
4. ELEVATIONS ARE BASED ON NAVD 88. PROJECT BENCHMARK IS NGS MONUMENT N813, ELEVATION = 11.09 FEET.
5. CONTRACTOR TO SEE TABLE BELOW FOR THE CLOSEST SURVEY CONTROL POINTS TO BE UTILIZED FOR BRINGING CONTROL TO THE PROJECT AREA. ALL POINTS ARE WITHIN SITE BOUNDARY. FOR ADDITIONAL CONTROL POINTS OR SURVEY CONTROL DATA CONTACT PROJECT ENGINEER.

N

SCALE (FEET)

0 60 120

SOURCE: Base plan by Towill, October 29-November 4, 2015

Survey Control Points

Point #	Elevation	Northing	Easting	Description
514	96.32	2121119.69	5992818.98	CALTRANS DISK
620	91.56	2121354.07	5992621.94	SET MAG NAIL
621	88.85	2121614.42	5992624.45	CALTRANS DISK STMPED SF14
629	127.08	2121474.09	5992411.15	SET REBAR & YELLOW CAP
630	130.78	2121385.64	5992338.73	FD. MAG NAIL #37
631	89.3	2121936.96	5992552.22	SET MAG NAIL
632	109.65	2121912.13	5992332.37	SET MAG NAIL
633	130.82	2121560.97	5992425.16	SET HUB & TACK
634	132.03	2121585.46	5992414.71	SET HUB & TACK
635	142.63	2121517.45	5992369.76	FD. MAG NAIL #33
636	131.93	2121664.93	5992400.28	FD. MAG NAIL #39
637	156.42	2121604.91	5992242.82	FD. CUT X #2
638	135.22	2121775.30	5992283.97	FD. MAG NAIL #42
639	125.53	2121727.76	5992401.94	SET HUB & TACK
640	116.35	2121778.92	5992457.49	SET HUB & TACK

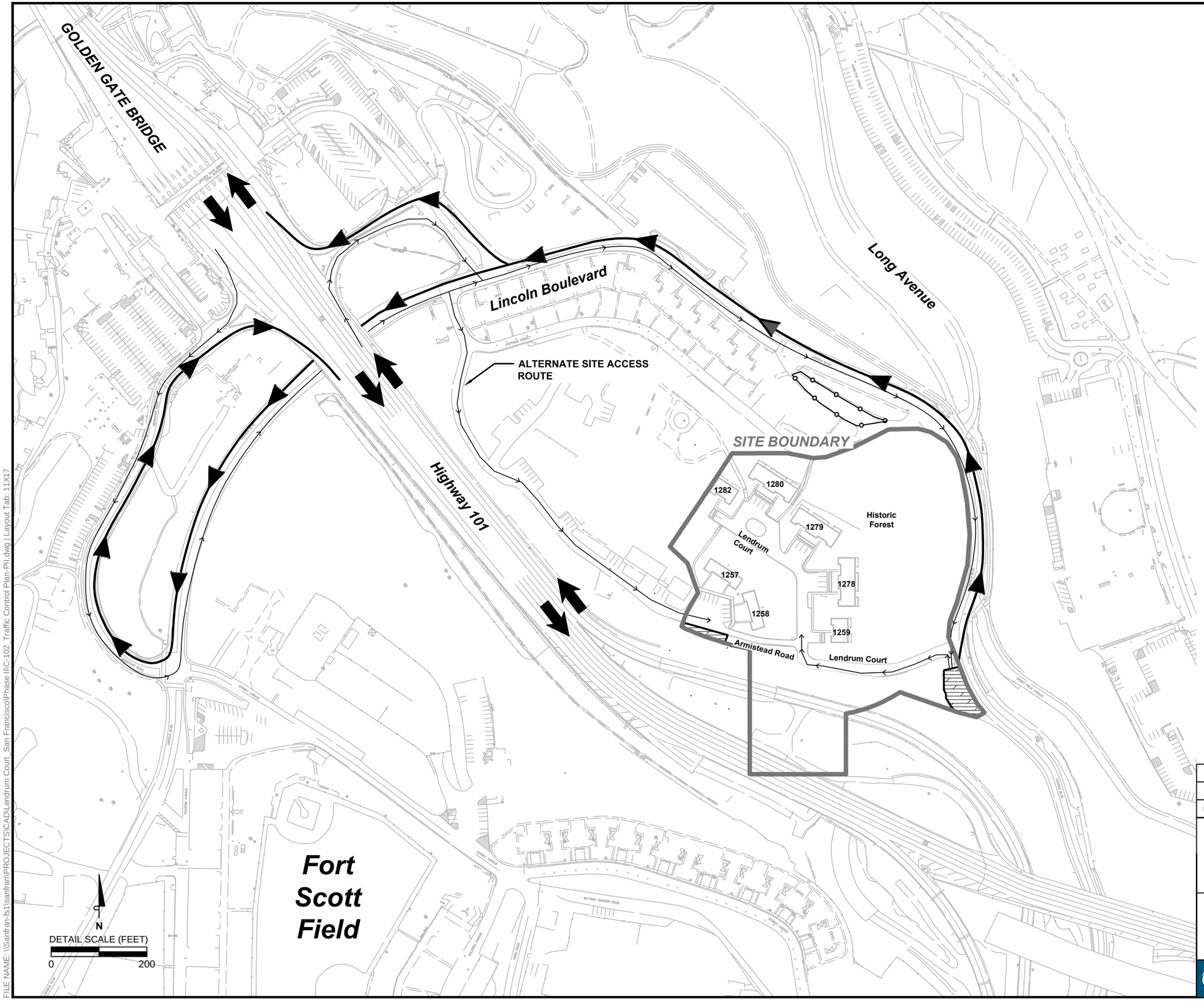
REV	DATE	DESCRIPTION	DESIGN BY	CHK'D BY
B	3/25/16	100% Design Drawing	J H-D	WBC
A	1/21/16	60% Design Drawing	J H-D	WBC

Lendrum Court Redmedial Area
The Presidio Trust
San Francisco, California

EXISTING SITE PLAN AND TOPOGRAPHIC SURVEY CONTROL PLAN

TRC | 229649 | REV B | SHEET C-101

FILE NAME: \\Sanfran-fs1\sanfran\PROJECTS\CAD\Lendrum Court San Francisco\Phase II\C-101 Existing Site Plan-PII 1.21.16.dwg | Layout Tab: 11x17 B&W



LEGEND

- PROPOSED TRUCK HAUL ROUTE FOR SOIL DISPOSED OFFSITE
- PROPOSED STAGING AREAS
- PROPOSED SITE ACCESS ROUTES
- CONTRACTOR PARKING

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NOTES:

1. AS PART OF THE TRAFFIC CONTROL PLAN SUBMITTAL, THE CONTRACTOR SHALL PREPARE SIGNAGE AND BARRIER DRAWINGS TO BE APPROVED BY TRUST PRIOR TO CONSTRUCTION ACTIVITIES.

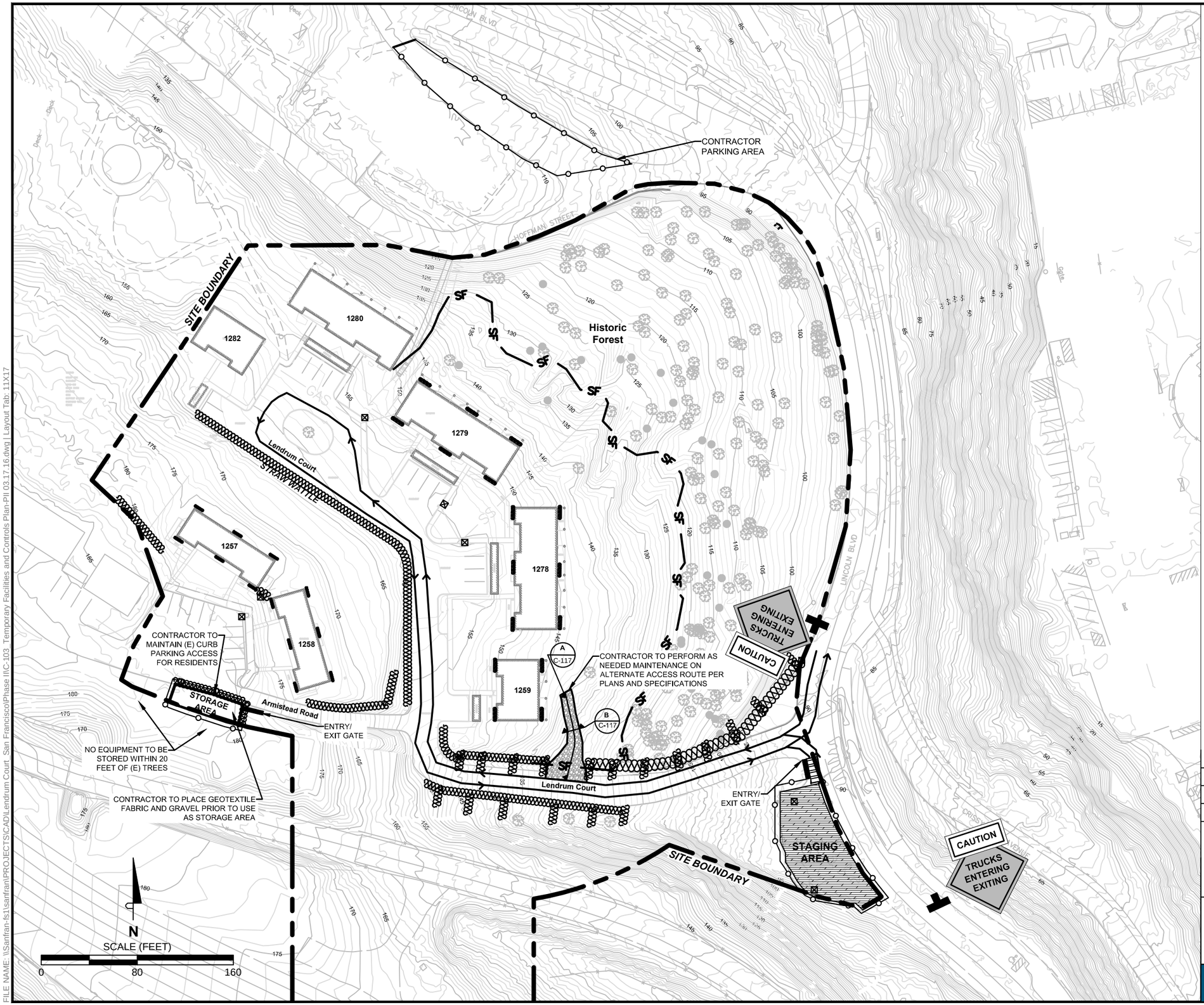
REV	DATE	DESCRIPTION	DESIGN BY	CHK'D BY
B	3/25/16	100% Design Drawing	J H-D	WBC
A	1/21/16	60% Design Drawing	J H-D	WBC

Lendrum Court Area
The Presidio Trust
San Francisco, California

TRAFFIC CONTROL PLAN

TRC | 229649 | REV B | SHEET C-102

FILE NAME: \\Sanfran-fs1\sanfran\PROJECTS\CAD\Lendrum Court_San Francisco\Phase II\C-102_Traffic Control Plan-PII.dwg | Layout Tab: 11X17



LEGEND

- PROPOSED STAGING AREAS
- FENCE LINE
- SF — SILT FENCE
- STORM DRAIN INLET PROTECTION
- STABILIZED CONSTRUCTION ENTRANCE OR EXIT
- APPROPRIATE BMP BELOW ROOF GUTTER DOWNSPOUTS
- SITE ACCESS ROUTES
- STRAW WATTLE
- TREE PROTECTION ZONE

REGISTERED PROFESSIONAL ENGINEER
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No. C 60853
Exp. 12/31/2016
3-10-16
CIVIL
STATE OF CALIFORNIA

NOTES:

1. CONTRACTOR WILL INSTALL TEMPORARY CONSTRUCTION AREA PERIMETER PANEL FENCING AT THE ACTIVE WORK ZONES AT THE SITE.
2. CONTRACTOR WILL PROVIDE EQUIPMENT STORAGE, REFUELING, AND SANITARY FACILITY LOCATIONS ONSITE.
3. CONTRACTOR WILL PROVIDE CONTROLS FOR STOCKPILES AND/OR EXPOSED SOIL AREAS (STRAW WATTLE, PLASTIC GROUND COVER, AND TARP), PER SPECIFICATIONS.
4. CONTRACTOR SHALL IMPLEMENT ALL TEMPORARY CONTROLS IDENTIFIED IN THE SITE SPECIFIC SWPPP.
5. SWPPP CONTROLS WILL BE IMPLEMENTED AS NEEDED PER CONSTRUCTION ACTIVITY PHASING.
6. CONTRACTOR SHALL NOT STORE ANY EQUIPMENT OUTSIDE OF DESIGNATED STAGING AREAS.
7. CONTRACTOR SHALL CONSTRUCT AND INSTALL TRAFFIC CONTROL SIGNAGE PER SPECIFICATIONS PRIOR TO START OF CONSTRUCTION.
8. TEMPORARY ACCESS ROUTE WILL BE CONSTRUCTED WITH MINIMUM 5 FEET SET BACK FROM NEAREST TREES.
9. ANY TREE TRIMMING MUST BE COORDINATED WITH ARBORIST.
10. ARBORIST SHALL BE PRESENT TO OBSERVE ANY WORK WITHIN TREE PROTECTION ZONE.
11. CONTRACTOR SHALL ESTABLISH AND MAINTAIN EXCLUSION, DECONTAMINATION, AND SUPPORT ZONES PRIOR TO CONSTRUCTION. ZONES MAY BE MODIFIED THROUGHOUT THE PROJECT.

SOURCE: Base plan by Towill, October 29-November 4, 2015

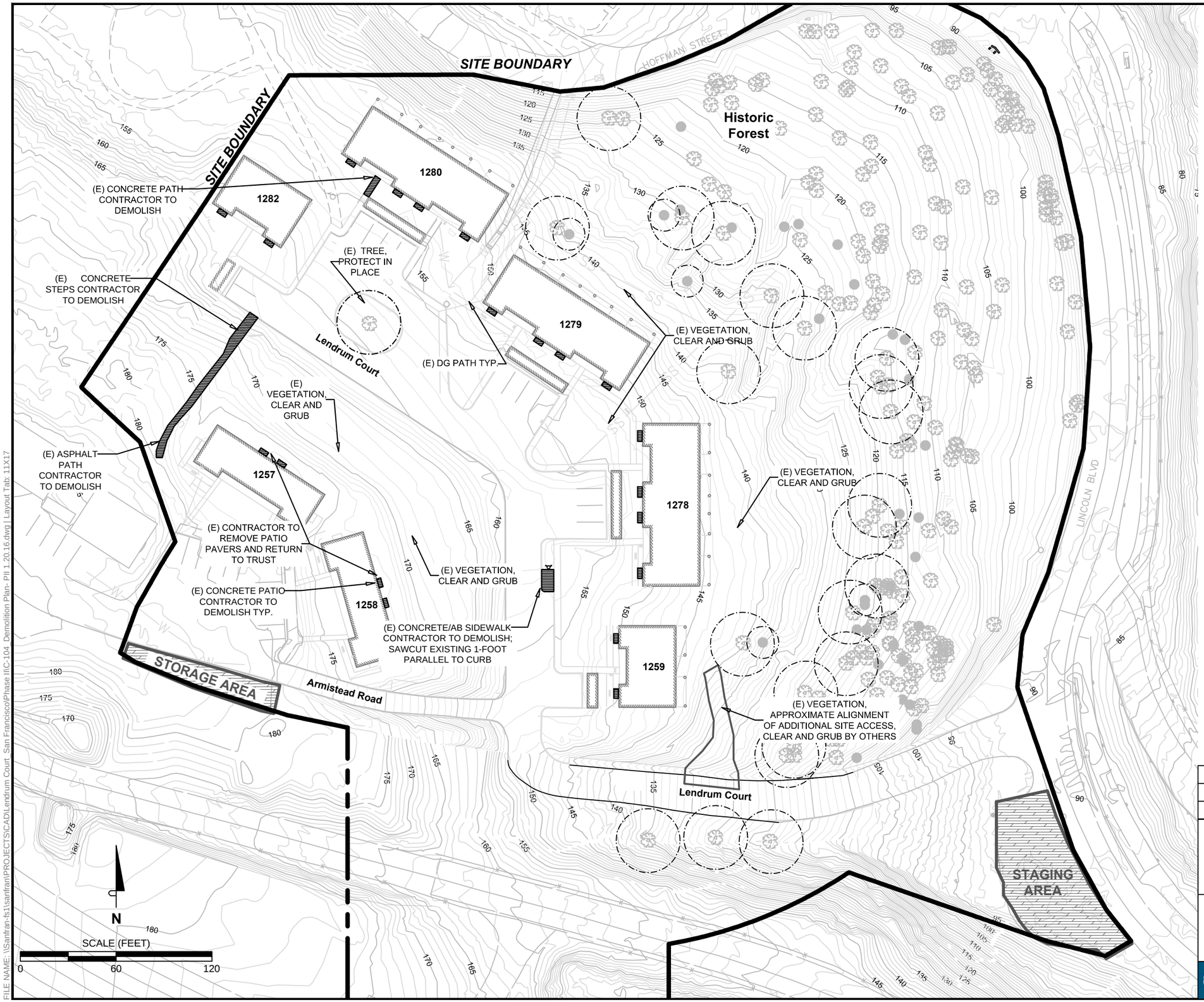
REV	DATE	DESCRIPTION	DESIGN BY	CHK'D BY
B	3/25/16	100% Design Drawing	J H-D	WBC
A	1/21/16	60% DESIGN DRAWING	J H-D	WBC

Lendrum Court Area
The Presidio Trust
San Francisco, California

TEMPORARY FACILITIES AND CONTROLS PLAN

TRC | 229649 | REV B | SHEET C-103

FILE NAME: \\Sanfran-fs1\sanfran\PROJECTS\CAD\Lendrum Court_San Francisco\Phase II\C-103_Temporary Facilities and Controls Plan-PII 03.17.16.dwg Layout Tab: 11X17



LEGEND

- Pavement to be demolished and removed from Site.
- Site Tree
- Toyon (HETEROMELES ARBUTIFOLIA)
- TREE PROTECTION ZONE
- Staging areas
- Fire Hydrant

REGISTERED PROFESSIONAL ENGINEER
WARREN B. CHAMBERLAIN
No. C 60853
Exp. 12/31/2016
5-10-16
CIVIL
STATE OF CALIFORNIA

NOTES:

1. SITE FEATURES AND TOPOGRAPHY PROVIDED BY PRESIDIO TRUST AS PERFORMED BY TOWILL DURING OCTOBER 29-NOVEMBER 4, 2015. SURVEY CONTROL POINTS FOR THE WORK ARE SHOWN ON C-106.
2. CONTRACTOR TO DEMOLISH AND REMOVE APPROXIMATELY 100 FEET OF AC TRAIL AND RECYCLE PER THE SPECIFICATIONS.
3. CONTRACTOR TO DEMOLISH AND REMOVE EXISTING CONCRETE PATIOS AND RECYCLE PER SPECIFICATIONS AS SHOWN.
4. CONTRACTOR TO CLEAR AND GRUB ALL GRADING AND EXCAVATION AREAS PER THE SPECIFICATIONS.
5. CONTRACTOR TO PROTECT ALL TREES AND ESTABLISH A PROTECTION ZONE AROUND EACH TREE.
6. STUMPS ARE TO BE GRINDED TO APPROXIMATELY 1 FT. BELOW ROUGH SURFACE GRADE OR AS DIRECTED BY THE ENGINEER.
7. CONTRACTOR TO DEMOLISH CONCRETE CURB AND ASPHALTIC BASE (AB) SIDEWALK ADJACENT TO FIRE HYDRANT WHILE PROTECTING THE FIRE HYDRANT IN PLACE. CONCRETE AND AB TO BE RECYCLED PER THE SPECIFICATIONS.
8. UNLESS NOTED CONTRACTOR SHALL PROTECT ALL CONCRETE FEATURES SUCH AS SIDEWALKS, CURBS, AND BUILDING ACCESS PATHS. DG PATHS TO BE REMOVED DURING INITIAL GRADING ACTIVITIES.
9. ARBORIST SHALL OBSERVE WORK PERFORMED WITHIN TREE PROTECTION ZONE.
10. IN AREAS WHERE GRASSES ARE PRESENT CONTRACTOR TO MOW AREA INITIALLY AND SAVE CLIPPINGS FOR FUTURE USE.
11. IF CONCRETE PATIO IS CONNECTED TO BUILDING FOUNDATION, THEN SAWCUT BEFORE DEMOLITION.
12. CONTRACTOR TO REMOVE AND SAVE EXISTING STEEL POST AND CABLE FENCE THROUGHOUT SITE.

SOURCE: Base plan by Towill, October 29-November 4, 2015

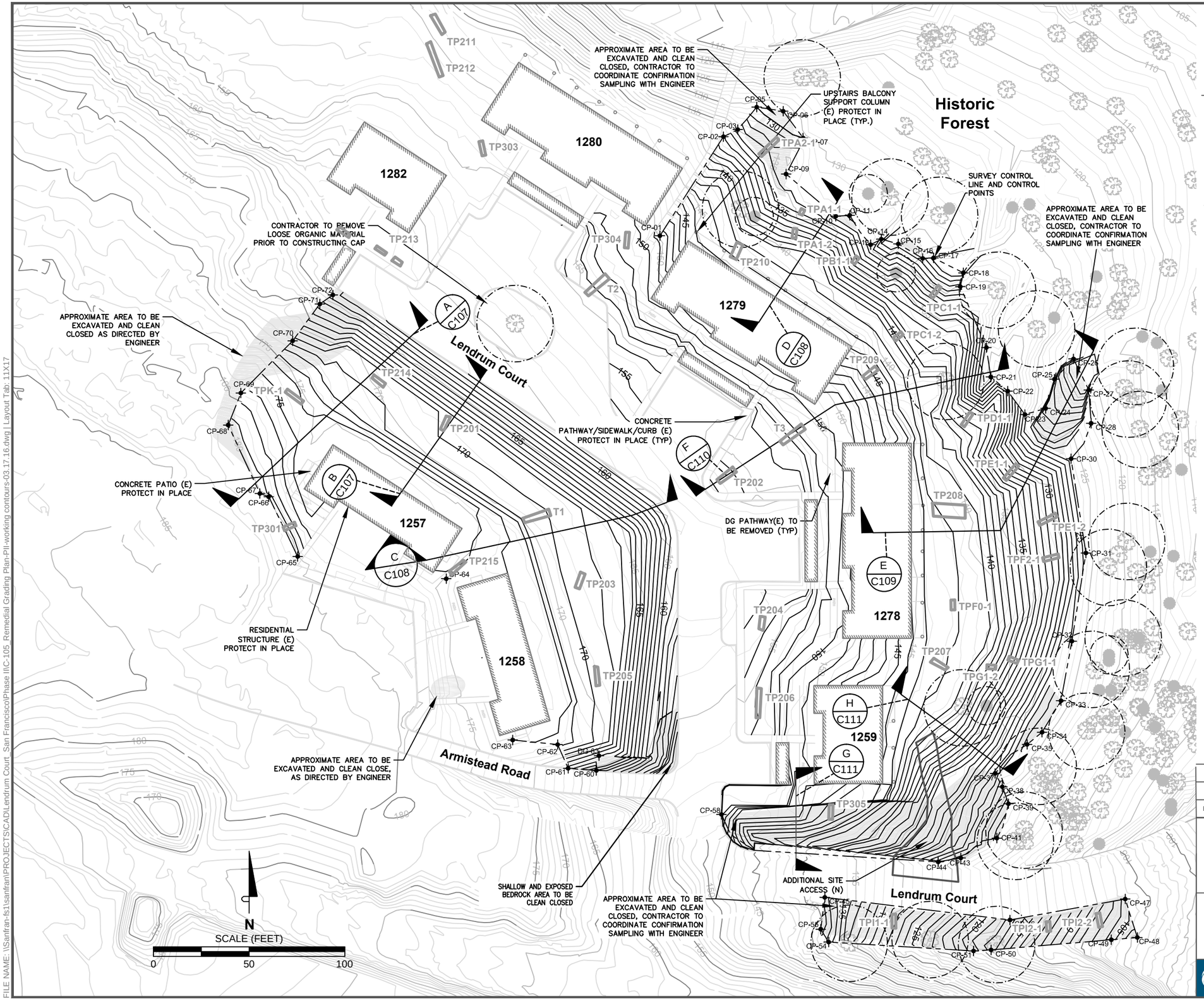
REV	DATE	DESCRIPTION	DESIGN BY	CHK'D BY
B	3/25/16	100% Design Drawing	J H-D	WBC
A	1/21/16	60% Design Drawing	J H-D	WBC

Lendrum Court Area
The Presidio Trust
San Francisco, California

DEMOLITION PLAN

TRC | 229649 | REV B | SHEET C-104

FILE NAME: \\Sanfran-fs1\sanfran\PROJECTS\CAD\Lendrum Court San Francisco\Phase II\C-104 Demolition Plan- PII 1.20.16.dwg | Layout Tab: 11X17



LEGEND

- GRADING CONTROL POINTS (CP-06)
- SURVEY CONTROL LINE
- EXISTING TREE
- EXISTING TOYON
- 140 ROUGH GRADE CONTOURS
- 140 EXISTING SURFACE CONTOURS
- AREA TO BE EXCAVATED AND CLEAN CLOSED
- TREE PROTECTION ZONE

NOTES:

1. CONTRACTOR SHALL REMOVE THE TOP 4 TO 6 INCHES (OR AS DIRECTED BY THE ENGINEER) OF SOIL UNSUITABLE FOR REUSE AND DG PATHWAY MATERIAL IN ALL GRADING AREAS AND STOCKPILE FOR DISPOSAL, WITH THE EXCEPTION OF THE TREE PROTECTION ZONES.
2. EXCAVATION AND GRADING LIMITS AND DEPTH SUBJECT TO CHANGE.
3. CONTRACTOR SHALL EXCAVATE AND GRADE SOIL WITHIN PROJECT LIMITS AS DIRECTED, AND WILL MAINTAIN STABLE SLOPE CONDITIONS.
4. CONTRACTOR SHALL PERFORM CONSTRUCTION AT THE EDGE OF THE EXISTING RESIDENTIAL STRUCTURES WITHOUT IMPACTING THE STRUCTURES PER THE CONSTRUCTION SPECIFICATIONS.
5. CONTRACTOR SHALL COORDINATE SURVEYS OF AS-BUILT EXCAVATION AND GRADING AREAS PRIOR TO AND AFTER BACKFILL.
6. CONTRACTOR SHALL PROTECT EXISTING UTILITIES AS SHOWN AND DISCOVERED IN THE FIELD.
7. EXISTING TOPOGRAPHIC SURVEY CONTROL POINTS ARE LOCATED ON DRAWING C-112.
8. ACTUAL LIMITS OF EXCAVATION MAY VARY FROM SURVEY CONTROL LINE WHERE EXISTING GROUND GRADE BREAK DICTATES OR AS DIRECTED BY FIELD ENGINEER.
9. EASTERN SURVEY CONTROL LINE SHALL BE LOCATED PER CONTROL POINTS CP-01 THRU CP-44 AND CP-58, LISTED ON C-112. ADDITION SURVEY CONTROL LINES SHALL BE LOCATED PER THE EDGE OF BUILDINGS, CONCRETE WALKWAYS, CURBS, AND SIDEWALKS.
10. CONTRACTOR SHALL CLEAR AND GRUB ALL EXCAVATION AND PLANNED GRADING AREAS.
11. EXCAVATIONS LOCATED ADJACENT TO FOOTINGS SHOULD NOT EXTEND BELOW AN IMAGINARY 1:1 (HORIZONATL:VERTICAL) PLANE PROJECTED DOWNWARD FROM THE FOOTING BEARING SURFACE TO THE BOTTOM EDGE OF THE EXCAVATION. WHERE NECESSARY, EXCAVATIONS NEAR EXISTING FOUNDATIONS SHOULD BE PERFORMED IN INCREMENTS (I.E. EXCAVATE, CONSTRUCT AND BACKFILL SHORT SECTIONS).

SOURCE: Base plan by Towill, October 29-November 4, 2015

REGISTERED PROFESSIONAL ENGINEER
WARREN B. CHAMBERLAIN
No. C 60853
Exp. 12/31/2016
5-10-16
CIVIL
STATE OF CALIFORNIA

REV	DATE	DESCRIPTION	DESIGN BY	CHK'D BY
B	5/10/16	100% Design Drawing	J H-D	WBC
A	1/21/16	60% Design Drawing	J H-D	WBC

Lendrum Court Area
The Presidio Trust
San Francisco, California

ROUGH GRADING PLAN

TRC | 229649 | REV B | SHEET C-105

CONTRACTOR TO SEE RHAA CONSTRUCTION AND PLANTING DRAWINGS FOR AREAS OUTSIDE OF CONSTRUCTED CAP

FEATHER FINAL GRADE TO MATCH EXISTING (TYP.)

CONCRETE STEPS (N) PER SPECIFICATIONS (2/C-120)

DECOMPOSED GRANITE PATH (N) PER SPECIFICATIONS (3/C-120)

APPROXIMATE LOCATION OF ASPHALT TRAIL (N) PER SPECIFICATIONS (4/C-114)

CONFORMANCE DETAIL (1/C-114)

CONCRETE PATIO (N) PER SPECIFICATIONS (TYP.) (3/C-119)

RESIDENTIAL STRUCTURE (E) PROTECT IN PLACE (TYP.)

CONTRACTOR TO BACKFILL TO MATCH EXISTING GRADE

DECOMPOSED GRANITE BOX STEPS (N) PER SPECIFICATIONS (1,2,3/C-118)

CAP TO MATCH EXPOSED BEDROCK (2/C-114)

CONCRETE DRAINAGE CHANNEL (N) PER SPECIFICATIONS (TYP.) (2/C-121)

CONCRETE SIDEWALK (N) PER SPECIFICATIONS (2/C-119)

TREE DETAIL (1/C-115)

CONFORMANCE DETAIL (3/C-114)

RAISED PLANTER BOXES (N) CONSTRUCTED BY OTHERS

CONCRETE WALKWAY (E) PROTECT IN PLACE (TYP.)

CONCRETE CURB (N) PER SPECIFICATIONS (1/C-119)

(N) AC ROADWAY PER SPECIFICATIONS

STORAGE STRUCTURE (E) PROTECT IN PLACE (TYP.)

FEATHER FINAL GRADE TO MATCH EXISTING (TYP.)

CONTRACTOR TO CONSTRUCT (N) AGGREGATE BASE CAP (TYP.)

Historic Forest

1280 1282 1279 1278 1257 1258 1259

Lendrum Court

Armistead Road

SITE BOUNDARY

N

SCALE (FEET)

0 50 100

LEGEND

- GRADING CONTROL POINT (CP-06)
- SURVEY CONTROL LINE
- SITE TREE
- TOYON (HETEROMELES ARBUTIFOLIA)
- FINAL GRADE CONTOURS (140)
- EXISTING GRADE CONTOURS (140)
- NEW CONCRETE PATIO/SIDEWALK/STAIRS
- NEW DG PATH
- NEW ASPHALT PATH
- GRAVEL CAP
- TREE PROTECTION ZONE
- HOT SPOT EXCAVATION
- EDGE OF CAP

REGISTERED PROFESSIONAL ENGINEER
WARREN B. CHAMBERLAIN
No. C 60853
Exp. 12/31/2016
5-10-16
CIVIL
STATE OF CALIFORNIA

NOTES:

1. CONTRACTOR SHALL PROTECT EXISTING UTILITIES AS SHOWN ON THE DRAWINGS AND/OR DISCOVERED IN THE FIELD.
2. CONTRACTOR SHALL PLACE SOIL WITHIN THE LIMITS OF GRADING AS SHOWN ON THE DRAWINGS AND AS DIRECTED BY THE TRUST. CONTRACTOR SHALL BE RESPONSIBLE FOR STABLE SLOPE CONDITIONS.
3. SURVEY CONTROL POINTS ARE SHOWN ON DRAWING C-101.
4. HORIZONTAL AND VERTICAL COORDINATES FOR POST CONSTRUCTION TOPOGRAPHIC GRADING CONTROL POINTS ARE SHOWN ON DRAWING C-112.
5. GRADING OUTSIDE OF THE SPECIFIED REMEDIAL EXCAVATION AREA MAY REQUIRE CUT AND FILL TO MEET FINAL GRADES. ALL GRADING IN THESE AREAS MUST BE OBSERVED BY TRUST REPRESENTATIVES.
6. THE UPPERMOST 18 INCHES SHALL BE COMPACTED TO 85–90% RELATIVE COMPACTION IN ALL AREAS TO BE PLANTED. ALL OTHER AREAS AND FILLS DEEPER THAN 18 INCHES SHALL BE COMPACTED TO A MINIMUM OF 90%.
7. ALL GRADING AND COMPACTION SHALL BE PERFORMED IN ACCORDANCE WITH THE DRAWINGS, SPECIFICATIONS AND RECOMMENDATIONS IN THE GEOTECHNICAL EVALUATION REPORT.
8. COMPACTION WITHIN 3 FEET OF EXISTING BUILDINGS SHALL BE PERFORMED USING SMALL EQUIPMENT SUCH AS A JUMPING JACK OR VIBRO PLATE TO PROTECT THE STRUCTURE AND FOUNDATIONS.
9. CONTRACTOR WILL HAVE ARBORIST PRESENT DURING ALL WORK WITHIN TREE PROTECTION ZONES (TYP).
10. CONTRACTOR TO UTILIZE HAND TOOLS OR SMALL TRACK MOUNTED EQUIPMENT WHEN WORKING IN TPZ.
11. EXCAVATIONS LOCATED ADJACENT TO FOOTINGS SHOULD NOT EXTEND BELOW AN IMAGINARY 1:1 (HORIZONATL:VERTICAL) PLANE PROJECTED DOWNWARD FROM THE FOOTING BEARING SURFACE TO THE BOTTOM EDGE OF THE EXCAVATION. WHERE NECESSARY, EXCAVATIONS NEAR EXISTING FOUNDATIONS SHOULD BE PERFORMED IN INCREMENTS (I.E. EXCAVATE, CONSTRUCT AND BACKFILL SHORT SECTIONS).
12. BACKFILL CLEAN CLOSED AREAS AS NECESSARY TO MEET FINAL GRADES

SOURCE: Base plan by Towill, October 29-November 4, 2015

REV	DATE	DESCRIPTION	DESIGN BY	CHK'D BY
B	5/10/16	100% Design Drawing	J H-D	WBC
A	1/21/16	60% Design Drawing	J H-D	WBC

Lendrum Court Area
The Presidio Trust
San Francisco, California

POST CONSTRUCTION GRADING PLAN

TRC Results you can rely on | 229649 | REV B | SHEET C-106

FILE NAME: \\Sanfran-fs1\sanfran\PROJECTS\CAD\Lendrum Court San Francisco\Phase II\C106-Post Construction Grading Plan-PII 90_03.17.16.dwg | Layout Tab: 11X17

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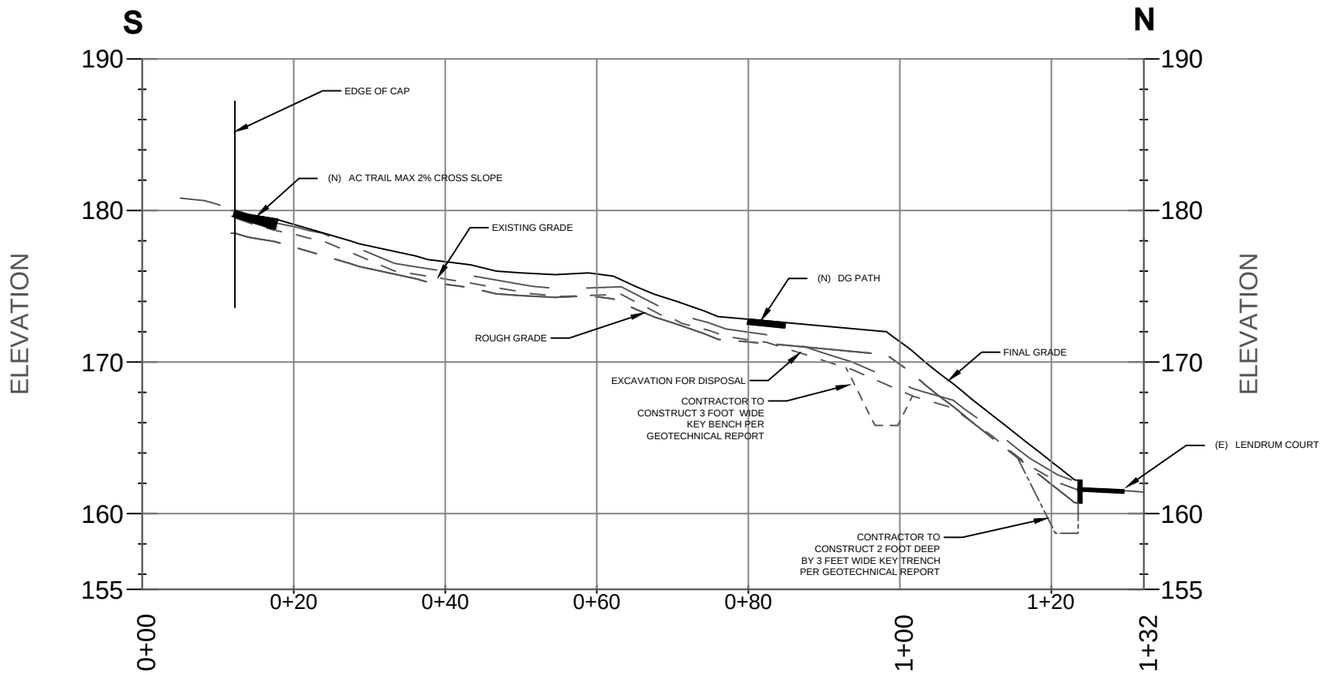
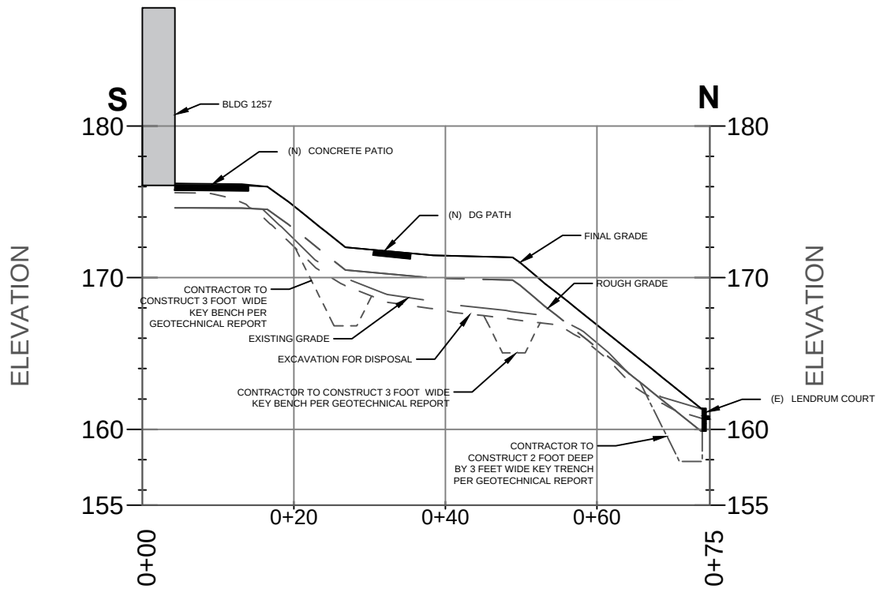


Alignment - B PROFILE



LEGEND

- EXISTING GRADE
- ROUGH GRADE
- FINAL GRADE
- EXCAVATION FOR DISPOSAL

NOTES:

1. CONTRACTOR SHALL REMOVE THE TOP 4 TO 6 INCHES (OR AS DIRECTED BY THE ENGINEER) OF SOIL UNSUITABLE FOR REUSE AND DG PATHWAY MATERIAL IN ALL GRADING AREAS AND STOCKPILE FOR DISPOSAL, WITH THE EXCEPTION OF THE TREE PROTECTION ZONES.
2. EXCAVATION AND GRADING LIMITS AND DEPTH SUBJECT TO CHANGE.
3. CONTRACTOR SHALL EXCAVATE AND GRADE SOIL WITHIN PROJECT LIMITS AS DIRECTED, AND WILL MAINTAIN STABLE SLOPE CONDITIONS.
4. CONTRACTOR SHALL PERFORM CONSTRUCTION AT THE EDGE OF THE EXISTING RESIDENTIAL STRUCTURES WITHOUT IMPACTING THE STRUCTURES PER THE PROJECT SPECIFICATIONS.
5. CONTRACTOR SHALL COORDINATE SURVEYS OF AS-BUILT EXCAVATION AND GRADING AREAS PRIOR TO AND AFTER BACKFILL.
6. CONTRACTOR SHALL PROTECT EXISTING UTILITIES AS SHOWN AND DISCOVERED IN THE FIELD.
7. ACTUAL LIMITS OF EXCAVATION MAY VARY FROM SURVEY CONTROL LINE WHERE EXISTING GROUND GRADE BREAK DICTATES OR AS DIRECTED BY FIELD ENGINEER.

REGISTERED PROFESSIONAL ENGINEER
WARREN B. CHAMBERLAIN
No. C 60853
Exp. 12/31/2016
5-10-16
CIVIL
STATE OF CALIFORNIA

VERTICAL SCALE (FEET)
0 10 20

HORIZONTAL SCALE (FEET)
0 20 40

SOURCE: Base plan by Towill, October 29-November 4, 2015

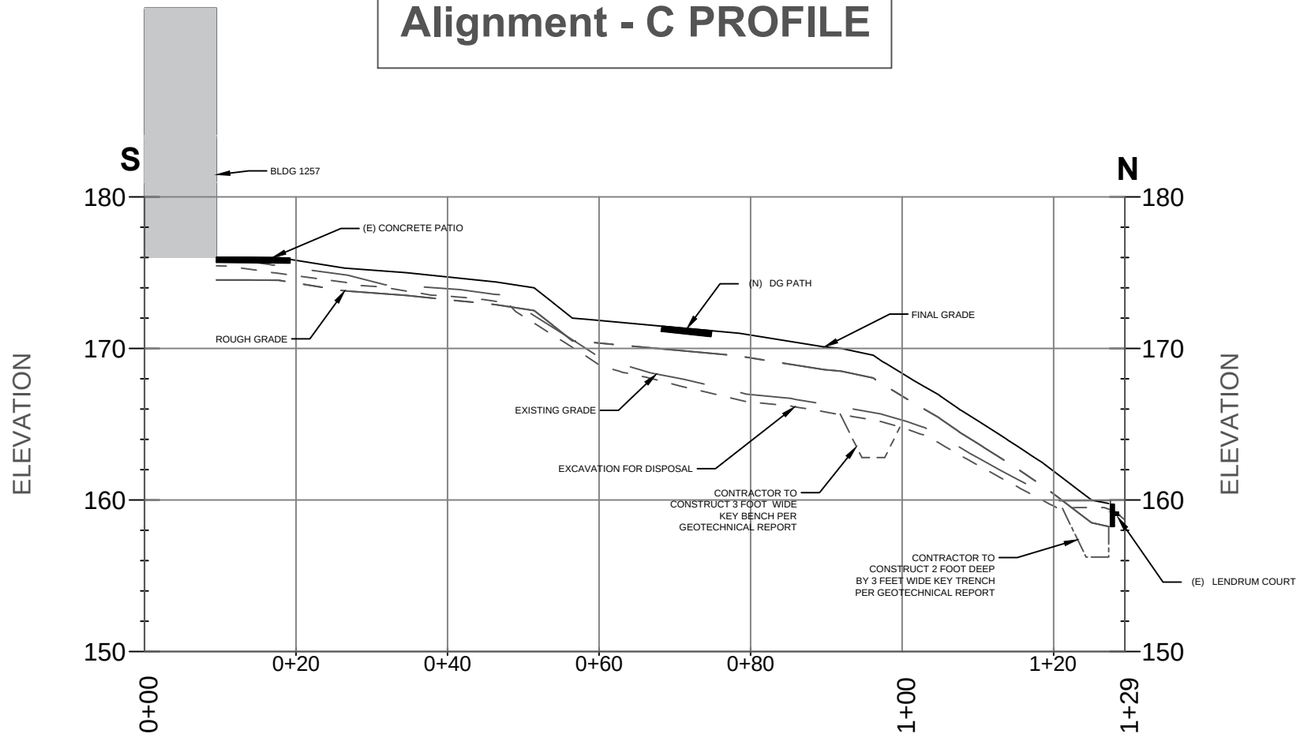
REV	DATE	DESCRIPTION	DESIGN BY	CHK'D BY
B	3/25/16	100% Design Drawing	J H-D	WBC
A	1/19/16	60% Design Drawing	J H-D	WBC

Lendrum Court Area
The Presidio Trust
San Francisco, California

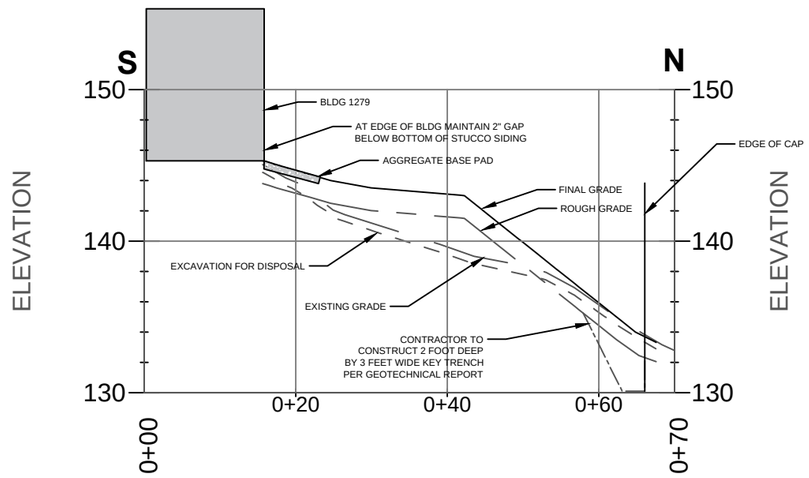
GRADING SECTIONS A & B

TRC | 229649 | REV B | SHEET C-107

Alignment - C PROFILE



Alignment - D PROFILE



LEGEND

- EXISTING GRADE
- ROUGH GRADE
- FINAL GRADE
- EXCAVATION FOR DISPOSAL

NOTES:

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Exp. 12/31/2016
5-10-16
CIVIL
STATE OF CALIFORNIA

VERTICAL SCALE (FEET)
0 10 20

HORIZONTAL SCALE (FEET)
0 20 40

SOURCE: Base plan by Towill, October 29-November 4, 2015

REV	DATE	DESCRIPTION	DESIGN BY	CHK'D BY
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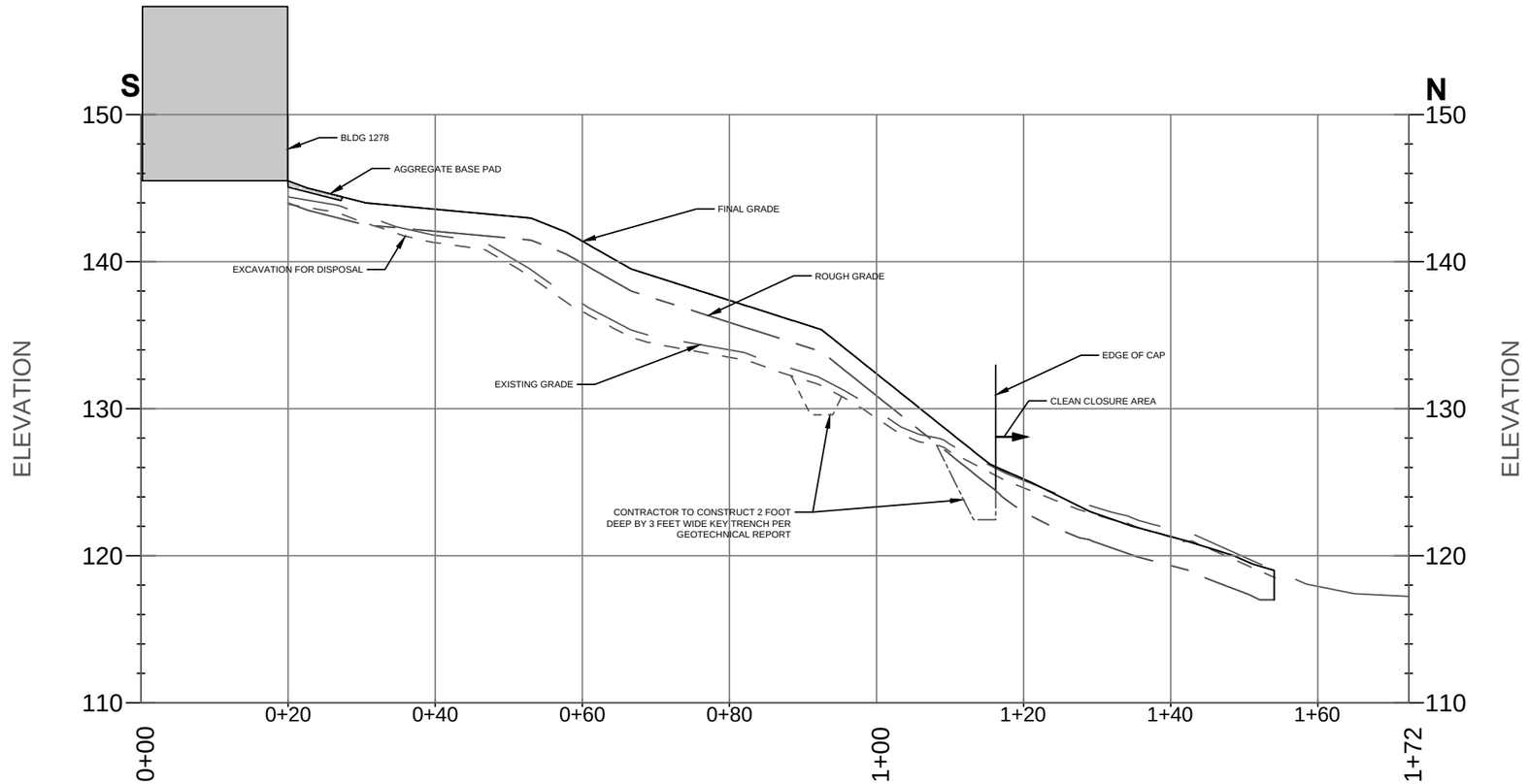
Lendrum Court Area
The Presidio Trust
San Francisco, California

GRADING SECTIONS C & D

TRC | 229649 | REV B | SHEET C-108

Alignment - E PROFILE



LEGEND

- EXISTING GRADE
- ROUGH GRADE
- FINAL GRADE
- EXCAVATION FOR DISPOSAL

NOTES:

1. CONTRACTOR SHALL REMOVE THE TOP 4 TO 6 INCHES (OR AS DIRECTED BY THE ENGINEER) OF SOIL UNSUITABLE FOR REUSE IN ALL GRADING AREAS AND STOCKPILE FOR DISPOSAL.
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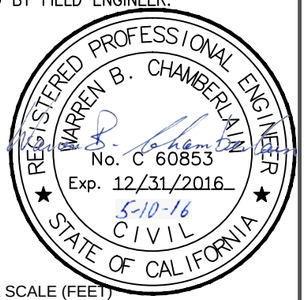
6. CONTRACTOR SHALL PROTECT EXISTING UTILITIES AS SHOWN AND DISCOVERED IN THE FIELD.
7. ACTUAL LIMITS OF EXCAVATION MAY VARY FROM SURVEY CONTROL LINE WHERE EXISTING GROUND GRADE BREAK DICTATES OR AS DIRECTED BY FIELD ENGINEER.



VERTICAL SCALE (FEET)
0 10 20

HORIZONTAL SCALE (FEET)
0 20 40

SOURCE: Base plan by Towill, October 29-November 4, 2015

REV	DATE	DESCRIPTION	DESIGN BY	CHK'D BY
B	3/25/16	100% Design Drawing	J H-D	WBC
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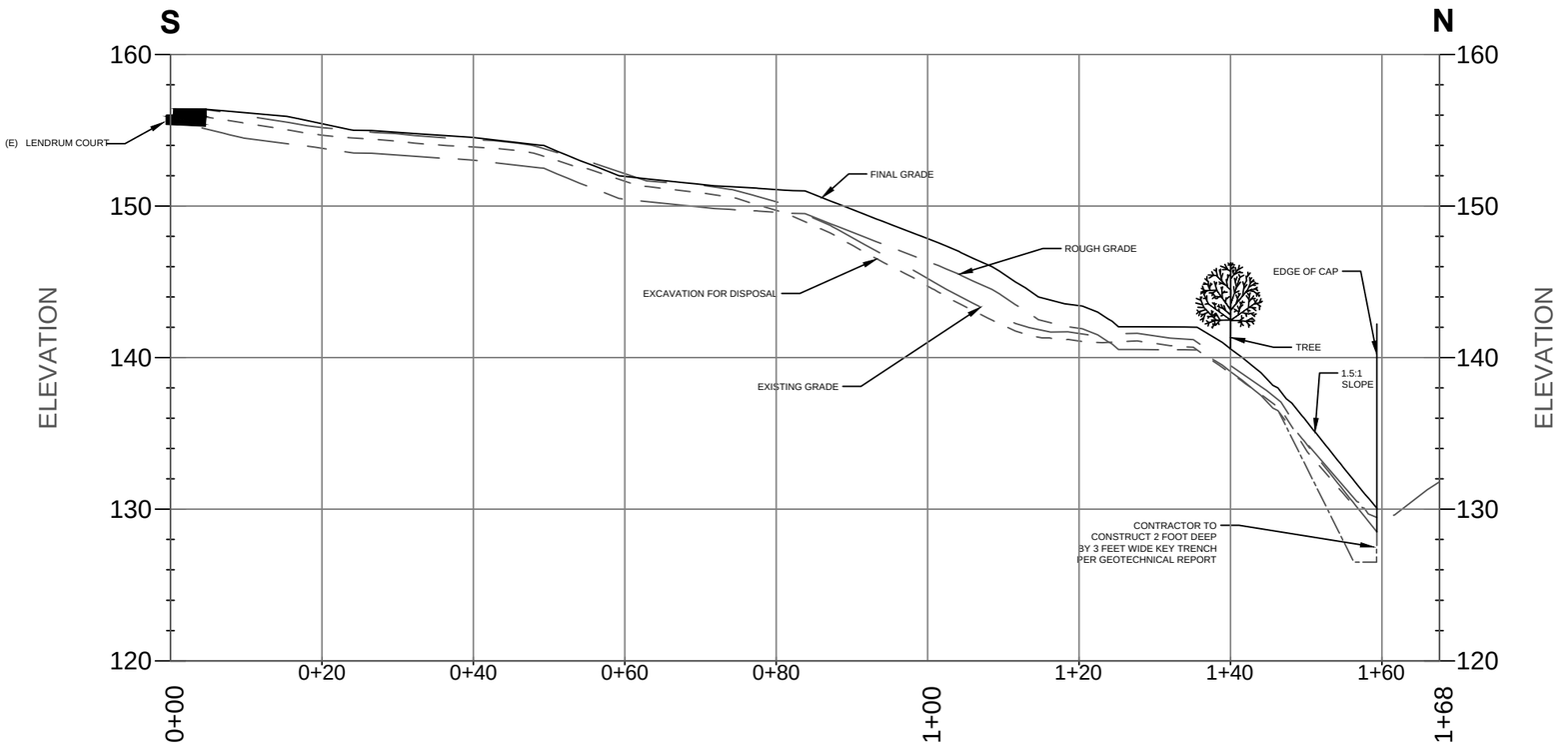
Lendrum Court Area
The Presidio Trust
San Francisco, California

GRADING SECTION E

TRC | 229649 | REV B | SHEET C-109

FILE NAME: \\Sanfran-fs1\sanfran\PROJECTS\CAD\Lendrum Court_San Francisco\Phase II\C-107_108_109 Profiles-PII 03.24.16 contour edit.dwg | Layout Tab: E

Alignment - F PROFILE



LEGEND

- EXISTING GRADE
- ROUGH GRADE
- FINAL GRADE
- EXCAVATION FOR DISPOSAL

NOTES:

1. CONTRACTOR SHALL REMOVE THE TOP 4 TO 6 INCHES (OR AS DIRECTED BY THE ENGINEER) OF SOIL UNSUITABLE FOR REUSE AND DG PATHWAY MATERIAL IN ALL GRADING AREAS AND STOCKPILE FOR DISPOSAL, WITH THE EXCEPTION OF THE TREE PROTECTION ZONES.
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7. ACTUAL LIMITS OF EXCAVATION MAY VARY FROM SURVEY CONTROL LINE WHERE EXISTING GROUND GRADE BREAK DICTATES OR AS DIRECTED BY FIELD ENGINEER.

REGISTERED PROFESSIONAL ENGINEER
WARREN B. CHAMBERLAIN
No. C 60853
Exp. 12/31/2016
5-10-16
CIVIL
STATE OF CALIFORNIA

VERTICAL SCALE (FEET)
0 10 20

HORIZONTAL SCALE (FEET)
0 20 40

SOURCE: Base plan by Towill, October 29-November 4, 2015

REV	DATE	DESCRIPTION	DESIGN BY	CHK'D BY
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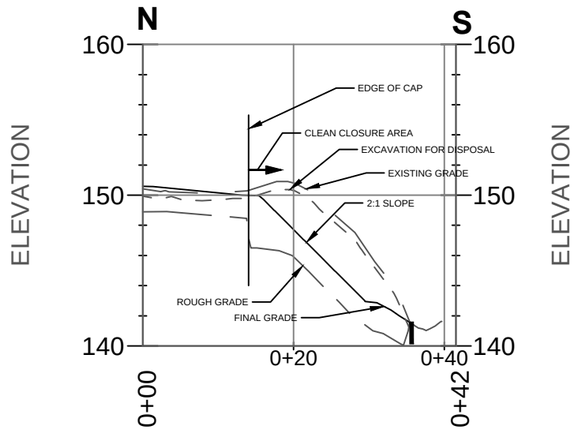
Lendrum Court Area
The Presidio Trust
San Francisco, California

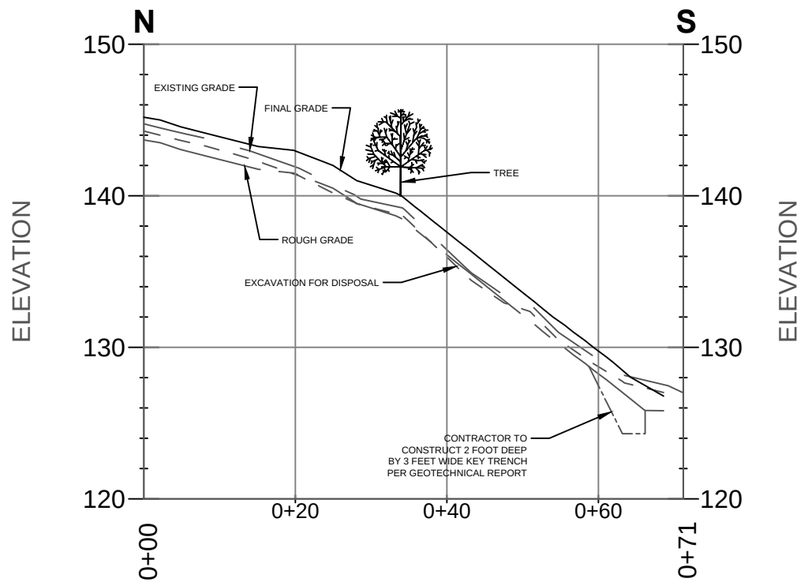
GRADING SECTION F

TRC	229649	REV B	SHEET C-110

Alignment - G PROFILE



Alignment - H PROFILE



LEGEND

- EXISTING GRADE
- ROUGH GRADE
- FINAL GRADE
- EXCAVATION FOR DISPOSAL

NOTES:

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REGISTERED PROFESSIONAL ENGINEER
WARREN B. CHAMBERLAIN
No. C 60853
Exp. 12/31/2016
5-10-16
CIVIL
STATE OF CALIFORNIA

VERTICAL SCALE (FEET)
0 10 20

HORIZONTAL SCALE (FEET)
0 20 40

SOURCE: Base plan by Towill, October 29-November 4, 2015

REV	DATE	DESCRIPTION	DESIGN BY	CHK'D BY
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Lendrum Court Area
The Presidio Trust
San Francisco, California

GRADING SECTIONS G & H

TRC | 229649 | REV B | SHEET C-111

Control Points

CP

Point	Northing	Easting	Elev. EG	Elev. RG	Elev. FG
CP-01	2121735.9725	5992216.2155	149.97	148.50	150.00
CP-02	2121787.7520	5992249.3992	137.78	136.00	137.35
CP-03	2121791.4721	5992256.8832	134.96	133.46	134.96
CP-05	2121803.2111	5992266.7768	131.00	130.00	131.00
CP-06	2121801.0830	5992280.6213	130.75	129.75	130.75
CP-07	5992280.6213	5992291.0124	130.97	130.00	131.00
CP-09	2121768.2126	5992282.1458	134.56	132.77	133.77
CP-10	2121746.2117	5992308.1065	134.00	131.50	133.21
CP-11	2121746.6870	5992315.3752	133.46	130.77	132.77
CP-13	2121731.3366	5992326.2934	132.00	130.69	132.02
CP-14	2121734.2541	5992331.8723	129.33	129.56	129.34
CP-15	2121731.7217	5992340.7265	129.50	127.49	129.00
CP-16	2121724.1544	5992353.5078	128.89	127.35	128.81
CP-17	2121724.4037	5992359.1628	127.00	125.50	127.00
CP-18	2121716.6180	5992374.7462	126.92	125.42	126.92
CP-19	2121709.4106	5992373.1322	130.00	128.50	130.00
CP-20	2121677.5718	5992386.7973	130.12	128.77	130.27
CP-21	2121662.2091	5992389.0746	130.00	128.50	130.00
CP-22	2121654.8342	5992397.9140	132.87	131.50	133.00
CP-23	2121642.5993	5992406.9145	127.00	125.50	127.00
CP-24	2121645.7982	5992417.7144	123.00	121.23	123.23
CP-25	2121661.0609	5992422.3398	122.00	119.84	121.84
CP-26	2121671.6684	5992432.2812	119.00	117.00	119.00
CP-27	2121655.4312	5992440.2679	119.00	117.00	119.00
CP-28	2121638.0285	5992441.4848	122.00	119.00	122.00
CP-30	2121619.5020	5992431.0271	126.56	125.06	126.56
CP-31	2121570.2609	5992438.7559	126.00	124.50	126.00
CP-32	2121524.1609	5992431.4275	126.85	125.78	126.80
CP-33	2121493.0691	5992425.7562	126.43	124.50	126.31
CP-34	2121476.5900	5992415.8477	126.26	124.50	126.46
CP-35	2121470.2481	5992408.0406	127.00	124.50	127.00
CP-37	2121455.0811	5992391.3530	128.04	126.54	128.04
CP-38	2121448.1156	5992395.1160	126.00	124.50	126.00
CP-39	2121439.2506	5992398.2903	123.99	122.42	124.00
CP-41	2121421.2856	5992392.2245	123.00	121.50	123.00
CP-43	2121410.8947	5992373.3964	125.00	123.98	125.00
CP-44	2121408.8888	5992361.6042	124.34	122.84	124.34
CP-45	2121390.3468	5992302.3732	138.95	137.45	138.95
CP-46	2121378.5311	5992399.0829	119.00	117.50	119.00
CP-47	2121389.4777	5992459.2946	107.00	105.50	107.00
CP-48	2121369.3709	5992465.6366	104.74	103.25	104.75
CP-49	2121368.2150	5992452.0245	107.00	105.50	107.00
CP-50	2121362.8811	5992389.2128	119.00	117.50	119.00
CP-51	2121362.3259	5992380.0721	121.00	119.50	121.00
CP-54	2121366.9808	5992304.3871	138.00	136.50	138.00
CP-55	2121373.7108	5992300.2323	140.00	138.50	140.00
CP-58	2121433.6933	5992248.3654	151.94	150.44	151.94
CP-60	2121456.6391	5992183.0006	163.56	162.06	163.56
CP-61	2121457.7549	5992168.2860	167.00	165.50	167.00
CP-62	2121470.1563	5992162.7946	173.00	171.50	173.00
CP-63	2121472.5480	5992139.3249	174.00	172.50	174.00
CP-64	2121556.8051	5992104.6034	174.95	173.50	175.00
CP-65	2121568.4377	5992026.9980	180.13	178.63	180.13
CP-66	2121599.6296	5992011.8576	180.01	178.50	180.00
CP-67	2121601.3239	5992007.2547	180.18	178.68	180.18
CP-68	2121637.1099	5991990.6983	180.01	178.37	179.87
CP-69	2121653.8537	5991997.3138	178.00	176.50	178.00
CP-70	2121681.1121	5992024.3667	172.00	170.50	172.00
CP-71	2121700.3497	5992038.5809	166.00	164.50	166.00
CP-72	2121705.0685	5992045.3679	164.00	162.50	164.00

DG

Point	Northing	Easting	Elev. EG	Elev. RG	Elev. FG
DG-01	2121724.6780	5992207.3888	151.53	150.50	152.00
DG-02	2121733.3271	5992240.3846	144.65	143.54	145.00
DG-03	2121759.4458	5992245.4275	142.79	142.50	144.00
DG-04	2121778.2504	5992255.9175	137.92	136.50	138.00
DG-05	2121774.3527	5992271.7946	135.46	133.50	135.00
DG-06	2121757.4551	5992278.4781	135.63	133.32	134.70
DG-07	2121738.6515	5992257.0295	141.86	141.50	143.00
DG-08	2121726.2865	5992289.9085	139.34	141.51	143.00
DG-09	2121721.6660	5992299.7159	138.79	141.50	143.00
DG-10	2121710.0026	5992303.9225	139.82	141.50	143.00
DG-11	2121730.1672	5992337.0651	129.04	127.50	129.00
DG-12	2121709.3968	5992338.6392	136.10	135.50	137.00
DG-14	2121693.8226	5992328.7148	138.93	141.50	143.00
DG-15	2121699.5305	5992333.6917	137.95	138.50	140.00
DG-16	2121716.5572	5992362.8200	127.30	126.50	128.00
DG-17	2121699.3915	5992347.9085	135.72	135.50	137.00
DG-18	2121677.8558	5992328.8835	140.53	142.50	144.00
DG-19	2121651.5820	5992307.8671	149.66	149.50	151.00
DG-20	2121620.7806	5992289.0620	154.01	152.49	154.00
DG-21	2121621.6170	5992301.0840	151.98	150.50	152.00
DG-22	2121643.5165	5992313.0084	149.43	149.50	151.00
DG-23	2121660.5904	5992339.8231	140.67	142.50	144.00
DG-24	2121670.0853	5992354.7600	138.97	138.50	140.00
DG-25	2121690.3257	5992361.7185	135.32	135.50	137.00
DG-26	2121713.5402	5992368.1751	127.41	126.50	128.00
DG-28	2121691.2506	5992370.3664	135.09	135.50	137.00
DG-30	2121680.5791	5992376.6321	135.60	135.50	137.00
DG-31	2121670.2812	5992367.0224	139.01	138.50	139.00
DG-32	2121647.0283	5992342.5731	143.74	142.50	144.00
DG-33	2121643.3679	5992364.1618	138.40	138.50	140.00
DG-34	2121655.9639	5992383.7434	130.08	128.50	130.00
DG-35	2121658.2975	5992392.4477	132.02	131.50	133.00
DG-36	2121652.4401	5992393.2846	133.65	134.50	136.00
DG-37	2121641.4392	5992385.5749	135.46	135.50	137.00
DG-38	2121645.2492	5992393.6525	134.82	134.50	136.00
DG-39	2121618.9428	5992370.1132	139.45	140.50	142.00
DG-40	2121621.4893	5992386.7231	136.54	134.50	136.00
DG-41	2121634.4788	5992407.3056	126.11	124.50	126.00
DG-42	2121655.2239	5992431.4713	120.25	118.00	120.00
DG-43	2121638.0280	5992421.3054	123.44	121.00	123.00
DG-44	2121627.8830	5992412.7141	126.01	124.50	126.00
DG-45	2121600.0253	5992390.0011	136.10	138.50	140.00
DG-46	2121580.7218	5992380.5423	139.39	141.50	143.00
DG-48	2121610.4695	5992419.7918	128.42	129.50	131.00
DG-49	2121556.6642	5992423.6380	131.08	130.50	132.00
DG-50	2121555.5097	5992436.1433	126.79	125.26	127.00
DG-51	2121537.7841	5992404.7084	136.64	126.50	138.00
DG-52	2121529.8883	5992391.5385	139.03	140.50	142.00
DG-53	2121525.5538	5992352.7687	144.45	140.50	145.00
DG-54	2121508.9833	5992343.4514	145.18	126.50	146.00
DG-55	2121509.9649	5992313.1078	148.52	138.50	150.00
DG-56	2121507.4847	5992276.6451	153.84	141.50	153.00
DG-57	2121520.5035	5992388.5148	139.63	126.50	142.00
DG-58	2121506.8199	5992421.4035	128.54	141.50	128.00
DG-59	2121496.8011	5992381.5426	139.22	138.50	140.00
DG-60	2121491.2467	5992366.5905	141.93	130.55	143.00
DG-61	2121482.1628	5992407.7899	129.37	126.50	128.00
DG-62	2121468.6797	5992345.0004	142.94	141.50	143.00
DG-63	2121463.4570	5992352.4728	139.72	138.50	140.00
DG-64	2121458.1235	5992380.1741	131.84	130.55	132.00
DG-65	2121436.5445	5992383.5332	127.33	125.76	127.00
DG-66	2121441.3094	5992359.3286	133.97	131.50	133.00

DG continued

Point	Northing	Easting	Elev. EG	Elev. RG	Elev. FG
DG-67	2121442.8886	5992351.2562	136.76	135.50	137.00
DG-68	2121448.8638	5992337.7129	143.80	142.50	144.00
DG-69	2121438.7909	5992327.7440	144.79	140.75	145.00
DG-70	2121413.7977	5992353.0066	130.25	128.67	130.00
DG-71	2121417.9720	5992341.3820	134.71	133.20	133.00
DG-72	2121434.7596	5992288.4993	150.61	146.63	149.00
DG-73	2121422.8271	5992290.5706	146.42	142.25	143.00
DG-74	2121382.3236	5992338.9642	130.00	128.55	130.00
DG-75	2121369.3107	5992366.3357	123.11	121.50	123.00
DG-76	2121367.4077	5992382.1627	119.37	118.50	120.00
DG-77	2121379.1863	5992459.2295	107.00	105.50	107.00
DG-79	2121443.3137	5992273.1433	150.65	150.55	153.00
DG-80	2121439.4837	5992253.0793	152.59	146.28	152.00
DG-81	2121423.8486	5992263.6692	150.55	150.31	144.00
DG-82	2121464.3665	5992210.5034	150.00	158.50	160.00
DG-83	2121464.3184	5992184.3774	167.93	166.14	160.37
DG-84	2121472.4796	5992188.3894	169.73	169.50	171.00
DG-85	2121483.5488	5992216.3294	159.00	157.50	159.00
DG-86	2121492.2883	5992174.2317	170.86	170.50	172.00
DG-87	2121493.1212	5992168.7895	172.47	172.50	174.00
DG-88	2121520.8712	5992194.8881	167.31	168.50	170.00
DG-89	2121523.4539	5992225.7053	156.97	155.50	157.00
DG-90	2121591.0352	5992219.1402	159.87	158.50	160.00
DG-91	2121579.4674	5992199.1356	164.73	167.50	169.00
DG-92	2121583.2935	5992195.2983	165.13	167.50	169.00
DG-93	2121578.5809	5992171.8199	167.35	169.50	171.00
DG-94	2121583.1012	5992170.8706	167.11	169.50	171.00
DG-95	2121597.0503	5992167.9412	166.73	169.50	171.00
DG-96	2121589.2003	5992144.6389	169.37	170.50	172.00
DG-97	2121585.5546	5992141.0727	171.36	172.50	174.00
DG-98	2121594.8619	5992117.6791	173.51	174.50	176.00
DG-99	2121649.4850	5992138.1058	160.99	159.50	161.00
DG-100	2121633.1736	5992076.9584	170.93	170.50	172.00
DG-101	2121659.1316	5992077.2309	168.33	170.50	172.00
DG-102	2121638.7663	5992043.0319	174.93	174.50	176.00
DG-103	2121628.1720	5992031.5369	175.19	174.50	176.00
DG-104	2121617.2428	5992010.4794	178.66	177.50	179.00
DG-105	2121639.8091	5991999.9370	178.97	177.50	179.00
DG-106	2121657.5577	5992022.2325	175.64	174.50	176.00
DG-107	2121663.3196	5992016.6540	175.95	174.50	176.00
DG-108	2121664.1494	5992042.0558	172.87	171.40	173.00
DG-109	2121669.3706	5992041.2705	172.54	170.50	173.00
DG-110	2121674.3007	5992056.3783	170.31	170.50	172.00
DG-111	2121677.8271	5992051.5307	169.82	170.19	171.69
DG-112	2121680.2634	5992223.6194	154.08	152.50	154.00
DG-113	2121685.7077	5992225.9907	151.95	150.50	152.00
DG-114	2121686.5516	5992202.3977	153.86	152.50	154.00
DG-115	2121694.7458	5992206.8735	152.31	150.50	152.00

NOTES:

1. SITE FEATURES AND TOPOGRAPHY PROVIDED BY PRESIDIO TRUST AS PERFORMED BY TOWILL DURING OCTOBER 29-NOVEMBER 4, 2015. SURVEY CONTROL POINTS FOR THE WORK ARE SHOWN ON C-106.
2. CONTRACTOR WILL DOCUMENT EXISTING CONDITIONS OF SITE ROADWAYS PRIOR TO START OF CONSTRUCTION.
3. APPROXIMATE LOCATION OF KNOWN UTILITIES ARE SHOWN ON THE PLANS. THE CONTRACTOR SHALL VERIFY UTILITY LOCATIONS AND NOTIFY THE RESPECTIVE UTILITY COMPANIES FOR FIELD LOCATION AND VERIFICATION PRIOR TO ALL CONSTRUCTION. THE CONTRACTOR SHALL VERIFY LOCATIONS AND ELEVATIONS OF ALL EXISTING PIPES AND BURIED UTILITIES. THE ENGINEER ASSUMES NO RESPONSIBILITY FOR THE COMPLETENESS OR ACCURACY OF DELINEATION SHOWN ON PLANS OR THOSE OF EXISTING UNDERGROUND UTILITIES THAT MAY BE ENCOUNTERED, BUT WHICH ARE NOT SHOWN ON THE PLAN. WHERE EXISTING UTILITY ELEVATIONS ARE IDENTIFIED, THE CONTRACTOR SHALL VERIFY ELEVATIONS IN THE FIELD AT THE LOCATION INDICATED. CONTRACTOR SHALL NOTIFY UNDERGROUND SERVICE ALERT (USA) A MINIMUM OF 3 BUSINESS DAYS PRIOR TO CONSTRUCTION ACTIVITIES.
4. EG = EXISTING GRADE
5. RG = ROUGH GRADE
6. FG = FINAL GRADE
7. CP = CONTROL POINT
8. DG = DESIGN GRADE

REGISTERED PROFESSIONAL ENGINEER
WARREN B. CHAMBERLAIN
No. C 60853
Exp. 12/31/2016
5-10-16
CIVIL
STATE OF CALIFORNIA

SOURCE: Base plan by Towill, October 29-November 4, 2015

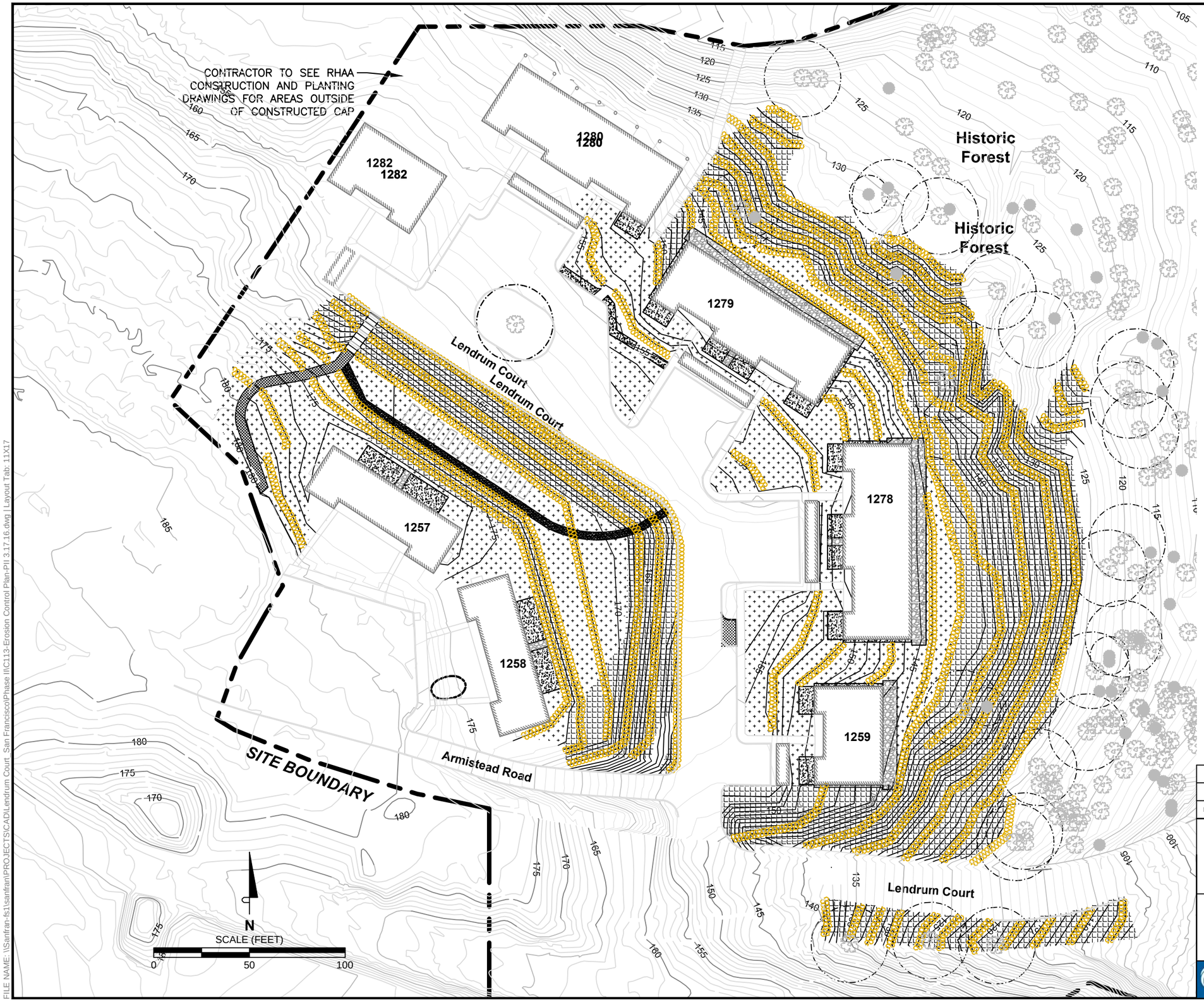
REV	DATE	DESCRIPTION	DESIGN BY	CHK'D BY
B	5/10/16	CONSTRUCTION 100%	J H-D	WBC
A	1/21/16	CONSTRUCTION 60%	J H-D	WBC

Lendrum Court Area
The Presidio Trust
San Francisco, California

EXCAVATION AND POST CONSTRUCTION TOPOGRAPHIC GRADING CONTROL POINTS

TRC Results you can rely on | 229649 | REV B | SHEET C-112

FILE NAME: \\Sanfran-fs1\sanfran\PROJECTS\CAD\Lendrum Court - San Francisco\Phase II\C-112 EXCAVATION AND POST CONSTRUCTION TOPOGRAPHIC GRADING CONTROL POINTS-PII 5.10.16.dwg | Layout Tab: 11x17 B&W



LEGEND

ECTC TYPE 4 EROSION CONTROL BLANKET ANCHORING PATTERN A, SEE DETAIL 2, C-116

ECTC TYPE 4 EROSION CONTROL BLANKET ANCHORING PATTERN B, SEE DETAIL 2, C-116

FIBER ROLL (STRAW WATTLE)

REGISTERED PROFESSIONAL ENGINEER
WARREN B. CHAMBERLAIN
No. C 60853
Exp. 12/31/2016
5-10-16
STATE OF CALIFORNIA

NOTES:

1. EROSION CONTROL IMPROVEMENTS WILL BE CONSTRUCTED IMMEDIATELY FOLLOWING COMPLETION OF GRADING AND WILL REMAIN AS IMPROVEMENTS.
2. CHANGES TO THIS EROSION CONTROL PLAN WILL BE MADE ONLY WITH APPROVAL OR AT THE DIRECTION OF THE TRUST.
3. CONTRACTOR SHALL PROTECT ALL SUBSURFACE STRUCTURES INCLUDING DRAINAGE PIPES.
4. ROLLED EROSION CONTROL PRODUCTS (RECP) OR EROSION CONTROL BLANKETS SHALL MEET OR EXCEED EROSION CONTROL TECHNOLOGY COUNCIL (ECTC) SPECIFICATIONS.
6. ALL EROSION CONTROL PRODUCTS, INCLUDING FASTENERS, SHALL BE 100% BIODEGRADABLE.
7. CONTRACTOR SHALL APPLY EROSION CONTROLS TO ALL AREAS CLEARED/GRUBBED OR OTHERWISE DISTURBED BY CONSTRUCTION ACTIVITIES. ACTUAL EROSION CONTROL AREA MAY VARY.
8. CONTRACTOR TO INSTALL STRAW MULCH BELOW EROSION CONTROL BLANKETS AND NETTING ACROSS THE ENTIRE REMEDIATION AREA PRIOR TO INSTALLATION.
9. REFER TO THE SITE SPECIFIC SWPPP (RDIP FIGURE 2) FOR TEMPORARY EROSION CONTROLS DURING CONSTRUCTION.
10. CONTRACTOR TO SPREAD GRASS CLIPPINGS FROM CLEARING AND GRUBBING AS DIRECTED BY ENGINEER.

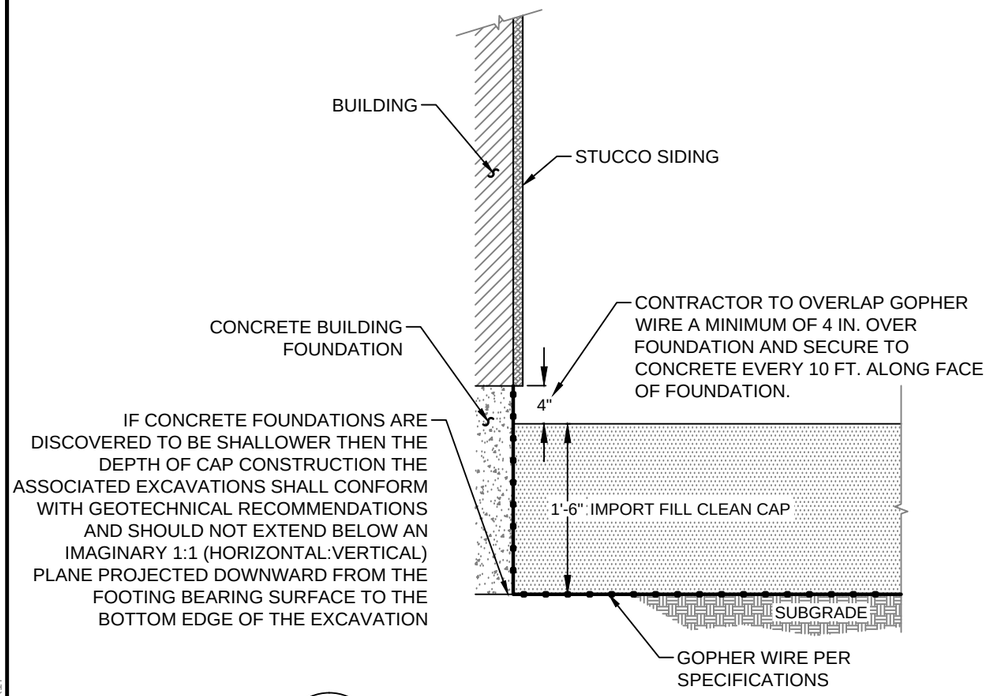
SOURCE: Base plan by Towill, October 29-November 4, 2015

REV	DATE	DESCRIPTION	DESIGN BY	CHK'D BY
B	3/25/16	100% Design Drawing	J H-D	WBC
A	1/21/16	60% Design Drawing	J H-D	WBC

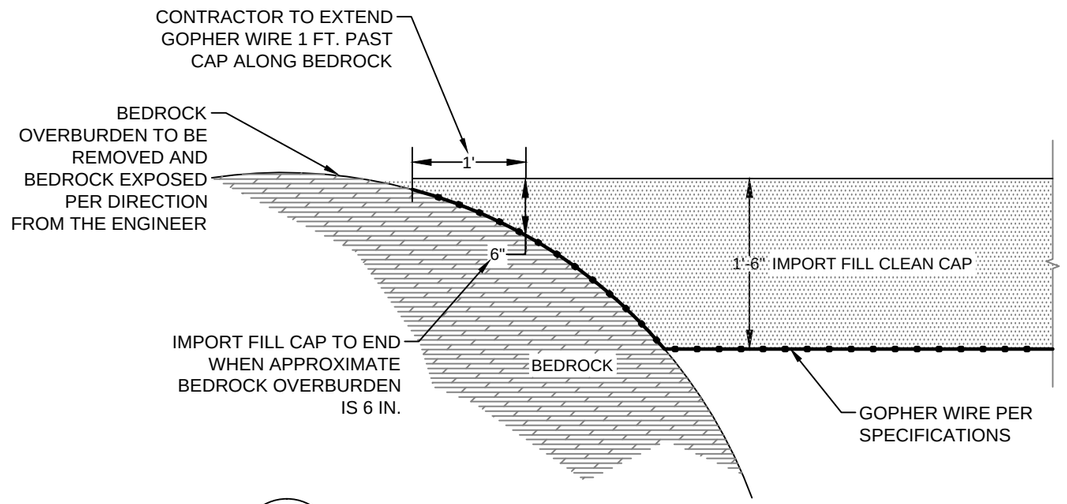
Lendrum Court Area
The Presidio Trust
San Francisco, California

FINAL EROSION CONTROL PLAN

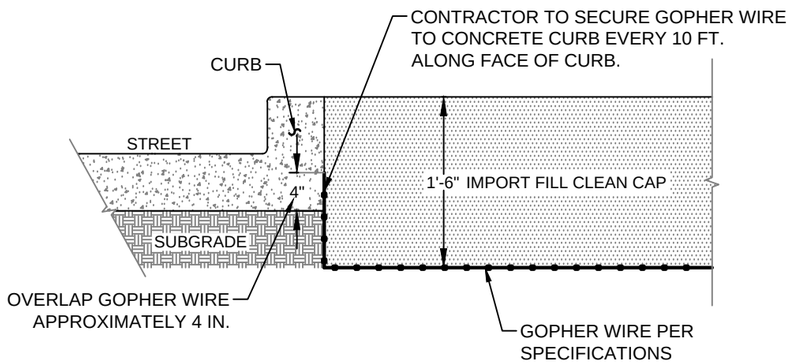
TRC Results you can rely on | 229649 | REV B | SHEET C-113



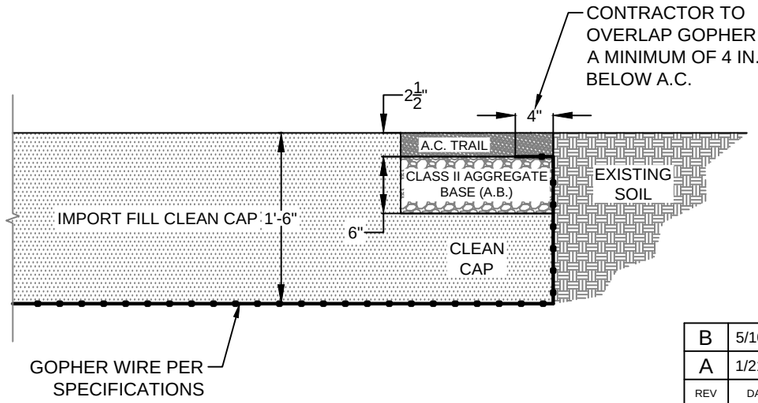
1 C-114 TYP. BUILDING CONFORMANCE DETAIL



2 C-114 TYP. BEDROCK CONFORMANCE DETAIL



3 C-114 TYP. CURB CONFORMANCE DETAIL



4 C-114 TYP. A.C. PATH CONFORMANCE DETAIL

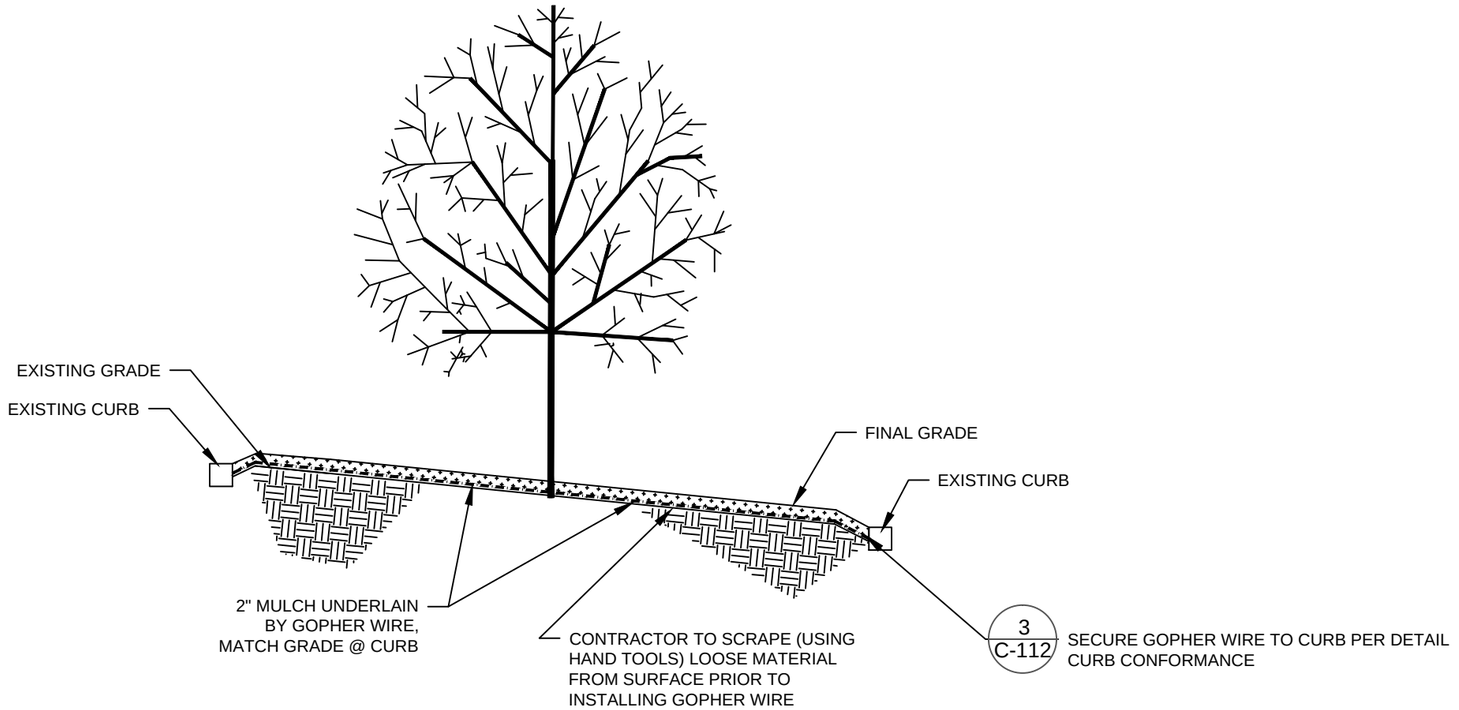
REGISTERED PROFESSIONAL ENGINEER
WARREN B. CHAMBERLAW
No. C 60853
Exp. 12/31/2016
5-10-16
CIVIL
STATE OF CALIFORNIA

REV	DATE	DESCRIPTION	DESIGN BY	CHK'D BY
B	5/10/16	CONSTRUCTION 100%	J H-D	WBC
A	1/21/16	CONSTRUCTION 60%	J H-D	WBC

Lendrum Court Area
The Presidio Trust
San Francisco, California

DETAILS - CONFORMANCE

TRC | 229649 | REV B | SHEET C-114



1
C-115

TREE DETAIL

(NOT TO SCALE)

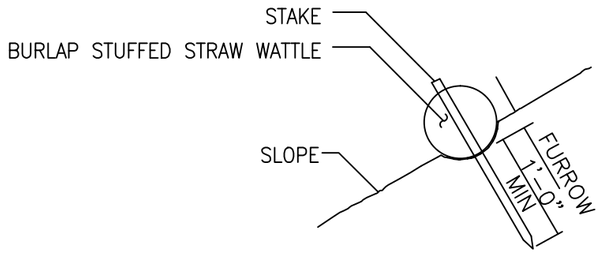
REGISTERED PROFESSIONAL ENGINEER
WARREN B. CHAMBERLAIN
No. C 60853
Exp. 12/31/2016
5-10-16
CIVIL
STATE OF CALIFORNIA

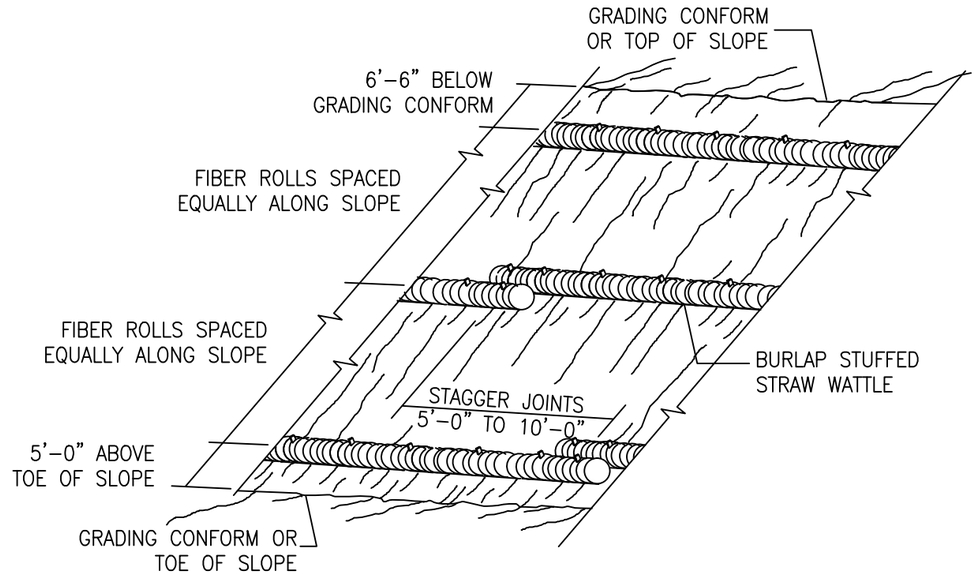
REV	DATE	DESCRIPTION	DESIGN BY	CHK'D BY
B	3/25/16	CONSTRUCTION 100%	J H-D	WBC
A	1/21/16	CONSTRUCTION 60%	J H-D	WBC

Lendrum Court Area
The Presidio Trust
San Francisco, California

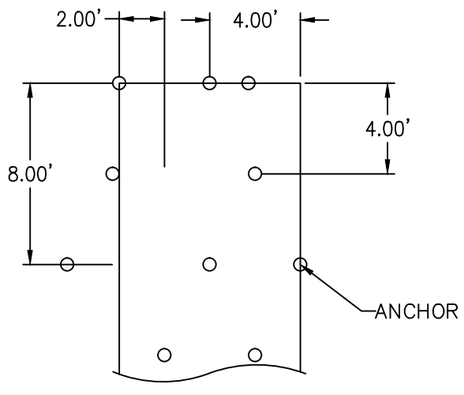
DETAILS -TREE PROTECTION CAP

TRC | 229649 | REV **B** | SHEET **C-115**





DETAIL 1- STRAW WADDLE LAYDOWN AND STAKING



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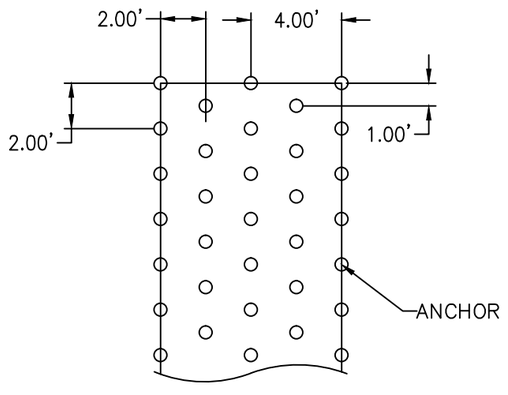


B

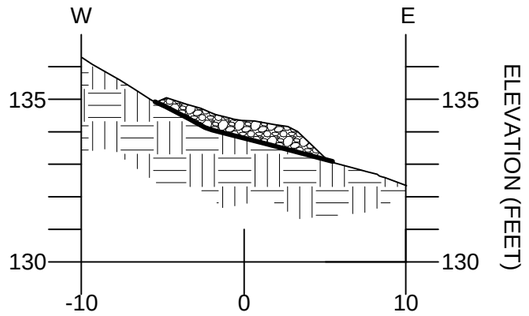
DETAIL 2- ANCHORING PLAN

REV	DATE	DESCRIPTION	DESIGN BY	CHK'D BY
B	3/25/16	100% Design Drawing	J H-D	WBC
A	1/21/16	60% Design Drawing	J H-D	WBC

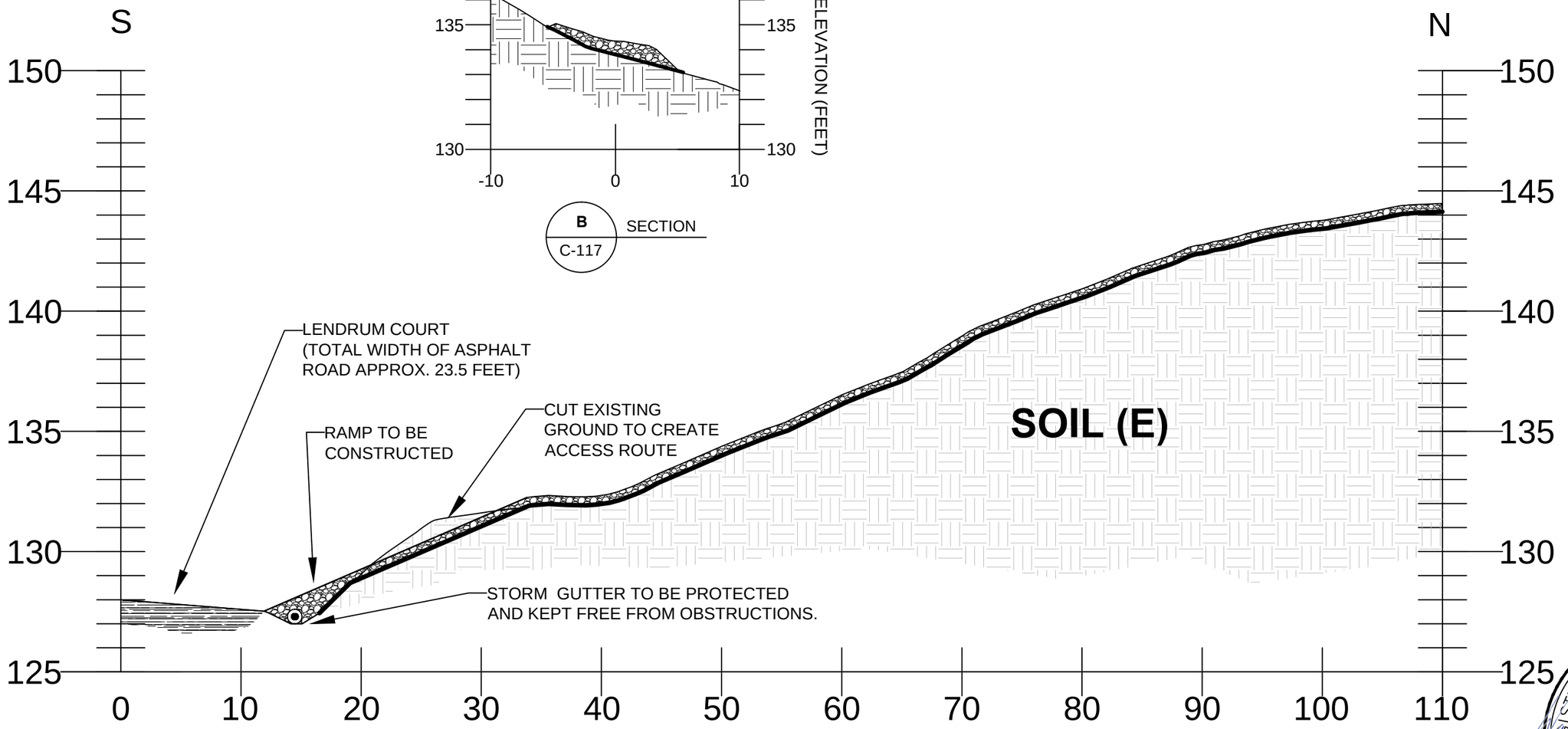
Lendrum Court Area
The Presidio Trust
San Francisco, California

DETAILS-EROSION CONTROLS

TRC | 229649 | REV B | SHEET C-116



B
C-117
SECTION



A
C-117
PROFILE

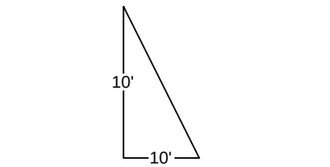
REGISTERED PROFESSIONAL ENGINEER
WARREN B. CHAMBERLAIN
No. C 60853
Exp. 12/31/2016
5-10-16
CIVIL
STATE OF CALIFORNIA

LEGEND

- 4 INCH AB LAYER
- GEOTEXTILE FABRIC LAYER
- PIPE TO BE PLACED BELOW RAMP/GUTTER PROTECTION TO ENSURE CONTINUED PROPER STORMWATER DRAINAGE
- EXISTING GROUND

NOTES:

1. CONTRACTOR WILL BE RESPONSIBLE FOR MAINTAINING TEMPORARY ACCESS ROAD DURING SITE ACTIVITIES.
2. EXISTING HILLSIDE WILL BE CLEARED OF VEGETATION AND GEOTEXTILE FABRIC WILL BE STAKED DOWN ON UNDERLYING SOIL.
3. APPROXIMATELY 4 INCHES OF AB WILL BE PLACED OVER GEOTEXTILE FABRIC TO CONSTRUCT ACCESS ROAD.
4. TEMPORARY ACCESS ROAD WILL BE CONSTRUCTED WITH MINIMUM 5 FEET SET BACK FROM NEAREST TREES.
5. CONTRACTOR WILL PROVIDE FINAL ACCESS ROUTE DESIGN IN PRE-CONSTRUCTION SUBMITTAL.
6. ARBORIST WILL BE PRESENT TO OBSERVE WORK PERFORMED WITHIN 20 FEET OF TREES.
7. RESIDENT ACCESS SHALL BE MAINTAINED THROUGOUT PROJECT DURATION VIA LENDRUM COURT.
8. SLOPE OF GRAVEL PLACEMENT AT EDGES OF TEMPORARY ACCESS ROAD IS NOT TO EXCEED A SLOPE OF 3:1.
9. NO MATERIALS, EQUIPMENT, SOIL, WASTE OR WASH-OUT MAY BE DEPOSITED, STORED, OR PLACED WITHIN THE TREE PROTECTION ZONES.



REV	DATE	DESCRIPTION	DRAWN BY	CHK'D BY
B	3/25/16	100% Design Drawing	J H-D	WBC
A	1/21/16	60% Design Drawing	J H-D	WBC

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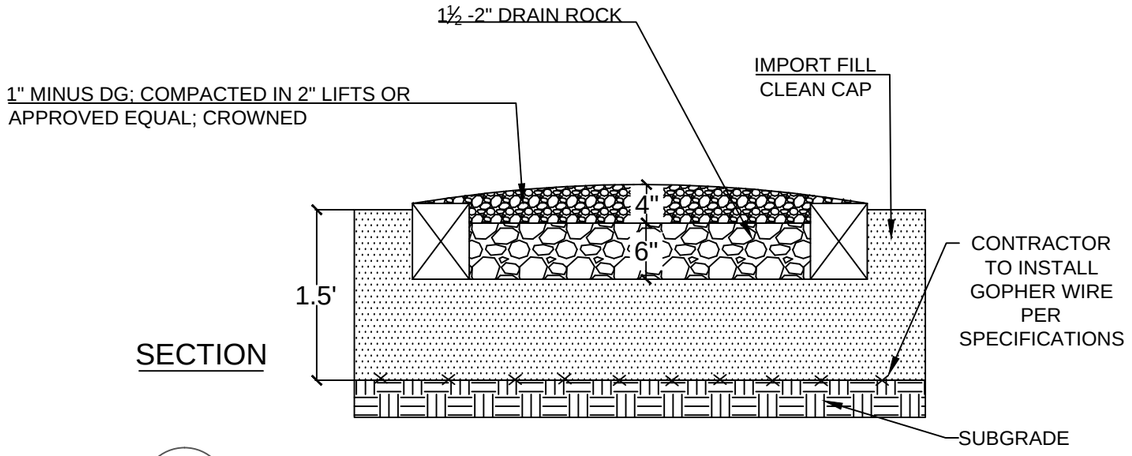
DETAILS
TEMPORARY ACCESS ROAD

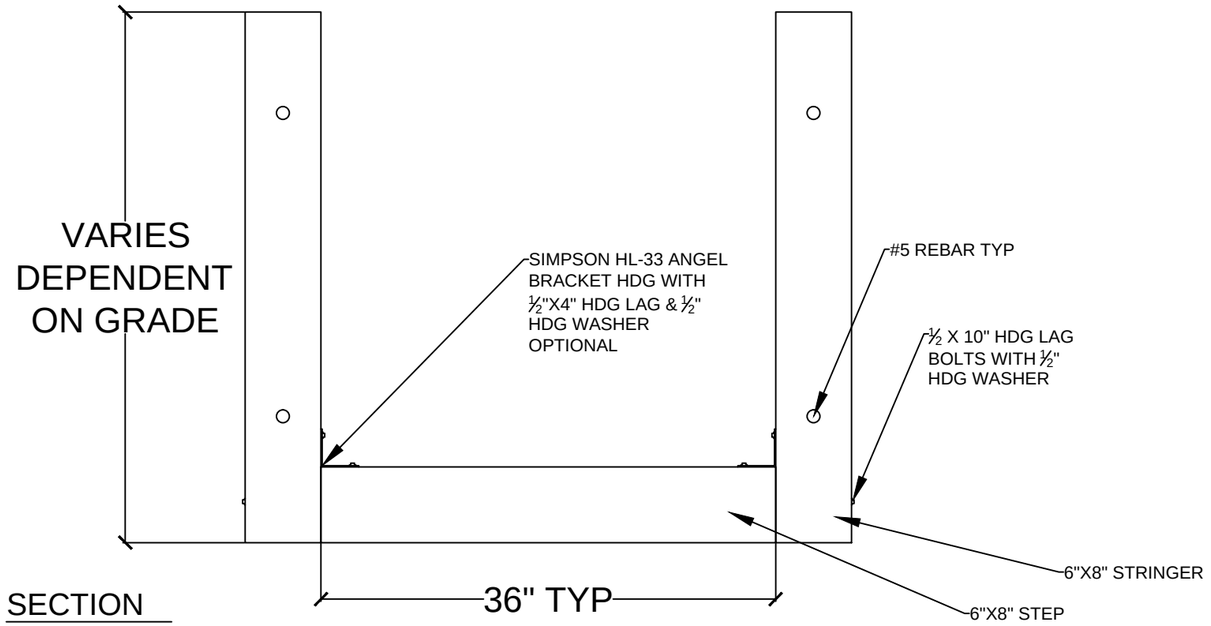
TRC | 229649 | REV B | SHEET C-117



SECTION

1 / C-118 BOX STEP FILL CROSS SECTION

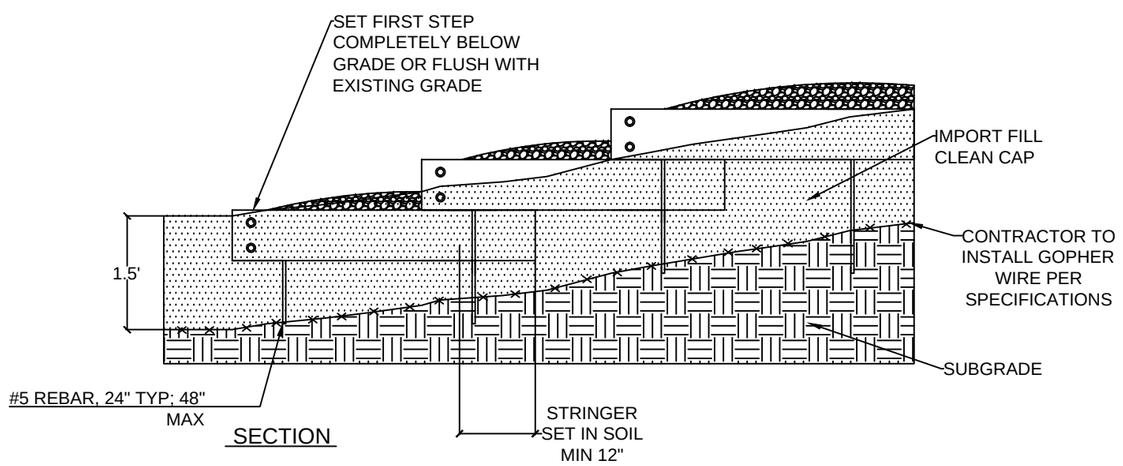
1" = 1'-4"



SECTION

3 / C-118 BOX STEP PLAN VIEW

1" = 1'-0"



SECTION

2 / C-118 BOX STEP FINISHED GRADE PROFILE VIEW

1" = 2'-0"

NOTES:

1. ALL WOOD ACQ GREEN.
2. ALL HARDWARE HOT-DIPPED GALVANIZED.
3. ALL HOLES PREDRILLED.
4. ALL CUT LUMBER ENDS ARE TO BE TREATED WITH COPPER NAPHTENATE OR EQUIVALENT FUNGI/INSECTICIDE WOOD PRESERVATIVE TREATMENT (JASCO).
5. MINIMUM 4" TREAD MATERIAL INSTALLED IN SMALL LIFTS. MAINTAIN PROPER MOISTURE THROUGHOUT.
6. THE COMPLETED TREAD SURFACE SHALL HAVE A CROWNED CENTER THAT ALLOWS WATER TO SHED OFF THE STRUCTURE.
7. CUT JOINTS MUST BE FLUSH WITH OUTSIDE FACES AND TOPS, ALLOWING NO FILL MATERIAL TO ESCAPE.
8. THE MAXIMUM RISE IS 8" AND THE MINIMUM RUN IS 12".
9. THE STRUCTURE SHOULD BE RECEDED INTO HILLSIDE AS MUCH AS POSSIBLE.

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No. C 60853
Exp. 12/31/2016
5-10-16
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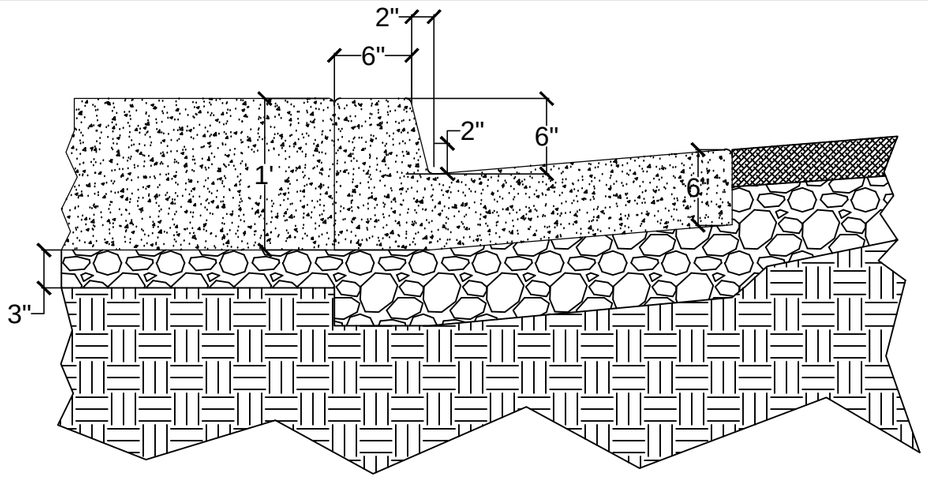
DETAILS-BOX STEP

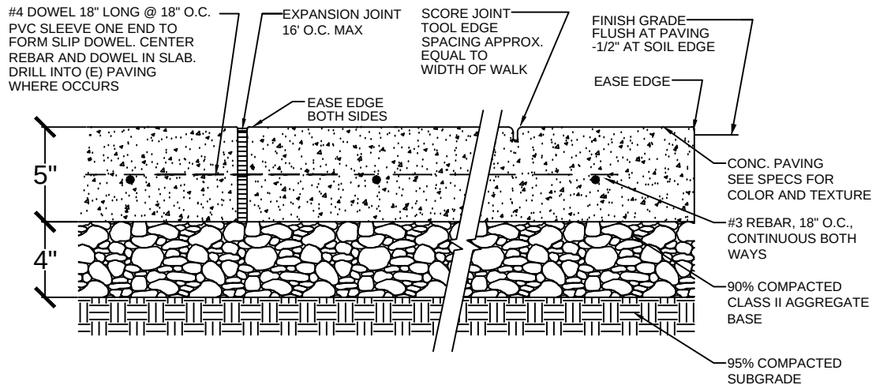
TRC | 229649 | REV **B** | SHEET **C-118**



SECTION

1 / C-119 CURB CONSTRUCTION

1" = 1'-0"

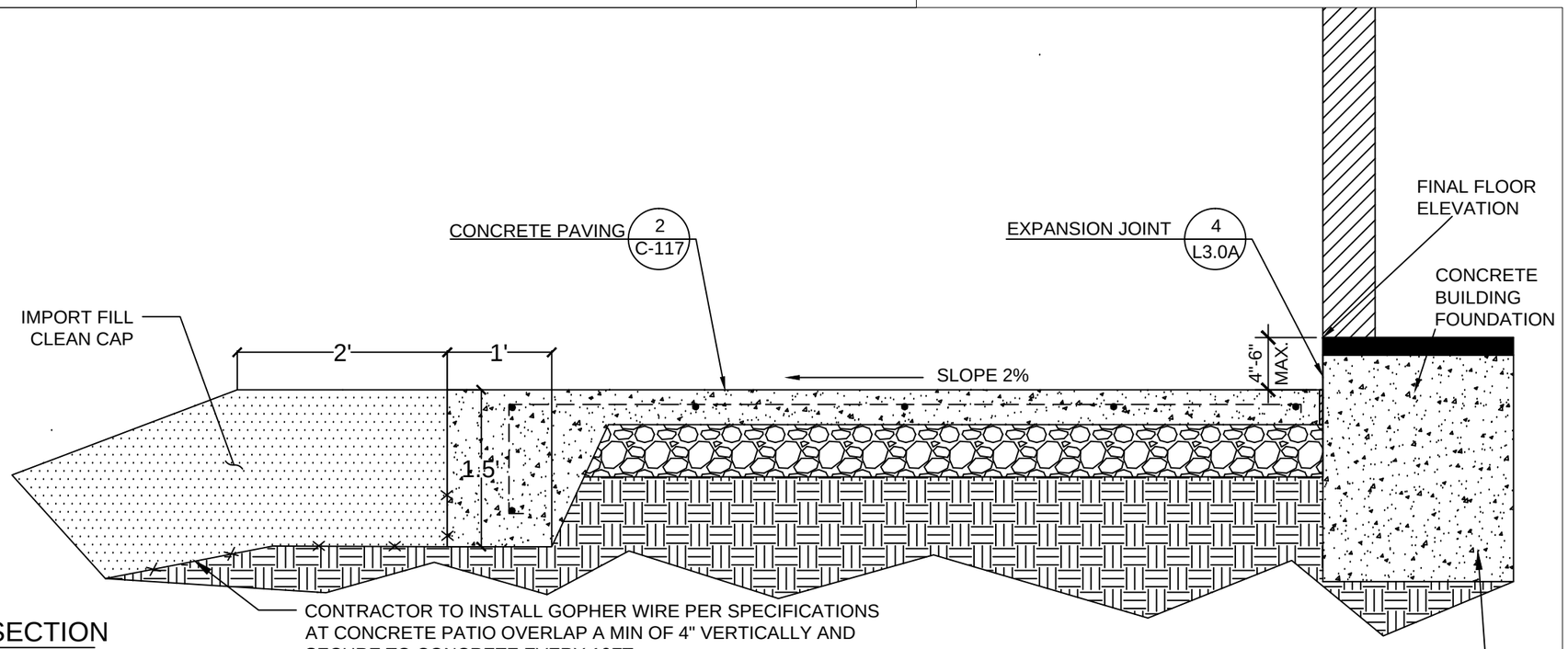


2 / C-119 CONCRETE PAVING

1" = 8"

LEGEND

- SUBGRADE SOIL
- CONCRETE
- AGGREGATE BASE
- ASPHALT
- IMPORT CLEAN FILL



SECTION

3 / C-119 CONCRETE PATIO

1" = 1'-4"

NOTES:

1. MINIMUM WIDTH OF CLEAR PASSAGEWAY FOR SIDEWALK SHALL BE 4'-2".
2. THREE INCHES OF AGGREGATE BASE IS REQUIRED BENEATH SIDEWALKS AND 6" BENEATH CURBS.
3. AGGREGATE BASE MUST BE COMPACTED ACCORDING TO CALTRANS SPECIFICATIONS.
4. DURING SIDEWALK AND CURB REPAIR, ENTIRE SECTION BETWEEN CONTRACTION OR EXPANSION JOINTS MUST BE REPLACED.

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DETAILS - CURB AND CONCRETE CONSTRUCTION

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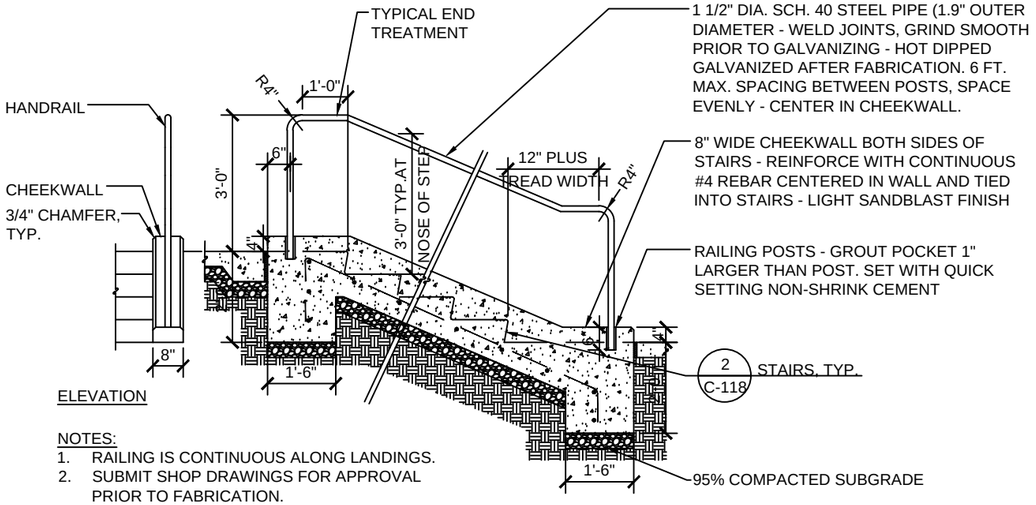
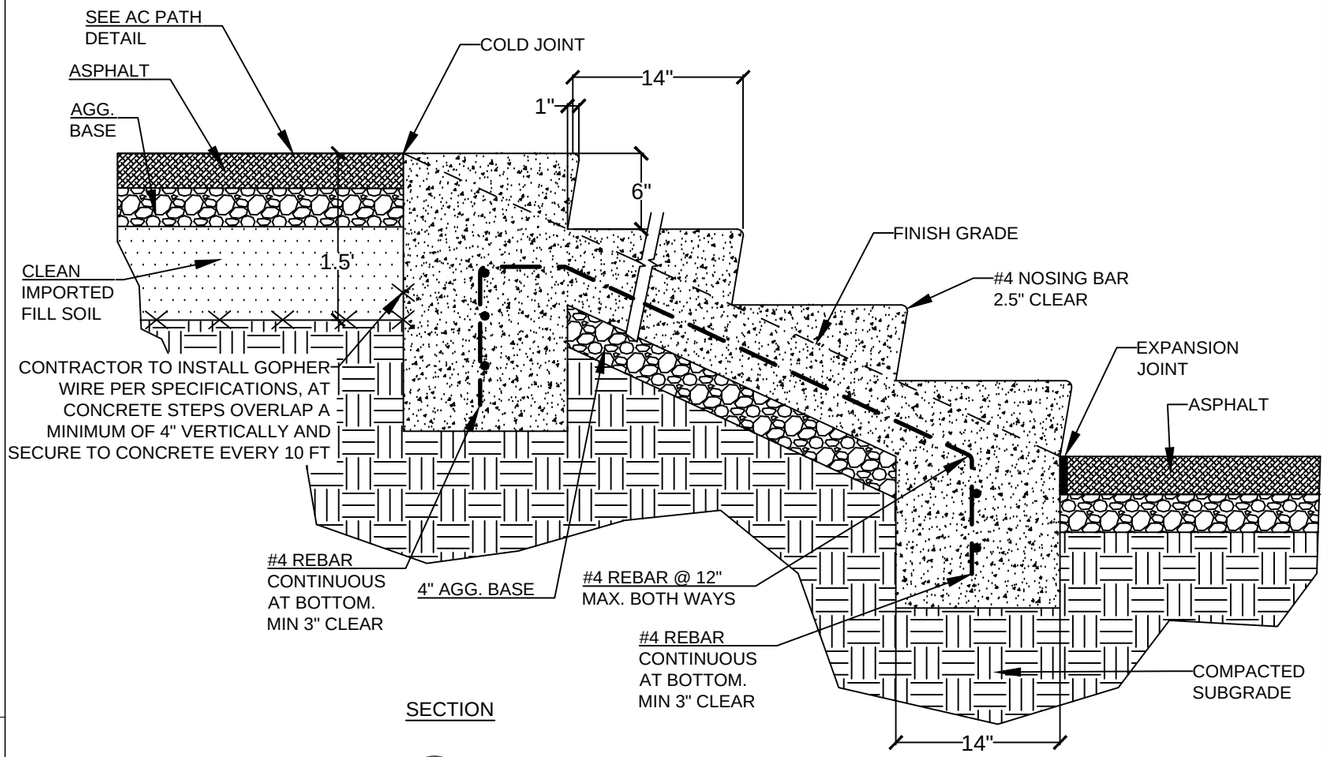


ELEVATION

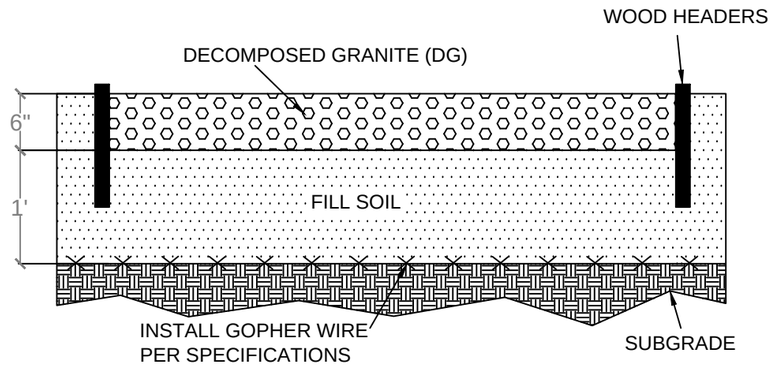
NOTES:
1. RAILING IS CONTINUOUS ALONG LANDINGS.
2. SUBMIT SHOP DRAWINGS FOR APPROVAL PRIOR TO FABRICATION.
3. PAINT HANDRAIL BLACK, SEMIGLOSS, PER SPECIFICATIONS.

1 C-120 **HANDRAIL**
NTS



SECTION

2 C-120 **CONCRETE STEPS**
NTS



NOTES:
1. SIX INCHES OF DG TO BE PLACED OVER 1' OF SOIL.

SECTION

3 C-120 **DG PATH CROSS SECTION**
1" = 1'-4"

LEGEND

- SUBGRADE SOIL
- CONCRETE
- AGGREGATE BASE
- DECOMPOSED GRANITE
- ASPHALT

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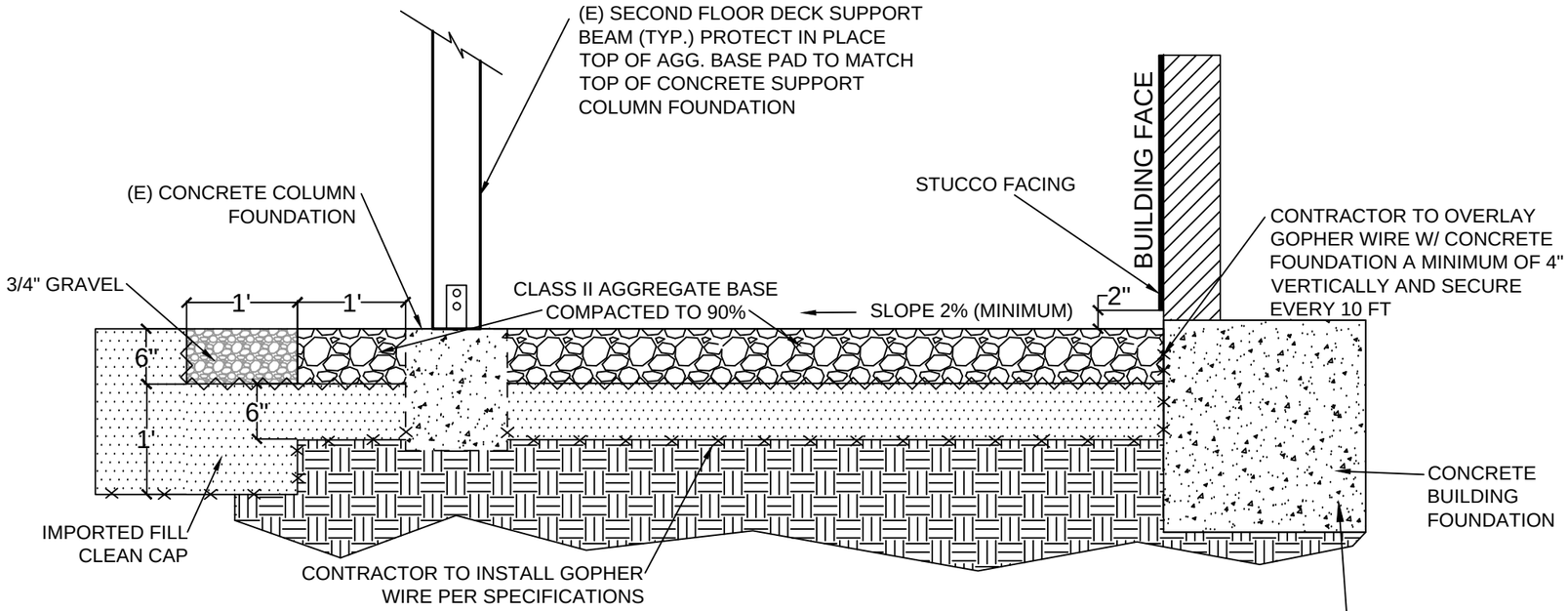
DETAILS - CONCRETE STEPS AND DG PATH

TRC | 229649 | REV B | SHEET C-120

FILE NAME: \\Sanfran-fs1\sanfran\PROJECTS\CAD\Lendrum Court_San Francisco\Phase III\C-118 119 120 121 122 Details-PII 5.10.16.dwg | Layout Tab: C-120



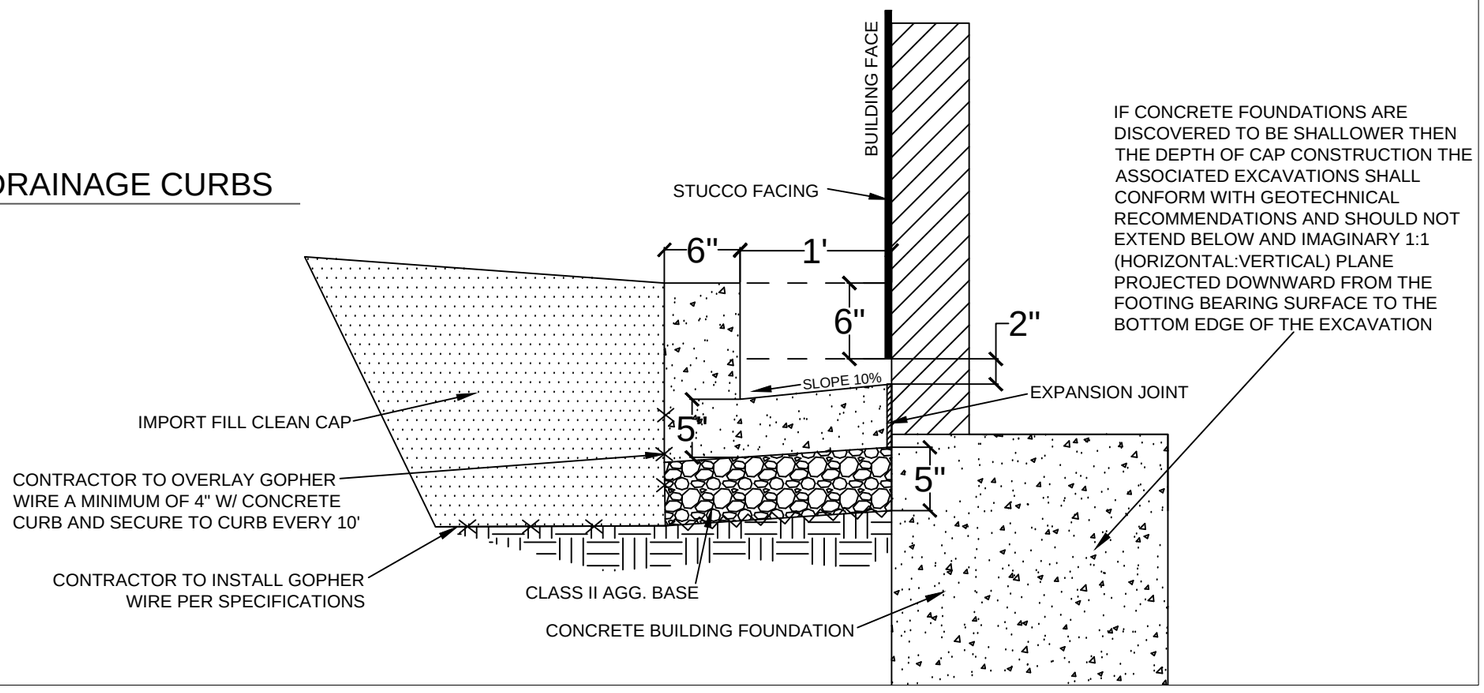
SECTION

1 / C-121 AGGREGATE BASE PAD

1" = 1'-4"

LEGEND

- SUBGRADE SOIL
- CONCRETE
- AGGREGATE BASE
- ASPHALT
- FILL SOIL
- GRAVEL
- GEOTEXTILE FABRIC
- GOPHER WIRE



SECTION

2 / C-121 BUILDING DRAINAGE CURBS

1" = 1'-0"

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A	1/21/16	60% Design Drawing	J H-D	WBC

Lendrum Court Area
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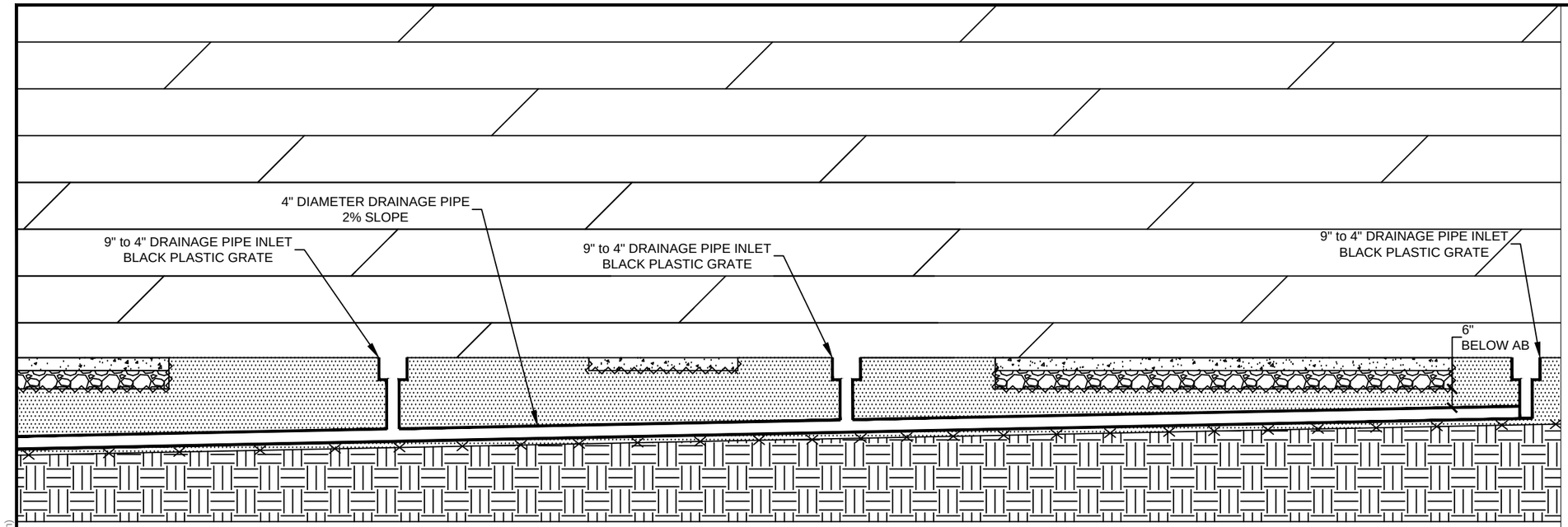
San Francisco, California

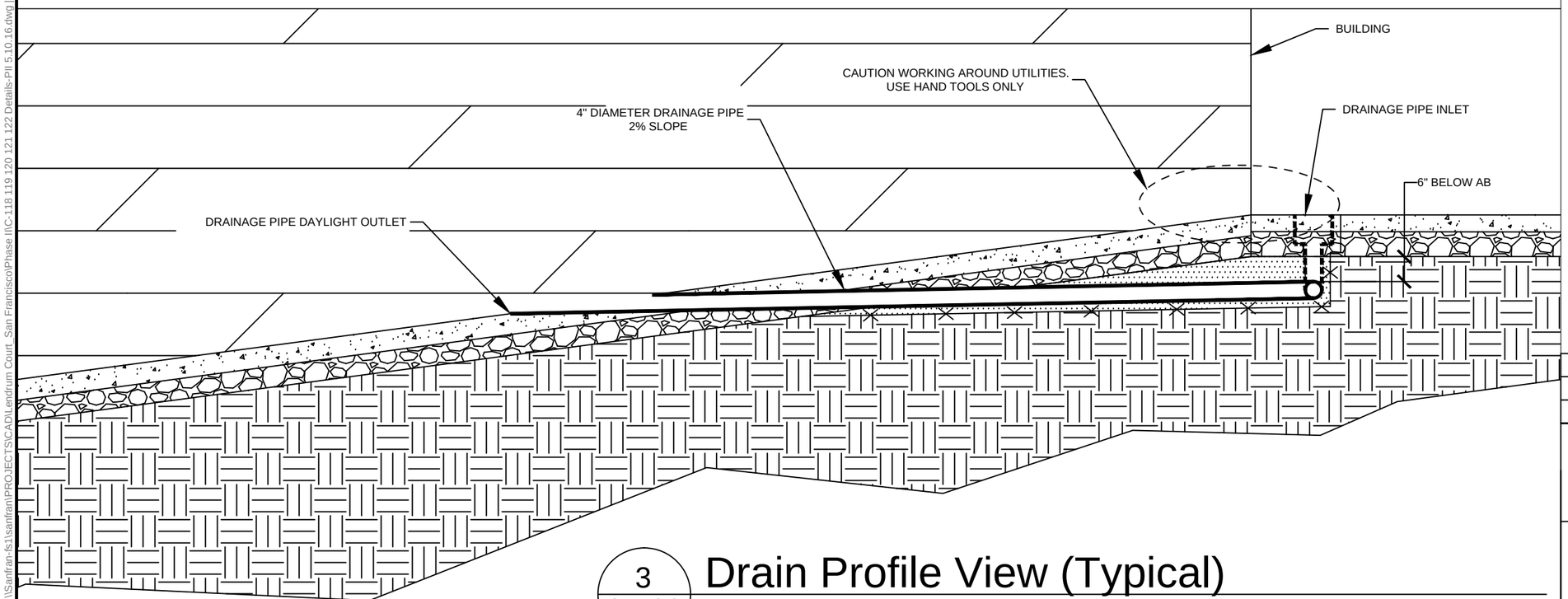
DETAILS -AB PAD AND BUILDING DRAINAGE

TRC | 229649 | REV B | SHEET C-121



2
C-122

Drain Profile View (Typical)



3
C-122

Drain Profile View (Typical)

LEGEND

- SUBGRADE SOIL
- CONCRETE
- AGGREGATE BASE
- ASPHALT
- FILL SOIL
- SIDE OF BUILDING
- DRAINAGE PIPE
- DRAINAGE INLET
- GEOTEXTILE FABRIC
- GOPHER WIRE

NOTES:

1. USE GREYDOCK StormDrain FSD-090-RCB 9" ROUND BLACK CATCH BASIN, WITH 4" BOTTOM OUTLET, OR EQUIVALENT.
2. USE 9" ROUND BLACK GRATE FOR INLET.
3. USE 4" DIAMETER SCH 40 PVC PIPE FOR SUBSURFACE DRAIN.
4. DRAINAGE TO BE CONSTRUCTED BEFORE HARDSCAPE FEATURES. HARDSCAPE FEATURES ARE TO BE BUILT AROUND THE DRAINAGE.

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REV	DATE	DESCRIPTION	DESIGN BY	CHK'D BY
A	3/25/16	100% Design Drawing	J H-D	WBC

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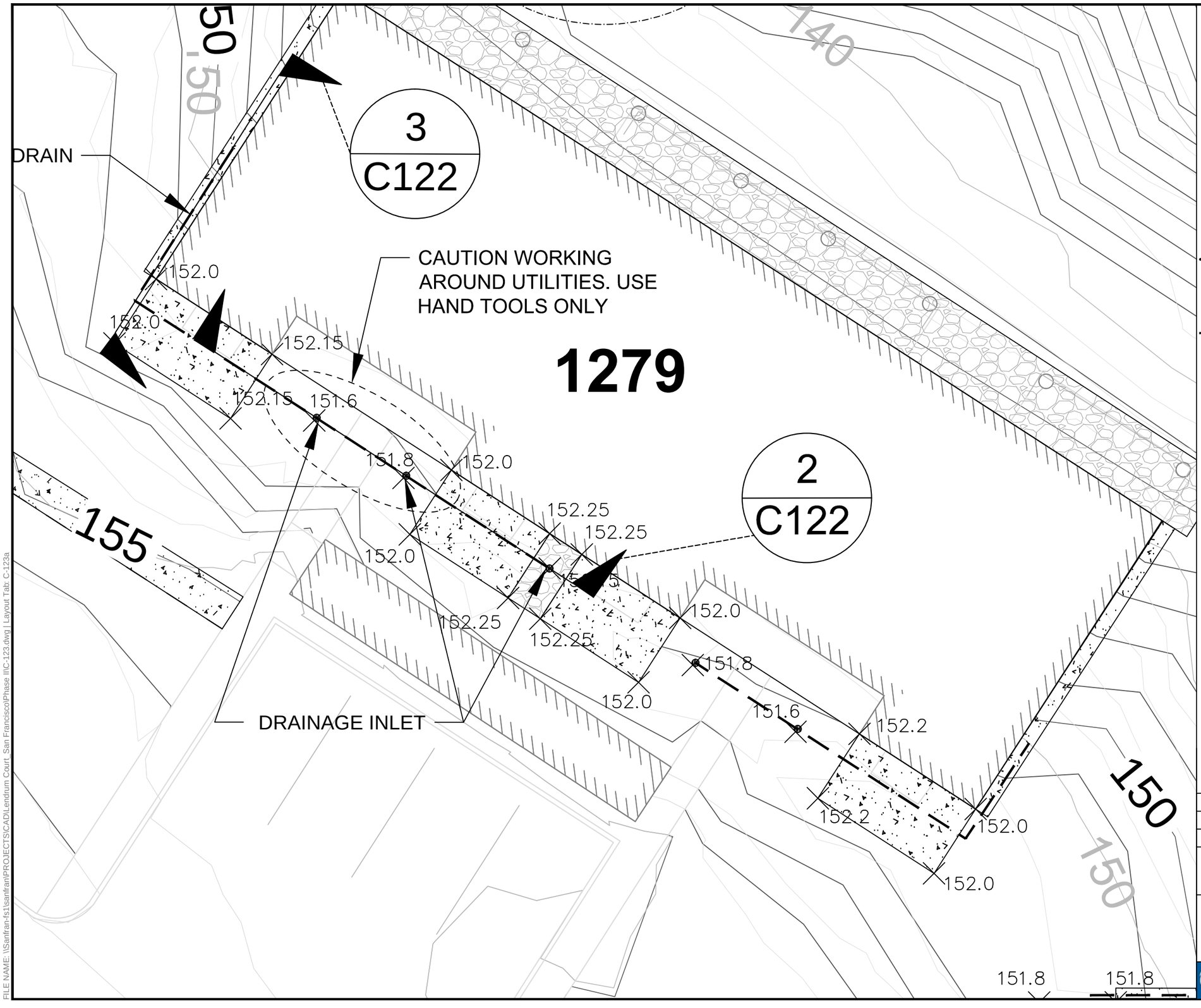
DETAILS -BUILDING DRAINAGE PIPE

TRC | 229649 | REV A | SHEET C-122



LEGEND

- SITE TREE
- TOYON (HETEROMELES ARBUTIFOLIA)
- 140 FINAL GRADE CONTOURS
- 140 EXISTING GRADE CONTOURS
- NEW CONCRETE PATIO/SIDEWALK/STAIRS
- NEW DG PATH
- NEW ASPHALT PATH
- GRAVEL CAP
- TREE PROTECTION ZONE
- EDGE OF CAP
- 151.8 SPOT ELEVATION
- TRACE OF DRAINAGE PIPE

REGISTERED PROFESSIONAL ENGINEER
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No. C 60853
Exp. 12/31/2016
5-10-16
CIVIL
STATE OF CALIFORNIA

N

SCALE (FEET)
0 10 20

SOURCE: Base plan by Towill, October 29-November 4, 2015

REV	DATE	DESCRIPTION	DESIGN BY	CHK'D BY
B	3/25/16	100% Design Drawing	J H-D	WBC
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San Francisco, California

BUILDING DRAINAGE GRADING PLAN

TRC Results you can rely on | 229649 | REV B | SHEET C-123a

FILE NAME: \\Sanfran-fs1\sanfran\PROJECTS\CAD\Lendrum Court, San Francisco\Phase II\C-123.dwg | Layout Tab: C-123a

2
C122

DRAINAGE INLET

1278

LEGEND

- SITE TREE
- TOYON (HETEROMELES ARBUTIFOLIA)
- 140 — FINAL GRADE CONTOURS
- 140 — EXISTING GRADE CONTOURS
- NEW CONCRETE PATIO/SIDEWALK/STAIRS
- NEW DG PATH
- NEW ASPHALT PATH
- GRAVEL CAP
- TREE PROTECTION ZONE
- EDGE OF CAP
- 151.8 — SPOT ELEVATION
- TRACE OF DRAINAGE PIPE

REGISTERED PROFESSIONAL ENGINEER
WARREN B. CHAMBERLAIN
No. C 60853
Exp. 12/31/2016
5-10-16
CIVIL
STATE OF CALIFORNIA

N

SCALE (FEET)
0 20 40

SOURCE: Base plan by Towill, October 29-November 4, 2015

REV	DATE	DESCRIPTION	DESIGN BY	CHK'D BY
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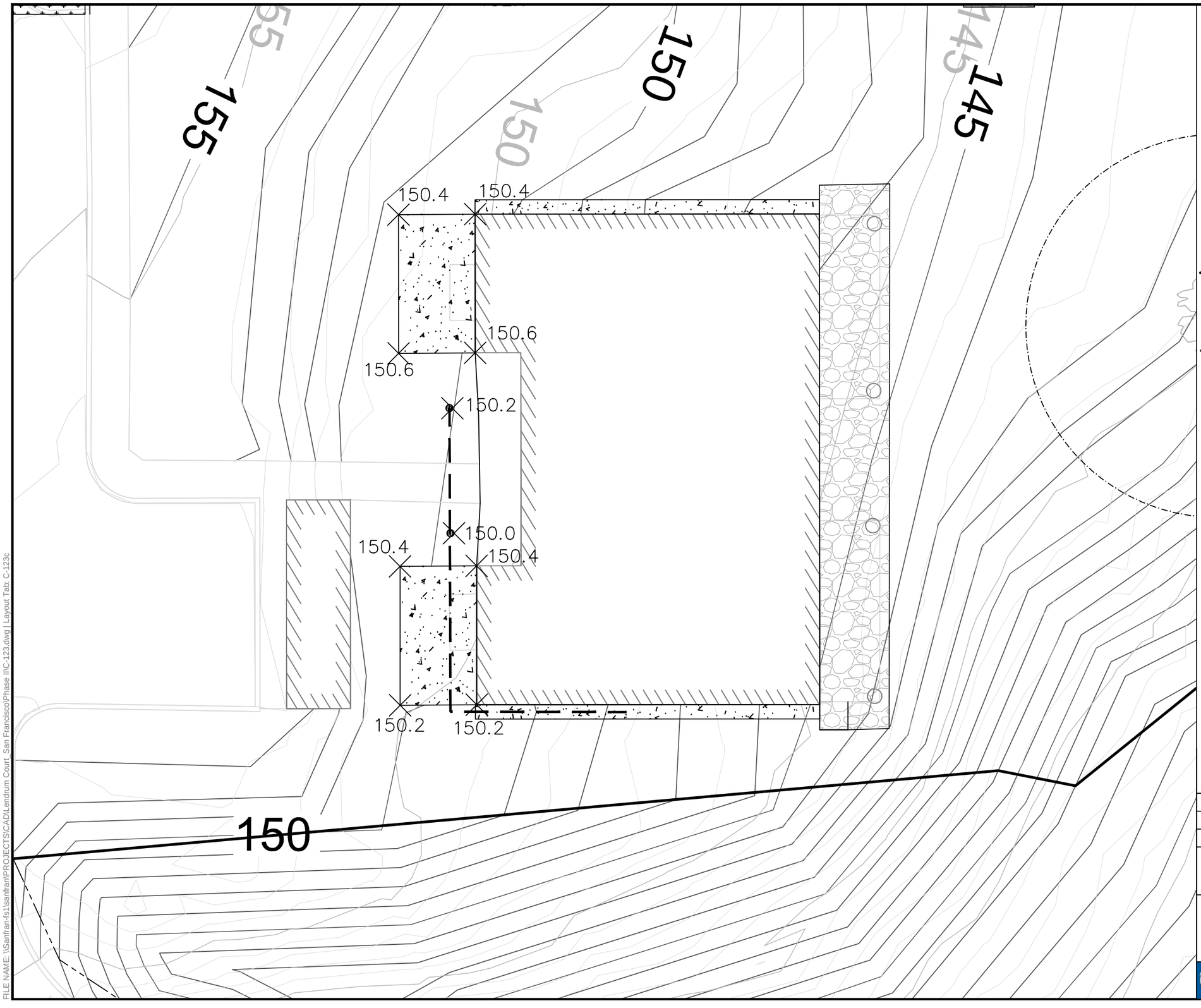
San Francisco, California

BUILDING DRAINAGE GRADING PLAN

TRC Results you can rely on | 229649 | REV B | SHEET C-123b

FILE NAME: \\Sanfran-fs1\sanfran\PROJECTS\CAD\Lendrum Court San Francisco\Phase II\C-123.dwg | Layout Tab: C-123b



LEGEND

- SITE TREE
- TOYON (HETEROMELES ARBUTIFOLIA)
- 140 FINAL GRADE CONTOURS
- 140 EXISTING GRADE CONTOURS
- NEW CONCRETE PATIO/SIDEWALK/STAIRS
- NEW DG PATH
- NEW ASPHALT PATH
- GRAVEL CAP
- TREE PROTECTION ZONE
- EDGE OF CAP
- 151.8 SPOT ELEVATION
- TRACE OF DRAINAGE PIPE

REGISTERED PROFESSIONAL ENGINEER
WARREN B. CHAMBERLAIN
No. C 60853
Exp. 12/31/2016
5-10-16
CIVIL
STATE OF CALIFORNIA

N

SCALE (FEET)

0 10 20

SOURCE: Base plan by Towill, October 29-November 4, 2015

REV	DATE	DESCRIPTION	DESIGN BY	CHK'D BY
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BUILDING DRAINAGE GRADING PLAN

TRC Results you can rely on | 229649 | REV B | SHEET C-123c

FILE NAME: \\Sanfran-fs1\sanfran\PROJECTS\CAD\Lendrum Court_San Francisco\Phase II\C-123.dwg | Layout Tab: C-123c

FINAL

TECHNICAL PROVISIONS

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TABLE OF CONTENTS

Design Drawings – 100% Design –

Sheet No.	Drawing No.	Description
1	G-001	Title Sheet
2	G-002	Notes, Legend, and Abbreviations
3	C-101	Existing Site Plan and Topographic Survey Control Plan
4	C-102	Traffic Control Plan
5	C-103	Temporary Facilities and Controls Plan
6	C-104	Demolition Plan
7	C-105	Rough Grading Plan
8	C-106	Post Construction Grading Plan
9	C-107	Grading Sections A & B
10	C-108	Grading Sections C & D
11	C-109	Grading Sections E
12	C-110	Grading Sections F
13	C-111	Grading Sections G & H
14	C-112	Excavation and Post Construction Topographic Grading Control Points
15	C-113	Final Erosion Control Plan
16	C-114	Details - Conformance
17	C-115	Details – Tree Protection Cap
18	C-116	Details – Erosion Controls
19	C-117	Details – Box Step
20	C-118	Details – Erosion Controls
21	C-119	Details – Curb & Concrete Construction
22	C-120	Details – Concrete Steps & DG Path
23	C-121	Details – AB Pad & Building Drainage
23	C-122	Details – Building Drainage Details
23	C-123 (a, b, c)	Details – Building Grading Plan

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21. PREPARATORY WORK

A. The Contractor's attention is directed to Article 14.02 "Utilities", 14.01.02 "Protection of Existing Utilities" and 12.03 "Site Investigation" of these Specifications.

B. All preparatory work and Clearing and Grubbing shall be in accordance with the findings and recommendations in accordance with Article 12.04 "Trust-Furnished Reports" of these specifications.

21.01. Mobilization

21.01.01. Scope of Work

A. Mobilization shall consist of all preparatory work and operations necessary for the movement of personnel, equipment, supplies and incidentals to the project site; for the establishment of all facilities necessary for work on the project, including; office setup, utility connections, establishment of toilet and sanitary stations, posting of signage and for all other work and operations which must be performed as part of mobilization as specified in these Specifications, and include costs incurred prior to beginning work on the various contract items on the Project site.

B. Prepare Staging Areas at locations shown on Drawing C-103 (Temporary Facilities and Control Plan). Staging areas to be surrounded by chain link fence and lockable gates in accordance to Article 28.01, and include rubble strip to prevent tracking of materials.

C. The Contractor shall coordinate with the Trust to notify all businesses, and residents, within a 500 foot radius of the Project, seven (7) days prior to the start of construction activities. The Contractor shall provide a schedule and directions to the Trust for proper notification as requested by the Trust's representative.

21.01.02. References

A. Office facilities shall be in accordance with Article 12.07, "Office Facilities," of these Specifications.

B. Project signs shall be in accordance with Article 12.06, "Project Signs," of these Specifications.

21.01.03. Placement

A. Office facilities shall be placed in accordance with Article 12.07, "Office Facilities." Project signs shall be installed and removed as shown on the Drawing C-103 and in accordance with Article 12.06, "Project Signs."

B. Staging Areas to be located in areas depicted on project drawing sheet C-103

21.01.04. Testing

No special requirements.

21.01.05. Submittals

A. The Contractor shall submit the Notification Letter to the Trust for approval.

B. Submittals for Pollution Control shall be in accordance with the Sections of these Specifications.

21.01.06. Measurement

Mobilization will not be measured.

21.02. Establish Environmental and Pollution Controls

21.02.01. Scope of Work

A. Establish Construction Storm Water Pollution and Prevention measures in accordance with project specific SWPPP (Article 12.04 Trust Furnished Reports) and Article 17.01 “Compliance with NPDES General Permit.

B. Establish Traffic Control features: to include posting of traffic control signage and placement of flagmen as necessary to regulate the flow of traffic in and around the project site, in accordance with Article 16.06 (Traffic Control) and Section 27.

C. Establish Dust and Odor Control features in accordance with Article 22.06 “Dust and Odor Control”.

D. Establish other Pollution Controls as listed in Article 21.01.02

21.02.02. References

A. Environmental and Pollution Controls shall be in accordance with the following Articles in these Specifications:

16.03 Noise Pollution and Vibration
16.04 Air Pollution
16.05 Spillage and Dust
17.01 Compliance with NPDES General Permit
17.02 Water Pollution Nuisance
17.03 Regulated Material Management

21.02.03. Materials

A. Contractor shall supply labor and materials necessary to implement Environmental and Pollution Controls.

21.02.04. Placement

A. Contractor shall place Environmental and Pollution Controls at locations shown of project Drawings C-1-3 and C-104.

21.02.05. Submittals

A. Contractor shall submit plans that detail types of instrumentation, frequency of testing or inspection, methods to implement all Environmental and Pollution Controls.

21.03. Clearing and Grubbing

21.03.01. Scope of Work

A. Clear and Grub existing vegetative areas as identified on project Drawing C-104 (Demolition Plan), and as described herein Article 21.02. Note, trees identified on Project Drawing C-104 will be removed by Trust or its designated contractor. However, contractor will grind stumps of removed trees designated for removal, and as identified on project Drawing C-104.

B. Clearing and grubbing shall be performed in advance of earthwork and in accordance with requirements in these Specifications. The Contractor’s

attention is directed to Article 14.02 “Utilities”, 14.01.02 “Preservation of Property”, 12.03 “Site Investigation” and Article 17.07 “Tree Protection” of these Specifications.

C. Clearing and grubbing shall consist of clearing and grubbing activities, including, but not limited to, brush, shrubs, reeds, weeds, roots and stems of giant reed (Arrundo donax), scrap wood and metal, debris, rocks, concrete rubble, sacked concrete buried man-made objects and concrete blocks, sediments, pipes, irrigation system, abandoned utilities, and all objectionable materials from the work site.

D. The Removal of designated trees within the work areas will be performed by others prior to clearing and grubbing activities.

E. Clearing and grubbing work shall be in accordance with the findings and recommendations in accordance with recommendations in Article 12.04 “Trust-Furnished Reports”, and in accordance with the provisions of Section 16, Clearing and Grubbing, of the State Specifications, except as modified herein. The Contractor must limit the extent of clearing and grubbing activities each year to only the portion of the Project that will be completed by the dates specified in Article 11.06.01 “Detailed Schedule of Work”. The project area shall be cleared and grubbed only to the extent necessary to accommodate the work, and in conformance with the notes and details shown on the Drawings.

F. Contractor to segregate wood chip mulch placed as groundcover from native or impacted soil by raking mulch into stockpiles. To the extent possible mulch stockpile to be free of soil material or waste. Mulch to be disposed of as green waste.

G. The construction activities will occur in very close proximity to existing shrubs, trees, and improvements. The Contractor shall take extreme care not to damage these items unless shown on the Drawings to be removed or approved by the Trust. No tree or growth shall be trimmed back without written approval of the Trust, including plants, trees and shrubs growing near the Project limits, which overhang onto the work site. Such overhanging foliage shall be protected and tied back if necessary. Landscaped areas and irrigation systems outside of the construction areas shall be preserved and protected from damage by the Contractor’s operation.

H. The Contractor shall coordinate with the Trust provided Forester during clearing and grubbing activities. The Forester will be authorized to give direction to the Contractor to prevent unnecessary damage to the health of trees or their roots, substrate, trunk, limbs, or foliage and to remedy any damage done to the same. Work shall not proceed without the presence of this Forester unless approved by the Trust.

I.

J. Vegetation should be cut or removed as close to the roots as possible without disturbing Site soil. Stripping of the root and upper soil layer shall be conducted during remedial excavation.

K. The contractor shall mow grasses to the extent practicable prior to clearing and grubbing and store clippings for use in revegetation of designated areas of the site per Drawing C-104.

L. Clearing and Grubbing materials shall be free of Site soil. Soil should be removed from material to be removed from the Site include soil attached to tree or stump roots.

M. Existing facilities which are to remain in place shall be protected in accordance with the provisions of Article 14.01.02 "Preservation of Property," of these Specifications.

21.03.02. Materials

A. Exiting concrete splash plates, pavers, and other reusable items shall be brushed clean of site soils and retained for reuse following remediation as approved by the Trust.

21.03.03. Placement

A. All existing joint poles, overhead utility lines, fences or other improvements not specifically designated on the Drawing C-104 to be removed or relocated shall remain in their original condition and location undisturbed. However, upon written permission by the Trust, fences and other existing improvements may, for the convenience of, and at the expense of the Contractor, be removed and temporarily relocated during construction and shall be replaced in their original location in as good or better condition as when the Contractor entered upon the work site.

B. All areas that have been over-excavated during the removal of concrete rubble, sacked concrete, buried man-made objects or concrete blocks shall be backfilled with suitable material in accordance with Article 23.03, "Import Fill," of these Specifications.

C. All cleared and grubbed materials (except post and cable fence determined to be suitable for reuse), shall be removed from the project site and legally disposed.

1. Contractor shall manage, recycle and/or dispose of all waste and debris in accordance with the requirements of these Specifications. Specifically, asphalt and concrete debris shall be separated and managed in accordance with Article 22.01 "Waste Management and Disposal".

21.03.04. Testing

No special requirements.

21.03.05. Submittals

A.

B. Prior to beginning any clearing and grubbing work, Contractor shall submit a plan that depicts the proposed limits and phasing of the clearing and grubbing.

C. The Contractor shall submit a recycling plan outlining all materials to be recycled. The plan shall indicate the material to be recycled and the location of the recycling center where the material will be delivered. The plan shall also indicate the materials to be removed that will not be recycled. The plan shall be submitted to the Trust for review and approval.

21.03.06. Measurement

A. Measurement shall be in accordance with the bid sheet.

21.04. Demolition and Disposal

21.04.01. Concrete Removal

21.04.01.01. Scope of Work

A. Remove Concrete Sidewalks, staircases, Pathways and Apartment Patio Features as identified on project Drawing C-104.

B. Concrete removal shall consist of the removal and disposal of existing concrete structures and improvements, which interfere with the construction required under this Contract and includes concrete structures, sidewalk, curb and gutter, handrails, and fence posts and foundations, other miscellaneous concrete structures and improvements, as shown on the Drawings, as specified in these Specifications and as directed by the Trust.

C. Handrails and fence post shall be evaluated for recycle, re-use as detailed in Article 21.05 “Abandon, Removal, Salvage, Relocation”.

D. Concrete removal does not include the removal of concrete rubble, sacked concrete, buried man-made objects, or concrete blocks buried below ground encountered during excavation activities. Removal of such material is included in EXCAVATION.

21.04.01.02. Materials

No special requirements.

21.04.01.03. Placement

A. Concrete removal shall conform to the provisions of Section 15-3, Removing Concrete, of the State Specifications, except as modified herein.

B. Concrete disposed of offsite must be hauled to a concrete recycle facility, meeting all federal, state, local regulations and approved by the Trust. Demolished concrete shall not be buried in structure backfill or used as buried Import Fill.

C. Excavation and Import Fill shall conform to provisions of Section 23, “Earthwork,” of these Specifications.

21.04.01.04. Testing

No special requirements.

21.04.01.05. Submittals

A. The Contractor is required to submit the location that concrete will be recycled. The location must meet all federal, state, and local regulations and be approved by the Trust.

21.04.01.06. Measurement

A. Measurement shall be in accordance with the bid sheet.

21.04.02. Asphalt Paving Removal

21.04.02.01. Scope of Work

A. Remove Asphalt Pathway as identified on project Drawing C-104.

B. Asphalt Paving Removal shall consist of the removal and disposal of existing asphalt paving as shown on the Drawings, as specified in these Specifications and as directed by the Trust.

C. The Contractor shall make arrangements with local recyclers, within San Francisco County, to recycle the pavement material removed during asphalt paving removal. Local recyclers may be found on the internet at www.recyclestuff.org.

21.04.02.02. Materials

No special requirements.

21.04.02.03. Placement

A. The Contractor shall sawcut the existing pavement along the limit lines shown on the drawings in accordance with the provisions of Section 701 of the City of San Francisco Standard Specifications. Pavement within the Project site shall be removed and disposed of at a recycling facility.

B. Miscellaneous items, wheel stops, curbs, base rock, etc. shall be legally disposed of outside the Presidio at a location provided by the Contractor. The disposal location must meet all federal, state, and local regulations and be approved by the Trust.

21.04.02.04. Testing

No special requirements.

21.04.02.05. Submittals

A. The Contractor is required to submit the location that asphalt will be recycled. The location must meet all federal, state, and local regulations and be approved by the Trust.

21.04.02.06. Measurement

A. Measurement shall be in accordance with the bid sheet.

21.05. Abandon, Removal, Salvage, Relocation

21.05.01. Fence Removal

21.05.01.01. Scope of Work

A. Removal of the post and cable temporary restriction fence shall consist of the removal, recycle, salvage and/or disposal of existing fencing, which interfere with the construction required under this Contract as shown on the Drawings, as specified in these Specifications, and as directed by the Trust.

21.05.01.02. Materials

A. Existing post and cable fence to be removed and salvaged shall be brushed clean of Site soils and stored by the Contractor until storage at a Trust designated location can be coordinated. Existing post and cable fence designated by the Trust to be recycled or disposed shall be removed from the site and recycled or disposed of at a Trust approved recycling location or landfill.

B. The Contractor shall provide labor and transportation to remove the post and cable fence from the site and store in a Trust designated storage location within the Presidio.

C. The Contractor's attention is directed to Article 14.01.02 "Preservation of Property" of these Specifications.

21.05.01.03. Testing

Testing is not required.

21.05.01.04. Submittal

A. The removal and salvage of the existing post and cable fences shall be included in the "clearing and grubbing proposed limits and phasing plan" required in Article 21.02 "Clearing and Grubbing" of these Specifications. Said plan shall be submitted by the Contractor and approved by the Trust prior to the commencement of any work related to removal and salvage of existing fences and gates.

21.05.01.05. Measurement

A. Quantities for fence and gate removal and/or salvage will not be measured.

21.05.02. Control of Water

21.05.02.01. Scope of Work

A. Control of Water will consist of doing all work and furnishing all labor, materials, and equipment required to design, construct, operate, and maintain measures to control water during the entire construction period. The Contractor shall note that periodic discharges from surface water, groundwater, rainfall, blow-off, storm drain discharge, and other discharges upstream can be expected any time of the year. It is the Contractor's responsibility to size the water control facilities/equipment such as to accommodate all flows/discharges, regardless of their source or the time of year in which they are experienced. Attention is directed to Article 7.01, "Safety and Protection," of these Specifications.

B. The construction site shall be kept free of standing water or excessively muddy conditions for proper execution of the construction work.

C. Attention is directed to Section 17.01 "Compliance with NPDES General Permit" of these Specifications, regarding the requirements, rules, regulations and conditions that govern the Contractor's operation in constructing water diversion and dewatering systems.

21.05.02.02. Materials

A. The Contractor shall make arrangements for furnishing all water required in connection with the work, including, but not limited to, water for dust control and compaction operations. The Contractor shall not use water from any springs or creeks for this purpose at any time during construction.

21.05.02.03. Submittals

A. The control of water and sediment control facilities shall be described in the Contractor's Storm Water Pollution Protection Plan (SWPPP).

21.05.02.04. Measurement

A. Control of water will not be measured.

22. WASTE MANAGEMENT, TRANSPORTATION, STOCKPILE MANAGEMENT AND DISPOSAL

A. All Waste Management, Transportation, Stockpile Management and Disposal shall be in accordance with the findings and recommendations in accordance with Article 12.04 “Trust-Furnished Reports” of these specifications.

B. The Contractor’s attention is directed to Article 17.03 “Regulated Material Management” and 15.01.02 “Working at the Presidio” of these Specifications.

C. Work shall meet or exceed the minimum requirements established by federal, state, and local laws and regulations that are applicable. These requirements are amended frequently and the Contractor shall be responsible for complying with amendments as they become effective. In the event that compliance exceeds the scope of work or conflicts with specific requirements of the contract, the Contractor shall notify the Trust immediately.

22.01. Waste Management and Disposal

22.01.01. Scope of Work

A. This specification covers requirements for waste management and offsite disposal of contaminated material at appropriate recycling, treatment, or disposal facilities. The recycling, treatment or disposal facilities shall be approved by the Trust in advance of transportation. A pre-approved list of disposal sites for Presidio waste is available to the contractor.

B. The work covered by this section includes but is not necessarily limited to the following:

1. Preparation of a Solid Materials Management Plan as described in Article 17.03.
2. Stockpile management as described in Article 22.02 “Stockpile Management” of these specifications.
3. Control of traffic as described in Article 16.06 “Traffic Control” of these specifications.
4. Vehicle loading and determination of weight of material contained in each shipment, including providing necessary scales or other measurement devices.
5. Preparation of manifests, shipping documents and appurtenant documentation.
6. Ensuring transport vehicles have been de-contaminated before leaving the site with a shipment and after unloading the shipment at the receiving facility.
7. Coordination with transporters and the receiving facility(s) pre-approved by the Trust.
8. Transportation and disposal of naturally occurring asbestos material, Class II designated waste, California Hazardous Waste and RCRA Hazardous Waste to the receiving facility(s).

C. Contractor's attention is directed to Articles 23.01 "Excavation and Grading Activities", 18.01 "Submittal Procedures", 22.03 "Decontamination" and 22.06 "Dust Control" of these specifications.

22.01.02. Materials

A. Class II Designated Landfill Waste shall be defined as soil which cannot be reused onsite within the top two feet of landscaped areas, but is not classified as a hazardous waste under federal or state law.

B. Contaminated soil shall be defined as having a regulatory restriction as defined by federal, state or local regulations based on the stockpile profiling conducted as defined in Article 22.02 "Stockpile Management", sampling results as conducted as defined in Article 22.04 "Confirmation Sampling" and/or in accordance with disposal facility requirements. Contaminated soil shall be inclusive of Hazardous and Non-hazardous Waste. Any soil identified as contaminated and proposed for offsite disposal must be approved by the Trust prior to leaving the site for disposal.

C. Hazardous Waste is defined as any solid, semi-solid, liquid waste, and or contained gaseous waste that has been determined to be hazardous on the basis of analytical laboratory reports and federal, state and local regulatory criteria and which is delivered to a properly licensed recycling, treatment, or disposal facility and which has the same general physical, chemical, biological, and radioactive constituents, and characteristics, and properties described on Waste Profile Sheets executed by the Contractor and/or Trust during profile and waste acceptance by the receiving facility. Hazardous waste shall also mean, as applicable, any containers within which the material is placed. Hazardous material shall be classified as California-Hazardous Waste and RCRA Hazardous Waste.

D. Hazardous materials are defined by applicable laws and regulations or any material that can be defined as explosive, flammable, poisonous, corrosive, oxidizing, irritating or otherwise harmful substance that could lead to death or injury.

E. Contractor generated waste includes chemical waste such as petroleum products, bituminous materials, salts, acids, alkalis, herbicides, paint thinners, solvents, disinfectants, as well as solid waste such as building materials, packaging, rubbish, debris, rubble, food waste, sanitary waste, green waste and other organic materials resulting from construction and demolition activities. These waste materials would typically consist of materials brought on site by the Contractor, suppliers or employees to execute the work, but are not fully consumed during the course of the construction.

22.01.03. Placement

A. See Stockpile Management

22.01.05. Testing

A. At Contractor's expense, the Contractor shall characterize and profile soil for disposal according to the requirements of the disposal facility. Available in-situ soil analytical data will be provided by the Trust. Contractor shall collect additional samples from the material to be disposed as required to profile the soil for disposal. Each soil sample collected by the Contractor shall be uniquely identified as directed by the Trust in accordance with Section 18 QUALITY ASSURANCE REQUIREMENTS.

B. Contractor shall coordinate with the Trust to obtain signatures on final waste acceptance documentation as needed.

22.01.06. Submittals

A. List of proposed disposal and recycling facilities for are waste materials.

B. Laboratory analytical results from the soil waste profile sampling.

C. Waste characterization and profile documentation

D. Copies of Manifests and Bills of Lading

E. Disposal Log

22.01.07. Measurement

A. Waste Characterization and Class II Disposal – The unit of measurement will be on a per ton basis. Measurement shall be performed at the disposal facility. The measurement will not include material that is transported and disposed without authorization. Copies of certified waybills from the disposal facility and manifests shall be submitted to document acceptable disposal and payment quantities. Weigh tickets shall include printout that documents the disposal facility name, time, date, truck number, waste description, and weight. Weighing shall be performed on accurately calibrated scales.

B. Waste Characterization and Class I Non RCRA Disposal – The unit of measurement will be on a per ton basis. Method of measurement and the documentation used for measurement will be similar to that for Waste Characterization and Class II Disposal.

C. Waste Characterization and Class I RCRA Disposal – The unit of measurement will be on a per ton basis. Method of measurement and the documentation used for measurement will be similar to that for Waste Characterization and Class II Disposal.

D. Measurement shall be in accordance with the bid sheet

22.02. Excavated Soil and Stockpile Management

22.02.01. Scope of Work

A. Excavated Soil and Stockpile Management includes, preparing and maintain stockpile areas as needed, transferring soils from active excavation areas to stockpiles or active loading zones, final loading into haul trucks, and any additional interim handling between excavation and transportation offsite.

B. Transfer of soils to and from the active remediation areas to the designated stockpile areas shown on the Drawings may be achieved using equipment approved by the Trust, such as small track mounted dump vehicles (within tree protection zones and tight spaces between buildings), off road track dump trucks, Morooka Carriers, and small trucks. Contractor may submit other means and methods for soil transfer and conveyance subject to Trust approval.

C. Excavated soil and other recyclable material shall be placed in temporary stockpiles immediately after excavation. Temporary stockpiles shall be maintained in good condition and constructed of materials that are compatible with the material to be stored. If multiple stockpiles are required, each shall be clearly labeled with an identification number and a written log shall be kept to track the type and source of contaminated material in each temporary stockpile.

22.02.02. Materials

A. The Contractor shall make arrangements for furnishing all equipment and materials required in connection with the work.

22.02.03. Placement

A. Stockpiles shall be constructed to isolate contaminated material from the environment. Contractor shall construct stockpiles in a safe manner and to facilitate profile sampling according to the requirements of the disposal facilities. Stockpiles shall be covered at the end of each workday as well as during the workday as directed by the Trust.

B. Stockpiles shall be constructed to include:

1. A chemically resistant geomembrane liner free of holes and other damage. Non-reinforced geomembrane liners shall have a minimum thickness of 20 mils. Scrim reinforced geomembrane liners shall have a minimum weight of 40 lbs. per 1,000 square feet. The ground surface on which the geomembrane is to be placed shall be free of rocks greater than 0.5 inches in diameter and any other object which could damage the membrane.

2. Geomembrane cover shall be free of holes or other damage to prevent precipitation from entering the stockpile. Non-reinforced geomembrane covers shall have a minimum thickness of 10 mils. The cover material shall be extended over the berms and anchored or ballasted to prevent waste from being removed or damaged by wind.

3. Berms surrounding stockpiles shall be a minimum of 6 inches in height.

4. Vehicle access points shall also be bermed.

C. Multiple stockpiles shall be created so that soil from one part of the excavation can be kept separate from other soils with differing levels of contamination.

D. Stockpiles shall be arranged in a manner that will allow access to other soil stockpiles, so that placement of one stockpile does not prevent the loading and transport of soil to or from another stockpile.

E. Temporary stockpiles may be constructed near active remedial excavation areas east of buildings 1259, 1278, and 1279, but above the historic forest

pending transfer to the designated Staging and Stockpiling areas shown on the drawings or being consolidated at other locations on the site. Temporary stockpiles placed in areas yet to be excavated do not require a geomembrane base material; all other stockpile requirements apply.

22.02.04. Submittals

A. Contractor shall prepare and submit an Excavated Soil and Stockpile Management Plan that describes in detail how excavated soils will be managed in active remediation areas, staged and transferred to the stockpile area at the corner of Lincoln Boulevard and Lendrum Court, loaded for off haul and transported offsite.

22.02.05. Measurement

A. Measurement shall be in accordance with the bid sheet.

22.03. Decontamination Area

22.03.01. Scope of Work

A. Setting up and maintaining Exclusion and Contamination Reduction Zones.

B. Personnel entering the Exclusion or Contamination Reduction Zones (CRZ) or otherwise exposed or subject to exposure to hazardous chemical vapors, liquids, or contaminated solids shall adhere to the personal hygiene and decontamination provisions. A detailed discussion of personal hygiene and decontamination facilities and procedures to be followed by site workers shall be submitted as part of the Health and Safety Plan.

C. Equipment Decontamination: Vehicles and equipment used in the Exclusion Zone (EZ) shall be decontaminated in the CRZ prior to leaving the site. Procedures for equipment decontamination shall be developed and utilized to prevent the spread of contamination into the Support Zone (SZ) and offsite areas. Equipment and materials will also be decontaminated of vegetation residue.

22.03.02. Materials

A. The Contractor shall make arrangements for furnishing all equipment and materials required to establish work zones.

22.03.03. Placement

A. Placement of the CRZ or EZ shall be as indicated in the Health and Safety Plan.

22.03.04. Measurement

A. CRZ or EZ work shall not be measured, include in mobilization charge.

22.04. Confirmation Sampling

22.04.01. Scope of Work

A. Soil confirmation sampling will be performed by the Trust and shall be completed in accordance the Trust's Confirmation and Sampling Plan.

B. The Contractor shall coordinate and assist the Trust with the collection of soil samples at no extra charge

C. The time for sample analysis, data review and approval is typically two weeks to obtain confirmation from the Trust that cleanup levels have been achieved. No payment will be made for standby/downtime associated with analysis, review, and approval of confirmation sampling data.

D. In the limited areas identified in the Drawing C-105 where clean closure is the goal no placement of fill or grading shall occur until the Trust has approved that waste removal within a given area as complete.

E. Contractor to provide Trust or its representative with chain-of-custody documentation that provides sample location identification number, date of sample collection, requested sample testing method and sample analytical results. Contractor will document soil sample collection location and depth on Site Plan Map.

F. Sample results to meet quality assurance and quality control limits provided in the Trust's Confirmation and Sampling Plan.

22.04.02. Materials

A. The Contractor shall make arrangements for furnishing all equipment and materials required in connection with the work.

22.04.03. Measurement

A. Confirmation sampling shall not be measured, however Contractor to maintain count of confirmation samples submitted for analysis and type of analysis. Final payment will be based on actual number of samples tested, for bid purposes allot 30% of sample collection cost for soil sample laboratory testing.

22.05. Hauling for Disposal

22.05.01. Scope of Work

A. Work includes loading, transportation and disposal of contaminated soil at an approved disposal facility.

B. General truck hauling requirements shall be in accordance with this section and Section 17 ENVIRONMENTAL COMPLIANCE.

C. All loads shall be covered before leaving the Site and shall be free of loose debris.

D. Transportation and Disposal Coordinator: The Contractor shall designate, by position and title, one person to act as the Transportation and Disposal Coordinator (TDC) for this contract. The TDC shall serve as the single point of contact for all environmental regulatory matters and shall have overall responsibility for total environmental compliance at the site including, but not limited to, accurate identification and classification of non-hazardous waste and hazardous waste and hazardous materials; determination of proper shipping names; identification of marking, labeling, packaging and placarding requirements; completion of waste profiles, hazardous waste manifests, bills of lading, exception and discrepancy reports; and all other environmental documentation. The TDC shall have, at a minimum, one year of specialized experience in the management and transportation of hazardous waste.

1. Certification: The Contractor and/or subcontractors transporting hazardous materials shall possess a current certificate of registration issued by the Research and Special Programs Administration (RSPA), U.S. Department of Transportation, when required by 49 CFR 107, Subpart G.

E. Shipping Documents: The Contractor shall ensure that each shipment of non-hazardous and hazardous material sent off-site is accompanied by properly completed shipping documents. Contractor shall organize, perform quality control and scan to electronic files all manifests. All manifests shall be submitted in paper and electronic (Adobe Acrobat PDF on compact disc) format for approval.

F. Other Waste Shipment Documents: The Contractor shall prepare a bill of lading for each shipment of non-hazardous and hazardous material which is not accompanied by a manifest or asbestos waste shipment record which fulfills the shipping paper requirements. The bill of lading shall satisfy the requirements of 49 CFR 172, Subpart C, and any applicable state or local law or regulation, and shall be submitted to the Owner for review and approval. Bills of lading requiring shipper's certifications will be signed by the Trust.

G. Contractor shall provide adequate personnel to monitor, direct, clean and count trucks.

H. Contractor shall perform work in accordance with Article 16.05 of the Special Provisions “Spillage and Dust” and Article 22.06 of the Technical Provisions “Dust and Odor Control”.

22.05.02. Materials

A. The Contractor shall provide all of the materials required for the packaging, labeling, marking, placarding, and transportation of non-hazardous, hazardous wastes and hazardous materials in conformance with Department of Transportation standards. Details in this specification shall not be construed as establishing the limits of the Contractor's responsibility.

B. The Contractor shall provide miscellaneous equipment and tools necessary to handle hazardous materials and hazardous wastes in a safe and environmentally sound manner.

C. Contaminated materials shall be disposed at a Trust-approved off-site disposal.

22.05.03. Testing

A. Transportation and disposal shall be performed on a classified basis based on the results of the waste profile sampling, in accordance with the designations and classifications specified in Article 22.01.02 “Materials” of this Section.

B. The Contractor, in consultation with the Trust, shall evaluate, prior to shipment of any material off-site, whether the material is characterized as a non-hazardous waste or as hazardous waste in addition to being regulated as a hazardous material; waste characterization shall be done for the

purpose of determining proper shipping descriptions, marking requirements, etc., as described below.

C. The Contractor, shall facilitate the Trust's representative to monitor and sample dust in accordance with the Air and Dust Mitigation and Monitoring Plan (Appendix H of the RDIP) at the site. The Contractor shall be responsible for any and all personnel air and dust monitoring required per their HASP.

22.05.04. Submittals

A. The following shall be submitted in accordance with Special Provisions Section 9 CONTROL OF WORK:

1. Waste Management Plan: Prior to start of work, the Contractor shall submit a plan to the Trust detailing the manner in which on and off site hazardous wastes shall be managed for Trust approval.

   a) Waste Management Plan. The Contractor will prepare a plan supplementing the general procedures presented in the RDIP. This detail will include a contractor for segregating stockpiling and waste characterization of various types of excavation spoils debris (e.g., hazardous, non-hazardous waste, debris, etc.).

2. Off-Site EPA Hazardous Waste Management Policy: The Contractor shall use RCRA Subtitle C permitted facilities which meet the requirements of 40 CFR 264 or facilities operating under interim status which meet the requirements of 40 CFR 265. In form attached in the Bid Schedule, Contractor must specify which disposal facilities shall be used. Trust reserves right to accept or reject proposed disposal sites at its sole discretion. Off-site treatment, storage, and/or disposal facilities with significant RCRA violations or compliance problems (such as facilities known to be releasing hazardous constituents into ground water, surface water, soil, or air) shall not be used.

3. Qualifications and Certificates

   a) Copies of the current certificates of registration issued to the Contractor and/or subcontractors.

   b) EPA Off-Site Hazardous Waste Management Policy: A letter from the proposed disposal facility(s) certifying that EPA considers the facilities to be used for all off-site disposal to be acceptable in accordance with the Off-Site Rule in 40 CFR 300, Section 440.

4. Shipping Documents and Packaging Certification: The Contractor shall submit all transportation related shipping documents to the Trust, including non-hazardous and hazardous waste manifests, bills of lading for hazardous materials, lists of corresponding proposed labels, packages, marks, and placards to be used for shipment, waste profiles, supporting waste analysis documents, for review by Trust a minimum of 14 days prior to anticipated pickup.

5. Transportation: The Contractor shall use manifests for transporting nonhazardous and hazardous wastes as required by 40 CFR 263 or any applicable state or local law or regulation. Transportation shall comply with all requirements in the Department of Transportation referenced regulations in the 49 CFR series. The Contractor shall prepare

hazardous waste manifests for each shipment of hazardous waste shipped off-site. Manifests and waste profiles shall be submitted to the Trust for review and approval.

22.05.05. Measurement

A. Hauling and disposal shall not be measured.

22.06. Dust and Odor Control

A. Dust shall mean airborne particulates that are associated with or result from the Contractor's activities. Of particular concern is dust associated with (1) the mechanical actions of excavation, grading, backfill and compaction, transport loading, and vehicle movement, and (2) ambient wind traversing excavations or stockpiles of debris, excavated soil, and dewatered sediment. Dust shall be inclusive of non-hazardous airborne materials and airborne hazardous materials.

B. Contractor shall coordinate Dust Control activities with SWPPP implementation. Refer to Article 17 of the Special Provisions.

C. Additional information regarding Dust Control activities can be found in Article 16.05 “Spillage and Dust” of the Special Provisions.

22.06.01. Scope of Work

A. This Section covers requirements for dust and odor control during Work on the site. Dust and odor control activities will primarily be associated with soil handling, decontamination, excavation, grading operations, backfill and compaction, and transport loading operations; however, the Contractor's responsibility for dust and odor control shall cover all the Contractor's operations and shall be continuous (even outside of working hours) throughout the duration of the project. The Work covered in this Section includes, but is not necessarily limited to the following.

1. Preparation of a Dust and Odor Control Plan.
2. Control of dust and odor during performance of the Work.
    a) Implementation of BMPs.
    b) Taping of windows adjacent and downwind of work areas.
    c) Construction of work area perimeter misting system, if necessary.
    d) Application of dust suppressant Posi-Cube (LSC Environmental Products Inc.) as needed in areas of exposed soil that active work is not being performed on.
3. Accommodate Trust Air monitoring within the Limits of Work.

22.06.02. Materials

A. To the extent practicable, equipment shall be selected and operated in a manner that minimizes dust generation. This shall include the use of rubber-tired vehicles on paved surfaces.

B. Dust control watering, commercial suppressants and foams shall be provided and used as necessary. Application of water shall be the preferred method for dust suppression. Commercial suppressants and foams shall be free of hazardous materials. Details of commercial suppressants and foams

shall be provided in the Dust and Odor Control Plan and will be subject to Favorable Review by the Trust. Posi-Cube (LSC Environmental Products Inc.) has been approved by the Trust for use at the site to stabilize areas of exposed soil.

C. The Contractor shall provide equipment for the application of dust control water, commercial suppressants and foams that are capable of application to the point of dust generation.

D. If needed the Contractor shall provide and install all equipment for the operation of perimeter misting systems around active work areas for dust control.

E. The Contractor shall provide equipment for the application of window taping.

F. The Contractor shall provide equipment for establishing a meteorological monitoring station.

22.06.03. Placement

A. During the performance of all Work under the Contract Documents and at all times during the duration of the project, the Contractor shall employ conscientious and effective means of dust and odor control. The Contractor shall assume responsibility for all damages, delays, government-imposed penalties or fines, and claims that result from the Contractor's negligent dust and odor control practices.

B. At a minimum, the Contractor shall control dust and odor using the following methods.

1. Vehicle and equipment speeds shall be restricted to 15 miles per hour (mph) or lower, as determined in the field by the Trust.
2. Stockpiles and disturbed areas not subject to vehicular traffic shall be located in the plan and stabilized by being kept adequately wetted and covered.
3. Misting or spraying shall be performed for exposed excavations, exposed soil surfaces, soil and sediment stockpiles, debris stockpiles, transport loading operations, and other dust and odor generation sites, at the frequency necessary to prohibit dust and odor generation.
4. Stabilize unpaved areas subject to vehicular traffic by keeping adequately wetted or covered.
5. The Contractor shall specify use of water as primary liquid means of dust control in work areas. Use of dust suppressant Posi-Cube in exposed soil areas where work is not occurring has been approved by the Trust and shall be implemented by the Contractor. Any other dust suppressant agents or soil stabilizers are prohibited unless reviewed and approved by the Trust.
6. During transport vehicle loading, debris and soil shall be deposited in the transport vehicle using the minimum practicable drop heights.
7. Material in trucks shall be covered and maintain at least 6 inches of freeboard during hauling activities to and/or off the site. All export trucks must have sealed tailgates.

8. Decontamination, including brushing down of equipment used for the Work shall be performed to prevent tracking of materials throughout and beyond the limits of work.

    a) Conduct activities so that no dirt or mud tracking is visible on any paved roadway open to the public.

9. Vacuum-powered street sweeping shall be performed at regular intervals to maintain paved roadways used by the Contractor free of sediment, soil, and debris.

10. Suspend earthwork or other dust producing activities during periods of high winds (hourly average wind speeds of 25 mph or greater) when dust control measures are not able to prevent visible dust plumes.

11. Except as required by the Trust, the Contractor shall not employ dust and odor control methods that result in ponded water, contamination of underlying or surficial soils, surface erosion, or a material increase in the weight of debris and soil excavated for disposal.

12. Tape and cover with plastic all windows and sliding glass doors in the vicinity and downwind of work areas.

C. Contingency requirements:

1. If (1) air monitoring conducted by the Contractor, (2) perimeter air monitoring conducted by the Trust, (3) observations or measurements made by the Contractor, the Trust, or regulatory agencies, or (4) complaint by the adjacent residents or businesses indicate the need for more stringent dust and odor control measures, the Contractor shall perform the following.

    a) Increase the dosage of dust and odor controls.

    b) Increase the frequency of dust and odor controls.

2. These measures shall be performed at no additional cost to the Trust and the Contractor shall include appropriate funds in the Contractor's Bid to cover such measures.

3. If further dust and odor control measures are needed, the Contractor will be consulted and one of the following measures may be required, at the sole discretion of the Trust. If, through no fault of the Contractor, further dust and odor control measures are required by the Trust, a Change Order will be negotiated for the following measures.

    a) Suspension of certain of the Contractor's operations (anticipated only during abnormally high wind conditions).

    b) Use of windscreens.

    c) Enclosure of transport loading operations.

22.06.04. Testing

A. Contractor shall implement an air quality monitoring program to protect the health of construction workers and the public. The air monitoring program shall be part of the Contractor’s Health and Safety Plan for the project. The air monitoring program shall include appropriate procedures, action levels,

equipment, and frequency of monitoring as approved by a Certified Industrial Hygienist (CIH).

1. Air monitoring shall be performed at locations where excavated soil material handling activities are expected to occur, and the expected prevailing wind direction. Contractor shall monitor air at the following locations:
   a) In loading areas
   b) In anticipated up-wind direction from the material handling area
   c) In anticipated down-wind direction from the material handling area
2. The air monitoring program shall consist of real-time particulate monitoring and shall include personal monitoring and meteorological monitoring (including establishment of monitoring station). Real-time particulate monitoring shall be performed to protect the construction worker from nuisance particulate dust and odors. If particulate dust concentrations exceed the established background concentrations as determined by background sampling, then engineering controls, described in this Section, will be implemented to reduce the particulate dust concentrations.
3. If at any time the airborne levels of contaminant(s) approach the OSHA Permissible Exposure Limit (PEL), or the Trust believes that the level might approach the PEL, the Contractor shall provide the necessary respirator equipment to its employees. All personnel in the work area shall be trained in the use of the respirator and shall wear it. Contractor shall provide evidence of each employee's respirator training prior to employee working in an area requiring a respirator.
4. Contractor shall also conduct visual monitoring of adjacent plants to assess dust buildup on leaves. If dust buildup on leaves is indicated, then the Contractor shall water the plant surfaces to remove accumulated dust in accordance with this Section.

B. Trust's Perimeter Air Monitoring Program: The Trust's perimeter air monitoring program shall be implemented independent of the Contractor's air monitoring program. The Trust's perimeter air monitoring program will consists of real-time and stationary particulate monitoring and shall include site perimeter monitoring/sampling, and meteorological monitoring. Real-time particulate monitoring shall be performed to protect the public from nuisance particulate dust. If particulate dust concentrations exceed the established background concentrations of 20 micrograms per cubic meter, as described in the RDIP or determined by baseline sampling, then engineering controls, described in this Section and included in the Contractor's Dust and Odor Control Plan, shall be implemented to reduce the particulate dust concentrations. The Contractor shall coordinate his air monitoring program and dust and odor control operations with the Trust's perimeter air monitoring program.

22.06.05. Submittals

A. The Contractor shall submit to the Trust for review and approval a Dust and Odor Control Plan within seven (7) calendar days of contract acceptance, which details the methods, materials, and equipment, to be used to

minimize worker and public exposure to dust and odors; the methods, materials, equipment, and frequency of the dust and odor control measures; the Contractor's construction zone real-time air monitoring program; contingency plans for incident/emergency situations. A favorably reviewed Dust and Odor Control Plan is required prior to the Contractor's mobilization to the site. The Dust and Odor Control Plan shall meet the following requirements:

1. Signed by a Certified Industrial Hygienist (CIH) certified in Comprehensive Practice by the American Board of Industrial Hygiene.
2. The Dust and Odor Control Plan shall comply with:
    a) Occupational Safety and Health Guidance Manual published by the National Institute of Occupational Safety and Health (NIOSH)
    b) Occupational Safety and Health Administration (OSHA), including addenda to it issued up to and including the date of advertisement of the contract
3. Identify and describe the means and methods for implementing the Dust and Odor Control Plan to prevent or minimize worker exposure, including:
    a) Identification of personnel designated to be on site.
    b) Job hazard analysis for work assignments.
    c) Summary of potential risks.
    d) Worker exposure air monitoring plan.
    e) Description of personal protective equipment.
    f) Delineation of work zones on the job site.
    g) Decontamination procedures.
    h) General safe work practices.
    i) Site security measures.
    j) Emergency response plans.
    k) Description of worker training.
4. Describe the means and methods for preventing visible dust emission and odors during general site activities, excavation, stockpiling, loading, transportation, placement of material, backfilling, compacting, and grading.

B. The Contractor shall submit a written air monitoring report, in accordance with the Contractor's Dust and Odor Control Plan, to the Trust every month. The report shall include:

1. Air monitoring results.
2. An analysis of results from the prior month.
3. The name and location of the laboratory where the analysis was performed.

4. An assessment of exposures of workers or the public.
5. Descriptions of the type of air monitoring equipment.
6. Sampling frequency.

22.06.06. Measurement

A. Dust and odor control shall not be measured.

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23. EARTHWORK

A. The Contractor's attention is directed to Article 14.02 "Utilities", 14.01.02 "Preservation of Property" and Article 12.03 "Site Investigation" of these Specifications.

B. All Earthwork shall be in accordance with the findings and recommendations in the Geotechnical Investigation Report and Remediation Reports identified in Article 12.04 "Trust-Furnished Reports" of these specifications.

23.01. Excavation and Grading Activities

23.01.01. Excavation

23.01.01.01. Scope of Work

A. Excavation, to follow clearing and grubbing activities, shall consist of all work and materials necessary to perform excavate and uniformly grade all areas in preparation for placement of Import Fill or final erosion controls. Excavation also includes removal of waste materials as specified in Article 22.01 "Waste Management and Disposal" of these Specifications, to the lines and grades as shown on the Drawings C-105, C-106, C-107, C-108, C-109, C-110 and C-111, as specified in these Specifications and as directed by the Trust. Specifically, excavation includes:

1. Excavation of Upper 4-6 inches of soil: remove approximately the upper 4 to 6 inches of organic rich top soil unsuitable for onsite reuse as designated on project Drawing C-105 following Clearing and Grubbing. Soil to be managed in accordance with Section 22.

2. Rough Grading: Following the removal of the soil unsuitable for reuse at the site grade the site to the planned rough grade as shown on Drawing C-105 and prepare surface for placement of cap construction materials. Including excavation, consolidation, compaction, key trenching, and grading of soils across the site. Project phasing shall be coordinated with earthwork activities to reduce the amount of temporarily stockpiled material.

3. Hand Excavation: remove soil and debris material within the modified tree protection zones (TPZ) using hand equipment at locations shown on the Drawings C-104, C-105 and C-106.

   a) An arborist must be present during all work within the modified TPZ.

   b) At the outer edges of the modified TPZ it is acceptable to utilize small track mounted excavators to excavate upon approval of the Trust engineer.

4. Excavate contaminated soil in areas designated on Drawing C-105 for clean closure. Remedial Excavation of contaminated soil to be consolidation within areas to be capped as designated on Drawing C-106. Extent of excavation to be determined in field based on confirmation samples. Temporary stockpiling of contaminated soil will be allowed until area of consolidation is designated in the field by Trust Representative.

B. The Contractor must limit the extent of excavation activity each year to only the portion of the site where the improvements will be completed by the dates specified in Article 11.06.02 “Baseline Schedule of Work”, of that year. Excavation must not begin until the Trust has received and approved the preconstruction quantity measurement survey data provided by the Contractor, which is to be performed after the completion clearing and grubbing in the areas to be excavated. Prior to any excavation activities, the Contractor shall also submit a “Proposed Excavation and Recycling Plan” to the Trust for review and approval.

C. Excavations shall conform to geotechnical recommendations and to the applicable provisions of Section 23 “Earthwork”, and Section 19 2, “Roadway Excavation”, of the State Specifications except as modified by these Specifications. The provisions of Section 19 1.04, “Removal and Disposal of Buried Man-Made Objects”, of the State Specifications shall not apply. The Contractor’s attention is directed to Article 23.08, “Unsuitable Material,” of these Specifications for removal and disposal of unsuitable material.

D. Contractor shall note that excavation may take place in close proximity to residential properties and structures.

E. All excavations shall be closely monitored during construction to detect any evidence of instability and distress to adjacent structures and properties per Article 12.03 “Site Investigation” of these Specifications. In addition, the following precautions shall be taken:

1. No construction access, staging, parking, or storage shall be permitted within 5-feet of adjacent properties or top of bank.
2. Heavy equipment shall be kept five (5) feet away from the edge of any structure.
3. Use of vibratory equipment or any equipment that shakes the ground shall be minimized in the vicinity of existing structures.
4. Contractor shall not over-excavate in vicinity of structures, except as directed by the Trust.

F. The Contractor shall be responsible for all costs associated with determining with certainty, including by means of soil testing, whether the material is acceptable at the Contractor’s preferred disposal site. For a list of approved disposal sites for materials, the Contractor’s attention is directed to Section 22 “Waste Management and Disposal” of these specifications.

G. In the event that excavated materials appear to be contaminated with regulated materials other than those described in the reports identified in Article 12.04 “Trust Provided Reports”, or appear to have contaminant concentrations significantly greater than those described in these reports, as determined by field observation and/or the Contractor’s initial soil tests, additional costs resulting from this situation, including though not necessarily limited to additional testing, stockpiling, double handling, special disposal, and loss of Contractor rate of production, shall be paid for by the Trust per Article 5.02.06 “Differing Site Conditions”.

H. The discovery of a sensitive species nesting bird or other form of wildlife, that affects the Contractor's operation, will be handled per Article 5.02.06, "Differing Site Conditions."

23.01.01.02. Materials

A. Areas that have been over-excavated during excavation, except where shown on the Drawings or as directed by the Trust, shall be backfilled with suitable materials in accordance with Article 23.03, "Import Fill," of these Specifications, at the Contractor's own expense and at no extra cost to the Trust.

23.01.01.03. Placement

If the project is a Remediation Project, use the following language.

A. All excavation shall be made to the limits of Remedial Excavation and in some locations confirmed by confirmation sampling as specified in Article 22.04 "Confirmation Sampling" of these specifications or to the finish grade as shown on the Drawings as directed by the Trust. Excavation limits shall be determined as identified in Drawings and as described in Article 12.04 "Trust-Furnished Reports" of these specifications.

B. The finish grade surface elevations shall conform to the tolerances set forth in Article 13.04 "Construction Survey" of these Specifications.

C. Compaction Requirements

1. Parking Lots, Trails and Maintenance Roads

   Backfill material used in over-excavated parking lots, trails and maintenance road areas shall be compacted (ASTM D1557) as follows:

   a) Below 1 foot of finished grade should be compacted at 90 percent relative compaction at optimum moisture content.

   b) Within 1 foot of finished grade should be compacted at 95 percent relative compaction at optimum moisture content.

2. Non-Planting Areas

   Backfill material used in over-excavated non-planting areas (i.e. parking lots, trails and maintenance roads) that are not shown on the Drawings or as directed by the Trust shall be compacted to 90 percent relative compaction at optimum moisture content in accordance with with ASTM D1557 Standard Laboratory compaction at the Contractor's expense.

3. Planting Areas

   The Backfill material used in over-excavated planting areas (i.e. stream channels, landscape areas, forestry areas and native plant areas) that are not shown on the Drawings or as directed by the Trust shall be compacted to 85 to 90 percent relative compaction at optimum moisture content at the Contractor's expense.

   All over-compacted areas shall be de-compacted to the compaction range specified per the direction of the Trust at the Contractor's expense.

D. Except as noted herein, all waste material, shall be removed from the project site and hauled to a disposal facility in accordance with Article 22.05 "Hauling and Disposal" of these specifications.

E. Removal, disposal and replacement of unsuitable material shall conform to the requirements of Article 23.08, "Unsuitable Material," of these Specifications.

F. No debris, exposed tree roots, or other objectionable materials shall be permitted in the final section.

23.01.01.04. Testing

A. Soil compaction testing to ASTM D1557 standards

23.01.01.05. Submittals

A. The Contractor shall submit the "Proposed Excavation and Grading Plan," to the Trust for review and approval, prior to any excavation work. The Contractor shall indicate means and methods that will be used to perform the Work including equipment types and sizes, phasing, completing hand excavation in tree protection zones, and equipment protocols for working near structures and trees.

23.01.01.06. Measurement

A. Measurement shall be in accordance with the bid sheet.

23.02. Gopher Wire Mesh Placement - Rodent Protection

23.02.01. General

A. Gopher wire mesh rodent protection as specified in details provided in contract drawings.

23.02.02. General Conditions

23.02.03. Contract Documents – Specifications

23.02.04. References

A. Not Applicable

23.02.05. Submittals

A. Panel layout drawing to be approved by ENGINEER prior to wire mesh installation.

23.02.06. Products

Gopher Wire Mesh Material

A. The gopher wire mesh shall be TWP 2 Mesh Galvanized Welded 16 Gauge Mesh or approved equal. All wire mesh used in the construction shall be new.

B. Material Specifications.

Property	Method	Units	Value
Roll Length (typical)		ft.	100
Roll Width (typical)		ft.	5

Mesh Opening		in.	0.5 x 0.5
Thickness	16 Gauge	in.	0.063

23.02.07. Execution

23.02.08. Manufacturers Certification

A. No Special Requirements

23.02.09. Delivery, Handling and Storage

A. Each mesh roll delivered to the project site shall be stored in dry area.

B. The following practices should be used as a minimum in receiving and storing wire mesh rolls in the designated storage area at the job site:

1. While unloading or transferring the mesh rolls from one location to another, prevent damage to mesh itself. If practical, the Installer may use forklift trucks fitted with poles that can be inserted into the cores of rolls. Be sure that the poles are at least two thirds the length of the rolls to avoid breaking the cores and possible damaging the mesh. Do not drag rolls. Store the mesh rolls to ensure that they are adequately protected for the following:

   a) Strong oxidizing chemicals, acids or bases.

   b) Crimping or crushing.

   c) Contaminants and soiling.

23.02.10. Gopher Wire Mesh Installation

A. Handling and Placement

1. The gopher wire mesh shall be handled in such a manner as to ensure the mesh is not damaged in any way.

2. Mesh to be placed directly on top of and secured to the compacted soil and buried a minimum of 18-inches below the final cap surface grades with the exception of the following locations:

   a) Within modified tree protection zones (TPZs) where the gopher wire will be placed at the bottom of the hand excavation, approximately 6 to 8 inches below final grade.

   b) Below aggregate base pads behind buildings 1259, 1278, and 1279 where the gopher wire will be place 1-foot below the ground surface at the base of the constructed cap.

3. On slopes, the mesh shall be secured in the anchor trench or tacked to form work and then rolled down the slope in such a manner as to continually keep the mesh in tension. If necessary the mesh shall be positioned by hand after being unrolled to minimize wrinkles.

4. Mesh shall be stapled to compacted foundation base using soil staples. Soil staples should be 6-inches in length and placed at 3-foot intervals. Mesh shall be cut using approved cutters (i.e., wire cutters, etc.).

5. Adjacent rolls of wire mesh shall be joined by overlapping by at least 6 inches and securely tied. Use of soil staples is acceptable.

6. In the corners of the side slopes an extra layer of gopher wire shall be placed along the slope on top of the previously installed gopher wire from top to bottom of the slope.

B. Repairs

1. Any holes or tears in the mesh shall be repaired by placing a patch extending two feet (2') beyond the edges of the hole or tear. The patch shall be secured to the original mesh by tying every 12 inches. If the hole or tear is more than 50% the width of the roll, the damaged area shall be cut out and the two portions of mesh shall be joined.

23.03. Import Fill

23.03.01. Scope of Work

A. The Contractor is hereby notified that after all the waste material has been re-graded or removed as shown in the Drawings and in specific areas verified by confirmation sampling, a majority of the site requires a clean cap to be constructed primarily with a 1.5-foot thick soil layer to be filled and compacted according to the grading plan shown on the Drawings. Import Fill shall consist of all work, materials, equipment, and incidentals necessary to furnish, transport, place, and compact suitable native soils for backfilling areas as shown on the Drawings, as specified in these Specifications, and as directed by the Trust.

B. Contractor shall utilize either Trust-Furnished or Contractor Supplied Import Fill to complete the project. Contractor shall provide all equipment, labor, and incidentals required to load and transport the Import Fill to the project site. Contractor is responsible for providing dust control during loading in accordance with these Specifications. Trust will make approved soils available to the contractor at the location provided below.

C. All work, material, equipment, and incidentals necessary to conform to the requirements of Article 12.04 "Trust Furnished Reports" of these specifications are part of Import Fill Scope of Work.

23.03.02. Materials

A. Trust supplied soil shall be the preferred source for import fill as available and will meet the material requirements provided below. If required, contractor supplied soil shall be used as directed by the Trust and shall meet the requirements below. Contractor shall obtain approval from the Trust for use of any materials not specified in this Section.

B. Contractor supplied import fill shall have the following characteristics:

1. At least 40% (by weight) of the soil materials passing US Standard Sieve No. 200.

2. Plasticity Index (PI) in the range of 10 to 20.

3. Liquid limit not to exceed 40.

4. The soil should not contain rocks or lumps over 3 inches in the greatest dimension.

5. No more that 10% of the soil particles should be greater than 1.5 inches in the greatest dimension.
6. Soil shall be free of organic matter, trash, concrete rubble and other deleterious material.

C. Import fill material, shall meet, but not be limited to, the following standards:

1. Capable of being compacted to a minimum of 90 percent relative compaction at optimum moisture content in accordance with ASTM D1557 Standard Laboratory compaction, or as otherwise directed by the Trust, using ordinary methods..
2. Have compaction moisture content within the range of 2% to 4% over the optimum moisture content.
3. Uncontaminated by regulated materials.

D. Import fill material shall conform to the following chemical requirements:

Constituent	Limit	Units
Forestry Requirements		
Bulk Density	1.2 to 1.4	g/cc
pH	6 to 7	Standard pH Units
Salt	20	mmhos/cm
Boron	0.5	mg/kg
Inorganic Chemical Constituents		
Antimony	5	mg/kg
Arsenic	6.2	mg/kg
Barium	500	mg/kg
Beryllium	10	mg/kg
Cadmium	1.9	mg/kg
Chromium	1,700	mg/kg
Cobalt	170	mg/kg
Copper	120	mg/kg
Cyanide	1,000	mg/kg
Lead	80	mg/kg
Tetraethyl Lead	0.0052	mg/kg
Mercury	1.6	mg/kg
Molybdenum	300	mg/kg
Nickel	4,500	mg/kg
Selenium	1.1	mg/kg
Silver	2	mg/kg
Thallium	1	mg/kg
Vanadium	90	mg/kg
Zinc	160	mg/kg
Semivolatile Organic Compounds		
Acenaphthene	30	mg/kg
Acenaphthylene	30	mg/kg
Anthracene	30	mg/kg
Benzo(a)anthracene	0.46	mg/kg
Benzo(a)pyrene	0.046	mg/kg
Benzo(b)fluoranthene	0.46	mg/kg
Benzo(g,h,i)perylene	30	mg/kg
Benzo(k)fluoranthene	4.6	mg/kg
Benzyl Alcohol	1	mg/kg
Chrysene	30	mg/kg
Dibenzo(a,h)anthracene	0.046	mg/kg
Dibenzofuran	910	mg/kg
Fluoranthene	30	mg/kg
Fluorene	30	mg/kg
Indeno(1,2,3-cd)pyrene	0.46	mg/kg
2-Methylnaphthalene	30	mg/kg

4-Methylphenol (p-Cresol)	50	mg/kg
Naphthalene	30	mg/kg
n-Nitrosodiphenylamine	20	mg/kg
Pentachlorophenol	3	mg/kg
Phenanthrene	30	mg/kg
Phenol	30	mg/kg
Pyrene	30	mg/kg
Volatile Organic Compounds		
Acetone	0.24	mg/kg
2-Butanone (MEK)	3.8	mg/kg
Carbon Disulfide	200	mg/kg
1,4-Dichlorobenzene	0.13	mg/kg
p-Isopropyltoluene (p-cymene)	130	mg/kg
Methylene Chloride	0.076	mg/kg
1,2,3-Trichlorobenzene	15	mg/kg
1,2,4-Trichlorobenzene	15	mg/kg
Trichlorofluoromethane	40	mg/kg
1,1,1-Trichloroethane	8	mg/kg
Polychlorinated Biphenols (PCBs), Pesticides, and Herbicides		
PCBs (Arochlor 1254)	0.16	mg/kg
Aldrin	0.0039	mg/kg
alpha-BHC	0.062	mg/kg
beta-BHC	0.062	mg/kg
delta-BHC	0.062	mg/kg
Chlordane	0.009	mg/kg
2,4-D	0.025	mg/kg
Dicamba	0.01	mg/kg
4,4'-DDD	0.049	mg/kg
4,4'-DDE	0.098	mg/kg
4,4'-DDT	0.0082	mg/kg
Dieldrin	0.039	mg/kg
Endosulfan	1.1	mg/kg
Endosulfan sulfate	1.1	mg/kg
Endrin	0.004	mg/kg
Endrin aldehyde	0.004	mg/kg
Endrin ketone	0.004	mg/kg
gamma-BHC (Lindane)	0.01	mg/kg
Heptachlor	0.017	mg/kg
Heptachlor epoxide	0.017	mg/kg
Isodrin	0.0039	mg/kg
MCPP	5	mg/kg
Methoxychlor	0.44	mg/kg

Petroleum Hydrocarbons and Constituents		
TPH (as diesel)	115	mg/kg
TPH (as gasoline)	100	mg/kg
TPH (as fuel oil/motor oil)	160	mg/kg
Benzene	0.005	mg/kg
Ethylbenzene	13	mg/kg
Toluene	1	mg/kg
Total Xylenes	33	mg/kg
Dioxins/Furnas		
2,3,7,8-TCDD	3.5E-06	mg/kg

Notes:
(a) From California Regional Water Quality Control Board, San Francisco Bay Region Order No. R2-2003-0080

The top 18-inches of each excavation will be backfilled exclusively with soils with no detectable concentrations (i.e., non-detect as defined by PQLs for the analytical method specified) of fuel constituents.

23.03.03. Placement

A. Import Fill must not be placed in standing water or when the subgrade is excessively wet without the written approval of the Trust. If groundwater or seepage is observed, Contractor shall immediately notify the Trust Representative. In no case can fill be place in areas where high groundwater or saturated soils could create soft pumping conditions

B. The Contractor shall not place Import Fill until the Trust has approved the Pre Cap Construction survey.

C. No heavy equipment shall operate within the tree protection zone as shown on the Drawings and as described in these Specifications. Work identified to be performed within the TPZ may be performed using hand excavation and where authorized small track mounted excavators but will require an arborist to be present during work.

D. Subgrade Preparation: After clearing and grubbing in accordance with Article 21.02, “Clearing and Grubbing,” of these Specifications, all surfaces to receive import fill (fill) shall be scarified to a minimum depth of 8 inches or as directed by the Trust, moisture conditioned, and mechanically compacted to 90 relative compaction at optimum moisture content. The compaction moisture content shall be within the range of -2% to +3% of the optimum moisture content, as determined by ASTM D1557 standard.

E. Fill on Slopes: Benching into existing slopes beyond planned excavation grades for all slopes steeper than 2.5:1 (H:V). The vertical face cut into the existing surface resulting from the benching operation shall be a minimum of 18 inches in height. All fill on slopes greater than 2.5:1 (H:V) shall be keyed into firm material at the base of the slope a minimum of 2 feet vertical and 3 feet horizontal per the Drawings.

F. Compaction on Slopes: To achieve compaction on slopes steeper than 3:1, overbuild fill slopes by a minimum of 1-foot laterally and cut the completed slope back to finish grade.

G. Import Fill at planting areas, such as areas within the stream channels, landscape areas, forestry, native plant areas and other areas which are shown on the Drawings as the areas to be landscaped, shall be compacted to between 85 and 90 percent relative compaction at optimum moisture content based on ASTM D1557 Standard. Soils deeper than 18 inches in these areas shall meet a minimum 90 percent minimum relative compaction.

H. Any necessary watering, aeration, or processing of fill material, or bridging of foundation soils, to obtain the required compaction shall not constitute an extra item of work and no direct or additional payment will be made therefore.

I. Ponding or Jetting to achieve compaction will not be permitted.

J. Import Fill shall be placed in 8-inch maximum vertical lifts, measured before compaction, in horizontal layers with a minimum width of 6 feet on gently sloped surfaces and minimum width of 2 feet on sloped surfaces. This specified width may be any combination of new fill plus cut into existing slope, except that a minimum cut of 2 feet into existing slope per layer of fill must be made.

K. If the backfill material becomes saturated from precipitation or any other source because it was not compacted to the specified density or was not backfilled and compacted to surface grade, through negligence or otherwise, Contractor shall remove the faulty material and replace it with suitable material compacted to the specified density. No additional payment will be made for doing such work or removal and replacement.

L. When densities of compacted materials do not meet the requirements, remove and/or re-compact the material until the requirements are met. The Contractor will be back charged the cost of retesting all failing tests, including the initial retest. Such back charges will be deducted from the Contractor's Progress Payments.

M. No Import Fill shall be placed outside of the cap as shown on the Drawings or on slopes steeper than 2.5:1 without approval of engineer.

23.03.04. Testing

A. Source Quality Control: Contractor shall test any non-Trust furnished import materials proposed for permanent use on site to demonstrate that the materials conform to the specified requirements. Tests shall be performed by an independent testing laboratory.

B. In-situ compaction tests using ASTM D6938 will be performed by the Trust for each 1,000 square feet per lift or as deemed necessary by the Construction Manager. The Contractor shall operate the equipment so as to assist the Trust in obtaining adequate tests. Any area that does not meet the compaction test requirements shall be removed and be re-compacted or de-compacted until tests meet the compaction requirements. All costs for such required removal, scarification and re-compaction of materials, including costs for retesting, shall be borne by the Contractor.

23.03.05. Submittals

A. For any Contractor-supplied import material, furnish, without additional cost to the Trust, such quantities of import materials as may be required by the Trust for test purposes. Cooperate with the Trust and furnish necessary facilities for sampling and testing of all materials and workmanship. Submit test results for import materials. Tests shall have been performed within 60 days of the submission. All material furnished and all work performed shall be subject to rigid inspection, and no material shall be delivered to the site until it has been favorably reviewed by the Trust, or used in the construction work until imported material has been inspected in the field by the Trust.

23.03.06. Measurement

A. For non-Trust Imported Fill, measurement will include cost to procure soil, testing, and delivery to Site. Measurement will be quantified in tons of soil procured.

B. For Trust supplied material measurement will included loading, hauling and off hauling at Site.

23.04. Trench Excavation

23.04.01. Scope of Work

A. Trench excavation shall consist of providing all work required to excavate for the installation of anchor trenches, new irrigation system, storm drain modifications, and subsurface drain system as shown on the Drawings, as specified in these Specifications, and as specified by the Trust.

B. Trench excavation shall not begin until the Contractor has submitted the "Proposed Trench Excavation Plans", per Article 15.01 "Excavation Safety", and the Trust has returned said plan indicating "In Receipt of."

C. The Contractor's attention is directed toward Section 6, "Rights of Way and Property," Article 14.01.02, "Preservation of Property," and Article 3.01, "Contractor's Responsibility," of these Specifications and Section 7 1.06, Safety and Health Provisions, of the State Specifications.

D. Existing material in the bottom of the trench that is unsuitable for supporting the irrigation piping shall be excavated and replaced with suitable permeable material in accordance with Article 23.09, "Permeable Material," of these Specifications. The excavation shall be free of standing water and loose or disturbed material before fill or concrete placement. Fill shall be placed immediately after excavation and subgrade observation.

23.04.02. Material / Placement

A. Trenches shall be excavated in conformance with Article 15.01, "Excavation Safety," of these Specifications.

B. The Contractor is solely responsible for excavation safety, including support to all adjacent improvements.

C. Trenches shall be excavated to a minimum of 6 inches below the final pipe invert. Trenches shall be excavated to allow proper compaction of pipe bedding and backfill material as set forth in Article 23.05, "Trench Backfill," of these Specifications.

D. All excess and unsuitable excavated material shall be consolidated at other areas within the site. Material that cannot be consolidated shall be removed

from the site and legally disposed of by the Contractor. Excavated materials that are temporarily stored on site shall be placed at a distance greater than the trench depth away from the top of the slope, or at a minimum distance of five (5) feet from the top of the trench, whichever is greater.

23.04.03. Testing

A. No special requirements.

23.04.04. Submittals

A. Proposed Trench Excavation Plans shall be supplied per Article 15.01, "Excavation Safety," of these Specifications.

23.04.05. Measurement

A. Measurement shall be in accordance with the bid sheet.

23.05. Trench Backfill

23.05.01. Scope of Work

A. Trench Backfill shall consist of all backfill required to restore excavated trenches to a finished grade that conforms to the surrounding existing ground or, within roadways, to the finish grade elevations as shown on the Drawings, as specified in these Specifications, and as directed by the Trust.

23.05.02. Materials / Placement

A. Pipe bedding material shall be Type A bedding material or Class 2 permeable material as specified in the State Specifications. Uniformly graded materials such as pea gravel shall not be used as bedding material.

B. Trench backfill above the pipe bedding shall be import fill material. Import Fill material and placement shall be in accordance with Article 23.03, "Import Fill", of these Specifications.

C. Pipes shall have a minimum pipe bedding of six (6) inches placed beneath the pipe. Pipe bedding material shall be placed at the same rate on both sides of the pipe and a minimum of four (4) inches above pipe crown.

D. In all stages of the trench backfilling operation, the Contractor shall limit both method and equipment so as to not damage the integrity of the pipe or related facilities or induce a diametrical variation of greater than plus or minus 0.5 percent.

E. Jetting or ponding to achieve compaction will not be permitted.

23.05.03. Testing

A. Testing shall be in accordance with Article 23.03, "Import Fill," of these Specifications.

23.05.04. Submittals

A. For any Contractor-supplied trench backfill, furnish, without additional cost to the Trust, such quantities of import materials as may be required by the Trust for test purposes. Cooperate with the Trust and furnish necessary

facilities for sampling and testing of all materials and workmanship. Submit test results for import materials. Tests shall have been performed within 60 days of the submission. All material furnished and all work performed shall be subject to rigid inspection, and no material shall be delivered to the site until it has been favorably reviewed by the Trust, or used in the construction work until it has been inspected in the field by the Trust.

23.05.05. Measurement

A. Trench backfill will not be measured.

23.06. Structural Excavation (Not Used)

23.07. Structural Backfill

23.07.01. Scope of Work

A. Structural Backfill shall consist of all work and materials necessary to furnish, place, spread, water, compact, and grade earth material around the structural facilities required under this Contract including aggregate base beneath the structural facilities as shown on the Drawings.

23.07.02. Materials

A. Structural Backfill shall conform to the provisions of Section 19 3.06, “Structural Backfill”, of the State Specifications, except as modified in these Specifications.

B. The use of existing soils excavated from site within the project limits for Structural Backfill shall conform to applicable provisions of Section 19-7.02, “Imported Borrow”, of the State Specifications and chemical composition identified in Article 23.03 “Import Fill” of these specifications. The material shall have the following characteristics:

1. At least 40% (by weight) of the soil materials passing US Standard Sieve No. 200
2. Plasticity Index (PI) in the range of 10 to 20
3. Liquid Limit not to exceed 40
4. The soil should not contain rocks or lumps over 3 inches in the greatest dimension
5. No more that 10% of the soil particles should be greater than 1.5 inches in the greatest dimension
6. Soil shall be free of organic matter, trash, concrete rubble and other deleterious material.
7. At least 20% sand equivalent.

C. Aggregate base to be placed under footings shall be Class 2, 3/4-inch maximum size, conforming to Section 26-1.02A, Class 2 Aggregate Base, of the State Specifications except that recycled asphalt material shall not be allowed.

23.07.03. Placement

A. Placement of Structural Backfill shall conform to the provisions of Section 19 3.06, “Structural Backfill”, of the State Specifications, except as modified in these Specifications.

B. Structural Backfill and aggregate bases under foundations shall have at least 95 % relative compaction at optimum moisture content.

C. Ponding or jetting to achieve compaction will not be permitted.

D. Finish grade for structural backfill shall be as shown on the Drawings or as required to conform to adjacent ground elevations.

23.07.04. Testing

A. Compaction shall conform to Section 19-5, “Compaction”, and Section 19-6, “Embankment Construction”, of the State Specifications, unless otherwise noted on the plans. Compaction test shall be conducted in accordance with the latest edition of ASTM D1557. Individual test results shall be used to determine whether compaction of an area meets minimum requirements in lieu of an averaging method.

B. Compaction tests will be performed by the Trust. The Contractor shall operate construction equipment so as to not hinder the Trust from obtaining adequate tests. Any area that does not meet minimum test requirements shall be removed and re-compacted until tests meet the minimum requirements. All costs for such required removal and re-compaction of materials, including costs for retesting, shall be borne by the Contractor. The compaction moisture content of the fill shall be within a range of -2% to +3% of optimum moisture content.

23.07.05. Submittals

A. For imported Structural Backfill, the Contractor shall submit an “Imported Material Certification Form” for each borrow source of structural backfill material per Article 23.03, “Import Fill,” of these Specifications for approval prior to import.

23.07.06. Measurement

B. Measurement shall be in accordance with the bid sheet.

23.08. Unsuitable Materials

A. Unsuitable Materials, as used in these Specifications shall refer to sand/silt pockets, lenses and layers that may be encountered in the native soil during excavation for the various items of work. Such loose sands and non-plastic silts may cause localized slope failure. When deemed unsuitable material by the Trust, such soils shall be removed as directed by the Trust.

23.08.01. Scope of Work

A. The Contractor is alerted to the possibility of the existence of unsuitable materials, including which may not be shown on the Drawings. The following provisions shall apply, regardless of whether the unsuitable materials are shown or not shown on the Drawings.

B. If, in the opinion of the Trust, unsuitable materials are encountered within the limits for structural or site excavation, they shall be removed and

disposed of outside of the Presidio. Where over-excavation has occurred to remove unsuitable materials, the over-excavated area shall be backfilled with Import Fill unless otherwise directed by the Trust or Engineer.

C. Unnecessary excavation by Contactor below the specified elevation of the excavation limits or structural excavation limit and not required for unsuitable material removal shall become the property of the Contractor.

D. The Contractor shall provide the Trust evidence that a disposal site for Unsuitable Material has been obtained and is an approved disposal site as determined by the Trust in advance. A list of pre-approved disposal sites is found in Article 22.01 "Waste Management and Disposal" of these specifications.

23.08.02. Materials

A. Unsuitable Materials shall be replaced by Import Fill that is compacted and tested in accordance with the requirements for backfill as specified in Article 23.03 "Import Fill" of these Specifications.

23.08.03. Placement

A. Contractor shall remove unsuitable materials as directed by the Trust. Excavated unsuitable materials shall be removed from the site within 24 hours.

B. Excess moisture content in the foundation material or bottom of the excavation site is not by itself sufficient cause of determining that the material is unsuitable. Preparation of the foundation to receive material and stabilization of the site to allow efficient and safe operation of equipment and use of labor shall be the responsibility of the Contractor. The Contractor may elect to excavate and replace suitable base material to facilitate compaction and/or stabilization at no additional costs. If the Contractor elects to remove and replace suitable foundation material, it shall be at its own expense and at no additional cost to the Trust.

23.08.04. Testing

A. Testing required for determining suitability of materials shall be provided by the Trust.

23.08.05. Submittals

A. No special requirements.

23.08.06. Measurement

A. Measurement shall be in accordance with the bid sheet.

23.09. Permeable Material

23.09.01. Scope of Work

A. Permeable material shall consist of all work and materials necessary to furnish, place, and compact permeable materials including drain rock, as shown on the Drawings, as specified in these Specifications and as directed by the Trust.

23.09.02. Materials

A. Permeable material shall conform to Class 1, Type B and Class 2 permeable material as specified in Section 68-1.025, “Permeable Material”, of the State Specifications.

23.09.03. Placement

A. Excavation for the placement of permeable material shall conform to Article 23.03, “Import Fill”.

B. Permeable material shall not be placed until the subgrade has been inspected and approved by the Trust. Permeable material shall not be placed over or around pipe until the installation of the pipe has been inspected and approved. Permeable material shall be placed over or around pipe with care to avoid any displacement in line or grade of the utility or pipe.

C. Permeable material shall be placed uniformly in layers 6 inches deep. The permeable material shall be placed in a manner to avoid segregation of particle sizes and to insure the continuity and integrity of all zones. No foreign materials shall be allowed to become intermixed with or otherwise contaminate the permeable materials.

D. The Contractor shall not allow permeable material to spill over into non-designated areas, including planting areas.

23.09.04. Testing

A. Permeable material gradation shall be sampled at the site and tested by the Trust.

B. Any difference of opinion between the Trust and the Contractor shall be resolved by checking the gradation of the truckload of permeable material.

C. Mechanical equipment, a sorting site, and labor needed in checking gradation shall be provided by the Contractor, at Contractor’s expense.

23.09.05. Submittals

A. The Contractor shall provide a certified test report on the sieve analysis certifying the gradation requirements for the permeable material are met.

B. The Contractor shall provide five (5) samples of permeable material. One (1) sample shall be provided at the quarry and the other samples shall be placed at the construction site. These samples shall be used as frequent reference for judging the gradation of the permeable material supplied.

23.09.06. Measurement

A. The quantity of permeable material will not be measured.

23.10. Shoring (Not Used)

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24. CONCRETE

24.01. Structural Concrete

24.01.01.01. Scope of Work

A. Structural concrete shall consist of all work and materials necessary to construct all reinforced concrete structures as shown on the Drawings, as specified by these Specifications, and as directed by the Trust, which includes furnishing and placing concrete forms (including stripping the forms), reinforcing steel and concrete.

24.01.01.02. Materials

A. Structural concrete shall be Class I Portland concrete (with not less than 675 pounds of Portland cement per cubic yard) conforming to the provisions of Section 51, “Concrete Structures”; Section 52, “Reinforcement”; and Section 90, “Portland Cement Concrete”, of the State Specifications and these Specifications.

B. Where corrosive soil due to low levels of resistivity are detected in the native material, cement shall be Type II Modified conforming to the provisions of Section 90 of the State Specifications, and structural concrete mix designs shall not contain less than 752 lbs. of cement per cubic yard.

C. The 28-day compressive strength of the Class I concrete shall be greater than or equal to 4,000 psi for all structures. Concrete with lesser strength will be rejected. Rejected concrete work shall be completely removed and disposed outside the Presidio at the Contractor’s expense. The structure shall then be reconstructed in accordance with the Drawings and these Specifications.

D. An air-entering agent may be used in accordance with the provisions of Section 90-4, “Admixtures”, of the State Specifications. The nominal limit of total air content shall be 4 percent.

E. The amount of water used in the concrete shall not exceed the amount necessary to produce a maximum slump of 3 inches for concrete sections thicker than 12 inches, and 4 inches for sections 12 inches thick or less. The amount of slump shall be consistently maintained within the limits of plus or minus ½ inch for each test. The maximum water-cement ration for Class I concrete shall be 0.46 by weight.

F. Drill and bond dowels shall conform to Section 83-2.02D (1), “General”, of the State Specifications and these Specifications.

G. Reinforcement shall be in accordance with the requirements of Section 52, “Reinforcement”, of the State Specifications and these Specifications. Galvanize reinforcing as indicated on the drawings per requirements of ASTM A767, “Standard Specification for the Zinc-Coated (Galvanized) Steel Bars for Concrete Reinforcement”.

H. Mechanical couplers for reinforcement are permitted and shall be the sleeve threaded type conforming to the requirements of Section 52-1.08B(1), “Mechanical Splices”, of the State Specifications and these Specifications. Galvanize couplers as indicated on the drawings per requirements of ASTM A767, “Standard Specification for the Zinc-Coated (Galvanized) Steel Bars for Concrete Reinforcement”.

I. Concrete forms shall be plywood, Exterior Grade, Douglas Fir, Class I, not less than ¾ inches thick. Smooth metal forms may be used in lieu of plywood.

24.01.01.03. Placement

A. Curing of concrete shall conform to the provisions of Section 90-7, “Curing Concrete”, of the State Specifications. The curing compound shall be non-pigmented curing compound with fugitive dye except when specified otherwise in these Specifications. The curing compound shall not be petroleum hydrocarbon resin base or chlorinated rubber base.

B. The Contractor shall have the option to place concrete by pumping. Pumping concrete through aluminum or magnesium pipes will not be permitted.

C. Transverse reinforcement shall be placed at right angles to channel control line unless otherwise shown on the Drawings. In curved reaches, transverse bars shall be spaced as shown on the applicable section of the Drawings with the spacing to be applied at the outside of the curve unless noted otherwise on the Drawings.

D. Before placing fresh concrete, the entire surface of each construction joint shall be thoroughly cleaned of surface laitance, curing compound or other material foreign to the concrete and clean coarse aggregate shall be exposed. Surfaces of fresh concrete in place no more than 8 hours may be cleaned with air and water jets, but concrete surfaces in place for more than 8 hours must be cleaned by abrasive blast methods.

E. The concrete in each integral part of the structure shall be placed continuously and the Contractor will not be permitted to commence work on any part unless facilities are on hand and the forces are sufficient to complete the part without interruption in the placing and finishing of the concrete.

F. Cold joints or joints in the concrete due to stopping work shall be avoided as far as possible but in the event of breakdown of Contractor’s operation; the Contractor shall complete the consolidation of the concrete to a reasonable uniform stable slope while the concrete is still plastic. Before concrete placing is resumed, the surfaces of cold joints shall be cleaned as described above and brushed with fresh mortar before concrete placing begins. Cold joint areas in concrete shall be tested by striking the surfaces with a hammer to detect possible voids or honeycomb areas. The Contractor shall remove all honeycomb or crummy concrete and shall repair such areas in accordance with these Specifications.

G. A Class 1 surface finish in accordance with Section 51 1.18B, “Class 1 Surface Finish”, of the State Specifications shall be provided on all exposed surfaces of formed concrete structures not specified to have special architectural treatment.

H. All formed surfaces which are to be buried shall be provided with an "ordinary" surface finish as specified in Section 51 1.18A, "Ordinary Surface Finish", of the State Specifications.

I. Concrete forms installation and removal are to comply with provisions of American Concrete Institute (ACI) 318 and 347.

24.01.01.04. Testing

A. The testing for compressive strength of concrete shall conform to the provisions of Section 90 9, Compressive Strength, of the State Specifications. Concrete slump tests shall be completed in accordance with ASTM Test Method C 143, as directed by the Trust.

24.01.01.05. Submittals

A. Mix designs for concrete shall be prepared by the Contractor. The mix shall be reviewed and approved by the Trust prior to ordering materials or mixing concrete.

24.01.01.06. Measurements

A. Measurement shall be in accordance with the bid sheet.

24.01.02. Lean Concrete

24.01.02.01. Scope of Work

A. Lean concrete shall be used as required on the Drawings and in these Specifications.

24.01.02.02. Materials

A. Lean Portland cement concrete (not less than 290 lbs. of Portland cement per cubic yard) shall conform to Section 90, "Portland Cement Concrete", of the State Specifications.

24.01.02.03. Placement

A. Placement of lean concrete shall conform to Section 90, "Portland Cement Concrete", of the State Specifications.

24.01.02.04. Testing

A. Testing for compressive strength of lean concrete will not be required.

24.01.02.05. Submittals

A. No special requirements.

24.01.02.06. Measurement

A. Measurement shall be in accordance with the bid sheet.

24.01.03. Joints, Water Stops and Sealants

24.01.03.01. Scope of Work

A. Expansion Joints, Waterstops and Sealing Joints shall consist of work and materials necessary to furnish and place these items in concrete as shown on the Drawings and as specified in these Specifications.

24.01.03.02. Materials/Placement

A. Hardboard and expanded polystyrene shall conform to the provisions in Section 51-1.12, D “Sheet Packing, Performed Pads and Board Filters”, of the State Specifications.

B. Furnishing and installation of waterstops shall conform to the requirements in Section 51-1.14, “Waterstops”, of the State Specifications.

C. Furnishing and installation of neoprene strip shall conform to the requirements for strip water stops as provided in Section 51-1.145, “Strip Waterstops”, of the State Specifications.

D. Expansion joints shall be provided at intermediate beams as called out on the drawings.

E. All joints shall be sealed in conformance with the details shown on the drawings and the provisions in Section 51, “Concrete Structures”, of the State Specifications.

24.01.03.03. Testing

A. No special requirements.

24.01.03.04. Submittals

A. No special requirements.

24.01.03.05. Measurement

A. Expansion joints will not be measured.

24.01.04. Formwork and False work

24.01.04.01. Scope of Work

A. Forms and False work shall consist of the structural design, work and materials necessary to support the placement of the concrete and furnish and place joints in the concrete as shown on the drawings and as specified in these Specifications.

24.01.04.02. Materials/Placement

A. Forms shall conform to the provisions in Section 51-1.05, “Forms” of the State Specifications.

B. False work shall conform to the provisions in Section 51-1.06, “False work” of the State Specifications.

24.01.04.03. Testing

A. No special requirements.

24.01.04.04. Submittals

A. The Contractor shall submit details and layout of the joints and the design and working drawings of false work.

24.01.04.05. Measurements

A. Form and False work will not be measured.

24.02. Architectural Finish

A. If project includes architectural staining of concrete, use the following language; otherwise delete text and replace with “Not Used.”

24.02.01. Architectural Staining, (Not Used)

24.02.02. Architectural Texturing (Not Used)

24.02.03. Non-Shrink Grout

24.02.03.01. Scope of Work

A. Non-Shrink grout shall be used as required on the Drawings and as specified in these Specifications.

24.02.03.02. Materials

A. Non-shrink non-metallic grout shall be one of the following or an approved equal:

1. Masterflow 928; BASF.
2. Sonogrout 10K; Degussa Building Systems.
3. Sure-Grip High Performance Grout; Dayton Superior Corporation.

24.02.03.03. Placement

A. Installation and mixing of the grout shall be in conformance with the manufacturer’s specifications.

24.02.03.04. Testing

A. No special requirements.

24.02.03.05. Submittals

A. Submit manufacturer’s product specifications for review.

24.02.03.06. Measurements

A. Non-shrink grout will not be measured

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25. PAVEMENT CONSTRUCTION AND FINAL SURFACES

25.01. Asphalt Concrete

25.01.01. Scope of Work

A. Asphalt Concrete shall consist of all work and materials necessary to furnish and place Asphalt Concrete at grade for ASPHALT TRAIL restoration as shown on the Drawing C-106 and as specified in the Specification and as directed by the Trust.

25.01.02. Material

A. Asphalt concrete shall be Type A conforming to the provisions in Section 25.01, “Asphalt Concrete”, of the Standard State Specifications and these Specifications. Surface course shall be ½ inch maximum, coarse Type A asphaltic concrete. The base course(s) shall be of ¾” maximum, coarse Type A asphaltic concrete.

B. Bituminous binder shall be PG 64-10 asphalt conforming to Section 92 of the Standard State Specifications. Certification of the above shall be furnished to the Trust.

C. The Contractor shall submit the AC mix design sufficiently in advance of manufacturing to allow for Trust’s review and approval. Trust may direct the amount of asphalt binder to be mixed with the aggregate.

D. Aggregate for surface course AC shall conform to the grading specified in Section 39-2.02, “Aggregate”, of the Standard State Specifications for one-half inch maximum, medium grading for the top layer of the surface course; one-half inch maximum, medium grading for asphalt concrete used to level irregularities in advance of placing the surface course; and all other asphalt concrete shall have aggregate conforming to the size noted for ¾” maximum, medium gradation. Aggregate shall have a sodium sulfate loss of less than 9.6% when tested in accordance with Test Method No. CCC 214 (AC).

E. When the combined grading of the coarse and fine aggregates is deficient in material passing the No. 200 sieve, commercial filler may be added in conformance with Subsection 39-3.03 of the Standard State Specifications.

F. Paint binder (tack coat) shall be of penetration type asphalt emulsion grade SS-1H furnished and applied in conformance with the provisions in Section 94, “Asphaltic Emulsions”, of the State Specifications, and these Specifications, and shall be applied to all vertical surfaces of concrete gutter and to existing surfacing that will come into contact with asphalt concrete.

G. Liquid Asphalt Prime Coat shall be liquid asphalt SS-1H furnished and applied to all surfaces of the aggregate base course in conformance with Section 93, “Liquid Asphalts”, of the State Specifications and these specifications. Spread at the rate of 0.25 gallons per square yard of surface. Prior to placement of asphaltic concrete, the prime coat shall have attained a minimum penetration of ¼ inch.

H. Bituminous seals shall conform to the State Specifications and shall be of the type designated on the Drawings.

25.01.03. Placement

A. Asphaltic pavement shall be spread and compacted in layers not to exceed 0.17-foot on any surface course and shall never exceed 0.25-foot on any single course. Asphaltic pavement shall be placed to the minimum thickness as shown on the Drawings. All mixtures, except open graded mixture, shall be spread at a temperature of not less than 225ºF and all initial rolling and tamping shall be performed when the temperature of not less than 225ºF and all initial rolling and tamping shall be performed when the temperature of the mixture is such that the sum of the air temperature plus the temperature of the mixture is between 280ºF and 375ºF. Open graded mixture shall be spread at a temperature suitable for workability.

B. All mixtures shall be placed only when the atmospheric temperature is above 50ºF. However, in no case will paving operations be allowed between November 1 and April 1, unless express permission is granted by the Trust.

C. Prior to placing the surface course, the finished surface of the previous layer shall not vary at any point more than 0.05-foot above or below the grade established by the Trust. All trimming of the surface shall be completed while the temperature of the mix is above 200ºF.

D. Immediately in advance of placing asphaltic concrete, additional prime coat shall be applied as directed by the Trust to areas where the prime coat has been destroyed and no additional compensation shall be allowed for this work.

E. A sand blotter shall be applied in specific locations to the prime coat as directed by the Trust in order to maintain vehicular and/or pedestrian traffic.

F. The Contractor shall not perform paving operations when the weather is rainy or foggy. It shall be the Contractor's responsibility, based on weather predictions, to schedule his paving operations to avoid paving in the rain or fog. If the day's operations are cancelled because of predicted rain or fog, a non-working day will be allowed regardless of actual working conditions.

G. Asphalt concrete shall not be placed on any surface which contains ponded water or excessive moisture.

H. If paving operations are in progress and rain or fog forces a shut down, loaded trucks in transit shall return to the plant and no compensation will be allowed therefore.

I. Attention is directed to the provisions in the first paragraph of Section 39-5, "Spreading", of the State Specifications. The extent of the areas where a surface course mixture shall be spread to level irregularities, as shown on the Drawings, shall be subject to revision by the Trust, depending on actual conditions prevailing on the project.

J. No traffic shall be allowed on the asphalt emulsion with the exception of vehicles unloading asphalt concrete. All vehicles involved with the Contractor's operations shall turn around within the roadway limits. Driveways and other adjacent property shall not be used without prior written consent of the Trust, a dated copy of which shall be delivered to the Trust prior to the use thereof.

K. The area to which paint binder has been applied shall be closed to public traffic. Care shall be taken to avoid tracking binder material onto existing pavement surfaces beyond the limits of construction.

L. A drop off of more than 0.25-foot will not be allowed at any time adjacent to traveled lanes of asphalt concrete surfacing.

25.01.04. Testing

A. Aggregate gradation tests shall be performed at the plant and submitted for review by the Trust prior to delivery of asphalt concrete to the project site. The Contractor shall perform and report the Bulk Specific Gravity (California Test 308, Method A) and Stabilometer Value ("S" Value) according to the requirements of the State of California Department of Transportation June 2009 Quality Control Manual for Hot Mix Asphalt. The Contractor shall operate the equipment so as to obtain adequate tests.

25.01.05. Submittals

A. AC mix design, gradation of aggregates and all certificates of compliance.

B. Bituminous binder certification.

25.01.06. Measurement

A. Measurement shall be in accordance with the bid sheet.

25.02. Roadway Restoration

25.02.01. Scope of Work

A. Roadway restoration shall consist of furnishing all labor, tools, equipment, and incidentals to provide final road surfacing including preparation of road beds and reconstructing roadway structure sections, sawcutting of existing pavement, constructing longitudinal and transverse conforms, removal and reinstatement of pavement stripes, removal and reinstatement of pavement markings, placing asphalt concrete primer coat, paint binder, asphalt concrete, and fog seal, as shown on the Drawings, as specified in these Specifications, and as directed by the Trust.

B. This work shall include furnishing and mixing mineral aggregate and asphalt binder at a central mixing plant, spreading and compacting the mixture, and furnishing and applying Prime Coat and Tack Coat to the lines, grades, and dimensions shown on the Drawings, and as specified in these Specifications.

25.02.03. Materials

A. Aggregate Base shall be Class 2 conforming to Section 26 of the State Specifications.

B. Asphalt Concrete Paving shall conform to Article 25.01, “Asphalt Concrete” of these Specifications. Paving, over areas where ponding of excess of un-penetrated prime coat exists shall not be allowed.

C. Longitudinal and transverse conforms between existing pavement and newly constructed pavement shall be made by cutting the existing pavement to a neat, smooth line at the conform line and constructing a vertical-face butt joint.

D. Painted traffic stripes and pavement markings shall conform to the provisions in Section 84, “Traffic Stripes and Pavement Markings” of the State Specifications.

E. Pavement markers shall conform to the provisions in Section 85, “Pavement Markers” of the State Specifications.

25.02.04. Placement

A. Subgrade shall be prepared as Section 23 “Earthwork” of these Specifications.

B. Painted traffic stripes, pavement markings, pavement markers and signs shall be restored to match the preconstruction condition, upon the completion of the construction at each roadway crossing.

C. Traffic stripes, pavement markings, and pavement markers shall be placed to the lines as established by the Contractor under the direction of the Trust. All work necessary to establish satisfactory lines and locations for traffic stripes, pavement markings, and pavement markers shall be performed by the Contractor.

D. Blue pavement markers shall be installed on the roadway opposite fire hydrants.

25.02.05. Testing

A. At the direction of the Trust, core samples of the in-place asphalt paving may be taken by a recognized commercial laboratory for checking conformance of paving thickness and for extraction of bitumen to establish conformance of combined aggregate grading and percent asphalt binder with these Specification and/or Specifications. Costs of such tests shall be included in the cost of asphaltic pavement, and no additional compensation shall be allowed.

25.02.06. Measurement

A. Road Restoration will not be measured.

25.03. Curb, Gutter, Sidewalk and Driveway Restoration

25.03.01. Scope of Work

A. Curb, curb and gutter, patio, sidewalk and driveway restoration shall consist of all work and materials necessary to install facilities at grade as shown on the Drawing and as specified in these Specifications.

25.03.02. Materials

A. Reinforcing steel shall be per Section 52, “Reinforcement” of the State Specifications.

B. Portland Cement Concrete, within the Presidio, shall be Class “A” per Article 24.01 Structural Concrete” of these specifications.

C. Base materials shall be Class 2 Aggregate Base per Section 26, “Aggregate Bases” of the State Specifications and shall be placed under all curbs and gutters, sidewalks and driveways per the Drawings and these Specifications.

25.03.03. Placement

A. Subgrade within the Presidio shall be prepared as Section 23 “Earthwork” of these Specifications.

B. Curb, gutter, sidewalk and driveways within the Presidio shall be constructed in locations shown on the Drawings in conformance with Section 73, “Concrete Curbs and Sidewalk”, of the State Specifications, and these Specifications at locations shown on the Drawings.

C. Sidewalks within driveway areas shall be considered as driveways and shall be thickened or reinforced where applicable, and shall be placed on 6” aggregate base, Class 2. Full compensation for providing and placing aggregate base and for furnishing and installing steel reinforcing dowels or mesh shall be considered as included in the contract price paid per square foot of concrete driveway and sidewalks and no additional compensation will be allowed therefore.

D. Concrete handicap access ramps shall be considered as sidewalk and shall conform to City of San Francisco Standards where applicable.

25.03.04. Testing

A. Compaction and sampling shall be per Article 24.01 “Structural Concrete”, of these Specifications.

25.03.04.01. Submittals

A. Contractor shall determine the mix proportions and consistency (slump) and shall furnish concrete which conforms to the strength designated by class or as shown on the Drawings, as specified in these Specifications, and as directed by the Trust. All mix designs shall be submitted for the Trust’s approval.

25.03.05. Measurement

A. Measurement shall be in accordance with the bid sheet.

25.04. Aggregate Base Access Road and Class II AB Pads

25.04.01. Scope of Work

A. Contractor to install and maintain Aggregate Base Access Road as shown on Drawing C-103; Access Road shall consist of excavating for and placing armoring aggregate on grade for the maintenance road, in earthen sections of the maintenance road where shown on the Drawings as specified in these Specifications and as directed by the Trust.

B. Contractor to install Aggregate Base (Gravel) Cap Class as shown on Drawing C-106, at rear of Building 1279, 1278, and 1259. Aggregate Base (Gravel) Cap shall consist of excavating and placing Class II AB aggregate on top of compacted imported fill as detailed on Drawing C-119.

25.04.02. Materials

A. Rock for aggregate shall be 1.5-inch Class II AB (State Specifications Section 26.2) and shall consist of clean, hard, and durable gravel or crushed rock. The use of rounded gravel or non-angular stone shall not be permitted.

B. The rock for aggregate shall have a minimum specific gravity of 2.60 in accordance with California Test Method No. 206 and a minimum durability index of 35 in accordance with California Test Method No. 229.

C. Drainage pipe to be schedule 80, 6-inch diameter rigid steel pipe.

D. Geotextile fabric to be US Fabrics US200 woven geotextile or equivalent.

25.04.03. Placement

E. The material shall be approved by the Trust before it is placed as aggregate. Placement of the aggregate and required compaction shall be in accordance with Section 26, “Aggregate Bases” of the State Specifications.

F. Alignment of access road will be cleared of loose vegetation and covered with geotextile fabric.

G. Geotextile fabric to be secured using minimum 6-inch steel soil staples at spacing recommended by geotextile fabric manufacturer.

H. No excavation for placement of aggregate base shall be allowed. Additional placement of aggregate may be used to create level surface to allow for safe movement of equipment and loads.

I. Contractor shall not place aggregate within 12 inches of any tree with a trunk diameter greater than 4 inches.

J. Temporary pipe will be placed at toe within street gutter of temporary access road to allow for street drainage of Lendrum Court as indicated on Drawing C-04. Ends of drainage pipe to be kept free of debris to allow for unimpeded flow of surface gutter flow.

25.04.04. Testing

A. Testing is not required.

25.04.05. Submittals

A. Contractor shall submit for each source providing armoring aggregate, in advance of its use on the project, the source gradation and quality parameters showing they meet the requirement specified in these Specifications.

25.04.06. Measurement

A. Measurement shall be in accordance with the bid sheet.

25.05. Decomposed Granite Outdoor Trails

25.05.01. Scope of Work

A. Decomposed Granite Outdoor Trails shall consist of furnishing all labor, tools, equipment and incidentals to provide final decomposed granite outdoor trails, including preparing subgrade including, header board edging, placing and compacting aggregate base course, and stabilizing and placing decomposed granite at locations of the Decomposed Granite Maintenance Access shown on the Drawings C-106 and C-120, as specified in these Specifications, and as directed by the Trust.

25.05.02. Materials

A. Decomposed granite shall be ¼" minus material and shall conform to the following:

Grading Requirements (AASHTO T11-82 and T27-82)

Sieve Size	Percent Passing
#3/8	100
#4	90-100
#8	75-80
#16	55-65
#30	40-50
#50	25-35
#100	15-20
#200	10-15

The color of decomposed granite shall be California Gold.

Stabilizer shall be either a water-based polymer, or organic powdered binder specifically manufactured to harden decomposed granite. The stabilizer shall not alter the gravel color.

25.05.03. Placement

A. Decomposed Granite shall be placed directly on native ground.

B. Blending Stabilizer: Blend 12 – 16 lbs. of Stabilizer per ton of decomposed granite. Stabilizer to be thoroughly and uniformly mixed throughout decomposed granite.

C. Placement of Decomposed Granite Screenings: Upon thorough moisture penetration, compact aggregate screenings to 90 to 95 percent relative compaction at optimum moisture content. Do not begin compaction for 6 hours after placement and up to 48 hours. Take care in compacting decomposed granite when adjacent to planting and irrigation systems.

D. Edging shall be installed to delineate the limits of the decomposed granite areas as shown on the plans and as specified in these specifications. Edging will not be required between decomposed granite areas and the concrete curbs or structures, pavement edges, or rock blanket areas.

E. Solidifying emulsion shall be thoroughly and uniformly mixed throughout the decomposed granite per the manufacturer's recommendations. Material shall be mixed in the field using portable mixing equipment, or delivered in mixer trucks from a local ready-mixed plant. Decomposed granite shall be placed in maximum lifts of 1.5 inch layers.

F. Each layer of decomposed granite shall be raked to evenly blend various material, sizes forming a smooth uniform surface. Decomposed granite shall be moistened sufficiently to obtain the required compaction.

G. Decomposed granite areas shall receive a final application of solidifying emulsion as recommended by the manufacturer.

H. The Contractor shall prevent runoff or overspray of solidifying emulsion onto adjacent paved or planting areas.

I. When work is complete, the surface shall be smooth and uniform; maintaining original flow lines, slope gradient and contours of the project site.

25.05.04. Testing

A. Mock-up: Prior to installation of any portion of the Decomposed Granite Outdoor Trail, install 4 feet wide x 10 feet long mockup of decomposed granite paving with Stabilizer additive at one location as directed by Trust. Prior to preparing mock-up, the Contractor shall submit a 2 kilogram sample of decomposed granite to the Trust for approval.

25.05.05. Submittals

A. Material Certificates: Provide copies of material certificates signed by material producer and Contractor, certifying that each material item complies with specified requirements. Additionally, provide "cut sheets" or product literature on all products to be used.

B. A Certificate of Compliance for the Stabilizer shall be furnished to the Trust in conformance with the provisions in Section 6 1.07, "Certificates of Compliance," of the State Specifications.

25.05.06. Measurement

A. Measurement shall be in accordance with the bid sheet.

26. SITE UTILITIES

A. The Contractor's attention is directed to Article 14.02 "Utilities", 14.02.01 "Preservation of Property" and 12.03 "Site Investigation" of these Specifications.

26.01. Stormwater Systems

26.01.01. Pipes and Culvert Crossings

26.01.01.01. Scope of Work

A. Pipes and culvert crossings shall consist of furnishing and installing pipe materials as specified on the Drawings required for storm water systems, including all labor materials, tools, equipment and incidentals and including all work.

26.01.01.02. Materials

A. For projects with RCP pipes and culverts, use the following language

1. RCP shall conform to the provisions of Section 65, "Reinforced Concrete Pipe", of the State Specifications, except as modified herein, and shall be Class III unless otherwise indicated on the Drawings.

2. Pipe joints shall be bell and spigot type employed steel joint rings and rubber gaskets in accordance with City of Francisco Standard Specifications.

B. For projects with CMP pipes and culverts, use the following language

3. CMP shall conform to the provisions of Section 66, "Corrugated Metal Pipe", of the State Specifications, except as modified herein, and shall be a minimum of 14 gage for steel pipe and 12 gage for aluminum pipe unless otherwise indicated on the Drawings.

4. Contact between steel and aluminum shall not be allowed.

C. For projects with plastic drainage pipes and culverts, use the following language

1. Plastic Pipes shall conform to the provisions of Section 64, "Plastic Pipe", of the State Specifications, except as modified herein, and shall be high density polyethylene (HDPE) single wall heavy duty pipe unless otherwise indicated on the Drawings.

2. Drainage Pipe shall have annular interior and exterior corrugations.

3. Pipe and fittings shall be made of virgin polyethylene compounds that comply with the cell classification 424420C for 4- through 10-inch (100-250mm) diameters, as defined and described in ASTM D3350, except that carbon black content should not exceed 4%.

4. Pipe joints shall be made with split or snap couplings. Standard connection shall meet the soil-tightness requirements of AASHTO M252 or M294. Gasketed connections shall incorporate a closed-cell synthetic expanded rubber gasket meeting the requirements of ASTM D1056 Grade 2A2. Gaskets, when applicable, shall be installed by the pipe manufacturer.

D. Fittings shall conform to AASHTO M252 or AASHTO M294.

26.01.01.03. Placement

A. For projects with RCP pipes and culverts, use the following language

1. Pipe shall be placed per Section 304 “Laying” of the City of San Francisco Standard Specifications.

2. Joints shall be set per Section 304 “Concrete Pipe” of the City of San Francisco Standard Specifications.

B. For projects with CMP pipes and culverts, use the following language

1. Pipe shall be placed per Section 66-1.05 “Laying Pipe” of the State Specifications.

2. Coupling Bands, if used, shall conform with Section 66-1.07 “Coupling Bands” of the State Specifications.

C. For projects with plastic drainage pipes and culverts, use the following language

1. Installation shall be in accordance with ASTM D2321.

D. For all pipes use the following language.

2. Trench Excavation and backfill shall be per Articles 23.04 “Trench Excavation” and 23.05 “Trench Backfill”, of these Specifications.

26.01.01.04. Testing

A. For projects with RCP pipes and culverts, use the following language

1. RCP Storm Drain quality assurance and including inspection at the manufacturing plant shall be per Section 304 “Reinforced Concrete Pipe (RCP)” of the City of San Francisco Standard Specifications.

B. For all pipes, use the following language

1. All pipes shall be inspected with closed-circuit television (CCTV) in accordance with Section 500-1.1.5, “Television Inspection,” of the Greenbook, Section 1307-3, “Television Inspection,” of the Standard Specifications, and these Specifications.

C. The Contractor shall submit the post-installation television inspection videos to the Trust, for review, within ten (10) working days after pipe installation.

D. CCTV inspection and cleaning of the RCP Storm Drain shall be done as two separate operations. The operation of any cleaning equipment during video inspection shall not be permitted. A camera with pan and tilt capabilities shall be required for all television inspection and any irregularities in the installed pipe encountered during video inspection shall be panned to and viewed thoroughly before proceeding. The Contractor shall submit the television inspection DVD-R’s and written logs to the Trust immediately following the recording. Television inspection DVD-R’s shall not be edited. If the Contractor does not comply with this section, the Contractor shall re-tape the pipeline at the Contractor’s sole expense. DVD recordable shall be “DVD-R” not “DVD+R” and the video file format shall be mpg.

E. Testing for Storm water System installation shall be in accordance with Article 23.05 “Trench Backfill,” of these Specifications, as directed by the Trust.

26.01.01.05. Submittals

A. Manufacturer’s specifications and a certificate from the manufacturer shall be furnished certifying the proposed storm drain pipe meets the requirements of this specification.

26.01.01.06. Measurement

A. Measurement shall be in accordance with the bid sheet.

26.01.02. Inlets and Outfalls (Not Used)

26.01.03. Storm Drain Manholes (Not Used)

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27. TRAFFIC CONTROL

27.01. Traffic Control

27.01.01. Scope of Work

A. Traffic Control shall consist of all work and materials necessary to maintain traffic and pedestrian access during all stages of the construction as shown on the Contractor's Traffic Control Plan(s), Drawing C-102, as specified in these Specifications, and as directed by the Trust, including:

1. Preparation of, and approval by the Trust of the Contractor's traffic control plan(s) showing the maintenance traffic and pedestrian access within the project limits throughout all stages of construction, per this Article, per General Provisions Article 16.06 "Traffic Control" of these Specifications.
2. Remove and replace traffic control markings and systems throughout the construction stages;
3. Remove and replace fencing, railing, Type K railing, barricade, and crash cushions throughout the construction stages;
4. Remove and replace channelizers, pavement striping, pavement markings, pavement markers, and trail closure signs, construction area signs throughout the construction stages;
5. Providing crossing guards as necessary throughout the construction stages, including for bus stops, as required;
6. All other miscellaneous work necessary throughout the construction stages for the project to complete the traffic control as required to complete all items of work.

B. The Contractor shall maintain traffic at the project area per the requirements of the City of San Francisco and Presidio Trust. Conceptual traffic control plans have been included in the Drawings. Contractor's Traffic control plan(s) shall be prepared by a registered Civil or Traffic Engineer and submitted to the Trust for approval.

C. The Contractor shall cooperate with the Trust and City of San Francisco authorities relative to handling traffic around the construction area and shall make arrangements relative to keeping the working area clear of parked vehicles so as to maintain sight visibility and access to adjacent properties.

D. The Contractor shall conduct operations and schedule cleanup so as to cause the least possible obstruction and inconvenience to traffic, pedestrians, cyclists, and adjacent property owners. All streets and sidewalk areas shall be swept clean in accordance with Article 3.01.20, "Cleaning Up", of these Specifications.

E. Damage done by the Contractor during the course of work to adjacent city or private property shall be repaired or replaced in kind in accordance with Section 6 "Rights of Way," of these Specifications, or as directed by the Trust.

F. Personal vehicles of the Contractor's employees, and the Contractor's equipment and vehicles shall not be parked on the traveled way or

shoulders at any time. When entering or leaving roadways carrying public traffic, the Contractor's equipment, whether empty or loaded, shall in all cases yield to public traffic and shall travel in the direction of the traffic. Flaggers and traffic signs may be required to control this activity.

G. When the entering or leaving time of the Contractor's equipment coincide with the children going to or leaving any schools in the area, in addition to providing flaggers, the Contractor shall also provide crossing guards at the Contractor's ingress and egress locations to direct the children crossing the roadway as directed by the Trust.

H. Those parts of public streets, right of way and sidewalks that are occupied by the Contractor, as approved by the Trust, shall be immediately vacated and returned to public use when use thereof is no longer necessary for the construction work. For long-term situations where construction work will be delayed for over 30 days, temporary traffic control measures shall be removed and streets restored to public use.

I. Attention is directed to Section 7 1.08, "Public Convenience", Section 7 1.09, "Public Safety", and Section 12, "Construction Area Traffic Control Devices", of the State Specifications, and Section 7, "Safety of Persons and Property," and Section 15 "Safety and Security," of these Specifications. Nothing in these Specifications shall be construed as relieving the Contractor from responsibility as provided in said Section 7 1.09, "Public Safety", of the State Specifications.

J. During hauling and excavation operations, a traffic lane on a two-lane street may be closed for periods not to exceed 5 minutes. Such traffic sign and flaggers as approved by the Trust and/or City of Francisco for said lane closure shall be in place prior to closing the lane to traffic. After each closure, all accumulated traffic shall be allowed to pass through the affected area before another closure is permitted.

K. Temporary lane closures shall consist of closing traffic lanes in accordance with the approved traffic control plan, the provisions of Section 12, "Construction Area Traffic Control Devices", of the State Specifications, and as specified herein. Temporary lane closures shall be removed when the Contractor is no longer occupying the lane.

L. Contractor is not relieved from the responsibility to provide such additional devices or take such measures as may be necessary to comply with the provisions of Section 7 1.09, "Public Safety", of the State Specifications.

M. Temporary traffic stripe (one coat) and pavement marking (one coat) shall be painted conforming to Section 84, "Traffic Stripes and Pavement Markings", of the State Specifications and as directed by the Trust.

N. Temporary pavement marker shall conform to Section 85, "Pavement Markers", of the State Specifications.

O. Traffic stripes and pavement markings, where in conflict with new striping and/or shown on the plans to be removed, shall be removed by grinding off said traffic markings.

P. Existing pavement markers, when no longer required for traffic lane delineation as directed by the Trust, shall be removed and disposed of.

Q. Removal of existing asphalt pavement, curb, gutter, sidewalk, barrier and other surface improvements required to complete the traffic staging construction shall conform to Article 21.03.01 “Concrete Removal” of these Specifications.

R. During traffic striping operations, traffic shall be controlled with lane closures, as specified herein.

S. Contractor shall replace traffic striping in kind. Contractor shall be responsible for recording pavement striping types and width of existing roadways prior to beginning construction.

T. Project Site Conditions:

1. Access routes to the Work area are shown on the Drawings. Use only access routes designated on the Drawings.

2. The primary designated truck route to all inbound traffic shall be the reverse route designated for outside destinations.

3. The secondary route for Presidio ingress/egress shall be via the Lombard gate – Presidio Boulevard – Lincoln Boulevard – Merchant Road route.

4. The Contractor and its Subcontractor vehicles shall not be allowed ingress and egress to the Presidio via Arguello Boulevard, Presidio Boulevard, 15th Avenue, and 25th Avenue gates.

5. Project involves hauling of debris, sediment, and other supplies between project site and the allowed entrance/exits of the Presidio. The Contractor shall provide a flagger to direct traffic while hauling activities are taking place.

27.01.02. Materials

A. Traffic control devices shall be in accordance with Section 12 3, “Traffic Handling Equipment and Devices”, of the State Specifications except as modified herein. If any component in the traffic control system is displaced, or ceases to operate or function as specified, from any cause, during the progress of the work, the Contractor shall immediately repair said component to its original condition or replace said component and shall restore the component to its original location.

B. Temporary fencing shall conform to Article 28.04, “Temporary Fence,” of these Specifications.

C. Portable Delineators

1. Portable delineators shall conform to the provisions of Section 12 3.04, “Portable Delineators”, of the State Specification except with the following modification; a minimum of two (2) reflective bands, each not less than 3 inches wide, shall be mounted at least 1½ inches apart and at a height on the post so that one (1) reflective band will be between 2½ feet and 3 feet above the roadway surface.

2. Traffic cones shall conform to the provisions of Section 12 3.10, “Traffic Cones”, of the State Specifications, amended as described herein.

3. Traffic cones shall be fluorescent and of a good commercial quality, flexible material suitable for the purpose intended. The outer portion above the base of the cone shall be translucent and be of a highly pigmented fluorescent orange polyvinyl compound. The overall height of the cone shall be at least 28 inches and the bottom inside diameter shall be not less than 10½ inches. The base shall be of sufficient weight and size or shall be anchored in a manner such that the traffic cone will remain in an upright position.

4. During the hours of darkness, as defined in Division 1, Section 280 of the Vehicle Code, traffic cones shall be illuminated conforming to the provisions in Section 12 3.11, Illuminated Traffic Cones, of the State Specifications, or, at the option of the Contractor, shall be traffic cones affixed or covered with a minimum 13-inch flexible reflective cone sleeve, placed a maximum of 3 inches from the top of the cone. The sleeves shall be silver white and shall be fabricated from sheeting that have not less than the following dry reflectance expressed in units of candlepower per foot candle per square foot. The reflectance values shall be determined by California Test 642. The wet reflectance values shall not be less than 90 percent of the dry values when tested in accordance with Federal Highway Administration Specification FP 79, Section 7.8.01 (c).

Divergence Angle, degree	Incidence Angle, degree	Dry Reflectance
0.2	-4	250
0.2	30	95
0.5	-4	95
0.5	30	65

5. Traffic cones to be in place during daylight hours shall not be affixed or covered with reflectorized cone sleeves.

D. Construction Area Signs

1. Construction area signs shall conform to Section 12-3.06, “Construction Area Signs”, of the State Specifications. These signs shall be furnished, installed, maintained and removed when no longer required as shown on the Drawings, in accordance with the provisions in Section 12, “Construction Area Traffic Control Devices”, of the State Specifications and as indicated in the Caltrans Traffic Manual. The base material of construction area signs shall not be plywood. All signs and other warning devices provided by the Contractor shall become the property of the Contractor after completion of the Contract.

2. During the hours of darkness, as defined in Division 1, Section 280 of the Vehicle Code, portable signs shown on the Drawings to be illuminated shall be, at the option of the Contractor, either illuminated signs in conformance with the provisions in Section 12 3.06B, “Portable Signs”, of the State Specifications, or Reflexite vinyl micro prism reflective sheeting signs, or 3M high intensity reflectorized sheeting on aluminum

substrate signs or Seibulite Brand Ultralite Grade Series encapsulated lens retro-reflective sheeting signs, or equal.

3. If any component in the traffic control system for lane closure is displaced, or ceases to operate or function as specified, from any cause, during the progress of the work, the Contractor shall immediately repair said component to its original condition or replace said component and shall restore the component to its original location.

E. Barricades

1. Temporary railing (Type K) shall conform to Section 12, "Construction Area Traffic Control Devices", of the State Specifications. A Type P marker panel is not required while the temporary crash cushion is placed in front of the first unit of rail (Type K) facing traffic. If temporary railing does not have a minimum of 2 feet to move upon impact, the barrier must be anchored to the pavement section as shown on the Drawings or approved by the Trust.

2. Type III barricades shall comply with Section 12, "Construction Area Traffic Control Devices", of the State Specifications. Each barricade unit shall have a self-contained flashing light unit installed at the top of one of the vertical posts in a manner that does not cover any portion of the reflectorized surface of the barricade. A Type N marker shall be installed on each Type III barricade.

3. Temporary crash cushion modules in groupings or arrays shall be installed and maintained at each location shown on the approved traffic control plan, specified in the Specifications or directed by the Trust. The grouping or array of sand filled temporary crash cushion shall be in accordance with the details shown on the Caltrans Standard Plan T2 and these Specifications.

F. Channelizers shall be the surface-mounted type and shall conform to the provisions in Section 12, Construction Area Traffic Control Devices, of the State Specifications. Channelizer posts shall be orange in color.

G. Traffic Stripes and Pavement Markings

1. Permanent traffic stripes and painted pavement markings shall be installed as specified in these Specifications and as directed by the Trust.

2. Pavement markings shall conform to the requirements of Section 84, Traffic Stripes and Pavement Markings, of the State Specifications.

3. If any component in the traffic control system for lane closure is displaced, or ceases to operate or function as specified, from any cause, during the progress of the work, the Contractor shall immediately repair said component to its original condition or replace said component and shall restore the component to its original location.

27.01.03. Placement

A. No stockpiling of materials or parking of equipment will be allowed on streets and sidewalks that are open or accessible to the public.

B. Large equipment or construction trucks shall access the site in compliance with the Trust and City of San Francisco truck route ordinances.

C. All construction signs shall be placed in the field and shall be visible to drivers and not covered or blocked by trees or other fixed objects.

D. Contractor shall verify any sprinkler system conflicts before installing construction area signs in planting strip. Contractor shall replace landscaping upon removal of construction area signs.

E. Each temporary railing unit (Type K) to be placed within 20 feet of the traffic lane shall have reflectors installed on top of the rail as directed by the Trust.

F. Temporary crush cushion modules shall be placed on movable pallets or frames. The pallets or frames shall provide a full bearing base beneath the modules. The modules and supporting pallets or frames shall not be moved by sliding or skidding along the pavement.

G. Complete traffic stripes shall have clean, well-defined edges, shall be uniform, shall be straight on tangent alignment, and shall be true arc on curved alignment. The width of completed traffic stripes shall not deviate more than 1/4 –inch on tangent nor more than ½-inch on curves.

H. Pedestrian access shall be maintained at all times in accordance with Section 7 “Safety of Persons and Property”, of these Specifications.

27.01.04. Testing

A. The Contractor shall accompany the Trust to inspect the area, which will be affected by project construction, during the hours of darkness, to determine the adequacy of the traffic control plans before approving commencement of any construction work. The Contractor shall correct or add any traffic control devices deemed required by the Trust.

27.01.05. Submittals

A. The Contractor shall submit to the Trust the Contractor’s Traffic Control Plan(s), approved by the Trust or City of San Francisco for right-of-way, at least ten (10) days prior to any work within the public right-of-way, which will affect traffic. No work will be allowed prior to approval of the Contractor’s Traffic Control Plan(s).

27.01.06. Measurement

A. Measurement shall be in accordance with the bid sheet.

28. FENCING AND GATES

28.01. Chain Link Fence

28.01.01 Scope of Work

Temporary chain link fences with gates shall be place around staging areas as shown in Drawing C-103, and around work areas during construction.

28.02. MATERIALS

A. Fence material shall be of Galvanize or coat ferrous materials. Do not use materials imperfectly galvanized or coated or with serious abrasions.

B. Post shall be minimum 1 ½ inch in diameter and fitted with end caps.

C. Post shall be secured in precast concrete blocks with a minimum height of 4-inches and 20-pounds in weight per block.

28.03. Placement

A. Temporary fencing will be installed as shown in Drawings for staging areas.

B. Posts shall be spaced 8-foot center to center. Post and cable fence shall be connected to existing fence.

C. Separate posts set on top of concrete structures shall be flattened on end and, shall be embedded in the post pocket with non-shrink grout per Article 24.07 “Non-Shrink Grout” of these Specifications, sleeves will not be required.

D. The Contractor’s attention is directed to Article 14.01.02 “Preservation of Property” of these Specifications.

28.04. Wood Fence – (Not Used)

28.05. Post and Cable Fence– (Not Used)

28.06. Temporary Fence

28.06.01. Scope of Work

A. Temporary fence shall consist of furnishing all labor, tools, equipment to install and remove temporary Type CL-6 fence around construction areas and orange construction fences around existing items that are to be protected in place, as necessary during construction, as specified in these Specifications, and as directed by the Trust.

28.06.02. Materials

A. Temporary Type CL-6 fence shall conform to Section 80, “Fences”, of the State Specifications and State Standard Plan Detail A85, except as modified herein.

B. Galvanizing and painting of steel items will not be required. Concrete footings for metal posts will not be required.

C. Orange Construction fence shall be 4 feet high, orange with an approximate mesh opening of 1 by 4 inches and made of high-density polyethylene resin, with a temperature range of -40 to 200 degrees Fahrenheit. Posts will be metal T-posts 6 feet in length.

28.06.03. Placement

A. Temporary Type CL 6 fence shall be installed before construction and removed after the item of work protected by the fencing is completed and the Trust approves removal of fencing.

B. The Contractor's attention is directed to Article 14.01.02 "Preservation of Property" of these Specifications.

28.06.04. Measurement

A. Measurement shall be in accordance with the bid sheet.

29. DRAINAGE FEATURES AND SLOPE PROTECTION

29.01. Rock Slope Protection — (Not Used)

29.02. Grouted Rock Slope Protection — (Not Used)

29.03. Lateral Grade Control Structures (Not Used)

29.04. Structural Drainage

29.04.01. Scope of Work

A. Structure Drainage shall consist of all work and materials necessary to furnish and construct drainage elements to convey storm water away from buildings and for erosion control as shown on the Drawings, as specified in these Specifications and as directed by the Trust.

B. This work includes installing, drainage features in and around buildings as shown on the Drawings C-121, C-122 and C-123 per these Specifications, and as directed by the Trust. The SWPPP prepared for the project by the Contractor must describe and include the use of temporary silt fence and fiber roll as a water pollution control practice for sediment control.

C. Structural drainage to be installed in and around buildings 1259, 1279, and 1280. Site topography is to be graded such that a structural depression is located in areas shown on Drawings C-121, C-122 and C-123.

D. Construct form work to support and pour concrete gutters. Note drainage pipe to daylight within concrete gutter as shown on Drawing C-123.

E. Drainage elements shall consist of a 9-inch by 9-inch drainage pipe inlet and Schedule 40 PVC pipe.

F. Pipe to be placed above protective gopher wire mesh.

G. Drainage pipe to maintain minimum of 2% slope.

H. Many utilities exist in and around buildings, to prevent damage only hand tools or light weight machinery should be used to construct drainage elements.

29.04.02. Materials

A. Polyvinyl chloride (PVC) pipe and fittings for weep holes shall be nominal 4-inch diameter Schedule 40 conforming to ASTM Designation D-1785. All fittings shall have solvent welded joints. The welding solvent shall conform to that recommended by the manufacturer of pipe. Perforations shall be staggered 16 mm holes.

B. Acrylonitrile-Butadiene-Styrene (ABS) fittings shall be allowed only where shown on the Drawings. The fittings shall conform to ASTM Designation 2751. The solvent-cement to join PVC and ABS shall conform to the manufacturer's recommendations.

C. Permeable material shall conform to the provisions of Article 23.09, "Permeable Material," of these Specifications.

D. Geotextile fabric shall conform to the provisions of Article 30.01, “Geotextile Fabric,” of these Specifications.

29.04.03. Placement

A. Structure drainage shall be placed as shown on the Drawings.

29.04.04. Testing

A. No special requirements.

29.04.05. Submittals

A. No special requirements.

29.04.06. Measurement

A. The quantities for Structural Drainage will not be measured.

29.05. Erosion Control - Temporary Silt Fence and Fiber Roll

29.05.01. Scope of Work

A. This work includes installing, maintaining, and removing temporary silt fence as shown on the Drawings C-102 and C-113 per these Specifications, and as directed by the Trust. The SWPPP prepared for the project by the Contractor must describe and include the use of temporary silt fence and fiber roll as a water pollution control practice for sediment control.

B. This work is included in “Compliance with NPDES General Permit”, Article 17.01 of these Specifications.

29.05.02. Materials

A. Silt Fence Fabric – Geosynthetic fabric for temporary silt fence must consist of one of the following:

1. Polyester
2. Polypropylene
3. Combined polyester and polypropylene

B. Sample under ASTM D 4354, Procedure

C. Test under ASTM D 4759. All properties must be based on Minimum Average Roll Value (MARV).

D. Identify, store, and handle under ASTM D 4873.

E. Protect geosynthetic materials from moisture, sunlight, and damage during shipping and storage. Label each unit with the manufacturer’s name, identifying information, and product identification.

F. Silt fence fabric must comply with the parameters shown in the following table:

Property	**ASTM Designation**	**Specification**	
		Woven	**Non-Woven**
Grab breaking load 1-inch grip, lb., min. in each direction	D 4632	120	120

Apparent elongation Percent, min., in each direction	D 4632	15	50
Water Flow Rate Max. average roll value, gallons per minute/square foot	D 4491	10-50	100-150
Permittivity 1/sec., min.	D 4491	0.05	0.05
Apparent opening size Max. Average roll value, U.S. Standard sieve size	D 4751	30	30
Ultraviolet Degradation Percent of original unexposed grab breaking load 500 hr., minimum	D 4595	70	

29.05.03. Posts

A. Posts must be wood or metal.

B. Wood posts must be:

1. Untreated fir, redwood, cedar, or pine and cut from sound timber.
2. Straight and free of loose or unsound knots and other defects that would render the stakes unfit for use.
3. Pointed on the end to be driven into the ground.
4. At least 2” x 2” in size, and 4 feet long.

C. Metal posts must:

1. Be made of steel.
2. Have a “U,” “T,” “L,” or other cross sectional shape that can resist failure from lateral loads.
3. Be pointed on the end to be driven into the ground.
4. Weigh at least 0.75 –pound per foot.
5. Be at least 4 feet long.
6. Have a safety cap attached to the exposed end. The safety cap must be orange or red plastic and fit snugly to the metal post.

29.05.04. Fiber Rolls (Straw Wattles)

A. Fiber rolls (also referred to as Straw Wattle) shall be prefabricated and delivered to the site fully assembled with the following properties:

1. Prefabricated fiber roll materials will be 100% biodegradable and composed of natural materials
2. Prefabricated fiber roll straw material will be certified weed free and shall meet Food and Agricultural Code (FAC) Section 5101 and 5205.

3. Prefabricated fiber roll biodegradable fabric used to contain straw material shall be comprised of burlap mesh knit from natural jute twine.
4. Roll dimensions: 10 to 12 inches in diameter, at least 10 feet long, and at least 2 pounds per linear foot.
5. Natural fiber, sterile, and weed-free.

29.05.05. Wood Stakes

A. Wood stakes must be:

1. Untreated fir, redwood, cedar, or pine and cut from sound timber.
2. Straight and free of loose or unsound knots and other defects which would render the stakes unfit for use.
3. Pointed on the end to be driven into the ground.

B. For fiber roll, wood stakes must be at least 1-inch by 1-inch by x 24-inch in size.

29.05.06. Placement

A. Silt fence must be:

1. Constructed with silt fence fabric, posts, and fasteners
2. Prefabricated or assembled at the job site

B. Silt fence fabric must be attached to posts using these methods:

1. If prefabricated silt fence is used, posts must be inserted into sewn pockets
2. If assembled on the job site:
   a) If wood posts are used, fasteners must be staples or nails
3. If steel posts are used, fasteners must be tie wires or locking plastic fasteners
4. Spacing of the fasteners must be no more than 8 inches apart

C. Place silt fence approximately parallel to the slope contour. For any 50-foot section of silt fence, do not allow the elevation at the base of the fence to vary more than 1/3 of the fence height.

D. Install silt fence by:

1. Embed geotextile and chain link fence a minimum of 8 inches into the ground. Backfill the embedment trench with soil and hand or mechanically tamp to secure the fabric into the soil.
2. Securing with posts placed on the downhill side of the fabric
3. Where ends of the geotextile come together, the ends shall be overlapped by 6 inches, folded, and stapled to prevent sediment bypass.
4. Extend both ends of the super silt fence a minimum of five horizontal feet upslope at 45 degrees to the main fence alignment to prevent runoff from going around the ends of the super silt fence.

E. Connect silt fence sections by:

1. Joining separate sections of silt fence to form reaches that are no more than 500 feet long
2. Securing the end posts of each section by wrapping the tops of the posts with at least two wraps of 16-gage diameter tie wire
3. Ensuring that each reach is a continuous run of silt fence from end to end or from an end to an opening, including joined panels

F. If Contractor mechanically pushes the silt fence fabric vertically through the soil, Contractor must demonstrate that the silt fence fabric will not be damaged and will not slip out of the soil, resulting in sediment passing under the silt fence fabric.

29.05.07. Maintenance

A. Maintain temporary silt fence and fiber roll to provide sediment holding capacity and to reduce runoff velocities.

B. Remove sediment deposits, trash, and debris from temporary silt fence as needed or when directed by the Trust. If removed sediment is deposited within project limits, it must be stabilized and not subject to erosion by wind or water. Trash and debris must be removed and disposed of as specified in Section 7-1.13, “Disposal of Material outside the Highway Right of Way,” of the State Specifications.

C. Maintain temporary silt fence by:

1. Removing sediment from behind the silt fence when sediment is 1/3 the height of the silt fence above ground.
2. Repairing or adjusting the silt fence when rills and other evidence of concentrated runoff occur beneath the silt fence fabric.
3. Repairing or replacing the silt fence fabric when it becomes split, torn, or unraveled.
4. Replacing or adjusting the fiber roll when rills and other evidence of concentrated runoff occur beneath the fiber roll.
5. Repairing or replacing the fiber roll when they become split, torn, or unraveled.
6. Adding stakes when the fiber roll slumps or sags.
7. Replacing broken or split wood stakes.

D. Repair temporary silt fence and fiber roll within 24 hours of discovering damage unless the Trust approves a longer period.

E. If Contractor vehicles, equipment, or activities disturb or displace temporary silt fence and fiber roll, repair temporary silt fence and fiber roll at Contractor expense.

F. The Contractor shall be responsible for maintenance costs for cleanup, repair, removal, disposal, or replacement due to improper installation or Contractor negligence.

29.05.08. Removal

A. When the Trust determines that temporary silt fence and fiber roll is not required, Contractor shall remove and dispose of fence under Section 7-1.13, "Disposal of Material Outside the Highway Right of Way," of the State Specifications.

B. Ground disturbance, including holes and depressions, caused by the installation and removal of the temporary silt fence must be backfilled and repaired under Section 15-1.02, "Preservation of Property," of the State Specifications.

29.05.09. Testing

A. There are no special requirements. However, Contractor shall periodically inspect and maintain the silt fence in accordance with the project approved SWPPP and the California Stormwater BMP Handbook, SE-1.

29.05.10. Submittals

A. Submit a Certificate of Compliance as specified in Section 6-1.07, "Certificates of Compliance" of the State Specifications for silt fence fabric and fiber roll.

29.05.11. Measurement

A. Measurement shall be in accordance with the bid sheet.

29.06. Erosion Control H-Straw Mulch

29.06.01. Scope of Work

A. Erosion Control Straw Mulch shall consist of all work and materials necessary including water to furnish and place straw mulch as required for erosion control during construction to conform to the requirements in SWPPP, the project BMPs these Specifications, and as directed by the Trust.

29.06.02. Materials

A. The Straw Mulch shall consist of two tons per acre of straw mulch: straw shall be stalks from oats, wheat, rye, barley, or rice and be weed and seed free and furnished in air-dry condition and with a consistency suitable for placing with commercial blowing equipment.

29.06.03. Soil Preparation

A. No preparation will be required.

29.06.04. Placement

A. Straw Mulch shall be placed in all areas of disturbed soil as shown on the Drawings. The Contractor shall accompany the Trust to confirm the Straw Mulch limits.

B. The Contractor shall plan and execute the Straw Mulch so as to allow evenly cover the area in a uniform thickness.

C. Straw Mulch may be placed by hand, using air-blown equipment, or applied as a hydromulch. Use of hydro mulch requires advanced written approval of the Trust.

D. After the Straw Mulch has been placed, place erosion control blanket on top of as directed on the Drawings. Fasten blanket to soil over all areas to receive Straw Mulch in accordance to Article 29.07 “Erosion Control Blanket”.

29.06.05. Submittals

A. Submit a description of the proposed Straw Mulch material to be used along with a certification for seed and weed free.

B. Submit a written description of how the mulch will be applied on site.

29.06.06. Testing

A. No testing is required

29.06.07. Measurement

A. Measurement shall be in accordance with the bid sheet.

29.07. Erosion Control Blanket

29.07.01. Scope of Work

A. This work includes installing Erosion Control Blanket and shall consist of all work and materials necessary to furnish and place rolled erosion control netting, complete in place as required for erosion control during construction to conform to the requirements in SWPPP, the project BMPs, these Specifications, and as directed by the Trust.

29.07.02. Materials

A. Erosion Control Blanket shall be C125 BN double net coconut blanket manufactured by North American Green or approved equal.

B. The long-term coconut fiber erosion control blanket shall be a machine-produced 100% biodegradable blanket with a 100% coconut fiber matrix with a functional longevity of up to 24 months.

C. The blanket shall be of consistent thickness with the coconut fiber evenly distributed over the entire area of the blanket. The blanket shall be covered on the top and bottom sides with 100% biodegradable woven, natural, organic fiber netting. The top netting shall consist of machine directional strands formed from two intertwined yarns with cross directional stands interwoven through the twisted machine strands (commonly referred to as a Leno weave) to form an approximate 1.27 x 2.54 cm mesh. The blanket shall be sewn together on 3.81 cm centers (50 stitches per roll width) with biodegradable thread.

D. Erosion Control Blanket shall meet requirements established by the Erosion Control Technology Council (ECTC) Specification.

E. The coconut fiber Erosion Control Blanket shall have the following properties:

1. Matrix: 100% Coconut Fiber (0.50 lb. /yd^2).
2. Netting: Top – Leno woven 100% biodegradable organic jute fiber (9.30 lbs./1,000ft^2 [4.50kg/100m^2] approximate weight).

3. Bottom – 100% biodegradable organic jute fiber (7.70 lbs. /1000 ft^2 [3.76 $kg/100m^2$] approximate weight).
4. Thread: Biodegradable.

29.07.03. Fasteners

A. Biodegradable wood stakes shall be 12 inch Eco-STAKE™ by North American Green or equal.

A. The stakes shall be 100% biodegradable and a "1" – shaped hardwood pin designed to safely and effectively secure erosion control blankets. The wood stake must exhibit ample rigidity to enable being driven into hard ground, with sufficient flexibility to resist breakage. The wood stake shall be the North American Green Eco-STAKE or approved equal, with the following dimensions:

1. Leg Length: 11.00 in. (27.94 cm)
2. Head Width: 1.25 in. (3.18 cm)
3. Head Thickness: 0.40 in. (1.02 cm)
4. Leg Width: 0.60 in. (1.52 cm) (tapered to point)
5. Leg Thickness: 0.40 in. (1.02 cm)
6. Total Length: 12.00 in. (30.48 cm)

29.07.04. Submittals

A. Submit a Certificate of Compliance under Section 6-1.07, "Certificates of Compliance" of the State Specifications for:

1. Netting
2. Fastener
3. Anchors

29.07.05. Testing

A. No testing is required for Erosion Control Blanket.

29.07.06. Placement

A. Prior to placing and securing blankets review all installation, lapping and staking details and procedures with Trust for approval. Control Blanket shall be installed within 4-hours of application of the Erosion Control Hydro-seeding (see Article 29.06). The blanket shall be carefully placed as to not disturb the hydro-seeding. Place and secure the blanket per the manufacturers details. Use a trench to secure and bury a 1-foot section of the top edge of the blanket with a flap of 12"-18" to fold back over the top of the trench. In the bottom of the trench secure the blanket with stakes 12" on center. Place the blankets end over end Shingle style in the direction of the flow of the channel and bank with an overlap of 4"-6". Provide stapling and staking per manufacturer minimum recommended spacing.

29.07.07. Measurement

A. Measurement shall be in accordance with the bid sheet.

29.08. Storm Drain Inlet Protection

29.08.01. Scope of Work

A. This work includes installation, maintenance and removal of Storm Drain Inlet Protection and shall consist of all work and materials necessary to furnish and place Storm Drain Inlet Protection material, complete in place as required during construction to conform to the requirements in the SWPPP, the project BMPs, these Specifications, and as directed by the Trust.

B. Storm Drain Inlet Protection shall be gravel bag berm(s) in conformance with DI Protection Type 3 as described in Section 4, Storm Drain Inlet Protection SC-10 of the Caltrans Construction Site Best Management Practices Manual.

29.08.02. Materials

A. Gravel bags shall be made of a woven polypropylene, polyethylene or polyamide fabric, or burlap material. When full, a bag should be 450 mm (1.5 ft) long, 300 mm (1 ft) wide, and 75 mm (3 in) thick, with a mass of approximately 15 kg (35 lb). Bag dimensions are standardized but may vary based on locally available materials. Alternative bag sizes shall be submitted for approval prior to deployment. Fill material shall be 13 mm to 25 mm (1/2 in to 1 in) class 2 aggregate base that is clean and free from clay and undesirable materials.

29.08.03. Placement

A. The gravel bag berm(s) shall be installed in accordance with Section 4, Storm Drain Inlet Protection SC-10 of the Caltrans Construction Site Best Management Practices Manual.

29.08.04. Maintenance

A. The gravel bag berm(s) shall be inspected and maintained in accordance with Section 4, Storm Drain Inlet Protection SC-10 of the Caltrans Construction Site Best Management Practices Manual.

29.08.05. Removal

A. When the Trust determines that the Storm Drain Inlet Protection is not required, Contractor shall remove and dispose of the gravel bag berms as described under Section 7-1.13, “Disposal of Material Outside the Highway Right of Way,” of the State Specifications.

29.08.06. Testing

A. There are no special testing requirements. However, Contractor shall periodically inspect and maintain the Storm Drain inlet Protection in accordance with the project approved SWPPP and Section 4, Storm Drain Inlet Protection SC-10 of the Caltrans Construction Site Best Management Practices Manual.

29.08.07. Submittals

A. Submit a Certificate of Compliance as specified in Section 6-1.07, “Certificates of Compliance” of the State Specifications for the gravel bag.

29.08.08. Measurement

Storm Drain Inlet Protection will not be measured.

30. GEOTEXTILES AND GEOCOMPOSITE MATERIALS

30.01. Geotextile Fabric—

30.01.01. Scope of Work

A. Geotextile fabrics shall consist of all work and materials necessary to furnish and place geotextile fabrics for structure drainage as shown on the Drawing C-106, as specified in these Specifications, and as directed by the Trust.

30.01.02. Materials

A. The geotextile fabric for structure drainage and other applications between the soil and permeable rock material shall be a nonwoven fabric conforming to Section 88-1.03, “Filter Fabric”, and Section 88-1.04 (Type B), “Rock Slope Protection Fabric”, of the State Specifications, Mirafi 700X or equal. The apparent opening size of the nonwoven fabric shall be less than No. 40 Standard Sieve Size (0.425 mm).

30.01.03. Placement

A. The geotextile fabrics shall be ultraviolet ray (UV) protected, covered within ten (10) days from time of placement, and shall not be stored in an area directly exposed to sunlight prior to installation.

B. The geotextile fabrics shall be handled and placed in accordance with the manufacturers’ recommendations, these Specifications, and as directed by the Trust. These Specifications shall take precedence over the manufacturer’s recommendations.

C. The surfaces on which the geotextile fabrics are to be installed shall be free of loose or extraneous material and sharp objects, graded smoothly, and compacted prior to placement of the fabric. Appropriate adjustments to the grade shall be made as required.

D. The fabrics shall conform to the surface irregularities of underlying graded soil. Geotextile fabric sections shall be joined by overlapping a minimum of 2 feet at the edges. Where applicable, the fabric shall be overlapped such that the upstream fabric is laid over the downstream fabric for transverse joints, and upslope fabric over the downslope fabric for longitudinal joints.

E. Any damage of the geotextile fabrics during placement as a result of the Contractor’s negligence shall be repaired or replaced, as directed by the Trust, by the Contractor at the Contractor’s own expense.

30.01.04. Testing

A. No special requirements.

30.01.05. Submittals

A. Manufacturers catalog information for selected products and a detailed description of the installation procedure of the geotextile fabric shall be submitted for the Trust’s approval.

30.01.06. Measurement

A. The quantities of geotextile fabric will not be measured.

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31. ONE-YEAR MAINTENANCE PERIOD

31.01. Revegetation and Landscape Establishment and Maintenance

31.01.01. Scope of Work

A. Revegetation and Landscape establishment maintenance shall consist of furnishing all labor, materials, tools, equipment, and incidentals to provide all services and materials as specified in these Specifications, and as directed by the Trust. The Contractor will be responsible for at a minimum the following:

1. Promoting the establishment of plants that are healthy and vigorous at the end of the 1 year maintenance period;
2. Maintain and repair all erosion control;
3. Weed control;
4. Pest and rodent control;
5. Maintain, adjust and repair, the irrigation system;
6. Adjust irrigation schedules as weather conditions change and as plants become established;
7. Provide manual irrigation of hydro-seeded areas or areas that have had erosion control repair work done as necessary;
8. Documentation of all maintenance procedures in a log book, irrigation system repairs and adjustments to schedule, including mortality counts and reports, erosion control repairs, pruning, planting basin maintenance, weed, pest and rodent control and all other tasks that are necessary to maintain the project site.

B. The requirement of the revegetation planting and irrigation maintenance work is to have healthy and vigorous plants at the end of the Maintenance Period that are developing the ability to survive without irrigation or other maintenance actions.

C. The requirement of the landscape planting and irrigation maintenance (trees, shrubs and vines) work is to establish and maintain permanent planting and irrigation that will be maintained by the Trust for many years to come after the 1 Year Establishment Maintenance Period. Wherever possible, these plantings should consist of the original plant materials installed during the first and second year of planting. Replacement plantings that may be required during the Maintenance Period may require additional maintenance actions beyond the Maintenance Period. If it is determined by the Trust that a sufficient quantity of the original plantings did not survive through the Maintenance Period due to Contractor negligence, the Contractor will be required to provide additional maintenance at no additional cost.

D. The Maintenance Period will be the plant establishment period beginning on the first day after acceptance of the all planting and irrigation installation as specified in these specifications and extending for one (1) year for the duration of the Contract period to ensure conformance with performance criteria. Upon written request from the Contractor, the Trust, may approve

the start of a Maintenance Period for the revegetation and landscape planting and irrigation in phases. If such phases are approved in writing by the Trust, the Maintenance Period as specified herein shall be performed for the required duration for each phase. The Contractor must submit a written request and receive the Trust's approval for each desired phase. The Contractor shall be responsible for maintaining all plants installed under this contract, including container plants, hydro seed, broadcast seed, and cuttings as well as the irrigation system as required achieving the performance criteria. Maintenance operations shall include, but are not limited to: weed, pest and rodent control; corrective pruning; irrigation system operation and maintenance; hand watering; replacement planting; reseeding cover of planting areas; preparing plant establishment forms; removal and disposal each site visit of all trash that has accumulated; reapplication of wood mulch (as needed); provision of yearly mortality counts; repair of damage from storm runoff; protection of slopes from erosion; filling of monthly maintenance log; and preparing and maintaining record drawings.

E. The goal of the planting actions is to have healthy and vigorous plants at the end of the Maintenance Period that are developing the ability to survive without irrigation or other maintenance actions. Whenever possible, these plantings should consist of the original plant materials installed during the Construction Period. Replacement plantings that may be required during the Maintenance Period may require additional maintenance actions beyond the Maintenance Period. If it is determined by the Trust that a sufficient quantity of the original plantings did not survive through the Maintenance Period due to Contractor negligence, the Contractor shall be required to provide additional maintenance at no additional cost.

31.01.02. Contractor Qualifications

A. The revegetation and landscape maintenance labor force shall be thoroughly familiar with, and trained in, the work to be accomplished and shall perform the task in a competent, efficient manner acceptable to the Trust. The Contractor shall follow the requirements below and have the following minimum qualifications:

1. A California C-27 Contractor's License in good standing with no complaints on file.
2. A minimum of five years of revegetation maintenance work in sensitive environmental settings of similar nature to this project.
3. The foreman or superintendent assigned to this project shall have the same experience qualifications.
4. The foreman or superintendent shall directly supervise the work force at all times. Notify Trust of all changes in supervision.
5. Provide proper identification at all times for Contractor's landscape maintenance vehicles and labor force.

31.01.03. Project Site Conditions

A. The Contractor shall document the general condition of existing irrigation system, making sure that all faulty controllers, broken or inoperable equipment is repaired prior to the start of the maintenance period and make

periodic inspections of surface drainage to ensure clear flow lines (removal of sediment buildup); Repair of surfaces that have been damaged by erosion, rodents, vehicles or other causes.

31.01.04. Sequence and Scheduling

A. Perform all maintenance during hours mutually agreed upon between Trust and Contractor. The first year of the One Year Establishment Maintenance shall begin on the first day following approval of the Contractor's requested Phase. The minimum frequency for Contractor's site visits during the Maintenance Period shall be the following:

March 1 through September 30
Year 1 – once every week
Year 2 – once every ten (10) calendar days
Year 3 – once every two (2) weeks

October 1 through February 28
Years 1, 2, and 3 – every two weeks

31.01.05. Performance Criteria

A. At the end of the One Year Establishment Maintenance Period for each Phase, the Trust will assume the maintenance responsibility for the respective Phase. For revegetation planting, the following criteria shall be met by the end of the One Year Maintenance Period to evaluate the compliance of the revegetation and landscape maintenance period.

B. Mortality rates and plants in poor health and vigor counted in the eighth month of the last year of the One Year Establishment Maintenance Period shall be used to determine if the One Year Establishment Maintenance Period will be extended. Plant health and vigor will be evaluated as described in the following monitoring and reporting section. Mortality rates and or plants in poor health and vigor exceeding the percentages below will extend the Establishment Maintenance Period as follows:

C. Revegetation (Native Plants and Forestry) Plantings:

1. If the mortality and/or poor health rate is less than 15% the maintenance period will be not be extended.
2. If the mortality and/or poor health rate is between 15% & 20% the maintenance period will be extended by six months to allow for replacement plant establishment
3. If the mortality and/or poor health rate is between 21% & 25% the maintenance period will be extended by one year to allow for replacement plant establishment
4. If the mortality and/or poor health rate is over 25% the maintenance period will be extended by two years to allow for replacement plant establishment

31.01.06. Landscape Plantings

A. 100% of all landscape trees, shrubs, and vines are healthy and vigorous at the end of the One Year Establishment Maintenance Period.

B. Any trees or vines that are replaced during the year must have a minimum of one year of Establishment Maintenance. The extension of maintenance will be one year from the time of replacement.

C. The above extension of maintenance time is from the date of the scheduled completion of the One Year Establishment Maintenance Period. The Contractor shall bear all costs related to any extension of the Establishment Maintenance Period. The Trust will evaluate and confirm the accuracy of the mortality and plants in poor health rates and make the determination of any extensions to the One Year Establishment Maintenance Period.

31.01.07. Monitoring and Reporting

A. The Contractor shall conduct annual plant monitoring to evaluate the plants in August or September each year of the One Year Establishment Maintenance Period. The Contractor shall submit results to the Trust for review. The results will be verified by the Trust who will advise the Contractor of corrective actions required to meet the required plant survivorship performance standards for the project. The Contractor solely shall be responsible for achieving the performance criteria noted in these Specifications.

B. To maintain adequate planting cover each year, the Contractor shall be responsible for ensuring plant health and vigor. The three categories that will be used to evaluate plant health and vigor are; plant foliage, wood, and root crown. Healthy plants will be those that are free of disease. Vigorous plants will be those that are robust, or physically strong. During the One Year Establishment Maintenance Period the Contractor will be responsible for providing plants that, at a minimum, receive a 'good' rating. A 'good' rating shall be defined as a plant that has no more than between 25%-49% of the foliage, wood, and root crown being affected by symptoms of poor health (e.g.; diseased foliage, wood or root crown; leaf or stem dieback; wildlife or insect damage).

C. The Contractor shall be responsible for checking the foliage of each plant for symptoms of disease, size color, wilting defoliation, new growth, browsing by wildlife, insect damage, and vandalism; and taking corrective actions as required. The Contractor shall be responsible for checking the wood of each plant for symptoms of disease, browsing by wildlife, insect damage, girdling, structural deformities, die-back and sunburn; and taking corrective actions as required. The Contactor shall be responsible for checking the root crown of each plant for symptoms of disease, girdling, insect damage, and die-back; and taking corrective actions as required.

D. The Contractor shall be responsible for anticipating corrective actions required to meet the performance requirements for this project, including procuring and installing replacement plantings, according to this Article.

E. During maintenance operations, the Contractor shall examine conditions of plants, plant identification tags, weak growth, stability of water basins, and examine soil moisture around each plant to ensure that the irrigation system is providing appropriate moisture to each plant during the irrigation season. The Contractor shall be responsible for corrective measures to ensure that all said items are maintained as installed according to the Drawings and these Specifications. All maintenance activities and observations shall be recorded in monthly plant establishment forms, according to this Article.

F. The Trust may conduct interim inspections and bring deficiencies to the Contractor's attention at any time.

G. The Contractor shall ensure site drainage in planting areas. At no time shall ponding of water be allowed on the site due to local runoff; the Contractor shall be responsible for control of water.

H. The Contractor shall be responsible for 100 percent of the remediation efforts required due to fire, vandalism, and other damages to meet the performance requirements of this Section.

31.02. Insect, Pest & Rodent Control

31.02.01. Scope of Work

A. Contractor shall provide all labor, materials, tools, equipment, and incidentals for providing rodent control. The Establishment Maintenance Period may be extended by the Trust if the project is improperly maintained, appreciable replacement is required, or other corrective work becomes necessary. Costs incurred due to damage or replacement during Establishment Maintenance Period shall be the responsibility of the Contractor. Contractor's pest and rodent control personnel shall be able to identify beneficial versus injurious insects, pests and rodents and visible signs and evidence of damage being caused by any insect, pest or rodent. Any observation of pests shall be noted and the Trust Vegetation Management Unit shall be contacted to determine if control measures are necessary.

B. Prior to any pesticide application the Contractor shall submit to the Trust's Vegetation Management Unit all pest control recommendations for review and approval.

C. All pesticide applications shall conform to the Trust's Pesticide Policy, Appendix G, and complies with Federal, State and Local regulations. All applications shall be done according to the pesticide label. All pesticide applications shall be approved through the submittal process by the Trust's Vegetation Management Unit.

31.02.02. Materials

A. Wire caging, if the Trust deems necessary. Contact the Trust for caging specification if applicable at the time.

B. If cultural and biological control methods, such as trapping, are not working and the State of California licensed Pest Control Advisor prescribes chemical applications, then the Contractor shall adhere to the following requirements: Pesticide materials shall be delivered to the site in the original unopened containers bearing legible labels indicating the Environmental Protection Agency (EPA) registration numbers. Pesticide materials shall be approved for use in or near aquatic environments. Contractor shall submit product specification for approval by the Trust.

31.02.03. Placement

A. Grazing and browsing of plant materials may be anticipated. At the direction of the Trust, Contractor shall install wire caging to protect target plant materials so that plants can establish.

B. As feasible, Contractor should seek cultural and biological control solutions, which do not depend on chemical applications for the eradications of insects, mites, snails, nematodes, and small animals (squirrels and gophers). Trapping should be utilized unless prescribed in writing by a State of California licensed Pest Control Advisor and/or Applicator, registered in San Francisco County, and who possesses a State of California Pest Control Business License. Method of control shall be approved by the Trust.

C. When pesticide becomes necessary to remove a pest or disease, a state-certified applicator shall apply required pesticides in accordance with EPA label restrictions and recommendations. The Trust shall approve all pesticide use in advance in writing.

31.02.04. Submittals

A. Should cultural and biological control solutions not be effective, and the State of California licensed Pest Control Advisor authorizes chemical control treatments, the Contractor shall submit to the Trust all products to be used as part of the pesticide treatment plan with proposed sequence of pesticide treatment work including: the pesticide trade name; chemical composition; formulation, concentration; application rate of active ingredients and method of application for all materials; and the name and state license number of the state certified applicator.

31.02.05. Inspections

A. Inspections shall be part of the Contractors daily observations. All observations shall be logged in a maintenance book for the Trust to review. The Trust shall be notified of an insect, pest or rodent observed on site to determine if control is necessary.

31.03. Measurement

A. Measurement shall be in accordance with the bid sheet.

31.04. Revegetation Hydro seed and Blanket – Post Installation

31.04.01. Scope of Work

A. Contractor shall provide all labor, materials, tools, equipment, and incidentals to erosion control within the revegetation hydro seeded areas during construction and the Post-Installation 1 Year Maintenance Period.

A. During construction and the first year revegetation hydro seed growing season - Revegetation hydro seed and blanket shall be maintained during construction and during the first year of seed establishment after installation. The Contractor shall be responsible for monitoring any signs of erosion and any damage or failures in the blanket and repair them immediately. After the first hydro seed growing and establishment year, the blanket will begin to break down and degrade. At this time, the Contractor no longer needs to repair or maintain the blanket as the hydro seed should be fully established by now.

B. During the Post-Installation 1 Year Maintenance Period It is the Contractors responsibility to maintain the project site and monitor erosion. If large erosion wash-out occur, the Trust shall be notified and will repair.

C. The maintenance period may be extended by the Trust if the project is improperly maintained, appreciable replacement is required, or other corrective work becomes necessary. Costs incurred due to damage or replacement during Post-Installation 1 Year Maintenance shall be the responsibility of the Contractor. Qualifications of the maintenance personnel shall be such that they are readily able to identify any plant materials growing on the site, whether they are weeds or desirable species.

31.04.02. Materials

A. Materials used for erosion control shall be submitted and approved by the Trust before use. It is the Contractor's responsibility to determine the best materials to mitigate or repair erosion that occurs during the 1 year establishment period. All materials shall be non-toxic and biodegradable.

31.04.03. Placement

A. Immediately after installation of revegetation hydro seed, the areas shall be protected against traffic or other use by erecting barricades and providing signage as required, or as directed by the Trust.

A. Contractor shall inspect the site for potential erosion throughout the planting and hydro-seeded areas during each site visit.

B. If an erosion problem is detected, the Contractor shall coordinate with the Trust on determining the appropriate erosion control measure.

C. Costs incurred for repair or replacement of bare, sparse, or damaged areas shall be the responsibility of the Contractor.

31.04.04. Submittals

A. Contractor shall record all maintenance activities and observations in maintenance logbook, including date, area, materials, and man-hours. Logbook shall document overall site conditions, areas of actual and potential erosion and control measures implemented.

B. During the maintenance, the Contractor shall submit the maintenance logbook to the Trust by the first week of each month. Submittals and shop drawings shall be required for approval prior to start of any work for which detailed specifications are not provided herein.

31.04.05. Inspections

A. In the event of Storms – Inspections and repairs to revegetation hydro seeded areas should be scheduled BEFORE the first season rains and DURING and AFTER each major storm.

B. Monthly Inspections – Contractor and the Trust shall inspect the project site together monthly to review the Contractor's compliance with these specifications. At the completion of each monthly inspection, the Trust will provide the Contractor with a punch list of items to be corrected and the Contractor shall have ten (10) calendar days to complete them.

C. Annual Inspections – Annual inspections shall be conducted once each year of the maintenance to review the Contractor's compliance with these specifications. The Contractor and the Trust shall be present and shall convene on one mutually agreed upon fall day.

D. Final Inspection – A final inspection of the project shall be conducted during the first two (2) weeks of the last month of the maintenance. At the completion of the inspection, the Trust will provide the Contractor with a punch list of items to be completed, and the Contractor shall complete the items on the punch list prior to the end of the maintenance. The Trust will grant Notice of Acceptance for completion of the Contract to the Contractor upon satisfactory completion of the items on the punch list.

31.04.06. Measurement

A. Measurement shall be in accordance with the bid sheet.

APPENDIX B
GEOTECHNICAL INVESTIGATION
LENDRUM COURT
PRESIDIO OF SAN FRANCISCO, CALIFORNIA

Prepared for

THE PRESIDIO TRUST
103 Montgomery Street, P.O. Box 29052
San Francisco, California 94129-0052

TRC Project No. 229649

May 2016

APPENDIX B
GEOTECHNICAL INVESTIGATION
LENDRUM COURT
PRESIDIO OF SAN FRANCISCO, CALIFORNIA

May 26, 2016

Prepared for

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1.0 INTRODUCTION

On behalf of the Presidio Trust (Trust), TRC has prepared this Geotechnical Evaluation for the remedial construction activities at Lendrum Court (the Site), Presidio of San Francisco, California (Presidio). This Geotechnical Evaluation is provided as an appendix to the Revised Remedial Design Implementation Plan (Revised RDIP) (TRC, 2016), which describes processes and procedures and presents the engineering plans and technical specifications to implement remedial actions at the Site. The purpose of this document is to detail geotechnical investigation activities performed at the Site and provide geotechnical recommendations relevant to remedial construction.

2.0 SITE CONDITIONS

2.1 Site Reconnaissance

TRC performed a reconnaissance of the site on April 23, 2015. At the time of the reconnaissance, the area of the site consisted of a developed area, including residential buildings, access roads, landscaping, and parking areas. The historic forest is located to the north and east of the developed area. The existing site grades in the landscaped area vary from approximate elevations of 130 to 180 feet (North American Vertical Datum of 1988, NAVD88). The existing site grades in the remedial action area of historic forest vary from approximate elevations of 125 to 145 feet NAVD88.

2.2 Exploration Program

2.2.1 Surface and Subsurface Investigation

The field investigation consisted of a surface reconnaissance and a subsurface exploration program using hand auger drilling equipment. Twenty two 3-inch-diameter exploratory borings were drilled on April 23, 2015 to depths ranging from 1½ to 6 feet below the existing ground surface. Six of the 22 borings were drilled in the general vicinity of an outcrop of serpentinite bedrock located northwest of the intersection of Lendrum Court and Armistead Road. Seven of the borings were drilled in the historic forest area. Exploratory borings were backfilled with soil cuttings or clean sand immediately after drilling. At each boring location, the upper 2 to 4 inches of soil was segregated during drilling and replaced at the same location and depth.

The approximate locations of the exploratory borings are shown on Figure B-1. The soils and bedrock encountered were continuously logged in the field by our representative and described in accordance with the Standard Practice for Description and Identification of Soils (Visual-Manual Procedure; ASTM D2488). The subsurface data obtained from the hand auger borings and laboratory tests is presented in Table B-1 and Attachment B-2.

The locations of borings were approximately determined by pacing from existing landmarks and site boundaries. The locations of the borings should be considered accurate only to the degree implied by the method used.

Representative soil samples were obtained from the borings at selected depths. All samples were returned to our laboratory for evaluation and appropriate testing.

The subsurface data and related information depict subsurface conditions at the locations indicated and on the date designated in the text. Subsurface conditions at other locations may differ from conditions occurring at these boring locations. The passage of time may result in

altered subsurface conditions due to environmental changes. In addition, any interpreted boundaries provided in Table B-1 represent the approximate boundary between soil types and the transition may be gradual.

2.2.2 Bedrock Outcrop Delineation Investigation

On January 20, 2016, a Data Gap Investigation was performed to

- delineate the extent of the serpentinite bedrock outcrop on the corner of Lendrum Court and Armistead Road,
- collect topsoil samples for analysis of site constituents of concern (COCs) in areas where the bedrock outcrop is less than 6 inches below existing grade, and
- collect fragmented bedrock samples for analysis of naturally occurring asbestos (NOA).

Bedrock delineation activities consisted of excavating test pits in and around the bedrock outcrop located near the intersection of Lendrum Court and Armistead Road. Test pits were excavated using a shovel and/or hand trowel until bedrock was encountered or until the test pit was at least 6 inches in depth.

- If bedrock was not encountered at a depth of less than 6 inches, TRC stepped in a distance of 2 to 5 feet in the anticipated direction of the bedrock outcrop and excavated an additional test pit.
- If bedrock was encountered at a depth of less than 6 inches, TRC stepped out a distance of 2 to 5 feet away from the bedrock outcrop and advanced an additional test pit.

In total, 28 test pits were excavated to further delineate the extent and depth of the serpentinite bedrock outcrop. Test pit locations and the estimated area where serpentinite bedrock is less than 6 inches below existing ground surface are shown on Figure B-1. Test pit field observations, including depth to bedrock measurements, are presented in Table B-2.

The analytical results of the topsoil and fragmented bedrock sampling activities performed as part of the Data Gap Investigation are presented in Appendices G and E of the Revised RDIP, respectively.

2.3 Subsurface

Subsurface conditions in and around the developed area generally consisted of medium stiff to stiff lean clay soil. The clay soil included varying amounts of sand and gravel.

Subsurface conditions in and around the historic forest generally consisted of medium stiff to stiff lean clay soil with varying amounts of sand, silt or gravel. Shallow serpentinite bedrock was encountered in borings HA-17 to HA-20 at depths between 1 to 2 feet below the existing ground surface.

The ground surface elevation of the six borings drilled near the outcrop of bedrock varied from approximately 155½ feet (NAVD88) to 170 feet (NAVD88). During the field investigation performed on April 23, 2015, samples of the rock were unable to be collected for a detailed evaluation of weathering or other characteristics. The bedrock is described in the *Remedial Investigation Summary Report and Screening Risk Evaluation,* prepared by Erler & Kalinowski as “weathered” (EKI, 2014). Cobbles and other evidence of weathered bedrock are noted in the trench and test pit logs from the Remedial Investigation phase. Serpentinite bedrock was

encountered in hand auger borings HA-11 to HA-13 and HA-15 at approximate depths of 1 to 2½ below the existing ground surface (elevations 164 feet and 153 feet NAVD88, respectively). Figure B-1 shows the approximate area where serpentinite bedrock less than 6 inches below the existing ground surface.

2.4 Laboratory Program

The laboratory testing program was directed toward a quantitative and qualitative evaluation of the physical and mechanical properties of the soils underlying the site and to aid in verifying soil classification.

The natural moisture content was measured (ASTM D2216) on 17 samples of the materials recovered from the borings. These moisture contents are recorded in Table B-1.

Two Plasticity Index (PI) tests (ASTM D4318) were performed on samples of the subsurface soils from the remedial action area to measure the range of moisture contents over which the materials exhibit plasticity. The PI was used to classify the soil in accordance with the Unified Soil Classification System and to evaluate the soil expansion potential. Results of the tests are presented in Table B-1 and Attachment B-1.

The PI tests were performed on representative lean clay soil samples from boring HA-4 and HA-23 collected at an approximate depth of 2 feet. The tests resulted in PIs of 17 and 18 (HA-4 and HA-23, respectively), indicating low to moderate plasticity and expansion potential of the near surface soils.

2.5 Groundwater

Free groundwater was not encountered in the borings during our subsurface exploration to the maximum explored depths of 6 feet below approximate site grades (minimum elevation of 149 feet, NAVD88). Fluctuations in the level of the groundwater may occur due to variations in rainfall, subsurface drainage patterns, and other factors not evident at the time measurements were made.

A more detailed discussion of groundwater levels/elevations is presented in the Removal Action Work Plan (RAW; TRC, 2015b). As summarized in the RAW, data from several piezometers and borings at nearby project sites suggest a groundwater depth of greater than 10 feet below the existing ground surface.

3.0 GEOLOGIC HAZARDS

A brief qualitative evaluation of geologic hazards was made during this investigation. Our comments concerning these hazards are presented below.

3.1 Fault Rupture

The project site is not mapped by the California Geological Survey (CGS) for fault rupture as part of the Alquist-Priolo Act. The nearest known active fault is the San Andreas Fault, located more than 5 miles southwest of the project area. Fault rupture through the site, therefore, is not anticipated.

3.2 Maximum Estimated Ground Shaking

Based on Equation 11.8-1 of ASCE 7-10 (ASCE 2010), a maximum considered earthquake geometric mean peak ground acceleration (PGA_M) of 0.62 g can be expected at the site.

3.3 Future Earthquake Probabilities

Although research on earthquake prediction has greatly increased in recent years, seismologists cannot predict when or where an earthquake will occur. The U.S. Geological Survey's Working Group on California Earthquake Probabilities (WGCEP, 2014) estimates a 72 percent chance of at least one magnitude 6.7 earthquake occurring in the San Francisco Bay region between 2014 and 2044. This result is an important outcome of WGCEP's work because any major earthquake can cause damage throughout the region. The 1989 Loma Prieta earthquake demonstrated this potential by causing severe damage in Oakland and San Francisco, more than 50 miles from the fault epicenter.

Although earthquakes can cause damage at a considerable distance, shaking is typically very intense near the fault rupture. Therefore, earthquakes located in urbanized areas of the region have the potential to cause much more damage than the 1989 Loma Prieta earthquake.

3.4 Liquefaction

The site is not within an area that has been mapped by CGS for potential seismically induced liquefaction hazards. During cyclic ground shaking, such as during earthquakes, cyclically induced stresses may cause increased pore water pressures within the soil matrix, resulting in liquefaction. Liquefied soil may lose shear strength and may lead to large shear deformations and/or flow failure under moderate to high shear stresses such as beneath foundations or sloping ground (Youd and Idriss, 2001). Liquefied soil can also settle (compact) as pore pressures dissipate following an earthquake. Limited field data is available on this subject; however, in some cases, settlement on the order of 2 to 3 percent of the thickness of the liquefied zone has been measured.

Based on the primarily fine-grained soils overlying generally shallow bedrock, we judge the risk of liquefaction to be low.

3.5 Dry Seismic Settlement

If near-surface soils vary in composition both vertically and laterally, strong earthquake shaking can cause non-uniform densification of loose to medium dense cohesionless soil strata. This results in movement of the near-surface soils. Based on the fine-grained soils over relatively shallow bedrock, we judge the risk of dry seismic settlement at the site to be low.

3.6 Lateral Spreading

Lateral spreading typically occurs as a form of horizontal displacement of relatively flat-lying alluvial material toward an open or "free" face such as an open body of water, channel or excavation. In soils, this movement is generally due to failure along a weak plane and may often be associated with liquefaction. As cracks develop within the weakened material, blocks of soil displace laterally towards the open face. Cracking and lateral movement may gradually propagate away from the face as blocks continue to break free. Generally, failure in this mode is analytically unpredictable since it is difficult to evaluate where the first tension crack will occur.

Because the potential for liquefaction is judged to be low, we judge the risk of lateral spreading at the site to also be low.

3.7 Landsliding

The site is not within an area mapped by CGS as having potential for seismically-induced landslide hazards. Therefore, TRC's professional opinion is that a landslide during a seismic event will not pose a hazard for the site.

4.0 EARTHWORK

Remedial construction activities include: excavation and disposal of organic-rich topsoil; excavating, re-grading and compaction of contaminated soils; and capping in place. The cap would consist of gopher wire overlain with imported fill. The gopher wire will consist of PVC-coated, 16-gauge welded galvanized steel wire mesh with ½-inch by ½-inch openings. Finish grades will generally be 2½H:1V (horizontal:vertical) with several localized areas as steep as 1½ H:1V.

To reduce impacts to the surrounding community, remedial construction will be performed in segments, where construction activities (i.e., clearing, excavation and re-grading) will be completed in one area before moving onto the next. Recommendations regarding earthwork activities relevant to the remedial construction are detailed below. A geotechnical engineer should review the final configuration of planned fills and excavations and proposed specific earthwork equipment to determine if additional setback restrictions are appropriate for the specific excavation conditions anticipated.

4.1 Clearing and Site Preparation

Prior to excavation, project areas should be cleared of all surface and subsurface improvements to be removed and deleterious materials, including designated trees, shrubs, associated roots, irrigation lines, pavements, abandoned utilities, and miscellaneous debris. The contractor is responsible for protection and safety of the work environment.

4.1.1 Clearing and Grubbing

Removal of designated trees should include removal of the tree and grinding or removal of the stump and associated roots greater than ½ inch to at least one foot below rough grade or as directed by the engineer. Depressions extending below the planned excavation grades including holes resulting from the removal of trees and stump grinding should be cleaned of loose soils and roots, backfilled with suitable material, and compacted as recommended in the "Compaction" section (Section 4.4) of this report.

Removal of designated shrubs should include removal of the entire root ball and all roots larger than ½-inch in diameter. Depressions extending below the planned excavation grades including holes resulting from the removal of shrubs should be cleaned of loose soils and roots, backfilled with suitable material, and compacted as recommended in the "Compaction" section (Section 4.4) of this report.

4.1.2 Removal of Paved Features

Excavated asphalt will be segregated from other debris and stockpiled on-site prior to being transported off-site to a landfill licensed to receive the material. Miscellaneous excavated debris will be recycled as practicable.

4.1.3 Removal of Organic-Rich Topsoil

After areas within the footprint of the soil cap have been cleared, soils should be stripped to a sufficient depth (estimated to be 4 to 6 inches below grade) to remove all remaining surface vegetation and topsoil containing greater than approximately 3 percent organic matter by weight. The required stripping depth should be established in the field by a representative of the geotechnical engineer at the time of construction. Excavated organic-rich soil will be temporarily stockpiled onsite prior to being transported off-site to a landfill licensed to receive the material.

4.1.4 Abandoned Utilities

TRC is unaware of any abandoned underground utilities located above the planned excavation grade at the site. Additionally, TRC does not intend to abandon any underground utilities that are currently operable. If abandoned utilities are encountered during remedial construction, they should be removed in their entirety or properly abandoned in place.

The decision to abandon in-place versus remove should be based on the level of risk associated with the particular utility line. The option to abandon in place is contingent on the existing utility or associated fill not compromising or conflicting with the remedial design or existing structures. Fills associated with underground utilities abandoned in place may have an increased potential for settlement. Utilities 4 inches or less in diameter to be abandoned in-place will be plugged at the exposed end using grout. Utilities greater than four inches in diameter will be removed completely or should be fully grouted in place, unless other methods of in-place pipe abandonment are agreed to in the field.

4.1.5 Demolition and Removal of Buried Structures

Demolition and removal of buried structures, including existing or historical foundations or slabs, is not anticipated as part of this project. However, if this situation arises during excavation, TRC recommends that the following activities be carried out under the observation of the geotechnical engineer's representative:

- Removal of buried structures;
- Backfilling of holes or pits; and
- Testing of backfill during placement.

The depth of over-excavation of should be approximately 12 inches into the competent material.

4.2 Subgrade Preparation

Plans for excavation and re-grading activities are detailed in the design drawings and technical provisions, presented in Appendix A of the Revised RDIP, and based on the specifications outlined below. The final design drawing and technical specification should be reviewed by a geotechnical engineer prior to implementation.

4.2.1 Excavation Recommendations

Temporary excavations should comply with current requirements of California Division of Occupational Safety and Health Administration (Cal/OSHA). Disturbance of bedrock at the site should be avoided to the extent possible since serpentinite bedrock, which may contain NOA, has been observed at the site. The likelihood of overburden soils containing significant levels of NOA is believed to be low since the percent NOA reported in composite samples collected from overlying Site soils were less than 0.25% (NOA soil sampling is detailed in Appendix E of the Revised RDIP). This is considered low for a short term construction project. As discussed in Section 3.3.2.6 of the Revised RDIP, no long-term adverse effect are anticipated as a result of leaving a small area (less than 800 square feet) of the serpentine bedrock formation at the site exposed.

On January 20, 2016, a Data Gap Investigation was performed to determine the extent to which NOA was present in the bedrock outcrop and within the loose, crushed rock that was suspected to be serpentinite and was observed in parts of the historic forest. Analytical results from this investigation confirmed the presence of NOA in the bedrock outcrop and in the serpentine rocks found in parts of the forest area. This presents the potential for airborne NOA to occur as a result of remedial construction activities in these areas. As such, NOA air monitoring activities, described in Appendix E, will be performed during earthwork in the vicinity of the bedrock outcrop near the corner of Armistead Road and Lendrum Court and in parts of the forest area where loose serpentinite rock is observed. Additionally, Best Management Practices (BMPs), including wetting, will be included in the specifications and will be enacted during excavation activities to minimize airborne particles or chemicals. Loose serpentine rocks resulting from or encountered during excavation will be properly disposed of off-site.

Shallow bedrock is generally anticipated to be present in the southern and eastern portions of the remedial action area (near the intersection of Lendrum Court and Armistead Road and in the historic forest, respectively). The actual extent and depth of bedrock in the forest area is currently only partially mapped since dense vegetation and steep slopes currently exists in this area. The precise location of the edge of the cap along the bedrock outcrop near the intersection of Lendrum Court and Armistead Road will be determined in the field by the Design Engineer and construction personnel. In this area, the cap will conform to the edge of bedrock 6 inches below the existing ground surface. Excavations into bedrock should be avoided to the extent practicable; however, if excavations in bedrock cannot be avoided BMPs as detailed above will be employed to minimize airborne particles or chemicals. The design drawings, presented in Appendix A of the Revised RDIP, include typical edge details for cap construction in the bedrock outcrop area.

Side slopes of excavations in building and pavement areas should be sloped at inclinations no greater than 3H:1V to minimize abrupt variations in fill thickness. In addition, a keyway should be cut into the slope at the base of the fill and at significant grade breaks in the finish grade to key the soil cap into the existing subgrade materials. We also recommend that, due to the steepness of the proposed grades, the new fill be notched into existing subgrade materials. At a minimum, we recommend keyways at the following locations, where the grading section alignments referenced below are shown on Sheets C-107, C-108, C-109, C-110, and C-111 of the Design Drawings (Appendix A of the Revised RDIP):

Grading Section Alignment A: 95+00, 1+20 (base)
Grading Section Alignment B: 0+27, 0+50, 0+70 (base)

Grading Section Alignment C: 0+55, 0+95, 1+28 (base)
Grading Section Alignment D: 0+41, 0+62 (base)
Grading Section Alignment E: 0+65, 0+90, 0+112 (base)
Grading Section Alignment F: 1+23, 1+59 (base)
Grading Section Alignment G: not required
Grading Section Alignment H: 0+27, 0+42 (base)

The keyway should be at least 3 feet wide and extend at least 2 feet deep into competent material. Keyways should parallel slope contours. Side slopes of the keyway should be excavated at approximately 1H:1V. Figure B-2 shows a typical fill section. Keyway recommendations may need revision during construction to account for field conditions.

Where applicable, previously excavated test pits should be field located, excavated to their full depth and lateral extent, and backfilled in accordance with the recommendations presented in the "Compaction" section of this report. The approximate locations of the test pits are shown on Sheet C-105 of the Design Drawings (Appendix A of the Revised RDIP). Excavated soils (native or contaminated fill) that meet the requirements outlined in the "Soil Cap Materials" section (Section 4.3.2) may be reused as engineered fill. Excavated material designated for reuse at the Site will be placed in areas identified for consolidation of impacted soils or be stockpiled for future consolidation. Excavated materials deemed unfit for reuse will be stockpiled and transported off-site for disposal at a licensed landfill facility.

Excavations located adjacent to footings should not extend below an imaginary 1:1 (horizontal:vertical) plane projected downward from the footing bearing surface to the bottom edge of the excavation. Where necessary, excavations near existing foundations should be performed in increments (i.e. excavate, construct and backfill short sections).

4.2.2 Permanent Drainage Recommendations

Subdrains should be installed as directed by engineer in any areas where seepage is observed. Potential seepage areas may include soil and bedrock contacts, pockets or lenses of coarse grained soil in the predominantly fine grained soil matrix, and areas of moist soil surrounded by relatively drier soils.

The drains should consist of 4-inch diameter, perforated pipes underlain by 2 inches of bedding (as detailed below) and be placed with perforations downward. Drain pipes should be bedded and backfilled with Class 2 Permeable Material (Caltrans Standard Specifications) or drain rock. If drain rock is used, the rock and pipe should be entirely enclosed with a permeable geotextile fabric (Mirafi 140N or equivalent). The Class 2 Permeable Material or geotextile wrapped drain rock should be at least 12 inches wide and 12 inches high.

4.2.3 Re-grading Recommendations

Prior to re-grading, exposed surface soils in the areas that receive fill should be scarified to a depth of 6 inches, moisture conditioned, and compacted in accordance with the recommendations for fill presented in the "Compaction" section (Section 4.4). The finished compacted subgrade should be firm and non-yielding under the weight of compaction equipment.

4.3 Cap Placement

4.3.1 Recommendations for Cap Design

In the landscaped area, the cap will include both hardscape and vegetated soil caps. Hardscape areas include: building foundations, asphalt roadways and paths, concrete sidewalks, building drainage curbs and patios. In planned open space areas, a vegetated soil cap will be constructed over the in-situ and consolidated contaminated soil and debris and will consist of gopher wire overlain by clean, imported soil.

With the exception of bedrock outcroppings, TRC recommends that the final soil cap have a maximum inclination of 1½H:1V (horizontal:vertical), with a goal of not exceeding 2.5H:1V.

Prior to placement of capping materials (i.e., soil cap or pavement), exposed surface soils should be scarified to a maximum depth of 6 inches, moisture conditioned, and compacted in accordance with the recommendations presented in Section 4.4. The finished compacted subgrade should be firm and non-yielding under the weight of compaction equipment.

4.3.2 Soil Cap Materials

The preferred soil borrow for the cap construction is native soil material from Lawrence Berkeley National Labs (LBNL), which is classified as gravelly loam. It is our understanding that the LBNL soil will be mixed with approximately 65 percent medium grained, poorly graded sand (by volume), approximately 5 percent compost (by volume) and ¼ pound of gypsum (per cubic foot).

Prior to soil cap placement, gopher wire will be placed on top of exposed subsurface soil and debris fill. It is our assumption that the gopher wire will serve as a demarcation layer between the soil cap and contaminated soils. Hardscapes identified as part of the cap (noted in Section 4.3.1) will not be underlain by a demarcation layer such as gopher wire.

Soil cap material should not contain rocks or lumps larger than 6 inches. Additionally, no more than 15 percent of the rocks or lumps should exceed 2½ inches. Import fill material for use in the soil cap should be thoroughly mixed, include only the minimum required organic content (preferably limited to the upper 1 foot), have a Plasticity Index of between 10 and 20, and contain sufficient binder to reduce the potential for sidewall caving of utility trenches. Samples of the proposed import fill should be submitted to TRC at least 10 days prior to delivery to the site to allow for visual review and laboratory testing. This will allow TRC to evaluate the general conformance of the import fill with the above geotechnical recommendations.

Consideration should also be given to the environmental characteristics and corrosion potential of any imported fill. Suitable documentation should be provided for import material. In addition, it may be appropriate to perform laboratory testing of the environmental characteristics and corrosion potential of imported materials.

4.4 Compaction

At depths of 18 or more inches below finish grade, all fill and scarified surface soils in the areas to receive fill should be compacted to a minimum of 90 percent relative compaction at optimum moisture content, as determined by the latest edition of ASTM Test Designation D1557. For the purposes of landscaping, the upper 18 inches of the soil cap should be compacted to between 85

and 90 percent relative compaction at a moisture content of approximately 3 percent over optimum. Fill should be placed in lifts no greater than eight inches in uncompacted thickness. Each successive lift should be firm and non-yielding under the weight of construction equipment.

4.5 Wet Weather Conditions

Earthwork contractors should be aware of the moisture sensitivity of soils and potential compaction difficulties. If construction is undertaken during wet weather conditions, the surficial soils may become saturated, soft and unworkable. Saturated soils may require aerating or blending with drier soils to achieve a workable moisture content. Subgrade stabilization techniques might include the use of engineering fabrics and/or crushed rock or chemical treatment. Therefore, TRC recommends that consideration be given to construction during dry periods.

4.6 Trench Backfill

Where needed, bedding and pipe embedment materials to be used around underground utility pipes should be well graded sand or gravel conforming to the pipe manufacturer's recommendations and should be placed and compacted in accordance with project specifications, local requirements or governing jurisdiction. General fill to be used above pipe embedment materials should be placed and compacted in accordance with local requirements or the recommendations contained in this section, whichever is more stringent.

On-site soils may be used as general fill above pipe embedment materials provided they meet the requirements of the "Soil Cap Materials", discussed in Section 4.3.2 of this report. General fill should be placed in lifts not exceeding eight inches in uncompacted thickness and should be compacted to at least 90 percent relative compaction by mechanical means only. Water jetting of trench backfill should not be allowed.

Utility trenches located adjacent to footings should not extend below an imaginary plane of 1:1 (horizontal:vertical) projected downward from the footing bearing surface to the bottom edge of the trench. Where utility trenches will cross beneath footing bearing planes, the footing concrete should be deepened to encase the pipe or the utility trench should be backfilled with sand/cement slurry or lean concrete within the foundation bearing plane.

Where relatively higher permeability sand or gravel backfill is used in trenches through lower permeability soils, TRC recommends a cut-off plug of compacted clayey soil or a 2-sack cement/sand slurry be placed where such trenches enter the building and pavement areas. This would reduce the likelihood of water entering the trenches from the landscape areas and seeping through the trench backfill into the building and pavement areas and coming into contact with expansive subgrade material.

4.7 Erosion Control

As with any hillside construction project, exposed cut and fill slopes require both short term and long term maintenance due to minor sloughing and erosion as well as protection if grading during the winter. To minimize this potential for erosion, we recommend that both short term and permanent erosion control measures be placed on all slopes. The establishment of erosion control measures is beneficial for aesthetics, reduces erosion by slowing runoff velocities, enhances infiltration and transpiration, traps sediment and other particles and protects soil from raindrop impact.

We recommend, at a minimum, all slopes be hydro-seeded if ground cover is not anticipated to be established prior to rains. For the proposed 2H:1V and 1½ H:1V fill slopes, we recommend more aggressive permanent erosion control measures be implemented to minimize surface runoff velocities and erosion. These measures may include permanent erosion control blankets or mats (i.e. North American Green's SC250 Permanent Turf Reinforcement Mat, or approved equivalent) used in combination with hydro-seeding.

4.8 Drainage

4.8.1 General Site Surface Drainage

Surface water should not be allowed to flow over the top of engineered slopes, down engineered slope faces or over retaining walls. Ponding of surface water should not be allowed at the top or bottom of slopes adjacent to retaining walls or on pavements. Positive surface gradients of at least 1 percent should be provided adjacent to the tops and bottoms of retaining walls to direct surface water toward suitable discharge facilities. Level areas above slopes should be graded to a 2 percent gradient or greater to direct surface water away from the top of slopes toward a suitable point of discharge such as concrete lined ditches or surface drain inlets. At a minimum, we recommend the surface drainage be designed in accordance with the latest edition of the California Building Code (CBC, 2013).

The proposed irrigation system for the Site currently consists of a sprinkler system and a drip irrigation system. The sprinkler system will be used initially to establish the landscaping. If significant irrigation of open-space areas adjacent to the upslope side of the project area occurs, both short-term and long-term drainage impacts to the development may occur and may not be observed for several years.

4.8.2 Surface Drainage at Existing Improvements

Positive surface water drainage gradients of at least 1 percent in soil cap and landscape areas should be provided to direct surface water away from existing foundations and slabs and towards suitable stormwater discharge facilities. Ponding of surface water should not be allowed on or adjacent to buildings or slabs-on-grade. Roof gutters should be used on all buildings. Roof downspouts should be connected to solid pipes that transmit storm water onto paved roadways, into drainage inlets or into storm drains.

Landscaping drainage inlets should be provided around the existing foundations to adequately collect irrigation or rain water and direct the water onto pavement or into storm water systems. It is important that the drainage inlets be properly designed and constructed so that the moisture content of the soils surrounding the foundations do not become excessive and no ponding of water occurs. Although the foundations are designed to account for some variability in the surrounding soil moisture, excessively moist or desiccated soils located near or below foundations may result in increased differential movement of the foundations.

Additional surface and subsurface drainage control measures may need to be installed if animal infestation is not controlled, and the resulting animal holes, burrows, and animal created loosened soils are not re-compacted or filled with sand/cement grout. Temporary and permanent erosion and sediment control measures should be installed over any exposed soils immediately after repairs are made.

4.9 Landscaping Considerations

TRC strongly recommends restricting surface water infiltration near structures and slabs-on-grade. This may be accomplished by:

- Selecting landscaping that requires little watering, especially within 3 feet of structures, slab-on-grade, or pavements,
- Using low flow rate sprinkler heads, or drip irrigation systems,
- Regulating the amount of water distributed to lawn or planter areas,
- Providing surface grades to drain rainfall or landscape watering to appropriate collection systems and away from structures, slabs-on-grade, or pavements, and
- Preventing water from draining toward or ponding near building foundations, slabs-on-grade, or pavements.

TRC recommends that the landscape architect incorporate these items into the landscaping plans, and that TRC has an opportunity to review the final landscaping plans before implementation.

4.10 Construction Observation

A representative from TRC's geotechnical group should observe and test the geotechnical aspects of the grading and earthwork for general conformance with TRC's recommendations for site preparation, selection of soil cap materials, and the placement and compaction of contaminated soils and soil cap materials.

5.0 2013 CBC SITE CLASS AND SITE SEISMIC COEFFICIENTS

Chapter 16 of the 2013 California Building Code (CBC, 2013) outlines the procedure for seismic design of structures. Based on our explorations, the site is underlain by clay soils and relatively shallow bedrock, which corresponds to a soil site class D. Based on this information and local seismic sources, the site may be characterized for design using the information in Table B-3.

6.0 SLOPE STABILITY ANALYSES

Static and seismic slope stability analyses were performed for the proposed slopes. No shear strength testing was performed for the analyses; rather, shear strength data was estimated from correlations from other soil properties, from research performed by other investigators, and engineering judgment.

The proposed finish grades shown on Sheet C-106 of the Design Drawings (Appendix A of the Revised RDIP) and data from our subsurface investigation (discussed in Section 2.3) were used for the analyses. Methods of analysis, soil and bedrock properties, and results are presented in Table B-4.

6.1 Method of Analysis

The lateral stability of a slope is influenced by the composition, inclination, and height of the slope. Stability is usually expressed as a factor of safety (FS) that is calculated for static and seismic conditions using the equation below:

$$FS = \frac{M_r}{M_d}$$

where:
FS = Factor of Safety
M_r = Resisting Moments
M_d = Driving Moments

The minimum allowable FS with respect to slope stability generally ranges from 1.5 to 2.0 for static conditions and 1 to 1.3 for seismic conditions. The minimum factors of safety recommended by The Southern California Earthquake Center (for proposed developments) are 1.5 and 1.15 for static and seismic analyses, respectively (DMG SP-117A, 2008).

The stability of the proposed fill slopes was evaluated under static and seismic conditions using the computer program Slope/W (released 2012) utilizing the Spencer method of analysis. Input parameters for the analyses included: slope geometry, soil layer thickness, soil type, soil unit weights, soil strength parameters, and groundwater conditions. We understand that medium sized excavation equipment may be used during construction. We estimated a surcharge weight of 60,000 pounds from the excavation equipment.

Static Conditions
The slopes were first analyzed to establish the minimum FS under static conditions. The slip circle with the minimum calculated factor of safety is assumed to be the most probable location of a slope instability.

Seismic Conditions – (Pseudo-Static Analysis Method)
Once the failure surfaces are identified, seismic conditions were simulated by adding an additional, horizontal force acting on the sliding mass in the direction of potential failure. This additional force is equal to the potential landslide mass multiplied by a seismic coefficient (k_y), which is a ground motion parameter used for pseudo-static stability analysis. K_y values of 0.15 (Seed method) were selected for the analyses based on recommendations published by the Southern California Earthquake Center (DMG SP-117A, 2008).

6.2 Soil and Bedrock Properties

The stability of the proposed fill slopes will be directly related to the characteristics of the lean clay soil and serpentinite bedrock materials. A summary of the strength values is presented in Table B-4.

6.3 Results of Analysis

The static and seismic factors of safety were computed for the conditions discussed in Section 5.2. The results of our analyses are summarized in Table B-5 and are presented graphically in Figures B-3 to B-8.

The slope stability analyses for static and seismic conditions indicate that the factors of safety for both conditions are greater than the minimum values recommended in DMG SP-117A (1.5 and 1.15, respectively); therefore, the final slopes presented in the Design Drawings (Appendix A of this Revised RDIP) are acceptable for static and seismic conditions.

7.0 LIMITATIONS

This report has been prepared for the design of Lendrum Court improvements in San Francisco, California and is intended for use by the Presidio Trust and the involved regulatory agencies (e.g., Department of Toxic Substances Control [DTSC]). The opinions, conclusions and recommendations presented in this report have been formulated in accordance with accepted geotechnical engineering practices that exist in the San Francisco Bay Area at the time this report was written. No warranty, expressed or implied, is made or should be inferred.

The opinions, conclusions and recommendations contained in this report are based upon local experience, engineering judgment, and information obtained from TRC's investigation, which includes data from widely separated discrete locations, visual observations during site reconnaissance, and review of other geotechnical data provided to TRC. The recommendations presented in this report are based on the assumption that soil and geologic conditions at or between explorations do not deviate substantially from those encountered or extrapolated from the information collected during our investigation. TRC is not responsible for the data presented by others.

TRC should be retained to review the geotechnical aspects of the final plans and specifications for conformance with the recommendations stated in this Geotechnical Evaluation. The recommendations provided in this report are based on the assumption that TRC will be retained to provide observation and testing services during construction to confirm that conditions are similar to that assumed for design and to form an opinion as to whether the work has been performed in accordance with the project plans and specifications. If TRC is not retained for these services, TRC cannot assume any responsibility for any potential claims that may arise during or after construction as a result of misuse or misinterpretation of TRC's report by others. Furthermore, TRC will cease to be the Geotechnical-Engineer-of-Record if we are not retained for these services and/or at the time another consultant is retained for follow up service to this report.

The opinions presented in this report are valid as of the present date for the property evaluated. Changes in the condition of the property will likely occur with the passage of time due to natural processes and/or the works of man. In addition, changes in applicable standards of practice can occur as a result of legislation and/or the broadening of knowledge. Furthermore, geotechnical issues may arise that were not apparent at the time of our investigation. Accordingly, the opinions presented in this report may be invalidated, wholly or partially, by changes outside of our control. Therefore, this report is subject to review and should not be relied upon after a period of three years, nor should it be used, or is it applicable, for any other properties.

8.0 REFERENCES

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Youd, T.L. and Idriss, I.M., et al., 2001, *Liquefaction Resistance of Soils: Summary Report From the 1996 NCEER and 1998 NCEER/NSF Workshops on Evaluation of Liquefaction Resistance of Soils,* ASCE Geotechnical and Geoenviromental Journal, October 2001.

TABLES

TABLE B-1
SUMMARY OF SUBSURFACE CONDITIONS
Lendrum Court
Presidio of San Francisco, California

Name	Approximate Ground Surface Elevation[1] (feet)	Depth Range (feet)	Soil & Rock Description	Moisture Content (percent)	Notes
HA-1	151	0 – 2.5	Lean Clay with Sand	14	Moderate plasticity, Trace glass
HA-2	155	0 – 2.5	Lean Clay with Sand	15	
HA-4	153	0 – 2.5	Lean Clay	16	Liquid Limit = 32 Plasticity Index = 17
HA-5	173	0 – 2.5	Lean Clay with Gravel	12	
HA-6	187	0 – 1.5 1.5 – 2.5	Lean Clay Sandy Lean Clay	12	
HA-7	169	0 – 2.5	Lean Clay	19	Moderate plasticity
HA-8	167	0 – 2.5	Lean Clay with Sand	18	Moderate plasticity
HA-9	169	0 – 2.5	Lean Clay with Sand	19	Moderate plasticity, Trace glass
HA-10	168	0 – 2.5	Lean Clay with Sand	18	Moderate plasticity, Trace glass
HA-11	156	0 – 2.25 2.25 – 2.5	Lean Clay with Sand Weathered serpentinite bedrock		
HA-12	165	0 – 1 1 – 1.25	Lean Clay with Sand Weathered serpentinite bedrock		
HA-13	156	0 – 2.25 2.25 – 2.75	Lean Clay with Sand Weathered serpentinite bedrock		
HA-14	170	0 – 6	Lean Clay with Sand		
HA-15	156	0 – 2.25 2.25 – 2.75	Lean Clay with Sand Weathered serpentinite bedrock		
HA-16	169	0 – 6	Lean Clay with Sand		

Footnotes:

1) Approximate ground surface elevation estimated from topographic plan dated November 2014 by Erler & Kalinowski, Inc.

TABLE B-2
BEDROCK OUTCROP DELINEATION INVESTIGATION RESULTS
Lendrum Court
Presidio of San Francisco, California

Test Pit Location	Depth to Bedrock	Notes
1a	>1'-6"	Very wet, did not reach bedrock at bottom of pit
1b	0'-10"	Hit bedrock approx. 6" deep
1c	**0'-2"**	**Hit bedrock <6" deep**
2a	--	Concrete at 4"-8"
2b	**0'-2"**	**Hit bedrock <6" deep**
2b1	**0'-4"**	**Hit bedrock <6" deep**
2b2	**0'-4"**	**Hit bedrock <6" deep**
2c	2'-0"	Significant litter, hit bedrock >6" deep
3a	>2'-0"	Did not reach bedrock at bottom of pit
3b	>1'-0"	Did not reach bedrock at bottom of pit
3b2	>1-0"	Did not reach bedrock at bottom of pit
3c	1'-6"	Significant debris, hit bedrock
5a	>1'-6"	Did not reach bedrock at bottom of pit
5b	>3'-0"	Did not reach bedrock at bottom of pit
5c	>3'-0"	Did not reach bedrock at bottom of pit
5d	2'-0"	Hit bedrock >6" deep
6a	>1'-0"	Did not reach bedrock at bottom of pit
6b	>1'-0"	Gravel; did not reach bedrock at bottom of pit
6c	>1'-0"	Gravel; did not reach bedrock at bottom of pit
6c2	>1-6"	Did not reach bedrock at bottom of pit
6d	>1'-0"	Did not reach bedrock at bottom of pit
6d2	>1'-0"	Did not reach bedrock at bottom of pit
7a	**0'-6"**	**Hit bedrock <6" deep**
7a1	>1'-0"	Did not reach bedrock at bottom of pit
7a2	>1'-0"	Did not reach bedrock at bottom of pit
7b	**0'-2"**	**Hit bedrock <6" deep**
7c	**0'-2"**	**Hit bedrock <6" deep**
7d	**0'-3"**	**Hit bedrock <6" deep**

TABLE B-3
2013 CBC SITE CLASS AND SITE SEISMIC COEFFICIENTS
Lendrum Court
Presidio of San Francisco, California

Latitude: 37.8052 N **Longitude: 122.4713 W**	**CBC Table/ Figure**	**Notes**	**Value**
Soil Profile Type	Table 1613.3.2	Site Class	D
Mapped Spectral Response Acceleration for MCE at 0.2 second Period	Figure 1613.3.1(1)	S_s	1.54
Mapped Spectral Response Acceleration for MCE at 1 Second Period	Figure 1613.3.1(2)	S_1	0.71
Site Coefficient	Table 1613.3.3(1)	F_a	1
Site Coefficient	Table 1613.3.3(2)	F_v	1.5
Adjusted MCE Spectral Response Parameter	Equation 16-37	S_{MS}	1.54
Adjusted MCE Spectral Response Parameter	Equation 16-38	S_{M1}	1.06
Design Spectral Response Acceleration Parameter	Equation 16-39	S_{DS}	1.03
Design Spectral Response Acceleration Parameter	Equation 16-40	S_{D1}	0.71

Abbreviations:

CBC = California Building Code
MCE = Maximum Considered Earthquake

TABLE B-4
SUMMARY OF STRENGTH VALUES
Lendrum Court
Presidio of San Francisco, California

Material Type	Unit Weight (pcf)	Cohesion (psf)	Internal Angle of Friction (degrees)
Clay Soil	115	250	30
Serpentinite Bedrock	140	750	25

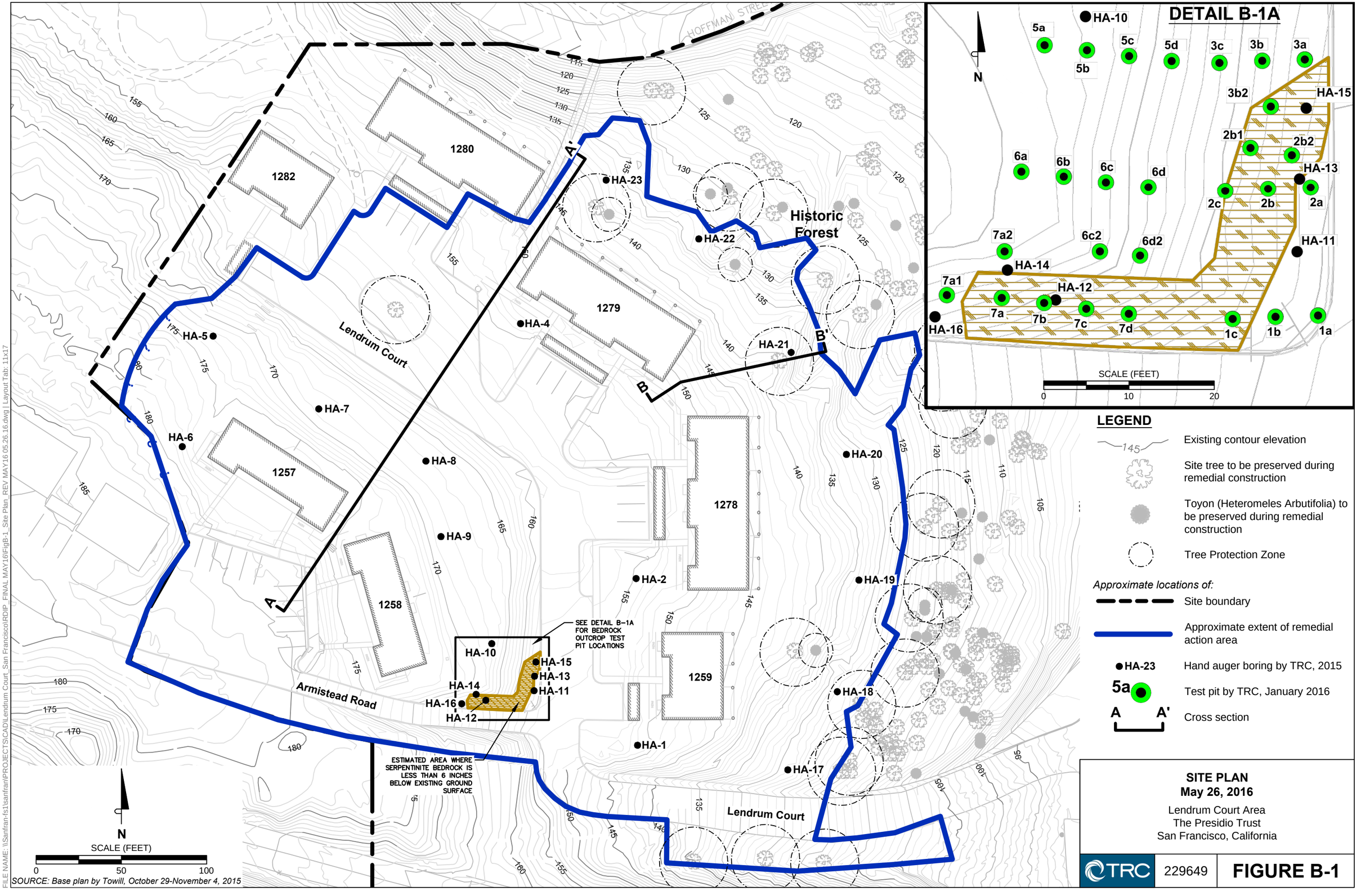
Abbreviations:
pcf = pounds per cubic foot
psf = pounds per square foot

TABLE B-5
SUMMARY OF ANALYSIS RESULTS
Lendrum Court
Presidio of San Francisco, California

Loading	k_y	Factor of Safety	Failure Type
Static	0	1.74	Approximately 8 feet beyond top slope crest to approximately 5 feet from bottom slope toe
Seismic[1]	0.15	1.22	Approximately 7 feet beyond top slope crest to approximately 5 feet from bottom slope toe

Footnotes:
1) Computed using pseudo-static method of analysis.

FIGURES



LEGEND

- Existing contour elevation (145)
- Site tree to be preserved during remedial construction
- Toyon (Heteromeles Arbutifolia) to be preserved during remedial construction
- Tree Protection Zone

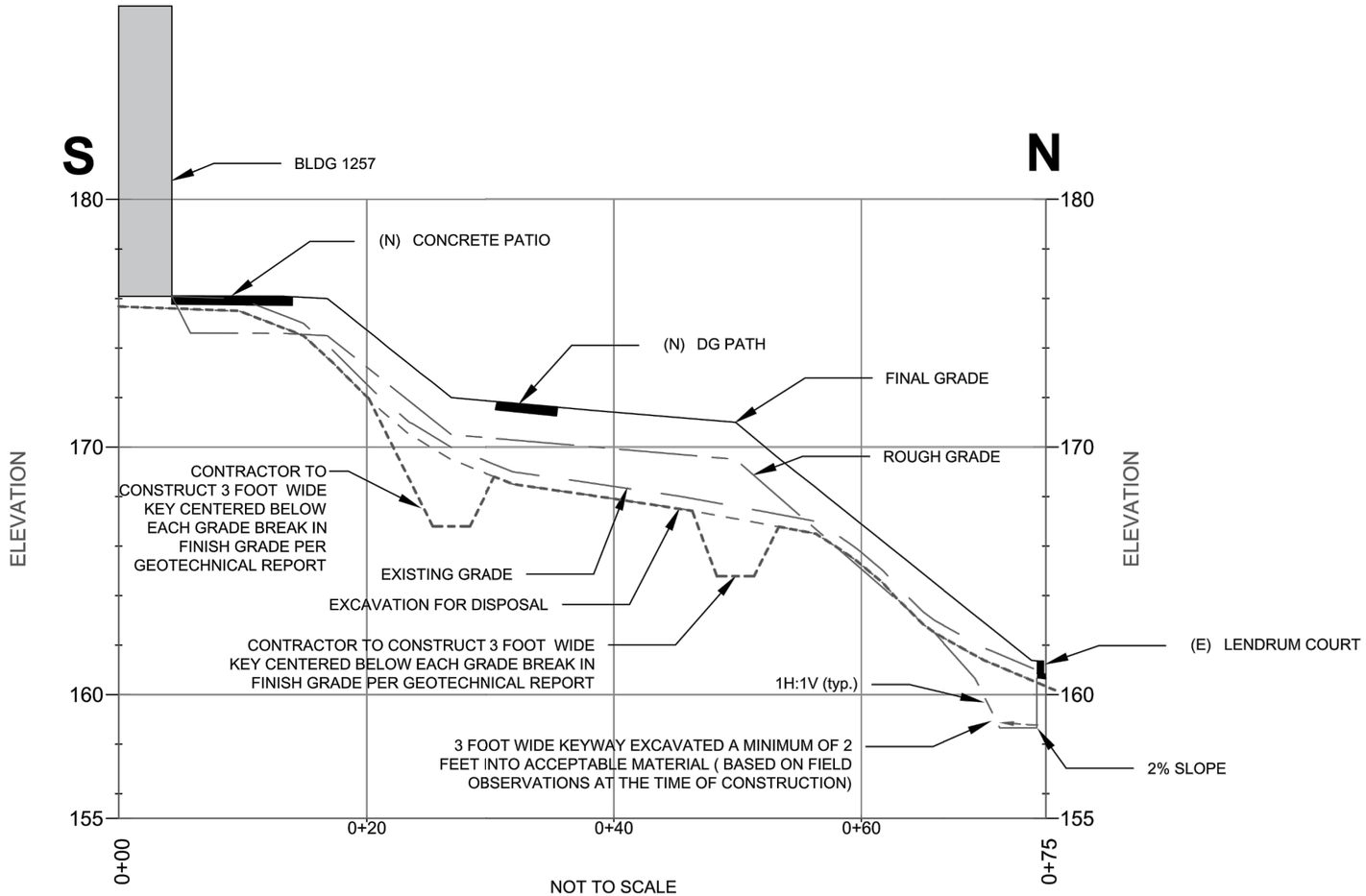
Approximate locations of:

- Site boundary
- Approximate extent of remedial action area
- HA-23 — Hand auger boring by TRC, 2015
- 5a — Test pit by TRC, January 2016
- A — A' — Cross section

SITE PLAN
May 26, 2016

Lendrum Court Area
The Presidio Trust
San Francisco, California

TRC | 229649 | **FIGURE B-1**



NOT TO SCALE

LEGEND

- EXISTING GRADE
- ROUGH GRADE
- FINAL GRADE
- EXCAVATION FOR DISPOSAL

NOTES:

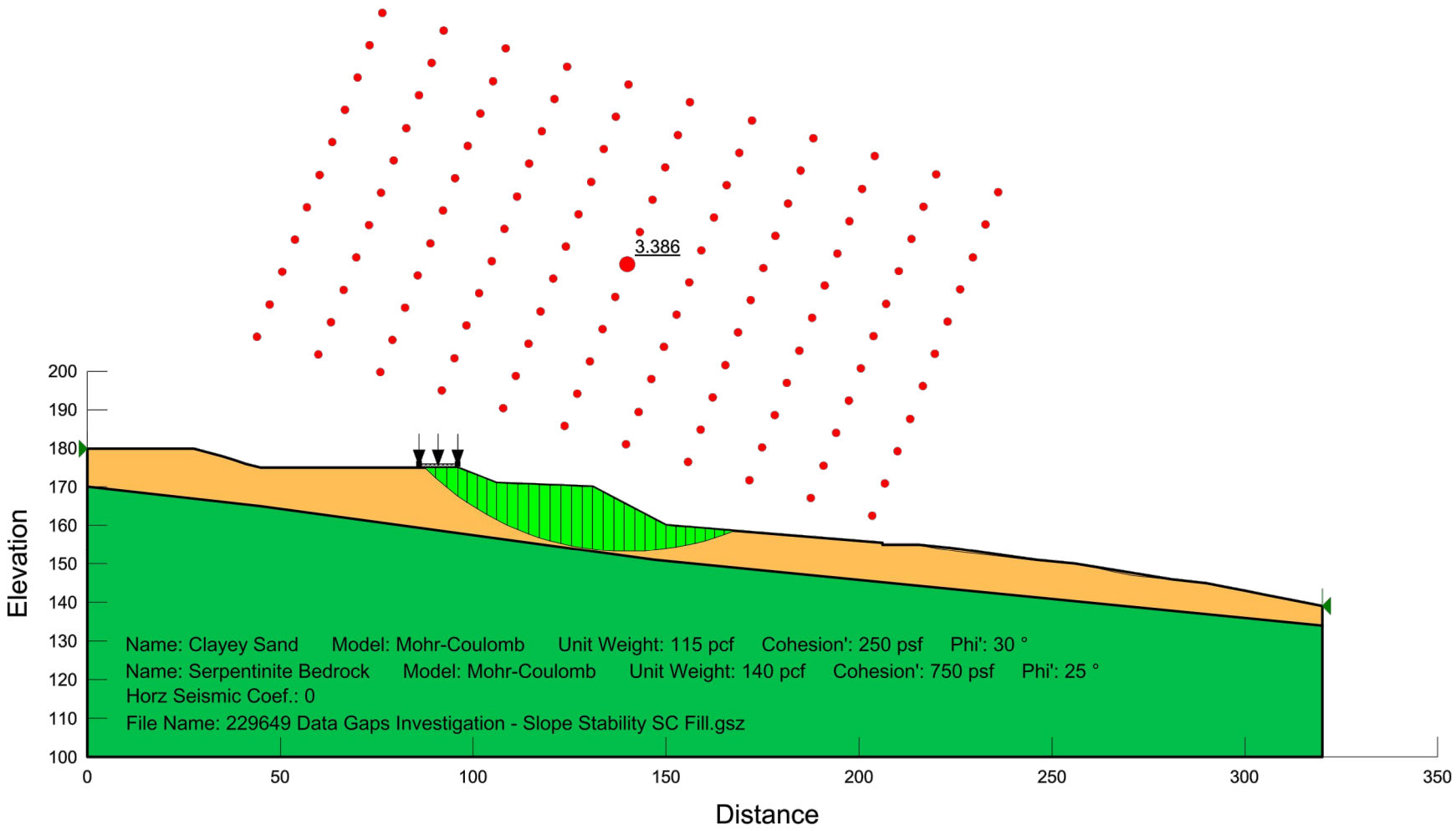
1. SLOPES SHOULD BE OVERBUILT AT LEAST 9 INCHES AND TRIMMED TO EXPOSE COMPACTED FILL.

TYPICAL FILL SECTION
May 26, 2016

Lendrum Court Area
The Presidio Trust
San Francisco, California

TRC | 229649 | **FIGURE B-2**

FILE NAME: \\Sanfran-fs1\sanfran\PROJECTS\CAD\Lendrum Court_San Francisco\RDIP_FINAL MAY16\FigB-2_Typical Fill Section MAY16 05.26.16.dwg | Layout Tab: 11x17

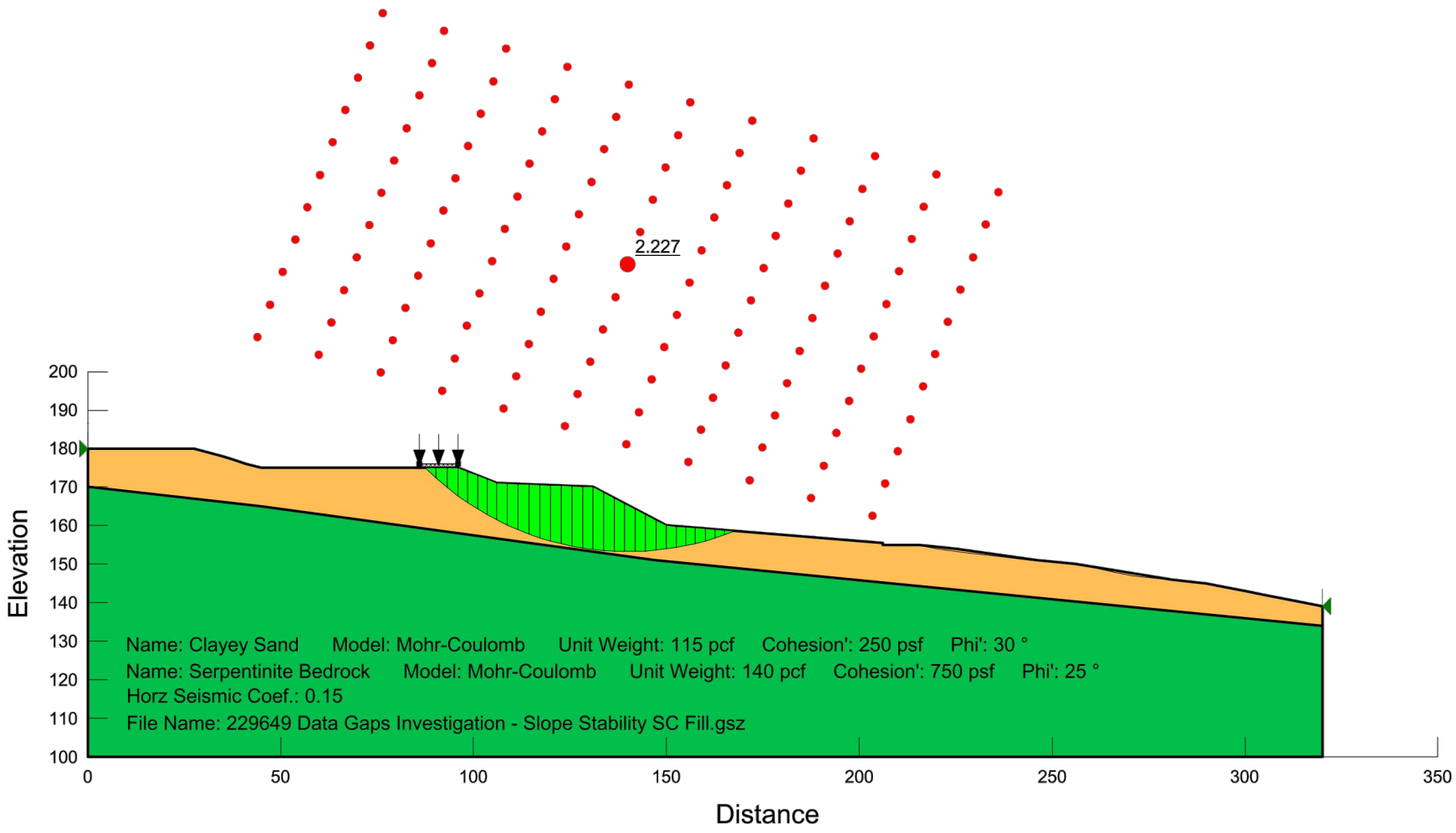


NOT TO SCALE

SLOPE STABILITY SECTION
A-A' - STATIC
May 26, 2016

Lendrum Court Area
The Presidio Trust
San Francisco, California

TRC | 229649 | **FIGURE B-3**

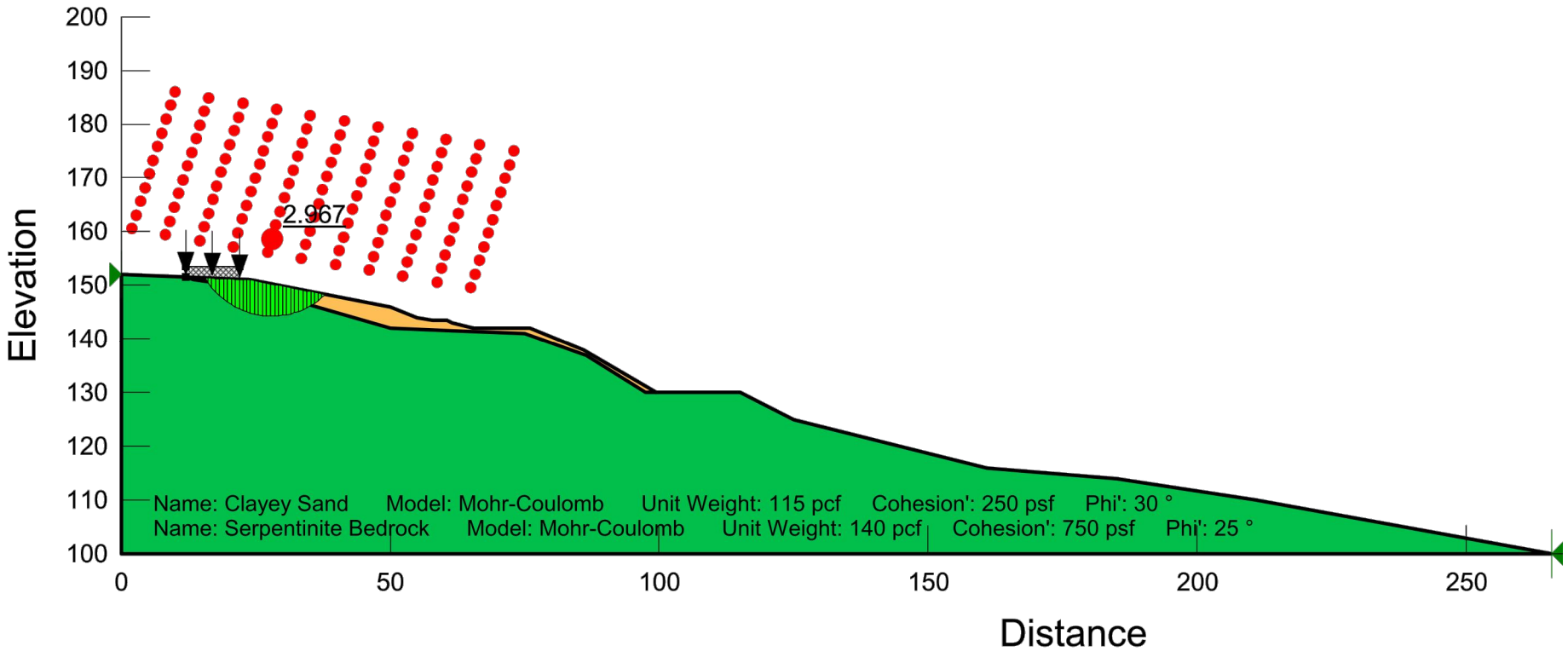


NOT TO SCALE

SLOPE STABILITY SECTION
A-A' - SEISMIC
May 26, 2016

Lendrum Court Area
The Presidio Trust
San Francisco, California

TRC | 229649 | **FIGURE B-4**

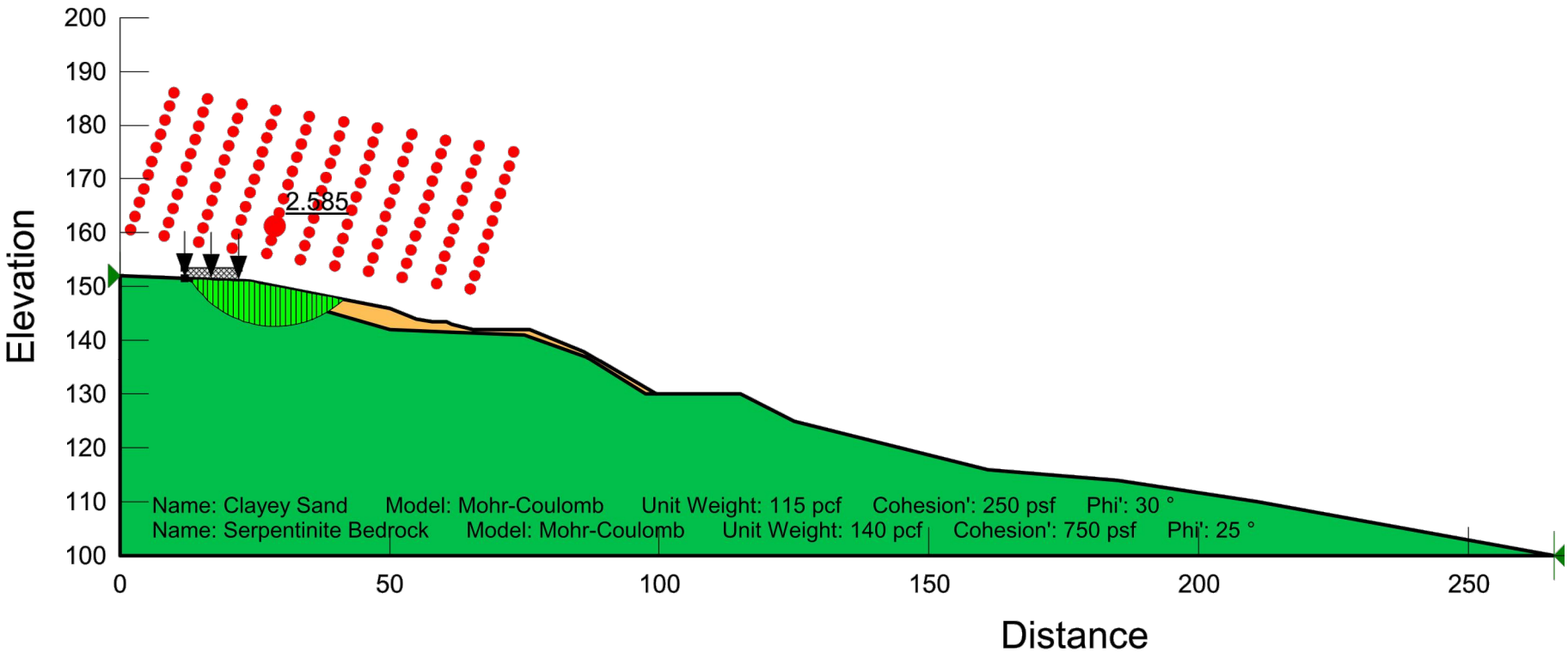


NOT TO SCALE

SLOPE STABILITY SECTION
B-B' - STATIC UPPER SLOPE
May 26, 2016

Lendrum Court Area
The Presidio Trust
San Francisco, California

TRC | 229649 | **FIGURE B-5**

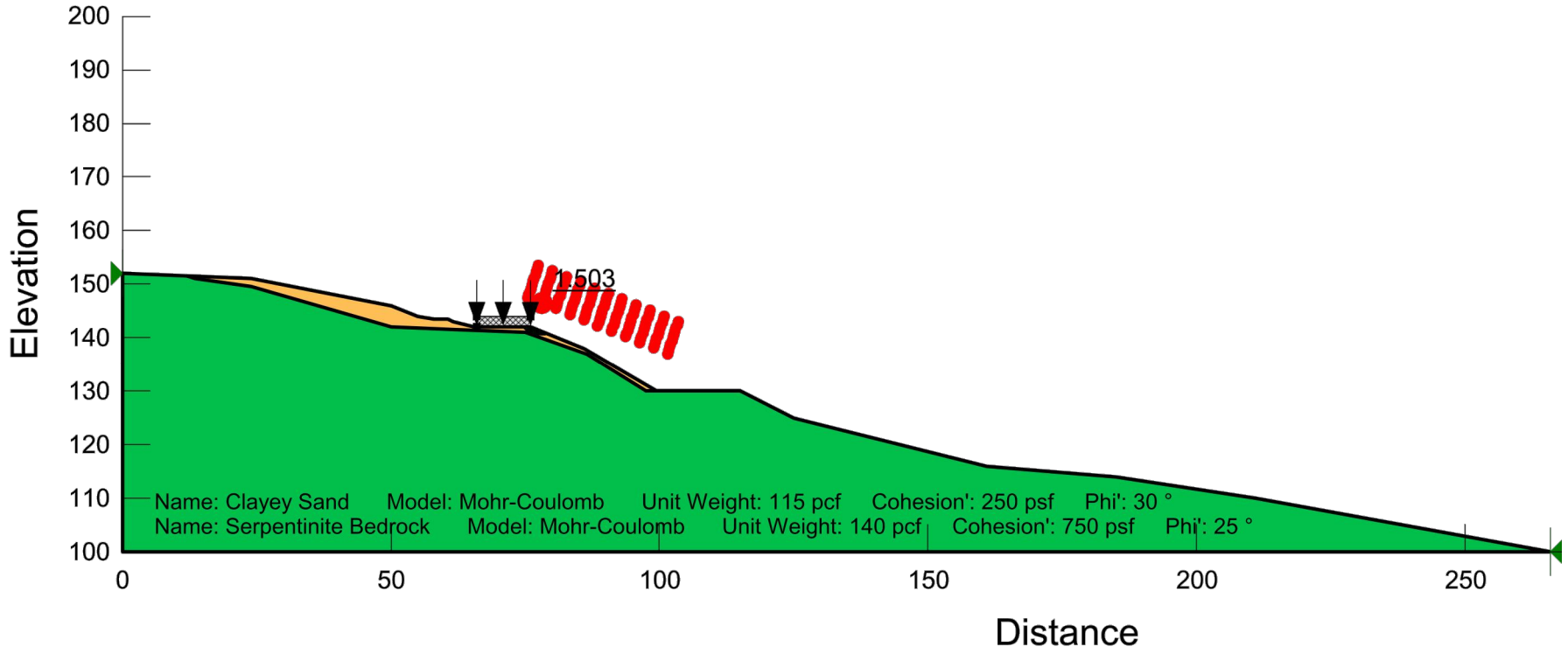


NOT TO SCALE

SLOPE STABILITY SECTION
B-B' - SEISMIC UPPER SLOPE
May 26, 2016

Lendrum Court Area
The Presidio Trust
San Francisco, California

TRC | 229649 | **FIGURE B-6**

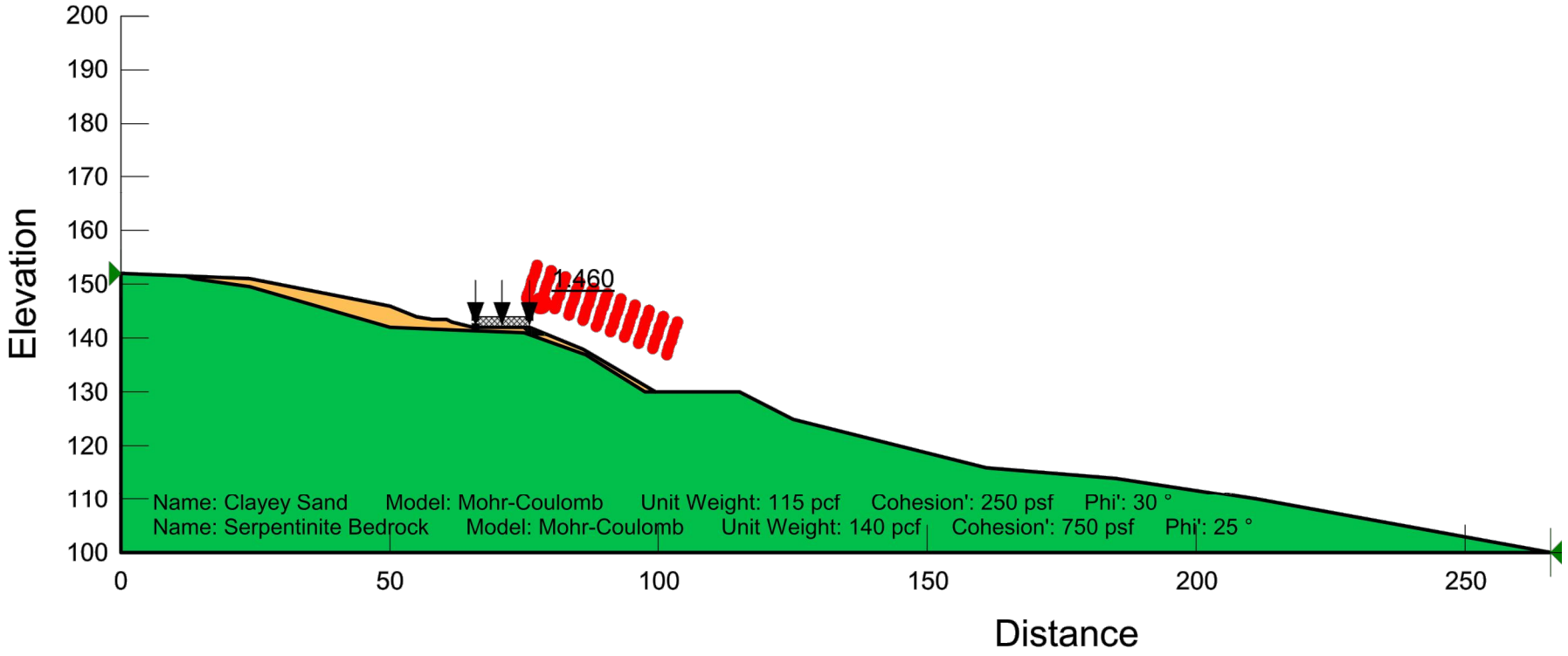


NOT TO SCALE

SLOPE STABILITY SECTION
B-B' - STATIC LOWER SLOPE
May 26, 2016

Lendrum Court Area
The Presidio Trust
San Francisco, California

TRC | 229649 | **FIGURE B-7**



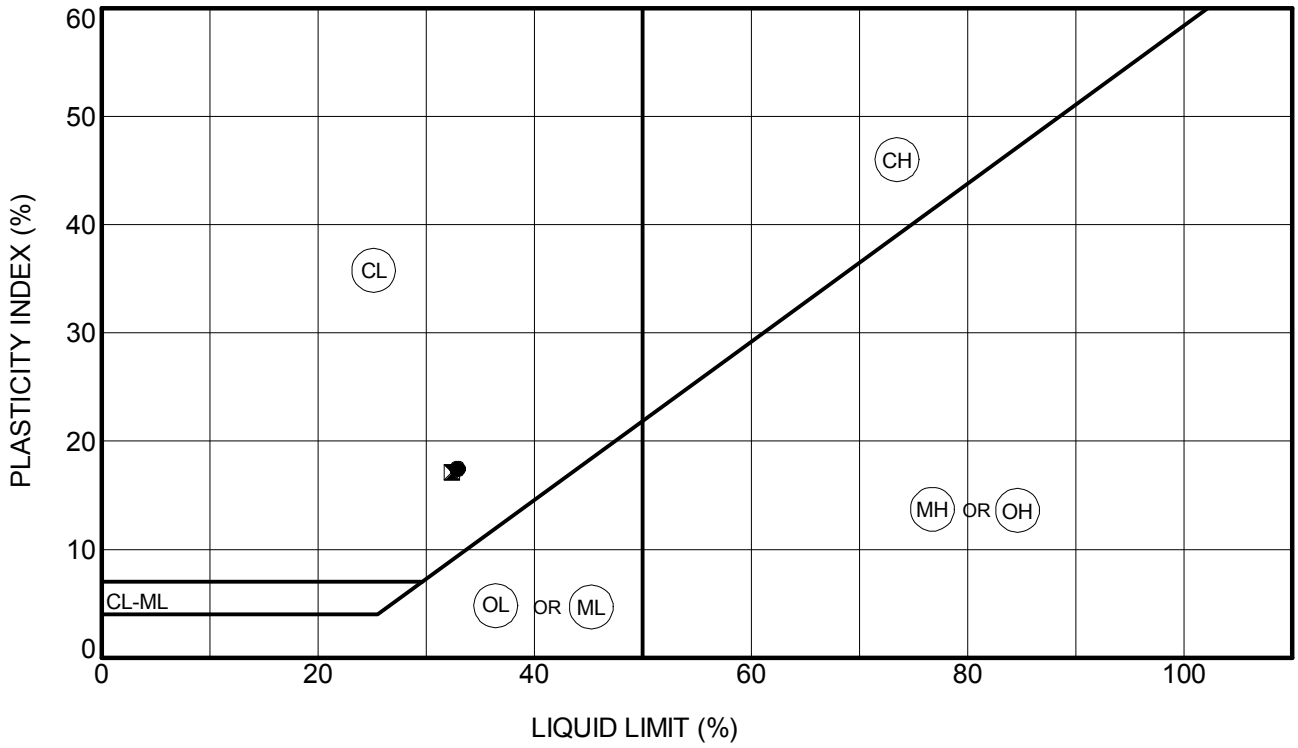
NOT TO SCALE

SLOPE STABILITY SECTION
B-B' - SEISMIC LOWER SLOPE
May 26, 2016

Lendrum Court Area
The Presidio Trust
San Francisco, California

TRC | 229649 | **FIGURE B-8**

ATTACHMENT B-1
ANALYTICAL LAB REPORTS



Symbol	Boring No.	Depth (ft.)	Natural Water Content (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Passing No. 200 Sieve	Unified Soil Classification Description
●	**HA-23**	**2.0**		**33**	**15**	**18**		**LEAN CLAY WITH SAND CL**
⊠	**HA-4**	**2.0**		**32**	**15**	**17**		**LEAN CLAY WITH SAND CL**

TRC

PLASTICITY CHART AND DATA

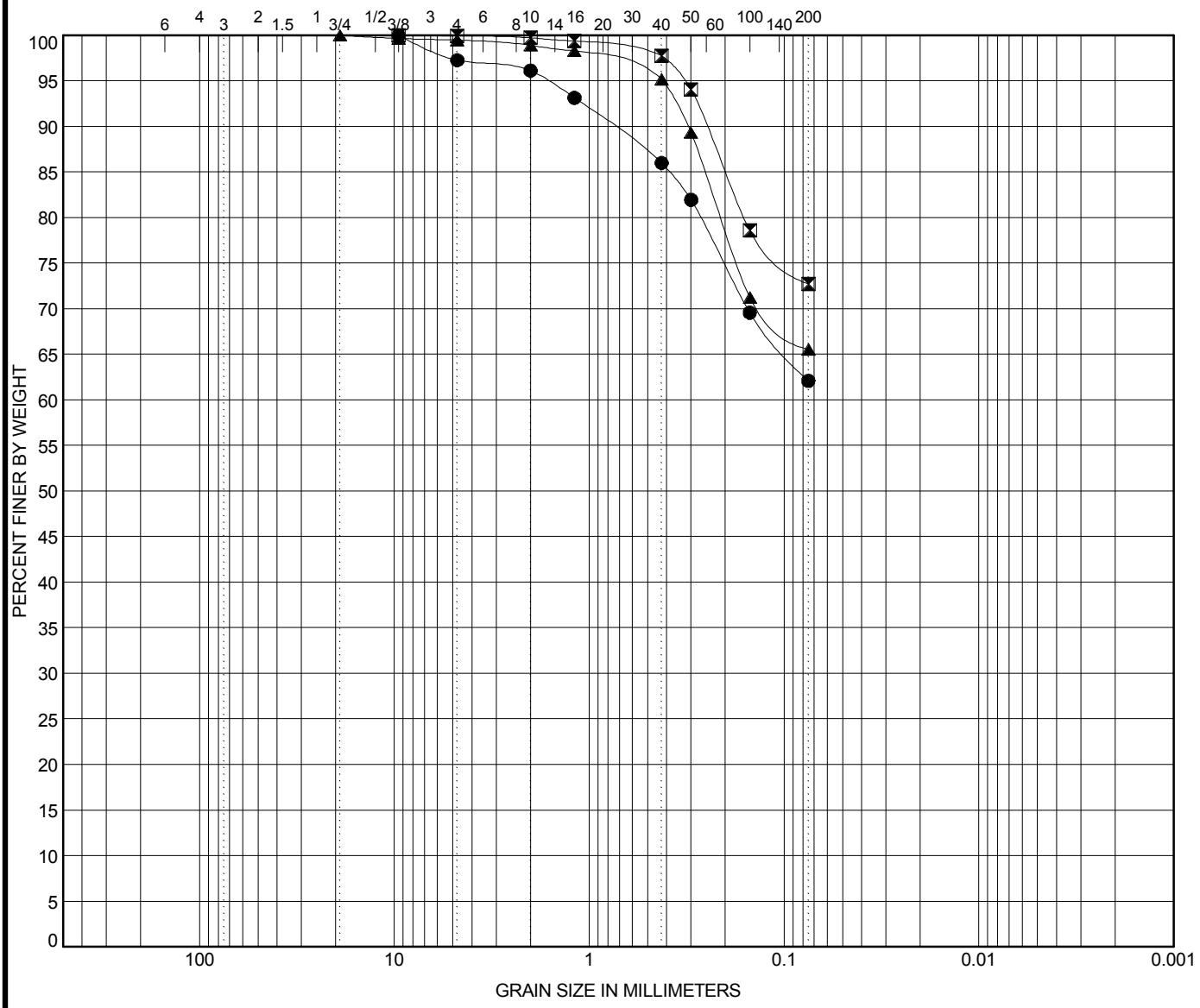
Project: DATA GAPS INVESTIGATION

Location: SAN FRANCISCO, CA

Project No.: 229649

FIGURE B-1

LA_CORP.GDT 5/28/15 MV*



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification		Classification	LL	PL	PI	Cc	Cu
●	**HA-18**	**1.0**	**SANDY LEAN CLAY CL**					
⊠	**HA-4**	**2.5**	**LEAN CLAY WITH SAND CL**					
▲	**HA-7**	**2.5**	**SANDY LEAN CLAY CL**					

	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**HA-18**	**1.0**	**9.5**				**2.7**	**35.2**	**62.1**	
⊠	**HA-4**	**2.5**	**9.5**				**0.0**	**27.2**	**72.7**	
▲	**HA-7**	**2.5**	**19.05**				**0.5**	**33.9**	**65.5**	

TRC

GRAIN SIZE DISTRIBUTION

Project: DATA GAPS INVESTIGATION

Location: SAN FRANCISCO, CA

Project No.: 229649

FIGURE B-2

LA_CORP.GDT 5/28/15 MV*

ATTACHMENT B-2
FIELD FORMS

Location of Boring:	Job Number:	Job Name:	Location:
	229649	Lendrum Court	San Fancisco
	Drilling Method:		Boring Number:
	Hand Auger		HA- 1
			Sheet:
	Sampling Method:		1 of 1
			DRILLING
			Start / Finish

Logged By: AC	Contractor:	Water Level					Time	Time
Date: 4/23/2015		Time						
Checked By:	Drillers:	Date					Date	Date
Datum:	Elevation:	Casing Depth						

Sampler Type	Inches Driven / Inches Recovered	Depth of Casing	Sample Number / Sample Depth	Blows per foot	Number of Rings	Depth (feet)	Mark	Soil Class	Surface Conditions
									Duff/organic soil
						0			Lean Clay w/ Sand
						1			reddish brown, moist, moderate plasticity
						2			F-C. sand, trace glass piece
						3			BOB @ ~2.5ft
						4			
						5			
						6			
						7			
						8			
						9			
						0			
						1			
						2			
						3			
						4			
						5			
						6			
						7			
						8			
						9			
						0			

Location of Boring:	Job Number: 229649	Job Name: Lendrum Court	Location: San Fancisco
	Drilling Method: Hand Auger		Boring Number: HA-2
			Sheet: 1 of 1
	Sampling Method:		DRILLING Start / Finish

Logged By: AC	Contractor:	Water Level					Time	Time
Date: 4/23/2015		Time						
Checked By:	Drillers:	Date					Date	Date
Datum:	Elevation:	Casing Depth						

Sampler Type	Inches Driven / Inches Recovered	Depth of Casing	Sample Number / Sample Depth	Blows per foot	Number of Rings	Depth (feet)	Mark	Soil Class	Surface Conditions / Notes
						0			Grass
						1		CL	Lean Clay w/ Sand reddish brown, moist, low PI F-M. sand
						2			
						3			Bot @ ~2.5 ft
						4			
						5			
						6			
						7			
						8			
						9			
						0			
						1			
						2			
						3			
						4			
						5			
						6			
						7			
						8			
						9			
						0			

Location of Boring:	Job Number: 229649	Job Name: Lendrum Court	Location: San Fancisco
	Drilling Method: Hand Auger		Boring Number: HA- 4
			Sheet: 1 of 1
	Sampling Method:		DRILLING Start / Finish

Logged By: AC	Contractor:	Water Level					Time	Time
Date: 4/23/2015		Time						
Checked By:	Drillers:	Date					Date	Date
Datum:	Elevation:	Casing Depth						

Sampler Type	Inches Driven / Inches Recovered	Depth of Casing	Sample Number / Sample Depth	Blows per foot	Number of Rings	Depth (feet)	Mark	Soil Class	Surface Conditions
									Grass
						0			lean clay
						1		CL	brown, moist, low PI
						2			yellowish brown, mod PI
						3			LOB @ 2.5 ft
						4			
						5			
						6			
						7			
						8			
						9			
						0			
						1			
						2			
						3			
						4			
						5			
						6			
						7			
						8			
						9			
						0			

Location of Boring:	Job Number: 229649	Job Name: Lendrum Court	Location: San Fancisco
	Drilling Method: Hand Auger		Boring Number: HA-5
			Sheet: 1 of 1
	Sampling Method:		DRILLING Start / Finish

Logged By: AC	Contractor:	Water Level					Time	Time
Date: 4/23/2015		Time						
Checked By:	Drillers:	Date					Date	Date
Datum:	Elevation:	Casing Depth						

Sampler Type	Inches Driven / Inches Recovered	Depth of Casing	Sample Number / Sample Depth	Blows per foot	Number of Rings	Depth (feet)	Mark	Soil Class	Surface Conditions
						0			Duff/organic soil
						1			Lean Clay w/ gravel brown, moist, Low PI F. gravel, F-C. sand
						2			Alt Reddish brown
						3			BOB @ 2.5ft
						4			
						5			
						6			
						7			
						8			
						9			
						0			
						1			
						2			
						3			
						4			
						5			
						6			
						7			
						8			
						9			
						0			

Location of Boring:	Job Number: 229649	Job Name: Lendrum Court	Location: San Fancisco
	Drilling Method: Hand Auger		Boring Number: HA-6
			Sheet: 1 of 1
	Sampling Method:		DRILLING Start / Finish

Logged By: AC	Contractor:	Water Level					Time	Time
Date: 4/23/2015		Time						
Checked By:	Drillers:	Date					Date	Date
Datum:	Elevation:	Casing Depth						

Sampler Type	Inches Driven / Inches Recovered	Depth of Casing	Sample Number / Sample Depth	Blows per foot	Number of Rings	Depth (feet)	Mark	Soil Class	Surface Conditions
									Grass
						0		CL	Lean Clay
						1			brown, moist, Low PI
						2		CL	Sandy Lean Clay
						3			yellowish brown, moist, Low-mod PI
						4			f. sand
						5			BOB @ 2.5Ft
						6			
						7			
						8			
						9			
						0			
						1			
						2			
						3			
						4			
						5			
						6			
						7			
						8			
						9			
						0			

Location of Boring:	Job Number:	Job Name:	Location:
	229649	Lendrum Court	San Fancisco
	Drilling Method: Hand Auger		Boring Number: HA- 7
	Sampling Method:		Sheet: 1 of 1
			DRILLING Start / Finish

Logged By: AC	Contractor:	Water Level					Time	Time
Date: 4/23/2015		Time						
Checked By:	Drillers:	Date					Date	Date
Datum:	Elevation:	Casing Depth						

Sampler Type	Inches Driven / Inches Recovered	Depth of Casing	Sample Number / Sample Depth	Blows per foot	Number of Rings	Depth (feet)	Mark	Soil Class	Surface Conditions
									grass
						0		CL	Lean Clay
						1			dk brown, moist, Med PI
						2			dk gray / dk brown
						3			Bot @ 2.5ft
						4			
						5			
						6			
						7			
						8			
						9			
						0			
						1			
						2			
						3			
						4			
						5			
						6			
						7			
						8			
						9			
						0			

Location of Boring:	Job Number: 229649	Job Name: Lendrum Court	Location: San Fancisco
	Drilling Method: Hand Auger		Boring Number: HA-8
			Sheet: 1 of 1
	Sampling Method:		DRILLING Start / Finish

Logged By: AC	Contractor:	Water Level					Time	Time
Date: 4/23/2015		Time						
Checked By:	Drillers:	Date					Date	Date
Datum:	Elevation:	Casing Depth						

Sampler Type	Inches Driven / Inches Recovered	Depth of Casing	Sample Number / Sample Depth	Blows per foot	Number of Rings	Depth (feet)	Mark	Soil Class	Surface Conditions
									Grass
						0		CL	lean Clay w/ Sand
						1			yellowish brown, moist, med. PI
						2			F-M sand, trace glass piece
									Dk gray, med. PI
						3			BOB @ 2.5 Ft
						4			
						5			
						6			
						7			
						8			
						9			
						0			
						1			
						2			
						3			
						4			
						5			
						6			
						7			
						8			
						9			
						0			

Location of Boring:	Job Number:	Job Name:	Location:
	229649	Lendrum Court	San Fancisco
	Drilling Method:		Boring Number:
	Hand Auger		HA- 9
			Sheet: 1 of 1
	Sampling Method:		DRILLING
			Start / Finish

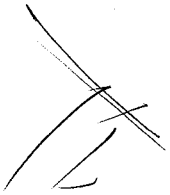
Logged By: AC	Contractor:	Water Level					Time	Time
Date: 4/23/2015		Time						
Checked By:	Drillers:	Date					Date	Date
Datum:	Elevation:	Casing Depth						

Sampler Type	Inches Driven / Inches Recovered	Depth of Casing	Sample Number / Sample Depth	Blows per foot	Number of Rings	Depth (feet)	Mark	Soil Class	Surface Conditions
									Grass
						0		CL	Lean Clay w/ sand
						1			dk brown, moist, med PI
						2			F-M sand, trace glass piece
									yellowish-brown, Low-mod PI
						3			BOB @ 2.5ft
						4			
						5			
						6			
						7			
						8			
						9			
						0			
						1			
						2			
						3			
						4			
						5			
						6			
						7			
						8			
						9			
						0			

Location of Boring:	Job Number: 229649	Job Name: Lendrum Court	Location: San Fancisco
	Drilling Method: Hand Auger		Boring Number: HA-10
			Sheet: 1 of 1
	Sampling Method:		DRILLING Start / Finish

Logged By: AC	Contractor:	Water Level					Time	Time
Date: 4/23/2015		Time						
Checked By:	Drillers:	Date					Date	Date
Datum:	Elevation:	Casing Depth						

Sampler Type	Inches Driven / Inches Recovered	Depth of Casing	Sample Number / Sample Depth	Blows per foot	Number of Rings	Depth (feet)	Mark	Soil Class	Surface Conditions: Grass
						0		CL	Lean Clay w/ Sand
						1			brown, moist, mod PI F. sand
						2			trace glass pieces
						3			yellowish brown, low-mod PI
						4			Bob @ 2.5 ft
						5			
						6			
						7			
						8			
						9			
						0			
						1			
						2			
						3			
						4			
						5			
						6			
						7			
						8			
						9			
						0			

Location of Boring:	Job Number:	Job Name:	Location:
	229649	Lendrum Court	San Fancisco
	Drilling Method: Hand Auger		Boring Number: HA- 11
	Sampling Method:		Sheet: 1 of 1
			DRILLING Start / Finish

Logged By: AC	Contractor:	Water Level					Time	Time
Date: 4/23/2015		Time						
Checked By:	Drillers:	Date					Date	Date
Datum:	Elevation:	Casing Depth						

Sampler Type	Inches Driven / Inches Recovered	Depth of Casing	Sample Number / Sample Depth	Blows per foot	Number of Rings	Depth (feet)	Mark	Soil Class	Surface Conditions
									Duff
						0		CL	Lean Clay w/ Sand
						1			dk brown, moist, low PI
						2			F - C, Sand
									brown
								Bedrock	Serpentinite (Bedrock) @ ~ 27-30 in. depth
						3			BOB @ ~~20~~ 2.5 ft
						4			
						5			
						6			
						7			
						8			
						9			
						0			
						1			
						2			
						3			
						4			
						5			
						6			
						7			
						8			
						9			
						0			

Location of Boring:	Job Number: 229649	Job Name: Lendrum Court	Location: San Fancisco
	Drilling Method: Hand Auger		Boring Number: HA-12
			Sheet: 1 of 1
	Sampling Method:		DRILLING Start / Finish

Logged By: AC	Contractor:	Water Level					Time	Time
Date: 4/23/2015		Time						
Checked By:	Drillers:	Date					Date	Date
Datum:	Elevation:	Casing Depth						

Sampler Type	Inches Driven / Inches Recovered	Depth of Casing	Sample Number / Sample Depth	Blows per foot	Number of Rings	Depth (feet)	Mark	Soil Class	Surface Conditions
						0		CL	Duff
						1			Lean Clay w/ Sand
						2			dk brown to brown, moist, Low-mod PI FM. sand
						3			Serpentenite (Bedrock) @ ~ 12-14 in. (depth)
						4			Bottom of boring 14 inches
						5			
						6			
						7			
						8			
						9			
						0			
						1			
						2			
						3			
						4			
						5			
						6			
						7			
						8			
						9			
						0			

Location of Boring:	Job Number:	Job Name:	Location:
	229649	Lendrum Court	San Fancisco
	Drilling Method: Hand Auger		Boring Number: HA- 13
			Sheet: 1 of 1
	Sampling Method:		DRILLING Start / Finish

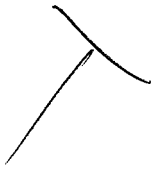
Logged By: AC	Contractor:	Water Level					Time	Time
Date: 4/23/2015		Time						
Checked By:	Drillers:	Date					Date	Date
Datum:	Elevation:	Casing Depth						

Sampler Type	Inches Driven / Inches Recovered	Depth of Casing	Sample Number / Sample Depth	Blows per foot	Number of Rings	Depth (feet)	Mark	Soil Class	Surface Conditions
						0		CL	Lean Clay w/ Sand
						1			DK brown, moist, low-med PI
						2			F. Misnd,
						3			DK yellowish brown
						4			serpentinite (bedrock) @ ~ 2'7" - 2'9"
						5			
						6			Bottom of boring @ 2'9"
						7			
						8			
						9			
						0			
						1			
						2			
						3			
						4			
						5			
						6			
						7			
						8			
						9			
						0			

Location of Boring:	Job Number:	Job Name:	Location:
	229649	Lendrum Court	San Fancisco
	Drilling Method: Hand Auger		Boring Number: HA-/4
			Sheet: /of/
	Sampling Method:		DRILLING Start / Finish

Logged By: AC	Contractor:	Water Level					Time	Time
Date: 4/23/2015		Time						
Checked By:	Drillers:	Date					Date	Date
Datum:	Elevation:	Casing Depth						

Sampler Type	Inches Driven / Inches Recovered	Depth of Casing	Sample Number / Sample Depth	Blows per foot	Number of Rings	Depth (feet)	Mark	Soil Class	Surface Conditions
									Duff
						0		CL	Lean Clay w/ Sand
						1			moist, Dk brown, Low PI
						2			F. M. Sand
						3			yellowish brown, mod PI
						4			
						5			
						6			BOB @ 6ft (No bedrock enc.)
						7			
						8			
						9			
						0			
						1			
						2			
						3			
						4			
						5			
						6			
						7			
						8			
						9			
						0			

Location of Boring:	Job Number: 229649	Job Name: Lendrum Court	Location: San Fancisco
	Drilling Method: Hand Auger		Boring Number: HA-15
			Sheet: 1 of 1
	Sampling Method:		DRILLING Start / Finish

Logged By: AC	Contractor:	Water Level					Time	Time
Date: 4/23/2015		Time						
Checked By:	Drillers:	Date					Date	Date
Datum:	Elevation:	Casing Depth						

Sampler Type	Inches Driven / Inches Recovered	Depth of Casing	Sample Number / Sample Depth	Blows per foot	Number of Rings	Depth (feet)	Mark	Soil Class	Surface Conditions
						0			Dirt
						1		CL	Lean Clay w/ Sand
						2			Dk brown, moist, Low-mod PI
						3			F. Sand
						4			yellowish brown
						5			Serpentinite (bedrock) @ ~ 2'7" - 2'9"
						6			
						7			BOB @ 2' 9"
						8			
						9			
						0			
						1			
						2			
						3			
						4			
						5			
						6			
						7			
						8			
						9			
						0			

Location of Boring:	Job Number: 229649	Job Name: Lendrum Court	Location: San Fancisco
	Drilling Method: Hand Auger		Boring Number: HA- 16
			Sheet: 1 of 1
	Sampling Method:		DRILLING Start / Finish

Logged By: AC	Contractor:	Water Level					Time	Time
Date: 4/23/2015		Time						
Checked By:	Drillers:	Date					Date	Date
Datum:	Elevation:	Casing Depth						

Sampler Type	Inches Driven / Inches Recovered	Depth of Casing	Sample Number / Sample Depth	Blows per foot	Number of Rings	Depth (feet)	Mark	Soil Class	Surface Conditions / Notes
						0			Surface Conditions: grass
						1		CL	Lean Clay w/ Sand moist, DK brown, Low PI F. Sand
						2			
						3			yellowish brown, mod PI
						4			
						5			
						6			BOB @ 6ft (No bedrock enc.)
						7			
						8			
						9			
						0			
						1			
						2			
						3			
						4			
						5			
						6			
						7			
						8			
						9			
						0			

Location of Boring:	Job Number:	Job Name:	Location:
	229649	Lendrum Court	San Fancisco
	Drilling Method:		Boring Number:
	Hand Auger		HA-17
			Sheet:
	Sampling Method:		1 of 1
			DRILLING
			Start / Finish

Logged By: AC	Contractor:	Water Level					Time	Time
Date: 4/23/2015		Time						
Checked By:	Drillers:	Date					Date	Date
Datum:	Elevation:	Casing Depth						

Sampler Type	Inches Driven / Inches Recovered	Depth of Casing	Sample Number / Sample Depth	Blows per foot	Number of Rings	Depth (feet)	Mark	Soil Class	Surface Conditions
									Duff / Organic soil
						0		CL	Silty Clay
						1			moist, brown, low PI
						2			trace F-M. sand
						3			BOB @ 1.0 (refusal)
						4			due to boulders/rocks
						5			
						6			
						7			
						8			
						9			
						0			
						1			
						2			
						3			
						4			
						5			
						6			
						7			
						8			
						9			
						0			

Location of Boring:	Job Number: 229649	Job Name: Lendrum Court	Location: San Fancisco
	Drilling Method: Hand Auger		Boring Number: HA-18
			Sheet: 1 of 1
	Sampling Method:		DRILLING Start / Finish

Logged By: AC	Contractor:	Water Level					Time	Time
Date: 4/23/2015		Time						
Checked By:	Drillers:	Date					Date	Date
Datum:	Elevation:	Casing Depth						

Sampler Type	Inches Driven / Inches Recovered	Depth of Casing	Sample Number / Sample Depth	Blows per foot	Number of Rings	Depth (feet)	Mark	Soil Class	Surface Conditions: Duff / Organic soil
						0		CL	Sandy Clay w/ Gravel
						1		Bedrock	Brown, moist, Low PI
						2			F-C sand, F. gravel (Cobs-A)
						3			Serpentinite (Bedrock)
						4			BOR @ 1.5 (refusal)
						5			
						6			
						7			
						8			
						9			
						0			
						1			
						2			
						3			
						4			
						5			
						6			
						7			
						8			
						9			
						0			

Location of Boring:	Job Number: 229649	Job Name: Lendrum Court	Location: San Fancisco
	Drilling Method: Hand Auger		Boring Number: HA- 19
			Sheet: 1 of 1
	Sampling Method:		DRILLING Start / Finish

Logged By: AC	Contractor:	Water Level					Time	Time
Date: 4/23/2015		Time						
Checked By:	Drillers:	Date					Date	Date
Datum:	Elevation:	Casing Depth						

Sampler Type	Inches Driven / Inches Recovered	Depth of Casing	Sample Number / Sample Depth	Blows per foot	Number of Rings	Depth (feet)	Mark	Soil Class	Surface Conditions / Description
									Surface Conditions: Duff / organic soil
						0		CL	Sandy Lean Clay
						1		Bd	moist, brown, Low PI F-C sand
						2			Serpentinite (bedrock)
						3			EOB @ 1.5 feet (refusal)
						4			
						5			
						6			
						7			
						8			
						9			
						0			
						1			
						2			
						3			
						4			
						5			
						6			
						7			
						8			
						9			
						0			

Location of Boring:	Job Number:	Job Name:	Location:
	229649	Lendrum Court	San Fancisco
	Drilling Method:		Boring Number:
	Hand Auger		HA-20
			Sheet: 1 of 1
	Sampling Method:		DRILLING
			Start / Finish

Logged By: AC	Contractor:	Water Level					Time	Time
Date: 4/23/2015		Time						
Checked By:	Drillers:	Date					Date	Date
Datum:	Elevation:	Casing Depth						

Sampler Type	Inches Driven / Inches Recovered	Depth of Casing	Sample Number / Sample Depth	Blows per foot	Number of Rings	Depth (feet)	Mark	Soil Class	Surface Conditions
									Drift / Organic soil
						0		CL	Lean Clay w/ Sand
						1			moist, Lt. brown, low-mod PI F-M sand
						2		bed	Serpentinite (Bedrock)
						3			Boul @ 2ft (refusal)
						4			
						5			
						6			
						7			
						8			
						9			
						0			
						1			
						2			
						3			
						4			
						5			
						6			
						7			
						8			
						9			
						0			

Location of Boring:	Job Number:	Job Name:	Location:
	229649	Lendrum Court	San Fancisco
	Drilling Method:		Boring Number:
	Hand Auger		HA-21
			Sheet:
	Sampling Method:		1 of 1
			DRILLING
			Start / Finish

Logged By: AC	Contractor:	Water Level					Time	Time
Date: 4/23/2015		Time						
Checked By:	Drillers:	Date					Date	Date
Datum:	Elevation:	Casing Depth						

Sampler Type	Inches Driven / Inches Recovered	Depth of Casing	Sample Number / Sample Depth	Blows per foot	Number of Rings	Depth (feet)	Mark	Soil Class	Surface Conditions
						0			Duff/Organic Soil
						1		CL	Lean Clay
						2			moist, Lt. brown, Low PI
						3			Dk yellowish brown
						4			DOB @ 2.5 ft (No bedrock enc.)
						5			
						6			
						7			
						8			
						9			
						0			
						1			
						2			
						3			
						4			
						5			
						6			
						7			
						8			
						9			
						0			

Location of Boring:	Job Number:	Job Name:	Location:
	229649	Lendrum Court	San Fancisco
	Drilling Method:		Boring Number:
	Hand Auger		HA-2
			Sheet: 1 of 1
	Sampling Method:		DRILLING Start / Finish

Logged By: AC	Contractor:	Water Level					Time	Time
Date: 4/23/2015		Time						
Checked By:	Drillers:	Date					Date	Date
Datum:	Elevation:	Casing Depth						

Sampler Type	Inches Driven / Inches Recovered	Depth of Casing	Sample Number / Sample Depth	Blows per foot	Number of Rings	Depth (feet)	Mark	Soil Class	Surface Conditions
						0			Duff / Organic Soil
						1		CL	Lean Clay
						2			Moist, Lt. brown, low-med PI
						3			Lt. reddish brown
						4			BOB @ 2.5 ft (No bedrock enc.)
						5			
						6			
						7			
						8			
						9			
						0			
						1			
						2			
						3			
						4			
						5			
						6			
						7			
						8			
						9			
						0			

Location of Boring:	Job Number: 229649	Job Name: Lendrum Court	Location: San Fancisco
	Drilling Method: Hand Auger		Boring Number: HA-23
			Sheet: 1 of 1
	Sampling Method:		DRILLING Start / Finish

Logged By: AC	Contractor:	Water Level					Time	Time
Date: 4/23/2015		Time						
Checked By:	Drillers:	Date					Date	Date
Datum:	Elevation:	Casing Depth						

Sampler Type	Inches Driven / Inches Recovered	Depth of Casing	Sample Number / Sample Depth	Blows per foot	Number of Rings	Depth (feet)	Mark	Soil Class	Surface Conditions
						0			Duff / Organics soil
						1		CL	Lean Clay moist, Lt. brown, low PI
						2			yellowish brown
						3			BOB @ 2.5ft (No bedrock enc.)
						4			
						5			
						6			
						7			
						8			
						9			
						0			
						1			
						2			
						3			
						4			
						5			
						6			
						7			
						8			
						9			
						0			

APPENDIX C
STORM WATER POLLUTION PREVENTION PLAN
LENDRUM COURT
PRESIDIO OF SAN FRANCISCO, CALIFORNIA

THE PRESIDIO TRUST
103 Montgomery Street, P.O. Box 29052
San Francisco, California 94129-0052

TRC Project No. 229649

May 2016

APPENDIX C
STORM WATER POLLUTION PREVENTION PLAN
LENDRUM COURT
PRESIDIO OF SAN FRANCISCO, CALIFORNIA

May 26, 2016

Prepared for

THE PRESIDIO TRUST
103 Montgomery Street, P.O. Box 29052
San Francisco, California 94129-0052

Prepared By

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Senior Project Engineer

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TABLE OF CONTENTS

FIGURES

ATTACHMENTS

ACRONYMS AND ABBREVIATIONS

BMPs	best management practices
CASQA	California Stormwater Quality Association
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CGP	Construction General Permit
COCs	chemicals of concern
CSMP	Construction Site Monitoring Plan
cy	cubic yards
DOT	Department of Transportation
DTSC	California Environmental Protection Agency Department of Toxic Substances Control
EPA	Environmental Protection Agency
FS/RAW	Feasibility Study/Removal Action Work Plan
LRP	Legally Responsible Person
MDL	Method Detection Limit
MSL	mean sea level
NEL	Numeric Effluent Limit
NOAA	National Oceanographic and Atmospheric Administration
NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System
QA/QC	Quality Assurance/Quality Control
QSD	Qualified SWPPP Developer
QSP	Qualified SWPPP Practitioner
PAHs	polycyclic aromatic hydrocarbons
PRDs	Permit Registration Documents
Presidio	Presidio of San Francisco
RDIP	Remedial Design Implementation Plan
Regional Water Board	California Regional Water Quality Control Board
RWQCB	Regional Water Quality Control Board
Site	Lendrum Court
SWPPP	Storm Water Pollution Prevention Plan
SWRCB	State Water Resources Control Board
Trust	Presidio Trust
VMP	Vegetation Management Plan
WDID	Waste Discharge Identification

STORM WATER POLLUTION PREVENTION PLAN

Lendrum Court
San Francisco, California

QUALIFIED SWPPP DEVELOPER

Approval and Certification of the Storm Water Pollution Prevention Plan

Project Name: Lendrum Court

Project Number: 229649

"This Storm Water Pollution Prevention Plan and Attachments were prepared under my direction to meet the requirements of the California Construction General Permit (CGP) (SWRCB Order No. 2009-009-DWQ as amended by Orders 2010-0014-DWQ and 2012-006-DWQ). I certify that I am a Qualified SWPPP Developer in good standing as of the date below."

Christian Herencia

QSD Signature

May 26, 2016
Date

Christian Herencia, PE, QSD/QSP
QSD Name

#000389
QSD Certification Number

Title and Affiliation: Senior Project Engineer, TRC Solutions Inc. (TRC)

Telephone Number: (858)-505-8881 ext. 14923

Email: CHerencia@TRCSolutions.com

STORM WATER POLLUTION PREVENTION PLAN

Lendrum Court
San Francisco, California

LEGALLY RESPONSIBLE PERSON

Approval and Certification of the Storm Water Pollution Prevention Plan

Project Name: Lendrum Court

"I certify under penalty of law that this document and all attachments were prepared under my direction or 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, 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."

Signature of Legally Responsible Person (or Approved Signatory)	Date
Name of LRP or Approved Signatory	Company
Title	Telephone Number

STORM WATER POLLUTION PREVENTION PLAN

Lendrum Court
San Francisco, California

1.0 SWPPP REQUIREMENTS

1.1 INTRODUCTION

This Construction Storm Water Pollution Prevention Plan (SWPPP) has been prepared at the direction of the Presidio Trust (Trust). This SWPPP is for the planned remediation project at the Lendrum Court Site (Site) located at the Presidio in San Francisco, California (Presidio), as presented in **Figure C-1**. The SWPPP is in compliance with the National Pollutant Discharge Elimination System (NPDES) Construction General Permit (CGP) for Storm Water Discharges Associated with Construction Activity, Order No. 2009-0009-DWQ, NPDES No. CAS000002 as amended by 2010-0014-DWQ and 2012-006-DWQ. This CGP, enforced by the State Water Resources Control Board (SWRCB), regulates pollutants in discharges of storm water associated with construction activity to surface waters. A copy of the CGP is located in **Attachment C-1**.

Uncontrolled runoff from construction sites is a water quality concern because of the adverse effects that sedimentation, and the pollutants that attach to it, can have on local water bodies. Numerous studies have shown that the amount of sediment transported by storm water runoff from construction sites with no controls is significantly greater than from sites with controls. In addition to sediment, construction activities can yield pollutants such as pesticides, petroleum products, construction chemicals, solvents, asphalts, and acids that can contaminate storm water runoff. During storms, construction sites can be the source of sediment-laden runoff, which has been shown to result in the loss of habitat for fish and other aquatic species, such as those that exist in the San Francisco Bay.

This SWPPP is designed to be a working document and will be modified as appropriate and as necessary during the life of the project to address changes in construction or operations that affect the discharge of pollutants from the Site. Therefore, the objectives of this SWPPP, along with its Attachments covering project-specific storm water pollution prevention practices, are as follows:

- Identify all pollutants, pollutant sources, including sources of sediment that can affect the quality of storm water discharges associated with construction activity (storm water discharges) from the construction Site and ensure they are controlled;
- Where not otherwise required to be under a Regional Water Quality Control Board (RWQCB) permit, identify and either eliminate, control, or treat all non-storm water discharges;
- Select Site Best Management Practices (BMPs). BMPs are effective and result in the reduction or elimination of pollutants in storm water discharges and authorized non-storm water discharges from construction activity to the Best Available Technology/Best Control Technology standard;

- Develop a maintenance schedule for sediment and erosion control BMPs installed during construction, designed to reduce or eliminate pollutants after construction is completed (post-construction BMPs);
- Present calculations and design details as well as BMP controls for Site run-on;
- Identify stabilization BMPs installed to reduce or eliminate pollutants after construction is completed;
- Identify and provide methods to implement BMP inspection, visual monitoring and Construction Site Monitoring Program (CSMP) requirements to comply with the CGP; and
- Identify a sampling and analysis strategy, and sampling schedule for discharges that have been discovered through visual observations to be potentially contaminated by pollutants not visually detectable in the runoff.

Although NPDES permit coverage is not required for this project due to authorization under Comprehensive Environmental Response Compensation and Liability Act (CERCLA), the SWPPP was prepared to substantially comply with California's General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities (General Permit) Order No. 2009-0009-DWQ (NPDES No. CAS000002) as amended by Orders 2010-0014-DWQ and 2012-006-DWQ issued by the SWRCB. The Contractor will perform construction in accordance with the SWPPP and Erosion Control Plan; however, as a federal agency implementing a remedial action under CERCLA, the Trust will not submit a Notice of Intent (NOI) for coverage under the State of California's General Permit for construction storm water management.

In addition to, and as part of this SWPPP, contractors will comply with applicable regulations in effect or placed into effect during the term of the contract between all contractors and the Trust, being either the laws of a municipal government within a state, state law, federal statutes, as any and all of them apply. As such, all contractors working at the Site will be held to the requirements and stipulations of this SWPPP.

The level of sediment and receiving water risks are calculated [as described in the Construction General Permit (CGP)] to determine the overall Risk Level for a project. The overall Risk Level determines the frequency of inspections, reporting and sampling. This SWPPP is prepared in accordance with the **Risk Level 1** requirements of the CGP. The Site Risk Analysis forms used to determine the Risk Level are presented in **Attachment C-2**.

1.2 PERMIT REGISTRATION DOCUMENTS

A NOI will not be submitted prior to the start of construction activity due to authorization under CERCLA.

1.3 SWPPP AVAILABILITY AND IMPLEMENTATION

The SWPPP shall be available at the construction Site during working hours. Upon request of the Water Board or agency inspectors, the SWPPP will be made available for review.

The SWPPP is to remain on-site during construction activities. Should there be a stop in construction activity between major phases of the project, the SWPPP and all applicable storm water documents will remain at the Legally Responsible Person's (LRP's) office, located a short distance from the Site at 103 Montgomery Street, P.O Box 29052, San Francisco, California 94129-0052.

The SWPPP shall be implemented concurrently with the start of ground disturbing activities.

1.4 AMENDMENTS

The SWPPP will be amended by the Qualified SWPPP Developer (QSD) when the following conditions are encountered:

- BMPs do not meet the objectives of reducing or eliminating pollutants in storm water discharges;
- There is a change in construction or operations, which may affect the discharge of pollutants to surface water, groundwater, or a municipal separate storm sewer system;
- Upon request by the California Regional Water Quality Control Board, San Francisco Bay Region (Regional Water Board) to amend this SWPPP; or
- As deemed necessary by the QSD.

All amendments to the SWPPP must be documented. When amended or revised, the SWPPP will include a listing of the date of initial preparation, the date of each amendment and be signed by a QSD. All amendments will be dated and remain in the SWPPP. Blank amendment forms and the Amendment Log are located in **Attachment C-3**.

The following items will be included in all amendments:

- Who requested the amendment;
- The location of the proposed change;
- The reason for change;
- The original BMP, if any; and
- The new proposed or revised BMP.

As of the completion date of this SWPPP, two amendments have been developed to reflect an expanded project scope. Amendment No. 1 reflects the addition of a soil stockpile area at the corner of Greenough Avenue and Kobbe Avenue in the Presidio. Amendment No. 2 addresses tree and vegetation removal activities at the Site. The amendments are included in **Attachment C-3**.

1.5 RETENTION OF RECORDS

All SWPPP related documents will remain with the SWPPP. This includes annual reports, inspection reports, sampling records and all correspondence on this project regarding the SWPPP. The Trust will

maintain a paper or electronic copy of all required records for three years from the date of project acceptance. These records will be available at the Site until construction is completed.

The Trust or their designee will manage all storm water documentation related to this project as described under the SWPPP until such a time that the owner notifies the SWRCB of a change in this process. The permittee shall furnish the RWQCB, SWRCB, or U.S. Environmental Protection Agency (EPA), within a reasonable time, any requested information to determine compliance with the CGP. The RWQCB may require records to be retained for longer periods.

In addition, the SWPPP will remain on Site while the Site is under construction during working hours, commencing with the initial construction activity and ending with termination of coverage under the CGP. All storm water correspondence related to this project will be kept in the applicable Appendices of this SWPPP.

1.6 NON-COMPLIANCE REPORTING

Reportable discharges or other violations of the CGP will be properly documented. Reportable discharges and violations include the following:

- Violations identified by the RWQCB during inspections; and
- Discharges which contain a hazardous substance in excess of reportable quantities established in 40 CFR §§ 117.3 and 302.4.

Paper copies of any Non-Compliance Reporting will be included as **Attachment C-4** of the SWPPP as applicable.

If a non-authorized discharge or other violation occurs, the site superintendent will immediately notify the QSD and the Trust. The Regional Water Board will be notified within seven days and a written violation report will be prepared and submitted to the Regional Water Board within 30 days of identifying the non-compliance issue. Once observed, corrective measures will be implemented immediately following the observed discharge or non-compliance. Corrective actions will be documented and retained in **Attachment C-4**.

The non-compliance report to the Regional Water Board will contain the following items:

- The date, time, location, nature of operation and type of unauthorized discharge.
- The cause or nature of the non-compliance.
- The control measures or BMPs deployed before the discharge event, or prior to receiving notice of the non-compliance.
- The date of deployment and type of control measures (BMPs) deployed after the discharge event, or after receiving the notice or order, including additional measures installed or planned to reduce or prevent re-occurrence.

1.7 SUMMARY REPORT

To ensure Site personnel are aware of the required data collection and reporting elements, a summary report will be prepared no later than September 1st each year. The summary reports will be certified in accordance with the Special Provisions in the CGP. The summary report will include the following information:

1. A summary and evaluation of all sampling and analysis results, including original laboratory reports;
2. The analytical method(s), method reporting unit(s), and Method Detection Limits (MDLs) of each analytical parameter (analytical results that are less than the MDL must be reported as "less than the MDL" or "<MDL");
3. A summary of all corrective actions taken during the project;
4. Identification of any compliance activities or corrective actions that were not implemented;
5. A summary of all violations of the CGP;
6. The individual(s) who performed facility inspections, sampling, visual observation (inspections), and/or measurements;
7. The date, place, time of facility inspections, sampling, visual observation (inspections),and/or measurements, including precipitation; and
8. The visual observations and sample collection exception records and reports.

1.8 CHANGES TO PROJECT COVERAGE

The CGP allows a permittee to reduce or increase the total acreage covered under the WDID# when a portion of the project is complete and/or conditions for termination of coverage have been met; when ownership of a portion of the project is sold to a different entity; or when new acreage is added to the project.

Any changes to the permit acreage will be documented by the permittee and include modifications to permit registration documents (PRDs, i.e., Site maps, SWPPP revisions as appropriate, and certifications) in accordance with requirements of the CGP within 30 days of a reduction or increase in total disturbed area. Updates to PRDs will be included as **Attachment C-4** of this SWPPP.

1.9 FINAL STABILIZATION

When all conditions on-site meet those described in Section II.D.1 of the Construction CGP, the owner will consider elements identified in this SWPPP complete.

Site "final stabilization" is defined as the state at which the Site will not pose any additional sediment discharge risk than it did prior to the commencement of Construction activity. These conditions include:

- No potential for construction related storm water related pollutants to be discharged into Site runoff;
- Final stabilization has been achieved;

- Construction materials and wastes have been properly removed;
- Compliance with Post-Construction Standards in Section XIII of the CGP has been demonstrated;
- Post-construction storm water management measures have been installed, and a long term maintenance plan has been established; and
- All construction related equipment, materials, and any temporary BMPs no longer required are removed from the Site.

Stabilization will be demonstrated through the following methods:

- Photographs showing 70% final cover method (no computational proof required); or
- Custom method (discharger demonstrates that Site complies with final stabilization).

2.0 PROJECT INFORMATION

This SWPPP is provided as an appendix to the Revised Remedial Design Implementation Plan (RDIP), which describes processes and procedures to be implemented by the Presidio Trust (Trust) to remediate the area.

2.1 PROJECT AND SITE DESCRIPTION

2.1.1 Site Description

Lendrum Court is located in the northwest corner of the Presidio, north of Doyle Drive, in the North Fort Scott Area (**Figure C-1**). The Site currently consists of parking lots, residential buildings, open space vegetated with native and non-native plants, and a historic forest area.

Army-era debris and incinerator ash are present in subsurface soils in the area of Buildings 1257, 1258, 1259, 1278, 1279, 1280, and 1282, which surround Lendrum Court (EKI, 2015; TRC, 2015b). Polycyclic aromatic hydrocarbons (PAHs), metals, and dioxin/furans, related to former incinerator debris and ash, are the constituents of concern (COCs) considered to drive remediation at the Site (TRC, 2015b). Cleanup levels for COCs at the Site were developed in the Cleanup Level Document (EKI, 2002; with updates through 2013), *Recreational Soil Cleanup Level for Lead* (TRC, 2015a), *Human Health Soil Preliminary Remediation Goals and Toxic Equivalency Values for Dioxins and Furans* (MACTEC, 2007), and TRC's Removal Action Workplan (RAW), dated July 2015 (TRC, 2015b).

2.1.2 Remedial Construction Activities

Remedial construction activities at the Site include excavation and disposal of organic topsoil, re-grading and compaction of contaminated soils, and capping in place. Construction activities, including vegetation removal, excavating, stockpiling, grading, loading and transporting contaminated debris and clean imported soils, have the potential to affect the quality of storm water discharges. After remedial construction is completed at the Site, soil on disturbed and backfilled areas will be stabilized and new soil slopes will be revegetated consistent with the Vegetation Management Plan (VMP, 2001).

2.1.3 Existing Drainage

The residential area of the Site generally slopes to the northeast (with a moderate to steep drop in elevation) in a series of terraces, likely graded as building pads for the residential units and parking lot area. Lendrum Court and parking lots are sloped to the northeast towards storm drain inlets, which connect to a storm drain that discharges into the San Francisco Bay. Rainfall on the historic forest area adjacent to buildings 1259, 1278 and 1279 currently flows northeast down the slope towards Lincoln Boulevard, where active storm drains are present.

Storm drain inlets are located within the staging area (located near the junction of Lendrum Court and Lincoln Boulevard). The storage area located off Armistead Road slopes gently to the northeast, where accumulated rainfall drains either to the storm drain located in the parking lot in front of Buildings 1257 and 1258 or down Armistead Road, into the concrete drainage swale on the north side of Lendrum Court, and, ultimately, to a drainage inlet on the west side of Lincoln Boulevard. Discharges that enter the storm drain system ultimately flow into the San Francisco Bay.

2.1.4 Geology and Groundwater

According to the Geologic Map of the San Francisco Bay Region, (United States Geological Society [USGS], 2006), Lendrum Court is underlain primarily by alluvial fill material, i.e., Quaternary hillslope deposits, and by serpentinite rock. Quaternary slope debris is also shown as the surficial deposit at the Site on Figure 6-1 of the Development of Presidio-Wide Cleanup Levels for Soil, Sediment, Groundwater and Surface Water ("Cleanup Level Document"; EKI, 2002). Based on a cut and fill map prepared by the Trust representing elevation changes from 1871 to 2000, cuts were made in native material at the Lendrum Court area to accommodate construction of roadways and building pads.

At Lendrum Court, four general layers have been identified in the shallow subsurface. These layers are listed below in stratigraphic order from the ground surface; however, not all layers are present in all locations.

Overburden:

- Found at depths between 0.5 and 2.5 feet below ground surface (bgs).
- Consists of yellow-brown silty sand, most likely of the Colma formation.
- Generally does not contain debris, although glass has been found in surface soil, often in the spoils pile by gopher holes (EKI, 2015).

Debris layer:

- Generally first encountered at depths of approximately 0.5 to 2.5 feet bgs below the overburden layer.
- Occasionally visible at the surface.
- Varies in thickness from 3 inches to 5 feet.
- Consists of a brown silty sand.
- Contains abundant glass fragments, melted glass, bottles, ceramics, and terra cotta, as well as lesser quantities of brick, charcoal, wire, metal, small animal bones, and burned wood (EKI, 2015).

Bottom layer:

- Consists of a yellow-brown to brown silty sand with no debris.
- Most likely represents Quaternary hillslope deposits as identified on the USGS map (USGS, 2006).
- Could be in-place hillslope deposits or re-worked material.

Bedrock:

- Consists of a weathered serpentinite with an outcrop southeast of Building 1258 adjacent to Armistead Road.

Groundwater and surface water have not been encountered during investigation activities at the Site.

2.1.5 Annual Precipitation

Over 80 percent of San Francisco's seasonal rain falls between November and March, occurring over about 10 days per month. The occurrence of rainfall during the early spring and fall is infrequent. While most storms during these periods produce light precipitation, the occasional coupling of polar and subtropical air masses can produce heavy rainfall events.

Rainfall from May through September is relatively rare, with an aggregate of less than an inch, or only about five percent of the yearly average total of approximately 21.5 inches. Off-season rains, which do occur, are usually the result of weak early or late season occluded fronts, or surges of subtropical moisture from the south that result in brief showers or thundershowers spreading into the area. Considerable moisture is due to drizzle when the marine layer deepens sufficiently. This is seldom enough to measure (i.e., less than .01 inch) on any given day, except along the immediate coast.

2.1.6 Developed Condition and Construction Site Estimates

Both pre- and post-construction drainage conditions will be approximately the same. Construction Site estimates for the impervious area occurring before and after the construction areas described below:

Construction Site area	2.59 acres
Percentage impervious area before construction	50%
Runoff coefficient before construction	0.70
Percentage impervious area after construction	50%
Runoff coefficient after construction	0.70

2.2 STORM WATER RUN-ON FROM OFF-SITE AREAS

Run-on flow from upslope areas of both staging areas is anticipated. Appropriate BMPs will be installed to address run-on as applicable. Storm water run-on from upslope areas of the project excavation area could occur between buildings 1257 and 1258 and to the west of building 1257. Straw waddle would be placed along the outer edge of the excavation area to divert storm water away from the excavation area and/or prevent erosion of excavated soil by dissipating the velocity of run-on flows.

2.3 FINDINGS OF THE CONSTRUCTION SITE SEDIMENT AND RECEIVING WATER RISK DETERMINATION

The Site Risk Level was evaluated and it was determined that the Site is a **Risk Level 1**. Overall predicted sediment loss is approximately 3.8 tons per acre. The result of the overall calculated Site Risk Level, based on the risk determination worksheet, is "low for level 1." Storm water does not discharge to a 303(d)-listed water body impaired by sediment. Therefore, the receiving water risk is "low for level 1". The Risk Determination Worksheet is included in **Attachment C-2**.

2.4 CONSTRUCTION SCHEDULE

The estimated construction activities are scheduled to be performed from May 2016 to November 2016. A detailed schedule is included in **Attachment C-5**.

2.5 POTENTIAL CONSTRUCTION ACTIVITY AND POLLUTANT SOURCES

Based on the presence and concentrations of COCs in Site soil, the Lendrum Court Remedial Unit consists of soil over an approximate 2.59 acre area to depths of 5 feet that contains COCs at concentrations that pose potential risks to human health and the environment and requires remediation.

Construction activity in all phases of the project has the potential to generate pollutants. BMPs will be implemented to control potential pollutants on-site, as described in Section 3.0. Materials that potentially cause pollutants, pollutant type, and visual cues for pollutant identification are listed in **Attachment C-6**.

2.6 IDENTIFICATION OF NON-STORM WATER DISCHARGES

Non-storm water discharges consist of discharges which do not originate from precipitation events. They can include, but are not limited to discharges of process water, air conditioner condensate, non-contact cooling water, vehicle wash water, sanitary wastes, concrete washout water, pain wash water, irrigation water, or pipe testing water. The CGP provides allowances for specified non-storm water discharges that do not cause erosion or carry other pollutants.

Non-storm water discharges into storm drainage systems or waterways, which are not authorized under the CGP and listed in the SWPPP, or authorized under a separate NPDES permit, are prohibited.

The following is a list of activities that may generate non-storm water discharges at the Site. BMPs for these activities are described in Section 3:

- Vehicle and equipment maintenance
- Material delivery and storage
- Soil stockpiling
- Solid waste generation
- Sanitary / septic waste generation

In addition, on-site soil remediation activities are being performed to excavate soil that contains the following chemicals of potential concern:

Soil Description	Polycyclic Aromatic Hydrocarbons (PAHs)	Metals	Dioxins/Furans
Debris Filled Area	Benzo[a]pyrene Benzo[a]pyrene Equivalents Dibenzo[a,h]anthracene	Arsenic Barium Copper Lead Zinc	TCDD TEQ
Outside Debris Fill Area	None	Lead	TCDD TEQ

2.7 REQUIRED SITE MAP INFORMATION

The Site map (**Figure C-1**) shows the project location, surface water boundaries, geographic features, construction Site perimeter, and preliminary and minimum requirements for temporary BMPs to be installed during construction activities. **Figure C-2** shows direction of storm water flow during construction activities and BMPs to be installed for all construction-related activities, including site stabilization, landscape, and erosion control activities. **Figure C-3** shows the BMPs to be implemented for final stabilization following construction completion. BMPs will be added or removed from the SWPPP Maps, as necessary, throughout the life of the project.

3.0 BEST MANAGEMENT PRACTICES

3.1 SCHEDULE FOR BMP IMPLEMENTATION

The following summarizes the phasing for implementing BMPs during construction at the Site and the BMPs that may be implemented. BMPs will be implemented, modified, and maintained to reflect the phase of construction and the weather conditions. All BMP details are located in **Attachment C-7**.

Phase of Construction	Best Management Practices	BMP Detail Numbers (Attachment C-7)
Pre-Construction	• Install perimeter controls in remedial excavation and staging locations • Locate Spill Kit on-site • Store materials properly • Stockpile BMPs necessary for the duration of the remediation phase of the project	EC-1 EC-8 NS-6 NS-9 NS-10 SE-1 SE-5 SE-7

	• Install Trackout BMPs at staging and storage area entrances • Spread wood mulch from chipped trees across vegetation clearance area • Provide SWPPP training to the appropriate staff • Place portable sanitation facilities a significant distance away from concentrated flow lines and discharge locations • Install BMPs at discharge locations of the project • Install BMPs at the four drain inlets on Lendrum Court and within the staging area off of Lincoln Boulevard	SE-10 TC-1 TC-2 WE-1 WM-1 WM-2 WM-4 WM-5 WM-9
Soil Excavation and Removal From Site	• Implement dust management BMPs • Perform sweeping of the Site's impervious areas • Perform maintenance on installed BMPs • All spills will be immediately cleaned • Solid waste to be routinely picked up and placed in the trash bins • Perform scheduled inspections • Manage soil stockpiles	EC-1 EC-15 NS-6 NS-8 NS-9 NS-10 SE-1 SE-5 SE-7 SE-8 SE-10 TC-1 TC-2 WE-1 WM-1 WM-2 WM-3 WM-4 WM-5 WM-6 WM-7 WM-9

Phase of Construction	Best Management Practices	BMP Detail Numbers (Attachment C-7)
Backfilling and Grading	• Implement dust management BMPs • Perform sweeping of the Site's impervious areas • Perform maintenance on installed BMPs • All spills will be immediately cleaned • Solid waste to be routinely picked up and placed in the trash bins • Perform scheduled inspections • Manage soil stockpiles	EC-1 NS-2 NS-6 NS-8 NS-9 NS-10 SE-1 SE-5 SE-7 SE-10 TC-1 TC-2 WE-1 WM-1 WM-2 WM-3 WM-4 WM-5 WM-6 WM-7 WM-9
Post-Construction Stabilization	• Install erosion control stabilization • Implement dust management BMPs • Perform sweeping of the Site's impervious areas • Perform maintenance on installed BMPs • Perform scheduled inspections • Maintain good housekeeping throughout the Site	EC-6 EC-7 EC-15 NS-1 NS-8 NS-9 SE-1 SE-5 SE-7 SE-10 TC-1 TC-2 WE-1 WM-1 WM-2 WM-5 WM-9

3.2 EROSION AND SEDIMENT CONTROL

Erosion control, also referred to as soil stabilization, consists of source control measures that are designed to prevent soil particles from detaching and becoming transported in storm water runoff. Soil stabilization BMPs protect the soil surface by covering and or binding soil particles. This project will incorporate both temporary and permanent stabilization practices.

Sediment controls trap particles after they have been dislodged and moved by wind or water. Sediment controls are generally passive systems that rely on filtering or settling soil particles out of water or wind that is transporting them. Sediment controls treat soil as a waste product and work to remove it from storm water runoff. Sediment control materials will be retained on-site throughout the duration of the project to allow for implementation of sediment controls in the event of predicted rain, or for rapid response to failure or emergencies.

The following erosion and sediment control BMPs will be incorporated into the project as described in **Figures C-2 and C-3** as conditions dictate.

3.2.1 Erosion Control BMPs

This construction project will implement the following practices to provide effective temporary and final erosion control during construction:

1. Preserve existing vegetation where required and when feasible.
2. The area of soil disturbing operations shall be controlled such that the Contractor is able to implement erosion control BMPs quickly and effectively.
3. Stabilize non-active areas within 14 days of cessation of construction activities or sooner if stipulated by local requirements.
4. Prior to the completion of construction, apply permanent erosion control to remaining disturbed soil areas.
5. All materials that will remain on site shall be all natural, bio-degradable, sterile, and weed-free.

Sufficient erosion control materials shall be maintained on-site to allow implementation in conformance with this SWPPP. Erosions controls are to be all natural materials as defined in the project specifications, where applicable.

Fact Sheets for erosion control BMPs are provided in **Attachment C-7**. If there is a conflict between documents, the Site map will prevail over narrative in the body of the SWPPP or guidance in the BMP Fact Sheets. Site-specific details in the Site map prevail over standard details included in the Fact Sheets. The narrative in the body of the SWPPP prevails over guidance in the BMP Fact Sheets.

Scheduling (EC-1): The schedule for this project is from May 2016 through November 2016.

Straw Mulch (EC-6): Dispersing temporary coverage with straw mulch and tackifier can stabilize open disturbed areas awaiting permanent vegetation or development. Straw mulch is anticipated to be utilized without tackifier; if the contractor determines that tackifier is necessary then the Trust will be notified.

Wood Mulch (EC-8): Following removal of vegetation in the Vegetation Clearance Area, removed trees will be chipped, then spread as mulch to provide erosion control for the slopes in the historic forest area prior to the start of construction.

Temporary Stabilization: Dispersing temporary mulch and erosion control mats can stabilize open disturbed areas awaiting permanent vegetation or development. If the undeveloped portions of the Site are not landscaped immediately, portions of the Site may need to be temporarily stabilized due to topographic characteristics. Applying straw mulch at a rate of at least 2,000 pounds per acre is to be used as a temporary type of stabilization if needed. On the proposed 2H:1V and 1 ½ H:1 V slopes, temporary stabilization measures will consist of straw, high-density erosion control blanket with a dense staking pattern overlain by straw wattles at the top, middle, and tow of slope, as indicated of **Figure C-3**.

Permanent Stabilization: Once an area of the project is complete, permanent vegetation should be installed per the VMP. This could include landscaping using native plants including grasses, shrubs, brush, and ground cover.

Soil Preparation/Roughening (EC-15): This BMP can be used to minimize the flow of water at the Site to promote infiltration of barren soil.

3.2.2 Sediment Control

Sediment controls are temporary or permanent structural measures that are intended to complement the selected erosion control measures and reduce sediment discharges from active construction areas. Sediment controls are designed to intercept and settle out soil particles that have been detached and transported by the force of water. Sediment controls are to be all natural materials as defined in the project specifications.

The following sediment controls shall be implemented:

Silt Fence (SE-1): A silt fence is composed of a woven material and installed for the purpose of temporarily retaining water and trapping sediment. Silt fence may be used during excavation activities.

Fiber Rolls (SE-5): Fiber rolls, or equivalent approved by the Engineer (e.g., straw waddle), are composed of biodegradable natural fibers stuffed into biodegradable open-weave netting and are designed to reduce sediment runoff. Fiber rolls are porous and allow water to filter through the fibers to trap sediment, thereby slowing runoff and reducing sheet and rill erosion. The fiber rolls will be manufactured of only natural fibers and be placed as necessary, to reduce runoff potential down slope of the staging area and at the base of soil stockpiles.

Gravel Bag Berm (SE-6): Gravel bag berms may be used as a sediment control device for the soil stockpiles or to divert storm water at the Site.

Street Sweeping (SE-7): Sweeping will occur on a daily basis and within 48 hours of a predicted rain event at the ingress and egress of vehicular areas, as needed. In addition, if soil is tracked anywhere else on the property or on City streets, a sweeper will be used in those locations.

Sandbag Barrier (SE-8): Sandbag barrier berms may be used as a sediment control device for the soil stockpiles or to divert storm water at the Site. As a temporary basis to hold small volumes of storm water, sandbags with visqueen positioned together can also be used to construct a temporary holding pond at the Site to collect storm water.

Storm Drain Inlet Protection (SE-10): Storm drain inlet protection will be applied to storm drains receiving runoff from the construction Site area on Merchant Road.

Stabilized Construction Entrance (TC-1): Installation of a shaker plate, located at points where vehicles leave a construction Site, provides a buffer area where vehicles can drop their mud and sediment to avoid transporting it onto public roads, to control erosion from surface runoff, and to help control dust. A shaker plate will be located near the exit of the Site.

Stabilized Construction Roadway (TC-2): Existing pavement will remain in the staging area during the project. Vehicles traveling through the staging area can drive on the existing pavement and drop sediment from tires before driving over the Stabilized Construction Entrance.

Wind Erosion Control (WE-1): Dust is easily transported off-site during the dry season, and with its close proximity to the San Francisco Bay, this project has a high potential for wind erosion. Water trucks and fire hoses will be used, as necessary, to prevent visible dust emissions from stockpiles, roadways, and soil disturbing activities (demolition activities, excavating, and backfilling).

Additional information for the BMPs described above is available in fact sheets from the California Stormwater Quality Association's (CASQA's) Construction Handbook 2003 and are included in **Attachment C-7** of the SWPPP.

3.3 NON-STORM WATER CONTROLS AND WASTE AND MATERIALS MANAGEMENT

3.3.1 Non-Storm Water Controls

Non-storm water discharges into storm drainage systems or waterways, which are not authorized under the CGP, are prohibited. Non-storm water discharges for which a separate NPDES permit is required by the local Regional Water Board are prohibited. The selection of non-storm water BMPs is based on the list of construction activities with a potential for non-storm water discharges identified in Section 2.7 of this SWPPP.

Non-storm water BMPs shall be implemented in conformance with the following guidelines and in accordance with the BMP Fact Sheets provided in **Attachment C-7**.

Water Conservation Practices (NS-1): Conserve water usage at the Site and when it will be applied in an area where the water will not discharge off-site.

Illicit Connection- Illegal Discharge Connection (NS-6): The Site will be locked when not attended and the construction Site will be inspected for illicit dumping or discharges prior to and during construction activities.

Vehicle and Equipment Cleaning (NS-8): Onsite cleaning of vehicles is prohibited except to the extent necessary for decontamination (biological and/or chemical) and safety purposes. Equipment brought to the site will be free of all soil and deleterious material, if equipment arrives in other than a clean condition it shall be rejected and not allowed on the site. Any water used during cleaning of vehicles and equipment will be contained and properly disposed per BMP Fact Sheet NS-8.

Vehicle and Equipment Fueling (NS-9): Equipment that must be refueled on-site will be done so by portable tanks away from storm water conveyances (i.e. storm drains, sidewalks, etc.). Spill response materials will be on hand in order to clean up any incidental fuel spills, if they were to occur.

Vehicle and Equipment Maintenance (NS-10): Major maintenance is to be performed off-site. Minor maintenance of vehicles may occur on-site. To prevent drips, leaks, or spills of any fluids, drip pans will be used if necessary to catch any discovered leaks until repairs can be made. Exposed soil shall be covered under the maintenance area of the vehicle to eliminate any contact with the soil. All used maintenance materials are to be properly removed from the Site as quickly as possible.

3.3.1.1 Decontamination of Construction Equipment

All vehicles, equipment, and personnel will be decontaminated prior to exiting established exclusion zones. Contaminants such as accumulated soil, dust, and other contamination from equipment will be removed at the decontamination station(s). Onsite management and off-site disposal of decontamination wastes, such as wash water and contaminated protective equipment used by onsite personnel, will be described in the Contractor HASP. A Decontamination Plan will be prepared by the Contractor for the proposed soil removal activities as part of submittals and will describe specific procedures to be used during soil removal activities to reduce the potential for contaminants to be transported off-site. Rumble strips or a tire washing facility would be established to ensure that vehicles leaving the site and staging areas do not carry soil onto public roads. In addition, all equipment and tools used at the site will be cleaned of all soil, plant parts, and other potentially harmful materials prior to being brought onto the site.

3.3.2 Materials and Waste Management

Materials management control practices consist of implementing procedural and structural BMPs for handling, storing, and using construction materials to prevent the release of those materials into storm water discharges. The amount and type of construction materials to be utilized at the Site will depend upon the type of construction and the length of the construction period. The materials may be used continuously, such as fuel for vehicles and equipment, or the materials may be used for a discrete period, such as soil binders for temporary stabilization.

Waste management consists of implementing procedural and structural BMPs for handling, storing, and ensuring proper disposal of wastes to prevent the release of those wastes into storm water discharges.

Materials and waste management pollution control BMPs shall be implemented to minimize storm water contact with construction materials, wastes, and service areas and to prevent materials and wastes from being discharged off-site. The primary mechanisms for storm water contacting potential pollutants include:

- Direct contact with precipitation
- Contact with storm water run-on and runoff
- Wind dispersion of loose materials
- Direct discharge to the storm drain system through spills or dumping
- Extended contact with some materials and wastes, such as asphalt cold mix and treated wood products, which can leach pollutants into storm water.

Material Delivery and Storage (WM-1): BMPs will be installed to prevent storm water from contacting the stored material on-site. All materials are to be stored in designated locations.

Material Use (WM-2): Any materials used on-site will be used appropriately so as not to cause potential impacts to storm water runoff.

Stockpile Management (WM-3): Contaminated soil is anticipated to be present on-site during excavation. A sediment control measure or berm to prevent soil from eroding will be installed at the perimeter of the stockpile. Additionally, non-contaminated soil stockpiles will be managed by covering with visqueen, as appropriate, to reduce contact with storm water.

Spill Prevention and Control (WM-4): BMPs are to be implemented to reduce and eliminate potential spills throughout the project. Materials, liquids, and equipment will be stored and handled away from storm drains and storm water conveyances. At least one prominently marked spill kit will be stored at the Site in order to clean up any spills as soon as possible. Spills will be properly addressed and remediated as soon as possible. All appropriate agencies are to be notified if the quantity of materials spilled exceeds the allowable limit.

Solid Waste Management (WM-5): Trash bins and waste receptacles will be on-site. All trash containers must contain lids and remain closed at the end of each day and during rain events.

Hazardous Waste Management (WM-6): Prevent or reduce the discharge of pollutants to storm water from hazardous waste through proper material use, waste disposal, and training of employees.

Contaminated Soil Management (WM-7): Contaminated soil will be excavated, transported, and stored in the designated areas with BMPs, including sweeping and stockpile management, implemented to protect storm water discharges from contacting contaminated soil.

Sanitary / Septic Waste Management (WM-9): Portable toilets will be on-site. They are to be placed away from discharge locations and areas of concentrated flow during rain events. Regularly scheduled cleanouts of the toilets will reduce the potential for pollutants flowing off-site.

3.3.3 Contaminated Soil Management

A RAW and RDIP were prepared for the remediation phase to describe how remediation activities will take place on-site. Appropriate BMPs will be implemented based on the specific remediation details in these documents.

As presented in the RDIP, specific areas are identified as requiring remediation of specific COCs. The areas containing these COCs in soil will be excavated and the soil either placed in the stockpile area or loaded directly onto trucks for off-site removal. If necessary, excavated soils will be placed on top of visqueen and covered with visqueen to contain exposure to storm water, and until transported off-site. Berms and sediment barriers may be installed on the down slope side of the stockpile areas to retain sediment.

Excavation will be completed in cells (50 feet by 50 feet) or in groups of cells and will generally begin at the ends of the excavation area working towards the center access road to reduce tracking contaminated soil over the previously cleared areas. Up to 5 feet of soil will be removed as the excavation proceeds. Water generated from significant rainfall events may accumulate in excavated areas throughout the site. Ponded runoff will evapotranspirate or will infiltrate into existing soils. Any additional accumulation may have to be treated prior to disposal.

3.4 POST-CONSTRUCTION STORM WATER MANAGEMENT

The CGP requires post-construction runoff reduction. Post-construction BMPs consist of permanent features designed to minimize pollutant discharges, including sediment, from the Site after construction has been completed. These BMPs will be implemented by the contractor. Potential post-construction BMPs may include the following:

- Minimization of land disturbance;
- Minimization of impervious surfaces;
- Treatment of storm water runoff using infiltration, detention/retention, biofilter BMPs; and
- Appropriately designed and constructed energy dissipation devices.

Following excavation and site grading, erosion control blankets underlain by straw mulch will be installed in conjunction with fiber rolls as shown in **Attachment C-13**.

Seedlings will be planted across the disturbed areas, after the completion of earthmoving operations in accordance with the VMP.

Post-construction BMPs:

Post-construction BMP	Responsible Party

4.0 BMP INSPECTION AND MAINTENANCE

The project includes a program to inspect and maintain all BMPs as identified in the SWPPP throughout the duration of the project based on the risk level requirements of the CGP. Inspections of the construction Site will be performed:

- Prior to an anticipated storm events to ensure that BMPs are properly installed and maintained;
- Every 24 hours during extended storm events to evaluate BMPs for adequacy, proper implementation and whether additional BMPs are required; and
- After storm events to identify areas contributing to a discharge of storm water associated with construction activity and to assure that the BMPs have functioned adequately.

Note: An inspection is triggered by a 50% chance of rain per the National Oceanographic and Atmospheric Administration (http://www.weather.gov/).

Routine inspections will be conducted weekly for the duration of the project. Inspections will be performed by the Qualified SWPPP Practitioner (QSP). For each inspection required above, the QSP will complete an inspection report. Blank inspection reports are located in **Attachment C-8**.

Corrective maintenance to BMPs will begin within 72 hours after being identified in the inspection report and completed within seven days of identifying the item, prior to the next rain event and as soon as feasible if conditions warrant. The QSP is to initial and date each item when complete as indicated in the inspection report. All completed inspection reports are to be retained in the SWPPP under **Attachment C-8**.

Non-storm water discharges will be monitored during weekly inspections. Therefore, the requirement for performing a quarterly non-storm water inspection will be met.

4.1 RAIN EVENT ACTION PLANS

This project is categorized as a **Risk Level 1**. Therefore, a Rain Event Action Plan is not required for the Site at this time.

5.0 TRAINING

An employee awareness-training program will be implemented to inform Site personnel at all levels of responsibility of the components and goals of this SWPPP. The purpose of the training program is to ensure that the necessary information is disseminated to all parties responsible for implementing the SWPPP. Section VII of the CGP requires that all elements of the SWPPP be developed by a QSD and implemented by a QSP. The training qualifications of the QSD and QSP will be provided in **Attachment C-9.** The QSP may delegate tasks to trained employees provided adequate supervision and oversight is provided. All training qualifications and activities will be retained in **Attachment C-9** and be submitted in the Annual Report.

Personnel at the Site shall receive training appropriate for individual roles and responsibilities on the project. Training will:

- Address how to implement each component of the SWPPP, including how and why tasks are to be implemented;
- Include inspections, spill prevention and response, good housekeeping, material management practices, implementation of BMPs, and record keeping procedures;
- Be both formal and informal, occur on an ongoing basis when it is appropriate and convenient, and will include training/workshops offered by the SWRCB, RWQCB, or other locally recognized agencies or professional organizations; and
- Be documented by having attendees sign an attendance sheet.

Attachment C-11 identifies personnel responsible for implementing specific items in the SWPPP for the project. Identified personnel shall be responsible for providing training information and subsequently completing the training logs shown in **Attachment C-9**, which identifies the site-specific storm water topics covered as well as the names of Site personnel who attended the meeting.

6.0 RESPONSIBLE PARTIES AND OPERATORS

6.1 RESPONSIBLE PARTIES

The authorized representatives assigned to this project are identified in **Attachment C-10**, including project Site personnel who will be responsible for SWPPP activities (QSD and QSP). This list includes the names of the individuals granted authority to sign permit-related documents.

Copies of the written authorizations for duly authorized representatives are included in **Attachment C-10**. A table is also included that includes the names, contact information for the individual and their role on the project. Date of training and date of recorded entry as well as a copy of training certificates or other verification of training as applicable are included in **Attachment C-9**.

The QSP shall have primary responsibility and significant authority for the implementation, maintenance and inspection/monitoring of SWPPP requirements. The QSP will be available at all times throughout the duration of the project. Responsibilities of the QSP include:

- Implementing all elements of the SWPPP, including but not limited to:
  - Ensuring all BMPs are implemented, inspected, and properly maintained;
  - Performing non-storm water and storm water visual observations and inspections;
  - Performing non-storm water and storm sampling and analysis, if required;
  - Performing routine visual inspections and observations; and
  - Implementing non-storm water management, and materials and waste management activities such as: monitoring discharges; general Site clean-up; vehicle and equipment cleaning, fueling and maintenance; spill control; ensuring that no materials other than storm water are discharged in quantities which will have an adverse effect on receiving waters or storm drain systems.
- The QSP may delegate these inspections and activities to an appropriately trained employee, but shall ensure adequacy and adequate deployment.
- Ensuring elimination of unauthorized discharges.
- Coordinate with the Contractor(s) to assure all of the necessary corrections/repairs are made immediately and that the project complies with the SWPPP and approved plans at all times.
- Notifying the LRP immediately of off-site discharges or other non-compliance events.

6.2 CONTRACTOR LIST

The CGP requires that the SWPPP include a list of names of all contractors, subcontractors, and individuals who will be directed by the QSP. The list is included as **Attachment C-11** of this SWPPP. The list includes telephone numbers and work addresses and the specific areas of responsibility of each subcontractor and emergency contact numbers. The prime contractor contact information is listed below:

Prime Contractor Contact

Name:_____

Title: _____

Company: _____

Address: _____

Phone Number: _____

Cell Phone Number: _____

7.0 CONSTRUCTION SITE MONITORING PROGRAM

7.1 PURPOSE

The CGP requires that a written site-specific CSMP be developed by each discharger prior to the commencement of construction activities, and be revised as necessary to reflect project revisions and that the CSMP be included with the SWPPP. This CSMP has been developed to meet the specific requirements and objectives identified for a **Risk Level 1** Site.

The objectives of the CSMP are as follows:

- Ensure that storm water discharges are in compliance with the Discharge Prohibitions, Effluent Limitations, and Receiving Water Limitations specified in the CGP;
- To aid in the implementation, evaluation, and revision of BMPs identified in the SWPPP;
- To identify the presence of non-storm water discharges;
- To ensure that practices at the facility to control pollutants in storm water discharges are evaluated and revised to meet changing Site conditions; and
- To measure the effectiveness of BMPs in removing pollutants from storm water discharges.

7.2 APPLICABILITY OF PERMIT REQUIREMENTS

This project has been determined to be a **Risk Level 1** project. The CGP identifies the following types of monitoring as being applicable for a **Risk Level 1** project.

- Visual inspections of BMPs;
- Visual monitoring of the Site related to qualifying storm events;
- Visual monitoring of the Site for non-storm water discharges;
- Sampling and analysis of construction Site runoff for non-visible pollutants when applicable; and

- Sampling and analysis of construction Site runoff as required by the Regional Water Board when applicable.

7.3 WEATHER AND RAIN EVENT TRACKING

Visual monitoring and inspections requirements for **Risk Level 1** are triggered by a qualifying rain event. A qualifying rain event is any event that produces ½ inch of precipitation. A minimum of 48 hours of dry weather will be used to distinguish between separate qualifying storm events.

7.3.1 Weather Tracking

The Site Superintendent should consult the National Oceanographic and Atmospheric Administration (NOAA) for the weather forecasts each day. These forecasts can be obtained at http://www.srh.noaa.gov/. Weather reports should be printed and retained in **Attachment C-12**.

The quantitative precipitation forecast that provides predictions for amount of rainfall in 6-hour intervals during the next three days for San Francisco is available at:

http://www.wrh.noaa.gov/forecast/wxtables/index.php?lat=37.7749295&lon=-122.4194155&clrindex=0&table=custom&duration=7&interval=6

7.3.2 Rain Gauges

A rain gauge will be installed at the project Site. The gauge will be installed in an open area away from obstructions, such as trees or overhangs. The gauge will be included on the weather station used for dust monitoring. Amounts of storm water accumulated in the rain gauge will be recorded daily and will be read at approximately the same time every day. Rain gauge readings will be retained on the BMP inspection reports. Once accumulated storm water in the rain gauge has been recorded, accumulated rain will be removed from the gauge, and the gauge returned to use.

7.4 MONITORING LOCATIONS

The entire Site will be monitored during construction activities for non-storm water discharges and authorized storm water discharges and BMP effectiveness.

7.5 SAFETY AND MONITORING EXEMPTIONS

Safety practices for sample collection will be in accordance with a health and safety plan prepared by the QSD and/or a health and safety plan prepared by the contractor and approved by the QSD. A summary of the safety requirements that apply to sampling personnel is provided below.

This project is not required to collect samples or conduct visual observations (inspections) under the following conditions:

- During dangerous weather conditions such as flooding and electrical storms.
- Outside of scheduled Site business hours, where construction activities would be performed during daylight hours [7 AM to 8 PM] on Monday through Friday, unless otherwise approved by the Trust.

If monitoring (visual monitoring or sample collection) of the Site is unsafe due to dangerous conditions noted above, the conditions for why an exception to performing the monitoring was necessary shall be documented and retained in **Attachment C-8**.

7.6 VISUAL MONITORING

This project is categorized as a **Risk Level 1**. Therefore, a visual inspection of storm water discharges at discharge locations must be performed within two business days (48 hours) after each qualifying rain event to (1) identify whether BMPs were adequately designed, implemented, and effective, and (2) identify additional BMPs and revise the SWPPP accordingly. The observers will conduct visual inspections during business hours and record the time, date, and rain gauge reading of all qualifying rain events. Within two business days (48 hours) prior to each qualifying rain event, the observers will visually inspect for the following:

- All storm water drainage areas to identify any spills, leaks, or uncontrolled pollutant sources. If needed, the discharger will implement appropriate corrective actions.
- All BMPs to identify whether they have been properly implemented in accordance with the SWPPP. If needed, the discharger shall implement appropriate corrective actions.
- Any storm water storage and containment areas to detect leaks and ensure maintenance of adequate freeboard.

For the visual observations (inspections) described above, the observers will inspect for the presence or absence of floating and suspended materials, a sheen on the surface, discolorations, turbidity, odors, and source(s) of any observed pollutants.

On-site records of all visual observations (inspections), personnel performing the observations, observation dates, weather conditions, locations observed, and corrective actions taken in response to the observations. These documents will be maintained in **Attachment C-8**.

Visual Monitoring and Inspections Schedule

Type of Inspection	**Frequency**
Routine Inspections	
• BMP Inspections (written inspection report)	Weekly
• BMP Inspections – Tracking Control	Daily
• BMP Inspections – Wind Erosion	Daily
Non-Storm Water Discharge Observations	Quarterly during daylight hours
Rain Event Triggered Inspections	
• Site Inspections Prior to a Qualifying Event	Within 48 hours of a qualifying event [1]
• BMP Inspections During an Extended Storm Event	Every 24-hour period of a rain event
• Site Inspections Following a Qualifying Event	Within 48 hours of a qualifying event[1]

Note:

1. A new qualifying rain event is identified when no precipitation is observed in a 48-hour period.

7.6.1 Routine BMP Inspections

Inspections of BMPs are conducted to identify and record the following:

- BMPs are properly installed;
- BMPs that need maintenance to operate effectively;
- BMPs that have failed; and
- BMPs that could fail to operate as intended.

7.6.2 Non-Storm Water Discharge Observations

Each drainage area will be inspected for the presence of or indications of prior unauthorized and authorized non-storm water discharges. Inspections will record:

- Presence or evidence of any non-storm water discharge (authorized or unauthorized);
- Pollutant characteristics (floating and suspended material, sheen, discoloration, turbidity, odor, etc.); and
- Source of discharge.

7.6.3 Rain-Event Triggered Observations and Inspections

Visual observations of the Site and inspections of BMPs are required prior to a qualifying rain event, following a qualifying rain event, and every 24-hour period during a qualifying rain event. Pre-rain inspections will be conducted after consulting NOAA and determining that a precipitation event with a 50 percent or greater probability of precipitation has been predicted.

7.6.4 Visual Monitoring Personnel

Visual monitoring shall be conducted by the Owner or their designee.

The name(s) and contact number(s) of the Site visual monitoring personnel are listed below. Personnel training qualifications are provided in **Attachment C-9**.

Assigned inspector: _____ Contact phone: _____

Assigned inspector: _____ Contact phone: _____

7.6.5 Visual Monitoring Follow-Up and Reporting

Correction of deficiencies identified by the observations or inspections, including required repairs or maintenance of BMPs, shall be initiated and completed as soon as possible. If identified deficiencies require design changes, including additional BMPs, the implementation of changes will be initiated within 72 hours of identification and be completed as soon as possible. When design changes to BMPs are required, the SWPPP shall be amended to reflect the changes.

Deficiencies identified in Site inspection reports and correction of deficiencies will be recorded on the Inspection Report and shall be retained in the SWPPP **Attachment C-8**.

7.7 WATER QUALITY SAMPLING AND ANALYSIS

7.7.1 Sampling and Analysis Plan for Non-Visible Pollutants in Storm Water Runoff

This Sampling and Analysis Plan for Non-Visible Pollutants describes the sampling and analysis strategy and schedule for monitoring non-visible pollutants in storm water runoff discharges from the project Site.

This SWPPP was designed to meet the requirements of **Risk Level 1**. However, sampling may need to be performed if visual monitoring indicates that there has been a breach, malfunction, leakage, or spill from a BMP which could result in the discharge of storm water pollutants that will not be visually detectable, or if storm water comes into contact with soil amendments or other exposed materials or contaminants and is allowed to be discharged. The sampling and analysis parameters and procedures are designed to determine whether the BMPs installed and maintained prevent discharges of sediment from contributing to impairment in receiving waters. If sampling and analysis is required per these situations, the following procedures will apply to sampling and analysis:

- Monitor for the applicable parameter;
- Samples will be collected during the first two hours of discharge from rain events;
- Samples will be collected during daylight hours (sunrise to sunset);
- All samples will be taken at discharge locations;
- Field samples will be collected and analyzed according to the specifications of the manufacturer of the sampling devices employed; and
- Portable meters will be calibrated according to manufacturer's specification.

7.7.1.1 Sampling Schedule

The following Table summarizes Risk Level 1 Monitoring Requirements.

Risk Level 1 Sampling Schedule

Type of Monitoring		When
Sampling & Analysis	Non-visible pollutant: Spill or BMP failure based on pollutant source assessment	Within first two hours of discharge from Site. Collect samples of runoff affected by the spilled or released material(s) and runoff that is unaffected by the spilled or released material(s)
Sampling & Analysis	Other	RWQCB or Total Maximum Daily Loads may require other monitoring.

If necessary, samples for the applicable non-visible pollutant(s), and a sufficiently large uncontaminated background samples, will be collected during the first two hours of discharge from rain events that result in a sufficient discharge for sample collection. Samples will be collected during daylight hours (sunrise to

sunset) and will be collected regardless of the time of year, status of the construction Site, or day of the week.

Sampling and analysis is required when non-visible pollutants have the potential to contact storm water and runoff the construction Site into a drainage system or water body at levels that may cause or contribute to exceedance of water quality standards. Collection of discharge samples for non-visible pollutant monitoring will be triggered when any of the following conditions are observed during the required inspections conducted before or during rain events:

- Materials or wastes containing potential non-visible pollutants are stored under covered conditions, but (1) a breach, malfunction, leakage, or spill is observed, (2) the leak or spill is not cleaned up prior to the rain event, and (3) there is the potential for discharge of non-visible pollutants to surface waters or a storm sewer system.
- An operational activity with the potential to contribute non-visible pollutants (1) was occurring during or within 24 hours prior to the rain event, (2) applicable BMPs were observed to be breached, malfunctioning, or improperly implemented, and (3) there is the potential for discharge of non-visible pollutants to surface waters or a storm sewer system.
- Soil amendments that have the potential to change the chemical properties, engineering properties, or erosion resistance of the soil have been applied, and there is the potential for discharge of non-visible pollutants to surface waters or a storm sewer system.
- Storm water runoff from an area contaminated by historical usage of the Site has the potential to combine with storm water runoff from the Site, and there exists the potential for discharge of non-visible pollutants to surface waters or a storm sewer system.

The samples must be collected as described below and in accordance with the applicable sections of the American Public Health Associations "Standard Methods for the Examination of Water and Wastewater." Only trained personnel are tasked with sampling responsibilities. Performed by trained staff, manual sampling is the primary method for collecting samples at this facility.

7.7.1.2 Sampling Locations

Sampling locations are based on proximity to identified discharge or run-on location(s), accessibility for sampling, personnel safety, and other factors in accordance with applicable requirements. Sampling locations for non-visible pollutants will be determined in the field, if a breach of BMPs or spills or there is the potential for discharge of non-visible pollutants to surface waters or drainage system have occurred. Samples should be obtained upgradient of the discharge and down gradient of the discharge.

- An upgradient control sample can be analyzed for the prevailing condition of the receiving water without any influence from the construction Site. The control sample will be used to determine the background levels.
- A down gradient sample location should be obtained where direct discharge leaves the property of the project.

7.7.1.3 Monitoring Preparation

Non-visible pollutant samples will be collected by:

Contractor: Yes ☒ No ☐

Owner/LRP: Yes ☒ No ☐

Consultant: Yes ☒ No ☐

Laboratory: Yes ☐ No ☒

An adequate stock of monitoring supplies and equipment for monitoring non-visible pollutants will be available on the project Site prior to a sampling event. Monitoring supplies and equipment will be stored in a cool temperature environment that will not come into contact with rain or direct sunlight. Sampling personnel will be available to collect samples in accordance with the sampling schedule. Supplies maintained at the project Site will include clean powder-free nitrile gloves, sample collection equipment, coolers, appropriate number and volume of sample bottles, identification labels, re-sealable storage bags, paper towels, personal rain gear, ice, Sampling Field Log Sheet, and Chain of Custody forms.

7.7.1.4 Analytical Constituents

In the event that potentially contaminated soil is excavated from the Site and is exposed to storm water, the storm water runoff from that area may be analyzed for the following constituents:

- PAH using EPA Method 8270SIM
- Dioxins/Furans using EPA Method 8290A
- Metals using EPA method 6010B

If storm water contacts the exposed contaminated soil and is anticipated to discharge off-site, runoff shall be collected and retained in temporary storage tanks.

7.7.1.5 Sample Collection

Samples of discharge may be collected at the designated non-visible pollutant sampling locations in the locations determined by observed breaches, malfunctions, leakages, spills, and operational areas that triggered the sampling event.

Grab samples shall be collected and preserved in accordance with the appropriate means and methods. The Site Superintendent, or personnel trained in water quality sampling under the direction of the Site Superintendent shall collect samples.

7.7.1.6 Designated Laboratory

Samples shall be analyzed using the analytical methods identified in Section 7.7.1.4.

Laboratory Name: Test America

Street Address: 1220 Quarry Lane

City, State Zip: Pleasanton, CA

Telephone Number: 925-484-1919

Point of Contact: Dimple Sharma

ELAP Certification Number: 2496

Samples will be delivered to the laboratory by:

Driven by Contractor: Yes ☐ No ☒

Picked up by Laboratory Courier: Yes ☒ No ☐

Shipped: Yes ☐ No ☒

7.7.1.7 Data Evaluation and Reporting

An evaluation of the water quality sample analytical results will be performed upon receiving analytical results from the laboratory. As determined by the Site conditions and sample result evaluation, appropriate BMPs shall be repaired or modified to mitigate discharges of potential pollutants. Revisions of BMPs shall be recorded as an amendment to the SWPPP.

The CGP prohibits the storm water discharges that contain hazardous substances equal to or in excess of reportable quantities established in 40 C.F.R. §§ 117.3 and 302.4. The results of any non-storm water discharge results that indicate the presence of a hazardous substance in excess of established reportable quantities shall be immediately reported to the Regional Water Board and other agencies as required by 40 C.F.R. §§ 117.3 and 302.4.

Results of non-visible pollutant monitoring shall be reported in the Annual Report.

7.7.2 Sampling and Analysis Plan for pH and Turbidity in Storm Water Runoff Discharges

Sampling and analysis of runoff for pH and turbidity is not required for **Risk Level 1** projects.

7.7.3 Additional Monitoring Following a Numeric Effluent Limit (NEL) Exceedance

This project is not subject to NELs.

7.7.4 Sampling and Analysis Plan for Non-Storm Water Discharges

This project is not subject to the non-storm water sampling and analysis requirements unless triggered by actions listed in Section 7.7.1.1.

7.7.5 Sampling and Analysis Plan for Other Pollutants Required by the Regional Water Board

This project is not subject to sampling and analysis plan for other pollutants required by the Regional Water Board.

7.7.6 Training of Sampling Personnel

Sampling personnel shall be trained to collect, maintain, and ship samples. Training records of designated contractor sampling personnel are provided in **Attachment C-9**.

The following storm water sampling personnel have received the following storm water sampling training and are qualified to obtain samples at the Site:

Name	Training
_____	_____
_____	_____
_____	_____

7.7.7 Sample Collection and Handling

7.7.7.1 Sample Collection

Preparation

A storm water sampling kit for each outfall to be sampled will be provided. Each kit should be opened upon receipt and checked for the following:

- Labeled glass and plastic bottles (some may contain a small amount of liquid preserve):
  - Amber glass bottle – one for each discharge location to be sampled
  - Large plastic bottle - one for each discharge location to be sampled
- One unlabeled, wide mouth glass collection bottle
- Synthetic Ice "blue ice"
- Chain of Custody Records
- pH paper

All sampling equipment, supplies, and bottles should be readily available and organized. Sampling equipment and bottles should be stored in an area where physical (dust, water) and chemical (solvent vapor) contamination will not occur.

Sampling Procedure

- Grab samples must be collected within the two hours of discharge from the storm during daylight hours. Sample collection is only required of storm water discharges that occur during scheduled operating hours that are preceded by at least three working days without storm water discharge.
- Take all needed sampling equipment and supplies to the sample location. Wear clean, waterproof, chemical resistant gloves and safety glasses when sampling to avoid contact with pollutants that may be present in storm water.
- Station yourself with the wind to your back to avoid contacting storm water while filling sample bottles.

- Prior to collecting a sample, the collecting bottle should be rinsed with two or three volumes of storm water from the flow of the outfall being sampled (do not rinse containers that have been pre-dosed with acid as a preservative).
- The grab sample should be collected from the approximate middle of the flow's width and depth if practical. Insert the collecting bottle into the flow with the bottle opening facing upstream. Avoid collecting large floating debris and do not touch the inside of the bottle.
- Fill sample bottles to the top or level indicated on the bottle.
- Complete the sample label on the bottle and place in the cooler with ice. Samples should be placed in the cooler as quickly as possible after being collected.
- While still in the field, fill the unlabeled glass sample collection bottle in accordance with the instructions provided. Record the results on the Chain of Custody Record where indicated.
- Complete the Chain of Custody Record provided with the sample kit. The Chain of Custody Record is a legal document used to track the sample for collection through analysis. If the validity of the analytical results is suspect, the information on the Chain of Custody Record can assist in explaining any unexpected or abnormal results. Verify the information is accurate and consistent on the sample label and the Chain of Custody Record. You must sign the Chain of Custody Record. Also, obtain the signature of the person to whom you are giving the sample. Make a copy of the Chain of Custody Record and file it in the on-site SWPPP. Send the original to with the sample to the analytical laboratory. The laboratory will return the original to your facility after receiving the samples and completing their portion of the Chain of Custody Record.

After completion of the sampling, the analytical laboratory will be contacted to coordinate sample pick up and deliver to the laboratory. Samples should not be left in a cooler for extended periods of time because the temperature of the cooler may rise. The results of the analysis samples that were not properly cooled may not be considered valid.

To maintain sample integrity and prevent cross-contamination, sample collection personnel shall follow the protocols below.

- Collect samples (for laboratory analysis) only in analytical laboratory-provided sample containers;
- Wear clean, powder-free nitrile gloves when collecting samples;
- Change gloves whenever something not known to be clean has been touched;
- Change gloves between sampling locations;
- Decontaminate all equipment (e.g. bucket, tubing) prior to sample collection using a trisodium phosphate water wash, distilled water rinse, and final rinse with distilled water. (Dispose of wash and rinse water appropriately, i.e., do not discharge to storm drain or receiving water). Do not decontaminate laboratory provided sample containers;
- Do not smoke during sampling events;
- Do not park vehicles in the immediate sample collection area with the engine running;
- Do not eat or drink during sample collection; and
- Do not breathe, sneeze, or cough in the direction of an open sample container.

Note, that depending upon the specific analytical test, some containers may contain preservatives. These containers should never be dipped into the stream, but filled indirectly from the collection container.

Laboratory Name: _____

Street Address: _____

City, State Zip: _____

Telephone Number: _____

Point of Contact: _____

7.7.7.2 Sample Documentation Procedures

All original sample bottle identification labels, Sampling Field Log Sheet, and Chain of Custody forms shall be recorded using waterproof ink. If an error is made in recording on a document, the individual shall make corrections by lining through the error and entering the correct information. All corrections shall be initialed and dated.

Duplicate samples shall be identified consistent with the numbering system for other samples to prevent the laboratory from identifying duplicate samples. Duplicate samples shall be identified in the Sampling Field Log Sheet.

Sample documentation procedures include the following:

Sample Bottle Identification Labels: Sampling personnel shall attach an identification label to each sample bottle. Sample identification shall uniquely identify each sample location.

Field Log Sheets: Sampling personnel shall complete the Sampling Field Log Sheet and Receiving Water Sampling Field Log Sheet for each sampling event, as appropriate.

Chain of Custody: Sampling personnel shall complete the Chain of Custody for each sampling event for which samples are collected for laboratory analysis. The sampler will sign the Chain of Custody when the sample(s) is turned over to the testing laboratory or courier.

7.8 BIOASSESSMENT MONITORING

This project is not subject to bioassessment monitoring.

7.9 WATERSHED MONITORING OPTION

This project is not participating in a watershed monitoring program. Therefore, this section is not applicable.

7.10 QUALITY ASSURANCE AND QUALITY CONTROL

An evaluation of the water quality sample analytical results, including figures with sample locations, the water quality analytical results and the quality assurance/quality control (QA/QC) data will performed by qualified personnel. Should the runoff sample show an increased level of the tested analyte relative to the

background sample, the BMPs, Site conditions, and surrounding influences will be assessed to determine the probable cause for the increase.

7.10.1 Field Logs

The purpose of field logs is to record sampling information and field observations during monitoring that may explain any uncharacteristic analytical results. Sampling information to be included in the field log include the date and time of water quality sample collection, sampling personnel, sample container identification numbers, and types of samples that were collected. Field observations should be noted in the field log for any abnormalities at the sampling location (color, odor, BMPs, etc.). Field measurements for pH and turbidity should also be recorded in the field log.

7.10.2 Clean Sampling Techniques

Clean sampling techniques involve the use of certified clean containers for sample collection and clean powder-free nitrile gloves during sample collection and handling. As discussed in Section 7.7.7, adoption of a clean sampling approach will minimize the chance of field contamination and questionable data results.

7.10.3 Chain of Custody

The sample Chain of Custody is an important documentation step that tracks samples from collection through analysis to ensure the validity of the sample. Sample Chain of Custody procedures include the following:

- Proper labeling of samples;
- Use of Chain of Custody forms for all samples; and
- Prompt sample delivery to the analytical laboratory.

Analytical laboratories usually provide Chain of Custody forms to be filled out for sample containers.

7.10.4 QA/QC Samples

QA/QC samples provide an indication of the accuracy and precision of the sample collection; sample handling; field measurements; and analytical laboratory methods. The following types of QA/QC will be conducted for this project:

☒ Field Duplicates at a frequency of 1 per every 10 samples or 1 per sample event

☐ Equipment Blanks at a frequency of 1 per day or 1 per sample event

☐ Field Blanks at a frequency of 1 per day or 1 per sample event

7.10.4.1 Field Duplicates

Field duplicates provide verification of laboratory or field analysis and sample collection. Duplicate samples shall be collected, handled, and analyzed using the same protocols as primary samples. The sample location where field duplicates are collected shall be randomly selected from the discharge locations. Duplicate samples shall be collected immediately after the primary sample has been collected. Duplicate

samples must be collected in the same manner and as close in time as possible to the original sample. Duplicate samples shall not influence any evaluations or conclusion.

7.10.4.2 Equipment Blanks

Equipment blanks provide verification that equipment has not introduced a pollutant into the sample. Equipment blanks are typically collected when:

- New equipment is used;
- Equipment that has been cleaned after use at a contaminated Site;
- Equipment that is not dedicated for surface water sampling is used; or
- Whenever a new lot of filters is used when sampling metals.

7.10.4.3 Field Blanks

Field blanks assess potential sample contamination levels that occur during field sampling activities. De-ionized water field blanks are taken to the field, transferred to the appropriate container, and treated the same as the corresponding sample type during the course of a sampling event.

7.10.4.4 Data Verification

After results are received from the analytical laboratory, the QSP or designee shall verify the data to ensure that it is complete, accurate, and the appropriate QA/QC requirements were met. Data must be verified when the analytical reports are received. Data verification shall include:

- Review the Chain of Custody and laboratory reports. Make sure all requested analyses were performed and all samples are accounted for in the reports.
- Review laboratory reports to make sure hold times were met and that the reporting levels meet or are lower than the reporting levels agreed to in the contract.
- Review data for outlier values and follow up with the laboratory. Occasionally typographical errors, unit reporting errors, or incomplete results are reported and should be easily detected. These errors need to be identified, clarified, and corrected quickly by the laboratory. The QSP or designee should especially note data that is an order of magnitude or more different than similar locations, or is inconsistent with previous data from the same location.
- Review laboratory QA/QC results. EPA establishes QA/QC checks and acceptable criteria for laboratory analyses. These data are typically reported along with the sample results. The QSP or designee shall evaluate the reported QA/QC data to check for contamination (method, field, and equipment blanks), precision (laboratory matrix spike duplicates), and accuracy (matrix spikes and laboratory control samples). When QA/QC checks are outside acceptable ranges, the laboratory must flag the data, and usually provides an explanation of the potential impact to the sample results.
- Review the data set for outlier values and, accordingly, confirm results and re-analyze samples where appropriate. Sample re-analysis should only be undertaken when it appears that some part of the QA/QC resulted in a value out of the accepted range. Sample results may not be discounted unless the analytical laboratory identifies the required QA/QC criteria were not met and confirms this in writing.

Field data including inspections and observations must be verified as soon as the field logs are received, typically at the end of the sampling event. Field data verification shall include:

- Review field logs to make sure all required measurements were completed and appropriately documented;
- Review reported values that appear out of the typical range or inconsistent; Follow-up immediately to identify potential reporting or equipment problems, if appropriate, recalibrate equipment after sampling;
- Verify equipment calibrations;
- Review observations noted on the field logs; and
- Review notations of any errors and actions taken to correct the equipment or recording errors.

7.11 RECORDS RETENTION

All records of storm water monitoring information and copies of reports (including Annual Reports) must be retained for a period of at least three years from date of submittal or longer if required by the Regional Water Board.

Results of visual monitoring, field measurements, and laboratory analyses must be kept in the SWPPP along with Chain of Custody, and other documentation related to the monitoring.

Records are to be kept on-site while construction is ongoing. Records to be retained include:

- The date, place, and time of inspections, sampling, visual observations, and/or measurements, including precipitation;
- The individual(s) who performed the inspections, sampling, visual observation, and/or field measurements;
- The date and approximate time of field measurements and laboratory analyses;
- The individual(s) who performed the laboratory analyses;
- A summary of all analytical results, the method detection limits and reporting limits, and the analytical techniques or methods used;
- Rain gauge readings from Site inspections;
- QA/QC records and results;
- Calibration records;
- Visual observation and sample collection exemption records; and
- The records of any corrective actions and follow-up activities that resulted from analytical results, visual observations, or inspections.

8.0 REFERENCES

California Stormwater Quality Association (CASQA), 2009, Stormwater BMP Handbook Portal: Construction, November.

MACTEC, 2007. Technical Memorandum, Human Health Soil Preliminary Remediation Goals and Toxic Equivalency Values for Dioxins and Furans, Presidio of San Francisco,

California, March 28.

State Water Resources Control Board, 2010. Order 2010-0014-DWQ, NPDES CGP No. CAS000002: National Pollutant Discharges Elimination System (NPDES) California CGP for Storm Water Discharge Associated with Construction and Land Disturbing Activities. Available on-line at: http://www.waterboards.ca.gov/water_issues/programs/stormwater/construction.shtml.

TRC, 2015a. Technical Memorandum Recreational Soil Cleanup Level for Lead, Presidio of San Francisco, San Francisco, California. April 6.

TRC, 2015b. *Remedial Action Work Plan, Lendrum Court, Presidio of San Francisco, California*. July.

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Water Quality Control Board, 2009. Order 2009-0009-DWQ, NPDES CGP No. CAS000002: National Pollutant Discharges Elimination System (NPDES) California CGP for Storm Water Discharge Associated with Construction and Land Disturbing Activities. Available on-line at: http://www.waterboards.ca.gov/water_issues/programs/stormwater/construction.shtml.

FIGURES

LEGEND

- Lendrum Court area
- Approximate former incinerator area
- Area A/B boundary
- Soil Stockpile Area

N

SCALE (FEET)

0 500 1,000

SITE LOCATION MAP
May 26, 2016

Lendrum Court and Incinerator Area
The Presidio Trust
San Francisco, California

TRC 229649 **FIGURE C-1**

FILE NAME: \\Sanfran-fs1\sanfran\PROJECTS\CAD\Lendrum Court_San Francisco\RDIP_FINAL_MAY16\FigC-1_Site Location Map 05.26.16.dwg | Layout Tab: 11x17

LEGEND

- PROPOSED STAGING AREAS
- FENCE LINE
- SF — SILT FENCE
- STORM DRAIN INLET PROTECTION
- STABILIZED CONSTRUCTION ENTRANCE OR EXIT
- APPROPRIATE BMP BELOW ROOF GUTTER DOWNSPOUTS
- STRAW WATTLE
- DIRECTION OF STORM WATER FLOW DURING CONSTRUCTION
- APPROXIMATE EXTENT OF REMEDIAL ACTION AREA
- APPROXIMATE SITE BOUNDARY
- APPROXIMATE LOCATION OF HISTORIC WORLD WAR I TRENCH
- 145 — EXISTING CONTOUR ELEVATION
- SITE TREE TO BE PRESERVED DURING REMEDIAL CONSTRUCTION
- TOYON (HETEROMELES ARBUTIFOLIA) TO BE PRESERVED DURING REMEDIAL CONSTRUCTION

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SCALE (FEET)

0 80 160

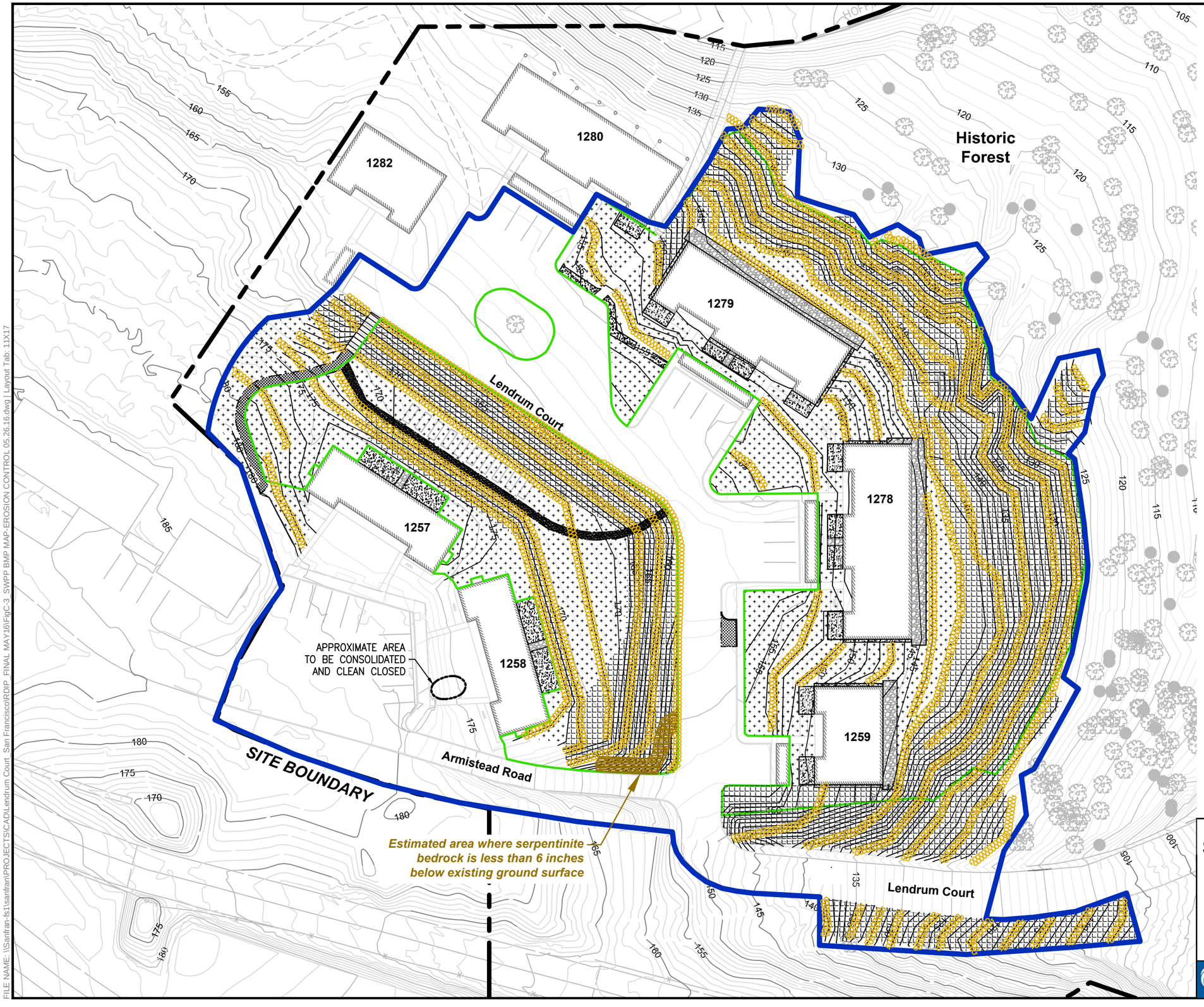
SOURCE: Base plan by Towill, October 29-November 4, 2015

SWPPP BEST MANAGEMENT PRACTICES
May 26, 2016

Lendrum Court Area
The Presidio Trust
San Francisco, California

TRC | 229649 | **FIGURE C-2**

FILE NAME: \\Sanfran-fs1\sanfran\PROJECTS\CAD\Lendrum Court_San Francisco\RDIP_FINAL_MAY16\Fig\C-2_SWPP BMP Map-Temp Facilities 05.26.16.dwg | Layout Tab: 11X17



LEGEND

- ECTC TYPE 4 EROSION CONTROL BLANKET ANCHORING PATTERN A, SEE DETAIL 2, C-116
- ECTC TYPE 4 EROSION CONTROL BLANKET ANCHORING PATTERN B, SEE DETAIL 2, C-116
- FIBER ROLL (STRAW WATTLE)
- APPROXIMATE EXTENT OF REMEDIAL ACTION AREA
- APPROXIMATE LIMITS OF CAP
- APPROXIMATE SITE BOUNDRY
- 140 FINAL GRADE CONTOUR ELEVATION
- 145 EXISTING CONTOUR ELEVATION
- NEW CONCRETE PATIOS, SIDEWALKS AND STAIRS
- NEW DECOMPOSED GRANITE PATH
- NEW ASPHALT PATH/ROADWAY
- NEW AGGREGATE BASE CAP
- SITE TREE TO BE PRESERVED DURING REMEDIAL CONSTRUCTION
- TOYON (HETEROMELES ARBUTIFOLIA) TO BE PRESERVED DURING REMEDIAL CONSTRUCTION

NOTE:
ALL EROSOIN CONTROL FABRIC TO BE UNDERLAIN BY A LAYER OF STRAW.

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SCALE (FEET)
0 50 100

SOURCE: Base plan by Towill, October 29-November 4, 2015

SWPPP FINAL EROSION CONTROLS
May 26, 2016

Lendrum Court Area
The Presidio Trust
San Francisco, California

TRC Results you can rely on | 229649 | **FIGURE C-3**

FILE NAME: \\Sanfran-fs1\sanfran\PROJECTS\CAD\Lendrum Court_San Francisco\RDJP_FINAL MAY16\Fig C-3_SWPP BMP MAP-EROSION CONTROL 05.26.16.dwg | Layout Tab: 11X17

ATTACHMENT C-1

CONSTRUCTION CGP

Linda S. Adams
Secretary for
Environmental Protection

State Water Resources Control Board

Arnold Schwarzenegger
Governor

Division of Water Quality
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NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES)
GENERAL PERMIT FOR
STORM WATER DISCHARGES
ASSOCIATED WITH CONSTRUCTION AND LAND DISTURBANCE
ACTIVITIES

ORDER NO. 2009-0009-DWQ
NPDES NO**. CAS000002**

This Order was adopted by the State Water Resources Control Board on:	**September 2, 2009**
This Order shall become effective on:	**July 1, 2010**
This Order shall expire on:	**September 2, 2014**

IT IS HEREBY ORDERED, that this Order supersedes Order No. 99-08-DWQ except for enforcement purposes. The Discharger shall comply with the requirements in this Order to meet the provisions contained in Division 7 of the California Water Code (commencing with section 13000) and regulations adopted thereunder, and the provisions of the federal Clean Water Act and regulations and guidelines adopted thereunder.

I, Jeanine Townsend, Clerk to the Board, do hereby certify that this Order with all attachments is a full, true, and correct copy of an Order adopted by the State Water Resources Control Board, on September 2, 2009.

AYE: Vice Chair Frances Spivy-Weber
Board Member Arthur G. Baggett, Jr.
Board Member Tam M. Doduc

NAY: Chairman Charles R. Hoppin

ABSENT: None

ABSTAIN: None

Jeanine Townsend
Clerk to the Board

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STATE WATER RESOURCES CONTROL BOARD
ORDER NO. 2009-0009-DWQ
NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM
GENERAL PERMIT NO. CAS000002

WASTE DISCHARGE REQUIREMENTS
FOR
DISCHARGES OF STORM WATER RUNOFF ASSOCIATED WITH CONSTRUCTION AND LAND DISTURBANCE ACTIVITIES

I. FINDINGS

A. General Findings

The State Water Resources Control Board (State Water Board) finds that:

1. The federal Clean Water Act (CWA) prohibits certain discharges of storm water containing pollutants except in compliance with a National Pollutant Discharge Elimination System (NPDES) permit (Title 33 United States Code (U.S.C.) §§ 1311 and 1342(p); also referred to as Clean Water Act (CWA) §§ 301 and 402(p)). The U.S. Environmental Protection Agency (U.S. EPA) promulgates federal regulations to implement the CWA's mandate to control pollutants in storm water runoff discharges. (Title 40 Code of Federal Regulations (C.F.R.) Parts 122, 123, and 124). The federal statutes and regulations require discharges to surface waters comprised of storm water associated with construction activity, including demolition, clearing, grading, and excavation, and other land disturbance activities (except operations that result in disturbance of less than one acre of total land area and which are not part of a larger common plan of development or sale), to obtain coverage under an NPDES permit. The NPDES permit must require implementation of Best Available Technology Economically Achievable (BAT) and Best Conventional Pollutant Control Technology (BCT) to reduce or eliminate pollutants in storm water runoff. The NPDES permit must also include additional requirements necessary to implement applicable water quality standards.

2. This General Permit authorizes discharges of storm water associated with construction activity so long as the dischargers comply with all requirements, provisions, limitations and prohibitions in the permit. In addition, this General Permit regulates the discharges of storm water associated with construction activities from all Linear Underground/Overhead Projects resulting in the disturbance of greater than or equal to one acre (Attachment A).

3. This General Permit regulates discharges of pollutants in storm water associated with construction activity (storm water discharges) to waters of the United States from construction sites that disturb one or more acres of land surface, or that are part of a common plan of development or sale that disturbs more than one acre of land surface.

4. This General Permit does not preempt or supersede the authority of local storm water management agencies to prohibit, restrict, or control storm water discharges to municipal separate storm sewer systems or other watercourses within their jurisdictions.

5. This action to adopt a general NPDES permit is exempt from the provisions of Chapter 3 of the California Environmental Quality Act (CEQA) (Public Resources Code Section 21100, et seq.), pursuant to Section 13389 of the California Water Code.

6. Pursuant to 40 C.F.R. § 131.12 and State Water Board Resolution No. 68-16,[1] which incorporates the requirements of § 131.12 where applicable, the State Water Board finds that discharges in compliance with this General Permit will not result in the lowering of water quality standards, and are therefore consistent with those provisions. Compliance with this General Permit will result in improvements in water quality.

7. This General Permit serves as an NPDES permit in compliance with CWA § 402 and will take effect on July 1, 2010 by the State Water Board provided the Regional Administrator of the U.S. EPA has no objection. If the U.S. EPA Regional Administrator objects to its issuance, the General Permit will not become effective until such objection is withdrawn.

8. Following adoption and upon the effective date of this General Permit, the Regional Water Quality Control Boards (Regional Water Boards) shall enforce the provisions herein.

9. Regional Water Boards establish water quality standards in Basin Plans. The State Water Board establishes water quality standards in various statewide plans, including the California Ocean Plan. U.S. EPA establishes water quality standards in the National Toxic Rule (NTR) and the California Toxic Rule (CTR).

[1] Resolution No. 68-16 generally requires that existing water quality be maintained unless degradation is justified based on specific findings.

10. This General Permit does not authorize discharges of fill or dredged material regulated by the U.S. Army Corps of Engineers under CWA § 404 and does not constitute a waiver of water quality certification under CWA § 401.

11. The primary storm water pollutant at construction sites is excess sediment. Excess sediment can cloud the water, which reduces the amount of sunlight reaching aquatic plants, clog fish gills, smother aquatic habitat and spawning areas, and impede navigation in our waterways. Sediment also transports other pollutants such as nutrients, metals, and oils and greases.

12. Construction activities can impact a construction site's runoff sediment supply and transport characteristics. These modifications, which can occur both during and after the construction phase, are a significant cause of degradation of the beneficial uses established for water bodies in California. Dischargers can avoid these effects through better construction site design and activity practices.

13. This General Permit recognizes four distinct phases of construction activities. The phases are Grading and Land Development Phase, Streets and Utilities Phase, Vertical Construction Phase, and Final Landscaping and Site Stabilization Phase. Each phase has activities that can result in different water quality effects from different water quality pollutants. This General Permit also recognizes inactive construction as a category of construction site type.

14. Compliance with any specific limits or requirements contained in this General Permit does not constitute compliance with any other applicable requirements.

15. Following public notice in accordance with State and Federal laws and regulations, the State Water Board heard and considered all comments and testimony in a public hearing on 06/03/2009. The State Water Board has prepared written responses to all significant comments.

16. Construction activities obtaining coverage under the General Permit may have multiple discharges subject to requirements that are specific to general, linear, and/or active treatment system discharge types.

17. The State Water Board may reopen the permit if the U.S. EPA adopts a final effluent limitation guideline for construction activities.

B. Activities Covered Under the General Permit

18. Any construction or demolition activity, including, but not limited to, clearing, grading, grubbing, or excavation, or any other activity that results in a land disturbance of equal to or greater than one acre.

19. Construction activity that results in land surface disturbances of less than one acre if the construction activity is part of a larger common plan of development or the sale of one or more acres of disturbed land surface.

20. Construction activity related to residential, commercial, or industrial development on lands currently used for agriculture including, but not limited to, the construction of buildings related to agriculture that are considered industrial pursuant to U.S. EPA regulations, such as dairy barns or food processing facilities.

21. Construction activity associated with Linear Underground/Overhead Utility Projects (LUPs) including, but not limited to, those activities necessary for the installation of underground and overhead linear facilities (e.g., conduits, substructures, pipelines, towers, poles, cables, wires, connectors, switching, regulating and transforming equipment and associated ancillary facilities) and include, but are not limited to, underground utility mark-out, potholing, concrete and asphalt cutting and removal, trenching, excavation, boring and drilling, access road and pole/tower pad and cable/wire pull station, substation construction, substructure installation, construction of tower footings and/or foundations, pole and tower installations, pipeline installations, welding, concrete and/or pavement repair or replacement, and stockpile/borrow locations.

22. Discharges of sediment from construction activities associated with oil and gas exploration, production, processing, or treatment operations or transmission facilities.[2]

23. Storm water discharges from dredge spoil placement that occur outside of U.S. Army Corps of Engineers jurisdiction (upland sites) and that disturb one or more acres of land surface from construction activity are covered by this General Permit. Construction sites that intend to disturb one or more acres of land within the jurisdictional boundaries of a CWA § 404 permit should contact the appropriate Regional Water Board to determine whether this permit applies to the site.

[2] Pursuant to the Ninth Circuit Court of Appeals' decision in *NRDC v. EPA* (9th Cir. 2008) 526 F.3d 591, and subsequent denial of the U.S. EPA's petition for reconsideration in November 2008, oil and gas construction activities discharging storm water contaminated only with sediment are no longer exempt from the NPDES program.

C. Activities Not Covered Under the General Permit

24. Routine maintenance to maintain original line and grade, hydraulic capacity, or original purpose of the facility.

25. Disturbances to land surfaces solely related to agricultural operations such as disking, harrowing, terracing and leveling, and soil preparation.

26. Discharges of storm water from areas on tribal lands; construction on tribal lands is regulated by a federal permit.

27. Construction activity and land disturbance involving discharges of storm water within the Lake Tahoe Hydrologic Unit. The Lahontan Regional Water Board has adopted its own permit to regulate storm water discharges from construction activity in the Lake Tahoe Hydrologic Unit (Regional Water Board 6SLT). Owners of construction sites in this watershed must apply for the Lahontan Regional Water Board permit rather than the statewide Construction General Permit.

28. Construction activity that disturbs less than one acre of land surface, and that is not part of a larger common plan of development or the sale of one or more acres of disturbed land surface.

29. Construction activity covered by an individual NPDES Permit for storm water discharges.

30. Discharges from small (1 to 5 acre) construction activities with an approved Rainfall Erosivity Waiver authorized by U.S. EPA Phase II regulations certifying to the State Board that small construction activity will occur only when the Rainfall Erosivity Factor is less than 5 (“R” in the Revised Universal Soil Loss Equation).

31. Landfill construction activity that is subject to the Industrial General Permit.

32. Construction activity that discharges to Combined Sewer Systems.

33. Conveyances that discharge storm water runoff combined with municipal sewage.

34. Discharges of storm water identified in CWA § 402(*l*)(2), 33 U.S.C. § 1342(*l*)(2).

35. Discharges occurring in basins that are not tributary or hydrologically connected to waters of the United States (for more information contact your Regional Water Board).

D. Obtaining and Modifying General Permit Coverage

36. This General Permit requires all dischargers to electronically file all Permit Registration Documents (PRDs), Notices of Termination (NOT), changes of information, annual reporting, and other compliance documents required by this General Permit through the State Water Board's Storm water Multi-Application and Report Tracking System (SMARTS) website.

37. Any information provided to the Regional Water Board shall comply with the Homeland Security Act and any other federal law that concerns security in the United States; any information that does not comply should not be submitted.

38. This General Permit grants an exception from the Risk Determination requirements for existing sites covered under Water Quality Orders No. 99-08-DWQ, and No. 2003-0007-DWQ. For certain sites, adding additional requirements may not be cost effective. Construction sites covered under Water Quality Order No. 99-08-DWQ shall obtain permit coverage at the Risk Level 1. LUPs covered under Water Quality Order No. 2003-0007-DWQ shall obtain permit coverage as a Type 1 LUP. The Regional Water Boards have the authority to require Risk Determination to be performed on sites currently covered under Water Quality Orders No. 99-08-DWQ and No. 2003-0007-DWQ where they deem it necessary. The State Water Board finds that there are two circumstances when it may be appropriate for the Regional Water Boards to require a discharger that had filed an NOI under State Water Board Order No. 99-08-DWQ to recalculate the site's risk level. These circumstances are: (1) when the discharger has a demonstrated history of noncompliance with State Water Board Order No. 99-08-DWQ or; (2) when the discharger's site poses a significant risk of causing or contributing to an exceedance of a water quality standard without the implementation of the additional Risk Level 2 or 3 requirements.

E. Prohibitions

39. All discharges are prohibited except for the storm water and non-storm water discharges specifically authorized by this General Permit or another NPDES permit. Non-storm water discharges include a wide variety of sources, including improper dumping, spills, or leakage from storage tanks or transfer areas. Non-storm water discharges may

contribute significant pollutant loads to receiving waters. Measures to control spills, leakage, and dumping, and to prevent illicit connections during construction must be addressed through structural as well as non-structural Best Management Practices (BMPs)[3]. The State Water Board recognizes, however, that certain non-storm water discharges may be necessary for the completion of construction.

40. This General Permit prohibits all discharges which contain a hazardous substance in excess of reportable quantities established in 40 C.F.R. §§ 117.3 and 302.4, unless a separate NPDES Permit has been issued to regulate those discharges.

41. This General Permit incorporates discharge prohibitions contained in water quality control plans, as implemented by the State Water Board and the nine Regional Water Boards.

42. Pursuant to the Ocean Plan, discharges to Areas of Special Biological Significance (ASBS) are prohibited unless covered by an exception that the State Water Board has approved.

43. This General Permit prohibits the discharge of any debris[4] from construction sites. Plastic and other trash materials can cause negative impacts to receiving water beneficial uses. The State Water Board encourages the use of more environmentally safe, biodegradable materials on construction sites to minimize the potential risk to water quality.

F. Training

44. In order to improve compliance with and to maintain consistent enforcement of this General Permit, all dischargers are required to appoint two positions - the Qualified SWPPP Developer (QSD) and the Qualified SWPPP Practitioner (QSP) - who must obtain appropriate training. Together with the key stakeholders, the State and Regional Water Boards are leading the development of this curriculum through a collaborative organization called The Construction General Permit (CGP) Training Team.

45. The Professional Engineers Act (Bus. & Prof. Code section 6700, et seq.) requires that all engineering work must be performed by a California licensed engineer.

[3] BMPs are scheduling of activities, prohibitions of practices, maintenance procedures, and other management practices to prevent or reduce the discharge of pollutants to waters of the United States. BMPs also include treatment requirements, operating procedures, and practice to control site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage.

[4] Litter, rubble, discarded refuse, and remains of destroyed inorganic anthropogenic waste.

G. Determining and Reducing Risk

46. The risk of accelerated erosion and sedimentation from wind and water depends on a number of factors, including proximity to receiving water bodies, climate, topography, and soil type.

47. This General Permit requires dischargers to assess the risk level of a site based on both sediment transport and receiving water risk. This General Permit contains requirements for Risk Levels 1, 2 and 3, and LUP Risk Type 1, 2, and 3 (Attachment A). Risk levels are established by determining two factors: first, calculating the site's sediment risk; and second, receiving water risk during periods of soil exposure (i.e. grading and site stabilization). Both factors are used to determine the site-specific Risk Level(s). LUPs can be determined to be Type 1 based on the flowchart in Attachment A.1.

48. Although this General Permit does not mandate specific setback distances, dischargers are encouraged to set back their construction activities from streams and wetlands whenever feasible to reduce the risk of impacting water quality (e.g., natural stream stability and habitat function). Because there is a reduced risk to receiving waters when setbacks are used, this General Permit gives credit to setbacks in the risk determination and post-construction storm water performance standards. The risk calculation and runoff reduction mechanisms in this General Permit are expected to facilitate compliance with any Regional Water Board and local agency setback requirements, and to encourage voluntary setbacks wherever practicable.

49. Rain events can occur at any time of the year in California. Therefore, a Rain Event Action Plan (REAP) is necessary for Risk Level 2 and 3 traditional construction projects (LUPs exempt) to ensure that active construction sites have adequate erosion and sediment controls implemented prior to the onset of a storm event, even if construction is planned only during the dry season.

50. Soil particles smaller than 0.02 millimeters (mm) (i.e., finer than medium silt) do not settle easily using conventional measures for sediment control (i.e., sediment basins). Given their long settling time, dislodging these soils results in a significant risk that fine particles will be released into surface waters and cause unacceptable downstream impacts. If operated correctly, an Active Treatment System (ATS[5]) can prevent or reduce the release of fine particles from construction sites.

[5] An ATS is a treatment system that employs chemical coagulation, chemical flocculation, or electro coagulation in order to reduce turbidity caused by fine suspended sediment.

Use of an ATS can effectively reduce a site's risk of impacting receiving waters.

51. Dischargers located in a watershed area where a Total Maximum Daily Load (TMDL) has been adopted or approved by the Regional Water Board or U.S. EPA may be required by a separate Regional Water Board action to implement additional BMPs, conduct additional monitoring activities, and/or comply with an applicable waste load allocation and implementation schedule. Such dischargers may also be required to obtain an individual Regional Water Board permit specific to the area.

H. Effluent Standards

52. The State Water Board convened a blue ribbon panel of storm water experts that submitted a report entitled, “The Feasibility of Numeric Effluent Limits Applicable to Discharges of Storm Water Associated with Municipal, Industrial and Construction Activities,” dated June 19, 2006. The panel concluded that numeric limits or action levels are technically feasible to control construction storm water discharges, provided that certain conditions are considered. The panel also concluded that numeric effluent limitations (NELs) are feasible for discharges from construction sites that utilize an ATS. The State Water Board has incorporated the expert panel’s suggestions into this General Permit, which includes both numeric action levels (NALs) and NELs for pH and turbidity, and special numeric limits for ATS discharges.

Numeric Effluent Limitations

53. Discharges of storm water from construction activities may become contaminated from alkaline construction materials resulting in high pH (greater than pH 7). Alkaline construction materials include, but are not limited to, hydrated lime, concrete, mortar, cement kiln dust (CKD), Portland cement treated base (CTB), fly ash, recycled concrete, and masonry work. This General Permit includes an NEL for pH (6.0-9.0) that applies only at sites that exhibit a "high risk of high pH discharge." A "high risk of high pH discharge" can occur during the complete utilities phase, the complete vertical build phase, and any portion of any phase where significant amounts of materials are placed directly on the land at the site in a manner that could result in significant alterations to the background pH of any discharges.

54. For Risk Level 3 discharges, this General Permit establishes technology-based, numeric effluent limitations (NELs) for turbidity of 500 NTU. Exceedances of the turbidity NEL constitutes a violation of this General Permit.

55. This General Permit establishes a 5 year, 24 hour (expressed in inches of rainfall) Compliance Storm Event exemption from the technology-based NELs for Risk Level 3 dischargers.

Determining Compliance with Numeric Limitations

56. This General Permit sets a pH NAL of 6.5 to 8.5, and a turbidity NAL of 250 NTU. The purpose of the NAL and its associated monitoring requirement is to provide operational information regarding the performance of the measures used at the site to minimize the discharge of pollutants and to protect beneficial uses and receiving waters from the adverse effects of construction-related storm water discharges. The NALs in this General Permit for pH and turbidity are not directly enforceable and do not constitute NELs.

57. This General Permit requires dischargers with NAL exceedances to immediately implement additional BMPs and revise their Storm Water Pollution Prevention Plans (SWPPPs) accordingly to either prevent pollutants and authorized non-storm water discharges from contaminating storm water, or to substantially reduce the pollutants to levels consistently below the NALs. NAL exceedances are reported in the State Water Boards SMARTS system, and the discharger is required to provide an NAL Exceedance Report when requested by a Regional Water Board.

58. If run-on is caused by a forest fire or any other natural disaster, then NELs do not apply.

59. Exceedances of the NELs are a violation of this Permit. This General Permit requires dischargers with NEL exceedances to implement additional monitoring, BMPs, and revise their SWPPPs accordingly. Dischargers are required to notify the State and Regional Water Boards of the violation through the State Water Boards SMARTs system, and provide an NEL Violation Report sharing additional information concerning the NEL exceedance.

I. Receiving Water Limitations

60. This General Permit requires all enrolled dischargers to determine the receiving waters potentially affected by their discharges and to comply with all applicable water quality standards, including any more stringent standards applicable to a water body.

J. Sampling, Monitoring, Reporting and Record Keeping

61. Visual monitoring of storm water and non-storm water discharges is required for all sites subject to this General Permit.

62. Records of all visual monitoring inspections are required to remain on-site during the construction period and for a minimum of three years.

63. For all Risk Level 3 and Risk Level 2 sites, this General Permit requires effluent monitoring for pH and turbidity. Sampling, analysis and monitoring requirements for effluent monitoring for pH and turbidity are contained in this General Permit.

64. Risk Level 3 sites in violation of the Numeric Effluent Limitations contained in this General Permit and with direct discharges to receiving water are required to conduct receiving water monitoring.

65. For Risk Level 3 sites larger than 30 acres and with direct discharges to receiving waters, this General Permit requires bioassessment sampling before and after site completion to determine if significant degradation to the receiving water's biota has occurred. Bioassessment sampling guidelines are contained in this General Permit.

66. A summary and evaluation of the sampling and analysis results will be submitted in the Annual Reports.

67. This General Permit contains sampling, analysis and monitoring requirements for non-visible pollutants at all sites subject to this General Permit.

68. Compliance with the General Permit relies upon dischargers to electronically self-report any discharge violations and to comply with any Regional Water Board enforcement actions.

69. This General Permit requires that all dischargers maintain a paper or electronic copy of all required records for three years from the date generated or date submitted, whichever is last. These records must be available at the construction site until construction is completed. For LUPs, these documents may be retained in a crew member's vehicle and made available upon request.

K. Active Treatment System (ATS) Requirements

70. Active treatment systems add chemicals to facilitate flocculation, coagulation and filtration of suspended sediment particles. The uncontrolled release of these chemicals to the environment can negatively affect the beneficial uses of receiving waters and/or degrade water quality (e.g., acute and chronic toxicity). Additionally, the batch storage and treatment of storm water through an ATS' can potentially

cause physical impacts on receiving waters if storage volume is inadequate or due to sudden releases of the ATS batches and improperly designed outfalls.

71. If designed, operated and maintained properly an ATS can achieve very high removal rates of suspended sediment (measured as turbidity), albeit at sometimes significantly higher costs than traditional erosion/sediment control practices. As a result, this General Permit establishes NELs consistent with the expected level of typical ATS performance.

72. This General Permit requires discharges of storm water associated with construction activity that undergo active treatment to comply with special operational and effluent limitations to ensure that these discharges do not adversely affect the beneficial uses of the receiving waters or cause degradation of their water quality.

73. For ATS discharges, this General Permit establishes technology-based NELs for turbidity.

74. This General Permit establishes a 10 year, 24 hour (expressed in inches of rainfall) Compliance Storm Event exemption from the technology-based numeric effluent limitations for ATS discharges. Exceedances of the ATS turbidity NEL constitutes a violation of this General Permit.

L. Post-Construction Requirements

75. This General Permit includes performance standards for post-construction that are consistent with State Water Board Resolution No. 2005-0006, "Resolution Adopting the Concept of Sustainability as a Core Value for State Water Board Programs and Directing Its Incorporation," and 2008-0030, “Requiring Sustainable Water Resources Management.“ The requirement for all construction sites to match pre-project hydrology will help ensure that the physical and biological integrity of aquatic ecosystems are sustained. This “runoff reduction” approach is analogous in principle to Low Impact Development (LID) and will serve to protect related watersheds and waterbodies from both hydrologic-based and pollution impacts associated with the post-construction landscape.

76. LUP projects are not subject to post-construction requirements due to the nature of their construction to return project sites to pre-construction conditions.

M. Storm Water Pollution Prevention Plan Requirements

77. This General Permit requires the development of a site-specific SWPPP. The SWPPP must include the information needed to demonstrate compliance with all requirements of this General Permit, and must be kept on the construction site and be available for review. The discharger shall ensure that a QSD develops the SWPPP.

78. To ensure proper site oversight, this General Permit requires a Qualified SWPPP Practitioner to oversee implementation of the BMPs required to comply with this General Permit.

N. Regional Water Board Authorities

79. Regional Water Boards are responsible for implementation and enforcement of this General Permit. A general approach to permitting is not always suitable for every construction site and environmental circumstances. Therefore, this General Permit recognizes that Regional Water Boards must have some flexibility and authority to alter, approve, exempt, or rescind permit authority granted under this General Permit in order to protect the beneficial uses of our receiving waters and prevent degradation of water quality.

IT IS HEREBY ORDERED that all dischargers subject to this General Permit shall comply with the following conditions and requirements (including all conditions and requirements as set forth in Attachments A, B, C, D, E and F)[6]:

II. CONDITIONS FOR PERMIT COVERAGE

A. Linear Underground/Overhead Projects (LUPs)

1. Linear Underground/Overhead Projects (LUPs) include, but are not limited to, any conveyance, pipe, or pipeline for the transportation of any gaseous, liquid (including water and wastewater for domestic municipal services), liquescent, or slurry substance; any cable line or wire for the transmission of electrical energy; any cable line or wire for communications (e.g. telephone, telegraph, radio or television messages); and associated ancillary facilities. Construction activities associated with LUPs include, but are not limited to, (a) those activities necessary for the installation of underground and overhead linear facilities (e.g., conduits, substructures, pipelines, towers, poles, cables, wires, connectors, switching, regulating and transforming equipment, and associated ancillary facilities); and include, but are not limited to, (b) underground utility mark-out, potholing, concrete and asphalt cutting and removal, trenching, excavation, boring and drilling, access road and pole/tower pad and cable/wire pull station, substation construction, substructure installation, construction of tower footings and/or foundations, pole and tower installations, pipeline installations, welding, concrete and/ or pavement repair or replacement, and stockpile/borrow locations.

2. The utility company, municipality, or other public or private company or agency that owns or operates the linear underground/overhead project is responsible for obtaining coverage under the General Permit where the construction of pipelines, utility lines, fiber-optic cables, or other linear underground/overhead projects will occur across several properties unless the LUP construction activities are covered under another construction storm water permit.

3. Only LUPs shall comply with the conditions and requirements in Attachment A, A.1 & A.2 of this Order. The balance of this Order is not applicable to LUPs except as indicated in Attachment A.

B. Obtaining Permit Coverage Traditional Construction Sites

[6] These attachments are part of the General Permit itself and are not separate documents that are capable of being updated independently by the State Water Board.

1. The Legally Responsible Person (LRP) (see Special Provisions, Electronic Signature and Certification Requirements, Section IV.I.1) must obtain coverage under this General Permit.

2. To obtain coverage, the LRP must electronically file Permit Registration Documents (PRDs) prior to the commencement of construction activity. Failure to obtain coverage under this General Permit for storm water discharges to waters of the United States is a violation of the CWA and the California Water Code.

3. PRDs shall consist of:

   a. Notice of Intent (NOI)
   b. Risk Assessment (Section VIII)
   c. Site Map
   d. Storm Water Pollution Prevention Plan (Section XIV)
   e. Annual Fee
   f. Signed Certification Statement

   Any information provided to the Regional Water Board shall comply with the Homeland Security Act and any other federal law that concerns security in the United States; any information that does not comply should not be submitted.

   Attachment B contains additional PRD information. Dischargers must electronically file the PRDs, and mail the appropriate annual fee to the State Water Board.

4. This permit is effective on July 1, 2010.

   a. **Dischargers Obtaining Coverage On or After July 1, 2010:** All dischargers requiring coverage on or after July 1, 2010, shall electronically file their PRDs prior to the commencement of construction activities, and mail the appropriate annual fee no later than seven days prior to the commencement of construction activities. Permit coverage shall not commence until the PRDs and the annual fee are received by the State Water Board, and a WDID number is assigned and sent by SMARTS.

   b. **Dischargers Covered Under 99-08-DWQ and 2003-0007-DWQ:** Existing dischargers subject to State Water Board Order No. 99-08-DWQ (existing dischargers) will continue coverage under 99-08-DWQ until July 1, 2010. After July 1, 2010, all NOIs subject to State Water Board Order No. 99-08-DWQ will be terminated. Existing dischargers shall electronically file their PRDs no later than

July 1, 2010. If an existing discharger's site acreage subject to the annual fee has changed, it shall mail a revised annual fee no less than seven days after receiving the revised annual fee notification, **or else lose permit coverage**. All existing dischargers shall be exempt from the risk determination requirements in Section VIII of this General Permit until two years after permit adoption. All existing dischargers are therefore subject to Risk Level 1 requirements regardless of their site's sediment and receiving water risks. However, a Regional Board retains the authority to require an existing discharger to comply with the Section VIII risk determination requirements.

5. The discharger is only considered covered by this General Permit upon receipt of a Waste Discharger Identification (WDID) number assigned and sent by the State Water Board Storm water Multi-Application and Report Tracking System (SMARTS). In order to demonstrate compliance with this General Permit, the discharger must obtain a WDID number and must present documentation of a valid WDID upon demand.

6. During the period this permit is subject to review by the U.S. EPA, the prior permit (State Water Board Order No. 99-08-DWQ) remains in effect. Existing dischargers under the prior permit will continue to have coverage under State Water Board Order No. 99-08-DWQ until this General Permit takes effect on July 1, 2010. Dischargers who complete their projects and electronically file an NOT prior to July 1, 2010, are not required to obtain coverage under this General Permit.

7. Small Construction Rainfall Erosivity Waiver

   EPA's Small Construction Erosivity Waiver applies to sites between one and five acres demonstrating that there are no adverse water quality impacts.

   Dischargers eligible for a Rainfall Erosivity Waiver based on low erosivity potential shall complete the electronic Notice of Intent (NOI) and Sediment Risk form through the State Water Board's SMARTS system, certifying that the construction activity will take place during a period when the value of the rainfall erosivity factor is less than five. Where the LRP changes or another LRP is added during construction, the new LRP must also submit a waiver certification through the SMARTS system.

   If a small construction site continues beyond the projected completion date given on the waiver certification, the LRP shall recalculate the rainfall erosivity factor for the new project duration and submit this

information through the SMARTS system. If the new R factor is below five (5), the discharger shall update through SMARTS all applicable information on the waiver certification and retain a copy of the revised waiver onsite. The LRP shall submit the new waiver certification 30 days prior to the projected completion date listed on the original waiver form to assure exemption from permitting requirements is uninterrupted. If the new R factor is five (5) or above, the LRP shall be required to apply for coverage under this Order.

8. In the case of a public emergency that requires immediate construction activities, a discharger shall submit a brief description of the emergency construction activity within five days of the onset of construction, and then shall submit all PRDs within thirty days.

C. Revising Permit Coverage for Change of Acreage or New Ownership

1. The discharger may reduce or increase the total acreage covered under this General Permit when a portion of the site is complete and/or conditions for termination of coverage have been met (See Section II.D Conditions for Termination of Coverage); when ownership of a portion of the site is sold to a different entity; or when new acreage, subject to this General Permit, is added to the site.

2. Within 30 days of a reduction or increase in total disturbed acreage, the discharger shall electronically file revisions to the PRDs that include:

   a. A revised NOI indicating the new project size;

   b. A revised site map showing the acreage of the site completed, acreage currently under construction, acreage sold/transferred or added, and acreage currently stabilized in accordance with the Conditions for Termination of Coverage in Section II.D below.

   c. SWPPP revisions, as appropriate; and

   d. Certification that any new landowners have been notified of applicable requirements to obtain General Permit coverage. The certification shall include the name, address, telephone number, and e-mail address of the new landowner.

   e. If the project acreage has increased, dischargers shall mail payment of revised annual fees within 14 days of receiving the revised annual fee notification.

3. The discharger shall continue coverage under the General Permit for any parcel that has not achieved "Final Stabilization" as defined in Section II.D.

4. When an LRP owns property with active General Permit coverage, and the LRP sells the property, or a parcel thereof, to another person, that person shall become an LRP with respect to whatever parcel was sold. The existing LRP shall inform the new LRP of the General Permit's requirements. In order for the new LRP to continue the construction activity on its parcel of property, the new LRP, or the new LRP's approved signatory, must submit PRDs in accordance with this General Permit's requirements.

D. Conditions for Termination of Coverage

1. Within 90 days of when construction is complete or ownership has been transferred, the discharger shall electronically file a Notice of Termination (NOT), a final site map, and photos through the State Water Boards SMARTS system. Filing a NOT certifies that all General Permit requirements have been met. The Regional Water Board will consider a construction site complete only when all portions of the site have been transferred to a new owner, or all of the following conditions have been met:

   a. For purposes of "final stabilization," the site will not pose any additional sediment discharge risk than it did prior to the commencement of construction activity;

   b. There is no potential for construction-related storm water pollutants to be discharged into site runoff;

   c. Final stabilization has been reached;

   d. Construction materials and wastes have been disposed of properly;

   e. Compliance with the Post-Construction Standards in Section XIII of this General Permit has been demonstrated;

   f. Post-construction storm water management measures have been installed and a long-term maintenance plan[7] has been established; and

[7] For the purposes of this requirement a long-term maintenance plan will be designed for a minimum of five years, and will describe the procedures to ensure that the post-construction storm water management measures are adequately maintained.

g. All construction-related equipment, materials and any temporary BMPs no longer needed are removed from the site.

2. The discharger shall certify that final stabilization conditions are satisfied in their NOT. Failure to certify shall result in continuation of permit coverage and annual billing.

3. The NOT must demonstrate through photos, RUSLE or RUSLE2, or results of testing and analysis that the site meets all of the conditions above (Section II.D.1) and the final stabilization condition (Section II.D.1.a) is attained by one of the following methods:

   a. "70% final cover method," no computational proof required

      OR:

   b. "RUSLE or RUSLE2 method," computational proof required

      OR:

   c. "Custom method", the discharger shall demonstrate in some other manner than a or b, above, that the site complies with the "final stabilization" requirement in Section II.D.1.a.

III. DISCHARGE PROHIBITIONS

A. Dischargers shall not violate any discharge prohibitions contained in applicable Basin Plans or statewide water quality control plans. Waste discharges to Areas of Special Biological Significance (ASBS) are prohibited by the California Ocean Plan, unless granted an exception issued by the State Water Board.

B. All discharges are prohibited except for the storm water and non-storm water discharges specifically authorized by this General Permit or another NPDES permit.

C. Authorized non-storm water discharges may include those from de-chlorinated potable water sources such as: fire hydrant flushing, irrigation of vegetative erosion control measures, pipe flushing and testing, water to control dust, uncontaminated ground water from dewatering, and other discharges not subject to a separate general NPDES permit adopted by a Regional Water Board. The discharge of non-storm water is authorized under the following conditions:

1. The discharge does not cause or contribute to a violation of any water quality standard;

2. The discharge does not violate any other provision of this General Permit;

3. The discharge is not prohibited by the applicable Basin Plan;

4. The discharger has included and implemented specific BMPs required by this General Permit to prevent or reduce the contact of the non-storm water discharge with construction materials or equipment.

5. The discharge does not contain toxic constituents in toxic amounts or (other) significant quantities of pollutants;

6. The discharge is monitored and meets the applicable NALs and NELs; and

7. The discharger reports the sampling information in the Annual Report.

If any of the above conditions are not satisfied, the discharge is not authorized by this General Permit. The discharger shall notify the Regional Water Board of any anticipated non-storm water discharges not already authorized by this General Permit or another NPDES permit, to determine whether a separate NPDES permit is necessary.

D. Debris resulting from construction activities are prohibited from being discharged from construction sites.

E. When soil contamination is found or suspected and a responsible party is not identified, or the responsible party fails to promptly take the appropriate action, the discharger shall have those soils sampled and tested to ensure proper handling and public safety measures are implemented. The discharger shall notify the appropriate local, State, and federal agency(ies) when contaminated soil is found at a construction site, and will notify the appropriate Regional Water Board.

IV. SPECIAL PROVISIONS

A. Duty to Comply

1. The discharger shall comply with all of the conditions of this General Permit. Any permit noncompliance constitutes a violation of the Clean Water Act (CWA) and the Porter-Cologne Water Quality Control Act and is grounds for enforcement action and/or removal from General Permit coverage.

2. The discharger shall comply with effluent standards or prohibitions established under Section 307(a) of the CWA for toxic pollutants within the time provided in the regulations that establish these standards or prohibitions, even if this General Permit has not yet been modified to incorporate the requirement.

B. General Permit Actions

1. This General Permit may be modified, revoked and reissued, or terminated for cause. The filing of a request by the discharger for a General Permit modification, revocation and reissuance, or termination, or a notification of planned changes or anticipated noncompliance does not annul any General Permit condition.

2. If any toxic effluent standard or prohibition (including any schedule of compliance specified in such effluent standard or prohibition) is promulgated under Section 307(a) of the CWA for a toxic pollutant which is present in the discharge and that standard or prohibition is more stringent than any limitation on the pollutant in this General Permit, this General Permit shall be modified or revoked and reissued to conform to the toxic effluent standard or prohibition and the dischargers so notified.

C. Need to Halt or Reduce Activity Not a Defense

It shall not be a defense for a discharger in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this General Permit.

D. Duty to Mitigate

The discharger shall take all responsible steps to minimize or prevent any discharge in violation of this General Permit, which has a reasonable likelihood of adversely affecting human health or the environment.

E. Proper Operation and Maintenance

The discharger shall at all times properly operate and maintain any facilities and systems of treatment and control (and related appurtenances) which are installed or used by the discharger to achieve compliance with the conditions of this General Permit. Proper operation and maintenance also includes adequate laboratory controls and appropriate quality assurance procedures. Proper operation and maintenance may require the operation of backup or auxiliary facilities or similar systems installed by a discharger when necessary to achieve compliance with the conditions of this General Permit.

F. Property Rights

This General Permit does not convey any property rights of any sort or any exclusive privileges, nor does it authorize any injury to private property or any invasion of personal rights, nor does it authorize any infringement of Federal, State, or local laws or regulations.

G. Duty to Maintain Records and Provide Information

1. The discharger shall maintain a paper or electronic copy of all required records, including a copy of this General Permit, for three years from the date generated or date submitted, whichever is last. These records shall be available at the construction site until construction is completed.

2. The discharger shall furnish the Regional Water Board, State Water Board, or U.S. EPA, within a reasonable time, any requested information to determine compliance with this General Permit. The discharger shall also furnish, upon request, copies of records that are required to be kept by this General Permit.

H. Inspection and Entry

The discharger shall allow the Regional Water Board, State Water Board, U.S. EPA, and/or, in the case of construction sites which discharge through a municipal separate storm sewer, an authorized representative of the municipal operator of the separate storm sewer system receiving the discharge, upon the presentation of credentials and other documents as may be required by law, to:

1. Enter upon the discharger's premises at reasonable times where a regulated construction activity is being conducted or where records must be kept under the conditions of this General Permit;

2. Access and copy at reasonable times any records that must be kept under the conditions of this General Permit;

3. Inspect at reasonable times the complete construction site, including any off-site staging areas or material storage areas, and the erosion/sediment controls; and

4. Sample or monitor at reasonable times for the purpose of ensuring General Permit compliance.

I. Electronic Signature and Certification Requirements

1. All Permit Registration Documents (PRDs) and Notice of Terminations (NOTs) shall be electronically signed, certified, and submitted via SMARTS to the State Water Board. Either the Legally Responsible Person (LRP) or a person legally authorized to sign and certify PRDs and NOTs on behalf of the LRP (the LRP's Approved Signatory) must submit all information electronically via SMARTS.

    a. The LRP's Approved Signatory must be one of the following:

        i. For a corporation: a responsible corporate officer. For the purpose of this section, a responsible corporate officer means: (a) a president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy or decision-making functions for the corporation; or (b) the manager of the facility if authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures;

        ii. For a partnership or sole proprietorship: a general partner or the proprietor, respectively;

        iii. For a municipality, State, Federal, or other public agency: either a principal executive officer or ranking elected official. The principal executive officer of a Federal agency includes the chief executive officer of the agency or the senior executive officer having responsibility for the overall operations of a principal geographic unit of the agency (e.g., Regional Administrators of U.S. EPA);

        iv. For the military: Any military officer who has been designated.

        v. For a public university: An authorized university official

b. Changes to Authorization. If an approved signatory's authorization is no longer accurate, a new authorization satisfying the requirements of paragraph (a) of this section must be submitted via SMARTS prior to or together with any reports, information or applications to be signed by an approved signatory.

2. All Annual Reports, or other information required by the General Permit (other than PRDs and NOTs) or requested by the Regional Water Board, State Water Board, U.S. EPA, or local storm water management agency shall be certified and submitted by the LRP or the LRP's approved signatory as described above.

J. Certification

Any person signing documents under Section IV.I above, shall make the following certification:

"I certify under penalty of law that this document and all attachments were prepared under my direction or 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, 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."

K. Anticipated Noncompliance

The discharger shall give advance notice to the Regional Water Board and local storm water management agency of any planned changes in the construction activity, which may result in noncompliance with General Permit requirements.

L. Bypass

Bypass[8] is prohibited. The Regional Water Board may take enforcement action against the discharger for bypass unless:

1. Bypass was unavoidable to prevent loss of life, personal injury or severe property damage;[9]

[8] The intentional diversion of waste streams from any portion of a treatment facility

[9] Severe property damage means substantial physical damage to property, damage to the treatment facilities that causes them to become inoperable, or substantial and permanent loss of natural resources that can reasonably be expected to occur in the absence of a bypass. Severe property damage does not mean economic loss caused by delays in production.

2. There were no feasible alternatives to bypass, such as the use of auxiliary treatment facilities, retention of untreated waste, or maintenance during normal periods of equipment downtime. This condition is not satisfied if adequate back-up equipment should have been installed in the exercise of reasonable engineering judgment to prevent a bypass that could occur during normal periods of equipment downtime or preventative maintenance;

3. The discharger submitted a notice at least ten days in advance of the need for a bypass to the Regional Water Board; or

4. The discharger may allow a bypass to occur that does not cause effluent limitations to be exceeded, but only if it is for essential maintenance to assure efficient operation. In such a case, the above bypass conditions are not applicable. The discharger shall submit notice of an unanticipated bypass as required.

M. Upset

1. A discharger that wishes to establish the affirmative defense of an upset[10] in an action brought for noncompliance shall demonstrate, through properly signed, contemporaneous operating logs, or other relevant evidence that:

   a. An upset occurred and that the discharger can identify the cause(s) of the upset

   b. The treatment facility was being properly operated by the time of the upset

   c. The discharger submitted notice of the upset as required; and

   d. The discharger complied with any remedial measures required

2. No determination made before an action of noncompliance occurs, such as during administrative review of claims that noncompliance was caused by an upset, is final administrative action subject to judicial review.

3. In any enforcement proceeding, the discharger seeking to establish the occurrence of an upset has the burden of proof

[10] An exceptional incident in which there is unintentional and temporary noncompliance the technology based numeric effluent limitations because of factors beyond the reasonable control of the discharger. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventative maintenance, or careless or improper operation.

N. Penalties for Falsification of Reports

Section 309(c)(4) of the CWA provides that any person who knowingly makes any false material statement, representation, or certification in any record or other document submitted or required to be maintained under this General Permit, including reports of compliance or noncompliance shall upon conviction, be punished by a fine of not more than $10,000 or by imprisonment for not more than two years or by both.

O. Oil and Hazardous Substance Liability

Nothing in this General Permit shall be construed to preclude the institution of any legal action or relieve the discharger from any responsibilities, liabilities, or penalties to which the discharger is or may be subject to under Section 311 of the CWA.

P. Severability

The provisions of this General Permit are severable; and, if any provision of this General Permit or the application of any provision of this General Permit to any circumstance is held invalid, the application of such provision to other circumstances and the remainder of this General Permit shall not be affected thereby.

Q. Reopener Clause

This General Permit may be modified, revoked and reissued, or terminated for cause due to promulgation of amended regulations, receipt of U.S. EPA guidance concerning regulated activities, judicial decision, or in accordance with 40 Code of Federal Regulations (CFR) 122.62, 122.63, 122.64, and 124.5.

R. Penalties for Violations of Permit Conditions

1. Section 309 of the CWA provides significant penalties for any person who violates a permit condition implementing Sections 301, 302, 306, 307, 308, 318, or 405 of the CWA or any permit condition or limitation implementing any such section in a permit issued under Section 402. Any person who violates any permit condition of this General Permit is subject to a civil penalty not to exceed $37,500[11] per calendar day of such violation, as well as any other appropriate sanction provided by Section 309 of the CWA.

[11] May be further adjusted in accordance with the Federal Civil Penalties Inflation Adjustment Act.

2. The Porter-Cologne Water Quality Control Act also provides for civil and criminal penalties, which in some cases are greater than those under the CWA.

S. Transfers

This General Permit is not transferable.

T. Continuation of Expired Permit

This General Permit continues in force and effect until a new General Permit is issued or the SWRCB rescinds this General Permit. Only those dischargers authorized to discharge under the expiring General Permit are covered by the continued General Permit.

V. EFFLUENT STANDARDS

A. Narrative Effluent Limitations

1. Storm water discharges and authorized non-storm water discharges regulated by this General Permit shall not contain a hazardous substance equal to or in excess of reportable quantities established in 40 C.F.R. §§ 117.3 and 302.4, unless a separate NPDES Permit has been issued to regulate those discharges.

2. Dischargers shall minimize or prevent pollutants in storm water discharges and authorized non-storm water discharges through the use of controls, structures, and management practices that achieve BAT for toxic and non-conventional pollutants and BCT for conventional pollutants.

B. Numeric Effluent Limitations (NELs)

Table 1- Numeric Effluent Limitations, Numeric Action Levels, Test Methods, Detection Limits, and Reporting Units

Parameter	Test Method	Discharge Type	Min. Detection Limit	Units	Numeric Action Level	Numeric Effluent Limitation
pH	Field test with calibrated portable instrument	Risk Level 2	0.2	pH units	lower NAL = 6.5 upper NAL = 8.5	N/A
		Risk Level 3			lower NAL = 6.5 upper NAL = 8.5	lower NEL = 6.0 upper NEL = 9.0
Turbidity	EPA 0180.1 and/or field test with calibrated portable instrument	Risk Level 2	1	NTU	250 NTU	N/A
		Risk Level 3			250 NTU	500 NTU

1. Numeric Effluent Limitations (NELs):

   a. **Storm Event, Daily Average pH Limits –** For Risk Level 3 dischargers, the pH of storm water and non-storm water discharges

shall be within the ranges specified in Table 1 during any site phase where there is a "high risk of pH discharge."[12]

b. **Storm Event Daily Average Turbidity Limit –** For Risk Level 3 dischargers, the turbidity of storm water and non-storm water discharges shall not exceed 500 NTU.

2. If daily average sampling results are outside the range of pH NELs (i.e., is below the lower NEL for pH or exceeds the upper NEL for pH) or exceeds the turbidity NEL (as listed in Table 1), the discharger is in violation of this General Permit and shall electronically file monitoring results in violation within 5 business days of obtaining the results.

3. **Compliance Storm Event**:

   Discharges of storm water from Risk Level 3 sites shall comply with applicable NELs (above) unless the storm event causing the discharges is determined after the fact to be equal to or larger than the Compliance Storm Event (expressed in inches of rainfall). The Compliance Storm Event for Risk Level 3 discharges is the 5 year, 24 hour storm (expressed in tenths of an inch of rainfall), as determined by using these maps:

   http://www.wrcc.dri.edu/pcpnfreq/nca5y24.gif
   http://www.wrcc.dri.edu/pcpnfreq/sca5y24.gif

   Compliance storm event verification shall be done by reporting on-site rain gauge readings as well as nearby governmental rain gauge readings.

4. Dischargers shall not be required to comply with NELs if the site receives run-on from a forest fire or any other natural disaster.

C. Numeric Action Levels (NALs)

1. For Risk Level 2 and 3 dischargers, the lower storm event average NAL for pH is 6.5 pH units and the upper storm event average NAL for pH is 8.5 pH units. The discharger shall take actions as described below if the discharge is outside of this range of pH values.

[12] A period of high risk of pH discharge is defined as a project's complete utilities phase, complete vertical build phase, and any portion of any phase where significant amounts of materials are placed directly on the land at the site in a manner that could result in significant alterations of the background pH of the discharges.

2. For Risk Level 2 and 3 dischargers, the NAL storm event daily average for turbidity is 250 NTU. The discharger shall take actions as described below if the discharge is outside of this range of turbidity values.

3. Whenever the results from a storm event daily average indicate that the discharge is below the lower NAL for pH, exceeds the upper NAL for pH, or exceeds the turbidity NAL (as listed in Table 1), the discharger shall conduct a construction site and run-on evaluation to determine whether pollutant source(s) associated with the site's construction activity may have caused or contributed to the NAL exceedance and shall immediately implement corrective actions if they are needed.

4. The site evaluation shall be documented in the SWPPP and specifically address whether the source(s) of the pollutants causing the exceedance of the NAL:

    a. Are related to the construction activities and whether additional BMPs are required to (1) meet BAT/BCT requirements; (2) reduce or prevent pollutants in storm water discharges from causing exceedances of receiving water objectives; and (3) determine what corrective action(s) were taken or will be taken and with a description of the schedule for completion.

        AND/OR:

    b. Are related to the run-on associated with the construction site location and whether additional BMPs measures are required to (1) meet BAT/BCT requirements; (2) reduce or prevent pollutants in storm water discharges from causing exceedances of receiving water objectives; and (3) what corrective action(s) were taken or will be taken with a description of the schedule for completion.

VI. RECEIVING WATER LIMITATIONS

A. The discharger shall ensure that storm water discharges and authorized non-storm water discharges to any surface or ground water will not adversely affect human health or the environment.

B. The discharger shall ensure that storm water discharges and authorized non-storm water discharges will not contain pollutants in quantities that threaten to cause pollution or a public nuisance.

C. The discharger shall ensure that storm water discharges and authorized non-storm water discharges will not contain pollutants that cause or contribute to an exceedance of any applicable water quality objectives or water quality standards (collectively, WQS) contained in a Statewide Water Quality Control Plan, the California Toxics Rule, the National Toxics Rule, or the applicable Regional Water Board's Water Quality Control Plan (Basin Plan).

D. Dischargers located within the watershed of a CWA § 303(d) impaired water body, for which a TMDL has been approved by the U.S. EPA, shall comply with the approved TMDL if it identifies "construction activity" or land disturbance as a source of the pollution.

VII. TRAINING QUALIFICATIONS AND CERTIFICATION REQUIREMENTS

A. General

The discharger shall ensure that all persons responsible for implementing requirements of this General Permit shall be appropriately trained in accordance with this Section. Training should be both formal and informal, occur on an ongoing basis, and should include training offered by recognized governmental agencies or professional organizations. Those responsible for preparing and amending SWPPPs shall comply with the requirements in this Section VII.

The discharger shall provide documentation of all training for persons responsible for implementing the requirements of this General Permit in the Annual Reports.

B. SWPPP Certification Requirements

1. **Qualified SWPPP Developer:** The discharger shall ensure that SWPPPs are written, amended and certified by a Qualified SWPPP Developer (QSD). A QSD shall have one of the following registrations or certifications, and appropriate experience, as required for:

   a. A California registered professional civil engineer;

   b. A California registered professional geologist or engineering geologist;

   c. A California registered landscape architect;

   d. A professional hydrologist registered through the American Institute of Hydrology;

   e. A Certified Professional in Erosion and Sediment Control (CPESC) ™ registered through Enviro Cert International, Inc.;

   f. A Certified Professional in Storm Water Quality (CPSWQ) ™ registered through Enviro Cert International, Inc.; or

   g. A professional in erosion and sediment control registered through the National Institute for Certification in Engineering Technologies (NICET).

Effective two years after the adoption date of this General Permit, a QSD shall have attended a State Water Board-sponsored or approved QSD training course.

2. The discharger shall list the name and telephone number of the currently designated Qualified SWPPP Developer(s) in the SWPPP.

3. **Qualified SWPPP Practitioner:** The discharger shall ensure that all BMPs required by this General Permit are implemented by a Qualified SWPPP Practitioner (QSP). A QSP is a person responsible for non-storm water and storm water visual observations, sampling and analysis. Effective two years from the date of adoption of this General Permit, a QSP shall be either a QSD or have one of the following certifications:

   a. A certified erosion, sediment and storm water inspector registered through Enviro Cert International, Inc.; or

   b. A certified inspector of sediment and erosion control registered through Certified Inspector of Sediment and Erosion Control, Inc.

   Effective two years after the adoption date of this General Permit, a QSP shall have attended a State Water Board-sponsored or approved QSP training course.

4. The LRP shall list in the SWPPP, the name of any Approved Signatory, and provide a copy of the written agreement or other mechanism that provides this authority from the LRP in the SWPPP.

5. The discharger shall include, in the SWPPP, a list of names of all contractors, subcontractors, and individuals who will be directed by the Qualified SWPPP Practitioner. This list shall include telephone numbers and work addresses. Specific areas of responsibility of each subcontractor and emergency contact numbers shall also be included.

6. The discharger shall ensure that the SWPPP and each amendment will be signed by the Qualified SWPPP Developer. The discharger shall include a listing of the date of initial preparation and the date of each amendment in the SWPPP.

VIII. RISK DETERMINATION

The discharger shall calculate the site's sediment risk and receiving water risk during periods of soil exposure (i.e. grading and site stabilization) and use the calculated risks to determine a Risk Level(s) using the methodology in

Appendix 1. For any site that spans two or more planning watersheds,[13] the discharger shall calculate a separate Risk Level for each planning watershed. The discharger shall notify the State Water Board of the site's Risk Level determination(s) and shall include this determination as a part of submitting the PRDs. If a discharger ends up with more than one Risk Level determination, the Regional Water Board may choose to break the project into separate levels of implementation.

IX. RISK LEVEL 1 REQUIREMENTS

Risk Level 1 Dischargers shall comply with the requirements included in Attachment C of this General Permit.

X. RISK LEVEL 2 REQUIREMENTS

Risk Level 2 Dischargers shall comply with the requirements included in Attachment D of this General Permit.

XI. RISK LEVEL 3 REQUIREMENTS

Risk Level 3 Dischargers shall comply with the requirements included in Attachment E of this General Permit.

XII. ACTIVE TREATMENT SYSTEMS (ATS)

Dischargers choosing to implement an ATS on their site shall comply with all of the requirements in Attachment F of this General Permit.

[13] Planning watershed: defined by the Calwater Watershed documents as a watershed that ranges in size from approximately 3,000 to 10,000 acres http://cain.ice.ucdavis.edu/calwater/calwfaq.html, http://gis.ca.gov/catalog/BrowseRecord.epl?id=22175 .

XIII. POST-CONSTRUCTION STANDARDS

A. All dischargers shall comply with the following runoff reduction requirements unless they are located within an area subject to post-construction standards of an active Phase I or II municipal separate storm sewer system (MS4) permit that has an approved Storm Water Management Plan.

1. This provision shall take effect three years from the adoption date of this permit, or later at the discretion of the Executive Officer of the Regional Board.

2. The discharger shall demonstrate compliance with the requirements of this section by submitting with their NOI a map and worksheets in accordance with the instructions in Appendix 2. The discharger shall use non-structural controls unless the discharger demonstrates that non-structural controls are infeasible or that structural controls will produce greater reduction in water quality impacts.

3. The discharger shall, through the use of non-structural and structural measures as described in Appendix 2, replicate the pre-project water balance (for this permit, defined as the volume of rainfall that ends up as runoff) for the smallest storms up to the 85th percentile storm event (or the smallest storm event that generates runoff, whichever is larger). Dischargers shall inform Regional Water Board staff at least 30 days prior to the use of any structural control measure used to comply with this requirement. Volume that cannot be addressed using non-structural practices shall be captured in structural practices and approved by the Regional Water Board. When seeking Regional Board approval for the use of structural practices, dischargers shall document the infeasibility of using non-structural practices on the project site, or document that there will be fewer water quality impacts through the use of structural practices.

4. For sites whose disturbed area exceeds two acres, the discharger shall preserve the pre-construction drainage density (miles of stream length per square mile of drainage area) for all drainage areas within the area serving a first order stream[14] or larger stream and ensure that post-project time of runoff concentration is equal or greater than pre-project time of concentration.

[14] A first order stream is defined as a stream with no tributaries.

B. All dischargers shall implement BMPs to reduce pollutants in storm water discharges that are reasonably foreseeable after all construction phases have been completed at the site (Post-construction BMPs).

XIV. SWPPP REQUIREMENTS

A. The discharger shall ensure that the Storm Water Pollution Prevention Plans (SWPPPs) for all traditional project sites are developed and amended or revised by a QSD. The SWPPP shall be designed to address the following objectives:

1. All pollutants and their sources, including sources of sediment associated with construction, construction site erosion and all other activities associated with construction activity are controlled;

2. Where not otherwise required to be under a Regional Water Board permit, all non-storm water discharges are identified and either eliminated, controlled, or treated;

3. Site BMPs are effective and result in the reduction or elimination of pollutants in storm water discharges and authorized non-storm water discharges from construction activity to the BAT/BCT standard;

4. Calculations and design details as well as BMP controls for site run-on are complete and correct, and

5. Stabilization BMPs installed to reduce or eliminate pollutants after construction are completed.

B. To demonstrate compliance with requirements of this General Permit, the QSD shall include information in the SWPPP that supports the conclusions, selections, use, and maintenance of BMPs.

C. The discharger shall make the SWPPP available at the construction site during working hours while construction is occurring and shall be made available upon request by a State or Municipal inspector. When the original SWPPP is retained by a crewmember in a construction vehicle and is not currently at the construction site, current copies of the BMPs and map/drawing will be left with the field crew and the original SWPPP shall be made available via a request by radio/telephone.

XV. REGIONAL WATER BOARD AUTHORITIES

A. In the case where the Regional Water Board does not agree with the discharger's self-reported risk level (e.g., they determine themselves to be a Level 1 Risk when they are actually a Level 2 Risk site), Regional Water Boards may either direct the discharger to reevaluate the Risk Level(s) for their site or terminate coverage under this General Permit.

B. Regional Water Boards may terminate coverage under this General Permit for dischargers who fail to comply with its requirements or where they determine that an individual NPDES permit is appropriate.

C. Regional Water Boards may require dischargers to submit a Report of Waste Discharge / NPDES permit application for Regional Water Board consideration of individual requirements.

D. Regional Water Boards may require additional Monitoring and Reporting Program Requirements, including sampling and analysis of discharges to sediment-impaired water bodies.

E. Regional Water Boards may require dischargers to retain records for more than the three years required by this General Permit.

XVI. ANNUAL REPORTING REQUIREMENTS

A. All dischargers shall prepare and electronically submit an Annual Report no later than September 1 of each year.

B. The discharger shall certify each Annual Report in accordance with the Special Provisions.

C. The discharger shall retain an electronic or paper copy of each Annual Report for a minimum of three years after the date the annual report is filed.

D. The discharger shall include storm water monitoring information in the Annual Report consisting of:

1. a summary and evaluation of all sampling and analysis results, including copies of laboratory reports;

2. the analytical method(s), method reporting unit(s), and method detection limit(s) of each analytical parameter (analytical results that are less than the method detection limit shall be reported as "less than the method detection limit");

3. a summary of all corrective actions taken during the compliance year;

4. identification of any compliance activities or corrective actions that were not implemented;

5. a summary of all violations of the General Permit;

6. the names of individual(s) who performed the facility inspections, sampling, visual observation (inspections), and/or measurements;

7. the date, place, time of facility inspections, sampling, visual observation (inspections), and/or measurements, including precipitation (rain gauge); and

8. the visual observation and sample collection exception records and reports specified in Attachments C, D, and E.

E. The discharger shall provide training information in the Annual Report consisting of:

1. documentation of all training for individuals responsible for all activities associated with compliance with this General Permit;

2. documentation of all training for individuals responsible for BMP installation, inspection, maintenance, and repair; and

3. documentation of all training for individuals responsible for overseeing, revising, and amending the SWPPP.

ATTACHMENT C-2

SITE RISK ANALYSIS

	A	B	C
1	**Sediment Risk Factor Worksheet**		**Entry**
2	**A) R Factor**		
3	Analyses of data indicated that when factors other than rainfall are held constant, soil loss is directly proportional to a rainfall factor composed of total storm kinetic energy (E) times the maximum 30-min intensity (I30) (Wischmeier and Smith, 1958). The numerical value of R is the average annual sum of EI30 for storm events during a rainfall record of at least 22 years. "Isoerodent" maps were developed based on R values calculated for more than 1000 locations in the Western U.S. Refer to the link below to determine the R factor for the project site.		
4	http://cfpub.epa.gov/npdes/stormwater/LEW/lewCalculator.cfm		
5	**R Factor Value**		13.4
6	**B) K Factor (weighted average, by area, for all site soils)**		
7	The soil-erodibility factor K represents: (1) susceptibility of soil or surface material to erosion, (2) transportability of the sediment, and (3) the amount and rate of runoff given a particular rainfall input, as measured under a standard condition. Fine-textured soils that are high in clay have low K values (about 0.05 to 0.15) because the particles are resistant to detachment. Coarse-textured soils, such as sandy soils, also have low K values (about 0.05 to 0.2) because of high infiltration resulting in low runoff even though these particles are easily detached. Medium-textured soils, such as a silt loam, have moderate K values (about 0.25 to 0.45) because they are moderately susceptible to particle detachment and they produce runoff at moderate rates. Soils having a high silt content are especially susceptible to erosion and have high K values, which can exceed 0.45 and can be as large as 0.65. Silt-size particles are easily detached and tend to crust, producing high rates and large volumes of runoff. Use Site-specific data must be submitted.		
8	Site-specific K factor guidance		
9	**K Factor Value**		0.32
10	**C) LS Factor (weighted average, by area, for all slopes)**		
11	The effect of topography on erosion is accounted for by the LS factor, which combines the effects of a hillslope-length factor, L, and a hillslope-gradient factor, S. Generally speaking, as hillslope length and/or hillslope gradient increase, soil loss increases. As hillslope length increases, total soil loss and soil loss per unit area increase due to the progressive accumulation of runoff in the downslope direction. As the hillslope gradient increases, the velocity and erosivity of runoff increases. Use the LS table located in separate tab of this spreadsheet to determine LS factors. Estimate the weighted LS for the site prior to construction.		
12	LS Table		
13	**LS Factor Value**		2.3
14			
15	**Watershed Erosion Estimate (=RxKxLS) in tons/acre**		9.8624
16	**Site Sediment Risk Factor**		**Low**
17	Low Sediment Risk: < 15 tons/acre		
18	Medium Sediment Risk: >=15 and <75 tons/acre		
19	High Sediment Risk: >= 75 tons/acre		
20			

Receiving Water (RW) Risk Factor Worksheet	Entry	Score
A. Watershed Characteristics	**yes/no**	
A.1. Does the disturbed area discharge (either directly or indirectly) to a **303(d)-listed waterbody impaired by sediment** (For help with impaired waterbodies please visit the link below) or has a **USEPA approved TMDL implementation plan for sediment**?:	**no**	**Low**
http://www.waterboards.ca.gov/water_issues/programs/tmdl/integrated2010.shtml		
OR		
A.2. Does the disturbed area discharge to a waterbody with designated beneficial uses of SPAWN & COLD & MIGRATORY? (For help please review the appropriate Regional Board Basin Plan)		
http://www.waterboards.ca.gov/waterboards_map.shtml		
Region 1 Basin Plan Region 2 Basin Plan Region 3 Basin Plan Region 4 Basin Plan Region 5 Basin Plan Region 6 Basin Plan Region 7 Basin Plan Region 8 Basin Plan Region 9 Basin Plan		

Combined Risk Level Matrix

Receiving Water Risk		Sediment Risk		
		Low	**Medium**	**High**
	Low	Level 1	Level 2	
	High	Level 2		Level 3

Project Sediment Risk:	**Low**
Project RW Risk:	**Low**
Project Combined Risk:	**Level 1**

ATTACHMENT C-3

SWPPP AMENDMENT LOG

STORM WATER POLLUTION PREVENTION PLAN

Lendrum Court
San Francisco, California

AMENDMENT LOG

Project Name: Lendrum Court

Project Number: 229649

Amendment No.	Date	Brief Description of Amendment, include section and page number	Prepared and Approved By
1	12/7/2015	Sec. 1.1 – Introduction; Sec. 1.4 – Amendements; Sec. 1.8 – Changes to Project Coverage; Sec. 2.1.1 – Site Description; Sec. 6.2 – Contractor List	Name: Christian Herencia QSD# 00389
2	1/7/2016	Sec. 1.1 – Introduction; Sec. 1.4 – Amendments; Sec. 1.8 – Changes to Project Coverage; Section 2.1.1 – Site Description	Name: Christian Herencia QSD# 00389
			Name: QSD#
			Name: QSD#
			Name: QSD#
			Name: QSD#
			Name: QSD#
			Name: QSD#
			Name: QSD#
			Name: QSD#
			Name: QSD#
			Name: QSD#

APPENDIX C
STORM WATER POLLUTION PREVENTION PLAN
LENDRUM COURT
PRESIDIO OF SAN FRANCISCO, CALIFORNIA

THE PRESIDIO TRUST
103 Montgomery Street, P.O. Box 29052
San Francisco, California 94129-0052

TRC Project No. 229649

December 7, 2015

Amendment No. 1

TRC
9685 Research Drive
Irvine, CA 92618
(949) 727-9336

APPENDIX C
STORM WATER POLLUTION PREVENTION PLAN
LENDRUM COURT
PRESIDIO OF SAN FRANCISCO, CALIFORNIA

December 7, 2015

Prepared for

THE PRESIDIO TRUST
103 Montgomery Street, P.O. Box 29052
San Francisco, California 94129-0052

Prepared By

Christian Herencia

Senior Project Engineer

Amendment No. 1

Brandon Reed, PE
Senior Staff Engineer

TRC
9685 Research Drive
Irvine, CA 92618
Telephone 949-727-9336

STORM WATER POLLUTION PREVENTION PLAN

Lendrum Court
San Francisco, California

QUALIFIED SWPPP DEVELOPER

Approval and Certification of the Storm Water Pollution Prevention Plan

Project Name: Lendrum Court

Project Number: 229649

"This Storm Water Pollution Prevention Plan and Attachments were prepared under my direction to meet the requirements of the California Construction General Permit (CGP) (SWRCB Order No. 2009-009-DWQ as amended by Orders 2010-0014-DWQ and 2012-006-DWQ). I certify that I am a Qualified SWPPP Developer in good standing as of the date below."

Christian Herencia

QSD Signature

12-07-2015
Date

Christian Herencia, PE, QSD/QSP
QSD Name

#000389
QSD Certification Number

Title and Affiliation: Senior Project Engineer, TRC Solutions Inc. (TRC)

Telephone Number: (858-505-8881 ext. 14923)

Email: CHerencia@TRCSolutions.com

STORM WATER POLLUTION PREVENTION PLAN

Lendrum Court
San Francisco, California

LEGALLY RESPONSIBLE PERSON

Approval and Certification of the Storm Water Pollution Prevention Plan

Project Name: Lendrum Court

"I certify under penalty of law that this document and all attachments were prepared under my direction or 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, 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."

Signature of Legally Responsible Person (or Approved Signatory)	Date
Name of LRP or Approved Signatory	Company
Title	Telephone Number

STORM WATER POLLUTION PREVENTION PLAN
Lendrum Court
San Francisco, California

1.0 SWPPP REQUIREMENTS

1.1 INTRODUCTION

This Construction Storm Water Pollution Prevention Plan (SWPPP) has been prepared at the direction of the Presidio Trust (Trust). This SWPPP is for the planned remediation project at the Lendrum Court Site (Site) located at the Presidio in San Francisco, California (Presidio). The SWPPP is in compliance with the National Pollutant Discharge Elimination System (NPDES) Construction General Permit (CGP) for Storm Water Discharges Associated with Construction Activity, Order No. 2009-0009-DWQ, NPDES No. CAS000002 as amended by 2010-0014-DWQ and 2012-006-DWQ. This CGP, enforced by the State Water Resources Control Board (SWRCB), regulates pollutants in discharges of storm water associated with construction activity to surface waters.

Reference the SWPPP (Lendrum Court, Presidio of San Francisco, CA) Project No. 229649, prepared by TRC Solutions (dated July 2015). Please note, no change to SWPPP Section 1.1.

This SWPPP is designed to be a working document and will be modified as appropriate and as necessary during the life of the project to address changes in construction or operations that affect the discharge of pollutants from the Site. Therefore, the objectives of this SWPPP, along with its Attachments covering project-specific storm water pollution prevention practices, are as follows:

- Identify all pollutants, pollutant sources, including sources of sediment that can affect the quality of storm water discharges associated with construction activity (storm water discharges) from the construction Site and ensure they are controlled;
- Where not otherwise required to be under a Regional Water Quality Control Board (RWQCB) permit, identify and either eliminate, control, or treat all non-storm water discharges;
- Select Site Best Management Practices (BMPs). BMPs are effective and result in the reduction or elimination of pollutants in storm water discharges and authorized non-storm water discharges from construction activity to the Best Available Technology/Best Control Technology standard;
- Develop a maintenance schedule for sediment and erosion control BMPs installed during construction, designed to reduce or eliminate pollutants after construction is completed (post-construction BMPs);
- Present calculations and design details as well as BMP controls for Site run-on;
- Identify stabilization BMPs installed to reduce or eliminate pollutants after construction is completed;
- Identify and provide methods to implement BMP inspection, visual monitoring and Construction Site Monitoring Program (CSMP) requirements to comply with the CGP; and

- Identify a sampling and analysis strategy, and sampling schedule for discharges that have been discovered through visual observations to be potentially contaminated by pollutants not visually detectable in the runoff.

Although NPDES permit coverage is not required for this project due to authorization under Comprehensive Environmental Response Compensation and Liability Act (CERCLA), the SWPPP was prepared to substantially comply with California's General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities (General Permit) Order No. 2009-0009-DWQ (NPDES No. CAS000002) as amended by Orders 2010-0014-DWQ and 2012-006-DWQ issued by the SWRCB. The Contractor will perform construction in accordance with the SWPPP and Erosion Control Plan; however, as a federal agency implementing a remedial action under CERCLA, the Trust will not submit a Notice of Intent (NOI) for coverage under the State of California's General Permit for construction storm water management.

Reference the SWPPP (Lendrum Court, Presidio of San Francisco, CA) Project No. 229649, prepared by TRC Solutions (dated July 2015). Please note, no change to SWPPP Section 1.1.

*This SWPPP **Amendment No. 1** is prepared in accordance with the Risk Level 1 requirements of the CGP. An additional location is required for temporary storage of opportunistic screened fill material that will incorporate a supplemental Stockpile Plan as provided in Figure A (attached).*

1.2 PERMIT REGISTRATION DOCUMENTS

A NOI will not be submitted prior to the start of construction activity due to authorization under CERCLA.

1.3 SWPPP AVAILABILITY AND IMPLEMENTATION

Reference the SWPPP (Lendrum Court, Presidio of San Francisco, CA) Project No. 229649, prepared by TRC Solutions (dated July 2015). Please note, no change to SWPPP Section 1.3.

1.4 AMENDMENTS

The SWPPP will be amended by the Qualified SWPPP Developer (QSD) when the following conditions are encountered:

- BMPs do not meet the objectives of reducing or eliminating pollutants in storm water discharges;
- There is a change in construction or operations, which may affect the discharge of pollutants to surface water, groundwater, or a municipal separate storm sewer system;
- Upon request by the California Regional Water Quality Control Board, San Francisco Bay Region (Regional Water Board) to amend this SWPPP; or
- As deemed necessary by the QSD.

All amendments to the SWPPP must be documented. When amended or revised, the SWPPP will include a listing of the date of initial preparation, the date of each amendment and be signed by a QSD. All

amendments will be dated and remain in the SWPPP. Blank amendment forms and the Amendment Log are located in Attachment C-3.

The following items will be included in all amendments:

- Who requested the amendment;
- The location of the proposed change;
- The reason for change;
- The original BMP, if any; and
- The new proposed or revised BMP.

Amendment No. 1 *proposes an increase in acreage (approximately 0.16 acres) that is located on an empty corner lot (Lot #1347) bounded by Greenough Avenue and Kobbe Avenue for the temporary storage of opportunistic screened fill material. In addition, it identifies a contractor that will be responsible for the storage, deployment of BMPs and maintenance of said material. Refer to the Amendment Form (No. 1) and Amendment Log provided.*

1.5 RETENTION OF RECORDS

Reference the SWPPP (Lendrum Court, Presidio of San Francisco, CA) Project No. 229649, prepared by TRC Solutions (dated July 2015). Please note, no change to SWPPP Section 1.5.

1.6 NON-COMPLIANCE REPORTING

Reference the SWPPP (Lendrum Court, Presidio of San Francisco, CA) Project No. 229649, prepared by TRC Solutions (dated July 2015). Please note, no change to SWPPP Section 1.6.

1.7 SUMMARY REPORT

Reference the SWPPP (Lendrum Court, Presidio of San Francisco, CA) Project No. 229649, prepared by TRC Solutions (dated July 2015). Please note, no change to SWPPP Section 1.7.

1.8 CHANGES TO PROJECT COVERAGE

Reference the SWPPP (Lendrum Court, Presidio of San Francisco, CA) Project No. 229649, prepared by TRC Solutions (dated July 2015). Please note, no change to SWPPP Section 1.8.

Amendment No. 1 *proposes an increase in acreage (approximately 0.16 acres) that is located on an empty corner lot (Lot #1347) bounded by Greenough Avenue and Kobbe Avenue.*

1.9 FINAL STABILIZATION

Reference the SWPPP (Lendrum Court, Presidio of San Francisco, CA) Project No. 229649, prepared by TRC Solutions (dated July 2015). Please note, no change to SWPPP Section 1.9.

2.0 PROJECT INFORMATION

This SWPPP is provided as an appendix to the Remedial Design Implementation Plan (RDIP), which describes processes and procedures to be implemented by the Presidio Trust (Trust) to remediate the area.

2.1 PROJECT AND SITE DESCRIPTION

2.1.1 Site Description

Reference the SWPPP (Lendrum Court, Presidio of San Francisco, CA) Project No. 229649, prepared by TRC Solutions (dated July 2015). Please note, no change to SWPPP, Sections 2.1.1.

***Amendment No. 1** proposes an increase in acreage (approximately 0.16 acres) that is located on an empty corner lot (Lot #1347) bounded by Greenough Avenue and Kobbe Avenue. The additional acreage will change the overall construction site acreage from 2.59 acres to 2.75 acres.*

2.1.2 Remedial Construction Activities

Reference the SWPPP (Lendrum Court, Presidio of San Francisco, CA) Project No. 229649, prepared by TRC Solutions (dated July 2015). Please note, no change to SWPPP, Sections 2.1.2 to 2.1.6 and Sections 2.2 to 2.7.

3.0 BEST MANAGEMENT PRACTICES

Reference the SWPPP (Lendrum Court, Presidio of San Francisco, CA) Project No. 229649, prepared by TRC Solutions (dated July 2015). Please note, no change to SWPPP, Sections 3.1 to 3.4.

4.0 BMP INSPECTION AND MAINTENANCE

Reference the SWPPP (Lendrum Court, Presidio of San Francisco, CA) Project No. 229649, prepared by TRC Solutions (dated July 2015). Please note, no change to SWPPP, Section 4.0 to 4.1.

5.0 TRAINING

Reference the SWPPP (Lendrum Court, Presidio of San Francisco, CA) Project No. 229649, prepared by TRC Solutions (dated July 2015). Please note, no change to SWPPP, Section 5.0.

6.0 RESPONSIBLE PARTIES AND OPERATORS

Reference the SWPPP (Lendrum Court, Presidio of San Francisco, CA) Project No. 229649, prepared by TRC Solutions (dated July 2015). Please note, no change to SWPPP, Sections 6.0 to 6.1.

6.2 CONTRACTOR LIST

The CGP requires that the SWPPP include a list of names of all contractors, subcontractors, and individuals who will be directed by the QSP. The list is included as Attachment C-11 of this SWPPP. The list includes telephone numbers and work addresses and the specific areas of responsibility of each subcontractor and emergency contact numbers. The prime contractor contact information is listed below.

Prime Contractor Contact

Name: *Claire Walker*

Title: Engineer

Company: *Engineering/Remediation Resources Group, Inc. (ERRG)*

Address: 115 Sansome Street, Suite 200, San Francisco, CA 94104

Phone Number: 415-395-9974

Cell Phone Number: 415-602-9448

7.0 CONSTRUCTION SITE MONITORING PROGRAM

Reference the SWPPP (Lendrum Court, Presidio of San Francisco, CA) Project No. 229649, prepared by TRC Solutions (dated July 2015). Please note, no change to SWPPP, Sections 7.0 to 7.11.

8.0 REFERENCES

Reference the SWPPP (Lendrum Court, Presidio of San Francisco, CA) Project No. 229649, prepared by TRC Solutions (dated July 2015). Please note, no change to SWPPP, Section 8.0.

LENDRUM COURT - PHASE 1 CONSTRUCTION
DISTURBED AREA AMENDMENT FORM

Amendment No. 1

Reason for Amendment:

Amendment No. 1 *was requested by the Presidio Trust in conjunction with the General Contractor Engineering/Remediation Resources Group, Inc. (ERRG). The proposed increase in acreage (approximately 0.16 acres) is located on an empty corner lot (Lot #1347) bounded by Greenough Avenue and Kobbe Avenue. A dense tree canopy surrounds all sides of the lot with the exception at Kobbe Avenue. The reason for the change in acreage is due to the need to provide temporary storage of opportunistic screened fill material that has become available from an adjacent construction site that is not related to the Lendrum Court project. The new proposed temporary storage location (Lot # 1347) was not originally accounted for in the Lendrum Court SWPPP, thus no BMPs were identified for the location. The new proposed temporary storage location (Lot # 1347) will implement Stockpile Management (WM3) pursuant to the CASQA Stormwater Best Management Practice Handbook Portal: Construction (Rev. July 2012) and incorporate additional BMPs as follows:*

- *Wrap k-rail and cover entire base area with geotextile fabric*
- *Install k-rail barriers on west, north, and east side of 1347 lot (all sides except along Kobbe Ave)*
- *Install straw wattle in swale downgradient of the 1347 lot, towards Greenough Ave*
- *Receive and stockpile opportunistic screened fill material from adjacent construction project not related to the Lendrum Court project*
- *Install zip tied geotextile fabric cover on top of stockpile and secure cover with sand bags*
- *Install straw wattle along southern side of stockpile which won't have k-rail (this is the upslope side and from where we'll be accessing the stockpile)*
- *Install temporary fence with privacy fence around entire perimeter of both k-rail and stockpile*

Date Amendment Implemented: *December 7, 2015*

What specifically was amended in the SWPPP?

The following Sections were amended:

Section 1.1 - Introduction; Section 1.4 - Amendments; Section 1.8 - Changes to Project Coverage; Section 2.1.1 - Site Description; Section 6.2 - Contractor List

I certify this SWPPP Amendment is being made by the responsible corporate officer or the authorized representative. A copy of the required delegation letter is included in the SWPPP.

Signature: Christian Herencia Date: *December 7, 2015*

Printed Name: Christian Herencia, PE, QSD/QSP

CERTIFICATE OF TRAINING

CALIFORNIA CONSTRUCTION GENERAL PERMIT

QUALIFIED SWPPP DEVELOPER (QSD)
AND
QUALIFIED SWPPP PRACTITIONER (QSP)

Christian Herencia

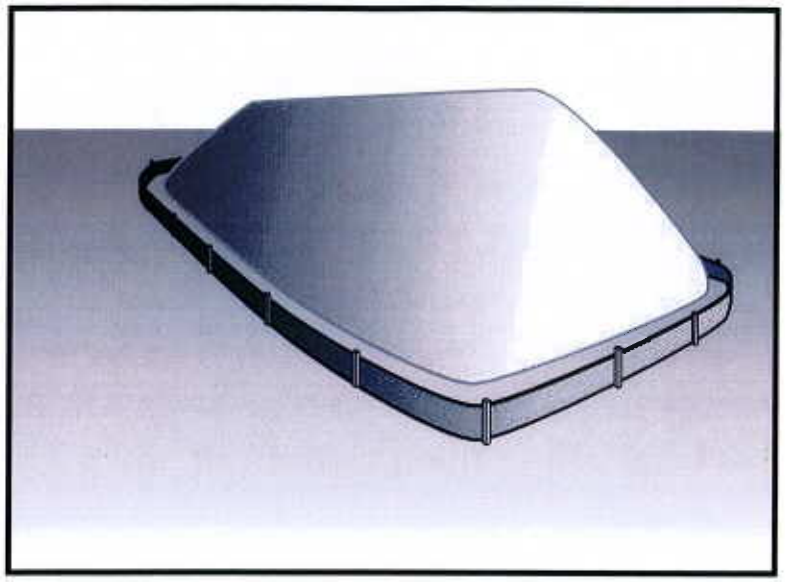
Jan 29, 2015 - Mar 01, 2017

Certificate # 00389

CASQA
CALIFORNIA STORMWATER QUALITY ASSOCIATION®

California Stormwater Quality Association and
California Construction General Permit Training Team

Stockpile Management WM-3



Categories		
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 Category**
☒ **Secondary Category**

Description and Purpose

Stockpile management procedures and practices are designed to reduce or eliminate air and stormwater pollution from stockpiles of soil, soil amendments, sand, paving materials such as portland cement concrete (PCC) rubble, asphalt concrete (AC), asphalt concrete rubble, aggregate base, aggregate sub base or pre-mixed aggregate, asphalt minder (so called "cold mix" asphalt), and pressure treated wood.

Suitable Applications

Implement in all projects that stockpile soil and other loose materials.

Limitations

- Plastic sheeting as a stockpile protection is temporary and hard to manage in windy conditions. Where plastic is used, consider use of plastic tarps with nylon reinforcement which may be more durable than standard sheeting.
- Plastic sheeting can increase runoff volume due to lack of infiltration and potentially cause perimeter control failure.
- Plastic sheeting breaks down faster in sunlight.
- The use of Plastic materials and photodegradable plastics should be avoided.

Implementation

Protection of stockpiles is a year-round requirement. To properly manage stockpiles:

Targeted Constituents	
Sediment	☑
Nutrients	☑
Trash	☑
Metals	☑
Bacteria	
Oil and Grease	☑
Organics	☑

Potential Alternatives

None

- On larger sites, a minimum of 50 ft separation from concentrated flows of stormwater, drainage courses, and inlets is recommended.
- After 14 days of inactivity, a stockpile is non-active and requires further protection described below. All stockpiles are required to be protected as non-active stockpiles immediately if they are not scheduled to be used within 14 days.
- Protect all stockpiles from stormwater runon using temporary perimeter sediment barriers such as compost berms (SE-13), temporary silt dikes (SE-12), fiber rolls (SE-5), silt fences (SE-1), sandbags (SE-8), gravel bags (SE-6), or biofilter bags (SE-14). Refer to the individual fact sheet for each of these controls for installation information.
- Implement wind erosion control practices as appropriate on all stockpiled material. For specific information, see WE-1, Wind Erosion Control.
- Manage stockpiles of contaminated soil in accordance with WM-7, Contaminated Soil Management.
- Place bagged materials on pallets and under cover.
- Ensure that stockpile coverings are installed securely to protect from wind and rain.
- Some plastic covers withstand weather and sunlight better than others. Select cover materials or methods based on anticipated duration of use.

Protection of Non-Active Stockpiles

A stockpile is considered non-active if it either is not used for 14 days or if it is scheduled not to be used for 14 days or more. Stockpiles need to be protected immediately if they are not scheduled to be used within 14 days. Non-active stockpiles of the identified materials should be protected as follows:

Soil stockpiles

- Soil stockpiles should be covered or protected with soil stabilization measures and a temporary perimeter sediment barrier at all times.
- Temporary vegetation should be considered for topsoil piles that will be stockpiled for extended periods.

Stockpiles of Portland cement concrete rubble, asphalt concrete, asphalt concrete rubble, aggregate base, or aggregate sub base

- Stockpiles should be covered and protected with a temporary perimeter sediment barrier at all times.

Stockpiles of "cold mix"

- Cold mix stockpiles should be placed on and covered with plastic sheeting or comparable material at all times and surrounded by a berm.

Stockpiles of fly ash, stucco, hydrated lime

- Stockpiles of materials that may raise the pH of runoff (i.e., basic materials) should be covered with plastic and surrounded by a berm.

Stockpiles/Storage of wood (Pressure treated with chromated copper arsenate or ammoniacal copper zinc arsenate

- Treated wood should be covered with plastic sheeting or comparable material at all times and surrounded by a berm.

Protection of Active Stockpiles

A stockpile is active when it is being used or is scheduled to be used within 14 days of the previous use. Active stockpiles of the identified materials should be protected as follows:

- All stockpiles should be covered and protected with a temporary linear sediment barrier prior to the onset of precipitation.
- Stockpiles of "cold mix" and treated wood, and basic materials should be placed on and covered with plastic sheeting or comparable material and surrounded by a berm prior to the onset of precipitation.
- The downstream perimeter of an active stockpile should be protected with a linear sediment barrier or berm and runoff should be diverted around or away from the stockpile on the upstream perimeter.

Costs

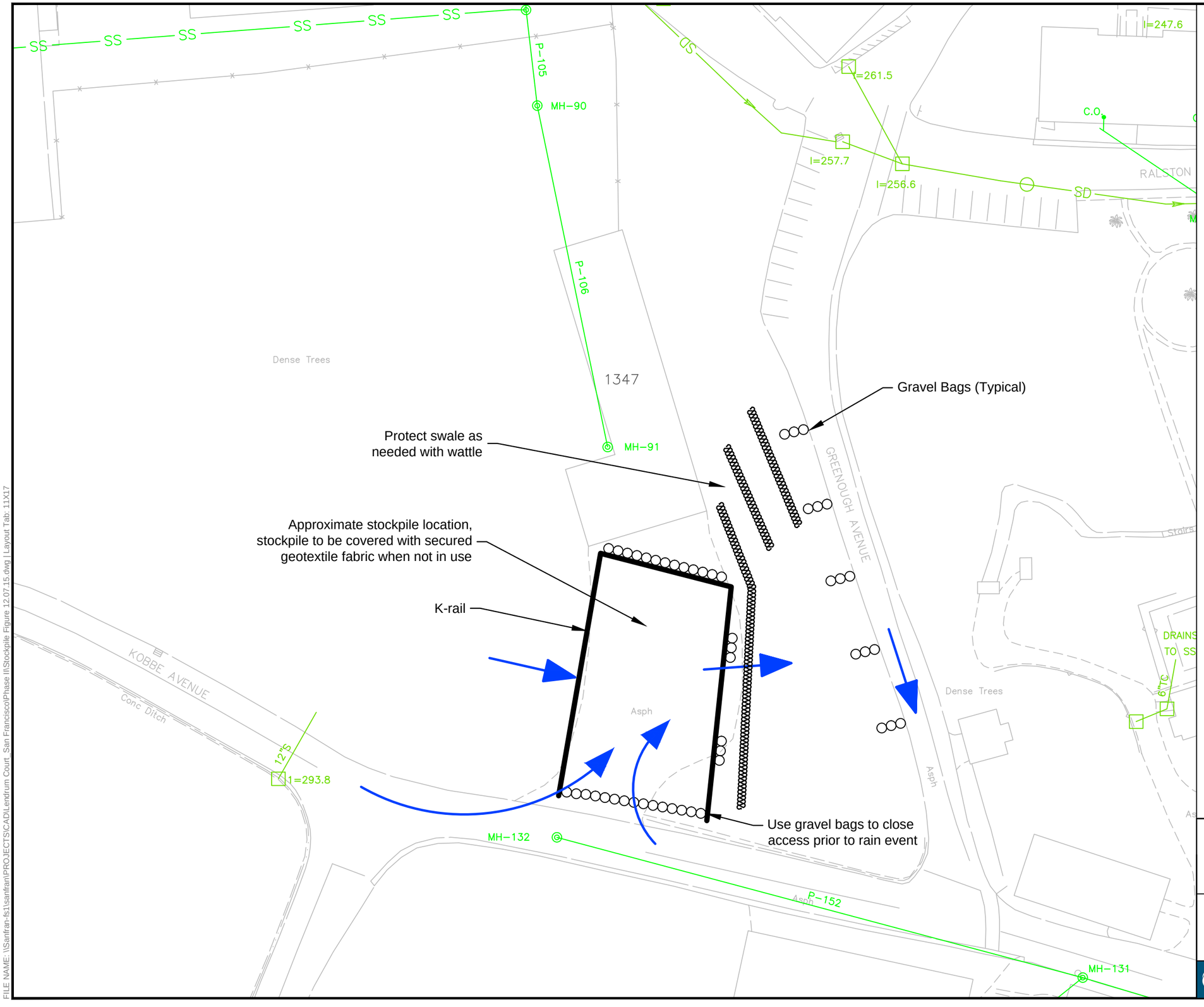
For cost information associated with stockpile protection refer to the individual erosion or sediment control BMP fact sheet considered for implementation (For example, refer to SE-1 Silt Fence for installation of silt fence around the perimeter of a stockpile.)

Inspection and Maintenance

- Stockpiles must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- It may be necessary to inspect stockpiles covered with plastic sheeting more frequently during certain conditions (for example, high winds or extreme heat).
- Repair and/or replace perimeter controls and covers as needed to keep them functioning properly.
- Sediment shall be removed when it reaches one-third of the barrier height.

References

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), March 2003.



Key

- GRAVEL BAG BERM
- FIBER ROLL (STRAW WATTLE)
- K-RAIL
- FLOW ARROW

N

DETAIL SCALE (FEET)

0 50

Building 1347
The Presidio Trust
San Francisco, California

STOCKPILE PLAN

TRC	229649	Date 12/7/2015	FIGURE A

FILE NAME: \\Sanfran-fs1\sanfran\PROJECTS\CAD\Lendrum Court_San Francisco\Phase II\Stockpile Figure 12.07.15.dwg | Layout Tab: 11X17

APPENDIX C
STORM WATER POLLUTION PREVENTION PLAN
LENDRUM COURT
PRESIDIO OF SAN FRANCISCO, CALIFORNIA

THE PRESIDIO TRUST
103 Montgomery Street, P.O. Box 29052
San Francisco, California 94129-0052

TRC Project No. 229649

January 7, 2016

Amendment No. 2

TRC
9685 Research Drive
Irvine, CA 92618
(949) 727-9336

APPENDIX C
STORM WATER POLLUTION PREVENTION PLAN
LENDRUM COURT
PRESIDIO OF SAN FRANCISCO, CALIFORNIA

January 7, 2016

Prepared for

THE PRESIDIO TRUST
103 Montgomery Street, P.O. Box 29052
San Francisco, California 94129-0052

Prepared By

Christian Herencia

Senior Project Engineer

Amendment No. 2

Brandon Reed, PE
Senior Staff Engineer

TRC
9685 Research Drive
Irvine, CA 92618
Telephone 949-727-9336

STORM WATER POLLUTION PREVENTION PLAN

Lendrum Court
San Francisco, California

QUALIFIED SWPPP DEVELOPER

Approval and Certification of the Storm Water Pollution Prevention Plan

Project Name: Lendrum Court

Project Number: 229649

"This Storm Water Pollution Prevention Plan and Attachments were prepared under my direction to meet the requirements of the California Construction General Permit (CGP) (SWRCB Order No. 2009-009-DWQ as amended by Orders 2010-0014-DWQ and 2012-006-DWQ). I certify that I am a Qualified SWPPP Developer in good standing as of the date below."

Christian Herencia

QSD Signature

01-07-2016
Date

Christian Herencia, PE, QSD/QSP
QSD Name

#000389
QSD Certification Number

Title and Affiliation: Senior Project Engineer, TRC Solutions Inc. (TRC)

Telephone Number: (858-505-8881 ext. 14923)

Email: CHerencia@TRCSolutions.com

STORM WATER POLLUTION PREVENTION PLAN

Lendrum Court
San Francisco, California

LEGALLY RESPONSIBLE PERSON

Approval and Certification of the Storm Water Pollution Prevention Plan

Project Name: Lendrum Court

"I certify under penalty of law that this document and all attachments were prepared under my direction or 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, 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."

Signature of Legally Responsible Person (or Approved Signatory)	Date
Name of LRP or Approved Signatory	Company
Title	Telephone Number

STORM WATER POLLUTION PREVENTION PLAN
Lendrum Court
San Francisco, California

1.0 SWPPP REQUIREMENTS

1.1 INTRODUCTION

This Construction Storm Water Pollution Prevention Plan (SWPPP) has been prepared at the direction of the Presidio Trust (Trust). This SWPPP is for the planned remediation project at the Lendrum Court Site (Site) located at the Presidio in San Francisco, California (Presidio). The SWPPP is in compliance with the National Pollutant Discharge Elimination System (NPDES) Construction General Permit (CGP) for Storm Water Discharges Associated with Construction Activity, Order No. 2009-0009-DWQ, NPDES No. CAS000002 as amended by 2010-0014-DWQ and 2012-006-DWQ. This CGP, enforced by the State Water Resources Control Board (SWRCB), regulates pollutants in discharges of storm water associated with construction activity to surface waters.

Reference the SWPPP (Lendrum Court, Presidio of San Francisco, CA) Project No. 229649, prepared by TRC Solutions (dated July 2015). Please note, no change to SWPPP Section 1.1.

This SWPPP is designed to be a working document and will be modified as appropriate and as necessary during the life of the project to address changes in construction or operations that affect the discharge of pollutants from the Site. Therefore, the objectives of this SWPPP, along with its Attachments covering project-specific storm water pollution prevention practices, are as follows:

- Identify all pollutants, pollutant sources, including sources of sediment that can affect the quality of storm water discharges associated with construction activity (storm water discharges) from the construction Site and ensure they are controlled;
- Where not otherwise required to be under a Regional Water Quality Control Board (RWQCB) permit, identify and either eliminate, control, or treat all non-storm water discharges;
- Select Site Best Management Practices (BMPs). BMPs are effective and result in the reduction or elimination of pollutants in storm water discharges and authorized non-storm water discharges from construction activity to the Best Available Technology/Best Control Technology standard;
- Develop a maintenance schedule for sediment and erosion control BMPs installed during construction, designed to reduce or eliminate pollutants after construction is completed (post-construction BMPs);
- Present calculations and design details as well as BMP controls for Site run-on;
- Identify stabilization BMPs installed to reduce or eliminate pollutants after construction is completed;
- Identify and provide methods to implement BMP inspection, visual monitoring and Construction Site Monitoring Program (CSMP) requirements to comply with the CGP; and

- Identify a sampling and analysis strategy, and sampling schedule for discharges that have been discovered through visual observations to be potentially contaminated by pollutants not visually detectable in the runoff.

Although NPDES permit coverage is not required for this project due to authorization under Comprehensive Environmental Response Compensation and Liability Act (CERCLA), the SWPPP was prepared to substantially comply with California's General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities (General Permit) Order No. 2009-0009-DWQ (NPDES No. CAS000002) as amended by Orders 2010-0014-DWQ and 2012-006-DWQ issued by the SWRCB. The Contractor will perform construction in accordance with the SWPPP and Erosion Control Plan; however, as a federal agency implementing a remedial action under CERCLA, the Trust will not submit a Notice of Intent (NOI) for coverage under the State of California's General Permit for construction storm water management.

Reference the SWPPP (Lendrum Court, Presidio of San Francisco, CA) Project No. 229649, prepared by TRC Solutions (dated July 2015). Please note, no change to SWPPP Section 1.1.

*This SWPPP **Amendment No. 2** is prepared in accordance with the Risk Level 1 requirements of the CGP. The contractor will install a temporary access road for the purposes of accessing and commencing the Trees and Vegetation Removal, and Mulching activity as provided in Drawing EC-001 (attached). Additional BMPs are required for protection of the slope during and after the removal and mulching activity.*

1.2 PERMIT REGISTRATION DOCUMENTS

A NOI will not be submitted prior to the start of construction activity due to authorization under CERCLA.

1.3 SWPPP AVAILABILITY AND IMPLEMENTATION

Reference the SWPPP (Lendrum Court, Presidio of San Francisco, CA) Project No. 229649, prepared by TRC Solutions (dated July 2015). Please note, no change to SWPPP Section 1.3.

1.4 AMENDMENTS

The SWPPP will be amended by the Qualified SWPPP Developer (QSD) when the following conditions are encountered:

- BMPs do not meet the objectives of reducing or eliminating pollutants in storm water discharges;
- There is a change in construction or operations, which may affect the discharge of pollutants to surface water, groundwater, or a municipal separate storm sewer system;
- Upon request by the California Regional Water Quality Control Board, San Francisco Bay Region (Regional Water Board) to amend this SWPPP; or
- As deemed necessary by the QSD.

All amendments to the SWPPP must be documented. When amended or revised, the SWPPP will include a listing of the date of initial preparation, the date of each amendment and be signed by a QSD. All amendments will be dated and remain in the SWPPP. Blank amendment forms and the Amendment Log are located in Attachment C-3.

The following items will be included in all amendments:

- Who requested the amendment;
- The location of the proposed change;
- The reason for change;
- The original BMP, if any; and
- The new proposed or revised BMP.

Pursuant to the review of pending activity, the Presidio Trust and the Project Manager requested an amendment. ***Amendment No. 2*** *proposes the installation of a temporary access road for the purposes of accessing the northeast side of Lendrum Court. This will allow the contractor to commence the Tree and Vegetation Removal, and Mulching activity, as well as for providing protection of the northeast slope. Additional deployment of BMPs and maintenance of said material will be required for the activity. Refer to the Amendment Form (No. 2) and Amendment Log provided.*

1.5 RETENTION OF RECORDS

Reference the SWPPP (Lendrum Court, Presidio of San Francisco, CA) Project No. 229649, prepared by TRC Solutions (dated July 2015). Please note, no change to SWPPP Section 1.5.

1.6 NON-COMPLIANCE REPORTING

Reference the SWPPP (Lendrum Court, Presidio of San Francisco, CA) Project No. 229649, prepared by TRC Solutions (dated July 2015). Please note, no change to SWPPP Section 1.6.

1.7 SUMMARY REPORT

Reference the SWPPP (Lendrum Court, Presidio of San Francisco, CA) Project No. 229649, prepared by TRC Solutions (dated July 2015). Please note, no change to SWPPP Section 1.7.

1.8 CHANGES TO PROJECT COVERAGE

Reference the SWPPP (Lendrum Court, Presidio of San Francisco, CA) Project No. 229649, prepared by TRC Solutions (dated July 2015). Please note, no change to SWPPP Section 1.8.

Amendment No. 2 *proposes additional BMPs and maintenance of said material for the forest area located on the northeast side of Lendrum Court. The forest area is bounded by Lendrum Court on the west, Armistead Road on the south, Lincoln Boulevard on the east and a vegetated canopy on the north.*

1.9 FINAL STABILIZATION

Reference the SWPPP (Lendrum Court, Presidio of San Francisco, CA) Project No. 229649, prepared by TRC Solutions (dated July 2015). Please note, no change to SWPPP Section 1.9.

2.0 PROJECT INFORMATION

This SWPPP is provided as an appendix to the Remedial Design Implementation Plan (RDIP), which describes processes and procedures to be implemented by the Presidio Trust (Trust) to remediate the area.

2.1 PROJECT AND SITE DESCRIPTION

2.1.1 Site Description

Reference the SWPPP (Lendrum Court, Presidio of San Francisco, CA) Project No. 229649, prepared by TRC Solutions (dated July 2015). Please note, no change to SWPPP, Sections 2.1.1.

***Amendment No. 2** proposes additional BMPs and maintenance of said material for the forest area located on the northeast side of Lendrum Court. The forest area is bounded by Lendrum Court on the west, Armistead Road on the south, Lincoln Boulevard on the east and a vegetated canopy on the north. There will be no increase in acreage.*

2.1.2 Remedial Construction Activities

Reference the SWPPP (Lendrum Court, Presidio of San Francisco, CA) Project No. 229649, prepared by TRC Solutions (dated July 2015). Please note, no change to SWPPP, Sections 2.1.2 to 2.1.6 and Sections 2.2 to 2.7.

3.0 BEST MANAGEMENT PRACTICES

Reference the SWPPP (Lendrum Court, Presidio of San Francisco, CA) Project No. 229649, prepared by TRC Solutions (dated July 2015). Please note, no change to SWPPP, Sections 3.1 to 3.4.

4.0 BMP INSPECTION AND MAINTENANCE

Reference the SWPPP (Lendrum Court, Presidio of San Francisco, CA) Project No. 229649, prepared by TRC Solutions (dated July 2015). Please note, no change to SWPPP, Section 4.0 to 4.1.

5.0 TRAINING

Reference the SWPPP (Lendrum Court, Presidio of San Francisco, CA) Project No. 229649, prepared by TRC Solutions (dated July 2015). Please note, no change to SWPPP, Section 5.0.

6.0 RESPONSIBLE PARTIES AND OPERATORS

Reference the SWPPP (Lendrum Court, Presidio of San Francisco, CA) Project No. 229649, prepared by TRC Solutions (dated July 2015). Please note, no change to SWPPP, Sections 6.0 to 6.1.

6.2 CONTRACTOR LIST

The CGP requires that the SWPPP include a list of names of all contractors, subcontractors, and individuals who will be directed by the QSP. The list is included as Attachment C-11 of this SWPPP. The list includes telephone numbers and work addresses and the specific areas of responsibility of each subcontractor and emergency contact numbers. The prime contractor contact information is listed below.

Prime Contractor Contact

Name: *Claire Walker*

Title: Engineer

Company: *Engineering/Remediation Resources Group, Inc. (ERRG)*

Address: 115 Sansome Street, Suite 200, San Francisco, CA 94104

Phone Number: 415-395-9974

Cell Phone Number: 415-602-9448

7.0 CONSTRUCTION SITE MONITORING PROGRAM

Reference the SWPPP (Lendrum Court, Presidio of San Francisco, CA) Project No. 229649, prepared by TRC Solutions (dated July 2015). Please note, no change to SWPPP, Sections 7.0 to 7.11.

8.0 REFERENCES

Reference the SWPPP (Lendrum Court, Presidio of San Francisco, CA) Project No. 229649, prepared by TRC Solutions (dated July 2015). Please note, no change to SWPPP, Section 8.0.

LEGEND

- Approximate site boundary
- Limit of Vegetation Clearance Area (Overexcavation / Drainage)
- Approximate extent of waste debris, *(from TRC Solutions, Inc. (July 2015) Final Removal Action Work Plan)*
- Existing elevation contour
- Site Tree (Within Work Area)
- Site Tree (Outside Work Area)
- Toyon (Heteromeles arbutifolia)
- Tree protection zone (20ft.radius fence around trees and 10 ft radius fence around toyons)
- Wood Mulch Cover Area (formerly Vegetation Clearance Area)
- Temporary Work Perimeter Fence
- Fiber Rolls (15' Spacing)
- Gravel Bag Berm (25' Spacing)
- Rolled Erosion Control Blanket (approximately 25' wide)

Approximate Utility line locations:

- GAS — Gas
- SS — Sanitary sewer
- SD — Storm sewer
- W — Water

N

SCALE (FEET)

0 50 100

SOURCE: Base plan by Towill, October 29-November 4, 2015

REV	DATE	DESCRIPTION	DESIGN BY	CHK'D BY
A	1/4/16	100% Plan Specifications	J H-D	WBC

Lendrum Court Area
The Presidio Trust
San Francisco, California

Erosion Control & Wood Mulch Plan

TRC | 229649 | DATE 1/4/2016 | **EC-001**

FILE NAME: \\Sanfran-fs1\sanfran\PROJECTS\CAD\Lendrum Court_San Francisco\Erosion Control & Wood Mulch Plan 1.11.16.dwg | Layout Tab: Drawing

LENDRUM COURT - PHASE 1 CONSTRUCTION
DISTURBED AREA AMENDMENT FORM

Amendment No. 2

Reason for Amendment:

Amendment No. 2 *was requested by the Presidio Trust in conjunction with the Project Manager. The amendment proposes additional BMPs and maintenance of said material for the forest area located on the northeast side of Lendrum Court. The forest area is bounded by Lendrum Court on the west, Armistead Road on the south, Lincoln Boulevard on the east and a vegetated canopy on the north. This will allow the contractor to commence the Tree and Vegetation Removal, and Mulching activity, as well as for providing protection of the northeast slope. There will be no increase in acreage. The proposed activity will implement Fiber Rolls (SE-5), Geotextiles and Mats (EC-7), Wood Mulch (EC-8) and Gravel Bag Berms (SE-6) pursuant to the CASQA Stormwater Best Management Practice Handbook Portal: Construction (Rev. July 2012) and incorporate additional BMPs as follows:*

- *Install temporary fence around entire perimeter for access control*
- *Install a temporary access driveway on the south side of forest area (along Armistead Road)*
- *Install a steel conveyance pipe for continuity of flow within gutter along Armistead Road*

Date Amendment Implemented: *January 7, 2016.*

What specifically was amended in the SWPPP?

The following Sections were amended:

Section 1.1 - Introduction; Section 1.4 - Amendments; Section 1.8 - Changes to Project Coverage; Section 2.1.1 - Site Description

I certify this SWPPP Amendment is being made by the responsible corporate officer or the authorized representative. A copy of the required delegation letter is included in the SWPPP.

Signature: Christian Herencia Date: *January 7, 2016*

Printed Name: Christian Herencia, PE, QSD/QSP

LENDRUM COURT - CONSTRUCTION
DISTURBED AREA AMENDMENT FORM

Reason for Amendment:

_____
_____
_____
_____
_____
_____

Date Amendment Implemented _____

What specifically was Amended in SWPPP:

_____
_____
_____
_____
_____
_____

I certify this SWPPP Amendment is being made by the responsible corporate officer or the authorized representative. A copy of the required delegation letter is included in the SWPPP.

Signature: _____ Date: _____

Printed Name: _____

ATTACHMENT C-4

NON-COMPLIANCE DOCUMENTATION

NOTIFICATION OF ANTICIPATED NON-COMPLIANCE
(Store Completed Forms in Appendix XVI)

This form will be used to report instances of anticipated non-compliance pursuant to Section IV. Special Provisions of the Order. The LRP must provide advanced notice to the local Regional Water Quality Control Board and local Storm Water Management Agency (see Appendix 7 for the relevant contact information).

WDID Number:_____

In accordance/compliance with the **State Water Resources Control Board** (SWRCB) Order No. 2009-0009-DWQ amended by 2010-0014-DWQ & 2012-0006-DWQ, National Pollutant Discharge Elimination System (NPDES) General Permit No. CAS000002 Waste Discharge Requirements for Discharges of Storm Water Runoff Associated with Construction and Land Disturbance Activities, the following discharge is anticipated:

Nature of planned change in construction activity that may result in non-compliance with CGP requirements:

Date, time, and location of anticipated discharge:

_____ _____
Name of LRP or Approved Signatory Title

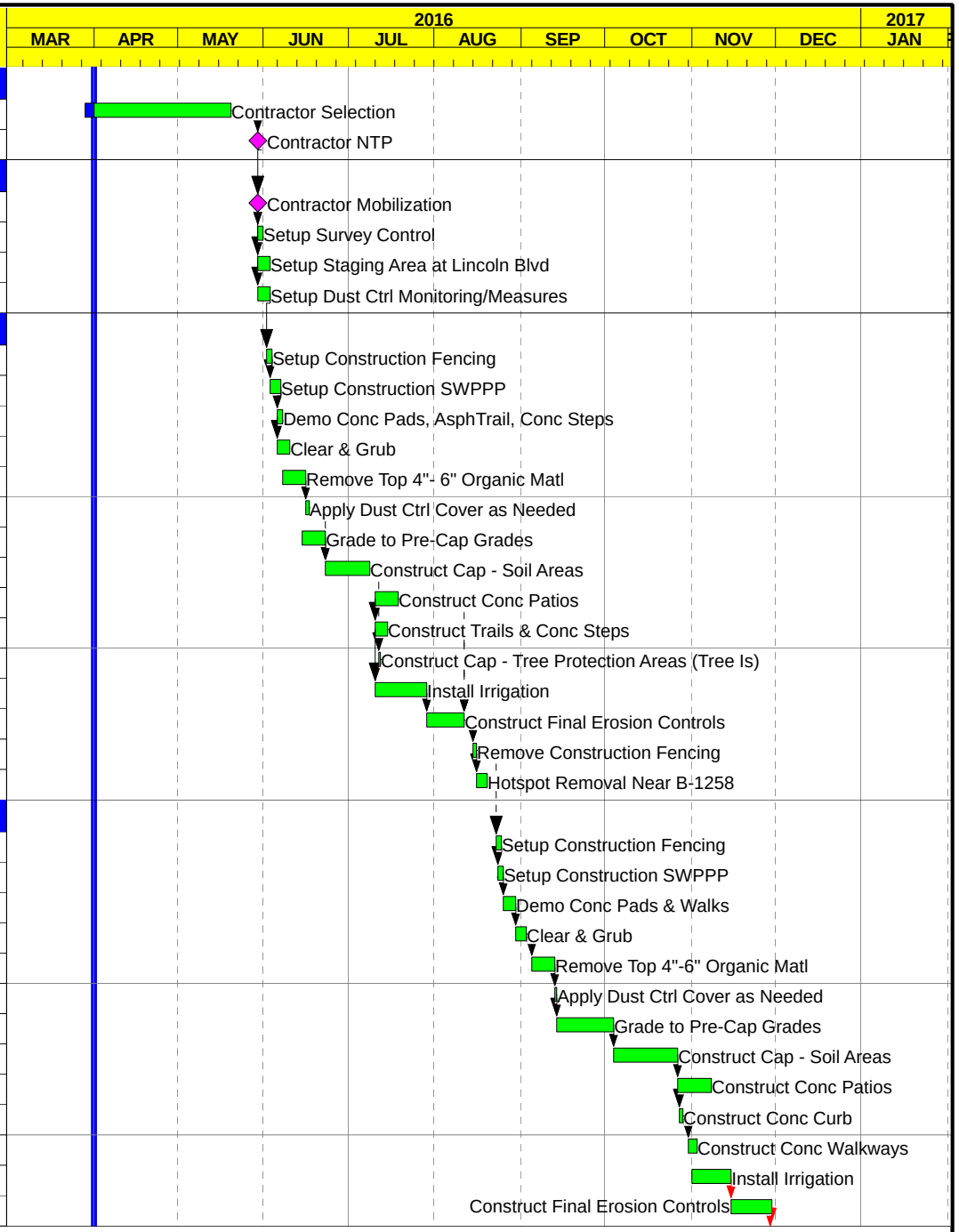
_____ _____
Company Telephone Number

_____ _____
Signature Date

ATTACHMENT C-5

CONSTRUCTION SCHEDULE

Activity ID	Activity Description	Orig Dur	Rem Dur	Early Start	Early Finish
Pre-Construction Activities					
00010	Contractor Selection	38	35	29MAR16A	19MAY16
00030	Contractor NTP	0	0	30MAY16*	
Mobilization					
00040	Contractor Mobilization	0	0	30MAY16*	
00050	Setup Survey Control	2	2	30MAY16	31MAY16
00060	Setup Staging Area at Lincoln Blvd	4	4	30MAY16	02JUN16
00070	Setup Dust Ctrl Monitoring/Measures	4	4	30MAY16	02JUN16
Construction Activities - Zone 1					
00080	Setup Construction Fencing	2	2	02JUN16	03JUN16
00090	Setup Construction SWPPP	2	2	03JUN16	06JUN16
00100	Demo Conc Pads, AsphTrail, Conc Steps	2	2	06JUN16	07JUN16
00110	Clear & Grub	4	4	06JUN16	09JUN16
00120	Remove Top 4"- 6" Organic Matl	6	6	08JUN16*	15JUN16
00130	Apply Dust Ctrl Cover as Needed	1	1	16JUN16	16JUN16
00140	Grade to Pre-Cap Grades	6	6	15JUN16*	22JUN16
00142	Construct Cap - Soil Areas	12	12	23JUN16	08JUL16
00160	Construct Conc Patios	6	6	11JUL16*	18JUL16
00170	Construct Trails & Conc Steps	4	4	11JUL16	14JUL16
00180	Construct Cap - Tree Protection Areas (Tree Is)	1	1	12JUL16*	12JUL16
00190	Install Irrigation	14	14	11JUL16	28JUL16
00200	Construct Final Erosion Controls	10	10	29JUL16	11AUG16
00210	Remove Construction Fencing	1	1	15AUG16	15AUG16
00220	Hotspot Removal Near B-1258	4	4	16AUG16	19AUG16
Construction Activities - Zone 2					
00300	Setup Construction Fencing	2	2	23AUG16*	24AUG16
00320	Setup Construction SWPPP	2	2	24AUG16	25AUG16
00330	Demo Conc Pads & Walks	2	2	26AUG16	29AUG16
00340	Clear & Grub	4	4	30AUG16	02SEP16
00350	Remove Top 4"-6" Organic Matl	6	6	05SEP16	12SEP16
00360	Apply Dust Ctrl Cover as Needed	1	1	13SEP16	13SEP16
00370	Grade to Pre-Cap Grades	14	14	14SEP16	03OCT16
00380	Construct Cap - Soil Areas	17	17	04OCT16	26OCT16
00390	Construct Conc Patios	8	8	27OCT16	07NOV16
00400	Construct Conc Curb	1	1	28OCT16	28OCT16
00410	Construct Conc Walkways	3	3	31OCT16	02NOV16
00430	Install Irrigation	10	10	01NOV16*	14NOV16
00440	Construct Final Erosion Controls	11	11	15NOV16	29NOV16



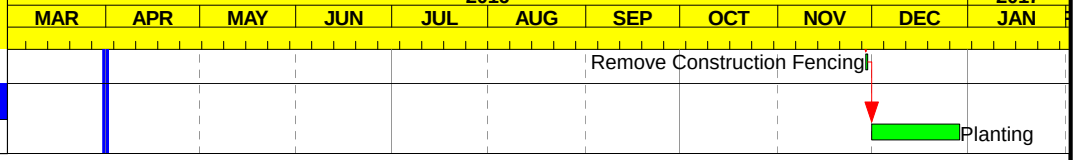
Start Date 04MAY15
Finish Date 28DEC16
Data Date 01APR16
Run Date 01APR16 07:34

Early Bar
Progress Bar

LEC1 Sheet 1 of 2

Construction Schedule
Lendrum Court Remediation
Presidio of San Francisco

Activity ID	Activity Description	Orig Dur	Rem Dur	Early Start	Early Finish
00450	Remove Construction Fencing	1	1	29NOV16	29NOV16
Planting					
00500	Planting	20	20	01DEC16	28DEC16



ATTACHMENT C-6

CONSTRUCTION ACTIVITIES, MATERIALS USED, AND ASSOCIATED POLLUTANTS

Materials Used and Associated Pollutants

Material Type	Pollutant	Visually Observable	Potential Location
Diesel Fuel	Petroleum distillates, naphthalene, xylene	Sheen/Stain	Site
Gasoline	Benzene, toluene, xylene, MTBE	Sheen/Stain	Site
Hydraulic Oil	Mineral oil, trace additives	Sheen/Stain	Site
Engine Oil	Mineral oil, additives, combustion byproducts	Sheen/Stain	Site
Transmission Oil	Mineral oil, trace additives	Sheen/Stain	Site
Engine Coolant	Ethylene and propylene glycol, heavy metals	Green/red	Site
Grease	Petroleum hydrocarbons	Sheen/Stain	Site
Fertilizer	Nitrogen, phosphorus	No	Site
Concrete (wet)	Fly ash, heavy metals, Portland cement	White solid	Not Applicable
Concrete coring slurry	Turbidity and pH	Gray liquid	Not Applicable
Concrete sawing slurry	Turbidity and pH	Gray liquid	Not Applicable
Cement	Aluminum calcium iron oxide, calcium sulfate	Gray powder	Not Applicable
Drywall joint compound	Pigment, vinyl acetate	White putty	Not Applicable
Grout	Silica sand, Portland cement	White powder	Not Applicable
Paint	Ethylene glycol, titanium oxide, VOC	Colored liquid	Not Applicable
Sealers	Diacetone alcohol		Site
Adhesives		White/yellow	Site
Sanitary waste	Human waste	Blue liquid	Site
Asphalt	Asphalt fumes, cutback asphalt,	Black material	Site
Curing Compounds	Glass Oxide, urea extended phenol	Creamy white	Site
Waste wash water		Suds, foam, froth	Site
Cleaning Solvents	Perchloroethylene, methylene chloride, TCE	Varies	Site
Sediment	Soil, Turbidity	Muddy	Site
Vegetation		Yes	Site
Solid Waste	Wood & paper packaging	Yes	Site
	Scrap metal	Yes	Site
	Rubber	Yes	Site
	Plastic	Yes	Site
	Glass	Yes	Site
	Food containers	Yes	Site
	Aluminum foil	Yes	Site
	Leftover food	Yes	Site
	Cigarette packages	Yes	Site
	Cigarette butts	Yes	Site
	Beverage containers	Yes	Site

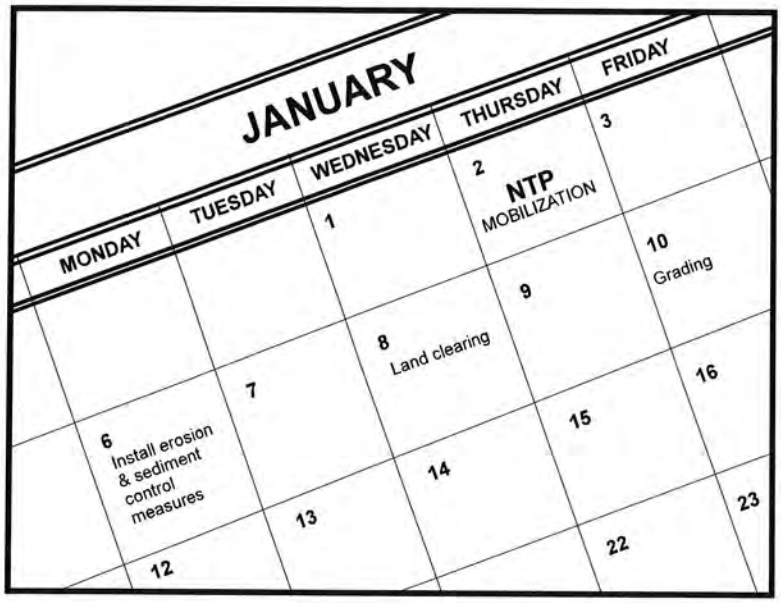
MTBE = Methyl tert-butyl ether
TCE = trichloroethylene
PVC = polyvinyl chloride

ATTACHMENT C-7

BMP FACT SHEETS

Scheduling

EC-1



Categories

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

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

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of construction. Clearly show how the rainy season relates to soil 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.

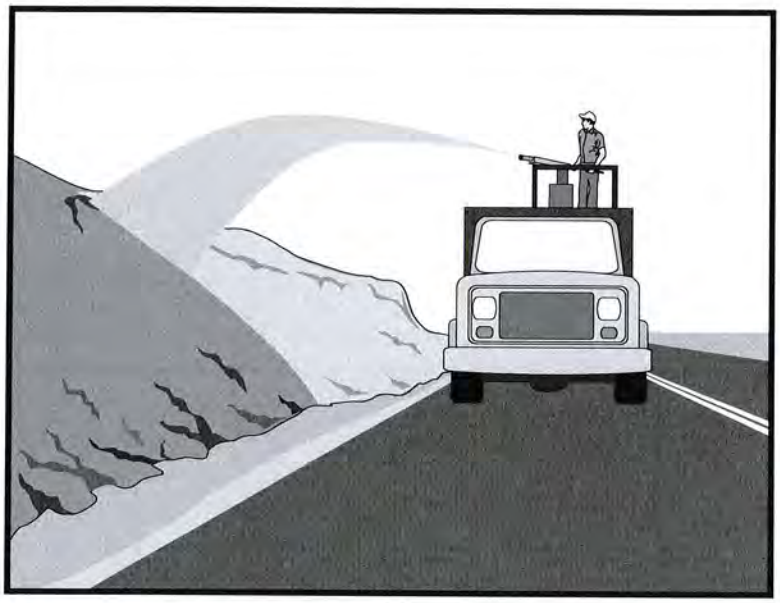
References

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.

Straw Mulch

EC-6



Categories

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SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	☒
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Legend:

☑ **Primary Category**

☒ **Secondary Category**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

EC-3 Hydraulic Mulch

EC-4 Hydroseeding

EC-5 Soil Binders

EC-7 Geotextiles and Mats

EC-8 Wood Mulching

EC-14 Compost Blanket

Description and Purpose

Straw mulch consists of placing a uniform layer of straw and incorporating it into the soil with a studded roller or crimper, or anchoring it with a tackifier or stabilizing emulsion. Straw mulch protects the soil surface from the impact of rain drops, preventing soil particles from becoming dislodged.

Suitable Applications

Straw mulch is suitable for disturbed areas requiring temporary protection until permanent stabilization is established. Straw mulch can be specified for the following applications:

- As a stand-alone BMP on disturbed areas until soils can be prepared for permanent vegetation. The longevity of straw mulch is typically less than six months.
- Applied in combination with temporary seeding strategies
- Applied in combination with permanent seeding strategies to enhance plant establishment and final soil stabilization
- Applied around containerized plantings to control erosion until the plants become established to provide permanent stabilization

Limitations

- Availability of straw and straw blowing equipment may be limited just prior to the rainy season and prior to storms due to high demand.

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- There is a potential for introduction of weed seed and unwanted plant material if weed-free agricultural straw is not specified.
- Straw mulch applied by hand is more time intensive and potentially costly.
- Wind may limit application of straw and blow straw into undesired locations.
- May have to be removed prior to permanent seeding or prior to further earthwork.
- "Punching" of straw does not work in sandy soils, necessitating the use of tackifiers.
- Potential fugitive dust control issues associated with straw applications can occur. Application of a stabilizing emulsion or a water stream at the same time straw is being blown can reduce this problem.
- Use of plastic netting should be avoided in areas where wildlife may be entrapped and may be prohibited for projects in certain areas with sensitive wildlife species, especially reptiles and amphibians.

Implementation

- Straw should be derived from weed-free wheat, rice, or barley. Where required by the plans, specifications, permits, or environmental documents, native grass straw should be used.
- Use tackifier to anchor straw mulch to the soil on slopes.
- Crimping, punch roller-type rollers, or track walking may also be used to incorporate straw mulch into the soil on slopes. Track walking can be used where other methods are impractical.
- Avoid placing straw onto roads, sidewalks, drainage channels, sound walls, existing vegetation, etc.
- Straw mulch with tackifier should not be applied during or immediately before rainfall.
- Additional guidance on the comparison and selection of temporary slope stabilization methods is provided in Appendix F of the Handbook.

Application Procedures

- When using a tackifier to anchor the straw mulch, roughen embankment or fill areas by rolling with a crimping or punching-type roller or by track walking before placing the straw mulch. Track walking should only be used where rolling is impractical.
- Apply straw at a rate of between 3,000 and 4,000 lb/acre, either by machine or by hand distribution and provide 100% ground cover. A lighter application is used for flat surfaces and a heavier application is used for slopes.
- Evenly distribute straw mulch on the soil surface.
- Anchoring straw mulch to the soil surface by "punching" it into the soil mechanically (incorporating) can be used in lieu of a tackifier.

- Methods for holding the straw mulch in place depend upon the slope steepness, accessibility, soil conditions, and longevity.
  - A tackifier acts to glue the straw fibers together and to the soil surface. The tackifier should be selected based on longevity and ability to hold the fibers in place. A tackifier is typically applied at a rate of 125 lb/acre. In windy conditions, the rates are typically 180 lb/acre.
  - On very small areas, a spade or shovel can be used to punch in straw mulch.
  - On slopes with soils that are stable enough and of sufficient gradient to safely support construction equipment without contributing to compaction and instability problems, straw can be "punched" into the ground using a knife blade roller or a straight bladed coulter, known commercially as a "crimper."

Costs

Average annual cost for installation and maintenance is included in the table below. Application by hand is more time intensive and potentially more costly.

BMP	Unit Cost per Acre
Straw mulch, crimped or punched	$2,458-$5,375
Straw mulch with tackifier	$1,823-$4,802

Source: Caltrans Soil Stabilization BMP Research for Erosion and Sediment Controls, July 2007

Inspection and Maintenance

- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Areas where erosion is evident should 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.
- The key consideration in inspection and maintenance is that the straw needs to last long enough to achieve erosion control objectives. Straw mulch as a stand-alone BMP is temporary and is not suited for long-term erosion control.
- Maintain an unbroken, temporary mulched ground cover while disturbed soil areas are inactive. Repair any damaged ground cover and re-mulch exposed areas.
- Reapplication of straw mulch and tackifier may be required to maintain effective soil stabilization over disturbed areas and slopes.

References

Soil Stabilization BMP Research for Erosion and Sediment Controls: Cost Survey Technical Memorandum, State of California Department of Transportation (Caltrans), July 2007.

Erosion and Sediment Control Manual, Oregon Department of Environmental Quality, February 2005.

Controlling Erosion of Construction Sites, Agricultural Information Bulletin #347, U.S. Department of Agriculture (USDA), Natural Resources Conservation Service (NRCS) (formerly Soil Conservation Service – SCS).

Guides for Erosion and Sediment Control in California, USDA Soils Conservation Service, January 1991.

Manual of Standards of Erosion and Sediment Control Measures, Association of Bay Area Governments, May 1995.

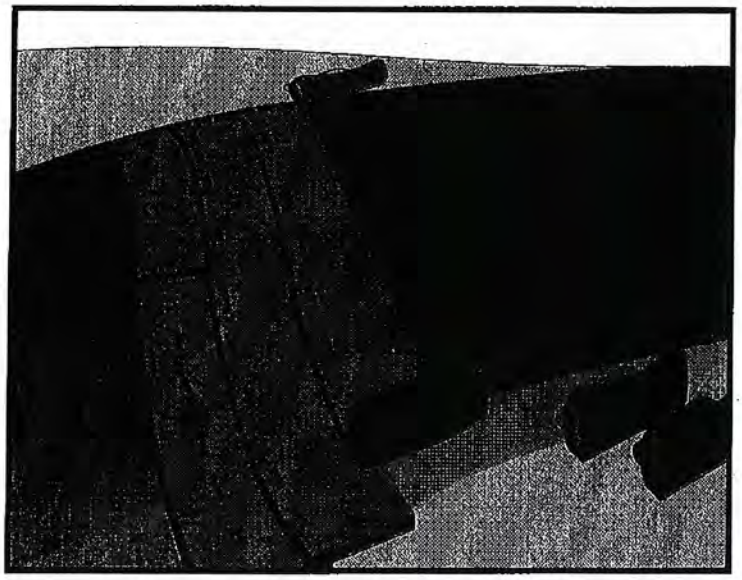
Soil Erosion by Water, Agricultural Information Bulletin #513, U.S. Department of Agriculture, Soil Conservation Service.

Stormwater Quality Handbooks Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), March 2003.

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.

Geotextiles and Mats EC-7



Categories		
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Legend:
☑ **Primary Category**
☒ **Secondary Category**

Targeted Constituents	
Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

EC-3 Hydraulic Mulch

EC-4 Hydroseeding

Description and Purpose

Mattings, or Rolled Erosion Control Products (RECPs), can be made of natural or synthetic materials or a combination of the two. RECPs are used to cover the soil surface to reduce erosion from rainfall impact, hold soil in place, and absorb and hold moisture near the soil surface. Additionally, RECPs may be used to stabilize soils until vegetation is established or to reinforce non-woody surface vegetation.

Suitable Applications

RECPs are typically applied on slopes where erosion hazard is high and vegetation will be slow to establish. Mattings are also used on stream banks, swales and other drainage channels where moving water at velocities between 3 ft/s and 6 ft/s are likely to cause scour and wash out new vegetation, and in areas where the soil surface is disturbed and where existing vegetation has been removed. RECPs may also be used when seeding cannot occur (e.g., late season construction and/or the arrival of an early rain season). RECPs should be considered when the soils are fine grained and potentially erosive. RECPs should be considered in the following situations.

- Steep slopes, generally steeper than 3:1 (H:V)
- Slopes where the erosion potential is high
- Slopes and disturbed soils where mulch must be anchored
- Disturbed areas where plants are slow to develop

- Channels with flows exceeding 3.3 ft/s
- Channels to be vegetated
- Stockpiles
- Slopes adjacent to water bodies

Limitations

- RECP installed costs are generally higher than other erosion control BMPs, limiting their use to areas where other BMPs are ineffective (e.g. channels, steep slopes).
- RECPs may delay seed germination, due to reduction in soil temperature.
- RECPs are generally not suitable for excessively rocky sites or areas where the final vegetation will be mowed (since staples and netting can catch in mowers). If a staple or pin cannot be driven into the soil because the underlying soil is too hard or rocky, then an alternative BMP should be selected.
- If used for temporary erosion control, RECPs should be removed and disposed of prior to application of permanent soil stabilization measures.
- The use of plastic should be limited to covering stockpiles or very small graded areas for short periods of time (such as through one imminent storm event) until more environmentally friendly measures, such as seeding and mulching, may be installed.
    - Plastic sheeting is easily vandalized, easily torn, photodegradable, and must be disposed of at a landfill.
    - Plastic sheeting results in 100% runoff, which may cause serious erosion problems in the areas receiving the increased flow.
- RECPs may have limitations based on soil type, slope gradient, or channel flow rate; consult the manufacturer for proper selection.
- Not suitable for areas that have foot traffic (tripping hazard) – e.g., pad areas around buildings under construction.
- RECPs that incorporate a plastic netting (e.g. straw blanket typically uses a plastic netting to hold the straw in place) may not be suitable near known wildlife habitat. Wildlife can become trapped in the plastic netting.
- RECPs may have limitations in extremely windy climates. However, when RECPs are properly trenched at the top and bottom and stapled in accordance with the manufacturer's recommendations, problems with wind can be minimized.

Implementation

Material Selection

- Natural RECPs have been found to be effective where re-vegetation will be provided by re-seeding. The choice of material should be based on the size of area, side slopes, surface conditions such as hardness, moisture, weed growth, and availability of materials.
- Additional guidance on the comparison and selection of temporary slope stabilization methods is provided in Appendix F of the Handbook.
- The following natural and synthetic RECPs are commonly used:

Geotextiles

- Material can be a woven or a non-woven polypropylene fabric with minimum thickness of 0.06 in., minimum width of 12 ft and should have minimum tensile strength of 150 lbs (warp), 80 lbs (fill) in conformance with the requirements in ASTM Designation: D 4632. The permittivity of the fabric should be approximately 0.07 sec^{-1} in conformance with the requirements in ASTM Designation: D4491. The fabric should have an ultraviolet (UV) stability of 70 percent in conformance with the requirements in ASTM designation: D4355. Geotextile blankets must be secured in place with wire staples or sandbags and by keying into tops of slopes to prevent infiltration of surface waters under geotextile. Staples should be made of minimum 11 gauge steel wire and should be U-shaped with 8 in. legs and 2 in. crown.
- Geotextiles may be reused if they are suitable for the use intended.

Plastic Covers

- Generally plastic sheeting should only be used as stockpile covering or for very small graded areas for short periods of time (such as through one imminent storm event). If plastic sheeting must be used, choose a plastic that will withstand photo degradation.
- Plastic sheeting should have a minimum thickness of 6 mils, and must be keyed in at the top of slope (when used as a temporary slope protection) and firmly held in place with sandbags or other weights placed no more than 10 ft apart. Seams are typically taped or weighted down their entire length, and there should be at least a 12 in. to 24 in. overlap of all seams. Edges should be embedded a minimum of 6 in. in soil (when used as a temporary slope protection).
- All sheeting must be inspected periodically after installation and after significant rainstorms to check for erosion, undermining, and anchorage failure. Any failures must be repaired immediately. If washout or breakages occur, the material should be re-installed after repairing the damage to the slope.

Erosion Control Blankets/Mats

- Biodegradable RECPs are typically composed of jute fibers, curled wood fibers, straw, coconut fiber, or a combination of these materials. In order for an RECP to be considered 100% biodegradable, the netting, sewing or adhesive system that holds the biodegradable mulch fibers together must also be biodegradable. See typical installation details at the end of this fact sheet.

- **Jute** is a natural fiber that is made into a yarn that is loosely woven into a biodegradable mesh. The performance of jute as a stand-alone RECP is low. Most other RECPs outperform jute as a temporary erosion control product and therefore jute is not commonly used. It is designed to be used in conjunction with vegetation. The material is supplied in rolled strips, which should be secured to the soil with U-shaped staples or stakes in accordance with manufacturers' recommendations.

- **Excelsior** (curled wood fiber) blanket material should consist of machine produced mats of curled wood excelsior with 80 percent of the fiber 6 in. or longer. The excelsior blanket should be of consistent thickness. The wood fiber must be evenly distributed over the entire area of the blanket. The top surface of the blanket should be covered with a photodegradable extruded plastic mesh. The blanket should be smolder resistant without the use of chemical additives and should be non-toxic and non-injurious to plant and animal life. Excelsior blankets should be furnished in rolled strips, a minimum of 48 in. wide, and should have an average weight of 0.8 lb/yd^2, ±10 percent, at the time of manufacture. Excelsior blankets must be secured in place with wire staples. Staples should be made of minimum 11 gauge steel wire and should be U-shaped with 8 in. legs and 2 in. crown.

- **Straw blanket** should be machine produced mats of straw with a lightweight biodegradable netting top layer. The straw should be attached to the netting with biodegradable thread or glue strips. The straw blanket should be of consistent thickness. The straw should be evenly distributed over the entire area of the blanket. Straw blanket should be furnished in rolled strips a minimum of 6.5 ft wide, a minimum of 80 ft long and a minimum of 0.5 lb/yd^2. Straw blankets must be secured in place with wire staples. Staples should be made of minimum 11 gauge steel wire and should be U-shaped with 8 in. legs and 2 in. crown.

- **Wood fiber blanket** is composed of biodegradable fiber mulch with extruded plastic netting held together with adhesives. The material is designed to enhance re-vegetation. The material is furnished in rolled strips, which must be secured to the ground with U-shaped staples or stakes in accordance with manufacturers' recommendations.

- **Coconut fiber blanket** should be a machine produced mat of 100 percent coconut fiber with biodegradable netting on the top and bottom. The coconut fiber should be attached to the netting with biodegradable thread or glue strips. The coconut fiber blanket should be of consistent thickness. The coconut fiber should be evenly distributed over the entire area of the blanket. Coconut fiber blanket should be furnished in rolled strips with a minimum of 6.5 ft wide, a minimum of 80 ft. long and a minimum of 0.5 lb/yd^2. Coconut fiber blankets must be secured in place with wire staples. Staples should be made of minimum 11 gauge steel wire and should be U-shaped with 8 in. legs and 2 in. crown.

- **Coconut fiber mesh** is a thin permeable membrane made from coconut or corn fiber that is spun into a yarn and woven into a biodegradable mat. It is designed to be used in conjunction with vegetation and typically has longevity of several years. The material is supplied in rolled strips, which must be secured to the soil with U-shaped staples or stakes in accordance with manufacturers' recommendations.

- **Straw coconut fiber blanket** should be machine produced mats of 70 percent straw and 30 percent coconut fiber with a biodegradable netting top layer and a biodegradable bottom net. The straw and coconut fiber should be attached to the netting with biodegradable thread or glue strips. The straw coconut fiber blanket should be of consistent thickness. The straw and coconut fiber should be evenly distributed over the entire area of the blanket. Straw coconut fiber blanket should be furnished in rolled strips a minimum of 6.5 ft wide, a minimum of 80 ft long and a minimum of 0.5 lb/yd^2. Straw coconut fiber blankets must be secured in place with wire staples. Staples should be made of minimum 11 gauge steel wire and should be U-shaped with 8 in. legs and 2 in. crown.

- Non-biodegradable RECPs are typically composed of polypropylene, polyethylene, nylon or other synthetic fibers. In some cases, a combination of biodegradable and synthetic fibers is used to construct the RECP. Netting used to hold these fibers together is typically non-biodegradable as well.

  - **Plastic netting** is a lightweight biaxially oriented netting designed for securing loose mulches like straw or paper to soil surfaces to establish vegetation. The netting is photodegradable. The netting is supplied in rolled strips, which must be secured with U-shaped staples or stakes in accordance with manufacturers' recommendations.

  - **Plastic mesh** is an open weave geotextile that is composed of an extruded synthetic fiber woven into a mesh with an opening size of less than ¼ in. It is used with re-vegetation or may be used to secure loose fiber such as straw to the ground. The material is supplied in rolled strips, which must be secured to the soil with U-shaped staples or stakes in accordance with manufacturers' recommendations.

  - **Synthetic fiber with netting** is a mat that is composed of durable synthetic fibers treated to resist chemicals and ultraviolet light. The mat is a dense, three dimensional mesh of synthetic (typically polyolefin) fibers stitched between two polypropylene nets. The mats are designed to be re-vegetated and provide a permanent composite system of soil, roots, and geomatrix. The material is furnished in rolled strips, which must be secured with U-shaped staples or stakes in accordance with manufacturers' recommendations.

  - **Bonded synthetic fibers** consist of a three dimensional geomatrix nylon (or other synthetic) matting. Typically it has more than 90 percent open area, which facilitates root growth. It's tough root reinforcing system anchors vegetation and protects against hydraulic lift and shear forces created by high volume discharges. It can be installed over prepared soil, followed by seeding into the mat. Once vegetated, it becomes an invisible composite system of soil, roots, and geomatrix. The material is furnished in rolled strips that must be secured with U-shaped staples or stakes in accordance with manufacturers' recommendations.

  - **Combination synthetic and biodegradable RECPs** consist of biodegradable fibers, such as wood fiber or coconut fiber, with a heavy polypropylene net stitched to the top and a high strength continuous filament geomatrix or net stitched to the bottom. The material is designed to enhance re-vegetation. The material is furnished in rolled strips,

which must be secured with U-shaped staples or stakes in accordance with manufacturers' recommendations.

Site Preparation

- Proper soil preparation is essential to ensure complete contact of the RECP with the soil. Soil Roughening is not recommended in areas where RECPs will be installed.
- Grade and shape the area of installation.
- Remove all rocks, clods, vegetation or other obstructions so that the installed blankets or mats will have complete, direct contact with the soil.
- Prepare seedbed by loosening 2 to 3 in. of topsoil.

Seeding/Planting

Seed the area before blanket installation for erosion control and re-vegetation. Seeding after mat installation is often specified for turf reinforcement application. When seeding prior to blanket installation, all areas disturbed during blanket installation must be re-seeded. Where soil filling is specified for turf reinforcement mats (TRMs), seed the matting and the entire disturbed area after installation and prior to filling the mat with soil.

Fertilize and seed in accordance with seeding specifications or other types of landscaping plans. The protective matting can be laid over areas where grass has been planted and the seedlings have emerged. Where vines or other ground covers are to be planted, lay the protective matting first and then plant through matting according to design of planting.

Check Slots

Check slots shall be installed as required by the manufacturer.

Laying and Securing Matting

- Before laying the matting, all check slots should be installed and the seedbed should be friable, made free from clods, rocks, and roots. The surface should be compacted and finished according to the requirements of the manufacturer's recommendations.
- Mechanical or manual lay down equipment should be capable of handling full rolls of fabric and laying the fabric smoothly without wrinkles or folds. The equipment should meet the fabric manufacturer's recommendations or equivalent standards.

Anchoring

- U-shaped wire staples, metal geotextile stake pins, or triangular wooden stakes can be used to anchor mats and blankets to the ground surface.
- Wire staples should be made of minimum 11 gauge steel wire and should be U-shaped with 8 in. legs and 2 in. crown.
- Metal stake pins should be 0.188 in. diameter steel with a 1.5 in. steel washer at the head of the pin, and 8 in. in length.
- Wire staples and metal stakes should be driven flush to the soil surface.

Installation on Slopes

Installation should be in accordance with the manufacturer's recommendations. In general, these will be as follows:

- Begin at the top of the slope and anchor the blanket in a 6 in. deep by 6 in. wide trench. Backfill trench and tamp earth firmly.
- Unroll blanket down slope in the direction of water flow.
- Overlap the edges of adjacent parallel rolls 2 to 3 in. and staple every 3 ft (or greater, per manufacturer's specifications).
- When blankets must be spliced, place blankets end over end (shingle style) with 6 in. overlap. Staple through overlapped area, approximately 12 in. apart.
- Lay blankets loosely and maintain direct contact with the soil. Do not stretch.
- Staple blankets sufficiently to anchor blanket and maintain contact with the soil. Staples should be placed down the center and staggered with the staples placed along the edges. Steep slopes, 1:1 (H:V) to 2:1 (H:V), require a minimum of 2 staples/yd^2. Moderate slopes, 2:1 (H:V) to 3:1 (H:V), require a minimum of 1 ½ staples/yd^2. Check manufacturer's specifications to determine if a higher density staple pattern is required.

Installation in Channels

Installation should be in accordance with the manufacturer's recommendations. In general, these will be as follows:

- Dig initial anchor trench 12 in. deep and 6 in. wide across the channel at the lower end of the project area.
- Excavate intermittent check slots, 6 in. deep and 6 in. wide across the channel at 25 to 30 ft intervals along the channels.
- Cut longitudinal channel anchor trenches 4 in. deep and 4 in. wide along each side of the installation to bury edges of matting, whenever possible extend matting 2 to 3 in. above the crest of the channel side slopes.
- Beginning at the downstream end and in the center of the channel, place the initial end of the first roll in the anchor trench and secure with fastening devices at 12 in. intervals. Note: matting will initially be upside down in anchor trench.
- In the same manner, position adjacent rolls in anchor trench, overlapping the preceding roll a minimum of 3 in.
- Secure these initial ends of mats with anchors at 12 in. intervals, backfill and compact soil.
- Unroll center strip of matting upstream. Stop at next check slot or terminal anchor trench. Unroll adjacent mats upstream in similar fashion, maintaining a 3 in. overlap.

- Fold and secure all rolls of matting snugly into all transverse check slots. Lay mat in the bottom of the slot then fold back against itself. Anchor through both layers of mat at 12 in. intervals, then backfill and compact soil. Continue rolling all mat widths upstream to the next check slot or terminal anchor trench.
- Alternate method for non-critical installations: Place two rows of anchors on 6 in. centers at 25 to 30 ft. intervals in lieu of excavated check slots.
- Staple shingled lap spliced ends a minimum of 12 in. apart on 12 in. intervals.
- Place edges of outside mats in previously excavated longitudinal slots; anchor using prescribed staple pattern, backfill, and compact soil.
- Anchor, fill, and compact upstream end of mat in a 12 in. by 6 in. terminal trench.
- Secure mat to ground surface using U-shaped wire staples, geotextile pins, or wooden stakes.
- Seed and fill turf reinforcement matting with soil, if specified.

Soil Filling (if specified for turf reinforcement mat (TRM))

Installation should be in accordance with the manufacturer's recommendations. Typical installation guidelines are as follows:

- After seeding, spread and lightly rake ½-3/4 inches of fine topsoil into the TRM apertures to completely fill TRM thickness. Use backside of rake or other flat implement.
- Alternatively, if allowed by product specifications, spread topsoil using lightweight loader, backhoe, or other power equipment. Avoid sharp turns with equipment.
- Always consult the manufacturer's recommendations for installation.
- Do not drive tracked or heavy equipment over mat.
- Avoid any traffic over matting if loose or wet soil conditions exist.
- Use shovels, rakes, or brooms for fine grading and touch up.
- Smooth out soil filling just exposing top netting of mat.

Temporary Soil Stabilization Removal

- Temporary soil stabilization removed from the site of the work must be disposed of if necessary.

Costs

Installed costs can be relatively high compared to other BMPs. Approximate costs for installed materials are shown below:

Rolled Erosion Control Products		Installed Cost per Acre (2004)[1]	Estimated Cost per Acre (2009)[2]
Biodegradable	Jute Mesh	$6,000-$7,000	$6,600-$7,700
	Curled Wood Fiber	$8,000-$10,500	$8,800-$11,050
	Straw	$8,000-$10,500	$8,800-$11,050
	Wood Fiber	$8,000-$10,500	$8,800-$11,050
	Coconut Fiber	$13,000-$14,000	$14,300-$15,400
	Coconut Fiber Mesh	$30,000-$33,000	$33,000-$36,300
	Straw Coconut Fiber	$10,000-$12,000	$11,000-$13,200
Non-Biodegradable	Plastic Netting	$2,000-$2,200	$2,200-$2,220
	Plastic Mesh	$3,000-$3,500	$3,300-$3,850
	Synthetic Fiber with Netting	$34,000-$40,000	$37,400-$44,000
	Bonded Synthetic Fibers	$45,000-$55,000	$49,500-$60,500
	Combination with Biodegradable	$30,000-$36,000	$33,000-$39,600

1. Source: Cost information received from individual product manufacturers solicited by Geosyntec Consultants (2004).
2. 2009 costs reflect a 10% escalation over year 2004 costs. Escalation based on informal survey of industry trends. Note: Expected cost increase is offset by competitive economic conditions.

Inspection and Maintenance

- RECPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Areas where erosion is evident shall be repaired and BMPs reapplied as soon as possible. Care should be exercised to minimize the damage to protected areas while making repairs, as any area damaged will require reapplication of BMPs.
- If washout or breakage occurs, re-install the material after repairing the damage to the slope or channel.
- Make sure matting is uniformly in contact with the soil.
- Check that all the lap joints are secure.
- Check that staples are flush with the ground.

References

Erosion and Sediment Control Manual, Oregon Department of Environmental Quality, February 2005

Erosion Control Pilot Study Report, State of California Department of Transportation (Caltrans), June 2000.

Guides for Erosion and Sediment Controls in California, USDA Soils Conservation Service, January 1991.

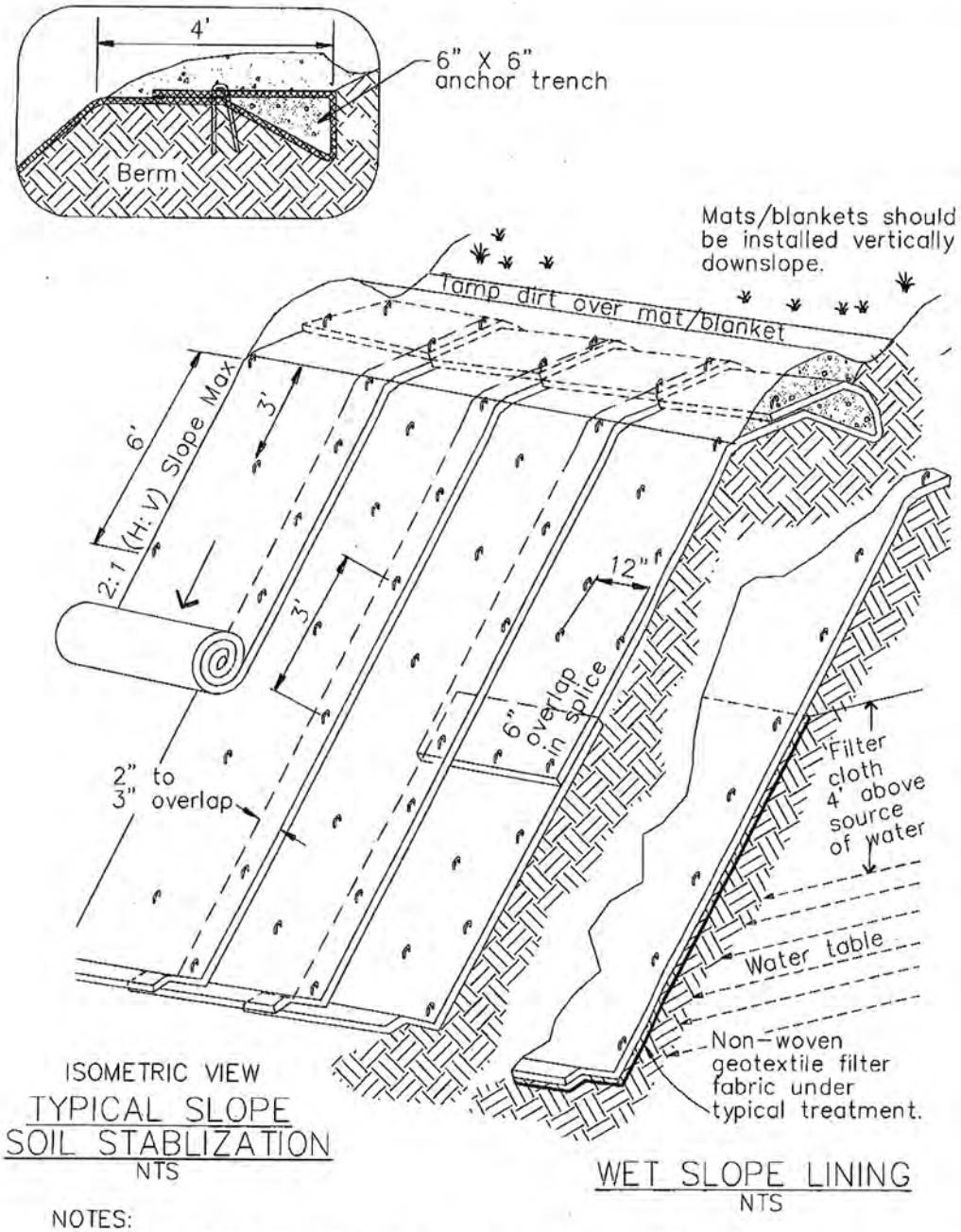
National Management Measures to Control Nonpoint Source Pollution from Urban Areas, United States Environmental Protection Agency, 2002.

Stormwater Quality Handbooks Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), March 2003.

Guidance Document: Soil Stabilization for Temporary Slopes, State of California Department of Transportation (Caltrans), November 1999.

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.



ISOMETRIC VIEW

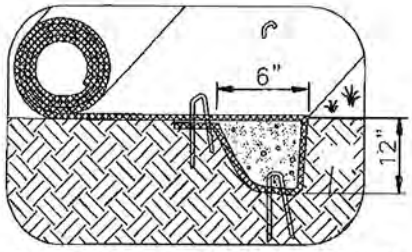
TYPICAL SLOPE
SOIL STABLIZATION
NTS

WET SLOPE LINING
NTS

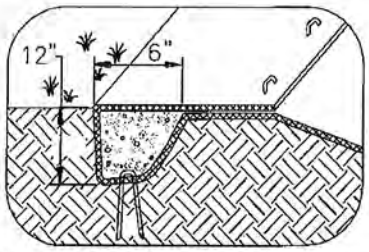
NOTES:

1. Slope surface shall be free of rocks, clods, sticks and grass. Mats/blankets shall have good soil contact.
2. Lay blankets loosely and stake or staple to maintain direct contact with the soil. Do not stretch.
3. Install per manufacturer's recommendations

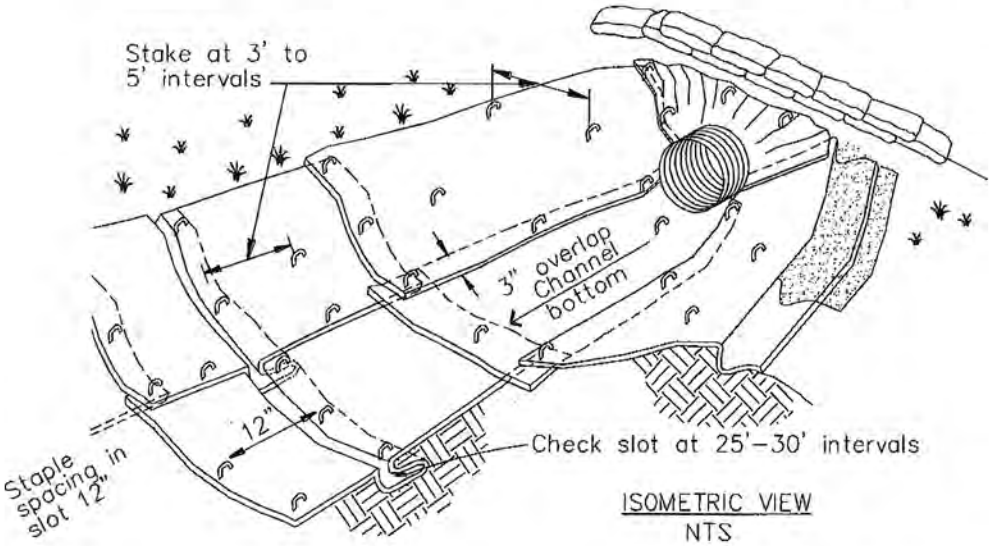
TYPICAL INSTALLATION DETAIL



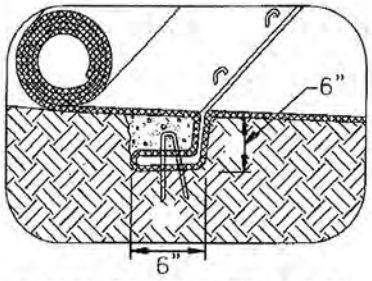
INITIAL CHANNEL ANCHOR TRENCH
NTS



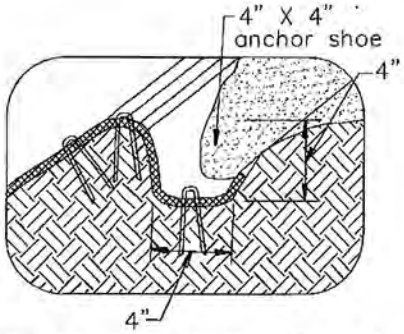
TERMINAL SLOPE AND CHANNEL ANCHOR TRENCH
NTS



ISOMETRIC VIEW
NTS



INTERMITTENT CHECK SLOT
NTS



LONGITUDINAL ANCHOR TRENCH
NTS

NOTES:
1. Check slots to be constructed per manufacturers specifications.
2. Staking or stapling layout per manufacturers specifications.
3. Install per manufacturer's recommendations

TYPICAL INSTALLATION DETAIL

Soil Preparation/Roughening EC-15

Description and Purpose

Soil Preparation/Roughening involves assessment and preparation of surface soils for BMP installation. This can include soil testing (for seed base, soil characteristics, or nutrients), as well as roughening surface soils by mechanical methods (including sheepsfoot rolling, track walking, scarifying, stair stepping, and imprinting) to prepare soil for additional BMPs, or to break up sheet flow. Soil Preparation can also involve tilling topsoil to prepare a seed bed and/or incorporation of soil amendments, to enhance vegetative establishment.

Suitable Applications

Soil preparation: Soil preparation is essential to proper vegetative establishment. In particular, soil preparation (i.e. tilling, raking, and amendment) is suitable for use in combination with any soil stabilization method, including RECPs or sod. Soil preparation should not be confused with roughening.

Roughening: Soil roughening is generally referred to as track walking (sometimes called imprinting) a slope, where treads from heavy equipment run parallel to the contours of the slope and act as mini terraces. Soil preparation is most effective when used in combination with erosion controls. Soil Roughening is suitable for use as a complementary process for controlling erosion on a site. Roughening is not intended to be used as a stand-alone BMP, and should be used with perimeter controls, additional erosion control measures, grade breaks, and vegetative establishment for maximum effectiveness. Roughening is intended to only affect surface soils and should not compromise slope stability or overall compaction. Suitable applications for soil roughening include:

Categories

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 Category**

☒ **Secondary Category**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

EC-3 Hydraulic Mulch

EC-5 Soil Binders

EC-7 Geotextiles and Mats

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- Along any disturbed slopes, including temporary stockpiles, sediment basins, or compacted soil diversion berms and swales.
- Roughening should be used in combination with hydraulically applied stabilization methods, compost blanket, or straw mulch; but should not be used in combination with RECPs or sod because roughening is intended to leave terraces on the slope.

Limitations

- Preparation and roughening must take place prior to installing other erosion controls (such as hydraulically applied stabilizers) or sediment controls (such as fiber rolls) on the faces of slopes.
- In such cases where slope preparation is minimal, erosion control/revegetation BMPs that do not require extensive soil preparation - such as hydraulic mulching and seeding applications - should be employed.
- Consideration should be given to the type of erosion control BMP that follows surface preparation, as some BMPs are not designed to be installed over various types of tillage/roughening, i.e., RECPs (erosion control blankets) should not be used with soil roughening due to a "bridging" effect, which suspends the blanket above the seed bed.
- Surface roughness has an effect on the amount of mulch material that needs to be applied, which shows up as a general increase in mulch material due to an increase in surface area (Topographic Index -see EC-3 Hydraulic Mulching).

Implementation

- Additional guidance on the comparison and selection of temporary slope stabilization methods is provided in Appendix F of the Handbook.

General

A roughened surface can significantly reduce erosion. Based on tests done at the San Diego State Erosion Research Laboratory, various roughening techniques on slopes can result in a 12 - 76% reduction in the erosion rate versus smooth slopes.

Materials

Minimal materials are required unless amendments and/or seed are added to the soil. The majority of soil roughening/preparation can be done with equipment that is on hand at a normal construction site, such as bull dozers and compaction equipment.

Installation Guidelines

Soil Preparation

- Where appropriate or feasible, soil should be prepared to receive the seed by disking or otherwise scarifying the surface to eliminate crust, improve air and water infiltration and create a more favorable environment for germination and growth.
- Based upon soil testing conducted, apply additional soil amendments (e.g. fertilizers, additional seed) to the soil to help with germination. Follow EC-4, Hydroseeding, when selecting and applying seed and fertilizers.

Cut Slope Roughening:

- Stair-step grade or groove the cut slopes that are steeper than 3:1.
- Use stair-step grading on any erodible material soft enough to be ripped with a bulldozer. Slopes consisting of soft rock with some subsoil are particularly suited to stair-step grading.
- Make the vertical cut distance less than the horizontal distance, and slightly slope the horizontal position of the "step" in toward the vertical wall.
- Do not make individual vertical cuts more than 2 feet (0.6 m) high in soft materials or more than 3 feet (0.9 m) high in rocky materials.
- Groove the slope using machinery to create a series of ridges and depressions that run across the slope, on the contour.

Fill Slope Roughening:

- Place on fill slopes with a gradient steeper than 3:1 in lifts not to exceed 8 inches (0.2 m), and make sure each lift is properly compacted.
- Ensure that the face of the slope consists of loose, uncompacted fill 4-6 inches (0.1-0.2 m) deep.
- Use grooving or tracking to roughen the face of the slopes, if necessary.
- Do not blade or scrape the final slope face.

Roughening for Slopes to be Mowed:

- Slopes which require mowing activities should not be steeper than 3:1.
- Roughen these areas to shallow grooves by track walking, scarifying, sheepsfoot rolling, or imprinting.
- Make grooves close together (less than 10 inches), and not less than 1 inch deep, and perpendicular to the direction of runoff (i.e., parallel to the slope contours).
- Excessive roughness is undesirable where mowing is planned.

Roughening With Tracked Machinery:

- Limit roughening with tracked machinery to soils with a sandy textural component to avoid undue compaction of the soil surface.
- Operate tracked machinery up and down the slope to leave horizontal depressions in the soil. Do not back-blade during the final grading operation.
- Seed and mulch roughened areas as soon as possible to obtain optimum seed germination and growth.

Costs

Costs are based on the additional labor of tracking or preparation of the slope plus the cost of any required soil amendment materials.

Inspection and Maintenance

- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Check the seeded slopes for signs of erosion such as rills and gullies. Fill these areas slightly above the original grade, then reseed and mulch as soon as possible.
- Inspect BMPs weekly during normal operations, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.

References

Soil Stabilization BMP Research for Erosion and Sediment Controls: Cost Survey Technical Memorandum, State of California Department of Transportation (Caltrans), July 2007.

Erosion and Sediment Control Manual, Oregon Department of Environmental Quality, February 2005.

Water Conservation Practices NS-1

Categories		
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

Water conservation practices are activities that use water during the construction of a project in a manner that avoids causing erosion and the transport of pollutants offsite. These practices can reduce or eliminate non-stormwater discharges.

Suitable Applications

Water conservation practices are suitable for all construction sites where water is used, including piped water, metered water, trucked water, and water from a reservoir.

Limitations

- None identified.

Implementation

- Keep water equipment in good working condition.
- Stabilize water truck filling area.
- Repair water leaks promptly.
- Washing of vehicles and equipment on the construction site is discouraged.
- Avoid using water to clean construction areas. If water must be used for cleaning or surface preparation, surface should be swept and vacuumed first to remove dirt. This will minimize amount of water required.

- Direct construction water runoff to areas where it can soak into the ground or be collected and reused.
- Authorized non-stormwater discharges to the storm drain system, channels, or receiving waters are acceptable with the implementation of appropriate BMPs.
- Lock water tank valves to prevent unauthorized use.

Costs

The cost is small to none compared to the benefits of conserving water.

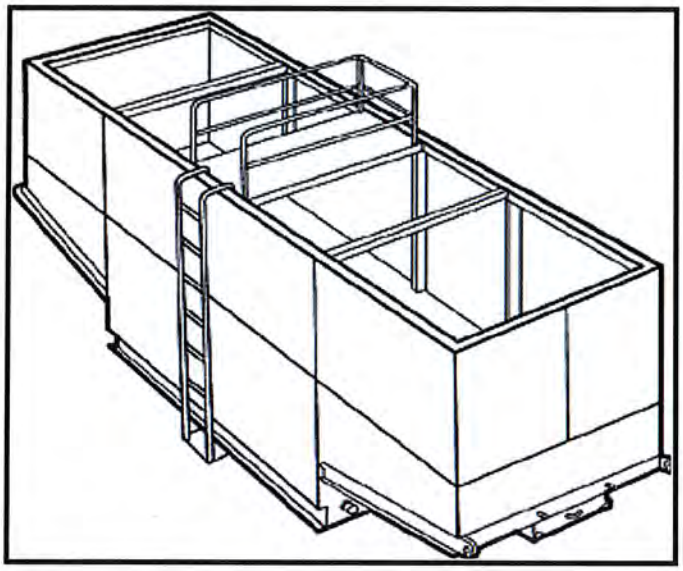
Inspection and Maintenance

- Inspect and verify that activity based BMPs are in place prior to the commencement of authorized non-stormwater discharges.
- Inspect BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Inspect BMPs subject to non-stormwater discharges daily while non-stormwater discharges are occuring.
- Repair water equipment as needed to prevent unintended discharges.
  - Water trucks
  - Water reservoirs (water buffalos)
  - Irrigation systems
  - Hydrant connections

References

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

Dewatering Operations NS-2



Categories

EC	Erosion Control	
SE	Sediment Control	☒
TC	Tracking Control	
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WM	Waste Management and Materials Pollution Control	

Legend:

☑ **Primary Category**

☒ **Secondary Category**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	☑
Organics	

Potential Alternatives

SE-5: Fiber Roll

SE-6: Gravel Bag Berm

Description and Purpose

Dewatering operations are practices that manage the discharge of pollutants when non-stormwater and accumulated precipitation (stormwater) must be removed from a work location to proceed with construction work or to provide vector control.

The General Permit incorporates Numeric Effluent Limits (NEL) and Numeric Action Levels (NAL) for turbidity (see Section 2 of this handbook to determine your project's risk level and if you are subject to these requirements).

Discharges from dewatering operations can contain high levels of fine sediment and other pollutants that, if not properly treated, could lead to exceedences of the General Permit requirements or Basin Plan standards.

Suitable Applications

These practices are implemented for discharges of non-stormwater from construction sites. Non-stormwaters include, but are not limited to, groundwater, water from cofferdams, water diversions, and waters used during construction activities that must be removed from a work area to facilitate construction.

Practices identified in this section are also appropriate for implementation when managing the removal of accumulated precipitation (stormwater) from depressed areas at a construction site.

Stormwater mixed with non-stormwater should be managed as non-stormwater.

Limitations

- Dewatering operations will require, and should comply with applicable local and project-specific permits and regulations. In some areas, all dewatering activities, regardless of the discharge volume, require a dewatering permit.
- Site conditions will dictate design and use of dewatering operations.
- The controls discussed in this fact sheet primarily address sediment. Other secondary pollutant removal benefits are discussed where applicable.
- The controls detailed in this fact sheet only allow for minimal settling time for sediment particles. Use only when site conditions restrict the use of the other control methods.
- Avoid dewatering discharges where possible by using the water for dust control.

Implementation

- A Construction Site Monitoring Plan (CSMP) should be included in the project Stormwater Pollution Prevention Plan (SWPPP).
- Regional Water Quality Control Board (RWQCB) Regions may require notification and approval prior to any discharge of water from construction sites.
- The destination of discharge from dewatering activities will typically determine the type of permit required by the discharger. For example, when discharging to a water of the U.S., a dewatering permit may be required from the site's governing RWQCB. When discharging to a sanitary sewer or Municipal Separate Storm Sewer System (MS4), a permit may need to be obtained through the owner of the sanitary sewer or MS4 in addition to obtaining an RWQCB dewatering permit. Additional permits or permissions from other agencies may be required for dewatering cofferdams or diversions.
- Dewatering discharges should not cause erosion at the discharge point. Appropriate BMPs should be implemented to maintain compliance with all applicable permits.
- Maintain dewatering records in accordance with all local and project-specific permits and regulations.

Sediment Treatment

A variety of methods can be used to treat water during dewatering operations. Several devices are presented below and provide options to achieve sediment removal. The sediment particle size and permit or receiving water limitations on sediment or turbidity are key considerations for selecting sediment treatment option(s); in some cases, the use of multiple devices may be appropriate. Use of other enhanced treatment methods (i.e., introduction of chemicals or electric current to enhance flocculation and removal of sediment) must comply with: 1) for storm drain or surface water discharges, the requirements for Active Treatment Systems (see SE-11); or 2) for sanitary sewer discharges, the requirements of applicable sanitary sewer discharge permits.

Sediment Basin (see also SE-2)

Description:

- A sediment basin is a temporary basin with a controlled release structure that is formed by excavation or construction of an embankment to detain sediment-laden runoff and allow sediment to settle out before discharging. Sediment basins are generally larger than Sediment Traps (SE-3) and have a designed outlet structure.

Appropriate Applications:

- Effective for the removal of trash, gravel, sand, silt, some metals that settle out with the sediment.

Implementation:

- Excavation and construction of related facilities is required.
- Temporary sediment basins should be fenced if safety is a concern.
- Outlet protection is required to prevent erosion at the outfall location.

Maintenance:

- Maintenance is required for safety fencing, vegetation, embankment, inlet and outlet, as well as other features.
- Removal of sediment is required when the storage volume is reduced by one-third.

Sediment Trap (See also SE-3)

Description:

- A sediment trap is a temporary basin formed by excavation and/or construction of an earthen embankment across a waterway or low drainage area to detain sediment-laden runoff and allow sediment to settle out before discharging. Sediment traps are generally smaller than Sediment Basins (SE-2) and do not have a designed outlet (but do have a spillway or overflow).

Appropriate Applications:

Effective for the removal of large and medium sized particles (sand and gravel) and some metals that settle out with the sediment.

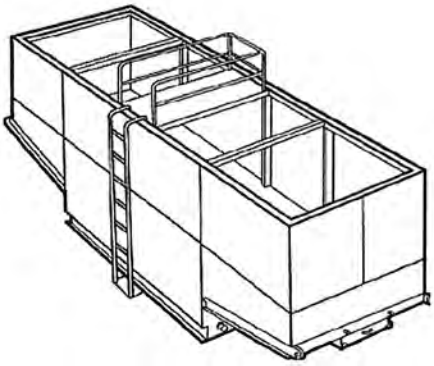
Implementation:

- Excavation and construction of related facilities is required.
- Trap inlets should be located to maximize the travel distance to the trap outlet.
- Use rock or vegetation to protect the trap outlets against erosion.

Maintenance:

- Maintenance is required for vegetation, embankment, inlet and outfall structures, as well as other features.
- Removal of sediment is required when the storage volume is reduced by one-third.

Weir Tanks



Description:

- A weir tank separates water and waste by using weirs. The configuration of the weirs (over and under weirs) maximizes the residence time in the tank and determines the waste to be removed from the water, such as oil, grease, and sediments.

Appropriate Applications:

- The tank removes trash, some settleable solids (gravel, sand, and silt), some visible oil and grease, and some metals (removed with sediment). To achieve high levels of flow, multiple tanks can be used in parallel. If additional treatment is desired, the tanks can be placed in series or as pre-treatment for other methods.

Implementation:

- Tanks are delivered to the site by the vendor, who can provide assistance with set-up and operation.
- Tank size will depend on flow volume, constituents of concern, and residency period required. Vendors should be consulted to appropriately size tank.
- Treatment capacity (i.e., volume and number of tanks) should provide at a minimum the required volume for discrete particle settling for treatment design flows.

Maintenance:

- Periodic cleaning is required based on visual inspection or reduced flow.
- Oil and grease disposal should be conducted by a licensed waste disposal company.

Dewatering Tanks

Description:

- A dewatering tank removes debris and sediment. Flow enters the tank through the top, passes through a fabric filter, and is discharged through the bottom of the tank. The filter separates the solids from the liquids.

Appropriate Applications:

- The tank removes trash, gravel, sand, and silt, some visible oil and grease, and some metals (removed with sediment). To achieve high levels of flow, multiple tanks can be used in parallel. If additional treatment is desired, the tanks can be placed in series or as pre-treatment for other methods.

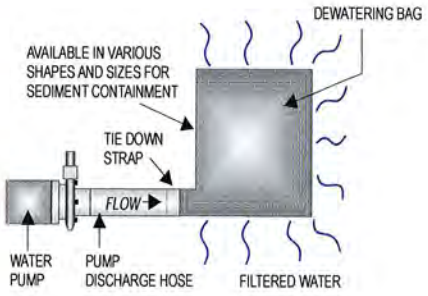
Implementation:

- Tanks are delivered to the site by the vendor, who can provide assistance with set-up and operation.
- Tank size will depend on flow volume, constituents of concern, and residency period required. Vendors should be consulted to appropriately size tank.

Maintenance:

- Periodic cleaning is required based on visual inspection or reduced flow.
- Oil and grease disposal should be conducted by licensed waste disposal company.

Gravity Bag Filter



Description:

- A gravity bag filter, also referred to as a dewatering bag, is a square or rectangular bag made of non-woven geotextile fabric that collects gravel, sand, silt, and fines.

Appropriate Applications:

- Effective for the removal of sediments (gravel, sand, silt, and fines). Some metals are removed with the sediment.

Implementation:

- Water is pumped into one side of the bag and seeps through the top, bottom, and sides of the bag.
- Place filter bag on pavement or a gravel bed or paved surface. Avoid placing a dewatering bag on unprotected bare soil. If placing the bag on bare soil is unavoidable, a secondary barrier should be used, such as a rock filter bed placed beneath and beyond the edges of the bag to, prevent erosion and capture sediments that escape the bag.
- Perimeter control around the downstream end of the bag should be implemented. Secondary sediment controls are important especially in the initial stages of discharge, which tend to allow fines to pass through the bag.

Maintenance:

- Inspection of the flow conditions, bag condition, bag capacity, and the secondary barrier (as applicable) is required.
- Replace the bag when it no longer filters sediment or passes water at a reasonable rate.
- Caution should be taken when removing and disposing of the bag, to prevent the release of captured sediment
- Properly dispose of the bag offsite. If sediment is removed from the bag prior to disposal (bags can potentially be reused depending upon their condition), dispose of sediment in accordance with the general maintenance procedures described at the end of this BMP Fact Sheet.

Sand Media Particulate Filter

Description:

- Water is treated by passing it through canisters filled with sand media. Generally, sand filters provide a final level of treatment. They are often used as a secondary or higher level of treatment after a significant amount of sediment and other pollutants have been removed using other methods.

Appropriate Applications:

- Effective for the removal of trash, gravel, sand, and silt and some metals, as well as the reduction of biochemical oxygen demand (BOD) and turbidity.
- Sand filters can be used for stand-alone treatment or in conjunction with bag and cartridge filtration if further treatment is required.
- Sand filters can also be used to provide additional treatment to water treated via settling or basic filtration.

Implementation:

- The filters require delivery to the site and initial set up. The vendor can provide assistance with installation and operation.

Maintenance:

- The filters require regular service to monitor and maintain the level of the sand media. If subjected to high loading rates, filters can plug quickly.
- Venders generally provide data on maximum head loss through the filter. The filter should be monitored daily while in use, and cleaned when head loss reaches target levels.
- If cleaned by backwashing, the backwash water may need to be hauled away for disposal, or returned to the upper end of the treatment train for another pass through the series of dewatering BMPs.

Pressurized Bag Filter

Pressurized Bag Filter

Description:

- A pressurized bag filter is a unit composed of single filter bags made from polyester felt material. The water filters through the unit and is discharged through a header. Vendors provide bag filters in a variety of configurations. Some units include a combination of bag filters and cartridge filters for enhanced contaminant removal.

Appropriate Applications:

- Effective for the removal of sediment (sand and silt) and some metals, as well as the reduction of BOD, turbidity, and hydrocarbons. Oil absorbent bags are available for hydrocarbon removal.
- Filters can be used to provide secondary treatment to water treated via settling or basic filtration.

Implementation:

- The filters require delivery to the site and initial set up. The vendor can provide assistance with installation and operation.

Maintenance:

- The filter bags require replacement when the pressure differential equals or exceeds the manufacturer's recommendation.

Cartridge Filter

Description:

- Cartridge filters provide a high degree of pollutant removal by utilizing a number of individual cartridges as part of a larger filtering unit. They are often used as a secondary or higher (polishing) level of treatment after a significant amount of sediment and other pollutants are removed. Units come with various cartridge configurations (for use in series with bag filters) or with a larger single cartridge filtration unit (with multiple filters within).

Appropriate Applications:

- Effective for the removal of sediment (sand, silt, and some clays) and metals, as well as the reduction of BOD, turbidity, and hydrocarbons. Hydrocarbons can effectively be removed with special resin cartridges.
- Filters can be used to provide secondary treatment to water treated via settling or basic filtration.

Implementation:

- The filters require delivery to the site and initial set up. The vendor can provide assistance.

Maintenance:

- The cartridges require replacement when the pressure differential equals or exceeds the manufacturer's recommendation.

Costs

- Sediment control costs vary considerably depending on the dewatering and sediment treatment system that is selected. Pressurized filters tend to be more expensive than gravity settling, but are often more effective. Simple tanks are generally rented on a long-term basis (one or more months) and can range from $360 per month for a 1,000 gallon tank to $2,660 per month for a 10,000 gallon tank. Mobilization and demobilization costs vary considerably.

Inspection and Maintenance

- Inspect and verify that dewatering BMPs are in place and functioning prior to the commencement of activities requiring dewatering.
- Inspect dewatering BMPs daily while dewatering activities are being conducted.

- Inspect all equipment before use. Monitor dewatering operations to ensure they do not cause offsite discharge or erosion.
- Sample dewatering discharges as required by the General Permit.
- Unit-specific maintenance requirements are included with the description of each unit.
- Sediment removed during the maintenance of a dewatering device may be either spread onsite and stabilized, or disposed of at a disposal site as approved by the owner.
- Sediment that is commingled with other pollutants should be disposed of in accordance with all applicable laws and regulations and as approved by the owner.

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), March 2003; Updated March 2004.

Stormwater Management for Construction Activities, Developing Pollution Prevention Plans and Best Management Practices, EPA 832-R-92005; USEPA, April 1992.

Labor Surcharge & Equipment Rental Rates, April 1, 2002 through March 31, 2003, California Department of Transportation (Caltrans).

Erosion and Sediment Control Manual, Oregon Department of Environmental Quality, February 2005.

Illicit Connection/Discharge NS-6

Categories		
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

Procedures and practices designed for construction contractors to recognize illicit connections or illegally dumped or discharged materials on a construction site and report incidents.

Suitable Applications

This best management practice (BMP) applies to all construction projects. Illicit connection/discharge and reporting is applicable anytime an illicit connection or discharge is discovered or illegally dumped material is found on the construction site.

Limitations

Illicit connections and illegal discharges or dumping, for the purposes of this BMP, refer to discharges and dumping caused by parties other than the contractor. If pre-existing hazardous materials or wastes are known to exist onsite, they should be identified in the SWPPP and handled as set forth in the SWPPP.

Implementation

Planning

- Review the SWPPP. Pre-existing areas of contamination should be identified and documented in the SWPPP.
- Inspect site before beginning the job for evidence of illicit connections, illegal dumping or discharges. Document any pre-existing conditions and notify the owner.
- Inspect site regularly during project execution for evidence

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of illicit connections, illegal dumping or discharges.

- Observe site perimeter for evidence for potential of illicitly discharged or illegally dumped material, which may enter the job site.

Identification of Illicit Connections and Illegal Dumping or Discharges

- **General** – unlabeled and unidentifiable material should be treated as hazardous.
- **Solids** - Look for debris, or rubbish piles. Solid waste dumping often occurs on roadways with light traffic loads or in areas not easily visible from the traveled way.
- **Liquids** - signs of illegal liquid dumping or discharge can include:
  - Visible signs of staining or unusual colors to the pavement or surrounding adjacent soils
  - Pungent odors coming from the drainage systems
  - Discoloration or oily substances in the water or stains and residues detained within ditches, channels or drain boxes
  - Abnormal water flow during the dry weather season
- **Urban Areas** - Evidence of illicit connections or illegal discharges is typically detected at storm drain outfall locations or at manholes. Signs of an illicit connection or illegal discharge can include:
  - Abnormal water flow during the dry weather season
  - Unusual flows in sub drain systems used for dewatering
  - Pungent odors coming from the drainage systems
  - Discoloration or oily substances in the water or stains and residues detained within ditches, channels or drain boxes
  - Excessive sediment deposits, particularly adjacent to or near active offsite construction projects
- **Rural Areas** - Illicit connections or illegal discharges involving irrigation drainage ditches are detected by visual inspections. Signs of an illicit discharge can include:
  - Abnormal water flow during the non-irrigation season
  - Non-standard junction structures
  - Broken concrete or other disturbances at or near junction structures

Reporting

Notify the owner of any illicit connections and illegal dumping or discharge incidents at the time of discovery. For illicit connections or discharges to the storm drain system, notify the local stormwater management agency. For illegal dumping, notify the local law enforcement agency.

Cleanup and Removal

The responsibility for cleanup and removal of illicit or illegal dumping or discharges will vary by location. Contact the local stormwater management agency for further information.

Costs

Costs to look for and report illicit connections and illegal discharges and dumping are low. The best way to avoid costs associated with illicit connections and illegal discharges and dumping is to keep the project perimeters secure to prevent access to the site, to observe the site for vehicles that should not be there, and to document any waste or hazardous materials that exist onsite before taking possession of the site.

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 BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Inspect the site regularly to check for any illegal dumping or discharge.
- Prohibit employees and subcontractors from disposing of non-job related debris or materials at the construction site.
- Notify the owner of any illicit connections and illegal dumping or discharge incidents at the time of discovery.

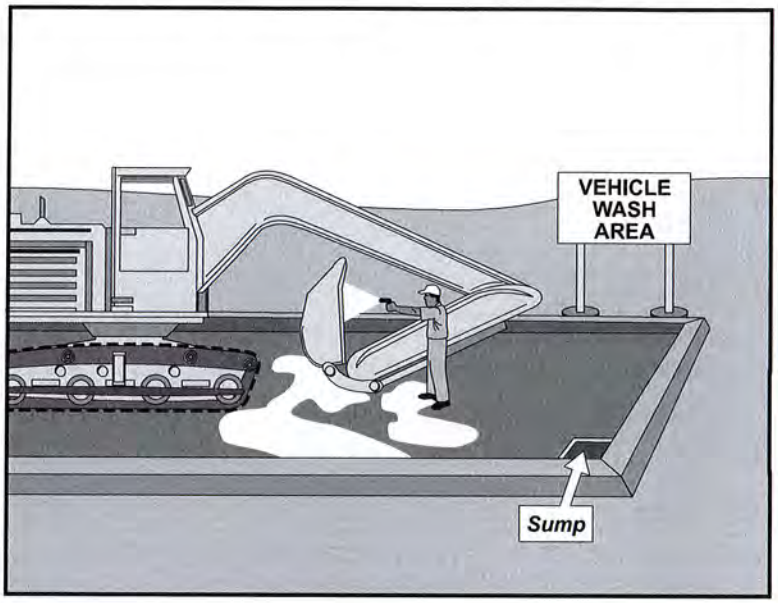
References

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 Practices, EPA 832-R-92005; USEPA, April 1992.

Vehicle and Equipment Cleaning NS-8



Categories

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

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 TC-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

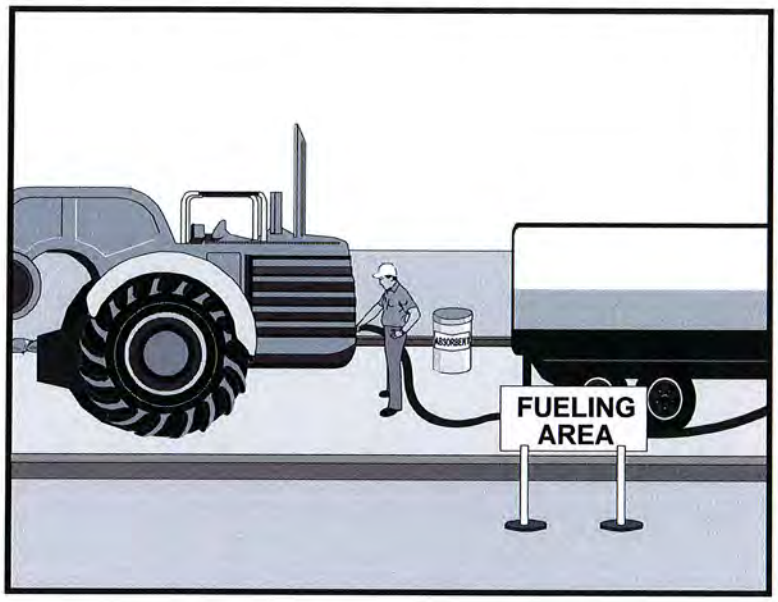
- Inspect and verify that activity-based BMPs are in place prior to the commencement of associated activities. While activities associated with the BMP are under way, inspect BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- 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



Categories

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WE	Wind Erosion Control	
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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 TC-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.
- Absorbent spill cleanup materials and spill kits should be available in fueling areas and on fueling trucks, and should

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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

- Inspect BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- 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

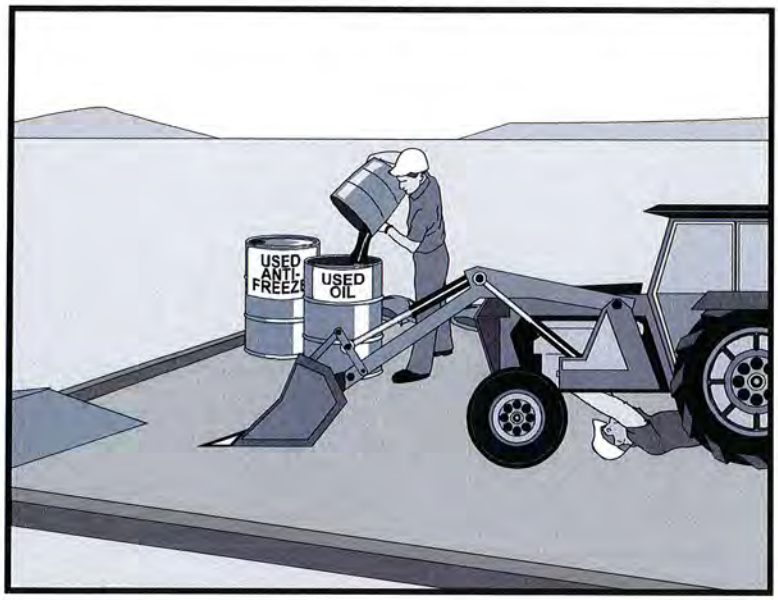
Blueprint for a Clean Bay: Best Management Practices to Prevent Stormwater Pollution from Construction Related Activities; Santa Clara Valley Nonpoint Source Pollution Control Program, 1995.

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



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☑ **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 TC-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

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Equipment Fueling.

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.

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 BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- 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

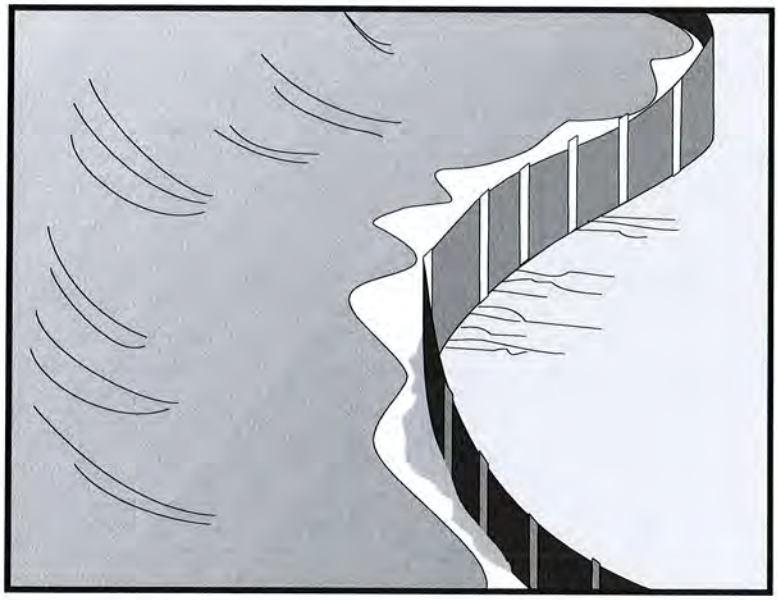
Blueprint for a Clean Bay: Best Management Practices to Prevent Stormwater Pollution from Construction Related Activities; Santa Clara Valley Nonpoint Source Pollution Control Program, 1995.

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.

Silt Fence

SE-1



Categories

EC	Erosion Control	
SE	Sediment Control	☑
TC	Tracking Control	
WE	Wind Erosion Control	
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Legend:

☑ **Primary Category**

☒ **Secondary Category**

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-10 Storm Drain Inlet Protection

SE-14 Biofilter Bags

Description and Purpose

A silt fence is made of a woven geotextile 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 could also be used as interior controls below disturbed areas where runoff may occur in the form of sheet and rill erosion and around inlets within disturbed areas (SE-10). 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.
- Around inlets.
- Below other small cleared areas.

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Limitations

- Do not use in streams, channels, drain inlets, or anywhere flow is concentrated.
- Do not use in locations where ponded water may cause a flooding hazard. Runoff typically ponds temporarily on the upstream side of silt fence.
- Do not use silt fence to divert water flows or place across any contour line. Fences not constructed on a level contour, or fences used to divert flow will concentrate flows resulting in additional erosion and possibly overtopping or failure of the silt fence.
- Improperly installed fences are subject to failure from undercutting, overtopping, 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 use on slopes subject to creeping, slumping, or landslides.

Implementation

General

A silt fence is a temporary sediment barrier consisting of woven geotextile stretched across and attached to supporting posts, trenched-in, 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.

The following layout and installation guidance can improve performance and should be followed:

- Use principally in areas where sheet flow occurs.
- 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, after which, the silt fence should be removed and properly disposed.
- Silt fence should be used in combination with erosion source controls up slope in order to provide the most effective sediment control.
- Be aware of local regulations regarding the type and installation requirements of silt fence, which may differ from those presented in this fact sheet.

Design and Layout

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). Woven geotextile 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.

Standard vs. Heavy Duty Silt Fence

Standard Silt Fence

- Generally applicable in cases where the slope of area draining to the silt fence is 4:1 (H:V) or less.
- Used for shorter durations, typically 5 months or less
- Area draining to fence produces moderate sediment loads.

Heavy Duty Silt Fence

- Use is generally limited to 8 months or less.
- Area draining to fence produces moderate sediment loads.
- Heavy duty silt fence usually has 1 or more of the following characteristics, not possessed by standard silt fence.
  - Fence fabric has higher tensile strength.
  - Fabric is reinforced with wire backing or additional support.
  - Posts are spaced closer than pre-manufactured, standard silt fence products.
  - Posts are metal (steel or aluminum)

Materials

Standard Silt Fence

- Silt fence material should be woven geotextile 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.

Heavy-Duty Silt Fence

- Some silt fence has a wire backing to provide additional support, and there are products that may use prefabricated plastic holders for the silt fence and use metal posts or 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 for health and safety purposes.

Installation Guidelines – Traditional Method

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 of the proposed silt fence (trenches should not be excavated wider or deeper than necessary for proper silt fence installation).

- 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 geotextile 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 geotextile and closer post spacing are used, the mesh support fence may be eliminated.

- Woven geotextile should be purchased in a long roll, then cut to the length of the barrier. When joints are necessary, geotextile 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 native material and compacted.

- Construct silt fences with a setback of at least 3 ft from the toe of a slope. Where, due to specific site conditions, a 3 ft setback is not available, 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 more 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.
- Cross barriers should be a minimum of $^1/_3$ and a maximum of ½ the height of the linear barrier.
- See typical installation details at the end of this fact sheet.

Installation Guidelines - Static Slicing Method

- Static Slicing is defined as insertion of a narrow blade pulled behind a tractor, similar to a plow blade, at least 10 inches into the soil while at the same time pulling silt geotextile fabric into the ground through the opening created by the blade to the depth of the blade. Once the gerotextile is installed, the soil is compacted using tractor tires.
- This method will not work with pre-fabricated, wire backed silt fence.
- Benefits:
    - Ease of installation (most often done with a 2 person crew). In addition, installation using static slicing has been found to be more efficient on slopes, in rocky soils, and in saturated soils.
    - Minimal soil disturbance.
    - Greater level of compaction along fence, leading to higher performance (i.e. greater sediment retention).
    - Uniform installation.
    - Less susceptible to undercutting/undermining.

Costs

- It should be noted that costs vary greatly across regions due to available supplies and labor costs.
- Average annual cost for installation using the traditional silt fence installation method (assumes 6 month useful life) is $7 per linear foot based on vendor research. Range of cost is $3.50 - $9.10 per linear foot.
- In tests, the slicing method required 0.33 man hours per 100 linear feet, while the trenched based systems required as much as 1.01 man hours per linear foot.

Inspection and Maintenance

- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- 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, and replaced with new silt fence barriers.
- Sediment that accumulates in the BMP should be periodically removed in order to maintain BMP effectiveness. Sediment should be removed when the sediment accumulation reaches one-third of the barrier height.
- Silt fences should be left in place until the upstream area is permanently stabilized. Until then, the silt fence should be inspected and maintained regularly.
- Remove silt fence when upgradient areas are stabilized. Fill and compact post holes and anchor trench, remove sediment accumulation, grade fence alignment to blend with adjacent ground, and stabilize disturbed area.

References

Manual of Standards of Erosion and Sediment Control Measures, Association of Bay Area Governments, May 1995.

National Management Measures to Control Nonpoint Source Pollution from Urban Areas, United States Environmental Protection Agency, 2002.

Proposed Guidance Specifying Management Measures for Sources of Nonpoint Pollution in Coastal Waters, Work Group-Working Paper, USEPA, April 1992.

Sedimentation and Erosion Control Practices, and Inventory of Current Practices (Draft), UESPA, 1990.

Southeastern Wisconsin Regional Planning Commission (SWRPC). Costs of Urban Nonpoint Source Water Pollution Control Measures. Technical Report No. 31. Southeastern Wisconsin Regional Planning Commission, Waukesha, WI. 1991

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), March 2003.

Stormwater Management Manual for The Puget Sound Basin, Washington State Department of Ecology, Public Review Draft, 1991.

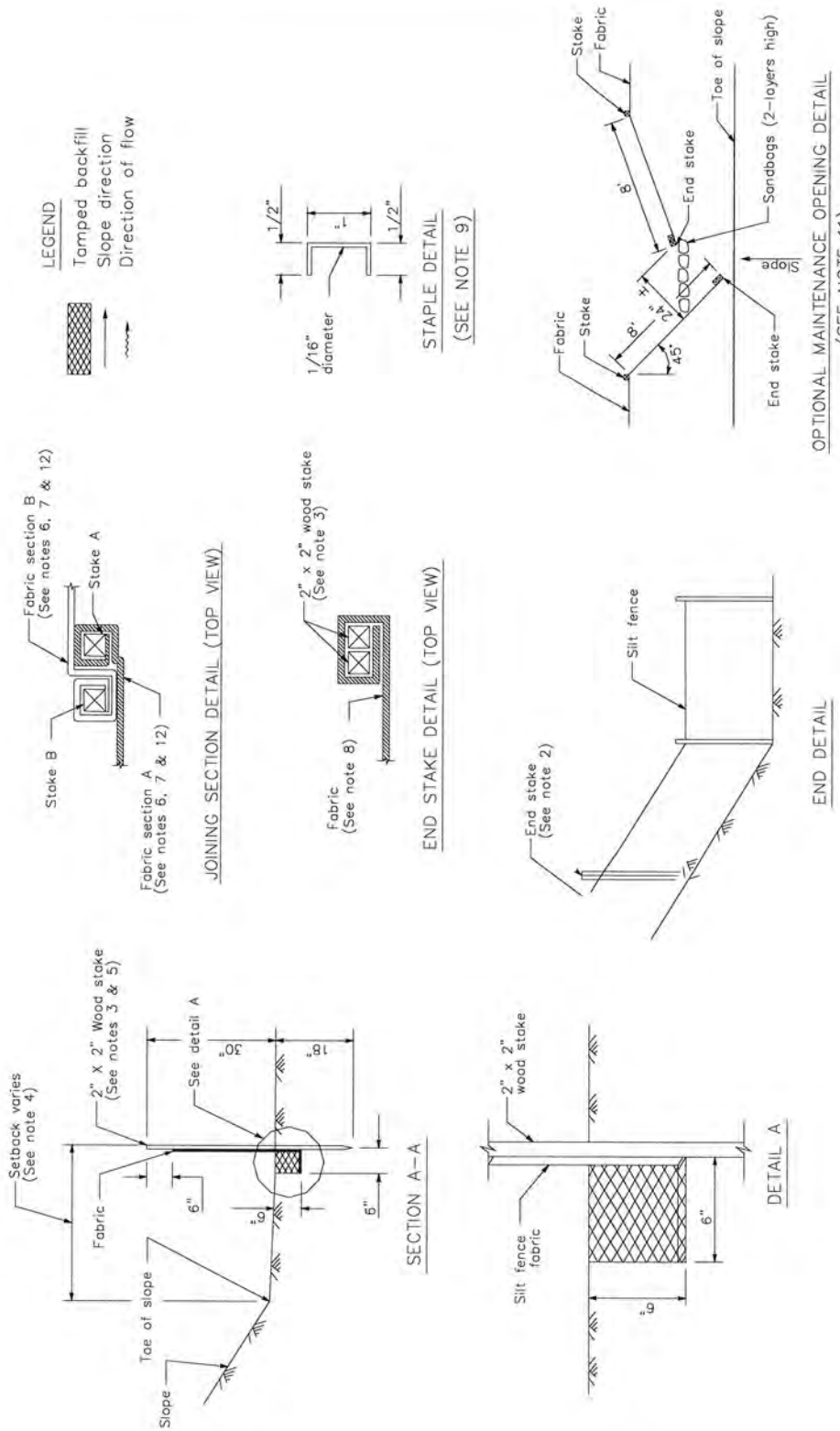
U.S. Environmental Protection Agency (USEPA). Stormwater Management for Industrial Activities: Developing Pollution Prevention Plans and Best Management Practices. U.S. Environmental Protection Agency, Office of Water, Washington, DC, 1992.

Water Quality Management Plan for the Lake Tahoe Region, Volume II, Handbook of Management Practices, Tahoe Regional Planning Agency, November 1988.Soil Stabilization BMP Research for Erosion and Sediment Controls: Cost Survey Technical Memorandum, State of California Department of Transportation (Caltrans), July 2007.

Erosion and Sediment Control Manual, Oregon Department of Environmental Quality, February 2005.

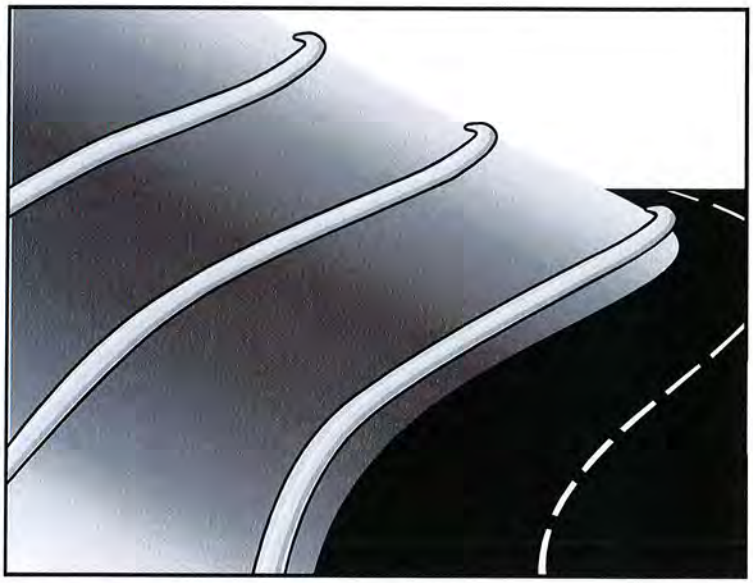
NOTES

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.
14. Add 3-4 bags to cross barrier on downgradient side of silt fence as needed to prevent bypass or undermining and as allowable based on site limits of disturbance.


LEGEND
Tamped backfill
Slope direction
Direction of flow
1/2"
1/16" diameter
1"
1/2"
STAPLE DETAIL
(SEE NOTE 9)
Stake
Fabric
8'
End stake
Toe of slope
Sandbags (2-layers high)
Slope
Fabric
Stake
8"
24"
4'
8"
45°
End stake
OPTIONAL MAINTENANCE OPENING DETAIL
(SEE NOTE 11)
Fabric section B
(See notes 6, 7 & 12)
Stake A
Stake B
Fabric section A
(See notes 6, 7 & 12)
JOINING SECTION DETAIL (TOP VIEW)
2" x 2" wood stake
(See note 3)
Fabric
(See note 8)
END STAKE DETAIL (TOP VIEW)
Silt fence
End stake
(See note 2)
END DETAIL
Setback varies
(See note 4)
2" X 2" Wood stake
(See notes 3 & 5)
See detail A
30"
18"
Fabric
6"
6"
Toe of slope
Slope
SECTION A-A
2" x 2"
wood stake
Silt fence
fabric
6"
6"
DETAIL A

Fiber Rolls

SE-5



Description and Purpose

A fiber roll consists of straw, coir, or other biodegradable materials bound into a tight tubular roll wrapped by netting, which can be photodegradable or natural. Additionally, gravel core fiber rolls are available, which contain an imbedded ballast material such as gravel or sand for additional weight when staking the rolls are not feasible (such as use as inlet protection). When fiber rolls are placed at the toe and on the face of slopes along the contours, they intercept runoff, reduce its flow velocity, release the runoff as sheet flow, and provide removal of sediment from the runoff (through sedimentation). By interrupting the length of a slope, fiber rolls can also reduce sheet and rill erosion until vegetation is established.

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 with minimal grade.
- Down-slope of exposed soil areas.
- At operational storm drains as a form of inlet protection.

Categories

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 Category**

☒ **Secondary Category**

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-14 Biofilter Bags

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- Around temporary stockpiles.

Limitations

- Fiber rolls are not effective unless trenched in and staked.
- Not intended for use in high flow situations.
- 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.
- Rolls typically function for 12-24 months depending upon local conditions.

Implementation

Fiber Roll Materials

- Fiber rolls should be prefabricated.
- Fiber rolls may come manufactured containing polyacrylamide (PAM), a flocculating agent within the roll. Fiber rolls impregnated with PAM provide additional sediment removal capabilities and should be used in areas with fine, clayey or silty soils to provide additional sediment removal capabilities. Monitoring may be required for these installations.
- Fiber rolls are made from weed free rice straw, flax, or a similar agricultural material bound into a tight tubular roll by netting.
- Typical fiber rolls vary in diameter from 9 in. to 20 in. Larger diameter rolls are available as well.

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).
- Prepare the slope before beginning installation.
- Dig small trenches across the slope on the contour. The trench depth should be ¼ to 1/3 of the thickness of the roll, and the width should equal the roll diameter, in order to provide area to backfill the trench.

- It is critical that rolls are installed perpendicular to water movement, and parallel to the slope contour.
- Start building trenches and installing rolls from the bottom of the slope and work up.
- It is recommended that pilot holes be driven through the fiber roll. Use a straight bar to drive holes through the roll and into the soil for the wooden stakes.
- Turn the ends of the fiber roll up slope to prevent runoff from going around the roll.
- Stake fiber rolls into the trench.
  - 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.
- See typical fiber roll installation details at the end of this fact sheet.

Removal

- Fiber rolls can be left in place or removed depending on the type of fiber roll and application (temporary vs. permanent installation). Typically, fiber rolls encased with plastic netting are used for a temporary application because the netting does not biodegrade. Fiber rolls used in a permanent application are typically encased with a biodegradeable material and are left in place. Removal of a fiber roll used in a permanent application can result in greater disturbance.
- Temporary installations should only be removed when up gradient areas are stabilized per General Permit requirements, and/or pollutant sources no longer present a hazard. But, they should also be removed before vegetation becomes too mature so that the removal process does not disturb more soil and vegetation than is necessary.

Costs

Material costs for regular fiber rolls range from $20 - $30 per 25 ft roll.

Material costs for PAM impregnated fiber rolls range between 7.00-$9.00 per linear foot, based upon vendor research.

Inspection and Maintenance

- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- 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 should be periodically removed

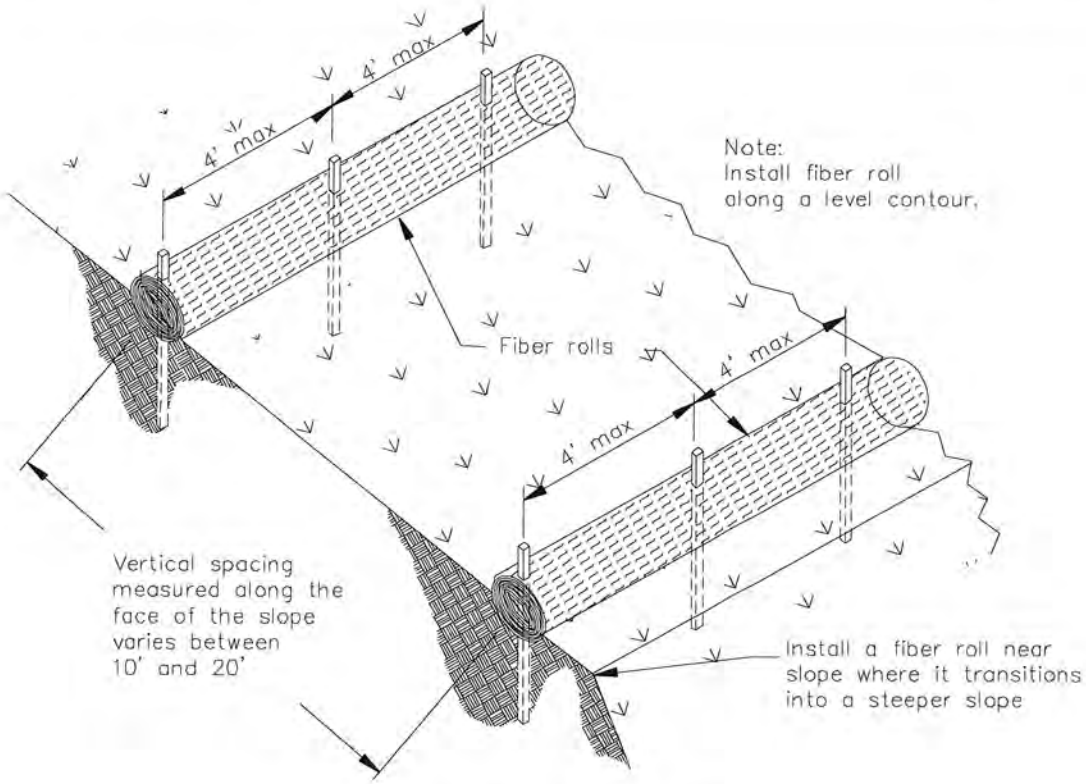
in order to maintain BMP effectiveness. Sediment should be removed when sediment accumulation reaches one-third the designated sediment storage depth.

- If fiber rolls are used for erosion control, such as in a 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.
- Repair any rills or gullies promptly.

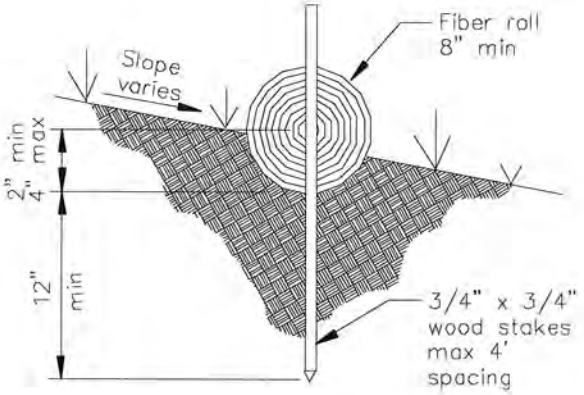
References

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), March 2003.

Erosion and Sediment Control Manual, Oregon Department of Environmental Quality, February 2005.



TYPICAL FIBER ROLL INSTALLATION
N.T.S.



ENTRENCHMENT DETAIL
N.T.S.

Street Sweeping and Vacuuming SE-7

Categories		
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

Street sweeping and vacuuming includes use of self-propelled and walk-behind equipment to remove sediment from streets and roadways, and to clean paved surfaces in preparation for final paving. Sweeping and vacuuming prevents sediment from the project site from entering storm drains or receiving waters.

Suitable Applications

Sweeping and vacuuming are suitable anywhere sediment is tracked from the project site onto public or private paved streets and roads, typically at points of egress. Sweeping and vacuuming are also applicable during preparation of paved surfaces for final paving.

Limitations

Sweeping and vacuuming may not be effective when sediment is wet or when tracked soil is caked (caked soil may need to be scraped loose).

Implementation

- Controlling the number of points where vehicles can leave the site will allow sweeping and vacuuming efforts to be focused, and perhaps save money.
- Inspect potential sediment tracking locations daily.
- Visible sediment tracking should be swept or vacuumed on a daily basis.
- Do not use kick brooms or sweeper attachments. These tend to spread the dirt rather than remove it.

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- If not mixed with debris or trash, consider incorporating the removed sediment back into the project

Costs

Rental rates for self-propelled sweepers vary depending on hopper size and duration of rental. Expect rental rates from $58/hour (3 yd^3 hopper) to $88/hour (9 yd^3 hopper), plus operator costs. Hourly production rates vary with the amount of area to be swept and amount of sediment. Match the hopper size to the area and expect sediment load to minimize time spent dumping.

Inspection and Maintenance

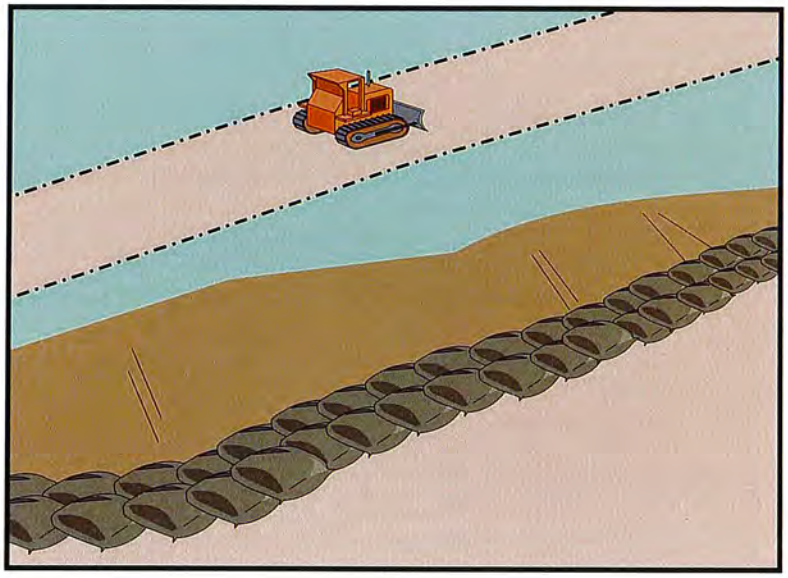
- Inspect BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- When actively in use, points of ingress and egress must be inspected daily.
- When tracked or spilled sediment is observed outside the construction limits, it must be removed at least daily. More frequent removal, even continuous removal, may be required in some jurisdictions.
- Be careful not to sweep up any unknown substance or any object that may be potentially hazardous.
- Adjust brooms frequently; maximize efficiency of sweeping operations.
- After sweeping is finished, properly dispose of sweeper wastes at an approved dumpsite.

References

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

Labor Surcharge and Equipment Rental Rates, State of California Department of Transportation (Caltrans), April 1, 2002 – March 31, 2003.

Sandbag Barrier SE-8



Categories

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 Category**
☒ **Secondary Category**

Description and Purpose

A sandbag barrier is a series of sand-filled bags placed on a level contour to intercept or to divert sheet flows. Sandbag barriers placed on a level contour 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-12 Temporary Silt Dike

SE-14 Biofilter Bags

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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.
- Sandbags are not intended to be used as filtration devices.
- Easily damaged by construction equipment.
- Degraded sandbags may rupture when removed, spilling sand.
- Sand is easily transported by runoff if bag is damaged or ruptured.
- Installation can be labor intensive.
- Durability of sandbags is somewhat limited and bags may need to be replaced when installation is required for longer than 6 months. 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 allows sediment to settle. Sand-filled bags have limited porosity, which is further limited as the fine sand tends to quickly plug with sediment, limiting or completely blocking 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-14, Biofilter Bags. 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 gravel bag berms, but less porous. Generally, sandbag barriers should be used in conjunction with temporary soil stabilization controls up slope to provide effective erosion and sediment control.

Design and Layout

- Locate sandbag barriers on a level contour.
- When used for slope interruption, the following slope/sheet flow length combinations apply:
  - Slope inclination of 4:1 (H:V) or flatter: Sandbags should be placed at a maximum interval of 20 ft, with the first row near the slope toe.
  - Slope inclination between 4:1 and 2:1 (H:V): Sandbags should be placed at a maximum interval of 15 ft. (a closer spacing is more effective), with the first row near the slope toe.

    Slope inclination 2:1 (H:V) or greater: Sandbags should be placed at a maximum interval of 10 ft. (a closer spacing is more effective), with the first row 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, sand bag barriers should be set back from the slope toe to facilitate cleaning. Where specific site conditions do not allow for a set-back, the sand bag barrier may be constructed on the toe of the slope. To prevent flows behind the barrier, bags can be placed perpendicular to a berm to serve as cross barriers.
- Drainage area should not exceed 5 acres.
- Stack sandbags at least three bags high.
- Butt ends of bags tightly.
- Overlap 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 (H:V) 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 (H:V) or flatter.
- See typical sandbag barrier installation details at the end of this fact sheet.

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 is not an acceptable substitute, as sand can more easily mobilize out of burlap.
- ***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 3 (Caltrans Standard Specification, Section 25) permeable material free from clay and deleterious material, such as recycled concrete or asphalt..

Costs

Empty sandbags cost $0.25 - $0.75. Average cost of fill material is $8 per yd^3. Additional labor is required to fill the bags. Pre-filled sandbags are more expensive at $1.50 - $2.00 per bag. These costs are based upon vendor research.

Inspection and Maintenance

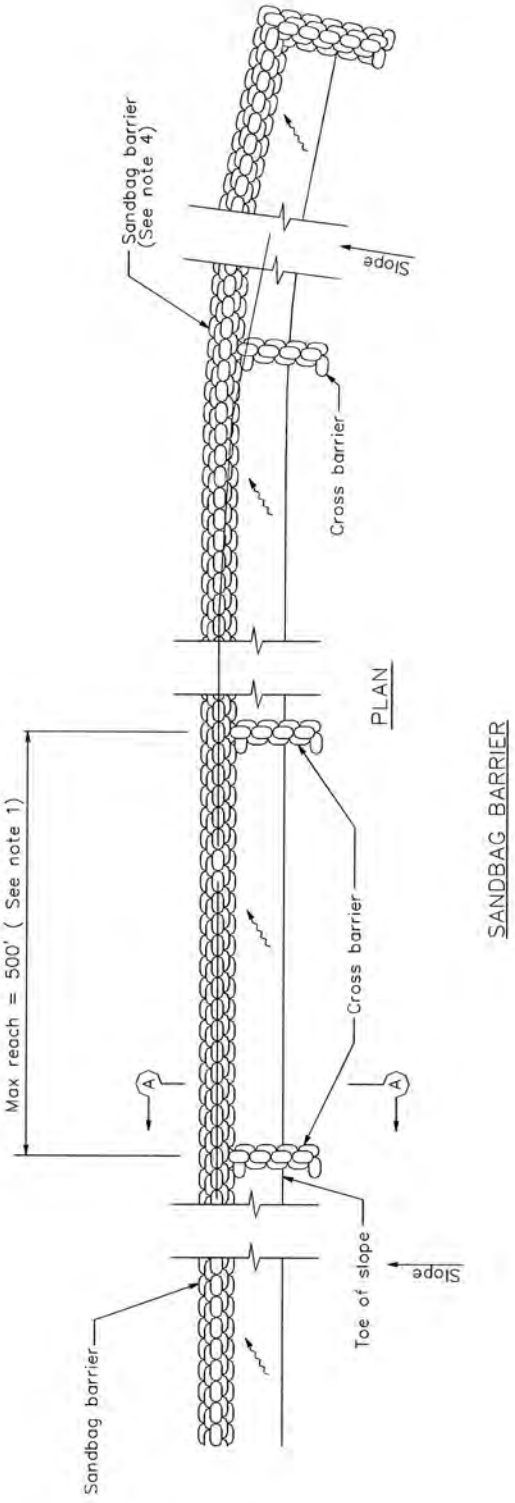
- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Sandbags 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 behind the BMP should be periodically removed in order to maintain BMP effectiveness. Sediment should be removed when the sediment accumulation reaches one-third of the barrier height.
- Remove sandbags when no longer needed and recycle sand fill whenever possible and properly dispose of bag material. Remove sediment accumulation, and clean, re-grade, and stabilize the area.

References

Standard Specifications for Construction of Local Streets and Roads, California Department of Transportation (Caltrans), July 2002.

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), March 2003.

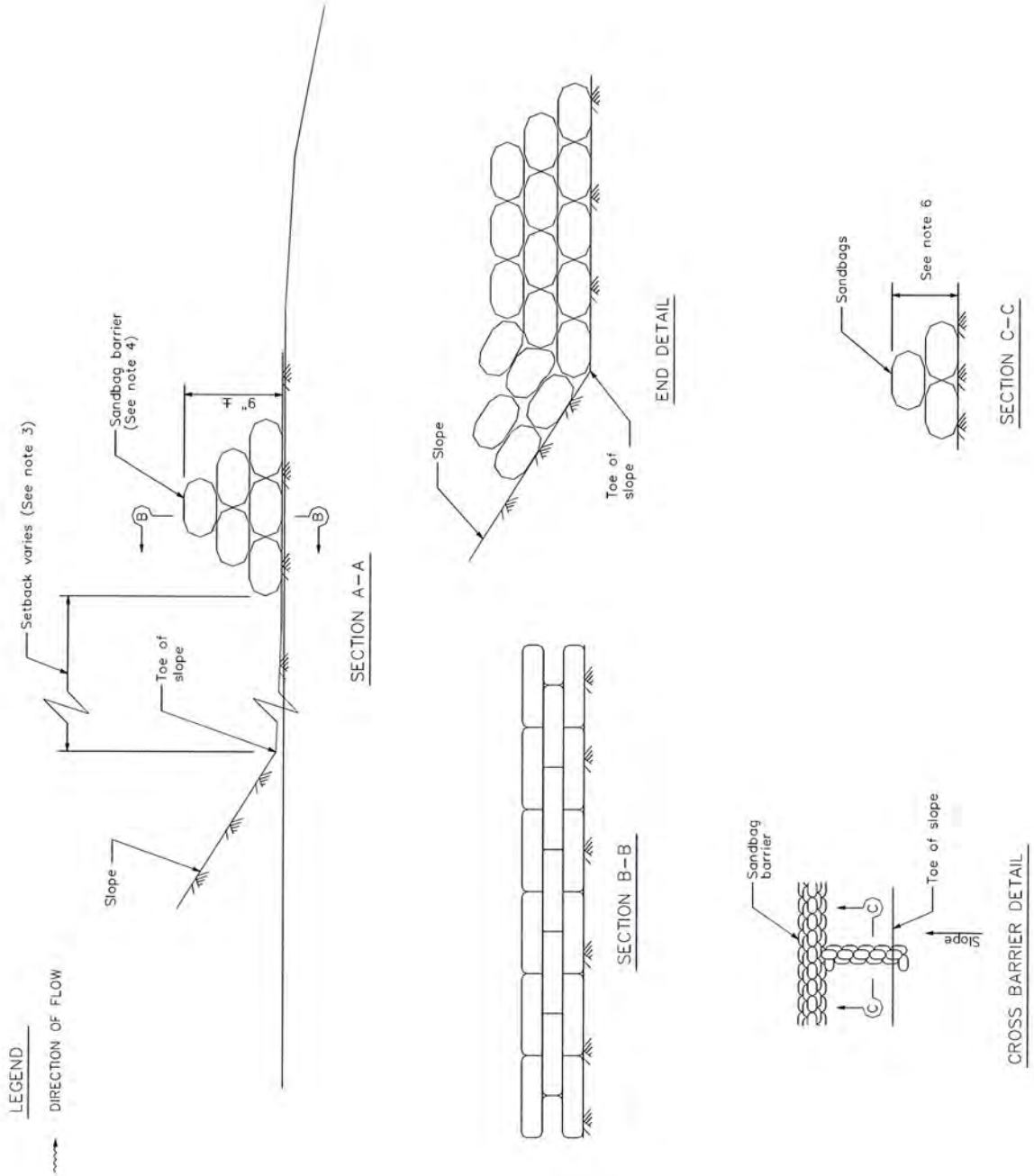
Erosion and Sediment Control Manual, Oregon Department of Environmental Quality, February 2005.



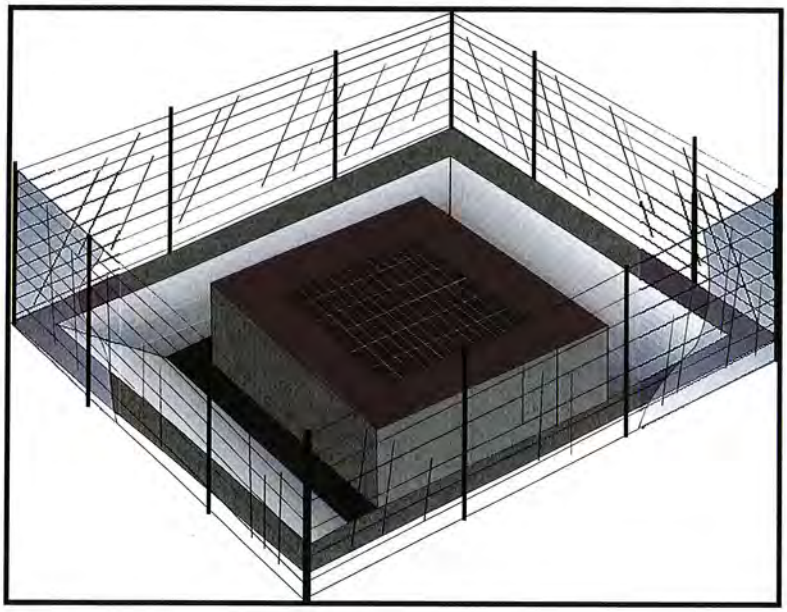
SANDBAG BARRIER

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.


LEGEND
DIRECTION OF FLOW
Setback varies (See note 3)
Sandbag barrier (See note 4)
9"
Toe of slope
Slope
B
SECTION A-A
Slope
Toe of slope
END DETAIL
SECTION B-B
Sandbags
See note 6
SECTION C-C
Sandbag barrier
Toe of slope
Slope
C
CROSS BARRIER DETAIL

Storm Drain Inlet Protection SE-10



Categories

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 Category**

☒ **Secondary Category**

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-8 Sandbag Barrier

SE-14 Biofilter Bags

Description and Purpose

Storm drain inlet protection consists of a sediment filter or an impounding area in, around or upstream of a storm drain, drop inlet, or curb inlet. Storm drain inlet protection measures temporarily pond runoff before it enters the storm drain, allowing sediment to settle. Some filter configurations also remove sediment by filtering, but usually the ponding action results in the greatest sediment reduction. Temporary geotextile storm drain inserts attach underneath storm drain grates to capture and filter storm water.

Suitable Applications

Every storm drain inlet receiving runoff from unstabilized or otherwise active work areas should be protected. Inlet protection should be used in conjunction with other erosion and sediment controls to prevent sediment-laden stormwater and non-stormwater discharges from entering the storm drain system.

Limitations

- Drainage area should not exceed 1 acre.
- In general straw bales should not be used as inlet protection.
- Requires an adequate area for water to pond without encroaching into portions of the roadway subject to traffic.

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- Sediment removal may be inadequate to prevent sediment discharges in high flow conditions or if runoff is heavily sediment laden. If high flow conditions are expected, use other onsite sediment trapping techniques in conjunction with inlet protection.
- Frequent maintenance is required.
- Limit drainage area to 1 acre maximum. For drainage areas larger than 1 acre, runoff should be routed to a sediment-trapping device designed for larger flows. See BMPs SE-2, Sediment Basin, and SE-3, Sediment Traps.
- Excavated drop inlet sediment traps are appropriate where relatively heavy flows are expected, and overflow capability is needed.

Implementation

General

Inlet control measures presented in this handbook should not be used for inlets draining more than one acre. Runoff from larger disturbed areas should be first routed through SE-2, Sediment Basin or SE-3, Sediment Trap and/or used in conjunction with other drainage control, erosion control, and sediment control BMPs to protect the site. Different types of inlet protection are appropriate for different applications depending on site conditions and the type of inlet. Alternative methods are available in addition to the methods described/shown herein such as prefabricated inlet insert devices, or gutter protection devices.

Design and Layout

Identify existing and planned storm drain inlets that have the potential to receive sediment-laden surface runoff. Determine if storm drain inlet protection is needed and which method to use.

- The key to successful and safe use of storm drain inlet protection devices is to know where runoff that is directed toward the inlet to be protected will pond or be diverted as a result of installing the protection device.
  - Determine the acceptable location and extent of ponding in the vicinity of the drain inlet. The acceptable location and extent of ponding will influence the type and design of the storm drain inlet protection device.
  - Determine the extent of potential runoff diversion caused by the storm drain inlet protection device. Runoff ponded by inlet protection devices may flow around the device and towards the next downstream inlet. In some cases, this is acceptable; in other cases, serious erosion or downstream property damage can be caused by these diversions. The possibility of runoff diversions will influence whether or not storm drain inlet protection is suitable; and, if suitable, the type and design of the device.
- The location and extent of ponding, and the extent of diversion, can usually be controlled through appropriate placement of the inlet protection device. In some cases, moving the inlet protection device a short distance upstream of the actual inlet can provide more efficient sediment control, limit ponding to desired areas, and prevent or control diversions.

- Six types of inlet protection are presented below. However, it is recognized that other effective methods and proprietary devices exist and may be selected.
  - Silt Fence: Appropriate for drainage basins with less than a 5% slope, sheet flows, and flows under 0.5 cfs.
  - Excavated Drop Inlet Sediment Trap: An excavated area around the inlet to trap sediment (SE-3).
  - Gravel bag barrier: Used to create a small sediment trap upstream of inlets on sloped, paved streets. Appropriate for sheet flow or when concentrated flow may exceed 0.5 cfs, and where overtopping is required to prevent flooding.
  - Block and Gravel Filter: Appropriate for flows greater than 0.5 cfs.
  - Temporary Geotextile Storm drain Inserts: Different products provide different features. Refer to manufacturer details for targeted pollutants and additional features.
  - Biofilter Bag Barrier: Used to create a small retention area upstream of inlets and can be located on pavement or soil. Biofilter bags slowly filter runoff allowing sediment to settle out. Appropriate for flows under 0.5 cfs.
- Select the appropriate type of inlet protection and design as referred to or as described in this fact sheet.
- Provide area around the inlet for water to pond without flooding structures and property.
- Grates and spaces around all inlets should be sealed to prevent seepage of sediment-laden water.
- Excavate sediment sumps (where needed) 1 to 2 ft with 2:1 side slopes around the inlet.

Installation

- ***DI Protection Type 1 - Silt Fence*** - Similar to constructing a silt fence; see BMP SE-1, Silt Fence. Do not place fabric underneath the inlet grate since the collected sediment may fall into the drain inlet when the fabric is removed or replaced and water flow through the grate will be blocked resulting in flooding. See typical Type 1 installation details at the end of this fact sheet.

  1. Excavate a trench approximately 6 in. wide and 6 in. deep along the line of the silt fence inlet protection device.
  2. Place 2 in. by 2 in. wooden stakes around the perimeter of the inlet a maximum of 3 ft apart and drive them at least 18 in. into the ground or 12 in. below the bottom of the trench. The stakes should be at least 48 in.
  3. Lay fabric along bottom of trench, up side of trench, and then up stakes. See SE-1, Silt Fence, for details. The maximum silt fence height around the inlet is 24 in.
  4. Staple the filter fabric (for materials and specifications, see SE-1, Silt Fence) to wooden stakes. Use heavy-duty wire staples at least 1 in. in length.

5. Backfill the trench with gravel or compacted earth all the way around.

- ***DI Protection Type 2 - Excavated Drop Inlet Sediment Trap*** - Install filter fabric fence in accordance with DI Protection Type 1. Size excavated trap to provide a minimum storage capacity calculated at the rate 67 yd^3/acre of drainage area. See typical Type 2 installation details at the end of this fact sheet.

- ***DI Protection Type 3 - Gravel bag*** - Flow from a severe storm should not overtop the curb. In areas of high clay and silts, use filter fabric and gravel as additional filter media. Construct gravel bags in accordance with SE-6, Gravel Bag Berm. Gravel bags should be used due to their high permeability. See typical Type 3 installation details at the end of this fact sheet.

  1. Construct on gently sloping street.
  2. Leave room upstream of barrier for water to pond and sediment to settle.
  3. Place several layers of gravel bags – overlapping the bags and packing them tightly together.
  4. Leave gap of one bag on the top row to serve as a spillway. Flow from a severe storm (e.g., 10 year storm) should not overtop the curb.

- ***DI Protection Type 4 – Block and Gravel Filter*** - Block and gravel filters are suitable for curb inlets commonly used in residential, commercial, and industrial construction. See typical Type 4 installation details at the end of this fact sheet.

  1. Place hardware cloth or comparable wire mesh with 0.5 in. openings over the drop inlet so that the wire extends a minimum of 1 ft beyond each side of the inlet structure. If more than one strip is necessary, overlap the strips. Place woven geotextile over the wire mesh.
  2. Place concrete blocks lengthwise on their sides in a single row around the perimeter of the inlet, so that the open ends face outward, not upward. The ends of adjacent blocks should abut. The height of the barrier can be varied, depending on design needs, by stacking combinations of blocks that are 4 in., 8 in., and 12 in. wide. The row of blocks should be at least 12 in. but no greater than 24 in. high.
  3. Place wire mesh over the outside vertical face (open end) of the concrete blocks to prevent stone from being washed through the blocks. Use hardware cloth or comparable wire mesh with 0.5 in. opening.
  4. Pile washed stone against the wire mesh to the top of the blocks. Use 0.75 to 3 in.

- ***DI Protection Type 5 – Temporary Geotextile Insert (proprietary)*** – Many types of temporary inserts are available. Most inserts fit underneath the grate of a drop inlet or inside of a curb inlet and are fastened to the outside of the grate or curb. These inserts are removable and many can be cleaned and reused. Installation of these inserts differs between manufacturers. Please refer to manufacturer instruction for installation of proprietary devices.

- ***DI Protection Type 6 - Biofilter bags*** – Biofilter bags may be used as a substitute for gravel bags in low-flow situations. Biofilter bags should conform to specifications detailed in SE-14, Biofilter bags.

  1. Construct in a gently sloping area.
  2. Biofilter bags should be placed around inlets to intercept runoff flows.
  3. All bag joints should overlap by 6 in.
  4. Leave room upstream for water to pond and for sediment to settle out.
  5. Stake bags to the ground as described in the following detail. Stakes may be omitted if bags are placed on a paved surface.

Costs

- Average annual cost for installation and maintenance of DI Type 1-4 and 6 (one year useful life) is $200 per inlet.
- Temporary geotextile inserts are proprietary and cost varies by region. These inserts can often be reused and may have greater than 1 year of use if maintained and kept undamaged. Average cost per insert ranges from $50-75 plus installation, but costs can exceed $100. This cost does not include maintenance.

Inspection and Maintenance

- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Silt Fences. If the fabric becomes clogged, torn, or degrades, it should be replaced. Make sure the stakes are securely driven in the ground and are in good shape (i.e., not bent, cracked, or splintered, and are reasonably perpendicular to the ground). Replace damaged stakes. At a minimum, remove the sediment behind the fabric fence when accumulation reaches one-third the height of the fence or barrier height.
- Gravel Filters. If the gravel becomes clogged with sediment, it should be carefully removed from the inlet and either cleaned or replaced. Since cleaning gravel at a construction site may be difficult, consider using the sediment-laden stone as fill material and put fresh stone around the inlet. Inspect bags for holes, gashes, and snags, and replace bags as needed. Check gravel bags for proper arrangement and displacement.
- Sediment that accumulates in the BMP should be periodically removed in order to maintain BMP effectiveness. Sediment should be removed when the sediment accumulation reaches one-third of the barrier height.
- Inspect and maintain temporary geotextile insert devices according to manufacturer's specifications.
- Remove storm drain inlet protection once the drainage area is stabilized.

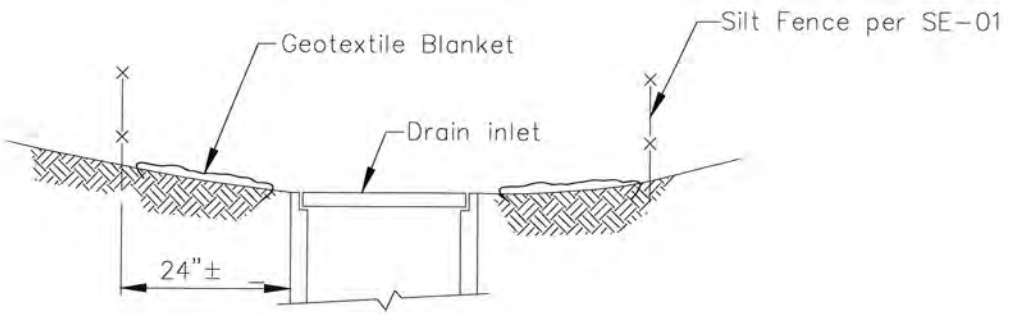
- Clean and regrade area around the inlet and clean the inside of the storm drain inlet, as it should be free of sediment and debris at the time of final inspection.

References

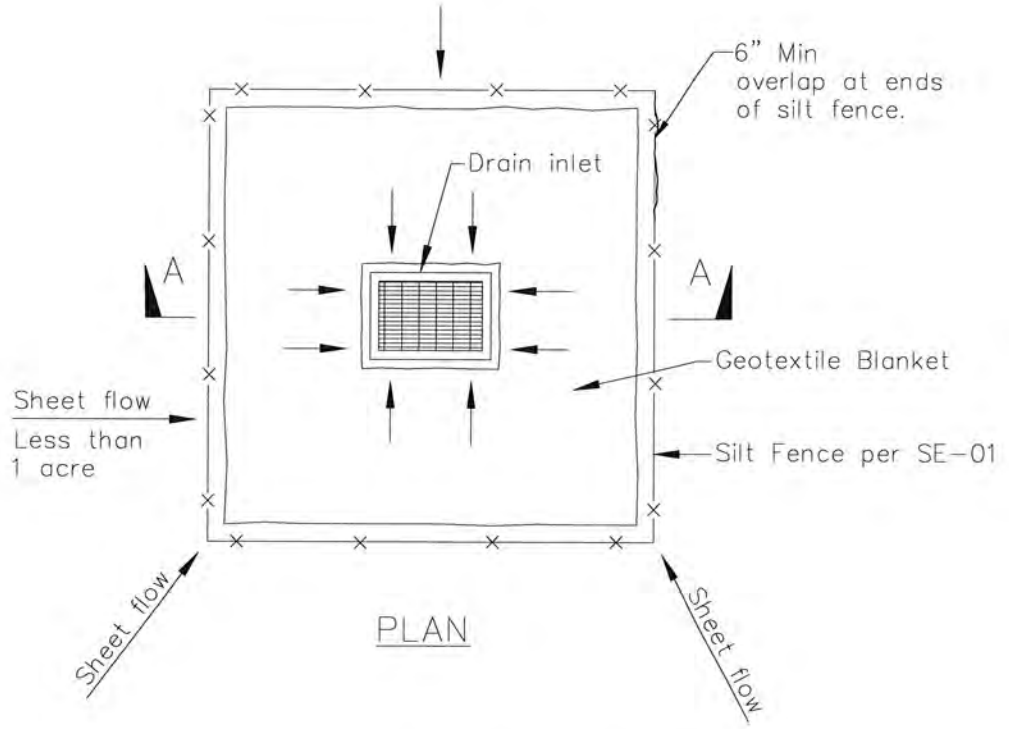
Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), March 2003.

Stormwater Management Manual for The Puget Sound Basin, Washington State Department of Ecology, Public Review Draft, 1991.

Erosion and Sediment Control Manual, Oregon Department of Environmental Quality, February 2005.



SECTION A–A

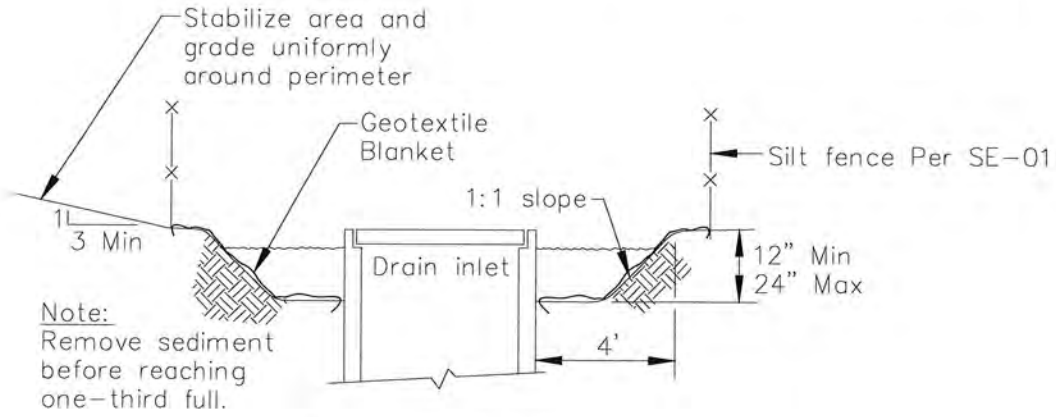


PLAN

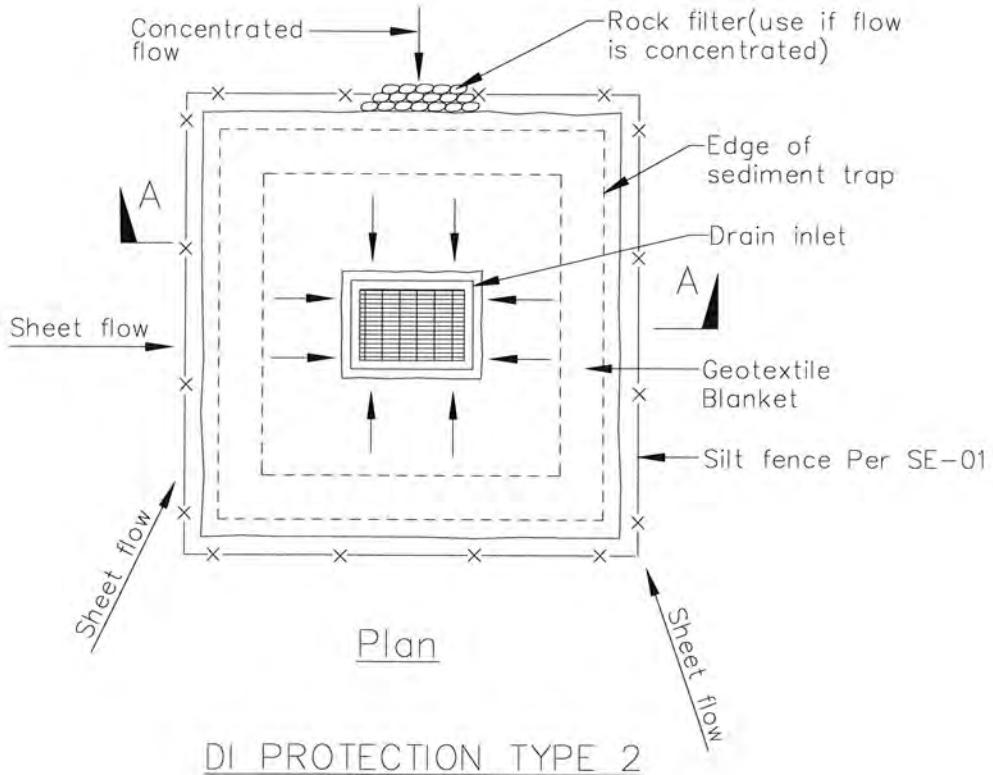
DI PROTECTION TYPE 1
NOT TO SCALE

NOTES:

1. For use in areas where grading has been completed and final soil stabilization and seeding are pending.
2. Not applicable in paved areas.
3. Not applicable with concentrated flows.



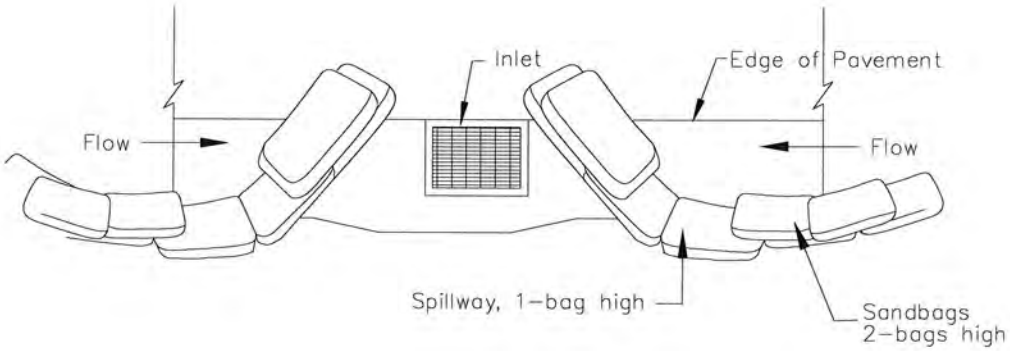
Section A-A



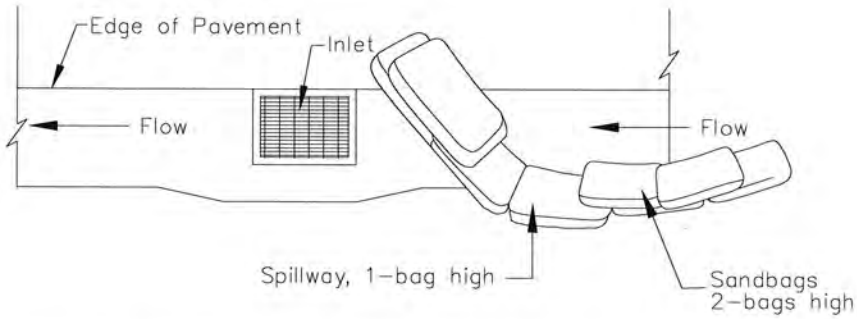
Plan

DI PROTECTION TYPE 2
NOT TO SCALE

Notes
1. For use in cleared and grubbed and in graded areas.
2. Shape basin so that longest inflow area faces longest length of trap.
3. For concentrated flows, shape basin in 2:1 ratio with length oriented towards direction of flow.



TYPICAL PROTECTION FOR INLET ON SUMP

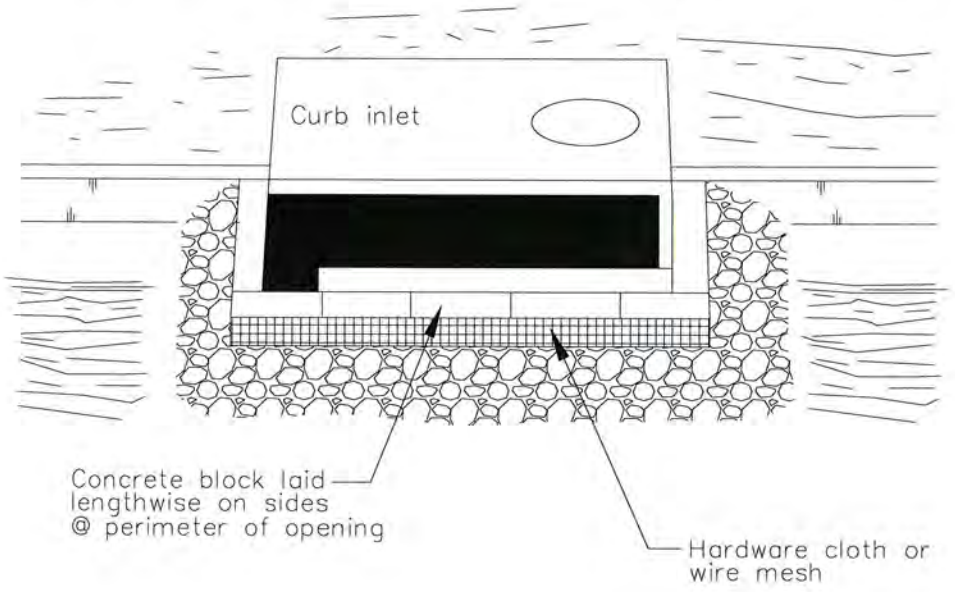


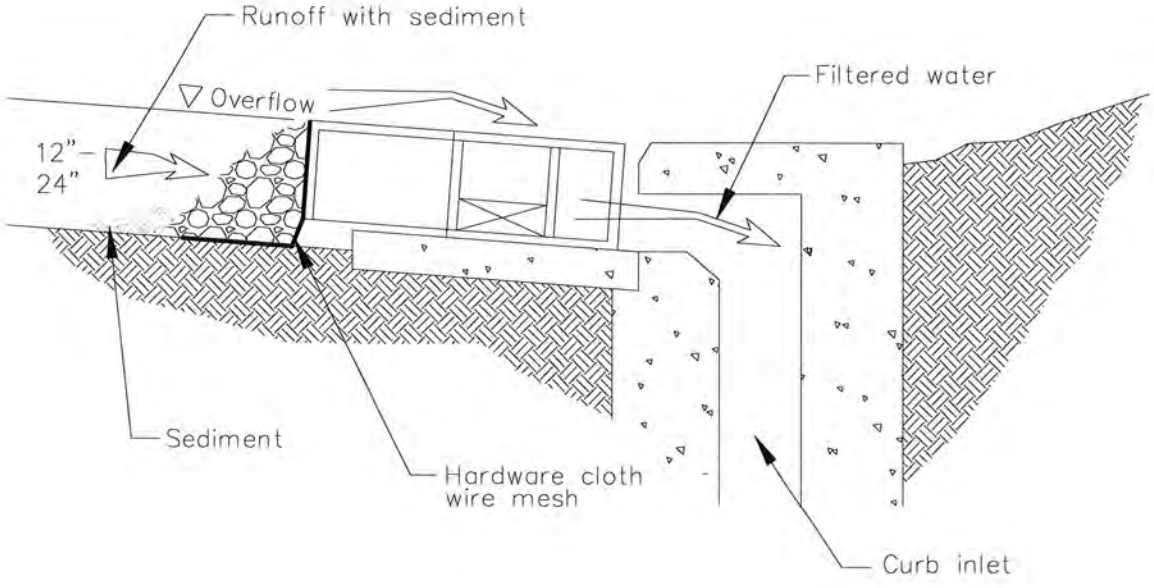
TYPICAL PROTECTION FOR INLET ON GRADE

NOTES:

1. Intended for short-term use.
2. Use to inhibit non-storm water flow.
3. Allow for proper maintenance and cleanup.
4. Bags must be removed after adjacent operation is completed
5. Not applicable in areas with high silts and clays without filter fabric.

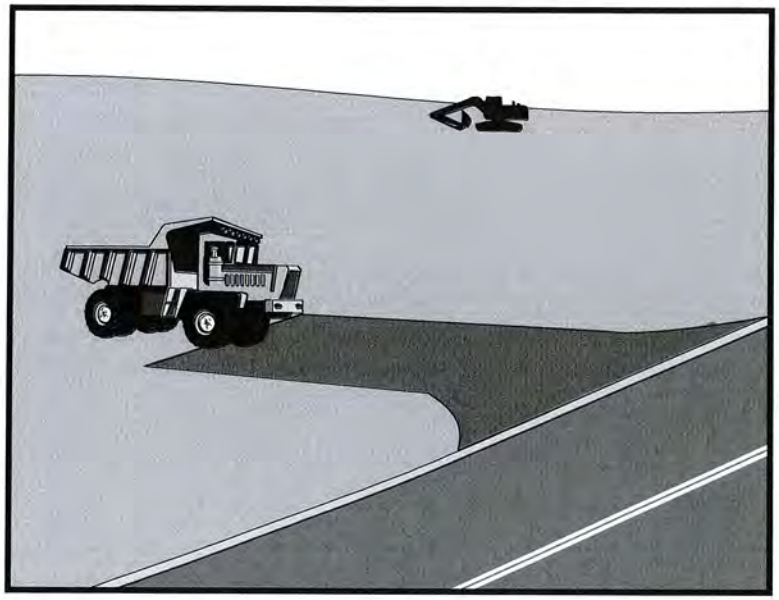
DI PROTECTION TYPE 3
NOT TO SCALE





DI PROTECTION – TYPE 4
NOT TO SCALE

Stabilized Construction Entrance/Exit TC-1



Categories

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

A stabilized construction access is defined by a point of entrance/exit to a construction site that is stabilized to reduce the tracking of mud and dirt onto public roads by construction vehicles.

Suitable Applications

Use at construction sites:

- Where dirt or mud can be tracked onto public roads.
- Adjacent to water bodies.
- Where poor soils are encountered.
- Where dust is a problem during dry weather conditions.

Limitations

- Entrances and exits require periodic top dressing with additional stones.
- This BMP should be used in conjunction with street sweeping on adjacent public right of way.
- Entrances and exits should be constructed on level ground only.
- Stabilized construction entrances are rather expensive to construct and when a wash rack is included, a sediment trap of some kind must also be provided to collect wash water runoff.

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Stabilized Construction Entrance/Exit TC-1

Implementation

General

A stabilized construction entrance is a pad of aggregate underlain with filter cloth located at any point where traffic will be entering or leaving a construction site to or from a public right of way, street, alley, sidewalk, or parking area. The purpose of a stabilized construction entrance is to reduce or eliminate the tracking of sediment onto public rights of way or streets. Reducing tracking of sediments and other pollutants onto paved roads helps prevent deposition of sediments into local storm drains and production of airborne dust.

Where traffic will be entering or leaving the construction site, a stabilized construction entrance should be used. NPDES permits require that appropriate measures be implemented to prevent tracking of sediments onto paved roadways, where a significant source of sediments is derived from mud and dirt carried out from unpaved roads and construction sites.

Stabilized construction entrances are moderately effective in removing sediment from equipment leaving a construction site. The entrance should be built on level ground. Advantages of the Stabilized Construction Entrance/Exit is that it does remove some sediment from equipment and serves to channel construction traffic in and out of the site at specified locations. Efficiency is greatly increased when a washing rack is included as part of a stabilized construction entrance/exit.

Design and Layout

- Construct on level ground where possible.
- Select 3 to 6 in. diameter stones.
- Use minimum depth of stones of 12 in. or as recommended by soils engineer.
- Construct length of 50 ft or maximum site will allow, and 10 ft minimum width or to accommodate traffic.
- Rumble racks constructed of steel panels with ridges and installed in the stabilized entrance/exit will help remove additional sediment and to keep adjacent streets clean.
- Provide ample turning radii as part of the entrance.
- Limit the points of entrance/exit to the construction site.
- Limit speed of vehicles to control dust.
- Properly grade each construction entrance/exit to prevent runoff from leaving the construction site.
- Route runoff from stabilized entrances/exits through a sediment trapping device before discharge.
- Design stabilized entrance/exit to support heaviest vehicles and equipment that will use it.

Stabilized Construction Entrance/Exit TC-1

- Select construction access stabilization (aggregate, asphaltic concrete, concrete) based on longevity, required performance, and site conditions. Do not use asphalt concrete (AC) grindings for stabilized construction access/roadway.
- If aggregate is selected, place crushed aggregate over geotextile fabric to at least 12 in. depth, or place aggregate to a depth recommended by a geotechnical engineer. A crushed aggregate greater than 3 in. but smaller than 6 in. should be used.
- Designate combination or single purpose entrances and exits to the construction site.
- Require that all employees, subcontractors, and suppliers utilize the stabilized construction access.
- Implement SE-7, Street Sweeping and Vacuuming, as needed.
- All exit locations intended to be used for more than a two-week period should have stabilized construction entrance/exit BMPs.

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 BMPs are under way, inspect BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Inspect local roads adjacent to the site daily. Sweep or vacuum to remove visible accumulated sediment.
- Remove aggregate, separate and dispose of sediment if construction entrance/exit is clogged with sediment.
- Keep all temporary roadway ditches clear.
- Check for damage and repair as needed.
- Replace gravel material when surface voids are visible.
- Remove all sediment deposited on paved roadways within 24 hours.
- Remove gravel and filter fabric at completion of construction

Costs

Average annual cost for installation and maintenance may vary from $1,200 to $4,800 each, averaging $2,400 per entrance. Costs will increase with addition of washing rack, and sediment trap. With wash rack, costs range from $1,200 - $6,000 each, averaging $3,600 per entrance.

References

Manual of Standards of Erosion and Sediment Control Measures, Association of Bay Area Governments, May 1995.

National Management Measures to Control Nonpoint Source Pollution from Urban Areas, USEPA Agency, 2002.

Proposed Guidance Specifying Management Measures for Sources of Nonpoint Pollution in Coastal Waters, Work Group Working Paper, USEPA, April 1992.

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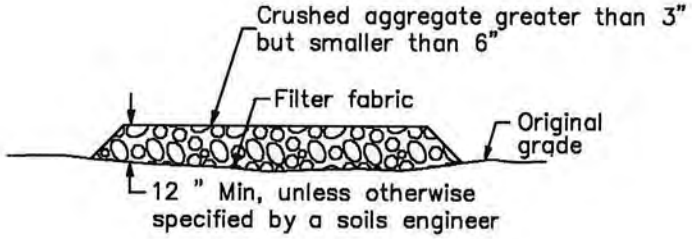
Stormwater Management of the Puget Sound Basin, Technical Manual, Publication #91-75, Washington State Department of Ecology, February 1992.

Virginia Erosion and Sedimentation Control Handbook, Virginia Department of Conservation and Recreation, Division of Soil and Water Conservation, 1991.

Guidance Specifying Management Measures for Nonpoint Pollution in Coastal Waters, EPA 840-B-9-002, USEPA, Office of Water, Washington, DC, 1993.

Water Quality Management Plan for the Lake Tahoe Region, Volume II, Handbook of Management Practices, Tahoe Regional Planning Agency, November 1988.

Stabilized Construction Entrance/Exit TC-1



SECTION B–B
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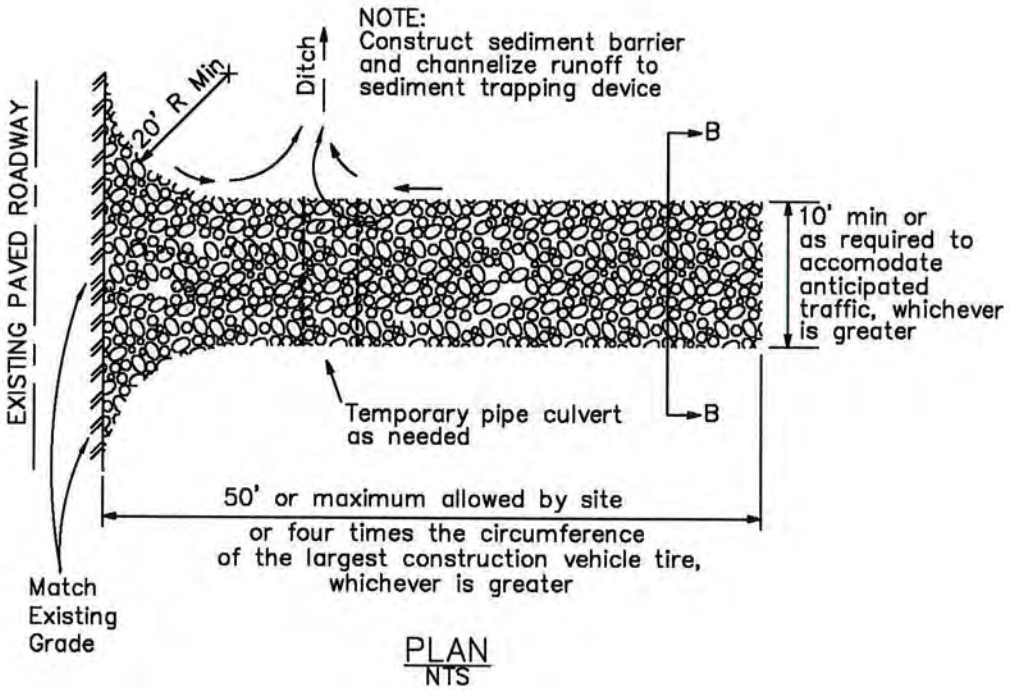
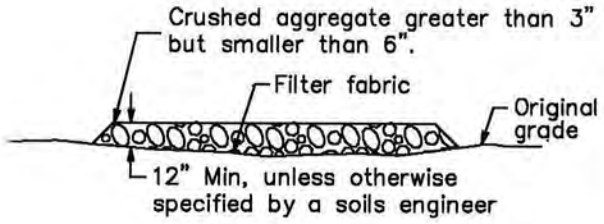


PLAN
NTS

Stabilized Construction Entrance/Exit TC-1



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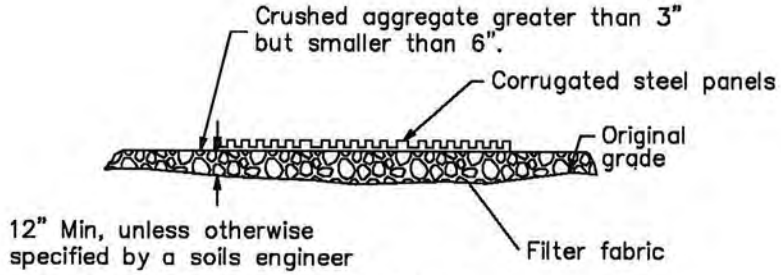
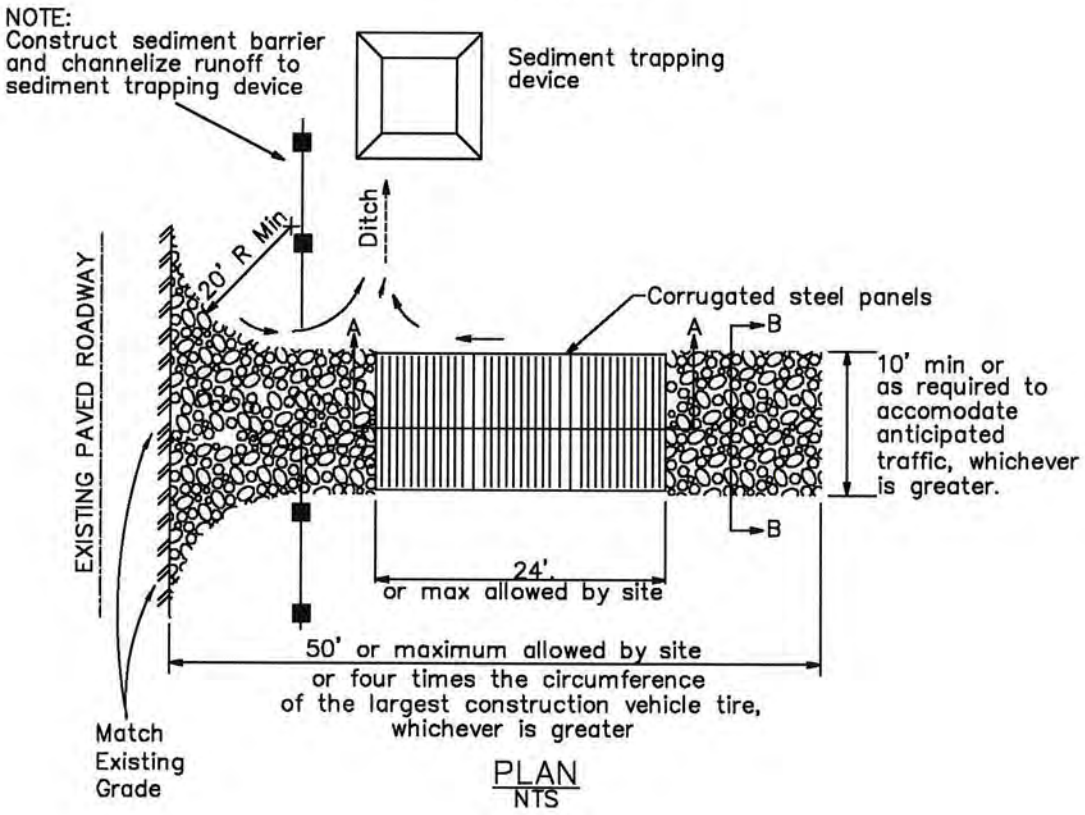
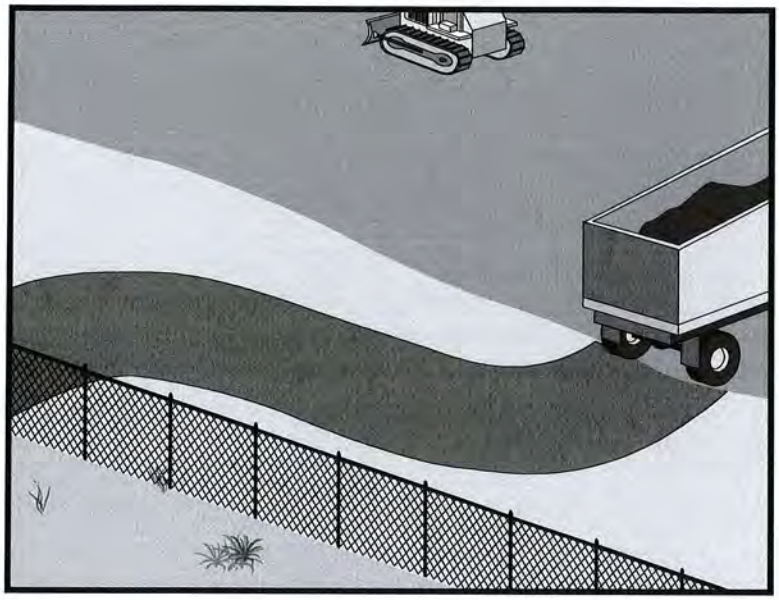


SECTION A–A
NOT TO SCALE



PLAN
NTS

Stabilized Construction Roadway TC-2



Categories

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

Access roads, subdivision roads, parking areas, and other onsite vehicle transportation routes should be stabilized immediately after grading, and frequently maintained to prevent erosion and control dust.

Suitable Applications

This BMP should be applied for the following conditions:

- Temporary Construction Traffic:
  - Phased construction projects and offsite road access
  - Construction during wet weather
- Construction roadways and detour roads:
  - Where mud tracking is a problem during wet weather
  - Where dust is a problem during dry weather
  - Adjacent to water bodies
  - Where poor soils are encountered

Limitations

- The roadway must be removed or paved when construction is complete.
- Certain chemical stabilization methods may cause stormwater or soil pollution and should not be used. See WE-1, Wind Erosion Control.

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- Management of construction traffic is subject to air quality control measures. Contact the local air quality management agency.
- Materials will likely need to be removed prior to final project grading and stabilization.
- Use of this BMP may not be applicable to very short duration projects.

Implementation

General

Areas that are graded for construction vehicle transport and parking purposes are especially susceptible to erosion and dust. The exposed soil surface is continually disturbed, leaving no opportunity for vegetative stabilization. Such areas also tend to collect and transport runoff waters along their surfaces. During wet weather, they often become muddy quagmires that generate significant quantities of sediment that may pollute nearby streams or be transported offsite on the wheels of construction vehicles. Dirt roads can become so unstable during wet weather that they are virtually unusable.

Efficient construction road stabilization not only reduces onsite erosion but also can significantly speed onsite work, avoid instances of immobilized machinery and delivery vehicles, and generally improve site efficiency and working conditions during adverse weather

Installation/Application Criteria

Permanent roads and parking areas should be paved as soon as possible after grading. As an alternative where construction will be phased, the early application of gravel or chemical stabilization may solve potential erosion and stability problems. Temporary gravel roadway should be considered during the rainy season and on slopes greater than 5%.

Temporary roads should follow the contour of the natural terrain to the maximum extent possible. Slope should not exceed 15%. Roadways should be carefully graded to drain transversely. Provide drainage swales on each side of the roadway in the case of a crowned section or one side in the case of a super elevated section. Simple gravel berms without a trench can also be used.

Installed inlets should be protected to prevent sediment laden water from entering the storm sewer system (SE-10, Storm Drain Inlet Protection). In addition, the following criteria should be considered.

- Road should follow topographic contours to reduce erosion of the roadway.
- The roadway slope should not exceed 15%.
- Chemical stabilizers or water are usually required on gravel or dirt roads to prevent dust (WE-1, Wind Erosion Control).
- Properly grade roadway to prevent runoff from leaving the construction site.
- Design stabilized access to support heaviest vehicles and equipment that will use it.

- Stabilize roadway using aggregate, asphalt concrete, or concrete based on longevity, required performance, and site conditions. The use of cold mix asphalt or asphalt concrete (AC) grindings for stabilized construction roadway is not allowed.
- Coordinate materials with those used for stabilized construction entrance/exit points.
- If aggregate is selected, place crushed aggregate over geotextile fabric to at least 12 in. depth. A crushed aggregate greater than 3 in. but smaller than 6 in. should be used.

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 BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Keep all temporary roadway ditches clear.
- When no longer required, remove stabilized construction roadway and re-grade and repair slopes.
- Periodically apply additional aggregate on gravel roads.
- Active dirt construction roads are commonly watered three or more times per day during the dry season.

Costs

Gravel construction roads are moderately expensive, but cost is often balanced by reductions in construction delay. No additional costs for dust control on construction roads should be required above that needed to meet local air quality requirements.

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.

Manual of Standards of Erosion and Sediment Control Measures, Association of Bay Area Governments, May 1995.

Stormwater Quality Handbooks Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

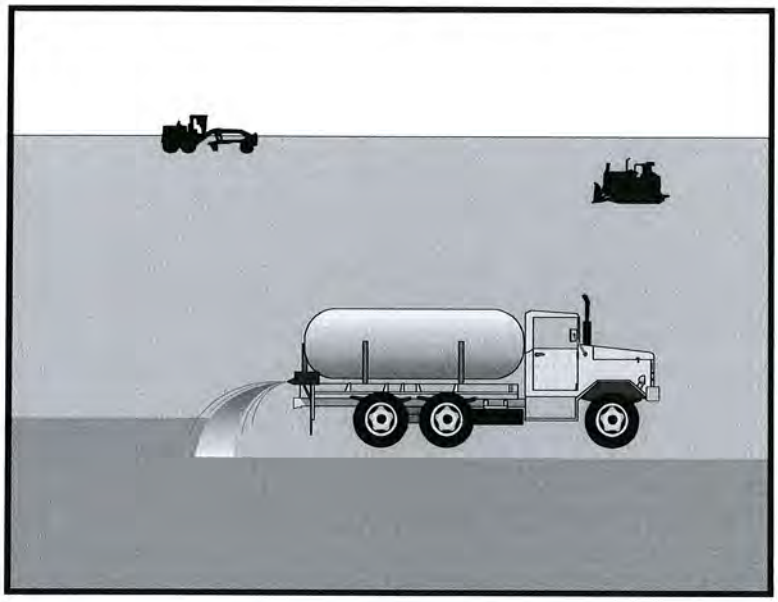
Stormwater Management for Construction Activities, Developing Pollution Prevention Plans and Best Management Practices, EPA 832-R-92005; USEPA, April 1992.

Stormwater Management of the Puget Sound Basin, Technical Manual, Publication #91-75, Washington State Department of Ecology, February 1992.

Virginia Erosion and Sedimentation Control Handbook, Virginia Department of Conservation and Recreation, Division of Soil and Water Conservation, 1991.

Water Quality Management Plan for the Lake Tahoe Region, Volume II, Handbook of Management Practices, Tahoe Regional Planning Agency, November 1988.

Wind Erosion Control WE-1



Categories

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 Category**

☒ **Secondary Category**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

EC-5 Soil Binders

Description and Purpose

Wind erosion or dust control consists of applying water or other chemical dust suppressants 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.

California's Mediterranean climate, with a short "wet" season and a typically long, hot "dry" season, allows the soils to thoroughly dry out. During the dry season, 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. Site conditions and climate can make dust control more of an erosion problem than water based erosion. Additionally, many local agencies, including Air Quality Management Districts, require dust control and/or dust control permits in order to comply with local nuisance laws, opacity laws (visibility impairment) and the requirements of the Clean Air Act. Wind erosion control is required to be implemented at all construction sites greater than 1 acre by the General Permit.

Suitable Applications

Most BMPs that provide protection against water-based erosion will also protect against wind-based erosion and dust control requirements required by other agencies will generally meet wind erosion control requirements for water quality protection. Wind erosion control BMPs are suitable during the following construction activities:

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- Construction vehicle traffic on unpaved roads
- Drilling and blasting activities
- 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 (generally less than a few hours) and should be applied daily (or more often) to be effective.
- Over watering may cause erosion and track-out.
- 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.
- Chemical dust suppression agents may have potential environmental impacts. Selected chemical dust control agents should be environmentally benign.
- Effectiveness of controls depends on soil, temperature, humidity, wind velocity and traffic.
- Chemical dust suppression agents should not be used within 100 feet of wetlands or water bodies.
- Chemically treated subgrades 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.
- In compacted areas, watering and other liquid dust control measures may wash sediment or other constituents into the drainage system.
- If the soil surface has minimal natural moisture, the affected area may need to be pre-wetted so that chemical dust control agents can uniformly penetrate the soil surface.

Implementation

Dust Control Practices

Dust control BMPs generally stabilize exposed surfaces and minimize activities that suspend or track dust particles. The following table presents dust control practices that can be applied to varying site conditions that could potentially 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 include minimizing surface areas to be disturbed, limiting onsite vehicle traffic to 15 mph or less, and controlling the number and activity of vehicles on a site at any given time.

Chemical dust suppressants include: mulch and fiber based dust palliatives (e.g. paper mulch with gypsum binder), salts and brines (e.g. calcium chloride, magnesium chloride), non-petroleum based organics (e.g. vegetable oil, lignosulfonate), petroleum based organics (e.g. asphalt emulsion, dust oils, petroleum resins), synthetic polymers (e.g. polyvinyl acetate, vinyls, acrylic), clay additives (e.g. bentonite, montimorillonite) and electrochemical products (e.g. enzymes, ionic products).

Site Condition	Dust Control Practices							
	Permanent Vegetation	Mulching	Wet Suppression (Watering)	Chemical Dust Suppression	Gravel or Asphalt	Temporary Gravel Construction Entrances/Equipment Wash Down	Synthetic 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 Stockpiles		X	X	X			X	X
Demolition			X			X	X	
Clearing/ Excavation			X	X				X
Truck Traffic on Unpaved Roads			X	X	X	X	X	
Tracking					X	X		

Additional preventive measures include:

- Schedule construction activities to minimize exposed area (see EC-1, Scheduling).
- Quickly treat exposed soils using water, mulching, chemical dust suppressants, or 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.
- Restrict construction traffic to stabilized roadways within the project site, as practicable.
- 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 (RWQCB) 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."

- 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 rapid clean up of sediments deposited on paved roads. Furnish stabilized construction road entrances and wheel wash areas.
- Stabilize inactive areas of construction sites using temporary vegetation or chemical stabilization methods.

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 and should meet all applicable regulatory requirements.

Costs

Installation costs for water and chemical dust suppression vary based on the method used and the length of effectiveness. Annual costs may be high since some of 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.
- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Check areas protected to ensure coverage.
- Most water-based dust control measures require frequent application, often daily or even multiple times per day. Obtain vendor or independent information on longevity of chemical dust suppressants.

References

Best Management Practices and Erosion Control Manual for Construction Sites, Flood Control District of Maricopa County, Arizona, September 1992.

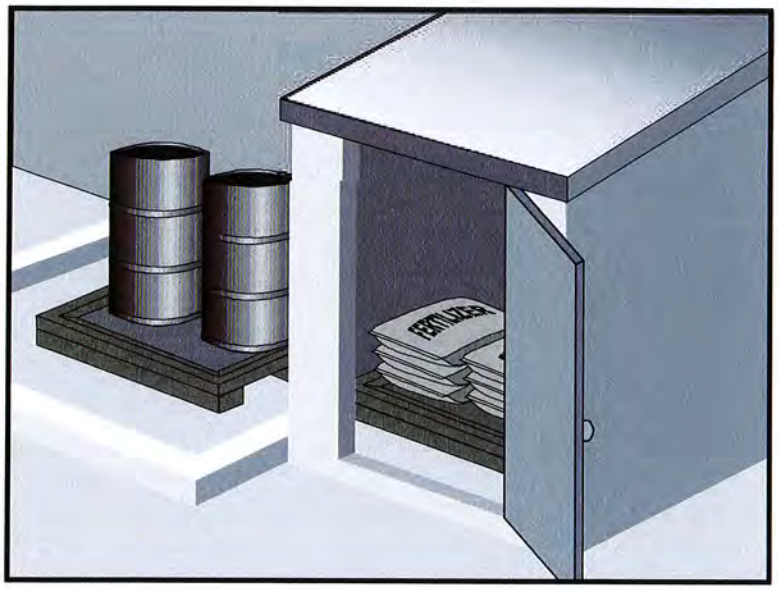
California Air Pollution Control Laws, California Air Resources Board, updated annually.

Construction Manual, Chapter 4, Section 10, "Dust Control"; Section 17, "Watering"; and Section 18, "Dust Palliative", California Department of Transportation (Caltrans), July 2001.

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.

Stormwater Quality Handbooks Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), March 2003.

Material Delivery and Storage WM-1



Categories		
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 Category**
☒ **Secondary Category**

Targeted Constituents	
Sediment	☑
Nutrients	☑
Trash	☑
Metals	☑
Bacteria	
Oil and Grease	☑
Organics	☑

Potential Alternatives

None

Description and Purpose

Prevent, reduce, or eliminate the discharge of pollutants from material delivery and storage to the stormwater system or watercourses by minimizing the storage of hazardous materials onsite, storing materials in watertight containers and/or a completely enclosed designated area, installing secondary containment, conducting regular inspections, and training employees and subcontractors.

This best management practice covers only material delivery and storage. For other information on materials, see WM-2, Material Use, or WM-4, Spill Prevention and Control. For information on wastes, see the waste management BMPs in this section.

Suitable Applications

These procedures are suitable for use at all construction sites with delivery and storage of the following materials:

- Soil stabilizers and binders
- Pesticides and herbicides
- Fertilizers
- Detergents
- Plaster
- Petroleum products such as fuel, oil, and grease

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- Asphalt and concrete components
- Hazardous chemicals such as acids, lime, glues, adhesives, paints, solvents, and curing compounds
- Concrete compounds
- Other materials that may be detrimental if released to the environment

Limitations

- Space limitation may preclude indoor storage.
- Storage sheds often must meet building and fire code requirements.

Implementation

The following steps should be taken to minimize risk:

- Chemicals must be stored in water tight containers with appropriate secondary containment or in a storage shed.
- When a material storage area is located on bare soil, the area should be lined and bermed.
- Use containment pallets or other practical and available solutions, such as storing materials within newly constructed buildings or garages, to meet material storage requirements.
- Stack erodible landscape material on pallets and cover when not in use.
- Contain all fertilizers and other landscape materials when not in use.
- Temporary storage areas should be located away from vehicular traffic.
- Material Safety Data Sheets (MSDS) should be available on-site for all materials stored that have the potential to effect water quality.
- Construction site areas should be designated for material delivery and storage.
- Material delivery and storage areas should be located away from waterways, if possible.
  - Avoid transport near drainage paths or waterways.
  - Surround with earth berms or other appropriate containment BMP. See EC-9, Earth Dikes and Drainage Swales.
  - Place in an area that will be paved.
- Storage of reactive, ignitable, or flammable liquids must comply with the fire codes of your area. Contact the local Fire Marshal to review site materials, quantities, and proposed storage area to determine specific requirements. See the Flammable and Combustible Liquid Code, NFPA30.
- An up to date inventory of materials delivered and stored onsite should be kept.

- Hazardous materials storage onsite should be minimized.
- Hazardous materials should be handled as infrequently as possible.
- Keep ample spill cleanup supplies appropriate for the materials being stored. Ensure that cleanup supplies are in a conspicuous, labeled area.
- Employees and subcontractors should be trained on the proper material delivery and storage practices.
- Employees trained in emergency spill cleanup procedures must be present when dangerous materials or liquid chemicals are unloaded.
- If significant residual materials remain on the ground after construction is complete, properly remove and dispose of materials and any contaminated soil. See WM-7, Contaminated Soil Management. If the area is to be paved, pave as soon as materials are removed to stabilize the soil.

Material Storage Areas and Practices

- Liquids, petroleum products, and substances listed in 40 CFR Parts 110, 117, or 302 should be stored in approved containers and drums and should not be overfilled. Containers and drums should be placed in temporary containment facilities for storage.
- A temporary containment facility should provide for a spill containment volume 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 container within its boundary, whichever is greater.
- A temporary containment facility should be impervious to the materials stored therein for a minimum contact time of 72 hours.
- A temporary containment facility should be maintained free of accumulated rainwater and spills. In the event of spills or leaks, accumulated rainwater and spills should be collected and placed into drums. These liquids should be handled as a hazardous waste unless testing determines them to be non-hazardous. All collected liquids or 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.
- Materials should be covered prior to, and during rain events.
- Materials should be stored in their original containers and the original product labels should be maintained in place in a legible condition. Damaged or otherwise illegible labels should be replaced immediately.

- Bagged and boxed materials should be stored on pallets and should not be allowed to accumulate on the ground. To provide protection from wind and rain throughout the rainy season, bagged and boxed materials should be covered during non-working days and prior to and during rain events.
- Stockpiles should be protected in accordance with WM-3, Stockpile Management.
- Materials should be stored indoors within existing structures or completely enclosed storage sheds when available.
- Proper storage instructions should be posted at all times in an open and conspicuous location.
- An ample supply of appropriate spill clean up material should be kept near storage areas.
- Also see WM-6, Hazardous Waste Management, for storing of hazardous wastes.

Material Delivery Practices

- Keep an accurate, up-to-date inventory of material delivered and stored onsite.
- Arrange for employees trained in emergency spill cleanup procedures to be present when dangerous materials or liquid chemicals are unloaded.

Spill Cleanup

- Contain and clean up any spill immediately.
- Properly remove and dispose of any hazardous materials or contaminated soil if significant residual materials remain on the ground after construction is complete. See WM-7, Contaminated Soil Management.
- See WM-4, Spill Prevention and Control, for spills of chemicals and/or hazardous materials.
- If spills or leaks of materials occur that are not contained and could discharge to surface waters, non-visible sampling of site discharge may be required. Refer to the General Permit or to your project specific Construction Site Monitoring Plan to determine if and where sampling is required.

Cost

- The largest cost of implementation may be in the construction of a materials storage area that is covered and provides secondary containment.

Inspection and Maintenance

- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Keep storage areas clean and well organized, including a current list of all materials onsite.
- Inspect labels on containers for legibility and accuracy.

- Repair or replace perimeter controls, containment structures, covers, and liners as needed to maintain proper function.

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.

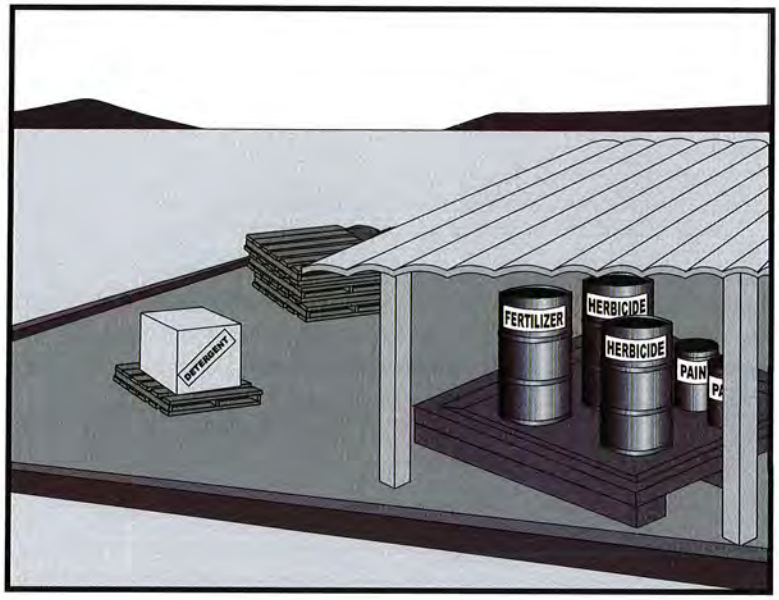
Coastal Nonpoint Pollution Control Program: Program Development and Approval Guidance, Working Group Working Paper; USEPA, April 1992.

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), March 2003.

Stormwater Management for Construction Activities; Developing Pollution Prevention Plans and Best Management Practice, EPA 832-R-92005; USEPA, April 1992.

Material Use

WM-2



Categories

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 Category**

☒ **Secondary Category**

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 the storm drain system or watercourses from material use by using alternative products, minimizing hazardous material use onsite, and training employees and subcontractors.

Suitable Applications

This BMP is suitable for use at all construction projects. These procedures apply when the following materials are used or prepared onsite:

- Pesticides and herbicides
- Fertilizers
- Detergents
- Petroleum products such as fuel, oil, and grease
- Asphalt and other concrete components
- Other hazardous chemicals such as acids, lime, glues, adhesives, paints, solvents, and curing compounds
- Other materials that may be detrimental if released to the environment

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Limitations

Safer alternative building and construction products may not be available or suitable in every instance.

Implementation

The following steps should be taken to minimize risk:

- Minimize use of hazardous materials onsite.
- Follow manufacturer instructions regarding uses, protective equipment, ventilation, flammability, and mixing of chemicals.
- Train personnel who use pesticides. The California Department of Pesticide Regulation and county agricultural commissioners license pesticide dealers, certify pesticide applicators, and conduct onsite inspections.
- The preferred method of termiticide application is soil injection near the existing or proposed structure foundation/slab; however, if not feasible, soil drench application of termiticides should follow EPA label guidelines and the following recommendations (most of which are applicable to most pesticide applications):
  - Do not treat soil that is water-saturated or frozen.
  - Application shall not commence within 24-hours of a predicted precipitation event with a 40% or greater probability. Weather tracking must be performed on a daily basis prior to termiticide application and during the period of termiticide application.
  - Do not allow treatment chemicals to runoff from the target area. Apply proper quantity to prevent excess runoff. Provide containment for and divert stormwater from application areas using berms or diversion ditches during application.
  - Dry season: Do not apply within 10 feet of storm drains. Do not apply within 25 feet of aquatic habitats (such as, but not limited to, lakes; reservoirs; rivers; permanent streams; marshes or ponds; estuaries; and commercial fish farm ponds).
  - Wet season: Do not apply within 50 feet of storm drains or aquatic habitats (such as, but not limited to, lakes; reservoirs; rivers; permanent streams; marshes or ponds; estuaries; and commercial fish farm ponds) unless a vegetative buffer is present (if so, refer to dry season requirements).
  - Do not make on-grade applications when sustained wind speeds are above 10 mph (at application site) at nozzle end height.
  - Cover treatment site prior to a rain event in order to prevent run-off of the pesticide into non-target areas. The treated area should be limited to a size that can be backfilled and/or covered by the end of the work shift. Backfilling or covering of the treated area shall be done by the end of the same work shift in which the application is made.
  - The applicator must either cover the soil him/herself or provide written notification of the above requirement to the contractor on site and to the person commissioning the

application (if different than the contractor). If notice is provided to the contractor or the person commissioning the application, then they are responsible under the Federal Insecticide Fungicide, and Rodenticide Act (FIFRA) to ensure that: 1) if the concrete slab cannot be poured over the treated soil within 24 hours of application, the treated soil is covered with a waterproof covering (such as polyethylene sheeting), and 2) the treated soil is covered if precipitation is predicted to occur before the concrete slab is scheduled to be poured.

- Do not over-apply fertilizers, herbicides, and pesticides. Prepare only the amount needed. Follow the recommended usage instructions. Over-application is expensive and environmentally harmful. Unless on steep slopes, till fertilizers into the soil rather than hydraulic application. Apply surface dressings in several smaller applications, as opposed to one large application, to allow time for infiltration and to avoid excess material being carried offsite by runoff. Do not apply these chemicals before predicted rainfall.
- Train employees and subcontractors in proper material use.
- Supply Material Safety Data Sheets (MSDS) for all materials.
- Dispose of latex paint and paint cans, used brushes, rags, absorbent materials, and drop cloths, when thoroughly dry and are no longer hazardous, with other construction debris.
- Do not remove the original product label; it contains important safety and disposal information. Use the entire product before disposing of the container.
- Mix paint indoors or in a containment area. Never clean paintbrushes or rinse paint containers into a street, gutter, storm drain, or watercourse. Dispose of any paint thinners, residue, and sludge(s) that cannot be recycled, as hazardous waste.
- For water-based paint, clean brushes to the extent practicable, and rinse to a drain leading to a sanitary sewer where permitted, or contain for proper disposal off site. For oil-based paints, clean brushes to the extent practicable, and filter and reuse thinners and solvents.
- Use recycled and less hazardous products when practical. Recycle residual paints, solvents, non-treated lumber, and other materials.
- Use materials only where and when needed to complete the construction activity. Use safer alternative materials as much as possible. Reduce or eliminate use of hazardous materials onsite when practical.
- Document the location, time, chemicals applied, and applicator's name and qualifications.
- Keep an ample supply of spill clean up material near use areas. Train employees in spill clean up procedures.
- Avoid exposing applied materials to rainfall and runoff unless sufficient time has been allowed for them to dry.
- Discontinue use of erodible landscape material within 2 days prior to a forecasted rain event and materials should be covered and/or bermed.

- Provide containment for material use areas such as masons' areas or paint mixing/preparation areas to prevent materials/pollutants from entering stormwater.

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.
- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Ensure employees and subcontractors throughout the job are using appropriate practices.

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.

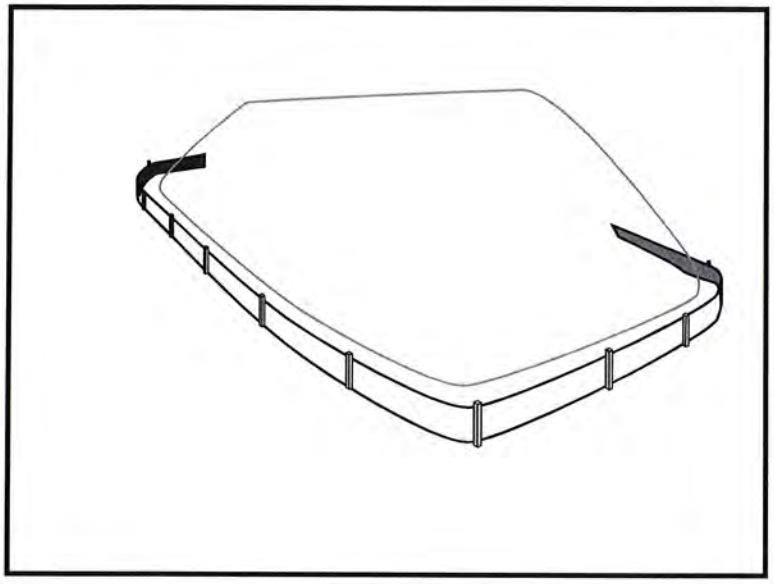
Coastal Nonpoint Pollution Control Program: Program Development and Approval Guidance, Working Group Working Paper; USEPA, April 1992.

Comments on Risk Assessments Risk Reduction Options for Cypermethrin: Docket No. OPP–2005–0293; California Stormwater Quality Association (CASQA) letter to USEPA, 2006.Environmental Hazard and General Labeling for Pyrethroid Non-Agricultural Outdoor Products, EPA-HQ-OPP-2008-0331-0021; USEPA, 2008.

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), March 2003.

Stormwater Management for Construction Activities; Developing Pollution Prevention Plans and Best Management Practice, EPA 832-R-92005; USEPA, April 1992.

Stockpile Management WM-3



Categories		
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 Category**
☒ **Secondary Category**

Description and Purpose

Stockpile management procedures and practices are designed to reduce or eliminate air and stormwater pollution from stockpiles of soil, soil amendments, sand, paving materials such as portland cement concrete (PCC) rubble, asphalt concrete (AC), asphalt concrete rubble, aggregate base, aggregate sub base or pre-mixed aggregate, asphalt minder (so called "cold mix" asphalt), and pressure treated wood.

Suitable Applications

Implement in all projects that stockpile soil and other loose materials.

Limitations

- Plastic sheeting as a stockpile protection is temporary and hard to manage in windy conditions. Where plastic is used, consider use of plastic tarps with nylon reinforcement which may be more durable than standard sheeting.
- Plastic sheeting can increase runoff volume due to lack of infiltration and potentially cause perimeter control failure.
- Plastic sheeting breaks down faster in sunlight.
- The use of plastic materials should be avoided when feasible and photodegradable plastics should not be used.

Implementation

Protection of stockpiles is a year-round requirement. To properly manage stockpiles:

Targeted Constituents	
Sediment	☑
Nutrients	☑
Trash	☑
Metals	☑
Bacteria	
Oil and Grease	☑
Organics	☑

Potential Alternatives
None

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- On larger sites, a minimum of 50 ft separation from concentrated flows of stormwater, drainage courses, and inlets is recommended.
- All stockpiles are required to be protected immediately if they are not scheduled to be used within 14 days.
- Protect all stockpiles from stormwater run-on using temporary perimeter sediment barriers such as compost berms (SE-13), temporary silt dikes (SE-12), fiber rolls (SE-5), silt fences (SE-1), sandbags (SE-8), gravel bags (SE-6), or biofilter bags (SE-14). Refer to the individual fact sheet for each of these controls for installation information.
- Implement wind erosion control practices as appropriate on all stockpiled material. For specific information, see WE-1, Wind Erosion Control.
- Manage stockpiles of contaminated soil in accordance with WM-7, Contaminated Soil Management.
- Place bagged materials on pallets and under cover.
- Ensure that stockpile coverings are installed securely to protect from wind and rain.
- Some plastic covers withstand weather and sunlight better than others. Select cover materials or methods based on anticipated duration of use.

Protection of Non-Active Stockpiles

Non-active stockpiles of the identified materials should be protected further as follows:

Soil stockpiles

- Cover and project soil stockpiles with soil stabilization measures and a temporary perimeter sediment barrier at all times.
- Consider temporary vegetation for topsoil piles that will be stockpiled for extended periods.

Stockpiles of Portland cement concrete rubble, asphalt concrete, asphalt concrete rubble, aggregate base, or aggregate sub base

- Provide covers and protect these stockpiles with a temporary perimeter sediment barrier at all times.

Stockpiles of "cold mix"

- Cover cold mix stockpiles and place them on plastic sheeting (or comparable material) and surround the stockpiles with a berm all times.

Stockpiles of fly ash, stucco, hydrated lime

- Cover stockpiles of materials that may raise the pH of runoff (i.e., basic materials) with plastic and surround the stockpiles with a berm at all times.

Stockpiles/Storage of wood (Pressure treated with chromated copper arsenate or ammoniacal copper zinc arsenate)

- Cover treated wood with plastic sheeting (or comparable material) and surround with a berm at all times.

Protection of Active Stockpiles

Active stockpiles of the identified materials should be protected as follows:

- All stockpiles should be covered and protected with a temporary linear sediment barrier prior to the onset of precipitation.
- Stockpiles of "cold mix" and treated wood, and basic materials should be placed on and covered with plastic sheeting or comparable material and surrounded by a berm prior to the onset of precipitation.
- The downstream perimeter of an active stockpile should be protected with a linear sediment barrier or berm and runoff should be diverted around or away from the stockpile on the upstream perimeter.

Costs

For cost information associated with stockpile protection refer to the individual erosion or sediment control BMP fact sheet considered for implementation (For example, refer to SE-1 Silt Fence for installation of silt fence around the perimeter of a stockpile.)

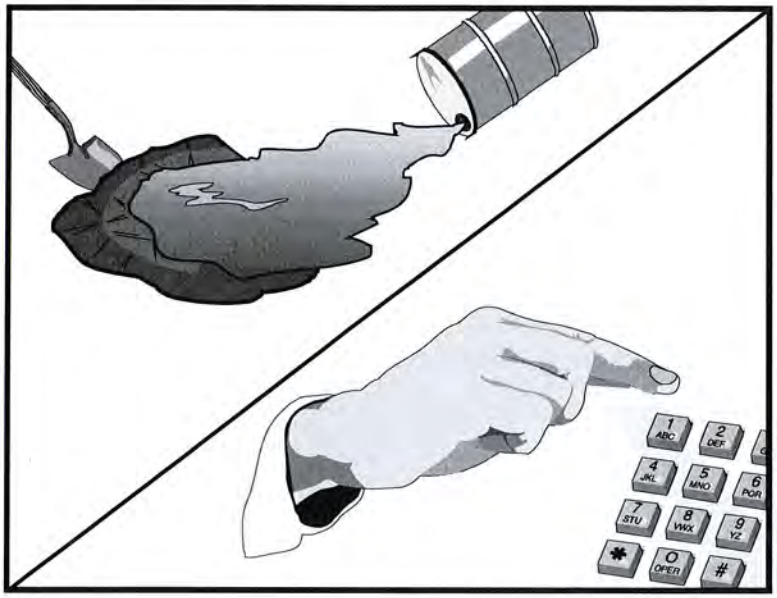
Inspection and Maintenance

- Stockpiles must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- It may be necessary to inspect stockpiles covered with plastic sheeting more frequently during certain conditions (for example, high winds or extreme heat).
- Repair and/or replace perimeter controls and covers as needed to keep them functioning properly.
- Sediment shall be removed when it reaches one-third of the barrier height.

References

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), March 2003.

Spill Prevention and Control WM-4



Categories

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 BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.

- 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

Categories

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
- Highway planting wastes, including vegetative material,

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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.
- Cover waste containers at the end of each work day and when it is raining.
- 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 BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Inspect BMPs subject to non-stormwater discharge daily while non-stormwater discharges occur
- Inspect construction waste area regularly.
- Arrange for regular waste collection.

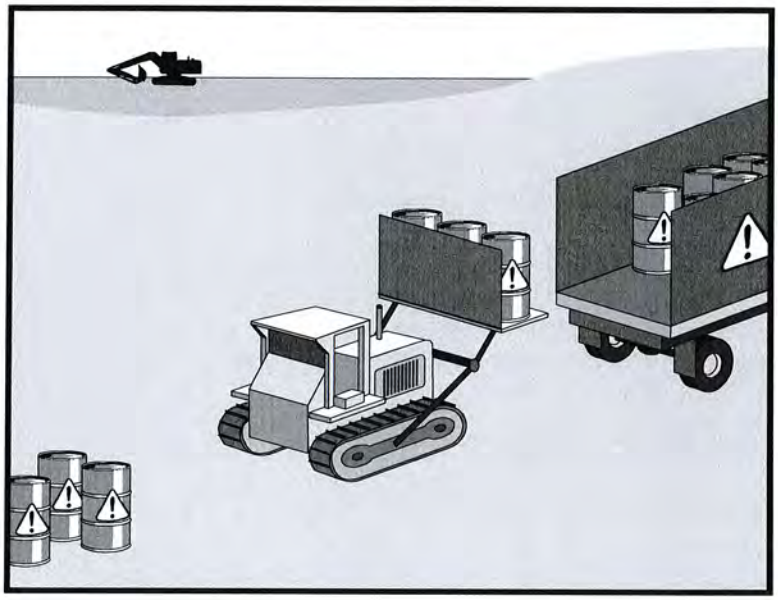
References

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



Categories

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
- Asphalt Products
- Concrete Curing Compounds
- Pesticides
- Palliatives
- Acids
- Septic Wastes
- Paints
- Stains
- Solvents
- Wood Preservatives
- 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 BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events..
- 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

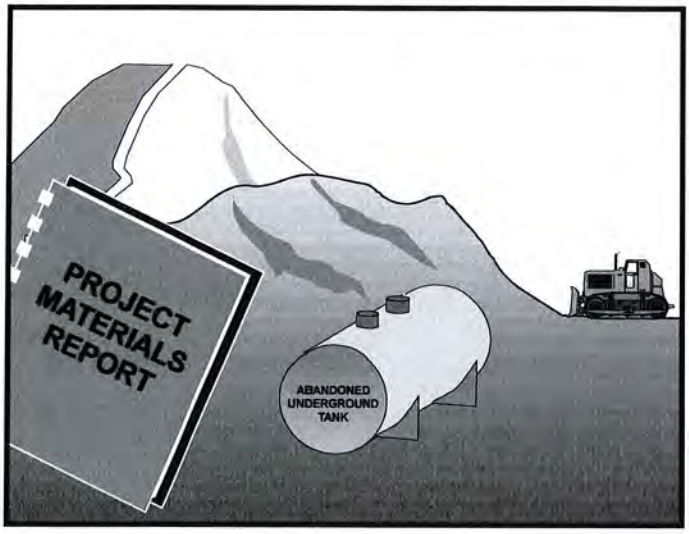
Blueprint for a Clean Bay: Best Management Practices to Prevent Stormwater Pollution from Construction Related Activities; Santa Clara Valley Nonpoint Source Pollution Control Program, 1995.

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



Categories		
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

Targeted Constituents	
Sediment	
Nutrients	☑
Trash	☑
Metals	☑
Bacteria	☑
Oil and Grease	☑
Organics	☑

Potential Alternatives

None

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plans, specifications, and 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 BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- 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

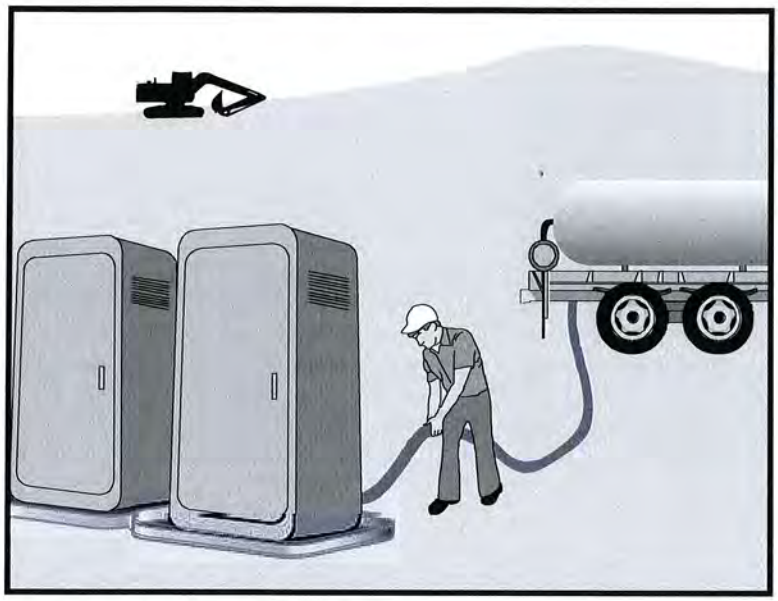
Blueprint for a Clean Bay: Best Management Practices to Prevent Stormwater Pollution from Construction Related Activities; Santa Clara Valley Nonpoint Source Pollution Control Program, 1995.

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.

Sanitary/Septic Waste Management WM-9



Categories

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 Category**

☒ **Secondary Category**

Targeted Constituents

Sediment	
Nutrients	☑
Trash	☑
Metals	
Bacteria	☑
Oil and Grease	
Organics	☑

Potential Alternatives

None

Description and Purpose

Proper sanitary and septic waste management prevent the discharge of pollutants to stormwater from sanitary and septic waste by providing convenient, well-maintained facilities, and arranging for regular service and disposal.

Suitable Applications

Sanitary septic waste management practices are suitable for use at all construction sites that use temporary or portable sanitary and septic waste systems.

Limitations

None identified.

Implementation

Sanitary or septic wastes should be treated or disposed of in accordance with state and local requirements. In many cases, one contract with a local facility supplier will be all that it takes to make sure sanitary wastes are properly disposed.

Storage and Disposal Procedures

- Temporary sanitary facilities should be located away from drainage facilities, watercourses, and from traffic circulation. If site conditions allow, place portable facilities a minimum of 50 feet from drainage conveyances and traffic areas. When subjected to high winds or risk of high winds, temporary sanitary facilities should be secured to prevent overturning.

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- Temporary sanitary facilities must be equipped with containment to prevent discharge of pollutants to the stormwater drainage system of the receiving water.
- Consider safety as well as environmental implications before placing temporary sanitary facilities.
- Wastewater should not be discharged or buried within the project site.
- Sanitary and septic systems that discharge directly into sanitary sewer systems, where permissible, should comply with the local health agency, city, county, and sewer district requirements.
- Only reputable, licensed sanitary and septic waste haulers should be used.
- Sanitary facilities should be located in a convenient location.
- Temporary septic systems should treat wastes to appropriate levels before discharging.
- If using an onsite disposal system (OSDS), such as a septic system, local health agency requirements must be followed.
- Temporary sanitary facilities that discharge to the sanitary sewer system should be properly connected to avoid illicit discharges.
- Sanitary and septic facilities should be maintained in good working order by a licensed service.
- Regular waste collection by a licensed hauler should be arranged before facilities overflow.
- If a spill does occur from a temporary sanitary facility, follow federal, state and local regulations for containment and clean-up.

Education

- Educate employees, subcontractors, and suppliers on sanitary and septic waste storage and disposal procedures.
- Educate employees, subcontractors, and suppliers of potential dangers to humans and the environment from sanitary and septic wastes.
- Instruct employees, subcontractors, and suppliers in identification of sanitary and septic waste.
- Hold regular meetings to discuss and reinforce the use of sanitary facilities (incorporate into regular safety meetings).
- Establish a continuing education program to indoctrinate new employees.

Costs

All of the above are low cost measures.

Inspection and Maintenance

- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Arrange for regular waste collection.
- If high winds are expected, portable sanitary facilities must be secured with spikes or weighed down to prevent over turning.
- If spills or leaks from sanitary or septic facilities occur that are not contained and discharge from the site, non-visible sampling of site discharge may be required. Refer to the General Permit or to your project specific Construction Site Monitoring Plan to determine if and where sampling is required.

References

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), March 2003.

Stormwater Management for Construction Activities; Developing Pollution Prevention Plans and Best Management Practice, EPA 832-R-92005; USEPA, April 1992.

ATTACHMENT C-8

CONSTRUCTION SITE INSPECTION REPORT FORM

BMP INSPECTION REPORT

Date and Time of Inspection:	Date Report Written:

Inspection Type: (Circle one)	Weekly *Complete Parts I,II,III and VII*	Pre-Storm *Complete Parts I,II,III,IV and VII*	During Rain Event *Complete Parts I, II, III, V, and VII*	Post-Storm *Complete Parts I,II,III,VI and VII*

Part I. General Information

Site Information

Construction Site Name: Lendrum Court	
Construction stage and completed activities:	Approximate area of site that is exposed:

Photos Taken: (Circle one)	Yes	No	Photo Reference IDs:

Weather

Estimate storm beginning: (date and time)	Estimate storm duration: (hours)
Estimate time since last storm: (days or hours)	Rain gauge reading and location: (in)

Is a "Qualifying Event" predicted or did one occur (i.e., 0.5" rain with 48-hrs or greater between events)? (Y/N)
If yes, summarize forecast:

Exemption Documentation (explanation required if inspection could not be conducted). Visual inspections are not required outside of business hours or during dangerous weather conditions such as flooding or electrical storms.

Inspector Information

Inspector Name:	Inspector Title:
Signature:	Date:

BMP INSPECTION REPORT

Part II. BMP Observations. **Describe deficiencies in Part III.**			
Minimum BMPs for Risk Level 1 Sites	Failures or other short comings (yes, no, N/A)	Action Required (yes/no)	Action Implemented (Date)
Good Housekeeping for Construction Materials			
Inventory of products (excluding materials designed to be outdoors)			
Stockpiled construction materials not actively in use are covered and bermed			
All chemicals are stored in watertight containers with appropriate secondary containment, or in a completely enclosed storage shed			
Construction materials are minimally exposed to precipitation			
BMPs preventing the off-site tracking of materials are implemented and properly effective			
Good Housekeeping for Waste Management			
Wash/rinse water and materials are prevented from being disposed into the storm drain system			
Portable toilets are contained to prevent discharges of waste			
Sanitation facilities are clean and with no apparent for leaks and spills			
Equipment is in place to cover waste disposal containers at the end of business day and during rain events			
Discharges from waste disposal containers are prevented from discharging to the storm drain system / receiving water			
Stockpiled waste material is securely protected from wind and rain if not actively in use			
Procedures are in place for addressing hazardous and non-hazardous spills			
Appropriate spill response personnel are assigned and trained			
Equipment and materials for cleanup of spills is available onsite			
Washout areas (e.g., concrete) are contained appropriately to prevent discharge or infiltration into the underlying soil			
Good Housekeeping for Vehicle Storage and Maintenance			
Measures are in place to prevent oil, grease, or fuel from leaking into the ground, storm drains, or surface waters			
All equipment or vehicles are fueled, maintained, and stored in a designated area with appropriate BMPs			
Vehicle and equipment leaks are cleaned immediately and disposed of properly			

BMP INSPECTION REPORT

Part II. BMP Observations Continued. Describe deficiencies in Part III.			
Minimum BMPs for Risk Level 1 Sites	Adequately designed, implemented and effective (yes, no, N/A)	Action Required (yes/no)	Action Implemented (Date)
Good Housekeeping for Landscape Materials			
Stockpiled landscape materials such as mulches and topsoil are contained and covered when not actively in use			
Erodible landscape material has not been applied 2 days before a forecasted rain event or during an event			
Erodible landscape materials are applied at quantities and rates in accordance with manufacturer recommendations			
Bagged erodible landscape materials are stored on pallets and covered			
Good Housekeeping for Air Deposition of Site Materials			
Good housekeeping measures are implemented onsite to control the air deposition of site materials and from site operations			
Non-Storm Water Management			
Non-Storm Water discharges are properly controlled			
Vehicles are washed in a manner to prevent non-storm water discharges to surface waters or drainage systems			
Streets are cleaned in a manner to prevent unauthorized non-storm Water discharges to surface waters or drainage systems.			
Erosion Controls			
Wind erosion controls are effectively implemented			
Effective soil cover is provided for disturbed areas inactive (i.e., not scheduled to be disturbed for 14 days) as well as finished slopes, open space, utility backfill, and completed lots			
The use of plastic materials is limited in cases when a more sustainable, environmentally friendly alternative exists.			
Sediment Controls			
Perimeter controls are established and effective at controlling erosion and sediment discharges from the site			
Entrances and exits are stabilized to control erosion and sediment discharges from the site			
Sediment basins are properly maintained			
Run-On and Run-Off Controls			
Run-on to the site is effectively managed and directed away from all disturbed areas.			
Other			
Are the project SWPPP and BMP plan up to date, available on-site and being properly implemented?			

BMP INSPECTION REPORT

Part III. Descriptions of BMP Deficiencies		
Deficiency	**Repairs Implemented: Note - Repairs must begin within 72 hours of identification and, complete repairs as soon as possible.**	
	Start Date	**Action**
1.		
2.		
3.		
4.		

Part IV. Additional Pre-Storm Observations. **Note the presence or absence of floating and suspended materials, sheen, discoloration, turbidity, odors, and source(s) of pollutants(s).**	
	Yes, No, N/A
Do storm water storage and containment areas have adequate freeboard? If no, complete Part III.	
Are drainage areas free of spills, leaks, or uncontrolled pollutant sources? If no, complete Part VII and describe below.	
Notes:	
Are storm water storage and containment areas free of leaks? If no, complete Parts III and/or VII and describe below.	
Notes:	

BMP INSPECTION REPORT

Part V. Additional During Storm Observations. **If BMPs cannot be inspected during inclement weather, list the results of visual inspections at all relevant outfalls, discharge points, and downstream locations. Note odors or visible sheen on the surface of discharges. Complete Part VII (Corrective Actions) as needed.**	
Outfall, Discharge Point, or Other Downstream Location	
Location	Description
Location	Description
Location	Description
Location	Description
Location	Description
Location	Description
Location	Description
Location	Description

BMP INSPECTION REPORT

Part VI. Additional Post-Storm Observations. **Visually observe (inspect) storm water discharges at all discharge locations within two business days (48 hours) after each qualifying rain event, and observe (inspect) the discharge of stored or contained storm water that is derived from and discharged subsequent to a qualifying rain event producing precipitation of ½ inch or more at the time of discharge. Complete Part VII (Corrective Actions) as needed.**	
Discharge Location, Storage or Containment Area	**Visual Observation**

Part VII. Additional Corrective Actions Required. **Identify additional corrective actions not included with BMP Deficiencies (Part III) above. Note if SWPPP change is required.**	
Required Actions	**Implementation Date**

ATTACHMENT C-9

TRAINING LOG

TRAINED CONTRACTOR PERSONNEL LOG
Storm Water Management Training Log and Documentation

Project Name: _____

WDID #: _____

Storm Water Management Topic: (check as appropriate)

☐ Erosion Control ☐ Sediment Control

☐ Wind Erosion Control ☐ Tracking Control

☐ Non-Storm Water Management ☐ Waste Management and Materials Pollution Control

☐ Storm Water Sampling

Specific Training Objective: _____

Location: _____ Date: _____

Instructor: _____ Telephone: _____

Course Length (hours): _____

Attendee Roster (Attach additional forms if necessary)

Name	Company	Phone

As needed, add proof of external training (e.g., course completion certificates, credentials for QSP, QSD).

CERTIFICATE OF TRAINING

CALIFORNIA CONSTRUCTION GENERAL PERMIT

QUALIFIED SWPPP PRACTITIONER (QSP)

James Chidester

Sep 05, 2013 - Sep 26, 2015

Certificate # 00497

CASQA
CALIFORNIA STORMWATER QUALITY ASSOCIATION

California Stormwater Quality Association and
California Construction General Permit Training Team

CERTIFICATE OF TRAINING

CALIFORNIA CONSTRUCTION GENERAL PERMIT

QUALIFIED SWPPP DEVELOPER (QSD)
AND
QUALIFIED SWPPP PRACTITIONER (QSP)

Christian Herencia

Jan 29, 2015 - Mar 01, 2017

Certificate # 00389

CASQA
CALIFORNIA STORMWATER QUALITY ASSOCIATION®

California Stormwater Quality Association and
California Construction General Permit Training Team

ATTACHMENT C-10

RESPONSIBLE PARTIES

AUTHORIZATION OF APPROVED SIGNATORIES

Project Name: Lendrum Court

WDID #: _____

Name of Personnel	Project Role	Company	Signature	Date

_____ _____

LRP's Signature Date

_____ _____

LRP Name and Title Telephone Number

ATTACHMENT C-11

CONTRACTORS AND SUBCONTRACTORS

LIST OF CONTRACTORS AND SUB-CONTRACTORS

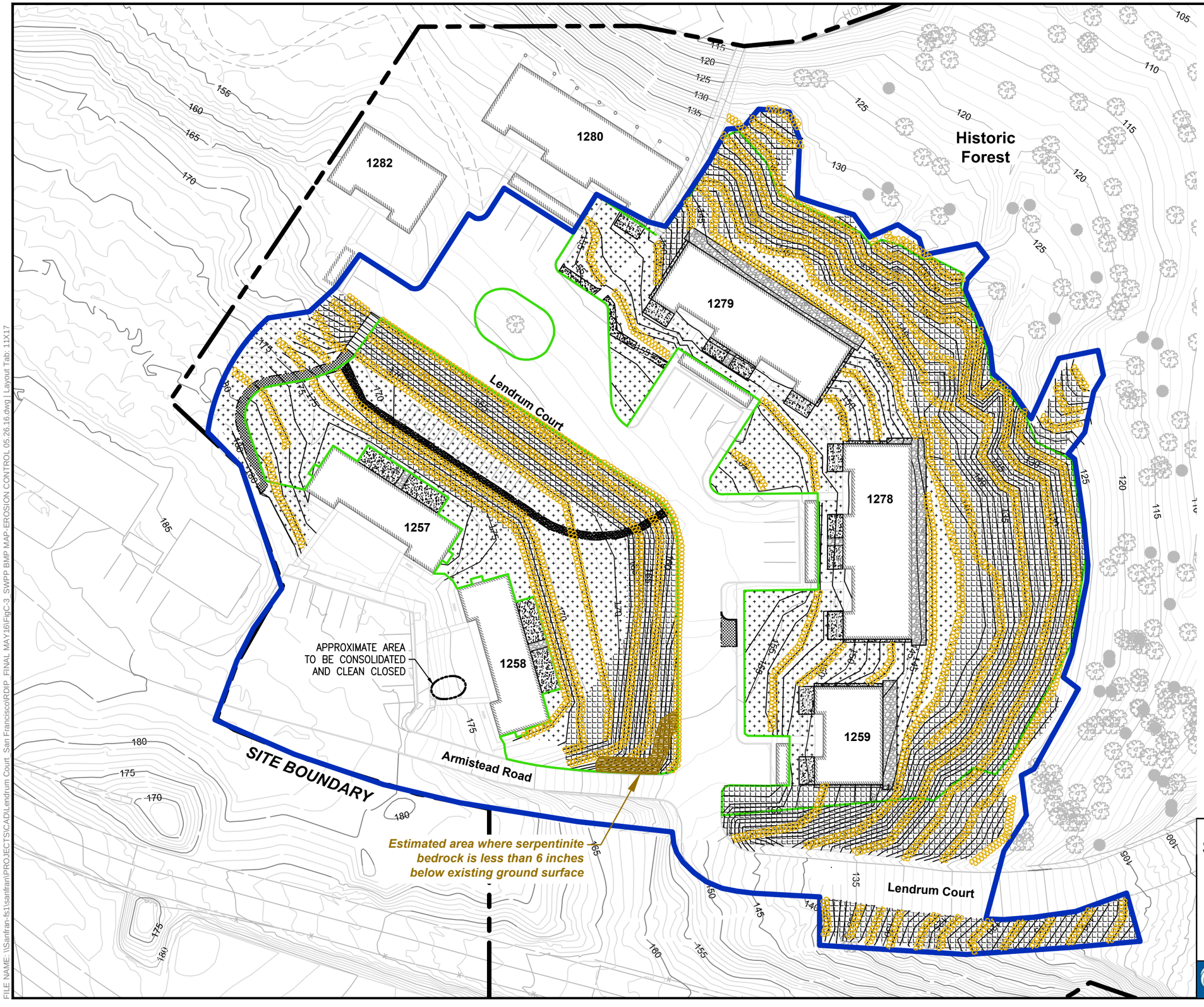
Company Name	Type of Work	Contact Name	Contact Phone Number

ATTACHMENT C-12

WEATHER REPORTS

ATTACHMENT C-13

FINAL EROSION CONTROL PLAN DESIGN DOCUMENTS



LEGEND

- ECTC TYPE 4 EROSION CONTROL BLANKET ANCHORING PATTERN A, SEE DETAIL 2, C-116
- ECTC TYPE 4 EROSION CONTROL BLANKET ANCHORING PATTERN B, SEE DETAIL 2, C-116
- FIBER ROLL (STRAW WATTLE)
- APPROXIMATE EXTENT OF REMEDIAL ACTION AREA
- APPROXIMATE LIMITS OF CAP
- APPROXIMATE SITE BOUNDRY
- 140 FINAL GRADE CONTOUR ELEVATION
- 145 EXISTING CONTOUR ELEVATION
- NEW CONCRETE PATIOS, SIDEWALKS AND STAIRS
- NEW DECOMPOSED GRANITE PATH
- NEW ASPHALT PATH/ROADWAY
- NEW AGGREGATE BASE CAP
- SITE TREE TO BE PRESERVED DURING REMEDIAL CONSTRUCTION
- TOYON (HETEROMELES ARBUTIFOLIA) TO BE PRESERVED DURING REMEDIAL CONSTRUCTION

NOTE:
ALL EROSOIN CONTROL FABRIC TO BE UNDERLAIN BY A LAYER OF STRAW.

N

SCALE (FEET)
0 50 100

SOURCE: Base plan by Towill, October 29-November 4, 2015

SWPPP FINAL EROSION CONTROLS
May 26, 2016

Lendrum Court Area
The Presidio Trust
San Francisco, California

TRC Results you can rely on | 229649 | **FIGURE C-3**

FILE NAME: \\Sanfran-fs1\sanfran\PROJECTS\CAD\Lendrum Court_San Francisco\RDJP_FINAL MAY16\Fig C-3_SWPP BMP MAP-EROSION CONTROL 05.26.16.dwg | Layout Tab: 11X17

SITE SPECIFIC
HEALTH & SAFETY PLAN

Lendrum Court
Remedial Construction
Presidio of San Francisco, California

TABLE OF CONTENTS

TABLES

ATTACHMENTS

Site Emergency Information

Emergency contact information is provided below. The hospital location map and directions are included in Attachment D.

Provider	Name	Phone Number
Emergency	Local agency	911
	Presidio Park Police	Emergency: (415) 561-5656 Non-emergency: (415) 561-5505
	Ambulance	911 or (415) 561-5656
	Police	911 or (415) 561-5656
	Fire	911 or (415) 561-5656
Local Hospital	California Pacific Medical Center 2333 Buchanan St. San Francisco, CA	General Line: (415) 600-6000 Emergency Room: (415) 600-3333
Emergency Coordinator	TBD	Office:_____ Cellular: _____

Project Team

Role/Title	Name	Number
Trust Project Manager (PM)	Nina Larssen	(415) 561-5421
TRC Program Manager	Eileen Fanelli	(949) 562-4122
TRC Project Manager	Justin Hanzel-Durbin	(415) 644-3050
TRC Field Manager	Bill Ingles	(510) 453-4023
TRC Site Safety Officer (SSO)	Jim Chidester	(925) 260-9267

SITE SPECIFIC HEALTH AND SAFETY PLAN (HSP)

Lendrum Court
Remedial Construction
Presidio of San Francisco, California

1.0 INTRODUCTION

The purpose of this Health & Safety Plan (HSP) is to establish responsibilities, procedures and contingencies for the protection of TRC employees, contractors, visitors and the public while performing remediation for the Presidio Trust. These activities will be completed at Lendrum Court. This site-specific HSP is to be implemented in conjunction with TRC (TRC) Health and Safety Management System.

The use of proper health and safety procedures in accordance with applicable Federal Occupational Safety and Health Administration (OSHA) regulations shall be required during site work. The procedures presented in this HSP are intended to serve as guidelines. They are not a substitute for sound judgment by site personnel.

1.1 KEY COMPANIES INVOLVED IN PROJECT

CUSTOMER OR CLIENT:	Presidio Trust
DESIGN ENGINEER:	TRC
CONTRACTOR:	Environmental Remediation Resources Group
SUBCONTRACTOR:	McGuire Hester

All subcontractors will also prepare an HSP(s) for the proposed field activities. Their HSP(s) will supplement TRC's HSP.

1.2 SCOPE OF WORK

The proposed work will be performed by TRC and their contractors/subcontractors and will include, but may not be limited to:

- Removal of vegetation in preparation for soil excavation work.
- Dust monitoring (see Air and Dust Monitoring and Mitigation Plan).
- Placement of erosion control measures.
- Characterization, transport, and disposal of excavated material to permitted landfills.
- Excavation and stockpiling of soil impacted by chemicals of concern (COC). Excavation will be accomplished using front loaders, bulldozers, or backhoes depending on site grades and access. Excavation will not be conducted below existing building footings.
- Post-excavation grading.
- Using a nuclear density gauge to confirm sufficient soil compaction (see HASP **Attachments E and H**).
- Placement of a cap, comprised of both hardscape and soil, over in-place and consolidated COC-impacted soil.

- Installation of an irrigation system and planting within the soil capped portion of the proposed landscape area.

2.0 SITE INFORMATION

This HSP considers the physical, chemical, and biological hazards that may be encountered during work activities at the site. Operations associated with this HSP will be conducted in accordance with the scope of work and approved design drawings/specifications.

Summary information for this project is provided in the following table:

Table 1: Site Information

Anticipated Work Period: Site description (see **Attachment A** for site plan):	May through-November 2016 Work activities will be completed on residential property and in the adjacent historic forest area. The work will be completed in parking lots/road areas, open field areas, and forested areas. Areas adjacent to the site include additional forested areas and open landscapes.
Approximate depth to groundwater:	Groundwater is not expected to be encountered at this Site.
Contaminants of concern (see **Attachment B**):	Polycyclic Aromatic Hydrocarbons: benzo(a)pyrene, benzo(a)pyrene equivalents, dibenzo(a,h)anthracene Metals: arsenic, barium, copper, lead, zinc Dioxins/furans Naturally Occurring Asbestos (NOA; Serpentinite bedrock)

3.0 ROLES & RESPONSIBILITIES

Contact information and names of key project personnel are listed below. A description of their responsibilities follows.

Table 2: Key Project Personnel and Contact Information

Role	Name	Contact Information
TRC Personnel		
TRC Program Manager	Eileen Fanelli	(949) 562-4122
TRC Project Manager	Justin Hanzel-Durbin	(415) 644-3050

TRC Field Manager	Bill Ingles	(510) 453-4023
TRC Site Safety Officer (SSO)	Jim Chidester	(925) 260-9267
TRC Assistant Site Safety Officer (Assistant SSO)	Carrie Boecher	(651) 249-6543
Contractor/Subcontractor Personnel ☐ NA		
☒ Contractor / ☐ Subcontractor Company Name: Environmental Remediation Resources Group (ERRG)		
Site Safety Officer (SSO)	Joe Corrick	(415) 933-0264
Assistant Site Safety Officer (SSO)	Don Schmidt	(707) 799-0584
☐ Contractor / ☒ Subcontractor Company Name: McGuire Hester		
Site Safety Officer (SSO)	Matt Kelly	(510) 772-6512
Assistant Site Safety Officer (SSO)	Don Hunt	(510) 632-7676 #1156
TRC Site Safety Officer or Assistant Safety Officer must report all site incidents immediately to the TRC Project Manager		
TRC PM/Supervisor must report all incidents INVOLVING PERSONAL INJURY immediately to:		
Sargent & Associates Contact	Bill Russell	Office:(978)256-7459 Fax :(978)256-4941
TRC Human Resources Manager	Suzanne Micallef	Office: (978) 656-3628
TRC PM/Supervisor must report all incidents NOT INVOLVING PERSONAL INJURY within 24 hours to:		
TRC National Safety Director	Mike Glenn	Office: (949)727-7347 Cell: (949) 697-7418
TRC ECR Safety Coordinator	Dave Sullivan	Office: (978) 656-3565 Cell: (978) 758-2809

3.1 TRC Project Manager/Supervisor

- Overall responsibility for development of a complete and accurate HSP. The HSP shall account for all foreseeable hazards.
- Responsible for the management and technical direction of all aspects of the project.
- Ensure the completion of periodic site inspections.
- Conduct incident investigations.
- Delegate responsibility for field implementation of the HSP to TRC Site Safety Officer.

3.2 Site Safety Officers (SSO) – TRC & Contractor Personnel

- Responsible for the daily implementation of the HSP.

- Ensures HSP is available onsite and that the plan is understood and signed by all personnel entering the site. (See **Attachment F** "Safety Compliance Agreement").
- Conducts (or coordinates the completion of) Tailgate Safety Meetings and ensures documentation of these meeting is available for review.
- Uses JSAs to emphasize hazards and protective measures discussed in the HSP.
- Communicates any revisions to the scope of work or HSP to affected personnel and Project Manager/Supervisor.
- Implements emergency response procedures.

3.3 Assistant Site Safety Officer (Asst SSO) – TRC & Contractor Personnel

- In the event the SSO is not on site, the Assistant SSO will assume the responsibilities of the SSO.

- It is TRC's intent to have a TRC SSO or Assistant SSO available onsite during work activities. On the occasion neither person are physically onsite, they will be available by phone. See "Table 2: Key Project Personnel and Contact Information".

3.4 TRC Employees

- Responsible for understanding and complying with this HSP, including the JSAs.
- Are required to participate in Tailgate Safety Meetings prior to commencement of site work.
- Must acknowledge an understanding of the HSP by signing the "Safety Compliance Agreement" (See **Attachment F**).

3.5 Contractors & Subcontractors

A copy of the HSP will be made available to each designated Contractor/Subcontractor (from now on to be referred to "Contractors") Site Health and Safety Officer (SSO) prior to coming to the site. Upon review or briefing of the HSP, each contractor and their personnel working at the site will be required to sign the "Safety Compliance Agreement" (See **Attachment F**) to verify their understanding and willingness to comply with the HSP.

TRC hires Contractors to apply their technical expertise to specific work tasks (i.e. construction, drilling, grading and heavy equipment operation/maintenance). Although TRC has a certain level of knowledge in these areas, the contractor is most knowledgeable of the hazards within their particular area of expertise and is in the best position to implement and monitor an effective H&S program. Contractors are required to follow and operate within their company's health and safety program and policies. TRC will exercise reasonable care to prevent and detect safety violations on the site. However, direct supervision of contractor employee safety is the responsibility of the contractor.

Contractors are to designate a company representative as their own Site Safety Officer and, if applicable, Assistant Safety Officer. This individual shall monitor the contractor's employees and ensure that safe working procedures are being followed. The Site Safety Officer and, if applicable, Assistant Safety Officer shall be identified to the TRC in writing, either by email,

letter or by having the individual sign and provide contact information on "Safety Compliance Agreement" (See **Attachment F**).

Contractors are to:

- Provide a copy of their HSP to the TRC SSO or Project Manager/Supervisor before work commences.
- Provide safety equipment and personal protective equipment for their employees.
- Ensure their equipment is in proper working order and their employees are trained and medically fit to complete the work assigned to them.
- Upon request, provide evidence that personnel working at the site have received the necessary training, certifications and, if applicable, medical surveillance.

The Contractor must inform the TRC SSO if the risks associated with a particular task exceed day-to-day safety requirements and necessitate additional safety precautions to protect the employees performing the particular task. In such cases, TRC may dictate that additional safety precautions be implemented. In the event a discrepancy arises between contractor safety procedures and those of TRC, the more stringent procedure is to be implemented.

3.6 Visitors / Regulatory Agents

- Visitors / regulatory agents will be provided an overview of the basic site safety information. A copy of this HSP will be made available for review.
- All visitors / regulatory agents are required to sign-in on "Safety Compliance Agreement" (See **Attachment F**) each time they enter the project site.
- Visitors / regulatory agents should be escorted by a TRC or designated contractor employee and should not be allowed to move about the site alone.

4.0 COMMUNICATION

Communication is an important aspect of project safety and this HSP. There are several processes incorporated in this HSP to ensure communication of health and safety hazards.

- Pre-job Project Planning meetings to discuss the scope of work and potential hazards.
- Site walk downs with the TRC workgroup, subcontractors and the customer/client.
- Development of site-specific HSP and JSAs.
- Communication and acknowledgement of understanding of HSP & JSAs by signing the "Safety Compliance Agreement" (See **Attachment F**).
- Tailgate meetings emphasizing that hazard assessment is a continuous process, and any potentially unsafe actions or condition are to be communicated immediately to the SSO.
- Communicating results of field observations/audits. Visual observations are to be conducted daily by the SSO. Periodic field observations will also be recorded on the TRC Field Observation

Form (**Attachment G**). Results from either observation will be communicated during Tailgate Safety Meetings.

5.0 REVISIONS TO HSP

If a situation arises where the HSP requires revision, the following option are available:

- Except in the case of emergency situations, no deviations from the HSP may be implemented without the prior notification and approval of the TRC Site Safety Officer (SSO).
- If HSP revisions are minor (i.e. not involving significant changes to the scope of work, associated hazards or PPE requirements), the TRC Site Safety Officer (SSO) can make hand-written revisions to the HSP in the field. HSP Revisions must then be communicated to affected personnel and the Project Manager/Supervisor.
- If HSP revisions are substantial (i.e. not involving significant changes to the scope of work, associated hazards or PPE requirements), the TRC Site Safety Officer (SSO) must consult with the Project Manager/Supervisor before making revisions. The TRC Site Safety Officer (SSO) can make hand-written revisions to the HSP in the field. HSP Revisions must then be communicated to affected personnel and the Project Manager/Supervisor. It is up to the discretion of the Project Manager/Supervisor whether a revised HSP will be reissued to replace the original HSP on the work site.

6.0 HAZARD ASSESSMENT

Hazard assessment is essential for establishing hazard prevention measures. Below is a list of potential physical, chemical and biological hazards associated with various TRC project sites. Not all hazards apply to this site-specific HSP. In addition, the list is not all-inclusive and may require additional hazards associated with a particular project/site to be added.

Please check, or add applicable hazards or hazardous tasks, hazards associated with the scope of work described in this HSP (Section 1.2). A JSA shall be developed to address each of the indicated hazards or hazardous tasks. JSAs are included in **Attachment E** of this HSP.

6.1 Physical Hazards

☒ Excavation
☒ Heavy Equipment (not drilling related)
☐ Drilling
☒ Overhead lines
☒ Underground utilities
☐ Energy Control – Lock out / Tag out
☐ Flammable Atmospheres (> 10% lower explosive limit [LEL] Hydrocarbons)
☐ Potentially Flammable (between 5 & 15% LEL for Methane; 4 & 44% LEL for H_2S) or Harmful Atmosphere
☒ Traffic - vehicular and pedestrian

☒ Trips, Slips & Falls
☒ Head, foot, eye, and back injuries
☐ Falling objects
☐ Working from elevated surface (> 6ft); Fall Protection / Fall Arrest
☐ Ladders Use
☒ Sharp objects
☒ Fugitive dust

Equipment
☒ Electrical equipment (including powered hand tools)
☒ Hydraulic equipment
☐ Pneumatic equipment

Non-Powered Hand Tool
☐ Cutting equipment
☒ Hammers, shovels, screwdrivers
☐ _____ (Additional equipment)
☐ Welding hazards
☐ Confined Spaces
☒ Munitions and Explosives (MEC)

Munitions and Explosives (MEC)

Historic training trenches dating to World War I have been identified and delineated at the Site (**Figure 2**). As such, there may be an increased likelihood of munitions and explosices (MEC), or unexploded ordnance (UXO) being present at the Site. Per the Presidio's Unexploded Ordnance Procedure (**Appendix L**), the following steps shall be taken if MEC/UXO or potential MEC/UXO is discovered during the construction activities:

1) Upon discovery of the MEC/UXO, the individual should back away at least 300 feet. **Under no circumstances should the MEC/UXO be touched or moved.**
2) TRC and subcontractors should **cease work** in the affected area, and **remove allpersonnel** from the affected area.
3) TRC field staff should **contact**:

   (1) Eileen Fanelli (TRC Program Manager)
   (2) Justin Hanzel-Durbin (TRC Project Manager/Supervisor)

Contact information for the above TRC Program and Project Managers are listed in **Table 2**.

TRC's Program or Project Manager should contact the Presidio Trust Project Manager [Nina Larssen – phone: (415) 561-5421]. The Presidio Trust Project Manager will contact the following authorities in the order shown:

- The United States Park Police (USPP) Communications Section (CommSec)
- Trust Safety and Occupational Health Manager;

- US Army; and
- Park Dispatch

The Trust Project Manager will coordinate with the US Army, in accordance with the May 1999 Memorandum of Agreement (MOA) between the Army, Trust, and the Department of Interior (NPS). Work will be resumed only upon authorization from the Presidio Trust. Please refer to **Attachment L** for a copy of the Presidio's Unexploded Ordnance Procedure and relevant contact information.
Do not proceed with work or leave the item unattended until directed by the Trust.

In the event that culturally historic resources, such as human remains of Native American or other derivation or cultural resources that have the potential to be significant, are encountered, TRC should follow the Unanticipated Discovery Protocol included in **Appendix L**.

6.2 Chemical Hazards

☐ Refined Petroleum products / waste oil
☒ Serpentinite Bedrock
☒ Polycyclic Aromatic Hydrocarbons (PAHs)
☒ Dioxins/Furans
☐ Hydrogen Sulfide
☐ Landfill Gases (e.g. methane)
☒ Metals
☒ Environmental samples, soil cuttings, decontamination water, dust (nuisance, silica)

6.3 Biological Hazards

☒ Noise Exposure
☒ Heat Stress
☐ Cold Stress
☒ Weather - heat, cold, rain, fog
☒ Poisonous Plants
☒ Animals/Insects
☐ Misc Pathogens

7.0 GENERAL SAFETY RULES

This section presents general safety rules for all persons working at the project site. Failure to follow safety protocols and/or continued negligence of health and safety policies will result in expulsion of a worker or firm from the site and may result in termination of employment.

1. Horseplay, fighting, gambling, or the possession of firearms is not permitted.
2. Work shall be well-planned and supervised to prevent injuries. Supervisors shall assure that employees observe and obey safety rules and regulations.

3. An employee reporting for work who, in the opinion of his supervisor, is unable to perform his assigned duties in a safe and reasonable manner shall not be allowed on the job.
4. No employee shall be assigned a task without first having been instructed on proper methods, including safety training, of carrying out the task. Any employee who feels they have not received proper instruction shall notify their supervisor prior to carrying out the task.
5. Injuries and accidents shall be reported immediately to the immediate supervisor, who will then report it to the SSO.
6. There shall be no consumption of food or drink in operational areas of the site. Hands should be thoroughly cleansed prior to eating.
7. Smoking is not permitted on the site.
8. When personnel are conducting hazardous operations, there shall be at least one other person (buddy system) on duty in the immediate area as a backup in case of emergency.
9. Wear required personal protective equipment (PPE) in the workplace when appropriate and/or when specified in the site specific health & safety plan. Loose clothing and jewelry should not be worn when operating machinery.
10. Do not operate any machinery if you are not authorized or qualified to do so. If unsure how to operate a machine or perform any assigned task, ask the Project Manager/Supervisor before proceeding.
11. Do not operate motorized equipment until proper training and certification has been provided (e.g. forklifts, etc.)
12. No one shall knowingly be permitted or required to work while the employee's ability or alertness is so impaired by fatigue, illness or other causes that it might unnecessarily expose the employee or others to injury.
13. Alcohol and drugs are strictly prohibited on any TRC premises, customer property, and/or in Company vehicles. Employees shall not report to work under the influence of drugs or alcohol. Employees are prohibited from possessing, using, manufacturing, distributing, dispensing, selling or purchasing illegal drugs or other controlled substances (as defined under federal and state law).

8.0 PERSONAL PROTECTIVE EQUIPMENT

TRC and Contractor personnel are required to wear PPE appropriate for the task and potential physical, chemical and biological exposures. Selection of PPE is based on hazard assessment (i.e. JSAs) and air monitoring.

8.1 PPE Required by All Personnel at All Times on the work site:

☒ Hard Hat
☒ Safety Shoes/Boots
☒ Safety Vest

☒ Eye Protection - ☒ glasses ☐ goggles ☐ face shield
☒ Hand Protection - ☒ kevlar ☐ nitrile ☐ other _____
☐ Hearing Protection
☐ Respiratory Protection - ☐ APR Particulate ☐ APR Chemical cartridge ☐ other _____
☐ Protective Clothing - ☐ Tyvex ☐ Nomex ☐ Coveralls ☐ other _____

8.2 PPE which should be available at all times on the work site:

☐ Hard Hat
☐ Safety Shoes/Boots
☐ Safety Vest
☒ Eye Protection - ☐ glasses ☒ goggles ☒ face shield
☒ Hand Protection - ☐ kevlar ☒ nitrile ☐ other _____
☒ Hearing Protection
☒ Respiratory Protection - ☒ APR Particulate ☐ APR Chemical cartridge ☐ other _____
☒ Protective Clothing - ☒ Tyvex ☐ Nomex ☐ Coveralls ☐ other _____

9.0 RESPIRATORY PROTECTION

For operations that require the use of a respirator, the TRC and Contractor SSOs must verify that Field Personnel are medically approved to use respiratory equipment, fit tested, and trained in the proper use of respirators. Only respirators that are NIOSH/MSHA approved are to be used.

Respiratory protection is mandatory if workers are required to complete tasks within a hazardous atmosphere. According to OSHA, a hazardous atmosphere is defined as:

- Flammable gas, vapor, or mist in excess of 10% of LEL.
- Atmospheric oxygen is below 19.5% or above 23.5%.
- When concentration of a known contaminant is greater than the permissible exposure limit (PEL).
- Airborne combustible dust exceeds its LEL (approximated when dust obscures vision at a distance of 5 feet or less).

If conditions warrant, air monitoring may be required to verify the presence or absence of a hazardous atmosphere. Air monitoring is to be conducted whenever a situation or condition arises that could reasonably result in a hazardous atmosphere.

9.1 Air-Purifying Particulate Respirators

Employees involved in construction and earthmoving operations that result in nuisance dust and particulates may use air-purifying respirators. These are commonly referred to as “dust masks” and do not require fit testing. Particulate respirators can to be used in situations where dust and particulates are the only contaminants posing an inhalation hazard. Particulate respirators are not to be used in oxygen deficient atmosphere or if hazardous levels of gas/vapor contaminants are also present. A high efficiency particulate air (HEPA), P100 respirator should be used in place of commercially available “dust masks.” Due to the potential exposure to airborne naturally occurring

asbestos (NOA) fibers, related to the disturbance of serpentinite rocks and soils, excavation activities are to avoid cutting into serpentinite bedrock.

9.2 Air-Purifying Gas/Vapor Respirators

TRC employees and Contractors are required to wear half-face, air-purifying respirators with the appropriate chemical cartridge under the following circumstances:

- When concentration of a known contaminant continuously exceeds permissible exposure limit (PEL) time-weighted average or the threshold limit value (TLV) time-weighted average.
- When volatile organic compound (VOC) vapors in the work area continuously exceed the threshold limit value- time-weighted average (TLV-TWA) for gasoline (300 parts per million [ppm]).
- When, at any time, VOC vapors in the work area exceed the threshold limit value - short-term exposure limit (TLV-STEL) for gasoline (500 ppm).

See **Attachment B** for additional information and regulatory exposure limits for chemicals of concern at this site.

Air purifying respirators (APRs) with chemical cartridges can be used under the following conditions:

- If the oxygen concentration is between 19.5% and 23.5%.
- If chemical contaminants have been identified.
- The toxic concentrations are known and the respirator cartridges are effective in removing the contaminants.
- The respirator and cartridges are NIOSH/MSHA approved.
- The contaminants have noticeable warning qualities such as odor and visibility characteristics including color.

In the event workers are required to wear air purifying respirators (APRs) with chemical cartridges, the following requirements must be met:

- The TRC or Contractor SSO must verify that workers are:
  - Medically approved (within one year) to use respiratory protection.
  - Fit-tested for the specific respirator to be used.
  - Trained in the proper use and limitations of the respirator to be used.
- Contractors must provide proof of the above to the TRC SSO, upon request.
- If an employee or contractor has not cleared by the SSO to use a respirator, they will not be assigned tasks that may potentially expose them to contaminants.
- Personnel with interfering facial hair are not permitted to wear respirators and shall not be permitted in areas where respiratory protection is required.

9.3 Air-Supplied Respirators

Air-supplied respirators, such as SCBA or airline, full-face respiratory protection, are not anticipated to be required at the site. This level of respiratory protection is utilized in oxygen deficient atmospheres or atmospheres considered to be at or above immediately dangerous to life and health

(IDLH) levels. These conditions will only occur in rare, if any, circumstances such as confined space entry or emergency situations. The use of air-supplied respiratory protection is not permitted without approval and guidance from the Project Manager.

10.0 AIR MONITORING

Air monitoring may be required to verify the presence or absence of a hazardous gas/vapor, or particulate atmospheres whenever a situation or condition arises that could reasonably result in a hazardous atmosphere. Refer to the Air and Dust Monitoring and Mitigation Plan for further details.

Based on OSHA's definition of a hazardous atmosphere, there are four different hazards that require monitoring. The table below describes the type of hazard, what air monitoring equipment to use and what levels constitute a hazard. The information provided in the table does not take into consideration all the possible variations of hazardous atmosphere; however it will provide guidance when determining the presence of a hazardous atmosphere. Any questions or concerns should be directed to the SSO before work begins.

Table 3: Air Monitoring Guidance

Hazard	Appropriate Air Monitoring Equipment	Hazardous Levels	Comments
Flammability	Combustible gas indicators (CGI) are direct-reading instruments; measures % LEL and oxygen.	***>5% of the LEL for Methane*** ***>4% of the LEL for H_2S*** >25% of the LEL petroleum hydrogen products during cold work >10% of the LEL petroleum hydrogen products during hot work	Since many flammable vapors are heavier than air, be sure to take readings at ground level. Work be suspended if CGI readings exceed 5% of LEL of methane. "Cold work" is work that cannot produce a source of ignition. Examples of cold work include valve adjustment and brush painting. "Hot work" is work that could produce a source of ignition, such as a spark or open flame. Examples of hot work include welding, cutting, grinding and the use of non-explosion proof electrical equipment.
Oxygen deficiency or abundance	Same as above or an Oxygen Meter	<19.5% and >23.5%	Concentrations >23.5% may present an increased flammability hazard.
Inorganic vapors/gases exceeding the PEL	Photoionization detector (PID) can detect organic and inorganic vapors/gases	Varies depending on chemical. See **Attachment B** for hazardous levels of common chemicals	It is impossible to differentiate the different chemicals using a PID meter. However, the PID will indicate whether chemicals are present and at what levels. Measurements taken within worker's breathing zone will be used to determine respiratory protection requirements.

Airborne combustible dust is not anticipated at the work site.

When conducting, air monitoring the following actions should be considered:

- Be familiar with the proper use and limitations of the air monitoring equipment to be used.

- ❑ Ensure air-monitoring equipment (TRC's or otherwise) is in working order and has been properly calibrated. The TRC SSO is to document verification of calibration (i.e. in a field log book).
- ❑ Clearly document the results of air monitoring, including:
  - Equipment name / type and calibration data
  - Date, time and site location of air monitoring (use a site map to clarify the locations of readings, if necessary).
  - Indication of what is being measured (LEL, oxygen, or ppm)
  - Results of the air monitoring
- ❑ Measurements for volatile organics should be taken at low point where vapors could accumulate.
- ❑ Measurements taken to determine the need for respiratory protection should be take within the worker's "breathing zone," keeping in mind the worker's closest proximity to the hazard source.
- ❑ An individual should never enter a confined area or excavation in order to conduct initial air monitoring. Instead, actions should be taken to lower the air monitoring equipment into the area to indicate the presence (or absence) of a hazardous atmosphere. Most air monitoring equipment has audible alarms.
- ❑ In the event that CGI readings on the site exceed 10 percent of the LEL, work will be suspended until the source can be eliminated or controlled.

11.0 SITE CONTROL

The primary objective of site control is to minimize the exposure to potentially hazardous substances and/or situations. Supervision and controlling access to the work site is necessary to protect site personnel, visitors and the public.

For this site, the following areas will be designated as hot, warm and cold zones:

Hot Zone: Within 10 feet of excavation edge or heavy equipment
Warm Zone: ☒ NA
Cold Zone: Outside the hot zone

For the purposes of this HSP, site control will be discussed under two circumstances: (1) work involving Physical Hazards and (2) work involving Chemical Hazards.

In either case, site control areas are to be clearly identified and communicated by the SSO. The hot zone must be clearly identified and should be isolated with cones, barricades, or high visibility caution tape. In addition, sufficient area also must be available to conduct operations while providing a protective buffer for persons and property outside the controlled areas.

☒ Work involving Physical Hazards

Work does *not* involve direct contact with hazardous substances. However, if the scope of work primarily involves physical hazards (i.e. vehicular traffic, heavy equipment operation, etc.), the establishment of a warm zone is not necessary. Instead, a hot zone must be established to surround all the physical hazards. The hot zone area shall provide enough room and buffer to protect both

Hot Zone

- Where personnel may be subject to chemical or physical hazards.
- Where known or suspected contamination exists and may also be where equipment operation and/or environmental sampling will take place.
- To be clearly identified and should be isolated with cones, barricades, or high visibility caution tape.
- Large enough to provide sufficient room and buffer to protect both workers and the public.

workers and the public. A cold zone is established outside the hot zone to allow "support" activities to be conducted in a safe location.

☐ Work involving Chemical Hazards

The concept of site control and the establishment of hot/cold work zones are intended for work involving the exposure (or potential exposure) to hazardous chemical concentrations. Under these circumstances, the purpose of work zones is two-fold: 1) minimize the exposure to potentially hazardous substances and 2) minimize the spread of hazardous substances outside the immediate work area through decontamination procedures.

A brief overview of site control work zones is provided below:

Cold Zone

- Located outside the hot zone where administrative and other support functions are located.
- Where adverse exposure to contaminants and physical hazards are unlikely.

11.1 Decontamination

The purpose of decontamination is to: (1) remove chemical containments from personnel and/or equipment and (2) significantly reduce the spread of chemical contaminants beyond the hot zone.

Decontamination is intended to occur within the hot zone. Depending on the project, there may be a need to decontaminate both personnel and equipment. The decontamination process should be appropriate to the chemical hazards present. For example refined petroleum contaminated soil on work boots/shoes may only require physical removal of the soil with a sturdy brush. However, decontamination of equipment (i.e. drilling augers) may require additional steps to ensure contaminants are not spread beyond the hot zone. Heavy equipment (i.e. excavators, trucks used for waste transportation, etc.) may require a combination of steps, including the placement of gravel at the entrance/exit of the site.

11.1.1 Personnel Decontamination Procedures ☐ NA

Remove contaminated items (i.e. gloves) in an "inside out" manner within designated decontamination area located within the hot zone. Labels in compliance with the hazard

communication standard will be affixed to containers of contaminated debris. Personnel will wash hands and face before eating or drinking and at the end of each day.

11.1.2 Equipment Decontamination Procedures ☐ NA

Instruments and equipment used during all phases of work will be decontaminated prior to and between locations to prevent cross-contamination. A triple rinse procedure will be used consisting of:

(1) Water and soap wash
(2) Potable water rinse
(3) Water final rinse

For excavation equipment too large for triple rinse decontamination process, a pressure washer will be used to clean the equipment. A decontamination area will be set up to containerize the fluids and soils washed off equipment during the decontamination process.

Contaminated materials and liquids will be sampled and profiled for disposal at a certified waster treatment/disposal facility. Following profile acceptance, the contaminated materials and liquids will be transported and disposed of in accordance with state guidelines. Clean materials and liquids will be disposed of on site.

11.2 Site Security

Appropriate security measures will be established in coordination with the site owner/operator and communicated to site personnel. The objective of these measures is to (1) protect the public from potential exposure to physical/chemical hazards; (2) avoid public interference with personnel and safe work practices; and (3) prevent theft or vandalism of equipment at the site.

Site specific security measures include:

- Locking any unattended vehicles and/or equipment.
- Installing temporary gates, fences, barricades and signage to deter pedestrians from entering work areas.
- Using caution tape and cones around potential trip hazards and properly covering any open holes that maybe left overnight.

12.0 PERSONNEL TRAINING

TRC and Contractor personnel are required to acknowledge their understanding and willingness to comply with this HSP before admission to the site by signing the "Safety Compliance Agreement" (See **Attachment F**).

Site specific training requirements are indicated below:

☒ Personnel shall meet the training requirements specified in the OSHA Hazardous Waste Operations and Emergency Response (HAZWOPER) Standard [29 CFR 1910.120(e) and CCR Title 8 Section 5192(e)].

13.0 MEDICAL PROGRAM

TRC has established a medical surveillance program to assess, monitor, and help protect the health of employees, in particular, employees who may be exposed to potentially hazardous substances during site work. Personnel undergo medical examinations as follows:

- **Initial:** Pre-employment / prior to any assignment involving work in a hazardous or potentially hazardous environment. The initial examination is used to establish a baseline picture of health against which future changes can be measured, and to identify any underlying illnesses or conditions that might be aggravated by chemical exposures or job activities. This exam also certifies whether an employee is medically fit to wear a respirator.
- **Periodic:** At least once every 12 to 24 months (depending on the employee's involvement in field activities) to measure changes in health status. This exam certifies whether an employee is still medically fit to wear a respirator.
- **Upon notification:** As soon as possible upon notification by an employee that they have developed signs or symptoms indicating possible overexposure to hazardous substances, or in response to an injury or exposure during an emergency situation.
- **Exit**: At termination of employment.

14.0 EMERGENCY RESPONSE PLAN

The TRC SSO (depending on which is present) will have controlling authority during an emergency. In the SSO's absence, the Alternate SSO will be in charge.

14.1 Evacuation Protocol

Evacuation protocol, routes and assembly areas from the site will be established by the SSO, and communicated to Field Personnel during the Tailgate Safety Meeting(s) prior to initiating work. In the event of an evacuation, personnel will meet at a pre-established assembly areas and the TRC SSO conduct a "head count" to see that everyone is accounted for. Contractor SSO is responsible for being able to provide an accurate head-count of contractor personnel.

14.2 First Aid & CPR

TRC employees and Contractors with current First Aid and CPR certification and who are willing to provide First Aid and CPR will be asked to identify themselves at Tailgate Safety Meetings. Their names will be documented on the Tailgate Meeting Checklist (**Attachment F**).

14.3 Emergency Medical Assistance

A list of emergency medical assistance sources has been established as part of this HSP. **Attachment C** lists the names, locations, and telephone numbers of emergency response organizations in the vicinity of the project site. **Attachment D** includes a map to the nearest hospital(s) with an *emergency room*.

A vehicle shall be available onsite during work activities to transport injured personnel to the identified emergency medical facilities, if necessary. Company vehicles are to be equipped with a fire extinguisher and first aid kit.

14.4 Emergency Procedures

In the event of an accident, injury, or other emergency, remember to:

- **Stop work and REMAIN CALM.**
- **Move personnel to a safe location (evacuation plan).**
- **Call Presidio Emergency Services at (415) 561-5656 or notify other emergency facilities, as necessary.**
- **Address medical emergencies and apply first aid, if necessary.**
  - Move injured or exposed person(s) from immediate area only if it is safe to do so.
  - If serious injury or life-threatening condition exists, call 911. Clearly describe the location, injury and conditions to the dispatcher. Designate a person to direct emergency equipment to the injured person.
- **Contain physical hazards.**
  - Act only if hazard is minimal and you are trained to deal with the situation. Otherwise evacuate and wait for emergency services to arrive.
- **Notify SSO and initiate incident reporting procedures.**
  - See Table 2 (page 3) of this HSP for contact information. In the event the SSO is not available, the order of notification should be the following: 1) Assistant SSO, 2) TRC Project Manager, and 3) HR Manager (if incident involves an injury) or EHS Supervisor (if incident does not involve an injury).
  - TRC SSO is to notify TRC Program and Project Managers as soon as reasonably possible.
- Do not resume work until the SSO has determined it is safe to do so.

14.5 Non-Emergency Medical Assistance

If an injury does occur and it is not life threatening, then the employee or employee's supervisor/project manager should contact WorkCare within the first hour after an injury. WorkCare information is proved in **Attachment I.** This information will help assist the injured

employee by connecting them with instant access to a medically qualified professional in order to provide guidance on appropriate first aid measures and medications.

15.0 INCIDENT REPORTING

In case of an accident, TRC personnel are to immediately report the incident to their Project Manager/Supervisor and follow the TRC incident reporting procedures detailed in the TRC IIPP. TRC's Incident Reporting Form and Near Miss Report are available through the Project Manager/Supervisor and in **Attachments J & K**, respectively.

All incidents and near misses are investigated in accordance with TRC's IIPP. The TRC Incident Report Form is to be completed and submitted to the TRC EHS Supervisor within 24 hours following any incident.

Contractor personnel are to report incidents to their SSO who is then required to report the incident to the TRC SSO, TRC Assistant SSO or TRC Program Manager and/or Project Manager immediately.

Some important information to include when reporting an incident are:
1. A description of the event (including date and time)
2. Details regarding personal injury and property damage, if any.
3. Whether emergency services were notified (i.e., medical facilities, fire department, police department) and the basis for that decision. Include time and names of persons/agencies notified, and their response.
4. Clarify the need for and type of TRC support.
5. Immediate corrective action(s) taken.
6. Personnel involved.

16.0 HEALTH AND SAFETY PLAN (HSP) SIGNATURE PAGE

Job Safety Analysis Author	**Date:**	**HSP Author**	**Date:**
	**4/20/15**		**4/20/15**
Kristin Bolen		**Kristin Bolen**	
		HSP Revision Author	
			**5/10/16**
		Jessica Barros	

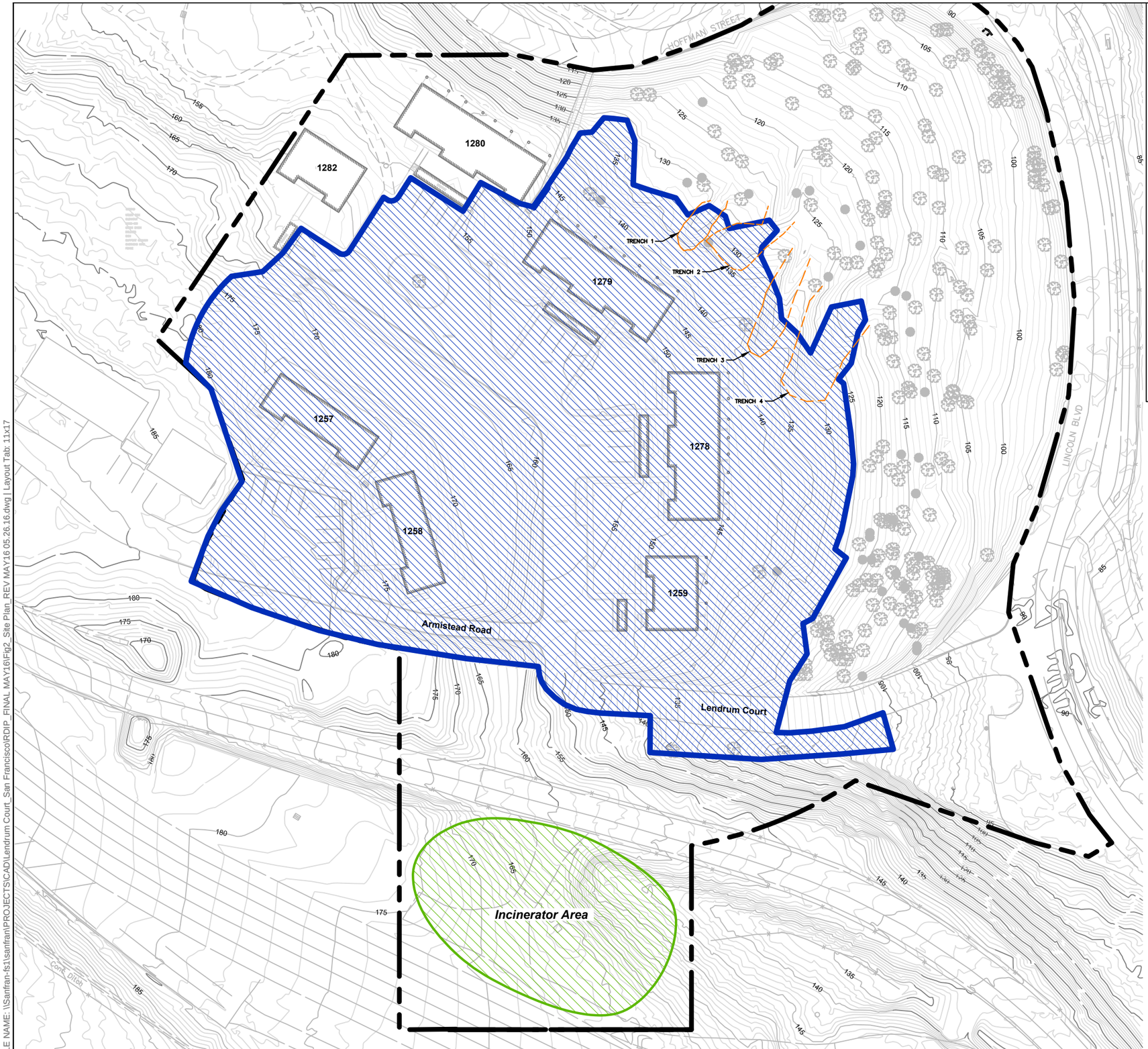
Review/Approvals:

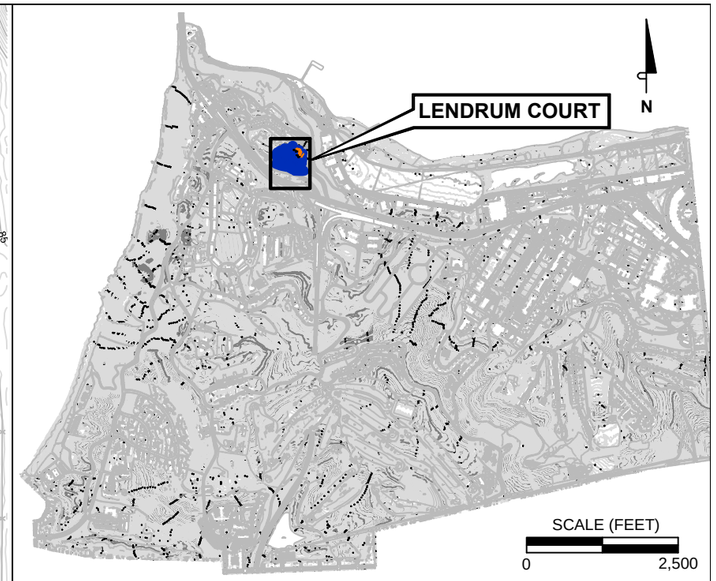
Site Safety Officer Facility/Field Supervisor	**Date:**	**Project Manager/Supervisor***	**Date:**
	5/26/16		**5/26/16**
Local Safety Coordinator* ☐ **NA**	**Date**	**EHS Supervisor/Safety Professional (CIH, CSP, other)***	**Date**
	5/10/16		

* Note: **For most projects, the Project Manager/Supervisor will review, approve and sign the HSP.** In the event the operations are beyond the normal scope of work, additional review is available upon the request from the PM/Supervisor. The Local Safety Coordinator is the first recourse for reviewing HSPs **not** involving high-risk operations. It is recommended that for HSPs involving high-risk operations (i.e. hazardous exposures to chemicals, large scale or deep excavations, confined space entry, etc.), the EHS Supervisor and/or a Safety Professional [Certified Industrial Hygienist (CIH), Certified Safety Professional (CSP) or other professionally qualified person] be consulted for review of the HSP to ensure proper protective measures are being implemented.

ATTACHMENT A

SITE PLAN





LEGEND

- Approximate site boundary
- Approximate location of historic World War I trench
- Approximate extent of remedial action area
- Protective in current configuration
- Existing contour elevation
- Site tree to be preserved during remedial construction
- Toyon (Heteromeles Arbutifolia) to be preserved during remedial construction

N

SCALE (FEET)

0 70 140

SOURCE: Base plan by Towill, October 29-November 4, 2015

SITE PLAN
May 26, 2016

Lendrum Court and Incinerator Area
The Presidio Trust
San Francisco, California

TRC 229649 **FIGURE 2**

FILE NAME: \\Sanfran-fs1\sanfran\PROJECTS\CAD\Lendrum Court_San Francisco\RDIP_FINAL_MAY16\Fig2_Site Plan_REV MAY16 05.26.16.dwg | Layout Tab: 11x17

ATTACHMENT B

OCCUPATIONAL HEALTH GUIDELINES AND TOXICOLOGICAL INFORMATION

Table B-1

OCCUPATIONAL HEALTH GUIDELINES AND TOXICOLOGICAL INFORMATION
Priority Pollutant Chemicals

Contaminant	ACGIH TLV-TWA	NIOSH REL	OSHA PEL	STEL	IDLH	Routes of Exposure	Known or Suspected Carcinogen	Symptoms
Benzo(a)pyrene (Coal tar pitch volatiles)	0.2 mg/m³	0.1 mg/m³	0.2 mg/m³	n/a	80 mg/m³	Inhalation, skin and/or eye contact	Yes	Dermatitis, bronchitis, potential carcinogen
Arsenic (inorganic compounds)	0.01 mg/m³	0.002 mg/m³ [15-minute]	0.01 mg/m³	n/a	5 mg/m³	Inhalation, skin absorption, skin and/or eye contact, ingestion	Yes	Ulceration of nasal septum, dermatitis, gastrointestinal disturbances, peripheral neuropathy, respiratory irritation, hyperpigmentation of skin, potential carcinogen
Barium	0.5 mg/m³	0.5 mg/m³	0.5 mg/m³	n/a	50 mg/m³	Inhalation, ingestion, skin and/or eye contact	No	Irritation eyes, skin, upper respiratory system; skin burns; gastroenteritis; muscle spasm; slow pulse, extrasystoles; hypokalemia
Copper	1 mg/m³	1 mg/m³	1 mg/m³	n/a	100 mg/m³	Inhalation, ingestion, skin and/or eye contact	No	Irritation eyes, nose, pharynx; nasal septum perforation; metallic taste; dermatitis
Lead	0.05 mg/m³	0.050 mg/m³ (8-hour)	0.05 mg/m³ TWA 0.03 mg/m³ Action Level	n/a	100 mg/m³	Inhalation, ingestion, skin and/or eye contact	No	Lassitude (weakness, exhaustion), insomnia; facial pallor; anorexia, weight loss, malnutrition; constipation, abdominal pain, colic; anemia; gingival lead line; tremor; paralysis wrist, ankles; encephalopathy; kidney disease; irritation eyes; hypertension
Dioxin (2,3,7,8-Tetrachloro-dibenzo-p-dioxin)	n/a	No REL, but identified by NIOSH as an occupational carcinogen.	none	n/a	100 mg/m³	Inhalation, skin absorption, ingestion, skin and/or eye contact	Yes	Irritation eyes; allergic dermatitis, chloracne; porphyria; gastrointestinal disturbance; possible reproductive, teratogenic effects; in animals: liver, kidney damage; hemorrhage; potential carcinogen
Naturally Occurring Asbestos (NOA) (serpentinite bedrock)	0.1 fiber/cm³	0.1 fiber/cm³	0.1 fiber/cm3 TWA 1.0 fiber/cm3 Excursion Limit (30 minutes)	1 fiber/cm³	n/a	Inhalation, ingestion, skin and/or eye contact	Yes	NOA (chronic exposure): dyspnea (breathing difficulty), interstitial fibrosis, restricted pulmonary function, finger clubbing; irritation eyes; potential carcinogen

Exposure and hazard data obtained from the NIOSH Pocket Guide to Chemical Hazards

Table B-1 (Continued)

OCCUPATIONAL HEALTH GUIDELINES AND TOXICOLOGICAL INFORMATION

TABLE KEY

ACGIH TLV-TWA	American Conference of Governmental Industrial Hygienists, Threshold Limit Value-Time Weighted Average
NIOSH REL	National Institute of Occupational Safety & Health, Recommended Exposure Limit
STEL	Short Term Exposure Limit
OSHA PEL	Occupational Safety and Health Administration, Permissible Exposure Limit
IDLH	Immediately Dangerous to Life and Health
ppm	parts per million
CNS	Central Nervous System
n/a	not available (i.e., no value has been established)

DEFINITIONS

Threshold Limit Value: Threshold limit values (TLVs) refer to airborne concentrations of substances and represent conditions under which it is believed nearly all workers may be repeatedly exposed, day after day, without adverse health effects.

Threshold Limit Value - Time Weighted Average: The time weighted average (TWA) is a concentration for a normal 8-hour workday and a 40-hour workweek, to which nearly all workers may be repeatedly exposed, day after day, without adverse effect. TLV-TWAs are established by the ACGIH.

Recommended Exposure Limit: Unless otherwise noted, the recommended exposure limit (REL) is a TWA concentration for up to a 10-hour workday during a 40-hour workweek. RELs are established by NIOSH to reduce or eliminate adverse occupational health effects.

Short Term Exposure Limit: A short term exposure limit (STEL) is defined as a 15-minute TWA exposure that should not be exceeded at any time during a workday. When compared to the REL (or TLV-TWA for ACGIH standards), the STEL allows the worker to be exposed to a higher concentration, BUT for a shorter period of time. Exposures above the REL up to the STEL should not be longer than 15 minutes and should not occur more than four times per day.

Permissible Exposure Limit: Permissible exposure limits (PELs) are TWA concentrations that must not be exceeded during any 8-hour work shift of a 40-hour workweek. PELs are established by OSHA (29 CFR 1910.1000).

Immediately Dangerous to Life and Health: Immediately dangerous to life and health (IDLH) values are established as concentrations from which a worker can escape within 30 minutes without suffering loss of life, irreversible health effects, or other deleterious effects that could prevent him/her from escaping the hazardous environment. The purpose of establishing an IDLH

exposure concentration is to ensure that workers can escape from a given contaminated environment in the event of failure of respiratory protection equipment.

Known or Suspected Carcinogen Classification: ACGIH categories for carcinogenicity classification:

A1 – Confirmed Human Carcinogen – The agent is carcinogenic to humans based on the weight of evidence from epidemiologic studies.

A2 – Suspected Human Carcinogen – Human data are accepted as adequate in quality but are conflicting or insufficient to classify the agent as a confirmed human carcinogen; OR the agent is carcinogenic in experimental animals at dose(s), by route(s) of exposure, at site(s), of histologic type(s), or by mechanism(s) considered relevant to worker exposure. The A2 is used primarily when there is limited evidence of carcinogenicity in humans and sufficient evidence of carcinogenicity in experimental animals with relevance to humans.

A3 – Confirmed Animal Carcinogen with Unknown Relevance to Humans – The agent is carcinogenic in experimental animals at a relatively high dose, by route(s) of administration, at site(s), of histologic type(s), or by mechanism(s) that may not be relevant to human exposure. Available epidemiologic studies do not confirm an increased risk of cancer in exposed humans. Available evidence does not suggest that the agent is likely to cause cancer in humans except under uncommon or unlikely routes or levels of exposure.

A4 – Not Classifiable as a Human Carcinogen – Agents which cause concern that they could be carcinogenic for humans but which cannot be assessed conclusively because of a lack of data. In vitro or animal studies do not provide indications of carcinogenicity which are sufficient to classify the agent into one of the other categories.

A5 – Not Suspected as a Human Carcinogen – The agent is not suspected to be a human carcinogen on the basis of properly conducted epidemiologic studies in humans. These studies have sufficiently long follow-up, reliable exposure histories, sufficiently high dose, or adequate statistical power to conclude that exposure to the agent does not convey a significant risk of cancer to humans; OR evidence suggesting a lack of carcingenicity in experimental animals is supported by mechanistic data.

ATTACHMENT C

EMERGENCY SERVICES
PHONE NUMBERS, DIRECTIONS, AND LOCAL AREA MAP

EMERGENCY SERVICES

FACILITY / LOCATION **TELEPHONE**

Emergency Situation (Presidio Emergency Services) ..... (415) 561-5656

WorkCare 24 Hour Non-Emergency Notification Number.....1-888-449-7787

Hospital Name, Address, Phone
California Pacific Medical Center
2333 Buchanan St.
San Francisco, CA

Directions (~14 min.)

1) Head east on Lendrum Ct toward Lincoln Blvd.
2) Turn Left onto Lincoln Blvd
3) Turn Left to stay on Lincoln Blvd
4) Turn right onto Merchant Rd.
5) Merge into US-101 S
6) Turn right onto Webster St.
7) Turn Left onto Washington St.
8) Take the 1st right onto Buchanan St.
9) 2333 Buchanan St. is on the right.

Direct Number to Emergency Room ..... (415) 600-3333
General Line ..... (415) 600-6000

Poison Control Center
California Poison Control System - San Francisco Division (800) 876-4766
at San Francisco General Hospital
University of California San Francisco
Box 1369
San Francisco, California 94143-1369

Office of Emergency Services (800) 852-7550

USA Dig Alert of Northern California (800) 642-4444

ATTACHMENT D

LOCAL AREA HOSPITAL MAP
with routes to hospital
(~14 min)

California Pacific Medical Center
2333 Buchanan St.
San Francisco, CA

ATTACHMENT E

JOB SAFETY ANALYSIS

JOB SAFETY ANALYSIS

COMPANY/ PROJECT NAME or ID/ LOCATION (City, State)	DATE PREPARED FOR HSP:	☐ NEW ☒ REVISED
Lendrum Court, Presidio – San Francisco	2/5/2016	
JSA WORK ACTIVITY (Description): **Working Around Asbestos**	**List of Contractor(s) and key work activity:** **TRC**	

SITE SPECIFIC JSA AUTHOR	POSITION / TITLE	DEPT	SIGNATURE
Kristin Bolen	**Sr. Project Scientist**	**ECR**	Kristin Bolen

"TRC APPROVED" JSA DEVELOPMENT TEAM	POSITION / TITLE	APPROVAL
Rachelle Clair	San Francisco Bay Safety Coordinator	Rachelle Clair
Dave Sullivan	ECR Safety Director	
Mike Glenn	National Safety Director	

Required PPE (indicate with "R") vs. Must Have Available On-site (indicate "A")

__R__ HARD HAT __R__ GLOVES:Kevlar __R__ SAFETY GLASSES _____GOGGLES _____FACE SHIELD	__A__ REFLECTIVE VEST __A__ HEARING PROTECTION __R__ SAFETY SHOES: Protective Toe __R__ 5pt.HARNESS / LANYARD PPE CLOTHING: _____Coveralls __R__Tyvek Suit _____Nomex ____Other (specify):	RESPIRATORY PROTECTION: ☐ NA __A__ Dust Mask __A__ ½ face Air Purifying Respirator (APR) A _ Particulate Mask: ☒ PM100 ☐ PM95 __R__ Cartridge: ☐ VOC ☐ HEPA Filter _____Full face ARP; specify cartiridge type: _____ Air Supplied Respirator _____SCBA _____Air-line	Additional PPE:

Always perform a Safety Assessment: 1) prior to starting work; 2) when changing tasks; and 3) throughout the day. Focus on each new task, procedures, and skill sets to be used.

[1] JOB TASKS	[2] POTENTIAL HAZARDS	[3] HAZARD CONTROLS (beyond wearing "Required" PPE)
1. Pre-start Meeting and Site Safety Analysis	a. Misunderstood scope of work / confusion	a. Review site plan and Hospital Route. Identify all work tasks. Identify work areas to be traversed and potential hazards within that area. a. Discuss location and how to identify serpentinite rocks, and if applicable, identify the location(s) of serpentinite bedrock outcrops within the work area. a. Ensure staff are aware that excavation activities should avoid cutting into or disturbing serpentine bedrock to the extent practicable.
2. Working around Asbestos	a. Exposure to airborne asbestos fibers	a. Restrict access to work area. Only people involved in work should be allowed in the area. a. Asbestos fibers in outdoor soil, indoor dust, or other source materials typically are not inherently hazardous, unless the asbestos is released from the source material into air where it can be inhaled. Aviod disturbing areas of serpentine soils which may contain asbestos. a. If the presence of asbestos is confirmed or suspected, wear suitable protective clothing (Tyvek) and appropiate respiratory protective equipment as required (e.g.: particulate mask or half-mask air-purifying respirator equipped with HEPA filter depending on condition) a. Do not use power tools on any suspected ACMs, they create dust; use hand tools instead. a. Samples suspected of containing asbestos must be immediately placed into sealed containers and labeled. a. If asbestos is suspected use HEPA vacuuming or wet cleaning to decontaminate and any equipment used in work operation until all surfaces are free of visible debris. Do not use brooms or brushes. a. Put asbestos waste in suitable sealed, leak-tights containers and label them. Wet wastes to prevent fibers from blowing around in the event the container is broken.

JOB SAFETY ANALYSIS

COMPANY/ PROJECT NAME or ID/ LOCATION (City, State)	DATE PREPARED FOR HSP:	☐ NEW ☒ REVISED
Lendrum Court, Presidio – San Francisco	2/5/2016	
JSA WORK ACTIVITY (Description): **Working Around Asbestos**	**List of Contractor(s) and key work activity:** **TRC**	

		a. Wash your hands and face before eating or drinking and at the end of the day. a. Do not take home any asbestos contaminated clothing for washing. Use disposable overalls and dispose of them as asbestos waste.
3. Field Changes:	a. b. c.	a. b. c.

GENERAL SAFETY HAZARDS	LOCATION(S) WHERE HAZARD IS TO BE EXPECTED	[3] HAZARD CONTROLS (beyond wearing "Required" PPE)
4. Slips, trips, and falls	a. In exclusion zone	a. Clean as you work. Put equipment away when done using it. Blot up puddles of standing water and sweep work area. a. Cover or use appropriate warning to protect all unattended open holes.
5. Cut/Pinched fingers or toes	a. Throughout work area; particularly when moving materials	a. Wear Kevlar gloves when lifting sharp or heavy equipment.
6. Strained muscles	a. Throughout work area; particularly when moving materials	a. Use proper lifting techniques; get help when moving heavy objects (>50 lbs).
7. Flying debris	a. In exclusion zone	a. Wear ANSI-approved safety glasses working around operating equipment.

Field Notes:

_____

_____

_____

[1] List all activities/steps which present a significant hazard, preferably in sequence. FOCUS ON POTENTIALLY HAZARDOUS ACTIVITIES; not the trivial ones. Apply common, yet knowledgeable & informed, sense to identify what could reasonably be expected to cause danger.

[2] CONCENTRATE ON SIGNIFICANT HAZARDS. What can go wrong? How can someone get hurt? Can someone be struck by or strike an object? caught on, in or between objects?; fall to ground or lower level?; experience excessive strain or stress? Be exposed to inhalation or skin hazards. Specify the hazards; be descriptive.

[3] Describe actions, procedures or limits necessary to eliminate or minimize the hazards. Be clear, concise and specific. Use objective, observable and quantified terms. Avoid subjective general statements such as, "be careful" or "use as appropriate".

LIMITATION: As part of TRC's EHS Policy, a JSA is provided by TRC for its employees. The purpose of a JSA is NOT to identify all hazards associated with a task, but to identify key potential hazards to get TRC and other onsite personnel thinking about other potential safety hazards and mitigating actions for unsafe conditions and behavior during various works. TRC recognizes that JSA's may not cover every conceivable step or hazard that emerges during a job, so we've provided a "Field Change" section below to amend a JSA if required. The JSA does not supersede or replace any local, state or federal permit, regulation, statute or other entities policies and procedures but is simply a tool for enhancing the execution of safe work at a jobsite under TRC's supervision. Similarly, all subcontractors are required to provide their own JSA(s) for their specialty prior to performing any work for TRC or its customers in accordance with TRC's EHS Policy; however, any unsafe condition or hazard not covered in any JSA is ultimately the direct responsibility of the person or entity performing the work.

JOB SAFETY ANALYSIS

COMPANY/ PROJECT NAME or ID/ LOCATION (City, State)	DATE PREPARED FOR HSP:	☐ NEW ☒ REVISED
Lendrum Court, Presidio – San Francisco	**2/5/2016**	

JSA WORK ACTIVITY (Description):	**List of Contractor(s) and key work activity:**
Compaction testing using a moisture/density gauge	**TRC, TBD**

SITE SPECIFIC JSA AUTHOR	POSITION / TITLE	DEPT	SIGNATURE
Krtistin Bolen	Sr. Project Scientist	ECR	Kristin Bolen

"TRC APPROVED" JSA DEVELOPMENT TEAM	POSITION / TITLE	APPROVAL DATE
Rachelle Clair	San Francisco Bay Safety Coordinator	Rachelle Clair
Dave Sullivan	ECR Safety Director	
Mike Glenn	National Safety Director	

Required PPE (indicate with "R") vs. Must Have Available On-site (indicate "A")

__R__ HARD HAT __R__ GLOVES Specify: ☒ Kevlar ☐ Nitrile ☐ Other _____. __R__ SAFETY GLASSES _____GOGGLES _____FACE SHIELD	__R__ REFLECTIVE VEST __A__ HEARING PROTECTION __R__ SAFETY SHOES: Protective Toe _____ 5pt.HARNESS / LANYARD PPE CLOTHING: ____Coveralls ____Tyvek Suit ____Nomex ____Other (specify):	RESPIRATORY PROTECTION: ☒ NA _____½ face Air Purifying Respirator (APR) _____Particulate Mask: ☐ PM100 ☐ PM95 _____ Cartridge: ☐ VOC ☐ _____ _____Full face ARP; specify cartiridge type: _____ Air Supplied Respirator ____SCBA _____Air-line	Additional PPE:

Always perform a Safety Assessment: 1) prior to starting work; 2) when changing tasks; and 3) throughout the day. Focus on each new task, procedures, and skill sets to be used.

[1] JOB TASKS	[2] POTENTIAL HAZARDS	[3] HAZARD CONTROLS (beyond wearing "Required" PPE)
1. Arive on site to assess work to be performed	a. Physical injury from being struck by moving vehicles or equipment	a. Establish eye contact with equipment operators. a. Know your surroundings and become acclimated where equipment is located, and where it is moving to and moving from.
2. Observe fill/soil placement	a. Physical injury from being struck by moving vehicles or equipment b. Uneven walking surfaces	a. Establish eye contact with equipment operators. b. Notice the type of surface you are walking on. (any large rocks, boulders, debris present, etc.)
3. Compaction testing using the nuclear gauge	a. Physical injury from being struck by moving vehicles or equipment b. Carrying heavy equipment across uneven surfaces c. Open trenches	a. Establish eye contact with equipment operators. b. Notice the type of surface you are walking on. (any large rocks, boulders, debris present, etc.) c. Stay away from edge of trenches
4. Footing observation	a. Open trenches b. Use of ladders fo access	a. Be aware of open trenches b. Use ladders whenever possible to access deeper footing excavations
5. Pier/Pile Installation	a. Heavy equipment b. Heavy objects overhead c. Noise d. Oil/grease spraying from equipment	a. Establish eye contact with equipment operators b. Be aware of surroundings c. Know when ear protection is needed d. Assume spray will occur and use protective glasses
Field Changes: 6.	a. b. c. d.	a. b. c. d.

JOB SAFETY ANALYSIS

GENERAL SAFETY HAZARDS	LOCATION(S) WHERE HAZARD IS TO BE EXPECTED	[3] HAZARD CONTROLS (beyond wearing "Required" PPE)
5. Slips, trips, and falls	a. Within construction site	a. Clean as you work. Put equipment away when done using it.
6. Cut/Pinched fingers or toes	a. Throughout work area; particularly when moving materials.	a. Wear kevlar gloves when lifting sharp or heavy equipment.
7. Strained muscles.	a. Throughout work area; particularly when moving gauges, slide hammer, or buckets of soil	a. Use proper lifting techniques; get help when moving heavy objects (>70 lbs).
8. Flying debris, dust, or water	a. Within construction site	a. Wear ANSI-approved safety glasses working around operating equipment.
9. Loud Noise	a. Within construction site	a. Wear ANSI-approved hearing protection around operating equipment.

Field Notes:

[1] List all activities/steps which present a significant hazard, preferably in sequence. FOCUS ON POTENTIALLY HAZARDOUS ACTIVITIES; not the trivial ones. Apply common, yet knowledgeable & informed, sense to identify what could reasonably be expected to cause danger.

[2] CONCENTRATE ON SIGNIFICANT HAZARDS. What can go wrong? How can someone get hurt? Can someone be struck by or strike an object? caught on, in or between objects?; fall to ground or lower level?; experience excessive strain or stress? Be exposed to inhalation or skin hazards. Specify the hazards; be descriptive.

[3] Describe actions, procedures or limits necessary to eliminate or minimize the hazards. Be clear, concise and specific. Use objective, observable and quantified terms. Avoid subjective general statements such as, "be careful" or "use as appropriate".

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JOB SAFETY ANALYSIS

COMPANY/ PROJECT NAME or ID/ LOCATION (City, State)	DATE PREPARED FOR HSP:	☐ NEW ☒ REVISED
Lendrum Court, Presidio – San Francisco	**5/26/15**	
JSA WORK ACTIVITY (Description): **Heat Illness Prevention**	List of Contractor(s) and key work activity:	

SITE SPECIFIC JSA AUTHOR	TITLE	DEPT	SIGNATURE
Kristin Bolen	Projet Scientist	RMD	Kristin Bolen

"TRC APPROVED" JSA DEVELOPMENT TEAM	POSITION / TITLE	APPROVAL DATE
Rachelle Clair	Con./SF/MV Safety Coordinator	Rachelle Clair
Dave Sullivan	RMD Safety Director	
Mike Glenn	National Safety Director	

Required PPE (indicate with "R") vs. Must Have Available On-site (indicate "A")

__R__ REFLECTIVE VEST __A__HARD HAT __R__GLOVES: **ANSI Cut Level 2,3, 4 or 5 Kevlar** __R__SAFETY GLASSES _____GOGGLES _____FACE SHIELD	__A__ HEARING PROTECTION __R__SAFETY SHOES: Protective Toe _____ 5pt.HARNESS / LANYARD PPE CLOTHING: Coveralls ____Tyvek Suit ____Nomex ____Other (specify):	RESPIRATORY PROTECTION: ☒ NA _____Disposable Particulate Respirator (N95) ____½ face Air Purifying Respirator (APR) _____Particulate Mask: ☐ PM100 ☐ PM95 _____ Cartridge: ☐ P100- Multigas ☐ _____ _____Full face ARP; specify cartridge type: _____ Air Supplied Respirator ____SCBA _____Air-line	Additional PPE:

Always perform a Safety Assessment: 1) prior to starting work; 2) when changing tasks; and 3) throughout the day. Focus on each new task, procedures, and skill sets to be used.

[1] JOB TASKS	[2] POTENTIAL HAZARDS	[3] HAZARD CONTROLS (beyond wearing "Required" PPE)
1. Working in temperatures > 80 to < 90 degrees F	a. Heat Cramps b. Heat Exhaustion c. Heat Stroke	a. Fluids mandatory every 60 minutes b. Rest breaks - self paced by time period worked c. Cool Device (bandana, headband, hardhat insert, poncho, etc.) – optional d. H.E.A.T. Kit with Heat Illness supplies e. Access to shade[1].
1. Working in temperatures> 90 to < 100 degrees F	a. Heat Cramps b. Heat Exhaustion c. Heat Stroke	a. Fluids mandatory every 60 minutes b. Rest breaks - self paced c. Cool Device - optional d. H.E.A.T. Kit with Heat Illness supplies e. Access to shade.
1. Working in temperatures > 100 degrees F	a. Heat Cramps b. Heat Exhaustion c. Heat Stroke	a. Fluids mandatory every 30 minutes b. Rest Breaks mandatory every 30 minutes c. Implement as least one of the following: • External Cool Device (AC) • Personal Cool Device (Cool Vest) • Rotate personnel, buddy system/add to work team d. Plan work at cooler time of day e. Contact supervisor frequently to give status reports. f. H.E.A.T. Kit with Heat Illness supplies g. Access to shade.

GENERAL SAFETY HAZARDS	LOCATION(S) WHERE HAZARD IS TO BE EXPECTED	[3] HAZARD CONTROLS (beyond wearing "Required" PPE)
1. Heat Cramps	a. Muscles most often affected include calves,	a. Start slowly b. Stretch before working out

[1] Access to shade should be available at the site as specified per California Code of Regulations (CCR), Title 8, Section 3395. Per subsections (d)(1) and (d)(2), shade shall be present when the temperature exceeds 80 degrees Fahrenheit, and timely access to shade should be provided upon an employee's request when temperatures do not exceed 80 degrees Fahrenheit. CCR defines "shade" as follows: Shade a means of blocking of direct sunlight. One indicator that blockage is sufficient is when objects do not cast a shadow in the area of blocked sunlight. Shade is not adequate when heat in the area of shade defeats the purpose of shade, which is to allow the body to cool. For example, a car sitting in the sun does not provide acceptable shade to a person inside it, unless the car is running with air conditioning. Shade may be provided by any natural or artificial means that does not expose employees to unsafe or unhealthy conditions and that does not deter or discourage access or use (8 CCR §3395).

JOB SAFETY ANALYSIS

COMPANY/ PROJECT NAME or ID/ LOCATION (City, State) **Lendrum Court, Presidio – San Francisco**	DATE PREPARED FOR HSP: **5/26/15**	☐ NEW ☒ REVISED
JSA WORK ACTIVITY (Description): **Heat Illness Prevention**	List of Contractor(s) and key work activity:	

	arms, abdomen and back	c. Rest briefly and cool down d. Do range-of-motion stretching and massage of the affected muscle group e. Drink water or sports drinks
2. Heat Exhaustion	a. Cool, clammy and pale skin b. Profuse sweating c. Dry tongue and thirst d. Severe muscle fatigue, weakness e. Mood changes (e.g., confusion or inability to think straight and rapid pulse) f. Feeling weak, faint or dizzy with headache or nausea g. Loss of appetite h. Physical collapse and sometimes cramping i. Decreased or dark-colored urine	a. Act immediately – May lead to heat exhaustion, stroke or death. b. Move the victim to a cool, shaded area to rest. c. Loosen and remove any heavy clothing. d. Administer cool water (about a cup every 15 minutes) unless sick to the stomach. e. If symptoms continue (e.g., dizziness or lightheadedness), lay the victim on his/her back and raise the legs 6 to 8 inches. - If nausea or upset stomach exists, lay the person on his/her side. f. Cool the person's body by fanning, spraying with a cool mist of water, sponging with cool water and/or applying cool, wet cloths for an evaporative effect. g. Encourage the person to rest. h. Monitor closely. i. Obtain emergency medical care if condition does not improve.
3. Heat Stroke	a. Very high temperature (104 degrees F or higher) b. Hot, dry, red skin c. Not sweating d. Deep breathing and fast pulse – Shallow breathing and weak pulse e. Dilated pupils f. Convulsions g. Loss of consciousness	a. Act immediately – inaction may lead to death or brain damage b. OBTAIN EMERGENCY MEDICAL CARE! c. Cool the individual as rapidly as possible: – Move victim to cool, shaded area. – Remove clothing – Spray with water – Fan – Apply cool, wet sheets – ice packs to groin, underarms, and neck

Regardless of the Advisory Level, the following factors need to be considered:

Humidity
Medications that affect heat tolerance (diuretics, beta-blockers, antihistamines, antidepressants)
Lack of acclimatization (conditioning)
Obesity or other personnel medical issues (personal illnesses or disease)
History of previous heat-related disorders
Physical conditioning

Field Notes:

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[1] List all activities/steps which present a significant hazard, preferably in sequence. FOCUS ON POTENTIALLY HAZARDOUS ACTIVITIES; not the trivial ones. Apply common, yet knowleable & informed, sense to identify what could reasonably be expected to cause danger.

[2] CONCENTRATE ON SIGNIFICANT HAZARDS. What can go wrong? How can someone get hurt? Can someone be struck by or strike an object?; caught on, in or between objects?; fall to ground or lower level?; experience excessive strain or stress? Be exposed to inhalation or skin hazards. Specify the hazards; be descriptive.

[3] Describe actions, procedures or limits necessary to eliminate or minimize the hazards. Be clear, concise and specific. Use objective, observable and quantified terms. Avoid subjective general statements such as, "be careful" or "use as appropriate".

LIMITATION: As part of TRC's EHS Policy, a JSA is provided by TRC for its employees. The purpose of a JSA is NOT to identify all hazards associated with a task, but to identify key potential hazards to get TRC and other onsite personnel thinking about other potential safety hazards and mitigating actions for unsafe conditions and behavior during various works. TRC recognizes that JSA's may not cover every conceivable step or hazard that emerges during a job, so we've provided a "Field Change" section below to amend a JSA if required. The JSA does not supersede or replace any local, state or federal permit, regulation, statute or other entities policies and procedures but is simply a tool for enhancing the execution of safe work at a jobsite under TRC's supervision. Similarly, all subcontractors are required to provide their own JSA(s) for their specialty

prior to performing any work for TRC or its customers in accordance with TRC's EHS Policy; however, any unsafe condition or hazard not covered in any JSA is ultimately the direct responsibility of the person or entity performing the work.

JOB SAFETY ANALYSIS

COMPANY/ PROJECT NAME or ID/ LOCATION (City, State)	DATE PREPARED FOR HSP:	☐ NEW ☒ REVISED
Lendrum Court, Presidio – San Francisco	2/4/16	
JSA WORK ACTIVITY (Description): **Soil Sampling**	List of Contractor(s) and key work activity:	

SITE SPECIFIC JSA AUTHOR	POSITION / TITLE	DEPT	SIGNATURE
Kristin Bolen	Sr. Project Scientist	ECR	Kristin Bolen

"TRC APPROVED" JSA DEVELOPMENT TEAM	POSITION / TITLE	APPROVAL DATE
Rachelle Clair	Con/SF/MV Safety Coordinator	Rachelle Clair
Dave Sullivan	ECR Safety Director	
Mike Glenn	National Safety Director	

Required PPE (indicate with "R") vs. Must Have Available On-site (indicate "A")

__R___ HARD HAT __R___ GLOVES Specify: ☒ Kevlar ☒ Nitrile ☐ Other _____. __R__SAFETY GLASSES _____GOGGLES _____FACE SHIELD	___A__ REFLECTIVE VEST ____ HEARING PROTECTION __R__SAFETY SHOES: Protective Toe _____ 5pt.HARNESS / LANYARD PPE CLOTHING: ____Coveralls ____Tyvek Suit ____Nomex ____Other (specify):	RESPIRATORY PROTECTION: ☒ NA _____½ face Air Purifying Respirator (APR) _____Particulate Mask: ☐ PM100 ☐ PM95 _____ Cartridge: ☐ VOC ☐ _____ _____Full face ARP; specify cartiridge type: _____ Air Supplied Respirator ____SCBA _____Air-line	Additional PPE:

Always perform a Safety Assessment: 1) prior to starting work; 2) when changing tasks; and 3) throughout the day. Focus on each new task, procedures, and skill sets to be used.

[1] JOB TASKS	[2] POTENTIAL HAZARDS	[3] HAZARD CONTROLS (beyond wearing "Required" PPE)
1. Soil Sampling	a. Collapse of soil stockpile.	a. Look over soil stock pile prior to approaching or removing soil sample to confirm its integrity. a. Chose a sample location that will not cause the pile to collapse. a. Notify someone prior to sampling of your activites and when you expect them to be complete and that you will check in when complete.
	b. Broken sample jar.	b. Wear Kevlar gloves beneath the nitriles to add a layer of protection from cuts. b. Be aware of material that is being placed in the jar and do not place jagged edged materials in the jar that may cause the jar to break.
	c. Jagged edges in sample material.	c. Wear Kevlar gloves beneath the nitriles to add a layer of protection from cuts. c. Be aware of material and watch hand placement when gathering the material. c. Use a shovel or other tool if possible to transfer the soil from the stockpile to the container.
2. Placing cooler in vehicle	a. Muscle strain from weight of the cooler	a. Be aware of how much ice and samples are in the cooler. a. Use more than one cooler if the weight will be over 50 lbs. a. Get assistance moving cooler if it is too heavy.
3.	a.	a.
Field Changes: 4.	a. b. c. d.	a. b. c. d.

JOB SAFETY ANALYSIS

GENERAL SAFETY HAZARDS	LOCATION(S) WHERE HAZARD IS TO BE EXPECTED	[3] HAZARD CONTROLS (beyond wearing "Required" PPE)
5. Slips, trips, and falls	a. In exclusion zone	a. Clean as you work. Put equipment away when done using it. Blot up puddles of standing water and sweep work area. a. Cover or use appropriate warning to protect all unattended open holes.
6. Cut/Pinched fingers or toes	a. Throughout work area; particularly when moving materials.	a. Wear Kevlar gloves when lifting sharp or heavy equipment.
7. Strained muscles.	a. Throughout work area; particularly when moving augers	a. Use proper lifting techniques; get help when moving heavy objects (>70 lbs).
8. Unauthorized Personnel in exclusion zone	a. In exclusion zone	a. Use visitor check-in log; do not allow anyone in exclusion zone without proper PPE and training documentation. (HAZWOPER).
9. Flying debris	a. In exclusion zone	a. Wear ANSI-approved safety glasses working around operating equipment.
10. Loud Noise	a. In exclusion zone	a. Wear ANSI-approved hearing protection around operating equipment.
11. Explosion/Fire	a. In exclusion zone	a. No smoking or open flame. Periodically monitor ambient air concentrations with PID/LEL Meter. Shut down job and move personnel and equipment upwind if hydrocarbon concentrations are **> 300 ppm or >10% of LEL.** a. Place 2-20lb ABC Fire extinguishers in location specified by SSO. a. Follow TRC's Cell Phone Use Guidelines.
12. Exposure to hydrocarbon impacted soil or groundwater	a. In exclusion zone	a. Wear nitrile gloves during handling of soil or groundwater.
13. Soil and groundwater cross-contamination	a. In exclusion zone	a. Identify and delineate soil stockpile area or storage area of drummed soil cuttings/decontamination water.

Field Notes:

[1] List all activities/steps which present a significant hazard, preferably in sequence. FOCUS ON POTENTIALLY HAZARDOUS ACTIVITIES; not the trivial ones. Apply common, yet knowledgeable & informed, sense to identify what could reasonably be expected to cause danger.

[2] CONCENTRATE ON SIGNIFICANT HAZARDS. What can go wrong? How can someone get hurt? Can someone be struck by or strike an object? caught on, in or between objects?; fall to ground or lower level?; experience excessive strain or stress? Be exposed to inhalation or skin hazards. Specify the hazards; be descriptive.

[3] Describe actions, procedures or limits necessary to eliminate or minimize the hazards. Be clear, concise and specific. Use objective, observable and quantified terms. Avoid subjective general statements such as, "be careful" or "use as appropriate".

LIMITATION: As part of TRC's EHS Policy, a JSA is provided by TRC for its employees. The purpose of a JSA is NOT to identify all hazards associated with a task, but to identify key potential hazards to get TRC and other onsite personnel thinking about other potential safety hazards and mitigating actions for unsafe conditions and behavior during various works. TRC recognizes that JSA's may not cover every conceivable step or hazard that emerges during a job, so we've provided a "Field Change" section below to amend a JSA if required. The JSA does not supersede or replace any local, state or federal permit, regulation, statute or other entities policies and procedures but is simply a tool for enhancing the execution of safe work at a jobsite under TRC's supervision. Similarly, all subcontractors are required to provide their own JSA(s) for their specialty prior to performing any work for TRC or its customers in accordance with TRC's EHS Policy; however, any unsafe condition or hazard not covered in any JSA is ultimately the direct responsibility of the person or entity performing the work.

JOB SAFETY ANALYSIS

COMPANY/ PROJECT NAME or ID/ LOCATION (City, State)	DATE PREPARED FOR HSP:	☐ NEW ☒ REVISED from S: Drive
Lendrum Court, Presidio – San Francisco)	2/5/2016	
JSA WORK ACTIVITY (Description): **Using Hand Tools**	List of Contractor(s) and key work activity: **TRC**	

SITE SPECIFIC JSA AUTHOR	POSITION / TITLE	DEPT	SIGNATURE
Kristin Bolen	**Sr. Staff Scientist**	**ECR**	Kristin Bolen

"TRC APPROVED" JSA DEVELOPMENT TEAM	POSITION / TITLE	APPROVAL
Rachelle Clair	San Francisco Bay Safety Coordinator	Rachelle Clair
Dave Sullivan	ECR Safety Director	
Mike Glenn	National Safety Director	

Required PPE (indicate with "R") vs. Must Have Available On-site (indicate "A")

__A__ REFLECTIVE VEST __A__ HARD HAT __R__ GLOVES:Kevlar __R__ SAFETY GLASSES __A__ GOGGLES __A__ FACE SHIELD	____ HEARING PROTECTION __R__ SAFETY SHOES: Protective Toe _____ 5pt.HARNESS / LANYARD PPE CLOTHING: ____Coveralls ____Tyvek Suit ____Nomex ____Other (specify):	RESPIRATORY PROTECTION: ☒ NA _____½ face Air Purifying Respirator (APR) _____Particulate Mask: ☐ PM100 ☐ PM95 _____ Cartridge: ☐ VOC ☐ _____ _____Full face ARP; specify cartridge type: _____ Air Supplied Respirator ____SCBA ____Air-line	Additional PPE:

Always perform a Safety Assessment: 1) prior to starting work; 2) when changing tasks; and 3) throughout the day. Focus on each new task, procedures, and skill sets to be used.

[1] JOB TASKS	[2] POTENTIAL HAZARDS	[3] HAZARD CONTROLS (beyond wearing "Required" PPE)
1. Inspection of tool prior to use	a. Misalignment of parts/ binding of moving parts/ breakage of any parts	a. If damaged, have the tool repaired prior to use
	b. Dull or dirty parts	b. Keeping cutting tools sharp and clean makes them easier to control and less likely to bind or break
2. Use of tools	a. Strains, cuts, scrapes	a. Avoid wet conditions, where tool can become slippery a. Do not wear loose clothing or jewelry. Keep hair, clothing, and gloves away from moving parts. a. Do not overreach. Keeping proper footing and balance will enable better control of the tool in unexpected situations. a. Wear appropriate Kevlar gloves when using a cutting tool and lifting sharp, heavy equipment or material which is likey to break or splinter. a. Do not use a fixed open blade knife for cutting.Use safety knife or approved alternative tool.a. If possible, use a vise or clamp to hold the item to be cut instead of attempting to hold it with your hands. a. Always cut away from the body.
	b. Flying parts	b. Wear safety glasses
3. Field Changes:		

GENERAL SAFETY HAZARDS	LOCATION(S) WHERE HAZARD IS TO BE EXPECTED	[3] HAZARD CONTROLS (beyond wearing "Required" PPE)
4. Slips, trips, and falls	a. In exclusion zone	a. Clean as you work. Put equipment away when done using it. Blot up puddles of standing water and sweep work area. a. Cover or use appropriate warning to protect all unattended open holes.

JOB SAFETY ANALYSIS

Field Notes:

_____

_____

_____

_____

[1] List all activities/steps which present a significant hazard, preferably in sequence. FOCUS ON POTENTIALLY HAZARDOUS ACTIVITIES; not the trivial ones. Apply common, yet knowledgeable & informed, sense to identify what could reasonably be expected to cause danger.

[2] CONCENTRATE ON SIGNIFICANT HAZARDS. What can go wrong? How can someone get hurt? Can someone be struck by or strike an object? caught on, in or between objects?; fall to ground or lower level?; experience excessive strain or stress? Be exposed to inhalation or skin hazards. Specify the hazards; be descriptive.

[3] Describe actions, procedures or limits necessary to eliminate or minimize the hazards. Be clear, concise and specific. Use objective, observable and quantified terms. Avoid subjective general statements such as, "be careful" or "use as appropriate".

LIMITATION: As part of TRC's EHS Policy, a JSA is provided by TRC for its employees. The purpose of a JSA is NOT to identify all hazards associated with a task, but to identify key potential hazards to get TRC and other onsite personnel thinking about other potential safety hazards and mitigating actions for unsafe conditions and behavior during various works. TRC recognizes that JSA's may not cover every conceivable step or hazard that emerges during a job, so we've provided a "Field Change" section below to amend a JSA if required. The JSA does not supersede or replace any local, state or federal permit, regulation, statute or other entities policies and procedures but is simply a tool for enhancing the execution of safe work at a jobsite under TRC's supervision. Similarly, all subcontractors are required to provide their own JSA(s) for their specialty prior to performing any work for TRC or its customers in accordance with TRC's EHS Policy; however, any unsafe condition or hazard not covered in any JSA is ultimately the direct responsibility of the person or entity performing the work.

JOB SAFETY ANALYSIS

COMPANY/ PROJECT NAME or ID/ LOCATION (City, State)	DATE PREPARED FOR HSP:	☐ NEW ☒ REVISED
Lendrum Court, Presidio – San Francisco	**2/4/2016**	
JSA WORK ACTIVITY (Description): **Heavy Equipment and/or Vehicles**	List of Contractor(s) and key work activity: **TRC, TBD**	

SITE SPECIFIC JSA AUTHOR	POSITION / TITLE	DEPT	SIGNATURE
Kristin Bolen	Sr. Projet Scientist	ECR	Kristin Bolen

"TRC APPROVED" JSA DEVELOPMENT TEAM	POSITION / TITLE	APPROVAL DATE
Rachelle Clair	San Francisco Bay Safety Coordinator	Rachelle Clair
Dave Sullivan	ECR Safety Director	
Mike Glenn	National Safety Director	

Required PPE (indicate with "R") vs. Must Have Available On-site (indicate "A")

__R__ REFLECTIVE VEST __R__ HARD HAT __R__ GLOVES: **ANSI Cut Level 4 & 5 Kevlar** __R__ SAFETY GLASSES _____ GOGGLES _____ FACE SHIELD	__A__ HEARING PROTECTION __R__ SAFETY SHOES: Protective Toe _____ 5pt.HARNESS / LANYARD PPE CLOTHING: ____Coveralls ____Tyvek Suit ____Nomex ____Other (specify):	RESPIRATORY PROTECTION: ☐ NA __A__ Dust Mask __A__ ½ face Air Purifying Respirator (APR) ____A__ Particulate Mask: ☒ PM100 ☐ PM95 _____ Cartridge: ☐ P100-Multigas ☐ _____ _____ Full face ARP; specify cartridge type: _____ Air Supplied Respirator ____SCBA _____Air-line	Additional PPE:

Always perform a Safety Assessment: 1) prior to starting work; 2) when changing tasks; and 3) throughout the day. Focus on each new task, procedures, and skill sets to be used.

[1] JOB TASKS	[2] POTENTIAL HAZARDS	[3] HAZARD CONTROLS (beyond wearing "Required" PPE)
1. Set-up Activities	a. Physical Injury or equipment damage from lack of concentration or focus	a. Review all plans (HASP, Work, Utility Plans, etc.) and logs in field notebook prior to starting a new task. Identify daily tasks and required personnel actions.
	b. Fire and explosion	b. No smoking or open flame. Periodically monitor ambient air concentrations with PID/LEL Meter. Shut down job and move personnel and equipment upwind if hydrocarbon concentrations are > 300 ppm or >10% of LEL. b. Place 2-20lb ABC Fire extinguishers in accordance with site safety officer's direction.
	c. Electric Shock/Electrocution	c. Have qualified electrician de-energize all circuits /power sources and follow Lock-Out, Tag-Out (LOTO) procedures.
	d. Malfunctioning Heavy Equipment Safety Devices	d. Perform all necessary equipment and safety checks prior to event startup (per operating manual).
2. Heavy Equipment and/or Vehicles	a. Eye injury from flying debris.	a. Wear ANSI approved-safety glasses at all times.
	b. High Noise Level.	b. Wear Ear Plugs or Ear Muffs when equipment is operating onsite.
	c. Being struck by moving vehicles or equipment onsite.	c. Establish eye contact with operators when moving about. Use hazard communications contained in HASP.
	d. Cut/Pinched fingers or toes; and strained muscles due to high vacuum.	d. Wear proper work and protective clothing (long pants, sleeved-shirt, steel-toed boots, safety vest, safety glasses, and safety helmet) at all times while on jobsite. d. Wear ANSI cut level 4 or 5 Kevlar gloves when lifting sharp or heavy equipment and using tools. d. Lift heavy objects utilizing leg muscles and get assistance when equipment exceeds 50-lbs.
	e. Equipment tip over.	e. Watch equipment location & swing points. Monitor live & dead loads adjacent to the work area.

JOB SAFETY ANALYSIS

COMPANY/ PROJECT NAME or ID/ LOCATION (City, State) **Lendrum Court, Presidio – San Francisco**		DATE PREPARED FOR HSP: **2/4/2016**	☐ NEW ☒ REVISED
JSA WORK ACTIVITY (Description): **Heavy Equipment and/or Vehicles**		List of Contractor(s) and key work activity: **TRC, TBD**	
	f. Slips/trips and falls. g. Materials loading/unloading h. Physical injury to visitors / spectators	e. Use a crane/loader/backhoe that is adequate for the load (Check loading capacity with operator and manual). e. Wear ANSI cut level 4 or 5 Kevlar gloves and use guide ropes to control load, do not use bare hands. f. Maintain good house keeping - place unused equipment out of walkways and work areas. Clean-up all spills and debris. g. Identify truck ingress/egress lanes. Keep loading area clear of debris and obstructions (including parked cars and overhead obstructions). h. Job supervisor or designated person controls entry in work area using exclusions zones and use check-in logs (found in HASP notebook).	
3. Clean-up	a. Slips, trips, and falls	a. Use good house-keeping, put equipment away when tasks are completed.	

	LOCATION(S) WHERE HAZARD IS TO BE EXPECTED	**[3] HAZARD CONTROLS (beyond wearing "Required" PPE)**
1.	a.	a.
2.	a.	a.
3.	a.	a.

Field Notes:

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[1] List all activities/steps which present a significant hazard, preferably in sequence. FOCUS ON POTENTIALLY HAZARDOUS ACTIVITIES; not the trivial ones. Apply common, yet knowledgeable & informed, sense to identify what could reasonably be expected to cause danger.

[2] CONCENTRATE ON SIGNIFICANT HAZARDS. What can go wrong? How can someone get hurt? Can someone be struck by or strike an object? caught on, in or between objects?; fall to ground or lower level?; experience excessive strain or stress? Be exposed to inhalation or skin hazards. Specify the hazards; be descriptive.

[3] Describe actions, procedures or limits necessary to eliminate or minimize the hazards. Be clear, concise and specific. Use objective, observable and quantified terms. Avoid subjective general statements such as, "be careful" or "use as appropriate".

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JOB SAFETY ANALYSIS

COMPANY/ PROJECT NAME or ID/ LOCATION (City, State)	DATE PREPARED FOR HSP:	☒ NEW ☐ REVISED
Lendrum Court, Presidio – San Francisco	2/4/2016	
JSA WORK ACTIVITY (Description): **Excavation**	List of Contractor(s) and key work activity: **TRC, TBD**	

SITE SPECIFIC JSA AUTHOR	POSITION / TITLE	DEPT	SIGNATURE
Kristin Bolen	Sr. Projet Scientist	ECR	

"TRC APPROVED" JSA DEVELOPMENT TEAM	POSITION / TITLE	APPROVAL DATE
Rachelle Clair	Con/SF/MV Safety Coordinator	
Dave Sullivan	ECR Safety Director	
Mike Glenn	National Safety Director	

Required PPE (indicate with "R") vs. Must Have Available On-site (indicate "A")

_R___ HARD HAT R/A___ GLOVES Specify: ☒ Kevlar ☒ Nitrile ☐ Other _____. R___SAFETY GLASSES _____GOGGLES _____FACE SHIELD	R___ REFLECTIVE VEST A___ HEARING PROTECTION R___SAFETY SHOES: Protective Toe _____ 5pt.HARNESS / LANYARD PPE CLOTHING: ____Coveralls A___Tyvek Suit ____Nomex ____Other (specify):	RESPIRATORY PROTECTION: ☐ NA ___A___Dust Mask ___A___½ face Air Purifying Respirator (APR) __A_Particulate Mask: ☒ PM100 ☐ PM95 ___Cartridge: ☐ P100-Multigas ☐ _____ _____Full face ARP; specify cartridge type: _____ Air Supplied Respirator ____SCBA _____Air-line	Additional PPE:

Always perform a Safety Assessment: 1) prior to starting work; 2) when changing tasks; and 3) throughout the day. Focus on each new task, procedures, and skill sets to be used.

[1] JOB TASKS	[2] POTENTIAL HAZARDS	[3] HAZARD CONTROLS (beyond wearing "Required" PPE)
1. Set-up Activities	a. Lack of concentration or focus b. Malfunctioning Heavy Equipment Safety Devices	a. Review all plans (HASP, Work, Utility Plans, etc.) and logs in field notebook prior to starting a new task. Identify daily tasks and required personnel actions. b. Perform all equipment and safety checks prior to event startup (per operating manual).
2 Excavation	a. Eye injury from flying debris b. Being struck by moving vehicles or equipment onsite. c. Equipment tip over d. Excavation cave-in	a. Wear ANSI approved-safety goggles and face mask at all times. a. Excavating equipment will not be operated near tops of cuts, banks, and cliffs if employees are working below b. Establish eye contact with operators when moving about. Use hazard communications contained in HASP. c. Tractors, bulldozers, scrapers, and carryalls should not operated where there is possibility of overturning in dangerous areas like edges of deep fills, cut banks, and steep slopes. c. Watch equipment location & swing points, monitor live & dead loads adjacent to the excavation. c. Maintain 2-foot safety buffer at edge of excavation. d. For excavations 4 feet or deeper a Competent Person will need to inspect the excavation daily to determine if the excavation is safe for entry. d. Excavations 5 feet or deeper or wherever there is an unstable sidewall that could endanger persons entering the excavation will be sloped or shored. d. Egress will need to be provided for excavations 4 feet or deeper. Travel distance to egress should not exceed 25 feet. d. Keep spoils and equipment a minimum of 2 feet from the edge of the excavation.

JOB SAFETY ANALYSIS

COMPANY/ PROJECT NAME or ID/ LOCATION (City, State)	DATE PREPARED FOR HSP:	☒ NEW ☐ REVISED
Lendrum Court, Presidio – San Francisco	2/4/2016	
JSA WORK ACTIVITY (Description):	List of Contractor(s) and key work activity:	
Excavation	**TRC, TBD**	

	e. Fugitive dust f. Suspected munitions and explosives of concern (MEC)	e. Cover or wet stockpiles of debris, soil, sand or other materials that can be blown by the wind. e. Keep vehicle speeds on unpaved surfaces below 5 miles per hour e. Mist or spray water while excavating and loading soil. e. Suspend earthmoving or other dust-producing activities during periods of high winds whenever dust control measures are not effective in preventing visible dust plumes. f. STOP WORK. DO NOT DISTURB ITEM. Take note of the characteristics of the item if it can be done safely. Be prepared to convey your observations to the appropriate individuals. f. All personnel will need to leave immediate area and take appropriate cover in an upwind position. f. Secure the area. f. Contact the Trust Project Manager f. Do not proceed with work or leave the item unattended until directed by the Trust.
3. Staging and Dumping of Soil	a. Bad organization creating confusion and hazard	a. Identify staging area, clearly mark and keep area clear of parked vehicles or stored materials/equipment. a. Identify truck ingress/egress lanes and keep clear. a. Clear stockpile area (including overhead obstructions) so that loader bucket doesn't impact a surface appurtenance or overhead line. a. Keep Spoils and equipment a minimum of 2 feet from the edge of the excavation.
Field Changes: 4.	a. b. c.	a. b. c.

GENERAL SAFETY HAZARDS	**LOCATION(S) WHERE HAZARD IS TO BE EXPECTED**	**[3] HAZARD CONTROLS (beyond wearing "Required" PPE)**
5. Slips, trips, and falls	a. In exclusion zone.	a. Clean as you work. Put equipment away when done using it. Blot up puddles of standing water and sweep work area. a. Cover or use appropriate warning to protect all unattended open holes.
6. Cut/Pinched fingers or toes	a. Throughout work area; particularly when moving materials.	a. Wear Kevlar gloves when lifting sharp or heavy equipment.
7. Strained muscles.	a. Throughout work area.	a. Use proper lifting techniques; get help when moving heavy objects (>70 lbs).
8. Unauthorized Personnel	a. In exclusion zone.	a. Use visitor check-in log; do not allow anyone in remedial enclosure without proper PPE and HASP review/signature.
9. Loud Noise	a. Throughout work area; particularly when moving materials.	a. Wear ANSI-approved hearing protection around operating equipment.

JOB SAFETY ANALYSIS

COMPANY/ PROJECT NAME or ID/ LOCATION (City, State) **Lendrum Court, Presidio – San Francisco**	DATE PREPARED FOR HSP: 2/4/2016	☒ NEW ☐ REVISED
JSA WORK ACTIVITY (Description): **Excavation**	List of Contractor(s) and key work activity: **TRC, TBD**	

10. Explosion/Fire	a. Throughout work area; particularly when moving materialst.	a. No smoking or open flame. Continuously monitor ambient air concentrations with FID/LEL Meter. Shut down job and move personnel and equipment upwind if hydrocarbon concentrations are **>50 ppm or >10% of LEL.** a. Place 1-5lb ABC Fire extinguisher in remediation compound. a. Follow TRC's Cell Phone Use Guidelines.

Field Notes:

[1] List all activities/steps which present a significant hazard, preferably in sequence. FOCUS ON POTENTIALLY HAZARDOUS ACTIVITIES; not the trivial ones. Apply common, yet knowledgeable & informed, sense to identify what could reasonably be expected to cause danger.

[2] CONCENTRATE ON SIGNIFICANT HAZARDS. What can go wrong? How can someone get hurt? Can someone be struck by or strike an object? caught on, in or between objects?; fall to ground or lower level?; experience excessive strain or stress? Be exposed to inhalation or skin hazards. Specify the hazards; be descriptive.

[3] Describe actions, procedures or limits necessary to eliminate or minimize the hazards. Be clear, concise and specific. Use objective, observable and quantified terms. Avoid subjective general statements such as, "be careful" or "use as appropriate".

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JOB SAFETY ANALYSIS

COMPANY/ PROJECT NAME or ID/ LOCATION (City, State)	DATE PREPARED FOR HSP:	☐ NEW ☒ REVISED
Lendrum Court, Presidio – San Francisco	2/4/2016	
JSA WORK ACTIVITY (Description): **Mobilization/Demobilization**	List of Contractor(s) and key work activity:	

SITE SPECIFIC JSA AUTHOR	TITLE	DEPT	SIGNATURE
Kristin Bolen	Sr. Project Scientist	ECR	Kristin Bolen

JSA REVIEWERS	TITLE/ AFFILIATION	APPROVAL DATE
Rachelle Clair	Con/SF/MV Safety Coordinator	Rachelle Clair
Dave Sullivan	ECR Safety Director	
Mike Glenn	National Safety Director	

Required PPE (indicate with "R") vs. Must Have Available On-site (indicate "A")

__A___ REFLECTIVE VEST __A___HARD HAT __A___GLOVES: Kevlar __A__SAFETY GLASSES _____GOGGLES _____FACE SHIELD	_A___ HEARING PROTECTION _R___SAFETY SHOES: Protective Toe _____ 5pt.HARNESS / LANYARD PPE CLOTHING: ____Coveralls ____Tyvek Suit ____Nomex ____Other (specify):	RESPIRATORY PROTECTION: ☐ NA __A___Dust Mask _____½ face Air Purifying Respirator (APR) __Particulate Mask: ☐ PM100 ☐ PM95 ___Cartridge: ☐ P100-Multigas ☐ _____ _____Full face ARP; specify cartridge type: _____ Air Supplied Respirator ____SCBA _____Air-line	Additional PPE:

Always perform a Safety Assessment: 1) prior to starting work; 2) when changing tasks; and 3) throughout the day. Focus on each new task, procedures, and skill sets to be used.

[1] JOB TASKS	[2] POTENTIAL HAZARDS	[3] HAZARD CONTROLS (beyond wearing "Required" PPE)
1. Inspect Vehicle Equipment	a. Vehicle failures	a. Inspect fluids, tires, connections and safety equipment regularly. a. Inspect gas tank level. a. Note any hazards with vehicle and report to the appropriate employee. a. Check trailer hitches (if present) for proper closure and safety devices (as necessary). a. Inspect tailgate/stake bed closure. a. Check that trailer doors (side and rear) are locked, as necessary a. Check that trailer's electrical cables are in good condition and test trailer's lights, as necessary. a. Check that all trailer jacks are up prior to departure, as necessary.
2. Loading and Unloading	a. Muscle strains, cuts and pinches	a. Ensure that appropriate PPE is worn and/or accessible including: gloves, steel- toed boots and safety glasses or goggles. a. Select vehicle size to meet projected field work requirements. a. Prepare an equipment check off list. a. Use proper lifting techniques (Squat to lift and lower. Do not bend at the waist or back, but use the legs for lifting. Keep the weight as close to you as possible. Bow your back in and raise up with your head first. If you must turn, turn with your feet, not your body. Never jerk or twist! Put the weight down by keeping your low back bowed in. Keep you feet apart.), and if necessary (object > 50 lbs.) use additional mechanical lifting aid (drum dolly, forklift, powered liftgate, tripod and winch) or additional labor. a. Tie down or secure items to prevent load shifts and equipment from flying out.
3. Driving	a. Accidents	a. Pay attention to the task at hand. Do not use a cell phone while driving. Obey traffic laws and drive defensively. a. When driving with the trailer, maintain slower driving

JOB SAFETY ANALYSIS

COMPANY/ PROJECT NAME or ID/ LOCATION (City, State) **Lendrum Court, Presidio – San Francisco**	DATE PREPARED FOR HSP: 2/4/2016	☐ NEW ☒ REVISED
JSA WORK ACTIVITY (Description): **Mobilization/Demobilization**	List of Contractor(s) and key work activity:	

	b. Load shifting	speeds, take wide turns to avoid hitting other cars or objects,and be aware of overhead clearance limitations. b. Slow for curves and dips. Ensure load is secure prior to leaving yard/Site. b. Occasionally check trailer and truck bed contents in the rear view mirror to ensure objects have not shifted.
4. Arrival at site	a. Site conditions changed from plan.	a. Review exclusion area setup. a. Observe traffic flow. a. Modify traffic control plan if necessary. a. Identify Emergency Shut-off devices.
5. Leaving Site	a. Damage to other vehicles or project site. b. Vehicle failures. c. Muscle strains, cuts, and pinches.	a. Inspect site house keeping, sweep and pick up trash/debris. a. Bag garbage to prevent fly-aways. Inspect tailgate/stake bed closure. b. Inspect gas tank level. Note any hazards with vehicle and report to the appropriate employee. Check trailer hitches for proper closure and safety devices. Refer to Section 1. c. Use proper lifting techniques. Refer to Section 2. c. Wear kevlar gloves and safety glasses. Watch out of potential pinch points.

Field Notes:

_____

_____

_____

_____

[1] List all activities/steps which present a significant hazard, preferably in sequence. FOCUS ON POTENTIALLY HAZARDOUS ACTIVITIES; not the trivial ones. Apply common, yet knowleable & informed, sense to identify what could reasonably be expected to cause danger.

[2] CONCENTRATE ON SIGNIFICANT HAZARDS. What can go wrong? How can someone get hurt? Can someone be struck by or strike an object?; caught on, in or between objects?; fall to ground or lower level?; experience excessive strain or stress? Be exposed to inhalation or skin hazards. Specify the hazards; be descriptive.

[3] Describe actions, procedures or limits necessary to eliminate or minimize the hazards. Be clear, concise and specific. Use objective, observable and quantified terms. Avoid subjective general statements such as, "be careful" or "use as appropriate".

LIMITATION: The purpose of a JSA is NOT to identify all hazards associated with a task, but to identify key potential hazards to get Contractors and other onsite personnel thinking about other potential safety hazards and mitigating actions for unsafe conditions and behavior during various works. Contractors should recognize that JSA's may not cover every conceivable step or hazard that emerges during a job, so we've provided a "Field Change" section below to amend a JSA if required. The JSA does not supersede or replace any local, state or federal permit, regulation, statute or other entities policies and procedures but is simply a tool for enhancing the execution of safe work at a jobsite. Similarly, all contractors are required to provide their own JSA(s) for their specialty prior to performing any work; however, any unsafe condition or hazard not covered in any JSA is ultimately the direct responsibility of the person or entity performing the work.

JOB SAFETY ANALYSIS

COMPANY/ PROJECT NAME or ID/ LOCATION (City, State)	DATE PREPARED FOR HSP:	☐ NEW ☒ REVISED
Lendrum Court, Presidio – San Francisco	2/5/2016	
JSA WORK ACTIVITY (Description): **Driving a Company Vehicle**	List of Contractor(s) and key work activity:	

SITE SPECIFIC JSA AUTHOR	TITLE	COMPANY	SIGNATURE
Kristin Bolen	Sr. Project Scientist	TRC	

JSA REVIEWERS	TITLE / AFFILIATION	
Rachelle Clair	Con./SF/MV Safety Coordinator	
Dave Sullivan	ECR Safety Director	
Mike Glenn	National Safety Director	

REQUIRED PPE

☐ HARD HAT ☐ GLOVES Specify: ☐ leather ☐ Nitrile ☐ Other _____. ☐ SAFETY GLASSES ☐ GOGGLES ☐ FACE SHIELD	☐ REFLECTIVE VEST ☐ HEARING PROTECTION ☐ SLIP RESISTANT SHOES ☐ 5 PT.HARNESS / LANYARD ☐ PPE CLOTHING: ☐ Coveralls ☐ Tyvek Suit ☐ Nomex ☐ Other _____.	☐ RESPIRATORY PROTECTION: ☐ ½ face Air Purifying Respirator (APR) ☐ Particulate Mask: ☐ PM100 ☐ PM95 ☐ Cartridge: ☐ Chemical ☐ Full face ARP _____. ☐ Air Supplied Respirator ☐ SCBA ☐ Air-line	☒ ADDITIONAL PPE AVAILABLE ONSITE (List): • Sun Glasses

Always perform a Safety Assessment: 1) prior to starting work; 2) when changing tasks; and 3) throughout the day. Focus on each new task, procedures, and skill sets to be used.

[1] JOB TASKS	[2] POTENTIAL HAZARDS	[3] HAZARD CONTROLS (beyond wearing "Required" PPE)
1. Have correct directions and know best route of travel to make it safely to intended destination.	a Getting lost in a bad area or showing up at the wrong location. Having doubt about where you are exactly supposed to be could cause undo stress while driving.	a. Ask questions and get safest route if destination is not known, an online locator can be used to assist with travel plans. Give other people your travel plans with addresses and phone numbers so you can be contacted.
2. Knowing what TRC's driving rules and policies are before getting behind the wheel on company time.	a. Driver using excuse that they didn't know the rules or policies and following common bad practices while driving.	a. Strong driver training and driving safety stewardship prior to personnel driving company owned vehicles or driving personal vehicles on company time.
3. Vehicle walk around and perimeter check	a. Trip, slip, fall. b. Possible human contact from unknown assailants. c. Struck by other vehicle.	a. Visual verification that vehicle tires are in safe working condition and that there are no sharp objects or foreign debris under the tires. b. Check for possible unsafe human interaction in the surrounding area c. Be conscious of other vehicle activity close by.
4. Unlock and open vehicle door, enter the vehicle and secure seatbelts.	a. Pinch or crush hazard if hand or fingers are not secured inside the vehicle before shutting vehicle door.	a. Ensure driver's seatbelt is functioning properly and verify that passengers seatbelt is also in good working condition then buckle up. Lock vehicle doors once inside as added protection factor. a. Verify all body parts are in the cab prior to closing the vehicle door.
5. Traveling safely at posted speed limits and following all road	a. Not obeying posted speed limits and not following road rules.	a. Driver must maintain California's DMV best Practice of following a 3 second gap. Keep good visual contact of all lanes and

JOB SAFETY ANALYSIS

COMPANY/ PROJECT NAME or ID/ LOCATION (City, State) **Lendrum Court, Presidio – San Francisco**	DATE PREPARED FOR HSP: 2/5/2016	☐ NEW ☒ REVISED
JSA WORK ACTIVITY (Description): **Driving a Company Vehicle**	List of Contractor(s) and key work activity:	

rules while driving on Roadways or Freeways		identifying an out in case of emergency maneuver due to other vehicle hazards and poor driving. a. Watch for slower moving and fast approaching vehicles in roadway.
6. Merging while entering Multilane Freeways and Making lane changes while traveling on multilane Freeways	a. Struck from side, rear contact with other vehicles, struck from behind.	a. Use vehicle signals, look over shoulder, check mirrors a. Be aware of fast approaching or slower moving vehicles and maintain speed while initiating merge a. Maintain speed and repeat same steps with all lane changes.
7. Proceeding through marked or signal controlled intersections or crosswalks after coming to a full stop	a. Struck from side, rear contact with other vehicles, struck from behind. b. Hitting pedestrians or bicyclists.	a. Driver should carefully look left and right prior to proceeding through intersection. a. Driver should allow other vehicles to proceed per the traffic rules. a. Driver should maintain lane selection through the intersection and proceed forward remaining in the same lane they stopped in. b. Driver should carefully look left and right prior to proceeding through crosswalks. b. Driver should carefully check blind spots for bicyclists prior to making a right or left turn.
8. Reaching final destination in vehicle and coming to a complete stop while parking	a. Striking other parked vehicles or striking pedestrian walking traffic b. Vehicle engine not completely stopping causing the vehicle to lunge forward.	a. Pay full attention to the new surrounding areas where you'll park. b. Ensure vehicle's engine has completely stopped and set parking break.
9. Opening vehicle door and exiting.	a. Struck by other vehicles b. Stepping onto uneven surface, c. Approached by someone unwanted.	a. Take a good look at surrounding areas and make sure there are no signs of oncoming traffic. b. Take a look outside at the ground before you step out making sure surface is level and object free. c. Keep aware of unwanted approaching personnel.
10.		

Field Notes:

_____

_____

_____

[1] List all activities/steps which present a significant hazard, preferably in sequence. FOCUS ON POTENTIALLY HAZARDOUS ACTIVITIES; not the trivial ones. Apply common, yet knowleable & informed, sense to identify what could reasonably be expected to cause danger.

[2] CONCENTRATE ON SIGNIFICANT HAZARDS. What can go wrong? How can someone get hurt? Can someone be struck by or strike an object?; caught on, in or between objects?; fall to ground or lower level?; experience excessive strain or stress? Be exposed to inhalation or skin hazards. Specify the hazards; be descriptive.

[3] Describe actions, procedures or limits necessary to eliminate or minimize the hazards. Be clear, concise and specific. Use objective, observable and quantified terms. Avoid subjective general statements such as, "be careful" or "use as appropriate".

JOB SAFETY ANALYSIS

LIMITATION: The purpose of a JSA is NOT to identify all hazards associated with a task, but to identify key potential hazards to get Contractors and other onsite personnel thinking about other potential safety hazards and mitigating actions for unsafe conditions and behavior during various works. Contractors should recognize that JSA's may not cover every conceivable step or hazard that emerges during a job, so we've provided a "Field Change" section below to amend a JSA if required. The JSA does not supersede or replace any local, state or federal permit, regulation, statute or other entities policies and procedures but is simply a tool for enhancing the execution of safe work at a jobsite. Similarly, all contractors are required to provide their own JSA(s) for their specialty prior to performing any work; however, any unsafe condition or hazard not covered in any JSA is ultimately the direct responsibility of the person or entity performing the work.

ATTACHMENT F

TAILGATE SAFETY MEETING CHECKLIST

AND

HSP COMPLIANCE AGREEMENT

TAILGATE SAFETY MEETING CHECKLIST

Date / Time of Tailgate Meeting: _____

- ☐ **Vehicle Inspection:** Driver will perform Driver's Daily Vehicle Inspection Checklist before leaving the yard or if changing drivers during the day.
- ☐ **Personnel training/qualifications:** Check cards for OSHA HAZWOPER 40-hour certification/8-hour-refresher training (or any other specialized training to perform the task if appropriate). TRC personnel have been trained on the Company's Drug and Alcohol Policy and will inform all site personnel.
- ☐ **Supplies:** Indicate location of first aid kit, fire extinguisher, clean water supply (drinking, eye wash), and Site Health and Safety Plan (HSP).
- ☐ **Emergency services:** Discuss location of nearest telephone and directions to hospital. Map, directions, phone numbers are provided in the HSP (**Attachment C & D**).
  - **First-Aid/CPR volunteers:** _____
    _____
- ☐ **Site background:** Discuss types, locations, and concentrations of chemicals found onsite, presence of free product, depth to groundwater, etc.
- ☐ **Serpentine soils:** Discuss how to identify serpentinite rocks, and if applicable, identify the location(s) of serpentinite bedrock outcrops within the work area. Ensure staff are aware that excavation activities should avoid cutting into or disturbing serpentine bedrock.
- ☐ **Munitions and Explosives (MEC):** Discuss the potential for MECs to be present at the site. Ensure all staff have been trained in the identification of MEC or potential MEC using pictures from Attachment L of this HASP and/or other appropriate materials.
- ☐ **Offsite Permits/Access Permits:** Discuss any permitting requirements for the site.

Work activities: Discuss scope of work for the day and activities to be performed.

- ☐ **Potential hazards: Review JSAs.** Discuss physical, chemical and biological hazards Discuss the prohibiting of any eating, drinking, and/or smoking in the work zone

- ☐ **Personal protective equipment (PPE):** Discuss required level of protection; review additional PPE requirements in JSAs, as needed.
  ☒ Hard Hat ☒ Safety Shoes/Boots ☒ Safety Vest ☒ Eye Protection - ☒ glasses
  ☐ goggles ☐ face shield ☒ Hand Protection - ☒ kevlar ☐ nitrile ☐ other _____
  ☐ Hearing Protection
  ☐ Respiratory Protection - ☐ APR Particulate ☐ APR Chemical cartridge
  ☐ other_____
  ☐ Protective Clothing - ☐ Tyvex ☐ Nomex ☐ Coveralls ☐ other _____
- ☐ **Utilities:** Utilities have been cleared/marked by appropriate divisions.
- ☐ **Traffic control** (vehicular and pedestrian): Work area is properly delineated and cordoned off from traffic. Upon completion of work, walk around vehicle to pick up cones and check all four sides and underneath vehicle for obstacles prior to moving vehicle.
- ☐ **Property Contact Notification:** Notify property contact/owner of site work activities to be performed.

HSP COMPLIANCE AGREEMENT

By signing below, I have completed the Tailgate Safety Meeting Checklist, reviewed this Site Health and Safety Plan and the Job Safety Analysis (JSA) and understand their contents. I hereby agree to comply with all safety requirements outlined herein:

TRC

Signature: _____, Site Safety Officer (SSO)

Print Name: _____ Date: _____

Signature: _____, Asst. Site Safety Officer (Asst. SSO)

Print Name: _____ Date: _____

Contractor:

Signature: _____, Site Safety Officer (SSO)
Print Name: _____ Date: _____

Signature: _____, Asst. Site Safety Officer (Asst. SSO)

Print Name: _____ Date: _____

Contractor:

Signature: _____, Site Safety Officer (SSO)

Print Name: _____ Date: _____

Signature: _____, Asst. Site Safety Officer (Asst. SSO)

Print Name: _____ Date: _____

HSP COMPLIANCE AGREEMENT (cont.)

By signing below, I have completed the Tailgate Safety Meeting Checklist, reviewed this Site Health and Safety Plan and the Job Safety Analysis (JSA) and understand their contents. I hereby agree to comply with all safety requirements outlined herein:

TRC Employees / Contractor Personnel / Visitors (cont.)

Signature: _____ Date: _____

Print Name: _____Company: _____

Signature: _____ Date: _____

Print Name: _____Company: _____

Signature: _____ Date: _____

Print Name: _____Company: _____

Signature: _____ Date: _____

Print Name: _____Company: _____

Signature: _____ Date: _____

Print Name: _____Company: _____

Signature: _____ Date: _____

Print Name: _____Company: _____

Signature: _____ Date: _____

Print Name: _____Company: _____

Signature: _____ Date: _____

Print Name: _____Company: _____

Signature: _____ Date: _____

Print Name: _____Company: _____

ATTACHMENT G

TRC SAFETY OBSERVATION FORM

TRC SAFETY OBSERVATION FORM

Revised January 2014

Location/Project Name: _____ **Date:** _____

Observer Name: _____

Observee Name: _____ **Time:** _____

Task Observed

Description of Task Observed and Background Information

Positive Comments

Conclusions / Why the Questionable Items Occurred?

Feedback Session Conducted By: _____ **Date:** _____

Name of Observee's Supervisor: _____ **Time:** _____

Questionable Observations/Root Cause Analysis

Personal Factor:
(1) Lack of skill or knowledge
(2) Correct way takes more time/requires more effort
(3) Shortcutting standard procedures is rewarded or appreciated
(4) In past, did not follow procedures or acceptable practices and no incident occurred

Job Factor:
(5) Lack of or inadequate operational procedures or work standards
(6) Inadequate communication of expectations or work standards
(7) Inadequate tools or equipment

Questionable Observation #	Root Cause Analysis #	Solution(s) To Prevent Potential Incident from Occurring	Person Responsible	Agreed Due Date	Date Completed

Results of Verification (were solutions done?) and Validation (were solutions effective?)

Reviewed by (Supervisor): _____ **Date:** _____

Approved by (Practice Safety Leader): _____ **Date:** _____

ATTACHMENT H

RADIATION SAFETY PLAN

CONSTRUCTION SERVICES
FIELD AND
RADIATION SAFETY PLAN

Radioactive Materials License 2536-43

Mountain View Office
1920 Old Middlefield Way
Mountain View, California 94043
650-967-2365 • 650-967-2785 (Fax)

Updated 01/15/13

TABLE OF CONTENTS

GEOTECHNICAL FIELD SAFETY
(EARTHWORK OBSERVATION AND TESTING)

The following safety procedures are recommended for all field personnel when performing CS services in the field:

1. Field personnel should read through and become familiar with this safety manual. The procedures outlined herein should be followed when you're working at project sites. Periodic site safety inspections will be made to observe employee compliance with the safety plan. Failure to follow safety procedures could result in disciplinary action or dismissal of the employee.

2. Field personnel have received training in the safe handling of nuclear soil gauges at an 8 hour gauge operator training class which is approved by the Nuclear Regulatory Commission (NRC). In using the gauges, the field personnel accept responsibility to become familiar with the material presented in that course and to follow the recommended procedures. In addition, field personnel should have in their possession, the shipping paper, a copy of the Authorization Letter, current leak test certificate and the Nuclear Gauge Operator's Manual for the gauge they are using. Personnel should be familiar with the information contained in those documents.

3. Field personnel should be appropriately dressed, wearing a hard hat and safety shoes. Safety glasses and ear protection should also be used when appropriate.

4. When entering a job site, observe the equipment in operation and the areas of the job where the equipment is working to avoid being in the way.

5. Check in with the contractor's superintendent to get an idea of how the scheduling of work activities at the site during that day might affect the work in which you are involved.

6. Do not follow construction equipment on the site unless the equipment operator is aware that you are behind him. Most heavy equipment does not have mirrors. There are times when the equipment operator may stop or change direction suddenly.

7. Do not enter excavations deeper than 5 feet unless they are properly shored. In addition, do not enter any excavation which appears unstable or dangerous.

8. Under no circumstances should test equipment, including nuclear testing gauges, be stored or set in or on the fill while waiting for the contractor to prepare the site. When the testing equipment is not being used, it should be immediately returned to the bed of the vehicle being used by the field technician.

9. Prior to performing tests, you should inform the equipment operator of your intention to be in his area and for what anticipated period of time. Ask that the equipment operator remove his equipment from the area or operate well beyond the zone of non-encroachment as shown in the following safety manual.

10. If you observe an obvious case of danger to any personnel on a construction site, you should report it to the superintendent and to the personnel involved.

RADIATION SAFETY PLAN

General

This Radiation Safety Plan covers the procedures for the safe and proper use and possession of radioactive material as contained in portable moisture/density gauges used to measure soil and other materials. When handled in accordance with this plan the radioactive materials present no hazard to the licensee's employees, customers, or the general public.

Radiation Safety Officer

All use and possession is under the direction and supervision of the Radiation Safety Officer (RSO). The RSO is a single point of accountability and responsibility between the Regulatory Agency and the Licensee. The RSO is responsible for all aspects of this Radiation Safety Plan including the following specific duties:

1. To ensure that all terms and conditions of the license are being complied with and that the information contained is up-to-date and accurate.

2. To ensure that the equipment is leak tested at the required intervals.

3. To ensure that the equipment is only used by operators authorized by the RSO, and that they use the equipment in accordance with all relevant regulations. This will include wearing of a suitable personnel monitoring device.

4. To maintain records as required by the license and the regulations.

5. To ensure that all equipment is properly secured against unauthorized removal at all times.

6. To serve as a point of contact and give assistance in case of emergency such as: equipment damage in the field, theft, or fire and to notify the proper authorities in case of an emergency.

7. To ensure that all operators have read and understand this Radiation Safety Plan.

8. To arrange appropriate training for all operators.

9. To post all required signs and notices.

10. Conduct a semi-annual physical inspection and inventory of gauges.

Operation

1. The operator will exercise suitable control over the gauge at all times. At no time is it to be left unattended or in the possession of an unauthorized person.

2. When not being used for field measurements the gauge will be locked and returned to its storage/transportation case.

3. When testing is complete the gauge will be returned to its permanent place of storage as soon as possible.

4. When using the equipment the operator will wear the personnel monitoring device assigned. When the operator is not using the equipment, the monitoring device will be kept in a radiation-free, low heat area.

5. At all times, operators will observe **AS LOW AS REASONABLY ACHIEVABLE**, (ALARA), principles to minimize any dosage received.

6. While the equipment is in the operators possession, the operator will have:

   A) A copy of the license.
   B) A copy of letter/card authorization from RSO.
   C) A copy of this Radiation Safety Plan.
   D) A copy of the Equipment Operations Manual.
   E) A copy of the current Leak Test Certificate.

Transportation

1. During transportation, the equipment shall be fully secured in the transporting vehicle and located away from personnel. When transported in a covered pick-up truck, the case will be locked, the case will be securely fastened and locked to the truck bed through at least two handles and cover will be locked. When transported in an open bed vehicle (pick-up truck), the case will be locked with two locks and the case securely fastened and locked to the truck bed through at least two handles. When transported in a closed vehicle (car or van), case will be locked with two locks and the vehicle will be locked. When the operator is not with the vehicle, the gauge will be locked as noted above and the steering wheel of the vehicle will be locked with a “club” type device.

2. The equipment will only be transported in an approved DOT shipping container with all the required labels and markings.

3. During transportation, the operator will have shipping papers (A) Within his/her immediate reach while he/she is restrained by the lap belt; and (B) either readily visible to a person entering the driver's compartment or in a holder which is mounted to the inside of the door on the driver's side of the vehicle.

4. When shipping by common carrier the package shall be in compliance with 49CFR170-179.

5. When transporting gauges to temporary job sites, the following documentation must be carried: copy of the current Leak Test Certificate, copy of radiation license, manufacturer’s instruction manual, authorized user list and the Radiation Safety Program.

Maintenance

1. Periodic maintenance will include periodic cleaning of the gauge. The operator will have received proper instructions on how to clean the gauge, and will wear his assigned monitoring device.

2. No maintenance will be performed in which the radioactive source is removed from the gauge. The gauge will be returned to the manufacturer or an approved service center for this type of service.

3. A leak test will be performed at the interval specified in the license, using an approved leak test kit, and in accordance with the gauge manufacturers instructions. The operator will have received proper instruction on how to leak test the gauge by the RSO and will wear his assigned monitoring device.

4. The shipping case will be periodically checked for integrity, and to verify that all labels are present and readable.

Records

Records will be maintained of:

Personnel Monitoring (TLDs collected on a quarterly basis),
Leak Tests (per gauge manufacturer specifications),
Training (annual), and
Inventory (gauges in and out)

Training

All operators will complete a manufacturer's Operator's Training Course. Operators will be given special training as required for their individual work assignments.

Disposal/Decommissioning

1. Disposal will only be performed by transferring to a properly licensed organization.

2. The regulatory agency will be notified 30 or more days in advance of any relocation of the storage area. Formal decommissioning will not be required provided leak tests are current.

EMERGENCY PLAN

SITUATION	PERSON	RESPONSIBILITY
I. Vehicle collision WITH visible damage to gauge	**Operator**	1. Notify Radiation Safety Officer (RSO), Robert Harrigan, Work telephone: (650) 967-2365 Home telephone: (650) 344-7864 Mobile telephone: (650) 444-3654 or Alternate Radiation Safety Officer(s) (ARSO) Mtn. View – Art Williams (650) 444-2235 Oakland – Patrick Forde (510) 760-3434 2. If any moving equipment is involved, stop it's movement until the extent of contamination, if any, can be established. 3. Cordon off the area around the incident. An area radius of fifteen (15) feet will be sufficient. 4. Visually inspect the gauge to determine the extent of the damage to the source(s), source housing(s), and shielding. 5. Notify local police or law enforcement agency of accident. 6. Do not touch nor allow anyone else to touch the gauge except an authorized representative of the State of California Health Services Department or other responsible governmental agency. 7. Get names and addresses of all of those who were in the area of the accident.
	RSO	1. Notify the State of California of accident and ask for instructions: Calif. Health Services Dept. Radiologic Health Branch: Richmond (510) 620-3416 (day) Sacramento (916) 327-5106 (day) Office of Emergency Services (24 hour) (800) 852-7550 CPN/ InstroTek (925) 363-9770 CPN/ InstroTek (24 hour) (800) 535-5053 Troxler (916) 631-0234 Troxler (24 hour) (919) 549-9539 2. Coordinate with operator of vehicle in the field as to what steps to take.

EMERGENCY PLAN

SITUATION	PERSON	RESPONSIBILITY
II. Vehicle collision WITHOUT visible damage to gauge	**Operator**	1. Notify Radiation Safety Officer (RSO), Robert Harrigan, Work telephone: (650) 967-2365 Home telephone: (650) 344-7864 Mobile telephone: (650) 444-3654 or Alternate Radiation Safety Officer(s) (ARSO) Mtn. View – Art Williams (650) 444-2235 Oakland – Patrick Forde (510) 760-3434 2. If any moving equipment is involved, stop it's movement until the extent of contamination, if any, can be established. 3. Cordon off the area around the incident. An area radius of fifteen (15) feet will be sufficient. 4. Visually inspect the gauge to determine the extent of the damage to the source(s), source housing(s), and shielding. 5. Inform investigating law enforcement officer of the presence of the gauge, but advise that there is no apparent damage to gauge. 6. Get names and addresses of all those in the area of the accident.
	RSO	1. Notify the State of California of accident and ask for instructions: Calif. Health Services Dept. Radiologic Health Branch: Richmond (510) 620-3416 (day) Sacramento (916) 327-5106 (day) Office of Emergency Services (24 hour) (800) 852-7550 CPN/ InstroTek (925) 363-9770 CPN/ InstroTek (24 hour) (800) 535-5053 Troxler (916) 631-0234 Troxler (24 hour) (919) 549-9539 2. Order a leak test as soon as gauge is returned. 3. Store gauge and prevent it from being used by placing "out of service" tags on it; do not allow it to be used until the results of leak test are discussed with State Health Services Department. 4. Provide State Health Services Department with results of leak test.

EMERGENCY PLAN

SITUATION	PERSON	RESPONSIBILITY
III. Damage by earth-moving equipment, regardless of visible or non-visible damage	**Operator**	1. Notify Radiation Safety Officer (RSO), Robert Harrigan, Work telephone: (650) 967-3265 Home telephone: (650) 344-7864 Mobile telephone: (650) 444-3654 or Alternate Radiation Safety Officer(s) (ARSO) Mtn. View – Art Williams (650) 444-2235 Oakland – Patrick Forde (510) 760-3434 2. If any moving equipment is involved, stop it's movement until the extent of contamination, if any, can be established. 3. Cordon off the area around the incident. An area radius of fifteen (15) feet will be sufficient. 4. Visually inspect the gauge to determine the extent of the damage to the source(s), source housing(s), and shielding. 5. Do not attempt to touch or remove gauge nor allow anyone else to do so other than authorized representative of State Health Services Department or other governmental agency. 6. Get names and addresses of all those present at time of accident.
	RSO	1. Notify the State of California of accident and ask for instructions: Calif. Health Services Dept. Radiologic Health Branch: Richmond (510) 620-3416 (day) Sacramento (916) 327-5106 (day) Office of Emergency Services (24 hour) (800) 852-7550 CPN/ InstroTek (925) 363-9770 CPN/ InstroTek (24 hour) (800) 535-5053 Troxler (916) 631-0234 Troxler (24 hour) (919) 549-9539 2. Order a leak test if gauge was ordered by State Health Services Department to be returned to office. 3. Store gauge and prevent it from being used by placing "out of service" tags on it; do not allow it to be used until the results of leak test are discussed with State Health Services Department. 4. Provide State Health Services Department with results of leak test.

EMERGENCY PLAN

SITUATION	PERSON	RESPONSIBILITY
IV. Fire in or at storage area	**Operator**	1. Notify Radiation Safety Officer (RSO), Robert Harrigan, Work telephone: (650) 967-2365 Home telephone: (650) 344-7864 Mobile telephone: (650) 444-3654 or Alternate Radiation Safety Officer(s) (ARSO) Mtn. View – Art Williams (650) 444-2235 Oakland – Patrick Forde (510) 760-3434 2. Call the Fire Department and inform them of the storage of radioactive material. 3. Take action appropriate with a fire to protect personnel. 4. Standby to advise the fire fighters as to the nature, locations, and potential hazards of the radioactive materials. Supply them with an information packet consisting of the facility layout and a data sheet of the equipment, including a photograph.
	RSO	1. Notify the State of California of accident and ask for instructions: Calif. Health Services Dept. Radiologic Health Branch: Richmond (510) 620-3416 (day) Sacramento (916) 327-5106 (day) Office of Emergency Services (24 hour) (800) 852-7550 CPN/ InstroTek (925) 363-9770 CPN/ InstroTek (24 hour) (800) 535-5053 Troxler (916) 631-0234 Troxler (24 hour) (919) 549-9539 2. Order a leak test of any gauges recovered. 3. Provide State Health Services Department with results of leak tests.

EMERGENCY PLAN

SITUATION	PERSON	RESPONSIBILITY
V. Theft, vandalism or malicious damage	**Operator**	1. Notify Radiation Safety Officer (RSO), Robert Harrigan, Work telephone: (650) 967-2365 Home telephone: (650) 344-7864 Mobile telephone: (650) 444-3654 or Alternate Radiation Safety Officer(s) (ARSO) Mtn. View – Art Williams (650) 444-2235 Oakland – Patrick Forde (510) 760-3434 2. Notify local law enforcement agency. 3. If gauge is present, do not allow anyone near the gauge except authorized representative of State Health Services Department or other responsible governmental agency.
	RSO	1. Notify the State of California of accident and ask for instructions: Calif. Health Services Dept. Radiologic Health Branch: Richmond (510) 620-3416 (day) Sacramento (916) 327-5106 (day) Office of Emergency Services (24 hour) (800) 852-7550 CPN/ InstroTek (925) 363-9770 CPN/ InstroTek (24 hour) (800) 535-5053 Troxler (916) 631-0234 Troxler (24 hour) (919) 549-9539 2. Order a leak test of gauge. 3. Store gauge and prevent it from being used by placing “out of service” tags on it; do not allow it to be used until the results of leak test are discussed with State Health Services Department. 4. Provide State Health Services Department with results of leak test.

ATTACHMENT I

WORKCARE PROGRAM INFORMATION

EARLY INCIDENT INTERVENTION®

Immediate Access to Medical Advice for Work Related Incidents

(888) 449-7787

INTRODUCTION

WorkCare, Inc. (WorkCare) and TRC have partnered together to promote Incident Intervention®, a resource designed to support company safety goals/targets—while reducing runaway-costs associated with workplace injuries and illnesses.

PURPOSE

Early Incident Intervention provides TRC employees with **IMMEDIATE** telephonic access to WorkCare clinicians at the time of a presumed, non-emergency workplace injury or illness. Clinicians provide expert guidance on the evaluation of symptoms, appropriate first aid, and the need for additional medical evaluation or treatment.

When utilizing this service within the first hour of an incident, known as the "Golden Hour," licensed medical staff can guide the case so that medical evaluation and treatment are rendered appropriately.

> ***"…helps the worker traverse the unpredictable terrain of work-related injuries and illness."***

PRINCIPLES OF EARLY INCIDENT INTERVENTION

- Utilizes principles of the "Golden Hour."
- Provides workers immediate clinician support at the time of an incident.
- Focuses on providing the right care, at the right time in the proper setting.

BENEFITS FOR EMPLOYEES

- Instant access to a medically qualified professional for evaluation of symptoms and possible outcomes.
- Professional guidance on appropriate first aid measures and medications.
- Professional advice regarding the need for additional medical evaluation or treatment.

BENEFITS FOR TRC

- Point of contact for emergency and non-emergency medical clinicians.
- Triages the incident to determine risk and urgency, delivering interventions that are consistent with medical guidelines for the specified injury and illness.
- Maintains communication with clinicians to ensure accurate and timely reporting.

ATTACHMENT J

TRC INCIDENT REPORT FORM

INCIDENT NOTIFICATION REPORT

(To be completed immediately after an Injury, Illness, Incident or Significant Near Miss by Employee's Supervisor and Employee involved)

Incident Category

☐ Injury/Illness ☐ Near Miss/Loss ☐ Property Damage ☐ Other

1 Incident Location: _____

2 Project #: _____

3 Client: _____

4 Date Incident Occurred: _____ Time: _____

5 Date Incident Reported: _____ Time: _____

TRC Employee Information

6 Name: _____ Phone: _____

7 Office: _____ Address: _____

8 Supervisor Name: _____ Phone: _____

9 Title or Occupation: _____

10 Sector/Practice:

Incident Description

11 Task Performed/Description of Incident:

12 Conditions at the Time of Incident (weather, lighting, etc.):

13 Description of Property Damage:

Employee Injury or Illness Description

14 Describe the Injury or Illness:

15 First Aid/Medical Treatment Administered:

16 Was WorkCare Contacted? ☐ Yes ☐ No

17 Name of Doctor's Office, Clinic or Hospital: _____

18 Address: Phone:

ATTACHMENT K

TRC NEAR MISS REPORT

TRC NEAR MISS REPORT

Near Miss Description:	

Date	Employee Name	Office	Project	Incident Location

What task was being performed at time of incident?

Describe Incident in detail:

Contributing Factors (Environment, Behaviors, Training, Procedures):

Describe the immediate corrective actions or changes to procedures taken (if any) as a result of the incident:

Lessons Learned:

ATTACHMENT L

PRESIDIO UNEXPLODED ORDNANCE PROCEDURE AND UNANTICIPATED DISCOVERY PROTOCOL

UNANTICIPATED DISCOVERY PROTOCOL

There are three types of unanticipated discoveries that are covered by this protocol:

- Human remains of Native American or other derivation.
- Cultural resources that have the potential to be significant.
- Cultural resources not requiring further consideration.

An unanticipated discovery refers to any situation where previously unidentified archaeological resources or human remains are encountered during ground-disturbing activities. Unanticipated discovery protocols apply to those archaeological finds that are exposed during construction or construction-related activities ***whether an archaeological monitor is present or not.*** All contractors will immediately report to the archaeologist if archaeological materials are uncovered during construction activities. All contractors must cease operations within the vicinity of the find until an archaeologist is consulted. If cultural materials are uncovered they should be ***avoided by all future project activities and protected in place*** until a decision about their potential significance can be made***.*** All materials are property of the Presidio Trust and are not to be taken for personal use or display. The removal of artifacts from federal land is a federal offense and can result in substantial fines and/or imprisonment.

Archaeological resources include stone, brick, and concrete building foundations, isolated historic artifacts, historic privy pits and household waste deposits, and items of Native American derivation such as stone tools, shell and animal bone waste, shell beads, and habitation areas. A more detailed list follows:

- Human remains;
- Concentrations of rock, ash, animal bone or shell;
- Buried layers containing a dark, almost black or very dark brown soil often containing charcoal and shell fragments,
- Concentrations of artifacts such as stone bowls, arrowheads, bone tools, shell beads, etc.;
- Architectural foundations made of stone, brick, wood, or concrete
- Architectural fabric
- Concentrations or historic material such as fragments of glass bottles, ceramic dishes, old cans, metal hardware, or other obvious trash dumps;
- Pockets of debris containing food remains (e.g. cut bone, seeds, pits); and,

Other materials that do not qualify as archaeological resources might also be encountered. These include: subsurface utilities such as water or sewer lines, materials manufactured after 1950, and small concentrations of broken concrete, broken asphalt, modern aluminum cans or beer bottles, and/or unmarked, unmortared bricks that have been deposited as fill, if no other cultural materials are present. These are generally not considered significant finds but should be brought to the archaeologist's attention to inform continued monitoring and oversight.

Human Remains

All project-related ground-disturbing activities at the Presidio are designed to avoid human remains. If human remains, funerary objects, sacred objects, or objects of cultural patrimony are inadvertently discovered they shall be ***protected in place*** and ***avoided*** by all project activities. Ground disturbing work in the vicinity of the find must immediately cease and the Presidio Trust archaeologist must be contacted. Presidio Archaeology Lab staff will notify the Presidio Trust's Federal Preservation Officer. If necessary, the Presidio Trust will notify the San Francisco Medical Examiner of the inadvertent discovery of human remains.

The immediate protection of human remains at the site shall be accomplished by (1) keeping any discovery confidential, and (2) securing the location to prevent disturbance of the remains and any associated materials.

The Presidio Trust archaeologist shall determine whether the Native American Graves Protection and Repatriation Act (NAGPRA) applies to the discovery and will ensure that the finds are treated in compliance with all requirements outlined at 43 CFR 10.4. Any materials not subject to NAGPRA will remain under Federal control.

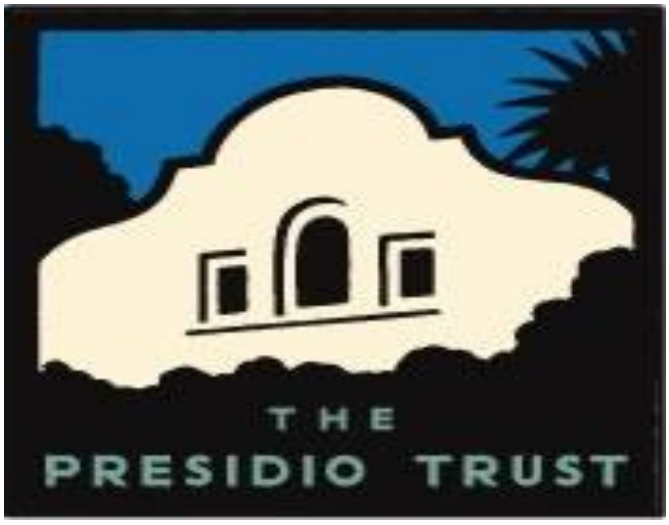
The Presidio Trust archaeologist shall determine whether the human remains are a single isolated burial or are potentially part of a cemetery or a larger archaeological site. This may necessitate the involvement of a consulting physical anthropologist. Articulated human remains, either as part of a single burial or larger cemetery, will be ***protected in place*** and ***avoided*** by all project activities. This may involve abandonment or redesign of the project.

If the discovery is limited to disarticulated human remains, the Presidio Trust archaeologist or a consulting physical anthropologist will direct necessary collection efforts. Further identification work may be necessary to determine the frequency of disarticulated human remains in the project area, and to determine an appropriate course of action. Any disarticulated remains collected from the site will be stored in archival boxes in a secure location until appropriate re-interment can take place. No human remains will be accessioned into the Presidio Trust Archaeological Collections.

CONTACT INFORMATION

In the event of a discovery that requires consultation with the Presidio Archaeology Lab, Juliana Fernandez, Trust Heritage Technician, should be contacted. Most inquiries should be directed to Ms. Fernandez. Megan Kane, Collections Specialist, should be contacted for information relating to the collection and/or discard of archeological materials. Kari Jones, Trust Archaeologist, should be contacted in the event that any of the aforementioned staff members are unavailable or if a significance determination is necessary.

Name	**Office phone** *(415) 561-*	**Mobile phone**	**Email**
Juliana Fernandez *Heritage Technician*	2114	231-4893	jfernandez@presidiotrust.gov
Megan Kane *Collections Specialist*	4251	385-4527	mkane@presidiotrust.gov
Kari Jones *Archaeologist*	5090	716-8519	kjones@presidiotrust.gov
Hans Barnaal *GIS Specialist*	4835	760-0127	hbarnaal@presidiotrust.gov
Archaeology Lab Fax	5089		



Unexploded Ordnance Procedure

For

The Presidio Trust

April 2013

Howard Rudolf
Safety and Occupational Health Manager

Andrea Andersen
Assistant General Counsel - Environmental

Eileen Fanelli
Environmental Remediation Manager

The Presidio Trust

I. Introduction:

The discovery of Unexploded Ordnance (UXO) at the Presidio of San Francisco ("Presidio") necessitates a procedure to ensure that the material is handled in a safe and efficient manner. Unexploded Ordnance is defined as military munitions that (A) have been primed, fused, armed or otherwise prepared for action; (B) have been fired, dropped, launched or projected, or placed in such a manner as to constitute a hazard to operations, installations, personnel, or material; and (C) remain unexploded whether by malfunction, design, or any other causes. Military munitions include confined gaseous, liquid, and solid propellants, explosives, pyrotechnics, chemical and riot control agents, chemical munitions, rockets, guided and ballistic missiles, bombs, warheads, mortar rounds, artillery ammunition, small arms ammunition, grenades, mines, torpedoes, depth charges, cluster munitions and dispensers, demolition charges, and their devices and components. These Discarded Military Munitions present a danger to Presidio Trust employees, Park Residents, Park Visitors, and outside contractors performing soil excavation at the Presidio. (See Section V of this procedure for pictures of UXO discovered at the Presidio.)

Moreover, the US Army Corp. of Engineers has provided additional information in a document entitled "The 3Rs of Unexploded Ordnance (UXO) Safety." This document is added at the end of this procedure.

II. Background:

Under a Memorandum of Agreement (MOA) that the Presidio Trust and the National Park Service have with the U.S. Army, known as the Presidio MOA, the U.S. Army retains responsibility for UXO discovered at the Presidio. The Presidio Trust will work cooperatively with the Army to promote a safe response to the discovery of UXO and to protect human health and the environment.

All UXO should be considered primed and dangerous!

III. Procedure:

1) Upon discovery of UXO, the individual should back away from the UXO at least 300 feet; optimally along the same path the site was entered. Under no circumstances should the UXO be touched or moved by anyone other than Explosive Ordnance Disposal (EOD) personnel.

2) The United States Park Police (USPP) Communications Section (CommSec) shall be notified immediately upon discovery of UXO at 415-561-5656. USPP has the primary responsibility of securing the scene and establishing a safety zone until the UXO is removed or rendered safe.

3) The reporting party should be prepared to provide the following information to the USPP CommSec:

    1. Name of the caller
    2. Location of the suspected UXO
    3. Description of the UXO
    4. Call back number for the caller
    5. Injuries or Fatalities

4) USPP CommSec will immediately notify the Army Corps of Engineers, Bruce Handel or his designee. If Army Corps personnel are unavailable, notify the Explosive Ordnance Disposal (EOD) team at Travis Air Force Base in Fairfield. For other than normal business hours the USPP CommSec will also notify the Presidio Trust Duty Officer who will be responsible for notifying the Safety and Occupational Health Manager (or designee). In all cases the Presidio Trust Director of Public Safety and Municipal Services will be notified.

    Contact Information:

    U.S. Army Corps of Engineers

    Bruce Handel
    Military Programs Team Lead
    South Pacific Division
    Army Corps of Engineers
    415-503-6579 (office)
    415-683-8994 (cell)
    bruce.handel@usace.army.mil

Explosive Ordnance Disposal (EOD) Team
Travis Air Force Base, Fairfield, CA.
(707) 424-5517

Presidio Trust After-hours Duty Officer
(415) 850-6092

Director of Public Safety and Municipal Services
Steve Potts
(415) 561-5330 (office)
(415) 850-8342 (cell)
spotts@presidiotrust.gov

Safety and Occupational Health Manager
Howard Rudolf
(415) 561-4141 (office)
(415) 748-0059 (cell)
hrudolf@presidiotrust.gov

Senior Advisor for Government and Media Relations

Dana Polk
(415) 561-2710 (office)
(415) 850-8190 (cell)
dpolk@presidiotrust.gov

5) Work within a 300 foot proximity to the UXO must be discontinued immediately and not resumed until the UXO is removed.

6) Barriers must be erected to isolate the UXO and maintain a minimum safe distance of 300 feet. (If roads or trails need to be closed to protect Park Visitors or Residents, the Trust Duty Officer or Director of Municipal Services and Public Safety will contact Roads and Trails staff to respond.)

7) USPP personnel will take pictures of the UXO to aid in identification and send those pictures to Army Corps of Engineers, Bruce Handel or his designee. If Army Corps personnel are unavailable, the Explosive Ordnance Disposal (EOD) team at Travis Air Force Base in Fairfield should be contacted directly. Pictures are to be forwarded electronically to the Army and Presidio Trust Safety and Occupational Health Manager (or designee).

8) If the Travis EOD Team or another U.S. Military EOD team cannot respond to the incident, and a safety perimeter has been established, and Trust contacts have been notified, **only** then should the USPP notify the San Francisco Police Department EOD Team.

9) Army Corps will identify the item as a UXO or as an item that is presumed to be acceptable to handle. If the item is identified as a UXO, the Army Corps will identify the type of UXO and provide advice on whether 300 feet is an adequate safe distance from the UXO. The agency or department responding will work with the Travis EOD Team to arrange for pick-up and disposal if necessary. Note that this procedure only applies to a UXO of military origin. If the Army Corps determines that a non-military device has been discovered, U.S. Park Police has 100% jurisdiction and control of ensuring that the device no longer poses a threat to public safety. Notably, if the device is modern, portable radios/electronic devices capable of transmissions (mobile phones, etc.) shall not be used within 500 feet of the UXO as determined by the USPP.

10) In the event that the UXO is considered unsafe for transport back to Travis Air Force Base, collaborative efforts by USPP and the Travis EOD Team will determine if the UXO will be detonated in place or at the closest site on the Presidio deemed safe for detonation.

11) The USPP CommSec and Trust Duty Officer or the Director of Public Safety and Municipal Services (or designee) are responsible for notifying the appropriate Trust personnel including, and the Safety and Occupational Health Manager. Trust personnel will notify the Public Information Officer.

12) The Travis EOD Team will not respond if the UXO is considered small arms (bullets less than 50 caliber). Contact Howard Rudolf for advice on how to proceed.

IV. Training:

1) The Safety and Occupational Health Manager will provide UXO Awareness Training on an annual basis for the appropriate Presidio Trust departments.
2) The Safety and Occupational Health Manager will provide UXO Awareness Training on an annual basis for the USPP.
3) The Safety and Occupational Health Manager will also provide training to outside contractors involved in any construction or environmental remediation project involving soil excavation before construction begins.
4) Copies of this procedure will be distributed electronically to all Presidio Trust employees and this procedure will be posted on the Presidio Trust internal Web page.

V. Sample Pictures of UXO:

3" Stoke Mortar
Discovered at Inspiration Point
July 2008

Confederate Civil War Cannonball
Discovered at the Nike Missile Site
July 2008

Small Arms Ammunition
Discovered at Building 104
April 2008

Anti-aircraft Shell
Discovered in the Presidio Archeology Lab
February, 2010

The 3 R's of Unexploded Ordnance (UXO) Safety

Military munitions that were used, but fail to function as intended are called UXO or unexploded ordnance. Military munitions abandoned without proper disposal or removed from storage in a military magazine or other storage area for the purpose of disposal are called discarded military munitions or DMM. The United States has always maintained a trained and ready military to protect its national interests. As a result of the munitions-related activities (e.g., live-fire training and testing, disposal operations) required to maintain this force, and other actions (e.g., souvenir collecting), UXO or DMM can be found almost anywhere. Although the Military controls access to areas known or suspected to contain UXO on active installations, a number of areas that are known or suspected to contain military munitions that were once used by the military have been transferred to public uses.

When anyone encounters or believes they may have encountered a munition, they should consider it extremely dangerous. To protect their family, friends and neighbors, everyone should learn and follow the 3Rs of explosives safety: **R**ecognize—when you may have encountered a munition and the potential danger; **R**etreat—do not touch, move or disturb it; **R**eport—notify local law enforcement of what you saw and where you saw it.

Although military munitions will most likely be found in areas that the Military currently uses or has used in the past, they could be encountered anywhere (e.g., Civil War battlefields, in homes as family souvenirs). Following the 3Rs when you have or think you may have encountered a munition can prevent a tragedy.

UXO are often referred to as duds, bombs, dummy rounds, or by other terms. Regardless of what you call them, they should be considered dangerous. Never touch, move or disturb munitions. Even Civil War cannon balls and souvenir munitions that may have been kept by a family and handled for years can be extremely dangerous.

Remember UXO can come in many shapes and sizes. It may look like: a pointed pipe, a soda can, a baseball, or a muffler.

UXO may be visible on the surface or be buried, be exposed by erosion or fires, look old or new, be complete or in parts, be found alone or in groups, and should be considered dangerous regardless of size or age.

Munitions can be hard to see, especially when they have had years to rust and settle into place. Beware as munitions can be hidden by deep grass, foliage or thick brush.

Even small munitions can be dangerous and should be treated with caution. If you believe you have encountered a munition, retreat - do not touch or disturb it, and call 415-561-5656.

Munitions including their components (e.g., projectiles, fuses, rocket motors) may contain high explosives, propellant or pyrotechnics. Munitions should never be collected as souvenirs or "trophies." No matter how old or damaged a munition may look, it can still be as or more dangerous than the day it was made.

Munitions can be clean or rusty and may be hard to recognize. Even old munitions can be very dangerous.

Munitions may be found both on land and in water.

The 3Rs of Explosives Safety

Recognize – Recognizing when you may have encountered a munition is key to reducing the risk of injury or death. If you encounter or suspect you may have encountered a munition, consider it extremely dangerous. Remember, munitions are sometimes hard to identify.

Retreat – If you encounter or suspect you may have encountered a munition, do not touch, move or disturb it, but immediately and carefully - do not run - leave the area following the same path on which you entered. If you can, mark the general area, not the munition, in some manner (e.g., with a hat, piece of cloth, or tying a piece of plastic to a tree branch).

Report – When you think you may have encountered a munition, notify your local law enforcement by calling 415-561-5656.

DON'T FORGET!

Munitions are dangerous and may not be easily recognizable. Never touch, move or disturb munitions or suspected munitions.

For more information visit the following websites:

https://www.denix.osd.mil/uxosafety
https://environment.usace.army.mil/what_we_do/fuds/

APPENDIX E
AIR AND DUST MONITORING AND MITIGATION PLAN
LENDRUM COURT
PRESIDIO OF SAN FRANCISCO, CALIFORNIA

THE PRESIDIO TRUST
103 Montgomery Street, P.O. Box 29052
San Francisco, California 94129-0052

TRC Project No. 229649

May 2016

APPENDIX E
AIR AND DUST MONITORING AND MITIGATION PLAN
LENDRUM COURT
PRESIDIO OF SAN FRANCISCO, CALIFORNIA

May 26, 2016

Prepared for

THE PRESIDIO TRUST
103 Montgomery Street, P.O. Box 29052
San Francisco, California 94129-0052

Prepared By

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ABBREVIATIONS AND ACRONYMS

ADMMP	Air and Dust Monitoring and Mitigation Plan
AHERA	Asbestos Hazard Emergency Response Act
ATCM	Air Toxics Control Measure
BAAQMD	Bay Area Air Quality Management District
BMPs	best management practices
Cal-EPA	California Environmental Protection Agency
CARB	California Air Resources Board
COCs	chemicals of concern
EDD	electronic data deliverables
DTSC	Department of Toxic Substances Control
mg/m^3	milligrams per cubic meter
mm	millimeter
NOA	naturally occurring asbestos
$\mu g/m^3$	micrograms per cubic meter
PAHs	polycyclic aromatic hydrocarbons
PELs	permissible exposure limit
$PM_{10/2.5}$	particles 10/2.5 microns or smaller in diameter
Presidio	Presidio of San Francisco
PVC	polyvinyl chloride
RAW	Remedial Action Workplan
QA/QC	quality assurance and quality control
QAPP	quality assurance project plan
RBCs	risk-based concentrations
RBC_{air}	risk-based concentrations in air
RDIP	Remedial Design and Implementation Plan
RSLs	Regional Screening Levels
Site	Lendrum Court
TEM	Transmission Electron Microscope
Trust	Presidio Trust
TWA	time-weighted average

1.0 INTRODUCTION

TRC Solutions, Inc. (TRC), on behalf of the Presidio Trust (Trust), has prepared this Air and Dust Monitoring and Mitigation Plan (ADMMP) for Site remedial construction activities at Lendrum Court, (the Site), located at the Presidio of San Francisco, California (Presidio) (Figure E-1). This ADMMP is provided as an appendix to the Revised Remedial Design and Implementation Plan (Revised RDIP), which describes processes and procedures to be implemented by the Trust to remediate the Site. The scope of Site remedial construction activities include earthwork related to the excavation, consolidation, and capping of contaminated soil within the landscape area and historic forest area of the Site. The lead oversight agency for the remedial construction activities is the California Environmental Protection Agency, Department of Toxic Substance Control (DTSC). This document details the objectives of the ADMMP, Site background, project action levels, monitoring protocols and strategies for dust management during Site remedial construction. Specifically, this report:

- Provides a review of Site background, and purpose and objectives of remedial activities ***(Section 1.0)***
- Provides action levels for dust and target compounds to be protective of public and worker health ***(Section 2.0)***
- Provides an overview of air monitoring and air sampling activities ***(Section 3.0)***
- Provides an overview of air monitoring, sampling and analysis methods ***(Section 4.0)***
- Provides data management and quality control ***(Section 5.0)***
- Provides an overview of dust control best management practices (BMPs) ***(Section 6.0)***

1.1 PURPOSE AND OBJECTIVES

This ADMMP will be implemented to monitor and mitigate possible offsite airborne migration of dust generated by onsite remedial construction activities at Lendrum Court. Specifically, the objectives of the monitoring and mitigation program are to:

- Identify action levels intended to be protective of public and worker health;
- Provide guidance for perimeter air monitoring, dust monitoring and personal air monitoring;
- Assess the need and effectiveness of dust controls;
- Document perimeter air quality during onsite earthmoving activities; and
- Identify best management practices (BMPs) for dust mitigation during remedial construction at the Site.

The monitoring results will be evaluated by TRC to assess whether dust control measures being implemented during remedial activities are adequate or if additional dust control measures are warranted. This evaluation will be made by comparing measured airborne dust concentrations to action levels identified in this ADMMP. Remedial activities will be halted by TRC if concentrations exceed the applicable "stop work" action levels, and work will not resume until adequate dust control measures are implemented to reduce measured concentrations of airborne dust below the applicable action levels.

1.2 BACKGROUND

This section provides a brief background for the Site including: a description of the site location and land use, nature and extent of contamination, chemicals of concern and target chemicals for monitoring, the presence of naturally occurring asbestos (NOA), and planned remedial construction activities.

1.2.1 Site Location and Land Use

Lendrum Court is situated in the northwest corner of the Presidio, north of Doyle Drive, in the North Fort Scott Area. The North Fort Scott neighborhood includes 17 residential buildings containing 42 units and housing approximately 110 residential tenants. Within the project area there are seven occupied residential buildings: 1257, 1258, 1259, 1278, 1279, 1280, and 1282. Behind buildings 1259, 1278, and 1279, to the northeast, is the historic forest.

The landscape area generally slopes to the northeast in a series of terraces, likely graded as building pads for the residential units and parking lot area. The sloping areas between the terraces are mostly landscaped with grass and shrubs. The historic forest has a thick understory of small statured trees and shrubs.

1.2.2 Nature and Extent of Contamination

Army-era debris and incinerator ash are present within subsurface soils at the Site (EKI, 2015; TRC, 2015b). Polycyclic aromatic hydrocarbons (PAHs), metals, and dioxin/furans, related to former incinerator debris and ash, are the constituents of concern (COCs) considered to drive the need for remediation at the Site (TRC, 2015b). Cleanup levels for COCs at the Site were developed in the Cleanup Level Document (EKI, 2002; with updates through 2013), *Recreational Soil Cleanup Level for Lead* (TRC, 2015a), *Human Health Soil Preliminary Remediation Goals and Toxic Equivalency Values for Dioxins and Furans* (MACTEC, 2007), and the RAW (TRC, 2015b).

1.2.3 Chemicals of Concern and Target Compounds for Air Monitoring

Chemicals of concern (COCs) present in Site soils that could pose potential risks to human health and the environment were identified in the Removal Action Work Plan (RAW) (TRC, 2015b) and are listed below:

- **Carcinogenic PAHs**
  - benzo(a)anthracene
  - benzo(a)pyrene equivalents
  - dibenzo(a,h)anthracene
- **Metals**
  - arsenic
  - barium
  - copper
  - lead

- zinc

- **Dioxins/Furans**
  - TCDD TEQ

Of these COCs, carcinogenic PAHs, metals, and dioxins/furans have been detected at concentrations that pose a potential risk to human health and therefore have been identified as target compounds for air monitoring. The maximum detected concentrations of these COCs are listed in Table E-1.

1.2.4 Naturally Occurring Asbestos

Shallow serpentinite bedrock, which has the potential to contain naturally occurring asbestos (NOA), is present in the southern portion of the landscape area near the intersection of Lendrum Court and Armistead Road (Figure E-1). As discussed in Section 2.2 of the Lendrum Court Geotechnical Investigation (Appendix B of the Revised RDIP), a subsurface exploration was performed on April 23, 2015 using 3-inch diameter hand auger drilling equipment. Within the landscape and historic forest areas, 22 exploratory borings (HA-1 through HA-23; Figure E-1) were drilled to depths ranging from 1½ to 6 feet below ground surface. These borings were continuously logged in the field by TRC staff and described in accordance with the Unified Soil Classification System (ASTM D2488; boring logs presented in Attachment B-2 in Revised RDIP Appendix B). Six of the exploratory borings (HA-11 through HA-16; Figure E-1) were drilled around the serpentinite bedrock outcrop, located adjacent to Armistead Road, in order to evaluate the subsurface extent. Completely weathered serpentinite bedrock was encountered in three of the six locations (HA-11, HA-13, and HA-15; Figure E-1) at approximate depths of 1 to 2½ feet below ground surface. Additionally, bedrock was encountered in four locations within the historic forest (HA-17 through HA-20) at approximate depths of 1 to 2 feet below ground surface. No bedrock was visually observed at the other 15 exploratory boring locations in the landscape and historic forest areas (HA-1 through HA-10, HA-12, HA-14 and HA-16 and HA-21 through HA-23; Figure E-1).

During the Remedial Investigation (RI) phase of the work, cobbles and other evidence of weathered bedrock were noted in some of the trench and test pit logs. As such, soil sampling for NOA was performed in conjunction with geotechnical sampling on April 23, 2015 to evaluate the extent to which NOA may be present in overburden Site soils. Soil samples were collected at 16 sampling locations throughout the Site (HA-1 through HA-10, and HA-17 though HA-23) and submitted as 8 composite samples (Figure E-1). Soil samples were collected using a hand auger and were collected between depths of 0.5 and 2.5 feet below ground surface. Samples were submitted to EMSL Analytical, a California State Environmental Accredited laboratory, and analyzed for asbestos by EPA Method 600/R-93/116 with California Air Resources Board (CARB) 435 Prep for a 0.25% target analytical sensitivity. Asbestos concentrations were reported to be below detection limits in seven of the eight composite samples. The single detection was reported as less than 0.25% Chrysotile, which is considered low for a short-term construction project (Attachment E-1). As such, the likelihood of overburden soil at the Site containing significant levels of NOA is believed to be low.

On January 20, 2016, a Data Gap Investigation was performed to

- delineate the extent of the serpentinite bedrock outcrop on the corner of Lendrum Court and Armistead Road (results discussed in Appendix B of the Revised RDIP);
- collect topsoil samples for analysis of site constituents of concern (COCs) in areas where the bedrock outcrop is less than six inches below existing grade (results discussed in Appendix G of the Revised RDIP); and
- collect fragmented bedrock samples for analysis of naturally occurring asbestos (NOA).

As part of this investigation, four discrete samples of loose, crushed bedrock fragments that were suspected to be serpentinite rock were collected throughout the forest area (SB505, SB-506, SB-507, and SB508), and one bedrock fragment was collected from the bedrock outcrop located near the intersection of Lendrum Court and Armistead Road (SB509). The approximate locations of these five samples are shown on Figure E-1. Bedrock fragment samples were submitted to EMSL Analytical for NOA analysis by EPA Method 600/R-93/116 with CARB 435 Prep for a 0.01% target analytical sensitivity. Asbestos concentrations were reported at or above the detection limit (i.e., less than 0.01%) in four of the five samples (SB505, SB-506, SB508, and SB509), where detections ranged from 0.01% to 0.89% (Attachment E-1). The confirmed presence of NOA containing rock within parts of the historic forest presents the potential for airborne NOA to occur as a result of remedial construction activities in these areas. As such, NOA air monitoring, described in Section 4.1.1, will be performed during earthmoving activities in the vicinity of the bedrock outcrop near the corner of Armistead Road and Lendrum Court and in parts of the historic forest where loose serpentinite rock is observed. Following receipt of analytical results and confirmation that NOA levels are less than action levels, the frequency of NOA sampling may be reduced or discontinued pending DTSC approval.

During remedial construction, disturbance of bedrock at the site will be avoided to the extent practicable. If excavations into bedrock cannot be avoided at the keyways or benches, provisions in the specifications will require implementation of BMPs, including wetting, to reduce the potential for airborne chemicals and dust generation. Loose serpentine rocks resulting from or encountered during excavation will be properly disposed of off-site.

1.2.5 Remedial Construction Activities

Remedial construction activities at the Site include excavation and disposal of the organic-rich topsoil; consolidation, compaction, and re-grading contaminated soils and debris; and capping in place. Construction activities including: excavating, stockpiling, grading, loading and transporting contaminated debris and clean imported soils, have the potential to generate dust. As detailed in

Sections 3.0 and 4.0, monitoring and mitigation measures will be implemented during construction to ensure conditions at the Site are protective for construction workers and the residents.

2.0 ACTION LEVELS

The following section presents action levels for the maximum concentrations of respirable particulate matter and target compounds. When concentrations of respirable particulate matter and target compounds are at or above action levels, mitigations (i.e., BMPs) must be implemented to reduce these concentrations. BMPs for dust control are expected to minimize risks of inhalation, ingestion, and skin contact with particulates and target compounds.

2.1 PARTICULATE ACTION LEVELS FOR REAL-TIME DUST MONITORING

Airborne particles are generally classified by particle diameter and the associated health effects. Large particles typically settle out of the air rapidly and pose a limited health risk, however, small particles [typically classified as either particulate matter smaller than 10 microns in diameter (PM_{10}) or 2.5 microns in diameter ($PM_{2.5}$)] may remain in the air for longer time periods and can penetrate deeper into the human respiratory system, resulting in adverse health effects. Additionally, airborne chemicals or chemicals sorbed to airborne dust particles can also pose a risk to human health. Action levels have been developed for particulate matter to monitor for potential migration of airborne dust and target compounds.

The recommended action levels for respirable dust PM_{10} is based on the California Ambient Air Quality Standard of 50 micrograms per cubic meter ($\mu g/m^3$), which is a 24-hour time-weighted average (TWA) [California Code of Regulations (CCR), Title 17, Section 70200]. Available data from Bay Area air monitoring stations indicate that annual average regional background PM_{10} concentrations are approximately 20 $\mu g/m^3$ (Bay Area Air Quality Management District [BAAQMD], 1999). Assuming that 20 $\mu g/m^3$ is a reasonable estimation of average background PM_{10} concentrations at the Site during non-work hours, then during a standard 8-hour workday, TWA PM_{10} concentrations of up to 110 $\mu g/m^3$ could occur during soil excavation activities at the site without exceeding the California 24-hour TWA of 50 $\mu g/m^3$ for PM_{10}. The calculation supporting this conclusion is shown below:

$$\sum_{i=1}^{n} C_i T_i$$

$$C_8 T_8 + C_{16} T_{16} = C_{24} T_{24}$$

$$C_8 * 8\ hrs + C_{16} 16\ hrs = C_{24}\ 24\ hrs$$

$$\frac{C_8 * 8\ hrs + 20\ \frac{\mu g}{m^3} * 16\ hrs}{24\ hours} = 50\ \frac{\mu g}{m^3}$$

$$C_8 = 110\ \frac{\mu g}{m^3}\ Particulate\ Action\ Level\ for\ 8\ hour\ work\ day.$$

$$C_{16} = 20\ \frac{\mu g}{m^3} Assumed\ background\ concentration.$$

$$C_{24} = 50\ \frac{\mu g}{m^3}\ California\ Ambient\ Air\ Quality\ Standard\ TWA_{24hr}$$

The portable dust monitoring equipment does not distinguish between particle sizes and will therefore collect dust samples with a range of diameters. Dust particles larger than 10 microns are likely to be associated with the excavation, and therefore comparison of data from the portable dust monitoring to these action levels is considered to be protective. Compliance with the 8-hour TWA PM_{10} action level of 110 µg/m^3 will be confirmed by the stationary perimeter dust monitors discussed in Section 4.1.1. To account for short-term variations in dust emissions, an equivalent 5-minute TWA of approximately 1 milligram per cubic meter (mg/m^3) will serve as the stop work action level as described in Section 4.2.

Instantaneous perimeter dust concentrations will be measured periodically using portable dust monitors during dust generating activities, as discussed in Section 3.0. Dust monitoring action levels and response actions are summarized in Table E-2.

2.2 ACTION LEVELS FOR TARGET COMPOUNDS

Action levels protective for the target compounds were derived from risk-based air concentrations to assess the protectiveness of the particulate action level (Table E-1). The risk-based concentrations (RBCs) and action levels will be used for comparison with sample analytical results. The action levels were derived from risk-based air concentrations, specifically, residential air Regional Screening Levels (RSLs; U.S. Environmental Protection Agency [EPA], 2015). In accordance with California Environmental Protection Agency (Cal-EPA) methodology for extrapolating health study data across exposure durations, RSLs were adjusted to account for the short-term nature of the project (i.e., 0.27 to 0.30 years) by multiplying the raw risk-based concentration in air by a factor of 10 to obtain an adjusted risk-based concentration in air (RBC_{air}; Cal-EPA, 2000). The resulting adjusted RBC_{air} values for each target compound are presented in Table E-1. If analytical results from dust samples indicate concentrations of target chemicals in air above the adjusted RBC_{air} values, work will stop until more aggressive dust control measures are implemented. However, it was determined during the baseline air monitoring that the reporting limit for arsenic will likely be above the originally calculated adjusted risk based concentration (TRC, 2015c).

2.2.1 Arsenic

Due to technical limitations associated with laboratory analytical methodology and sample equipment, the laboratory reporting limits for arsenic will likely be above the adjusted risk based concentration of 0.0065 µg/m^3 (EPA, 2015). It was determined necessary to perform additional site-specific risk calculations for arsenic.

Using the arsenic reporting limits from the July 2015 baseline sampling event, which ranged from 0.0139 to 0.0173 µg/m^3, the human health cancer risk represented calculated between 2.1 x 10^{-5} to 2.7 x 10^{-5} (TRC, 2015c). The arsenic adjusted risk-based concentration used to calculate the cancer risk is

based on a 26-year exposure averaged over a 70-year lifetime. The cancer risks based on the arsenic adjusted risk based concentration falls within USEPA's and CalEPA's acceptable level of risk, which ranges from one in one-million (1×10^{-6}) to one in ten thousand (1×10^{-4}) (USEPA, 1990 and DTSC, 2011).

The adjusted risk based concentration is conservatively based on a target risk of 1×10^{-5} assuming a 26 year exposure for 350 days per year. The remedial construction has an estimated duration of less than a year. To evaluate for the short term duration of the project, USEPA's Regional Screening Level calculator was used to calculate a residential risk-based concentration for arsenic based on a target risk of 1×10^{-6} with a 1 year exposure duration for 250 days per year exposure frequency. Under this exposure scenario, the cancer risk-based concentration is 0.024 µg/m^3 and the non-cancer risk-based concentration is 0.022 µg/m^3. These values again conservatively assume that residential receptors will be exposed to these concentrations for 250 days in one year for 24 hours each day. During remedial construction, potential dust generating activities will occur for 8 eight hours per day, five to six days per week, for an estimated 6 to 8 months at the Site. The output file from USEPA's Regional Screening Level calculator is presented in Attachment E-3.

The cancer risks associated with the reporting limits based on a residential risk-based concentration of 0.024 µg/m^3, ranges from 5.8×10^{-7} to 7.2×10^{-7}. These cancer risks are less than 1.0×10^{-6}, and are considered *de minimis,* risk levels that are so low as to not warrant any further investigation or analysis (USEPA, 1990). The detection limit non-cancer hazard indices associated with 0.022 µg/m^3 ranges from 0.63 to 0.78. The non-cancer hazards are below the target hazard index of 1.

Based on the above evaluations, a short-term residential risk-based arsenic concentration of 0.022 µg/m^3 was calculated using USEPA's Regional Screening Level calculator. This short-term residential risk-based arsenic concentration (0.022 µg/m^3) was then used to calculate a site-specific arsenic dust action level of 2,200 µg/m^3 (Table E-1).

2.2.2 Naturally Occurring Asbestos (NOA)

Remedial actions, including air and dust monitoring activities, will be implemented under CERCLA with DTSC as the lead regulatory agency. The proposed NOA action level for ambient air monitoring at Lendrum Court were adopted from action levels developed by the BAAQMD[1]. In the event that ambient air monitoring results indicate levels equal to or above 1,600 Transmission Electron Microscope (TEM) structures per cubic meter (s/m³) from any DTSC-approved air monitor, TRC shall notify DTSC as soon as practical of the monitoring results and relay the following information: project

[1] The project areas are located within the jurisdiction of the BAAQMD. However, as the Site remedial actions will be implemented under CERCLA, the project is not required to have permits from the BAAQMD. Nevertheless, the project will aim to meet the substantive aspects of BAAQMD air quality requirements. The proposed NOA action level for (1) DTSC notification and onsite dust investigation (1,600 TEM s/m^3) and (2) for suspending work at the site (16,000 TEM s/m^3) is based on the BAAQMD-approved Naturally-occurring Asbestos Dust Mitigation Plan for the Hunters Point Site (Hunters Point Shipyard, 2009).

site name, sampler ID and location, actual TEM structures per cubic meter, the date the sample was taken, and the date analysis was reported. Additionally, such a measurement will trigger an immediate onsite investigation to determine if dust mitigation measures are still effective. If there is any evidence of dust generation, dust control measures will be re-applied or enhanced as applicable until dust is abated and monitored ambient NOA levels drop below 1,600 TEM structures per cubic meter at each DTSC-approved monitoring location.

In the event that ambient air monitoring results indicated levels equal to or above the action level of 16,000 TEM structures per cubic meter from any DTSC-approved air monitor, TRC shall notify DTSC as soon as practical of the monitoring results including: project site name, sampler ID and location, actual TEM structures per cubic meter, the date the sample was taken, and the date analysis was reported. Additionally, all remedial construction activities that may contribute to airborne TEM structures will be suspended until dust is abated and ambient monitoring drops below 16,000 TEM structures per cubic meter at each DTSC-approved monitoring location.

2.3 DUST ACTION LEVEL

To facilitate air monitoring during active soil removal activities, particulate monitoring will serve as a surrogate method of assessing compliance with risk-based levels using the following equation:

$$Dust\ Action\ Level = \frac{RBC_{air}}{C_{soil}} \times 10^9 \frac{\mu g}{kg}$$

Where:

Dust Action Level = Concentration of respirable dust at which the target compound would be at its established risk-based air concentration, expressed in µg/m^3.

RBC_{air} = Risk-based concentration for the COC in air, expressed in µg/m^3.

C_{soil} = Representative soil concentration of the target chemical, expressed in milligrams per kilogram

Dust Action Levels for each target compound are shown in Table E-1. These Dust Action Levels are orders of magnitude higher than the recommended 8-hour TWA PM_{10} concentration. Therefore, adherence to the eight-hour TWA PM_{10} concentration of 110 µg/m^3 will be protective for all compounds that may be expected in airborne dust.

3.0 OVERVIEW OF AIR MONITORING APPROACH

Air monitoring will include a combination of portable real-time direct-reading instruments and stationary samplers as discussed below.

3.1 METEOROLOGICAL MONITORING

Historical wind data from a nearby weather station located at Chrissy Field[1] shows the predominant wind direction as from the west or southwest and towards the east or northeast. However, to gain site specific meteorological data and account for the wind and climate variations within the Presidio, a weather station (Tycon Power Systems Weather Station or equivalent) will be set up to measure wind direction, wind speed, temperature, rainfall, and humidity. The weather station will be mounted at least 4 feet above the ground and 20 feet away from other obstructions that could affect ambient air flow patterns. These data will be used to establish the locations of dust monitoring equipment.

3.2 DUST MONITORING LOCATIONS

Dust monitoring will be conducted upwind of the Site (one station) downwind of the Site (two stations) at the boundaries of the work area. As the work area changes during the remedial activities dust monitoring locations will be reevaluated. Wind speed and direction measurements will be collected automatically at one-minute intervals during earthmoving activities. The wind speed and direction measurements will be checked manually at least three times over the course of each work day. If there is an indication that a significant and sustained shift in wind direction has occurred, the perimeter air monitoring stations may be repositioned, as appropriate. Average wind speed and direction will be printed out weekly in a tabular format and retained with the field logs. The optimum location of the air monitoring locations will be chosen based on assessment of the following factors:

- Length of remedial project work area boundaries;
- Predominant wind directions, based on meteorological measurements;
- Where earthmoving activities are occurring within the project area; and
- Security of monitoring locations.

3.3 BASELINE SAMPLES

To characterize baseline airborne concentrations of total particulate, lead, carcinogenic PAHs, and dioxin/furans at the remediation project area boundary, baseline air samples were collected on July 2015, prior to beginning earthmoving activities. Baseline air samples and real time particulate monitoring were collected at one upwind and two downwind perimeter air monitoring locations. Sample collection methods are described in Section 4.0. Particulate concentrations during the three baseline air monitoring events did not exceed any of the dust monitoring action levels presented in Table E-2, however during the July 27, 2015 baseline air monitoring event there were two particulate concentration spikes of 97 and 87 µg/m^3. While these elevated particulate concentrations did not exceed action levels, they may reflect offsite truck and/or construction activities associated with the surrounding roadways, that include Doyle Drive, Lincoln Blvd, and the Golden Gate Bridge. Concentrations of all COCs were below these risk based concentrations or, in the case of arsenic, below laboratory reporting limits. These

[1] Source: www.windfinder.com

low/non COC detections indicate that neither the surrounding highway areas, nor site soils, are contributing significant levels of COC's to the air. No baseline NOA ambient air samples will be collected.

3.4 CONSTRUCTION SAMPLES

To confirm that target chemical concentrations do not exceed their adjusted RBC values, air samples will be collected for offsite laboratory analysis at the three perimeter monitoring locations during earthmoving activities. Samples will be collected on a once per week basis as discussed in Section 4.1. Following receipt of analytical results and confirmation that concentrations of target compounds are less than adjusted RBC_{air} values, the frequency of sample collection from the stationary samplers will be reduced or discontinued upon receipt of DTSC approval.

If dust or air monitoring data exceed adjusted RBCs for target chemicals, dust control techniques will be modified, as appropriate, and DTSC will be notified. The results of laboratory-analyzed air samples and direct-reading measurements will be made available to DTSC upon request.

3.5 REAL-TIME MONITORING FOR DUST

Instantaneous particulate matter concentrations will be measured along the Site remediation project area perimeter using a portable dust monitor. To establish daily background levels for the instantaneous monitoring, readings will be taken upwind of the remediation project area at the beginning of the day and at least one other time during the day.

4.0 AIR MONITORING METHODS AND LABORATORY ANALYSIS

The following describes the methods that will be used for stationary sampling, personal air monitoring and real-time air monitoring.

4.1 STATIONARY SAMPLING

Dust samples will be collected and analyzed for lead, PAHs, and dioxins/furans on a once per week basis, where sampling for individual analytes may be performed on different days of the week (e.g., sampling for lead on Mondays, PAHs on Tuesdays, dioxins/furans on Wednesdays). Samples will be collected over an 8-hour work day using high-volume air samplers operated at a flow rate of 250 liters per minute or the highest operating flow the samplers are capable of due to site conditions. For each constituent, the air sampler will be equipped the appropriate corresponding filter insert. Dust samples will be collected and analyzed as detailed below:

- PAHs by EPA Method TO-13a collected on polyurethane foam (PUF) filters;
- Lead by EPA Method 6020 collected on 5.0 micron polyvinyl chloride (PVC) filters; and
- Dioxins/furans by EPA Method TO-9A collected on PUF filters.

Each high-volume sampler will be checked periodically to assess if the unit is operating in accordance with manufacturer operating procedures. Additionally, the samplers will be calibrated in accordance

with the manufacturer's recommendations and fuel for the generator powering the samplers will be checked and added as necessary throughout the day. Sampling parameters, including the times when the pumps are turned on and off and the flow rates at the beginning and end of the sampling period, will be recorded on a field log.

Following sample collection, all filter cases will be labeled, capped, and shipped on ice to the laboratory for analysis. All sampling shall be conducted by qualified persons, and testing shall be performed by an OSHA certified laboratory. Copies of the results of testing and sampling shall be made available to the Trust within five (5) days of receipt from the certified laboratory.

Following receipt of analytical results and confirmation that concentrations of COCs are less than RBC_{air} values or characteristic of background conditions, the frequency of COC sampling using stationary samplers at the site perimeter may be reduced or discontinued pending DTSC approval.

4.1.1 Stationary NOA Sampling

Stationary NOA sampling will be done in accordance with BAAQMD requirements for work at construction sites containing NOA, including the *Asbestos Airborne Toxic Control Measure (ATCM) for Construction, Grading, Quarrying and Surface Mining Operations (California Air Resource Board 2002-07-29).* Sampling at all airborne asbestos monitoring stations will be conducted using battery operated heavy duty vacuum pumps. Either model SKC 1532 and/or Model BGI 100 or an equivalent model vacuum pump will be used for each of the monitoring stations. The battery will be a marine grade deep cycle 12 volt battery, or equivalent. A battery charging station will be set up at a secure location at the Site to ensure adequately charged batteries are always available for pump operation. Selected equipment will be of the type that is used extensively in air sampling for asbestos.

The sampling train will consist of the following; pump, a flow regulator/dampener, a lockable air flow adjustment valve, tygon tubing and filter cassette assembly. The inlet of the tygon tubing with filter cassette will be attached to a tripod, or equivalent, to ensure samples are consistently collected from an elevation of 4 feet above ground surface in a location with unrestricted air flow. The filter cassettes will have a 25-millimeter in diameter cassette with an open-faced 55-millimeter cowl and will consist of a mixed cellulose ester (MCE) filter with a 0.45 micron pore size.

Each of the pumps, battery packs, sampling trains and cassettes will be inspected regularly to ensure proper operation. To prevent vandalism, the NOA air monitoring equipment, including the pump, battery, and flow regulator/dampener, will be stored on the ground in a container similar to a large lockable toolbox. The tygon tubing will enter and exit through two holes in the box, where the holes will be sized so as not to restrict airflow. These boxes will be locked and, if possible, positioned behind locked fences. In the event monitors are found to not be operating properly, as soon as practicable, DTSC will be notified of the location, monitor name, time discovered, plan of action and estimated time needed to complete repairs.

NOA air monitoring will be performed on days when earthmoving activities will be performed in the vicinity of the bedrock outcrop near the corner of Armistead Road and Lendrum Court and in parts of the historic forest where loose serpentinite rock is observed. On days when NOA air monitoring is required, each high-volume air monitoring sample will consist of a continuous 24-hour sampling period from approximately 8:00 AM to 8:00 AM the next day. This time frame was selected so that each day of field work is captured by a single sample. Additionally, by starting the sampling in the morning, TRC can periodically check the air monitoring equipment over the course of the workday to ensure the samplers are functioning properly during this critical time period. This sampling period also simplifies logistics involving sample pickup by the laboratory's currier. At the time of sample collection and set up for the next monitoring run, a field technician will record in a field notebook or electronic data tablet the sample ID number, the sample location, the date and time the pump was activated, the date and time the pump was deactivated, the flow rate at the start of sampling, the flow rate at the end of sampling, the calculated average flow rate, and the calculated total volume of air pumped during the sampling run. All data will be transcribed onto the chain-of-custody form that will remain with the samples until they are delivered to the analytical laboratory.

A rotameter will be used to calibrate the flow rate both before and after sample collection. The rotameter will be attached to the end of the sampling train to check the flow rate before the prior day's cassette is removed. This is accomplished by placing a specialized cover over the cowl that allows a rotameter to be attached to the cover. The field technician will read the flow rate and record the reading. After the reading is recorded, the sample cassette is removed, labeled and placed in a sealable plastic bag. Once complete, a new cassette is fitted onto the end of the tygon tubing, the cover placed over the cowl, the rotameter attached to check the flow rate at the start of sampling. If an adjustment is necessary, the technician will turn the regulator until the desired flow rate is achieved. The desired flow rate is between 0.5 and 2.5 liters per minute.

At the conclusion of sampling, the samples will be promptly delivered to a California accredited analytical laboratory for analysis. All samples will be accompanied by the chain-of-custody filled out for that day's sampling. All procedures for sample collection, measurement verified methodology, and other QA/QC procedures will be available upon request.

All asbestos air samples will be analyzed by TEM per the United States Environmental Protection Agency, Asbestos Hazard Emergency Act (AHERA) criteria pursuant to Title 17 of the California Code of Regulations (17 CCR) Section 93105. The following exceptions are required by the ATCM and will be included:

1. The analytical sensitivity shall be 0.001 structures per cubic centimeter (0.001 s/cc); and
2. All asbestos structures with an aspect ratio greater than three to one (3 to 1) shall be counted irrespective of length.

For purposes of consistency with other adjacent airborne asbestos monitoring programs, the asbestos data will be reported in s/m³. Following receipt of analytical results and confirmation that NOA levels are less than action levels, the frequency of NOA sampling may be reduced or discontinued pending DTSC approval.

4.2 REAL-TIME DUST MONITORING

Dust will be monitored along the perimeter of the remediation project area and within the work zone using a monitor such as a Thermo Scientific PDR 1000 (or equivalent). The monitor will have a detection limit of 1.0 µg/m^3 or less and a minimum accuracy of 1.0 µg/m^3. Stationary dust monitors will be deployed along the perimeter of the remediation project area at one upwind location, and one downwind location. A third dust monitor will be used for mobile instantaneous monitoring.

Instantaneous monitoring will be conducted periodically during the workday and will consist of taking readings at the perimeter of the remediation project area and the work zone. When conducting perimeter monitoring, the monitoring circuit will begin in the upwind portion of the site, where background concentrations will be recorded, and proceed around the perimeter of the fenced remediation project area. If readings exceeding the respirable dust action level of 110 µg/m^3 are measured, the monitoring personnel will stop walking and obtain a stabilized reading. If the stabilized reading exceeds 110 µg/m^3, the location of the reading will be recorded in the field logs and dust suppression efforts will be increased. If instantaneous readings exceed the 5 minute TWA stop work action level of 1 milligrams per cubic meter (mg/m^3), monitoring personnel will stop walking and obtain a 5-minute TWA of dust concentrations. If the observed 5-minute TWA is above 1 mg/m^3, the location of the reading will be recorded in the field logs and the earthmoving activities will be suspended until more stringent dust control practices are implemented. Corrective actions are summarized in Table E-2.

Stationary dust monitors will be configured with an audible alarm to signal to personnel if readings exceeding the respirable dust action level of 110 µg/m^3 are measured. If alarm conditions continue, reading will be recorded in the field log and dust suppression efforts will be increased. If the observed 5-minute TWA is above 1 mg/m^3, the location of the reading will be recorded in the field logs and the earthmoving activities will be suspended until more stringent dust control practices are implemented. Corrective actions are summarized in Table E-2.

At the end of the day, the data will be downloaded from the monitors. Average and maximum dust concentrations for the day will be documented and saved. After downloading the data, the monitors will be turned off and locked away until activities resume the following work day.

Each monitor will be checked periodically to assess if the unit is operating in accordance with manufacturer operating procedures. Additionally, the monitors will be calibrated in accordance with the manufacturer's recommendations and will be zeroed with pure air and the battery checked at the beginning and end of each work day following manufacturer's instructions.

4.3 PERSONAL AIR MONITORING

At the start of remedial earthwork activities, a negative exposure assessment will be initiated by the contractor to determine if personal air monitoring is required. Negative exposure assessments are to be conducted on appropriate personnel involved in representative construction tasks. If the assessment shows exposure is below California Division of Occupational Safety and Health (Cal/OSHA) permissible exposure limits (PELs) no additional personal air monitoring will occur. If ongoing personal air monitoring is required, the contractor will be responsible for developing and instituting a personal air monitoring program for their employees, as outlined in their health and safety plan.

If at any time the perimeter air monitoring results are above the action levels in Table E-1, another negative exposure assessment will be initiated and the necessity of personal air monitoring will be reevaluated.

4.4 METEOROLOGICAL MEASUREMENTS

Wind speed and direction measurements will be collected automatically at five-minute intervals during earthmoving activities. The wind speed and direction measurements will be checked manually at least once per hour. If there is an indication that a significant and sustained shift in wind direction has occurred, the perimeter air monitoring stations may be repositioned, as appropriate. Average wind speed and direction will be recorded daily in a tabular format and retained with the field logs.

4.5 CALIBRATION PROCEDURES

Calibration procedures will be documented to establish and maintain data quality records. Instrument maintenance activities will be documented on field logs. Calibration and check-out procedures for the dust monitor will be performed at least daily in accordance with manufacturer's recommendations. Because monitoring equipment may be influenced by changes in environmental parameters such as ambient temperature and humidity, the monitoring equipment may also be calibrated during the middle of the work day. All instruments will be zeroed at the beginning of the workday per the manufacturer’s instructions. Prior to each use, the monitor response and battery charge will be checked. No other quality control procedures are anticipated for the monitoring activities.

5.0 DATA MANAGEMENT AND DATA EVALUATION

Air perimeter samples will be collected and analyzed for lead, PAHs, and dioxins/furans following sampling methodology and analysis methods described in Section 4.1.

The Trust’s construction quality assurance (CQA) team will obtain analytical data directly from the laboratory and will perform Level II Data Validation in accordance with the Addendum to the QAPP (Tetra Tech, 2011). Sample data will be tabulated and compared to applicable action levels (Table E-1). The data will be presented to Trust and DTSC within five working days of receipt of laboratory data.

If laboratory analysis of air and dust samples indicates that COCs are not present in excess of action levels, then no corrective actions will be performed. If laboratory analysis of air samples indicates the

presence of COCs in excess of target levels or background concentrations, whichever is greater, the Trust, in consultation with the contractor and TRC, will implement additional dust control measures at the Site (e.g., additional application of dust control products or operation of misters) to establish conditions that are protective for construction workers and offsite receptors.

5.1 SAMPLE DESIGN PROCESS

This section describes the types of samples to be collected and sample collection procedures. Sampling procedures will be performed in accordance with protocols described in the Presidio QAPP, and summarized in the following sections.

Sample Types

Air is the media to be sampled during the remedial action. Field samples and quality assurance/quality control (QA/QC) samples will be generated. Field samples include Excavation and Perimeter air and dust samples. Quality control samples for air sampling will consist of field blanks, laboratory blanks, laboratory spike, and laboratory spike duplicates. Field quality control checks of air samples will be performed by the collection and submission of field blanks. Field blanks consist of air sample matrices that have been briefly opened to field conditions and then sealed. A minimum of one field blank will be collected and submitted for analysis for each air sampling event. Additional field blanks will be collected at a ratio of one field blank for every 10 air samples analyzed. Laboratory quality control checks (i.e. laboratory blanks, spikes, and spike duplicates) will be performed by adherence to laboratory quality control procedures and the analysis of laboratory quality control samples. A minimum of one laboratory blank, one laboratory spike, and one laboratory spike duplicate will be analyzed for each air sampling event.

Sample Collection

Sample locations will be surveyed using a global positioning system (GPS). The GPS information will be downloaded each day and a figure will be prepared showing the location of each sample, which will be verified as representative by the sampler.

Sample Documentation and Handling

Sampling personnel will document field activities, conditions, sample locations, and IDs in field notes and on the tracking sheet provided as Attachment E-2. Labeling, packaging, storage, handling, and shipping will be performed in accordance with the Presidio QAPP. The following sections describe the documentation and handling processes that will be used during the air and dust sampling program.

Sample Labels and Numbering System

Samples will be appropriately labeled so they can be identified and correlated with the sample location. Sample information will be printed legibly with waterproof ink. The label will contain sufficient

information so that the sample can be correlated with field logs, sample collection logs, and chain-of-custody forms. Each sample label will contain the following information:

- Project name;
- Unique sample identifier as described below;
- Date and time of sample collection;
- Remarks as needed; and
- Initials or name of the sampler.

Each sample collected will be assigned a unique ID. The sample designation will facilitate data management by referencing sample type, and location. IDs consist of an alphanumeric code that sequentially provide reference information in the format of 1) site designation, 2) sample type, and 3) three-digit numerical sequence of sample.

Perimeter Air Samples:

For example, the sample ID 1257PAS100 would refer to the following:

- 1257 – The sample is from the area northwest of Building 1257.
- PAS – The sample source location is the perimeter and it is a perimeter air sample.
- 100 – The unique sequential sample number for this sample is 100. The project sample numerical sequence will begin with sample number 100, which indicates that this was the first perimeter air sample collected for the project location.

Field Blank Samples**:**

Field blanks will include the ID of the primary sample collected, followed by the designation "FB", in turn followed by the date collected. For example, a field blank collected on July 10, 2015 would be "FB0071015".

Prior to field mobilization, the sampling contractor will present a list of samples and sample identification numbers for approval to the Trust's database manager.

Sample Packaging and Shipping

After collection and labeling, samples will be placed on ice in containers and transported to the analytical laboratory by a courier, or shipped through a parcel delivery service, depending on the location of the laboratory. The following steps will be taken before the sample containers are transported.

- Confirm that all samples in the container are listed on the chain-of-custody form and that the information on the chain-of-custody form matches what is written on the sample label;
- Make sure all sample container caps are tight;
- Place samples in sealed, water-tight plastic bags;
- Place enough ice in sample container(s) to maintain samples at 4 degrees C or less; and

- Place sufficient packing material in the container to minimize the potential for breakage of samples.

The chain-of-custody form will be appropriately signed by the field sampler relinquishing the samples and the laboratory personnel receiving the samples. If samples are to be shipped via a parcel delivery service, the following steps will also be taken:

- Place the top page of each chain-of-custody form in a sealed clear plastic envelope in the container; and
- Secure the container closure and place a custody seal over the container lid.

Chain of Custody Documentation

Sample chain-of-custody documentation will be maintained from initial sampling to completion of analysis and reporting to verify sample integrity. Documentation procedures will be in accordance with protocols described in the Presidio QAPP (Tetra-Tech, 2011). Documentation will also include acceptance and relinquishment signatures for persons through whose custody the samples have passed.

5.2 RECORD KEEPING

Records of dust monitoring activities will be prepared for each circuit of the remediation project area perimeter and will include the following information:

- Date and time of monitoring;
- Operator name;
- Instrument type;
- Date/time of last calibration;
- General weather conditions (wind speed and direction, temperature, precipitation, cloud cover);
- Location and measurement of background concentration;
- Location and stabilized measurement for elevated readings;
- Summary of contractor activities and suspected source of elevated readings (only needed if elevated readings are encountered); and follow-up sampling (if initiated) or other response actions.

Example Field Data Sheets are included in Attachment E-2.

5.3 DATA VALIDATION AND DATA MANAGEMENT

The sampling contractor will obtain analytical data directly from the laboratory in the form of Presidio-formatted electronic data deliverables (EDDs) and electronic versions of the Level II and Level III analytical data packages. In accordance with the QAPP Addendum (Tetra-Tech, 2011), the sampling contractor will perform a cursory review of the chemical data (USEPA Level II validation) to identify significant issues affecting data quality including method QC failures, blank contamination, and elevated detection limits. The results of the Level II data validation and the laboratory data packages will be presented in the Construction Completion Report.

Pertinent chain of custody information, analytical data (obtained electronically from the laboratory), sample location data (northing and easting coordinates), and data validation qualifiers will be loaded into the sampling contractor's database. At the end of the sampling program, Trust-formatted EDDs appended with the data validation qualifiers and sample coordinates will be transmitted to the Trust. Tables of Level II validated analytical data will be generated from sampling contractor's database for presentation during meetings and in the Construction Completion Report.

6.0 DUST CONTROL BMPS

6.1 POTENTIAL SOURCES OF DUST EMISSIONS

Project activities that are potential sources of dust emissions include:

- Excavation Activities
- Onsite Soil Transport and Stockpiling
- Placement and Grading of Import Backfill Soil
- Vehicle Travel – site egress and travel on unpaved surfaces
- Soil Hauling
- Post Grading Erosion Control Measures.

BMPs described below will be implemented to control dust emissions

6.2 BMPS DURING EXCAVATION ACTIVITIES

Excavation of asphalt, debris, and soil could generate windborne dust and particulate matter emissions. Excavation activities will be visually monitored for the generation of fugitive dust. If dust is being generated, the contractor will implement BMPs to control fugitive dust emissions, which may include the following:

- Taping windows and doors of residences located adjacent to the construction area.
- Prior to initiation of excavation work, the excavation area may be pre-wetted, as necessary, to prevent visible emissions.
- Following the completion of excavation in a particular section and prior to proceeding to the next section, the contractor may wet the disturbed surface area as necessary to minimize the creation of dust. Excavations or other soil-disturbed areas that will remain inactive for more than seven days or that are susceptible to emitting dust may be wetted as necessary during dry weather.
- Excavations or other soil-disturbed areas may be sprayed with a dust control product that is all-natural and biodegradable (e.g., Posi-Cube). The product should be applied such that it comprises less than 1% of the soil by weight.
- Operating misters within or along the perimeter of the fenced construction area.

6.3 BMPs for Onsite Soil Transport and Stockpiling

It is anticipated that the contractor will utilize loaders to transfer soil from temporary stockpiles to the soil staging area which may result in dust emissions. The contractor will minimize the creation of dust and particulate matter emissions by implementing the following BMPs:

- Placing a plastic bottom liner beneath soil stockpiles, a plastic liner on top, and weed-free straw wattles around the plastic liner.
- Soil stockpiles may be sprayed with a dust control product that is all-natural and biodegradable (e.g., Posi-Cube). The product should be applied such that it comprises less than 1% of the soil by weight.
- The soil stockpiles may be wetted, as necessary, to reduce visible emissions.

6.4 BMPs for Vehicle Travel

The following sections discuss BMPs to reduce the potential for dust generation when operating vehicles in the remediation project area.

6.4.1 Egress from the Site

The contractor will remove visible track-out of soil onto paved roads at locations where vehicles exit the work by wet sweeping at the end of the workday or at least once per day. Gravel pads or rumble strips will be installed as an additional track-out measure installed at the access points from the remediation project area to paved roads.

6.4.2 Unpaved Surfaces

The contractor will control dust emissions from construction traffic traveling on unpaved surfaces by implementing one or more of the following BMPs:

- Unpaved surfaces in the remediation project area will be wetted and/or sprayed with a dust control product (e.g., Posi-Cube) as necessary to minimize the creation of dust.
- No vehicle will exceed 15 miles per hour on the unpaved surfaces within the remediation project area.

6.5 BMPs for Soil Hauling

Haul trucks that are used to transport excavation spoils off site and import backfill material onsite will be provided with a tarp cover.

6.6 BMPs for Placement of Backfill and Grading

After backfill soil is placed, the areas will be wetted and/or sprayed with a dust control product (e.g., Posi-Cube) as necessary to minimize visible dust creation. Grading and backfilling activities will be halted during periods of sustained strong winds; specifically, hourly average wind speeds of 25 mph or greater.

6.7 BMPS FOR POST GRADING EROSION CONTROL

The contractor will place surface erosion control measures to reduce post construction erosion which may create dust. Surface erosion control measures may include straw wattles, bales, ground cover, etc. made of sterile, weed-free straw.

7.0 REFERENCES

Bay Area Air Quality Management District [BAAQMD], 1999. *BAAQMD CEQ Guidelines Assessing the Air Quality Impacts of Projects and Plans*. December.

California Environmental Protection Agency (Cal-EPA), 2000. *Determination of Non-Cancer Chronic Reference Exposure Levels*. February.

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EKI, 2015. *Lendrum Court Remedial Investigation Summary Report and Screening Risk Evaluation, Presidio of San Francisco, California.* In progress.

EPA, 2002. *Guidance on Environmental Data Verification and Data Validation. EPA QA/G-8. EPA/240/R-02/004.* November.

Hunters Point Shipyard, 2009. *Revised Naturally-occurring Asbestos Dust Mitigation Plan.* Prepared for Lennar/Bayview Hunters Point. May.

MACTEC, 2007. *Technical Memorandum, Human Health Soil Preliminary Remediation Goals and Toxic Equivalency Values for Dioxins and Furans, Presidio of San Francisco, California*, March 28.

Tetra Tech, 2001. *Presidio-Wide Quality Assurance Project Plan (QAPP), Sampling and Analysis Plan*, Presidio of San Francisco, San Francisco, California. April.

TRC, 2015a. *Technical Memorandum Recreational Soil Cleanup Level for Lead, Presidio of San Francisco, San Francisco, California*. April 6.

TRC, 2015b. *Draft Removal Action Work Plan, Lendrum Court, Presidio of San Francisco, California*. April 22.

TRC, 2015c. *Draft Baseline Air Monitoring Report, Presidio of San Francisco, California.* December 15.

United States Environmental Protection Agency (EPA), 1990, Corrective Action for Solid Waste Management Units at Hazardous Waste Management Facilities, Proposed Rule: Federal Register, v. 55, p. 3078.

United States Environmental Protection Agency (EPA), 2015. Regional Screening Levels. Updated November 2015

TABLES

TABLE E-1
ACTION LEVELS FOR TARGET CHEMICALS
Lendrum Court
Presidio of San Francisco, California

Target Chemicals	Maximum Detected Concentration in Soil [(1)]	Risk Based Concentration in Air [(2)]	Adjusted Risk Based Concentration in Air [(3)]	Dust Action Level [(4)]
	mg/kg	mg/m^3	mg/m^3	$\mu g/m^3$
Metals				
Arsenic	10	--	2.2E-5 [(5)]	2,200
Barium	920	5.2E-04	5.2E-03	5,652
Copper	440	--	--	NA
Lead	2,400	1.5E-04	1.5E-03	625
Zinc	1,100	--	--	NA
Polycyclic Aromatic Hydrocarbons (PAHs)				
Benzo(a)pyrene	0.31	9.2E-07	9.2E-06	29,677
Benzo(a)pyrene Equivalents	1.1	9.2E-07	9.2E-06	8,364
Dibenzo(a,h)anthracene	0.69	8.4E-07	8.4E-06	12,174
Dioxin/Furans				
TCDD TEQ	0.0000178	7.4E-11	7.4E-10	41,573
NOA ACTION LEVELS (S/m^3)				
NOA Notification Action Level[(6)]	1,600			
NOA Stop Work Action Level[(6)]	16,000			

Abbreviations:

-- = not available; compound does not have an inhalation pathway
mg/kg = milligrams per kilogram.
NA = not applicable
$\mu g/m^3$ = micrograms per cubic meter.
RSL = risk based screening level
TCDD TEQ = 2,3,7,8-tetrachlorodibenzo-p-dioxin toxic equivalency
RBC_{air} = Risk-based concentration for the COC in air, expressed in units of mg/m^3.
C_{soil} = Representative soil concentration of the target chemical, expressed in units of mg/kg.
NOA = naturally occuring asbestos
S/m^3 = structures per cubic meter
DTSC = Department of Toxic Substances Control
BAAQMD = Bay Area Air Quality Management District

Footnotes:

(1) Analytical results from Tables 6A and Table 6B of EKI, 2015.

(2) Residential regional screening levels from EPA, 2015.

(3) The risk-based concentrations (RBCs) were adjusted by a factor of 10 to account for the short-term duration of the project relative to the lifetime exposure assumptions incorporated into RSL values.

(4) Respirable dust action levels for individual chemical compounds were calculated using the following equation:
Dust action level = $\frac{RBC_{air}}{C_{soil}} \times 10^9 \frac{\mu g}{kg}$

(5) The arsenic adjusted risk based concentration is a short-term residential risk-based concentration using the USEPA Regional Screening Level Calculator (Attachment E-3). Discussion of input parameters are described in Section 2.2.1.

(6) The project areas are located within the jurisdiction of the BAAQMD. However, as the Site remedial actions will be implemented under CERCLA, the project is not required to have permits from the BAAQMD. Nevertheless, the project will aim to meet the substantive aspects of BAAQMD air quality requirements. The proposed NOA action level for (1) DTSC notification and onsite dust investigation (1,600 TEM s/m3) and (2) for suspending work at the site (16,000 TEM s/m3) is based on the BAAQMD-approved Naturally-occurring Asbestos Dust Mitigation Plan for the Hunters Point Site (Hunters Point Shipyard, 2009).

References:

Erler & Kalinowski, Inc. (Inc), 2015. Lendrum Court Remedial Investigation Summary Report and Screening Risk Evaluation, Presidio of San Francisco, Hunters Point Shipyard, 2009. Revised Naturally-occuring Asbestos Dust Mitigation Plan. Prepared for Lennar/Bayview Hunters Point. May.
United States Environmental Protection Agency (EPA), 2015. Regional Screening Levels. Updated November 2015.

TABLE E-2
DUST MONITORING ACTION LEVELS AND RESPONSE ACTIONS
Lendrum Court
Presidio of San Francisco, California

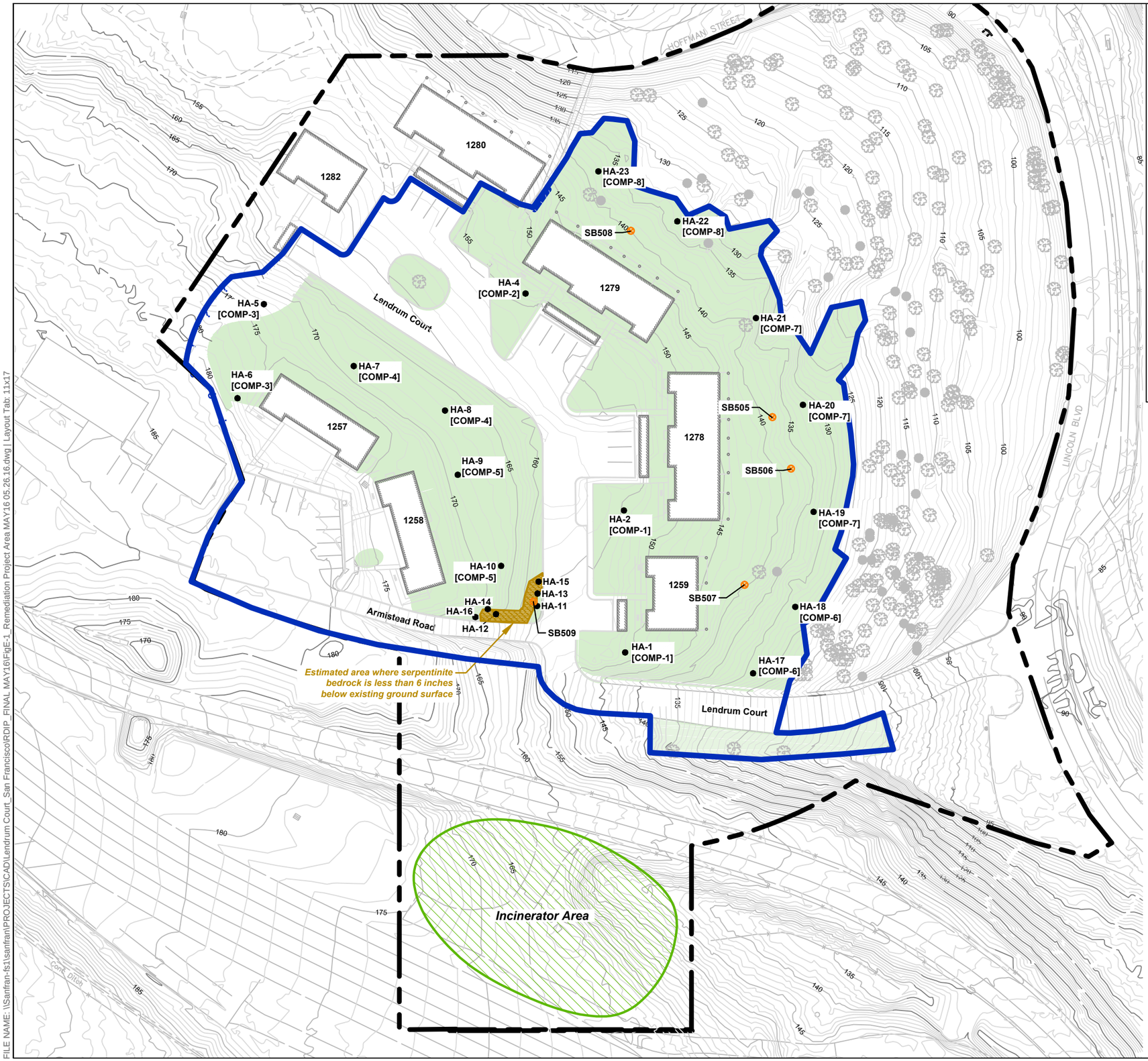
Parameter	Location and Monitoring Frequency	Action Level	Response Action
Airborne Particulates (Dust)	Remediation Area Perimeter/Monitor Every Hour	< 110 µg/m^3	Continue work and continue monitoring. Based on 8-hour time-weighted average (TWA) for PM_{10}.
		110 -1000 µg/m^3	Implement dust suppression measures.
		> 1 mg/m^3	Response level based on 5-minute time weighted average. Cease work, exit the area, and contact the Site Health and Safety Officer.

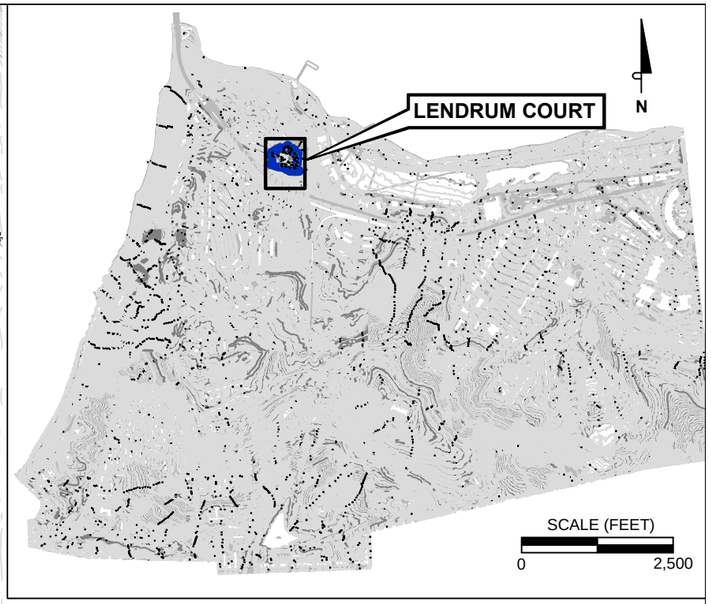
Abbreviations:

mg/m^3 = milligrams per cubic meter

µg/m^3 = micrograms per cubic meter

FIGURES





LEGEND

- Approximate site boundary
- Approximate extent of remedial action area
- 145 — Existing contour elevation
- Site tree to be preserved during remedial construction
- Toyon to be preserved during remedial construction
- ● HA-23 — Approximate location of hand auger boring by TRC, April 23, 2015
- [COMP-7] — Hand auger NOA composites collected by TRC, April 23, 2015
- Approximate limits of soil disturbance during construction
- SB506 — Approximate location of bedrock fragment sample collected by TRC, January 2016

N

SCALE (FEET)

0 70 140

SOURCE: Base plan by Towill, October 29-November 4, 2015

LENDRUM COURT REMEDIATION PROJECT AREA
May 26, 2016

Lendrum Court and Incinerator Area
The Presidio Trust
San Francisco, California

TRC | 229649 | **FIGURE E-1**

FILE NAME: \\Sanfran-fs1\sanfran\PROJECTS\CAD\Lendrum Court_San Francisco\RDIP_FINAL_MAY16\FigE-1_Remediation Project Area MAY16 05.26.16.dwg | Layout Tab: 11x17

ATTACHMENT E-1
NOA SAMPLING ANALYTICAL RESULTS

EMSL Analytical, Inc
464 McCormick Street, San Leandro, CA 94577
Phone/Fax: (510) 895-3675 / (510) 895-3680
http://www.EMSL.com sanleandrolab@emsl.com

EMSL Order:	091505924
CustomerID:	TRCS25
CustomerPO:	80182
ProjectID:	

Attn: **Justin Hanzel-Durbin**
TRC Environmental Corp.
101 2nd Street
Suite 300
San Francisco, CA 94105

Phone:	(510) 267-1970
Fax:	(510) 267-1972
Received:	04/27/15 9:00 AM
Analysis Date:	5/1/2015
Collected:	4/23/2015

Project: **229649 PRESIDIO LENDRUM CT**

Test Report: PLM Analysis of Bulk Samples for Asbestos via EPA 600/R-93/116 Method with CARB 435 Prep (Milling) Level A for 0.25% Target Analytical Sensitivity

Sample	Description	Appearance	Non-Asbestos % Fibrous	Non-Asbestos % Non-Fibrous	Asbestos % Type
1279SB-01-0.5/1279SB-02-1.5 COMPOSITE *091505924-0001*	COMP-1	Brown Non-Fibrous Homogeneous		100.00% Non-fibrous (other)	**None Detected**
1279SB-04-1.5/1279SB-04-0.5 COMPOSITE *091505924-0002*	COMP-2	Brown Non-Fibrous Homogeneous		100.00% Non-fibrous (other)	**None Detected**
1279SB-05-0.5/1279SB-06-1.5 COMPOSITE *091505924-0003*	COMP-3	Brown Non-Fibrous Homogeneous		100.00% Non-fibrous (other)	**None Detected**
1279SB-07-0.5/1279SB-08-1.5 COMPOSITE *091505924-0004*	COMP-4	Brown Non-Fibrous Homogeneous		100.00% Non-fibrous (other)	**None Detected**
1279SB-09-0.5/1279SB-10-1.5 COMPOSITE *091505924-0005*	COMP-5	Brown Non-Fibrous Homogeneous		100.00% Non-fibrous (other)	**None Detected**

NOTE: TRC Added composite names for greater clarity between Figure E-1 and this corresponding analytical lab report.

Analyst(s)

Adam C. Fink (8)

Chris Dojlidko, Laboratory Manager
or other approved signatory

Initial report from 05/01/2015 21:23:26

EMSL Analytical, Inc
464 McCormick Street, San Leandro, CA 94577
Phone/Fax: (510) 895-3675 / (510) 895-3680
http://www.EMSL.com sanleandrolab@emsl.com

EMSL Order:	091505924
CustomerID:	TRCS25
CustomerPO:	80182
ProjectID:	

Attn: **Justin Hanzel-Durbin**
TRC Environmental Corp.
101 2nd Street
Suite 300
San Francisco, CA 94105

Phone:	(510) 267-1970
Fax:	(510) 267-1972
Received:	04/27/15 9:00 AM
Analysis Date:	5/1/2015
Collected:	4/23/2015

Project: **229649 PRESIDIO LENDRUM CT**

Test Report: PLM Analysis of Bulk Samples for Asbestos via EPA 600/R-93/116 Method with CARB 435 Prep (Milling) Level A for 0.25% Target Analytical Sensitivity

			Non-Asbestos		Asbestos
Sample	**Description**	**Appearance**	**% Fibrous**	**% Non-Fibrous**	**% Type**
1279SB-17-0.5/1279SB-18-1.5 COMPOSITE *091505924-0006*	COMP-6	Brown Non-Fibrous Homogeneous		100.00% Non-fibrous (other)	**None Detected**
1279SB-19-.5/1279SB-20-1.5/1279SB-21-2.5 COMPOSITE *091505924-0007*	COMP-7	Brown Non-Fibrous Homogeneous		100.00% Non-fibrous (other)	**<0.25% Chrysotile**
1279SB-22-0.5/1279SB-23-1.5 COMPOSITE *091505924-0008*	COMP-8	Brown Non-Fibrous Homogeneous		100.00% Non-fibrous (other)	**None Detected**

NOTE: TRC Added composite names for greater clarity between Figure E-1 and this corresponding analytical lab report.

Analyst(s)

Adam C. Fink (8)

Chris Dojlidko, Laboratory Manager
or other approved signatory

Initial report from 05/01/2015 21:23:26

OrderID: 091505924

TRC

CHAIN OF CUSTODY RECORD

☐ **Mountain View Office**
1920 Old Middlefield Rd
Mountain View, CA 94043
Tel: 650.967.2365
Fax: 650.967.2785

☒ **San Francisco**
101 2nd Street, Suite 300
San Francisco, CA 94105
Tel: 415.644.3000
Fax: 415.541.9378

Detection Limit <0.25 5/8

PLM C435-A

Project Name: Presidio Lendrum Ct

Job No.: 229649 P.O. #: 80182

Report To: JHanzel-Durbin@trcsolutions.com

Sampler (print): Nathan Berube

Sampler (signature): [signature]

Electronic Deliverable Format Required: ☒ YES ☐ NO

EDF LOGCODE: ☐ LAMV LAO

Global ID #:

Sample Type: Soil

Turnaround Requirements
5 Working Days
☐ 72 Hours
☐ 24 Hours
☐ 2-3 Hours RUSH
☒ STANDARD 2wk

QC Requirement:
☐ Level IV
☒ EDF
☐ Excel/EDD

091505924

Analyses: ☐EPA 8260B –Full List ☐ EPA 8260B -8010 List | ☐ TPH gas ☐ BTEX ☐ Fuel oxygenates ☐ MTBE | ☐ TPH Diesel ☒ Si-Gel ☐ Motor Oil | TRPH (418.1) with silica gel column | ☐ Ferrous Iron Fe+2 (HACH 8146) | ☐Hexavalent Chromium (7199) | ☐ Bromide (300) | Metals: arsenic, barium, chromium, cadmium, copper, lead, selenium | ~~Metals: ☐ CAM 17 (6010)~~ NOA CARB 435 PLM | Organochlorine Pesticides (8081) | PCBs (8082) | PAHs (8310)

Sample I.D. (Field Point Name)	Date	Time	Lab I.D.	Sample Matrix	# of cont	Preserved?	NOA CARB 435 PLM	Comments:
1279SB01-0.5	4.23.15	0857		Soil	1	N/A	X	2pt comp
1279SB02-1.5	↓	0930		↓	↓	↓	X	
1279SB03-1.5 (~~1279SB03-2.0~~)		0956					X	2pt comp
1279SB04-0.5		0951					X	
1279SB05-0.5		1013					X	2pt comp
1279SB06-1.5		1034					X	
1279SB07-0.5		1046					X	2pt comp
1279SB08-1.5		1116					X	
1279SB09-0.5		1130					X	2pt comp
1279SB10-1.5		1150					X	
1279SB11-0.5		1245					X	2pt comp
1279SB12-1.5	↓	1305		↓	↓	↓	X	

Relinquished By: [signature] Date: 4.24.15 Time:

Received By: LB Date: 4/27 Time: 9a

Relinquished By: Date: Time:

Received By: Date: Time:

Relinquished By: Date: Time:

Lab of Record:

Received by Lab: Date: Time:

PM Initial:

Temp:

OrderID: 091505924

TRC

CHAIN OF CUSTODY RECORD

☐ **Mountain View Office**
1920 Old Middlefield Rd
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Fax: 650.967.2785

☐ **San Francisco**
101 2nd Street, Suite 300
San Francisco, CA 94105
Tel: 415.644.3000
Fax: 415.541.9378

Detection Limit < 0.25 %

№ 091505924

Project Name: Presidio Lendrum Ct
Job No.: 279649
P.O. #:
Report To: JustinHanzel-Durbin@trcsolution.com
Sampler (print): **Nathan Berube**
Sampler (signature):
Electronic Deliverable Format Required: ☒ YES ☐ NO
EDF LOGCODE: ☐ LAMV LAO
Global ID # :
Sample Type: Soil

Turnaround Requirements
5 Working Days
☐ **72 Hours**
☐ **24 Hours**
☐ **2-3 Hours RUSH**
☒ **STANDARD**

QC Requirement:
☐ **Level IV**
☒ **EDF**
☐ **Excel/EDD**

Sample I.D. (Field Point Name)	Date	Time	Lab I.D.	Sample Matrix	# of cont	Preserved?	☐EPA 8260B –Full List ☐EPA 8260B -8010 List	☐ TPH gas ☐ BTEX ☐ Fuel oxygenates ☐ MTBE	☐ TPH Diesel ☒ Si-Gel ☐ Motor Oil	TRPH (418.1) with silica gel column	☐ Ferrous Iron Fe +2(HACH 8146)	☐Hexavalent Chromium (7199)	☐ Bromide (300)	Metals: arsenic, barium, chromium, cadmium, copper, lead, selenium	Metals: ☐ ~~CAM 17 (6010)~~ NOA CARB 435 PLM	Organochlorine Pesticides (8081)	PCBs (8082)	PAHs (8310)	Comments:
1279SB 19-0.5	4.23.15	1325		Soil	1	N/A									X				3pt Comp
1279SB 20-1.5		1350													X				
1279SB 21-2.5		1414													X				
1279SB 22-0.5		1430													X				2pt Comp
1279SB 23-1.5		1442													X				
~~1279SB~~																			

Relinquished By:	Date: 4.24.15	Time:	Received By:	Date:	Time:
Relinquished By:	Date:	Time:	Received By:	Date:	Time:
Relinquished By:	Date:	Time:	Lab of Record:		
			Received by Lab:	Date:	Time:

PM Initial:
Temp:

EMSL Analytical, Inc.
464 McCormick Street, San Leandro, CA 94577
Phone: (510) 895-3675 Fax: (510) 895-3680
Email: SanLeandroLab@emsl.com

Attn: *Justin hanzel-Durbin*
TRC Environmental Corp.
101 2nd Street Suite 300
San Francisco, CA 94105
Phone: 510-267-1970
Fax: 510-267-1972

Project: **LENDRUM CT. DATA GAP INVESTIGATION 229649**

Customer ID: TRCS25
Customer PO: Unavailable
Received: 1/21/16 9:30AM
EMSL Order: 091601385
Analysis Date: 2/2/2016 - 2/3/2016

Report Date: **2/3/2016**

TEM CARB 435 Level: C (0.01%)

Asbestos Analysis via Modified EPA 600/R-93/ 116 method Utilizing Analytical Electron Microscopy (Section 2.5.5.2) with CARB 435 Prep (Milling) in Soil

Client Sample ID / ***EMSL Sample ID***	*Location*	*Mineral Type(s)*	*# of Structures Detected*	*Analytical Sensitivity %*	*Asbestos Weight %*	*Comments*
12795B505[0.0] / ***091601385-0001***		Chrysotile	33	0.01	0.16	
12795B506[0.0] / ***091601385-0002***		Chrysotile	11	0.01	0.01	
12795B507[0.0] / ***091601385-0003***		Chrysotile	29	0.01	< 0.01	
12795B508[0.0] / ***091601385-0004***		Chrysotile	61	0.01	0.5	
12795B509[0.0] / ***091601385-0005***		Chrysotile	53	0.01	0.89	

rcgeng
Analyst

Approved Signatory

TEM CARB Spreadsheet Version: 4.7

This is the Last Page of the Report

091601385

EMSL

TRC

CHAIN OF CUSTODY RECORD

☐ **Mountain View Office**
1920 Old Middlefield Rd
Mountain View, CA 94043
Tel: 650.967.2365
Fax: 650.967.2785

☒ **San Francisco**
505 Sansome Street, Suite 1600
San Francisco, CA 94111
Tel: 415.434.2600
Fax: 415.434.2321

TEM - MP 1/21/16

Project Name: Lendrum Ct. Data Gap Investigation
Job No.: 229649 P.O. #:
Report To: Justin Hengel-Durbin / Caroline Boecher
Sampler (print): Caroline Boecher
Sampler (signature): [signature]
Electronic Deliverable Format Required: ☒ YES ☐ NO
EDF LOGCODE: ☐ TRCO
Global ID #:
Sample Type: (Soil) Groundwater Soil Vapor

Turnaround Requirements
☐ 5 Working Days
☐ 72 Hours
☐ 24 Hours
☐ 2-3 Hours RUSH
☒ STANDARD

QC Requirement:
☐ Level IV
☐ EDF
☒ Excel/EDD

Sample I.D. (Field Point Name)	Date	Time	Lab I.D.	Sample Matrix	# of cont	Preserved?	~~☐ EPA 8260B ☐ Gas w/ ☐ BTEX ☐ MTBE~~ NOA CARB 435 Level C	☐ TPH EPA 8015M* ☐ Silica Gel ☐ Diesel ☐ Motor Oil ☐ Other___	Metals: ☐ Lead ☐ LUFT ☐ RCRA	TRPH (418.1) with silica gel column	☐ Ferrous Iron Fe^{+2} (HACH 8146)	☐ Hexavalent Chromium (7199)	2-Propanol	VOCs	TO-15	Organochlorine Pesticides (8081)	PCBs (8082)	PAHs (8310)	
127958505 [0.0]	1/20/16	1117		Rock	1	—	X												
127958506 [0.0]	↓	1120		↓	↓	↓	↓												
127958507 [0.0]	↓	1123		↓	↓	↓	↓												
127958508 [0.0]	↓	1127		↓	↓	↓	↓												
127958509 [0.0]	↓	1130		↓	↓	↓	↓												

Relinquished By: [signature] Date: 1/20/16 Time:
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ATTACHMENT E-2
EXAMPLE SAMPLE FIELD DATA SHEETS

Air Monitoring Field Data Sheet

PROJECT NAME_____
DATE _____
SHEET _____ **OF** _____
SAMPLER'S NAME _____
DATE OF LAST CALIBRATION _____

NOTES / SUMMARY OF ACTIVITIES:

_____
_____
_____
_____
_____

DISCRETE READINGS

Sample Location # _____
Time _____
Wind Direction (From) _____
Wind Speed (mph) _____
Particulates (mg/m^3) _____

Sample Location # _____
Time _____
Wind Direction (From) _____
Wind Speed (mph) _____
Particulates (mg/m^3) _____

Sample Location # _____
Time _____
Wind Direction (From) _____
Wind Speed (mph) _____
Particulates (mg/m^3) _____

Sample Location # _____
Time _____
Wind Direction (From) _____
Wind Speed (mph) _____
Particulates (mg/m^3) _____

DAILY STATISTICS

Sample Location # _____
Average Conc. (mg/m^3) _____
Max Conc. (mg/m^3) _____

Sample Location # _____
Average Conc. (mg/m^3) _____
Max Conc. (mg/m^3) _____

Sample Location # _____
Average Conc. (mg/m^3) _____
Max Conc. (mg/m^3) _____

Sample Location # _____
Average Conc. (mg/m^3) _____
Max Conc. (mg/m^3) _____

PERIMETER WALK DATA

Perimeter Walk # _____
Time _____
Wind Direction (From) _____
Wind Speed (mph) _____
Max Conc. (mg/m^3) _____
Location of Max _____
# of Exceedances _____
Exceedance Locations _____

Perimeter Walk # _____
Time _____
Wind Direction (From) _____
\Wind Speed (mph) _____
Max Conc. (mg/m^3) _____
Location of Max _____
# of Exceedances _____
Exceedance Locations _____

ATTACHMENT E-3

USEPA ARSENIC OUTPUT

Site-specific

Resident Equation Inputs for Air

Variable	Value
TR (target cancer risk) unitless	1.0E-6
ED_{res} (exposure duration - resident) year	1
THQ (target hazard quotient) unitless	1
LT (lifetime - resident) year	70
EF_{res} (exposure frequency) day/year	250
ED_{0-2} (exposure duration first phase) year	2
ED_{2-6} (exposure duration second phase) year	4
ED_{6-16} (exposure duration third phase) year	10
ED_{16-26} (exposure duration fourth phase) year	10
EF_{0-2} (exposure frequency first phase) day/year	350
EF_{2-6} (exposure frequency second phase) day/year	350
EF_{6-16} (exposure frequency third phase) day/year	350
EF_{16-26} (exposure frequency fourth phase) day/year	350
ET_{0-2} (exposure time first phase) hr/day	24
ET_{2-6} (exposure time second phase) hr/day	24
ET_{6-16} (exposure time third phase) hr/day	24
ET_{16-26} (exposure time fourth phase) hr/day	24
ET_{res} (exposure time) hour/day	24

Site-specific

Resident Screening Levels (RSL) for Air

ca=Cancer, nc=Noncancer, ca* (Where nc SL < 100 x ca SL),
ca** (Where nc SL < 10 x ca SL), max=SL exceeds ceiling limit (see User's Guide), sat=SL exceeds csat,
Smax=Soil SL exceeds ceiling limit and has been substituted with the max value (see User's Guide),
Ssat=Soil inhalation SL exceeds csat and has been substituted with the csat

Chemical	CAS Number	Mutagen?	VOC?	Inhalation Unit Risk $(ug/m^3)^{-1}$	IUR Ref	Chronic RfD (mg/kg-day)	Chronic RfD Ref	Chronic RfC (mg/m^3)	Chronic RfC Ref	Carcinogenic SL TR=1.0E-6 (ug/m^3)	Noncarcinogenic SL THI=1 (µg/m^3)	Screening Level (ug/m^3)
Arsenic, Inorganic	7440-38-2	No	No	4.30E-03	U	3.00E-04	U	1.50E-05	U	2.38E-02	2.19E-02	2.19E-02 nc

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APPENDIX F
CONSTRUCTION QUALITY ASSURANCE PLAN
LENDRUM COURT
PRESIDIO OF SAN FRANCISCO, CALIFORNIA

THE PRESIDIO TRUST
103 Montgomery Street, P.O. Box 29052
San Francisco, California 94129-0052

TRC Project No. 229649

May 2016

TRC
9685 Research Drive
Irvine, California 92618
(949) 727-9336

APPENDIX F
CONSTRUCTION QUALITY ASSURANCE PLAN
LENDRUM COURT
PRESIDIO OF SAN FRANCISCO, CALIFORNIA

May 26, 2016

Prepared for

THE PRESIDIO TRUST
103 Montgomery Street, P.O. Box 29052
San Francisco, California 94129-0052

Prepared By

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Principal Engineer

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FIGURE

ABBREVIATIONS AND ACRONYMS

AB	Aggregate Base
ADMMP	Air and Dust Monitoring and Mitigation Plan
CCR	California Code of Regulations
CI	Construction Inspector
CM	Construction Manager
COCs	chemicals of concern
CQA	Construction Quality Assurance
CQAP	Construction Quality Assurance Plan
CSAP	Confirmation Sampling and Analysis Plan
DTSC	California Environmental Protection Agency, Department of Toxic Substances Control
Presidio	Presidio of San Francisco
QA/QC	quality assurance/quality control
RAW	Remedial Action Workplan
RDIP	Remedial Design Implementation Plan
Site	Lendrum Court - Phase 1
SWPPP	Storm Water Pollution Prevention Plan
TBD	To Be Determined
TPZ	Tree Protection Zone
Trust	Presidio Trust

1.0 INTRODUCTION

On behalf of the Presidio Trust (Trust), TRC has prepared this Construction Quality Assurance Plan (CQAP) for remedial construction activities at the Lendrum Court Site (the Site), located at the Presidio of San Francisco, California (Presidio). This CQAP is provided as an appendix to the Revised Remedial Design Implementation Plan (RDIP), which describes processes and procedures to be implemented by the Trust to remediate the Lendrum Court Site. The RDIP was developed based on TRC's *Removal Action Work Plan* (TRC, 2015), which was approved by DTSC in August 2015. This CQAP describes the objectives and scope of the Construction Quality Assurance (CQA) program that will be implemented during remedial construction activities at the Site.

1.1 PURPOSE AND OBJECTIVES

The CQA program provides a definition of the materials, and procedures to be used during construction. Additionally, the CQA program assures regulatory agencies that construction materials will be tested, installed, and monitored as specified in the design drawings and technical specifications (Drawings and Specifications; Appendix A of the RDIP), constructed in accordance with accepted civil engineering practices, applicable CQA requirements, and manufacture specifications to maintain warranties of material products.

This CQAP was developed with the objectives of: (a) assuring implementation of remedial construction activities at the Site, which includes excavation and disposal of organic topsoil, re-grading and compaction of contaminated soils, and capping in place, and (b) meeting the requirements of California Code of Regulations, Title 22, Chapter 14, Article 2, Section 66264.19 for a construction quality assurance program. This CQAP presents the construction procedures and material requirements that will be implemented during construction. The final construction documents will include Drawings and Specifications for all major contract elements. The documents will also specify the minimum experience requirements for contractors, work crews, and inspectors.

The scope of the CQAP is to:

- Provide clarification as to the roles and responsibilities of participating parties, structure of meetings to be held during construction, and general inspection and documentation procedures;
- Establish procedures that will assure work activities are performed in accordance with the project design to achieve performance requirements; and
- Include requirements for construction procedures, CQA oversight, field and laboratory testing.

Title 22 California Code of Regulations (CCR) Section 66264.19 (the State of California's adoption of the Code of Federal Regulations, Part 264) requires a CQA program for construction of all surface

impoundments, waste piles or landfill units that are required to comply with 22 CCR Sections 66264.221 (c) and (d), 66264.251 (c) and (d), and 66264.304 (c) and (d).

1.2 CQAP ORGANIZATION

This CQA Plan is organized into the following sections:

- Identification of key project personnel
- Definitions
- Personnel qualifications
- Meetings during construction
- Monitoring and testing activities
- Construction documentation.

1.3 KEY PROJECT PERSONNEL

Presidio Trust (Trust)

The Trust is the Contracting Agency and the Owner of the Project. The Trust will direct all work activities, and will administer all pay requests and change orders. The Trust's Remediation Project Manager will serve as the Owner's representative, will directly contract with the primary contractor (Contractor), and will regularly communicate the status of the project to Department of Toxic Substances Control (DTSC) and other stakeholders. The Trust will also contract air and dust monitoring and soil confirmation sampling services during soil removal and placement activities at the Site.

Trust Contact Information:

Remediation Project Manager:
Nina Larssen
Office: (415) 561-5421
Email: nlarssen@presidiotrust.gov
Mailing Address:
103 Montgomery Street, P.O. Box 29052
San Francisco, California 94129-0052

Engineering Design Firm: TRC

Warren Chamberlain, P.G., C.HG. P.E., of TRC will represent the Trust as their design engineer and address issues related to the Project Drawings and Specifications included in the remedial design documents. During construction, TRC will perform field sampling, air and dust monitoring, and project design oversight on behalf of the Trust, and prepare project documentation that will be included in the Construction Completion Report. Additionally, TRC will represent the Trust as the Construction Manager

on site throughout construction activities and will coordinate between the Contractor, Trust, TRC, subcontractors, and other site visitors to facilitate a successful project.

TRC Key Personnel and Contact Information:

Design Engineer and CQA Officer:
Warren Chamberlain, P.G., C.H.G., P.E.
Office: (415) 644-3054
Cell: (650) 270-8741
Email: WChamberlain@trcsolutions.com
Street & Mailing Address:
505 Sansome Street, Suite 1600
San Francisco, CA 94111

Geotechnical Engineer:
Wilson Wong, P.E.
Office: (650) 967-2365 x 171
Cell: (650) 554-8889
Email: WWong@trcsolutions.com
Street & Mailing Address:
1920 Old Middlefield Way
Mountain View, CA 94043

Project Manager:
Justin Hanzel-Durbin
Office: (510) 663-4169
Cell: (415) 209-3326
Email: JHanzel-Durbin@trcsolutions.com
Street & Mailing Address:
505 Sansome Street, Suite 1600
San Francisco, CA 94111

TRC Client Service Manager:
Eileen Fanelli
Office: (949) 341-7447
Cell: (949) 562-4122
Email: EFanelli@trcsolutions.com
Street & Mailing Address:
9685 Research Drive,
Irvine, CA, 92618

Construction Manager (CM):
Bill Ingles
Cell: (510) 453-4023
Email: WIngles@trcsolutions.com

Construction Inspector (CI):
Jim Chidester
Cell: (925) 260-9267
Email: jchidester@trcsolutions.com
Street & Mailing Address:
2300 Clayton Rd., Suite 610
Concord, CA 94507

Contractor

The Trust's Contractor, Engineering/Remediation Resources Group, Inc., is responsible for remedial construction activities, as outlined in the RDIP. The Contractor will implement the remedial action as outlined in the Drawings and Specifications.

Contractor Contact Information:

Senior Project Manager:
Tyson Appel
Office: (415) 848-7106
Cell: (925) 250-4056
Email: tyson.appel@errg.com
Street & Mailing Address:
115 Sansome Street, Suite 200
San Francisco, CA 94104

Regulatory Agency

The DTSC is the lead regulatory agency for the project that will serve as the primary point of contact for regulatory affairs during remedial construction, and certify closure in accordance with the Remedial Action Workplan (RAW; TRC 2015), which was prepared by TRC on behalf of the Trust.

DTSC Contact Information

Primary Point of Contact:
George Chow
Email: George.Chow@dtsc.ca.gov
Office: (510) 540-3879

Fax: (510) 540-3819
Address:
700 Heinz Avenue, Ste. 200
Berkeley, CA 94710

2.0 PERSONNEL QUALIFICATIONS

This section presents the qualifications and responsibilities of key members of the construction team, as required by CCR 66264.19(b)(2). An organization chart illustrating the responsibilities and lines of communication between the Trust, the Contractor, CQA team and onsite construction personnel, and the regulatory agency is included on Figure F-1.

2.1 CONSTRUCTION MANAGER

The Construction Manager (CM) (i.e., the Trust's designated Owner's Representative):

- Has practical experience in construction coordination, contract administration, and earthwork construction.
- Will communicate effectively with the CI, CQA Officer, and Contractor so that there will be a clear understanding of construction activities and problems or deficiencies.
- Has the authority to enforce the requirements of the RAW, RDIP, Drawings and Specifications, and contract requirements.

Major duties and responsibilities of the CM are to:

- Review the RAW, RDIP, Drawings and Specifications (and other contract documents), and the CQAP to become familiar with the design, construction, and testing requirements.
- Lead and facilitate all construction meetings, prepare minutes of the meetings, and distribute minutes to all attending and involved parties.
- Review the Contractor's progress and construction schedule to identify and discuss potential impacts or delays.
- In cooperation with the Trust's Project Manager and Contracting Officer, the CM will enforce requirements of the construction contract with the Contractor.

2.2 CONSTRUCTION INSPECTOR

The Construction Inspector (CI):

- Has formal training and practical experience in earthwork construction.
- Will communicate effectively with the CM and CQA Officer, with regard to project progress and provide results of geotechnical testing and analytical testing to ensure project specifications are being met. The CI will communicate with the Contractor on a daily basis

and establish a clear understanding of construction activities, identify problems or deficiencies, and potential schedule impacts or delays.

Major duties and responsibilities of the CI are to:

- Review the RAW, RDIP, Drawings and Specifications (and other contract documents), and the CQAP to become familiar with the design, construction, and testing requirements. The CI should also become familiar with the Contractor's work schedule and work phases.
- Attend preconstruction, weekly, and construction deficiency or conflict resolution meetings.
- Observe work in progress.
- Prepare daily field reports documenting field activities and monitoring conducted at the Site. These should be submitted to the Project Manager, Construction Manager and CQA Officer on a daily basis for review and approval.
- Responsible for the CQA documents and on-site organization of the documents for easy access. The CI will also be responsible for keeping duplicate records of all documentation at an off-site location.

2.2 CQA OFFICER

The CQA Officer will have requisite experience and will be registered as a professional engineer (PE) or certified engineering geologist (CEG) in the State of California.

The CQA Officer:

- Is an engineer with experience in the State of California in earthwork excavation, remedial design, and construction monitoring.
- Has practical, technical, and managerial experience that will allow the CQAP to be properly implemented.
- Will be able to communicate effectively with construction personnel (including the CI and CM), design engineers, contractors, analytical testing laboratories, the Trust, and regulatory agencies so that there will be a clear understanding of construction activities and this CQAP.

Major duties and responsibilities of the CQA Officer are to:

- Review the RAW, RDIP, Drawings and Specifications (and other contract documents), and the CQAP to become familiar with the design, construction, and testing requirements.
- Become familiar with the Contractor's work schedule and work phases.
- Attend preconstruction, weekly, and construction deficiency or conflict resolution meetings.
- Prepare a schedule of CQA monitoring activities, and coordinate the CQA monitoring schedule to provide necessary monitoring and testing.

- Manage or provide necessary CQA monitoring and testing in compliance with CQA requirements and procedures pertaining to earthwork excavation, monitoring, and confirmation sampling.
- Observe work in progress on an intermittent basis.
- Review inspection reports, inspection data sheets, and inspection photographs on a daily basis, and evaluate inspection reports for internal consistency, accuracy, and completeness.
- Interpret data and review reports documenting CQA monitoring and testing activities.
- Identify work that will be accepted or rejected based on monitoring observations or test results.
- Prepare a Final CQA Report for inclusion in the Construction Completion Report.
- Incorporate revisions into the CQA Plan and distribute revised copies to the contractors and other relevant parties.

The CQA Officer will provide direction to the CQA Monitors (i.e., engineering or field technicians) who may perform CQA monitoring and testing activities in compliance with CQA requirements. CQA Monitors must have formal training and practical experience for inspecting and testing construction work relative to solid waste disposal sites, including conducting and recording inspection activities, preparing field logs, and performing field tests.

2.3 DESIGN ENGINEER

TRC's Design Engineer:

- Is a professional civil engineer registered in the State of California.
- Has relevant experience in earthwork excavation, remedial design, and construction monitoring.
- Has practical, technical, and managerial experience that will allow the CQAP to be implemented in accordance with the design documents.
- Will be able to communicate effectively with construction personnel (including the CI and CM), contractors, the Trust, and regulatory agencies so that there will be a clear understanding of construction activities and this CQAP.

Major duties and responsibilities of the Design Engineer are to:

- Assist the Contractor and the CQA team with interpretation of the design elements presented in the RDIP, drawings and specifications, and contract documents.
- Become familiar with the Contractor's work schedule and work phases.

- Attend preconstruction and construction deficiency or conflict resolution meetings on an as-needed basis.

The Design Engineer designated for the project is Warren B. Chamberlain, P.E. The geotechnical evaluation, recommendations, and engineering support are being provided by Wilson Wong, PE.

2.4 CONTRACTOR

The Trust's Contractor:

- Has relevant construction experience in understanding design documents, earthwork, excavation, handling, transport and disposal of waste material, and implementation of the remedy.

The Contractor's Site Superintendent:

- Has formal training and practical experience in construction management.
- Has specific knowledge of excavation practices, loading and transportation practices, preparing waste manifests, understands equipment capabilities, and dust and erosion control best management practices.
- Has qualifications in accordance with the project requirements.

Major duties and responsibilities of the Contractor are to:

- Provide all tools, equipment, supervision, labor, and materials necessary to complete the project as identified in the RAW, RDIP, Drawings and Specifications (and other contract documents), and approved design changes.
- Attend preconstruction, weekly, and construction problem or deficiency meetings.
- Prepare and submit construction progress schedules, obtain necessary permits and plan approvals, procure and submit material specifications data sheets prior to initiating construction activities for review by the CM and other submittals as required in the construction contract.

3.0 MEETINGS DURING CONSTRUCTION

Regular meetings will be held throughout the duration of the construction project to enhance communication between the Contractor, TRC, subcontractors, the Trust, stakeholders, and regulatory agencies. These meetings will aid the organizations involved in becoming familiar with the project's design, construction procedures, and if applicable, recent design changes. Types of regular meetings include:

- Pre-construction (kick-off meeting);

- Daily Tailgate (discussion of safety and construction issues); and
- Status meetings (held among regulatory agencies).

3.1 PRE-CONSTRUCTION KICKOFF MEETING

The Trust will hold a kick-off meeting prior to the initiation of construction activities. The meeting will include representative(s) of the Trust, DTSC, the Trust's Contractor, TRC, and other subcontractors that will participate throughout the project. Discussion topics may include:

- Project objectives, including elements of the RDIP and CQAP;
- Roles, responsibilities, lines of authority, and lines of communication and authority;
- Estimated daily work hours and work days per week throughout the project;
- Health and safety, and emergency contact information;
- Communications with the public, regulators, and media;
- Protection of natural resources;
- Work area security and check in procedures;
- Material and equipment delivery, handling, and storage areas; and
- Borrow, stockpile locations, water management, and dust and erosion control procedures.

The CM will prepare the kick-off meeting minutes and include them in the meeting documentation section of the Construction Completion Report.

3.2 DAILY MEETINGS

The CI will lead daily tailgate meetings at the start of each work day with all contractors and subcontractors working at the Site. Discussion items may include safety, quality issues, planned activities, lessons-learned, and expected visitors. A sign-in sheet will document meeting attendees; no meeting minutes will be prepared.

3.3 STATUS MEETINGS

The CM will lead status meetings for Trust and regulatory agency representatives. The CM will distribute a packet that contains a summary of the work activities, and if applicable, field and laboratory reports. Discussion topics will include: a summary of completed work, overview of project progress, changes in schedule, test results, changes to protocols, and inspection results. The CM will take meeting notes that will be part of the project documentation and will be included in the documentation portion of the Construction Completion Report.

4.0 CQA MONITORING AND TESTING ACTIVITIES

This section includes the inspection and sampling activities to be performed by the CQA team, per the requirements of 22 CCR 66264.19(b)(3) and 66264.19 (3). Monitoring and testing activities will be performed by the CQA team throughout the remedial construction activities at Lendrum Court. In general, the following pre-construction, construction, and post-construction inspection activities will be conducted.

Pre-Construction

Pre-construction inspection activities of the CQA team will generally include:

- Review of design criteria, Drawings and Specifications associated with the remedial construction;
- Review of contractors' submittals, samples, and supporting test reports;
- Review of the contractors' work schedules;
- Inspection of materials planned for construction; and
- Verification that the temporary alternate access route is established per the design Drawings and Specifications.

Construction

The construction inspection activities of the CQA team will generally include:

- Review of the contractors' work schedules;
- Verification that materials are provided as specified in the Drawings and Specifications or that alternative materials, if requested, are approved by the Design Engineer prior to being delivered to the project;
- Observation of all phases of the construction and documentation of the contractors' compliance or noncompliance with the Drawings and Specifications, and/or the directions of the Design Engineer. Field tests and visual observations will be used to evaluate construction practices; and
- Changes to accommodate seasonal conditions, if warranted.

Post-Construction Final Documentation

At construction completion, a final CQA report will be prepared to include:

- Daily inspection summary reports;
- Inspection data sheets;
- Photographic reporting data sheets;

- A summary of soil test results, including a map showing the locations of where tests are performed;
- As-built reports; and
- Deviations from Design and Specifications (with justifying documentation).

A statement that remedial construction has been implemented in general conformance with the approved Plans, Specifications, and the approved modifications of the Drawings and Specifications, will be included in the final CQA report. The final CQA report will be sent to the appropriate regulatory agencies.

4.1 EARTHWORK AND EROSION CONTROLS

The CI will monitor the following components of the work: excavations, consolidation and compaction of soil and debris, site grading, cap placement, installation of erosion control measures and re-vegetation. These activities are divided into pre-construction, construction, and post-construction activities.

The CM, CI, and CQA Officer, will conduct pre-construction training and information sessions to familiarize the Contractor's field staff with the specified design, testing, and monitoring policies and procedures. Construction procedures will be established with the goal of meeting the design requirements.

During the pre-construction period, the CM will:

- Become familiar with the requirements listed in the RDIP and Drawings and Specifications.
- Review Contractor submittals and either (1) approve submittals if no changes are required, (2) approve submittals with comment, or (3) reject submittals and request the Contractor resubmit with corrections. If resubmittals are deemed adequate, the CM will approve with written acknowledgement.

The CM, CI, and CQA Officer will implement this CQA program to document compliance with the requirements of the RDIP. Activities associated with this program have been separated into the following categories:

- Pre-Construction Activities;
- Demolition;
- Remedial Grading;
- Air and Dust Monitoring;
- Confirmation Soil Sampling and Analytical Testing;
- Disposal;
- Cap Construction;
- Soil Compaction Testing;

- Placement and anchoring of the protective gopher wire mesh;
- Erosion Control Measures;
- Revegetation;
- Remedial Construction Quality Control/Quality Assurance; and
- Repairs.

4.1.1 Pre-Construction Activities

During the Pre-Construction activities, the CI will confirm the following activities have been performed:

- Mobilization of construction equipment, establishment of work zones including designating soil stockpile areas, placement of protective fencing, and other temporary features in general accordance with the Drawings.
- Best Management Practices (BMPs) are in place or are being prepared.
- Erosion and sediment controls are on site, have been placed where appropriate, and are available for deployment.
- Establishment of the temporary alternate access route and appropriate signage is posted in general accordance with the Drawings and Specifications.
- A pre-construction (i.e., base grade) topographic survey has been completed by the Contractor prior to initiating demolition activities.

4.1.2 Demolition

During the Demolition activities, the CI will confirm the following:

- Trees designated for removal in the Drawings have been cut down and the stumps have been grinded to a depth of at least one-foot below rough grade.
- Clearing and grubbing activities have been performed to remove the organic-rich topsoil, which is estimated to extend 4 to 6 inches below existing grade.
- Hardscape features (e.g., patios, curbs, sidewalks, paths) designated for demolition, have been removed in general accordance with the Drawings.
- Demolition activities are performed in accordance with natural resource requirements and equipment restrictions provided in the RDIP, Drawings and/or Specifications, including adherence to protocols for work within tree protection zones (TPZs)[1].

[1] A TPZ extends 20 feet radially from the trunk of the tree and 10 feet radially from a shrub.

- Demolition activities are being performed in a safe manner and in accordance with the site-specific Health and Safety Plan (Appendix D of the RDIP).

4.1.3 Rough Grading

During rough grading, the CM, supported by the CI and engineering and field technicians, will confirm the following:

- Remedial grading activities are performed in a safe manner and in accordance with the site-specific Health and Safety Plan.
- Remedial grading activities are performed in accordance with natural resource requirements and equipment restrictions provided in the RDIP, and Drawings and Specifications.
- Excavations are performed in general accordance with the requirements and plans presented in the Drawings and Specifications, including:
    - Excavation of organic-rich topsoil, which is estimated to extend 4 to 6 inches below existing grade;
    - Excavation of contaminated soil and debris to construct rough grades;
    - Excavations in and confirmation sampling in areas designated to be clean closed during remedial construction;
    - Excavation activities and/or removal of surficial plant litter within TPZs is performed utilizing hand tools or small, track-mounted equipment and work is overseen by an arborist; and
    - Excavations into serpentinite bedrock should be avoided to the extent practicable.
- Excavation activities are performed in a manner that will allow for like waste materials to be segregated and individually stockpiled. Additional waste segregation may be required by the Trust based on the types of material found during the excavation.
- Stockpiled waste and soil, if stockpiled on clean ground, is placed on protective ground liners and covered in accordance with the RDIP.
- Delineation of the area where serpentinite bedrock is less than 6 inches below existing ground surface.
- Contaminated soil and debris are consolidated to construct rough grades. Soil to be placed in lifts no greater than eight inches in uncompacted thickness as specified in the Geotechnical Evaluation (Appendix B of the RDIP).
- Prior to placement of capping materials, exposed surface soils (i.e., rough grades) are scarified to a maximum depth of 6 inches, moisture conditioned, and compacted in accordance with the recommendations presented in the Geotechnical Evaluation.
- Compaction testing is performed at the locations shown on Figure F-2 and as specified in the RDIP, Geotechnical Evaluation, and Drawings and Specifications.
- An as-built survey is performed by the Contractor.

4.1.4 Air and Dust Monitoring

Air and Dust Monitoring will be conducted in accordance with the Air and Dust Monitoring and Mitigation Plan (ADMMP; Appendix E of the RDIP), which details baseline and construction air monitoring requirements. In support of air and dust monitoring activities, the CQA Officer, supported by the CM and CQA Monitoring field technicians, will:

- Confirm that monitoring methods, sampling frequency, and record keeping is performed in accordance with the requirements of the ADMMP.
- Compile and review analytical test results, and transmit the results to the Trust and DTSC.
- If analytical results from dust samples indicate concentrations of lead in air above the adjusted RBC_{air} value, the CM, in collaboration with the Contractor, will ensure that work is stopped until more aggressive dust control measures are implemented.

4.1.5 Confirmation Soil Sampling and Analytical Testing

In support of confirmation sampling and testing activities, the CQA Officer, supported by the CM and field technicians, will:

- Confirm collection and documentation of confirmation soil samples in accordance with the requirements of the Confirmation Sampling and Analysis Plan (CSAP; Appendix G of the RDIP).
- Compile and review analytical test results, and transmit the results to the Trust and DTSC.
- If the analytical results indicate constituents in the soil are greater in concentration than the cleanup levels presented in the RDIP, the CQA Officer and CM, in collaboration with the Trust and DTSC will determine how much additional soil needs to be excavated.
- If the analytical results indicate concentrations of COCs in the soil are less than or equal to the required cleanup levels in the RDIP, the CQA or TRC's project manager will inform the DTSC and the Trust of these findings. Upon concurrence by the Trust, the CM will document that the excavation is complete and will document the limits of the completed excavation on a site plan.

4.1.6 Disposal

During the waste disposal activities, the CM will confirm the following:

- The Contractor has characterized the waste, has reported the results to the Trust, and has recycled or disposed of the waste in accordance with the Specifications.
- The CQA Monitor has collected and verified waste manifests from the Contractor.

4.1.7 Cap Construction

During cap construction, the CM, supported by the CI field technicians, will confirm the following:

- Import soil meets all environmental and geotechnical requirements presented in the Geotechnical Evaluation and the Specifications.
- Cap construction is performed in a safe manner and in accordance with the site-specific Health and Safety Plan.
- Cap construction is performed in accordance with natural resource requirements and equipment restrictions provided in the RDIP, Drawings, and Specifications, including adherence to protocols for work within TPZs.
- Placement of the protective soil cap is performed in general accordance with the requirements and plans presented in the Drawings and Specifications, including:
    - The soil cap is constructed using clean imported soil, where the typical minimum thickness of the soil cap is 1.5 feet;
    - Import soil to be placed in lifts no greater than eight inches in uncompacted thickness as specified in the Geotechnical Evaluation (Appendix B of the RDIP).
    - PVC-coated,16-gauge welded galvanized steel gopher wire mesh with ½-inch by ½-inch openings is installed and anchored properly;
    - The soil cap conforms to buildings, bedrock outcrops, curbs, and AC paths, as shown in the Drawings (Sheet C-114, Details 1, 2, 3, and 4);
    - The aggregate base (AB) pads that will serve as the protective cap in the areas behind Buildings 1259, 1278 and 1279 are constructed as shown on plans (Sheet C-119, Detail 3); and
    - The soil cap is constructed as shown on plans around the trees within the traffic island which are to be preserved (Sheet C-115, Detail 1).
- Imported soil for the cap will be compacted in accordance with the recommendations presented in the Geotechnical Evaluation. Compaction testing is performed at the locations shown on Figure F-3 and as specified in the RDIP, and Drawings and Specifications.
- Final grades are constructed in general accordance with the requirements and plans presented in the Drawings and Specifications. The final grade contour lines are target elevation that may be subject to change due to slope rounding, compaction or other field conditions encountered during the construction activity. Justification for grading adjustments during construction will be documented by the CI, and ultimately be implemented under the approval and direction of the Design Engineer.
- A final grade topographic survey is performed by the Contractor.

4.1.8 Erosion Control Measures

Erosion control measures will be conducted in accordance with the Storm Water Pollution Prevention Plan (SWPPP; Appendix C of the RDIP), which will be implemented during remedial construction and post-construction phases of work. The CM, supported by a QSP or trained technician, will perform inspections per the SWPPP. After completion of the field construction work, the CM or the CQA officer will confirm the following:

- The Contractor has removed and disposed of erosion control materials that were installed for temporary erosion control and are not required to remain on site during the post-construction phase of work.
- The Contractor has removed all temporary structural erosion control measures and has re-graded the Site in accordance with the Drawings and Specifications and to the satisfaction of the Trust.
- The post-construction erosion control measures are installed as indicated in the Drawings. Field adjustments shall be made in consultation with the CM and Design Engineer to accommodate unanticipated conditions.

4.1.9 Revegetation

During the revegetation activities, the CM, supported by the CI, will confirm the following:

- Excavations associated with revegetation do not extend into contaminated soils or debris fill.
- Verification that hydroseed and/or plants are disease free and meet project Specifications.
- Planting activities do not compromise the cap (e.g., gopher wire is not cut, cap thickness and elevations reflect as-built final grades).
- Watering activities associated with revegetation do not promote erosion of the cap.

4.1.10 Remedial Construction Quality Control/Quality Assurance

A general summary of quality assurance/quality control (QA/QC) testing protocols planned to be followed during remedial construction are presented in Table F-1. Additional QA/QC and testing requirements are detailed in the Specifications.

4.1.11 Repairs

Any areas of the construction work that have not been accepted by the CM and the CQA Officer shall be repaired in accordance with the requirements of the RDIP and Drawings and Specifications or by other accepted means. The CM will:

- Identify areas requiring repair based on monitoring observations and testing; and
- Document that the repairs have been made and conform to Specifications.

The CM and CQA Officer will prepare a punch list identifying deficiencies in the final condition of the construction project that require repair before final acceptance of the work. The CM will transmit to the Trust for review prior to being forwarded to the Contractor for action. After the Contractor has made the final repairs, the CM and CQA Officer will conduct an additional inspection focusing on the previously identified deficiencies. After deficiencies are repaired and accepted, the CQA Officer will prepare a letter of acceptance for the completed work and will transmit this letter to the Trust.

5.0 CONSTRUCTION DOCUMENTATION

5.1 DAILY FIELD REPORTS

The CI will complete a daily report of construction activities at the end of each day. Daily reports will be included and summarized in the status reports that will be transmitted during the status meetings and included in the documentation section of the Construction Completion Report. Contents of the daily reports will include the following information:

- Project name, date, and location.
- Weather and site conditions.
- Summary of observations and work performed, including a description that specifies the location of the work (identified by coordinates) and the units of work being tested and/or observed. The summary will also identify which contractor or sub-contractor performed the work.
- Supporting inspection data sheets and records prepared by the CQA Monitor(s).
- Materials and equipment delivered to the project site.
- Any deviations or changes to the RDIP, Drawings, Specifications, and this CQAP.
- Corrective actions that were taken, if any.
- Significant delays.
- Production rates (quantities excavated, excavation rates, etc.).
- Suggestions to the Contractor provided by the CQA personnel.
- Substantive conversations with the Contractor or visitors.
- Observation of unforeseen conditions that might cause a slowdown by the contractor.
- Work or material in place that do not comply with the Specifications. Note the corrective actions that were taken.
- A factual account of accidents and/or injuries that may have occurred.

5.2 INSPECTION DATA SHEETS

Field observations and field testing performed by the CQA Officer or CQA Monitor(s) will be recorded on an inspection data sheet, which will be included in the daily field report prepared by the CI. Field testing will follow ASTM standard test procedures in accordance with the Specifications. Field observations may include: ASTM notes, charts, drawings or sketches, photographs, or any combination of the above. The inspection data sheets will contain the following minimum information:

- Description and title of the inspection activity;
- Time the activity was performed;
- Location of the inspection activity;
- Weather conditions;
- Site conditions;
- Standard test method used or type of inspection activity;
- Test equipment used;
- Record of observation and/or test data, with all calculations completed and checked;
- Comparison of test results and observations with specification requirements;
- Names and titles of all persons involved in the inspection activity; and
- Record of material or workmanship that does not meet the Designs or Specifications, corrective action measures, and results.

5.3 WEEKLY AND MONTHLY STATUS REPORTS

Weekly Status Reports

The CM, supported by the CI, will prepare a weekly status report that will contain:

- A transmittal cover that summarizes the contents of the report;
- A summary of activities completed during the week reported;
- A projection of work to be completed in the following week;
- Deviations or changes to plans or schedule;
- Copies of Daily Field Reports;
- Laboratory results (including a summary table that compares to cleanup levels); and
- CQA issues.

These weekly status reports will be included in the documentation section of the Construction Completion Report.

Monthly Status Reports

Monthly construction summaries will be prepared by the CQA Officer and will include the following items:

- Summary of work completed during the reporting month;
- Summary of the completed inspection data sheets;
- Inspection dates;
- Time spent on the site;
- Activities performed;
- Tests performed;
- Specific locations inspected; and
- Methods used in analyzing sample results for the purpose of construction quality assurance.

These monthly status reports will be included in the documentation section of the Construction Completion Report.

5.4 OTHER DOCUMENTATION

In addition to the daily and weekly status reports, the following documentation activities will be performed:

- Construction Monitor(s), will complete air and dust monitoring and mitigation documentation as specified in the ADMMP.
- The Contractor will submit copies of weight tickets and waste manifests to the Trust weekly.

5.5 DEFICIENCY IDENTIFICATION AND CORRECTIVE ACTION

The CM will inform the Trust of differences in plans as interpreted by the Contractor, CQA Officer, or Design Engineer, or suspected work deficiencies. After the CM has identified a deficiency or change in plans, they will meet with the Trust to:

- Define and discuss the problem or deficiency;
- Review alternative solutions; and
- Implement an action plan to resolve the problem or deficiency.

5.6 PLAN MODIFICATION

The Trust or the CM (as authorized by the Trust and DTSC) has authority to direct design changes, such as extending excavation activities beyond proposed limits shown on Drawings. The CM will document these changes in the daily field notes and weekly status report summary transmittal. Significant design changes will be made following consultation between the CM, the Trust, Design Engineer, and DTSC.

The CQA Officer will be responsible for incorporating revisions into the CQA Plan and distributing revised copies to the construction contractors and other relevant parties.

5.7 CHANGE IN SCOPE DOCUMENTATION

The CQA personnel will document the Trust's request to perform out-of-scope services through change order requests made by the Contractor, which will be included in the weekly status reports.

5.8 FINAL INSPECTION

Following completion of the remedial action, final inspection will be conducted in accordance with the *Presidio Trust and United States Department of Defense, Department of the Army, Memorandum of Agreement Regarding Environmental Remediation of Presidio of San Francisco*, dated May 24, 1999.

5.9 PHOTOGRAPHIC DOCUMENTATION

The CQA Team (i.e., CQA Officer, Construction Monitor(s), CM and CI) will take photographs to document observations, problems, deficiencies, or work in progress and will store them in a protective file. Photographic documentation will include:

- Pre-construction photographs;
- Traffic control and site security;
- Demolition activities;
- Remedial grading activities;
- Cap construction;
- Stockpiling and truck loading operations;
- Erosion Controls;
- Unforeseen conditions observed during remedial construction; and
- Equipment decontamination.

The CI will be responsible for filing photographs in chronological order in a permanent, protective file and index them by:

- Date and time of each photograph;
- Location where the photograph was taken and information regarding the orientation of the view of the photograph; and
- Description of the subject matter.

5.10 SITE SURVEY REQUIREMENTS

The CM will be responsible for directing surveyors to the appropriate survey benchmarks for both vertical and horizontal control. Topographic surveys will be performed for pre-construction grade, base grade, and final grade by the Contractor. The CM will include a copy of these topographic maps in the Construction Completion Report.

5.11 CONSTRUCTION COMPLETION REPORT

After completion of remedial construction activities, the CQA Officer will prepare a Final CQA Report to be included as an appendix in the Construction Completion Report. The CQA Officer will document that the field work was conducted in accordance with this CQAP. The CQA report will include:

- Detailed summary of the remedial action activities completed;
- Confirmation soil sampling data and associated survey data;
- Pre-construction, base grade and final grade topographic survey maps;
- Waste characterization analytical data;
- Soil compaction test results;
- Deviations from design and material specifications (with justifying documentation);
- Copies of waste manifests and supporting waste disposal information;
- As-built drawings;
- A photographic record of the work;
- Daily field and inspection summary reports; and
- A visitor contact log.

5.12 DOCUMENT CONTROL AND STORAGE

During construction, the CI will be responsible for the CQA documents and organization of the documents for easy access. The CQA officer will also be responsible for keeping duplicate records of all documentation at an off-site location.

The CQA Officer will be responsible for incorporating revisions into the CQA Plan and distributing revised copies to the CM, CI, construction contractors and other relevant parties.

Following completion of remedial construction, the Trust will store original documents so that they are protected from damage, yet can be readily accessed. All documentation will be maintained throughout the vegetation establishment period.

6.0 REFERENCES

TRC, 2015. *Removal Action Work Plan, Lendrum Court, Presidio of San Francisco, California*. July.

TRC, 2016a. Revised Remedial Design Implementation Plan. Lendrum Court, Presidio of San Francisco, California, March.

TRC, 2016b. Construction Drawings and Specifications, Lendrum Court Area, The Presidio Trust, San Francisco, California.

TABLE

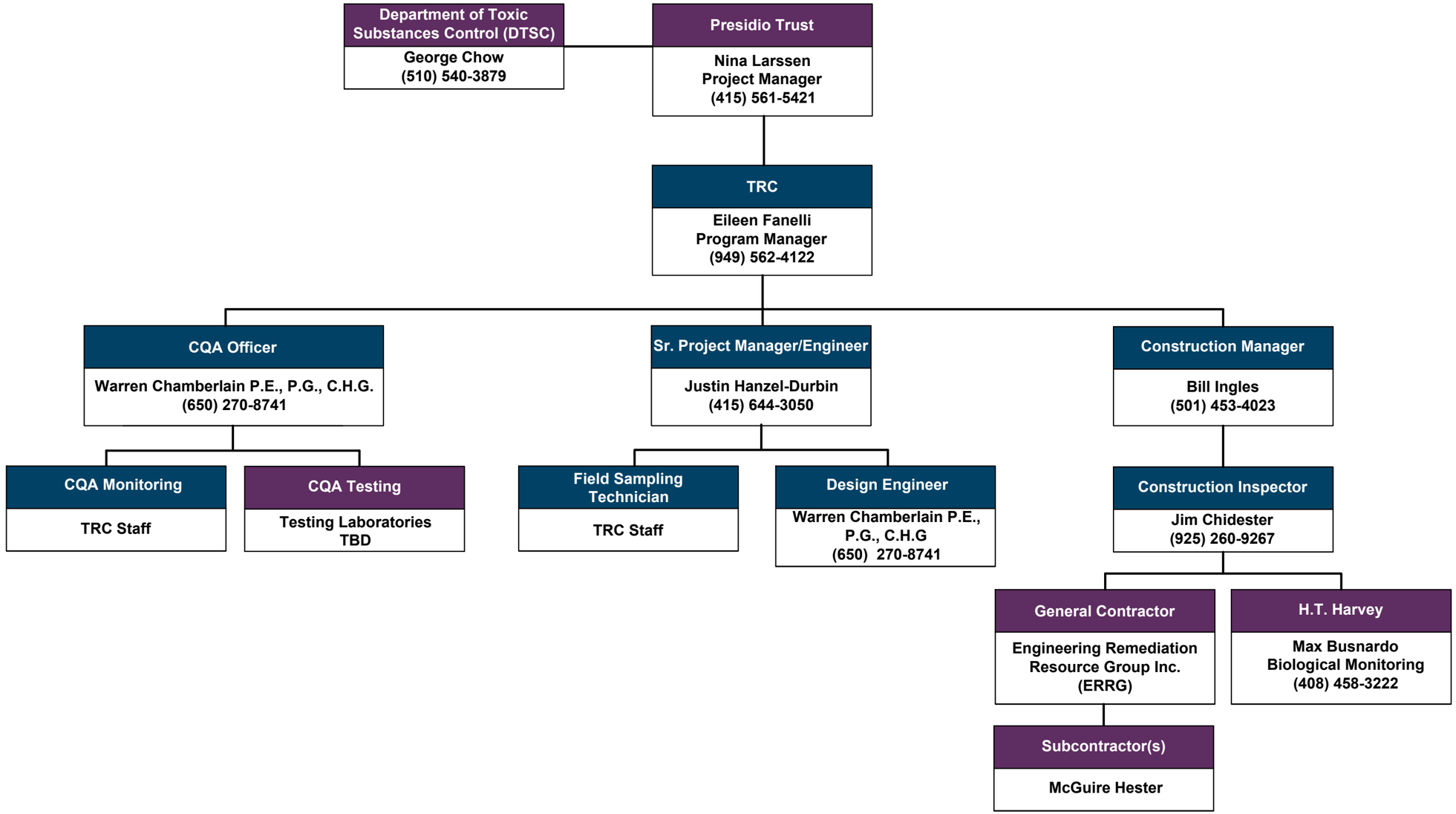
TABLE F-1
REMEDIAL CONSTRUCTION QUALITY ASSURANCE/QUALITY CONTROL TESTING PROTOCOLS
Lendrum Court
Presidio of San Francisco, California

Type of Test	Party Responsible for Testing/Monitoring	Compliance Requirement	Monitoring/Testing Frequency
Temporary Alternate Access Route			
Inspection during alternate access route construction	CM	Construction adheres to TRC's Design Drawings	Daily during construction. Road construction should be completed according to Section 25.04 of the Technical Specifications.
Periodic inspections throughout remedial construction	CI	Visual Inspection	Weekly during construction
Traffic Control Monitoring			
Visual inspection	CM	Fencing, barricades, and signage have been installed in accordance with the Design Drawings and Technical Specifications.	Prior to starting each new phase of construction.
	CI	Provide flagmen during all soil import, transport, and export activities as well as during the morning hours related to rush hour.	Daily
Soil Disposal Testing			
Waste Profile Sampling	Contractor	Landfill Requirements	Per Section 22.01 of the Technical Specifications.
Confirmation Sampling[2]			
Confirmation Sampling (Soil)	Design Engineer representative (Field Technician)	Cleanup Levels	See CSAP (RDIP Appendix G) for number of samples to be collected and list of chemicals of concern.
Air Monitoring[1]			
Dust Monitoring	Contractor	Visual Inspection	See ADMMP (RDIP Appendix E) for monitoring requirements.
	Design Engineer representative (Field Technician)	Monitoring of Dust for Particulate Matter and Lead.	
Import Fill Testing			
Import Soil Profiling and Physical Testing	Design Engineer representative (Field Technician)	Geotechnical/Design Engineer and Trust Approval	Per Section 23.03 of the Technical Specifications.
Compaction Testing[1] (ASTM D6938)			
Import Fill 0 to 18 inches of FG	Design Engineer representative (Engineering Technician)	85-90% Relative Compaction; approximately +3% Optimum Moisture Content	Approx. 1 test per 100 cubic yards (see Figures F-2 and F-3)
Import Fill >18 inches below FG	Design Engineer representative (Engineering Technician)	Minimum of 90% Relative Compaction, Optimum Moisture Content	Approx. 1 test per 100 cubic yards (see Figures F-2 and F-3)
In Place Soils	Design Engineer representative (Engineering Technician)	Minimum of 90% Relative Compaction, Optimum Moisture Content	Approx. 1 test per 100 cubic yards (see Figures F-2 and F-3)
Utility Trench Backfill Soils	Design Engineer representative (Engineering Technician)	Minimum of 90% Relative Compaction, Optimum Moisture Content	Approx. 1 test per 100 cubic yards (see Figures F-2 and F-3)
Erosion Control Monitoring[1]			
Construction Phase BMP Inspection (Wattles, Silt, Fences, Erosion Control Fabric, etc.)	Design Engineer (QSD) or representative (QSP)	Visual Inspection	Weekly per SWPPP (RDIP Appendix C).
BMP Inspection - Tracking Control	Contractor	Visual Inspection	Daily per SWPPP (RDIP Appendix C).
BMP Inspection - Wind Erosion	Contractor	Visual Inspection	Daily per SWPPP (RDIP Appendix C).
BMP Inspection - Stockpile Management	Contractor	Visual Inspection	Daily per SWPPP (RDIP Appendix C).
Post-Construction Phase (Wattles, Silt, Fences, Erosion Control Fabric, etc.)	Trust's Designated O&M Contractor	Visual Inspection	Maintain erosion control measures for a period of 12 months.

Notes:
1) CQA Monitor will provide quality assurance oversight on 10% of the tests and/or monitoring events.
2) In accordance with the Trust's QAPP, duplicate samples and equipment blank samples will be collected on 10% of the samples collected.

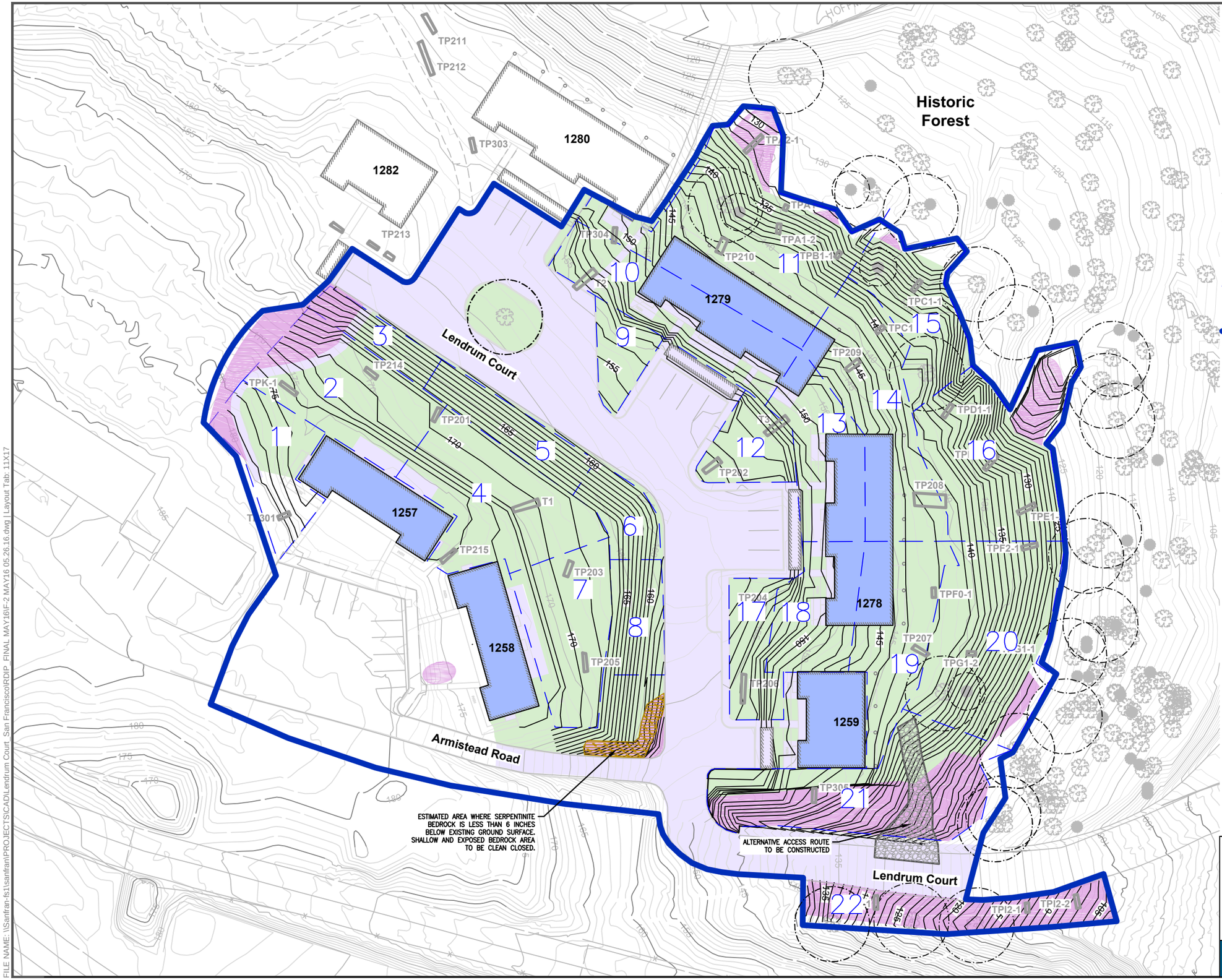
Abbreviations:
ADMMP = Air and Dust Monitoring and Mitigation Plan
ASTM = American Society for Testing and Materials
CI = Construction Inspector
CM = Construction Manager
CSAP = Confirmation Sampling and Analysis Plan
FG = Final Grade
RDIP = Remedial Design Implementation Plan
SWPPP = Stormwater Pollution Prevention Plan
QSD = Qualified SWPPP Developer
QSP = Qualified SWPPP Practitioner

FIGURES



PROJECT TEAM
ORGANIZATIONAL CHART
May 26, 2016
Lendrum Court Area
The Presidio Trust
San Francisco, California

TRC | 229649 | **FIGURE F-1**



LEGEND

- SITE TREE TO BE PRESERVED DURING REMEDIAL CONSTRUCTION
- TOYON TO BE PRESERVED DURING REMEDIAL CONSTRUCTION
- TREE PROTECTION ZONE
- 140 — REMEDIAL GRADE CONTOUR ELEVATION
- 140 — EXISTING CONTOUR ELEVATION
- 1 — COMPACTION TESTING AREA
- COMPACTION TESTING AREA BORDER
- APPROXIMATE EXTENT OF REMEDIAL ACTION AREA
- Approximate limits of cap
- Approximate areas of building that serve as cap
- Areas of asphalt, pavement and hardscape that serve as cap
- Approximate areas to be excavated and clean closed

NOTES:

1. ROUGH GRADING COMPACTION TESTING TO MEET 90% OPTIMUM MOISTURE CONTENT.
2. TREE PROTECTION ZONES EXTEND 20 FEET RADIALLY FROM THE TRUNK OF EACH TREE AND 10 FEET RADIALLY FROM EACH TOYON. AN ARBORIST IS REQUIRED TO OVERSEE ANY WORK PERFORMED WITHIN TREE PROTECTION ZONES.

N

SCALE (FEET)

0 50 100

SOURCE: Base plan by Towill, October 29-November 4, 2015

ROUGH GRADE- PROPOSED LOCATIONS FOR SOIL COMPACTION TESTING
May 26, 2016

Lendrum Court Area
The Presidio Trust
San Francisco, California

TRC | 229649 | **FIGURE F-2**

LEGEND

- SITE TREE TO BE PRESERVED DURING REMEDIAL CONSTRUCTION
- TOYON TO BE PRESERVED DURING REMEDIAL CONSTRUCTION
- TREE PROTECTION ZONE
- 140 — REMEDIAL GRADE CONTOUR ELEVATION
- 140 — EXISTING CONTOUR ELEVATION
- 1 — COMPACTION TESTING AREA
- COMPACTION TESTING AREA BORDER
- APPROXIMATE EXTENT OF REMEDIAL ACTION AREA
- Approximate limits of cap
- Approximate areas of building that serve as cap
- Areas of asphalt, pavement and hardscape that serve as cap
- Approximate areas to be excavated and clean closed

NOTES:

1. FINAL GRADING COMPACTION TESTING TO MEET 85–90% OPTIMUM MOISTURE CONTENT PER GEOTECHNICAL REPORT.
2. TREE PROTECTION ZONES EXTEND 20 FEET RADIALLY FROM THE TRUNK OF EACH TREE AND 10 FEET RADIALLY FROM EACH TOYON. AN ARBORIST IS REQUIRED TO OVERSEE ANY WORK PERFORMED WITHIN TREE PROTECTION ZONES.

N

SCALE (FEET)

0 50 100

SOURCE: Base plan by Towill, October 29-November 4, 2015

FINAL GRADE- PROPOSED LOCATIONS FOR SOIL COMPACTION TESTING
May 26, 2016

Lendrum Court Area
The Presidio Trust
San Francisco, California

TRC Results you can rely on | 229649 | **FIGURE F-3**

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DRAFT APPENDIX G
CONFIRMATION SAMPLING AND ANALYSIS PLAN
LENDRUM COURT
PRESIDIO OF SAN FRANCISCO, CALIFORNIA

THE PRESIDIO TRUST
103 Montgomery Street, P.O. Box 29052
San Francisco, California 94129-0052

TRC Project No. 229649

May 2016

APPENDIX G
CONFIRMATION SAMPLING AND ANALYSIS PLAN
LENDRUM COURT
PRESIDIO OF SAN FRANCISCO, CALIFORNIA

May 26, 2016

Prepared for

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TABLES

FIGURES

ACRONYMS

bgs	below ground surface
COCs	chemicals of concern
CSAP	Confirmation Sampling and Analysis Plan
DTSC	Department of Toxic Substances Control
EDD	electronic disc deliverable
EKI	Erler & Kalinowski, Inc.
RAW	Feasibility Study/Remedial Action Plan
ft^2	square feet
GPS	Global positioning system
ID	Identification
Presidio	Presidio of San Francisco
QA/QC	quality assurance/quality control
QAPP	Quality Assurance Project Plan
RI	Remedial Investigation
RDIP	Remedial Design Implementation Plan
Site	Lendrum Court
SOPs	Standard Operating Procedures
Trust	Presidio Trust
USEPA	United States Environmental Protection Agency

1.0 INTRODUCTION

This document presents the Confirmation Sampling and Analysis Plan (CSAP) for the remedial action described in the Removal Action Work Plan (RAW) for the area west of Building 1258, the area northwest of Building 1257, the area north of Building 1279, the area northeast of Building 1278, and the area east and south of Building 1259, and the sloped area south of Lendrum Court (the clean closure areas) at the Lendrum Court Site (the Site), Presidio of San Francisco, California (Presidio) (TRC, 2015b). This CSAP is provided as an appendix to the Revised Remedial Design Implementation Plan (RDIP) and describes processes and procedures to be implemented by the Presidio Trust (Trust) to remediate the clean closure areas at the Site. This CSAP was prepared by TRC on behalf of the Trust.

The remedial action for the clean closure areas is attainment of clean closure through excavation, characterization, transportation, off-site disposal of chemicals of concern (COCs)-impacted soil, and perimeter and confirmation soil sampling. As described in the RAW, remedial action for soil at the Site will be considered complete when concentrations of COCs in soil confirmation samples collected from the lateral and vertical limits of the excavation meet cleanup levels identified in Table G-1.

Based on the findings of the Remedial Investigation (RI; EKI, 2015), the clean closure areas were assigned one of two designations: areas located within the debris-filled area and areas located outside the debris-filled area. Clean closure areas outside the debris-filled area were identified and defined based on the presence of concentrations of lead exceeding a Site-specific soil target level protective of applicable Site receptors.

Designation	Clean Closure Areas	COCs
Within Debris-Filled Area	• North of Building 1279 • Northeast of Building 1278 • South of Building 1259 • Eastern portion of the sloped area south of Lendrum Court • Overburden on Bedrock Outcrop[2]	Metals PAHs Dioxins/Furans[1]
Outside Debris-Filled Area	• West of Building 1258 • Northwest of Building 1257 • East of Building 1259 • Western portion of the sloped area south of Lendrum Court[3]	Lead Dioxins/Furans[1]

[1]Due to the unknown correlation between incinerator debris and dioxin/furan concentrations, dioxins/furans have been retained as a potential COC.
[2] No evidence of debris has been observed in overburden soils on the bedrock outcrop to date; however, investigation activities in this area have been limited, so this area is conservatively classified as within the debris-filled area.
[3] Conservatively retained as a clean closure area, as detailed in Section 1.1.

Clean Closure Areas in Debris-Filled Area

During the Remedial Investigation, incinerator debris was observed in the remediation areas north of Building 1279, northeast of Building 1278, south of Building 1259, and in the eastern portion of the sloped area south of Lendrum Court (RI; EKI, 2015). Because these areas are outside the extent of the proposed soil cap and hardscape serving as a cap, they will be remediated using a clean closure approach. The approximate extent of the clean closure areas containing debris are shown on Figure G-1.

As shown on the design drawings (Appendix A of the RDIP), the protective soil cap will conform to the bedrock outcrop located at the corner of Armistead Road and Lendrum Court. The protective soil cap will extend to areas where the depth of soil overlying bedrock is greater than six inches below ground surface (bgs). In areas where the depth of the soil overlying bedrock is less than six inches thick (herein referred to as bedrock overburden soil), soil will be moistened and scraped off without disturbing the underlying serpentinite bedrock. Following removal of the overburden soils, the bedrock outcrop will be left exposed. The protective soil cap, which will be placed in areas surrounding the bedrock outcrop will be graded to match the outcrop's existing contours.

Clean Closure Areas Outside Debris-Filled Area

Since incinerator debris and ash were not observed in the remediation areas west of Building 1258, northwest of Building 1257, east of Building 1259, or in the western portion of the sloped area south of Lendrum Court during the Remedial Investigation (RI; EKI, 2015), elevated concentrations of lead were used to define the approximate extent of the clean closure areas. The excavation areas were identified based on concentrations of lead exceeding a Site-specific soil target level protective of receptors in the residential/landscaped area and the forest/recreational area. The approximate extent of the clean closure areas and the proposed perimeter and confirmation samples (with the exception of the clean closure area west of Building 1259) are shown on Figure G-1. The extent of the clean closure area west of Building 1258 is shown on Figure G-2.

The following sections summarize the COCs and cleanup levels for the Site, present the soil confirmation sampling and laboratory analytical methods, and describe the proposed locations of the confirmation soil samples.

1.1 CHEMICALS OF CONCERN

Due the presence of incinerator debris in the areas north of Building 1279, northwest of Building 1278, south of Building 1259, and in the eastern portion of the sloped area south of Lendrum Court (the clean closure areas within the debris-filled area), the COCs for these clean closures areas are metals (arsenic, barium, copper, lead, and zinc) and polycyclic aromatic hydrocarbons (PAHs). Because the correlation between the presence of debris and elevated dioxin/furan concentrations is unknown, dioxins/furans have been retained as a potential COC. Metals, PAHs, and dioxin/furans

have also conservatively been retained as COCs for the bedrock overburden soil since investigation activities aimed at identifying debris have been limited in this area to date.

Lead was identified as a COC in the clean closure areas located west of Building 1258, northwest of Building 1257, and east of Building 1259. PAHs were not retained as a COC in these clean closure areas since PAH impacts appear to be closely correlated with presence of incinerator debris and ash. The correlation between the presence of incinerator debris and ash and elevated dioxin/furan concentrations is not as well defined at the Site; therefore, dioxin and furans have been retained as a potential COC in the clean closure areas described above. In the western portion of the sloped area south of Lendrum Court (the clean closure areas outside the debris-filled area), the concentration of lead reported in the sample collected from test pit TPI1-1 [150 milligram per kilogram (mg/kg); EKI, 2015; Figure G-1] is slightly below the forest/recreational screening level for lead (160 mg/L). Since this was the only sample collected and analyzed for lead in the western portion of the sloped area south of Lendrum Court, this area was conservatively retained as a clean closure area, where lead and dioxin/furans were retained as COCs.

1.2 CLEANUP LEVELS

Table G-1 presents the Site cleanup levels for the COCs identified in the RI (EKI, 2015) and the RAW (TRC, 2015b). These cleanup levels were based on applicable cleanup levels that were developed in the Cleanup Level Document (EKI, 2002; with updates through 2013), *Recreational Soil Cleanup Level for Lead* (TRC, 2015a), *Human Health Soil Preliminary Remediation Goals and Toxic Equivalency Values for Dioxins and Furans* (MACTEC, 2007), and the RAW (TRC, 2015b). Serpentinite and Colma Formation background threshold levels are used to evaluate the Site soil metal concentrations because soils in the overburden fill appear consistent with the Colma Formation and serpentinite rock is present in the subsurface and outcrops adjacent to Armistead Road. Additionally, samples collected in the clean closure areas to date have not been analyzed for dioxin/furans; therefore, these COCs pose an unknown risk in all clean closure areas. Depending on the sample location, different cleanup levels will be used to evaluate confirmation sample data as indicated below:

- **West of Building 1258 and Bedrock Overburden Soil:** As discussed in the RAW (TRC, 2015b), lead concentrations detected in the test pit west of Building 1258 (TP-302; Figure G-2) and the bedrock overburden soil are present at levels that pose a risk to residential human health and ecological buffer zone receptors in the residential/landscaped area. Concentrations of lead and dioxin/furans in soil samples collected from this clean closure area will be screened against the Site-specific residential/landscaped screening levels presented in Table G-1.
- **Northwest of Building 1257:** As discussed in the RAW (TRC, 2015b), lead is present at concentrations that pose a risk to residential human health and ecological special-status in the residential/landscaped area. Concentrations of lead and dioxin/furans in soil samples collected from this clean closure area will be screened against the Site-specific residential/landscaped screening levels presented in Table G-1.
- **North of Building 1279 and Northeast of Building 1278:** The RI (EKI, 2015) identified incinerator debris in the forested areas north of Building 1279 and northeast of Building

1278. As such, arsenic, barium, copper, lead, zinc, and PAHs are considered COCs since these constituents are correlated with the presence of incinerator debris. Concentrations of these COCs and concentrations of dioxin/furans in samples collected from the clean closure areas north of Building 1279 and northeast of Building 1278 will be screened against the Site-specific forest/recreational screening levels presented in Table G-1.

- **East of Building 1259:** During the RI, lead concentrations that pose a risk to ecological special-status receptors were reported for samples collected in the forest area east of Building 1259. Concentrations of lead and dioxin/furans in samples collected from the clean closure area east of Building 1259 will be screened against the Site-specific forest/recreational screening levels presented in Table G-1.
- **South of Building 1259:** The RI (EKI, 2015) identified incinerator debris in test pit TP305, just south of Building 1259. As such, arsenic, barium, copper, lead, zinc, and PAHs are considered COCs in the clean closure area south of Building 1259 since these constituents are correlated with the presence of incinerator debris. Concentrations of these COCs and concentrations of dioxin/furans in samples collected from this clean closure area will be screened against the Site-specific residential/landscaped screening levels presented in Table G-1.
- **Eastern Portion of the Sloped Area South of Lendrum Court:** The RI (EKI, 2015) identified incinerator debris in the eastern portion of the sloped area located on the south side of Lendrum Court. As such, Site soils in this area will screened against the forest/recreational screening levels presented in Table G-1 for metals and PAHs.
- **Western Portion of the Sloped Area South of Lendrum Court:** Site soils in this area will be screened against the forest/recreational screening levels presented in Table G-1 for lead and dioxin/furans.

To provide additional clarification regarding applicable screening levels, Table G-2 indicates on a per-sample basis if the Site-specific residential/landscape or forest/recreational screening level applies.

2.0 OVERVIEW OF SAMPLING APPROACH

The following describes the proposed approach to confirmation sampling at the Site.

2.1 PERIMETER SAMPLING

Clean Closure Areas in Debris-Filled Area

To refine the bounds of the clean closure areas in locations where debris have been documented (i.e., north of Building 1279, northeast of Building 1278, south of Building 1259, and the eastern portion of the sloped area south of Lendrum Court), perimeter samples will be collected at the locations shown on Figure G-1. To confirm the absence of incinerator debris at the edge of these clean closure areas, potholes will be performed at perimeter sampling locations. Potholes will be hand dug with a shovel or mattock to a depth of approximately one foot below the estimated

depth of debris. If debris is observed at a pothole location along the leading edge of the clean closure area, the location and observation of debris will be documented, and a step-out pothole will be performed approximately 10 feet from the main excavation area. Excavation and step-out locations are limited to areas outside of the proposed soil cap and areas where no hardscape elements (e.g., cement walkways, sidewalks, and asphalt parking) are present. Additionally, excavation, potholing, and sampling activities will not extend into bedrock. If debris is encountered at a pothole location adjacent to the cap (i.e., 1259PS102, 1259PS106 through 1259PS110) or Lendrum Court (i.e., SLCPS108 though SLCPS110), the pothole should be extended to the maximum depth of debris and perimeter samples should be collected as described in the following paragraph.

Perimeter samples will be collected at approximately 25-foot intervals along the edge of the clean closure areas, with the exception of edge areas that boarder the portion of Lendrum Court that is intended to serve as a cap (i.e., southern and western edge of the clean closure area located south of Building 1259). At each perimeter sampling location indicated on Figure G-1, two soil samples will be collected over a 0.5-foot interval, where the bottom of the sampling intervals will correspond to the estimated depth of debris and 1-foot below the estimated depth of debris. Perimeter samples will be analyzed for the constituents identified in Table 2.

Clean Closure Areas Outside of Debris-Filled Area

To delineate the bounds of the clean closure areas northwest of Building 1257, east of Building 1259, and in the western portion of the sloped area south of Lendrum Court, perimeter samples will be collected as shown on Figure G-1. Perimeter samples will be collected at approximately 25-foot intervals along the edge of the clean closure areas, with the exception of edge areas that boarder the portion of Lendrum Court that is intended to serve as a cap (i.e., northern edge of the clean closure area located in the western portion of the sloped area south of Lendrum Court).

Although debris was not identified in these clean closure areas, potholes will be performed at perimeter sampling locations to confirm the absence of incinerator debris. Potholes will be hand dug with a shovel or mattock to a depth of approximately two feet. If debris is not encountered in the pothole, perimeter samples will be collected between the surface and 0.5 feet, 0.5 feet to 1-foot, and 1-foot and 1.5 feet. Perimeter samples will be analyzed for the constituents identified in Table 2. If COC concentrations in a perimeter sample exceed screening levels, the excavation area will be extended, and a step-out perimeter sample will be collected. The excavation and step-out locations are limited to areas outside of the proposed soil cap and areas where no hardscape elements (e.g., cement walkways, sidewalks, and asphalt parking) are present. Additionally, excavation and sampling activities will not extend into bedrock.

If incinerator debris is encountered in clean closure areas thought to be located outside of the debris-fill area, digging will stop and a sample will be collected and analyzed in accordance with Table G-2. The location and observation of debris will be documented, and additional excavation activities will be developed for the impacted area in an addendum to this CSAP.

2.2 EXCAVATION SAMPLING

Clean closure areas will be excavated to remove known impacted soil from the Site. In clean closure areas containing debris-fill, the exact shape and dimensions of the excavation will be determined visually in the field based on the absence of debris. In clean closure areas outside the debris area, the initial excavation depth is planned to be approximately 0.5 feet. In all clean closure areas, one sample will be collected from the floor of the excavation for every 650 square feet (ft^2). If COC concentrations in the floor sample exceed screening levels, the excavation will be extended to a deeper depth and a step-out floor sample will be collected. The excavation and step-out floor samples will not be extended into bedrock.

Clean Closure Area West of Building 1258

The area west of Building 1258 will be initially excavated to remove known impacted soil from the Site. As the Contractor completes excavation to design depths, one sample will be collected from the floor of the excavation for every 650 square feet (ft^2) and approximately one sidewall sample will be collected every 25 feet around the perimeter of this clean closure area. If sidewall samples and/or floor sample exceed the screening levels for COCs, step-out samples will be collected approximately 10 feet from the main excavation area. The main excavation and step-out locations are limited to areas where there are no hardscape present (e.g., cement walkways, sidewalks, and asphalt parking). Excavation and step-out sampling locations are shown on Figure G-2.

2.3 BEDROCK OVERBURDEN SOIL SAMPLING

To characterize the bedrock overburden soil near the corner of Armistead Road and Lendrum Court, TRC collected samples of the bedrock overburden soil on January 20, 2016. All of the soil samples were collected from areas where the overburden soils were less than six inches thick. One sample was collected for approximately every 650 square foot (ft^2) area and every 25 feet around the perimeter where the depth of soil overlying bedrock was less than six inches. A total of five samples were collected and submitted for laboratory analysis of lead. The sampling locations are shown on Figure G-1. Based on the results, four of the five soil samples exhibited concentrations of lead above the residential screening levels. As a result, the bedrock overburden soils will be moistened and scraped off without disturbing the serpentinite bedrock to attain clean closure in this area. The exposed bedrock outcrop will remain uncovered following soil removal activities.

3.0 SAMPLING AND ANALYSIS PLAN

The approximate extent of the excavations and proposed confirmation soil sampling locations (i.e., perimeter and excavation samples) are shown for the clean closure areas on Figures G-1 and G-2. Additionally, the estimated extent of bedrock overburden soil is shown on Figure G-1. As discussed in Section 1.1, the COCs for clean closure areas located within debris-filled areas are metals, PAHs, and dioxin/furans. As such, all confirmation samples in these areas will be

analyzed for arsenic, barium, copper, lead, and zinc, PAHs, and one sample from each area will be analyzed for dioxin/furans. In clean closure areas located outside of the debris-filled areas, samples will be analyzed for lead, and one sample from each clean closure area will be analyzed for dioxin/furans.

Table G-2 contains a sample tracking matrix for the various phases of confirmation sampling based on planned samples. Confirmation soil samples will be collected and analyzed in accordance with the Presidio Quality Assurance Project Plan (QAPP) (Tetra Tech, 2001) and Addendum to the QAPP (Trust, 2011).

3.1 LABORATORY ANALYSIS, DATA REVIEW, AND DATA EVALUATION

Soil confirmation samples collected from the excavation area and perimeter samples will be analyzed for lead using United States Environmental Protection Agency (USEPA) Test Method 6020 and dioxin/furans using USEPA Test Method 8290.

The Trust's sampling contractor will obtain analytical data directly from the laboratory and will perform Level II Data Validation in accordance with the QAPP (Tetra Tech, 2002) and the *Guidance on Environmental Data Verification and Data Validation* (EPA, 2002). Confirmation sample data will be tabulated and compared to applicable cleanup levels (Table G-1). The data will be presented to Trust and DTSC within five working days of receipt of laboratory data.

If laboratory analysis of confirmation samples indicates that no COCs are present in excess of cleanup levels, then no further excavation will be performed on the corresponding floor represented by that sample or samples. If laboratory analysis of confirmation samples indicates the presence of COCs in excess of cleanup levels, the Trust will evaluate the site data in consultation with the DTSC to assess whether the residual COC concentrations represent a site-specific release and pose residual risk. If the COC concentration is deemed to pose potential risk, the sampling contractor in collaboration with the Trust and DTSC will decide how much additional soil will be excavated.

3.2 SAMPLE DESIGN PROCESS

This section describes the types of samples to be collected and sample collection procedures. Sampling procedures will be performed in accordance with protocols described in the Presidio QAPP, and summarized in the following sections.

Sample Types

Soil is the media to be sampled during the remedial action. Field samples and quality assurance/quality control (QA/QC) samples will be generated. Field samples include Excavation and Perimeter confirmation samples. QA/QC samples will comprise 1) duplicate soil samples submitted to the laboratory as control elements to verify the accuracy and consistency of analytical results, and 2) equipment rinsate samples collected to document the effectiveness of equipment decontamination methods.

Sample Collection

Confirmation samples will be collected in accordance with the Presidio Trust Standard Operating Procedures (SOPs), specifically SOP No. 001 of the Presidio QAPP (TetraTech, 2001). Confirmation soil samples will be collected using one of three methods; 1) advancing a hand-held drive-sampler lined with a stainless-steel sample tube; 2) pushing the sample tube directly into the soil, or 3) collecting the sample from a backhoe bucket. If samples are collected from a backhoe bucket, the sample collector will direct the operator and observe the process as the bucket is filled to verify that the material is representative of in-situ soil from the targeted sample location. A sample tube will be pushed or driven into the soil in the bucket until the sample tube is completely filled. Following collection, sample tubes will be capped with Teflon-lined lids, labeled, placed in Ziplock® bags (or equivalent), stored in a cooler with ice, and submitted to the analytical laboratory under chain-of-custody control.

Sample locations will be marked in the field with stakes and pin flags containing the sample identification (ID). The locations will be surveyed using a global positioning system (GPS). The GPS information will be downloaded each day and a figure will be prepared showing the location of each sample, which will be verified as representative by the sampler.

Sampling Equipment Decontamination

Decontamination of reusable sampling equipment will be performed before initial use onsite and between each use at discrete sample locations. Sampling equipment will be decontaminated by washing with a non-phosphate soap with deionized water rinse or by using a steam cleaner. Decontamination rinsate will be contained and transported to polyethylene tanks at the Central Magazine at the Presidio.

Sample Documentation and Handling

Sampling personnel will document field activities, conditions, sample locations, and IDs in field notes and on the tracking sheet provided as Table G-2. Labeling, packaging, storage, handling, and shipping will be performed in accordance with the Presidio QAPP. The following sections describe the documentation and handling processes that will be used during the confirmation sampling program.

Sample Labels and Numbering System

Samples will be appropriately labeled so they can be identified and correlated with the sample location. Sample information will be printed legibly with waterproof ink. The label will contain sufficient information so that the sample can be correlated with field logs, sample collection logs, and chain-of-custody forms. Each sample label will contain the following information:

- Project name;
- Unique sample identifier as described below;

- Date and time of sample collection;
- Remarks as needed; and
- Initials or name of the sampler.

Each sample collected will be assigned a unique ID. The sample designation will facilitate data management by referencing sample type, location, and the sample depth. IDs consist of an alphanumeric code that sequentially provide reference information in the format of 1) site designation, 2) sample type, 3) three-digit numerical sequence of sample, and 4) depth below ground surface in brackets as follows:

Excavation Confirmation Samples:

For example, the sample ID 1258EX101[0.0] would refer to the following:

- 1258 – The sample is from the area west of Building 1258.
- EX – The sample source location is the excavation and it is an excavation confirmation sample.
- 101 – The unique sequential sample number for this sample is 101. The project sample numerical sequence will begin with sample number 101, which indicates that this was the first confirmation sample collected for the project.
- [0.0] – The sample was collected at a depth of 0.0 feet bgs.

Samples taken from south of Lendrum Court will use "SLC" as the site designation, in place of a building number. Table G-2 lists planned confirmation sample IDs; the numerical sequence begins with 101. If over-excavation or step-out sampling is performed, those samples will begin with 201.

Perimeter Confirmation Samples:

For example, the sample ID 1257PS101[0.0] would refer to the following:

- 1257 – The sample is from the area northwest of Building 1257.
- PS – The sample source location is the perimeter and it is a perimeter confirmation sample.
- 101 – The unique sequential sample number for this sample is 101. The project sample numerical sequence will begin with sample number 101, which indicates that this was the first confirmation sample collected for the project.
- [0.0] – The sample was collected at a depth of 0.0 feet bgs.

Table G-2 lists planned confirmation sample IDs; the numerical sequence begins with 101. If a step-out sampling is performed, those samples will begin with 201.Samples from Soil Overlying Bedrock:

For example, the sample ID 1279SB101[0.0] would refer to the following:

- 1279 – The sample is from the area southwest of Building 1279.
- SB – The sample source location is soil overlying bedrock.

- 101 – The unique sequential sample number for this sample is 101. The project sample numerical sequence will begin with sample number 101, which indicates that this was the first characterization sample collected for the project.
- [0.0] – The sample was collected at a depth of 0.0 feet bgs.

Table G-2 lists planned confirmation sample IDs; the numerical sequence begins with 100. If a step-out sampling is performed, those samples will begin with 200.

Duplicate Samples**:**

The duplicate sample will be collected from the same depth immediately adjacent to the primary sample. Duplicate samples will have the source code ("DUP") followed by the date. For example, sample number DUP050115 indicates a duplicate sample that was collected on May 1, 2015. The sampling contractor and the Trust will confirm that each duplicate sample collected in the field has a unique identification number. If more than one duplicate is collected on a single date, then the sample number will also include the suffix "-1", or "-2", etc., to differentiate the duplicate samples from that day (e.g., DUP050115-2 indicates the second of two duplicate samples collected on that date). Field logs and sample collection logs will also indicate the source location of the duplicate sample for correlation purposes.

Equipment Blank Samples**:**

Equipment blanks will include the ID of the primary sample collected, followed by the designation "RB", in turn followed by the number of the primary sample collected after the equipment blank is collected. For example, an equipment blank collected after the collection of sample number 1258EX100[0.0], would have the sample number 1258EX100RB101, indicating that it was collected between samples 100 and 101. Note that an equipment blank collected after the last primary sample of the day would not have a following sample designation and would end with "RB" (e.g., 1258EX101RB).

Prior to field mobilization, the sampling contractor will present a list of samples and sample identification numbers for approval to the Trust's database manager.

Sample Packaging and Shipping

After collection and labeling, samples will be placed in refrigerated containers and transported to the analytical laboratory by a courier, or shipped through a parcel delivery service, depending on the location of the laboratory. The following steps will be taken before the sample containers are transported.

- Confirm that all samples in the container are listed on the chain-of-custody form and that the information on the chain-of-custody form matches what is written on the sample label;
- Make sure all sample container caps are tight;
- Place samples in sealed, water-tight plastic bags;
- Place enough ice in sample container(s) to maintain samples at 4 ºC or less; and

- Place sufficient packing material in the container to minimize the potential for breakage of samples.

The chain-of-custody form will be appropriately signed by the field sampler relinquishing the samples and the laboratory personnel receiving the samples. If samples are to be shipped via a parcel delivery service, the following steps will also be taken:

- Place the top page of each chain-of-custody form in a sealed clear plastic envelope in the container; and
- Secure the container closure and place a custody seal over the container lid.

Chain of Custody Documentation

Sample chain-of-custody documentation will be maintained from initial sampling to completion of analysis and reporting to verify sample integrity. Documentation procedures will be in accordance with protocols described in the Presidio QAPP. Documentation will also include acceptance and relinquishment signatures for persons through whose custody the samples have passed.

Quality Assurance and Quality Control Sampling

In order to assess data quality, field duplicates will be collected at a frequency of approximately 10 percent of the total number of samples generated. For each day of sampling, additional sample volume from one sample will be collected for matrix spike/matrix spike duplicate analyses; e.g., one additional tube of soil will be collected. In accordance with the Presidio QAPP, if reusable samplers are used; (e.g., a drive sampler), equipment blank samples will be collected each sampling day, but not to exceed 10 percent of the total number of primary samples. The sampling contractor will maintain a sample tracking form (included as Table G-2), which tracks the samples collected (primary and QC samples).

4.0 DATA VALIDATION AND DATA MANAGEMENT

The sampling contractor will obtain analytical data directly from the laboratory in the form of Presidio-formatted electronic disc deliverables (EDDs) and electronic versions of the Level II and Level III analytical data packages. In accordance with the QAPP Addendum (Trust, 2011), the sampling contractor will perform a cursory review of the chemical data (USEPA Level II validation) to identify significant issues affecting data quality including method QC failures, blank contamination, and elevated detection limits. The results of the Level II data validation and the laboratory data packages will be presented in the Construction Completion Report.

Pertinent chain of custody information, analytical data (obtained electronically from the laboratory), sample location data (northing and easting coordinates), and data validation qualifiers will be loaded into the sampling contractor's database. At the end of the sampling program, Presidio-formatted EDDs appended with the data validation qualifiers and sample coordinates will be transmitted to the Presidio Trust Database Manager. Tables of Level II validated analytical data

will be generated from sampling contractor's database for presentation during meetings and in the Construction Completion Report.

5.0 REFERENCES

EKI, 2002. *Development of Presidio-wide Cleanup Levels for Soil, Sediment, Groundwater, and Surface Water, Presidio of San Francisco, California.* October (with updates through 2013).

EKI, 2015. *Lendrum Court Remedial Investigation Summary Report and Screening Risk Evaluation, Presidio of San Francisco, California.* May 15.

EPA, 2002. *Guidance on Environmental Data Verification and Data Validation. EPA QA/G-8. EPA/240/R-02/004.* November.

MACTEC, 2007. *Technical Memorandum, Human Health Soil Preliminary Remediation Goals and Toxic Equivalency Values for Dioxins and Furans, Presidio of San Francisco, California*, March 28.

Presidio Trust (Trust), 2011. *Addendum to the Presidio-Wide Quality Assurance Project Plan and Sampling and Analysis Plan, Revision 1*, Presidio of San Francisco, California

Tetra Tech, 2001. *Presidio-Wide Quality Assurance Project Plan, Sampling and Analysis Plan, Presidio of San Francisco, San Francisco, California*. April.

TRC, 2015a. *Technical Memorandum Recreational Soil Cleanup Level for Lead, Presidio of San Francisco, San Francisco, California*. April 6.

TRC, 2015b. *Removal Action Work Plan, Lendrum Court, Presidio of San Francisco, California*. July.

TABLES

TABLE G-1
SOIL CLEANUP LEVELS FOR CHEMICALS OF CONCERN
Lendrum Court
Presidio of San Francisco, California

Chemicals of Concern	Applicable Cleanup Levels [a]						Regional Background / Ambient Levels [b]	Site-Specific Cleanup Levels	
	Human Health Soil PRGs		Ecological PRGs		Background Level			Landscaped / Residential Area[c]	Forest / Recreational Area[d]
	Residential	Recreational	Buffer Zone	Special-Status	Serpentinite Lithology	Colma Formation			
	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)
Metals									
Arsenic	0.36	0.88	64	10	5.4	6.2	11	6.2	6.2
Barium	5,000	12,000	500	320	230	180	1,500	500	320
Copper	--	--	120	30	85	49	76	120	85
Lead	80	180	300	160	66	7.5	48	80	160
Zinc	22,000	52,000	50	4	160	79	150	160	160
PAHs									
Benzo(a)pyrene	0.046	0.11	40	30	--	--	0.92 to 1.5	0.046	0.11
Benzo(a)pyrene equivalents	0.046	0.11	40	30	--	--	0.92 to 1.5	0.046	0.11
Dibenzo(a,h)anthracene	0.046	0.11	40	30	--	--	0.92 to 1.5	0.046	0.11
Dioxin and Furans (values are in pg/g)									
TCDD TEQ	3.5	8.2	--	--	--	--	7 to 20	3.5	8.2

Abbreviations:
-- = not available / applicable
mg/kg = milligrams per kilogram
pg/g = picograms per gram
TCDD TEQ = 2,3,7,8-tetrachlorodibenzo-p-dioxin toxic equivalency

Footnotes:
a. Applicable cleanup levels from the following sources:
EKI's 2002 (with updates through 2013) *Development of Presidio-Wide Cleanup Levels for Soil, Sediment, Groundwater, and Surface Water* . Presidio of San Francisco
Lead Residential: Office of Environmental Health Hazard Assessment's (OEHHA) September 2009 *Revised California Human Health Screening Levels for Lead* .
Lead Recreational: TRC's April 6, 2015 *Recreational Soil Cleanup Level for Lead, Presidio of San Francisco, California* .
TCDD TEQ Human Health Soil PRGs: MACTEC's 2007 *Technical Memorandum, Human Health Soil Preliminary Remediation Goals and Toxic Equivalency Values for Dioxins and Furans Presidio of San Francisco, California.*
b. Regional background and ambient levels from the following sources:
Metals: Upper Estimate Regional Background from Table 4-Comparison of Background Values to Other Background Estimates from Lawrence Berkeley National Laboratory *Analysis of Background Distributions of Metals in the Soil at Lawrence Berkeley National Laboratory* , D. Diamond, D. Baskin, D. Brown, L. Lund, J. Najita, and I Javandel, June 2002 Revised April 2009.
Arsenic: D. J. Duverge *Estabilishing Background Arsenic in Soil of the Urbanized San Francisco Bay Region, Master of Science in Geosciences, December 2011.*
PAHs: ENVIRON, Entrix, IRIS Environmental, and ENV America. *Background Levels of Polycyclic Aromatic Hydrocarbons in Northern California Surface Soil* . June 2002.
TCDD TEQ: California Department of Food and Agriculture (CDFA) 2004 *Evaluation of Heavy Metals and Dioxin in Inorganic Commercial Fertilizers.*
c. The cleanup levels for the landscaped/residential areas are the lower of the residential and ecological buffer zone. If the applicable residential human health or ecological buffer-zone cleanup level is less than the background level, the greater of the two background threshold levels was selected as the cleanup level.
d. The cleanup levels for the Forest/recreational area are the lower of the residential and ecological buffer zone. If the applicable recreational human health or ecological special-status cleanup level is less than the background level, the greater of the two background threshold levels was selected as the cleanup level.

TABLE G-2
SAMPLE TRACKING TABLE
Lendrum Court
Presidio of San Francisco, California

Sample ID [a]	Sample Depth (feet bgs)	Excavation Sample Location	Laboratory Analysis				Residential Cleanup Level for Sample Screening [b]	Forest/ Recreational Cleanup Level for Sample Screening [b]
			Lead (USEPA 6020)	As, Ba, Cu, Zn (USEPA 6020)	PAHs (USEPA 8270)	Dioxins/ Furans (USEPA 8290A)		
Excavation West of Building 1258								
1258EX101[TBD]	TBD	Sidewall	●			●	●	
1258EX102[TBD]	TBD	Sidewall	●				●	
1258EX103[TBD]	TBD	Sidewall	●				●	
1258EX104[TBD]	TBD	Sidewall	●				●	
1258EX105[TBD]	TBD	Floor	●				●	
Step-out Samples								
1258EX201[TBD]	TBD	Sidewall	●				●	
1258EX202[TBD]	TBD	Sidewall	●				●	
1258EX203[TBD]	TBD	Sidewall	●				●	
1258EX204[TBD]	TBD	Sidewall	●				●	
1258EX205[TBD]	TBD	Floor	●				●	
Soil Overlying Bedrock Sampling East-Southeast of Building 1258								
1279SB500[0.0]	0.0	--	●				●	
1279SB501[0.0]	0.0	--	●				●	
1279SB502[0.0]	0.0	--	●				●	
1279SB503[0.0]	0.0	--	●				●	
1279SB504[0.0]	0.0	--	●				●	
Excavation Northwest of Building 1257								
1257EX101[0.5]	0.5	--	●				●	
1257EX102[0.5]	0.5	--	●				●	
1257EX103[0.5]	0.5	--	●				●	
Perimeter Sampling Northwest of Building 1257								
1257PS101[0.0]	0.0	--	●				●	
1257PS101[0.5]	0.5	--	●				●	
1257PS101[1.0]	1.0	--	●				●	
1257PS102[0.0]	0.0	--	●			●	●	
1257PS102[0.5]	0.5	--	●			●	●	
1257PS102[1.0]	1.0	--	●				●	
1257PS103[0.0]	0.0	--	●				●	
1257PS103[0.5]	0.5	--	●				●	
1257PS103[1.0]	1.0	--	●				●	
1257PS104[0.0]	0.0	--	●				●	
1257PS104[0.5]	0.5	--	●				●	
1257PS104[1.0]	1.0	--	●				●	
1257PS105[0.0]	0.0	--	●				●	
1257PS105[0.5]	0.5	--	●				●	
1257PS105[1.0]	1.0	--	●				●	
1257PS106[0.0]	0.0	--	●				●	
1257PS106[0.5]	0.5	--	●				●	
1257PS106[1.0]	1.0	--	●				●	
1257PS107[0.0]	0.0	--	●				●	
1257PS107[0.5]	0.5	--	●				●	
1257PS107[1.5]	1.0	--	●				●	

Abbreviations:
-- = not applicable
● = recommended analysis or cleanup level
bgs = below ground surface
TBD = to be determined
USEPA = United States Environmental Protection Agency

Footnotes:
a. See Figures G-1 and G2 for sample locations.
b. Table G-1 lists the cleanup levels.

Note: Duplicate, equipment blank, and matrix spike and matrix spike duplicate (MS/MSD) samples will be collected. Ten percent (10%) of the samples colle and MS/MSD samples, and an equipment blank sample will be collected each day of sampling.

TABLE G-2
SAMPLE TRACKING TABLE
Lendrum Court
Presidio of San Francisco, California

Sample ID [a]	Sample Depth (feet bgs)	Excavation Sample Location	Laboratory Analysis				Residential Cleanup Level for Sample Screening [b]	Forest/ Recreational Cleanup Level for Sample Screening [b]
			Lead (USEPA 6020)	As, Ba, Cu, Zn (USEPA 6020)	PAHs (USEPA 8270)	Dioxins/ Furans (USEPA 8290A)		
Excavation North of Building 1279								
1279EX101[TBD]	TBD	--	●	●	●			●
Perimeter Sampling North of Building 1279								
1279PS101[TBD]	TBD	--	●	●	●			●
1279PS101[TBD+1']	TBD +1'	--	●	●	●			●
1279PS102[TBD]	TBD	--	●	●	●			●
1279PS102[TBD+1']	TBD +1'	--	●	●	●			●
1279PS103[TBD]	TBD	--	●	●	●	●		●
1279PS103[TBD+1']	TBD +1'	--	●	●	●			●
1279PS104[TBD]	TBD	--	●	●	●			●
1279PS104[TBD+1']	TBD +1'	--	●	●	●			●
1279PS105[TBD]	TBD	--	●	●	●			●
1279PS105[TBD+1']	TBD + 1'	--	●	●	●			●
1279PS106[TBD]	TBD	--	●	●	●			●
1279PS106[TBD+1']	TBD + 1'	--	●	●	●			●
Excavation Sampling East of Building 1259								
1259EX101[0.5]	0.5	--	●					●
1259EX102[0.5]	0.5	--	●			●		●
1259EX103[0.5]	0.5	--	●					●
Perimeter Sampling East of Building 1259								
1259PS101[0.0]	0.0	--	●					●
1259PS101[0.5]	0.5	--	●					●
1259PS101[1.0]	1.0	--	●					●
1259PS102[0.0]	0.0	--	●					●
1259PS102[0.5]	0.5	--	●					●
1259PS102[1.0]	1.0	--	●					●
1259PS102[0.0]	0.0	--	●					●
1259PS103[0.5]	0.5	--	●					●
1259PS103[1.0]	1.0	--	●					●
1259PS104[0.0]	0.0	--	●					●
1259PS104[0.5]	0.5	--	●					●
1259PS104[1.0]	1.0	--	●					●
Excavation Sampling South of Building 1259								
1259EX104 [TBD]	TBD	--	●	●	●		●	
1259EX105[TBD]	TBD	--	●	●	●		●	
1259EX106[TBD]	TBD	--	●	●	●	●	●	
Permiter Sampling South of Building 1259								
1259PS105[TBD]	TBD	--	●	●	●		●	
1259PS105[TBD+1']	TBD +1'	--	●	●	●		●	
1259PS106[TBD]	TBD		●	●	●		●	
1259PS106[TBD+1']	TBD +1'	--	●	●	●		●	
1259PS107[TBD]	TBD		●	●	●		●	
1259PS107[TBD+1']	TBD +1'	--	●	●	●		●	
1259PS108[TBD]	TBD		●	●	●		●	
1259PS108[TBD+1']	TBD +1'	--	●	●	●		●	
1259PS109[TBD]	TBD		●	●	●		●	
1259PS109[TBD+1']	TBD +1'	--	●	●	●		●	

Abbreviations:
-- = not applicable
● = recommended analysis or cleanup level
bgs = below ground surface
TBD = to be determined
USEPA = United States Environmental Protection Agency

Footnotes:
a. See Figures G-1 and G2 for sample locations.
b. Table G-1 lists the cleanup levels.

Note: Duplicate, equipment blank, and matrix spike and matrix spike duplicate (MS/MSD) samples will be collected. Ten percent (10%) of the samples collected will be duplicate and MS/MSD samples, and an equipment blank sample will be collected each day of sampling.

TABLE G-2
SAMPLE TRACKING TABLE
Lendrum Court
Presidio of San Francisco, California

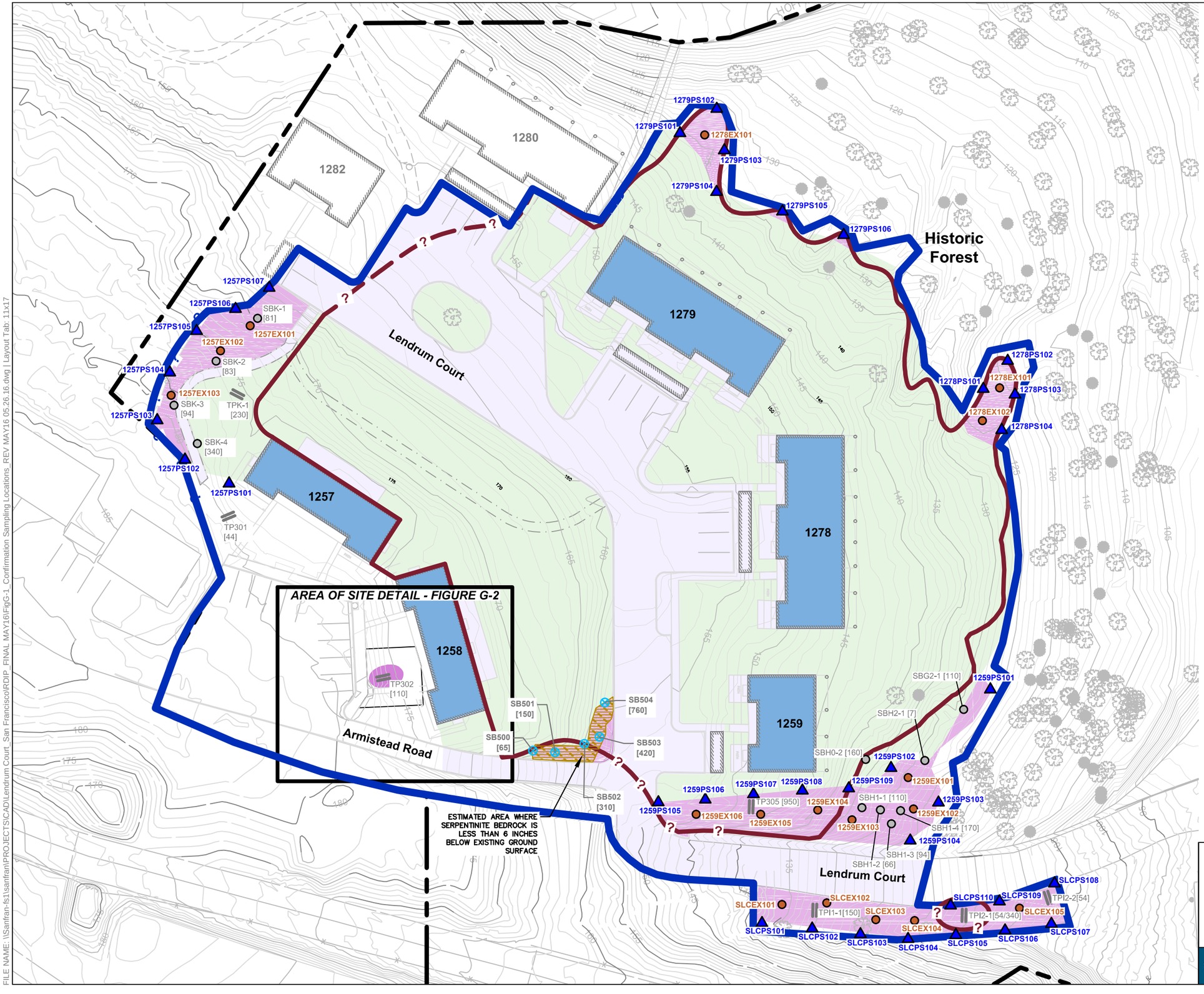
Sample ID [a]	Sample Depth (feet bgs)	Excavation Sample Location	Laboratory Analysis				Residential Cleanup Level for Sample Screening [b]	Forest/ Recreational Cleanup Level for Sample Screening [b]
			Lead (USEPA 6020)	As, Ba, Cu, Zn (USEPA 6020)	PAHs (USEPA 8270)	Dioxins/ Furans (USEPA 8290A)		
Excavation Sampling Northeast of Building 1278								
1278EX101[TBD]	TBD	--	●	●	●			●
1278EX102[TBD]	TBD	--	●	●	●	●		●
Perimeter Sampling Northeast of Building 1278								
1278PS101[TBD]	TBD	--	●	●	●			●
1278PS101[TBD+1']	TBD	--	●	●	●			●
1278PS102[TBD]	TBD	--	●	●	●			●
1278PS102[TBD+1]	TBD	--	●	●	●			●
1278PS103[TBD]	TBD	--	●	●	●			●
1278PS103[TBD+1']	TBD	--	●	●	●			●
1278PS103[TBD]	TBD	--	●	●	●			●
1278PS104[TBD+1']	TBD	--	●	●	●			●
Excavation Sampling South of Lendrum Court (West)								
SLCEX101[TBD]	0.5	--	●					●
SLCEX102[TBD]	0.5	--	●			●		●
SLCEX104[TBD]	0.5	--	●					●
Perimeter Sampling South of Lendrum Court (West)								
SLCPS101[0.0]	0.0	--	●					●
SLCPS101[1.0]	1.0	--	●					●
SLCPS101[1.5]	1.5	--	●					●
SLCPS102[0.0]	0.0	--	●					●
SLCPS102[1.0]	1.0	--	●					●
SLCPS102[1.5]	1.5	--	●					●
SLCPS103[0.0]	0.0	--	●					●
SLCPS103[1.0]	1.0	--	●					●
SLCPS103[1.5]	1.5	--	●					●
Excavation Sampling South of Lendrum Court (East)								
SLCEX104[TBD]	TBD	--	●	●	●			●
SLCEX105[TBD]	TBD	--	●	●	●			●
Perimeter Sampling South of Lendrum Court (East)								
SLCPS104[TBD]	TBD	--	●	●	●			●
SLCPS104[TBD+1']	TBD+1	--	●	●	●			●
SLCPS105[TBD]	TBD	--	●	●	●			●
SLCPS105[TBD+1']	TBD +1'	--	●	●	●			●
SLCPS106[TBD]	TBD	--	●	●	●			●
SLCPS106[TBD+1']	TBD +1'	--	●	●	●			●
SLCPS107[TBD]	TBD	--	●	●	●	●		●
SLCPS107[TBD+1']	TBD +1'	--	●	●	●			●
SLCPS108[TBD]	TBD	--	●	●	●			●
SLCPS108[TBD+1']	TBD +1'	--	●	●	●			●
SLCPS109[TBD]	TBD	--	●	●	●			●
SLCPS109[TBD+1']	TBD +1'	--	●	●	●			●
SLCPS110[TBD]	TBD	--	●	●	●			●
SLCPS110[TBD+1']	TBD+1'	--	●	●	●			●

Abbreviations:
-- = not applicable
● = recommended analysis or cleanup level
bgs = below ground surface
TBD = to be determined
USEPA = United States Environmental Protection Agency

Footnotes:
a. See Figures G-1 and G2 for sample locations.
b. Table G-1 lists the cleanup levels.

Note: Duplicate, equipment blank, and matrix spike and matrix spike duplicate (MS/MSD) samples will be collected. Ten percent (10%) of the samples collected will be duplicate and MS/MSD samples, and an equipment blank sample will be collected each day of sampling.

FIGURES



LEGEND

- Approximate site boundary
- Approximate extent of remedial action area
- 145 — Existing contour elevation
- Approximate limits of soil cap
- Approximate areas of building that serve as cap
- Areas of asphalt / pavement / hardscape that serve as cap
- Approximate areas to be consolidated and clean closed
- Site tree to be preserved during remedial construction
- Toyon to be preserved during remedial construction
- Approximate extent of debris, queried where uncertain
  NOTE: Extent of debris outline from EKI, Inc. (April 2015) Remedial Investigation Summary Report
- Approximate Location of Historic Pothole (sample point)
- Approximate Location of Historic Trench
- [83] Lead concentration in soil (milligrams per kilogram [mg/kg])
- Proposed perimeter confirmation sampling location
- Proposed confirmation sampling location
- Approximate location of bedrock overburden sample collected by TRC, January 2016

N

SCALE (FEET)

0 50 100

SOURCE: Base plan by Towill, October 29-November 4, 2015

SITE-WIDE CONFIRMATION ANALYSIS PLAN
May 26, 2016

Lendrum Court Area
The Presidio Trust
San Francisco, California

TRC | 229649 | **FIGURE G-1**

FILE NAME: \\Sanfran-fs1\sanfran\PROJECTS\CAD\Lendrum Court_San Francisco\RDIP_FINAL_MAY16\FigG-1_Confirmation Sampling Locations_REV MAY16 05.26.16.dwg | Layout Tab: 11x17

LEGEND

- Approximate site boundary
- Approximate extent of remedial action area
- 145 — Existing contour elevation
- Approximate limits of cap
- Approximate areas of building that serve as cap
- Areas of asphalt / pavement / hardscape that serve as cap
- Approximate area to be consolidated and clean closed
- Approximate extent of debris
  NOTE: Extent of debris outline from EKI, Inc. (April 2015) Remedial Investigation Summary Report
- Approximate location of historic trench TP302
- [110] — Lead concentration in soil (milligrams per kilogram [mg/kg])
- Proposed confirmation sample

N

SCALE (FEET)

0 10 20

SOURCE: Base plan by Towill, October 29-November 4, 2015

SITE DETAIL
PROPOSED SAMPLE LOCATIONS
May 26, 2016

Lendrum Court Area
The Presidio Trust
San Francisco, California

TRC | 229649 | **FIGURE G-2**

FILE NAME: \\Sanfran-fs1\sanfran\PROJECTS\CAD\Lendrum Court_San Francisco\RDIP_FINAL MAY16\FigG-2_Site Detail_Prop Sample Locations MAY16.05.26.16.dwg | Layout Tab: 11x17

ATTACHMENT

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Pleasanton
1220 Quarry Lane
Pleasanton, CA 94566
Tel: (925)484-1919

TestAmerica Job ID: 720-69894-1
Client Project/Site: Lendrum Ct. Data Gap Investigation

For:
TRC Solutions, Inc.
505 Sansome Street
Suite 1600
San Francisco, California 94111

Attn: Mr. Justin Hanzel-Durbin

Authorized for release by:
1/27/2016 4:24:52 PM

Dimple Sharma, Senior Project Manager
(925)484-1919
dimple.sharma@testamericainc.com

Table of Contents

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Job ID: 720-69894-1

Laboratory: TestAmerica Pleasanton

Narrative

Job Narrative
720-69894-1

Comments
No additional comments.

Receipt
The samples were received on 1/21/2016 1:55 PM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 5.6º C.

Metals
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

General Chemistry
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Detection Summary

Client: TRC Solutions, Inc.
Project/Site: Lendrum Ct. Data Gap Investigation

TestAmerica Job ID: 720-69894-1

Client Sample ID: 1279SB500(0.0) — Lab Sample ID: 720-69894-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	65		2.2		mg/Kg	4	☼	6010B	Total/NA

Client Sample ID: 1279SB501(0.0) — Lab Sample ID: 720-69894-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	150		2.7		mg/Kg	4	☼	6010B	Total/NA

Client Sample ID: 1279SB502(0.0) — Lab Sample ID: 720-69894-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	310		1.9		mg/Kg	4	☼	6010B	Total/NA

Client Sample ID: 1279SB503(0.0) — Lab Sample ID: 720-69894-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	420		2.3		mg/Kg	4	☼	6010B	Total/NA

Client Sample ID: 1279SB504(0.0) — Lab Sample ID: 720-69894-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	760		2.3		mg/Kg	4	☼	6010B	Total/NA

This Detection Summary does not include radiochemical test results.

Client: TRC Solutions, Inc.
Project/Site: Lendrum Ct. Data Gap Investigation

TestAmerica Job ID: 720-69894-1

Client Sample ID: 1279SB500(0.0)
Date Collected: 01/20/16 10:52
Date Received: 01/21/16 13:55

Lab Sample ID: 720-69894-1
Matrix: Solid

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	25		0.10		%			01/25/16 11:35	1

Client: TRC Solutions, Inc.
Project/Site: Lendrum Ct. Data Gap Investigation

TestAmerica Job ID: 720-69894-1

Client Sample ID: 1279SB500(0.0)
Date Collected: 01/20/16 10:52
Date Received: 01/21/16 13:55

Lab Sample ID: 720-69894-1
Matrix: Solid
Percent Solids: 75.0

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	65		2.2		mg/Kg	☼	01/25/16 10:18	01/26/16 06:08	4

Client: TRC Solutions, Inc.
Project/Site: Lendrum Ct. Data Gap Investigation

TestAmerica Job ID: 720-69894-1

Client Sample ID: 1279SB501(0.0)
Date Collected: 01/20/16 10:55
Date Received: 01/21/16 13:55

Lab Sample ID: 720-69894-2
Matrix: Solid

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	32		0.10		%			01/25/16 11:35	1

Client Sample Results

Client: TRC Solutions, Inc.
Project/Site: Lendrum Ct. Data Gap Investigation

TestAmerica Job ID: 720-69894-1

Client Sample ID: 1279SB501(0.0)
Date Collected: 01/20/16 10:55
Date Received: 01/21/16 13:55

Lab Sample ID: 720-69894-2
Matrix: Solid
Percent Solids: 68.0

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	150		2.7		mg/Kg	☼	01/25/16 10:18	01/26/16 06:13	4

Client: TRC Solutions, Inc.
Project/Site: Lendrum Ct. Data Gap Investigation

TestAmerica Job ID: 720-69894-1

Client Sample ID: 1279SB502(0.0)
Date Collected: 01/20/16 10:57
Date Received: 01/21/16 13:55

Lab Sample ID: 720-69894-3
Matrix: Solid

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	23		0.10		%			01/25/16 11:35	1

Client Sample Results

Client: TRC Solutions, Inc.
Project/Site: Lendrum Ct. Data Gap Investigation

TestAmerica Job ID: 720-69894-1

Client Sample ID: 1279SB502(0.0)
Date Collected: 01/20/16 10:57
Date Received: 01/21/16 13:55

Lab Sample ID: 720-69894-3
Matrix: Solid
Percent Solids: 76.8

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	310		1.9		mg/Kg	☼	01/25/16 10:18	01/26/16 06:19	4

Client: TRC Solutions, Inc.
Project/Site: Lendrum Ct. Data Gap Investigation

TestAmerica Job ID: 720-69894-1

Client Sample ID: 1279SB503(0.0)
Date Collected: 01/20/16 11:02
Date Received: 01/21/16 13:55

Lab Sample ID: 720-69894-4
Matrix: Solid

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	31		0.10		%			01/26/16 09:06	1

Client Sample Results

Client: TRC Solutions, Inc.
Project/Site: Lendrum Ct. Data Gap Investigation

TestAmerica Job ID: 720-69894-1

Client Sample ID: 1279SB503(0.0)
Date Collected: 01/20/16 11:02
Date Received: 01/21/16 13:55

Lab Sample ID: 720-69894-4
Matrix: Solid
Percent Solids: 68.8

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	420		2.3		mg/Kg	☼	01/25/16 10:18	01/26/16 06:34	4

Client: TRC Solutions, Inc.
Project/Site: Lendrum Ct. Data Gap Investigation

TestAmerica Job ID: 720-69894-1

Client Sample ID: 1279SB504(0.0)
Date Collected: 01/20/16 11:06
Date Received: 01/21/16 13:55

Lab Sample ID: 720-69894-5
Matrix: Solid

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	39		0.10		%			01/26/16 09:06	1

Client: TRC Solutions, Inc.
Project/Site: Lendrum Ct. Data Gap Investigation

TestAmerica Job ID: 720-69894-1

Client Sample ID: 1279SB504(0.0)
Date Collected: 01/20/16 11:06
Date Received: 01/21/16 13:55

Lab Sample ID: 720-69894-5
Matrix: Solid
Percent Solids: 60.9

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	760		2.3		mg/Kg	☼	01/25/16 10:18	01/26/16 06:39	4

Method: 6010B - Metals (ICP)

Lab Sample ID: MB 720-196154/1-A
Matrix: Solid
Analysis Batch: 196261

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 196154

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	ND		0.50		mg/Kg		01/25/16 10:18	01/26/16 04:38	1

Lab Sample ID: LCS 720-196154/2-A
Matrix: Solid
Analysis Batch: 196261

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 196154

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Lead			50.0	50.0		mg/Kg		100	80 - 120		

Lab Sample ID: LCSD 720-196154/3-A
Matrix: Solid
Analysis Batch: 196261

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 196154

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Lead			50.0	49.5		mg/Kg		99	80 - 120	1	20

Lab Sample ID: LCSSRM 720-196154/4-A
Matrix: Solid
Analysis Batch: 196261

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 196154

Analyte			Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits		
Lead			302	272		mg/Kg		90	62 - 113		

Method: Moisture - Percent Moisture

Lab Sample ID: 720-69894-4 DU
Matrix: Solid
Analysis Batch: 196241

Client Sample ID: 1279SB503(0.0)
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
Percent Moisture	31			33		%				5	20

QC Association Summary

Client: TRC Solutions, Inc.
Project/Site: Lendrum Ct. Data Gap Investigation

TestAmerica Job ID: 720-69894-1

Metals

Prep Batch: 196154

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
720-69894-1	1279SB500(0.0)	Total/NA	Solid	3050B	
720-69894-2	1279SB501(0.0)	Total/NA	Solid	3050B	
720-69894-3	1279SB502(0.0)	Total/NA	Solid	3050B	
720-69894-4	1279SB503(0.0)	Total/NA	Solid	3050B	
720-69894-5	1279SB504(0.0)	Total/NA	Solid	3050B	
LCS 720-196154/2-A	Lab Control Sample	Total/NA	Solid	3050B	
LCSD 720-196154/3-A	Lab Control Sample Dup	Total/NA	Solid	3050B	
LCSSRM 720-196154/4-A	Lab Control Sample	Total/NA	Solid	3050B	
MB 720-196154/1-A	Method Blank	Total/NA	Solid	3050B	

Analysis Batch: 196261

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
720-69894-1	1279SB500(0.0)	Total/NA	Solid	6010B	196154
720-69894-2	1279SB501(0.0)	Total/NA	Solid	6010B	196154
720-69894-3	1279SB502(0.0)	Total/NA	Solid	6010B	196154
720-69894-4	1279SB503(0.0)	Total/NA	Solid	6010B	196154
720-69894-5	1279SB504(0.0)	Total/NA	Solid	6010B	196154
LCS 720-196154/2-A	Lab Control Sample	Total/NA	Solid	6010B	196154
LCSD 720-196154/3-A	Lab Control Sample Dup	Total/NA	Solid	6010B	196154
LCSSRM 720-196154/4-A	Lab Control Sample	Total/NA	Solid	6010B	196154
MB 720-196154/1-A	Method Blank	Total/NA	Solid	6010B	196154

General Chemistry

Analysis Batch: 196169

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
720-69894-1	1279SB500(0.0)	Total/NA	Solid	Moisture	
720-69894-2	1279SB501(0.0)	Total/NA	Solid	Moisture	
720-69894-3	1279SB502(0.0)	Total/NA	Solid	Moisture	

Analysis Batch: 196241

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
720-69894-4	1279SB503(0.0)	Total/NA	Solid	Moisture	
720-69894-4 DU	1279SB503(0.0)	Total/NA	Solid	Moisture	
720-69894-5	1279SB504(0.0)	Total/NA	Solid	Moisture	

Lab Chronicle

Client: TRC Solutions, Inc.
Project/Site: Lendrum Ct. Data Gap Investigation

TestAmerica Job ID: 720-69894-1

Client Sample ID: 1279SB500(0.0) — **Lab Sample ID: 720-69894-1**
Date Collected: 01/20/16 10:52 — **Matrix: Solid**
Date Received: 01/21/16 13:55

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	196169	01/25/16 11:35	NVP	TAL PLS

Client Sample ID: 1279SB500(0.0) — **Lab Sample ID: 720-69894-1**
Date Collected: 01/20/16 10:52 — **Matrix: Solid**
Date Received: 01/21/16 13:55 — **Percent Solids: 75.0**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			196154	01/25/16 10:18	MJD	TAL PLS
Total/NA	Analysis	6010B		4	196261	01/26/16 06:08	SLK	TAL PLS

Client Sample ID: 1279SB501(0.0) — **Lab Sample ID: 720-69894-2**
Date Collected: 01/20/16 10:55 — **Matrix: Solid**
Date Received: 01/21/16 13:55

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	196169	01/25/16 11:35	NVP	TAL PLS

Client Sample ID: 1279SB501(0.0) — **Lab Sample ID: 720-69894-2**
Date Collected: 01/20/16 10:55 — **Matrix: Solid**
Date Received: 01/21/16 13:55 — **Percent Solids: 68.0**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			196154	01/25/16 10:18	MJD	TAL PLS
Total/NA	Analysis	6010B		4	196261	01/26/16 06:13	SLK	TAL PLS

Client Sample ID: 1279SB502(0.0) — **Lab Sample ID: 720-69894-3**
Date Collected: 01/20/16 10:57 — **Matrix: Solid**
Date Received: 01/21/16 13:55

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	196169	01/25/16 11:35	NVP	TAL PLS

Client Sample ID: 1279SB502(0.0) — **Lab Sample ID: 720-69894-3**
Date Collected: 01/20/16 10:57 — **Matrix: Solid**
Date Received: 01/21/16 13:55 — **Percent Solids: 76.8**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			196154	01/25/16 10:18	MJD	TAL PLS
Total/NA	Analysis	6010B		4	196261	01/26/16 06:19	SLK	TAL PLS

Lab Chronicle

Client: TRC Solutions, Inc.
Project/Site: Lendrum Ct. Data Gap Investigation

TestAmerica Job ID: 720-69894-1

Client Sample ID: 1279SB503(0.0) — **Lab Sample ID: 720-69894-4**
Date Collected: 01/20/16 11:02 — **Matrix: Solid**
Date Received: 01/21/16 13:55

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	196241	01/26/16 09:06	NVP	TAL PLS

Client Sample ID: 1279SB503(0.0) — **Lab Sample ID: 720-69894-4**
Date Collected: 01/20/16 11:02 — **Matrix: Solid**
Date Received: 01/21/16 13:55 — **Percent Solids: 68.8**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			196154	01/25/16 10:18	MJD	TAL PLS
Total/NA	Analysis	6010B		4	196261	01/26/16 06:34	SLK	TAL PLS

Client Sample ID: 1279SB504(0.0) — **Lab Sample ID: 720-69894-5**
Date Collected: 01/20/16 11:06 — **Matrix: Solid**
Date Received: 01/21/16 13:55

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	196241	01/26/16 09:06	NVP	TAL PLS

Client Sample ID: 1279SB504(0.0) — **Lab Sample ID: 720-69894-5**
Date Collected: 01/20/16 11:06 — **Matrix: Solid**
Date Received: 01/21/16 13:55 — **Percent Solids: 60.9**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			196154	01/25/16 10:18	MJD	TAL PLS
Total/NA	Analysis	6010B		4	196261	01/26/16 06:39	SLK	TAL PLS

Laboratory References:
TAL PLS = TestAmerica Pleasanton, 1220 Quarry Lane, Pleasanton, CA 94566, TEL (925)484-1919

Certification Summary

Client: TRC Solutions, Inc.
Project/Site: Lendrum Ct. Data Gap Investigation

TestAmerica Job ID: 720-69894-1

Laboratory: TestAmerica Pleasanton

All certifications held by this laboratory are listed. Not all certifications are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
California	State Program	9	2496	01-31-16 *

* Certification renewal pending - certification considered valid.

Method Summary

Client: TRC Solutions, Inc.
Project/Site: Lendrum Ct. Data Gap Investigation

TestAmerica Job ID: 720-69894-1

Method	Method Description	Protocol	Laboratory
6010B	Metals (ICP)	SW846	TAL PLS
Moisture	Percent Moisture	EPA	TAL PLS

Protocol References:

EPA = US Environmental Protection Agency

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL PLS = TestAmerica Pleasanton, 1220 Quarry Lane, Pleasanton, CA 94566, TEL (925)484-1919

Sample Summary

Client: TRC Solutions, Inc.
Project/Site: Lendrum Ct. Data Gap Investigation

TestAmerica Job ID: 720-69894-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
720-69894-1	1279SB500(0.0)	Solid	01/20/16 10:52	01/21/16 13:55
720-69894-2	1279SB501(0.0)	Solid	01/20/16 10:55	01/21/16 13:55
720-69894-3	1279SB502(0.0)	Solid	01/20/16 10:57	01/21/16 13:55
720-69894-4	1279SB503(0.0)	Solid	01/20/16 11:02	01/21/16 13:55
720-69894-5	1279SB504(0.0)	Solid	01/20/16 11:06	01/21/16 13:55

TA

TRC

CHAIN OF CUSTODY RECORD

☐ **Mountain View Office**
1920 Old Middlefield Rd
Mountain View, CA 94043
Tel: 650.967.2365
Fax: 650.967.2785

☒ **San Francisco**
505 Sansome Street, Suite 1600
San Francisco, CA 94111
Tel: 415.434.2600
Fax: 415.434.2321

720-69894 ref# 1606242

Project Name: Lendrum Ct. Data Gap Investigation

Job No.: 229649

P.O. #:

Report To: Justin Hanzel-Durkin/Caroline Boechner

Sampler (print): Caroline Boechner

Sampler (signature): [signature]

Electronic Deliverable Format Required: ☒ YES ☐ NO

EDF LOGCODE: ☐ TRCO

Global ID # :

Sample Type: (Soil) Groundwater Soil Vapor

Turnaround Requirements
- ☒ 5 Working Days
- ☐ 72 Hours
- ☐ 24 Hours
- ☐ 2-3 Hours RUSH
- ☐ STANDARD

QC Requirement:
- ☐ Level IV
- ☐ EDF
- ☒ Excel/EDD

Sample I.D. (Field Point Name)	Date	Time	Lab I.D.	Sample Matrix	# of cont	Preserved?	☐ EPA 8260B –Full List ☐ Gas w/ ☐BTEX ☐ MTBE	☐ TPH EPA 8015M* ☐ Silica Gel ☐Diesel ☐ Motor Oil ☐ Other	Metals: ☒ Lead ☐ LUFT ☐ RCRA	TRPH (418.1) with silica gel column	☐ Ferrous Iron Fe +2(HACH 8146)	☐Hexavalent Chromium (7199)	2-Propanol	VOCs	TO-15	Organochlorine Pesticides (8081)	PCBs (8082)	PAHs (8310)
1279SB500[0.0]	1/20/16	1052		Soil	1	Ice			X									
1279SB501[0.0]	"	1055		"	"	"			"		⊗	Please retain all samples						
1279SB502[0.0]	"	1057		"	"	"			"			for potential additional						
1279SB503[0.0]	"	1102		"	"	"			"			analyses pending lead						
1279 SB504[0.0]	↓	1106		↓	↓	↓			↓			results ⊗						

720-69894 Chain of Custody

Relinquished By: [signature]	Date: 1/21/16	10:44	Received By: [signature]	Date: 1-21-16 Time: 10:44
Relinquished By: [signature]	Date: 1-21-16	Time: 1355	Received By: [signature]	Date: 1/21/16 Time: 1355
Relinquished By:	Date:	Time:	Lab of Record:	
			Received by Lab:	Date: Time:

PM Initial:

Temp: 5.6 °C

1/27/2016

Sharma, Dimple

From: Berube, Nathan <NBerube@trcsolutions.com>
Sent: Thursday, January 21, 2016 12:07 PM
To: Sharma, Dimple
Subject: TRC Lendrum Ct. Data Gap Investigation COC correction

Hi Dimple,

I sent 5 discrete soil samples to you this morning TRC job # 229649;

They are being analyzed for Lead and also need to be DRY WEIGHT CORRECTED, which I neglected to indicate on the COC.

Please ensure the lab is aware of this correction.

Thanks,

Nate

Login Sample Receipt Checklist

Client: TRC Solutions, Inc.

Job Number: 720-69894-1

Login Number: 69894
List Number: 1
Creator: Mullen, Joan

List Source: TestAmerica Pleasanton

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	N/A	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

APPENDIX H
PROJECT SCHEDULE

LENDRUM COURT
PRESIDIO OF SAN FRANCISCO, CALIFORNIA

May 26, 2016

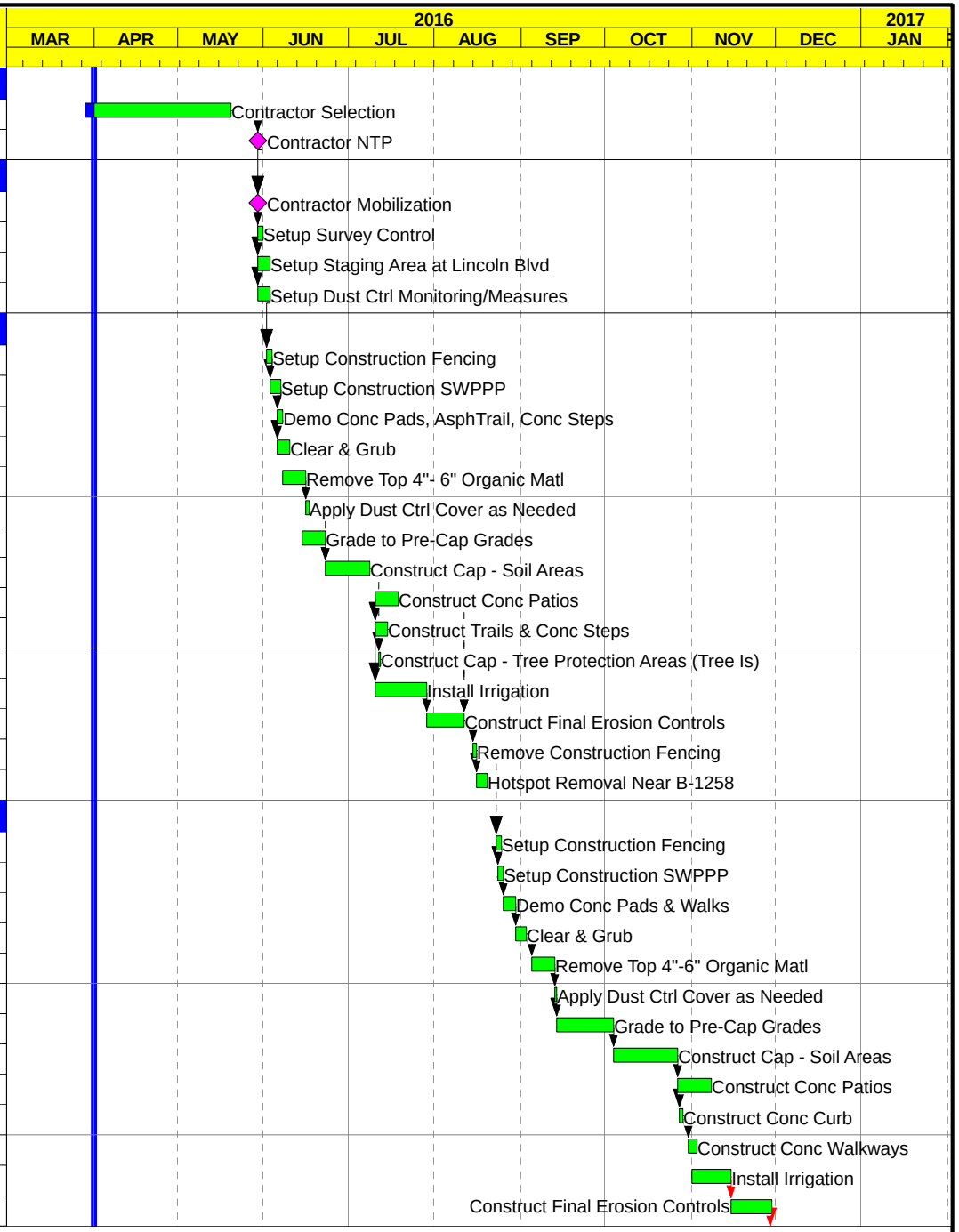
Prepared for

THE PRESIDIO TRUST
103 Montgomery Street, P.O. Box 29052
San Francisco, California 94129-0052

TRC Project No. 229649

TRC
9685 Research Drive
Irvine, California 92618
(949) 727-9336

Activity ID	Activity Description	Orig Dur	Rem Dur	Early Start	Early Finish
Pre-Construction Activities					
00010	Contractor Selection	38	35	29MAR16A	19MAY16
00030	Contractor NTP	0	0	30MAY16*	
Mobilization					
00040	Contractor Mobilization	0	0	30MAY16*	
00050	Setup Survey Control	2	2	30MAY16	31MAY16
00060	Setup Staging Area at Lincoln Blvd	4	4	30MAY16	02JUN16
00070	Setup Dust Ctrl Monitoring/Measures	4	4	30MAY16	02JUN16
Construction Activities - Zone 1					
00080	Setup Construction Fencing	2	2	02JUN16	03JUN16
00090	Setup Construction SWPPP	2	2	03JUN16	06JUN16
00100	Demo Conc Pads, AsphTrail, Conc Steps	2	2	06JUN16	07JUN16
00110	Clear & Grub	4	4	06JUN16	09JUN16
00120	Remove Top 4"- 6" Organic Matl	6	6	08JUN16*	15JUN16
00130	Apply Dust Ctrl Cover as Needed	1	1	16JUN16	16JUN16
00140	Grade to Pre-Cap Grades	6	6	15JUN16*	22JUN16
00142	Construct Cap - Soil Areas	12	12	23JUN16	08JUL16
00160	Construct Conc Patios	6	6	11JUL16*	18JUL16
00170	Construct Trails & Conc Steps	4	4	11JUL16	14JUL16
00180	Construct Cap - Tree Protection Areas (Tree Is)	1	1	12JUL16*	12JUL16
00190	Install Irrigation	14	14	11JUL16	28JUL16
00200	Construct Final Erosion Controls	10	10	29JUL16	11AUG16
00210	Remove Construction Fencing	1	1	15AUG16	15AUG16
00220	Hotspot Removal Near B-1258	4	4	16AUG16	19AUG16
Construction Activities - Zone 2					
00300	Setup Construction Fencing	2	2	23AUG16*	24AUG16
00320	Setup Construction SWPPP	2	2	24AUG16	25AUG16
00330	Demo Conc Pads & Walks	2	2	26AUG16	29AUG16
00340	Clear & Grub	4	4	30AUG16	02SEP16
00350	Remove Top 4"-6" Organic Matl	6	6	05SEP16	12SEP16
00360	Apply Dust Ctrl Cover as Needed	1	1	13SEP16	13SEP16
00370	Grade to Pre-Cap Grades	14	14	14SEP16	03OCT16
00380	Construct Cap - Soil Areas	17	17	04OCT16	26OCT16
00390	Construct Conc Patios	8	8	27OCT16	07NOV16
00400	Construct Conc Curb	1	1	28OCT16	28OCT16
00410	Construct Conc Walkways	3	3	31OCT16	02NOV16
00430	Install Irrigation	10	10	01NOV16*	14NOV16
00440	Construct Final Erosion Controls	11	11	15NOV16	29NOV16



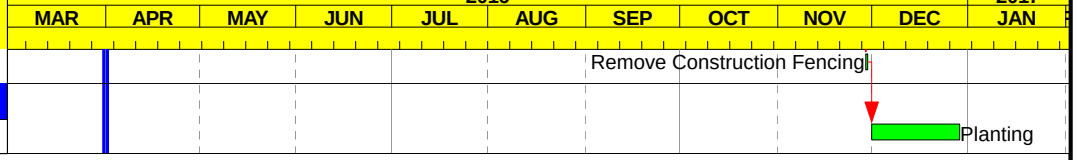
Start Date 04MAY15
Finish Date 28DEC16
Data Date 01APR16
Run Date 01APR16 07:34

Early Bar
Progress Bar

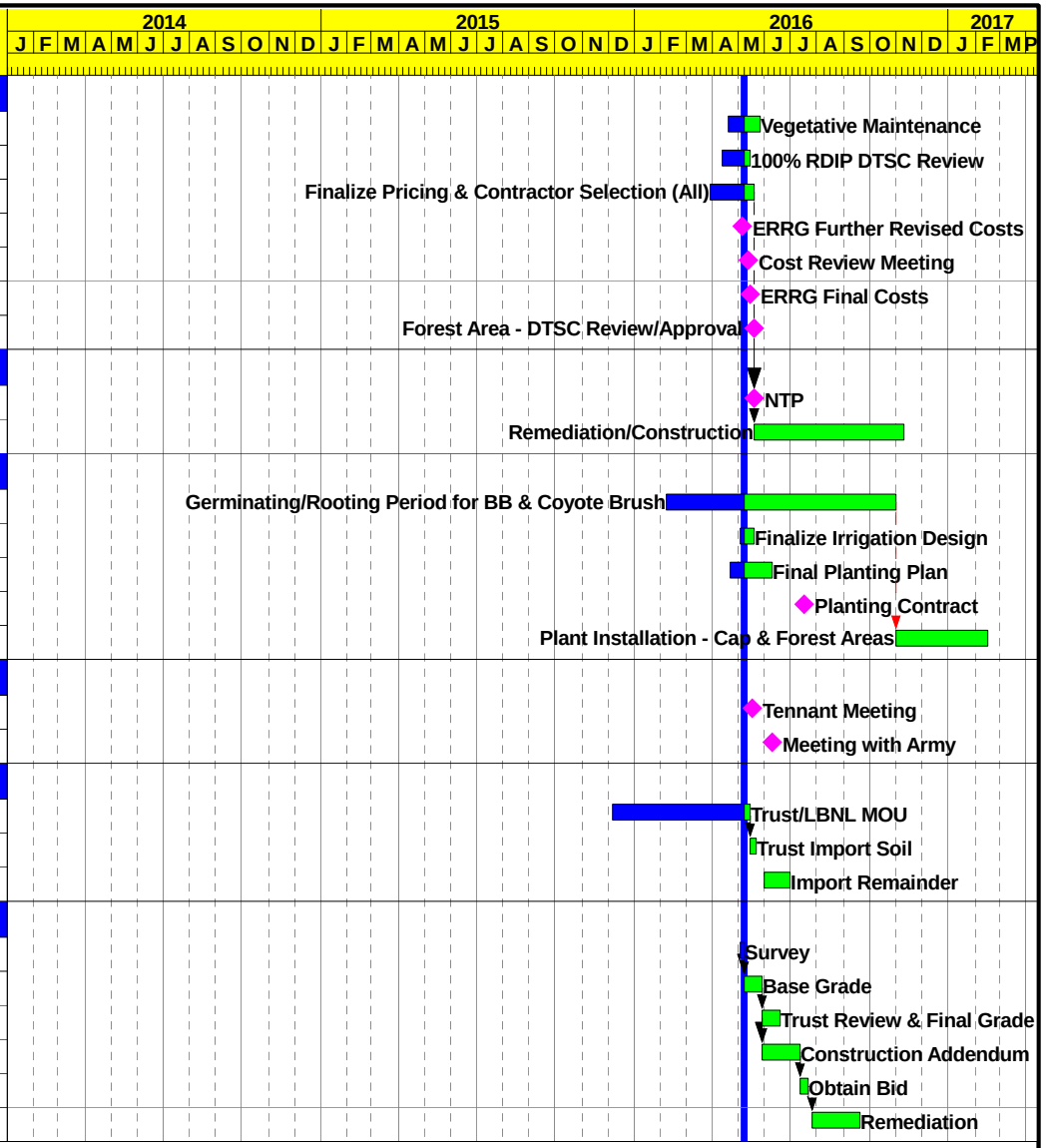
LEC1 Sheet 1 of 2

Construction Schedule
Lendrum Court Remediation
Presidio of San Francisco

Activity ID	Activity Description	Orig Dur	Rem Dur	Early Start	Early Finish
00450	Remove Construction Fencing	1	1	29NOV16	29NOV16
Planting					
00500	Planting	20	20	01DEC16	28DEC16



Activity ID	Activity Description	Orig Dur	Rem Dur	Early Start	Early Finish
Remedial Design of Forest Area					
0560	Vegetative Maintenance	27	14	20APR16A	26MAY16
0580	100% RDIP DTSC Review	12	5	13APR16A	13MAY16
0590	Finalize Pricing & Contractor Selection (All)	38	9	29MAR16A	19MAY16
0595	ERRG Further Revised Costs	0	0		04MAY16A
0596	Cost Review Meeting	0	0		11MAY16*
0597	ERRG Final Costs	0	0		13MAY16*
0820	Forest Area - DTSC Review/Approval	0	0		19MAY16*
Construction - Landscape & Forest Areas					
0600	NTP	0	0		19MAY16*
0610	Remediation/Construction	125	125	19MAY16	09NOV16
Post-Restoration Planting					
0710	Germinating/Rooting Period for BB & Coyote Brush	186	126	08FEB16A	31OCT16
0726	Finalize Irrigation Design	13	9	03MAY16A	19MAY16
0744	Final Planting Plan	34	23	22APR16A	08JUN16
0748	Planting Contract	0	0		15JUL16*
0750	Plant Installation - Cap & Forest Areas	76	76	01NOV16	14FEB17
Meetings					
0970	Tennant Meeting	0	0		17MAY16*
0972	Meeting with Army	0	0		09JUN16*
LBNL Soil					
1080	Trust/LBNL MOU	5	5	07DEC15A	13MAY16
1090	Trust Import Soil	5	5	16MAY16	20MAY16*
1096	Import Remainder	22	22	01JUN16*	30JUN16
ADL Area					
1440	Survey	3	0	04MAY16A	06MAY16A
1442	Base Grade	15	15	09MAY16	27MAY16
1444	Trust Review & Final Grade	15	15	30MAY16	17JUN16
1446	Construction Addendum	32	32	30MAY16	12JUL16
1448	Obtain Bid	6	6	13JUL16	20JUL16
1450	Remediation	40	40	27JUL16	20SEP16



Start Date	02DEC13
Finish Date	14FEB17
Data Date	09MAY16
Run Date	09MAY16 17:16

May 9, 2016 Update
Lendrum Court Remediation
Presidio of San Francisco

Early Bar
Progress Bar

APPENDIX I
MEMORANDUM ON TREE PRESERVATION

LENDRUM COURT
PRESIDIO OF SAN FRANCISCO, CALIFORNIA

May 26, 2016

Prepared for

THE PRESIDIO TRUST
103 Montgomery Street, P.O. Box 29052
San Francisco, California 94129-0052

TRC Project No. 229649

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415.434.2321 FAX

www.trcsolutions.com

May 26, 2016

Mr. George Chow
Department of Toxic Substances Control
700 Heinz Avenue
Berkeley, CA 94710-0052

RE: Memorandum on Tree Preservation

Dear Mr. Chow,

TRC Solutions (TRC), on behalf of the Presidio Trust (Trust), has prepared the following memorandum as an appendix to the Revised Remedial Design Implementation Plan (RDIP) to describe the activities that informed the decision to retain select trees at the Lendrum Court Site at the Presidio of San Francisco, California (Presidio) (Figure I-1). This memorandum provides background information on the remedial actions to be implemented. Additionally, this memo includes a description of the cap designs at these locations and construction procedures to be implemented around the trees that will be protected in place.

1.0 BACKGROUND

Shallow soil at the site is impacted by polycyclic aromatic hydrocarbons (PAHs), heavy metals, and dioxins and furans. In accordance with the selected remedy presented in the *Removal Action Workplan* (RAW) for Lendrum Court (TRC, 2015), remedial action at the site will consist of removal and/or consolidation of Army-era debris and incinerator ash from the shallow sub-surface soil, placement of a protective soil cover layer, implementation of Institutional Controls (ICs) through the use of LUCs, and implementation of a post-remediation Operations, Monitoring, and Maintenance Plan (OMMP) to monitor the capped portions of the site. The protective soil cap will be constructed of approximately 1.5 feet of clean imported fill underlain by gopher wire.

During construction projects, it is common for a Tree Protection Zone (TPZ) to be established around trees to prevent impacts to essential feeder roots. The feeder roots obtain oxygen, moisture, and nutrients from the soil which are essential for tree survival. If feeder roots were to be buried under 1.5 feet of soil cap or the full 1.5 feet of cap thickness is removed, the capacity of the roots to uptake oxygen and moisture would be substantially diminished. Moreover, suffocation of feeder roots and burial of the root crown can promote tree disease. Tree disease can cause a variety of species (including pine trees and eucalyptus trees) to catastrophically fail, leading to a substantial risk to life and property.

Presidio Trust Forestry (Forestry) standard for the TPZ is a 20-foot radius of no-impact measured from the base of each tree trunk. For the smaller-statured Toyon shrubs present in the forest area of the site, Forestry has specified that a 10-foot TPZ is appropriate. Within TPZs, actions that could impact the health of feeder roots are not permitted. Such actions could include compaction, soil removal, or soil placement.

1.0 Tree Preservation in the Landscape Area

Within the landscape portion of the site (i.e., area previously referred to as Phase 1), the tree located within the island of Lendrum Court (Tree 6; Figure I-1) and the trees located near the northeast corner of Building 1278 (Trees 10 and 11; Figure I-1) were intended to be protected in place. The other eleven trees in the landscaped area were slated for removal. The criteria, procedures, and analytical data that informed this recommendation is detailed in the Memorandum on Trees to be Preserved During Phase 1 Construction, dated August 5, 2015, which is presented as Attachment I-1 of this memorandum. This memorandum was submitted as Appendix I of the Phase 1 RDIP, which was approved by DTSC in a letter dated August 12, 2015.

It was noted in the Memorandum on Trees to be Preserved During Phase 1 Construction that if construction activities around Trees 10 and 11 would inevitably cause extensive damage to feeder roots and, in turn, adversely impact tree health, the Trust may opt to remove those trees. Based on additional evaluation, the closeness of the trees to building 1278 (less than 5 feet), branches overhanging the building, and the potential future risk

for catastrophic tree failure, it was ultimately decided that Trees 10 and 11 should be removed.

With the exception of Tree 6 (Figure I-1), all trees located within the Landscape Area were removed by Forestry personnel between July 9 and July 29, 2015. A 70-ton crane, provided by Professional Tree Care (PTC), was utilized on July 29, 2015 to support tree removal activities at the site.

2.0 Tree Preservation in the Forest Area

2.1 Preliminary Tree Preservation Assessments

A site walk was conducted on September 23rd with Michael Boland, the Presidio Trust Acting Executive Director, to obtain guidance on the preservation of existing vegetation in the forest area (i.e., area previously refered to as Phase 2). Key takeaways from the site walk included:

- Removal of large, mature eucalyptus and cypress trees, especially those in poor condition, is acceptable. Due to multiple layers of trees in the forest area, a visual buffer will remain between the residents and traffic on Lincoln despite tree removal in the forest area.
- Preference is to retain mature Toyon shrubs over other tree species since these plants are relatively old and considered valuable from an ecological and aesthetic standpoint. Although not ideal, it was noted that preservation will be considered even if the cap design and construction requires building soil up around the trunk of the shrub.
- Although the trees along Armistead road (south and south east of 1259 have an aesthetic value, they pose significant challenges for cap design and construction. As such, removing and replacing these trees may be a reasonable consideration.

Following the site walk, additional assessments were performed in consultation with Trust Planning. Specifically, tree and shrub surveys, were performed by HortScience, Inc. and H.T. Harvey & Associates, respectively. The scope of both assessments included evaluation of the overall condition and health of the plants and the potential for survival following the impact of remedial construction.

An evaluation of the native woody understory shrubs was performed by restoration ecologists Gavin Archbald and Patrick Furtado (H.T. Harvey & Associates) on November 23, 2015. The methodology and findings of the shub survey are presented in the Native Understory Shrub Survey Results memorandum, dated November 30, 2015 (Attachment I-2). The health and vigor of the Toyon shubs identified during the survey was low to moderate, and a low incident of Toyon natural seedlings was observed.

The tree assessment was performed by John Leffingwell (HortScience, Inc.) on November 19, 2015. The results of the tree assessment are detailed in the Lendrum Court Remediation Tree Assessment memorandum, dated December 21, 2015. Recommendations regarding tree preservation and removal are presented in Table 2 of the memorandum (Attachment I-2). Within the remedial construction area, six trees were considered for preservation.

The results of the shrub survey and the preliminary results of the tree assessment were presented at an N^2 Review meeting held on December 10, 2015. Permitting that specific stipulations are adhered to, no adverse effects were identified under NHPA and, based on the N^2 Project Screening Form, the N^2 presentation, and NHPA determination, it was determined that the project meets the criteria for a Categorical Exclusion under NEPA. Following this determination, a public meeting was held on January 7, 2015 to present the findings of the tree and shrub surveys and discuss the proposed tree removal and reforestation activities. The presentation from this meeting is posted on the Presidio Trust's Lendrum Court Remediation webpage[1] and presented in Attachment I-3.

2.2 Nesting Bird Surveys

In preparation for tree removal activities, an initial survey for actively nesting raptors and hummingbirds was conducted by H.T. Harvey & Associates wildlife ecologist/ornithologist, Stephen L. Peterson, M.S., on February 5, 2016. No active or inactive raptor or hummingbird nests were detected on the project site or in the surrounding survey area. The methods and findings of this nesting bird survey are detailed in the Lendrum Court Vegetation Removal - Nesting Raptor Survey (HTH #3686-02) memorandum, which is presented in Attachment I-5. To ensure no new

[1] http://www.presidio.gov/presidio-trust/planning/Pages/Lendrum-Court-Remediation.aspx

nesting activity had occurred at the site since the initial bird survey, a second bird and raptor survey was performed on February 18, 2016, four days prior to the start of tree removal activities at the site. No raptor or humming bird nests were observed during this secondary survey.

2.3 Tree Removal Activities

Plans and specifications for tree removal activities at Lendrum Court were prepared as part of a tree removal bid package, which was submitted to DTSC on January 6, 2016 (Attachment I-4). The proposed scope of work primarily consisted of cutting ground vegetation to within six inches of the ground surface and removal of 53 trees and 17 Toyon shrubs. The bid package proposed that, in addition to the tree located within the island of Lendrum Court (Tree 6; Figure I-1), six trees and three Toyon shubs located within the remedial action area be preserved. The bid package was approved by DTSC in an email dated January 14, 2016.

The bid for tree removal activities within the forest area was awarded to PCT. PCT mobilized to the site on February 22, 2016, and tree removal activities began on February 23, 2016. Logs were split and chipped in the forest area using a track mounted chipper. Special care was taken to minimize impacts to local residents by limiting the duration of chipping noise to one to two hours per day. The wood chips were spread in the forest area as erosion control material.

3.0 ALTERED STAND ASSESSMENT

Trees located at the leading edge of the forest stand, although protected to some degree by the Lendrum Court residences, were exposed to winds coming off the ocean during growth. Therefore, the stature and shape of trees at the leading edge of the forest developed in response to resisting these wind loads. The majority of the trees located at the leading edge of the stand were removed to accommodate remedial construction activities in the forest area. The trees that remain will form the new leading edge of the stand, which will be exposed to higher wind velocities than previously experienced by these trees. As such, there is an increased potential for trees or parts of trees (e.g., branch, stem) to fail.

An altered stand assessment was performed by John Leffingwell (HortScience, Inc.) on March 1 and 16, 2016 to assess the potential impacts from tree removal on the trees to be preserved in the forest area. TRC and Forestry personnel were present on site during the March 16, 2016 assessment. The altered stand assessment aimed to identify

- if preserved trees along the leading edge of the stand would experience increased wind velocities;
- parts of trees that may be at an increased risk for failure as a result of the new wind forces following tree removal; and
- management actions that would reduce the potential for the tree or parts of the tree from failing as a result of the anticipated wind forces.

For the majority of the trees preserved in the stand, no impacts from increased wind speeds were anticipated and no management action was recommended. Fifty-nine (59) trees located adjacent to the Lendrum Ct. residences, reforestation areas, Lendrum Court, Lincoln Boulevard, and Hoffman Street had the potential to hit a target, should they or one of their parts (e.g., branch, stem, whole tree) should fail. Of the 59 trees assessed, 9 were identified as having the potential to be impacted by increased wind speeds as a result of tree removals performed in preparation for remedial construction at Lendrum Court. As such, the following recommendations were made by HortScience, Inc.:

- Prune three trees (Trees 13, 28 and 50; Figure I-2)
- Remove one stem from two trees (Trees 85 and 7202; Figure I-2)
- Remove four additional trees (Trees 26, 30, 47 and 68; Figure I-2)

One of the trees located within the remedial construction area was previously identified for preservation (Tree 47; Figure I-2); however, the Trust felt that the structure of the tree was poor and that it could pose a risk to Lendrum Court residences and reforestation area workers. As such, it was decided that five trees and three Toyon shrubs will be retained within the forested portion of the remedial construction area (Figure I-1). The Lendrum Court Altered Stand Assessment, dated March 16, 2016 is presented as Attachment I-6.

4.0 CAP CONSTRUCTION IN TREE PROTECTION ZONES

4.1 Cap Construction in the Tree 6 TPZ[2]

In the Memorandum on Trees to be Preserved During Phase 1 Construction (Attachment I-A), Presidio Trust forestry experts requested that alternative cap designs be implemented around the Trees 6 to maximize its chance of survival. A modified cap that requires minimal excavation and cover placement was proposed for Tree 6 (Figure I-1). Construction of the alternate cap will consist of removing existing surficial plant litter/duff material (e.g., pine needles, leaves, bark, and loose soil), placement of gopher wire, and placement of a two-inch thick layer mulch on top of the gopher wire. The gopher wire is intended to prevent gophers from bringing waste materials and serve as a barrier between the mulch layer and contaminated soil and debris that may be present at deeper depths. The gopher wire will conform to the curb surrounding the island in Lendrum Court, and hardscape elements (e.g., roads, curbs) existing within the modified TPZ will remain in place and act as a cap.

4.2 Cap Construction in Forest Area TPZs

In total, five trees and three Toyon shrubs will be retained within the forested portion of the remedial construction area. The locations of these trees and shrubs are shown on Figure I-1. Cap construction within the TPZs for trees and shrubs will consist of excavating six to eight inches of surficial soil utilizing hand tools or small track-mounted equipment and placing 1.5 feet of clean imported soil underlain by gopher wire.

4.3 Construction Protocols and Limitations

Any clearing and grubbing, excavation, or other earthwork activities performed within the standard TPZ that extends 20 feet radially from the trunk of each tree will be overseen by an arborist and be performed using hand tools or small track-mounted equipment.

Field logs documenting tree removal and cap construction activities will be presented in the Construction Completion Report (CCR), which will be submitted to DTSC following the completion of remedial construction at Lendrum Court.

[2] The location of Tree 6 is shown on Figure I-1.

Please contact me at JHanzel-Durbin@trcsolutions.com or (415) 644-3050 if you have any questions about tree removal or preservation activities at the site.

Sincerely,
TRC Solutions, Inc.

Justin Hanzel-Durbin
Senior Engineer/Project Manager

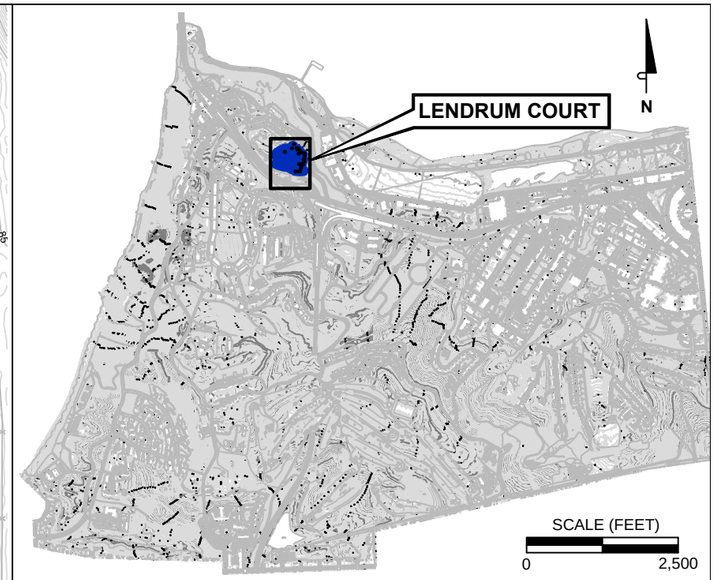
Jessica Barros, PE
Senior Staff Engineer

ATTACHMENTS:

Figure I-1 – Site Plan
Figure I-2 – Tree Removal Plan

Attachment I-1 – Memorandum on Trees to be Preserved During Phase 1 Construction
Attachment I-2 – Tree and Shrub Assessments
Attachment I-3 – Project Update Presentation – January 7, 2016
Attachment I-4 – Tree Removal Bid Package
Attachment I-5 – Nesting Bird Survey Results
Attachment I-6 – Altered Stand Assessment

FIGURES



LEGEND

- Approximate site boundary
- Approximate extent of remedial action area
- Protective in current configuration
- 145 Existing contour elevation
- Site tree to be preserved during remedial construction
- Toyon (Heteromeles Arbutifolia) to be preserved during remedial construction

NOTES:

1. Areas beneath pavement not mapped by EKI (2015) as containing debris are consequently assumed to contain debris for purposes of establishing a land use control (LUC) boundary.
2. Tree protection zones extend 20 feet radially from the trunk of each tree and 10 feet radially from each Toyon. An arborist is required to oversee any work performed within tree protection zones.

N

SCALE (FEET)

0 70 140

SOURCE: Base plan by Towill, October 29-November 4, 2015

SITE PLAN
May 26, 2016

Lendrum Court and Incinerator Area
The Presidio Trust
San Francisco, California

TRC | 229649 | **FIGURE I-1**

FILE NAME: \\Sanfran-fs1\sanfran\PROJECTS\CAD\Lendrum Court_San Francisco\RDIP_FINAL MAY16\Figure I-1 MAY16 05.26.16.dwg | Layout Tab: 11x17

Vegetation Clearance Area

Tree 135 (Preserve and Trim)

Toyons 136 and 182 (Preserve and Trim)

Contractor to flush cut stumps

Tree 115 (Preserve and Trim)

Toyon 200 (Preserve and Trim)

Tree 50 (Preserve and Trim)

SITE ACCESS

TEMPORARY FENCE (N)

Trees 11 and 12 (Preserve and Trim)

STAGING AREA

1280 1282 1279 1278 1257 1258 1259

Lincoln Blvd.

Lendrum Court

Armistead Road

LEGEND

- Approximate site boundary
- Limit of Vegetation Clearance Area (Overexcavation / Drainage)
- Approximate extent of waste debris, *(from TRC Solutions, Inc. (July 2015) Final Removal Action Work Plan)*
- Tree/Shrub identified for removal
- Existing elevation contour
- Site Tree (Within Work Area)
- Site Tree (Outside Work Area)
- Toyon (Heteromeles arbutifolia)
- Tree protection zone (20ft.radius fence around trees and 10 ft radius fence around toyons)
- Vegetation Clearance Area
- Temporary Work Perimeter Fence

Approximate Utility line locations:

- GAS — Gas
- SS — Sanitary sewer
- SD — Storm sewer
- W — Water

N

SCALE (FEET)

0 50 100

SOURCE: Base plan by Towill, October 29-November 4, 2015

REV	DATE	DESCRIPTION	DESIGN BY	CHK'D BY
B	5/2/16	100% Plan Specifications	J H-D	WBC
A	12/30/15	100% Plan Specifications	J H-D	WBC

Lendrum Court Area
The Presidio Trust
San Francisco, California

Figure I-2
Tree Removal Plan

TRC | 22964 | DATE 5/26/2016

FILE NAME: \\Sanfran-fs1\sanfran\PROJECTS\CAD\Lendrum Court_San Francisco\Tree Removal\Tree Removal Figure 5.2.2016.dwg | Layout Tab: Drawing

ATTACHMENT I-1
MEMORANDUM ON TREES TO BE PRESERVED DURING PHASE 1 CONSTRUCTION

APPENDIX I
MEMORANDUM ON TREES TO BE PRESERVED DURING PHASE 1 REMEDIAL CONSTRUCTION LENDRUM COURT PRESIDIO OF SAN FRANCISCO, CALIFORNIA

August 5, 2015

Prepared for

THE PRESIDIO TRUST
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San Francisco, California 94129-0052

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August 5, 2015

Mr. George Chow
Department of Toxic Substances Control
700 Heinz Avenue
Berkeley, CA 94710-0052

RE: Memorandum on Trees to be Preserved During Phase 1 Construction

Dear Mr. Chow,

TRC Solutions (TRC), on behalf of the Presidio Trust (Trust), has prepared the following memorandum as an appendix to the Phase 1 Remedial Design Implementation Plan (RDIP) to describe the criteria, procedures, and analytical data that informed the design of the protective soil cap around the trees to be retained within the phase 1 area of Lendrum Court Site (site; phase 1 area) at the Presidio of San Francisco, California (Presidio) (Figure I-1). This memorandum provides background information on the remedial actions to be implemented in the phase 1 area of the site and the risk for construction activities to adversely impact tree health. Additionally, this memo presents the analytical results of soil sampling performed around select trees and includes a description of the alternative cap designs at these locations and construction procedures to be implemented around the phase 1 trees that will be protected in place.

1.0 BACKGROUND

Shallow soil at the site is impacted by polycyclic aromatic hydrocarbons (PAHs), heavy metals, and dioxins and furans. In accordance with the selected remedy presented in the *Removal Action Workplan* (RAW) for Lendrum Court (TRC, 2015), remedial action at the site will consist of removal and/or consolidation of Army-era debris and incinerator ash from the shallow sub-surface soil, placement of a protective soil cover layer, implementation of Institutional Controls (ICs) through the use of LUCs, and implementation of a post-remediation Operations, Monitoring, and Maintenance Plan

(OMMP) to monitor the capped portions of the site. In the phase 1 areas designated for soil capping, the protective soil cap will be constructed of approximately 1.5 feet (ft) of clean imported fill underlain by gopher wire.

Within the Phase 1 area, the tree located within the island of Lendrum Court (Tree 6) and the trees located near the northeast corner of Building 1278 (Trees 10 and 11) are intended to be protected in place. The other eleven trees existing in the Phase 1 area will be removed as shown on Figure I-1. Trees located within the Phase 2 area of the site will be retained during Phase 1 remedial construction. Photos of Tree 6 and Trees 10 and 11 are presented in Attachment A.

Presidio Trust forestry experts have requested that trees that can be preserved during remediation receive an alternate cap design to maximize their chance of survival. Trees, including pine trees and eucalyptus trees, rely on feeder roots located in the upper 0.5 to 2 ft of the soil profile surrounding each tree. The feeder roots obtain oxygen, moisture, and nutrients from the soil which are essential for tree survival. If feeder roots were to be buried under 1.5 ft of soil cap or the full 1.5 feet of cap thickness is removed, the capacity of the roots to uptake oxygen and moisture would be substantially diminished. Moreover, suffocation of feeder roots and burial of the root crown can promote tree disease. Tree disease can cause a variety of species (including pine trees and eucalyptus trees) to catastrophically fail, leading to a substantial risk to life and property.

2.0 MODIFIED TREE PROTECTION ZONES (TPZS)

During construction projects, it is common for a Tree Protection Zone (TPZ) to be established around trees to prevent impacts to essential feeder roots. Presidio Trust Forestry (Forestry) standard for the TPZ is a 20-foot radius of no-impact measured from the base of each tree trunk. Within this zone, actions that could impact the health of feeder roots are not permitted. Such actions could include compaction, soil removal, or soil placement. However, if necessary to achieve both project goals and tree preservation, Forestry may modify the size and shape of the TPZ on a case-by-case basis and allow limited impacts to occur within the standard TPZ. In these cases, modified TPZ are crafted with Forestry's guidance to provide a high likelihood of preserving tree health.

On May 4, 2015, a site walk was held to evaluate the potential for remedial construction activities to adversely impact the health of trees in the Phase 1 area and to develop modified TPZs where applicable. Attendees included representatives from TRC, Trust Forestry, Remediation, and Planning departments, and H.T. Harvey (an ecological consulting firm).

During the site walk, it was concluded that significant excavation activities and/or placement of a 1.5 ft cap of soil placed over existing tree roots would constitute a substantial risk to the survival of the existing trees. As such, modified TPZs were designed on a tree-by-tree basis as discussed below in Section 4.0.

The design of the modified TPZs was finalized during a meeting held on May 12, 2015, where representatives from TRC, Trust Forestry, Remediation, and Planning departments, and H.T. Harvey were present. During this meeting, potential options for alternative cap designs within the modified TPZs were discussed; however, it was determined that the preferred alternative would be to limit cap construction within the modified TPZs to the greatest extent possible. As such, it was determined that further sampling in the vicinity of select trees would be appropriate to determine if construction of a cap could be avoided or significantly minimized within the modified TPZs.

3.0 SOIL SAMPING PERFORMED WITHIN MODIFIED TPZS

To provide coverage of the four selected tree areas [i.e., Tree 6; Tree 7; Trees 10 & 11; and Trees 12, 13, & 14], TRC collected soil samples from the 15 soil boring locations shown on Figure I-1. Soil samples were collected at depths of 0-0.5 feet below ground surface (bgs) and 1.5-2.0 feet bgs. As identified on Table I-1, at several locations, samples were only collected at one depth interval due to field conditions. Initially, the samples were only analyzed for total lead. Further analyses of samples for the remaining site COCs was only performed in areas where lead concentrations did not exceed screening levels.

Laboratory Analysis

Soil samples were analyzed for:

- Total lead analysis (EPA Method 6010) dry weight corrected

For the Tree 6 area, where all but one result was at or below 80 milligrams per kilogram (mg/kg), samples were also analyzed for the following additional parameters:

- CAM metals by EPA Method SW6020/7471A
- PAHs by EPA Method SW8270C-SIM
- Dioxins/furans by EPA Method SW1613B (one select sample)

Results

Analytical data for CAM metals and PAHs are summarized in Table I-1 along with governing residential or ecological buffer zone screening levels. Analytical laboratory reports are presented in Attachment B, and the results of this sampling event are summarized below:

Tree 6

Tree 6 is located in the island in the middle of Lendrum Court. Four soil boring locations were sampled around this tree. Only one of the five samples [1279SB432(1.5)] exceeded the 80 mg/kg screening level at a depth of 1.5 ft bgs. Concentrations for lead and other tested metals, PAHs and dioxin and furans were below the respective screening levels.

Tree 7

Tree 7 is located directly adjacent to the paved surface of Lendrum Court, southwest of Building 1279. Four soil boring locations were sampled around this tree. Five of the seven samples collected exceeded the total lead screening level, with a maximum detected concentration of 160 mg/kg. Samples from 1279SB436 and 1279SB437 at 1.5 ft bgs were the only two samples in the Tree 7 area that contained lead at concentrations below screening levels.

Trees 10 & 11

Trees 10 & 11 are located adjacent to the northeast corner of Building 1278. Four soil sample borings were performed around these trees. Five of the eight samples (including one duplicate) exceeded the total lead screening level, with a maximum detected concentration of 610 mg/kg. Samples from 1279SB440 at 0.0 and 1.5 ft bgs contained lead at concentrations below screening levels. Additionally, the one sample from boring

1279SB438 at 0 ft bgs, located between the Trees 10 & 11 and Building 1278, contained lead at concentrations below screening levels.

Trees 12, 13, & 14

Trees 12, 13, & 14 are located between Lendrum Court and the south side of Building 1259. Three soil sample borings were performed near these trees. Five of the eight soil samples exceeded the total lead limit, with a maximum concentration detected of 190 mg/kg. The primary and duplicate samples from 1279SB444 at 0.0 ft bgs contained lead at concentrations below screening levels. Additionally, lead was not detected above the laboratory reporting limit for the sample from 1279SB42 at 1.5 ft bgs.

Conclusions

For Tree 6, given that only one of the five samples contained lead concentrations above screening levels and that this sample was collected at depth of 1.5 ft bgs, a modified cap that requires minimal excavation and cover placement is proposed. Additional details regarding cap construction around Tree 6 are discussed in Section 4.0 below.

Due to the presence of lead in soil at concentrations above site screening levels (80 mg/kg) in the vicinity of Trees 7, 10, 11, 12, 13, and 14 a constructed cap will be required around these trees. Construction of an acceptable soil cap around Tree 7 would likely have a significant impact on tree health, therefore, the Trust has opted to remove this tree. Given the location of Trees 12, 13, and 14 (i.e., near the edge of the phase 1 boundary), the Trust, in concurrence with TRC and H.T. Harvey, decided that cap construction in this area would be best performed during phase 2 remedial construction, which is scheduled to begin summer 2016. In the interim, exclusion fencing would be installed in this area as shown on the design drawings (Appendix A of the RDIP).

Trees 10 and 11 will attempt to be retained during phase 1 remedial construction. As discussed in Section 4.0, an alternative soil cap designed to minimize damage to feeder roots is proposed within the modified TPZ for Trees 10 and 11.

4.0 DESIGN OF MODIFIED TPZs AND SOIL CAP FOR TREES 6, 10 AND 11

Modified TPZ CAP alternatives were designed for Tree 6 and Trees 10 and 11. The design considers the species of tree, trunk circumference at breast height, approximate distance from the trunk of the tree to the drip line[1] of the tree, landscape position of the tree (e.g., on a slope versus a relatively flat grade), and the proximity to hardscape elements or buildings. Knowledge of these tree-specific features can be used to approximate the general rooting pattern of the tree and identify the area around the tree where it is critical that excavation and/or soil placement activities are limited.

Tree 6

Pending the acceptance of an alternate cap design and implementation of a modified TPZ, preservation of Tree 6 during phase 1 remedial construction is thought to be feasible. Tree 6 is a pine tree within the Landscaped Vegetation Zone designated in the Presidio Vegetation Management Plan (VMP; Trust and NPS, 2001). The decision to retain Tree 6 is pursuant to the VMP objective to integrate core cultural landscape features (such as heritage trees) into site plans and designs (Section 3.4.3; Trust and NPS, 2001). The modified TPZ for this tree is shown on Figure I-1. Hardscape elements (e.g., roads, curbs) existing within the modified TPZ will remain in place and act as a cap. Within the island where there is exposed soil though significant amounts of thick roots are also exposed at the surface. The proposed alternate cap construction will consist of removing existing surficial plant litter duff material (e.g., pine needles, leaves, bark, and loose soil), placement of gopher wire, and placement of a two-inch thick layer mulch on top of the gopher wire. Cap design within the modified TPZ for Tree 6 is shown on Figure I-2 and in the design drawings (Sheet C-113, Detail 1). The gopher wire is intended to prevent gophers from bringing waste materials, which may be present in this area at depths greater than 1.5 ft below the surface. Although the island in Lendrum Court appears to be a low-traffic pedestrian area, the gopher wire will additionally serve as a barrier between the mulch layer and contaminated soil and debris that may be present at deeper depths. The gopher wire will conform to the curb surrounding the island in Lendrum Court as shown in the design drawings (Appendix A of the RDIP).

[1] The drip line is the area defined by the outermost circumference of a tree canopy where water drips from and onto the ground.

To protect tree health to the greatest extent possible, the proposed cap design for Tree 6 minimizes excavation activities around tree roots, minimizes the placement of additional material above roots, while also effectively blocking human exposure to the underlying material. Excavation activities have the potential to damage the critical network of small diameter, shallow feeder roots that obtain oxygen, moisture, and nutrients from the soil. The presence of a dense root plate and the numerous shallow, large diameter roots observed within the island of Lendrum Court further suggests that excavation activities within the modified TPZ may adversely impact the health and stability of the tree. The design of the proposed mulch layer, specifically the material selection and depth, was driven by the objective to allow for sufficient moisture and oxygen uptake by feeder roots, while also creating a barrier to human exposure to underlying soils. The two-inch mulch layer will not suffocate feeder roots, and this layer will also assist in keeping the gopher wire intact.

Trees 10 & 11

The two eucalyptus trees located near the northeast corner of Building 1278 (i.e., Trees 10 and 11) are intended to be preserved during Phase 1 remedial construction. Given the positioning of Trees 10 and 11 and the proposed final grades in this area, it is possible that these trees may be able to be protected in place if the proposed alternate cap design and modified TPZ is implemented. Trees 10 and 11 are cited within an area that is designated by the Presidio VMP as a Landscape Vegetation Zone; therefore, the decision to retain Trees 10 and 11 is pursuant to the VMP objective to integrate core cultural landscape features (such as heritage trees) into site plans and designs (Trust and NPS, 2001). The modified TPZ for these trees consists of approximately a 12-foot protection zone upslope (i.e., to the west/northwest) and a 15-foot protection zone downslope (i.e., to the south/southeast).

Since soil sampling results indicated that lead concentrations in near-surface soils around Trees 10 and 11 exceeded screening levels, a more robust soil cap than proposed for Tree 6, is proposed within the modified TPZ to be protective of ecological and human health. Cap construction within the modified TPZ for Trees 10 and 11 will consist of excavating 6 to 8 inches of soil below existing grade and placing 6 to 8 inches of clean imported soil

underlain by gopher wire. Excavation activities have the potential to damage feeder roots that obtain oxygen, moisture, and nutrients from the soil. Additionally, the placement of excess soil above the roots of Trees 10 and 11 could suffocate these trees by limiting moisture and oxygen uptake. Limiting the depth of the excavation and soil cap from 1.5 feet (i.e., the standard design for the phase 1 area) to 6 to 8 inches around Trees 10 and 11 is more conducive for tree health. This thinner, alternate cap design would remain and effective barrier to human exposure to underlying contaminated soils and debris. The cap design around Trees 10 and 11 is shown on Figure I-2 and in the design drawings (Sheet C-113, Detail 2). Additionally, the drainage feature to be installed along the northern of Building 1278 (shown on Figure I-2) will also serve as a cap.

5.0 CONSTRUCTION PROTOCOLS AND LIMITATIONS

Any clearing and grubbing, excavation, or other earthwork activities performed within the standard TPZ that extends 20 feet radially from the trunk of each tree will:

- Be overseen by an arborist; and
- Be performed using hand tools or small track-mounted equipment.

If determined that soil cap construction activities around Trees 10 and 11 will inevitably cause extensive damage to feeder roots and, in turn, adversely impact tree health, the Trust may opt to remove these trees during phase 1 construction.

The rationale and conclusions provided in this document, including discussions regarding tree health and the reasoning behind the protection of specific trees, are concurred with by Trust Forestry staff. Documentation of Trust concurrence is presented in Attachment C.

Sincerely,
TRC Solutions, Inc.

Justin Hanzel-Durbin
Senior Engineer/Project Manager

Jessica Barros, PE
Senior Staff Engineer

ATTACHMENTS:

Table I-1 – Tree Protection Zone Sampling
Figure I-1 – Site Plan
Figure I-2 – Tree Details
Attachment A – Photos of Trees to be Retained in the Phase 1 Area
Attachment B – Analytical Laboratory Data
Attachment C – Documentation of Trust Concurrence with Tree Memo Content

REFERENCES:

Presidio Trust (Trust), 2001b. United States Department of the Interior, National Park Service (NPS), 2015a. *Vegetation Management Plan and Environmental Assessment, Presidio of San Francisco, California*. December.

TABLES

TABLE I-1
TREE PROTECTION ZONE SAMPLING
Lendrum Court
Presidio of San Francisco

All units are in milligrams per kilogram (mg/kg)

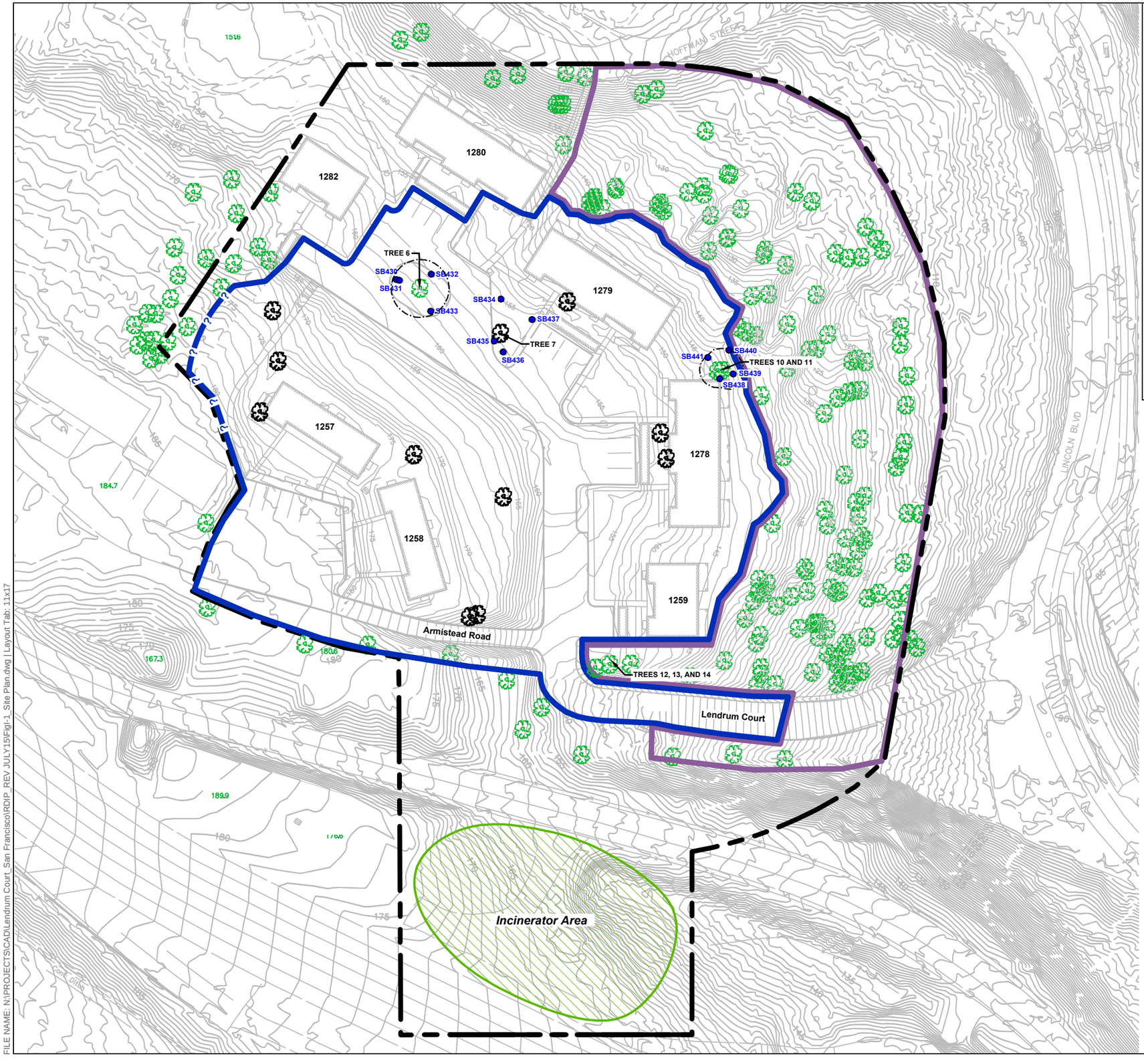
Sample Location	Date Collected	Sample Depth feet bgs	Arsenic	Barium	Beryllium	Chromium	Cobalt	Copper	Lead	Mercury	Molybdenum	Nickel	Vanadium	Zinc	Fluoranthene	Pyrene
1279SB-430	6/10/2015	0	3.9	88	0.21	92	11	34	66 F1	0.093	<0.55	98	48	57	0.059	0.058
1279SB-431	6/10/2015	1.5	3.9	83	0.37	69	9.5	15	4.1	0.054	<0.46	39	56	31	<0.0055	<0.0055
1279SB-432	6/10/2015	0	3.8	94	0.24	150	16	15	23	0.067	<0.50	160	54	41	<0.022	<0.022
	6/10/2015	1.5	--	--	--	--	--	--	**380**	--	--	--	--	--	--	--
1279SB-433	6/10/2015	0	4.8	170	0.25	98	34	17	50	0.057	0.46	97	55	56	<0.053	<0.053
	6/10/2015	1.5	3.8	86	0.24	61	12	16	3	0.032	<0.40	36	54	31	<0.0055	<0.0055
1279SB-434	6/10/2015	0	--	--	--	--	--	--	**110**	--	--	--	--	--	--	--
	6/10/2015	1.5	--	--	--	--	--	--	**160**	--	--	--	--	--	--	--
1279SB-435	6/10/2015	0	--	--	--	--	--	--	**140**	--	--	--	--	--	--	--
1279SB-436	6/10/2015	0	--	--	--	--	--	--	**81**	--	--	--	--	--	--	--
	6/10/2015	1.5	--	--	--	--	--	--	4.5	--	--	--	--	--	--	--
1279SB-437	6/10/2015	0	--	--	--	--	--	--	**85**	--	--	--	--	--	--	--
	6/11/2015	1.5	--	--	--	--	--	--	54	--	--	--	--	--	--	--
1279SB-438	6/11/2015	0							52							
1279SB-439	6/11/2015	0	--	--	--	--	--	--	**200**	--	--	--	--	--	--	--
	6/11/2015	1.5	--	--	--	--	--	--	**110**	--	--	--	--	--	--	--
1279SB-440	6/11/2015	0	--	--	--	--	--	--	60	--	--	--	--	--	--	--
	6/11/2015	1.5	--	--	--	--	--	--	6.2	--	--	--	--	--	--	--
1279SB-441	6/11/2015	0	--	--	--	--	--	--	**100**	--	--	--	--	--	--	--
DUP 061115	6/11/2015	0	--	--	--	--	--	--	**120**	--	--	--	--	--	--	--
	6/11/2015	1.5	--	--	--	--	--	--	**610**	--	--	--	--	--	--	--
1279SB-442	6/11/2015	0	--	--	--	--	--	--	**160**	--	--	--	--	--	--	--
DUP061215-2 (442)	6/12/2015	0	--	--	--	--	--	--	**190**	--	--	--	--	--	--	--
	6/11/2015	1.5	--	--	--	--	--	--	<0.88	--	--	--	--	--	--	--
1279SB-443	6/11/2015	0	--	--	--	--	--	--	**110**	--	--	--	--	--	--	--
	6/11/2015	1.5	--	--	--	--	--	--	**92**	--	--	--	--	--	--	--
1279SB-444	6/11/2015	0	--	--	--	--	--	--	41	--	--	--	--	--	--	--
DUP061215-3 (444)	6/11/2015	0	--	--	--	--	--	--	47	--	--	--	--	--	--	--
	6/11/2015	1.5	--	--	--	--	--	--	**490**	--	--	--	--	--	--	--
ological Buffer Zone Screening Levels [a]			6.2	500	10	1,700	170	120	80	1.6	300	4,500	90	160	40	40

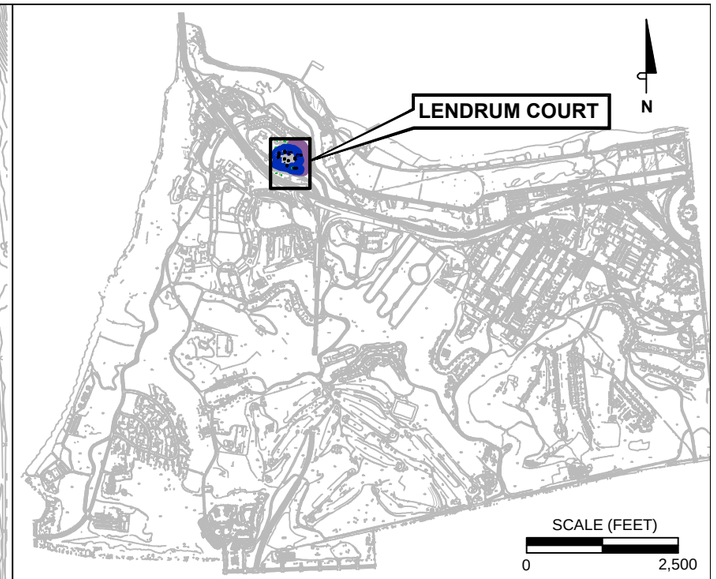
Results in bold indicate exceedance of screening level.

Abbreviations:
-- = not analyzed
bgs = below ground surface
DUP = duplicate sample
F1 = Matrix spike and/or matrix spike duplicate are outside acceptance criteria.

Footnotes:
[a] The screening levels from the Table 7-2 of EKI's 2002 (with updates through 2013) *Development of Presidio-Wide Cleanup Levels for Soil, Sediment, Groundwater, and Surface Water, Presidio of San Francisco* and Office of Environmental Health Hazard Assessment's (OEHHA) September 2009 *Revised California Human Health Screening Levels for Lead.* The screening levels are based on serpentinite and colma background levels, residential human health, and ecological buffer zone screening levels.

FIGURES





LEGEND

- Approximate site boundary
- Phase 1 remedial action area (approximate)
- Phase 2 remedial action area (approximate)
- Protective in current configuration
- 145 — Existing contour elevation
- Tree intended to be preserved during Phase 1 remedial construction
- Tree to be removed
- [1279] SB444 — Approximate sample location - June 10-12, 2015
- Modified tree protection zone (TPZ)
  NOTE: *Tree protection zones extend 20 feet radially from the trunk of each tree. An arborist is required to oversee any work performed within tree protection zones.*

N

SCALE (FEET)
0 70 140

SOURCE: Base plan by Erler & Kalinowski, Inc., November 2014.

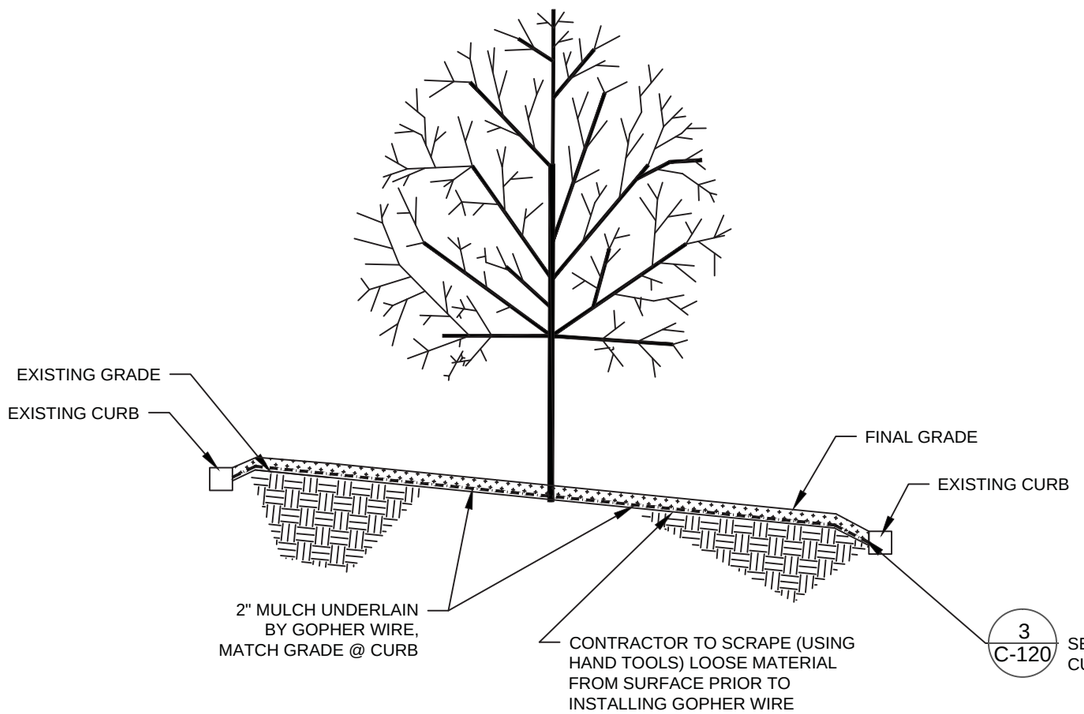
NOTE:
Areas beneath pavement not mapped by EKI (2015) as containing debris are consequently assumed to contain debris for purposes of establishing a land use control (LUC) boundary.

SITE PLAN
July 22, 2015

Lendrum Court and Incinerator Area
The Presidio Trust
San Francisco, California

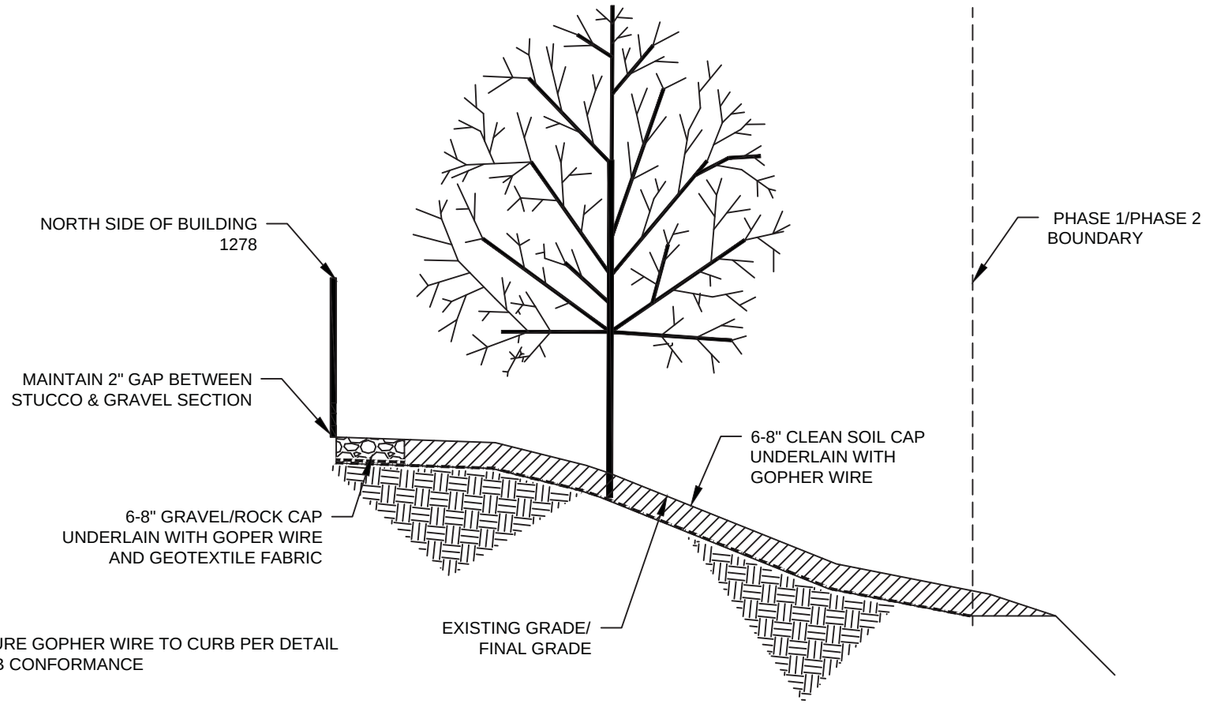
TRC | 229649 | **FIGURE I-1**

FILE NAME: N:\PROJECTS\CAD\Lendrum Court_San Francisco\RDIP_REV JULY15\Fig I-1_Site Plan.dwg | Layout Tab: 11x17



1 C-113 **TREE DETAIL**

(NOT TO SCALE)



2 C-113 **TREES DETAIL**

(NOT TO SCALE)

REV	DATE	DESCRIPTION	DESIGN BY	CHK'D BY
B	7/22/15	CONSTRUCTION 100%	J H-D	WC
A	7/14/15	CONSTRUCTION 95%	J H-D	WC

Lendrum Court Area
The Presidio Trust
San Francisco, California

FIGURE I-2
DETAILS - TREE PROTECTION CAP

TRC | 229649 | REV **B** | SHEET **C-113**

ATTACHMENT A

PHOTOS OF TREES TO BE RETAINED IN THE PHASE 1 AREA

Tree 6

Trees 10 & 11

ATTACHMENT B

ANALYTICAL LABORATORY REPORTS

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Pleasanton
1220 Quarry Lane
Pleasanton, CA 94566
Tel: (925)484-1919

TestAmerica Job ID: 720-65387-3
Client Project/Site: Presidio
Revision: 1

For:
TRC Solutions, Inc.
10680 White Rock Road
Suite 100
Rancho Cordova, California 95670

Attn: Mr. Justin Hanzel-Durbin

Authorized for release by:
6/30/2015 11:51:44 AM

Dimple Sharma, Senior Project Manager
(925)484-1919
dimple.sharma@testamericainc.com

Table of Contents

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Client: TRC Solutions, Inc.
Project/Site: Presidio

TestAmerica Job ID: 720-65387-3

Job ID: 720-65387-3

Laboratory: TestAmerica Pleasanton

Narrative

Job Narrative
720-65387-3

Comments
No additional comments.

Receipt
The samples were received on 6/10/2015 5:17 PM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 1.6º C.

Dioxin
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Dioxin Prep
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Detection Summary

Client: TRC Solutions, Inc.
Project/Site: Presidio

TestAmerica Job ID: 720-65387-3

Client Sample ID: 1279SB431(1.5) **Lab Sample ID: 720-65387-2**

No Detections.

This Detection Summary does not include radiochemical test results.

Client: TRC Solutions, Inc.
Project/Site: Presidio

TestAmerica Job ID: 720-65387-3

Client Sample ID: 1279SB431(1.5)
Date Collected: 06/10/15 13:30
Date Received: 06/10/15 17:17

Lab Sample ID: 720-65387-2
Matrix: Solid
Percent Solids: 90.0

Method: 8290 - Dioxins and Furans (HRGC/HRMS)

Analyte	Result	Qualifier	RL	EDL	Unit	D	Prepared	Analyzed	Dil Fac
Total PeCDD	ND		5.5		pg/g	☼	06/19/15 10:53	06/29/15 10:27	1
2,3,4,6,7,8-HxCDF	ND		5.5		pg/g	☼	06/19/15 10:53	06/29/15 10:27	1
1,2,3,7,8,9-HxCDD	ND		5.5		pg/g	☼	06/19/15 10:53	06/29/15 10:27	1
1,2,3,4,7,8,9-HpCDF	ND		5.5		pg/g	☼	06/19/15 10:53	06/29/15 10:27	1
1,2,3,4,6,7,8-HpCDF	ND		5.5		pg/g	☼	06/19/15 10:53	06/29/15 10:27	1
OCDD	ND		11		pg/g	☼	06/19/15 10:53	06/29/15 10:27	1
2,3,7,8-TCDD	ND		1.1		pg/g	☼	06/19/15 10:53	06/29/15 10:27	1
Total TCDF	ND		1.1		pg/g	☼	06/19/15 10:53	06/29/15 10:27	1
Total HxCDF	ND		5.5		pg/g	☼	06/19/15 10:53	06/29/15 10:27	1
1,2,3,7,8-PeCDD	ND		5.5		pg/g	☼	06/19/15 10:53	06/29/15 10:27	1
1,2,3,7,8-PeCDF	ND		5.5		pg/g	☼	06/19/15 10:53	06/29/15 10:27	1
1,2,3,6,7,8-HxCDD	ND		5.5		pg/g	☼	06/19/15 10:53	06/29/15 10:27	1
2,3,7,8-TCDF	ND		1.1		pg/g	☼	06/19/15 10:53	06/29/15 10:27	1
1,2,3,6,7,8-HxCDF	ND		5.5		pg/g	☼	06/19/15 10:53	06/29/15 10:27	1
Total TCDD	ND		1.1		pg/g	☼	06/19/15 10:53	06/29/15 10:27	1
1,2,3,7,8,9-HxCDF	ND		5.5		pg/g	☼	06/19/15 10:53	06/29/15 10:27	1
OCDF	ND		11		pg/g	☼	06/19/15 10:53	06/29/15 10:27	1
Total PeCDF	ND		5.5		pg/g	☼	06/19/15 10:53	06/29/15 10:27	1
Total HpCDD	ND		5.5		pg/g	☼	06/19/15 10:53	06/29/15 10:27	1
1,2,3,4,7,8-HxCDD	ND		5.5		pg/g	☼	06/19/15 10:53	06/29/15 10:27	1
Total HxCDD	ND		5.5		pg/g	☼	06/19/15 10:53	06/29/15 10:27	1
Total HpCDF	ND		5.5		pg/g	☼	06/19/15 10:53	06/29/15 10:27	1
1,2,3,4,7,8-HxCDF	ND		5.5		pg/g	☼	06/19/15 10:53	06/29/15 10:27	1
1,2,3,4,6,7,8-HpCDD	ND		5.5		pg/g	☼	06/19/15 10:53	06/29/15 10:27	1
2,3,4,7,8-PeCDF	ND		5.5		pg/g	☼	06/19/15 10:53	06/29/15 10:27	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C-2,3,7,8-TCDD	*81*		*40 - 135*	*06/19/15 10:53*	*06/29/15 10:27*	*1*
13C-2,3,7,8-TCDF	*83*		*40 - 135*	*06/19/15 10:53*	*06/29/15 10:27*	*1*
13C-1,2,3,7,8-PeCDD	*72*		*40 - 135*	*06/19/15 10:53*	*06/29/15 10:27*	*1*
13C-1,2,3,7,8-PeCDF	*76*		*40 - 135*	*06/19/15 10:53*	*06/29/15 10:27*	*1*
13C-1,2,3,6,7,8-HxCDD	*89*		*40 - 135*	*06/19/15 10:53*	*06/29/15 10:27*	*1*
13C-1,2,3,4,7,8-HxCDF	*81*		*40 - 135*	*06/19/15 10:53*	*06/29/15 10:27*	*1*
13C-1,2,3,4,6,7,8-HpCDD	*74*		*40 - 135*	*06/19/15 10:53*	*06/29/15 10:27*	*1*
13C-1,2,3,4,6,7,8-HpCDF	*79*		*40 - 135*	*06/19/15 10:53*	*06/29/15 10:27*	*1*
13C-OCDD	*59*		*40 - 135*	*06/19/15 10:53*	*06/29/15 10:27*	*1*

Isotope Dilution Summary

Client: TRC Solutions, Inc.
Project/Site: Presidio

TestAmerica Job ID: 720-65387-3

Method: 8290 - Dioxins and Furans (HRGC/HRMS)

Matrix: Solid **Prep Type: Total/NA**

		Percent Isotope Dilution Recovery (Acceptance Limits)							
Lab Sample ID	Client Sample ID	TCDD (40-135)	TCDF (40-135)	PeCDD (40-135)	PeCDF1 (40-135)	HxCDD2 (40-135)	HxCDF1 (40-135)	HpCDD (40-135)	HpCDF1 (40-135)
720-65387-2	1279SB431(1.5)	81	83	72	76	89	81	74	79
LCS 320-77311/2-A	Lab Control Sample	62	64	57	61	69	62	59	64
LCSD 320-77311/3-A	Lab Control Sample Dup	83	87	75	81	90	81	77	83
MB 320-77311/1-A	Method Blank	62	62	54	58	67	59	55	61

		Percent Isotope Dilution Recovery (Acceptance Limits)
Lab Sample ID	Client Sample ID	OCDD (40-135)
720-65387-2	1279SB431(1.5)	59
LCS 320-77311/2-A	Lab Control Sample	48
LCSD 320-77311/3-A	Lab Control Sample Dup	65
MB 320-77311/1-A	Method Blank	45

Surrogate Legend

TCDD = 13C-2,3,7,8-TCDD
TCDF = 13C-2,3,7,8-TCDF
PeCDD = 13C-1,2,3,7,8-PeCDD
PeCDF1 = 13C-1,2,3,7,8-PeCDF
HxCDD2 = 13C-1,2,3,6,7,8-HxCDD
HxCDF1 = 13C-1,2,3,4,7,8-HxCDF
HpCDD = 13C-1,2,3,4,6,7,8-HpCDD
HpCDF1 = 13C-1,2,3,4,6,7,8-HpCDF
OCDD = 13C-OCDD

Method: 8290 - Dioxins and Furans (HRGC/HRMS)

Lab Sample ID: MB 320-77311/1-A
Matrix: Solid
Analysis Batch: 78199

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 77311

Analyte	MB Result	MB Qualifier	RL	EDL	Unit	D	Prepared	Analyzed	Dil Fac
Total PeCDD	ND		5.0		pg/g		06/19/15 10:53	06/29/15 05:34	1
2,3,4,6,7,8-HxCDF	ND		5.0		pg/g		06/19/15 10:53	06/29/15 05:34	1
1,2,3,7,8,9-HxCDD	ND		5.0		pg/g		06/19/15 10:53	06/29/15 05:34	1
1,2,3,4,7,8,9-HpCDF	ND		5.0		pg/g		06/19/15 10:53	06/29/15 05:34	1
1,2,3,4,6,7,8-HpCDF	ND		5.0		pg/g		06/19/15 10:53	06/29/15 05:34	1
OCDD	ND		10		pg/g		06/19/15 10:53	06/29/15 05:34	1
2,3,7,8-TCDD	ND		1.0		pg/g		06/19/15 10:53	06/29/15 05:34	1
Total TCDF	ND		1.0		pg/g		06/19/15 10:53	06/29/15 05:34	1
Total HxCDF	ND		5.0		pg/g		06/19/15 10:53	06/29/15 05:34	1
1,2,3,7,8-PeCDD	ND		5.0		pg/g		06/19/15 10:53	06/29/15 05:34	1
1,2,3,7,8-PeCDF	ND		5.0		pg/g		06/19/15 10:53	06/29/15 05:34	1
1,2,3,6,7,8-HxCDD	ND		5.0		pg/g		06/19/15 10:53	06/29/15 05:34	1
2,3,7,8-TCDF	ND		1.0		pg/g		06/19/15 10:53	06/29/15 05:34	1
1,2,3,6,7,8-HxCDF	ND		5.0		pg/g		06/19/15 10:53	06/29/15 05:34	1
Total TCDD	ND		1.0		pg/g		06/19/15 10:53	06/29/15 05:34	1
1,2,3,7,8,9-HxCDF	ND		5.0		pg/g		06/19/15 10:53	06/29/15 05:34	1
OCDF	ND		10		pg/g		06/19/15 10:53	06/29/15 05:34	1
Total PeCDF	ND		5.0		pg/g		06/19/15 10:53	06/29/15 05:34	1
Total HpCDD	ND		5.0		pg/g		06/19/15 10:53	06/29/15 05:34	1
1,2,3,4,7,8-HxCDD	ND		5.0		pg/g		06/19/15 10:53	06/29/15 05:34	1
Total HxCDD	ND		5.0		pg/g		06/19/15 10:53	06/29/15 05:34	1
Total HpCDF	ND		5.0		pg/g		06/19/15 10:53	06/29/15 05:34	1
1,2,3,4,7,8-HxCDF	ND		5.0		pg/g		06/19/15 10:53	06/29/15 05:34	1
1,2,3,4,6,7,8-HpCDD	ND		5.0		pg/g		06/19/15 10:53	06/29/15 05:34	1
2,3,4,7,8-PeCDF	ND		5.0		pg/g		06/19/15 10:53	06/29/15 05:34	1

Isotope Dilution	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C-2,3,7,8-TCDD	*62*		*40 - 135*	*06/19/15 10:53*	*06/29/15 05:34*	*1*
13C-2,3,7,8-TCDF	*62*		*40 - 135*	*06/19/15 10:53*	*06/29/15 05:34*	*1*
13C-1,2,3,7,8-PeCDD	*54*		*40 - 135*	*06/19/15 10:53*	*06/29/15 05:34*	*1*
13C-1,2,3,7,8-PeCDF	*58*		*40 - 135*	*06/19/15 10:53*	*06/29/15 05:34*	*1*
13C-1,2,3,6,7,8-HxCDD	*67*		*40 - 135*	*06/19/15 10:53*	*06/29/15 05:34*	*1*
13C-1,2,3,4,7,8-HxCDF	*59*		*40 - 135*	*06/19/15 10:53*	*06/29/15 05:34*	*1*
13C-1,2,3,4,6,7,8-HpCDD	*55*		*40 - 135*	*06/19/15 10:53*	*06/29/15 05:34*	*1*
13C-1,2,3,4,6,7,8-HpCDF	*61*		*40 - 135*	*06/19/15 10:53*	*06/29/15 05:34*	*1*
13C-OCDD	*45*		*40 - 135*	*06/19/15 10:53*	*06/29/15 05:34*	*1*

Lab Sample ID: LCS 320-77311/2-A
Matrix: Solid
Analysis Batch: 78199

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 77311

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
2,3,4,6,7,8-HxCDF	100	124		pg/g		124	71 - 137
1,2,3,7,8,9-HxCDD	100	109		pg/g		109	68 - 138
1,2,3,4,7,8,9-HpCDF	100	108		pg/g		108	68 - 129
1,2,3,4,6,7,8-HpCDF	100	111		pg/g		111	71 - 134
OCDD	200	240		pg/g		120	70 - 128
2,3,7,8-TCDD	20.0	22.1		pg/g		110	60 - 138

Method: 8290 - Dioxins and Furans (HRGC/HRMS) (Continued)

Lab Sample ID: LCS 320-77311/2-A
Matrix: Solid
Analysis Batch: 78199

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 77311

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
1,2,3,7,8-PeCDD			100	118		pg/g		118	70 - 122		
1,2,3,7,8-PeCDF			100	112		pg/g		112	69 - 134		
1,2,3,6,7,8-HxCDD			100	113		pg/g		113	68 - 136		
2,3,7,8-TCDF			20.0	22.0		pg/g		110	56 - 158		
1,2,3,6,7,8-HxCDF			100	124		pg/g		124	67 - 140		
1,2,3,7,8,9-HxCDF			100	115		pg/g		115	72 - 134		
OCDF			200	258		pg/g		129	63 - 141		
1,2,3,4,7,8-HxCDD			100	104		pg/g		104	60 - 138		
1,2,3,4,7,8-HxCDF			100	116		pg/g		116	74 - 128		
1,2,3,4,6,7,8-HpCDD			100	115		pg/g		115	71 - 128		
2,3,4,7,8-PeCDF			100	114		pg/g		114	70 - 131		

Isotope Dilution	*LCS %Recovery*	*LCS Qualifier*	*Limits*
13C-2,3,7,8-TCDD	*62*		*40 - 135*
13C-2,3,7,8-TCDF	*64*		*40 - 135*
13C-1,2,3,7,8-PeCDD	*57*		*40 - 135*
13C-1,2,3,7,8-PeCDF	*61*		*40 - 135*
13C-1,2,3,6,7,8-HxCDD	*69*		*40 - 135*
13C-1,2,3,4,7,8-HxCDF	*62*		*40 - 135*
13C-1,2,3,4,6,7,8-HpCDD	*59*		*40 - 135*
13C-1,2,3,4,6,7,8-HpCDF	*64*		*40 - 135*
13C-OCDD	*48*		*40 - 135*

Lab Sample ID: LCSD 320-77311/3-A
Matrix: Solid
Analysis Batch: 78199

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 77311

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
2,3,4,6,7,8-HxCDF			100	124		pg/g		124	71 - 137	0	20
1,2,3,7,8,9-HxCDD			100	109		pg/g		109	68 - 138	0	20
1,2,3,4,7,8,9-HpCDF			100	111		pg/g		111	68 - 129	3	20
1,2,3,4,6,7,8-HpCDF			100	116		pg/g		116	71 - 134	4	20
OCDD			200	236		pg/g		118	70 - 128	2	20
2,3,7,8-TCDD			20.0	22.3		pg/g		111	60 - 138	1	20
1,2,3,7,8-PeCDD			100	120		pg/g		120	70 - 122	2	20
1,2,3,7,8-PeCDF			100	117		pg/g		117	69 - 134	4	20
1,2,3,6,7,8-HxCDD			100	115		pg/g		115	68 - 136	2	20
2,3,7,8-TCDF			20.0	22.1		pg/g		111	56 - 158	1	20
1,2,3,6,7,8-HxCDF			100	125		pg/g		125	67 - 140	1	20
1,2,3,7,8,9-HxCDF			100	120		pg/g		120	72 - 134	4	20
OCDF			200	255		pg/g		127	63 - 141	1	20
1,2,3,4,7,8-HxCDD			100	102		pg/g		102	60 - 138	2	20
1,2,3,4,7,8-HxCDF			100	116		pg/g		116	74 - 128	0	20
1,2,3,4,6,7,8-HpCDD			100	115		pg/g		115	71 - 128	0	20
2,3,4,7,8-PeCDF			100	117		pg/g		117	70 - 131	3	20

Isotope Dilution	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
13C-2,3,7,8-TCDD	*83*		*40 - 135*

Method: 8290 - Dioxins and Furans (HRGC/HRMS) (Continued)

Lab Sample ID: LCSD 320-77311/3-A
Matrix: Solid
Analysis Batch: 78199

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 77311

Isotope Dilution	LCSD %Recovery	LCSD Qualifier	Limits
13C-2,3,7,8-TCDF	87		40 - 135
13C-1,2,3,7,8-PeCDD	75		40 - 135
13C-1,2,3,7,8-PeCDF	81		40 - 135
13C-1,2,3,6,7,8-HxCDD	90		40 - 135
13C-1,2,3,4,7,8-HxCDF	81		40 - 135
13C-1,2,3,4,6,7,8-HpCDD	77		40 - 135
13C-1,2,3,4,6,7,8-HpCDF	83		40 - 135
13C-OCDD	65		40 - 135

QC Association Summary

Client: TRC Solutions, Inc.
Project/Site: Presidio

TestAmerica Job ID: 720-65387-3

Specialty Organics

Prep Batch: 77311

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
720-65387-2	1279SB431(1.5)	Total/NA	Solid	8290	
LCS 320-77311/2-A	Lab Control Sample	Total/NA	Solid	8290	
LCSD 320-77311/3-A	Lab Control Sample Dup	Total/NA	Solid	8290	
MB 320-77311/1-A	Method Blank	Total/NA	Solid	8290	

Analysis Batch: 78199

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
720-65387-2	1279SB431(1.5)	Total/NA	Solid	8290	77311
LCS 320-77311/2-A	Lab Control Sample	Total/NA	Solid	8290	77311
LCSD 320-77311/3-A	Lab Control Sample Dup	Total/NA	Solid	8290	77311
MB 320-77311/1-A	Method Blank	Total/NA	Solid	8290	77311

Lab Chronicle

Client: TRC Solutions, Inc.
Project/Site: Presidio

TestAmerica Job ID: 720-65387-3

Client Sample ID: 1279SB431(1.5)
Date Collected: 06/10/15 13:30
Date Received: 06/10/15 17:17

Lab Sample ID: 720-65387-2
Matrix: Solid
Percent Solids: 90.0

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	8290			77311	06/19/15 10:53	GDB	TAL SAC
Total/NA	Analysis	8290		1	78199	06/29/15 10:27	SMA	TAL SAC

Laboratory References:

TAL SAC = TestAmerica Sacramento, 880 Riverside Parkway, West Sacramento, CA 95605, TEL (916)373-5600

Certification Summary

Client: TRC Solutions, Inc.
Project/Site: Presidio

TestAmerica Job ID: 720-65387-3

Laboratory: TestAmerica Pleasanton

All certifications held by this laboratory are listed. Not all certifications are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
California	State Program	9	2496	01-31-16

Laboratory: TestAmerica Sacramento

All certifications held by this laboratory are listed. Not all certifications are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
A2LA	DoD ELAP		2928-01	01-31-16
Alaska (UST)	State Program	10	UST-055	12-18-15
Arizona	State Program	9	AZ0708	08-11-15
Arkansas DEQ	State Program	6	88-0691	06-17-16
California	State Program	9	2897	01-31-16
Colorado	State Program	8	N/A	08-31-15
Connecticut	State Program	1	PH-0691	06-30-15 *
Florida	NELAP	4	E87570	06-30-16
Hawaii	State Program	9	N/A	01-29-16
Illinois	NELAP	5	200060	03-17-16
Kansas	NELAP	7	E-10375	10-31-15
Louisiana	NELAP	6	30612	06-30-16
Michigan	State Program	5	9947	01-31-16
Nevada	State Program	9	CA44	07-31-15
New Jersey	NELAP	2	CA005	06-30-15 *
New York	NELAP	2	11666	04-01-16
Oregon	NELAP	10	CA200005	01-29-16
Oregon	NELAP Secondary AB	10	E87570	06-30-15
Pennsylvania	NELAP	3	9947	03-31-16
Texas	NELAP	6	T104704399-08-TX	05-31-16
US Fish & Wildlife	Federal		LE148388-0	02-28-16
USDA	Federal		P330-11-00436	12-30-17
USEPA UCMR	Federal	1	CA00044	11-06-16
Utah	NELAP	8	QUAN1	02-28-16
Virginia	NELAP Secondary AB	3	460278	03-14-16
Washington	State Program	10	C581	05-04-16
West Virginia (DW)	State Program	3	9930C	12-31-15
Wyoming	State Program	8	8TMS-Q	01-29-16

* Certification renewal pending - certification considered valid.

Method Summary

Client: TRC Solutions, Inc.
Project/Site: Presidio

TestAmerica Job ID: 720-65387-3

Method	Method Description	Protocol	Laboratory
8290	Dioxins and Furans (HRGC/HRMS)	SW846	TAL SAC

Protocol References:

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL SAC = TestAmerica Sacramento, 880 Riverside Parkway, West Sacramento, CA 95605, TEL (916)373-5600

Sample Summary

Client: TRC Solutions, Inc.
Project/Site: Presidio

TestAmerica Job ID: 720-65387-3

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
720-65387-2	1279SB431(1.5)	Solid	06/10/15 13:30	06/10/15 17:17

720-65387-3

Sharma, Dimple

From: Hanzel-Durbin, Justin <JHanzel-Durbin@trcsolutions.com>
Sent: Wednesday, June 17, 2015 10:49 AM
To: Sharma, Dimple
Cc: Fanelli, Eileen
Subject: RE: TestAmerica EDD and report files from 720-65387-1 Presidio
Attachments: image001.jpg

Dimple please analyze sample SB431(1.5) for dioxins and furans at standard TAT.
Thank you
Justin

Justin Hanzel-Durbin
Senior Engineer/Project Manager
Environmental/Remediation

505 Sansome Street, Suite 1600, San Francisco, CA 94111
T: 415.644.3050 | F: 415.434.2321 | Cell: 415.209.3326

Follow us on LinkedIn or Twitter | www.trcsolutions.com
JHanzel-Durbin@trcsolutions.com

720-65387 Chain of Custody

From: Sharma, Dimple [mailto:Dimple.Sharma@testamericainc.com]
Sent: Wednesday, June 17, 2015 10:06 AM
To: *Hanzel-Durbin, Justin*
Cc: Fanelli, Eileen
Subject: RE: TestAmerica EDD and report files from 720-65387-1 Presidio

I am sure there is enough sample to add dioxins and furans but the TAT for dioxins and furans will be 2 weeks. Please let me know which sample you want for dioxins and furans.

Thanks.

Dimple Sharma

Senior Project Manager

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

1220 Quarry Lane

Pleasanton, CA 94566

Tel 925.484.1919 ext. 103 | Fax 925.600.3002

www.testamericainc.com

Login Sample Receipt Checklist

Client: TRC Solutions, Inc.

Job Number: 720-65387-3

Login Number: 65387
List Number: 1
Creator: Bullock, Tracy

List Source: TestAmerica Pleasanton

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	N/A	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	False	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Login Sample Receipt Checklist

Client: TRC Solutions, Inc.

Job Number: 720-65387-3

Login Number: 65387
List Number: 2
Creator: Hytrek, Cheryl

List Source: TestAmerica Sacramento
List Creation: 06/17/15 07:03 PM

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	N/A	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	False	Dioxins need to be in the dark
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Pleasanton
1220 Quarry Lane
Pleasanton, CA 94566
Tel: (925)484-1919

TestAmerica Job ID: 720-65387-2
Client Project/Site: Presidio

For:
TRC Solutions, Inc.
10680 White Rock Road
Suite 100
Rancho Cordova, California 95670

Attn: Mr. Justin Hanzel-Durbin

Authorized for release by:
6/19/2015 2:50:14 PM

Dimple Sharma, Senior Project Manager
(925)484-1919
dimple.sharma@testamericainc.com

Table of Contents

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Case Narrative

Client: TRC Solutions, Inc.
Project/Site: Presidio

TestAmerica Job ID: 720-65387-2

Job ID: 720-65387-2

Laboratory: TestAmerica Pleasanton

Narrative

Job Narrative
720-65387-2

Comments
No additional comments.

Receipt
The samples were received on 6/10/2015 5:17 PM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 1.6º C.

Receipt Exceptions

The Chain-of-Custody (COC) was incomplete as received and/or improperly completed. COC has both methods 6020 checked and 6010 is written for Lead only.

received in a clear jar and dioxins need to be in the dark so put in a box.
1279SB431(1.5) (720-65387-2)

GC/MS Semi VOA
Method 8270C SIM: The following samples was diluted due to the abundance of non-target analytes: 1279SB430(0) (720-65387-1), 1279SB432(0) (720-65387-3) and 1279SB433(0) (720-65387-5). Elevated reporting limits (RLs) are provided.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Metals
Method 6010B: The following sample was diluted due to the abundance of non-target analyte: 1279SB433(0) (720-65387-5). Elevated reporting limits (RLs) are provided.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Organic Prep
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Detection Summary

Client: TRC Solutions, Inc.
Project/Site: Presidio

TestAmerica Job ID: 720-65387-2

Client Sample ID: 1279SB430(0) — Lab Sample ID: 720-65387-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Fluoranthene	59		57		ug/Kg	5	☼	8270C SIM	Total/NA
Pyrene	58		57		ug/Kg	5	☼	8270C SIM	Total/NA
Arsenic	3.9		1.1		mg/Kg	1	☼	6010B	Total/NA
Barium	88		0.55		mg/Kg	1	☼	6010B	Total/NA
Beryllium	0.21		0.11		mg/Kg	1	☼	6010B	Total/NA
Chromium	92		0.55		mg/Kg	1	☼	6010B	Total/NA
Cobalt	11		0.22		mg/Kg	1	☼	6010B	Total/NA
Copper	34		1.7		mg/Kg	1	☼	6010B	Total/NA
Nickel	98		0.55		mg/Kg	1	☼	6010B	Total/NA
Vanadium	48		0.55		mg/Kg	1	☼	6010B	Total/NA
Zinc	57		1.7		mg/Kg	1	☼	6010B	Total/NA
Mercury	0.093		0.010		mg/Kg	1	☼	7471A	Total/NA

Client Sample ID: 1279SB431(1.5) — Lab Sample ID: 720-65387-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Arsenic	3.9		0.93		mg/Kg	1	☼	6010B	Total/NA
Barium	83		0.46		mg/Kg	1	☼	6010B	Total/NA
Beryllium	0.37		0.093		mg/Kg	1	☼	6010B	Total/NA
Chromium	69		0.46		mg/Kg	1	☼	6010B	Total/NA
Cobalt	9.5		0.19		mg/Kg	1	☼	6010B	Total/NA
Copper	15		1.4		mg/Kg	1	☼	6010B	Total/NA
Nickel	39		0.46		mg/Kg	1	☼	6010B	Total/NA
Vanadium	56		0.46		mg/Kg	1	☼	6010B	Total/NA
Zinc	31		1.4		mg/Kg	1	☼	6010B	Total/NA
Mercury	0.054		0.0094		mg/Kg	1	☼	7471A	Total/NA

Client Sample ID: 1279SB432(0) — Lab Sample ID: 720-65387-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Arsenic	3.8		0.99		mg/Kg	1	☼	6010B	Total/NA
Barium	94		0.50		mg/Kg	1	☼	6010B	Total/NA
Beryllium	0.24		0.099		mg/Kg	1	☼	6010B	Total/NA
Chromium	150		0.50		mg/Kg	1	☼	6010B	Total/NA
Cobalt	16		0.20		mg/Kg	1	☼	6010B	Total/NA
Copper	15		1.5		mg/Kg	1	☼	6010B	Total/NA
Nickel	160		0.50		mg/Kg	1	☼	6010B	Total/NA
Vanadium	54		0.50		mg/Kg	1	☼	6010B	Total/NA
Zinc	41		1.5		mg/Kg	1	☼	6010B	Total/NA
Mercury	0.067		0.0099		mg/Kg	1	☼	7471A	Total/NA

Client Sample ID: 1279SB433(0) — Lab Sample ID: 720-65387-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Arsenic	4.8		1.5		mg/Kg	2	☼	6010B	Total/NA
Barium	170		0.37		mg/Kg	1	☼	6010B	Total/NA
Beryllium	0.25		0.073		mg/Kg	1	☼	6010B	Total/NA
Chromium	98		0.73		mg/Kg	2	☼	6010B	Total/NA
Cobalt	34		0.29		mg/Kg	2	☼	6010B	Total/NA
Copper	17		2.2		mg/Kg	2	☼	6010B	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample ID: 1279SB433(0) (Continued) — Lab Sample ID: 720-65387-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Molybdenum	0.46		0.37		mg/Kg	1	☼	6010B	Total/NA
Nickel	97		0.73		mg/Kg	2	☼	6010B	Total/NA
Vanadium	55		0.73		mg/Kg	2	☼	6010B	Total/NA
Zinc	56		2.2		mg/Kg	2	☼	6010B	Total/NA
Mercury	0.057		0.010		mg/Kg	1	☼	7471A	Total/NA

Client Sample ID: 1279SB433(1.5) — Lab Sample ID: 720-65387-6

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Arsenic	3.8		0.80		mg/Kg	1	☼	6010B	Total/NA
Barium	86		0.40		mg/Kg	1	☼	6010B	Total/NA
Beryllium	0.24		0.080		mg/Kg	1	☼	6010B	Total/NA
Chromium	61		0.40		mg/Kg	1	☼	6010B	Total/NA
Cobalt	12		0.16		mg/Kg	1	☼	6010B	Total/NA
Copper	16		1.2		mg/Kg	1	☼	6010B	Total/NA
Nickel	36		0.40		mg/Kg	1	☼	6010B	Total/NA
Vanadium	54		0.40		mg/Kg	1	☼	6010B	Total/NA
Zinc	31		1.2		mg/Kg	1	☼	6010B	Total/NA
Mercury	0.032		0.0098		mg/Kg	1	☼	7471A	Total/NA

Client Sample ID: 1279SB432(1.5),RB433(0) — Lab Sample ID: 720-65387-7

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Mercury	0.00021		0.00020		mg/L	1		7470A	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample ID: 1279SB430(0)
Date Collected: 06/10/15 12:30
Date Received: 06/10/15 17:17

Lab Sample ID: 720-65387-1
Matrix: Solid
Percent Solids: 86.9

Method: 8270C SIM - PAHs by GCMS (SIM)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acenaphthene	ND		57		ug/Kg	☼	06/17/15 11:44	06/18/15 03:07	5
Acenaphthylene	ND		57		ug/Kg	☼	06/17/15 11:44	06/18/15 03:07	5
Anthracene	ND		57		ug/Kg	☼	06/17/15 11:44	06/18/15 03:07	5
Benzo[a]anthracene	ND		57		ug/Kg	☼	06/17/15 11:44	06/18/15 03:07	5
Benzo[a]pyrene	ND		57		ug/Kg	☼	06/17/15 11:44	06/18/15 03:07	5
Benzo[b]fluoranthene	ND		57		ug/Kg	☼	06/17/15 11:44	06/18/15 03:07	5
Benzo[g,h,i]perylene	ND		57		ug/Kg	☼	06/17/15 11:44	06/18/15 03:07	5
Benzo[k]fluoranthene	ND		57		ug/Kg	☼	06/17/15 11:44	06/18/15 03:07	5
Chrysene	ND		57		ug/Kg	☼	06/17/15 11:44	06/18/15 03:07	5
Dibenz(a,h)anthracene	ND		57		ug/Kg	☼	06/17/15 11:44	06/18/15 03:07	5
Fluoranthene	**59**		57		ug/Kg	☼	06/17/15 11:44	06/18/15 03:07	5
Fluorene	ND		57		ug/Kg	☼	06/17/15 11:44	06/18/15 03:07	5
Indeno[1,2,3-cd]pyrene	ND		57		ug/Kg	☼	06/17/15 11:44	06/18/15 03:07	5
Naphthalene	ND		57		ug/Kg	☼	06/17/15 11:44	06/18/15 03:07	5
Phenanthrene	ND		57		ug/Kg	☼	06/17/15 11:44	06/18/15 03:07	5
Pyrene	**58**		57		ug/Kg	☼	06/17/15 11:44	06/18/15 03:07	5

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2-Fluorobiphenyl	*70*		*33 - 120*	*06/17/15 11:44*	*06/18/15 03:07*	*5*
Terphenyl-d14	*80*		*35 - 146*	*06/17/15 11:44*	*06/18/15 03:07*	*5*

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND		0.55		mg/Kg	☼	06/17/15 21:48	06/19/15 01:34	1
Arsenic	**3.9**		1.1		mg/Kg	☼	06/17/15 21:48	06/19/15 01:34	1
Barium	**88**		0.55		mg/Kg	☼	06/17/15 21:48	06/19/15 01:34	1
Beryllium	**0.21**		0.11		mg/Kg	☼	06/17/15 21:48	06/19/15 01:34	1
Cadmium	ND		0.14		mg/Kg	☼	06/17/15 21:48	06/19/15 01:34	1
Chromium	**92**		0.55		mg/Kg	☼	06/17/15 21:48	06/19/15 01:34	1
Cobalt	**11**		0.22		mg/Kg	☼	06/17/15 21:48	06/19/15 01:34	1
Copper	**34**		1.7		mg/Kg	☼	06/17/15 21:48	06/19/15 01:34	1
Molybdenum	ND		0.55		mg/Kg	☼	06/17/15 21:48	06/19/15 01:34	1
Nickel	**98**		0.55		mg/Kg	☼	06/17/15 21:48	06/19/15 01:34	1
Selenium	ND		1.1		mg/Kg	☼	06/17/15 21:48	06/19/15 01:34	1
Silver	ND		0.28		mg/Kg	☼	06/17/15 21:48	06/19/15 01:34	1
Thallium	ND		0.55		mg/Kg	☼	06/17/15 21:48	06/19/15 01:34	1
Vanadium	**48**		0.55		mg/Kg	☼	06/17/15 21:48	06/19/15 01:34	1
Zinc	**57**		1.7		mg/Kg	☼	06/17/15 21:48	06/19/15 01:34	1

Method: 7471A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	**0.093**		0.010		mg/Kg	☼	06/17/15 22:38	06/18/15 15:06	1

Client Sample ID: 1279SB431(1.5)

Date Collected: 06/10/15 13:30
Date Received: 06/10/15 17:17

Lab Sample ID: 720-65387-2

Matrix: Solid
Percent Solids: 90.0

Method: 8270C SIM - PAHs by GCMS (SIM)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acenaphthene	ND		5.5		ug/Kg	☼	06/17/15 11:44	06/18/15 00:44	1
Acenaphthylene	ND		5.5		ug/Kg	☼	06/17/15 11:44	06/18/15 00:44	1
Anthracene	ND		5.5		ug/Kg	☼	06/17/15 11:44	06/18/15 00:44	1
Benzo[a]anthracene	ND		5.5		ug/Kg	☼	06/17/15 11:44	06/18/15 00:44	1
Benzo[a]pyrene	ND		5.5		ug/Kg	☼	06/17/15 11:44	06/18/15 00:44	1
Benzo[b]fluoranthene	ND		5.5		ug/Kg	☼	06/17/15 11:44	06/18/15 00:44	1
Benzo[g,h,i]perylene	ND		5.5		ug/Kg	☼	06/17/15 11:44	06/18/15 00:44	1
Benzo[k]fluoranthene	ND		5.5		ug/Kg	☼	06/17/15 11:44	06/18/15 00:44	1
Chrysene	ND		5.5		ug/Kg	☼	06/17/15 11:44	06/18/15 00:44	1
Dibenz(a,h)anthracene	ND		5.5		ug/Kg	☼	06/17/15 11:44	06/18/15 00:44	1
Fluoranthene	ND		5.5		ug/Kg	☼	06/17/15 11:44	06/18/15 00:44	1
Fluorene	ND		5.5		ug/Kg	☼	06/17/15 11:44	06/18/15 00:44	1
Indeno[1,2,3-cd]pyrene	ND		5.5		ug/Kg	☼	06/17/15 11:44	06/18/15 00:44	1
Naphthalene	ND		5.5		ug/Kg	☼	06/17/15 11:44	06/18/15 00:44	1
Phenanthrene	ND		5.5		ug/Kg	☼	06/17/15 11:44	06/18/15 00:44	1
Pyrene	ND		5.5		ug/Kg	☼	06/17/15 11:44	06/18/15 00:44	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2-Fluorobiphenyl	*61*		*33 - 120*	*06/17/15 11:44*	*06/18/15 00:44*	*1*
Terphenyl-d14	*75*		*35 - 146*	*06/17/15 11:44*	*06/18/15 00:44*	*1*

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND		0.46		mg/Kg	☼	06/17/15 21:48	06/19/15 01:39	1
Arsenic	**3.9**		0.93		mg/Kg	☼	06/17/15 21:48	06/19/15 01:39	1
Barium	**83**		0.46		mg/Kg	☼	06/17/15 21:48	06/19/15 01:39	1
Beryllium	**0.37**		0.093		mg/Kg	☼	06/17/15 21:48	06/19/15 01:39	1
Cadmium	ND		0.12		mg/Kg	☼	06/17/15 21:48	06/19/15 01:39	1
Chromium	**69**		0.46		mg/Kg	☼	06/17/15 21:48	06/19/15 01:39	1
Cobalt	**9.5**		0.19		mg/Kg	☼	06/17/15 21:48	06/19/15 01:39	1
Copper	**15**		1.4		mg/Kg	☼	06/17/15 21:48	06/19/15 01:39	1
Molybdenum	ND		0.46		mg/Kg	☼	06/17/15 21:48	06/19/15 01:39	1
Nickel	**39**		0.46		mg/Kg	☼	06/17/15 21:48	06/19/15 01:39	1
Selenium	ND		0.93		mg/Kg	☼	06/17/15 21:48	06/19/15 01:39	1
Silver	ND		0.23		mg/Kg	☼	06/17/15 21:48	06/19/15 01:39	1
Thallium	ND		0.46		mg/Kg	☼	06/17/15 21:48	06/19/15 01:39	1
Vanadium	**56**		0.46		mg/Kg	☼	06/17/15 21:48	06/19/15 01:39	1
Zinc	**31**		1.4		mg/Kg	☼	06/17/15 21:48	06/19/15 01:39	1

Method: 7471A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	**0.054**		0.0094		mg/Kg	☼	06/17/15 22:38	06/18/15 15:08	1

Client Sample ID: 1279SB432(0)

Date Collected: 06/10/15 13:45
Date Received: 06/10/15 17:17

Lab Sample ID: 720-65387-3

Matrix: Solid
Percent Solids: 90.7

Method: 8270C SIM - PAHs by GCMS (SIM)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acenaphthene	ND		22		ug/Kg	☼	06/17/15 11:44	06/18/15 03:30	2
Acenaphthylene	ND		22		ug/Kg	☼	06/17/15 11:44	06/18/15 03:30	2
Anthracene	ND		22		ug/Kg	☼	06/17/15 11:44	06/18/15 03:30	2
Benzo[a]anthracene	ND		22		ug/Kg	☼	06/17/15 11:44	06/18/15 03:30	2
Benzo[a]pyrene	ND		22		ug/Kg	☼	06/17/15 11:44	06/18/15 03:30	2
Benzo[b]fluoranthene	ND		22		ug/Kg	☼	06/17/15 11:44	06/18/15 03:30	2
Benzo[g,h,i]perylene	ND		22		ug/Kg	☼	06/17/15 11:44	06/18/15 03:30	2
Benzo[k]fluoranthene	ND		22		ug/Kg	☼	06/17/15 11:44	06/18/15 03:30	2
Chrysene	ND		22		ug/Kg	☼	06/17/15 11:44	06/18/15 03:30	2
Dibenz(a,h)anthracene	ND		22		ug/Kg	☼	06/17/15 11:44	06/18/15 03:30	2
Fluoranthene	ND		22		ug/Kg	☼	06/17/15 11:44	06/18/15 03:30	2
Fluorene	ND		22		ug/Kg	☼	06/17/15 11:44	06/18/15 03:30	2
Indeno[1,2,3-cd]pyrene	ND		22		ug/Kg	☼	06/17/15 11:44	06/18/15 03:30	2
Naphthalene	ND		22		ug/Kg	☼	06/17/15 11:44	06/18/15 03:30	2
Phenanthrene	ND		22		ug/Kg	☼	06/17/15 11:44	06/18/15 03:30	2
Pyrene	ND		22		ug/Kg	☼	06/17/15 11:44	06/18/15 03:30	2

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2-Fluorobiphenyl	*80*		*33 - 120*	*06/17/15 11:44*	*06/18/15 03:30*	*2*
Terphenyl-d14	*82*		*35 - 146*	*06/17/15 11:44*	*06/18/15 03:30*	*2*

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND		0.50		mg/Kg	☼	06/17/15 21:48	06/19/15 01:44	1
Arsenic	**3.8**		0.99		mg/Kg	☼	06/17/15 21:48	06/19/15 01:44	1
Barium	**94**		0.50		mg/Kg	☼	06/17/15 21:48	06/19/15 01:44	1
Beryllium	**0.24**		0.099		mg/Kg	☼	06/17/15 21:48	06/19/15 01:44	1
Cadmium	ND		0.12		mg/Kg	☼	06/17/15 21:48	06/19/15 01:44	1
Chromium	**150**		0.50		mg/Kg	☼	06/17/15 21:48	06/19/15 01:44	1
Cobalt	**16**		0.20		mg/Kg	☼	06/17/15 21:48	06/19/15 01:44	1
Copper	**15**		1.5		mg/Kg	☼	06/17/15 21:48	06/19/15 01:44	1
Molybdenum	ND		0.50		mg/Kg	☼	06/17/15 21:48	06/19/15 01:44	1
Nickel	**160**		0.50		mg/Kg	☼	06/17/15 21:48	06/19/15 01:44	1
Selenium	ND		0.99		mg/Kg	☼	06/17/15 21:48	06/19/15 01:44	1
Silver	ND		0.25		mg/Kg	☼	06/17/15 21:48	06/19/15 01:44	1
Thallium	ND		0.50		mg/Kg	☼	06/17/15 21:48	06/19/15 01:44	1
Vanadium	**54**		0.50		mg/Kg	☼	06/17/15 21:48	06/19/15 01:44	1
Zinc	**41**		1.5		mg/Kg	☼	06/17/15 21:48	06/19/15 01:44	1

Method: 7471A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	**0.067**		0.0099		mg/Kg	☼	06/17/15 22:38	06/18/15 15:11	1

Client Sample ID: 1279SB433(0)

Date Collected: 06/10/15 14:30
Date Received: 06/10/15 17:17

Lab Sample ID: 720-65387-5

Matrix: Solid
Percent Solids: 93.5

Method: 8270C SIM - PAHs by GCMS (SIM)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acenaphthene	ND		53		ug/Kg	☼	06/17/15 11:44	06/18/15 03:54	5
Acenaphthylene	ND		53		ug/Kg	☼	06/17/15 11:44	06/18/15 03:54	5
Anthracene	ND		53		ug/Kg	☼	06/17/15 11:44	06/18/15 03:54	5
Benzo[a]anthracene	ND		53		ug/Kg	☼	06/17/15 11:44	06/18/15 03:54	5
Benzo[a]pyrene	ND		53		ug/Kg	☼	06/17/15 11:44	06/18/15 03:54	5
Benzo[b]fluoranthene	ND		53		ug/Kg	☼	06/17/15 11:44	06/18/15 03:54	5
Benzo[g,h,i]perylene	ND		53		ug/Kg	☼	06/17/15 11:44	06/18/15 03:54	5
Benzo[k]fluoranthene	ND		53		ug/Kg	☼	06/17/15 11:44	06/18/15 03:54	5
Chrysene	ND		53		ug/Kg	☼	06/17/15 11:44	06/18/15 03:54	5
Dibenz(a,h)anthracene	ND		53		ug/Kg	☼	06/17/15 11:44	06/18/15 03:54	5
Fluoranthene	ND		53		ug/Kg	☼	06/17/15 11:44	06/18/15 03:54	5
Fluorene	ND		53		ug/Kg	☼	06/17/15 11:44	06/18/15 03:54	5
Indeno[1,2,3-cd]pyrene	ND		53		ug/Kg	☼	06/17/15 11:44	06/18/15 03:54	5
Naphthalene	ND		53		ug/Kg	☼	06/17/15 11:44	06/18/15 03:54	5
Phenanthrene	ND		53		ug/Kg	☼	06/17/15 11:44	06/18/15 03:54	5
Pyrene	ND		53		ug/Kg	☼	06/17/15 11:44	06/18/15 03:54	5

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2-Fluorobiphenyl	*79*		*33 - 120*	*06/17/15 11:44*	*06/18/15 03:54*	*5*
Terphenyl-d14	*78*		*35 - 146*	*06/17/15 11:44*	*06/18/15 03:54*	*5*

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND		0.73		mg/Kg	☼	06/17/15 21:48	06/19/15 03:24	2
Arsenic	**4.8**		1.5		mg/Kg	☼	06/17/15 21:48	06/19/15 03:24	2
Barium	**170**		0.37		mg/Kg	☼	06/17/15 21:48	06/19/15 01:49	1
Beryllium	**0.25**		0.073		mg/Kg	☼	06/17/15 21:48	06/19/15 01:49	1
Cadmium	ND		0.18		mg/Kg	☼	06/17/15 21:48	06/19/15 03:24	2
Chromium	**98**		0.73		mg/Kg	☼	06/17/15 21:48	06/19/15 03:24	2
Cobalt	**34**		0.29		mg/Kg	☼	06/17/15 21:48	06/19/15 03:24	2
Copper	**17**		2.2		mg/Kg	☼	06/17/15 21:48	06/19/15 03:24	2
Molybdenum	**0.46**		0.37		mg/Kg	☼	06/17/15 21:48	06/19/15 01:49	1
Nickel	**97**		0.73		mg/Kg	☼	06/17/15 21:48	06/19/15 03:24	2
Selenium	ND		1.5		mg/Kg	☼	06/17/15 21:48	06/19/15 03:24	2
Silver	ND		0.37		mg/Kg	☼	06/17/15 21:48	06/19/15 03:24	2
Thallium	ND		0.73		mg/Kg	☼	06/17/15 21:48	06/19/15 03:24	2
Vanadium	**55**		0.73		mg/Kg	☼	06/17/15 21:48	06/19/15 03:24	2
Zinc	**56**		2.2		mg/Kg	☼	06/17/15 21:48	06/19/15 03:24	2

Method: 7471A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	**0.057**		0.010		mg/Kg	☼	06/17/15 22:38	06/18/15 15:13	1

Client Sample ID: 1279SB433(1.5)

Date Collected: 06/10/15 15:00
Date Received: 06/10/15 17:17

Lab Sample ID: 720-65387-6

Matrix: Solid
Percent Solids: 89.8

Method: 8270C SIM - PAHs by GCMS (SIM)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acenaphthene	ND		5.5		ug/Kg	☼	06/17/15 11:44	06/18/15 01:08	1
Acenaphthylene	ND		5.5		ug/Kg	☼	06/17/15 11:44	06/18/15 01:08	1
Anthracene	ND		5.5		ug/Kg	☼	06/17/15 11:44	06/18/15 01:08	1
Benzo[a]anthracene	ND		5.5		ug/Kg	☼	06/17/15 11:44	06/18/15 01:08	1
Benzo[a]pyrene	ND		5.5		ug/Kg	☼	06/17/15 11:44	06/18/15 01:08	1
Benzo[b]fluoranthene	ND		5.5		ug/Kg	☼	06/17/15 11:44	06/18/15 01:08	1
Benzo[g,h,i]perylene	ND		5.5		ug/Kg	☼	06/17/15 11:44	06/18/15 01:08	1
Benzo[k]fluoranthene	ND		5.5		ug/Kg	☼	06/17/15 11:44	06/18/15 01:08	1
Chrysene	ND		5.5		ug/Kg	☼	06/17/15 11:44	06/18/15 01:08	1
Dibenz(a,h)anthracene	ND		5.5		ug/Kg	☼	06/17/15 11:44	06/18/15 01:08	1
Fluoranthene	ND		5.5		ug/Kg	☼	06/17/15 11:44	06/18/15 01:08	1
Fluorene	ND		5.5		ug/Kg	☼	06/17/15 11:44	06/18/15 01:08	1
Indeno[1,2,3-cd]pyrene	ND		5.5		ug/Kg	☼	06/17/15 11:44	06/18/15 01:08	1
Naphthalene	ND		5.5		ug/Kg	☼	06/17/15 11:44	06/18/15 01:08	1
Phenanthrene	ND		5.5		ug/Kg	☼	06/17/15 11:44	06/18/15 01:08	1
Pyrene	ND		5.5		ug/Kg	☼	06/17/15 11:44	06/18/15 01:08	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2-Fluorobiphenyl	*63*		*33 - 120*	*06/17/15 11:44*	*06/18/15 01:08*	*1*
Terphenyl-d14	*80*		*35 - 146*	*06/17/15 11:44*	*06/18/15 01:08*	*1*

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND		0.40		mg/Kg	☼	06/17/15 21:48	06/19/15 01:54	1
Arsenic	**3.8**		0.80		mg/Kg	☼	06/17/15 21:48	06/19/15 01:54	1
Barium	**86**		0.40		mg/Kg	☼	06/17/15 21:48	06/19/15 01:54	1
Beryllium	**0.24**		0.080		mg/Kg	☼	06/17/15 21:48	06/19/15 01:54	1
Cadmium	ND		0.10		mg/Kg	☼	06/17/15 21:48	06/19/15 01:54	1
Chromium	**61**		0.40		mg/Kg	☼	06/17/15 21:48	06/19/15 01:54	1
Cobalt	**12**		0.16		mg/Kg	☼	06/17/15 21:48	06/19/15 01:54	1
Copper	**16**		1.2		mg/Kg	☼	06/17/15 21:48	06/19/15 01:54	1
Molybdenum	ND		0.40		mg/Kg	☼	06/17/15 21:48	06/19/15 01:54	1
Nickel	**36**		0.40		mg/Kg	☼	06/17/15 21:48	06/19/15 01:54	1
Selenium	ND		0.80		mg/Kg	☼	06/17/15 21:48	06/19/15 01:54	1
Silver	ND		0.20		mg/Kg	☼	06/17/15 21:48	06/19/15 01:54	1
Thallium	ND		0.40		mg/Kg	☼	06/17/15 21:48	06/19/15 01:54	1
Vanadium	**54**		0.40		mg/Kg	☼	06/17/15 21:48	06/19/15 01:54	1
Zinc	**31**		1.2		mg/Kg	☼	06/17/15 21:48	06/19/15 01:54	1

Method: 7471A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	**0.032**		0.0098		mg/Kg	☼	06/17/15 22:38	06/18/15 15:15	1

Client Sample ID: 1279SB432(1.5),RB433(0)

Date Collected: 06/10/15 14:15
Date Received: 06/10/15 17:17

Lab Sample ID: 720-65387-7

Matrix: Water

Method: 8270C SIM - PAHs by GCMS (SIM)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Naphthalene	ND		0.11		ug/L		06/17/15 09:35	06/18/15 00:20	1
Acenaphthene	ND		0.11		ug/L		06/17/15 09:35	06/18/15 00:20	1
Acenaphthylene	ND		0.11		ug/L		06/17/15 09:35	06/18/15 00:20	1
Fluorene	ND		0.11		ug/L		06/17/15 09:35	06/18/15 00:20	1
Phenanthrene	ND		0.11		ug/L		06/17/15 09:35	06/18/15 00:20	1
Anthracene	ND		0.11		ug/L		06/17/15 09:35	06/18/15 00:20	1
Benzo[a]anthracene	ND		0.11		ug/L		06/17/15 09:35	06/18/15 00:20	1
Chrysene	ND		0.11		ug/L		06/17/15 09:35	06/18/15 00:20	1
Benzo[a]pyrene	ND		0.11		ug/L		06/17/15 09:35	06/18/15 00:20	1
Benzo[b]fluoranthene	ND		0.11		ug/L		06/17/15 09:35	06/18/15 00:20	1
Benzo[k]fluoranthene	ND		0.11		ug/L		06/17/15 09:35	06/18/15 00:20	1
Benzo[g,h,i]perylene	ND		0.11		ug/L		06/17/15 09:35	06/18/15 00:20	1
Indeno[1,2,3-cd]pyrene	ND		0.11		ug/L		06/17/15 09:35	06/18/15 00:20	1
Fluoranthene	ND		0.11		ug/L		06/17/15 09:35	06/18/15 00:20	1
Pyrene	ND		0.11		ug/L		06/17/15 09:35	06/18/15 00:20	1
Dibenz(a,h)anthracene	ND		0.11		ug/L		06/17/15 09:35	06/18/15 00:20	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2-Fluorobiphenyl	*50*		*29 - 120*	*06/17/15 09:35*	*06/18/15 00:20*	*1*
Terphenyl-d14	*93*		*45 - 120*	*06/17/15 09:35*	*06/18/15 00:20*	*1*

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND		0.010		mg/L		06/17/15 14:17	06/17/15 22:50	1
Arsenic	ND		0.010		mg/L		06/17/15 14:17	06/17/15 22:50	1
Barium	ND		0.010		mg/L		06/17/15 14:17	06/17/15 22:50	1
Beryllium	ND		0.0020		mg/L		06/17/15 14:17	06/17/15 22:50	1
Cadmium	ND		0.0025		mg/L		06/17/15 14:17	06/17/15 22:50	1
Chromium	ND		0.010		mg/L		06/17/15 14:17	06/17/15 22:50	1
Cobalt	ND		0.0020		mg/L		06/17/15 14:17	06/17/15 22:50	1
Copper	ND		0.020		mg/L		06/17/15 14:17	06/17/15 22:50	1
Lead	ND		0.0050		mg/L		06/17/15 14:17	06/17/15 22:50	1
Molybdenum	ND		0.010		mg/L		06/17/15 14:17	06/17/15 22:50	1
Nickel	ND		0.010		mg/L		06/17/15 14:17	06/17/15 22:50	1
Selenium	ND		0.020		mg/L		06/17/15 14:17	06/17/15 22:50	1
Silver	ND		0.0050		mg/L		06/17/15 14:17	06/17/15 22:50	1
Thallium	ND		0.010		mg/L		06/17/15 14:17	06/17/15 22:50	1
Vanadium	ND		0.010		mg/L		06/17/15 14:17	06/17/15 22:50	1
Zinc	ND		0.020		mg/L		06/17/15 14:17	06/17/15 22:50	1

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	**0.00021**		0.00020		mg/L		06/17/15 11:23	06/17/15 16:00	1

Surrogate Summary

Client: TRC Solutions, Inc.
Project/Site: Presidio

TestAmerica Job ID: 720-65387-2

Method: 8270C SIM - PAHs by GCMS (SIM)

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)									
		FBP	TPH								
Lab Sample ID	Client Sample ID	(33-120)	(35-146)								
720-65387-1	1279SB430(0)	70	80								
720-65387-2	1279SB431(1.5)	61	75								
720-65387-3	1279SB432(0)	80	82								
720-65387-5	1279SB433(0)	79	78								
720-65387-6	1279SB433(1.5)	63	80								
LCS 720-183780/2-A	Lab Control Sample	69	87								
MB 720-183780/1-A	Method Blank	69	89								

Surrogate Legend

FBP = 2-Fluorobiphenyl
TPH = Terphenyl-d14

Method: 8270C SIM - PAHs by GCMS (SIM)

Matrix: Water **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)									
		FBP	TPH								
Lab Sample ID	Client Sample ID	(29-120)	(45-120)								
720-65387-7	1279SB432(1.5),RB433(0)	50	93								
LCS 720-183765/2-A	Lab Control Sample	63	87								
LCSD 720-183765/3-A	Lab Control Sample Dup	66	85								
MB 720-183765/1-A	Method Blank	67	91								

Surrogate Legend

FBP = 2-Fluorobiphenyl
TPH = Terphenyl-d14

Method: 8270C SIM - PAHs by GCMS (SIM)

Lab Sample ID: MB 720-183765/1-A
Matrix: Water
Analysis Batch: 183774

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 183765

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acenaphthene	ND		0.10		ug/L		06/17/15 09:35	06/17/15 23:09	1
Acenaphthylene	ND		0.10		ug/L		06/17/15 09:35	06/17/15 23:09	1
Anthracene	ND		0.10		ug/L		06/17/15 09:35	06/17/15 23:09	1
Benzo[a]anthracene	ND		0.10		ug/L		06/17/15 09:35	06/17/15 23:09	1
Benzo[a]pyrene	ND		0.10		ug/L		06/17/15 09:35	06/17/15 23:09	1
Chrysene	ND		0.10		ug/L		06/17/15 09:35	06/17/15 23:09	1
Benzo[b]fluoranthene	ND		0.10		ug/L		06/17/15 09:35	06/17/15 23:09	1
Benzo[k]fluoranthene	ND		0.10		ug/L		06/17/15 09:35	06/17/15 23:09	1
Benzo[g,h,i]perylene	ND		0.10		ug/L		06/17/15 09:35	06/17/15 23:09	1
Fluorene	ND		0.10		ug/L		06/17/15 09:35	06/17/15 23:09	1
Indeno[1,2,3-cd]pyrene	ND		0.10		ug/L		06/17/15 09:35	06/17/15 23:09	1
Fluoranthene	ND		0.10		ug/L		06/17/15 09:35	06/17/15 23:09	1
Naphthalene	ND		0.10		ug/L		06/17/15 09:35	06/17/15 23:09	1
Phenanthrene	ND		0.10		ug/L		06/17/15 09:35	06/17/15 23:09	1
Pyrene	ND		0.10		ug/L		06/17/15 09:35	06/17/15 23:09	1
Dibenz(a,h)anthracene	ND		0.10		ug/L		06/17/15 09:35	06/17/15 23:09	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2-Fluorobiphenyl	*67*		*29 - 120*	*06/17/15 09:35*	*06/17/15 23:09*	*1*
Terphenyl-d14	*91*		*45 - 120*	*06/17/15 09:35*	*06/17/15 23:09*	*1*

Lab Sample ID: LCS 720-183765/2-A
Matrix: Water
Analysis Batch: 183774

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 183765

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Acenaphthene	10.0	7.64		ug/L		76	24 - 120
Acenaphthylene	10.0	8.33		ug/L		83	24 - 120
Anthracene	10.0	7.47		ug/L		75	44 - 120
Benzo[a]anthracene	10.0	8.65		ug/L		86	48 - 120
Benzo[a]pyrene	10.0	7.78		ug/L		78	43 - 120
Chrysene	10.0	8.87		ug/L		89	47 - 120
Benzo[b]fluoranthene	10.0	8.05		ug/L		80	42 - 120
Benzo[k]fluoranthene	10.0	7.82		ug/L		78	42 - 120
Benzo[g,h,i]perylene	10.0	7.98		ug/L		80	35 - 120
Fluorene	10.0	8.06		ug/L		81	27 - 120
Indeno[1,2,3-cd]pyrene	10.0	8.12		ug/L		81	36 - 120
Fluoranthene	10.0	8.06		ug/L		81	43 - 120
Naphthalene	10.0	7.95		ug/L		80	19 - 120
Phenanthrene	10.0	7.42		ug/L		74	31 - 120
Pyrene	10.0	7.98		ug/L		80	47 - 120
Dibenz(a,h)anthracene	10.0	8.44		ug/L		84	33 - 120

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
2-Fluorobiphenyl	*63*		*29 - 120*
Terphenyl-d14	*87*		*45 - 120*

Method: 8270C SIM - PAHs by GCMS (SIM) (Continued)

Lab Sample ID: LCSD 720-183765/3-A
Matrix: Water
Analysis Batch: 183774

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 183765

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Acenaphthene			10.0	8.19		ug/L		82	24 - 120	7	35
Acenaphthylene			10.0	8.82		ug/L		88	24 - 120	6	35
Anthracene			10.0	7.62		ug/L		76	44 - 120	2	35
Benzo[a]anthracene			10.0	8.56		ug/L		86	48 - 120	1	35
Benzo[a]pyrene			10.0	7.39		ug/L		74	43 - 120	5	35
Chrysene			10.0	8.77		ug/L		88	47 - 120	1	35
Benzo[b]fluoranthene			10.0	7.90		ug/L		79	42 - 120	2	35
Benzo[k]fluoranthene			10.0	7.12		ug/L		71	42 - 120	9	35
Benzo[g,h,i]perylene			10.0	6.99		ug/L		70	35 - 120	13	35
Fluorene			10.0	8.46		ug/L		85	27 - 120	5	35
Indeno[1,2,3-cd]pyrene			10.0	7.14		ug/L		71	36 - 120	13	35
Fluoranthene			10.0	8.27		ug/L		83	43 - 120	3	35
Naphthalene			10.0	8.22		ug/L		82	19 - 120	3	35
Phenanthrene			10.0	7.62		ug/L		76	31 - 120	3	35
Pyrene			10.0	8.27		ug/L		83	47 - 120	3	35
Dibenz(a,h)anthracene			10.0	7.29		ug/L		73	33 - 120	15	35

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
2-Fluorobiphenyl	*66*		*29 - 120*
Terphenyl-d14	*85*		*45 - 120*

Lab Sample ID: MB 720-183780/1-A
Matrix: Solid
Analysis Batch: 183774

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 183780

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acenaphthene	ND		5.0		ug/Kg		06/17/15 11:17	06/17/15 23:56	1
Acenaphthylene	ND		5.0		ug/Kg		06/17/15 11:17	06/17/15 23:56	1
Anthracene	ND		5.0		ug/Kg		06/17/15 11:17	06/17/15 23:56	1
Benzo[a]anthracene	ND		5.0		ug/Kg		06/17/15 11:17	06/17/15 23:56	1
Benzo[a]pyrene	ND		5.0		ug/Kg		06/17/15 11:17	06/17/15 23:56	1
Chrysene	ND		5.0		ug/Kg		06/17/15 11:17	06/17/15 23:56	1
Benzo[b]fluoranthene	ND		5.0		ug/Kg		06/17/15 11:17	06/17/15 23:56	1
Benzo[k]fluoranthene	ND		5.0		ug/Kg		06/17/15 11:17	06/17/15 23:56	1
Benzo[g,h,i]perylene	ND		5.0		ug/Kg		06/17/15 11:17	06/17/15 23:56	1
Fluorene	ND		5.0		ug/Kg		06/17/15 11:17	06/17/15 23:56	1
Indeno[1,2,3-cd]pyrene	ND		5.0		ug/Kg		06/17/15 11:17	06/17/15 23:56	1
Fluoranthene	ND		5.0		ug/Kg		06/17/15 11:17	06/17/15 23:56	1
Naphthalene	ND		5.0		ug/Kg		06/17/15 11:17	06/17/15 23:56	1
Phenanthrene	ND		5.0		ug/Kg		06/17/15 11:17	06/17/15 23:56	1
Pyrene	ND		5.0		ug/Kg		06/17/15 11:17	06/17/15 23:56	1
Dibenz(a,h)anthracene	ND		5.0		ug/Kg		06/17/15 11:17	06/17/15 23:56	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2-Fluorobiphenyl	*69*		*33 - 120*	*06/17/15 11:17*	*06/17/15 23:56*	*1*
Terphenyl-d14	*89*		*35 - 146*	*06/17/15 11:17*	*06/17/15 23:56*	*1*

Method: 8270C SIM - PAHs by GCMS (SIM) (Continued)

Lab Sample ID: LCS 720-183780/2-A
Matrix: Solid
Analysis Batch: 183774

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 183780

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Acenaphthene	333	283		ug/Kg		85	43 - 120
Acenaphthylene	333	308		ug/Kg		92	46 - 120
Anthracene	333	262		ug/Kg		79	55 - 120
Benzo[a]anthracene	333	285		ug/Kg		86	65 - 120
Benzo[a]pyrene	333	263		ug/Kg		79	62 - 120
Chrysene	333	296		ug/Kg		89	54 - 120
Benzo[b]fluoranthene	333	271		ug/Kg		81	60 - 120
Benzo[k]fluoranthene	333	255		ug/Kg		77	63 - 120
Benzo[g,h,i]perylene	333	268		ug/Kg		80	42 - 120
Fluorene	333	293		ug/Kg		88	47 - 120
Indeno[1,2,3-cd]pyrene	333	273		ug/Kg		82	50 - 120
Fluoranthene	333	270		ug/Kg		81	59 - 120
Naphthalene	333	287		ug/Kg		86	42 - 120
Phenanthrene	333	262		ug/Kg		79	51 - 120
Pyrene	333	277		ug/Kg		83	63 - 120
Dibenz(a,h)anthracene	333	284		ug/Kg		85	51 - 120

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
2-Fluorobiphenyl	*69*		*33 - 120*
Terphenyl-d14	*87*		*35 - 146*

Method: 6010B - Metals (ICP)

Lab Sample ID: MB 720-183792/1-A
Matrix: Water
Analysis Batch: 183867

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 183792

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND		0.010		mg/L		06/17/15 14:17	06/17/15 22:16	1
Arsenic	ND		0.010		mg/L		06/17/15 14:17	06/17/15 22:16	1
Barium	ND		0.010		mg/L		06/17/15 14:17	06/17/15 22:16	1
Beryllium	ND		0.0020		mg/L		06/17/15 14:17	06/17/15 22:16	1
Cadmium	ND		0.0025		mg/L		06/17/15 14:17	06/17/15 22:16	1
Chromium	ND		0.010		mg/L		06/17/15 14:17	06/17/15 22:16	1
Cobalt	ND		0.0020		mg/L		06/17/15 14:17	06/17/15 22:16	1
Copper	ND		0.020		mg/L		06/17/15 14:17	06/17/15 22:16	1
Lead	ND		0.0050		mg/L		06/17/15 14:17	06/17/15 22:16	1
Molybdenum	ND		0.010		mg/L		06/17/15 14:17	06/17/15 22:16	1
Nickel	ND		0.010		mg/L		06/17/15 14:17	06/17/15 22:16	1
Selenium	ND		0.020		mg/L		06/17/15 14:17	06/17/15 22:16	1
Silver	ND		0.0050		mg/L		06/17/15 14:17	06/17/15 22:16	1
Thallium	ND		0.010		mg/L		06/17/15 14:17	06/17/15 22:16	1
Vanadium	ND		0.010		mg/L		06/17/15 14:17	06/17/15 22:16	1
Zinc	ND		0.020		mg/L		06/17/15 14:17	06/17/15 22:16	1

Method: 6010B - Metals (ICP) (Continued)

Lab Sample ID: LCS 720-183792/2-A
Matrix: Water
Analysis Batch: 183867

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 183792

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Antimony	1.00	0.913		mg/L		91	80 - 120
Arsenic	1.00	0.962		mg/L		96	80 - 120
Barium	1.00	0.980		mg/L		98	80 - 120
Beryllium	1.00	0.989		mg/L		99	80 - 120
Cadmium	1.00	0.947		mg/L		95	80 - 120
Chromium	1.00	0.984		mg/L		98	80 - 120
Cobalt	1.00	0.973		mg/L		97	80 - 120
Copper	1.00	0.980		mg/L		98	80 - 120
Lead	1.00	0.994		mg/L		99	80 - 120
Molybdenum	1.00	0.995		mg/L		99	80 - 120
Nickel	1.00	0.977		mg/L		98	80 - 120
Selenium	1.00	0.932		mg/L		93	80 - 120
Silver	0.500	0.462		mg/L		92	80 - 120
Thallium	1.00	0.981		mg/L		98	80 - 120
Vanadium	1.00	0.991		mg/L		99	80 - 120
Zinc	1.00	0.931		mg/L		93	80 - 120

Lab Sample ID: LCSD 720-183792/3-A
Matrix: Water
Analysis Batch: 183867

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 183792

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Antimony	1.00	0.922		mg/L		92	80 - 120	1	20
Arsenic	1.00	0.963		mg/L		96	80 - 120	0	20
Barium	1.00	0.979		mg/L		98	80 - 120	0	20
Beryllium	1.00	0.995		mg/L		100	80 - 120	1	20
Cadmium	1.00	0.945		mg/L		94	80 - 120	0	20
Chromium	1.00	0.987		mg/L		99	80 - 120	0	20
Cobalt	1.00	0.972		mg/L		97	80 - 120	0	20
Copper	1.00	0.984		mg/L		98	80 - 120	0	20
Lead	1.00	0.995		mg/L		99	80 - 120	0	20
Molybdenum	1.00	0.997		mg/L		100	80 - 120	0	20
Nickel	1.00	0.976		mg/L		98	80 - 120	0	20
Selenium	1.00	0.933		mg/L		93	80 - 120	0	20
Silver	0.500	0.465		mg/L		93	80 - 120	1	20
Thallium	1.00	0.980		mg/L		98	80 - 120	0	20
Vanadium	1.00	0.996		mg/L		100	80 - 120	0	20
Zinc	1.00	0.929		mg/L		93	80 - 120	0	20

Lab Sample ID: MB 720-183834/1-A
Matrix: Solid
Analysis Batch: 183913

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 183834

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND		0.50		mg/Kg		06/17/15 21:48	06/18/15 23:53	1
Arsenic	ND		1.0		mg/Kg		06/17/15 21:48	06/18/15 23:53	1
Barium	ND		0.50		mg/Kg		06/17/15 21:48	06/18/15 23:53	1
Beryllium	ND		0.10		mg/Kg		06/17/15 21:48	06/18/15 23:53	1

Method: 6010B - Metals (ICP) (Continued)

Lab Sample ID: MB 720-183834/1-A
Matrix: Solid
Analysis Batch: 183913

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 183834

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cadmium	ND		0.13		mg/Kg		06/17/15 21:48	06/18/15 23:53	1
Chromium	ND		0.50		mg/Kg		06/17/15 21:48	06/18/15 23:53	1
Cobalt	ND		0.20		mg/Kg		06/17/15 21:48	06/18/15 23:53	1
Copper	ND		1.5		mg/Kg		06/17/15 21:48	06/18/15 23:53	1
Molybdenum	ND		0.50		mg/Kg		06/17/15 21:48	06/18/15 23:53	1
Nickel	ND		0.50		mg/Kg		06/17/15 21:48	06/18/15 23:53	1
Selenium	ND		1.0		mg/Kg		06/17/15 21:48	06/18/15 23:53	1
Silver	ND		0.25		mg/Kg		06/17/15 21:48	06/18/15 23:53	1
Thallium	ND		0.50		mg/Kg		06/17/15 21:48	06/18/15 23:53	1
Vanadium	ND		0.50		mg/Kg		06/17/15 21:48	06/18/15 23:53	1
Zinc	ND		1.5		mg/Kg		06/17/15 21:48	06/18/15 23:53	1

Lab Sample ID: LCS 720-183834/2-A
Matrix: Solid
Analysis Batch: 183913

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 183834

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Antimony	50.0	45.8		mg/Kg		92	80 - 120
Arsenic	50.0	49.1		mg/Kg		98	80 - 120
Barium	50.0	49.9		mg/Kg		100	80 - 120
Beryllium	50.0	50.8		mg/Kg		102	80 - 120
Cadmium	50.0	47.9		mg/Kg		96	80 - 120
Chromium	50.0	50.5		mg/Kg		101	80 - 120
Cobalt	50.0	49.2		mg/Kg		98	80 - 120
Copper	50.0	50.7		mg/Kg		101	80 - 120
Molybdenum	50.0	50.4		mg/Kg		101	80 - 120
Nickel	50.0	49.6		mg/Kg		99	80 - 120
Selenium	50.0	46.8		mg/Kg		94	80 - 120
Silver	25.0	24.1		mg/Kg		96	80 - 120
Thallium	50.0	49.9		mg/Kg		100	80 - 120
Vanadium	50.0	51.2		mg/Kg		102	80 - 120
Zinc	50.0	48.4		mg/Kg		97	80 - 120

Lab Sample ID: LCSD 720-183834/3-A
Matrix: Solid
Analysis Batch: 183913

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 183834

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Antimony	50.0	46.0		mg/Kg		92	80 - 120	0	20
Arsenic	50.0	49.4		mg/Kg		99	80 - 120	1	20
Barium	50.0	50.0		mg/Kg		100	80 - 120	0	20
Beryllium	50.0	51.1		mg/Kg		102	80 - 120	1	20
Cadmium	50.0	47.8		mg/Kg		96	80 - 120	0	20
Chromium	50.0	50.7		mg/Kg		101	80 - 120	0	20
Cobalt	50.0	49.2		mg/Kg		98	80 - 120	0	20
Copper	50.0	50.9		mg/Kg		102	80 - 120	0	20
Molybdenum	50.0	50.7		mg/Kg		101	80 - 120	1	20
Nickel	50.0	49.7		mg/Kg		99	80 - 120	0	20
Selenium	50.0	47.2		mg/Kg		94	80 - 120	1	20

Method: 6010B - Metals (ICP) (Continued)

Lab Sample ID: LCSD 720-183834/3-A
Matrix: Solid
Analysis Batch: 183913

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 183834

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Silver	25.0	24.1		mg/Kg		96	80 - 120	0	20
Thallium	50.0	50.3		mg/Kg		101	80 - 120	1	20
Vanadium	50.0	51.7		mg/Kg		103	80 - 120	1	20
Zinc	50.0	46.8		mg/Kg		94	80 - 120	3	20

Lab Sample ID: LCSSRM 720-183834/25-A
Matrix: Solid
Analysis Batch: 183913

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 183834

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits
Antimony	74.6	48.5		mg/Kg		65	11 - 101
Arsenic	45.5	43.1		mg/Kg		95	69 - 119
Barium	579	535		mg/Kg		92	61 - 117
Beryllium	155	150		mg/Kg		97	56 - 102
Cadmium	201	178		mg/Kg		89	67 - 118
Chromium	106	99.9		mg/Kg		94	67 - 121
Cobalt	247	222		mg/Kg		90	64 - 133
Copper	130	126		mg/Kg		97	68 - 126
Molybdenum	165	153		mg/Kg		93	62 - 128
Nickel	305	277		mg/Kg		91	65 - 117
Selenium	133	125		mg/Kg		94	63 - 126
Silver	33.5	30.6		mg/Kg		91	51 - 130
Thallium	191	174		mg/Kg		91	64 - 124
Vanadium	214	210		mg/Kg		98	67 - 123
Zinc	388	341		mg/Kg		88	62 - 110

Method: 7470A - Mercury (CVAA)

Lab Sample ID: MB 720-183781/1-A
Matrix: Water
Analysis Batch: 183809

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 183781

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.00020		mg/L		06/17/15 11:22	06/17/15 15:43	1

Lab Sample ID: LCS 720-183781/2-A
Matrix: Water
Analysis Batch: 183809

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 183781

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	0.0100	0.00954		mg/L		95	85 - 115

Lab Sample ID: LCSD 720-183781/3-A
Matrix: Water
Analysis Batch: 183809

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 183781

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Mercury	0.0100	0.0101		mg/L		101	85 - 115	6	20

Method: 7471A - Mercury (CVAA)

Lab Sample ID: MB 720-183835/1-A
Matrix: Solid
Analysis Batch: 183888

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 183835

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.010		mg/Kg		06/17/15 22:38	06/18/15 15:40	1

Lab Sample ID: LCS 720-183835/2-A
Matrix: Solid
Analysis Batch: 183888

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 183835

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	0.833	0.797		mg/Kg		96	80 - 120

Lab Sample ID: LCSD 720-183835/3-A
Matrix: Solid
Analysis Batch: 183888

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 183835

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Mercury	0.833	0.804		mg/Kg		97	80 - 120	1	20

GC/MS Semi VOA

Prep Batch: 183765

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
720-65387-7	1279SB432(1.5),RB433(0)	Total/NA	Water	3510C	
LCS 720-183765/2-A	Lab Control Sample	Total/NA	Water	3510C	
LCSD 720-183765/3-A	Lab Control Sample Dup	Total/NA	Water	3510C	
MB 720-183765/1-A	Method Blank	Total/NA	Water	3510C	

Analysis Batch: 183774

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
720-65387-1	1279SB430(0)	Total/NA	Solid	8270C SIM	183780
720-65387-2	1279SB431(1.5)	Total/NA	Solid	8270C SIM	183780
720-65387-3	1279SB432(0)	Total/NA	Solid	8270C SIM	183780
720-65387-5	1279SB433(0)	Total/NA	Solid	8270C SIM	183780
720-65387-6	1279SB433(1.5)	Total/NA	Solid	8270C SIM	183780
720-65387-7	1279SB432(1.5),RB433(0)	Total/NA	Water	8270C SIM	183765
LCS 720-183765/2-A	Lab Control Sample	Total/NA	Water	8270C SIM	183765
LCS 720-183780/2-A	Lab Control Sample	Total/NA	Solid	8270C SIM	183780
LCSD 720-183765/3-A	Lab Control Sample Dup	Total/NA	Water	8270C SIM	183765
MB 720-183765/1-A	Method Blank	Total/NA	Water	8270C SIM	183765
MB 720-183780/1-A	Method Blank	Total/NA	Solid	8270C SIM	183780

Prep Batch: 183780

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
720-65387-1	1279SB430(0)	Total/NA	Solid	3546	
720-65387-2	1279SB431(1.5)	Total/NA	Solid	3546	
720-65387-3	1279SB432(0)	Total/NA	Solid	3546	
720-65387-5	1279SB433(0)	Total/NA	Solid	3546	
720-65387-6	1279SB433(1.5)	Total/NA	Solid	3546	
LCS 720-183780/2-A	Lab Control Sample	Total/NA	Solid	3546	
MB 720-183780/1-A	Method Blank	Total/NA	Solid	3546	

Metals

Prep Batch: 183781

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
720-65387-7	1279SB432(1.5),RB433(0)	Total/NA	Water	7470A	
LCS 720-183781/2-A	Lab Control Sample	Total/NA	Water	7470A	
LCSD 720-183781/3-A	Lab Control Sample Dup	Total/NA	Water	7470A	
MB 720-183781/1-A	Method Blank	Total/NA	Water	7470A	

Prep Batch: 183792

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
720-65387-7	1279SB432(1.5),RB433(0)	Total/NA	Water	3010A	
LCS 720-183792/2-A	Lab Control Sample	Total/NA	Water	3010A	
LCSD 720-183792/3-A	Lab Control Sample Dup	Total/NA	Water	3010A	
MB 720-183792/1-A	Method Blank	Total/NA	Water	3010A	

Analysis Batch: 183809

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
720-65387-7	1279SB432(1.5),RB433(0)	Total/NA	Water	7470A	183781
LCS 720-183781/2-A	Lab Control Sample	Total/NA	Water	7470A	183781
LCSD 720-183781/3-A	Lab Control Sample Dup	Total/NA	Water	7470A	183781

Metals (Continued)

Analysis Batch: 183809 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MB 720-183781/1-A	Method Blank	Total/NA	Water	7470A	183781

Prep Batch: 183834

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
720-65387-1	1279SB430(0)	Total/NA	Solid	3050B	
720-65387-2	1279SB431(1.5)	Total/NA	Solid	3050B	
720-65387-3	1279SB432(0)	Total/NA	Solid	3050B	
720-65387-5	1279SB433(0)	Total/NA	Solid	3050B	
720-65387-6	1279SB433(1.5)	Total/NA	Solid	3050B	
LCS 720-183834/2-A	Lab Control Sample	Total/NA	Solid	3050B	
LCSD 720-183834/3-A	Lab Control Sample Dup	Total/NA	Solid	3050B	
LCSSRM 720-183834/25-A	Lab Control Sample	Total/NA	Solid	3050B	
MB 720-183834/1-A	Method Blank	Total/NA	Solid	3050B	

Prep Batch: 183835

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
720-65387-1	1279SB430(0)	Total/NA	Solid	7471A	
720-65387-2	1279SB431(1.5)	Total/NA	Solid	7471A	
720-65387-3	1279SB432(0)	Total/NA	Solid	7471A	
720-65387-5	1279SB433(0)	Total/NA	Solid	7471A	
720-65387-6	1279SB433(1.5)	Total/NA	Solid	7471A	
LCS 720-183835/2-A	Lab Control Sample	Total/NA	Solid	7471A	
LCSD 720-183835/3-A	Lab Control Sample Dup	Total/NA	Solid	7471A	
MB 720-183835/1-A	Method Blank	Total/NA	Solid	7471A	

Analysis Batch: 183867

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
720-65387-7	1279SB432(1.5),RB433(0)	Total/NA	Water	6010B	183792
LCS 720-183792/2-A	Lab Control Sample	Total/NA	Water	6010B	183792
LCSD 720-183792/3-A	Lab Control Sample Dup	Total/NA	Water	6010B	183792
MB 720-183792/1-A	Method Blank	Total/NA	Water	6010B	183792

Analysis Batch: 183888

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
720-65387-1	1279SB430(0)	Total/NA	Solid	7471A	183835
720-65387-2	1279SB431(1.5)	Total/NA	Solid	7471A	183835
720-65387-3	1279SB432(0)	Total/NA	Solid	7471A	183835
720-65387-5	1279SB433(0)	Total/NA	Solid	7471A	183835
720-65387-6	1279SB433(1.5)	Total/NA	Solid	7471A	183835
LCS 720-183835/2-A	Lab Control Sample	Total/NA	Solid	7471A	183835
LCSD 720-183835/3-A	Lab Control Sample Dup	Total/NA	Solid	7471A	183835
MB 720-183835/1-A	Method Blank	Total/NA	Solid	7471A	183835

Analysis Batch: 183913

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
720-65387-1	1279SB430(0)	Total/NA	Solid	6010B	183834
720-65387-2	1279SB431(1.5)	Total/NA	Solid	6010B	183834
720-65387-3	1279SB432(0)	Total/NA	Solid	6010B	183834
720-65387-5	1279SB433(0)	Total/NA	Solid	6010B	183834
720-65387-5	1279SB433(0)	Total/NA	Solid	6010B	183834
720-65387-6	1279SB433(1.5)	Total/NA	Solid	6010B	183834

Metals (Continued)

Analysis Batch: 183913 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
LCS 720-183834/2-A	Lab Control Sample	Total/NA	Solid	6010B	183834
LCSD 720-183834/3-A	Lab Control Sample Dup	Total/NA	Solid	6010B	183834
LCSSRM 720-183834/25-A	Lab Control Sample	Total/NA	Solid	6010B	183834
MB 720-183834/1-A	Method Blank	Total/NA	Solid	6010B	183834

Client Sample ID: 1279SB430(0)

Lab Sample ID: 720-65387-1
Date Collected: 06/10/15 12:30
Matrix: Solid
Date Received: 06/10/15 17:17
Percent Solids: 86.9

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3546			183780	06/17/15 11:44	NVP	TAL PLS
Total/NA	Analysis	8270C SIM		5	183774	06/18/15 03:07	MQL	TAL PLS
Total/NA	Prep	3050B			183834	06/17/15 21:48	CTD	TAL PLS
Total/NA	Analysis	6010B		1	183913	06/19/15 01:34	CAM	TAL PLS
Total/NA	Prep	7471A			183835	06/17/15 22:38	ECT	TAL PLS
Total/NA	Analysis	7471A		1	183888	06/18/15 15:06	CAM	TAL PLS

Client Sample ID: 1279SB431(1.5)

Lab Sample ID: 720-65387-2
Date Collected: 06/10/15 13:30
Matrix: Solid
Date Received: 06/10/15 17:17
Percent Solids: 90.0

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3546			183780	06/17/15 11:44	NVP	TAL PLS
Total/NA	Analysis	8270C SIM		1	183774	06/18/15 00:44	MQL	TAL PLS
Total/NA	Prep	3050B			183834	06/17/15 21:48	CTD	TAL PLS
Total/NA	Analysis	6010B		1	183913	06/19/15 01:39	CAM	TAL PLS
Total/NA	Prep	7471A			183835	06/17/15 22:38	ECT	TAL PLS
Total/NA	Analysis	7471A		1	183888	06/18/15 15:08	CAM	TAL PLS

Client Sample ID: 1279SB432(0)

Lab Sample ID: 720-65387-3
Date Collected: 06/10/15 13:45
Matrix: Solid
Date Received: 06/10/15 17:17
Percent Solids: 90.7

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3546			183780	06/17/15 11:44	NVP	TAL PLS
Total/NA	Analysis	8270C SIM		2	183774	06/18/15 03:30	MQL	TAL PLS
Total/NA	Prep	3050B			183834	06/17/15 21:48	CTD	TAL PLS
Total/NA	Analysis	6010B		1	183913	06/19/15 01:44	CAM	TAL PLS
Total/NA	Prep	7471A			183835	06/17/15 22:38	ECT	TAL PLS
Total/NA	Analysis	7471A		1	183888	06/18/15 15:11	CAM	TAL PLS

Client Sample ID: 1279SB433(0)

Lab Sample ID: 720-65387-5
Date Collected: 06/10/15 14:30
Matrix: Solid
Date Received: 06/10/15 17:17
Percent Solids: 93.5

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3546			183780	06/17/15 11:44	NVP	TAL PLS
Total/NA	Analysis	8270C SIM		5	183774	06/18/15 03:54	MQL	TAL PLS
Total/NA	Prep	3050B			183834	06/17/15 21:48	CTD	TAL PLS
Total/NA	Analysis	6010B		1	183913	06/19/15 01:49	CAM	TAL PLS
Total/NA	Prep	3050B			183834	06/17/15 21:48	CTD	TAL PLS
Total/NA	Analysis	6010B		2	183913	06/19/15 03:24	CAM	TAL PLS
Total/NA	Prep	7471A			183835	06/17/15 22:38	ECT	TAL PLS

Lab Chronicle

Client: TRC Solutions, Inc.
Project/Site: Presidio

TestAmerica Job ID: 720-65387-2

Client Sample ID: 1279SB433(0)

Date Collected: 06/10/15 14:30
Date Received: 06/10/15 17:17

Lab Sample ID: 720-65387-5
Matrix: Solid
Percent Solids: 93.5

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	7471A		1	183888	06/18/15 15:13	CAM	TAL PLS

Client Sample ID: 1279SB433(1.5)

Date Collected: 06/10/15 15:00
Date Received: 06/10/15 17:17

Lab Sample ID: 720-65387-6
Matrix: Solid
Percent Solids: 89.8

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3546			183780	06/17/15 11:44	NVP	TAL PLS
Total/NA	Analysis	8270C SIM		1	183774	06/18/15 01:08	MQL	TAL PLS
Total/NA	Prep	3050B			183834	06/17/15 21:48	CTD	TAL PLS
Total/NA	Analysis	6010B		1	183913	06/19/15 01:54	CAM	TAL PLS
Total/NA	Prep	7471A			183835	06/17/15 22:38	ECT	TAL PLS
Total/NA	Analysis	7471A		1	183888	06/18/15 15:15	CAM	TAL PLS

Client Sample ID: 1279SB432(1.5),RB433(0)

Date Collected: 06/10/15 14:15
Date Received: 06/10/15 17:17

Lab Sample ID: 720-65387-7
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3510C			183765	06/17/15 09:35	CJG	TAL PLS
Total/NA	Analysis	8270C SIM		1	183774	06/18/15 00:20	MQL	TAL PLS
Total/NA	Prep	3010A			183792	06/17/15 14:17	ECT	TAL PLS
Total/NA	Analysis	6010B		1	183867	06/17/15 22:50	SLK	TAL PLS
Total/NA	Prep	7470A			183781	06/17/15 11:23	ECT	TAL PLS
Total/NA	Analysis	7470A		1	183809	06/17/15 16:00	SLK	TAL PLS

Laboratory References:

TAL PLS = TestAmerica Pleasanton, 1220 Quarry Lane, Pleasanton, CA 94566, TEL (925)484-1919

Certification Summary

Client: TRC Solutions, Inc.
Project/Site: Presidio

TestAmerica Job ID: 720-65387-2

Laboratory: TestAmerica Pleasanton

All certifications held by this laboratory are listed. Not all certifications are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
California	State Program	9	2496	01-31-16

Method Summary

Client: TRC Solutions, Inc.
Project/Site: Presidio

TestAmerica Job ID: 720-65387-2

Method	Method Description	Protocol	Laboratory
8270C SIM	PAHs by GCMS (SIM)	SW846	TAL PLS
6010B	Metals (ICP)	SW846	TAL PLS
7470A	Mercury (CVAA)	SW846	TAL PLS
7471A	Mercury (CVAA)	SW846	TAL PLS

Protocol References:

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL PLS = TestAmerica Pleasanton, 1220 Quarry Lane, Pleasanton, CA 94566, TEL (925)484-1919

Sample Summary

Client: TRC Solutions, Inc.
Project/Site: Presidio

TestAmerica Job ID: 720-65387-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
720-65387-1	1279SB430(0)	Solid	06/10/15 12:30	06/10/15 17:17
720-65387-2	1279SB431(1.5)	Solid	06/10/15 13:30	06/10/15 17:17
720-65387-3	1279SB432(0)	Solid	06/10/15 13:45	06/10/15 17:17
720-65387-5	1279SB433(0)	Solid	06/10/15 14:30	06/10/15 17:17
720-65387-6	1279SB433(1.5)	Solid	06/10/15 15:00	06/10/15 17:17
720-65387-7	1279SB432(1.5),RB433(0)	Water	06/10/15 14:15	06/10/15 17:17

Sharma, Dimple 720-65387-2

From: Hanzel-Durbin, Justin <JHanzel-Durbin@trcsolutions.com>
Sent: *Tuesday, June 16, 2015 5:28 PM*
To: Sharma, Dimple
Cc: Fanelli, Eileen
Subject: FW: TestAmerica EDD and report files from 720-65387-1 Presidio
Attachments: J65387-1 UDS Level 2 Report Final Report.pdf; 720-65387-1_Std_Tal.csv; image001.jpg

Dimple please analyze the following samples on standard TAT from this set in the attached report:
SB430(0)
SB431(1.5)
SB432(0)
SB433(0)
SB433(1.5)

Analyze for CAM 17 metals (already have lead number) and PAHs 8270C dry weight corrected

Additionally run water sample 1279SB432(1.5)RB433(0) for CAM 17 metals and PAHs as well – standard TAT.
Thanks
Justin

720-65387 Chain of Custody

Justin Hanzel-Durbin
Senior Engineer/Project Manager
Environmental/Remediation

505 Sansome Street, Suite 1600, San Francisco, CA 94111
T: 415.644.3050 | F: 415.434.2321 | Cell: 415.209.3326

Follow us on LinkedIn or Twitter | www.trcsolutions.com
JHanzel-Durbin@trcsolutions.com

From: Hanzel-Durbin, Justin
Sent: Tuesday, June 16, 2015 2:14 PM
To: Patrick Woods (PWoods@trcsolutions.com)
Subject: FW: TestAmerica EDD and report files from 720-65387-1 Presidio

First data set

Justin Hanzel-Durbin
Senior Engineer/Project Manager
Environmental/Remediation

505 Sansome Street, Suite 1600, San Francisco, CA 94111
T: 415.644.3050 | F: 415.434.2321 | Cell: 415.209.3326

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JHanzel-Durbin@trcsolutions.com

65387-2 Rev.

Sharma, Dimple

From: Hanzel-Durbin, Justin <JHanzel-Durbin@trcsolutions.com>
Sent: Wednesday, June 17, 2015 10:02 AM
To: Sharma, Dimple
Cc: Fanelli, Eileen
Subject: RE: TestAmerica EDD and report files from 720-65387-1 Presidio
Attachments: *image001.jpg*

Please have all these analyses run on rush 48 hour TAT. Also is there volume in any of these samples to run a dioxin and furan analyses?

Thanks
Justin

RUSH

Justin Hanzel-Durbin
Senior Engineer/Project Manager
Environmental/Remediation

505 Sansome Street, Suite 1600, San Francisco, CA 94111
T: 415.644.3050 | F: 415.434.2321 | Cell: 415.209.3326

Follow us on LinkedIn or Twitter | www.trcsolutions.com
JHanzel-Durbin@trcsolutions.com

From: Sharma, Dimple [mailto:Dimple.Sharma@testamericainc.com]
Sent: Tuesday, June 16, 2015 5:32 PM
To: Hanzel-Durbin, Justin
Cc: Fanelli, Eileen
Subject: RE: TestAmerica EDD and report files from 720-65387-1 Presidio

Hi Justin,
I will add these analyses and also please let me know if you need lvl4 data package for these as I am not generating data package for these. The PAHs will be charged at 100% mark up as the hold time is up on these samples tomorrow for water samples.

Thanks.

Dimple Sharma

Senior Project Manager

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

1220 Quarry Lane

Pleasanton, CA 94566

720-65387 Chain of Custody

720-65387-3

Sharma, Dimple

From: Hanzel-Durbin, Justin <JHanzel-Durbin@trcsolutions.com>
Sent: Wednesday, June 17, 2015 10:49 AM
To: Sharma, Dimple
Cc: Fanelli, Eileen
Subject: RE: TestAmerica EDD and report files from 720-65387-1 Presidio
Attachments: image001.jpg

Dimple please analyze sample SB431(1.5) for dioxins and furans at standard TAT.
Thank you
Justin

Justin Hanzel-Durbin
Senior Engineer/Project Manager
Environmental/Remediation

505 Sansome Street, Suite 1600, San Francisco, CA 94111
T: 415.644.3050 | F: 415.434.2321 | Cell: 415.209.3326

Follow us on LinkedIn or Twitter | www.trcsolutions.com
JHanzel-Durbin@trcsolutions.com

720-65387 Chain of Custody

From: Sharma, Dimple [mailto:Dimple.Sharma@testamericainc.com]
Sent: Wednesday, June 17, 2015 10:06 AM
To: *Hanzel-Durbin, Justin*
Cc: Fanelli, Eileen
Subject: RE: TestAmerica EDD and report files from 720-65387-1 Presidio

I am sure there is enough sample to add dioxins and furans but the TAT for dioxins and furans will be 2 weeks. Please let me know which sample you want for dioxins and furans.

Thanks.

Dimple Sharma

Senior Project Manager

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

1220 Quarry Lane

Pleasanton, CA 94566

Tel 925.484.1919 ext. 103 | Fax 925.600.3002

www.testamericainc.com

Login Sample Receipt Checklist

Client: TRC Solutions, Inc.

Job Number: 720-65387-2

Login Number: 65387
List Number: 1
Creator: Bullock, Tracy

List Source: TestAmerica Pleasanton

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	N/A	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	False	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Pleasanton
1220 Quarry Lane
Pleasanton, CA 94566
Tel: (925)484-1919

TestAmerica Job ID: 720-65387-1
Client Project/Site: Presidio

For:
TRC Solutions, Inc.
10680 White Rock Road
Suite 100
Rancho Cordova, California 95670

Attn: Mr. Justin Hanzel-Durbin

Authorized for release by:
6/12/2015 3:35:20 PM

Dimple Sharma, Senior Project Manager
(925)484-1919
dimple.sharma@testamericainc.com

Table of Contents

Qualifiers

Metals

Qualifier	Qualifier Description
F1	MS and/or MSD Recovery is outside acceptance limits.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Case Narrative

Client: TRC Solutions, Inc.
Project/Site: Presidio

TestAmerica Job ID: 720-65387-1

Job ID: 720-65387-1

Laboratory: TestAmerica Pleasanton

Narrative

Job Narrative
720-65387-1

Comments
No additional comments.

Receipt
The samples were received on 6/10/2015 5:17 PM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 1.6º C.

Receipt Exceptions

The Chain-of-Custody (COC) listed both methods 6020 and 6010 for lead. Samples logged in by method 6010 per client.

Metals
Method 6010B: The following samples was diluted due to the abundance of non-target analyte: 1279SB432(1.5) (720-65387-4) and 1279SB433(0) (720-65387-5). Elevated reporting limits (RLs) are provided.

Method 6010B: The serial dilution performed for the following sample associated with batch 720-183507 was outside control limits: (720-65387-A-1-C SD ^)

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

General Chemistry
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Detection Summary

Client: TRC Solutions, Inc.
Project/Site: Presidio

TestAmerica Job ID: 720-65387-1

Client Sample ID: 1279SB430(0) — Lab Sample ID: 720-65387-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	66	F1	0.45		mg/Kg	1	☼	6010B	Total/NA

Client Sample ID: 1279SB431(1.5) — Lab Sample ID: 720-65387-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	4.1		0.42		mg/Kg	1	☼	6010B	Total/NA

Client Sample ID: 1279SB432(0) — Lab Sample ID: 720-65387-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	23		0.41		mg/Kg	1	☼	6010B	Total/NA

Client Sample ID: 1279SB432(1.5) — Lab Sample ID: 720-65387-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	380		0.59		mg/Kg	2	☼	6010B	Total/NA

Client Sample ID: 1279SB433(0) — Lab Sample ID: 720-65387-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	50		0.67		mg/Kg	2	☼	6010B	Total/NA

Client Sample ID: 1279SB433(1.5) — Lab Sample ID: 720-65387-6

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	14		0.47		mg/Kg	1	☼	6010B	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample Results

Client: TRC Solutions, Inc.
Project/Site: Presidio

TestAmerica Job ID: 720-65387-1

Client Sample ID: 1279SB430(0)
Date Collected: 06/10/15 12:30
Date Received: 06/10/15 17:17

Lab Sample ID: 720-65387-1
Matrix: Solid
Percent Solids: 86.9

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	66	F1	0.45		mg/Kg	☼	06/11/15 13:52	06/11/15 21:53	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	13		0.10		%			06/11/15 16:49	1

Client Sample Results

Client: TRC Solutions, Inc.
Project/Site: Presidio

TestAmerica Job ID: 720-65387-1

Client Sample ID: 1279SB431(1.5)
Date Collected: 06/10/15 13:30
Date Received: 06/10/15 17:17

Lab Sample ID: 720-65387-2
Matrix: Solid
Percent Solids: 90.0

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	4.1		0.42		mg/Kg	☼	06/11/15 13:52	06/11/15 21:58	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	10		0.10		%			06/11/15 16:49	1

Client Sample Results

Client: TRC Solutions, Inc.
Project/Site: Presidio

TestAmerica Job ID: 720-65387-1

Client Sample ID: 1279SB432(0)
Date Collected: 06/10/15 13:45
Date Received: 06/10/15 17:17

Lab Sample ID: 720-65387-3
Matrix: Solid
Percent Solids: 90.7

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	23		0.41		mg/Kg	☼	06/11/15 13:52	06/11/15 22:03	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	9.3		0.10		%			06/11/15 16:49	1

Client Sample Results

Client: TRC Solutions, Inc.
Project/Site: Presidio

TestAmerica Job ID: 720-65387-1

Client Sample ID: 1279SB432(1.5)
Date Collected: 06/10/15 14:10
Date Received: 06/10/15 17:17

Lab Sample ID: 720-65387-4
Matrix: Solid
Percent Solids: 89.2

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	380		0.59		mg/Kg	☼	06/11/15 13:52	06/12/15 10:00	2

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	11		0.10		%			06/11/15 16:49	1

Client: TRC Solutions, Inc.
Project/Site: Presidio

TestAmerica Job ID: 720-65387-1

Client Sample ID: 1279SB433(0)
Date Collected: 06/10/15 14:30
Date Received: 06/10/15 17:17

Lab Sample ID: 720-65387-5
Matrix: Solid
Percent Solids: 93.5

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	50		0.67		mg/Kg	☼	06/11/15 13:52	06/12/15 10:05	2

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	6.5		0.10		%			06/11/15 16:49	1

Client: TRC Solutions, Inc.
Project/Site: Presidio

TestAmerica Job ID: 720-65387-1

Client Sample ID: 1279SB433(1.5)
Date Collected: 06/10/15 15:00
Date Received: 06/10/15 17:17

Lab Sample ID: 720-65387-6
Matrix: Solid
Percent Solids: 89.8

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	14		0.47		mg/Kg	☼	06/11/15 13:52	06/11/15 22:19	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	10		0.10		%			06/11/15 16:49	1

Method: 6010B - Metals (ICP)

Lab Sample ID: MB 720-183449/1-A
Matrix: Solid
Analysis Batch: 183507

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 183449

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	ND		0.50		mg/Kg		06/11/15 13:52	06/11/15 21:08	1

Lab Sample ID: LCS 720-183449/2-A
Matrix: Solid
Analysis Batch: 183507

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 183449

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Lead	50.0	49.9		mg/Kg		100	80 - 120

Lab Sample ID: LCSD 720-183449/3-A
Matrix: Solid
Analysis Batch: 183507

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 183449

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Lead	50.0	50.3		mg/Kg		101	80 - 120	1	20

Lab Sample ID: LCSSRM 720-183449/12-A
Matrix: Solid
Analysis Batch: 183507

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 183449

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits
Lead	302	267		mg/Kg		88	62 - 113

Lab Sample ID: 720-65387-1 MS
Matrix: Solid
Analysis Batch: 183507

Client Sample ID: 1279SB430(0)
Prep Type: Total/NA
Prep Batch: 183449

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Lead	66	F1	46.4	107		mg/Kg	☼	89	75 - 125

Lab Sample ID: 720-65387-1 MSD
Matrix: Solid
Analysis Batch: 183507

Client Sample ID: 1279SB430(0)
Prep Type: Total/NA
Prep Batch: 183449

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Lead	66	F1	47.2	131	F1	mg/Kg	☼	138	75 - 125	20	20

Method: Moisture - Percent Moisture

Lab Sample ID: 720-65387-1 DU
Matrix: Solid
Analysis Batch: 183474

Client Sample ID: 1279SB430(0)
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Percent Moisture	13		14		%		4	20

QC Association Summary

Client: TRC Solutions, Inc.
Project/Site: Presidio

TestAmerica Job ID: 720-65387-1

Metals

Prep Batch: 183449

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
720-65387-1	1279SB430(0)	Total/NA	Solid	3050B	
720-65387-1 MS	1279SB430(0)	Total/NA	Solid	3050B	
720-65387-1 MSD	1279SB430(0)	Total/NA	Solid	3050B	
720-65387-2	1279SB431(1.5)	Total/NA	Solid	3050B	
720-65387-3	1279SB432(0)	Total/NA	Solid	3050B	
720-65387-4	1279SB432(1.5)	Total/NA	Solid	3050B	
720-65387-5	1279SB433(0)	Total/NA	Solid	3050B	
720-65387-6	1279SB433(1.5)	Total/NA	Solid	3050B	
LCS 720-183449/2-A	Lab Control Sample	Total/NA	Solid	3050B	
LCSD 720-183449/3-A	Lab Control Sample Dup	Total/NA	Solid	3050B	
LCSSRM 720-183449/12-A	Lab Control Sample	Total/NA	Solid	3050B	
MB 720-183449/1-A	Method Blank	Total/NA	Solid	3050B	

Analysis Batch: 183507

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
720-65387-1	1279SB430(0)	Total/NA	Solid	6010B	183449
720-65387-1 MS	1279SB430(0)	Total/NA	Solid	6010B	183449
720-65387-1 MSD	1279SB430(0)	Total/NA	Solid	6010B	183449
720-65387-2	1279SB431(1.5)	Total/NA	Solid	6010B	183449
720-65387-3	1279SB432(0)	Total/NA	Solid	6010B	183449
720-65387-6	1279SB433(1.5)	Total/NA	Solid	6010B	183449
LCS 720-183449/2-A	Lab Control Sample	Total/NA	Solid	6010B	183449
LCSD 720-183449/3-A	Lab Control Sample Dup	Total/NA	Solid	6010B	183449
LCSSRM 720-183449/12-A	Lab Control Sample	Total/NA	Solid	6010B	183449
MB 720-183449/1-A	Method Blank	Total/NA	Solid	6010B	183449

Analysis Batch: 183524

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
720-65387-4	1279SB432(1.5)	Total/NA	Solid	6010B	183449
720-65387-5	1279SB433(0)	Total/NA	Solid	6010B	183449

General Chemistry

Analysis Batch: 183474

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
720-65387-1	1279SB430(0)	Total/NA	Solid	Moisture	
720-65387-1 DU	1279SB430(0)	Total/NA	Solid	Moisture	
720-65387-2	1279SB431(1.5)	Total/NA	Solid	Moisture	
720-65387-3	1279SB432(0)	Total/NA	Solid	Moisture	
720-65387-4	1279SB432(1.5)	Total/NA	Solid	Moisture	
720-65387-5	1279SB433(0)	Total/NA	Solid	Moisture	
720-65387-6	1279SB433(1.5)	Total/NA	Solid	Moisture	

Lab Chronicle

Client: TRC Solutions, Inc.
Project/Site: Presidio

TestAmerica Job ID: 720-65387-1

Client Sample ID: 1279SB430(0)

Lab Sample ID: 720-65387-1
Date Collected: 06/10/15 12:30
Matrix: Solid
Date Received: 06/10/15 17:17
Percent Solids: 86.9

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			183449	06/11/15 13:52	ECT	TAL PLS
Total/NA	Analysis	6010B		1	183507	06/11/15 21:53	SLK	TAL PLS
Total/NA	Analysis	Moisture		1	183474	06/11/15 16:49	EYT	TAL PLS

Client Sample ID: 1279SB431(1.5)

Lab Sample ID: 720-65387-2
Date Collected: 06/10/15 13:30
Matrix: Solid
Date Received: 06/10/15 17:17
Percent Solids: 90.0

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			183449	06/11/15 13:52	ECT	TAL PLS
Total/NA	Analysis	6010B		1	183507	06/11/15 21:58	SLK	TAL PLS
Total/NA	Analysis	Moisture		1	183474	06/11/15 16:49	EYT	TAL PLS

Client Sample ID: 1279SB432(0)

Lab Sample ID: 720-65387-3
Date Collected: 06/10/15 13:45
Matrix: Solid
Date Received: 06/10/15 17:17
Percent Solids: 90.7

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			183449	06/11/15 13:52	ECT	TAL PLS
Total/NA	Analysis	6010B		1	183507	06/11/15 22:03	SLK	TAL PLS
Total/NA	Analysis	Moisture		1	183474	06/11/15 16:49	EYT	TAL PLS

Client Sample ID: 1279SB432(1.5)

Lab Sample ID: 720-65387-4
Date Collected: 06/10/15 14:10
Matrix: Solid
Date Received: 06/10/15 17:17
Percent Solids: 89.2

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			183449	06/11/15 13:52	ECT	TAL PLS
Total/NA	Analysis	6010B		2	183524	06/12/15 10:00	EFH	TAL PLS
Total/NA	Analysis	Moisture		1	183474	06/11/15 16:49	EYT	TAL PLS

Client Sample ID: 1279SB433(0)

Lab Sample ID: 720-65387-5
Date Collected: 06/10/15 14:30
Matrix: Solid
Date Received: 06/10/15 17:17
Percent Solids: 93.5

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			183449	06/11/15 13:52	ECT	TAL PLS
Total/NA	Analysis	6010B		2	183524	06/12/15 10:05	EFH	TAL PLS
Total/NA	Analysis	Moisture		1	183474	06/11/15 16:49	EYT	TAL PLS

Lab Chronicle

Client: TRC Solutions, Inc.
Project/Site: Presidio

TestAmerica Job ID: 720-65387-1

Client Sample ID: 1279SB433(1.5)
Date Collected: 06/10/15 15:00
Date Received: 06/10/15 17:17

Lab Sample ID: 720-65387-6
Matrix: Solid
Percent Solids: 89.8

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			183449	06/11/15 13:52	ECT	TAL PLS
Total/NA	Analysis	6010B		1	183507	06/11/15 22:19	SLK	TAL PLS
Total/NA	Analysis	Moisture		1	183474	06/11/15 16:49	EYT	TAL PLS

Laboratory References:

TAL PLS = TestAmerica Pleasanton, 1220 Quarry Lane, Pleasanton, CA 94566, TEL (925)484-1919

Certification Summary

Client: TRC Solutions, Inc.
Project/Site: Presidio

TestAmerica Job ID: 720-65387-1

Laboratory: TestAmerica Pleasanton

All certifications held by this laboratory are listed. Not all certifications are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
California	State Program	9	2496	01-31-16

Method Summary

Client: TRC Solutions, Inc.
Project/Site: Presidio

TestAmerica Job ID: 720-65387-1

Method	Method Description	Protocol	Laboratory
6010B	Metals (ICP)	SW846	TAL PLS
Moisture	Percent Moisture	EPA	TAL PLS

Protocol References:

EPA = US Environmental Protection Agency

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL PLS = TestAmerica Pleasanton, 1220 Quarry Lane, Pleasanton, CA 94566, TEL (925)484-1919

Sample Summary

Client: TRC Solutions, Inc.
Project/Site: Presidio

TestAmerica Job ID: 720-65387-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
720-65387-1	1279SB430(0)	Solid	06/10/15 12:30	06/10/15 17:17
720-65387-2	1279SB431(1.5)	Solid	06/10/15 13:30	06/10/15 17:17
720-65387-3	1279SB432(0)	Solid	06/10/15 13:45	06/10/15 17:17
720-65387-4	1279SB432(1.5)	Solid	06/10/15 14:10	06/10/15 17:17
720-65387-5	1279SB433(0)	Solid	06/10/15 14:30	06/10/15 17:17
720-65387-6	1279SB433(1.5)	Solid	06/10/15 15:00	06/10/15 17:17

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

720-65387

TESTAMERICA Pleasanton Chain of Custody
1220 Quarry Lane ● Pleasanton CA 94566-4756
Phone: (925) 484-1919 ● Fax: (925) 600-3002

Reference #: 16719

Date_____ Page_____ of_____

6/12/2015

Report To

Attn: Justin Hanzel-Durbin
Company: TRC
Address: 505 Sansome St., Ste 1600
Email: JHanzel-Durbin@trcsolutions.com
Bill To:
Sampled By: TB
Attn:
Phone: 925-665-9978

Analysis Request

Sample ID	Date	Time	Matrix	Preserv	Volatile Organics GC/MS (VOCs) ☐ EPA 8260B	HVOCs by ☐ EPA 8260B	EPA 8260B: ☐ Gas ☐ BTEX ☐ 5 Oxygenates ☐ DCA, EDB ☐ Ethanol	TEPH EPA 8015B ☐ Silica Gel ☐ Diesel ☐ Motor Oil ☐ Other	SemiVolatile Organics GC/MS ☐ EPA 8270C	PNAPAHs by ☐ 8270C ☐ 8270C SIM Hold	Oil and Grease ☐ Petroleum (EPA 1664/9071) ☐ Total	Pesticides ☐ EPA 8081 PCBs ☐ EPA 8082	CAM17 Metals (EPA 6010/7470/7471) Hold	Metals: ☐ 6010B ☐ 200.7 ☐ Lead ☐ LUFT ☐ RCRA ☐ Other:	Metals: ☐ 6020 ☐ 200.8 (ICP-MS): Cam 17 Lead only	☐ W.E.T (STLC) ☐ W.E.T (DI) ☐ TCLP	Hex. Chrom by ☐ EPA 7196 ☐ or EPA 7199	pH ☐ 9040 ☐ SM4500	☐ Spec. Cond. ☐ Alkalinity ☐ TSS ☐ SS ☐ TDS	Anions: ☐ Cl ☐ SO_4 ☐ NO_3 ☐ F ☐ Br ☐ NO_2 ☐ PO_4	Hold (do 3) ☐ Perchlorate by EPA 314.0	COD ☐ EPA 410.4 ☐ SM5220D ☐ Turbidity	Dioxins/furans Hold Sw 1613 B	4- moisture	Number of Containers
127958430(0)	6/10/15	1230	S							X			X		X							X	X	1
127958431(1.5)	6/10/15	1330	S							X			X		X							X	X	1
127958432(0)	6/10/15	1345	S							X			X		X							X	X	1
[redacted]																								
127958432(1.5)	6/10/15	1410	S							X			X		X							X	X	1
127958433(0)	6/10/15	1430	S							X			X		X							X	X	1
127958433(1.5)	6/10/15	1500	S							X			X		X							X	X	1
(127958432(1.5))RB433(0)	6/10/15	1415	W	HNO_3						X			X											3

Project Info.

Project Name/ #: 229649/Task 9/A
PO#:
Credit Card Y/N: If yes, please call with payment information ASAP

Sample Receipt

of Containers: 9
Head Space:
Temp: 1.6 °C

TAT: 10 Day | 5 Day | 4 Day | 3 Day | 2 Day | 1 Day | Other:

Report: ☐ Routine ☐ Level 3 ☐ Level 4 ☐ EDD ☐ EDF
Special Instructions / Comments: ☐ Global ID _____

See Terms and Conditions on reverse

1) Relinquished by:	2) Relinquished by:	3) Relinquished by:
Signature [redacted] Time 1510	Signature [redacted] Time 1717	Signature Time
Printed Name Taylor Busch Date 6/10/15	Printed Name Gary Date 6-10-15	Printed Name Date
Company TRC	Company TA	Company

1) Received by:	2) Received by:	3) Receive
Signature Time 1510	Signature Time 1717	Signature Time
Printed Name Dan Evans Date 6-10-15	Printed Name Date 6/10/15	Printed Nar Date
Company TA	Company TA	Company

720-65387 Chain of Custody

Rev.10/2012

Sharma, Dimple

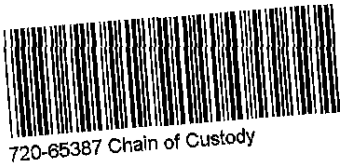
From: Hanzel-Durbin, Justin <JHanzel-Durbin@trcsolutions.com>
Sent: Thursday, June 11, 2015 11:14 AM
To: Sharma, Dimple
Cc: Busch, Taylor; Barros, Jessica
Subject: *RE: Samples from yesterday at the presidio*
Attachments: image001.jpg

Ok one more thing, once we get the samples from yesterday logged in we would like to have the lead analyses be done on a 24 hour TAT.
Thanks
Justin

Justin Hanzel-Durbin
Senior Engineer/Project Manager
Environmental/Remediation

505 Sansome Street, Suite 1600, San Francisco, CA 94111
T: 415.644.3050 | F: 415.434.2321 | Cell: 415.209.3326

Follow us on LinkedIn or Twitter | www.trcsolutions.com
JHanzel-Durbin@trcsolutions.com



From: Hanzel-Durbin, Justin
Sent: Thursday, June 11, 2015 9:19 AM
To: 'dimple.sharma@testamericainc.com'
Cc: Busch, Taylor; Barros, Jessica
Subject: Samples from yesterday at the presidio

I talked to my field staff who submitted Presidio samples yesterday and wanted to clarify one thing I know was marked in error on the COC and request that you forward me the log in sheet and COC prior to analyzing the samples. No samples from yesterday should be analyzed for Dioxins and Furans and for clarity the only analyses to be done at this time is for lead on a dry weight corrected basis; based on those results we will further analyze the samples.
Thanks
Justin

Justin Hanzel-Durbin
Senior Engineer/Project Manager
Environmental/Remediation

505 Sansome Street, Suite 1600, San Francisco, CA 94111
T: 415.644.3050 | F: 415.434.2321 | Cell: 415.209.3326

Follow us on LinkedIn or Twitter | www.trcsolutions.com
JHanzel-Durbin@trcsolutions.com

Login Sample Receipt Checklist

Client: TRC Solutions, Inc.

Job Number: 720-65387-1

Login Number: 65387
List Number: 1
Creator: Bullock, Tracy

List Source: TestAmerica Pleasanton

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	N/A	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	False	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

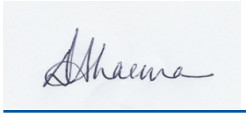
ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Pleasanton
1220 Quarry Lane
Pleasanton, CA 94566
Tel: (925)484-1919

TestAmerica Job ID: 720-65456-2
Client Project/Site: Presidio-Cavallo Hut LBP Removal

For:
TRC Solutions, Inc.
10680 White Rock Road
Suite 100
Rancho Cordova, California 95670

Attn: Mr. Justin Hanzel-Durbin



Authorized for release by:
6/16/2015 5:49:24 PM

Dimple Sharma, Senior Project Manager
(925)484-1919
dimple.sharma@testamericainc.com

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

Table of Contents

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Detection Summary

Client: TRC Solutions, Inc.
Project/Site: Presidio-Cavallo Hut LBP Removal

TestAmerica Job ID: 720-65456-2

Client Sample ID: DUP061215-2 (442) — Lab Sample ID: 720-65456-11

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	190		0.82		mg/Kg	2	☼	6010B	Total/NA

Client Sample ID: DUP061215-3 (444) — Lab Sample ID: 720-65456-12

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	47		0.43		mg/Kg	1	☼	6010B	Total/NA

Client Sample ID: DUP061215-4 (454) — Lab Sample ID: 720-65456-13

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	1600		0.45		mg/Kg	1	☼	6010B	Total/NA

Client Sample ID: DUP061215-5 (457) — Lab Sample ID: 720-65456-15

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	240		1.1		mg/Kg	2	☼	6010B	Total/NA

Client Sample ID: DUP061215-6 (458) — Lab Sample ID: 720-65456-19

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	590		0.53		mg/Kg	1	☼	6010B	Total/NA

Client Sample ID: DUP061215-7 (459) — Lab Sample ID: 720-65456-23

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	350		0.38		mg/Kg	1	☼	6010B	Total/NA

Client Sample ID: DUP061215-8 (460) — Lab Sample ID: 720-65456-26

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	300		0.90		mg/Kg	2	☼	6010B	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample Results

Client: TRC Solutions, Inc.
Project/Site: Presidio-Cavallo Hut LBP Removal

TestAmerica Job ID: 720-65456-2

Client Sample ID: DUP061215-2 (442)
Date Collected: 06/12/15 10:40
Date Received: 06/12/15 18:53

Lab Sample ID: 720-65456-11
Matrix: Solid
Percent Solids: 89.8

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	190		0.82		mg/Kg	☼	06/13/15 13:38	06/16/15 11:01	2

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	10		0.10		%			06/12/15 21:58	1

Client: TRC Solutions, Inc.
Project/Site: Presidio-Cavallo Hut LBP Removal

TestAmerica Job ID: 720-65456-2

Client Sample ID: DUP061215-3 (444)
Date Collected: 06/12/15 10:41
Date Received: 06/12/15 18:53

Lab Sample ID: 720-65456-12
Matrix: Solid
Percent Solids: 93.9

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	47		0.43		mg/Kg	☼	06/13/15 13:38	06/16/15 03:19	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	6.1		0.10		%			06/12/15 21:58	1

Client: TRC Solutions, Inc.
Project/Site: Presidio-Cavallo Hut LBP Removal

TestAmerica Job ID: 720-65456-2

Client Sample ID: DUP061215-4 (454)
Date Collected: 06/12/15 10:50
Date Received: 06/12/15 18:53

Lab Sample ID: 720-65456-13
Matrix: Solid
Percent Solids: 92.6

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	1600		0.45		mg/Kg	☼	06/13/15 13:38	06/16/15 03:23	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	7.4		0.10		%			06/12/15 21:58	1

Client: TRC Solutions, Inc.
Project/Site: Presidio-Cavallo Hut LBP Removal

TestAmerica Job ID: 720-65456-2

Client Sample ID: DUP061215-5 (457)
Date Collected: 06/12/15 11:02
Date Received: 06/12/15 18:53

Lab Sample ID: 720-65456-15
Matrix: Solid
Percent Solids: 87.5

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	240		1.1		mg/Kg	☼	06/13/15 13:38	06/16/15 11:06	2

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	12		0.10		%			06/12/15 21:58	1

Client: TRC Solutions, Inc.
Project/Site: Presidio-Cavallo Hut LBP Removal

TestAmerica Job ID: 720-65456-2

Client Sample ID: DUP061215-6 (458)
Date Collected: 06/12/15 12:15
Date Received: 06/12/15 18:53

Lab Sample ID: 720-65456-19
Matrix: Solid
Percent Solids: 86.4

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	590		0.53		mg/Kg	☼	06/13/15 13:38	06/16/15 04:01	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	14		0.10		%			06/12/15 21:58	1

Client: TRC Solutions, Inc.
Project/Site: Presidio-Cavallo Hut LBP Removal

TestAmerica Job ID: 720-65456-2

Client Sample ID: DUP061215-7 (459)
Date Collected: 06/12/15 12:52
Date Received: 06/12/15 18:53

Lab Sample ID: 720-65456-23
Matrix: Solid
Percent Solids: 91.7

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	350		0.38		mg/Kg	☼	06/13/15 13:38	06/16/15 04:29	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	8.3		0.10		%			06/12/15 21:58	1

Client: TRC Solutions, Inc.
Project/Site: Presidio-Cavallo Hut LBP Removal

TestAmerica Job ID: 720-65456-2

Client Sample ID: DUP061215-8 (460)
Date Collected: 06/12/15 13:27
Date Received: 06/12/15 18:53

Lab Sample ID: 720-65456-26
Matrix: Solid
Percent Solids: 85.6

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	300		0.90		mg/Kg	☼	06/13/15 14:35	06/16/15 15:46	2

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	14		0.10		%			06/12/15 21:58	1

Method: 6010B - Metals (ICP)

Lab Sample ID: MB 720-183589/1-A
Matrix: Solid
Analysis Batch: 183686

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 183589

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	ND		0.50		mg/Kg		06/13/15 13:38	06/16/15 02:03	1

Lab Sample ID: LCS 720-183589/2-A
Matrix: Solid
Analysis Batch: 183686

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 183589

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Lead	50.0	50.2		mg/Kg		100	80 - 120

Lab Sample ID: LCSD 720-183589/3-A
Matrix: Solid
Analysis Batch: 183686

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 183589

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Lead	50.0	50.0		mg/Kg		100	80 - 120	0	20

Lab Sample ID: LCSSRM 720-183589/25-A
Matrix: Solid
Analysis Batch: 183686

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 183589

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits
Lead	302	259		mg/Kg		86	62 - 113

Lab Sample ID: MB 720-183590/1-A
Matrix: Solid
Analysis Batch: 183719

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 183590

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	ND		0.50		mg/Kg		06/13/15 14:35	06/16/15 12:11	1

Lab Sample ID: LCS 720-183590/2-A
Matrix: Solid
Analysis Batch: 183719

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 183590

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Lead	50.0	51.2		mg/Kg		102	80 - 120

Lab Sample ID: LCSD 720-183590/3-A
Matrix: Solid
Analysis Batch: 183719

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 183590

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Lead	50.0	51.8		mg/Kg		104	80 - 120	1	20

Lab Sample ID: LCSSRM 720-183590/25-A
Matrix: Solid
Analysis Batch: 183719

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 183590

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits
Lead	302	268		mg/Kg		89	62 - 113

Client: TRC Solutions, Inc.
Project/Site: Presidio-Cavallo Hut LBP Removal

TestAmerica Job ID: 720-65456-2

Method: Moisture - Percent Moisture

Lab Sample ID: 720-65456-26 DU
Matrix: Solid
Analysis Batch: 183571

Client Sample ID: DUP061215-8 (460)
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
Percent Moisture	14			15		%				6	20

Metals

Prep Batch: 183589

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
720-65456-11	DUP061215-2 (442)	Total/NA	Solid	3050B	
720-65456-12	DUP061215-3 (444)	Total/NA	Solid	3050B	
720-65456-13	DUP061215-4 (454)	Total/NA	Solid	3050B	
720-65456-15	DUP061215-5 (457)	Total/NA	Solid	3050B	
720-65456-19	DUP061215-6 (458)	Total/NA	Solid	3050B	
720-65456-23	DUP061215-7 (459)	Total/NA	Solid	3050B	
LCS 720-183589/2-A	Lab Control Sample	Total/NA	Solid	3050B	
LCSD 720-183589/3-A	Lab Control Sample Dup	Total/NA	Solid	3050B	
LCSSRM 720-183589/25-A	Lab Control Sample	Total/NA	Solid	3050B	
MB 720-183589/1-A	Method Blank	Total/NA	Solid	3050B	

Prep Batch: 183590

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
720-65456-26	DUP061215-8 (460)	Total/NA	Solid	3050B	
LCS 720-183590/2-A	Lab Control Sample	Total/NA	Solid	3050B	
LCSD 720-183590/3-A	Lab Control Sample Dup	Total/NA	Solid	3050B	
LCSSRM 720-183590/25-A	Lab Control Sample	Total/NA	Solid	3050B	
MB 720-183590/1-A	Method Blank	Total/NA	Solid	3050B	

Analysis Batch: 183686

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
720-65456-12	DUP061215-3 (444)	Total/NA	Solid	6010B	183589
720-65456-13	DUP061215-4 (454)	Total/NA	Solid	6010B	183589
720-65456-19	DUP061215-6 (458)	Total/NA	Solid	6010B	183589
720-65456-23	DUP061215-7 (459)	Total/NA	Solid	6010B	183589
LCS 720-183589/2-A	Lab Control Sample	Total/NA	Solid	6010B	183589
LCSD 720-183589/3-A	Lab Control Sample Dup	Total/NA	Solid	6010B	183589
LCSSRM 720-183589/25-A	Lab Control Sample	Total/NA	Solid	6010B	183589
MB 720-183589/1-A	Method Blank	Total/NA	Solid	6010B	183589

Analysis Batch: 183704

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
720-65456-11	DUP061215-2 (442)	Total/NA	Solid	6010B	183589
720-65456-15	DUP061215-5 (457)	Total/NA	Solid	6010B	183589

Analysis Batch: 183719

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
LCS 720-183590/2-A	Lab Control Sample	Total/NA	Solid	6010B	183590
LCSD 720-183590/3-A	Lab Control Sample Dup	Total/NA	Solid	6010B	183590
LCSSRM 720-183590/25-A	Lab Control Sample	Total/NA	Solid	6010B	183590
MB 720-183590/1-A	Method Blank	Total/NA	Solid	6010B	183590

Analysis Batch: 183732

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
720-65456-26	DUP061215-8 (460)	Total/NA	Solid	6010B	183590

QC Association Summary

Client: TRC Solutions, Inc.
Project/Site: Presidio-Cavallo Hut LBP Removal

TestAmerica Job ID: 720-65456-2

General Chemistry

Analysis Batch: 183571

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
720-65456-11	DUP061215-2 (442)	Total/NA	Solid	Moisture	
720-65456-12	DUP061215-3 (444)	Total/NA	Solid	Moisture	
720-65456-13	DUP061215-4 (454)	Total/NA	Solid	Moisture	
720-65456-15	DUP061215-5 (457)	Total/NA	Solid	Moisture	
720-65456-19	DUP061215-6 (458)	Total/NA	Solid	Moisture	
720-65456-23	DUP061215-7 (459)	Total/NA	Solid	Moisture	
720-65456-26	DUP061215-8 (460)	Total/NA	Solid	Moisture	
720-65456-26 DU	DUP061215-8 (460)	Total/NA	Solid	Moisture	

Lab Chronicle

Client: TRC Solutions, Inc.
Project/Site: Presidio-Cavallo Hut LBP Removal

TestAmerica Job ID: 720-65456-2

Client Sample ID: DUP061215-2 (442)

Lab Sample ID: 720-65456-11
Date Collected: 06/12/15 10:40
Matrix: Solid
Date Received: 06/12/15 18:53
Percent Solids: 89.8

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			183589	06/13/15 13:38	CTD	TAL PLS
Total/NA	Analysis	6010B		2	183704	06/16/15 11:01	EFH	TAL PLS
Total/NA	Analysis	Moisture		1	183571	06/12/15 21:58	EYT	TAL PLS

Client Sample ID: DUP061215-3 (444)

Lab Sample ID: 720-65456-12
Date Collected: 06/12/15 10:41
Matrix: Solid
Date Received: 06/12/15 18:53
Percent Solids: 93.9

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			183589	06/13/15 13:38	CTD	TAL PLS
Total/NA	Analysis	6010B		1	183686	06/16/15 03:19	SLK	TAL PLS
Total/NA	Analysis	Moisture		1	183571	06/12/15 21:58	EYT	TAL PLS

Client Sample ID: DUP061215-4 (454)

Lab Sample ID: 720-65456-13
Date Collected: 06/12/15 10:50
Matrix: Solid
Date Received: 06/12/15 18:53
Percent Solids: 92.6

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			183589	06/13/15 13:38	CTD	TAL PLS
Total/NA	Analysis	6010B		1	183686	06/16/15 03:23	SLK	TAL PLS
Total/NA	Analysis	Moisture		1	183571	06/12/15 21:58	EYT	TAL PLS

Client Sample ID: DUP061215-5 (457)

Lab Sample ID: 720-65456-15
Date Collected: 06/12/15 11:02
Matrix: Solid
Date Received: 06/12/15 18:53
Percent Solids: 87.5

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			183589	06/13/15 13:38	CTD	TAL PLS
Total/NA	Analysis	6010B		2	183704	06/16/15 11:06	EFH	TAL PLS
Total/NA	Analysis	Moisture		1	183571	06/12/15 21:58	EYT	TAL PLS

Client Sample ID: DUP061215-6 (458)

Lab Sample ID: 720-65456-19
Date Collected: 06/12/15 12:15
Matrix: Solid
Date Received: 06/12/15 18:53
Percent Solids: 86.4

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			183589	06/13/15 13:38	CTD	TAL PLS
Total/NA	Analysis	6010B		1	183686	06/16/15 04:01	SLK	TAL PLS
Total/NA	Analysis	Moisture		1	183571	06/12/15 21:58	EYT	TAL PLS

Lab Chronicle

Client: TRC Solutions, Inc.
Project/Site: Presidio-Cavallo Hut LBP Removal

TestAmerica Job ID: 720-65456-2

Client Sample ID: DUP061215-7 (459)

Lab Sample ID: 720-65456-23

Date Collected: 06/12/15 12:52
Date Received: 06/12/15 18:53

Matrix: Solid
Percent Solids: 91.7

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			183589	06/13/15 13:38	CTD	TAL PLS
Total/NA	Analysis	6010B		1	183686	06/16/15 04:29	SLK	TAL PLS
Total/NA	Analysis	Moisture		1	183571	06/12/15 21:58	EYT	TAL PLS

Client Sample ID: DUP061215-8 (460)

Lab Sample ID: 720-65456-26

Date Collected: 06/12/15 13:27
Date Received: 06/12/15 18:53

Matrix: Solid
Percent Solids: 85.6

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			183590	06/13/15 14:35	CTD	TAL PLS
Total/NA	Analysis	6010B		2	183732	06/16/15 15:46	EFH	TAL PLS
Total/NA	Analysis	Moisture		1	183571	06/12/15 21:58	EYT	TAL PLS

Laboratory References:

TAL PLS = TestAmerica Pleasanton, 1220 Quarry Lane, Pleasanton, CA 94566, TEL (925)484-1919

Certification Summary

Client: TRC Solutions, Inc.
Project/Site: Presidio-Cavallo Hut LBP Removal

TestAmerica Job ID: 720-65456-2

Laboratory: TestAmerica Pleasanton

All certifications held by this laboratory are listed. Not all certifications are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
California	State Program	9	2496	01-31-16

Method Summary

Client: TRC Solutions, Inc.
Project/Site: Presidio-Cavallo Hut LBP Removal

TestAmerica Job ID: 720-65456-2

Method	Method Description	Protocol	Laboratory
6010B	Metals (ICP)	SW846	TAL PLS
Moisture	Percent Moisture	EPA	TAL PLS

Protocol References:

EPA = US Environmental Protection Agency

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL PLS = TestAmerica Pleasanton, 1220 Quarry Lane, Pleasanton, CA 94566, TEL (925)484-1919

Sample Summary

Client: TRC Solutions, Inc.
Project/Site: Presidio-Cavallo Hut LBP Removal

TestAmerica Job ID: 720-65456-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
720-65456-11	DUP061215-2 (442)	Solid	06/12/15 10:40	06/12/15 18:53
720-65456-12	DUP061215-3 (444)	Solid	06/12/15 10:41	06/12/15 18:53
720-65456-13	DUP061215-4 (454)	Solid	06/12/15 10:50	06/12/15 18:53
720-65456-15	DUP061215-5 (457)	Solid	06/12/15 11:02	06/12/15 18:53
720-65456-19	DUP061215-6 (458)	Solid	06/12/15 12:15	06/12/15 18:53
720-65456-23	DUP061215-7 (459)	Solid	06/12/15 12:52	06/12/15 18:53
720-65456-26	DUP061215-8 (460)	Solid	06/12/15 13:27	06/12/15 18:53

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

720-65456

TESTAMERICA Pleasanton Chain of Custody
1220 Quarry Lane • Pleasanton CA 94566-4756
Phone: (925) 484-1919 • Fax: (925) 600-3002

Reference #: 16792

Date 6/12/15 Page 1 of 3

6/16/2015

Report To

Attn: Justin Henzel-Durbin
Company: TRC
Address: 505 Sansome St., Ste 1600
Email: JHenzel-Durbin@trcsolutions.com
Bill To:
Sampled By: TB
Attn:
Phone: 925-665-9928

Analysis Request

Sample ID	Date	Time	Matrix	Preserv	Volatile Organics GC/MS (VOCs) ☐ EPA 8260B	HVOCs by ☐ EPA 8260B	EPA 8260B: ☐ Gas ☐ BTEX ☐ 5 Oxygenates ☐ DCA, EDB ☐ Ethanol	TEPH EPA 8015B ☐ Silica Gel ☐ Diesel ☐ Motor Oil ☐ Other ___	SemiVolatile Organics GC/MS ☐ EPA 8270C	PNA/PAH's by ☐ 8270C ☐ 8270C SIM	Oil and Grease ☐ Petroleum ☐ Total (EPA 1664/9071)	Pesticides ☐ EPA 8081 PCBs ☐ EPA 8082	CAM17 Metals (EPA 6010/7470/7471) Hold	Metals: ☐ 6010B ☐ 200.7 ☐ Lead ☐ LUFT ☐ RCRA ☐ Other: ___	Metals: ☐ 6020 ☐ 200.8 (ICP-MS): Lead only	☐ W.E.T (STLC) ☐ W.E.T (DI) ☐ TCLP	Hex. Chrom by ☐ EPA 7196 ☐ or EPA 7199	pH ☐ 9040 ☐ SM4500	☐ Spec. Cond. ☐ Alkalinity ☐ TSS ☐ SS ☐ TDS	Anions: ☐ Cl ☐ SO_4 ☐ NO_3 ☐ F ☐ Br ☐ NO_2 ☐ PO_4	~~Perchlorate by EPA 314.0~~	COD ☐ EPA 410.4 ☐ SM5220D ☐ Turbidity	Dioxins/Furans Swlab13 B	% moisture	Number of Containers
1279SB454(0.25)	6/12/15	830	S	48hr TAT, lead, % moisture						X			X		X							X			X	2
1279SB454(1.5)		835		Hold																						1
1279SB454(3)		845		Hold																						1
1279SB455(0.25)		915		48hr TAT, lead, % moisture																						1
DUP061215 [455]		916		Hold																						1
1279SB455(1.5)		920		Hold																						1
1279SB455(3)		925		Hold																						1
1279SB456(0.25)		945		48hr TAT, lead, % moisture																						1
1279SB456(1.5)		1000		Hold																						1
1279SB456(3)		1012		Hold																						1

RUSH

Project Info.

Project Name/ #: 229649/Task 4/A
PO#:
Credit Card Y/N: If yes, please call with payment information ASAP

Sample Receipt

of Containers: 11
Head Space:
Temp: 23.4°C

TAT: 10 Day | 5 Day | 4 Day | 3 Day | 2 Day | 1 Day
Other: 24-hour on specific leads, contact J. Henzel-Durbin

Report: ☐ Routine ☐ Level 3 ☐ Level 4 ☐ EDD ☐ EDF
Special Instructions / Comments: ☐ Global ID ___

See Terms and Conditions on reverse

1) Relinquished by:
Signature: TB Time: 1300
Printed Name: T Bush Date: 6/12/15
Company: TRC

2) Relinquished by:
Signature: [illegible] Time: 653p
Printed Name: Steven Bang Date: 6/12/15
Company: UltraEX

3) Relinquished by:
Signature: Time:
Printed Name: Date:
Company:

1) Received by:
Signature: [illegible] Time: 1601
Printed Name: Steven Bang Date: 6/12/15
Company: UltraEX

2) Received by:
Signature: [illegible] Time: 1853
Printed Name: J Gonzales Date: 6/12/15
Company: JAP

720-65456 Chain of Custody

Printed Name: Date:
Company:

Rev.10/2012

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

720-65456

TESTAMERICA Pleasanton Chain of Custody
1220 Quarry Lane ● Pleasanton CA 94566-4756
Phone: (925) 484-1919 ● Fax: (925) 600-3002

Reference #: _____

Date 6/12/15 Page 2 of 3

6/16/2015

Report To

Attn:
Company:
Address:
Email:
Bill To: | Sampled By:
Attn: | Phone:

Analysis Request

Sample ID	Date	Time	Matrix	Preserv	Volatile Organics GC/MS (VOCs) ☐ EPA 8260B	HVOCs by ☐ EPA 8260B	EPA 8260B: ☐ Gas ☐ BTEX ☐ 5 Oxygenates ☐ DCA, EDB ☐ Ethanol	TEPH EPA 8015B ☐ Silica Gel ☐ Diesel ☐ Motor Oil ☐ Other ___	SemiVolatile Organics GC/MS ☐ EPA 8270C	PNA/PAH's by ☐ 8270C ☒ 8270C SIM	Oil and Grease (EPA 1664/9071) ☐ Petroleum ☐ Total	Pesticides ☐ EPA 8081 PCBs ☐ EPA 8082	CAM17 Metals (EPA 6010/7470/7471)	Metals: ☐ 6010B ☐ 200.7 ☐ Lead ☐ LUFT ☐ RCRA ☐ Other: ___	Metals: ☐ 6020 ☐ 200.8 (ICP-MS):	☐ W.E.T (STLC) ☐ W.E.T (DI) ☐ TCLP	Hex. Chrom by ☐ EPA 7196 ☐ or EPA 7199	pH ☐ 9040 ☐ SM4500	☐ Spec. Cond. ☐ Alkalinity ☐ TSS ☐ SS ☐ TDS	Anions: ☐ Cl ☐ SO_4 ☐ NO_3 ☐ F ☐ Br ☐ NO_2 ☐ PO_4	☐ Perchlorate by EPA 314.0	COD ☐ EPA 410.4 ☐ SM5220D ☐ Turbidity			Number of Containers
DUP061215-2 [442]	6/12/15	1040	S							X			X		X									X		1
DUP061215-3 [444]		1041																								1
DUP061215-4 [453]		1050																								1
12795B457(0.25)		1100				48hr TAT [lead, % moisture																	X			2
DUP061215-5 [457]		1102																								1
12795B457(1.5)		1140				Hold																				1
12795B457(3)		1155				Hold																				1
12795B458(0.25)		1210				48hr TAT [lead, % moisture																	X			2
DUP061215-6 [458]		1215																								1
12795B458(1.5)		1230				Hold																				1

Page 22 of 27

Project Info.

Project Name/ #:
PO#:
Credit Card Y/N: If yes, please call with payment information ASAP

Sample Receipt

of Containers:
Head Space:
Temp:

TAT: 10 Day | 5 Day | 4 Day | 3 Day | 2 Day | 1 Day | Other:

Report: ☐ Routine ☐ Level 3 ☐ Level 4 ☐ EDD ☐ EDF
Special Instructions / Comments: ☐ Global ID _____

See Terms and Conditions on reverse

1) Relinquished by:	2) Relinquished by:	3) Relinquished by:
Signature: [signature] Time: 1300	Signature: [signature] Time: 654p	Signature: Time:
Printed Name: T Bevel Date: 6/12/15	Printed Name: Steven Doug Date: 6/12/15	Printed Name: Date:
Company: TRC	Company: Ultra Ex	Company:

1) Received by:	2) Received by:	3) Received by:
Signature: [signature] Time: 1601	Signature: [signature] Time: 1854	Signature: Time:
Printed Name: Steven Doug Date: 6/12/15	Printed Name: J Gonzales Date: 6/12/15	Printed Name: Date:
Company: Ultra Ex	Company: TAP	Company:

Rev.10/2012

Reference #: ______

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

720-65456

TESTAMERICA Pleasanton Chain of Custody
1220 Quarry Lane ● Pleasanton CA 94566-4756
Phone: (925) 484-1919 ● Fax: (925) 600-3002

Date 6/12/15 Page 3 of 3

Report To

Attn:
Company:
Address:
Email:
Bill To: Sampled By:
Attn: Phone:

Analysis Request

Sample ID	Date	Time	Matrix	Preserv	Volatile Organics GC/MS (VOCs) ☐ EPA 8260B	HVOCs by ☐ EPA 8260B	EPA 8260B: ☐ Gas ☐ BTEX ☐ 5 Oxygenates ☐ DCA, EDB ☐ Ethanol	TEPH EPA 8015B ☐ Silica Gel ☐ Diesel ☐ Motor Oil ☐ Other	SemiVolatile Organics GC/MS ☐ EPA 8270C	PNA/PAH's by ☐ 8270C ☒ 8270C SIM Hold	Oil and Grease ☐ Petroleum (EPA 1664/9071) ☐ Total	Pesticides ☐ EPA 8081 PCBs ☐ EPA 8082	CAM17 Metals (EPA 6010/7470/7471) Hold	Metals: ☐ 6010B ☐ 200.7 ☐ Lead ☐ LUFT ☐ RCRA ☐ Other:	Metals: ☒ 6020 ☐ 200.8 (ICP-MS): lead only	☐ W.E.T (STLC) ☐ W.E.T (DI) ☐ TCLP	Hex. Chrom by ☐ EPA 7196 ☐ or EPA 7199	pH ☐ 9040 ☐ SM4500	☐ Spec. Cond. ☐ Alkalinity ☐ TSS ☐ SS ☐ TDS	Anions: ☐ Cl ☐ SO_4 ☐ NO_3 ☐ F ☐ Br ☐ NO_2 ☐ PO_4	MSMDs ~~☐ Perchlorate by EPA 314.0~~	COD ☐ EPA 410.4 ☐ SM5220D ☐ Turbidity	Dioxins/Furans Sw/613B	% moisture	Number of Containers
12795B458(3)	6/12/15	1240	S	Hold						X			X		X									X	1
12795B459(0.25)		1250		48hr TAT, lead, % moisture																	X				2
DUP061215-7 [459]		1252																							1
12795B459(1.5)		1310		Hold																					1
12795B460(0.25)		1325		48hr TAT, lead, % moisture																	X				2
~~[illegible]~~																									1
DUP061215-8 [460]		1327																							1
12795B461(0.25)		1400		48hr TAT, lead, % moisture																					1
12795B461(1.5)		1415		Hold																					1
12795B461 RB		1430	W	48hr TAT, lead																					3

Project Info. **Sample Receipt**

Project Name/ #: # of Containers:
Head Space:
PO#: Temp:
Credit Card Y/N: If yes, please call with payment information ASAP

T A T	10 Day	5 Day	4 Day	3 Day	2 Day	1 Day	Other:

Report: ☐ Routine ☐ Level 3 ☐ Level 4 ☐ EDD ☐ EDF
Special Instructions / Comments: ☐ Global ID ______

See Terms and Conditions on reverse

1) Relinquished by:	2) Relinquished by:	3) Relinquished by:
Signature: [signature] Time: 1300	Signature: [signature] Time: 653p	Signature: Time:
Printed Name: T Bush Date: 6/12/15	Printed Name: Steven Dury Date: 6/12/15	Printed Name: Date:
Company: TRC	Company: UltraEx	Company:
1) Received by:	**2) Received by:**	**3) Received by:**
Signature: [signature] Time: 1601	Signature: [signature] Time: 1853	Signature: Time:
Printed Name: Steven Dury Date: 6/12/15	Printed Name: J Gonzaly Date: 6/12/15	Printed Name: Date:
Company: UltraEx	Company: TAP	Company:

Rev.10/2012

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

720-65456

TESTAMERICA Pleasanton Chain of Custody
1220 Quarry Lane • Pleasanton CA 94566-4756
Phone: (925) 484-1919 • Fax: (925) 600-3002

Reference #: 16792

Date 6/12/15 Page 1 of 3

6/16/2015

Report To

Attn: Justin Hanzel-Durbin
Company: TRC
Address: 505 Sansome St., Ste 1600
Email: JHanzel-Durbin@trcsolutions.com
Bill To:
Sampled By: TB
Attn:
Phone: 925-665-9728

Analysis Request

Sample ID	Date	Time	Matrix	Preserv	Volatile Organics GC/MS (VOCs) ☐ EPA 8260B	HVOCs by ☐ EPA 8260B	EPA 8260B: ☐ Gas ☐ BTEX ☐ 5 Oxygenates ☐ DCA, EDB ☐ Ethanol	TEPH EPA 8015B ☐ Silica Gel ☐ Diesel ☐ Motor Oil ☐ Other	SemiVolatile Organics GC/MS ☐ EPA 8270C	PNA/PAHs by ☐ 8270C ~~☐ 8270C SIM~~ Hold	Oil and Grease (EPA 1664/9071) ☐ Petroleum ☐ Total	Pesticides ☐ EPA 8081 PCBs ☐ EPA 8082	CAM17 Metals (EPA 6010/7470/7471) Hold	Metals: ☐ 6010B ☐ 200.7 ☐ Lead ☐ LUFT ☐ RCRA ☐ Other:	~~Metals: ☐ 6020~~ ☐ 200.8 (ICP-MS): lead only	☐ W.E.T (STLC) ☐ W.E.T (DI) ☐ TCLP	Hex. Chrom by ☐ EPA 7196 ☐ or EPA 7199	pH ☐ 9040 ☐ SM4500	☐ Spec. Cond. ☐ Alkalinity ☐ TSS ☐ SS ☐ TDS	Anions: ☐ Cl ☐ SO_4 ☐ NO_3 ☐ F ☐ Br ☐ NO_2 ☐ PO_4	~~☐ Perchlorate by EPA 314.0~~ MSMS	COD ☐ EPA 410.4 ☐ SM5220D ☐ Turbidity	Dioxins/Furans SW8123	% moisture	Number of Containers
1279SB454(0.25)	6/12/15	830	S	48hr TAT, lead, % moisture						X			X		X								X	2
1279SB454(1.5)	"	835	"	Hold																				1
1279SB454(3)	"	845	"	Hold																				1
1279SB455(0.25)	"	915	"	48hr TAT, lead, % moisture																				1
DUP061215 [455]	"	916	"	Hold																				1
1279SB455(1.5)	"	920	"	Hold																				1
1279SB455(3)	"	925	"	Hold																				1
1279SB456(0.25)	"	945	"	48hr TAT, lead, % moisture																				1
1279SB456(1.5)	"	1000	"	Hold																				1
1279SB456(3)	"	1012	"	Hold																				1

RUSH

Project Info.

Project Name/ #: 229649/Task 4/1
PO#:
Credit Card Y/N: If yes, please call with payment information ASAP

Sample Receipt

of Containers: 11
Head Space:
Temp: 23.4°C

TAT: 10 Day | 5 Day | 4 Day | 3 Day | 2 Day | 1 Day
Other: 24-hr on specific leads, contact J. Hanzel-Durbin

Report: ☐ Routine ☐ Level 3 ☐ Level 4 ☐ EDD ☐ EDF
Special Instructions / Comments: ☐ Global ID

See Terms and Conditions on reverse

1) Relinquished by:
Signature: TB Time: 1300
Printed Name: T Bush Date: 6/12/15
Company: TRC

2) Relinquished by:
Signature: [illegible] Time: 653P
Printed Name: Steven Bay Date: 6/12/15
Company: UltraEX

3) Relinquished by:
Signature: Time:
Printed Name: Date:
Company:

1) Received by:
Signature: [illegible] Time: 1601
Printed Name: Steven Bay Date: 6/12/15
Company: UltraEX

2) Received by:
Signature: [illegible] Time: 1853
Printed Name: J Gonzales Date: 6/12/15
Company: JAP

720-65456 Chain of Custody

Printed Name: Date:
Company:

Rev.10/2012

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

720-65456

TESTAMERICA Pleasanton Chain of Custody
1220 Quarry Lane ● Pleasanton CA 94566-4756
Phone: (925) 484-1919 ● Fax: (925) 600-3002

Reference #: _____

Date 6/12/15 Page 2 of 3

6/16/2015

Report To

Attn:
Company:
Address:
Email:
Bill To: | Sampled By:
Attn: | Phone:

Analysis Request

Sample ID	Date	Time	Matrix	Preserv	Volatile Organics GC/MS (VOCs) ☐ EPA 8260B	HVOCs by ☐ EPA 8260B	EPA 8260B: ☐ Gas ☐ BTEX ☐ 5 Oxygenates ☐ DCA, EDB ☐ Ethanol	TEPH EPA 8015B ☐ Silica Gel ☐ Diesel ☐ Motor Oil ☐ Other	Semi Volatile Organics GC/MS ☐ EPA 8270C	PNA/PAH's by ☐ 8270C ☐ 8270C SIM	Oil and Grease (EPA 1664/9071) ☐ Petroleum ☐ Total	Pesticides ☐ EPA 8081 PCBs ☐ EPA 8082	CAM17 Metals (EPA 6010/7470/7471)	Metals: ☐ 6010B ☐ 200.7 ☐ Lead ☐ LUFT ☐ RCRA ☐ Other:	Metals: ☐ 6020 ☐ 200.8 (ICP-MS):	☐ W.E.T (STLC) ☐ W.E.T (DI) ☐ TCLP	Hex. Chrom by ☐ EPA 7196 ☐ or EPA 7199	pH ☐ 9040 ☐ SM4500	☐ Spec. Cond. ☐ Alkalinity ☐ TSS ☐ SS ☐ TDS	Anions: ☐ Cl ☐ SO_4 ☐ NO_3 ☐ F ☐ Br ☐ NO_2 ☐ PO_4	☐ Perchlorate by EPA 314.0	COD ☐ EPA 410.4 ☐ SM5220D ☐ Turbidity		% moisture	Number of Containers
DUP061215-2 [442]	6/12/15	1040	S							X			X		X									X	1
DUP061215-3 [443]		0941																							1
DUP061215-4 [454]		1050																							1
1279SB457(0.25)		1100			48hr TAT, Hold, % moisture																	X			2
DUP061215-5 [457]		1102																							1
1279SB457(1.5)		1140			Hold																				1
1279SB457(3)		1155			Hold																				1
1279SB458(0.25)		1210			48hr TAT, Hold, % moisture																	X			2
DUP061215-6 [458]		1215																							1
1279SB458(1.5)		1230			Hold																				1

Project Info.

Project Name/ #:
PO#:
Credit Card Y/N: If yes, please call with payment information ASAP

Sample Receipt

of Containers:
Head Space:
Temp:

TAT: 10 Day | 5 Day | 4 Day | 3 Day | 2 Day | 1 Day | Other:

Report: ☐ Routine ☐ Level 3 ☐ Level 4 ☐ EDD ☐ EDF
Special Instructions / Comments: ☐ Global ID _____

See Terms and Conditions on reverse

1) Relinquished by:	2) Relinquished by:	3) Relinquished by:
Signature: [signature] Time: 1300	Signature: [signature] Time: 654p	Signature: Time:
Printed Name: T Buzek Date: 6/12/15	Printed Name: Steven Dong Date: 6/12/15	Printed Name: Date:
Company: TRC	Company: Ultra Ex	Company:

1) Received by:	2) Received by:	3) Received by:
Signature: [signature] Time: 1601	Signature: [signature] Time: 1854	Signature: Time:
Printed Name: Steven Dong Date: 6/12/15	Printed Name: J Gonzales Date: 6/12/15	Printed Name: Date:
Company: Ultra Ex	Company: TAP	Company:

Rev.10/2012

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

720-65456

TESTAMERICA Pleasanton Chain of Custody

1220 Quarry Lane ● Pleasanton CA 94566-4756

Phone: (925) 484-1919 ● Fax: (925) 600-3002

Reference #: ____________

Date 6/12/15 Page 3 of 3

Report To

Attn:

Company:

Address:

Email:

Bill To: Sampled By:

Attn: Phone:

Analysis Request

Sample ID	Date	Time	Matrix	Preserv	Volatile Organics GC/MS (VOCs) ☐ EPA 8260B	HVOCs by ☐ EPA 8260B	EPA 8260B: ☐ Gas ☐ BTEX ☐ 5 Oxygenates ☐ DCA, EDB ☐ Ethanol	TEPH EPA 8015B ☐ Silica Gel ☐ Diesel ☐ Motor Oil ☐ Other ___	SemiVolatile Organics GC/MS ☐ EPA 8270C	PNA/PAH's by ☐ 8270C ☒ 8270C SIM Hold	Oil and Grease (EPA 1664/9071) ☐ Petroleum ☐ Total	Pesticides ☐ EPA 8081 PCBs ☐ EPA 8082	CAM17 Metals (EPA 6010/7470/7471) Hold	Metals: ☐ 6010B ☐ 200.7 ☐ Lead ☐ LUFT ☐ RCRA ☐ Other: ___	Metals: ☒ 6020 ☐ 200.8 (ICP-MS): lead only	☐ W.E.T (STLC) ☐ W.E.T (DI) ☐ TCLP	Hex. Chrom by ☐ EPA 7196 ☐ or EPA 7199	pH ☐ 9040 ☐ SM4500	☐ Spec. Cond. ☐ Alkalinity ☐ TSS ☐ SS ☐ TDS	Anions: ☐ Cl ☐ SO_4 ☐ NO_3 ☐ F ☐ Br ☐ NO_2 ☐ PO_4	MS/MSD ~~☒ Perchlorate by EPA 314.0~~	COD ☐ EPA 410.4 ☐ SM5220D ☐ Turbidity	Dioxins/Furans SW1613B	% moisture	Number of Containers
12795B458(3)	6/12/15	1240	S	Hold						X			X		X									X	1
12795B459(0.25)		1250		48hr TAT, lead, % moisture																	X				2
DUP061215-7 [459]		1252																							1
12795B459(1.5)		1310		Hold																					1
12795B460(0.25)		1325		48hr TAT, lead, % moisture																	X				2
[illegible]																									1
DUP061215-8 [460]		1327																							1
12795B461(0.25)		1400		48hr TAT, lead, % moisture																					1
12795B461(1.5)		1415		Hold																					1
12795B461 RB		1430	W	48hr TAT, lead																					3

Project Info. **Sample Receipt**

Project Name/ #: # of Containers:

Head Space:

PO#: Temp:

Credit Card Y/N: If yes, please call with payment information ASAP

T A T	10 Day	5 Day	4 Day	3 Day	2 Day	1 Day	Other:

Report: ☐ Routine ☐ Level 3 ☐ Level 4 ☐ EDD ☐ EDF

Special Instructions / Comments: ☐ Global ID ________

See Terms and Conditions on reverse

1) Relinquished by:	2) Relinquished by:	3) Relinquished by:
Signature: [signature] Time: 1300	Signature: [signature] Time: 653p	Signature Time
Printed Name: T Busch Date: 6/12/15	Printed Name: Steven Dung Date: 6/12/15	Printed Name Date
Company: TRC	Company: UltraEx	Company

1) Received by:	2) Received by:	3) Received by:
Signature: [signature] Time: 1601	Signature: [signature] Time: 1853	Signature Time
Printed Name: Steven Dung Date: 6/12/15	Printed Name: J Gonzaly Date: 6/12/15	Printed Name Date
Company: UltraEx	Company: TAP	Company

Rev.10/2012

6/16/2015

Login Sample Receipt Checklist

Client: TRC Solutions, Inc.

Job Number: 720-65456-2

Login Number: 65456
List Number: 1
Creator: Gonzales, Justinn

List Source: TestAmerica Pleasanton

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	N/A	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	False	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	False	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Pleasanton
1220 Quarry Lane
Pleasanton, CA 94566
Tel: (925)484-1919

TestAmerica Job ID: 720-65409-1
Client Project/Site: Presidio

For:
TRC Solutions, Inc.
10680 White Rock Road
Suite 100
Rancho Cordova, California 95670

Attn: Mr. Justin Hanzel-Durbin

Authorized for release by:
6/15/2015 2:34:05 PM

Dimple Sharma, Senior Project Manager
(925)484-1919
dimple.sharma@testamericainc.com

Table of Contents

Qualifiers

Metals

Qualifier	Qualifier Description
4	MS, MSD: The analyte present in the original sample is greater than 4 times the matrix spike concentration; therefore, control limits are not applicable.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Job ID: 720-65409-1

Laboratory: TestAmerica Pleasanton

Narrative

Job Narrative
720-65409-1

Comments
No additional comments.

Receipt
The samples were received on 6/11/2015 4:00 PM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 4.4° C.

Receipt Exceptions

Logged for 6010 lead per history.

Metals
Method 6010B: Due to sample matrix effect on the internal standard (ISTD), a dilution was required for the following sample: 1279SB434(1.5) (720-65409-3).

Method 6010B: The following samples was diluted due to the abundance of non-target analyte: 1279SB436(1.5) (720-65409-6), 1279SB437(0) (720-65409-8), 1279SB441(0) (720-65409-15), 1279SB442(0) (720-65409-18), 1279SB442(1.5) (720-65409-19) and 1279SB443(1.5) (720-65409-21). Elevated reporting limits (RLs) are provided.

Method 6010B: The serial dilution performed for the following sample associated with batch 720-183570 was outside control limits: (720-65409-A-23-C SD)

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

General Chemistry
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Detection Summary

Client: TRC Solutions, Inc.
Project/Site: Presidio

TestAmerica Job ID: 720-65409-1

Client Sample ID: 1279SB433(1.5) — Lab Sample ID: 720-65409-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	3.0		0.49		mg/Kg	1	☼	6010B	Total/NA

Client Sample ID: 1279SB434(0) — Lab Sample ID: 720-65409-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	110		0.50		mg/Kg	1	☼	6010B	Total/NA

Client Sample ID: 1279SB434(1.5) — Lab Sample ID: 720-65409-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	160		1.0		mg/Kg	2	☼	6010B	Total/NA

Client Sample ID: 1279SB435(0) — Lab Sample ID: 720-65409-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	140		0.49		mg/Kg	1	☼	6010B	Total/NA

Client Sample ID: 1279SB436(0) — Lab Sample ID: 720-65409-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	81		0.52		mg/Kg	1	☼	6010B	Total/NA

Client Sample ID: 1279SB436(1.5) — Lab Sample ID: 720-65409-6

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	4.5		0.71		mg/Kg	2	☼	6010B	Total/NA

Client Sample ID: 1279SB437(0) — Lab Sample ID: 720-65409-8

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	85		0.86		mg/Kg	2	☼	6010B	Total/NA

Client Sample ID: 1279SB437(1.5) — Lab Sample ID: 720-65409-9

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	54		0.44		mg/Kg	1	☼	6010B	Total/NA

Client Sample ID: 1279SB438(0) — Lab Sample ID: 720-65409-10

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	52		0.49		mg/Kg	1	☼	6010B	Total/NA

Client Sample ID: 1279SB439(0) — Lab Sample ID: 720-65409-11

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	200		0.55		mg/Kg	1	☼	6010B	Total/NA

Client Sample ID: 1279SB439(1.5) — Lab Sample ID: 720-65409-12

This Detection Summary does not include radiochemical test results.

Client Sample ID: 1279SB439(1.5) (Continued) — Lab Sample ID: 720-65409-12

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	110		0.50		mg/Kg	1	☼	6010B	Total/NA

Client Sample ID: 1279SB440(0) — Lab Sample ID: 720-65409-13

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	60		0.47		mg/Kg	1	☼	6010B	Total/NA

Client Sample ID: 1279SB440(1.5) — Lab Sample ID: 720-65409-14

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	6.2		0.47		mg/Kg	1	☼	6010B	Total/NA

Client Sample ID: 1279SB441(0) — Lab Sample ID: 720-65409-15

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	100		0.83		mg/Kg	2	☼	6010B	Total/NA

Client Sample ID: DUP 061115 — Lab Sample ID: 720-65409-16

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	120		0.49		mg/Kg	1	☼	6010B	Total/NA

Client Sample ID: 1279SB441(1.5) — Lab Sample ID: 720-65409-17

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	610		0.56		mg/Kg	1	☼	6010B	Total/NA

Client Sample ID: 1279SB442(0) — Lab Sample ID: 720-65409-18

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	160		0.86		mg/Kg	2	☼	6010B	Total/NA

Client Sample ID: 1279SB442(1.5) — Lab Sample ID: 720-65409-19

No Detections.

Client Sample ID: 1279SB443(0) — Lab Sample ID: 720-65409-20

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	110		0.51		mg/Kg	1	☼	6010B	Total/NA

Client Sample ID: 1279SB443(1.5) — Lab Sample ID: 720-65409-21

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	92		1.0		mg/Kg	2	☼	6010B	Total/NA

Client Sample ID: 1279SB444(0) — Lab Sample ID: 720-65409-22

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	41		0.38		mg/Kg	1	☼	6010B	Total/NA

This Detection Summary does not include radiochemical test results.

Detection Summary

Client: TRC Solutions, Inc.
Project/Site: Presidio

TestAmerica Job ID: 720-65409-1

Client Sample ID: 1279SB444(1.5) — Lab Sample ID: 720-65409-23

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	490		1.1		mg/Kg	2	☼	6010B	Total/NA

Client Sample ID: 1279SB445(0.25) — Lab Sample ID: 720-65409-25

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	320		0.47		mg/Kg	1	☼	6010B	Total/NA

Client Sample ID: 1279SB446(0.25) — Lab Sample ID: 720-65409-27

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	780		0.54		mg/Kg	1	☼	6010B	Total/NA

Client Sample ID: 1279SB447(1.5) — Lab Sample ID: 720-65409-30

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	11		0.88		mg/Kg	2	☼	6010B	Total/NA

Client Sample ID: 1279SB448(0.25) — Lab Sample ID: 720-65409-32

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	36		0.42		mg/Kg	1	☼	6010B	Total/NA

Client Sample ID: 1279SB449(1.5) — Lab Sample ID: 720-65409-35

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	31		0.39		mg/Kg	1	☼	6010B	Total/NA

Client Sample ID: 1279SB450(1.5) — Lab Sample ID: 720-65409-37

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	25		0.90		mg/Kg	2	☼	6010B	Total/NA

Client Sample ID: 1279SB451(1.5) — Lab Sample ID: 720-65409-39

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	9.2		0.43		mg/Kg	1	☼	6010B	Total/NA

This Detection Summary does not include radiochemical test results.

Client: TRC Solutions, Inc.
Project/Site: Presidio

TestAmerica Job ID: 720-65409-1

Client Sample ID: 1279SB433(1.5)
Date Collected: 06/10/15 15:45
Date Received: 06/11/15 16:00

Lab Sample ID: 720-65409-1
Matrix: Solid
Percent Solids: 90.2

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	3.0		0.49		mg/Kg	☼	06/11/15 22:09	06/12/15 23:22	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	9.8		0.10		%			06/11/15 21:28	1

Client: TRC Solutions, Inc.
Project/Site: Presidio

TestAmerica Job ID: 720-65409-1

Client Sample ID: 1279SB434(0)
Date Collected: 06/10/15 16:00
Date Received: 06/11/15 16:00

Lab Sample ID: 720-65409-2
Matrix: Solid
Percent Solids: 91.8

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	110		0.50		mg/Kg	☼	06/11/15 22:09	06/12/15 23:37	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	8.2		0.10		%			06/11/15 21:28	1

Client: TRC Solutions, Inc.
Project/Site: Presidio

TestAmerica Job ID: 720-65409-1

Client Sample ID: 1279SB434(1.5)
Date Collected: 06/10/15 16:20
Date Received: 06/11/15 16:00

Lab Sample ID: 720-65409-3
Matrix: Solid
Percent Solids: 88.6

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	160		1.0		mg/Kg	☼	06/11/15 22:09	06/15/15 10:13	2

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	11		0.10		%			06/11/15 21:28	1

Client: TRC Solutions, Inc.
Project/Site: Presidio

TestAmerica Job ID: 720-65409-1

Client Sample ID: 1279SB435(0)
Date Collected: 06/10/15 16:25
Date Received: 06/11/15 16:00

Lab Sample ID: 720-65409-4
Matrix: Solid
Percent Solids: 87.6

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	140		0.49		mg/Kg	☼	06/11/15 22:09	06/12/15 23:46	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	12		0.10		%			06/11/15 21:28	1

Client: TRC Solutions, Inc.
Project/Site: Presidio

TestAmerica Job ID: 720-65409-1

Client Sample ID: 1279SB436(0)
Date Collected: 06/10/15 16:35
Date Received: 06/11/15 16:00

Lab Sample ID: 720-65409-5
Matrix: Solid
Percent Solids: 90.5

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	81		0.52		mg/Kg	☼	06/11/15 22:09	06/12/15 23:51	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	9.5		0.10		%			06/11/15 21:28	1

Client: TRC Solutions, Inc.
Project/Site: Presidio

TestAmerica Job ID: 720-65409-1

Client Sample ID: 1279SB436(1.5)
Date Collected: 06/10/15 16:55
Date Received: 06/11/15 16:00

Lab Sample ID: 720-65409-6
Matrix: Solid
Percent Solids: 89.3

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	4.5		0.71		mg/Kg	☼	06/11/15 22:09	06/15/15 10:18	2

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	11		0.10		%			06/11/15 21:28	1

Client: TRC Solutions, Inc.
Project/Site: Presidio

TestAmerica Job ID: 720-65409-1

Client Sample ID: 1279SB437(0)
Date Collected: 06/11/15 07:30
Date Received: 06/11/15 16:00

Lab Sample ID: 720-65409-8
Matrix: Solid
Percent Solids: 89.7

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	85		0.86		mg/Kg	☼	06/11/15 22:09	06/15/15 10:23	2

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	10		0.10		%			06/11/15 21:28	1

Client: TRC Solutions, Inc.
Project/Site: Presidio

TestAmerica Job ID: 720-65409-1

Client Sample ID: 1279SB437(1.5)
Date Collected: 06/11/15 07:40
Date Received: 06/11/15 16:00

Lab Sample ID: 720-65409-9
Matrix: Solid
Percent Solids: 89.5

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	54		0.44		mg/Kg	☼	06/11/15 22:09	06/12/15 21:42	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	10		0.10		%			06/11/15 21:28	1

Client: TRC Solutions, Inc.
Project/Site: Presidio

TestAmerica Job ID: 720-65409-1

Client Sample ID: 1279SB438(0)
Date Collected: 06/11/15 07:50
Date Received: 06/11/15 16:00

Lab Sample ID: 720-65409-10
Matrix: Solid
Percent Solids: 88.7

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	52		0.49		mg/Kg	☼	06/11/15 22:09	06/12/15 21:47	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	11		0.10		%			06/11/15 21:28	1

Client: TRC Solutions, Inc.
Project/Site: Presidio

TestAmerica Job ID: 720-65409-1

Client Sample ID: 1279SB439(0)
Date Collected: 06/11/15 07:55
Date Received: 06/11/15 16:00

Lab Sample ID: 720-65409-11
Matrix: Solid
Percent Solids: 86.1

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	200		0.55		mg/Kg	☼	06/11/15 22:09	06/12/15 21:52	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	14		0.10		%			06/11/15 21:28	1

Client: TRC Solutions, Inc.
Project/Site: Presidio

TestAmerica Job ID: 720-65409-1

Client Sample ID: 1279SB439(1.5)
Date Collected: 06/11/15 08:10
Date Received: 06/11/15 16:00

Lab Sample ID: 720-65409-12
Matrix: Solid
Percent Solids: 88.5

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	110		0.50		mg/Kg	☼	06/11/15 22:09	06/12/15 21:57	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	11		0.10		%			06/11/15 21:28	1

Client: TRC Solutions, Inc.
Project/Site: Presidio

TestAmerica Job ID: 720-65409-1

Client Sample ID: 1279SB440(0)
Date Collected: 06/11/15 08:15
Date Received: 06/11/15 16:00

Lab Sample ID: 720-65409-13
Matrix: Solid
Percent Solids: 91.0

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	60		0.47		mg/Kg	☼	06/11/15 22:09	06/12/15 22:02	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	9.0		0.10		%			06/11/15 21:28	1

Client: TRC Solutions, Inc.
Project/Site: Presidio

TestAmerica Job ID: 720-65409-1

Client Sample ID: 1279SB440(1.5)
Date Collected: 06/11/15 08:17
Date Received: 06/11/15 16:00

Lab Sample ID: 720-65409-14
Matrix: Solid
Percent Solids: 91.1

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	6.2		0.47		mg/Kg	☼	06/11/15 22:09	06/12/15 22:07	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	8.9		0.10		%			06/11/15 21:28	1

Client: TRC Solutions, Inc.
Project/Site: Presidio

TestAmerica Job ID: 720-65409-1

Client Sample ID: 1279SB441(0)
Date Collected: 06/11/15 08:25
Date Received: 06/11/15 16:00

Lab Sample ID: 720-65409-15
Matrix: Solid
Percent Solids: 88.8

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	100		0.83		mg/Kg	☼	06/11/15 22:09	06/15/15 10:28	2

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	11		0.10		%			06/11/15 21:28	1

Client: TRC Solutions, Inc.
Project/Site: Presidio

TestAmerica Job ID: 720-65409-1

Client Sample ID: DUP 061115
Date Collected: 06/11/15 08:26
Date Received: 06/11/15 16:00

Lab Sample ID: 720-65409-16
Matrix: Solid
Percent Solids: 88.3

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	120		0.49		mg/Kg	☼	06/11/15 22:09	06/12/15 22:17	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	12		0.10		%			06/11/15 21:28	1

Client: TRC Solutions, Inc.
Project/Site: Presidio

TestAmerica Job ID: 720-65409-1

Client Sample ID: 1279SB441(1.5)
Date Collected: 06/11/15 08:32
Date Received: 06/11/15 16:00

Lab Sample ID: 720-65409-17
Matrix: Solid
Percent Solids: 86.8

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	610		0.56		mg/Kg	☼	06/11/15 22:09	06/12/15 22:22	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	13		0.10		%			06/11/15 21:28	1

Client: TRC Solutions, Inc.
Project/Site: Presidio

TestAmerica Job ID: 720-65409-1

Client Sample ID: 1279SB442(0)
Date Collected: 06/11/15 08:45
Date Received: 06/11/15 16:00

Lab Sample ID: 720-65409-18
Matrix: Solid
Percent Solids: 89.4

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	160		0.86		mg/Kg	☼	06/11/15 22:09	06/15/15 10:33	2

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	11		0.10		%			06/11/15 21:28	1

Client: TRC Solutions, Inc.
Project/Site: Presidio

TestAmerica Job ID: 720-65409-1

Client Sample ID: 1279SB442(1.5)
Date Collected: 06/11/15 08:51
Date Received: 06/11/15 16:00

Lab Sample ID: 720-65409-19
Matrix: Solid
Percent Solids: 52.5

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	ND		4.2		mg/Kg	☼	06/11/15 22:09	06/15/15 10:38	5

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	48		0.10		%			06/11/15 21:28	1

Client: TRC Solutions, Inc.
Project/Site: Presidio

TestAmerica Job ID: 720-65409-1

Client Sample ID: 1279SB443(0)
Date Collected: 06/11/15 09:00
Date Received: 06/11/15 16:00

Lab Sample ID: 720-65409-20
Matrix: Solid
Percent Solids: 89.4

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	110		0.51		mg/Kg	☼	06/11/15 22:09	06/12/15 22:47	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	11		0.10		%			06/11/15 21:28	1

Client: TRC Solutions, Inc.
Project/Site: Presidio

TestAmerica Job ID: 720-65409-1

Client Sample ID: 1279SB443(1.5)
Date Collected: 06/11/15 09:05
Date Received: 06/11/15 16:00

Lab Sample ID: 720-65409-21
Matrix: Solid
Percent Solids: 85.4

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	92		1.0		mg/Kg	☼	06/11/15 22:09	06/15/15 10:43	2

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	15		0.10		%			06/11/15 21:28	1

Client: TRC Solutions, Inc.
Project/Site: Presidio

TestAmerica Job ID: 720-65409-1

Client Sample ID: 1279SB444(0)
Date Collected: 06/11/15 09:10
Date Received: 06/11/15 16:00

Lab Sample ID: 720-65409-22
Matrix: Solid
Percent Solids: 94.6

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	41		0.38		mg/Kg	☼	06/11/15 21:31	06/12/15 13:27	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	5.4		0.10		%			06/11/15 21:59	1

Client: TRC Solutions, Inc.
Project/Site: Presidio

TestAmerica Job ID: 720-65409-1

Client Sample ID: 1279SB444(1.5)
Date Collected: 06/11/15 09:20
Date Received: 06/11/15 16:00

Lab Sample ID: 720-65409-23
Matrix: Solid
Percent Solids: 88.3

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	490		1.1		mg/Kg	☼	06/11/15 21:31	06/12/15 15:52	2

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	12		0.10		%			06/11/15 21:59	1

Client: TRC Solutions, Inc.
Project/Site: Presidio

TestAmerica Job ID: 720-65409-1

Client Sample ID: 1279SB445(0.25)
Date Collected: 06/11/15 10:20
Date Received: 06/11/15 16:00

Lab Sample ID: 720-65409-25
Matrix: Solid
Percent Solids: 91.7

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	320		0.47		mg/Kg	☼	06/11/15 21:31	06/12/15 13:32	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	8.3		0.10		%			06/11/15 21:59	1

Client: TRC Solutions, Inc.
Project/Site: Presidio

TestAmerica Job ID: 720-65409-1

Client Sample ID: 1279SB446(0.25)
Date Collected: 06/11/15 10:45
Date Received: 06/11/15 16:00

Lab Sample ID: 720-65409-27
Matrix: Solid
Percent Solids: 92.2

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	780		0.54		mg/Kg	☼	06/11/15 21:31	06/12/15 13:52	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	7.8		0.10		%			06/11/15 21:59	1

Client: TRC Solutions, Inc.
Project/Site: Presidio

TestAmerica Job ID: 720-65409-1

Client Sample ID: 1279SB447(1.5)
Date Collected: 06/11/15 12:15
Date Received: 06/11/15 16:00

Lab Sample ID: 720-65409-30
Matrix: Solid
Percent Solids: 88.9

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	11		0.88		mg/Kg	☼	06/11/15 21:31	06/12/15 16:02	2

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	11		0.10		%			06/11/15 21:59	1

Client: TRC Solutions, Inc.
Project/Site: Presidio

TestAmerica Job ID: 720-65409-1

Client Sample ID: 1279SB448(0.25)
Date Collected: 06/11/15 12:40
Date Received: 06/11/15 16:00

Lab Sample ID: 720-65409-32
Matrix: Solid
Percent Solids: 88.8

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	36		0.42		mg/Kg	☼	06/11/15 21:31	06/12/15 14:17	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	11		0.10		%			06/11/15 21:59	1

Client: TRC Solutions, Inc.
Project/Site: Presidio

TestAmerica Job ID: 720-65409-1

Client Sample ID: 1279SB449(1.5)
Date Collected: 06/11/15 13:00
Date Received: 06/11/15 16:00

Lab Sample ID: 720-65409-35
Matrix: Solid
Percent Solids: 91.3

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	31		0.39		mg/Kg	☼	06/11/15 21:31	06/12/15 14:32	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	8.7		0.10		%			06/11/15 21:59	1

Client: TRC Solutions, Inc.
Project/Site: Presidio

TestAmerica Job ID: 720-65409-1

Client Sample ID: 1279SB450(1.5)
Date Collected: 06/11/15 13:30
Date Received: 06/11/15 16:00

Lab Sample ID: 720-65409-37
Matrix: Solid
Percent Solids: 88.0

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	25		0.90		mg/Kg	☼	06/11/15 21:31	06/12/15 16:12	2

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	12		0.10		%			06/11/15 21:59	1

Client: TRC Solutions, Inc.
Project/Site: Presidio

TestAmerica Job ID: 720-65409-1

Client Sample ID: 1279SB451(1.5)
Date Collected: 06/11/15 13:45
Date Received: 06/11/15 16:00

Lab Sample ID: 720-65409-39
Matrix: Solid
Percent Solids: 88.9

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	9.2		0.43		mg/Kg	☼	06/11/15 21:31	06/12/15 15:03	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	11		0.10		%			06/11/15 21:59	1

Method: 6010B - Metals (ICP)

Lab Sample ID: MB 720-183491/1-A
Matrix: Solid
Analysis Batch: 183550

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 183491

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	ND		0.50		mg/Kg		06/11/15 21:31	06/12/15 12:47	1

Lab Sample ID: LCS 720-183491/2-A
Matrix: Solid
Analysis Batch: 183550

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 183491

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Lead	50.0	50.0		mg/Kg		100	80 - 120

Lab Sample ID: LCSD 720-183491/3-A
Matrix: Solid
Analysis Batch: 183550

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 183491

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Lead	50.0	49.9		mg/Kg		100	80 - 120	0	20

Lab Sample ID: LCSSRM 720-183491/25-A
Matrix: Solid
Analysis Batch: 183550

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 183491

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits
Lead	302	262		mg/Kg		87	62 - 113

Lab Sample ID: 720-65409-23 MS
Matrix: Solid
Analysis Batch: 183570

Client Sample ID: 1279SB444(1.5)
Prep Type: Total/NA
Prep Batch: 183491

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Lead	500		51.0	631	4	mg/Kg	☼	261	75 - 125

Lab Sample ID: 720-65409-23 MSD
Matrix: Solid
Analysis Batch: 183570

Client Sample ID: 1279SB444(1.5)
Prep Type: Total/NA
Prep Batch: 183491

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Lead	500		44.9	556	4	mg/Kg	☼	128	75 - 125	13	20

Lab Sample ID: MB 720-183493/1-A
Matrix: Solid
Analysis Batch: 183604

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 183493

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	ND		0.50		mg/Kg		06/11/15 22:09	06/12/15 22:50	1

Lab Sample ID: LCS 720-183493/2-A
Matrix: Solid
Analysis Batch: 183604

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 183493

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Lead	50.0	50.2		mg/Kg		100	80 - 120

Lab Sample ID: LCSD 720-183493/3-A
Matrix: Solid
Analysis Batch: 183604

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 183493

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Lead			50.0	50.6		mg/Kg		101	80 - 120	1	20

Lab Sample ID: LCSSRM 720-183493/27-A
Matrix: Solid
Analysis Batch: 183604

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 183493

Analyte			Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits		
Lead			302	292		mg/Kg		97	62 - 113		

Lab Sample ID: 720-65409-1 MS
Matrix: Solid
Analysis Batch: 183604

Client Sample ID: 1279SB433(1.5)
Prep Type: Total/NA
Prep Batch: 183493

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
Lead	3.0		51.3	45.6		mg/Kg	☼	83	75 - 125		

Lab Sample ID: 720-65409-1 MSD
Matrix: Solid
Analysis Batch: 183604

Client Sample ID: 1279SB433(1.5)
Prep Type: Total/NA
Prep Batch: 183493

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Lead	3.0		49.9	42.3		mg/Kg	☼	79	75 - 125	8	20

Method: Moisture - Percent Moisture

Lab Sample ID: 720-65409-1 DU
Matrix: Solid
Analysis Batch: 183490

Client Sample ID: 1279SB433(1.5)
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
Percent Moisture	9.8			9.8		%				0.3	20

Lab Sample ID: 720-65409-23 DU
Matrix: Solid
Analysis Batch: 183492

Client Sample ID: 1279SB444(1.5)
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
Percent Moisture	12			11		%				3	20

Metals

Prep Batch: 183491

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
720-65409-22	1279SB444(0)	Total/NA	Solid	3050B	
720-65409-23	1279SB444(1.5)	Total/NA	Solid	3050B	
720-65409-23 MS	1279SB444(1.5)	Total/NA	Solid	3050B	
720-65409-23 MSD	1279SB444(1.5)	Total/NA	Solid	3050B	
720-65409-25	1279SB445(0.25)	Total/NA	Solid	3050B	
720-65409-27	1279SB446(0.25)	Total/NA	Solid	3050B	
720-65409-30	1279SB447(1.5)	Total/NA	Solid	3050B	
720-65409-32	1279SB448(0.25)	Total/NA	Solid	3050B	
720-65409-35	1279SB449(1.5)	Total/NA	Solid	3050B	
720-65409-37	1279SB450(1.5)	Total/NA	Solid	3050B	
720-65409-39	1279SB451(1.5)	Total/NA	Solid	3050B	
LCS 720-183491/2-A	Lab Control Sample	Total/NA	Solid	3050B	
LCSD 720-183491/3-A	Lab Control Sample Dup	Total/NA	Solid	3050B	
LCSSRM 720-183491/25-A	Lab Control Sample	Total/NA	Solid	3050B	
MB 720-183491/1-A	Method Blank	Total/NA	Solid	3050B	

Prep Batch: 183493

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
720-65409-1	1279SB433(1.5)	Total/NA	Solid	3050B	
720-65409-1 MS	1279SB433(1.5)	Total/NA	Solid	3050B	
720-65409-1 MSD	1279SB433(1.5)	Total/NA	Solid	3050B	
720-65409-2	1279SB434(0)	Total/NA	Solid	3050B	
720-65409-3	1279SB434(1.5)	Total/NA	Solid	3050B	
720-65409-4	1279SB435(0)	Total/NA	Solid	3050B	
720-65409-5	1279SB436(0)	Total/NA	Solid	3050B	
720-65409-6	1279SB436(1.5)	Total/NA	Solid	3050B	
720-65409-8	1279SB437(0)	Total/NA	Solid	3050B	
720-65409-9	1279SB437(1.5)	Total/NA	Solid	3050B	
720-65409-10	1279SB438(0)	Total/NA	Solid	3050B	
720-65409-11	1279SB439(0)	Total/NA	Solid	3050B	
720-65409-12	1279SB439(1.5)	Total/NA	Solid	3050B	
720-65409-13	1279SB440(0)	Total/NA	Solid	3050B	
720-65409-14	1279SB440(1.5)	Total/NA	Solid	3050B	
720-65409-15	1279SB441(0)	Total/NA	Solid	3050B	
720-65409-16	DUP 061115	Total/NA	Solid	3050B	
720-65409-17	1279SB441(1.5)	Total/NA	Solid	3050B	
720-65409-18	1279SB442(0)	Total/NA	Solid	3050B	
720-65409-19	1279SB442(1.5)	Total/NA	Solid	3050B	
720-65409-20	1279SB443(0)	Total/NA	Solid	3050B	
720-65409-21	1279SB443(1.5)	Total/NA	Solid	3050B	
LCS 720-183493/2-A	Lab Control Sample	Total/NA	Solid	3050B	
LCSD 720-183493/3-A	Lab Control Sample Dup	Total/NA	Solid	3050B	
LCSSRM 720-183493/27-A	Lab Control Sample	Total/NA	Solid	3050B	
MB 720-183493/1-A	Method Blank	Total/NA	Solid	3050B	

Analysis Batch: 183550

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
720-65409-22	1279SB444(0)	Total/NA	Solid	6010B	183491
720-65409-25	1279SB445(0.25)	Total/NA	Solid	6010B	183491
720-65409-27	1279SB446(0.25)	Total/NA	Solid	6010B	183491
720-65409-32	1279SB448(0.25)	Total/NA	Solid	6010B	183491

Metals (Continued)

Analysis Batch: 183550 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
720-65409-35	1279SB449(1.5)	Total/NA	Solid	6010B	183491
720-65409-39	1279SB451(1.5)	Total/NA	Solid	6010B	183491
LCS 720-183491/2-A	Lab Control Sample	Total/NA	Solid	6010B	183491
LCSD 720-183491/3-A	Lab Control Sample Dup	Total/NA	Solid	6010B	183491
LCSSRM 720-183491/25-A	Lab Control Sample	Total/NA	Solid	6010B	183491
MB 720-183491/1-A	Method Blank	Total/NA	Solid	6010B	183491

Analysis Batch: 183554

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
720-65409-23	1279SB444(1.5)	Total/NA	Solid	6010B	183491
720-65409-30	1279SB447(1.5)	Total/NA	Solid	6010B	183491
720-65409-37	1279SB450(1.5)	Total/NA	Solid	6010B	183491

Analysis Batch: 183570

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
720-65409-23 MS	1279SB444(1.5)	Total/NA	Solid	6010B	183491
720-65409-23 MSD	1279SB444(1.5)	Total/NA	Solid	6010B	183491

Analysis Batch: 183601

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
720-65409-9	1279SB437(1.5)	Total/NA	Solid	6010B	183493
720-65409-10	1279SB438(0)	Total/NA	Solid	6010B	183493
720-65409-11	1279SB439(0)	Total/NA	Solid	6010B	183493
720-65409-12	1279SB439(1.5)	Total/NA	Solid	6010B	183493
720-65409-13	1279SB440(0)	Total/NA	Solid	6010B	183493
720-65409-14	1279SB440(1.5)	Total/NA	Solid	6010B	183493
720-65409-16	DUP 061115	Total/NA	Solid	6010B	183493
720-65409-17	1279SB441(1.5)	Total/NA	Solid	6010B	183493
720-65409-20	1279SB443(0)	Total/NA	Solid	6010B	183493

Analysis Batch: 183604

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
720-65409-1	1279SB433(1.5)	Total/NA	Solid	6010B	183493
720-65409-1 MS	1279SB433(1.5)	Total/NA	Solid	6010B	183493
720-65409-1 MSD	1279SB433(1.5)	Total/NA	Solid	6010B	183493
720-65409-2	1279SB434(0)	Total/NA	Solid	6010B	183493
720-65409-4	1279SB435(0)	Total/NA	Solid	6010B	183493
720-65409-5	1279SB436(0)	Total/NA	Solid	6010B	183493
LCS 720-183493/2-A	Lab Control Sample	Total/NA	Solid	6010B	183493
LCSD 720-183493/3-A	Lab Control Sample Dup	Total/NA	Solid	6010B	183493
LCSSRM 720-183493/27-A	Lab Control Sample	Total/NA	Solid	6010B	183493
MB 720-183493/1-A	Method Blank	Total/NA	Solid	6010B	183493

Analysis Batch: 183615

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
720-65409-3	1279SB434(1.5)	Total/NA	Solid	6010B	183493
720-65409-6	1279SB436(1.5)	Total/NA	Solid	6010B	183493
720-65409-8	1279SB437(0)	Total/NA	Solid	6010B	183493
720-65409-15	1279SB441(0)	Total/NA	Solid	6010B	183493
720-65409-18	1279SB442(0)	Total/NA	Solid	6010B	183493
720-65409-19	1279SB442(1.5)	Total/NA	Solid	6010B	183493

Metals (Continued)

Analysis Batch: 183615 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
720-65409-21	1279SB443(1.5)	Total/NA	Solid	6010B	183493

General Chemistry

Analysis Batch: 183490

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
720-65409-1	1279SB433(1.5)	Total/NA	Solid	Moisture	
720-65409-1 DU	1279SB433(1.5)	Total/NA	Solid	Moisture	
720-65409-2	1279SB434(0)	Total/NA	Solid	Moisture	
720-65409-3	1279SB434(1.5)	Total/NA	Solid	Moisture	
720-65409-4	1279SB435(0)	Total/NA	Solid	Moisture	
720-65409-5	1279SB436(0)	Total/NA	Solid	Moisture	
720-65409-6	1279SB436(1.5)	Total/NA	Solid	Moisture	
720-65409-8	1279SB437(0)	Total/NA	Solid	Moisture	
720-65409-9	1279SB437(1.5)	Total/NA	Solid	Moisture	
720-65409-10	1279SB438(0)	Total/NA	Solid	Moisture	
720-65409-11	1279SB439(0)	Total/NA	Solid	Moisture	
720-65409-12	1279SB439(1.5)	Total/NA	Solid	Moisture	
720-65409-13	1279SB440(0)	Total/NA	Solid	Moisture	
720-65409-14	1279SB440(1.5)	Total/NA	Solid	Moisture	
720-65409-15	1279SB441(0)	Total/NA	Solid	Moisture	
720-65409-16	DUP 061115	Total/NA	Solid	Moisture	
720-65409-17	1279SB441(1.5)	Total/NA	Solid	Moisture	
720-65409-18	1279SB442(0)	Total/NA	Solid	Moisture	
720-65409-19	1279SB442(1.5)	Total/NA	Solid	Moisture	
720-65409-20	1279SB443(0)	Total/NA	Solid	Moisture	
720-65409-21	1279SB443(1.5)	Total/NA	Solid	Moisture	

Analysis Batch: 183492

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
720-65409-22	1279SB444(0)	Total/NA	Solid	Moisture	
720-65409-23	1279SB444(1.5)	Total/NA	Solid	Moisture	
720-65409-23 DU	1279SB444(1.5)	Total/NA	Solid	Moisture	
720-65409-25	1279SB445(0.25)	Total/NA	Solid	Moisture	
720-65409-27	1279SB446(0.25)	Total/NA	Solid	Moisture	
720-65409-30	1279SB447(1.5)	Total/NA	Solid	Moisture	
720-65409-32	1279SB448(0.25)	Total/NA	Solid	Moisture	
720-65409-35	1279SB449(1.5)	Total/NA	Solid	Moisture	
720-65409-37	1279SB450(1.5)	Total/NA	Solid	Moisture	
720-65409-39	1279SB451(1.5)	Total/NA	Solid	Moisture	

Lab Chronicle

Client: TRC Solutions, Inc.
Project/Site: Presidio

TestAmerica Job ID: 720-65409-1

Client Sample ID: 1279SB433(1.5)

Lab Sample ID: 720-65409-1
Date Collected: 06/10/15 15:45
Matrix: Solid
Date Received: 06/11/15 16:00
Percent Solids: 90.2

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			183493	06/11/15 22:09	CTD	TAL PLS
Total/NA	Analysis	6010B		1	183604	06/12/15 23:22	SLK	TAL PLS
Total/NA	Analysis	Moisture		1	183490	06/11/15 21:28	EYT	TAL PLS

Client Sample ID: 1279SB434(0)

Lab Sample ID: 720-65409-2
Date Collected: 06/10/15 16:00
Matrix: Solid
Date Received: 06/11/15 16:00
Percent Solids: 91.8

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			183493	06/11/15 22:09	CTD	TAL PLS
Total/NA	Analysis	6010B		1	183604	06/12/15 23:37	SLK	TAL PLS
Total/NA	Analysis	Moisture		1	183490	06/11/15 21:28	EYT	TAL PLS

Client Sample ID: 1279SB434(1.5)

Lab Sample ID: 720-65409-3
Date Collected: 06/10/15 16:20
Matrix: Solid
Date Received: 06/11/15 16:00
Percent Solids: 88.6

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			183493	06/11/15 22:09	CTD	TAL PLS
Total/NA	Analysis	6010B		2	183615	06/15/15 10:13	EFH	TAL PLS
Total/NA	Analysis	Moisture		1	183490	06/11/15 21:28	EYT	TAL PLS

Client Sample ID: 1279SB435(0)

Lab Sample ID: 720-65409-4
Date Collected: 06/10/15 16:25
Matrix: Solid
Date Received: 06/11/15 16:00
Percent Solids: 87.6

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			183493	06/11/15 22:09	CTD	TAL PLS
Total/NA	Analysis	6010B		1	183604	06/12/15 23:46	SLK	TAL PLS
Total/NA	Analysis	Moisture		1	183490	06/11/15 21:28	EYT	TAL PLS

Client Sample ID: 1279SB436(0)

Lab Sample ID: 720-65409-5
Date Collected: 06/10/15 16:35
Matrix: Solid
Date Received: 06/11/15 16:00
Percent Solids: 90.5

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			183493	06/11/15 22:09	CTD	TAL PLS
Total/NA	Analysis	6010B		1	183604	06/12/15 23:51	SLK	TAL PLS
Total/NA	Analysis	Moisture		1	183490	06/11/15 21:28	EYT	TAL PLS

Client Sample ID: 1279SB436(1.5)

Lab Sample ID: 720-65409-6
Date Collected: 06/10/15 16:55
Matrix: Solid
Date Received: 06/11/15 16:00
Percent Solids: 89.3

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			183493	06/11/15 22:09	CTD	TAL PLS
Total/NA	Analysis	6010B		2	183615	06/15/15 10:18	EFH	TAL PLS
Total/NA	Analysis	Moisture		1	183490	06/11/15 21:28	EYT	TAL PLS

Client Sample ID: 1279SB437(0)

Lab Sample ID: 720-65409-8
Date Collected: 06/11/15 07:30
Matrix: Solid
Date Received: 06/11/15 16:00
Percent Solids: 89.7

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			183493	06/11/15 22:09	CTD	TAL PLS
Total/NA	Analysis	6010B		2	183615	06/15/15 10:23	EFH	TAL PLS
Total/NA	Analysis	Moisture		1	183490	06/11/15 21:28	EYT	TAL PLS

Client Sample ID: 1279SB437(1.5)

Lab Sample ID: 720-65409-9
Date Collected: 06/11/15 07:40
Matrix: Solid
Date Received: 06/11/15 16:00
Percent Solids: 89.5

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			183493	06/11/15 22:09	CTD	TAL PLS
Total/NA	Analysis	6010B		1	183601	06/12/15 21:42	SLK	TAL PLS
Total/NA	Analysis	Moisture		1	183490	06/11/15 21:28	EYT	TAL PLS

Client Sample ID: 1279SB438(0)

Lab Sample ID: 720-65409-10
Date Collected: 06/11/15 07:50
Matrix: Solid
Date Received: 06/11/15 16:00
Percent Solids: 88.7

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			183493	06/11/15 22:09	CTD	TAL PLS
Total/NA	Analysis	6010B		1	183601	06/12/15 21:47	SLK	TAL PLS
Total/NA	Analysis	Moisture		1	183490	06/11/15 21:28	EYT	TAL PLS

Client Sample ID: 1279SB439(0)

Lab Sample ID: 720-65409-11
Date Collected: 06/11/15 07:55
Matrix: Solid
Date Received: 06/11/15 16:00
Percent Solids: 86.1

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			183493	06/11/15 22:09	CTD	TAL PLS
Total/NA	Analysis	6010B		1	183601	06/12/15 21:52	SLK	TAL PLS
Total/NA	Analysis	Moisture		1	183490	06/11/15 21:28	EYT	TAL PLS

Lab Chronicle

Client: TRC Solutions, Inc.
Project/Site: Presidio

TestAmerica Job ID: 720-65409-1

Client Sample ID: 1279SB439(1.5)

Lab Sample ID: 720-65409-12
Date Collected: 06/11/15 08:10
Matrix: Solid
Date Received: 06/11/15 16:00
Percent Solids: 88.5

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			183493	06/11/15 22:09	CTD	TAL PLS
Total/NA	Analysis	6010B		1	183601	06/12/15 21:57	SLK	TAL PLS
Total/NA	Analysis	Moisture		1	183490	06/11/15 21:28	EYT	TAL PLS

Client Sample ID: 1279SB440(0)

Lab Sample ID: 720-65409-13
Date Collected: 06/11/15 08:15
Matrix: Solid
Date Received: 06/11/15 16:00
Percent Solids: 91.0

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			183493	06/11/15 22:09	CTD	TAL PLS
Total/NA	Analysis	6010B		1	183601	06/12/15 22:02	SLK	TAL PLS
Total/NA	Analysis	Moisture		1	183490	06/11/15 21:28	EYT	TAL PLS

Client Sample ID: 1279SB440(1.5)

Lab Sample ID: 720-65409-14
Date Collected: 06/11/15 08:17
Matrix: Solid
Date Received: 06/11/15 16:00
Percent Solids: 91.1

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			183493	06/11/15 22:09	CTD	TAL PLS
Total/NA	Analysis	6010B		1	183601	06/12/15 22:07	SLK	TAL PLS
Total/NA	Analysis	Moisture		1	183490	06/11/15 21:28	EYT	TAL PLS

Client Sample ID: 1279SB441(0)

Lab Sample ID: 720-65409-15
Date Collected: 06/11/15 08:25
Matrix: Solid
Date Received: 06/11/15 16:00
Percent Solids: 88.8

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			183493	06/11/15 22:09	CTD	TAL PLS
Total/NA	Analysis	6010B		2	183615	06/15/15 10:28	EFH	TAL PLS
Total/NA	Analysis	Moisture		1	183490	06/11/15 21:28	EYT	TAL PLS

Client Sample ID: DUP 061115

Lab Sample ID: 720-65409-16
Date Collected: 06/11/15 08:26
Matrix: Solid
Date Received: 06/11/15 16:00
Percent Solids: 88.3

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			183493	06/11/15 22:09	CTD	TAL PLS
Total/NA	Analysis	6010B		1	183601	06/12/15 22:17	SLK	TAL PLS
Total/NA	Analysis	Moisture		1	183490	06/11/15 21:28	EYT	TAL PLS

Client Sample ID: 1279SB441(1.5)

Lab Sample ID: 720-65409-17
Date Collected: 06/11/15 08:32
Matrix: Solid
Date Received: 06/11/15 16:00
Percent Solids: 86.8

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			183493	06/11/15 22:09	CTD	TAL PLS
Total/NA	Analysis	6010B		1	183601	06/12/15 22:22	SLK	TAL PLS
Total/NA	Analysis	Moisture		1	183490	06/11/15 21:28	EYT	TAL PLS

Client Sample ID: 1279SB442(0)

Lab Sample ID: 720-65409-18
Date Collected: 06/11/15 08:45
Matrix: Solid
Date Received: 06/11/15 16:00
Percent Solids: 89.4

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			183493	06/11/15 22:09	CTD	TAL PLS
Total/NA	Analysis	6010B		2	183615	06/15/15 10:33	EFH	TAL PLS
Total/NA	Analysis	Moisture		1	183490	06/11/15 21:28	EYT	TAL PLS

Client Sample ID: 1279SB442(1.5)

Lab Sample ID: 720-65409-19
Date Collected: 06/11/15 08:51
Matrix: Solid
Date Received: 06/11/15 16:00
Percent Solids: 52.5

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			183493	06/11/15 22:09	CTD	TAL PLS
Total/NA	Analysis	6010B		5	183615	06/15/15 10:38	EFH	TAL PLS
Total/NA	Analysis	Moisture		1	183490	06/11/15 21:28	EYT	TAL PLS

Client Sample ID: 1279SB443(0)

Lab Sample ID: 720-65409-20
Date Collected: 06/11/15 09:00
Matrix: Solid
Date Received: 06/11/15 16:00
Percent Solids: 89.4

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			183493	06/11/15 22:09	CTD	TAL PLS
Total/NA	Analysis	6010B		1	183601	06/12/15 22:47	SLK	TAL PLS
Total/NA	Analysis	Moisture		1	183490	06/11/15 21:28	EYT	TAL PLS

Client Sample ID: 1279SB443(1.5)

Lab Sample ID: 720-65409-21
Date Collected: 06/11/15 09:05
Matrix: Solid
Date Received: 06/11/15 16:00
Percent Solids: 85.4

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			183493	06/11/15 22:09	CTD	TAL PLS
Total/NA	Analysis	6010B		2	183615	06/15/15 10:43	EFH	TAL PLS
Total/NA	Analysis	Moisture		1	183490	06/11/15 21:28	EYT	TAL PLS

Client Sample ID: 1279SB444(0)

Lab Sample ID: 720-65409-22
Date Collected: 06/11/15 09:10
Matrix: Solid
Date Received: 06/11/15 16:00
Percent Solids: 94.6

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			183491	06/11/15 21:31	CTD	TAL PLS
Total/NA	Analysis	6010B		1	183550	06/12/15 13:27	EFH	TAL PLS
Total/NA	Analysis	Moisture		1	183492	06/11/15 21:59	EYT	TAL PLS

Client Sample ID: 1279SB444(1.5)

Lab Sample ID: 720-65409-23
Date Collected: 06/11/15 09:20
Matrix: Solid
Date Received: 06/11/15 16:00
Percent Solids: 88.3

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			183491	06/11/15 21:31	CTD	TAL PLS
Total/NA	Analysis	6010B		2	183554	06/12/15 15:52	EFH	TAL PLS
Total/NA	Analysis	Moisture		1	183492	06/11/15 21:59	EYT	TAL PLS

Client Sample ID: 1279SB445(0.25)

Lab Sample ID: 720-65409-25
Date Collected: 06/11/15 10:20
Matrix: Solid
Date Received: 06/11/15 16:00
Percent Solids: 91.7

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			183491	06/11/15 21:31	CTD	TAL PLS
Total/NA	Analysis	6010B		1	183550	06/12/15 13:32	EFH	TAL PLS
Total/NA	Analysis	Moisture		1	183492	06/11/15 21:59	EYT	TAL PLS

Client Sample ID: 1279SB446(0.25)

Lab Sample ID: 720-65409-27
Date Collected: 06/11/15 10:45
Matrix: Solid
Date Received: 06/11/15 16:00
Percent Solids: 92.2

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			183491	06/11/15 21:31	CTD	TAL PLS
Total/NA	Analysis	6010B		1	183550	06/12/15 13:52	EFH	TAL PLS
Total/NA	Analysis	Moisture		1	183492	06/11/15 21:59	EYT	TAL PLS

Client Sample ID: 1279SB447(1.5)

Lab Sample ID: 720-65409-30
Date Collected: 06/11/15 12:15
Matrix: Solid
Date Received: 06/11/15 16:00
Percent Solids: 88.9

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			183491	06/11/15 21:31	CTD	TAL PLS
Total/NA	Analysis	6010B		2	183554	06/12/15 16:02	EFH	TAL PLS
Total/NA	Analysis	Moisture		1	183492	06/11/15 21:59	EYT	TAL PLS

Lab Chronicle

Client: TRC Solutions, Inc.
Project/Site: Presidio

TestAmerica Job ID: 720-65409-1

Client Sample ID: 1279SB448(0.25)

Lab Sample ID: 720-65409-32
Date Collected: 06/11/15 12:40
Matrix: Solid
Date Received: 06/11/15 16:00
Percent Solids: 88.8

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			183491	06/11/15 21:31	CTD	TAL PLS
Total/NA	Analysis	6010B		1	183550	06/12/15 14:17	EFH	TAL PLS
Total/NA	Analysis	Moisture		1	183492	06/11/15 21:59	EYT	TAL PLS

Client Sample ID: 1279SB449(1.5)

Lab Sample ID: 720-65409-35
Date Collected: 06/11/15 13:00
Matrix: Solid
Date Received: 06/11/15 16:00
Percent Solids: 91.3

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			183491	06/11/15 21:31	CTD	TAL PLS
Total/NA	Analysis	6010B		1	183550	06/12/15 14:32	EFH	TAL PLS
Total/NA	Analysis	Moisture		1	183492	06/11/15 21:59	EYT	TAL PLS

Client Sample ID: 1279SB450(1.5)

Lab Sample ID: 720-65409-37
Date Collected: 06/11/15 13:30
Matrix: Solid
Date Received: 06/11/15 16:00
Percent Solids: 88.0

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			183491	06/11/15 21:31	CTD	TAL PLS
Total/NA	Analysis	6010B		2	183554	06/12/15 16:12	EFH	TAL PLS
Total/NA	Analysis	Moisture		1	183492	06/11/15 21:59	EYT	TAL PLS

Client Sample ID: 1279SB451(1.5)

Lab Sample ID: 720-65409-39
Date Collected: 06/11/15 13:45
Matrix: Solid
Date Received: 06/11/15 16:00
Percent Solids: 88.9

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			183491	06/11/15 21:31	CTD	TAL PLS
Total/NA	Analysis	6010B		1	183550	06/12/15 15:03	EFH	TAL PLS
Total/NA	Analysis	Moisture		1	183492	06/11/15 21:59	EYT	TAL PLS

Laboratory References:

TAL PLS = TestAmerica Pleasanton, 1220 Quarry Lane, Pleasanton, CA 94566, TEL (925)484-1919

Certification Summary

Client: TRC Solutions, Inc.
Project/Site: Presidio

TestAmerica Job ID: 720-65409-1

Laboratory: TestAmerica Pleasanton

All certifications held by this laboratory are listed. Not all certifications are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
California	State Program	9	2496	01-31-16

Method Summary

Client: TRC Solutions, Inc.
Project/Site: Presidio

TestAmerica Job ID: 720-65409-1

Method	Method Description	Protocol	Laboratory
6010B	Metals (ICP)	SW846	TAL PLS
Moisture	Percent Moisture	EPA	TAL PLS

Protocol References:

EPA = US Environmental Protection Agency

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL PLS = TestAmerica Pleasanton, 1220 Quarry Lane, Pleasanton, CA 94566, TEL (925)484-1919

Sample Summary

Client: TRC Solutions, Inc.
Project/Site: Presidio

TestAmerica Job ID: 720-65409-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
720-65409-1	1279SB433(1.5)	Solid	06/10/15 15:45	06/11/15 16:00
720-65409-2	1279SB434(0)	Solid	06/10/15 16:00	06/11/15 16:00
720-65409-3	1279SB434(1.5)	Solid	06/10/15 16:20	06/11/15 16:00
720-65409-4	1279SB435(0)	Solid	06/10/15 16:25	06/11/15 16:00
720-65409-5	1279SB436(0)	Solid	06/10/15 16:35	06/11/15 16:00
720-65409-6	1279SB436(1.5)	Solid	06/10/15 16:55	06/11/15 16:00
720-65409-8	1279SB437(0)	Solid	06/11/15 07:30	06/11/15 16:00
720-65409-9	1279SB437(1.5)	Solid	06/11/15 07:40	06/11/15 16:00
720-65409-10	1279SB438(0)	Solid	06/11/15 07:50	06/11/15 16:00
720-65409-11	1279SB439(0)	Solid	06/11/15 07:55	06/11/15 16:00
720-65409-12	1279SB439(1.5)	Solid	06/11/15 08:10	06/11/15 16:00
720-65409-13	1279SB440(0)	Solid	06/11/15 08:15	06/11/15 16:00
720-65409-14	1279SB440(1.5)	Solid	06/11/15 08:17	06/11/15 16:00
720-65409-15	1279SB441(0)	Solid	06/11/15 08:25	06/11/15 16:00
720-65409-16	DUP 061115	Solid	06/11/15 08:26	06/11/15 16:00
720-65409-17	1279SB441(1.5)	Solid	06/11/15 08:32	06/11/15 16:00
720-65409-18	1279SB442(0)	Solid	06/11/15 08:45	06/11/15 16:00
720-65409-19	1279SB442(1.5)	Solid	06/11/15 08:51	06/11/15 16:00
720-65409-20	1279SB443(0)	Solid	06/11/15 09:00	06/11/15 16:00
720-65409-21	1279SB443(1.5)	Solid	06/11/15 09:05	06/11/15 16:00
720-65409-22	1279SB444(0)	Solid	06/11/15 09:10	06/11/15 16:00
720-65409-23	1279SB444(1.5)	Solid	06/11/15 09:20	06/11/15 16:00
720-65409-25	1279SB445(0.25)	Solid	06/11/15 10:20	06/11/15 16:00
720-65409-27	1279SB446(0.25)	Solid	06/11/15 10:45	06/11/15 16:00
720-65409-30	1279SB447(1.5)	Solid	06/11/15 12:15	06/11/15 16:00
720-65409-32	1279SB448(0.25)	Solid	06/11/15 12:40	06/11/15 16:00
720-65409-35	1279SB449(1.5)	Solid	06/11/15 13:00	06/11/15 16:00
720-65409-37	1279SB450(1.5)	Solid	06/11/15 13:30	06/11/15 16:00
720-65409-39	1279SB451(1.5)	Solid	06/11/15 13:45	06/11/15 16:00

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

TESTAMERICA Pleasanton Chain of Custody

1220 Quarry Lane ● Pleasanton CA 94566-4756

Phone: (925) 484-1919 ● Fax: (925) 600-3002

720-65409

Reference #: 161749

Date 6/11/15 Page 1 of 4

Report To

Attn: Justin Hanzel-Durbin

Company: TRC

Address: 505 Sansome, Ste 1600

Email: JHanzel-Durbin@trcsolutions.com

Bill To:

Sampled By: TB

Attn:

Phone: 925-665-9478

Analysis Request

Analysis columns:
1. Volatile Organics GC/MS (VOCs) ☐ EPA 8260B
2. HVOCs by ☐ EPA 8260B
3. EPA 8260B: ☐ Gas ☐ BTEX ☐ 5 Oxygenates ☐ DCA, EDB ☐ Ethanol
4. TEPH EPA 8015B ☐ Silica Gel ☐ Diesel ☐ Motor Oil ☐ Other ___
5. SemiVolatile Organics GC/MS ☐ EPA 8270C
6. PNA/PAHs by ☐ 8270C ☒ 8270C SIM (Hold)
7. Oil and Grease (EPA 1664/9071) ☐ Petroleum ☐ Total
8. Pesticides ☐ EPA 8081 PCBs ☐ EPA 8082
9. CAM17 Metals (EPA 6010/7470/7471) (Hold)
10. Metals: ☐ 6010B ☐ 200.7 ☐ Lead ☐ LUFT ☐ RCRA ☐ Other: ___
11. Metals: ☒ 6020 ☐ 200.8 (ICP-MS): lead only (Cam 17 crossed out)
12. ☐ W.E.T (STLC) ☐ W.E.T (DI) ☐ TCLP
13. Hex. Chrom by ☐ EPA 7196 ☐ or EPA 7199
14. pH ☐ 9040 ☐ SM4500
15. ☐ Spec. Cond. ☐ Alkalinity ☐ TSS ☐ SS ☐ TDS
16. Anions: ☐ Cl ☐ SO_4 ☐ NO_3 ☐ F ☐ Br ☐ NO_2 ☐ PO_4
17. msm Ds (☐ Perchlorate by EPA 314.0 crossed out)
18. COD ☐ EPA 410.4 ☐ SM5220D ☐ Turbidity
19. Dioxins/furans SW1613B (Hold)
20. % moisture
21. Number of Containers

Sample ID	Date	Time	Matrix	Preserv	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
127958 433(1.5)	6/10/15	1515								X			X		X									X	1
127958 434(0)	6/10/15	1600								X			X		X									X	1
127958 434(1.5)	6/10/15	1620								X			X		X									X	1
127958 435(0)	6/10/15	1625								X			X		X									X	1
127958 436(0)	6/10/15	1635								X			X		X									X	1
127958 436(1.5)	6/10/15	1655								X			X		X									X	1
127958 436(1.5)	6/11/15	725								[illegible]			[illegible]		[illegible]								X	[illegible]	1
127958 437(0)	6/11/15	730								X			X		X								[illegible]	X	1
127958 437(1.5)	6/11/15	740								X			X		X									X	1
127958 438(0)	6/11/15	750								X			X		X									X	1

720-65409 Chain of Custody

Project Info.

Project Name/ #: 229/Task 4/A

PO#:

Credit Card Y/N: If yes, please call with payment information ASAP

Sample Receipt

of Containers:

Head Space:

Temp: 4.4°C

T A T	10 Day	5 Day	4 Day	3 Day	2 Day	1 Day	Other: 24-hr on lead only

Report: ☐ Routine ☐ Level 3 ☐ Level 4 ☐ EDD ☐ EDF ☐ Global ID ___

Special Instructions / Comments:

See Terms and Conditions on reverse

	1)	2)	3)
Relinquished by: Signature	[signature]	Victor Ramo	
Time	1408	16:00	
Printed Name	Taylor Busch	Victor Ramo	
Date	6/11/15	6/11/15	
Company	TRC	TA	RUSH
Received by: Signature	[signature]	[signature]	
Time	1408	16:00	
Printed Name	Sam Barquerigo	T Bullock	
Date	6/11/15	6/11/15	
Company	TA	TA	

Rev.10/2012

6/15/2015

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

TESTAMERICA Pleasanton Chain of Custody

1220 Quarry Lane • Pleasanton CA 94566-4756
Phone: (925) 484-1919 Fax: (925) 600-3002

720-65409

Reference #: 161749

Date ________ Page 2 of 4

6/15/2015

Report To

Attn:
Company:
Address:
Email:
Bill To: | Sampled By:
Attn: | Phone:

Analysis Request

Sample ID	Date	Time	Matrix	Preserv	Volatile Organics GC/MS (VOCs) ☐ EPA 8260B	HVOCs by ☐ EPA 8260B	EPA 8260B: ☐ Gas ☐ BTEX ☐ 5 Oxygenates ☐ DCA, EDB☐ Ethanol	TEPH EPA 8015B ☐ Silica Gel ☐ Diesel ☐ Motor Oil ☐ Other ___	SemiVolatile Organics GC/MS ☐ EPA 8270C	PNA/PAHs by ☐ 8270C ☒ 8270C SIM [Hold]	Oil and Grease (EPA 1664/9071) ☐ Petroleum ☐ Total	Pesticides ☐ EPA 8081 PCBs ☐ EPA 8082	CAM17 Metals (EPA 6010/7470/7471) [Hold]	Metals: ☐ 6010B ☐ 200.7 ☐ Lead ☐ LUFT ☐ RCRA ☐ Other: ____	Metals: ☒ 6020 ☐ 200.8 (ICP-MS): lead only	☐ W.E.T (STLC) ☐ W.E.T (DI) ☐ TCLP	Hex. Chrom by ☐ EPA 7196 ☐ or EPA 7199	pH ☐ 9040 ☐ SM4500	☐ Spec. Cond. ☐ Alkalinity ☐ TSS ☐ SS ☐ TDS	Anions: ☐ Cl ☐ SO_4 ☐ NO_3 ☐ F ☐ Br ☐ NO_2 ☐ PO_4	~~☐ Perchlorate by EPA 314.0~~ ms msDs	COD ☐ EPA 410.4 ☐ SM5220D ☐ Turbidity	Dioxins/Furans SW1613B [Hold]	% moisture	Number of Containers
1279SB439(0)	6/11/15	755								X			X		X									X	1
1279SB439(1.5)	6/11/15	810																							1
1279SB440(0)	6/11/15	815																							1
1279SB440(1.5)	6/11/15	817																							1
1279SB441(0)	6/11/15	825																							1
DUP061115	6/11/15	826																							1
1279SB441(1.5)	6/11/15	832																							1
1279SB442(0)	6/11/15	845																							1
1279SB442(1.5)	6/11/15	851																							1
1279SB443(0)	6/11/15	900																							1

Project Info. | **Sample Receipt**

Project Name/ #: | # of Containers:
Head Space:
PO#: | Temp:
Credit Card Y/N: If yes, please call with payment information ASAP

TAT	10 Day	5 Day	4 Day	3 Day	2 Day	1 Day	Other:

Report: ☐ Routine ☐ Level 3 ☐ Level 4 ☐ EDD ☐ EDF
Special Instructions / Comments: ☐ Global ID ____

See Terms and Conditions on reverse

1) Relinquished by:	2) Relinquished by:	3) Relinquished by:
Signature: [signature] Time: 1408	Signature: Victor Romo Time: 16:00	Signature: Time:
Printed Name: T. Busch Date: 6/11/15	Printed Name: Victor Romo Date: 6/11/15	Printed Name: Date:
Company: TRC	Company: TA	Company:
1) Received by:	2) Received by:	3) Received by:
Signature: [signature] Time: 1408	Signature: [signature] Time: 1600	Signature: Time:
Printed Name: Sam Burgarry Date: 6/11/15	Printed Name: T Bullace Date: 6/11/15	Printed Name: Date:
Company: TA	Company: TA	Company:

Rev.10/2012

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Phone: (925) 484-1919 • Fax: (925) 600-3002

Reference #: 161749
720-65409
Date _____ Page 3 of 4

6/15/2015

Report To

Attn:
Company:
Address:
Email:
Bill To: Sampled By:
Attn: Phone:

Analysis Request

Sample ID	Date	Time	Matrix	Preserv	Volatile Organics GC/MS (VOCs) ☐ EPA 8260B	HVOCs by ☐ EPA 8260B	EPA 8260B: ☐ Gas ☐ BTEX ☐ 5 Oxygenates ☐ DCA, EDB ☐ Ethanol	TEPH EPA 8015B ☐ Silica Gel ☐ Diesel ☐ Motor Oil ☐ Other ___	Semi Volatile Organics GC/MS ☐ EPA 8270C	PNA/PAH's by ☐ 8270C ☒ 8270C SIM (Hold)	Oil and Grease (EPA 1664/9071) ☐ Petroleum ☐ Total	Pesticides ☐ EPA 8081 PCBs ☐ EPA 8082	CAM17 Metals (EPA 6010/7470/7471) (Hold)	Metals: ☐ 6010B ☐ 200.7 ☐ Lead ☐ LUFT ☐ RCRA ☐ Other: ___	Metals: ☐ 6020 ☐ 200.8 (ICP-MS): (Hold)	☐ W.E.T (STLC) ☐ W.E.T (DI) ☐ TCLP	Hex. Chrom by ☐ EPA 7196 ☐ or EPA 7199	pH ☐ 9040 ☐ SM4500	☐ Spec. Cond. ☐ Alkalinity ☐ TSS ☐ SS ☐ TDS	Anions: ☐ Cl ☐ SO_4 ☐ NO_3 ☐ F ☐ Br ☐ NO_2 ☐ PO_4	~~TRPH~~ ☐ ~~Perchlorate by EPA 314.0~~	COD ☐ EPA 410.4 ☐ SM5220D ☐ Turbidity	Dioxins/furans SW8268 (Hold)	% moisture	Number of Containers
127958443(1.5)	6/4/15	905								X			X		X								X	1
127958444(0)	6/4/15	910								X			X		X								X	1
127958444(1.5)	6/4/15	920								X			X		X								X	1
127958444(1.5)RB444(6)	6/4/15	935								X			X		X								X	1
127958445(0.25)	6/4/15	1020																						1
127958445(1.5)	6/4/15	1030																						1
127958446(0.25)	6/4/15	1045																						1
127958446(1.5)	6/4/15	1050																						1
127958446(3)	6/4/15	1056																						1
127958447(1.5)	6/4/15	1215																						1

Project Info.

Project Name/ #:
PO#:
Credit Card Y/N: If yes, please call with payment information ASAP

Sample Receipt

of Containers:
Head Space:
Temp:

TAT: 10 Day | 5 Day | 4 Day | 3 Day | 2 Day | 1 Day | Other:

Report: ☐ Routine ☐ Level 3 ☐ Level 4 ☐ EDD ☐ EDF
Special Instructions / Comments: ☐ Global ID _____

See Terms and Conditions on reverse

1) Relinquished by:	2) Relinquished by:	3) Relinquished by:
Signature: T [illegible] Time: 1408	Signature: Victor Romo Time: 1600	Signature: Time:
Printed Name: T. Bush Date: 6/11/15	Printed Name: Victor Romo Date: 6/11/15	Printed Name: Date:
Company: TRC	Company: TA	Company:

1) Received by:	2) Received by:	3) Received by:
Signature: [illegible] Time: 1408	Signature: [illegible] Time: 1600	Signature: Time:
Printed Name: San Buenviaje Date: 6/11/15	Printed Name: T Bullock Date: 6/11/15	Printed Name: Date:
Company: TA	Company: TA	Company:

Rev.10/2012

Reference #: 161749

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720-65409

Page 4 of 4

6/15/2015

Report To

Attn:
Company:
Address:
Email:
Bill To: | Sampled By:
Attn: | Phone:

Analysis Request

Sample ID	Date	Time	Matrix	Preserv	Volatile Organics GC/MS (VOCs) ☐ EPA 8260B	HVOCs by ☐ EPA 8260B	EPA 8260B: ☐ Gas ☐ BTEX ☐ 5 Oxygenates ☐ DCA, EDB ☐ Ethanol	TEPH EPA 8015B ☐ Silica Gel ☐ Diesel ☐ Motor Oil ☐ Other	SemiVolatile Organics GC/MS ☐ EPA 8270C	PNA/PAHs by ☐ 8270C ☒ 8270C SIM [Hold]	Oil and Grease (EPA 1664/9071) ☐ Petroleum ☐ Total	Pesticides ☐ EPA 8081 PCBs ☐ EPA 8082	CAM17 Metals (EPA 6010/7470/7471) [Hold]	Metals: ☐ 6010B ☐ 200.7 ☐ Lead ☐ LUFT ☐ RCRA ☐ Other:	Metals: ☒ 6020 ☐ 200.8 (ICP-MS): Lead only	☐ W.E.T (STLC) ☐ W.E.T (DI) ☐ TCLP	Hex. Chrom by ☐ EPA 7196 ☐ or EPA 7199	pH ☐ 9040 ☐ SM4500	☐ Spec. Cond. ☐ Alkalinity ☐ TSS ☐ SS ☐ TDS	Anions: ☐ Cl ☐ SO_4 ☐ NO_3 ☐ F ☐ Br ☐ NO_2 ☐ PO_4	MS/MSD ~~☐ Perchlorate by EPA 314.0~~	COD ☐ EPA 410.4 ☐ SM5220D ☐ Turbidity	Dioxins/Furans SW8290B [Hold]	% Moisture	Number of Containers
12795B447(3)	6/11/15	1230								X			X		X						●			X	1
12795B448(0.25)	6/11/15	1246																							1
12795B448(1.5)	6/11/15	1250																							1
12795B448(3)	6/11/15	1255																							1
12795B449(1.5)	6/11/15	1300																							1
12795B449(3)	6/11/15	1320																							1
12795B450(1.5)	6/11/15	1330																							1
12795B450(3)	6/11/15	1335																							1
12795B451(1.5)	6/11/15	1345																							1
12795B451(3)	6/11/15	1400																							1

Project Info. | **Sample Receipt**

Project Name/ #: | # of Containers:
Head Space:
PO#: | Temp:
Credit Card Y/N: If yes, please call with payment information ASAP

TAT	10 Day	5 Day	4 Day	3 Day	2 Day	1 Day	Other:

Report: ☐ Routine ☐ Level 3 ☐ Level 4 ☐ EDD ☐ EDF
Special Instructions / Comments: ☐ Global ID ________

1) Relinquished by:	2) Relinquished by:	3) Relinquished by:
Signature: [signature] Time: 1408	Signature: Victor Romo Time: 16:00	Signature: Time:
Printed Name: T. Bush Date: 6/11/15	Printed Name: Victor Romo Date: 6/11/15	Printed Name: Date:
Company: TRC	Company: TA.	Company:
1) Received by:	**2) Received by:**	**3) Received by:**
Signature: [signature] Time: 1408	Signature: [signature] Time: 1600	Signature: Time:
Printed Name: Sam Bayrami Date: 6/11/15	Printed Name: T. Bulloc Date: 6/11/15	Printed Name: Date:
Company: TA	Company: TA	Company:

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Phone: (925) 484-1919 • Fax: (925) 600-3002

Reference #: 161749

720-65409-rev

Date 6/11/15 Page 1 of 4

Report To

Attn: Justin Hanzel-Durbin
Company: TRC
Address: 505 Sansome, Ste 1600
Email: JHanzel-Durbin@trcsolutions.com
Bill To: | Sampled By: TB
Attn: | Phone: 925-665-4478

Analysis Request (columns): Volatile Organics GC/MS (VOCs) ☐ EPA 8260B; HVOCs by ☐ EPA 8260B; EPA 8260B: ☐ Gas ☐ BTEX ☐ 5 Oxygenates ☐ DCA, EDB ☐ Ethanol; TEPH EPA 8015B ☐ Silica Gel ☐ Diesel ☐ Motor Oil ☐ Other ___; SemiVolatile Organics GC/MS ☐ EPA 8270C; PNA/PAHs by ☐ 8270C ☒ 8270C SIM (Hold); Oil and Grease ☐ Petroleum (EPA 1664/9071) ☐ Total; Pesticides ☐ EPA 8081 PCBs ☐ EPA 8082; CAM17 Metals (EPA 6010/7470/7471) (Hold); Metals: ☐ 6010B ☐ 200.7 ☐ Lead ☐ LUFT ☐ RCRA ☐ Other: ___; Metals: ☒ 6020 ☐ 200.8 (ICP-MS): lead only (6020); ☐ W.E.T (STLC) ☐ W.E.T (DI) ☐ TCLP; Hex. Chrom by ☐ EPA 7196 ☐ or EPA 7199; pH ☐ 9040 ☐ SM4500; ☐ Spec. Cond. ☐ Alkalinity ☐ TSS ☐ SS ☐ TDS; Anions: ☐ Cl ☐ SO_4 ☐ NO_3 ☐ F ☐ Br ☐ NO_2 ☐ PO_4; msgm Ds [illegible] ~~☐ Perchlorate by EPA 314.0~~; COD ☐ EPA 410.4 ☐ SM5220D ☐ Turbidity; Dioxins/Furans SW1613B (Hold); % moisture; Number of Containers

Sample ID	Date	Time	Mat rix	Preserv	PNA/PAHs 8270C SIM	CAM17 Metals	Metals 6020 (lead only)	Dioxins/Furans SW1613B	% moisture	Number of Containers
127958433(1.5)	6/10/15	1515			X	X	X		X	1
127958434(0)	6/10/15	1606			X	X	X		X	1
127958434(1.5)	6/10/15	1620			X	X	X		X	1
127958435(0)	6/10/15	1625			X	X	X		X	1
127958436(0)	6/10/15	1635			X	X	X		X	1
127958436(1.5)	6/10/15	1655			X	X	X		X	[illegible]
127958436(1.5)	6/11/15	725			[illegible]	[illegible]	[illegible]	X	[illegible]	1
127958437(0)	6/11/15	730			X	X	X	[illegible]	X	1
127958437(1.5)	6/11/15	740			X	X	X		X	1
127958438(0)	6/11/15	750			X	X	X		X	1

24 hour TAT for all samples on this page, analyses for Lead and moisture %, JHD

720-65409 Chain of Custody

Project Info.
Project Name/ #: 229 / Test 4/A
PO#:
Credit Card Y/N: If yes, please call with payment information ASAP

Sample Receipt
# of Containers:
Head Space:
Temp: 4.4°C

TAT: ☐ 10 Day ☐ 5 Day ☐ 4 Day ☐ 3 Day ☐ 2 Day ☐ 1 Day Other: 24 hr for lead only

Report: ☐ Routine ☐ Level 3 ☐ Level 4 ☐ EDD ☐ EDF ☐ Global ID ___
Special Instructions / Comments:

1) Relinquished by:	2) Relinquished by:	3) Relinquished by:
Signature: [signature] Time: 1408	Signature: Victor Ramo Time: 16:00	Signature: Time:
Printed Name: Tal Bush Date: 6/11/15	Printed Name: Victor Ramo Date: 6/11/15	Printed Name: Date:
Company: TRC	Company: TA	Company:
1) Received by:	2) Received by:	3) Received by:
Signature: [signature] Time: 1408	Signature: [signature] Time: 16:00	Signature: Time:
Printed Name: Sam Banquerigo Date: 6/11/15	Printed Name: T Bullock Date: 6/11/15	Printed Name: Date:
Company: TA	Company: TA	Company:

RUSH

See Terms and Conditions on reverse

Rev.10/2012

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TESTAMERICA Pleasanton Chain of Custody
1220 Quarry Lane • Pleasanton CA 94566-4756
Phone: (925) 484-1919 • Fax: (925) 600-3002

Reference #: 161749

720-65409

Date ______ Page 2 of 4

Report To

Attn:
Company:
Address:
Email:
Bill To: Sampled By:
Attn: Phone:

Analysis Request

Sample ID	Date	Time	Matrix	Preserv.	Volatile Organics GC/MS (VOCs) ☐ EPA 8260B	HVOCs by ☐ EPA 8260B	EPA 8260B: ☐ Gas ☐ BTEX ☐ 5 Oxygenates ☐ DCA, EDB ☐ Ethanol	TEPH EPA 8015B ☐ Silica Gel ☐ Diesel ☐ Motor Oil ☐ Other	SemiVolatile Organics GC/MS ☐ EPA 8270C	PNA/PAHs by ☐ 8270C ☒ 8270C SIM [Hold]	Oil and Grease (EPA 1664/9071) ☐ Petroleum ☐ Total	Pesticides ☐ EPA 8081 PCBs ☐ EPA 8082	CAM17 Metals (EPA 6010/7470/7471) [Hold]	Metals: ☐ 6010B ☐ 200.7 ☐ Lead ☐ LUFT ☐ RCRA ☐ Other:	Metals: ☒ 6020 ☐ 200.8 (ICP-MS) lead only	☐ W.E.T (STLC) ☐ W.E.T (DI) ☐ TCLP	Hex. Chrom by ☐ EPA 7196 ☐ or EPA 7199	pH ☐ 9040 ☐ SM4500	☐ Spec. Cond. ☐ Alkalinity ☐ TSS ☐ SS ☐ TDS	Anions: ☐ Cl ☐ SO_4 ☐ NO_3 ☐ F ☐ Br ☐ NO_2 ☐ PO_4	MS/MSD ~~☐ Perchlorate by EPA 314.0~~	COD ☐ EPA 410.4 ☐ SM5220D ☐ Turbidity	Dioxins/Furans SW1613B [Hold]	% moisture	Number of Containers
1279SB439(0)	6/11/15	755								X			X		X									X	1
1279SB439(1.5)	6/11/15	810																							1
1279SB440(0)	6/11/15	815																							1
1279SB440(1.5)	6/11/15	817																							1
1279SB441(0)	6/11/15	825																							1
DUP061115	6/11/15	826																							1
1279SB441(1.5)	6/11/15	832																							1
1279SB442(0)	6/11/15	845																							1
1279SB442(1.5)	6/11/15	851																							1
1279SB443(0)	6/11/15	900																							1

24 hour TAT for all samples on this page, analyses for Lead and moisture %, JHD

Project Info. **Sample Receipt**

Project Name/ #: # of Containers:
Head Space:
PO#: Temp:
Credit Card Y/N: If yes, please call with payment information ASAP

T A T	10 Day	5 Day	4 Day	3 Day	2 Day	1 Day	Other:

Report: ☐ Routine ☐ Level 3 ☐ Level 4 ☐ EDD ☐ EDF ☐ Global ID ______
Special Instructions / Comments:

See Terms and Conditions on reverse

1) Relinquished by:	2) Relinquished by:	3) Relinquished by:
Signature: [signature] Time: 1408	Signature: Victor Romo Time: 16:00	Signature: Time:
Printed Name: T. Bush Date: 6/11/15	Printed Name: Victor Romo Date: 6/11/15	Printed Name: Date:
Company: TRC	Company: TA	Company:
1) Received by:	**2) Received by:**	**3) Received by:**
Signature: [signature] Time: 1408	Signature: [signature] Time: 1600	Signature: Time:
Printed Name: Sam Burgos Date: 6/11/15	Printed Name: T. Bullock Date: 6/11/15	Printed Name: Date:
Company: TA	Company: TA	Company:

Rev. 10/2012

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Phone: (925) 484-1919 • Fax: (925) 600-3002

Reference #: 161749
720-65409
Date _____ Page 3 of 4

Report To

Attn:
Company:
Address:
Email:
Bill To: | Sampled By:
Attn: | Phone:

Analysis Request

Sample ID	Date	Time	Matrix	Preserv	Volatile Organics GC/MS (VOCs) ☐ EPA 8260B	HVOCs by ☐ EPA 8260B	EPA 8260B: ☐ Gas ☐ BTEX ☐ 5 Oxygenates ☐ DCA, EDB ☐ Ethanol	TEPH EPA 8015B ☐ Silica Gel ☐ Diesel ☐ Motor Oil ☐ Other ___	Semi-Volatile Organics GC/MS ☐ EPA 8270C	PNA/PAH's by ☐ 8270C ☒ 8270C SIM Hold	Oil and Grease (EPA 1664/9071) ☐ Petroleum ☐ Total	Pesticides ☐ EPA 8081 PCBs ☐ EPA 8082	CAM17 Metals (EPA 6010/7470/7471) Hold	Metals: ☐ 6010B ☐ 200.7 ☐ Lead ☐ LUFT ☐ RCRA ☐ Other: ___	Metals: ☐ 6020 ☐ 200.8 (ICP-MS): Lead only	W.E.T (STLC) ☐ W.E.T (DI) ☐ TCLP	Hex. Chrom by ☐ EPA 7196 ☐ or EPA 7199	pH ☐ 9040 ☐ SM4500	☐ Spec. Cond. ☐ Alkalinity ☐ TSS ☐ SS ☐ TDS	Anions: ☐ ☐ SO_4 ☐ NO_3 ☐ F ☐ Br ☐ NO_2 ☐ PO_4	MS/MSD ☐ Perchlorate by EPA 314.0	COD ☐ EPA 410.4 ☐ SM5220D ☐ Turbidity	Dioxins/furans SW846 8290 Hold	% moisture	Number of Containers
1279SB443(1.5)	6/4/15	905		24 hour TAT, lead & %moisture						X			X		X								X	1
1279SB444(0)	6/4/15	910		24 hour TAT, lead & %moisture						-			X		X							X	X	1
1279SB444(1.5)	6/4/15	920		24 hour TAT, lead & %moisture						X			X		X						X		X	2
1279SB444(1.5)RB445(0)	6/4/15	935		5 day TAT, lead						X			X		X								X	1
1279SB445(0.25)	6/4/15	1020		48 hour TAT, lead & %moisture																				1
1279SB445(1.5)	6/4/15	1030		Hold all analyses																				1
1279SB446(0.25)	6/4/15	1045		48 hour TAT, lead & %moisture																				1
1279SB446(1.5)	6/4/15	1050		Hold all analyses																				1
1279SB446(3)	6/4/15	1056		Hold all analyses																				1
1279SB447(1.5)	6/4/15	1215		48 hour TAT, lead & %moisture																				1

Project Info.

Project Name/ #:
PO#:
Credit Card Y/N: If yes, please call with payment information ASAP

Sample Receipt

of Containers:
Head Space:
Temp:

TAT: 10 Day | 5 Day | 4 Day | 3 Day | 2 Day | 1 Day | Other:

Report: ☐ Routine ☐ Level 3 ☐ Level 4 ☐ EDD ☐ EDF
Special Instructions / Comments: ☐ Global ID _____

See Terms and Conditions on reverse

1) Relinquished by:	2) Relinquished by:	3) Relinquished by:
Signature: [signature] Time: 1408	Signature: Victor Romo Time: 16:00	Signature: Time:
Printed Name: T. Bush Date: 6/11/15	Printed Name: Victor Romo Date: 6/11/15	Printed Name: Date:
Company: TRC	Company: TA	Company:

1) Received by:	2) Received by:	3) Received by:
Signature: [signature] Time: 1408	Signature: [signature] Time: 1600	Signature: Time:
Printed Name: Sam Barquero Date: 6/11/15	Printed Name: T Bullock Date: 6/11/15	Printed Name: Date:
Company: TA	Company: TA	Company:

Rev.10/2012

6/15/2015

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Phone: (925) 484-1919 Fax: (925) 600-3002

Reference #: 161749

720-65409

Page 4 of 4

Report To

Attn:

Company:

Address:

Email:

Bill To: Sampled By:

Attn: Phone:

Analysis Request

Sample ID	Date	Time	Matrix	Preserv	Volatile Organics GC/MS (VOCs) ☐ EPA 8260B	HVOCs by ☐ EPA 8260B	EPA 8260B: ☐ Gas ☐ BTEX ☐ 5 Oxygenates ☐ DCA, EDB ☐ Ethanol	TEPH EPA 8015B ☐ Silica Gel ☐ Diesel ☐ Motor Oil ☐ Other	SemiVolatile Organics GC/MS ☐ EPA 8270C	PNA/PAHs by ☐ 8270C ☒ 8270C SIM (Hold)	Oil and Grease ☐ Petroleum (EPA 1664/9071) ☐ Total	Pesticides ☐ EPA 8081 PCBs ☐ EPA 8082	CAM17 Metals (EPA 6010/7470/7471) (Hold)	Metals: ☐ 6010B ☐ 200.7 ☐ Lead ☐ LUFT ☐ RCRA ☐ Other:	Metals: ☒ 6020 ☐ 200.8 (ICP-MS): lead only	☐ W.E.T (STLC) ☐ W.E.T (DI) ☐ TCLP	Hex. Chrom by ☐ EPA 7196 ☐ or EPA 7199	pH ☐ 9040 ☐ SM4500	☐ Spec. Cond. ☐ Alkalinity ☐ TSS ☐ SS ☐ TDS	Anions: ☐ Cl ☐ SO_4 ☐ NO_3 ☐ F ☐ Br ☐ NO_2 ☐ PO_4	msmDs ~~☐ Perchlorate by EPA 314 0~~	COD ☐ EPA 410.4 ☐ SM5220D ☐ Turbidity	Dioxins/Furans SW8013 13 (Hold)	% moisture	Number of Containers
1279SB447(3)	6/11/15	1230	Hold all analyses							X			X		X									X	1
1279SB448(0.25)	6/11/15	1246	48 hour TAT, lead & %moisture																						1
1279SB448(1.5)	6/11/15	1250	Hold all analyses																						1
1279SB448(3)	6/11/15	1255	Hold all analyses																						1
1279SB449(1.5)	6/11/15	1300	48 hour TAT, lead & %moisture																						1
1279SB449(3)	6/11/15	1320	Hold all analyses																						1
1279SB450(1.5)	6/11/15	1330	48 hour TAT, lead & %moisture																						1
1279SB450(3)	6/11/15	1335	Hold all analyses																						1
1279SB451(1.5)	6/11/15	1345	48 hour TAT, lead & %moisture																						1
1279SB451(3)	6/11/15	1400	Hold all analyses																						1

Project Info. | **Sample Receipt**

Project Name/ #: | # of Containers:

Head Space:

PO#: | Temp:

Credit Card Y/N: If yes, please call with payment information ASAP

T A T	10 Day	5 Day	4 Day	3 Day	2 Day	1 Day	Other:

Report: ☐ Routine ☐ Level 3 ☐ Level 4 ☐ EDD ☐ EDF

Special Instructions / Comments: ☐ Global ID ______

See Terms and Conditions on reverse

	1) Relinquished by:	2) Relinquished by:	3) Relinquished by:
Signature / Time	[signature] 1408	Victor Rome 16:00	
Printed Name / Date	T. Bxxl 6/11/15	Victor Romo 6/11/15	
Company	[signature]	TA.	

	1) Received by:	2) Received by:	3) Received by:
Signature / Time	[signature] 1408	[signature] 1600	
Printed Name / Date	Sam Bayrorix 6/11/15	T Bullock 6/11/15	
Company	TA	TA	

Rev.10/2012

Login Sample Receipt Checklist

Client: TRC Solutions, Inc.

Job Number: 720-65409-1

Login Number: 65409
List Number: 1
Creator: Mullen, Joan

List Source: TestAmerica Pleasanton

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	N/A	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	False	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

ATTACHMENT C
DOCUMENTATION OF TRUST CONCURRENCE WITH TREE MEMO CONTENT

Barros, Jessica

From: Larssen, Nina [mailto:nlarssen@presidiotrust.gov]
Sent: Friday, July 31, 2015 6:22 PM
To: Fanelli, Eileen <EFanelli@trcsolutions.com>
Subject: FW: Tree Memo - Concurrence Request

Eileen,

See message below from Jason Thurm, Trust Forestry Supervisor, for concurrence on the tree memo to be included in the Phase 1 Lendrum Ct RDIP.

Nina Larssen
Remediation Project Manager

Presidio Trust
67 Martinez Street, P.O. Box 29052
San Francisco, CA 94129
W: (415) 561-5421
C: (415) 246-3650
www.presidio.gov
Facebook | Twitter

From: Thurm, Jason
Sent: Friday, July 31, 2015 5:24 PM
To: Larssen, Nina <nlarssen@presidiotrust.gov>
Cc: Potts, Steve <SPotts@presidiotrust.gov>
Subject: RE: Tree Memo - Concurrence Request

Hi Nina, I've read both documents and yes, I do concur with the red lined edits to the tree memo and i do hope they will satisfy the questions from the DTSC.

Jason

Sent from my Verizon Wireless 4G LTE

Jason Thurm
Forestry Supervisor
The Presidio Trust
(415) 850-5563
-------- Original message --------
From: "Larssen, Nina" <nlarssen@presidiotrust.gov>
Date: 07/31/2015 3:29 PM (GMT-08:00)
To: "Thurm, Jason" <jthurm@presidiotrust.gov>
Cc: "Potts, Steve" <SPotts@presidiotrust.gov>
Subject: Tree Memo - Concurrence Request

Jason,

Please review attached tree memo and comments from DTSC and provide either comment or your concurrence .

Thanks,

Nina

ATTACHMENT I-2
TREE AND SHRUB ASSESSMENTS

H. T. HARVEY & ASSOCIATES
Ecological Consultants

Memorandum

Project# 3686-02

30 November 2015

To: Justin Hanzel-Durbin and Eileen Fanelli (TRC Solutions)

From: Gavin Archbald and Max Busnardo (H. T. Harvey & Associates)

Cc: Joe Howard (H. T. Harvey & Associates), Patrick Furtado (H. T. Harvey & Associates), and John Leffingwell (HortScience, Inc)

Subject: **Lendrum Court Soil Remediation Project – Native Understory Shrub Survey Results**

Introduction & Methods

At the request of TRC Solutions, H. T. Harvey and Associates surveyed the location, diameter at breast height (DBH) and health and vigor of native woody understory shrubs in the Phase II historic forest section of the Lendrum Court Remediation Project area. The field work was carried out by restoration ecologists G. Archbald, M.S., and P. Furtado, M.S. on November 23, 2015. We surveyed all native understory shrubs with a DBH equal to or greater than 2 inches within the historic forest between the "approximate site boundary" line and apartment buildings shown on the *Tree Survey figure 229649* provided by TRC Solutions. Shrub locations were recorded using an iPad relative to the locations of overstory trees previously mapped by H. T. Harvey and Associates (H. T. Harvey & Associates 2014). Health and vigor scores were qualitatively applied to each shrub based on health-related factors such as leaf color, fruit development, new growth, trunk and limb damage, and fungal/insect infestation using the numerical score shown in Table 1.

Table 1. Plant Health and Vigor Categories

QUALITATIVE HEALTH AND VIGOR RATING	NUMERICAL SCORE	OBSERVATIONS
High	1-3	67-100% healthy foliage
Medium	4-6	34-66% healthy foliage
Low	7-9	zero-33% healthy foliage

Results

Fifty toyon (*Heteromeles arbutifilia*) shrubs were located in the survey area (Table 2). The locations of surveyed shrubs are shown in Figure 1. Shrub locations are shown relative to Phase II remediation boundaries provided to H. T. Harvey & Associates by TRC Solutions. Toyon shrubs are native to California coastal and interior chaparral plant communities and are tolerant of both shade and full sun (Sawyer et al 2009). No other native understory shrub species were located within the survey area. DBH trunk sizes of the toyon understory ranged from 2 to 12 inches with an average of 7 inches. The majority of toyon shrubs were relatively large, mature specimens. Health and vigor of all toyon shrubs in the survey area were rated either Medium or Low, and the majority of the shrubs surveyed (i.e., 60%) exhibited a health and vigor rating of Low (Table 2). The average health and vigor score was 7, which yields an average health and vigor rating of Low. The low to medium average health and vigor ratings were due to observations of conditions of poor health and vigor, such as:

- Broken and rotting limbs, root crowns, and trunks
- Spotting, blight, and lesions on leaves
- Sparse leaf canopy
- Sparse and/or failing fruits
- Deep cuts (to cambium layer) on trunks and branches

In addition to the toyon shrubs identified in our survey, we observed numerous toyon resprouts from previously cut/damaged stumps. The DBH of the resprouts was below the threshold of our survey and therefore, the resprouts do not appear on Table 2 or Figure 1. Nonetheless, the health and vigor of the resprouts appeared Low to Medium, comparable to the health and vigor of the mature toyon covered by our survey. We observed a low abundance of toyon natural seedlings (i.e., natural recruits from seed, rather than resprouts) in the survey area. Representative photos of shrubs with medium and low health and vigor scores are provided in Appendix A.

Table 2. Native Understory Shrub Survey Results

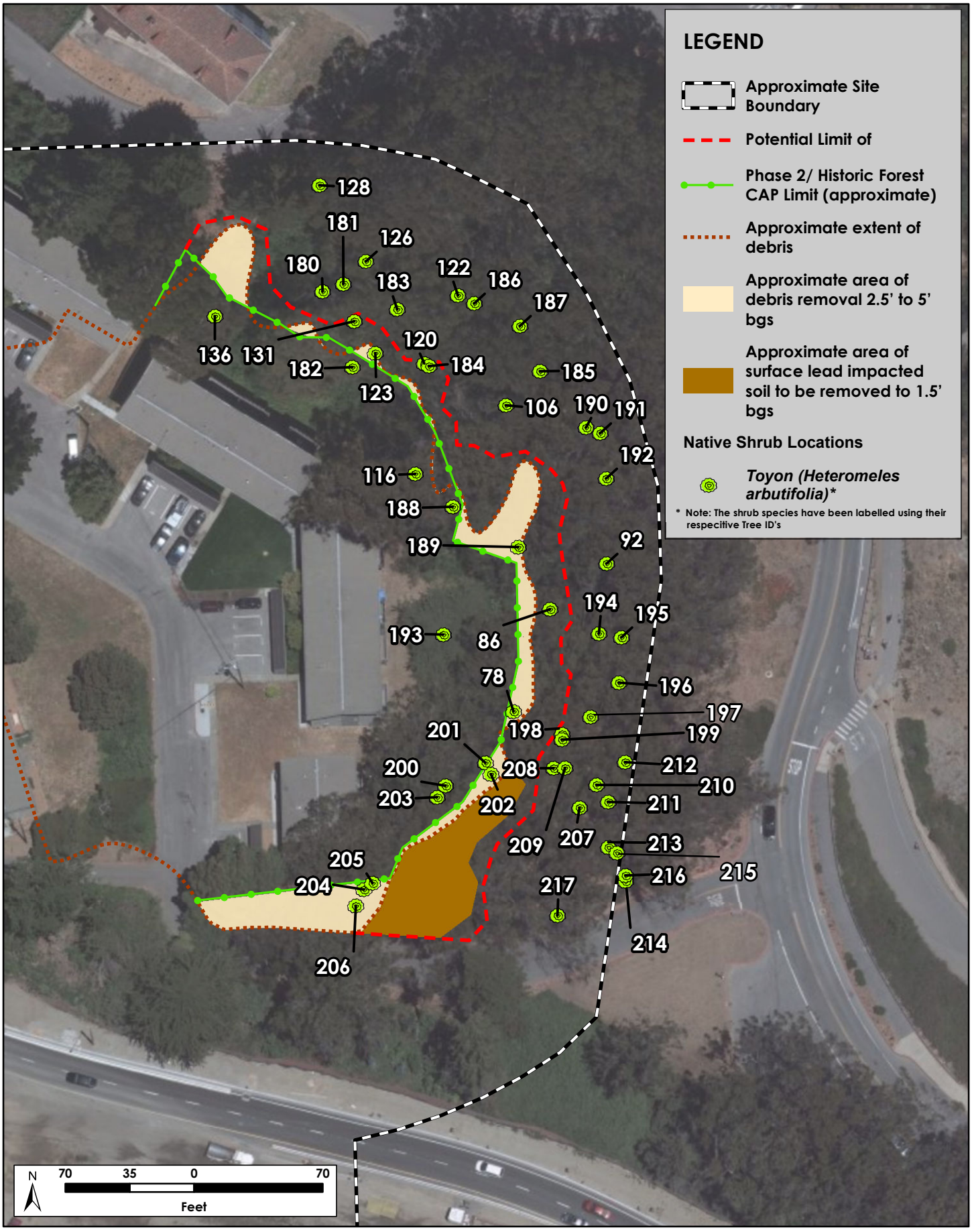
SPECIES	COMMON NAME	TREE NUMBER	DIAMETER AT BREAST HEIGHT (INCHES)	HEATH AND VIGOR SCORE	QUALTATIVE HEALTH AND VIGOR RATING
Heteromeles arbutifolia	Toyon	78	6, 6, 4	5	Medium
Heteromeles arbutifolia	Toyon	86	8, 4, 4	6	Medium
Heteromeles arbutifolia	Toyon	92	6, 8, 6, 4, 5	7	Low
Heteromeles arbutifolia	Toyon	106	9, 8, 5, 4	7	Low
Heteromeles arbutifolia	Toyon	116	17	6	Medium
Heteromeles arbutifolia	Toyon	120	8	7	Low
Heteromeles arbutifolia	Toyon	122	8, 4	8	Low
Heteromeles arbutifolia	Toyon	123	7, 6	7	Low
Heteromeles arbutifolia	Toyon	126	6,6	8	Low
Heteromeles arbutifolia	Toyon	128	12, 3, 4, 8, 3, 4, 3, 1	7	Low
Heteromeles arbutifolia	Toyon	131	6	8	Low
Heteromeles arbutifolia	Toyon	136	9, 5, 3, 2	7	Low
Heteromeles arbutifolia	Toyon	180	7	7	Low
Heteromeles arbutifolia	Toyon	181	7	7	Low
Heteromeles arbutifolia	Toyon	182	5	7	Low
Heteromeles arbutifolia	Toyon	183	4	9	Low

SPECIES	COMMON NAME	TREE NUMBER	DIAMETER AT BREAST HEIGHT (INCHES)	HEATH AND VIGOR SCORE	QUALTATIVE HEALTH AND VIGOR RATING
Heteromeles arbutifolia	Toyon	184	7	8	Low
Heteromeles arbutifolia	Toyon	185	5	7	Low
Heteromeles arbutifolia	Toyon	186	5	5	Medium
Heteromeles arbutifolia	Toyon	187	5, 5, 5	6	Medium
Heteromeles arbutifolia	Toyon	188	7	6	Medium
Heteromeles arbutifolia	Toyon	189	6	6	Medium
Heteromeles arbutifolia	Toyon	190	4, 4	7	Low
Heteromeles arbutifolia	Toyon	191	5, 4, 3	8	Low
Heteromeles arbutifolia	Toyon	192	5, 3	8	Low
Heteromeles arbutifolia	Toyon	193	6	8	Low
Heteromeles arbutifolia	Toyon	194	6, 4	6	Medium
Heteromeles arbutifolia	Toyon	195	4, 5, 6, 6, 6	6	Medium
Heteromeles arbutifolia	Toyon	196	5, 6	9	Low
Heteromeles arbutifolia	Toyon	197	4	8	Low
Heteromeles arbutifolia	Toyon	198	58	8	Low
Heteromeles arbutifolia	Toyon	199	7	8	Low
Heteromeles arbutifolia	Toyon	200	5, 5	5	Medium
Heteromeles arbutifolia	Toyon	201	7, 6, 4	7	Low
Heteromeles arbutifolia	Toyon	202	5	7	Low
Heteromeles arbutifolia	Toyon	203	4	5	Medium
Heteromeles arbutifolia	Toyon	204	5, 5	5	Medium
Heteromeles arbutifolia	Toyon	205	2	5	Medium
Heteromeles arbutifolia	Toyon	206	3, 5, 6	5	Medium
Heteromeles arbutifolia	Toyon	207	3	7	Low
Heteromeles arbutifolia	Toyon	208	3	5	Medium
Heteromeles arbutifolia	Toyon	209	3	6	Medium
Heteromeles arbutifolia	Toyon	210	3	8	Low
Heteromeles arbutifolia	Toyon	211	3	9	Low
Heteromeles arbutifolia	Toyon	212	5	7	Low
Heteromeles arbutifolia	Toyon	213	4, 5	6	Medium
Heteromeles arbutifolia	Toyon	214	3	5	Medium
Heteromeles arbutifolia	Toyon	215	5	7	Low
Heteromeles arbutifolia	Toyon	216	2	5	Medium
Heteromeles arbutifolia	Toyon	217	3, 2, 3, 2, 2	4	Medium

References

H. T. Harvey & Associates. 2015a. Tree Survey Table and Map. Prepared for TRC Solutions, Inc. dated April 8, 2015. Los Gatos, CA.

Sawyer, J.O., Keeler-Wolf, T. and J. M. Evans. 2009. A Manual of California Vegetation Second Edition.



N:\Projects3600\3686-01\Reports\San Francisco Presidio Lendrum Court Soil Remediation Project\Figure 1. Phase II Historic Forest Understory Native Shrub Survey Results.mxd

H. T. HARVEY & ASSOCIATES
Ecological Consultants

Figure 1. Phase II Historic Forest Understory Native Shrub Survey Results

San Francisco Presidio Lendrum Court Soil Remediation Project (3686-02)

November 2015

Attachment A – Selected Photographs

Photo 1. Spotting was observed on most toyon shrubs in the survey (e.g, shrub 136 shown here).

Photo 2. Lesions were common on leaves (e,g., shrub 136 shown here)

Photo 3. Rotting was observed at base of several toyon shrubs and along main trunks (e.g, shrub 122 shown here)

Photo 4. Examples of spotting, lesions, and insect damage on toyon leaves

Photo 5. Spotted and blighted leaves were observed at the base of several toyon shrubs (e.g., shrub 181 shown here)

Photo 6. Shrub health and vigor was medium in areas of relatively high light at the margins of the historic forest (e.g, shrub 201 shown here)

December 21, 2015

Justin Hanzel-Durbin
TRC
505 Sansome Street, Suite 1600
San Francisco, CA 94111

Subject: Updated **Lendrum Ct. Remediation Tree Assessment**
Presidio of San Francisco

Dear Mr. Hanzel-Durbin,

TRC is coordinating the soil remediation work at the subject site in San Francisco. As part of the planning, HortScience, Inc. was asked to assess the trees potentially impacted by the proposed soil remediation work, establish their health and structural condition and provide recommendations to reduce impacts to trees from the proposed work. Since the time of our December 1st DRAFT report, the plan and tree locations have been refined and we were asked to update the report to reflect the new information. This letter responds to that request.

The remediation area includes the upper portion of the vegetated hillside north and east of 1279 Lendrum Ct., east of 1278 Lendrum Ct. and east and south of 1259 Lendrum Court. Three trees on the south side of Lendrum Ct. were not included in the current assessment but will be added at the time of our next site visit.

Assessment Methods

Trees were assessed on November 19, 2015. All trees 6" or greater in diameter, within or adjacent to the project area were included. The exception was Toyons (*Heteromeles arbutifolia*), which are described under a separate report prepared by HT Harvey and Associates. The assessment procedure consisted of the following steps:

1. Identifying the tree as to species;
2. Tagging each tree with an identifying number and recording its location on a map;
3. Measuring the trunk diameter at a point 54" above grade;
4. Evaluating the health and structural condition using a scale of 0–5:
   - ***5*** - A healthy, vigorous tree, reasonably free of signs and symptoms of disease, with good structure and form typical of the species.
   - ***4*** - Tree with slight decline in vigor, small amount of twig dieback, minor structural defects that could be corrected.
   - ***3*** - Tree with moderate vigor, moderate twig and small branch dieback, thinning of crown, poor leaf color, moderate structural defects that might be mitigated with regular care.
   - ***2*** - Tree in decline, epicormic growth, extensive dieback of medium to large branches, significant structural defects that cannot be abated.
   - ***1*** - Tree in severe decline, dieback of scaffold branches and/or trunk; most of foliage from epicormics; extensive structural defects that cannot be abated.
   - ***0*** – Dead.

Description of Trees
We assessed 112 trees, representing 5 species (Table 1). Descriptions of each tree are found in the ***Tree Assessment Form*** and locations are plotted on the ***Tree Assessment Map*** (see Attachments).

The forested hillside was dominated by blue gum eucalyptus, representing 99 of the trees. As is typical in these forested settings, a handful of the blue gums are dominant and grow large, while others remain suppressed, fighting for light and resources beneath their larger neighbors. The blue gums were largely semi-mature, with diameters between 13" and 24" (47 trees) and young, with diameters between 6" and 12" (26 trees). Sixteen (16) of the blue gums were mature (24-36") and 10 were over-mature (37-62").

Overall, blue gums were in fair condition (51 trees). Twenty-five (25) were in poor condition, 21 were in good and 2 were dead. Condition of the blue gums reflects the dense forested setting and competition amongst the trees.

Five (5) river red gums were located just north of building #1279. All were in fair condition and three were semi-mature (13-16" in diameter).

Four (4) Monterey cypresses were included in the assessment. Three of these were located north of building 1279 (#127, 130 and 137) and #80 was located just east of building #1278. The three in the northern extent of the site were semi-mature (13-18" in diameter) and #80 was mature, with multiple stems measuring from 8-34" in diameter. With the exception of #130, which was suppressed beneath tree #130 and in fair condition, Monterey cypresses were in good to excellent condition.

One Monterey pine (tree #138) was assessed in the far north reach of the site. This was a young tree in good condition.

Table 1. Tree condition and frequency of occurrence.
Lendrum Ct. Remediation site, Presidio of San Francisco

Common Name	Scientific Name	Condition Rating				No. of trees
		Dead (0)	Poor (1-2)	Fair (3)	Good (4-5)	
Red river gum	*Eucalyptus camaldulensis*	-	-	5	-	5
Blue gum	*Eucalyptus globulus*	2	25	51	21	99
Monterey cypress	*Hesperocyparis macrocarpa*	-	-	1	3	4
Canary island pine	*Pinus canariensis*	-	-	1	2	3
Monterey pine	*Pinus radiata*	-	-	-	1	1
Total		**2**	**25**	**58**	**27**	**112**
		2%	22%	52%	24%	100%

Evaluation of Impacts
Appropriate tree retention develops a practical match between the location and intensity of remediation activities and the quality and health of trees. The November 19 ***Tree Assessment*** was the reference point for tree condition and quality. Potential impacts from the remediation work were evaluated using the Historic Forest Survey Plan (Exhibit 1) prepared TRC (dated December 3, 2015).

Soil remediation work will include excavation and removal of contaminated soil and placement and compaction of a soil cap. The current depth of excavation and soil cap is based on lead levels found during testing. Final depth of excavation and soil cap may change as a result of future soil testing performed during the soil excavation process.

Currently, there are four zones of excavation and soil cap proposed. These have been color-coded on the attached ***Tree Assessment Map*** and include:

- Blue - Soil cap with cut of up to 0.5' and fill of up to 1'.
- Orange - Key trench with cut of up to 2.5' and fill of up to 2.5' (this is to stabilize the cap up the hill?).
- Yellow - No soil cap but cut of up to 2.5' and fill of up to 5'.
- Purple - No soil cap but cut of up to 1.5' and fill of up to 1.5'.

Based on my assessment of the plans, a total of 54 of the trees fall within the proposed limits of grading. Fifty-eight (58 trees) fall outside of the limits of grading, including 12 that would be close to the current limits of grading.

In my opinion, trees within the orange (key trench) and yellow (cut of up to 2.5' and fill of up to 5') areas are going to be difficult to preserve, irrespective of special excavation and soil placement techniques. Roots of trees are typically concentrated in the top 2-3' of soil and removal of all of the soil around the roots to depths of 2.5' or more has the potential to destabilize the trees. A total of 27 of the trees currently fall within the orange (8 trees) and yellow (19 trees) areas and require removal (Table 2, following page).

A total of 27 trees fall within the blue and purple areas. For these trees, I would recommend focusing on those trees in the best condition and which will have the greatest likelihood of tolerating the impacts associated with soil excavation and placement of compacted fill around the roots. Removal is recommended for 20 of the trees within the blue and purple areas (8 blue and 12 purple), including 1 dead tree, 4 in poor condition and 15 in fair.

Preservation of the 7 trees in the blue and purple areas (6 blue and 1 purple) will require following the ***Tree Preservation Specifications*** provided at the end of this report. In addition, trees preserved where soil is removed, replaced and compacted can be expected to experience some amount of decline, such as dieback of twigs and branches, as a result.

Preservation is recommended for 54 of the trees outside the current limit of grading. Removal is recommended for 3 trees in poor condition that are close to the current limit of grading.

In summary, a total of 61 trees are recommended for preservation, 7 of which fall within the blue and purple remediation zones. Fifty-one (51) trees have been identified for removal, including 27 within the orange and yellow remediation zones, 20 within the blue and purple remediation zones and 3 that are close to the current limit of grading (Table 2, following page).

Tree #39 is proposed for preservation in close proximity to the access road from Lendrum Court. The access road will receive a layer of geotextile fabric and 4-6" of base rock. I believe the tree will tolerate impacts associated with the access road, provided the ***Tree Preservation Specifications*** are followed.

Table 2. Recommendations for Action
Lendrum Ct. Remediation site, Presidio of San Francisco

Tree No.	Common Name	Trunk Diameter	Remediation Zone	Recommendation
13	Blue gum	30,24,22,16,15	Beyond LOG	**Preserve**, outside impacts
14	Blue gum	30	Beyond LOG	**Preserve**, outside impacts
15	Blue gum	14	Beyond LOG	**Preserve**, outside impacts
16	Blue gum	28,25,24	Beyond LOG	**Preserve**, outside impacts
17	Blue gum	10	Beyond LOG	**Preserve**, outside impacts
18	Blue gum	11	Beyond LOG	**Preserve**, outside impacts
19	Blue gum	13	Beyond LOG	**Preserve**, outside impacts
20	Blue gum	12,10	Beyond LOG	**Preserve**, outside impacts
21	Blue gum	14,10	Beyond LOG	**Preserve**, outside impacts
22	Blue gum	8	Beyond LOG	**Preserve**, outside impacts
23	Blue gum	26	Beyond LOG	**Preserve**, outside impacts
24	Blue gum	14	Beyond LOG	**Preserve**, outside impacts
25	Blue gum	9,6	Beyond LOG	**Preserve**, outside impacts
26	Blue gum	7	Beyond LOG	**Preserve**, outside impacts
27	Blue gum	26	Beyond LOG	**Preserve**, outside impacts
29	Blue gum	15	Beyond LOG	**Preserve**, outside impacts
30	Blue gum	14	Beyond LOG	**Preserve**, outside impacts
31	Blue gum	10	Beyond LOG	**Preserve**, outside impacts
32	Blue gum	22,20, 20,13,10,9,6	Beyond LOG	**Preserve**, outside impacts
33	Blue gum	16	Close to LOG	Remove, declining.
34	Blue gum	14	Beyond LOG	**Preserve**, outside impacts
35	Blue gum	24	Purple	Remove, fair condition.
36	Blue gum	39	Purple	Remove, fair condition.
37	Blue gum	22	Purple	Remove, fair condition.
38	Blue gum	10	Purple	Remove, declining.
39	Blue gum	34	Purple	**Preserve**, hand work
40	Blue gum	48	Yellow	Remove, cut/fill 2.5-5'.
41	Canary island pine	20	Yellow	Remove, cut/fill 2.5-5'.
42	Canary island pine	24	Yellow	Remove, cut/fill 2.5-5'.
43	Canary island pine	22	Yellow	Remove, cut/fill 2.5-5'.
44	Blue gum	30	Purple	Remove, fair condition.
45	Blue gum	14	Purple	Remove, fair condition.
46	Blue gum	22	Orange	Remove, key trench.
47	Blue gum	19	Blue	**Preserve**, hand work
48	Blue gum	9	Blue	Remove, dead.
49	Blue gum	20	Blue	Remove, declining.
50	Blue gum	36,10	Blue	**Preserve**, hand work
51	Blue gum	22	Blue	Remove, fair condition.
52	Blue gum	21	Purple	Remove, fair condition.
53	Blue gum	16	Purple	Remove, declining.
54	Blue gum	18	Purple	Remove, fair condition.
55	Blue gum	12	Purple	Remove, fair condition.
56	Blue gum	14,8,8	Purple	Remove, fair condition.
57	Blue gum	6	Beyond LOG	**Preserve**, outside impacts
58	Blue gum	7	Beyond LOG	**Preserve**, outside impacts
59	Blue gum	6	Beyond LOG	**Preserve**, outside impacts
60	Blue gum	28,18,18,16	Close to LOG	**Preserve**, close to LOG

(**Continued, following page**)

Table 2. Recommendations for Action, continued
Lendrum Ct. Remediation site, Presidio of San Francisco

Tree No.	Common Name	Trunk Diameter	Remediation Zone	Recommendation
61	Blue gum	24	Close to LOG	**Preserve**, close to LOG
62	Blue gum	12	Close to LOG	Remove, declining.
63	Blue gum	23	Close to LOG	**Preserve**, close to LOG
64	Blue gum	8	Beyond LOG	**Preserve**, outside impacts
65	Blue gum	7	Beyond LOG	**Preserve**, outside impacts
66	Blue gum	20	Purple	Remove, fair condition.
67	Blue gum	26,23	Close to LOG	Remove, fair condition.
68	Blue gum	10	Close to LOG	Remove, declining.
69	Blue gum	6	Beyond LOG	**Preserve**, outside impacts
70	Blue gum	12	Yellow	Remove, cut/fill 2.5-5'.
71	Blue gum	20,18,16	Close to LOG	**Preserve**, close to LOG
72	Blue gum	33	Yellow	Remove, cut/fill 2.5-5'.
73	Blue gum	16	Yellow	Remove, cut/fill 2.5-5'.
74	Blue gum	9	Beyond LOG	**Preserve**, outside impacts
75	Blue gum	24,20,18,18,14	Beyond LOG	**Preserve**, outside impacts
76	Blue gum	13	Yellow	Remove, cut/fill 2.5-5'.
77	Blue gum	22,19	Yellow	Remove, cut/fill 2.5-5'.
79	Blue gum	36,26	Orange	Remove, key trench.
80	Monterey cypress	34,26,15,8	Blue	**Preserve**, hand work
81	Blue gum	40,22,10	Blue	Remove, declining.
82	Blue gum	15	Yellow	Remove, cut/fill 2.5-5'.
83	Blue gum	17,14	Beyond LOG	**Preserve**, outside impacts
84	Blue gum	20	Beyond LOG	**Preserve**, outside impacts
85	Blue gum	24,22,14,12,8,5	Beyond LOG	**Preserve**, outside impacts
87	Blue gum	10	Blue	**Preserve**, hand work
88	Blue gum	11,11,9,8,8,6,3	Yellow	Remove, cut/fill 2.5-5'.
89	Blue gum	22,12,9,9,9,8	Yellow	Remove, cut/fill 2.5-5'.
90	Blue gum	7	Yellow	Remove, cut/fill 2.5-5'.
91	Blue gum	22	Yellow	Remove, cut/fill 2.5-5'.
93	Blue gum	10	Beyond LOG	**Preserve**, outside impacts
94	Blue gum	36	Beyond LOG	**Preserve**, outside impacts
95	Blue gum	15,12,8,6	Beyond LOG	**Preserve**, outside impacts
96	Blue gum	21	Yellow	Remove, cut/fill 2.5-5'.
97	Blue gum	50	Yellow	Remove, cut/fill 2.5-5'.
98	Blue gum	12	Blue	Remove, fair condition.
99	Blue gum	44	Orange	Remove, key trench.
100	Blue gum	23	Yellow	Remove, cut/fill 2.5-5'.
101	Blue gum	20	Yellow	Remove, cut/fill 2.5-5'.
102	Blue gum	8	Yellow	Remove, cut/fill 2.5-5'.
103	Blue gum	30	Beyond LOG	**Preserve**, outside impacts
104	Blue gum	13	Orange	Remove, key trench.
105	Blue gum	54	Close to LOG	**Preserve**, close to LOG
107	Blue gum	26	Beyond LOG	**Preserve**, outside impacts
108	Blue gum	24,18,8	Beyond LOG	**Preserve**, outside impacts
109	Blue gum	14,13,9,8	Beyond LOG	**Preserve**, outside impacts
110	Blue gum	41	Beyond LOG	**Preserve**, outside impacts
111	Blue gum	16,12	Beyond LOG	**Preserve**, outside impacts

(**Continued, following page**)

Table 2. Recommendations for Action, continued
Lendrum Ct. Remediation site, Presidio of San Francisco

Tree No.	Common Name	Trunk Diameter	Remediation Zone	Recommendation
114	Blue gum	20, 14	Blue	Remove, fair condition.
115	Blue gum	62	Blue	**Preserve**, hand work
117	Blue gum	14,7	Blue	Remove, fair condition.
118	Blue gum	24,21,13	Orange	Remove, key trench.
119	Blue gum	24	Close to LOG	**Preserve**, close to LOG
121	Blue gum	36,31,18	Beyond LOG	**Preserve**, outside impacts
124	Blue gum	17	Close to LOG	**Preserve**, close to LOG
125	Blue gum	50,36	Beyond LOG	**Preserve**, outside impacts
127	Monterey cypress	18	Beyond LOG	**Preserve**, outside impacts
129	Red river gum	16,14,12	Orange	Remove, key trench.
130	Monterey cypress	16	Orange	Remove, key trench.
132	Red river gum	15	Close to LOG	**Preserve**, close to LOG
133	Red river gum	13,8	Orange	Remove, key trench.
134	Red river gum	10	Blue	Remove, fair condition.
135	Red river gum	22,16,12	Blue	**Preserve**, hand work
137	Monterey cypress	13	Beyond LOG	**Preserve**, outside impacts
138	Monterey pine	12	Beyond LOG	**Preserve**, outside impacts
139	Blue gum	50	Beyond LOG	**Preserve**, outside impacts

Specific recommendations for cap soil will be provided following review of soil test results. In addition, windthrow potential analysis shall be performed for those trees to be preserved once a final decision on which trees will be preserved and removed is made.

If you have any questions or comments regarding my observations or recommendations, please contact me.

John Leffingwell
Board Certified Master Arborist #3966B
Registered Consulting Arborist #442

Attached: ***Tree Preservation Specifications***

Tree Assessment Form

Tree Assessment Map

Tree Preservation Specifications
Lendrum Ct. Remediation project

Design recommendations

1. All plans affecting trees shall be reviewed by the Consulting Arborist with regard to tree impacts. These include, but are not limited to, demolition plans, grading and utility plans.
2. Forward results of soil tests for the cap soil to the Consulting Arborist for review and comment as they are available. Recommendations for cap soil around trees to be preserved within the remediation zones will be provided following review of test results.
3. For those trees identified for preservation within remediation areas, special excavation techniques, such as water or air excavation, must be used to minimize root damage and loss.
4. Evaluate keeping compaction of cap soil around trees to be preserved within the remediation zones at 80% or less.
5. A **TREE PROTECTION ZONE** (**TPZ**) must be established for trees to be preserved, in which no disturbance is permitted. **TREE PROTECTION ZONES** for trees identified for preservation shall be established at the dripline. Any work within the **TPZ**, such as air or water soil excavation, but must be approved and monitored by the Consulting Arborist.
6. If temporary haul or access roads must pass over **TREE PROTECTION ZONES** of trees to be retained, a road bed of 6" of mulch or gravel shall be created to reduce soil compaction and root damage. The road bed material shall be replenished as necessary to maintain a 6" depth. Use of a geotextile fabric beneath the rock can help in rock removal.
7. To protect the trunk of tree #39 from equipment damage, wrap the trunk to a height of 8' with straw wattle and orange snow fencing to provide a visual cue and protection from contact.
8. Underground services including utilities, sub-drains, water or sewer shall be routed around the **TREE PROTECTION ZONE**. Where encroachment cannot be avoided, special construction techniques such as hand digging or tunneling under roots shall be employed where necessary to minimize root loss.
9. **Tree Preservation Notes**, prepared by the Consulting Arborist, should be included on all plans.

Pre-construction and demolition treatments and recommendations

1. The tree removal contractor shall meet with the Consulting Arborist before beginning work to discuss work procedures and tree protection.
2. Where possible, cap and abandon all existing underground utilities within the **TPZ** in place. Removal of utility boxes by hand is acceptable but no trenching should be performed within the **TPZ** in an effort to remove utilities, irrigation lines, etc.
3. If structures and underground features have to be removed within the **TREE PROTECTION ZONE** it shall be done by hand or using the smallest equipment, and operate from outside the **TREE PROTECTION ZONE**. The Consulting Arborist shall be on-site during all operations within the **TREE PROTECTION ZONE** to monitor demolition activity.

4. Once the limit of grading has been determined, establish a fence at that limit to prevent damage to trees preserved outside the limit of grading. Fences shall be 6 ft. chain link or equivalent as approved by Consulting Arborist. Fences are to remain until all grading and soil placement and compaction is completed. Place weather proof signs, 2' x 2', on the fencing that read "**TREE PROTECTION ZONE** Keep Out" (eg. one sign for each of the four compass points).

5. Prune trees to be preserved within the remediation zones to clean the crown and to provide construction clearance. All pruning shall be done by a State of California Licensed Tree Contractor (C61/D49). All pruning shall be done by Certified Arborist or Certified Tree Worker in accordance with the Best Management Practices for Pruning (International Society of Arboriculture, 2002) and adhere to the most recent editions of the American National Standard for Tree Care Operations (Z133.1) and Pruning (A300).

6. All tree work shall comply with the Migratory Bird Treaty Act as well as California Fish and Wildlife code 3503-3513 to not disturb nesting birds. To the extent feasible tree pruning and removal should be scheduled outside of the breeding season. Breeding bird surveys should be conducted prior to tree work. Qualified biologists should be involved in establishing work buffers for active nests.

Tree protection during construction

1. Prior to beginning work, the contractors working in the vicinity of trees to be preserved are required to meet with the Consulting Arborist at the site to review all work procedures, access routes, storage areas and tree protection measures.

2. Any excavation within the (**TPZ**) or other work that is expected to encounter tree roots shall be approved and monitored by the Consulting Arborist.

3. If injury should occur to any tree during construction, it should be evaluated as soon as possible by the Consulting Arborist so that appropriate treatments can be applied.

4. Fences have been erected to protect trees to be preserved. Fences define a specific **TREE PROTECTION ZONE** for each tree or group of trees. Fences are to remain until all site work has been completed. Fences may not be relocated or removed without permission of the Consulting Arborist.

5. No materials, equipment, spoil, waste or wash-out water may be deposited, stored, or parked within the **TREE PROTECTION ZONE** (fenced area), neither temporarily nor permanently.

6. Any additional tree pruning needed for clearance during construction must be performed by a qualified arborist and not by construction personnel.

7. Any roots damaged during grading or construction shall be exposed to sound tissue and cut cleanly with a saw.

8. Following soil remediation work, apply 4-6" of wood chip mulch within the **TREE PROTECTION ZONE** of trees preserved within the remediation zones. Use of chips from trees removed on the project is encouraged.

End of specifications

Tree Assessment

Lendrum Ct. Remediation
Presidio of San Francisco, California
November 2015

HORT SCIENCE

TRUST No.	TRC No.	SPECIES	SIZE DIAMETER (in inches)	CONDITION 0=DEAD, 1=POOR 5=EXCELLENT	COMMENTS
--	13	Blue gum	30,24,22,16,15	3	Multiple attachments at 3'; one sided with laterals & dead branches S. over Lendrum Ct.
--	14	Blue gum	30	3	High crown; lateral S.; moderate dieback.
--	15	Blue gum	14	2	High, small crown; extensive dieback.
--	16	Blue gum	28,25,24	4	Multiple attachments at 3'; upright form; crooks in upper canopy; dieback.
--	17	Blue gum	10	3	Suppressed; small crown; dieback.
--	18	Blue gum	11	2	Suppressed; high, small crown; dieback.
--	19	Blue gum	13	2	High, small crown; crook at 30'; moderate dieback.
--	20	Blue gum	12,10	2	Codominant trunks at 2'; suppressed; dead top.
--	21	Blue gum	14,10	2	Codominant trunks at base; suppressed; extensive dieback.
--	22	Blue gum	8	1	Suppressed; declining.
--	23	Blue gum	26	3	High crown; one sided E.; dead branches.
--	24	Blue gum	14	3	High, small crown.
--	25	Blue gum	9,6	2	Suppressed; declining.
--	26	Blue gum	7	1	Leans heavily S. over Lendrum Ct.
--	27	Blue gum	26	3	Leans S.; crook at 30'; small lateral S.
--	29	Blue gum	15	3	High crown; crook at 30'; weight E.
--	30	Blue gum	14	2	Suppressed; lateral S. over Lendrum Ct.
--	31	Blue gum	10	3	Trunk sweeps from base.
--	32	Blue gum	22,20, 20,13,10,9,6	3	Multiple attachments at 2'; lateral S. over Lendrum Ct.; several dead stems.
--	33	Blue gum	16	2	Codominant trunks at 7'; suppressed; declining.
--	34	Blue gum	14	3	Suppressed; leans S. over Lendrum Ct.

Tree Assessment

Lendrum Ct. Remediation
Presidio of San Francisco, California
November 2015

HORT SCIENCE

TRUST No.	TRC No.	SPECIES	SIZE DIAMETER (in inches)	CONDITION 0=DEAD, 1=POOR 5=EXCELLENT	COMMENTS
--	35	Blue gum	24	3	High crown; very one sided W.; lateral over Lendrum Ct.
--	36	Blue gum	39	3	Multiple attachments at 8'; one sided S.; moderate dieback; ivy.
--	37	Blue gum	22	3	High crown; weight NW.
--	38	Blue gum	10	2	Suppressed; declining.
5602	39	Blue gum	34	4	Multiple attachments at 30'; asymmetric form; moderate dieback; ivy.
5601	40	Blue gum	48	4	Codominant trunks at 7'; good form and structure; moderate dieback; ivy.
5600	41	Canary island pine	20	4	One sided NE..; ivy.
5599	42	Canary island pine	24	3	Asymmetric form; lateral N.; ivy.
5598	43	Canary island pine	22	4	Upright form; one sided W.; ivy.
--	44	Blue gum	30	3	Upright form; dead branches to 4".
--	45	Blue gum	14	3	Suppressed; slight lean N.; good vigor.
--	46	Blue gum	22	4	Asymmetric; laterals NW.
--	47	Blue gum	19	4	Asymmetric form; laterals.
--	48	Blue gum	9	0	Dead.
--	49	Blue gum	20	2	Basal wound; leans NE.; small crown.
5603	50	Blue gum	36,10	4	Good form; windswept N.; dieback.
--	51	Blue gum	22	3	Leans E.; small crown; extensive dieback.
--	52	Blue gum	21	3	Slight lean NE.; fair structure; dieback.
--	53	Blue gum	16	2	Lost top at 20'; high, small crown.
--	54	Blue gum	18	3	Crook at 40'; high, small crown.
--	55	Blue gum	12	3	High crown; dieback.
--	56	Blue gum	14,8,8	3	Multiple attachments at base; dead tops; dieback.

Tree Assessment

Lendrum Ct. Remediation
Presidio of San Francisco, California
November 2015

HORT SCIENCE

TRUST No.	TRC No.	SPECIES	SIZE DIAMETER (in inches)	CONDITION 0=DEAD, 1=POOR 5=EXCELLENT	COMMENTS
--	57	Blue gum	6	0	Dead.
--	58	Blue gum	7	1	Almost dead.
--	59	Blue gum	6	3	High, small crown; dieback.
--	60	Blue gum	28,18,18,16	3	Multiple attachments at 3'; low stem SW.; moderate dieback.
--	61	Blue gum	24	3	Codominant trunks at base; 26" stem high crown & asymmetric; 12" stem topped at 8'.
--	62	Blue gum	12	2	Suppressed; declining.
--	63	Blue gum	23	3	High crown; crook at 35'.
--	64	Blue gum	8	1	Suppressed; lost top
--	65	Blue gum	7	2	Leans E.; dieback.
--	66	Blue gum	20	3	Slight lean NW.; trunk wound; small crown.
--	67	Blue gum	26,23	3	Codominant trunks at 3'; upright form; basal cavity N.
--	68	Blue gum	10	1	Declining.
--	69	Blue gum	6	3	High, small crown; crooks in upper crown.
--	70	Blue gum	12	3	Codominant trunks at 3'; 7" stem dead ; 12" stem asymmetric.
--	71	Blue gum	20,18,16	4	Multiple attachments at 3'; upright form; crooks in upper canopy; dieback.
--	72	Blue gum	33	3	Codominant trunks at 2'; stems twisted around each other; lateral W.; dieback.
--	73	Blue gum	16	3	Narrow form; lower branches dead; nasal cavity.
--	74	Blue gum	9	3	Upright form; small crown.
--	75	Blue gum	24,20,18,18,14	4	Multiple attachments at 3'; upright form; crooks in upper canopy; dieback.
--	76	Blue gum	13	3	Crook at 40'; high, small crown.

Tree Assessment

Lendrum Ct. Remediation
Presidio of San Francisco, California
November 2015

HORT SCIENCE

TRUST No.	TRC No.	SPECIES	SIZE DIAMETER (in inches)	CONDITION 0=DEAD, 1=POOR 5=EXCELLENT	COMMENTS
--	77	Blue gum	22,19	3	Codominant trunks at 2'; 22" stem upright; 19" stem leans E. to horizontal; dead branches.
--	79	Blue gum	36,26	4	Codominant trunks at 3'; good form and structure; thin canopy; dead branches to 4".
--	80	Monterey cypress	34,26,15,8	4	Spreading form; branches to ground; dead/broken branches E.
--	81	Blue gum	40,22,10	1	Mostly dead.
--	82	Blue gum	15	2	One sided N.; trunk wounds; dieback.
--	83	Blue gum	17,14	3	Codominant trunks at 3'; upright form; dieback.
--	84	Blue gum	20	4	Good form and structure; high crown; one sided E.
--	85	Blue gum	24,22,14,12,8,5	4	Multiple attachments at 3'; mostly upright; couple of smaller stems extend E.; dieback.
--	87	Blue gum	10	4	Good form and structure; one sided S.; dieback.
--	88	Blue gum	11,11,9,8,8,6,3	3	Multiple attachments at base; stump sprout; basal cavities & decay.
--	89	Blue gum	22,12,9,9,9,8	3	Multiple attachments at base; upright, narrow form; dieback.
--	90	Blue gum	7	2	Dead top.
--	91	Blue gum	22	4	High crown; one sided NE.
--	93	Blue gum	10	1	Mostly dead.
--	94	Blue gum	36	3	Codominant trunks at 20'; one sided E.; moderate dieback.
--	95	Blue gum	15,12,8,6	2	Multiple attachments at 3'; extensive dieback.
--	96	Blue gum	21	2	Codominant trunks at 15'; one sided E.; extensive dieback.

Tree Assessment

Lendrum Ct. Remediation
Presidio of San Francisco, California
November 2015

HORT SCIENCE

TRUST No.	TRC No.	SPECIES	SIZE DIAMETER (in inches)	CONDITION 0=DEAD, 1=POOR 5=EXCELLENT	COMMENTS
--	97	Blue gum	50	4	Multiple attachments at 10'; upright form; moderate dieback.
--	98	Blue gum	12	3	Very one sided SE.; moderate dieback.
--	99	Blue gum	44	4	Codominant trunks at 20'; narrow attachment; upright form; dieback.
--	100	Blue gum	23	3	High crown; one sided E.; dieback.
--	101	Blue gum	20	3	Codominant trunks at 4'; suppressed; lateral S.; dieback.
--	102	Blue gum	8	3	High, small crown; dieback.
--	103	Blue gum	30	4	Codominant trunks at 20'; one sided with laterals E.; dieback.
--	104	Blue gum	13	3	Suppressed; crown bowed E.; dieback.
--	105	Blue gum	54	4	Multiple attachments at 7'; upright form; dead branches S.; dieback.
--	107	Blue gum	26	3	High crown; one sided NE.; moderate dieback.
--	108	Blue gum	24,18,8	3	Suppressed; poor form and structure; dieback.
--	109	Blue gum	14,13,9,8	3	Multiple attachments at 4'; narrow form; dieback.
--	110	Blue gum	41	3	Codominant trunks at 6'; one sided E.; moderate dieback.
--	111	Blue gum	16,12	3	Codominant trunks at 3'; one stem bowed E.; other stem upright; moderate dieback.
5606	114	Blue gum	20, 14	3	Codominant trunks at 3'; crown bowed N.; 13" stem dead.
--	115	Blue gum	62	4	Multiple attachments at 7'; one sided E.; laterals E.; dead branches to 5".

Tree Assessment

Lendrum Ct. Remediation
Presidio of San Francisco, California
November 2015

HORT SCIENCE

TRUST No.	TRC No.	SPECIES	SIZE DIAMETER (in inches)	CONDITION 0=DEAD, 1=POOR 5=EXCELLENT	COMMENTS
--	117	Blue gum	14, 7	3	Codominant trunks at 2'; several laterals NW.; dieback.
--	118	Blue gum	24,21,13	2	Multiple attachments at base; basal decay; 25" stem dead.
--	119	Blue gum	24	3	One sided and leaning E.; dead branches to 8".
--	121	Blue gum	36,31,18	4	Multiple attachments at 4'; upper crown sweeps E.; dead branches to 7".
--	124	Blue gum	17	3	Crooks at 10' & 30'; bleeding.
--	125	Blue gum	50,36	4	Multiple attachments at 6'; spreading form; lateral S.; dead branches to 5".
--	127	Monterey cypress	18	4	Upright; one sided SW.
--	129	Red river gum	16,14,12	3	Multiple attachments at 3'; spreading form; dieback.
--	130	Monterey cypress	16	3	Overtopped by #129; poor form and structure.
--	132	Red river gum	15	3	Multiple attachments at 7'; history of branch failure.
--	133	Red river gum	13,8	3	Codominant trunks at base; trunk wound on 10" stem.
--	134	Red river gum	10	3	Codominant trunks at 5'; 14" stem broken at 10'; dieback.
5607	135	Red river gum	22,16,12	3	Multiple attachments at 3'; 16" stem broken at 8'; dieback.
--	137	Monterey cypress	13	5	Good young tree.
--	138	Monterey pine	12	4	Good young tree; lost top.
--	139	Blue gum	50	4	Codominant trunks at 20'; good form and structure.

Potential Limit of Grading

Trees 80, 87, and 115 (Preserve if possible)

Trees 47 and 50 (Preserve if possible)

Trees 39, 11, and 12 (Preserve if possible)

ADDITIONAL SITE ACCESS (N)

1280

1279

1278

1259

1258

Lendrum Court

Armistead Road

Lincoln Blvd.

LINCOLN BLVD

CRISSY FIELD

LEGEND

- Approximate site boundary
- Potential Limit of Grading (Overexcavation / Drainage)
- Phase 2 / Historic Forest CAP Limit (approximate)
- Approximate extent of debris, *(from EKI, Inc. (April 2015) Remedial Investigation Summary Report)*
- Tree/Shrub identified for removal
- 145 — Existing contour elevation
- Site Tree (Within Work Area)
- Site Tree (Outside Work Area)
- Toyon (Heteromeles arbutifolia)
- Approximate area of debris removal 2.5' to 5' bgs
- Approximate area of surface lead impacted soil to be removed to 1.5' bgs
- Trees outside cap with cut/fill to 1.5'
- Trees in cap with cut/fill of 0.5'/1.5
- Trees in key trench area with cut/fill to 2.5'
- Trees outside cap with cut/fill of 2.5' to 5'

N

SCALE (FEET)

0 50 100

SOURCE: Base plan by Towill, October 29-November 4, 2015

Historic Forest Survey
HortScience and HT Harvey Recomendations

Lendrum Court Historic Forest Phase II
The Presidio Trust
San Francisco, California

TRC 229649 **DRAFT EXHIBIT 1**

FILE NAME: \\Sanfran-fs1\sanfran\PROJECTS\CAD\Lendrum Court_San Francisco\Exhibit 1-Tree Survey 12.03.2015.dwg | Layout Tab: 11x17

ATTACHMENT I-3
PROJECT UPDATE PRESENTATION – JANUARY 7, 2016

Lendrum Court Site Remediation

Project Update

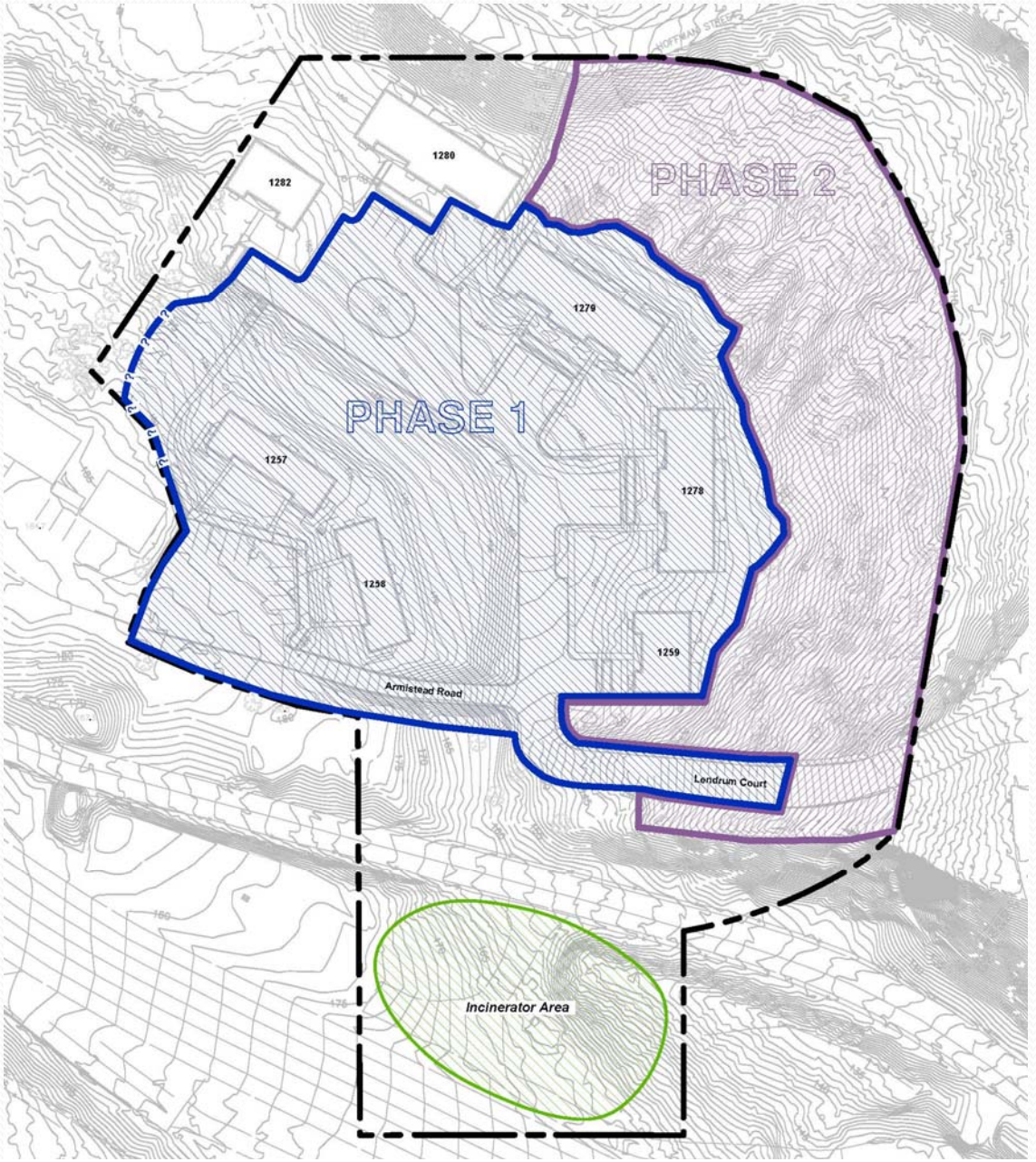
January 7, 2016

Agenda

- Required Phase 2 Remedial Actions
- Landscape Evaluations and Assessments
  - HortScience – Tree Assessment
  - H.T. Harvey and Associates – Toyon Assessment
- Vegetation Removal Plan
- Post Remediation Planting Plan
- Questions & Answers

Remedial Phases

- Phase 1 – Residential Area
- Phase 2 – Historic Forest Area



Current Status of Activities

- Since the September 2015 meeting the project completed:
  - Topographical survey of historic forest
  - Tree evaluation by HortScience
  - Toyon & Understory Evaluation by HT Harvey & Associates
  - Trust internal coordination
  - Developed recommendations for tree preservation

Vegetative Analysis

- HortScience (December 2015) Lendrum Court Remediation Tree Assessment Memorandum
  - Assessed 112 trees, 54 located within the potential limit of grading
  - Condition ratings relative to tree health and structure
  - Rating scale 0 to 5, with 0 = dead.
  - Of the trees in construction area, majority rated fair (3 rating).

- H.T. Harvey Associates (November 2015) Native Understory Shrub Survey Results memorandum
  - Toyon evaluated for health and vigor based on leaf color, fruit development, new growth, trunk and limb damage, and fungal/insect infestation.
  - Of the approximately 50 Toyon with a diameter of 2-inches or greater, ranked low to medium, with majority rated low.
  - A low incident of Toyon natural seedlings was observed.

Tree 58 - Dead

Tree 130 – Poor form and structure

Tree 50 – Windswept, dieback, will preserve

Tree 80 – Spreading, broken branches

Toyon Health

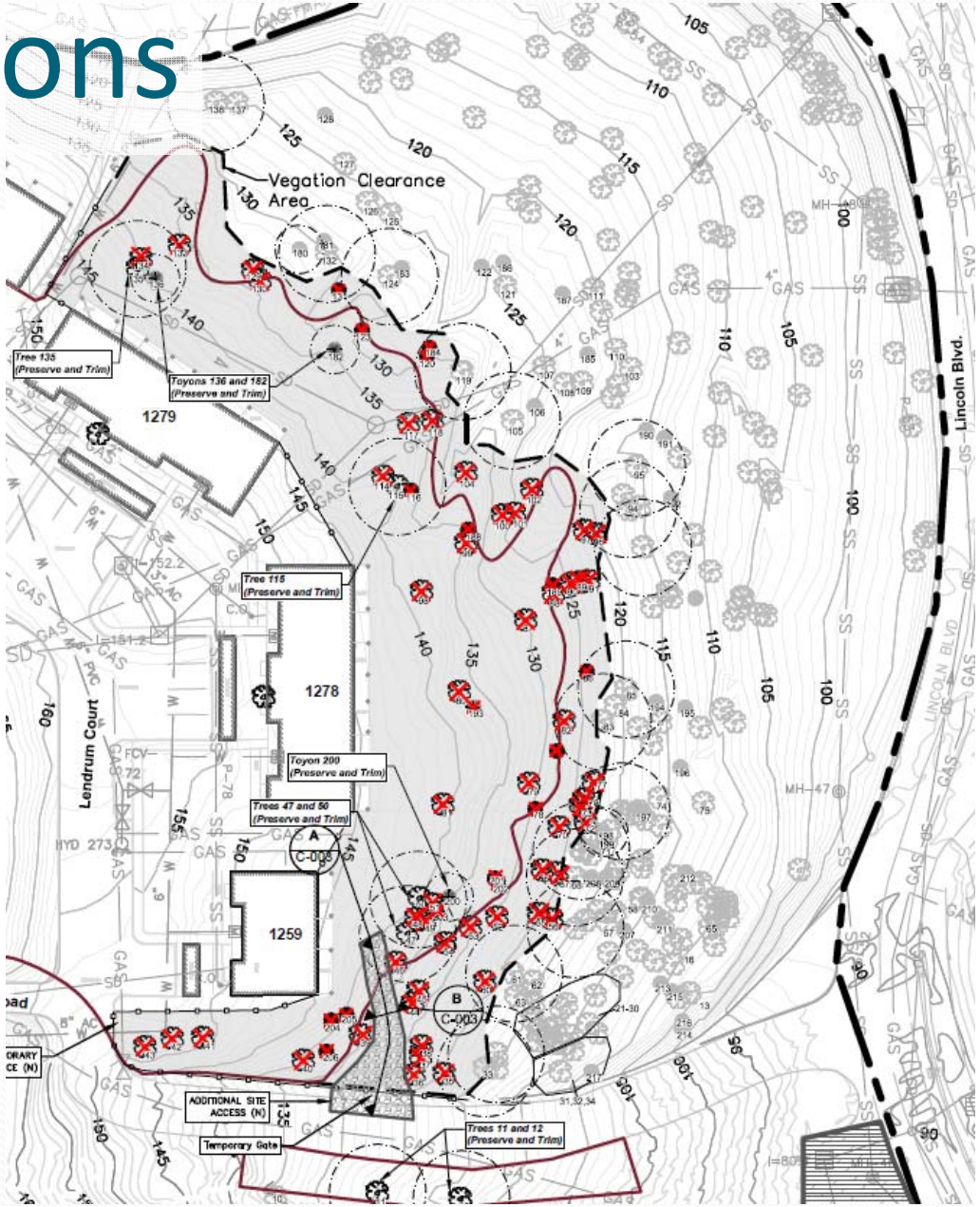
Recommendations

Within the Potential Limit of Grading:

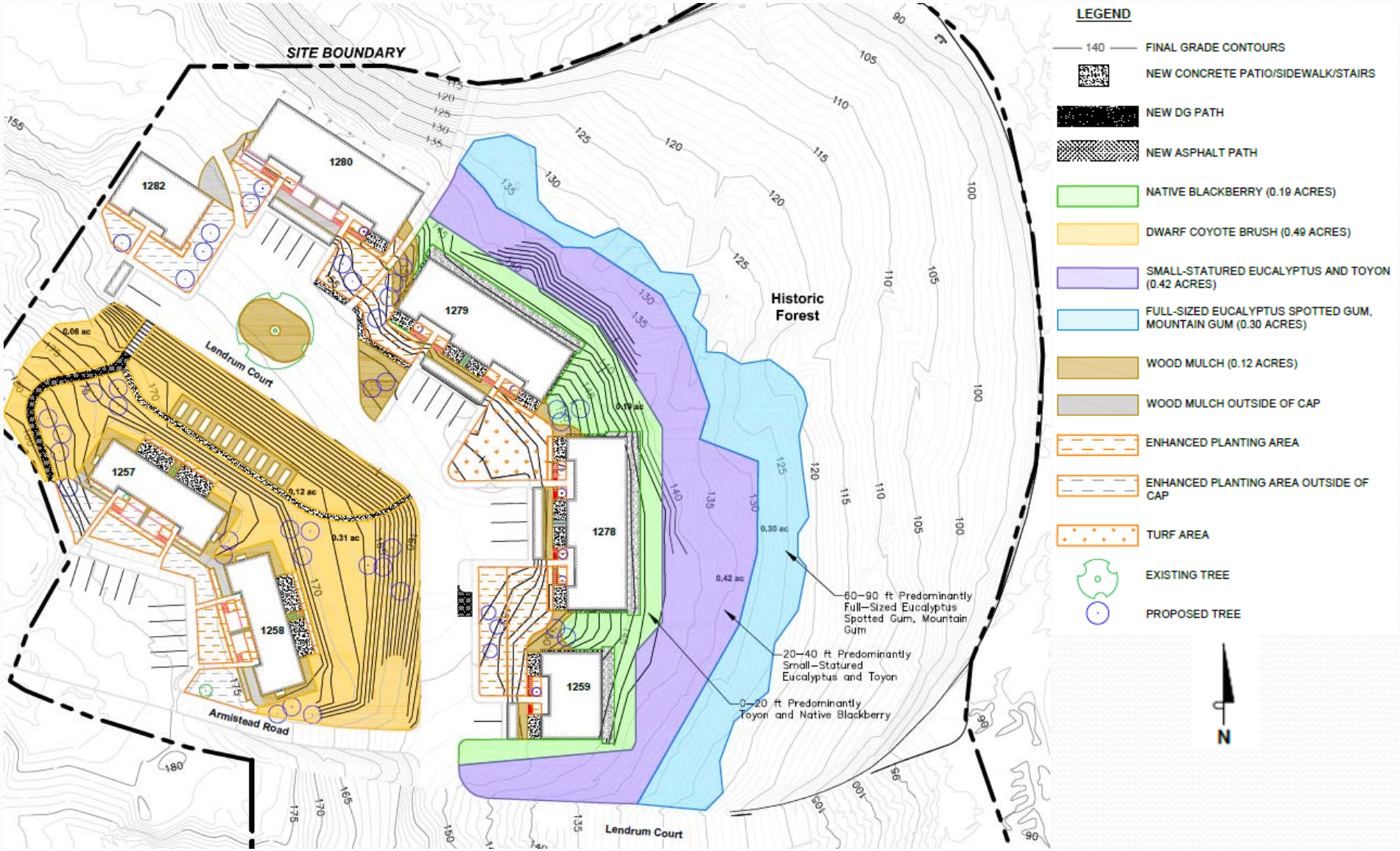
- Preserve up to 4 trees in debris area
- Preserve 2 trees south of Lendrum
- Preserve 3 Toyon
- Remove understory
- Replant

Outside the Limit of Grading

- Over 150 trees to be preserved
- Over 25 Toyon to be preserved
- Understory to remain intact
- Trimming to improve health of remaining trees



Post-Remedial Construction Planting



Post Remediation Native Plantings

World War II Memorial plants 2014 and 2015

Post Remediation Planting

Trees planted at Landfill E (Pop Hicks Field) in 2013 and today

Tree Planting at Rob Hill

Eucalyptus trees planted in 2003

Tree Growth at Rob Hill

Currently, 20 to 40-feet tall

Next Steps

- Nesting bird survey – end of January 2016
- Vegetation and tree removal – February
- Final design – March
- Regulatory review/approval of Phase 2 Design– April
- Construction start weather permitting - May
- Documents posted at:

http://www.presidio.gov/presidio-trust/planning/Pages/Lendrum-Court-Remediation.aspx

Vegetation Removals

- Work hours 8am to 5pm, Monday through Friday, with potential for Saturday work if necessary.
- Estimated duration: 30 work days
- Traffic control and flagman
- Staging of contractor's equipment and chipping will likely be on Lincoln Blvd.

Questions?

ATTACHMENT I-4
TREE REMOVAL BID PACKAGE

SUMMARY OF WORK

1. The work to be completed under this contract shall consist of furnishing all tools, equipment, materials, supplies, and manufactured articles and labor, transportation and services, including fuel, power, water and essential communications, and performing all work, or other operations required for the removal of trees and vegetation; trimming of select trees and construction of a temporary access road in support of the Lendrum Court Remediation Project.
2. Obtain necessary permits from the Trust, specifically the Dig Permit, and shall notify Underground Service Alert (USA) to confirm location of underground utilities prior to the start of work.
3. Establish a temporary construction fence separating the vegetative clearance area from adjacent buildings and roads as shown in Drawing C-002. Temporary fence shall be chain link fencing and secured with weighted blocks or sandbags as necessary.
4. Construct a temporary access road in the area labeled "Additional Site Access" shown on C-002, as specified in the AGGREGATE BASE ACCESS ROAD SPECIFICATIONS section on this sheet and drawing C-003
5. Trees and vegetation shall be cleared with in the vegetative clearance area, shown on C-002, with exception of trees marked for preservation. Vegetation shall be cut as close to the roots as possible without disturbing site soils and no higher than 6-inches from the ground surface.
6. Prune Trees to be preserved within the vegetative clearance area as directed by the Trust/Trust Representative. All pruning shall be done by a State of California licensed tree contractor (C61/D49) and adhere to the most recent editions of the American National Standards for Tree Care Operations (Z133.1) and Pruning (A300). All pruning shall be done by certified arborist or certified tree worker in accordance with the best management practices for pruning (International Society of Arboriculture, 2002).
7. Cut all felled trees and vegetation to workable sizes and transport to staging area. Chip tree and woody material. Reserve chipped wood for placement as mulch within the vegetative area following tree and vegetation removal.
8. Following tree and vegetation clearing, apply 2-3-inches of wood chips in vegetation clearance area.
9. Dispose of excess vegetation at an off-site disposal facility approved by the Trust.
10. A list identifying trees designated for removal is provided on Table 1.

PRE-CONSTRUCTION REQUIREMENTS:

1. Contractor shall submit a Vegetation Removal Plan one week prior to mobilization. Plan shall:
   a. Outline the sequence of the contractors work activities.
   b. Provide a daily schedule of anticipated work activities.
   c. Show layout of the staging area.
   d. Detail tree protection measures.
   e. Detail SWPPP protection measures.
   f. Identify off-site disposal facility.
2. Contractor shall submit a site Health & Safety Plan in conformance with applicable law.
3. Prior to mobilization, Contractor shall meet with the Trust arborist to discuss work procedures and tree protection.
4. Temporary fences shall be erected as feasible to protect trees to be preserved as shown on C-002. Typical orange construction fencing shall be used to define a specific tree protection zone for each tree or group of trees to be preserved within or adjacent to the vegetative clearance area of 20-feet for trees and 10-feet for toyons or as agreed to with the Trust arborist. Fencing is to remain in place until all work is completed.
5. No materials, equipment, soil, waste or wash-out may be deposited, stored, or placed within the tree protection zones.
6. Any additional tree pruning for clearance or to facilitate the work must be approved by the Trust arborist.

OTHER REQUIREMENTS:

1. All work shall comply with the migratory bird treaty act as well as California Fish and Wildlife Code 3503-3513. The Trust will complete a bird nesting survey no longer than 3-days prior to the Contractor mobilization to the site. Contractor shall modify work sequence as necessary to maintain buffers established by the Trust for nesting birds.
2. The Trust will supply a biologic monitor as necessary during Contractor execution of the work. The biological monitor is authorized to give direction to the contractor to prevent impacts to nesting birds.
3. The Trust will supply a qualified arborist to monitor Contractor work. The Trust arborist will be authorized to give direction to the contractor to prevent damage to the health of trees, their roots, substrate, trunk, libs or foliage and to remedy any damage done to the same.
4. The Trust will supply an archeologist to monitor Contractors work. The Trust archeologist will be authorized to give direction to the Contractor to prevent and/or minimize damage to historic earth works located at the northeastern edge of the vegetation clearance area.
5. Work hours are 8:00AM to 5:00PM Monday through Friday. No evening or weekend work is allowed without the written permission of the Trust.
6. Contractor will provide traffic control throughout the project to maintain safe access to and from the area.
7. Contractor work will occur in close proximity to existing facilities, including but not limited to shrubs, trees, and site improvements. The Contractor shall take extreme care not to damage existing facilities. The Contractor shall immediately notify the Trust if any facilities are damaged and shall make repairs as directed by the Trust.
8. Contractor acknowledges that it is working within a waste release site being remediated under the oversight of the California Environmental Protection Agency, Department of Toxic Substances Control and that the Contractor's work force has the proper training and certifications to work at the site. Site human health contaminants of concern including lead, polycyclic nuclear hydrocarbons and dioxin/furans. Reports are available for review at the Presidio Trust Library, 103 Montgomery Street.
9. The Contractor acknowledges that the Presidio is a former military base and has been notified that there is a potential for discovery of waste munitions. The Contractor and all field personnel shall participate in Trust provided awareness training prior to beginning work.
10. The Contractor acknowledges that the work is in an area of naturally occurring serpentine soils that may contain naturally occurring asbestos. The Contractor shall provide proper safety precautions to protect site workers.

AGGREGATE BASE ACCESS ROAD SPECIFICATIONS:

1. Scope of Work
   a. Contractor to install Aggregate Base Access Road at location shown on Drawing C-002; Access Road shall consist of placing aggregate on grade for the temporary access road. Temporary access road profile shown on Drawing C-003.
2. Materials
   a. Rock for aggregate shall be 1.5-inch Class II AB (State Specifications Section 26.2) and shall consist of clean, hard, and durable gravel or crushed rock. The use of rounded gravel or non-angular stone shall not be permitted.
   b. The rock for aggregate shall have a minimum specific gravity of 2.60 in accordance with California Test Method No. 206 and a minimum durability index of 35 in accordance with California Test Method No. 229.
   c. Drainage pipe to be schedule 80, 6-inch diameter rigid steel pipe.
   d. Geotextile fabric to be US Fabrics US200 woven geotextile or equivalent.
3. Placement
   a. The material shall be approved by the Trust before it is placed as aggregate. Placement of the aggregate and required compaction shall be in accordance with Section 26, "Aggregate Bases" of the State Specifications.
   b. Alignment of access road will be cleared of loose vegetation and covered with geotextile fabric.
   c. Geotextile fabric to be secured using minimum 6-inch steel soil staples at spacing recommended by geotextile fabric manufacturer.
   d. No excavation for placement of aggregate base shall be allowed. Additional placement of aggregate may be used to create level surface to allow for safe movement of equipment and loads.
   e. Contractor shall not place aggregate within 20-feet of any tree or 10-feet of any toyon designated for preservation (see Table 1).
   f. Temporary pipe will be placed at tow within street gutter of temporary access road to allow for street drainage of Lendrum Court as indicated on Drawing C-003. Ends of drainage pipe to be kept free of debris to allow for unimpeded flow of surface gutter flow.
4. Testing
   a. Testing is not required.
5. Submittals
   a. Contractor shall submit for each source providing aggregate base, in advance of its use on the project, the source gradation and quality parameters showing they meet the requirement specified in these Specifications.
6. Measurement
   a. Measurement shall be in accordance with the bid sheet.

REV	DATE	DESCRIPTION	DESIGN BY	CHK'D BY
A	12/30/15	100% Plan Specifications	J H-D	WBC

Lendrum Court Area
The Presidio Trust
San Francisco, California

Tree Removal Plan Specifications

TRC | 229649 | DATE 12/30/2015 | **C-001**

Vegation Clearance Area

Tree 135 (Preserve and Trim)

Toyons 136 and 182 (Preserve and Trim)

Tree 115 (Preserve and Trim)

Toyons 193, 200, and 203 (Preserve and Trim)

Trees 47 and 50 (Preserve and Trim)

Trees 11 and 12 (Preserve and Trim)

TEMPORARY FENCE (N)

ADDITIONAL SITE ACCESS (N)

Temporary Gate

STAGING AREA

Lincoln Blvd.

Lendrum Court

Armistead Road

1278 1279 1280 1282 1257 1258 1259

A C-003

B C-003

LEGEND

- Approximate site boundary
- Limit of Vegetation Clearance Area (Overexcavation / Drainage)
- Approximate extent of waste debris, *(from TRC Solutions, Inc. (July 2015) Final Removal Action Work Plan)*
- Tree/Shrub identified for removal
- Existing elevation contour
- Site Tree (Within Work Area)
- Site Tree (Outside Work Area)
- Toyon (Heteromeles arbutifolia)
- Tree protection zone (20ft.radius fence around trees and 10 ft radius fence around toyons)
- Vegetation Clearance Area
- Temporary Work Perimeter Fence

Approximate Utility line locations:

- GAS — Gas
- SS — Sanitary sewer
- SD — Storm sewer
- W — Water

N

SCALE (FEET)

0 50 100

SOURCE: Base plan by Towill, October 29-November 4, 2015

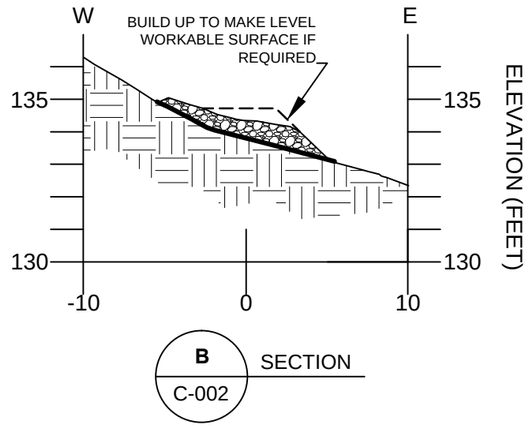
REV	DATE	DESCRIPTION	DESIGN BY	CHK'D BY
A	12/30/15	100% Plan Specifications	J H-D	WBC

Lendrum Court Area
The Presidio Trust
San Francisco, California

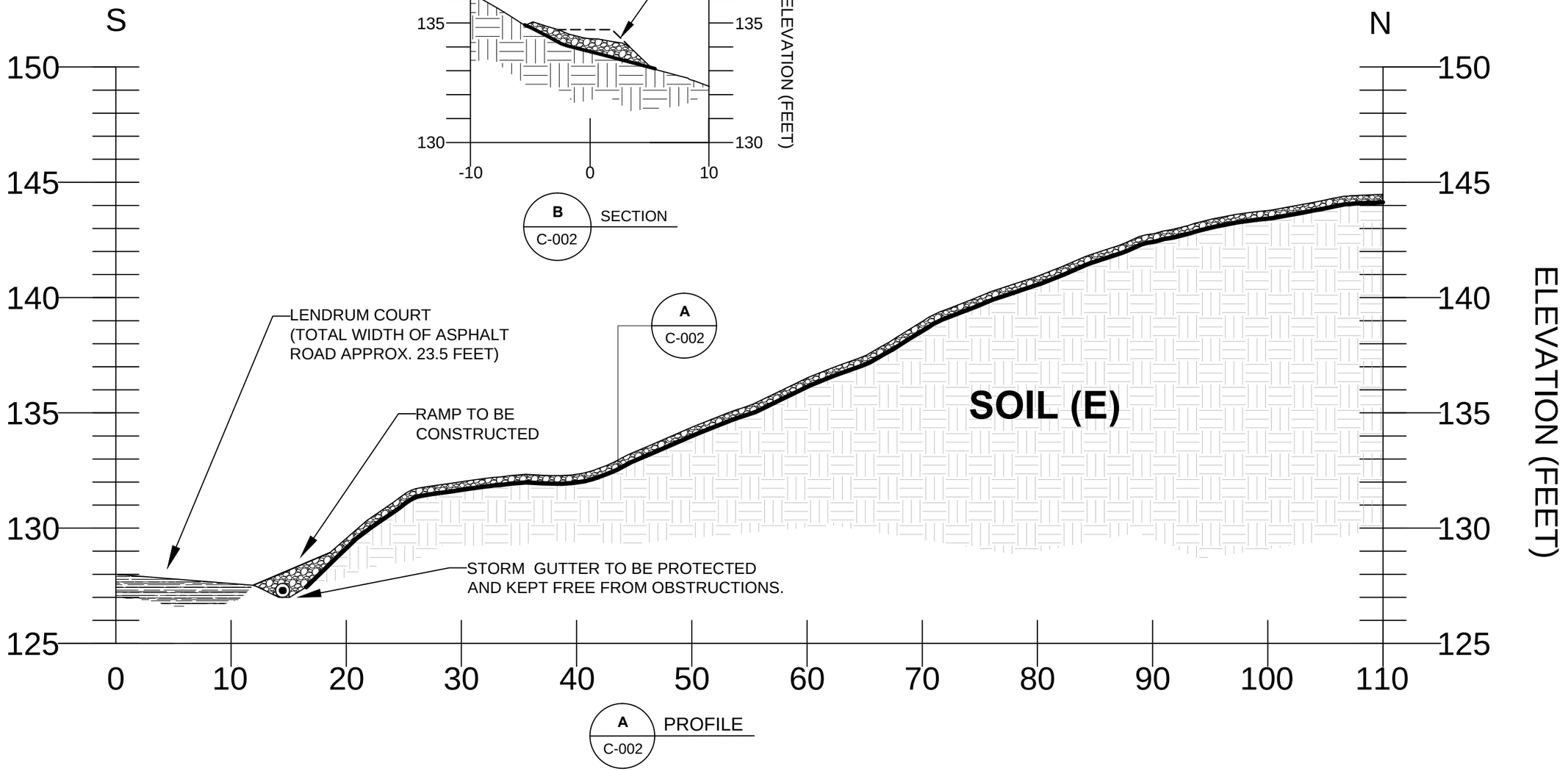
Tree Removal Plan

TRC | 229649 | DATE 12/30/2015 | C-002

FILE NAME: \\Sanfran-fs1\sanfran\PROJECTS\CAD\Lendrum Court_San Francisco\Tree Removal\Tree Removal Figure 12.29.2015.dwg | Layout Tab: Drawing



B / C-002 SECTION



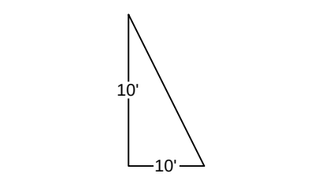
A / C-002 PROFILE

LEGEND

- 4 INCH CLASS II AB LAYER
- GEOTEXTILE FABRIC LAYER
- PIPE TO BE PLACED BELOW RAMP/GUTTER PROTECTION TO ENSURE CONTINUED PROPER STORMWATER DRAINAGE

NOTES:

1. CONTRACTOR WILL BE RESPONSIBLE FOR CONSTRUCTING AND MAINTAINING TEMPORARY ROAD DURING SITE ACTIVITIES.
2. APPROXIMATELY 4 INCHES OF CLASS II AB WILL BE PLACED OVER GEOTEXTILE FABRIC TO CONSTRUCT ROAD.
3. TEMPORARY ACCESS ROAD WILL BE CONSTRUCTED WITH MINIMUM 5 FEET SET BACK FROM NEAREST TREES.
4. CONTRACTOR WILL PROVIDE FINAL ACCESS ROAD DESIGN IN PRE-CONSTRUCTION SUBMITTAL.
5. ACCESS ROAD CROSS SLOPE WILL BE DICTATED BY PROPOSED EQUIPMENT TO BE USED AND SHALL NOT EXCEED STANDARD EQUIPMENT OPERATING REQUIREMENTS.
6. ARBORIST WILL BE PRESENT TO OBSERVE WORK PERFORMED WITHIN 20 FEET OF TREES.
7. RESIDENT ACCESS SHALL BE MAINTAINED THROUGHOUT PROJECT DURATION VIA LENDRUM COURT.
8. SLOPE OF GRAVEL PLACEMENT AT EDGES OF ROUTE IS NOT TO EXCEED A SLOPE OF 3:1.
9. CONTRACTOR TO RETAIN ACCESS ROAD FOLLOWING CONSTRUCTION FOR USE IN PHASE 2; WITH EXCEPTION OF INITIAL RAMP FROM LENDRUM COURT.



VERTICAL EXAGGERATION = 2:1
HORIZONTAL SCALE (FEET)

0 20 40

REV	DATE	DESCRIPTION	DRAWN BY	CHK'D BY
A	12/30/15	100% Plan Specifications	JHD	WC

Lendrum Court Area
The Presidio Trust
San Francisco, California

Details
Temporary Access Road

TRC | 229649 | DATE 12/30/2015 | SHEET C-003

Table 1. Historic Forest Tree Removal Table
Lendrum Court Historic Forest Phase II
The Presidio Trust, San Francisco, California

Tree #	Common Name	[1]Trunk Diameter @ 54"	Recommendation
47	Blue gum	19	**Preserve**
35	Blue gum	24	Remove
36	Blue gum	39	Remove
37	Blue gum	22	Remove
38	Blue gum	10	Remove
39	Blue gum	34	Remove
40	Blue gum	48	Remove
41	Canary island pine	20	Remove
42	Canary island pine	24	Remove
43	Canary island pine	22	Remove
44	Blue gum	30	Remove
45	Blue gum	14	Remove
46	Blue gum	22	Remove
48	Blue gum	9	Remove
49	Blue gum	20	Remove
50	Blue gum	36, 10	**Preserve**
51	Blue gum	22	Remove
52	Blue gum	21	Remove
53	Blue gum	16	Remove
54	Blue gum	18	Remove
55	Blue gum	12	Remove
56	Blue gum	8, 14, 8	Remove
60	Blue gum	18, 16, 18, 28	Remove
66	Blue gum	20	Remove
67	Blue gum	26, 23	Remove
70	Blue gum	12	Remove
72	Blue gum	33	Remove
73	Blue gum	16	Remove
76	Blue gum	13	Remove
77	Blue gum	22, 22	Remove
79	Blue gum	26, 36	Remove
80	Monterey cypress	22, 40, 10	Remove
81	Blue gum	8	Remove
82	Blue gum	15	Remove
87	Blue gum	10	Remove
88	Blue gum	6, 8, 9, 11, 11, 8, 3	Remove
89	Blue gum	22, 9, 9, 9, 8, 12	Remove
90	Blue gum	7	Remove
91	Blue gum	22	Remove
96	Blue gum	21	Remove
97	Blue gum	50	Remove
98	Blue gum	11	Remove
99	Blue gum	44	Remove
100	Blue gum	23	Remove
101	Blue gum	20	Remove
102	Blue gum	8	Remove
104	Blue gum	13	Remove
114	Blue gum	20, 14	Remove
115	Blue gum	62	**Preserve**
117	Blue gum	14, 7	Remove
118	Blue gum	13, 21, 24	Remove
129	River red gum	14, 16, 12	Remove
130	Monterey cypress	16	Remove
133	River red gum	8, 13	Remove
134	River red gum	10	Remove
135	River red gum	16, 22, 12	**Preserve**
Toyon			
116	Toyon	17	Remove
78	Toyon	6, 6, 4	Remove
86	Toyon	8, 4, 4	Remove
120	Toyon	8	Remove
123	Toyon	7, 6	Remove
131	Toyon	6	Remove
136	Toyon	9, 5, 3, 2	**Preserve**
182	Toyon	5	**Preserve**
184	Toyon	7	Remove
188	Toyon	7	Remove
189	Toyon	6	Remove
193	Toyon	6	**Preserve**
200	Toyon	5,5	**Preserve**
201	Toyon	7, 6, 4	Remove
202	Toyon	5	Remove
203	Toyon	4	**Preserve**
204	Toyon	5,5	Remove
205	Toyon	2	Remove
206	Toyon	3, 5, 6	Remove

Notes:
1 Where multiple trunk diameters are provided the tree consists of several trunks branching out of one base.

12/28/15 Update

Lendrum Court - Phase II Tree Removal and Green Waste Removal - Historic Forest Area								Comments
New Bid Item	**Old Bid Item**	**Description**	**Definition**	**Unit**	**Qty (f.)**	**Unit Price**	**Price Ext**	
1		Mobilization (a.)	Includes mobilization of all equipment necessary to complete the line items below (e.g., staging area, construction equipment, HASP, utility connections, toilets and wash stations).	LS	1			
2		Demobilization	Includes demobilization of all equipment necessary to complete the line items below (e.g., staging, construction equipment, utility connections, toilets and wash stations).	LS	1			
3		Administrative Submittals	Include all submittals as required by the specifications such as Tree Removal plan, Traffic Plan, HASP, SWPPP and all permits necessary to complete the work as shown on the drawings and specifications. TRC will provide Draft SWPPP for implementation.	LS	1			
4		Install Temporary Security Fence	Supply, install, and relocate 6-foot tall temporary fencing as needed during tree removal to control work areas and maintain a safe construction site. Remove fencing when the project is complete. Fence rental based on 1 month contract.	LF	360			
5		Clearing (Vegetation Clearing)	Trim work area to the ground surface and remove impediments to tree removal. Transport and dispose of vegetative materials at an appropriate off-site facility, where vegetation shall be disposed of as green waste.	SF	35,200			
6		Tree Removal	Removal all designated trees from vegetation clearance area	EA	67			
7		Tree Trimming	Trim Trees and Toyon as directed by Trust Arborist	EA	9			
8		Tree Protection Measures	Install and maintain orange construction fencing and other measure on trees within or adjacent to the vegetation clearance area	EA	9			
9		Chipping and Mulching	Perform chipping of trees to produce mulch for later use. Chipping and mulching to be performed in staging area.	LS	1			
10		Traffic Control Implementation	Provide flagmen during all import, transport, and export activities as well as during the morning hours related to rush hour (2 hours each morning) or as needed throughout the project. Duration assumed to be 4 weeks.	Weekly	4			
11		Alternate Access Road (located behind Building 1259)	Install access road behind Building 1259 per design drawings and in conformance with Specifications.	LS	1			
12		Site Stabilization (spread mulch)	Following completion of tree and vegetation removal cover all of the vegetation clearance area (shown on figure 2) with 2-3 inches of mulch from the chipping of the onsite trees.	LS	1			
13		Green Waste Disposal	Transport and disposal of excess vegetative waste	ton	2			
	Total:							

ATTACHMENT I-5
NESTING BIRD SURVEY RESULTS

H. T. HARVEY & ASSOCIATES
Ecological Consultants

Justin Hanzel-Durbin

TRC Solutions

505 Sansome Street, Suite 1600

San Francisco, CA 94111

Subject: Lendrum Court Vegetation Removal - Nesting Raptor Survey (HTH #3686-02)

Dear Mr. Hanzel-Durbin:

Per your request, H. T. Harvey & Associates has conducted a nesting raptor survey prior to vegetation removal activities on the approximately 1-acre Project site located at the Presidio's Lendrum Court in San Francisco, California. The Project site is located within the Presidio, approximately 0.35 miles to the southeast of the Golden Gate Bridge, between U.S. Route 101/California State Route 1 and Lincoln Boulevard in a residential neighborhood. The Project site is composed of three habitat types: (1) developed land, (2) ruderal grassland/ornamental woodland, and (3) eucalyptus (*Eucalyptus* spp.) semi-natural forest stands. It is our understanding that a number of trees and shrubs have been identified for removal east of Lendrum Court. The purpose of the survey was to assess the presence or absence of active raptor nests within the Project area, including a 300-foot buffer that may be impacted by vegetation removal. In addition, hummingbirds have begun nesting, so any active hummingbird nests encountered would be noted as well. It is our understanding that local residents and Presidio Trust personnel believe that a pair of great horned owls (*Bubo virginianus*) have historically nested downslope and northeast of buildings 1279 and 1280, within the Project site. Therefore, an extra focus was placed upon not only this forested area, but all other trees within the Project site and surrounding area that could potentially support a platform or cavity suitable for an active great horned owl nest.

Methods

H. T. Harvey & Associates wildlife ecologist/ornithologist Stephen L. Peterson, M.S., conducted the survey for actively nesting raptors and hummingbirds on February 5, 2016. During the survey, Stephen walked all areas of the Project site as well as accessible areas within 300 feet searching for raptor nests. Potential nest sites that were searched for include large stick nests; platforms formed at the junction of multiple branches with the trunk; and large cavities. Using binoculars (Eagle Optics Ranger ED 8x42) and a spotting scope (Eagle Optics Vortex 20-60x85), he observed all trees from multiple angles and vantage points, which included all accessible under-canopy locations; the tree stands downslope from buildings 1279 and 1280, along Hoffman Street; and to gain a better canopy view of the forested Project site, the sidewalk east of Lincoln Boulevard. The treeline along Armistead Road, which parallels U.S. Route 101/California State Route 1, and the forested area directly west of building 1257, was also thoroughly searched for any large stick nests, platforms, or cavities large enough for use by nesting raptors. Additionally, he looked for raptors and hummingbirds carrying nesting materials or food, distraction displays, and other physical or behavioral evidence of nesting.

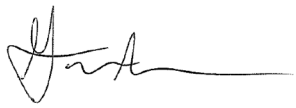
Stephen is a wildlife ecologist/ornithologist with a B.S. in Wildlife Science and an M.S. in Wildlife Biology from Utah State University. Stephen has extensive experience conducting surveys for a variety of nesting bird species. He has spent hundreds of hours in the field conducting nesting bird surveys over the past nine years. Therefore, he is well qualified to conduct this survey.

Results

Stephen detected no active or inactive raptor or hummingbird nests on the Project site or in the surrounding survey area. Furthermore, he did not find any stick nests, platforms, or large cavities present within the forested Project area that could potentially support an active nest of raptors, including great horned owls. Great horned owls and other raptors are large and conspicuous birds that would not have been missed if they were sitting on an active stick nest. However, great horned owls are also known to nest in depressed platforms within a buildup of bark strips and other vegetation that form between the intersection of large trunks of various trees, such as eucalyptus, or within large cavities of dead snags, where they may be difficult to detect. Nonetheless, evidence of their presence in these platforms or cavities may be noted by the presence of whitewash buildup on the leaves and bark of the tree, and underneath the nest, on the ground. Stephen detected no sign of whitewash on any of the trees or the leaves within the Project area. In addition, no structures forming a depressed platform, nor any cavities large enough for a great horned owl nest, were observed in the forested areas of the Project site.

Please feel free to contact me at garchbald@harveyecology.com or (408) 458-3252 if you have any questions about the survey results. Thank you for contacting H. T. Harvey & Associates regarding this project.

Sincerely,



Gavin Archbald
Senior Restoration Ecologist/Project Manger

ATTACHMENT I-6
ALTERED STAND ASSESSMENT

March 16, 2016

Justin Hanzel-Durbin
TRC
505 Sansome Street, Suite 1600
San Francisco, CA 94111

Subject: **Lendrum Ct. Altered Stand Assessment**
Presidio of San Francisco, CA

Dear Mr. Hanzel-Durbin:

TRC is coordinating the soil remediation work at the subject site in San Francisco. As part of the approval process, the Presidio Trust (the Trust) requested that HortScience, Inc. assess the potential impacts from tree removal on the trees to remain in the lee of those removed. This letter responds to that request.

Background and Methods
As part of the soil remediation work, an estimated 51 trees located on the vegetated hillside north and east of 1279 Lendrum Ct., east of 1278 Lendrum Ct. and east and south of 1259 Lendrum Ct., will be removed (**Photo 1**, following page).

The vegetation in these areas was dominated by blue gum eucalyptus (*Eucalyptus globulus*). Toyon (*Heteromeles arbutifolia*), Red river gum (*Eucalyptus camldulensis*), Monterey cypress (*Hesperocyparis macrocarpa*), Canary Island pine (*Pinus canariensis*), and Monterey pine (*Pinus radiata*) were also present in relatively low numbers. Trees in this stand were generally mature in form and development, and their overall condition was fair.

Trees in the leading edge of this stand, although protected to some degree by the Lendrum Ct. residences, had developed in response to winds coming off the ocean. As a result, trees to remain to the north and east of those removed were protected from the wind. Removal of the trees for soil remediation work will remove the leading edge of the stand. Those that remain will form the new edge, which will be exposed to higher wind velocities than previously, increasing the potential for failures. This is especially true during the first few years following the removals, until the remaining trees can acclimate to the new conditions.

I was asked to assess all of the trees to remain with a target, including those adjacent to Lendrum Ct., Lincoln Blvd. and Hoffman St. (**Photo 1**, following page). In general, this represented the outer edge of the forest, as the interior trees had no target.

In performing the assessment, I considered the following for each tree:

- If the removal of the trees would result in increased wind velocities. This was based on the trees proximity to the new edge or other topographic or man-made feature that may accelerate the wind, such as Lendrum Ct. or Hoffman Street.

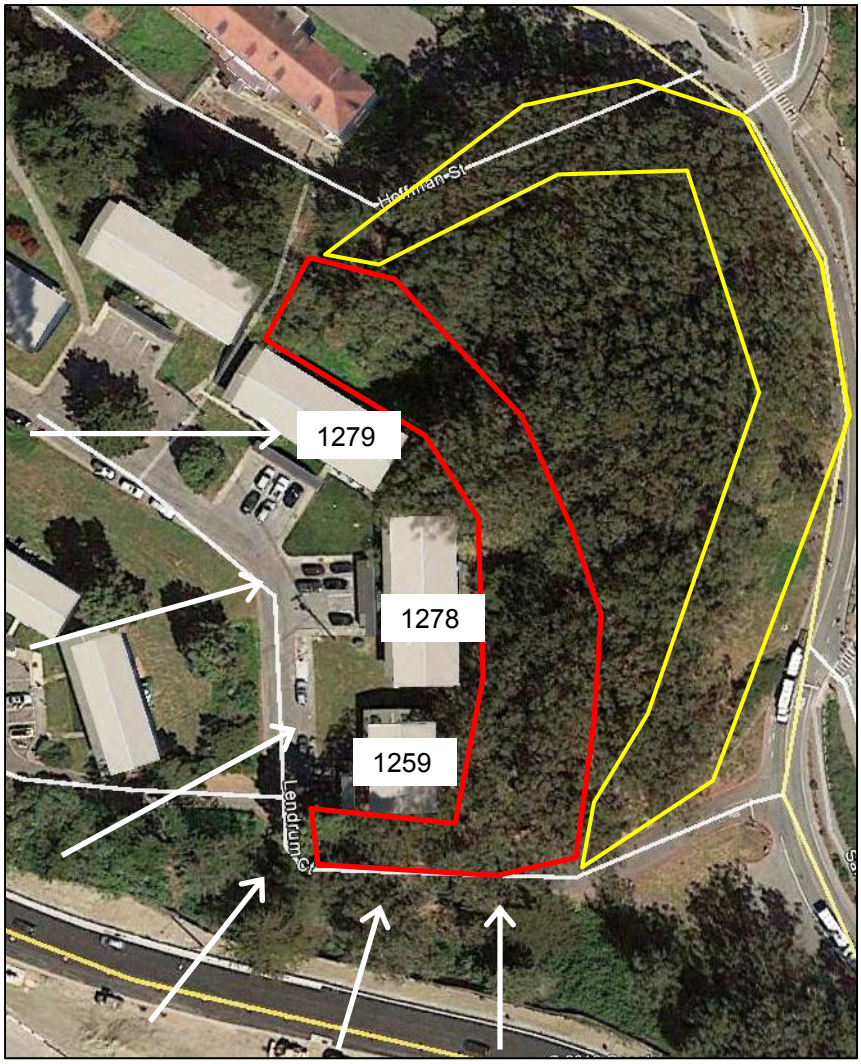


Photo 1: Aerial image showing the Lendrum Ct. neighborhood, with dominant wind directions indicated by white arrows. Approximate area of proposed tree removal for the soil remediation work is outlined in red and area of altered stand tree assessment is outlined in yellow.

- If I felt the tree would experience increased wind velocities, I identified that part of the tree with a target and which would be at increased risk for failure as a result of the new wind forces following tree removal.

- What management action would help reduce the potential for the tree or one of its parts from failing as a result of the anticipated wind forces.

Results and Recommendations

Trees were assessed on March 1 and 16, 2016 and included 29 with TRC numbers (#13-32, 34, 47, 50, 68, 85 and 137-139), 30 with Trust numbers (#3151-3172, 5761-5763, 5766, 7200-7202 and 9658) and 2 trees that had both a TRC number and a Trust number (#50/5603 and 135/5607). Results of individual tree assessments are provided in the ***Tree Assessment Form*** and locations are shown on the ***Tree Assessment Map*** (see attachments).

The majority of the trees that will be preserved in the stand were far enough from the new edge or other topographic features that may accelerate the wind that no impacts from increased wind speeds were anticipated and no management action was recommended.

Fifty-nine (59) trees located adjacent to the Lendrum Ct. residences, reforestation areas, Lendrum Ct., Lincoln Blvd. and Hoffman St. had the potential to hit a target, should they or one of their parts (branch, stem or whole tree) should fail.

Of the 59 trees I assessed, 9 were identified as having the potential to be impacted by increased wind speeds associated with the Lendrum Ct. remediation project and require pruning or removal.

Following is a brief summary of the recommendations for action. Management recommendations for each tree requiring pruning or removal are provided in Table 1 (following page), as well as in the ***Tree Assessment Form*** (see Attachments).

- Three (3) of the trees were identified for pruning, including TRC #13, 28 and 50/5603. Trees #13 and 28 had laterals and/or dead branches extending over Lendrum Ct. that require end-weight reduction or removal of the branch. Tree #50 had lateral branches extending over the 1278 Lendrum Ct. residence. **The Trust has asked that the pruning of tree #50 be coordinated with Jason Thurm of the forestry department.**

- Four (4) trees were identified for removal based on declining health, lean and the presence of decay, including TRC #26, 30, 47 and 68. Tree #47 was previously identified for preservation but the Trust felt that the structure of the tree was poor and that it could pose a risk to Lendrum Ct. residences and reforestation area workers.

- Two trees should have stems removed as follows: The 14" stem of tree #85 was damaged during the removal process and should be removed. Tree #7202 should have the 22" diameter stem that leaned toward Lincoln Blvd. removed.

Please contact me if you have any questions regarding my observations or recommendations.

Sincerely,

John Leffingwell
Board Certified Master Arborist WE-3966B
Registered Consulting Arborist #442

Attached: ***Tree Assessment Form***

Tree Assessment Map

Table 1: Recommendations for Action
Lendrum Ct. Altered Stand Assessment
Presidio San Francisco

Trust tree #	TRC tree #	Species	Size (in)	Recommendation
--	13	Blue gum	30,24,22,16,15	**Prune laterals & dead wood over Lendrum**
--	14	Blue gum	30	None
--	15	Blue gum	14	None
--	16	Blue gum	28,25,24	None
--	17	Blue gum	10	None
--	18	Blue gum	11	None
--	19	Blue gum	13	None
--	20	Blue gum	12,10	None
--	21	Blue gum	14,10	None
--	22	Blue gum	8	None
--	23	Blue gum	26	None
--	24	Blue gum	14	None
--	25	Blue gum	9,6	None
--	26	Blue gum	7	**Remove**
--	27	Blue gum	26	None
--	28	Blue gum	24	**Prune lateral over Lendrum**
--	29	Blue gum	15	None
--	30	Blue gum	14	**Remove**
--	31	Blue gum	10	None
--	32	Blue gum	22,20, 20,13,10,9,6	None
--	34	Blue gum	14	None
0	47	Blue gum	19	**Remove**
5603	50	Blue gum	36,10	**Prune under Trust supervision**
0	68	Blue gum	10	**Remove**
0	85	Blue gum	24,22,14,12,8,5	**Prune to remove 14" stem.**
5607	135	Red river gum	22,16,12	None
--	137	Monterey cypress	13	None
--	138	Monterey pine	12	None
--	139	Blue gum	50	None
3151	--	Blue gum	38	None
3152	--	Blue gum	33	None
3153	--	Blue gum	16,14,10	None
3154	--	Blue gum	12,11	None
3155	--	Blue gum	20,19,16	None
3156	--	Blue gum	16,15,14	None
3157	--	Blue gum	7,5	None
3158	--	Blue gum	17	None
3159	--	Blue gum	16,7	None

(**Continued, following page**)

Table 1: Recommendations for Action, continued
Lendrum Ct. Altered Stand Assessment
Presidio San Francisco

TRC tree #	Trust tree #	Species	Size (in)	Recommendation
3160	--	Blue gum	7,5	None
3161	--	Blue gum	10	None
3162	--	Blue gum	15,9,9	None
3163	--	Blue gum	18,18	None
3164	--	Blue gum	27	None
3165	--	Blue gum	27	None
3166	--	Blue gum	24,15	None
3167	--	Blue gum	29,16,12,12	None
3168	--	Blue gum	36,16	None
3169	--	Blue gum	7,5	None
3170	--	Blue gum	32,28,27,24,22	None
3171	--	Blue gum	17	None
3172	--	River red gum	9,8,7,6 ,5	None
5761	--	Blue gum	17,16,8,6	None
5762	--	Blue gum	30	None
5763	--	Blue gum	38,24	None
5766	--	Blue gum	44	None
7200	--	Blue gum	16,9	None
7201	--	Blue gum	8	None
9658	--	Blue gum	14	None
7202	--	Blue gum	24,23,21,21,18,12	**Prune to remove 22" stem.**

Tree Assessment

Lendrum Ct. Altered Stand Assessment
Presidio of San Francisco, California
March 1 and 16, 2016

HORT SCIENCE

TRUST No.	TRC No.	SPECIES	SIZE DIAMETER (in inches)	CONDITION 0=DEAD, 1=POOR 5=EXCELLENT	COMMENTS	RECOMMENDATION
--	13	Blue gum	30,24,22,16,15	3	Multiple attachments at 3'; one sided with laterals & dead branches S. over Lendrum Ct.	**Prune laterals & dead wood over Lendrum**
--	14	Blue gum	30	3	High crown; lateral S.; moderate dieback.	None
--	15	Blue gum	14	2	High, small crown; extensive dieback.	None
--	16	Blue gum	28,25,24	4	Multiple attachments at 3'; upright form; crooks in upper canopy; dieback.	None
--	17	Blue gum	10	3	Suppressed; small crown; dieback.	None
--	18	Blue gum	11	2	Suppressed; high, small crown; dieback.	None
--	19	Blue gum	13	2	High, small crown; crook at 30'; moderate dieback.	None
--	20	Blue gum	12,10	2	Codominant trunks at 2'; suppressed; dead top.	None
--	21	Blue gum	14,10	2	Codominant trunks at base; suppressed; extensive dieback.	None
--	22	Blue gum	8	1	Suppressed; declining.	None
--	23	Blue gum	26	3	High crown; one sided E.; dead branches.	None
--	24	Blue gum	14	3	High, small crown.	None
--	25	Blue gum	9,6	2	Suppressed; declining.	None
--	26	Blue gum	7	1	Leans heavily S. over Lendrum Ct.	**Remove**
--	27	Blue gum	26	3	Leans S.; crook at 30'; small lateral S.	None

Tree Assessment

Lendrum Ct. Altered Stand Assessment
Presidio of San Francisco, California
March 1 and 16, 2016

HORT SCIENCE

TRUST No.	TRC No.	SPECIES	SIZE DIAMETER (in inches)	CONDITION 0=DEAD, 1=POOR 5=EXCELLENT	COMMENTS	RECOMMENDATION
--	28	Blue gum	24	3	Lateral over Lendrum.	**Prune lateral over Lendrum**
--	29	Blue gum	15	3	High crown; crook at 30'; weight E.	None
--	30	Blue gum	14	2	Suppressed; lateral S. over Lendrum Ct.	**Remove**
--	31	Blue gum	10	3	Trunk sweeps from base.	None
--	32	Blue gum	22,20, 20,13,10,9,6	3	Multiple attachments at 2'; lateral S.	None
--	34	Blue gum	14	3	Suppressed; leans S. over Lendrum Ct.	None
--	47	Blue gum	19	4	Asymmetric form; laterals.	**Remove**
5603	50	Blue gum	36,10	4	Good form; windswept N.; dieback.	**Prune under Trust supervision**
--	68	Blue gum	10	1	Declining.	**Remove**
--	85	Blue gum	24,22,14,12,8,5	4	Multiple attachments at 3'; mostly upright; couple of smaller stems extend E.; dieback.	**Prune to remove 14" stem.**
5607	135	Red river gum	22,16,12	3	Multiple attachments at 3'; 16" stem broken at 8'; dieback.	None
--	137	Monterey cypress	13	5	Good young tree.	None
--	138	Monterey pine	12	4	Good young tree; lost top.	None
--	139	Blue gum	50	4	Codominant trunks at 20'; good form and structure.	None
3151	--	Blue gum	38	3	Codominant trunks @ 5' & above; vase-shaped crown; 1 lateral over power lines.	None
3152	--	Blue gum	33	3	Codominant trunks @ 5'; high narrow	None

Tree Assessment

Lendrum Ct. Altered Stand Assessment
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HORT SCIENCE

TRUST No.	TRC No.	SPECIES	SIZE DIAMETER (in inches)	CONDITION 0=DEAD, 1=POOR 5=EXCELLENT	COMMENTS	RECOMMENDATION
3153	--	Blue gum	16,14,10	3	Multiple attachments @ base; upper	None
3154	--	Blue gum	12,11	2	Codominant trunks @ base with girdling root; suppressed; weight over Lincoln & power lines.	None
3155	--	Blue gum	20,19,16	3	Codominant trunks @ base; lateral over Lincoln & power lines.	None
3156	--	Blue gum	16,15,14	2	Suppressed; multiple attachments @ base; decay where stem was removed; stem over Lincoln.	None
3157	--	Blue gum	7,5	2	Codominant trunks @ 2'; suppressed.	None
3158	--	Blue gum	17	3	Lost central leader; crook over Lincoln & power lines.	None
3159	--	Blue gum	16,7	3	Codominant trunks @ base; one-sided to NE.	None
3160	--	Blue gum	7,5	2	Suppressed; codominant trunks @ base.	None
3161	--	Blue gum	10	2	Suppressed.	None
3162	--	Blue gum	15,9,9	3	Multiple attachments @ base; bowed over Lincoln.	None
3163	--	Blue gum	18,18	**2**	Codominant trunks @ base; leans over Lincoln. 2012: suppressed.	None
3164	--	Blue gum	27	**3**	One-sided over Lincoln but relatively straight.	None
3165	--	Blue gum	27	**2**	One-sided & leaning over Lincoln. 2012: bark loss @ base on tension.	None

Tree Assessment

Lendrum Ct. Altered Stand Assessment
Presidio of San Francisco, California
March 1 and 16, 2016

HORT SCIENCE

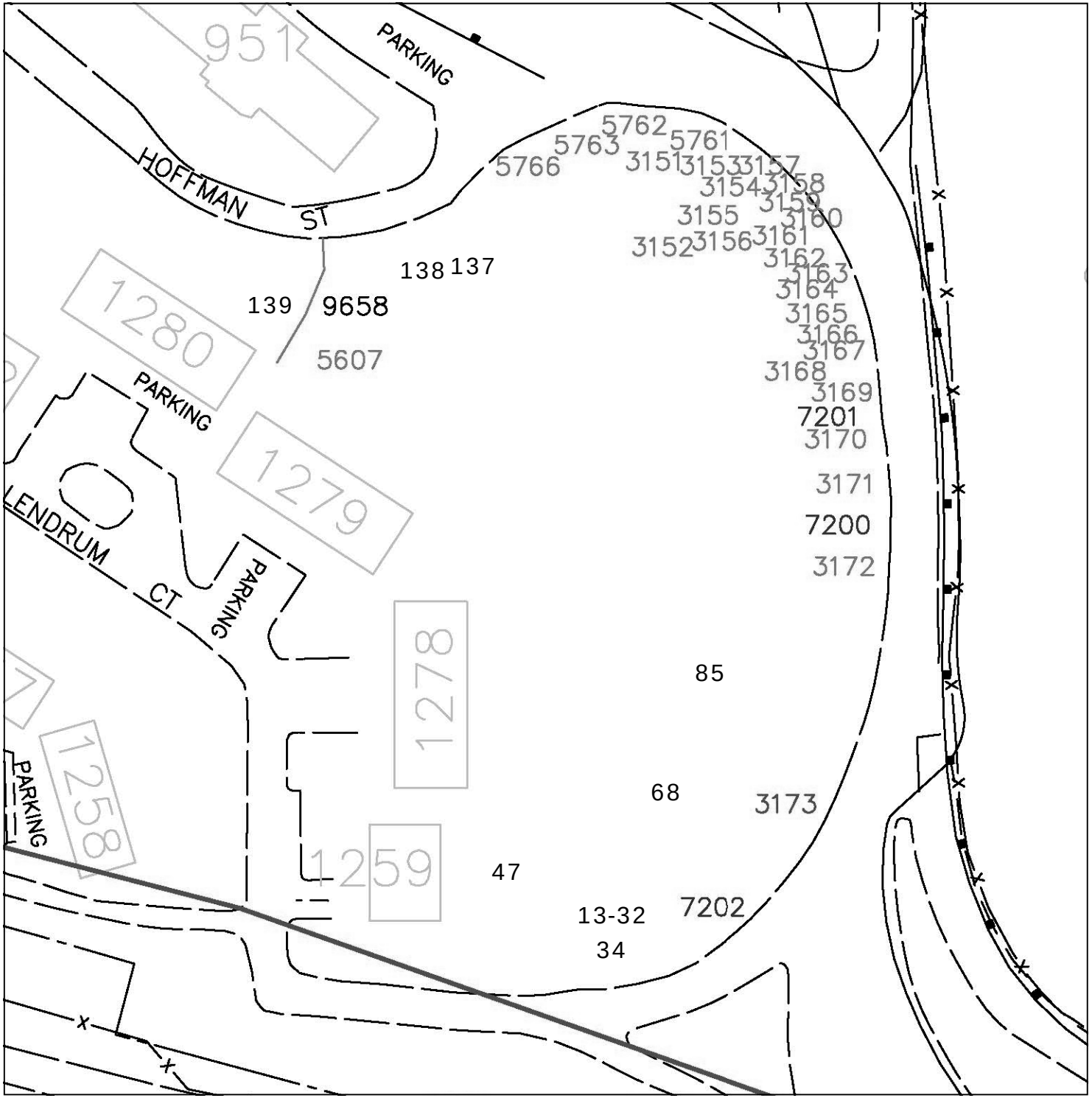
TRUST No.	TRC No.	SPECIES	SIZE DIAMETER (in inches)	CONDITION 0=DEAD, 1=POOR 5=EXCELLENT	COMMENTS	RECOMMENDATION
3166	--	Blue gum	24,15	3	Codominant trunks @ base; 24" stem bowed over Lincoln.	None
3167	--	Blue gum	29,16,12,12	3	Multiple attachments @ base; 4 of 5 stems suppressed; smaller stems leaning over Lincoln.	None
3168	--	Blue gum	36,16	3	Codominant trunks @ base; 33" stem codominant trunks @ 25'; bowed over Lincoln; no basal flare; base outside dripline.	None
3169	--	Blue gum	7,5	2	In toyon mass; stump sprout on cut bank above Lincoln.	None
3170	--	Blue gum	32,28,27,24,22	3	Multiple upright attachments @ 3'; trunk wound; dead central stem.	None
3171	--	Blue gum	17	4	Good tree; one-sided to E.	None
3172	--	River red gum	9,8,7,6 ,5	2	Stump sprout; weak attachment; stem over Lincoln has trunk wound opposite lean.	None
5761	--	Blue gum	17,16,8,6	3	Multiple attachments @ base; failed tree hung up in crown; bows to electric lines; near tree #3150.	None
5762	--	Blue gum	30	4	Nice tree; one-sided to N.	None
5763	--	Blue gum	38,24	4	Codominant trunks @ base; 38" upright; 24" suppressed on W.	None
5766	--	Blue gum	44	4	Good tree; big crown; low lateral; untagged.	None

Tree Assessment

Lendrum Ct. Altered Stand Assessment
Presidio of San Francisco, California
March 1 and 16, 2016

HORT SCIENCE

TRUST No.	TRC No.	SPECIES	SIZE DIAMETER (in inches)	CONDITION 0=DEAD, 1=POOR 5=EXCELLENT	COMMENTS	RECOMMENDATION
7200	--	Blue gum	16,9	4	Near #3171; codominant trunks @ base.	None
7201	--	Blue gum	8	3	Near #3171. 2012: lost central leader.	None
7202	--	Blue gum	24,23,21,21,18,12	3	Multiple attachments at base; 22" stem leans E. over Lincoln to horizontal w/ wound & decay in lower trunk.	**Prune to remove 22" stem.**
9658	--	Blue gum	14	2	Adj. to #5607; untagged; strong lean N.; base outside dripline.	None



Altered Stand Tree Assessment

Lendrum Court
The Presidio
San Francisco, CA

Prepared for:
TRC
San Francisco, CA

March 2016

No Scale

Notes:

Base map provided by:
The Presidio Trust

Numbered tree locations are approximate

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APPENDIX J
RESPONSE TO COMMENTS
ON THE REVISED RDIP

LENDRUM COURT
PRESIDIO OF SAN FRANCISCO, CALIFORNIA

May 26, 2016

Prepared for

THE PRESIDIO TRUST
103 Montgomery Street, P.O. Box 29052
San Francisco, California 94129-0052

TRC Project No. 229649

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May 11, 2016

Mr. George Chow
Department of Toxic Substances Control
700 Heinz Avenue
Berkeley, CA 94710-0052

RE: RESPONSE TO COMMENTS ON THE REVISED RDIP FOR LENDRUM COURT

Dear Mr. Chow,

The comments listed below were received from DTSC in an email sent on May 3, 2016, and are in response to the version of the Revised RDIP for Lendrum Court that is dated March 25, 2016. The following color coding was used to differentiate comments received from different DTSC staff:

Black – George Chow
Blue – Peter Gathungu
Green – Perry Meyers
Purple – Kimi Klein
Orange - Julie Pettijohn

The responses to these comments are shown below in red text. TRC will be transmitting an updated version of the Revised RDIP to DTSC, which is dated May 11, 2016. The revisions shown in redline and blueline on the March 25, 2016 version of the RDIP have been accepted. Edits shown in redline on the version of the Revised RIDP dated May 11, 2016 are reflective of changes made with regards to the comments below.

RDIP Text

- Section 2.2, Remedy Implementation, "Construct protective soil cap:" – Bullet 4 describes the cap construction within the TPZs for the four trees and three toyon shrubs. Since the cap here is the same as for the rest of the capped area (gopher wire + 1.5 feet of clean imported soil), please make that clearer. This bullet has been revised to state:
    - *As indicated on Figure 4, four trees and three toyon shrubs located within the proposed soil cap will be preserved during construction. Cap construction within the modified TPZ for these trees and shrubs will consist of excavating 6 to 8 inches of surficial soil utilizing hand tools or small track-mounted equipment and constructing the cap in accordance with the standard specifications for soil cap construction at the site (i.e., placement of 1.5 feet of clean imported soil underlain by gopher wire).*

- Section 2.2, Site Restoration and Project Close Out – Bullet 3 describes planting to be done in accordance with landscape plans for Lendrum Court and planting plans for the area east of Buildings 1279, 1278, and 1259. Please include these plans or figure(s) that summarize their requirements. The landscape drawings, planting plans, and irrigation designs have not yet been finalized. This bullet has been revised as follows:
    - *Planting in accordance with the Trust's Management Plan (PTMP; Trust, 2002), landscaping plans for Lendrum Court, and Planting Plans for the area east of Buildings 1279, 1278, and 1259. The landscaping plans and planting plans for Lendrum Court are in the process of being finalized and will be submitted to DTSC in early June 2016 as a separate submittal.*

- Section 2.2, Post Closure Operations and Maintenance – please add the LUCs for the incinerator area and capped area. The bullet has been added to this section:
    - Land use controls for the capped area of the Lendrum Court site and the incinerator area.

- Section 3.1, Project Requirements – please add a bullet for protection of cultural resources. A bullet listing "cultural resources" has been added to Section 3.1.

- Section 3.2.2. Grading Approach and Plans – Bullet 4 refers to alternative cap features to be retained within the residential area and in the historic forest area. I believe the only "alternative cap" proposed is for the tree within the island in the parking lot. The only location where an "alternative cap" is proposed is within the island located in the middle of Lendrum Court. The discussion in Section 3.2.2 has been revised to clarify that this is the only location where an "alternative cap" will be constructed.

- 3.2.3.1, Existing Site Conditions – 2nd to last bullet describes analytical results for bedrock outcrop overburden soils. Please clarify if these samples were gathered within areas where the overburden was <6''. (Please also ensure that Section 2.3 of Appendix G makes this clear.) All bedrock overburden samples (i.e., SB500 through SB504) were collected from areas where overburden soil thickness was less than 6 inches. This has been clarified in Section 3.2.3.1 of the Revised RDIP and Section 2.3 of Appendix G.

- Section 3.2.4, Surface Water Management – please revise the last sentence in the second paragraph to say, "after which only long-term monitoring as required by the Site O&M Plan will continue." The text in Section 3.2.4 has been revised as requested. For consistency, similar language discussing the Site OMMP in Section 3.3.3.4.1 has also been revised.

- Section 3.3.1.7 Cultural Resources – The text states that the proposed grading plan will maintain the presence of the trenches while also fulfilling the Site's remedial objectives. (a) Where appropriate in this report, please include additional details on maintaining the presence of the trenches. It is not clear what this means. The paragraph in Section 3.3.1.7

that stated "proposed grading plan will maintain the presence of the trenches while also fulfilling the Site's remedial objectives" has been revised as follows:

The trenches at the site have been surveyed and documented; however, the Trust's preference is to preserve the general appearance of the historic trench features in this area. As such, efforts were made to design the grades so that the topographic resemblance of the historic trenches are maintained where possible, while still adhering to the standard specifications for soil cap design at the site (i.e., placement of 1.5 feet of clean imported soil underlain by gopher wire). Consultation with the Trust's archaeological staff indicates that the proposed grading plan will maintain the general appearance of the historic trenches while also fulfilling the Site's remedial objectives. Prior to construction, the extent of the trenches will be delineated on-site to minimize secondary construction impacts, such as equipment traffic, temporary stockpiling, etc., in these areas. The extent of the trenches is shown on Figures 3, 4, and 5.

(b) Discussion in 3.3.2.4.3 states that impacts to the trenches will be minimized, and the proposed grading plan will maintain the overall shape and presence of the trenches. Will maintaining the overall shape of the trenches interfere with the thickness or any other requirements of the soil cap? No. The cap in the trench areas will be constructed in accordance with the standard specifications for soil cap construction at the site (i.e., placement of 1.5 feet of clean imported soil underlain by gopher wire). The following text has been added to Section 3.3.1.7 to clarify cap design in the area where trenches are present.

The trenches at the site have been surveyed and documented; however, the Trust's preference is to preserve the general appearance of the historic trench features in this area. As such, efforts were made to design the grades so that the topographic resemblance of the historic trenches are maintained where possible, while still adhering to the standard specifications for soil cap design at the site (i.e., placement of 1.5 feet of clean imported soil underlain by gopher wire).

(c) Discussion in previous reports seemed to indicate that these trenches were drainages that formed naturally. Wherever appropriate in the document, please discuss why these are now considered cultural resources (what evidence is there that these were man-made trenches, how did that information arise?). TRC has revised Section 3.3.1.7 to include text that clarifies the rational for the classifying the trenches in the historic forest as cultural resources. Although previously considered drainage features, a Trust cultural resource specialist identified these features as trenches while walking the site. Their historical use as training trenches was confirmed through historic aerial photographs and historic documents (Archive Search Report, Presidio of San Francisco, 2003). There are other known trenches of this type on the Presidio, and the Army conducted a Presidio-wide survey of all historic trenches, including those at Lendrum Court, to prepare the Archive Search Report.

- Section 3.3.2.4.1 of the RDIP document provides procedures for the contractor to follow for munitions and explosives. There is also a corresponding discussion about procedures to follow in the Site Specific Health & Safety Plan (HASP) (Appendix D). During site work, will any special screening of soil be done for MEC or potential MEC, or will these procedures be followed just as MEC or potential MEC is discovered during earthwork activities? Please clarify. In addition, the documents should be amended to include that all personnel will be trained in the identification of MEC or potential MEC (e.g., using pictures from Attachment L of the HASP or other appropriate materials) and this training should be documented in the Attachment F HASP Tailgate Safety Meeting Checklist. No special screening will be done for MEC or potential MEC prior to or during earthwork activities. Section 3.3.2.4.1 has been revised to state:

  All personnel will be trained in the identification of MEC or potential MEC using pictures and information presented in the HASP or other appropriate training resources (Appendix D, Attachment L). During daily tailgate safety meetings, personnel will be reminded of the need to be vigilant about monitoring work zones for MEC.

- Section 3.3.2.4.2, Natural Resource Monitoring –

  - Paragraph 1, Bullet 4 - The document indicates that 'remaining vegetation will be controlled to keep it six inches in height or less through the limits of the work to avoid creating areas attractive to birds for nesting.' Please add clarification that this will be for the vegetation, and not for the 4 trees and 3 toyon that will be preserved during construction. The fourth bullet in Paragraph 1 of Section 3.3.2.4.2 has been revised as requested.

  - Paragraph 2 – please update to reflect that most of the trees have already been removed at this time. Paragraph 2 of Section 3.3.2.4.2 has been revised as requested.

  - Paragraph 3 – Section 2.2 implies that there is a 6-8 inch maximum excavation limit in the TPZs. If this is the case, please add that information here as well. Paragraph 3 of Section 3.3.2.4.2 has been revised as requested.

  - Paragraph 3 – Remove text 'Phase I area' from paragraph 3 of Section 3.3.2.4.2 (paragraph beginning with 'Four trees and three..' This text has been deleted.

- Section 3.3.2.4.3, Cultural Resource Monitoring – see comment [on Section 3.3.1.7 Cultural Resources], it is unclear what "maintaining the overall shape and presence" of the trenches really means. The text in this section has been revised to state:

  Cultural resources at the site include a series of historic training trenches north-northeast of Buildings 1278 and 1279, as shown on Figures 3, 4, and 5. As discussed in

Section 3.3.1.7, efforts were made to design the proposed grades so that the topographic resemblance of the historic trenches are generally left intact, while still adhering to the standard specifications for soil cap construction at the site (i.e., placement of 1.5 feet of clean imported soil underlain by gopher wire). Construction activities will be coordinated with the Trust's cultural resources personnel and conducted in a manner that minimizes impacts to the trenches.

- Please add language describing the proposed remedy in the vicinity of the bedrock outcropping. Appendix A shows that cap placement will extend until there is 6 inches of bedrock overburden ("Import fill cap to end when approximate bedrock overburden is 6 in"). Appendix G says that the areas with overburden <6'' will be clean closed, does this mean that the <6'' overburden will be replaced with clean soil? The following text has been added to Section 3.3.2.6:

  A serpentine bedrock outcrop is located near the intersection of Lendrum Court and Armistead Road. In areas where the thickness of overburden soil is less than 6 inches, the contaminated overburden soils will be scraped off the bedrock surface, and bedrock in these areas will remain exposed. In areas where the overburden thickness is between 6 inches to 1.5 feet, the overburden soils will be scraped down to the surface of the bedrock, and clean soil will be used to construct a soil cap that conforms to the portion of the bedrock surface that will be left exposed.

- Section 5.0, Land Use Controls –
  - In the second to last sentence, or where more appropriate in the document, please clarify that the Cap OMMP "will be outlined in a site-specific OMMP, which will be proposed to DTSC for DTSC's approval." The last sentence of Section 5.0 has been revised as requested.

  - In the last sentence, please add that the LUCMRR addendum will be submitted to DTSC for approval. The text has been revised as follows: *LUCMRR addendum will be prepared for the site and submitted to DTSC for approval. Following DTSC approval, the LUCMRR addendum will be incorporated into the Trust LUCMRR (EKI, 2006).*

Table 1:

- Please verify that Table 1 includes any necessary discussion on cultural resources. Table 1 has been revised to include discussion of cultural resources, specifically, historic training trenches.

- Please remove 'Phase I Area' from Table 1 – section on Conformance with RHAA Conceptual Landscape Plan. Text referencing the Phase I Area has been deleted.

Appendix A:

Design Drawings

- The design drawings are signed and stamped, but the stamping/signing date is not included. The stamping/signing date should be included to comply with the requirements of the California Business and Professions Code. The design drawings provided in Appendix A of the Revised RDIP dated May 11, 2016 have been stamped, signed, and dated in accordance with the requirements of the California Business and Professional Code.

- Several details, such as Detail 1 on Sheet C-114 and Detail 3 on Sheet C-119, show excavations adjacent to existing building foundations which appear to be in contravention of the requirements in the Geotechnical Report (see Comment 8 below). Upon review of the details referenced above, it appears that the foundations were not drawn correctly, it is our understanding that the foundations are approximately 1.5 feet thick. Therefore excavation for our cap should not extend below the foundations. We have added notes to these detail drawings that state: *"if concrete foundations are discovered to be shallower then the depth of cap construction the associated excavations shall conform with geotechnical recommendations and should not extend below an imaginary 1:1 (horizontal:vertical) plane projected downward from the footing bearing surface to the bottom edge of the excavation."*

Technical Provisions

- Section 23.01.01.03 Placement – The text in Items C(1) a and b refer to "optimum density" in reference to a compaction standard (ASTM D1557). This is confusing, the commonly used terminology is "maximum dry density" and optimum moisture content. The term "optimum moisture content" has replaced the term "optimum density".

- Section 23.02.09 Delivery, Handling and Storage – The text in Item B refers to "drainage net rolls" and the following sub item (1) refers to mesh, which appears to be referring to gopher wire mesh. The reference to "drainage net rolls" has been removed. DTSC is correct in assuming gopher wire rolls.

- Section 23.03.03 Placement – The text in the third sentence in item D Subgrade Preparation states two compaction levels (90% and 95%) but does not distinguish locations where each is required (paved or landscaped areas which have different requirements). Text that references 95% compaction is not relevant to the project as no foundations will be constructed. As such, the following text has been deleted from the Technical Provisions:
  The soils shall be mechanically compacted to at least 90 percent relative compaction below 1-foot of the foundation subgrade and to at least 95 percent within 1-foot above the foundation subgrade, in accordance with ASTM D1557. The ASTM D1557 laboratory compaction tests should be performed at the time of construction to provide a proper basis for compaction control.

Hardscape areas (new paths, patios, etc.) are non–structural, and 90% to optimum moisture content should suffice.

Appendix B: Geotechnical Report

- Section 2.1 Site Reconnaissance – The third sentence uses past tense in reference to the historic forest. However, we understand that the forest is still existing. TRC concurs with this comment. The text has been revised to state: *The historic forest is located to the north and east of the developed area.*

  Section 4.2.1 Excavation Recommendations – The last sentence in the first paragraph states that a naturally occurring asbestos (NOA) level of 0.25% is considered low for a short term construction project. Discussion should be expanded on likely long-term effects on residents, especially children, from weathering of exposed serpentinite rock that is likely to generate NOA and whether it would be prudent to extend the cap over it, such as with a grout/concrete cover. In addition, we note that there are/may be additional requirements from the Asbestos Airborne Toxic Control Measure (ATCM) for Construction, Grading, Quarrying, and Surface Mining Operations (California Air Resources Board 200207-29) that may be imposed on the project. How will exposed serpentine will be handled, especially what regulations/rules might be triggered by exposing additional surface area of serpentine rock even if the rock itself is not disturbed? We do not believe there will be any long term effect on residents due to the additional small area of exposed bedrock formation at this site. Serpentinite bedrock is currently naturally exposed as an outcrop at the corner of Lendrum Court and Armstead Road. A portion of the steep side slopes of this bedrock outcrop is currently covered by a thin layer of contaminated soil that has eroded from further up the slope and organic plant litter that has fallen over the years. The proposed design for this area includes removing the 1 to 6 inches of contaminated soil from this small (less than 800 square feet) portion of partially exposed bedrock outcrop. Removal of the soil will be performed through surgical excavation with minimal impact on the rock itself, which will be left in its natural state. During excavation in this area and any other location where serpentinite rock is observed, air monitoring for naturally occurring asbestos (NOA) will be performed as described in the Air and Dust Mitigation and Monitoring Plan (ADMMP; Appendix E of the RDIP). The ADMMP was prepared to comply with standard Bay Area Air Quality Management District requirements for work at construction sites containing NOA and other site contaminants including the Asbestos Airborne Toxic Control Measure (ATCM) for Construction, Grading, Quarrying, and Surface Mining Operations (California Air Resources Board 200207-29) and includes appropriate BMPs for excavation control. Due to the naturally steep slopes of the bedrock outcrop, proposed surrounding vegetation, and general limited access to this area, it is unlikely that local residents will come in contact with the exposed bedrock. Regulations regarding NOA are limited to Construction, Grading, Quarrying, and Surface Mining Operations at locations with serpentinte bedrock and construction of high use surfaces with

materials containing high percentages of NOA. This project shall comply with all current regulations governing construction.

A summary of this information is included in Section 3.3.2.6 of the Revised RDIP. Additionally, text has been added Section 4.2.1 of Appendix B to state that no long-term adverse effects are anticipated as a result of leaving a portion of the bedrock outcrop exposed.

- Section 4.2.1 Excavation Recommendations – The text in the sixth paragraph states that previously excavated test pits should be field located, excavated and backfilled. The text refers to February 2014 Erler & Kalinowski Remedial Investigation Summary Report for approximate test locations. The referenced test pits should be shown on the current design drawings/grading plans for ease of location during construction rather than including them by reference. The text in Section 4.2.1 has been revised to reference Sheet C-105 of the design drawings, which are included in Appendix A of the Revised RDIP.

- Section 4.2.1 Excavation Recommendations – The text in the seventh (last) paragraph states that excavations located adjacent to footings should not extend below an imaginary 1:1 (horizontal:vertical) plane projected downward from the footing bearing surface to the bottom edge of the excavation. We note that Detail 1 on Drawing C-114 (Appendix A) appears to be in conflict with this recommendation. Upon review of the details referenced above, it appears that the foundations were not drawn correctly, it is our understanding that the foundations are approximately 1.5 feet thick. Therefore excavation for our cap should not extend below the foundations. We have added notes to these detail drawings that state *"if concrete foundations are discovered to be shallower then the depth of cap construction the associated excavations shall conform with geotechnical recommendations and should not extend below an imaginary 1:1 (horizontal:vertical) plane projected downward from the footing bearing surface to the bottom edge of the excavation."*

- Figure B-3 through B-8 – The soil strength parameters for clay (115 pcf, cohesion of 250 psf and friction angle of 30 degrees) are different from the values listed in Table B-4 Summary of Strength Values. Please evaluate if using consistent values changes the analyses, and make any revisions as necessary. The soil strength parameters listed for clay on Figures B-3 through B-8 were used to complete the slope stability analysis and are representative of the estimated properties of the mixed soil cap material. As such, the analysis and resultant factors of safety presented in the March 25, 2016 Revised RDIP submittal were correct.

  An error was made with regards to the soil strength parameters listed in Table B-4 of the March 25, 2016 Revised RIDP submittal, where the values listed in the table were not updated to reflect the revised estimated properties of the mixed soil cap material. In the Revised RDIP submittal dated May 11, 2016, Table B-4 has been revised to show the correct soil strength parameters for clay, which are as follows:

- Unit weight of 115 pounds per cubic foot (pcf);
- Cohesion of 250 pounds per square foot (psf); and
- Friction angle of 30 degrees.

Appendix D – HASP

- Table 2 of the HASP should be updated to include designated personnel at the earliest opportunity and in advance of site work (many personnel are currently listed as 'TBD.') TRC has updated Table 2 of the HASP. No personnel are listed as 'TBD' in the version of the HASP dated May 11, 2016.

- Table 3 – provide definitions/examples of 'hot work' and 'cold work.' The following definitions of 'hot work' and 'cold work' have been added to the comments section of Table 3:

  - *"Cold work" is work that cannot produce a source of ignition. Examples of cold work include valve adjustment and brush painting.*
  - *"Hot work" is work that could produce a source of ignition, such as a spark or open flame. Examples of hot work include welding, cutting, grinding and the use of non-explosion proof electrical equipment.*

- Table B-1 – Use the most up to date occupational exposure limits for benzo(a)pyrene/coal tar pitch volatiles, copper and lead. Although NIOSH has not set an REL for dioxin, NIOSH has identified dioxin as an occupational carcinogen which should be added to the table. The following changes were made to Table B-1:

  - Revised to indicate that no REL has been set for dioxin; however, NIOSH identifies dioxin as an occupational carcinogen.
  - The NIOSH REL listed for benzo(a)pyrene/coal tar pitch volatiles was revised to 0.1 mg/m^3.
  - An action level of 0.03 mg/m^3 was added for lead in addition to the OSHA PEL of 0.05 mg/m^3.

  Please provide additional guidance if the changes above do fully address DTSC's comment regarding updated occupational exposure limits for benzo(a)pyrene/coal tar pitch volatiles, copper and lead. The following references were reviewed in an effort to identify updated occupational exposure limits for benzo(a)pyrene/coal tar pitch volatiles, copper, and lead:
  - OSHA Chemical Sampling Information (https://www.osha.gov/dts/chemicalsampling/toc/toc_chemsamp.html)
  - CCR, Title 8, Section 5155 – Table AC-1: Permissible Exposure Limits for Chemical Contaminants (https://www.dir.ca.gov/title8/5155table_ac1.html)

  No updated occupational exposure limits were identified for copper.

- See comment above about tailgate safety meeting checklist additions on MEC. [i.e., Documents should be amended to include that all personnel will be trained in the identification of MEC or potential MEC (e.g., using pictures from Attachment L of the HASP or other appropriate materials) and this training should be documented in the Attachment F HASP Tailgate Safety Meeting Checklist.] The following bullet point has been added to HASP Attachment F - Tailgate Safety Meeting Checklist:

    - *Munitions and Explosives (MEC): Discuss the potential for MECs to be present at the site. Ensure all staff have been trained in the identification of MEC or potential MEC using pictures from Attachment L of this HASP and/or other appropriate materials.*

- A job safety analysis has been provided for heat illness prevention. The analysis should be amended to include the provision of shade as required by the Cal/OSHA heat illness standard. Appropriate equipment to provide shade should be brought to the site to meet the requirements of the standard. The heat illness prevention job safety analysis (JSA) has been revised to list "access to shade" as hazard control. Additionally, the following language has been added to this JSA:

  Access to shade should be available at the site as specified per California Code of Regulations (CCR), Title 8, Section 3395. Per subsections (d)(1) and (d)(2), shade shall be present when the temperature exceeds 80 degrees Fahrenheit, and timely access to shade should be provided upon an employee's request when temperatures do not exceed 80 degrees Fahrenheit. CCR defines "shade" as follows: Shade a means of blocking of direct sunlight. One indicator that blockage is sufficient is when objects do not cast a shadow in the area of blocked sunlight. Shade is not adequate when heat in the area of shade defeats the purpose of shade, which is to allow the body to cool. For example, a car sitting in the sun does not provide acceptable shade to a person inside it, unless the car is running with air conditioning. Shade may be provided by any natural or artificial means that does not expose employees to unsafe or unhealthy conditions and that does not deter or discourage access or use (8 CCR §3395).

Appendix E ADMMP

- Page 5, Section 2.1 Particulate Action Levels for Real - Time Dust Monitoring. The basis for the airborne particulates (dust) action level of 110 µg/m^3 should be further clarified by including the calculation and rationale for this value. The calculation of the 110 µg/m^3 action level has been included in Section 2.1 of the ADMMP (Appendix E of the Revised RDIP). The background concentration of 20 µg/m^3, which is used in the calculation of the particulates (dust) action level, is from a 1999 CEQ Guidelines for Assessing the Air Quality Impacts of Projects and Plans. During the three baseline sampling events that were performed on July 21, 27, and 31, 2015 ambient dust concentrations were recorded using three real-time dust monitors (PDR-1000 or equivalent). The average concentration recorded during these baseline sampling events were 12.4 µg/m^3. If this site-specific baseline was used instead of 20 µg/m^3, our action level would be raised to 125 µg/m^3. As

such, TRC opted for the more conservative approach of using 20 µg/m^3 as the particulate background concentration. This background value has also been used to calculate particulate (dust) action levels for previous Presidio projects that have involved a scope of work similar to the remedial construction activities proposed for Lendrum Court.

- Page 7, Section 2.2.2 Naturally Occurring Asbestos (NOA) – There are two NOA action levels provided in the cited reference *(Revised Naturally-occurring Asbestos Dust Mitigation Plan, Parcel A Phase I Development, Hunters Point Shipyard,* approved by the Bay Area Quality Management District (BAAQMD) on August 4, 2009) - 1,600 transmission electron microscopy (TEM) structures per cubic meter and 16,000 structures per cubic meter. The HERO recommends the inclusion of the lower value as the notification value and the higher value as a stop-work value, as proposed in the citation. The text in Section 2.2.2 has been revised as follows to indicate that DTSC should be notified of any air monitoring results equal to or above 1,600 TEM structures per cubic meter:

  In the event that ambient air monitoring results indicate levels equal to or above 1,600 Transmission Electron Microscope (TEM) structures per cubic meter (s/m³) the action from any DTSC-approved air monitor, TRC shall notify DTSC as soon as practical of the monitoring results and relay the following information: project site name, sampler ID and location, actual transmission electron microscope (TEM) structures per cubic meter, the date the sample was taken, and the date analysis was reported. Additionally, such a measurement will trigger an immediate onsite investigation to determine if dust mitigation measures are still effective. If there is any evidence of dust generation, dust control measures will be re-applied or enhanced as applicable until dust is abated and monitored ambient NOA levels drop below 1,600 TEM structures per cubic meter at each DTSC-approved monitoring location.

- Page 8, Section 2.3 Dust Action Level – Please add the following clarifying statement to the end of this section: "Therefore, adherence to the eight-hour TWA PM10 concentration of 110 µg/m^3 will be protective for all compounds that may be expected in airborne dust". This clarifying statement has been added to the version of Appendix E that is dated May 11, 2016.

- Page 8, Section 3.2 Dust Monitoring Locations – Please include a statement addressing how often during a work day that air monitoring stations will be identified as being upwind or downwind. The text in Section 3.2 has been revised to state:

  Wind speed and direction measurements will be collected automatically at one-minute intervals during earthmoving activities. The wind speed and direction measurements will be checked manually at least three times over the course of each work day. If there is an indication that a significant and sustained shift in wind direction has occurred, the perimeter air monitoring stations may be repositioned, as appropriate. Average wind speed and direction will be printed out weekly in a tabular format and retained with the field logs.

- Page 10, Section 4.1.1 Stationary NOA Sampling – The sampling methodology described in this section should be supported by the citation of appropriate guidance(s) from regulatory agencies, such as, the BAAQMD and/or the California Air Resources Board (ARB). The sampling methodology for stationary NOA sampling complies with standard Bay Area Air Quality Management District requirements for work at construction sites containing NOA, including the *Asbestos Airborne Toxic Control Measure (ATCM) for Construction, Grading, Quarrying, and Surface Mining Operations* (California Air Resources Board 200207-29). Additionally, appropriate BMPs included in the ADMMP (Appendix E of the Revised RDIP) for excavation control and dust mitigation will be adhered to during remedial construction.

- Section 4.1.1 - Please explain why the 24-hour sampling period of 3:30 pm – 3:30 pm was selected. After additional consideration, the proposed sampling period has been changed from approximately 8:00 am to 8:00 am the next day. This time frame was selected so that day of field work is captured by a single sample. Additionally, by starting the sampling in the morning, TRC can periodically check the air monitoring equipment over the course of the workday to ensure the samplers are functioning properly during this critical time period. This sampling period also simplifies logistics involving sample pickup by the laboratory's courier.

  In Appendix E a lock box is discussed for preventing vandalism or theft of the air monitoring equipment. I would like some additional details about the construction of these boxes to ensure they will not prevent the air monitoring equipment from functioning properly. The NOA air monitoring equipment, including the pump, battery, and flow regulator/dampener, will be stored on the ground in a container similar to a large lockable toolbox. The tool box would then be locked to a fence, tree, power pole, or other stable site feature. The tygon tubing will enter and exit through two holes in the box, where the holes will be sized so as not to restrict airflow. The inlet of the tygon tubing with filter cassette will be attached to a tripod, or equivalent, to ensure samples are consistently collected at an elevation of 4 feet above ground surface in a location with unrestricted air flow. The text in Appendix E, Section 4.1.1, Stationary NOA sampling, was revised to clarify this methodology. Picture of a typical setup is shown below, this photo is from a site that was entirely fenced so no locking was needed.

Appendix G - CSAP

- Please clarify whether the bedrock overburden sampling was in areas of <6'' soil overburden or not. All bedrock overburden samples (i.e., SB500 through SB504) were collected from areas where overburden soil thickness of less than 6 inches. This has been clarified in Section 2.3 of Appendix G.

- The text states that in the area where bedrock overburden is >6'', the excavated area will be backfilled with clean soil. It is unclear whether the overburden that is scraped off from <6'' thick areas will be replaced with clean soil or not. The exposed bedrock will remain exposed after the overburden soils are scraped off. The backfilled clean soil surrounding the outcrops will be graded to match the bedrock's existing contours. This has been clarified in Sections 1.0 and 2.3 of Appendix G.

Appendix I Memorandum on Tree Preservation

- Trees are identified by number in the text, but there is no figure labeling the trees. An additional figure, Figure I-2, has been added to Appendix I. When tree numbers are identified in the text, the figure showing the tree location and number is referenced.

- Cover page of Appendix I on Tree Preservation. The date (March 25, 2015) appears to be in error. Please revise and include the correct date. TRC concurs that date listed on the last version of this document was an error and should have read March 25, 2016. The date on the cover page has been revised to May 11, 2016.

- Section 2.3 Tree Removal Activities. The date in the last sentence of the first paragraph appears to be in error. TRC acknowledges this error and has revised the date to January 14, 2016 instead of January 14, 2015.

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May 26, 2016

Mr. George Chow
Department of Toxic Substances Control
700 Heinz Avenue
Berkeley, CA 94710-0052

RE: RESPONSE TO COMMENTS ON THE MAY 11, 2016 VERSION OF THE REVISED RDIP FOR LENDRUM COURT

Dear Mr. Chow,

The comments listed below were received from DTSC in an email sent on May 24, 2016, and are in response to the version of the Revised RDIP for Lendrum Court dated May 11, 2016. The email stated that the Response to Comments Letter and version of the Revised RDIP (both dated May 11, 2016 and received by DTSC on May 12, 2016) addressed all of DTSC's comments except the comments discussed below. The responses to these comments are shown in red text.

RDIP Text

Section 2.2, Post Closure Operations and Maintenance. There is an extra "will" in the first sentence. The text in Section 2.2 has been revised as shown below:

Upon completion of the construction phase, the ~~will~~ following plans and regulations will be implemented for the site:

Section 3.3.2

(1) The First sentence is missing an "of" before "Lendrum Court". The text in Section 3.3.2 has been revised as shown below:

The following sections describe the construction activities that must be completed prior to remediation of Lendrum Court.

(2) Please include that remedial construction activities will be conducted in accordance with the regulations regarding NOA. Construction activities will be conducted in compliance with applicable regulations, including California Code of Regulations Title 17, Section 93105 – Final Regulation Order on Asbestos Airborne Toxic Control Measure for Construction, Grading, Quarrying, and Surface Mining Operations. This regulatory order is presented as Attachment J-1. The text in Section 3.3.2 has been revised to state:

3.3.2 Construction Activities

The following sections describe the construction activities that must be completed prior to remediation of Lendrum Court. Construction activities will be conducted in compliance with applicable regulations. This includes but is not limited to California Code of Regulations Title 17, Section 93105, California Code of Regulations Title 8, Section 5192, and applicable DTSC guidance.

Please provide additional details on how soil is planned to be removed from the serpentine bedrock[1]. The following text has been added to Section 3.3.2.6 on Engineered Soil Cover Construction:

Bedrock overburden will be removed through surgical excavation utilizing small excavators, hand tools, and if necessary a wet-vac. All efforts will be utilized to reduce impact with the bedrock itself and work will be performed in substantial compliance with all local, state, and federal regulations.

Appendix A - Technical Provisions

A previous DTSC comment said *Technical Provisions, Section 23.01.01.03 Placement – The text in Items C(1) a and b refer to "optimum density" in reference to a compaction standard (ASTM D1557). This is confusing, the commonly used terminology is "maximum dry density" and optimum moisture content.* C(1)a and b still need revision in consultation with the geotechnical engineer. Items C(1) a and b in Section 23.01.01.03 have been revised.

Appendix B

The final geotechnical report will need to have a signing/stamping date.

- Appendix B: Geotechnical Evaluation has been signed and dated.

Appendix J

Please include the RTCs as an appendix to the final document.

- Appendix J: Response to Comments on the Revised RDIP has been added to the final version of the Revised RDIP dated May 26, 2016.

Please contact me at JHanzel-Durbin@trcsolutions.com or (415) 644-3050 if you have any questions about tree removal or preservation activities at the site.

Sincerely,
TRC Solutions, Inc.

[1] Comment received from George Chow via phone on May 23, 2016.

Justin Hanzel-Durbin
Senior Engineer/Project Manager

Jessica Barros, PE
Senior Staff Engineer

ATTACHMENTS:

Attachment J-1 – Final Regulation Order for Asbestos Airborne Toxic Control Measure for Construction, Grading, Quarrying, and Surface Mining Operations

ATTACHMENT J-1

FINAL REGULATION ORDER FOR ASBESTOS AIRBORNE TOXIC CONTROL MEASURE FOR CONSTRUCTION, GRADING, QUARRYING, AND SURFACE MINING OPERATIONS

APPENDIX J
RESPONSE TO COMMENTS
ON THE REVISED RDIP

LENDRUM COURT
PRESIDIO OF SAN FRANCISCO, CALIFORNIA

May 26, 2016

Prepared for

THE PRESIDIO TRUST
103 Montgomery Street, P.O. Box 29052
San Francisco, California 94129-0052

TRC Project No. 229649

TRC
9685 Research Drive
Irvine, California 92618
(949) 727-9336

FINAL REGULATION ORDER

ASBESTOS AIRBORNE TOXIC CONTROL MEASURE FOR CONSTRUCTION, GRADING, QUARRYING, AND SURFACE MINING OPERATIONS

CALIFORNIA CODE OF REGULATIONS
TITLE 17, SECTION 93105

FINAL REGULATION ORDER

ASBESTOS AIRBORNE TOXIC CONTROL MEASURE FOR CONSTRUCTION, GRADING, QUARRYING, AND SURFACE MINING OPERATIONS

Section 93105. Asbestos Airborne Toxic Control Measure for Construction, Grading, Quarrying, and Surface Mining Operations.

(a) Effective Date.

(1) No later than 120 days after the approval of this section by the Office of Administrative Law, each air pollution control and air quality management district must:

(A) Implement and enforce the requirements of this section; or

(B) Propose their own asbestos airborne toxic control measure as provided in Health & Safety Code section 39666(d).

(2) *Pre-existing Operations*: The owner/operator of any project in which the construction, grading, quarrying, or surface mining operation started before the effective date of this section shall comply with this section by:

(A) The date the district begins implementing and enforcing this section as required in subsection (a)(1)(A); or

(B) The compliance date specified in the airborne toxic control measure adopted by the district as required in subsection (a)(1)(B).

(b) Applicability. Unless one of the specific exemptions specified in subsection (c) applies, this section shall apply to any construction, grading, quarrying, or surface mining operation on any property that meets any of the following criteria:

(1) Any portion of the area to be disturbed is located in a geographic ultramafic rock unit; or

(2) Any portion of the area to be disturbed has naturally-occurring asbestos, serpentine, or ultramafic rock as determined by the owner/operator, or the Air Pollution Control Officer (APCO); or

(3) Naturally-occurring asbestos, serpentine, or ultramafic rock is discovered by the owner/operator, a registered geologist, or the APCO in the area to be disturbed after the start of any construction, grading, quarrying, or surface mining operation.

(c) General Exemptions.

(1) *Geologic Evaluation*: The APCO may provide an exemption from this section for any property that meets the criterion in subsection (b)(1) if a registered geologist has conducted a geologic evaluation of the property and determined that no serpentine or ultramafic rock is likely to be found in the area to be disturbed. Before an exemption can be granted, the owner/operator must provide a copy of a report detailing the geologic evaluation to the APCO for his or her consideration.

(A) At a minimum, the geologic evaluation must include:

1. A general description of the property and the proposed use;

2. A detailed site characterization which may include:
   i. A physical site inspection;
   ii. Offsite geologic evaluation of adjacent property;
   iii. Evaluation of existing geological maps and studies of the site and surrounding area;
   iv. Development of geologic maps of the site and vicinity;
   v. Identification and description of geologic units, rock and soil types, and features that could be related to the presence of ultramafic rocks, serpentine, or asbestos mineralization; and
   vi. A subsurface investigation to evaluate the nature and extent of geologic materials in the subsurface where vertical excavation is planned; methods of subsurface investigation may include, but are not limited to borings, test pits, trenching, and geophysical surveys;

3. A classification of rock types found must conform to the nomenclature based on the International Union of Geological Science system;

4. A description of the sampling procedures used;

5. A description of the analytical procedures used, which may include mineralogical analyses, petrographic analyses, chemical analyses, or analyses for asbestos content;

6. An archive of collected rock samples for third party examination; and

7. A geologic evaluation report documenting observations, methods, data, and findings; the format and content of the report should follow the Guidelines for Engineering Geologic

Reports issued by the State Board of Registration for Geologists and Geophysicists.

(B) The district may request any additional tests or other information needed to evaluate an application for exemption.

(C) The district shall grant or deny a request for an exemption within 90 days of the receipt of a complete application.

(D) If the request for an exemption is denied, the APCO shall provide written reasons for the denial.

(E) *Expiration of the Geologic Exemption:* If the owner/operator discovers any naturally-occurring asbestos, serpentine, or ultramafic rock in the area to be disturbed after the exemption is granted, then:

1. The owner/operator must comply with the requirements of this section;

2. The owner/operator must report the discovery of the naturally-occurring asbestos, serpentine, or ultramafic rock to the APCO no later than the next business day; and

3. The exemption under subsection (c)(1) shall expire and cease to be effective.

(2) If a method is developed to accurately demonstrate that property located in a geographic ultramafic rock unit has no detectable asbestos in the area to be disturbed, then the ARB Executive Officer shall propose to the Board for adoption a regulatory amendment allowing the method to be utilized, as appropriate, to obtain an exemption from the requirements specified in this section.

(3) *Agriculture and Timber Harvesting*: This section shall not apply to agricultural operations or timber harvesting except for construction of roads and buildings. Construction of roads is subject to the requirements of subsection (e) if the road is part of a construction or grading operation, quarry, or surface mine, and is subject to the requirements of subsection (d) if the road is not part of a construction or grading operation, quarry, or surface mine.

(4) *Homeowners and Tenants*: Individuals engaged in covered activities on residential property they own or occupy are exempt from subsections (e)(1) and (e)(3)(A).

(5) *Sand and Gravel Operations*: The APCO may provide an exemption for crushing, screening and conveying equipment, stockpiles, and off-site material transport at a sand and gravel operation if the operation processes only materials from an alluvial deposit.

(A) The district shall grant or deny a request for an exemption within ninety (90) days of the receipt of a complete application.

(B) If the request for an exemption is denied, the APCO shall provide written reasons for the denial.

(d) Requirements for Road Construction and Maintenance. These requirements shall apply to roads that are not part of a construction or grading project, quarry, or surface mine.

(1) No person shall conduct any road construction or maintenance activities that disturb any area that meets any criterion listed in subsections (b)(1) or (b)(2) unless all of the following conditions are met.

(A) The APCO is notified in writing at least fourteen (14) days before the beginning of the activity or in accordance with a procedure approved by the district.

(B) All the following dust control measures are implemented during any road construction or maintenance activity:

1. Unpaved areas subject to vehicle traffic must be stabilized by being kept adequately wetted, treated with a chemical dust suppressant, or covered with material that contains less than 0.25 percent asbestos;

2. The speed of any vehicles and equipment traveling across unpaved areas must be no more than fifteen (15) miles per hour unless the road surface and surrounding area is sufficiently stabilized to prevent vehicles and equipment traveling more than 15 miles per hour from emitting dust that is visible crossing the project boundaries;

3. Storage piles and disturbed areas not subject to vehicular traffic must be stabilized by being kept adequately wetted, treated with a chemical dust suppressant, or covered with material that contains less than 0.25 percent asbestos; and

4. Activities must be conducted so that no track-out from any road construction project is visible on any paved roadway open to the public.

(C) Equipment and operations must not cause the emission of any dust that is visible crossing the project boundaries.

(2) No person shall conduct any road construction or maintenance activity that disturbs the ground surface in an area that meets the criteria in subsection (b)(3) unless:

(A) The APCO is notified no later than the next business day of the discovery that the area meets the criteria in subsection (b)(3); and

(B) The requirements of subsections (d)(1)(B) through (d)(1)(C), are implemented within twenty-four (24) hours of the discovery.

(3) *Exemptions from the Requirements for Road Construction and Maintenance.* The following exemptions may apply in addition to the applicable general exemptions specified in subsection (c).

(A) *Emergency Road Repairs:* Subsection (d)(1)(A) shall not apply when construction of a road or firebreak, or a road repair is necessary due to a landslide, flood, or other emergency or to mitigate a condition that constitutes an imminent hazard to the public. The owner/operator shall notify the APCO no later than the next business day of the action taken and the condition establishing the applicability of this subsection.

(B) *Remote locations:* The APCO may provide an exemption from the requirements of subsection (d) for any activity which will occur at a remote location.

1. The district shall grant or deny a request for an exemption within ninety (90) days of the receipt of a complete application.

2. If the request for an exemption is denied, the APCO shall provide written reasons for the denial.

(e) Requirements for Construction and Grading Operations.

(1) *Areas of one acre or less meeting the criteria in subsections (b)(1) or (b)(2)*: No person shall engage in any construction or grading operation on property where the area to be disturbed is **one (1.0) acre or less** unless all of the following dust mitigation measures are initiated at the start and maintained throughout the duration of the construction or grading activity:

(A) Construction vehicle speed at the work site must be limited to fifteen (15) miles per hour or less;

(B) Prior to any ground disturbance, sufficient water must be applied to the area to be disturbed to prevent visible emissions from crossing the property line;

(C) Areas to be graded or excavated must be kept adequately wetted to prevent visible emissions from crossing the property line;

(D) Storage piles must be kept adequately wetted, treated with a chemical dust suppressant, or covered when material is not being added to or removed from the pile;

(E) Equipment must be washed down before moving from the property onto a paved public road; and

(F) Visible track-out on the paved public road must be cleaned using wet sweeping or a HEPA filter equipped vacuum device within twenty-four (24) hours.

(2) *Areas greater than one acre meeting the criteria in subsections (b)(1) or (b)(2)*: No person shall engage in any construction or grading operation on property where the area to be disturbed is **greater than one (1.0) acre** unless:

(A) An Asbestos Dust Mitigation Plan for the operation has been:

1. Submitted to and approved by the district before the start of any construction or grading activity; and

2. The provisions of that dust mitigation plan are implemented at the beginning and maintained throughout the duration of the construction or grading activity; and

(B) For a project started before the effective date of this section for which an asbestos dust mitigation plan was submitted at least sixty (60) days before the effective date, and for which the district has not yet approved the asbestos dust mitigation plan:

1. The measures in subsection (e)(1) must be implemented and maintained until the district-approved asbestos dust mitigation plan is implemented; and

2. The provisions of the district-approved asbestos dust mitigation plan must be implemented within fourteen (14)

days of district approval of the plan and maintained throughout the remainder of the construction or grading activity.

(3) *Property that meets the criteria in subsection (b)(3)*: No person shall engage in any construction or grading operation unless the following requirements are met:

(A) The owner/operator notifies the district of the discovery of naturally-occurring asbestos, serpentine, or ultramafic rock no later than the next business day;

(B) The dust mitigation measures in subsection (e)(1) are implemented within twenty-four (24) hours after determining that the property meets the criteria in subsection (b)(3); and

(C) For operations in which the area to be disturbed is **one (1.0) acre or less**, the dust mitigation measures in subsection (e)(1) are maintained throughout the duration of the construction or grading activity; or

(D) For operations in which the area to be disturbed is **greater than one (1.0) acre**, the owner/operator must:

1. Submit an asbestos dust mitigation plan to the district within fourteen (14) days of the discovery of naturally-occurring asbestos, serpentine, or ultramafic rock;

2. Maintain the dust mitigation measures in subsection (e)(1) until the provisions of the district-approved asbestos dust mitigation plan are implemented;

3. Implement the provisions of the district-approved asbestos dust mitigation plan within fourteen (14) days of district approval of the plan; and

4. Maintain the provisions of the district-approved asbestos dust mitigation plan throughout the remainder of the construction or grading activity.

(4) *Asbestos Dust Mitigation Plans*: An Asbestos Dust Mitigation Plan must specify dust mitigation practices which are sufficient to ensure that no equipment or operation emits dust that is visible crossing the property line, and must include one or more provisions addressing **each** of the following topics.

(A) Track-out prevention and control measures which shall include:

1. Removal of any visible track-out from a paved public road at any location where vehicles exit the work site; this shall be accomplished using wet sweeping or a HEPA filter equipped vacuum device at the end of the work day or at least one time per day; and

2. Installation of one or more of the following track-out prevention measures:
   i. A gravel pad designed using good engineering practices to clean the tires of exiting vehicles;
   ii. A tire shaker;
   iii. A wheel wash system;
   iv. Pavement extending for not less than fifty (50) consecutive feet from the intersection with the paved public road; or
   v. Any other measure as effective as the measures listed above.

(B) Keeping active storage piles adequately wetted or covered with tarps.

(C) Control for disturbed surface areas and storage piles that will remain inactive for more than seven (7) days, which shall include one or more of the following:

1. Keep the surface adequately wetted;

2. Establishment and maintenance of surface crusting sufficient to satisfy the test in subsection (h)(6);

3. Application of chemical dust suppressants or chemical stabilizers according to the manufacturers' recommendations;

4. Covering with tarp(s) or vegetative cover;

5. Installation of wind barriers of fifty (50) percent porosity around three (3) sides of a storage pile;

6. Installation of wind barriers across open areas; or

7. Any other measure as effective as the measures listed above.

(D) Control for traffic on on-site unpaved roads, parking lots, and staging areas which shall include:

1. A maximum vehicle speed limit of fifteen (15) miles per hour or less; and

2. One or more of the following:
   i. Watering every two hours of active operations or sufficiently often to keep the area adequately wetted;
   ii. Applying chemical dust suppressants consistent with manufacturer's directions;
   iii. Maintaining a gravel cover with a silt content that is less than five (5) percent and asbestos content that is less than 0.25 percent, as determined using an approved asbestos bulk test method, to a depth of three (3) inches on the surface being used for travel; or
   iv. Any other measure as effective as the measures listed above.

(E) Control for earthmoving activities which shall include one or more of the following:

1. Pre-wetting the ground to the depth of anticipated cuts;

2. Suspending grading operations when wind speeds are high enough to result in dust emissions crossing the property line, despite the application of dust mitigation measures;

3. Application of water prior to any land clearing; or

4. Any other measure as effective as the measures listed above.

(F) *Control for off-site transport*. The owner/operator shall ensure that no trucks are allowed to transport excavated material off-site unless:

1. Trucks are maintained such that no spillage can occur from holes or other openings in cargo compartments; and

2. Loads are adequately wetted and either:
   i. Covered with tarps; or
   ii. Loaded such that the material does not touch the front, back, or sides of the cargo compartment at any point less than six inches from the top and that no point of the load extends above the top of the cargo compartment.

(G) *Post construction stabilization of disturbed areas*. Upon completion of the project, disturbed surfaces shall be stabilized using one or more of the following methods:

1. Establishment of a vegetative cover;

2. Placement of at least three (3.0) inches of non-asbestos-containing material;

3. Paving;

4. Any other measure deemed sufficient to prevent wind speeds of ten (10) miles per hour or greater from causing visible dust emissions.

(H) *Air monitoring for asbestos (if required by the APCO).*

1. If required by the district APCO, the plan must include an air-monitoring component.

2. The air monitoring component shall specify the following:
   i. Type of air sampling device(s);
   ii. Siting of air sampling device(s);
   iii. Sampling duration and frequency; and
   iv. Analytical method.

(I) *Frequency of reporting*: The plan shall state how often the items specified in subsection (e)(5)(B), and any other items identified in the plan, will be reported to the district.

(5) *Recordkeeping and Reporting Requirements*.

(A) *Recordkeeping Requirements:* The owner/operator shall maintain all of the following records for at least seven (7) years following the completion of the construction project:

1. The results of any air monitoring conducted at the request of the APCO;

2. The documentation for any geologic evaluation conducted on the property for the purposes of obtaining an exemption, except the archive of collected samples which may be discarded at the expiration of the exemption or one (1) year after the exemption is granted whichever is less; and

3. The results of any asbestos bulk sampling that meets any of the following conditions:
   i. The asbestos bulk sampling was conducted by the owner/operator to document the applicability of or compliance with this section, or
   ii. The asbestos bulk sampling was done at the request of the district APCO.

(B) *Reporting Requirements:* The owner/operator of any grading or construction operation subject to this section shall submit the following to the District:

1. The results of any air monitoring conducted at the request of the APCO; and

2. The results of any asbestos bulk sampling that meets any of the following conditions:
   i. Asbestos bulk sampling conducted by the owner/operator to document applicability of or compliance with this section; or
   ii. Asbestos bulk sampling done at the request of the APCO.

(f) Requirements for Quarrying and Surface Mining Operations.

(1) No person shall engage in any quarrying or surface mining operation that meets the criteria of subsections (b)(1) or (b)(2) unless an Asbestos Dust Mitigation Plan for the operation has been submitted to and approved by the District and the fugitive dust mitigation measures specified in the Plan are implemented and maintained throughout the duration of any quarrying or surface mining operation except,

(A) *Pre-existing Operations*: The owner or operator of any quarrying or surface mining operation that was in operation before the date this section is implemented as determined pursuant to subsection (a) that has not obtained district approval of the asbestos dust mitigation plan may continue operating if all the following conditions are met:

1. The owner/operator has submitted an asbestos dust mitigation plan to the district at least sixty (60) days prior to the date specified in subsection (a);

2. The owner/operator implements all of the dust mitigation measures specified in subsections (f)(2)(B) and (f)(2)(C) by the effective date specified in subsection (a) and maintains

them until the provisions of an approved asbestos dust mitigation plan are implemented; and

3. The owner/operator implements the provisions of the asbestos dust mitigation plan within fourteen (14) days following district approval of the plan.

(B) *Mineral exploration activities*: Mineral exploration activities as defined in the California Public Resources Code section 2714(d) in an area meeting any of the conditions of subsection (b) are not required to submit an asbestos dust mitigation plan but shall instead implement and maintain the following measures throughout the duration of the activity:

1. Limit vehicle speeds on the site to fifteen (15) miles per hour or less;

2. Apply sufficient water during any ground disturbance to prevent visible dust from crossing the property line;

3. Keep disturbed areas and storage piles adequately wetted until they are permanently stabilized;

4. Install a track-out prevention device designed to prevent track-out onto any paved public road;

5. Clean up any visible track-out at the end of the workday or at a minimum within twenty-four (24) hours; and

6. Cover, treat with a chemical dust suppressant, or otherwise stabilize any disturbed areas when operations cease for more than seven (7) days.

(2) The owner/operator of any quarry or surface mine that meets any of the criteria in subsection (b)(3) shall:

(A) Notify the APCO no later than the next business day of the discovery.

(B) Implement all the following measures within twenty-four (24) hours following the discovery:

1. Keep stock and working piles adequately wetted during the addition and removal of material;

2. Keep on-site unpaved roads, parking lots, and staging areas stabilized using one of the following measures:
   i. Adequately wetted; or
   ii. Controlled using dust palliatives or suppressants; or
   iii. paving; or
   iv. Covered to a depth of three (3) inches with gravel that contains less than 0.25 percent asbestos as determined using an approved asbestos bulk test method;

3. Keep exposed areas and inactive stockpiles that are prone to mechanical or wind disturbances:
   i. Adequately wetted; or
   ii. Controlled using dust palliatives or suppressants, paving, wind berms or breaks; or
   iii. Covered with tarps or material that contains less than 0.25 percent asbestos as determined using an approved asbestos bulk test method;

4. Ensure that materials to be quarried, excavated, or graded are adequately wetted;

5. Ensure that all loads are adequately wetted before and during truck loading operations;

6. Ensure that all trucks transporting materials off-site meet the conditions of either paragraph i or paragraph ii at the time the truck leaves the site:
   i. Loads are adequately wetted and covered with tarps; or
   ii. Loads are adequately wetted and the material does not touch the front back or sides of the cargo compartment at any point less than six (6) inches from the top and no point of the load extends above the top of the cargo compartment; and

7. Limit vehicle speeds within the quarry or surface mining operation to fifteen (15) miles per hour or less.

(C) Implement all of the following measures within fourteen (14) days of the determination that the operation meets any of the criteria in subsection (b)(3).

~~1.~~ Measures to ensure that material being excavated, crushed, screened, loaded, transferred or conveyed does not result in any dust that is visible crossing the property line.

2. Measures to ensure that no grinding mill, screening operation, or transfer point on a belt conveyor discharges into the air any visible emissions other than uncombined water vapor, for a period aggregating more than three minutes in any one hour which are:
   i. Fifty percent as dark or darker in shade as that designated as number one on the Ringlemann Chart, as published by the United States Bureau of Mines; or
   ii. Of such opacity as to obscure an observers view to a degree equal to or greater than smoke as described in subsection (f)(2)(C)2.i. or ten (10) percent opacity.

3. Measures to ensure that no crusher discharges into the air any visible emissions other than uncombined water vapor, for a period aggregating more than three minutes in any one hour which are:
   i. Seventy-five percent as dark or darker in shade as that designated as number one on the Ringlemann Chart, as published by the United States Bureau of Mines; or
   ii. Of such opacity as to obscure an observers view to a degree equal to or greater than smoke as described in subsection (f)(3)(C)3.i. or fifteen (15) percent opacity.

4. Measures for material handling sufficient to meet the requirements of subsections (f)(2)(C)1. through (f)(2)(C)3. Such measures may include the following:
   i. Installation and operation of spraybars on all conveyors; and
   ii. Installation of shrouds at all drop points.

5. Track-out control and prevention measures which shall include:
   i. Installation of a gravel pad, grizzly, tire washing system, or paving at least fifty (50) feet of the access road, and
   ii. Cleaning any visible track-out off the paved public road using wet sweeping or a HEPA filter equipped vacuum device at the end of each workday.

6. Stabilization of all on-site roads, parking lots, and staging areas open to the public by one of the following methods:
   i. Pave with asphalt or concrete, or
   ii. Treat with a chemical dust suppressant applied according to manufacturers directions, or
   iii. Maintain a gravel cover that has a depth of at least three (3) inches and contains less than 0.25 percent asbestos

as determined using an approved asbestos bulk test method.

(D) Submit an Asbestos Dust Mitigation Plan to the District within fourteen (14) days and maintain the measures specified in subsections (f)(2)(B) and (f)(2)(C) until the asbestos dust mitigation measures in the district-approved Asbestos Dust Mitigation Plan are implemented.

(3) An Asbestos Dust Mitigation Plan required by subsections (f)(1) and (f)(2)(D) must include sections which address each of the following topics.

(A) A Fugitive Dust Mitigation Component which shall, at a minimum, include the measures specified in subsections (f)(2)(B) and (f)(2)(C), unless the APCO determines that it is appropriate to add, omit, or modify these measures depending on site-specific parameters. The plan shall also require that:

1. Equipment and operations do not emit dust that is visible crossing the property line;

2. Crushers do not discharge into the air any visible emissions other than uncombined water vapor, for a period aggregating more than three minutes in any one hour, which is:
   i. Seventy-five percent as dark or darker in shade as that designated as number one on the Ringlemann Chart, as published by the United States Bureau of Mines; or
   ii. Of such opacity as to obscure an observers view to a degree equal to or greater than smoke as described in subsection (f)(3)(A)2.i. or fifteen (15) percent opacity; and

3. Grinding mills, screening operations, and transfer points on belt conveyors do not discharge into the air any visible emissions other than uncombined water vapor, for a period aggregating more than three minutes in any one hour, which is:
   i. Fifty percent as dark or darker in shade as that designated as number one on the Ringlemann Chart, as published by the United States Bureau of Mines; or
   ii. Of such opacity as to obscure an observers view to a degree equal to or greater than smoke as described in subsection (f)(3)(A)3.i. or ten (10) percent opacity.

(B) *Air monitoring for asbestos (if required by the APCO).*

1. If required by the district APCO, the plan must include an air monitoring component.

2. The air monitoring component shall specify the following:
   i. Type of air sampling device(s);
   ii. Siting of air sampling device(s);
   iii. Sampling duration and frequency; and
   iv. Analytical method.

(C) *Frequency of reporting*. The plan shall state how often the items specified in subsection (f)(5)(B), and any other items identified in the plan, will be reported to the district.

(4) Upon petition by the owner/operator the APCO may approve the use of requirements or restrictions established under other regulatory programs to meet the requirements of subsection (f) under the following conditions:

(A) The requirements or restrictions are equivalent to or more stringent than the requirements of subsection (f); and

(B) The requirements or restrictions are enforceable by the APCO.

(5) *Recordkeeping and Reporting Requirements*: The owner/operator of a surface mining or quarrying operation subject to this section must comply with the following recordkeeping and reporting requirements.

(A) *Recordkeeping Requirements:* The owner/operator shall maintain all of the following records for at least seven (7) years:

1. The results of any air monitoring conducted at the request of the APCO;

2. The documentation for any geologic evaluation conducted on the property for the purpose of obtaining an exemption except, the archive of collected rock samples which may be discarded at the expiration of the exemption or one (1) year after the district granted or denied the exemption, whichever comes first; and

3. The results of any asbestos bulk sampling that meets any of the following conditions:

i. The asbestos bulk sampling was conducted by the owner/operator to document the applicability of, or compliance with this section; or
ii. The asbestos bulk sampling was done at the request of the district APCO.

(B) *Reporting Requirements:* The owner/operator shall submit the following to the District:

1. The results of any air monitoring conducted at the request of the APCO;

2. The documentation of any geologic evaluation conducted on the property in question; and

3. The results of any asbestos bulk sampling that meets any of the following conditions:
i. Asbestos bulk sampling conducted by the owner/operator to document applicability of or compliance with this section; or
ii. Asbestos bulk sampling done at the request of the district APCO.

(g) Air Monitoring for Asbestos. Pursuant to the requirements of Health and Safety Code section 41511:

(1) Air monitoring may be required by the district APCO.

(2) The APCO may revise the asbestos dust mitigation plan on the basis of the results of the air monitoring.

(h) Test Methods.

(1) *Ultramafic Rock*: The ultramafic rock composition of any material shall be determined using standard analysis techniques including, but not limited to, color index assessment, microscopic examination, petrographic analysis or rock thin sections, or chemical analysis techniques, such as X-ray fluorescence spectrometry or inductively coupled plasma analysis.

(2) *Bulk Sampling Methods*: ARB Test Method 435, or an alternative asbestos bulk test method approved in writing by the Executive Officer of the California Air Resources Board, shall be used to determine the asbestos content of a bulk sample. For the purposes of determining compliance with this section, references in ARB Test Method 435 to "serpentine aggregate" shall mean “gravel” or other “bulk materials” to be tested for asbestos content.

(3) *Analysis of Air Samples*: Analysis of all air samples shall follow the analytical method specified by the United States Environmental Protection Agency, Asbestos Hazard Emergency Response Act (AHERA) criteria for asbestos (40 CFR, Part 763 Subpart E, Appendix A, adopted October 30, 1987), with the following exceptions:

(A) The analytical sensitivity shall be 0.001 structures per cubic centimeter (0.001 s/cc); and

(B) All asbestos structures with an aspect ratio greater than three to one (3 to1) shall be counted irrespective of length.

(4) The results of the analysis of air samples shall be reported as transmission electron microscopy (TEM) asbestos structures per cubic centimeter (s/cc).

(5) *Adequately Wetted*: Field determination of "adequately wetted" shall be as follows:

(A) If the district-approved asbestos dust mitigation plan has specified a percent moisture content for specific materials the determination shall be as specified in the district-approved asbestos dust mitigation plan; or

(B) If no moisture threshold is specified in a district-approved asbestos dust mitigation plan, a sample of at least one (1) quart in volume shall be taken from the top three (3) inches of a road, or bare area or from the surface of a stockpile. The sample shall be poured out from a height of four (4) feet onto a clean hard surface. The material shall be considered to be adequately wetted if there is no observable dust emitted when the material is dropped.

(6) *Surface Crusting*: "Measurement of the stability of surface crusting on horizontal surfaces" shall be as follows:

(A) Where a visible crust exists, drop a steel ball with a diameter of 15.9 millimeters (0.625 inches) and a mass ranging from 16 to 17 grams from a distance of 30 centimeters (one foot) directly above (at a 90 degree angle perpendicular to) the ground surface. If blowsand (thin deposits of loose grains covering less than 50 percent of the surface that have not originated from the surface being tested) is present, clear the blowsand from the surfaces to be tested before dropping the steel ball.

(B) A sufficient crust is determined to exist if, when the ball is dropped according to subsection (h)(6)(A), the ball does not sink into the surface so that it is partially or fully surrounded by loose grains and, upon removing the ball, the surface on which it was dropped has not been pulverized so that loose grains are visible.

(C) Drop the ball three times each in three representative test areas within a survey area measuring 1 foot by 1 foot that represents a random portion of the surface being evaluated. The test area shall be deemed to have passed if at least two of the three times the ball was dropped, the results met the criteria in subsection (h)(6)(B). If all three test areas pass, the area shall be deemed to be "sufficiently crusted".

(i) Definitions. For the purposes of this section, the following definitions shall apply:

(1) "Access road" means any road extending from a public thoroughfare onto the property of a construction project, quarry, or surface mining operation.

(2) "Adequately wetted" means sufficiently moistened with water to minimize the release of particulate matter into the ambient air as determined by the test method(s) in subsection (h)(5).

(3) "Agricultural operation" means activities necessary for the growing and harvesting of crops or raising of fowl or animals.

(4) "APCO" means the executive officer, air pollution control officer, or the designee of the executive officer or air pollution control officer of any air pollution control or air quality management district created or continued in existence pursuant to Part 3 (commencing with section 40000), Division 26, Health and Safety Code.

(5) "Approved asbestos bulk test method" means ARB Test Method 435 or an alternative asbestos bulk test method approved in writing by the Executive Officer of the California Air Resources Board.

(6) "ARB" means the California Air Resources Board.

(7) "ARB Test Method 435" means the test method specified in title 17, California Code of Regulations, section 94147.

(8) "Asbestos" means asbestiforms of the following minerals: chrysotile (fibrous serpentine), crocidolite (fibrous riebeckite), amosite (fibrous cummingtonite--grunerite), fibrous tremolite, fibrous actinolite, and fibrous anthophyllite.

(9) "Asbestos-containing material" means any material that has an asbestos content of 0.25 percent or greater.

(10) "Asbestos Dust Mitigation Plan" means a detailed written document specifying measures that would be implemented to minimize the emissions of asbestos-laden dust.

(11) "Carry-out" or "track-out" means any bulk material that adheres to and agglomerates on the exterior surfaces of motor vehicles, haul trucks, and/or equipment, including tires, and that has fallen or been deposited onto a paved public roadway.

(12) "Construction," "grading," "construction or grading operation" and "construction or grading activity" mean any surface disturbance conducted with powered equipment or any related activity, including, but not limited to, all surface and subsurface cuts and fills, excavation, trenching, stockpiling, bulldozing, and landfills.

(13) "District" means any air pollution control or air quality management district created or continued in existence pursuant to Part 3 (commencing with section 40000), Division 26, Health and Safety Code.

(14) "Geographic ultramafic rock unit" means a geographic area that is designated as an ultramafic rock unit or ultrabasic rock unit, including the unit boundary line, on any of the maps referenced in Appendix A.

(15) "Geologic evaluation" means an evaluation of a property to determine the presence of various types of rocks, including ultramafic rock, serpentinite, or other metamorphic derivatives of ultramafic rock.

(16) "Gravel pad" means a layer of gravel, rock, or crushed rock which is at least one inch or larger in diameter and less than five (5) percent silt content, maintained at the point of intersection of a paved public roadway and a work site entrance to dislodge mud, dirt, and debris from tires of motor vehicles and haul trucks prior to leaving a worksite.

(17) "Grizzly" means a device used to dislodge mud, dirt, and debris from the tires and undercarriage of motor vehicles and haul trucks prior to leaving the work site.

(18) "HEPA filter" means a High Efficiency Particulate Air filter used to remove particles less than one (1) micron in aerodynamic diameter and operates at removal efficiencies of 99.9 percent or greater.

(19) "Naturally-occurring asbestos" means asbestos that has not been processed in an asbestos mill.

(20) "Owner/operator" or "person" includes, but is not limited to:

(A) An individual, trust, firm, joint stock company, business concern, partnership, limited liability company, association, or corporation including, but not limited to, a government corporation;

(B) Any city, county, district, commission, the state or any department, agency, or political subdivision thereof, any interstate body, and the federal government or any department or agency thereof to the extent permitted by law; or

(C) A project proponent and any of its contractors or subcontractors.

(21) “Paving” means creating a cover consisting of portland cement, asphalt concrete, or chip seal.

(22) “Project Boundaries” means the right-of-way and any construction easements adjacent to and necessary for the purposes of a specific road construction project or maintenance activity.

(23) "Property" means any real property including, but not limited to, any contiguous parcel or parcels of land and anything attached to, or erected on it.

(24) "Quarrying" means the act of obtaining stone from the earth by means of cutting, digging, excavating, or blasting and includes processes used to convert the excavated material into commercial products.

(25) "Registered geologist" means an individual that is currently licensed as a geologist with the State of California, Department of Consumer Affairs, Board of Geology and Geophysicists.

(26) "Remote location" means any location that is at least one (1.0) mile from the location of a receptor. "Receptor" includes, but is not limited to, any hospital, school, day care center, work site, business, residence, and permanent campground. The distance to the nearest receptor is to be measured from the outermost limit of the area to be disturbed or road surface, whichever is closer.

(27) “Road Construction and Maintenance” means the activities undertaken to build roads, highways, railroads, bridges, culverts, drains and other works incidental to road or highway construction, and maintenance activities that involve grading or excavation. Road Construction and Maintenance does

not include the construction of rest stops, maintenance buildings, or parking lots. These excluded activities are subject to the requirements of subsection (e).

(28) "Road surface" means the traveled way of a road and any shoulder which may extend up ten (10) feet from the edge of the traveled way.

(29) "Sand and Gravel Operation" means any facility operating in alluvial deposits.

(30) "Serpentine" means any form of the following hydrous magnesium silicate minerals: antigorite, lizardite, and chrysotile.

(31) "Serpentinite" means a rock consisting almost entirely of serpentine, although small amounts of other minerals such as magnetite, chromite, talc, brucite, and tremolite-actinolite may also be present. "Serpentinite" is a metamorphic derivative of the ultramafic rocks, peridotite, pyroxenite, or dunite.

(32) "Surface mining" means all, or any part of, the process involved in the mining of minerals on mined lands by removing overburden and mining directly from the mineral deposit, open-pit mining of minerals naturally exposed, mining by the auger method, dredging and quarrying, or surface work incident to an underground mine. "Surface mining" includes, but is not limited to, in place distillation or retorting or leaching, the production and disposal of mining waste, prospecting and exploratory activities or any activity subject to regulation under the Surface Mining and Reclamation Act of 1975, Public Resources Code section 2700 et seq.

(33) "Ultrabasic rock" means ultramafic rock.

(34) "Ultramafic rock" means an igneous rock composed of 90 percent or greater of one or a combination of the following iron/magnesium-rich, dark-colored silicate minerals: olivine, pyroxene, or more rarely amphibole. For the purposes of this section, "ultramafic rock" includes the following rock types: dunite, pyroxenite, and peridotite; and their metamorphic derivatives.

(35) "Visible emissions" means any particulate matter that is visually detectable without the aid of instruments other than corrective lenses.

NOTE: Authority cited: Sections 39600, 39601, 39650, 39658, 39659, 39666, and 41511, Health and Safety Code. Reference: Sections 39650, 39658, 39659, 39666, and 41511, Health and Safety Code.

APPENDIX A

California Department of Conservation
Division of Mines and Geology

AVAILABLE GEOLOGIC MAPS FOR CALIFORNIA

GEOLOGIC ATLASES OF CALIFORNIA Scale 1:250,000

GEOLOGIC ATLAS OF CALIFORNIA: ALTURAS
Compiled by Gay, T.E. and others, 1958

GEOLOGIC ATLAS OF CALIFORNIA: BAKERSFIELD
Compiled by Smith, A.R., 1964 (reprinted 1992)

GEOLOGIC ATLAS OF CALIFORNIA: DEATH VALLEY
Compiled by Streitz, R.L. and Stinson, M.C., 1974 (reprinted 1991)

GEOLOGIC ATLAS OF CALIFORNIA: FRESNO
Compiled by Matthews, R.A. and Burnett, J.L., 1965 (reprinted 1991)

GEOLOGIC ATLAS OF CALIFORNIA: KINGMAN
Compiled by Jennings, C.W., 1961

GEOLOGIC ATLAS OF CALIFORNIA: LONG BEACH
Compiled by Jennings, C.W., 1962 (reprinted 1992)

GEOLOGIC ATLAS OF CALIFORNIA: LOS ANGELES
Compiled by Jennings, C.W. and Strand, R.G., 1969 (reprinted 1991)

GEOLOGIC ATLAS OF CALIFORNIA: MARIPOSA
Compiled by Strand, R.G., 1967 (reprinted 1991)

GEOLOGIC ATLAS OF CALIFORNIA: NEEDLES
Compiled by Bishop, C.C., 1963 (reprinted 1992)

GEOLOGIC ATLAS OF CALIFORNIA: REDDING
Compiled by Strand, R.G., 1962

GEOLOGIC ATLAS OF CALIFORNIA: SALTON SEA
Compiled by Jennings, C.W., 1967 (reprinted 1992)

GEOLOGIC ATLAS OF CALIFORNIA: SAN LUIS OBISPO
Compiled by Jennings, C.W., 1958 (reprinted 1992)

GEOLOGIC ATLAS OF CALIFORNIA: SAN DIEGO - EL CENTRO
Compiled by Strand, R.G., 1962 (reprinted 1992)

GEOLOGIC ATLAS OF CALIFORNIA: SANTA ANA
Compiled by Rogers, T.H., (reprinted 1992)

GEOLOGIC ATLAS OF CALIFORNIA: SANTA CRUZ
Compiled by Jennings, C.W. and Strand, R.G., 1958 (reprinted 1992)

GEOLOGIC ATLAS OF CALIFORNIA: SANTA MARIA
Compiled by Jennings, C.W., 1959 (reprinted 1992)

GEOLOGIC ATLAS OF CALIFORNIA: TRONA
Compiled by Jennings, C.W., 1962

GEOLOGIC ATLAS OF CALIFORNIA: UKIAH
Compiled by Jennings, C.W. and Strand, R.G., 1960 (reprinted 1992)

GEOLOGIC ATLAS OF CALIFORNIA: WALKER LAKE
Compiled by Koenig, J.B., 1963 (reprinted 1992)

GEOLOGIC ATLAS OF CALIFORNIA: WESTWOOD
Compiled by Lyndon, P.A. and others, 1960

REGIONAL GEOLOGIC MAP SERIES Scale 1:250,000

GEOLOGIC MAP OF THE CHICO QUADRANGLE
(set of five sheets)
By Saucedo, G.J. and Wagner, D.L., 1992

GEOLOGIC MAP OF THE SACRAMENTO QUADRANGLE
(set of four sheets)
Compiled by Wagner, D.L. and others, 1981

GEOLOGIC MAP OF THE SANTA ROSA QUADRANGLE
(set of five sheets)
Compiled by Wagner, D.L. and Bortugno, E.J. (reprinted 1999)

GEOLOGIC MAP OF THE SAN BERNARDINO QUADRANGLE
(set of five sheets)
Compiled by Bortugno, E.J. and Spittler, T.E. (reprinted 1998)

GEOLOGIC MAP OF THE WEED QUADRANGLE
(set of four sheets)
By Wagner, D.L. and Saucedo, G.J., 1987

GEOLOGIC MAP OF THE SAN FRANCISCO-SAN JOSE QUADRANGLE
(set of five sheets)
By Wagner, D.L., Bortugno, E.J. and McJunkin, R.D., 1990
Color-coded faults

LOCAL GEOLOGIC MAPS

AREAS MORE LIKELY TO CONTAIN NATURALLY-OCCURRING ASBESTOS IN WESTERN EL DORADO COUNTY, CALIFORNIA
By Ron Churchill, March 2000
Scale 1:100,000

SERPINTINITE SURVEY OF LAKE COUNTY, CALIFORNIA – MAP A, ULTRAMAFIC, ULTRABASIC, AND SERPENTINE ROCK AND SOILS OF LAKE COUNTY,
Adopted: March 2, 1992
Scale: 1:100,000