Sharp
Environmental
Technologies, Inc.

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November 17, 2014
ECI Removal Action Work Plan - Revised
Via E-mail

Mr. Ron Flury
Ecology Control Industries
20846 Normandie Avenue
Torrance, California 90502

Re: Removal Action Work Plan - Revised, Ecology Control Industries, 20846 Normandie Avenue, Torrance, California 90502

Dear Mr. Flury:

Sharp Environmental Technologies, Inc. (SET), has prepared this revised *Removal Action Work Plan* (RAW) detailing the procedures for the removal of contaminated soil at the referenced site.

Accordingly, this RAW describes the objectives, methodologies, and activities that will be performed for contaminated soil excavation, transport and disposal in the area of the historic storm water pathway. The RAW also includes a health and safety plan detailing procedures for worker protection during the course of the project, a quality assurance project plan and a transportation plan for waste disposal.

The scope of work is based on requirements by the Department of Toxic Substances Control and recently requested revisions to include a detailed section addressing noise control during excavation activities.

If you have any questions, please call me at (310) 505-3675.

Sincerely,
Sharp Environmental Technologies, Inc.

Jeffrey E. Sharp, PG #6777, CEG #2160
Senior Geologist

Enclosure

Sharp
Environmental
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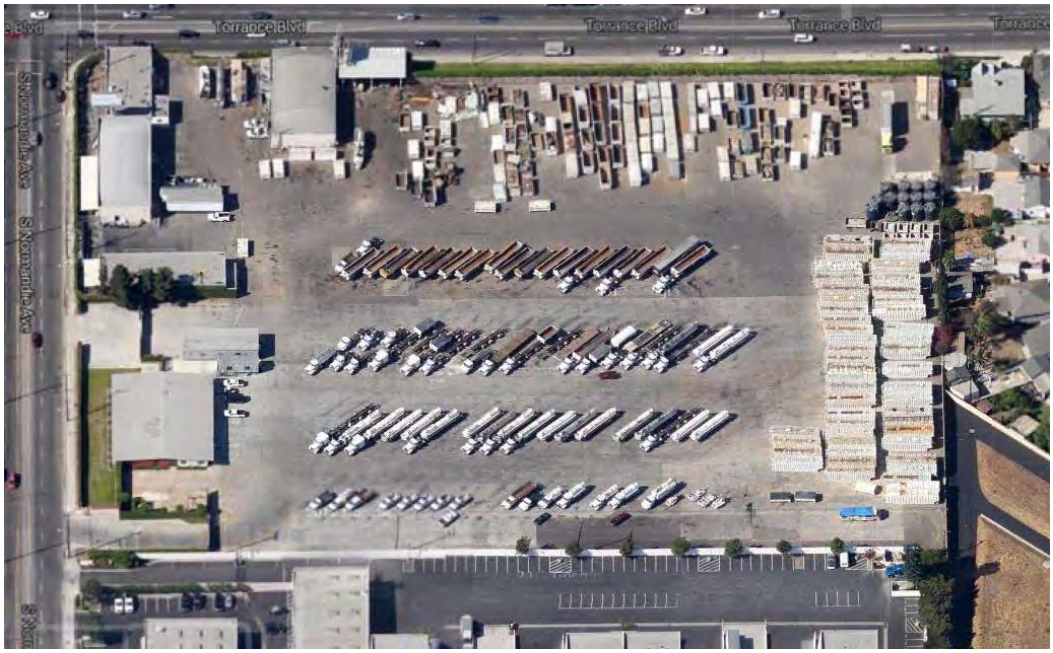
839 S. Beacon Street, #1967, San Pedro, California 90733 Tel (310) 505-3675 Fax (310) 548-3935

REMOVAL ACTION WORK PLAN - REVISED

ECOLOGY CONTROL INDUSTRIES

20846 Normandie Avenue
Torrance, California 90502



Submitted to

MR. RON FLURY
ECOLOGY CONTROL INDUSTRIES
20846 Normandie Avenue
Torrance, California 90502

November 17, 2014

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PROFESSIONAL CERTIFICATION

This *Removal Action Work Plan - Revised* has been prepared and approved by

Jeffrey Sharp, PG #6777, CEG #2160
Senior Geologist

STATEMENT OF LIMITATIONS

The services described in this *Removal Action Work Plan - Revised* will be performed in accordance with generally accepted professional environmental consulting principles and practices.

Opinions and recommendations contained in this work plan apply to conditions existing at certain locations when services will be performed and are intended only for the specific purposes, locations, time frames, and project parameters indicated. Sharp Environmental Technologies, Inc., cannot be responsible for the impact of any changes in environmental standards, practices, or regulations after performance of services.

Any use of this work plan by a third party is expressly prohibited without a written, specific authorization from the client and Sharp Environmental Technologies, Inc. Such authorization will require a signed waiver and release agreement.

This work plan is issued with the understanding that the client, the property owner, or its representative are responsible for ensuring that the information, conclusions, and/or recommendations contained herein are brought to the attention of the appropriate regulatory agencies, as required.

1. INTRODUCTION

Sharp Environmental Technologies, Inc. (SET), prepared this *Removal Action Work Plan - Revised* (RAW) detailing the proposed work for contaminated soil excavation, transport and off-site disposal along the eastern property boundary at *Ecology Control Industries (ECI)*, *20846 Normandie Avenue, Torrance, California 90502,* and hereinafter referred to as *the site* (Figure 1 – Site Vicinity Map).

This RAW has been prepared to address all actions associated with the removal of soils contaminated with chemicals of concern (COCs) at the eastern property boundary of the site. The RAW includes the objectives, methodologies, and activities for conducting the removal action, a description of the on-site contamination, and the goals to be achieved by the removal action, as required by the California Health and Safety Code (H&SC) section 25323.1 and the State of California Department of Toxic Substances Control (DTSC).

Environmental site assessments were previously conducted at the site. Elevated levels of the COCs were detected in the site soils that pose a potential threat to human health and/or the environment. Based on the data collected during the investigations, the DTSC has determined that a "Response Action" is required to address the potential threat or hazard posed by the presence of elevated levels of the COCs detected at the site. The Response Action determination letter will be included as Appendix A once received from the DTSC.

Due to the physical and chemical nature of the COCs, the historical on-site releases of the COCs likely persist in shallow site soil. Because the COCs typically have a low migration potential within a soil column, DTSC recommended that removal actions be performed to mitigate the identified potential threat to human health and the environment prior to construction of proposed residential developments.

The RAW also includes a health and safety plan detailing procedures for worker protection during the course of the project, a quality assurance project plan (QAPP) and a transportation plan for waste disposal.

1.1 Objective

The objective of this RAW is to present a scope of work for the removal action to rehabilitate the site to the extent that no environmental hazards originating from historical operations impact the development of the site for future residential occupancy.

The proposed action at the site focuses on the removal and disposal of soils impacted with the COCs to reduce the threat to human health and the environment and to provide a permanent solution that reduces the toxicity, mobility, and volume of contaminated soil. DTSC has preliminarily determined that the proposed action is the preferred remedy in terms of the three technology evaluation criteria: effectiveness, implementability, and cost.

Removal action objectives (RAOs) have been established that are protective of human health and the environment and reduce the potential for exposure to the COCs in shallow soil encountered at the site. These RAOs are presented below.

- Minimize exposure of residents to the contaminants of concern in shallow soil through inhalation, dermal absorption, and ingestion.
- Minimize potential for migration of the contaminants of concern from the soil to other media.
- Remove impacted soils that exceed human health risk criteria, to prevent exposure to the excessive COCs.
- Collect soil samples after excavation to confirm removal to human health screening levels.
- Leave the site in a physical condition that is compatible with single-family residential use.
- Obtain a "No Further Action (NFA)" decision by the DTSC for the site, after completion of the removal action and prior to any residential occupancy.

1.2 Human Health Risk Criteria

Removal of impacted soil that exceeds the human health risk criteria for the following COCs:

- The DTSC screening level of 0.089 milligrams per kilogram (mg/kg) for polychlorinated biphenyls (PCBs) in soil
- The California Human Health Screening Level (CHHSL) for organochlorine pesticides (OCPs) in residential soil, established by the Office of Environmental Health Hazard Assessment (OEHHA):
    - 0.033 mg/kg for aldrin
    - 0.5 mg/kg for lindane (gamma-BHC)
    - 0.43 mg/kg for chlordane (all forms)
    - 2.3 mg/kg for 2,4'- and 4,4'- dichlorodiphenyl-dichloroethane (DDD)
    - 1.6 mg/kg for 2,4'- and 4,4'- dichlordiphenyl-dichloroethylene (DDE)
    - 1.6 mg/kg for 2,4'- and 4,4'- dichlorodiphenyl-trichloroethane (DDT)
    - 0.035 mg/kg for dieldrin
    - 0.13 mg/kg for heptachlor
    - or 0.46 mg/kg for toxaphene
- The cancer risk criteria of 1 x 10-6
- The non-cancer hazard index of 1
- The California hazardous waste classification concentration in soil of:
    - 1.0 mg/kg for 4,4'-DDT
    - 1.0 mg/kg for 4,4'-DDE
    - 1.0 mg/kg for 4,4'-DDD

And exceeds the following environmental risk criteria:

- The environmental screening level of 1,000 mg/kg for total petroleum hydrocarbons as diesel (TPHd) and 10,000 mg/kg for total petroleum hydrocarbons as oil (TPHo) in soils developed by the State Water Resources Control Board or Regional Water Quality Control Board

The DTSC will certify that all necessary actions have been completed in accordance with the approved RAW and that site areas have been investigated and remediated as required.

The remedial goals developed and adopted for contaminated soil at the site will be responsive to these RAOs. The primary remedial goal for the site is performance-based and focuses on restoring the soils to normal conditions in regards to the COCs detected in shallow soil.

The goal of this remedial action is for all significant contamination to be excavated, removed from the site, and treated and/or disposed off-site. As part of the NFA decision, the DTSC will certify that all necessary response actions have been completed in accordance with the approved RAW and that site conditions do not pose a significant risk to future residents at the site.

1.3 Scope of Work

The remedial excavation will be performed in the area of the historic storm water pathway and is identified in Figure 2 – Site Map. With the results of previous investigations, SET defined the limits of the required excavation to maximize the removal of contaminated soil and includes:

- Pre-fieldwork preparation, including obtaining permits, USA notification;
- Trenching and shoring along the eastern property boundary;
- Soil excavation and disposal;
- Confirmation sampling and analysis;
- Backfill and grading of excavated area;
- Preparation of a report summarizing the remedial excavation.

All work will be performed under the supervision of a Professional Geologist (PG) licensed in California in compliance with the requirements of the Geologist and Geophysicists Act, Business and Professions Code sections 7800–7887.

1.4 Extent and Volume of Soil Removal

The preliminary estimated total volume of all soils proposed to be addressed for removal in this RAW is between approximately 10,000 and 20,000 cubic yards. Additional sidewall sloping may be necessary at the excavation to a depth of 25 feet. Additional excavation may be necessary, based on the results of field observations.

Soil will be stockpiled on-site and sampled for laboratory analysis to determine waste classifications prior to off-site disposal.

1.5 Health Effects of Chemicals of Concern

Exposure to gamma- and alpha-chlordanes through inhalation, ingestion, skin absorption, and/or congestion causes blurred vision, confusion, ataxia, delirium, cough, abdominal pain, nausea, vomiting, diarrhea, and irritation; and affects the central nervous system (CNS), eyes, respiratory system, liver, kidneys. Exposure to 4, 4'-DDD through inhalation, ingestion, absorption, and/or congestion causes dizziness, drowsiness, headache, and nausea; irritation of eyes, nose, and throat; dry cracked skin; and affects the skin, eyes, respiratory system, and CNS. Exposure to 4,4'-DDE and 4,4'-DDT through inhalation, ingestion, absorption, and/or congestion causes dizziness, excitement, drowsiness, incoordination, and staggering gait; irritation of eyes, nose, and throat; corneal vacuolization; anorexia, nausea, vomiting, and abdominal pain; dermatitis; and affects the CNS, eyes, liver, kidneys, and skin. Exposure to dieldrin through inhalation, ingestion, absorption, and/or

congestion causes headache, nausea, dizziness, nausea, vomiting, liver damage, and kidney damage; and affects the CNS, liver, kidneys, and skin. Exposure to toxaphene through inhalation/ingestion/ skin absorption/skin or eye contact causes irritation of eyes and nose; loss of balance, drowsiness, headache, nausea, visual disturbances, dizziness, and liver damage (carcinogen); and affects the CNS, liver, kidneys, and skin.

Exposure to TPH through inhalation, ingestion, and skin adsorption causes dizziness, drowsiness, headache, and nausea; irritation of the eyes, nose, and throat; and dry cracked skin; and affects the CNS, respiratory system, skin, and eyes. Exposure pathways for arsenic include inhalation, contact, and ingestion, causing ulceration of nasal septum, respiratory irritation, hyper-pigmentation of skin, and dermatitis. Exposure to elevated concentrations of arsenic affects the liver, kidney, skin, lungs, and lymphatic system.

1.6 Cleanup Goals

RAOs are established to protect human health and the environment. RAOs are based on site-specific media of concern, COCs, exposure routes and receptors, and acceptable contaminant level or range of contaminant levels for each exposure route. The media of concern for the proposed site is limited to soil. The overall objectives of the removal actions described in this RAW include the following:

- Minimize potential for migration of pesticides and PCBs from soil to other media (air and surface water).
- Reduce identified elevated concentrations of pesticides and PCBs to levels where post remediation concentrations result in an acceptable health risk.

To achieve these RAOs, the following steps will be completed:

- Remove impacted soil with TPHd concentrations above 1,000 mg/kg and TPHo concentrations above 10,000 mg/kg.
- Remove impacted soil with OCP concentrations above the following: 0.43 mg/kg for alpha- and gamma-chlordane, 2.30 mg/kg for 4,4-DDD, 1.60 mg/kg for 4,4-DDE and 4,4-DDT, 0.035 mg/kg for dieldrin, and 0.46 mg/kg for toxaphene.
- Collect confirmation soil samples in consultation with DTSC to verify that impacted soil has been adequately removed.
- Estimate the quantity of soil removed from the excavation area based on the final excavation dimensions and compare the estimated volumes to the quantities reported on the waste manifests. Copies of the waste manifests, showing appropriate signatures from the receiving facility, will be included in the removal action completion report.

1.7 Exposure Assumptions

The DTSC PEA Guidance Manual (DTSC, 1999) specifies use of a residential land use exposure scenario. Exposure assumptions used for the residential land-use evaluation are based on default assumptions presented in the DTSC PEA Guidance Manual. Primary assumptions include an exposure frequency of 350 days per year and exposure duration of 6 years and 24 years for child and adult exposures, respectively.

2. SITE DESCRIPTION

The site is located at 20846 Normandie Avenue in Torrance, California 90502 (Figure 1). The ECI property comprises of four parcels identified by Los Angeles County Assessor numbers 7348020-003, 004, 007, and 008.

The site consists of a 9.01-acre property currently occupied by ECI as a vehicle and equipment dispatch yard and a temporary hazardous and non-hazardous waste storage facility. The subject site contains one 5,400-square foot building located along the northern property line and is approximately 90 percent covered with either concrete or paved asphalt, with the remaining area consisting of unpaved soils (Figure 2).

2.1 Historic Storm Water Pathway

Prior to approximately 1969, the historic storm water pathway in the vicinity of the ECI property was an unlined linear topographic depression that acted as a local surface drainage feature. A 1947 aerial photograph showing the drainage channel is provided on Figure 3, and a 1951 topographic map on Figure 4 showing the drainage channel. The drainage channel passed under Torrance Boulevard and traversed the eastern portion of the ECI Property before continuing east through what is now the closed Royal Boulevard Landfill (ARMCO Site).

During the late 1960s and early 1970s, the drainage ditch was replaced by the Los Angeles County Flood Control District (LACFCD) with an underground concrete storm water conveyance system. Project No. 685 (also known as the Kenwood Drain), a concrete box culvert, replaced the historic storm water drainage ditch from 204th Street, along Kenwood Avenue, through the ECI property, and eventually emptying into the Torrance Lateral, a large, open, and concrete-lined drainage channel (Figure 5). The LACFCD maintains an easement for Project 685 within the properties it traverses, including the ECI property.

As-built construction drawings for the Project 685 segment along the drainage channel (Los Angeles County Department of Public Works [LACDPW, 1969]) indicate a pre-construction ground elevation of approximately 16 feet above mean sea level (MSL) at the bottom of the drainage channel. This is believed to be the lowest elevation of the historic storm water pathway within the ECI property. The Project 685 box drain (8 feet wide and 12.5 feet high) is shown on the as-built drawings as having an invert elevation (exterior bottom of the drain) at approximately 11 to 12 feet MSL. Thus, installation of Project 685 required excavation of 4 to 5 feet of existing soil from the unlined drainage channel (Earth Tech, Inc. [Earth Tech], 2008).

2.2 ECI Site History

Prior to 1992, Akzo Coatings (Akzo) owned the land now occupied by ECI. In 1992, ECI's owner purchased approximately 4.7 acres of land from Akzo. Several years later, additional acres of adjacent land was purchased by ECI from Akzo, creating ECI's final property size of approximately 9.01 acres (Los Angeles County Tax Assessor's Office, 2006). Currently, ECI owns the parcels beginning at the corner along Torrance Boulevard and Normandie Avenue while the eastern portion of the property is now part of 20846 Normandie Ave, LLC.

During its ownership, Akzo operated numerous underground storage tanks (USTs) containing petroleum-based solvents located along the southern boundary of Lot 2 (southern portion of the

current ECI property). A release of toluene from one of the tanks required soil and groundwater investigations and the installation of a soil vapor extraction (SVE) system. The SVE system was installed around the time of property transfer to ECI, and included grading the southern area of the property prior to the installation of the SVE system, and covering the western portion of Lot 2 with concrete following installation. Akzo operated the SVE system for several years after the property was sold to and occupied by ECI. On July 22, 1996, the California Regional Water Quality Control Board (LARWQCB) issued a closure letter confirming the completion of the UST remedial action.

In 1998, ECI graded and paved Lot 1, the northern portion of the property (ECI, 2005). Pre-grading construction drawings of Lot 1 indicate surface elevations ranging from approximately 40 feet above MSL along its western boundary, to approximately 36 feet above MSL along its eastern boundary. A low of 31 feet above MSL was evident in the northeast corner along the LACFCD drainage easement and a high of over 50 feet MSL where there was a large mound of soil generated from prior grading of the southern lot.

Soil from the large mound and an earthen embankment along Torrance Boulevard were used to level the property. After grading, the surface of the ECI property transitioned smoothly from approximately 40 feet above MSL at its western edge to a low of approximately 34 feet above MSL along its eastern edge. Residential properties immediately east of the ECI property have lower elevations of approximately 30 to 32 feet above MSL (Earth Tech, 2008).

3. ENVIRONMENTAL BACKGROUND

3.1 Property Ownership and Business Type

The property is in part owned by Mr. Ron Flury and is currently occupied by Ecology Control Industries as a vehicle and equipment dispatch yard and a temporary hazardous and non-hazardous waste storage facility. The eastern portion is now under new ownership by 20846 Normandie Ave, LLC.

3.2 Contaminant Discovery

In 2005, pesticides and PCBs were detected in soil by ECI as part of due diligence activities prior to sale of the property. The due diligence sampling activities detected several chemicals present in soils at concentrations exceeding residential action levels, including: DDT, DDE, DDD, chlordane, petroleum hydrocarbons, and PCBs. The sum of DDT, DDE, and DDD concentrations (referred to collectively as total DDT) were detected in subsurface soil samples collected from the eastern and southeastern portions of the ECI property in concentrations up to 325 mg/kg. Although contended by Montrose, EPA has attributed the presence of total DDT in these soils to former Montrose chemical manufacturing activities. From 1947 to 1982, Montrose manufactured technical grade DDT at a plant located approximately 0.5 miles north/northwest of the ECI property. EPA believes that DDT-impacted soils at the ECI property may be the result of contaminated storm water runoff from the former Montrose plant. The ECI property is located "downstream" from the former Montrose plant property, by way of the historical storm water drainage pathway.

Montrose agreed to conduct additional soil investigation activities at the ECI property. Accordingly, a draft Field Sampling Plan (FSP; Earth Tech, June 2006a) and draft Quality Assurance Project Plan (QAPP; Earth Tech, June 2006b) for additional soil sampling and analysis at the ECI property were

submitted to EPA for review on June 2, 2006. EPA conditionally approved the draft plans in a letter dated June 21, 2006. EPA then issued Unilateral Administrative Order (UAO) 09-2006-022 on June 23, 2006 for additional soil investigation activities at the ECI property. The initial phase of Montrose field soil sampling activities at the ECI property occurred between July 10 and 24, 2006 (Earth Tech, 2008).

The EPA Historic Storm Water Pathway – South Study Area is located south of Torrance Boulevard and east of Normandie Avenue in Torrance, California, and includes portions of eight properties. The eight properties include ECI and seven residential properties located directly east of the ECI property along Torrance Boulevard, Raymond Avenue, and 209th Street. The residential properties are the subject of a separate investigation being performed by CH2M HILL, Inc. under contract to EPA. This RAW addresses only that portion of the historic storm water pathway that traversed the ECI property.

3.3 Recent/Relevant Environmental Investigations

Recent assessments at the site were documented in the following reports, which are summarized below:

- *Environmental Site Assessment* (Haley & Aldrich, Inc. (HAI), 2005)
- *Draft Soil Investigation Report* (Earth Tech, 2006)
- *Summary Report - Human Health Risk Evaluation* (HAI, 2006)
- *Revised Soil Investigation Report, Historic Storm Water Pathway* (Earth Tech, 2008)
- *Final Human Health Risk Assessment* (Innovative Technical Solutions, Inc. [ITSI], 2010)
- *Phase II – Environmental Site Assessment* (SET, 2014)

The complete site assessment history from 1984 through 2010 from has been summarized in SET's *Site Assessment History Summary Report* dated May 22, 2014. The report includes summaries of all available documents to date with exception of the 2014 assessment by SET. A summary of the most recent assessment by SET is included below.

3.3.1 2005 Environmental Site Assessment Report – Haley & Aldrich, Inc.

In 2005, ECI commissioned implementation of an Environmental Site Assessment (ESA) at its property for real estate divestiture purposes. HAI was contracted by ECI to perform the work and collected and analyzed over 200 soil samples from the entire ECI property from February to June 2005. ECI excavated soil in areas where the results of the initial soil sampling indicated chemical concentrations above residential human health standards. HAI performed confirmation soil sampling at ECI from March to June 2005. During investigation of the ECI site, the resulting laboratory analyses reported the detection of a number of pesticides including: DDT, DDE, DDD, benzene hexachloride (BHC: alpha, beta, delta, and gamma isomers), chlordane (alpha and gamma isomers), dieldrin, endrin aldehyde, endrin ketone, heptachlor and heptachlor epoxide, and toxaphene. The laboratory reported the detection of TPH as diesel fuel and motor oil ranges, and the detection of PCBs, specifically Aroclors 1254 and 1260.

Many of the soil samples collected were grab samples taken from the sidewalls of excavations created along the eastern portion of the ECI property. The depth of sample collection ranged from just below ground surface to approximately 15 feet.

The soil analytical results identified elevated concentrations of several chemicals. Chemicals affecting soils at concentrations exceeding federal or state regulatory limits or regional background concentrations for residential soils included:

- Total DDT – Detected at a maximum reported concentration of 325 mg/kg total DDT. Samples containing elevated total DDT concentrations were collected from the eastern portion of the ECI property. Approximately 35 soil samples had total DDT concentrations above the upper end of the regional residential background range of 10 mg/kg.
- Chlordane – Detected at a maximum reported concentration of 3.5 mg/kg from soil collected along the easternmost portion of the property.
- PCBs – Detected along the southeast corner of the ECI property at a maximum concentration of 23.1 mg/kg (sum of Aroclors 1254 and 1260).
- Other chemical constituents detected in soil samples from the ECI property included:
- BHC, up to 0.025 mg/kg (sum of alpha, beta, delta, and gamma isomers);
- Dieldrin; up to 0.18 mg/kg;
- Heptachlor and heptachlor epoxide; up to 0.011 mg/kg;
- Endrin aldehyde and endrin ketone; up to 0.033 mg/kg;
- Toxaphene; up to 0.07 mg/kg;
- TPH-d and TPH-o; up to 21,000 mg/kg

In the summer of 2005, EPA learned of the presence of DDT and other chemicals in the soil at the ECI property. The ECI work was initiated without direction or oversight from the EPA. EPA requested that the owner stop excavation and implement best management practices for erosion control and other protective measures. ECI was requested to minimize erosion of the excavated soil piles, and to minimize the generation and migration of fugitive dust, potentially containing DDT and other chemicals, from the excavated soil piles. In addition, EPA requested that ECI provide all information related to its soil sampling activities including sampling locations and laboratory data reports.

In November 2005, EPA authorized ECI to perform a removal action to address the excavated soil and open excavations. On December 15, 2005, the EPA issued UAO Docket No. 09-2006-02a to ECI and Montrose. The UAO required the transport and disposal of the excavated soil at the ECI property, and the backfilling and covering of the open excavations. Beginning in January 2006, the soil piles were transported to a permitted hazardous waste facility for thermal treatment and landfilling. On behalf of Montrose, Earth Tech provided air monitoring of fugitive dust potentially containing DDT during the loading of soil into trucks by ECI (Earth Tech, 2006).

3.3.2 2006 Draft Soil Investigation Report – Earth Tech

The July 2006 investigation results were documented in the *Draft Soil Investigation Report – Historic Storm Water Pathways, South* (Earth Tech, December 2006) The July 2006 investigation characterized the nature and extent of pesticides and PCBs along a series of east-west transects positioned roughly perpendicular to the direction of the historical stormwater flow. Soil borings were spaced close together along each transect (30-feet) in order to provide a high level of characterization, but the spacing between transects was increased to 60 feet to reduce the number of borings required during the initial phase of historical stormwater pathway characterization. The approach used during the 2006 investigation characterized the nature and extent of pesticides and PCBs along the investigation transects.

A portion of the July 2006 soil samples exhibited pesticide and PCB concentrations exceeding the characterization benchmarks established by EPA for the investigation. In accordance with the UAO, EPA requested that soil samples be collected from selected locations between the July 2006 transects to further characterize the nature and extent of pesticides and PCBs within the ECI portion of the historical storm water pathway (i.e. a higher boring density). Additionally, vertical delineation of pesticides and PCBs was required at a small number of locations where the deepest soil sample was found to contain chemical concentrations exceeding the characterization benchmarks. Based on the July 2006 results, a supplemental soil sampling program was implemented at the ECI property in May 2007 to further characterize the nature and extent of pesticides and PCBs within the ECI portion of the historical storm water pathway. EPA conditionally approved the *Draft Field Sampling Plan Addendum* (Earth Tech, 2007) in an Interim Conditional Approval letter dated April 27, 2007.

Data obtained from the Montrose soil sampling efforts, in combination with existing ECI property data and additional data collected by EPA in the residential portion of the study area, were intended to fully characterize the presence, distribution, and concentrations of pesticide/PCB chemicals in the study area soils and identify those soils, if any, requiring remedial action.

3.3.3 2006 Human Health Risk Evaluation – Haley & Aldrich, Inc.

In 2006, Haley & Aldrich conducted a human health risk evaluation (HHRE) at the site with the purpose of assessing whether estimated human health risks at the site, based on the results of on-site soil and soil-gas samples previously collected by HAI in 2005, are considered acceptable for on-site commercial/ industrial uses.

A subsurface soil investigation and limited remedial excavation activities were performed at the subject site between February and June 2005 to assess current on-site soil conditions. Soil matrix and soil-gas samples were collected to address historical operations (presence of former underground storage tanks and chemical storage areas), possible historical agricultural use at the site, and other chemical uses in proximity to the site. Soil matrix samples were obtained from soil borings and within the remedial excavations. Soil-gas samples were obtained throughout the site.

No volatile organic compounds (VOCs) were detected in the soil-gas samples. The information from these investigation and remedial excavation activities was used in the HHRE

The results of the HHRE indicated the total hazard index (HI) and the cumulative incremental lifetime cancer risk (ILCR) for the identified receptors at the site are less than the acceptable thresholds for HI and ILCR of 1.0 and 1 x 10-5, respectively. Therefore HAI concluded that the contaminants of potential concern (COPC) concentrations detected at the site do not pose a significant risk to human health for an on-site commercial/industrial worker or a construction worker. Based on these results, the subject site is suitable for commercial/industrial land uses.

3.3.4 2008 Revised Soil Investigation Report – Earth Tech

On behalf of Montrose Chemical Corporation of California (Montrose) and in compliance with Unilateral Administrative Order (UAO) 09-2006-022, Earth Tech submitted a revised investigation report to the EPA. The EPA requested that Montrose conduct further soil investigation for the presence of pesticides and PCBs located along a portion of the historic storm water pathway that traverses the ECI property.

The objective of the ECI investigation was to obtain additional analytical data adequate to characterize the vertical and lateral extent of pesticides and PCBs in soil within the ECI portion of the Historic Storm Water Pathway – South Study Area.

Fifteen pesticides (excluding isomers of the same chemical) and three PCB Aroclors were detected in the soil samples collected at the ECI property and northern embankment. Nine of the pesticides and the PCBs occurred in concentrations exceeding EPA regional screening levels (RSLs), CHHSLs, or characterization benchmarks in at least one sample. Of these chemicals, total chlordanes, dieldrin, total DDT, and total PCBs occurred most frequently and in the highest concentrations. At the ECI plant property, shallow soils in the upper 8 feet (0 to 8 feet below ground surface [bgs]) were impacted most frequently by total chlordanes, dieldrin, and total PCBs, with up to 3.7 percent of the samples containing pesticides/PCBs in excess of the characterization benchmarks. Deeper soils at the ECI plant property (8 to 24 feet bgs) and soils along the northern embankment were most frequently impacted by total DDT, with up to 20.1 percent of the samples containing total DDT in excess of the characterization benchmark. Nine of the samples collected below 24 feet bgs were impacted with pesticides or PCBs above the characterization benchmarks.

The vertical extent of pesticides/PCBs exceeding residential action levels in soils was effectively delineated by the investigation activities conducted in 2006 and 2007, with the exception of PCBs in boring P10 (Figure 5). The deepest sample collected at this boring (20 to 24 feet bgs) exhibited a total PCB concentration of 0.58 mg/kg, exceeding the benchmark of 0.089 mg/kg. However, because PCBs are not a chemical of concern at the Montrose Superfund site and because boring P10 was located within the LACFCD easement (no native soils until at least 26 feet bgs), EPA did not require vertical delineation of PCBs at this location. The vertical extent of total chlordanes and dieldrin impacts to soil at the ECI plant property was found to be 12 and 16 feet bgs, respectively. The vertical impact of total DDT impacts to soil at ECI was found to be 24 feet bgs. In 2007, 12 borings were drilled to a depth of 28 feet bgs, and none of the soil samples collected below 24 feet bgs were found to contain total DDT above the characterization benchmark. The average total DDT concentration measured in soils classified as native by CH2M Hill was 0.158 mg/kg, which is significantly below the characterization benchmark of 10 mg/kg. It is important to note that none of the native soil was impacted by total DDT above the benchmark. All of the soil impacted by total DDT above the benchmark at the ECI property was classified as either fill or reworked materials.

The lateral extent of pesticides/PCBs exceeding residential action levels in soils throughout the historical storm water pathway was effectively delineated by the investigation activities conducted in 2006 and 2007. Soil borings were drilled in 30-foot intervals from the western boundary of the historical storm water pathway to the eastern boundary of the ECI property. Soil borings were also drilled in 30- to 60-foot intervals along the entire length of the historical storm water pathway from north to south. The soil investigation activities effectively delineated the western extent of total DDT, total chlordanes, and dieldrin impacts to soil in all areas of the historical storm water pathway as shown in Figure 5. The western extent of total PCB impacts to soil was delineated in all areas, except at boring P01, P25, and P31. At these three borings, total PCBs were detected in concentrations between 0.138 and 3.000 mg/kg, exceeding the residential action level of 0.089 mg/kg. However, EPA did not require further delineation of PCBs to the west because PCBs are not a chemical of concern at the Montrose Superfund site and because areas to the west would not be within the historical storm water pathway. Delineation to the east of the ECI property was the subject of a concurrent soil investigation conducted by EPA.

On September 13, 2007, based on the investigation data collected in 2006 and 2007, EPA concluded that Montrose had satisfactorily characterized the nature and extent of pesticides/PCBs within the portion of the historical storm water pathway traversing the ECI property. No additional investigation activities were proposed and submittal of the investigation report fulfilled Montrose's obligations under the UAO.

3.3.5 2010 Final Human Health Risk Assessment Report – ITSCI

As part of UAO 09-2006-022, ITSI prepared a baseline Human Health Risk Assessment (HHRA) for the USEPA, Region 9 to provide a quantitative evaluation of the potential human health risks associated with theoretical exposures to chemicals in soil at the ECI site. The report relied upon data collected during the additional soil investigations conducted at the ECI property by Earth Tech to quantify potential health risks for future on-site populations including adult and child residents, adult industrial workers, and construction workers. Exposure pathways addressed for these populations included soil ingestion, dermal contact, and particulate inhalation for soil from 0 to 2 feet below ground surface (bgs) (residential and industrial worker scenarios), 0 to 5 feet bgs (residential scenario), and 0 to 16 feet bgs (residential and construction worker scenarios). Two exposure point concentrations were used for each of these scenarios, i.e., the maximum detected concentration and the 95 percent UCL.

Results of the baseline HHRA demonstrated that the increased likelihood of cancer risk from soil exposures is due primarily to 4,4'-DDT. Although residential reuse of the site would pose the highest estimated cancer risk, the increased likelihood of cancer risk is within EPA's risk management range of one in 1 million (10^{-6} or 1E-06) to one in 10,000 (10^{-4} or 1E-04) if residents are not exposed to soil deeper than 16 feet bgs. For the future resident, the additional likelihood of cancer risk due to chemical concentrations in soil from surface to 16 feet bgs increases with depth.

If the site remains an industrial facility, increased cancer risk due to potential soil exposures of industrial workers is also within the risk management range. Exposures of construction workers to soils within the 0-to-16-foot bgs range also are associated with increased cancer risk that is within the risk management range. The risk assessment assumes that excavation and/or redevelopment activities will take place over a period of one year. In the event that these activities were for a shorter duration, the estimated cancer risk would decrease correspondingly.

The risk assessment also acknowledged that TPH contamination still remains at the site, and that TPH is a chemical of concern that needs further characterization prior to site redevelopment. Tetrachloroethene (PCE) was detected in one location with a concentration of 5.5 mg/kg. ITSI concluded that for future reuse other than as a parking lot, the potential vapor intrusion pathway, which was not addressed in their HHRA, may have to be evaluated.

3.3.6 2014 Environmental Site Assessment Report – SET

Between July 26 and November 14, 2013, SET conducted a soil and soil-gas assessment at the northwestern property and the western half of the southern property at the site. The purpose of the assessment was to evaluate the soil and soil gas in these areas, which may have been impacted with volatile organic compounds, petroleum hydrocarbons, pesticides and metals originating from the historical operations on-site. Although soil and soil gas at the site in general has been investigated multiple times since the initial toluene spill report in 1984, the subsurface conditions of the northwestern property has never been addressed. Soil and soil-gas samples in the western half of the

southern property were collected to confirm results of previous investigations. The scope of work included:

- 15 on-site soil borings to a maximum depth of 50 feet bgs with soil sample collection between 0.5 and 50 feet bgs for analysis of TPH, VOCs, semi-VOCs (SVOCs), OCPs and metals; and
- 10 soil-gas probes between 5 and 45 feet bgs for analysis of VOCs.

Based on the findings of the site assessment in soil, SET concluded the following:

- TPHd and TPHo detections were well below the LARWQCB soil screening level (SSL). TPH appeared to present no significant risk in the area of the site investigated.

- No VOCs were detected with exception of one sample at 30 feet bgs (B6). 8.9 microgram per kilogram [µg/kg] of PCE was detected, which is well below the EPA RSL for residential soil. Therefore, VOCs in soil appeared to present no significant risk in the area of the site investigated.

- No SVOCs were detected any of the nine soil samples. Based on the absence of concentrations in soil, SVOCs appear to present no significant risk in the area of the site investigated.

- No OCP detections exceeded residential CHHSLs. Therefore, OCPs appeared to present no significant risk in the area of the site investigated.

- Of the metals analyzed, only arsenic exceeded the residential CHHSL in all samples with a maximum concentrations of 3.93 mg/kg. However, the concentrations are below the generally accepted threshold limit of 12 mg/kg established for the Los Angeles Unified School District throughout the Los Angeles area. Based on the absence of elevated concentrations in soil, metals appeared to present no significant risk in the area of the site investigated.

Based on the findings of the site assessment in soil gas, SET concluded the following:

- PCE concentrations exceeding residential CHHSLs in soil gas below buildings constructed without engineered fill below sub-slab gravel (as assumed for this site) were observed in probes B4 (southeastern section of the northwestern parcel) and B1 and B5 (west of the former UST system).

- The residential CHHSL for benzene (0.036 µg/l) was exceeded in one detection in boring B9 (northwestern area of the property).

SET concluded that the elevated concentrations of PCE and benzene may presents some level of risk for the areas investigated during this assessment and recommended a supplemental site investigation of the horizontal and vertical extent of PCE and benzene at the identified locations with the following actions (Figure 6):

- Step-down and step-out sampling in the vicinity of B1, B4 and B5 to evaluate the horizontal and vertical extent of PCE in soil gas;
- Step-down and step-out sampling in the vicinity of B9 to evaluate the horizontal and vertical extent of benzene in soil gas; and
- A health risk evaluation to determine potential risks for future residential occupants at the site.

4. ENVIRONMENTAL SETTING

4.1 Site Topography

The topography at the ECI property is generally even and planar, with a surface elevation of approximately 40 feet above mean sea level (MSL) along its western edge. The surface of the site slopes to the east to an elevation of approximately 34 feet above MSL. A localized storm water catch basin located near the LACFCD drain box (eastern boundary area) is the lowest feature within the paved ECI plant property (Figure 5).

The majority of the ECI plant property is paved with asphalt or concrete, with the exception of a narrow strip along the eastern boundary that is uncovered. Along the northern boundary of the property is a sloped and landscaped embankment bounded by Torrance Boulevard to the north. The embankment is approximately 10 vertical feet in height. In 1998, ECI removed soils from along the bank, thereby reducing the grade to its present day condition, for purposes of filling a localized depression in the northeast corner of the property (Earth Tech, 2008).

4.2 Geology and Hydrogeology

The ECI site is located within the south central portion of the West Coast Groundwater Basin. The Ballona Escarpment bounds the West Coast Groundwater Basin to the north, the Newport-Inglewood Structural Zone to the northeast, Palos Verdes Hills to the southwest, and the Pacific Ocean to the south and west.

The site is also located in the southern portion of the Torrance Plain landform element. There are four major structural features within the Torrance Plain or in the vicinity of the EPA Historic Storm Water Pathway Study Area: the Newport-Inglewood Structural Zone (Barrows, 1974), the Palos Verdes Fault, the Torrance Anticline, and the Gardena Syncline (EPA, 1998; California Department of Water Resources [CDWR], 1961). The stratigraphy of the West Coast Basin includes Quaternary-age continental and marine deposits and Tertiary-age marine sediments overlying a basement complex of igneous and metamorphic rocks. The geologic units of hydrogeologic interest are (in order from oldest to youngest) the Pico Formation; the San Pedro Formation; the Lakewood Formation; and older dune sand, alluvium, and active dune sand (CDWR, 1961).

The specific occurrence, depth, and thickness of surface and near surface sediments at the ECI property have not previously been significantly differentiated but were expected to be comprised of unconsolidated sedimentary deposits and reworked soil from past grading operations. According to CDWR (1961), the ECI property is underlain first by the Lakewood Formation and is approximately 200 feet thick in the vicinity. Generally, the Lakewood Formation comprises terrace deposits, the Palos Verdes Sand, and unnamed Upper Pleistocene deposits. Material types are both marine and non-marine, and include gravel, sand, silt, and clay. Near surface soils from the nearby Montrose Superfund Site were described as follows in the 1998 Remedial Investigation (RI) Report (EPA, 1998):

Upper Layer – Playa Deposits: This layer occurs from near the ground surface to approximately 25 feet below ground surface. Based on grain-size analyses of soil samples collected in this layer, silt and clay comprise more than 65 percent of these soils.

Middle Layer – Palos Verdes Sands: This layer occurs from approximately 25 to 45 feet bgs and consists primarily of fine-grained sands. According to grain-size analysis of soil samples collected in this layer, fine and medium grained sands comprise more than 70 percent of these soils.

Lower Layer – Upper Bellflower Aquitard: This layer is found from approximately 45 to approximately 95 feet bgs and consists of multiple thin sand layers interbedded with layers of silts and clays. Grain-size analysis of soil samples collected in this layer ranged from more than 70 percent fine-grained sand to more than 60 percent silt. This soil layer varied from fine-grained sands to clays and silts with increasing depth.

Hydrogeologic units in the west Coast Basin include aquitards and aquifers of varying compositions and water-yielding properties. These units, in order from shallow to deep, include the Bellflower Aquitard, the Gage Aquifer, an unnamed aquitard, the Lynwood Aquifer, another unnamed aquitard, and the Silverado Aquifer. The first-encountered groundwater beneath the area is at approximately 65 feet bgs, in the Upper Bellflower Aquitard (Earth Tech, 2008).

Groundwater quality data are available from investigations proximal to the Montrose study area; however, these data are not related to the investigations of the historical storm water pathway.

4.3 Site Geology

During the site investigations, gravel with various amounts of silt, clay, and sand was encountered fairly broadly across the area investigated to a depth ranging from surface to 5 feet bgs, followed at depth by lean to sandy clay, with occasional silty sand or sandy silt layers. A variety of debris materials were observed in a number of the soil samples collected at the ECI property including (but not limited to): brick, concrete, asphalt, plastic, wood, glass, ceramic tile, linoleum, and electrical wire. Debris materials were encountered from near surface to a maximum depth of approximately 23 feet bgs in the various soil borings logged.

Within the ECI plant property, native soils were found to occur between approximately 20 and 26 feet bgs. Fill materials overlayed the native soils. In some cases, there was an intermediate soil type between the fill materials and native soils, identified by Earth Tech as "potentially native" and by CH2M Hill as "reworked". The reworked material is very similar to the native soils but lacking in evidence of plant roots or root channels. Where identified, the reworked material was generally thin, with thicknesses between approximately 0 and 4 feet.

4.4 Meteorology

Moderate temperatures with comfortable humidity and limited precipitation characterize the climate in Los Angeles. Temperatures are normally mild, with rare extremes above 100ºF or below freezing. Mean annual precipitation is approximately 14.5 inches, of which approximately 12.2 inches occur from November through March. Temperatures are expected to range between 70ºF and 90ºF.

5. APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

Previous investigations of the site indicate the presence of contaminants of concern in soil in the site-specific areas proposed for excavation. The most effective remedial action has been determined to be

removal consisting of soil excavation and off-site disposal. This section discusses the relevant and appropriate requirements for the proposed soil excavation and off-site disposal.

5.1 Public Participation

The DTSC has developed a public participation strategy to determine the level of public interest and ensure that the local community has an opportunity to provide input into the decision process. Based on expressed community interest, DTSC may hold a public comment period and, if appropriate, a public meeting before approving the RAW.

5.2 California Environmental Quality Act

The California Environmental Quality Act (CEQA), modeled after the National Environmental Policy Act (NEPA) of 1969, was enacted in 1970 as a system of checks and balances for land-use development and management decisions in California. It is an administrative procedure to ensure comprehensive environmental review of cumulative impacts prior to project approval. It has no agency enforcement tool, but allows challenge in courts.

CEQA applies to all discretionary activities proposed to be carried out or approved by California public agencies, unless an exemption applies. The DTSC recommended RAs at the site. Therefore, the proposed RAs at the site are a CEQA project with DTSC as the lead agency.

The RA may have a significant effect on public health or the environment at the site and in the immediate vicinity because of the proposed soil movement. As part of its approval process for the project, DTSC will prepare a draft Notice of Exemption (NOE). Upon approval of this RAW, DTSC will file the NOE with the Governor's Office of Planning and Research (OPR) to comply with the CEQA requirements. The draft NOE has not been prepared as of the date this draft RAW was prepared; when it is available, a copy of the draft NOE will be included in the appendices of the final RAW.

5.3 Noise Control

The project may potentially generate significant noise impacts, and as such mitigation measures are required. The State of California's noise insulation standards are codified in the California Code of Regulations, Title 24, Building Standards Administrative Code, Part 2, California Building Code. These noise standards are applied to new construction in California for the purpose of interior noise compatibility from exterior noise sources. The regulations specify that acoustical studies must be prepared when noise-sensitive structures, such as residential buildings, schools, or hospitals, are located near major transportation noise sources, and where such noise sources create an exterior noise level of 60 A-weighted decibels (dBA) Community Noise Equivalent Level (CNEL) or higher.

Acoustical studies that accompany building plans must demonstrate that the structure has been designed to limit interior noise in habitable rooms to acceptable noise levels. For new residential buildings, schools, and hospitals, the acceptable interior noise limit for new construction is 45 dBA CNEL. California Code of Regulations has guidelines for evaluating the compatibility of various land uses as a function of community noise exposure. The State of California also establishes noise limits for vehicles licensed to operate on public roads. For heavy trucks, the State pass-by standard is consistent with the federal limit of 80 dBA. The State pass-by standard for light trucks and passenger cars (less than 4.5 tons, gross vehicle rating) is also 80 dBA at 15 meters from the centerline. These standards are

implemented through controls on vehicle manufacturers and by legal sanction of vehicle operators by state and local law enforcement officials.

To limit population exposure to physically and/or psychologically damaging as well as intrusive noise levels, the federal government, the State of California, various county governments, and most municipalities in the state have established standards and ordinances to control noise. The City of Torrance regulates noise through the City of Torrance Municipal Code, Division 4, Chapter 6, Noise Regulation. Potential noise and vibration impacts were evaluated based on the City of Torrance, Municipal Code, Federal Transit Administration (FTA) methodology, and supplemental criteria for single-event noise to determine whether a significant adverse noise impact would result from the construction and operation of the proposed project (http://www.torranceca.gov/pdf/gp_drafteir/Ch%2005-11%20N.pdf, page 5.11-4).

The City of Torrance prohibits outside construction or repair work on buildings, structures, or projects in or adjacent to a residential area between the hours of 6:00 PM and 7:30 AM Monday through Friday and 5:00 PM to 9:00 AM on Saturday that exceeds 50 dBA at a residential property line. Construction is prohibited on Sundays. Properties zoned as commercial, industrial, or within an established redevelopment District are exempt from the day and hour restrictions as long as there is a minimum 300-foot buffer between the property and the property line of the nearest residential use and noise levels do not exceed 50 dBA at the residential property line.

Project activities may produce temporary yet somewhat significant noise impacts. If it becomes necessary, noise control measures will be initiated. The RAW will conform to standards for construction noise impacts on adjacent land as provided by the City of Torrance General Plan Draft Noise Element Implementation (GP), as detailed here. The GP provides typical noise levels for diesel trucks at 50 feet away at 50 miles an hour to be approximately 90 dBA. Further, the city of Torrance also addresses noise concerns and issues by providing for Conditional Use Permits. Hearing protection should be worn at the site if noise levels exceed 85 decibel. Hearing protection with a noise reduction rating of at least 25 decibel should be worn (i.e., earplugs or earmuffs). The Site Health and Safety Supervisor will inform site personnel when and if hearing protection is required. High noise levels are usually associated with the operation of drill rigs, compressors, generators, pumps, motors, and portable hand tools including drills and jackhammers.

The RP and or representatives shall implement procedures to both control and reduce noise generation from project construction activities. Typical noise control procedures include the following:

- Require construction contractors to comply with the construction hours and days limitations established in local noise ordinances.
- Night-time construction would require approval from local jurisdictions.
- Require all construction contractors to locate fixed construction equipment (e.g., compressors and generators) as far as possible from noise-sensitive receptors.
- Equipment used in the construction of individual project components shall be muffled and maintained in good operating condition.
- Internal combustion engine driven equipment shall be fitted with intake and exhaust mufflers that are in good condition.
- If pile driving is required for facility construction, the contract specifications for those projects shall incorporate the following requirements:

a. Wherever possible, sonic or vibratory pile drivers will be used lieu of impact pile drivers.
b. Wherever feasible, pile holes will be pre-drilled to reduce potential noise and vibration impacts.

Additional noise attenuating measures include:

- changing the location of stationary construction equipment and/or staging areas;
- notifying adjacent residences and nearby sensitive receptors in advance of construction work;
- shutting off idling equipment; rescheduling construction activities;
- requiring on-going construction noise monitoring to assure adherence to city/county construction equipment standards; and/or
- installing temporary barriers around stationary construction noise sources.

To further address the potential for nuisance impact of project construction, construction contractors shall implement the following:

- Signs will be posted at the construction site that include permitted construction days and hours, a day and evening.
- Contact number for the job site, and a contact number for the applicable jurisdiction agency will be posted in the event of problems.
- An on-site complaint and enforcement manager shall track and respond to noise complaints.

5.4 Waste Management

Elevated levels of pesticides and PCBs were detected in the proposed excavation area during previous site assessments. The impacted soil is proposed to be excavated and disposed off-site and therefore must be classified before off-site disposal. Based on results of the previous investigations, all soil to be excavated is preliminary classified as non-hazardous designated waste.

If laboratory results exceed the soluble threshold limit concentration (STLC) limits, the waste will be classified as non-Resource Conservation and Recovery Act (non-RCRA) California regulated hazardous waste, and if the results exceed the toxicity characteristic leaching procedure (TCLP) limit then the waste will be handled as RCRA hazardous waste. The STLC and the TCLP limits for hazardous waste classification is outlined in the following table.

Compound	STLC Limit (mg/l)	TCLP Limit (mg/l)
Chlordane	0.25	0.03
4-4-DDD	0.1	NA
4-4-DDE	0.1	NA
4-4-DDT	0.1	NA
Dieldrin	0.8	NA
Toxaphene	0.5	0.5
TPH(cc)	NA	NA

NA = Not applicable
mg/l = Milligram per liter

Compliance with all requirements of hazardous waste generation, temporary on-site storage, transportation and disposal is required, as necessary. As a hazardous waste generator, ECI will secure an EPA ID number from the DTSC for proper management of the hazardous waste. Any container used for on-site storage will be properly labeled with a hazardous waste label. Within 90 days after its generation, the hazardous waste will be transported off-site for disposal. Any shipment of hazardous wastes in California will be transported by a registered and licensed hazardous waste hauler under a uniform hazardous waste manifest. Land ban requirements will also be followed as necessary.

5.5 Air Quality Monitoring

The South Coast Air Quality Management District (AQMD) has two rules that address excavation (Rules 1150 and 1166) and one that addresses fugitive dust (Rule 403). Rule 1150 applies to the excavation of sanitary landfills and does not apply to this project. Rule 1166 applies to the project excavations of soils because of the potential for containing volatile organic compounds (VOCs). SET will provide and comply with the Rule 1166 Various Locations Permit to initiate the project at the site.

Several elements of Rule 403, such as protocols for mitigation of potential fugitive dust emissions, have been incorporated into this RAW. Excavation, loading, and transport of impacted soils will be in compliance with AQMD Rule 403 prevention, reduction, and mitigation measures for fugitive dust emissions. However, notification of the AQMD is required only for large operations (disturbing more than 100 acres or moving more than 10,000 cubic yards per day). The estimated daily mass of material removed from the site will be approximately 1,000 tons/day. Therefore, no notification or filing of a Fugitive Dust Emission Control Plan is required due to project size.

5.6 Health and Safety

All contractors will be responsible for operating in accordance with the most current requirements of Title 8, California Code of Regulations, section 5192 (8 CCR 5192) and Title 29, Code of Federal Regulations, section 1910.120 (29 CFR 1910.120), Standards for Hazardous Waste Operations and Emergency Response (HAZWOPER). On-site personnel are responsible for operating in accordance with all applicable regulations of the Occupational Safety and Health Administration (OSHA) outlined in 8 CCR General Industry and Construction Safety Orders and 29 CFR 1910 and 29 CFR 1926, Construction Industry Standards, as well as other applicable federal, state and local laws and regulations. All personnel shall operate in compliance with all California OSHA requirements.

A site-specific HSP has been prepared for the site in accordance with current health and safety standards as specified by the federal and California OSHAs. The HSP is included as Appendix A.

The provisions of the HSP are mandatory for all personnel of the project and its contractors who are at the site. The contractor and its subcontractors contracted for fieldwork in association with this RAW will either adopt and abide by the HSP or shall develop their own safety plans which, at a minimum, meet the requirements of the HSP. All on-site personnel shall read the HSP and sign the "Approval/ Distribution of Health and Safety Plan" before starting site activities. The on-site health and safety officer will be responsible for implementation of the HSP. A health and safety meeting will be conducted at the beginning of the each day during field activities. The HSP is included in Appendix B.

5.7 Quality Assurance/Quality Control

An integral part of sampling and analysis are quality assurance/quality control (QA/QC) procedures to ensure the reliability and compatibility of all data generated during the investigation. The procedures are described in detail in the QAPP (Appendix C). The QAPP includes project organization and responsibilities during the corrective action. Data quality as measured by the precision, accuracy, representativeness, completeness, and comparability of field and laboratory data is discussed. The collection and analysis of field and laboratory control samples, including sampling frequency, is included. Quality control procedures including data quality assessment and management, data validation and reporting, and audit and corrective action programs is discussed.

The chemical data to be collected for this effort will be used to determine that the extent of contamination is properly evaluated and/or removed. As such, it is critical that the chemical data be the highest confidence and quality. Consequently, strict QA/QC procedures will be adhered to and the procedures include:

- Observation of strict protocols for field sampling and decontamination procedures; and
- Collection and laboratory analysis of appropriate field equipment blanks to monitor for contamination of samples in the field or the laboratory;
- Collection of soil and soil-gas duplicate samples to evaluate field precision and accuracy;
- Laboratory calibration against internal standards, surrogate recoveries, laboratory control samples, instruments blanks, method blanks, and matrix spike/matrix spike duplicate samples to evaluate analytical precision and accuracy.
- Attainment of completeness goals.

5.7.1 Soil Sampling

In accordance with standard DTSC protocols, appropriate QA/QC samples will be collected during the sampling program:

- Ten percent of soil samples submitted for laboratory analysis (each analysis) will be submitted as duplicate (collocated) samples and analyzed for the same constituents. The duplicate soil samples will be collected at the same time as the corresponding field sample and will be obtained immediately above or below the corresponding field sample.
- One out of every 20 samples will be selected for matrix spike/matrix spike duplicate testing by the laboratory.

5.7.2 Soil-gas Sampling (As Needed)

In the event, additional soil-gas samples are required in areas selected for further assessment by the DTSC, the Cal/EPA/DTSC protocols will be followed to collect duplicate soil-gas samples at a frequency of 10 percent in Summa® canisters using a flow regulator and transported off-site to a fixed laboratory. One Summa® canister trip blank per day of sampling will also be collected. These samples will be collected following the primary soil-gas sample collection by attaching the conductor tubing directly to the Summa® canister and opening the valve of the canister that is under a negative pressure. The Summa® canister sampling will be conducted at a sampling rate of 200 ml/min or less. The soil-gas and blank sample collected in the Summa canisters will be analyzed for VOCs by EPA Method TO-15

according to the Advisory on Active Soil Gas Investigations (Cal/EPA, DTSC, RWQCB, 2012). Additional requirements of the QA/QC sampling protocol includes:

- Duplicate field samples will be collected in either 125-milliliter glass bulbs or 60-milliliter plastic syringes for on-site analysis of VOCs by EPA Method 8260B. Soil-gas method blank samples will be collected and analyzed by the mobile laboratory during each day of soil-gas sampling.
- One equipment blank sample per day of sampling per equipment used will be submitted for the same analysis as samples submitted for that day. Equipment blank samples for field equipment rinse liquid will be collected by pouring organic-free water over decontaminated sampling equipment at the end of each day. Equipment blanks will consist of three laboratory-provided 40-milliliter volatile organic ampoules (VOAs) containing a hydrochloric acid preservative. The VOAs will be identified on the chain-of-custody forms and will be delivered to the laboratory for analysis with other soil samples collected on the same day.
- One trip blank per soil-gas sample shipping container will be submitted for VOC analysis only.
- One out of every 20 samples will be selected for matrix spike/matrix spike duplicate testing by the laboratory.

All soil-gas samples will be analyzed within the holding times for each analytical method. Soil-gas sample containers will be covered to eliminate light intrusion into the samples.

A summary of all QA/QC samples, analytical methods, quantity, container, preservation requirements, holding time, and method detection limits is provided in the QAPP.

5.8 Others

All necessary permits and approvals identified in this RAW will be obtained prior to any drilling or excavation activities. Upon approval from the DTSC, removal activities will be performed by a California-certified contractor with oversight from a California professional geologist or professional civil engineer.

6. REMOVAL ACTION SCOPE

Data from the investigation of the previous site assessments indicate pesticides and PCBs as contaminants of concern in soil at concentrations exceeding levels considered safe for residential occupancy. The most effective remedial action has been determined to be removal consisting of soil excavation and off-site disposal. Upon receipt of the DTSC's approval, shoring and removal activities will be performed by a California-certified contractor with supervision by a California professional geologist and professional civil engineer. All removal, transportation and disposal will be performed in accordance with all applicable federal, state, and local laws, regulations, and ordinances.

6.1 Field Documentation

The excavation operations contractor will be responsible for maintaining a field logbook during the excavation activities. The field logbook will serve to document observations, personnel on-site, equipment arrival and departure times, and other vital project information.

6.1.1 Field Records

Field logbooks or daily field reports will be used to document where, when, how, and from whom any vital project information was obtained. Logbook or field report entries will be complete and accurate enough to permit reconstruction of field activities. Logbooks will be bound with consecutively numbered pages or daily field records will be collected in binders. Each page will be dated and the time of entry noted in military time. All entries will be legible, written in black ink, and signed by the individual making the entries. Language will be factual, objective, and free of personal opinions or other terminology, which might prove inappropriate. If an error is made, corrections will be made by crossing a line through the error and entering the correct information. Corrections will be dated and initialed. No entries will be obliterated or rendered unreadable.

Entries in the field logbook or daily field reports will include at a minimum the following for each fieldwork date:

- Site name and address
- Recorder's name
- Team members and their responsibilities
- Time of site arrival/entry on site and time of site departure
- Other personnel on-site
- A summary of any on-site meetings
- Quantity of impacted soils excavated
- Quantity of impacted soils temporarily stored on-site
- Quantity of excavated soils in truckloads transported off-site
- Names of waste transporters and proposed disposal facilities
- Copies or numbers of manifests or other shipping documents (such as bill of landing) for waste shipments
- Quantity of imported fill material in truckloads
- Deviations from this RAW and site HASP
- Changes in personnel and responsibilities as well as reasons for the changes
- Levels of safety protection
- Calibration readings for any equipment used and equipment model and serial number

At a minimum, the following information will be recorded during the collection of each sample:

- Sample identification number
- Sample location and description
- Site sketch showing sample location and measured distances
- Sampler's name(s)
- Date and time of sample collection
- Designation of sample as composite or grab
- Type of sample (i.e., matrix)
- Type of preservation
- Type of sampling equipment used
- Field observations and details important to analysis or integrity of samples (e.g., heavy rains, odors, colors, etc.)
- Instrument readings (e.g., photoionization detector [PID], etc.)
- Chain-of-custody form numbers
- Transport arrangements (courier delivery, laboratory pickup, etc.)

- Recipient laboratory(ies)

6.1.2 Chain-of-Custody Records

Chain-of-custody records are used to document sample collection and shipment to laboratory for analysis. All sample shipments for analyses will be accompanied by a chain-of-custody record. Form(s) will be completed and sent with the samples for each laboratory and each shipment. If multiple coolers are sent to a single laboratory on a single day, chain-of-custody form(s) will be completed and sent with the samples for each cooler. The chain-of-custody record will identify the contents of each shipment and maintain the custodial integrity of the samples. Generally, a sample is considered to be in someone's custody if it is either in someone's physical possession, in someone's view, locked up, or kept in a secured area that is restricted to authorized personnel. Until receipt by the laboratory, the custody of the samples will be the responsibility of the sample collector.

6.1.3 Photographs

Photographs will be taken of the excavation area(s), stockpiles and locations, and other areas of interest on-site to document the excavation operations. They will serve to verify information entered in the field logbook. When a photograph is taken, the following information will be written in the logbook or will be recorded in a separate field photography log:

- Time, date, location, and, if appropriate, weather conditions
- Description of the subject photographed
- Name of person taking the photograph

6.2 Site Preparation and Security Measures

Prior to equipment mobilization for the proposed excavation operations, site preparation activities may include site inspections, surveying, boundary staking, sampling, demarcation of hot spots, improvement of access roads, utility connections or disconnections, and fencing and windscreen installation.

6.3 Delineation of Excavation Areas

The area limit of the excavation will be delineated by the excavation operations contractor, in consultation with DTSC representatives, before commencement of removal activities. The area to be excavated shall be identified as the "excavation area" and will be marked (as the exclusion zone) in the field by the excavation operations contractor with stakes and/or high visibility paint.

6.4 Permits and Plans

The following permits from State and local agencies may be required to conduct all work:

- DTSC approval of the RAW
- National Pollutant Discharge Elimination System (NPDES) permit (if required)
- Storm drain easement access
- Southern California Edison easement access
- Shoring permit (currently submitted and in approval progress with LACDPW)
- Grading permi t(currently submitted and in approval progress with LACDPW)

These and all other necessary permits or approvals will be obtained prior to the implementation of the excavation operations.

6.5 Agency Communication

During excavation, SET will implement this communication system with the DTSC to address unexpected site conditions:

- In the event the lateral limits of an excavation must be significantly expanded, or the depth of an excavation in specific areas increased due to unanticipated conditions that may be encountered, SET on-site staff will verbally communicate the conditions to the DTSC representatives on-site (or by telephone with the responsible DTSC representative).
- SET will evaluate the conditions and communicate the proposed actions with the DTSC via e-mail.
- Upon concurrence, SET project management will direct field staff to implement appropriate actions.
- Any unexpected site conditions and associated resolutions will be documented in the soil removal report.

6.6 Utility Clearance

Clearance of underground utilities and other hazardous underground obstacles will be conducted prior to start of excavation. Such possible obstacles may include water, electrical, gas, oil, communication cable, phone cable, TV cable, and sewer lines. At a minimum, the utility clearance will include a 48-hour notification of the local Underground Services Alert (USA) and a site visit. In addition, a geophysical survey will be conducted to identify all subsurface lines and other features/obstructions. If underground utilities are discovered they will be temporarily removed and replaced after completion of the excavation.

6.7 Security Measures

Appropriate barriers and/or privacy fencing will be installed prior to the beginning of the excavation process to ensure that all work areas are secure and safe. To ensure trespassers or unauthorized personnel are not allowed near work areas, security measures may include, but are not limited to:

- Maintaining a visitor's log. Visitors must have prior approval from the site manager to enter the site. Visitors shall not be permitted to enter the site without first receiving site-specific health and safety information from the site safety coordinator.
- Installing barrier fencing to restrict access to sensitive areas such as exclusion zones.
- Providing adequate site security to ensure unauthorized personnel have no access to work areas and/or contaminated materials.
- Before leaving the site, all personnel must sign out in the visitor's log.
- Maintaining a safe and secure work area, including areas where equipment is stored or placed, at the close of each workday.

Persons requesting site access will be required to demonstrate a valid purpose for access and if access to work areas and/or contaminated materials is planned, provide appropriate documentation to demonstrate they have received proper training required by the site-specific HSP (see Appendix B).

6.8 Contaminant Control

The following measures will be implemented during soil excavation activities to prevent any potential exposure of material to the adjacent properties:

- The excavation operations will be conducted when the RAW is approved by the DTSC.
- SET will take necessary steps to minimize impact to the community.
- Air monitoring procedures will be implemented during excavation activities.
- The covering of windows and doors at nearby residences may be warranted.
- Adjacent tenants will be informed prior to initiation of any removal activities.
- Excavation activities will only be conducted during daylight business hours.

6.9 Air Monitoring and Dust Control Plan

6.9.1 Air Monitoring

Excavation of soil at this site requires that South Coast Air Quality Management District (AQMD) Rule 1166 be followed. The field data sheet entitled "Dust, Odor and VOC Air Monitoring Field Data Sheet for Excavation Activities" (included in Appendix E) will be used during excavation activities and includes the requirements for Rule 1166 monitoring. Air monitoring for VOCs will be conducted every 15 minutes during excavation activities and when soil stockpiles are being worked. Air monitoring will consist of monitoring the excavation and the site perimeter by measurement of ambient air using a photo-ionization detector (PID) calibrated to 50 parts per million (ppm) hexane to detect VOCs. Visual inspections for fugitive dust emissions and observations of odor should also be documented at this time.

Air monitoring will be performed during all excavation activities in which contaminated or potentially contaminated materials will be disturbed or handled. The excavation operations manager will staff the site with an air monitoring/health and safety professional as needed whose responsibilities will include:

- Monitoring of dust levels in the excavation area and other locations. The site air monitoring professional will have the authority to stop work in the event that on-site activities generate dust levels greater than 1.0 milligrams per cubic meter (mg/m^3), which is 10 percent of the California Occupational Safety and Health Administration (Cal/OSHA) permissible exposure limit (PEL) of 10 mg/m^3. In California, PELs for chemical contaminants are provided by the Department of Industrial Relations, listed in the California Code of Regulations, Title 8, Section 5155.
- Assuring that all real-time aerosol monitors and industrial hygiene air-sampling equipment and media are properly calibrated and in good working condition. Real-time, data-logging aerosol monitors (personal DataRAM) will be used, when required, to measure dust levels. Real-time information will be posted daily, and discussed with site workers.
- Coordination of general site safety activities, including all daily hazard communication, safety practices and procedure briefings.
- Oversight of personal decontamination practices, and
- General site safety leadership, support and recordkeeping activities.

6.9.2 Dust Control

Fugitive dust control measures will be implemented at the site to mitigate off-site dust migration to neighboring properties and affecting on-site workers. This section details potential dust control measures that the contractor will implement to minimize dust emissions during the removal action. Dust emissions may result from activities during removal action and from wind erosion. These sources are most effectively controlled using wet suppression. A high wind threshold will also be established to minimize wind erosion during extreme meteorological conditions and low visibility/permeability wind fencing will be installed around the excavation area. Stockpiles will be covered unless being loaded, water will be sprayed on areas which have already been excavated and are subject to wind erosion. Additionally, SET will monitor dust levels and airborne concentrations of the VOCs in the following general locations:

- Upwind;
- Proximate to the excavation area;
- Up to three fence line/downwind locations; and
- As deemed necessary to determine worker exposure (to be determined by the contractor).
- Real-time, data-logging aerosol monitors (i.e., personal DataRAM or PDM-3 Mini Ram particulate monitor manufactured by MIE) will be used to measure airborne dust levels during the work hours at the site. At a minimum, the PDM-3 MiniRAM or an equivalent dust meter will be placed upwind to monitor background dust levels, a second dust meter will be placed on the excavation equipment (i.e., backhoe) to provide worst-case dust concentrations at the site, and one dust meter will be placed downwind to monitor dust levels leaving the site. Locations of the upwind and downwind dust meters will be determined at the beginning of each day, based on the wind conditions. Locations will be reviewed during the excavations and locations adjusted depending on wind conditions. Excavation activities will be temporarily halted and dust masks will be provided to site workers in the event particulate concentrations exceed the action level of 1.0 mg/m^3. Dust meters will be calibrated daily. Dust monitoring results will be posted daily and discussed with site workers. The dust meters will be set to log dust levels over five-minute periods and will be visually read every 15 minutes.
- The National Ambient Air Quality Standard (NAAQS) for dust is 50 micrograms per cubic meter (µg/m^3), based on dust particles greater than 10 microns in diameter (PM10). Therefore, the action level for off-site dust monitoring activities will be 50 µg/m^3. In the event that on-site activities generate dust concentrations in excess of the established action levels, excavation activities will cease until dust concentrations are below the action levels.

Exposure guidelines for the site COCs are summarized in the table below.

Exposure Guidelines for Site Chemical Hazards

Chemical Name	Odor Threshold	CAL/OSHA PEL [a]	ACGIH TLV [b]	Site Action Levels [c]	Community Action Level (Fence Line) [d]
Total Dust	Not Listed	10 mg/m^3	10 mg/m^3	1.0 mg/m^3	0.05 mg/m^3
Chlordane	Not Listed	0.5 mg/m^3	0.5 mg/m^3	500 µg/m^3	N/A
4-4-DDD	Not Listed	1.0 mg/m^3	1.0 mg/m^3	0.1 mg/m^3	N/A

Exposure Guidelines for Site Chemical Hazards					
Chemical Name	***Odor Threshold***	***CAL/OSHA PEL [a]***	***ACGIH TLV [b]***	***Site Action Levels [c]***	***Community Action Level (Fence Line) [d]***
Total Dust	*Not Listed*	*10 mg/m^3*	*10 mg/m^3*	*1.0 mg/m^3*	*0.05 mg/m^3*
4-4-DDE	*Not Listed*	*1.0 mg/m^3*	*1.0 mg/m^3*	*0.1 mg/m^3*	*N/A*
4-4-DDT	*Not Listed*	*1.0 mg/m^3*	*1.0 mg/m^3*	*0.1 mg/m^3*	*N/A*
Dieldrin	*Not Listed*	*0.25 mg/m^3*	*0.25 mg/m^3*	*250 µg/m^3*	*N/A*
Toxaphene	*Not Listed*	*0.5 mg/m^3*	*0.5 mg/m^3*	*500 µg/m^3*	*N/A*

Notes:

a Permissible Exposure Limits (Cal/OSHA Article 107, Table AC1)

b 1990-1991 Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices, American Conference of Governmental Industrial Hygienists

c Site action level is calculated as 10% of threshold limit value or PEL (as measured by NIOSH methods), whichever is lower. If an action level is met or exceeded, then additional dust mitigation measures will be implemented. If the site air contaminants cannot be controlled reliably within 15 minutes, all work will cease and a certified industrial hygienist will be consulted. If site action level for lead is exceeded on the integrated air monitors, a certified industrial hygienist will be immediately consulted.
Site action levels for unknown volatile organic compounds (VOCs) as measured by real-time photo-ionization detector = 1 ppm

d Community action level for total dust/particulate is based on AQMD regulations.

mg/m3 — milligrams per cubic meter
µg/m3 — micrograms per cubic meter
N/A — Not available

6.9.2.1 Wet Suppression

The main mechanism for the control of fugitive dust emissions from construction activities and wind erosion is by watering, which leads to the formation of a surface crust to reduce the available reservoir of dust. In addition to water, a wide variety of chemical dust suppressants are available to enhance the formation of a surface crust. The effectiveness of wet suppression is dependent on the type of activities occurring, the frequency of watering, and the meteorological conditions. Watering of the active excavation area will be conducted throughout the excavation operations as needed. The watering schedule will be determined by an evaluation of the air monitoring and meteorological data, site conditions, and site activities. Wet suppression for this site consists of the following:

- Minimizing dust generation activities and methods used during excavations;
- Using a water truck equipped with valved hoses that will refill at a local fire hydrant equipped with a permitted temporary water meter;
- Manual spraying of the excavation to reduce dust, as needed;
- Manual spraying of soil stockpiles to reduce dust when the stockpiles are being worked and are not covered; and
- Ensuring that excavated material is removed from all vehicles leaving this site using brushes and water spray, as required.

Note that water should be used sparingly so that discharge of dust-suppression water from this site is prevented and soil transported off-site for disposal is not saturated.

6.9.2.2 Meteorological Monitoring

On-site ambient weather conditions (wind speed and direction, and relative humidity) will be monitored by the following methods: an on-site met station, real-time internet weather locations, or the National Weather Service (if a local station can provide data relevant to the site). If off-site meteorological stations cannot provide data relevant to the site, an on-site meteorological station will be set up and monitored during excavation activities.

On-site meteorological monitoring will be performed simultaneously with the excavation activities to ensure all necessary precautions have been taken.

6.9.2.3 High Wind Warnings

High wind conditions can lead to higher dust emissions. Thus, based on the information collected by the on-site meteorological station, work will be stopped during high wind conditions. There are no wind speed restrictions stated in local or federal regulations.

However, an initial self-imposed action level for work stoppage will be set at a sustained wind speed of 25 mph for a 15-minute duration. This action level is subject to revision based on actual site conditions.

6.9.2.4 Wind Fences

Wind fences will be used as a dust control measure in conjunction with other dust control measures discussed above. The fence reduces the wind speed at a specific location. The fence dimensions necessary to achieve optimum effectiveness will vary depending on the geography of the dust source. Typically, a fence material with 50 percent porosity is generally considered optimum for most applications. Low visibility/permeability windscreens will be installed around the perimeters of the excavation area during the removal activities.

6.10 Storm-Water Management Procedures

A storm-water NPDES General Permit may be required for construction at this site because it is in excess of 1 acre in area. Additionally, ECI's existing Storm Water Pollution Prevention Plan (SWPPP) and commonly accepted best management practices (BMPs) will be followed if a storm event occurs during the excavation phase of this project. The following BMPs will be implemented if a storm event starts or is imminent. Note that the primary intent of the BMPs described below is to prevent storm water from eroding stockpiles and open excavations, which could result in sediment or contamination in soil being discharged with storm water to the storm drain. The following BMPs will be implemented as needed:

- Place sandbags or equivalent around edges of the base sheet under stockpiles to prevent surface flow over or through the stockpiles.
- Cover all stockpiles and open excavations with 10-mil-thick polyethylene sheeting, using sandbags to secure the edges and taking care to ensure that all storm water will flow off the sheeting and not collect in the sheeting beneath the stockpiles.
- Place straw bale barrier, gravel bag barrier, or fiber rolls around the stockpiles and excavations to divert storm-water surface flow.

Additional requirements may be necessary and are currently discussed. They will be detailed in the final RAW documents.

6.11 Excavation

An immediate soil removal (excavation and off-site disposal) has been accepted by the DTSC as the preferred remedial action. In consultation with the DTSC, no other alternative removal options will be considered further for this remedial action.

The excavation involves the removal of soil containing the COCs. Excavation operations may generate fugitive dust emissions. Suppressant foam, water spray and other forms of vapor and dust control may be required during excavation, and workers may be required to use personal protective equipment to reduce exposure to the COCs. The depth of excavations may be limited due to physical constraints associated with the site. Sloping excavation sidewalls may result in increased volume of soil requiring excavation. Confirmation soil sampling and analysis will be conducted to verify that cleanup goals were met at the excavation bottom and sidewalls.

Excavation may require additional area for soil stockpiling, prior to transporting off-site for treatment or disposal. Clean import soil or other fill material will be brought to the site to backfill areas where impacted soil was removed. Import soil and/or other fill material would be accompanied by certificates, analytical data, and/or other supporting documents that indicate the import material is in conformance with cleanup criteria.

Excavation will be an effective means for removing impacted soil from the site and will be used in conjunction with appropriate disposal options.

Off-site disposal involves removing impacted soil from the site and transporting it to an appropriate off-site facility for disposal. Off-site disposal will be an effective means of removing contaminated soil from the site and the RAOs for soil could be met using this technology.

All fieldwork will be completed by properly trained and equipped hazardous waste workers. Impacted soil will be removed with a backhoe, bulldozer, tracked excavator, shovels or other types of earth moving equipment, as necessary. As soil is excavated, it will be loaded directly onto transportation trucks or temporarily stored in staging areas on-site. During loading efforts will be made to minimize the soil drop height from the loader's bucket into the transport trucks. Dust control and air quality monitoring activities will be conducted as described in previous sections of this RAW. Excavation will proceed in lateral and vertical directions until the cleanup goals are met, as determined from confirmation sampling results. All work will be supervised by an SET Civil Engineer or a PG registered in the State of California.

After loading, the trucks will be checked to see if the manifests are completed correctly. The loaded trucks will then be prepared for off-site transportation as detailed in Appendix D. A traffic control plan approved by the City of Torrance will be implemented during the excavation activities.

Note that before soil excavation and sampling activities are started (and on a daily basis during these activities), weather information will be obtained by the project manager, concerning the probability and severity of a storm event occurring during the scheduled excavation activities. Activities may be postponed based on the predicted weather. For example, if a prolonged storm event resulting in rain in excess of 0.1 inch is predicted, storm-water management plans will be implemented and excavation

activities may be postponed. However, a light rain event may not require work to stop, but storm-water management plans should be put in place. Weather forecasts can be obtained by calling the Western Regional Climate Center or via the Internet at.

Dust control and air monitoring for dust, odor, and VOC emissions will be conducted during all activities resulting in generation of dust, and in compliance with AQMD Rule 1166. The dust control plan and air monitoring plan are described in Sections 8.2 and 8.3 of this RAP. A field data sheet compliant with Rule 1166 for documentation of the air monitoring efforts is included in Appendix E. Note that a notification regarding use of the Various Locations Rule 1166 Contaminated Soil Mitigation Plan must be sent to the AQMD 24 hours before the excavation activities begin.

6.11.1 Pre-Demolition Survey Plan

A site survey will be performed before demolition of the site is started in preparation for site development. The site survey will be performed by a Registered Civil Engineer or Land Surveyor licensed in the State of California. The purpose of this survey is to provide horizontal control The survey will include existing features so that they can be located in the event they are damaged during site demolition and subsequent site development activities.

6.11.2 Shoring

An engineered shoring system will be installed prior to start of excavation to protect the residential neighborhood to the east and on-site workers. After preparation and approval of the shoring design, SET will excavate two narrow slot trenches along the eastern property boundary adjacent to the backyards of the residences to prevent any damage or cave-in due to soil instability. The first trench will be excavated as close to the property boundary as possible without impacting the residential properties. The trench will be excavated to approximately 15 feet bgs at a width of approximately 1 foot. As the trench is excavated, sections will be backfilled with concrete until the entire length of the trench is completed. The excavated soil will be stockpiled and covered for later profiling and lawful disposal.

Once the contaminated soil excavation extended to 15 feet bgs, a second narrow trench will be excavated to a depth of 10 feet (for a total of 25 feet bgs) parallel to the first and the process repeated until access is gained to the entire length and depth of the contaminated soil in the drainage area.

A geotechnical soil investigation may be necessary prior to shoring design to determine if the proposed trenching and backfilling with concrete can achieve the desired shoring protection.

6.11.3 Excavation Activities

The approximate limits of excavation are illustrated in Figure 2. The area of excavation is approximately 480 feet long and 180 feet wide at the north end and 40 feet wide at the south end, and is west of the adjacent eastern residential neighborhood. The depth of excavation will be approximately 25 feet bgs. The initial excavation includes the source area and will extend marginally in the western direction within the site as illustrated in Figure 5.

The volume of soil to be excavated is between approximately 10,000 and 20,000 cubic yards. Assuming a swell factor of 25 percent, the total volume to be transported off site will be between approximately 12,500 and 25,000 cubic yards.

A second phase of soil excavation and sampling will be performed, as needed. This will be repeated until the lateral and vertical limits of the excavation are defined by analytical results for the soil samples that are below cleanup goals defined for this site.

Shoring of the western sidewall of the excavation is unnecessary because the excavation will be sloped in accordance with the OSHA requirements described in 29 CFR Part 1926. It should be noted that, as outlined in the HSP, under no circumstances will any field personnel be allowed into the excavation deeper than 5 feet bgs. The sidewalls of any excavation at depths of 5 feet or greater will be sloped at a 1 (horizontal) to 1 (vertical) gradient. It is anticipated that the excavation areas may have sloughed excavation sides during excavation activities.

Soil excavation will commence in the northern portion and continue southward along the eastern property border. Stormwater will be managed as outlined in the ECI stormwater pollution prevention plan. Excavation areas and stockpiles will be protected from impact by stormwater by placing sufficient sandbags around the perimeters.

6.11.4 Confined Space Entry Requirements

For the proposed excavation operations, confined-space entry procedures do not apply. Whenever compliance is necessary, the site-specific HSP (Appendix B) will be updated.

6.11.5 Soil Management Procedures

Conventionally accepted soil management procedures will prevent fugitive dust emissions during excavation and stockpiling, reduce volatilization of VOCs to the air from impacted soil, and contain site soil, silt, and other sediment material sourced from the excavation activities.

At a minimum, the procedures described in this section will be implemented at the site. If storm events are forecast or imminent, the procedures described in Section 7.10 will also be implemented.

6.11.5.1 Soil Staging and Storage Operations

If it is necessary to temporarily store the excavated soil on-site until off-site transportation and disposal are available, the following may apply. The staging process will be conducted in a manner to minimize the generation of dust. At the staging areas, excavated soil will be placed on an impermeable barrier base (e.g., plastic sheeting) and covered with tarps or other proper materials to prevent any run-on and/or dust generation. If significant rainfall is anticipated, the staging areas will be bermed to contain any run-off. Excavated soil will be temporarily stockpiled or placed in roll-off bins while awaiting disposal. Soil stockpiles will be lined and covered with plastic sheeting to prevent wind erosion and contaminant migration until truck load-out occurs (additional details are described in Appendix D).

The temporary on-site storage of excavated soil wastes will be secured and properly labeled with hazardous waste signs until off-site transportation and disposal are ready for loading. In no case, will the waste storage be longer than 90 days after its generation. Storage of any hazardous waste longer than 90 days after its generation may require a permit or approval from DTSC. Direct loading may take place concurrently with excavation operations, with access of loaders to the stockpile from outside of the excavation areas, while excavation operations deposit impacted soil from the excavation areas to the staging areas.

If soil is stockpiled, it will be placed on 10-mil-thick polyethylene sheeting, or equivalent. The designated stockpile area will be relatively flat and free of sharp objects such as large rocks, concrete, or other debris. Sandbags or equivalent will be used to anchor the sheeting to ensure that it remains in place.

All soil stockpiles will be covered with a minimum of one layer of 10-mil-thick sheeting, or equivalent, when not being worked. The stockpile cover will be secured using sandbags, or equivalent. The stockpiles will be covered to prevent wind erosion and to reduce hydration by atmospheric condensation.

Additional samples may be collected for laboratory analysis of the soil stockpiles if it is determined that excavation samples and recent field laboratory data are not sufficient for disposition. The actual number of additional samples collected will depend on the amount of soil excavated and the requirements of the selected disposal or recycling facility.

Excavated soil that exceeds the cleanup goals for this site will be transported off-site for recycling or disposal at an approved facility. Laboratory analytical results from the excavation, stockpiles, and shallow soil samples will be provided to the waste disposal contractor to profile the material for recycling or disposal. As stated above, additional laboratory analysis may be required.

6.11.5.2 Decontamination Area and Procedures

Entry to the contaminated areas should be limited to avoid unnecessary exposure and related transfer of contaminants. In unavoidable circumstances, any equipment or trucks should be decontaminated in a designated decontamination area before leaving the site as follows.

Equipment that comes into direct contact with potentially contaminated soil or water will be decontaminated to assure the quality of samples collected and/or to avoid cross-contamination. Disposable equipment intended for one-time use will not be decontaminated, but will be packaged for appropriate disposal. Decontamination will occur prior to and after each designated use of a piece of equipment, using the following procedures:

- Non-phosphate detergent and tap water wash, using a brush if necessary
- Tap-water rinse
- Initial deionized/distilled water rinse
- Final deionized/distilled water rinse

Trucks that come into direct contact with potentially contaminated soil or water will be decontaminated prior to leaving the site to prevent the off-site tracking of contaminated soil. Trucks will be visually inspected before leaving the site, and any dirt adhering to the exterior surfaces will be brushed off and collected on plastic sheeting. The storage bins or beds of the trucks will be inspected to ensure the loads are properly covered and secured. Excavation equipment surfaces will also be brushed off prior to removal from the exclusion zone.

Equipment will be decontaminated in a pre-designated area on pallets or plastic sheeting. Clean bulky equipment will be stored on plastic sheeting in uncontaminated areas. Cleaned small equipment will be stored in plastic bags. Materials to be stored more than a few hours will also be covered.

6.11.5.3 Stockpile Construction

SET will attempt to segregate stockpiles for each type of waste classification based on field observations of odor and soil discoloration. Soil excavated will be closely monitored with a PID. Soil with different classifications will be segregated by SET without mixing or comingling with adjacent stockpiles.

SET will construct stockpiles on a level surface that is geotechnically and structurally competent. Each completed stockpile will be finished to a uniform shape and the top will be sloped at a minimum grade of 2 percent to provide drainage.

SET will remove residual water from the stockpile of excavated soils. No residual water will be allowed to drain onto the ground. SET will manage, store, test and dispose of any accumulated water in compliance with all federal, state, and local regulations and requirements. Disposal facilities and waste profiles will be approved by ECI prior to disposal.

The 10-mil plastic sheeting will be placed by SET on the prepared subgrade with minimum 18 inches overlap of individual sheets. Any damage to the liner will be repaired promptly by SET.

SET will conduct AQMD Rule 1166 air monitoring at the stockpiles. SET will maintain the stockpiles and provide mitigation measures in accordance with the AQMD Rule 1166 Various Locations Permit and as directed by the DTSC based on the air monitoring results. As required by AQMD, excavated VOC-impacted soils will be segregated and stockpiled separately from all other materials by SET. The total quantity of stockpiled VOC-impacted soil will not exceed the limit stipulated by the SCAQMD Rule 1166 Various Locations Permit. Soils with VOC concentration greater than 1,000 parts per million by volume ppmv will be segregated from other VOC-impacted soils, immediately placed and scaled within DOT-approved containers. and disposed at a licensed off-site disposal facility by SET per direction from ECI, in accordance with the AQMD Rule 11 66 Various Locations Permit.

Stockpiles will be clearly demarcated, tracked and labeled by SET to correspond with representative samples submitted for laboratory testing for soil characterization purposes as presented in this section.

Stormwater will be managed in accordance with the SWPPP by ECI. The stockpile area will be surrounded by a secondary containment perimeter barrier, berm or dike to preclude storm water runoff from the stockpile to surrounding areas of the project site.

6.12 Soil Confirmation Sampling

Once predetermined excavation sections are complete, each excavation section will be sampled at the bottom and sidewalls to verify contaminant removal and to confirm that elevated concentrations of TPH(cc); pesticides and PCBs exceeding the cleanup goals do not extend vertically to deeper depths or horizontally beyond the excavation boundaries. Sidewall samples will be collected at a frequency of one per 15 linear feet of sidewall and one per 100 to 200 square feet of excavation bottom. The exact amount and sample locations will be determined in the field. Sample results will be used to verify contaminant removal and to confirm that elevated concentrations of COCs do not extend beyond the excavation limits. Additional confirmation sampling will be implemented if any visually impacted soil is encountered at excavation depth.

Confirmation soil samples will be collected using a clean trowel or single-use, disposable nitrile glove and transferred directly into sampling jars, thereby reducing the quantity of sampling equipment,

which will significantly reduce the possibility of cross-contamination. Samples will be delivered to the laboratory on the same day collected, if time permits, and no later than the day following collection. In the event the samples are delivered the day after they are collected, the samples will be secured under proper chain-of-custody documentation at the SET's office until delivery.

All confirmation soil samples will be analyzed for the respective COCs. Analytical results from confirmation samples exceeding cleanup goals will result in further excavation and confirmation sampling. SET may further excavate vertically from any bottom sample and laterally from any outward-facing sidewall sample until the cleanup goals are met. The actual excavation activities will be conducted in 6-inch lifts followed by confirmation samples to define the actual limits of the excavation.

Soil samples will be analyzed in accordance with standard EPA protocols and the QAPP for one or more of the following:

- Total petroleum hydrocarbons (full carbon chain) by EPA Method 8015;
- Volatile organic compounds (VOCs) by EPA Method 8260B;
- Polychlorinated biphenyls by EPA Method 8082;
- Organochlorine pesticides by EPA Method 8081A; and
- California Code of Regulations Title 22, California Assessment Manual (CAM) metals by EPA Method 6010B/7470A

The excavations will be considered complete if the confirmation sample results do not exceed 0.43 mg/kg for chlordanes, 2.30 mg/kg for 4,4-DDD, 1.60 mg/kg for 4,4-DDE, 1.60 mg/kg for 4,4-DDT, 0.035 mg/kg for dieldrin, 0.46 mg/kg for toxaphene, and 1,000 mg/kg for TPH(cc).

The removal areas will be considered complete if the laboratory analytical results of the final confirmation samples indicate that concentrations of respective COCs in individual samples are at or below the applicable screening level. If a COC is detected above the designated screening level, then additional excavation will occur from the corresponding sampling area. The expanded excavation will be re-sampled in accordance with the procedure described above. This process will repeat vertically and horizontally and will be considered complete when the cleanup goal is achieved or a Site boundary is reached.

In addition to evaluating the quality of the remaining soil, the quantity of soil removed will be reconciled by comparing the volumes excavated to the quantities reported on the waste manifests. The volumes of the excavation areas will be estimated based on the final excavation dimensions. The estimated volumes and reported weights should reconcile to a conversion factor between 1.2 and 1.5 tons per cubic yard. Copies of the waste manifests, showing appropriate signatures from the receiving facility, will be included in the final report.

It is anticipated that the excavation areas will be backfilled and compacted with clean imported soil, consistent with the construction specifications, immediately following DTSC approval of the remedial action.

6.13 Soil Characterization for Disposal

6.13.1 Soil Sampling

If the STLC results are less than 0.1 milligram per liter [mg/l] for 4,4-DDD, 4,4-DDE, and 4,4-DDT, the soil will be disposed as a non-hazardous waste. If the STLC results are less than 0.25, 0.8, and 0.5 mg/l for chlordanes, dieldrin, and toxaphene, respectively, the soil will be disposed as a non-hazardous waste. If the results of the STLC analysis for the OCPs exceed the concentrations noted above, the excavated soil will be disposed as a non-RCRA California hazardous waste.

Samples will be tested for TCLP at the same time as STLC to minimize standby time. If the results exceed the TCLP limit, the waste will be handled as RCRA hazardous waste. Soil removed during the remedial action implementation will be profiled based on the results of confirmation soil samples, as discussed in the section below.

SET proposes to collect composite soil samples from the stockpiled soil for profiling the waste at approximately 1 to 2 feet below the surface of the stockpile. The samples will be collected in glass jars that will be sealed immediately with Teflon-lined caps. Each sample container will be labeled with the sample identification number and sampling depth. The samples will then be stored on ice in a portable cooler maintained below 4 degrees Celsius and transported to a state-certified laboratory. The samples will be recorded on a chain-of-custody record identifying the sampler, date, time, couriers used, responsible laboratory personnel, and requested analyses. SET will deliver the samples to a state-certified laboratory within 24 hours of collection. The following sampling frequencies will apply to the total soil volume for each of the preliminary waste classifications. Total stockpiled soil volume may include multiple individual stockpiles.

- Tier I: 0 – 500 cubic yards: 3 samples
- Tier II: 501 – 10,000 cubic yards: 3 samples for the first 500 cubic yards and 1 sample for each 500 cubic yards thereafter
- Tier III: > 10,001 cubic yards: 3 samples for the first 500 cubic yards, 1 sample for each 500 cubic yards for the next 9,500 cubic yards, and 1 sample for each 1,000 cubic yards thereafter.

Water spray or mist, as appropriate, will be applied during soil loading operations. Temporary stockpiling will be necessary and the excavated soil will be stored in soil staging areas on-site. Prior to the stockpiling of excavated soil, plastic sheeting will be placed over the stockpile staging area to avoid cross-contamination of undisturbed soil. The stockpile will be covered with plastic sheeting and weighted down with sand bags or equivalent weights to prevent the stockpile from becoming uncovered by wind.

6.13.2 Laboratory Analysis

SET's soil sampling and handling procedures will be in accordance with USEPA's *Test Methods for Evaluating Solid Waste – Physical/Chemical Methods* (SW-846; Revision 6). Soil samples will be transferred to laboratory-quality sample containers and preserved by SET in accordance with SW-846. Each soil sample will be recorded and transported using an approved chain-of-custody form.

SET will request laboratory turn-around time sufficient to meet its contractual schedule; however the maximum turn-around time will be seven calendar days.

Soil samples will be analyzed in accordance with standard EPA protocols and the QAPP for one or more of the following:

- Total petroleum hydrocarbons (full carbon chain) by EPA Method 8015;
- Volatile organic compounds (VOCs) by EPA Method 8260B;
- Polychlorinated biphenyls by EPA Method 8082;
- Organochlorine pesticides by EPA Method 8081A; and
- California Code of Regulations Title 22, California Assessment Manual (CAM) metals by EPA Method 6010B/7470A

6.14 Transportation Plan for Off-site Disposal

The excavated soil will be profiled and approval will be received before soil is transported off-site for lawful disposition. Based on the previous site investigation, the soil excavated from the site will be handled, transported and disposed of as non-hazardous designated waste unless otherwise directed or approved by the DTSC.

Final determination of the facility identified for disposal will be based on approval from the facility. Once the disposal facility is confirmed, copies of waste profile reports used to secure disposal permission from the facility will be provided to the DTSC. In addition, compliance with the land disposal restrictions and land ban requirements for hazardous wastes will be documented and provided to the DTSC in the event a portion of the soil needs to be designated as hazardous waste.

All vehicles will be decontaminated prior to leaving the work area. For track-out prevention and control, all trucks will be dry brushed after loading to remove loose soil. The dump truck or roll-off bin portion of the truck will then be covered with a tarp to prevent soil and/or dust from spilling out of the truck during transport to the disposal facility.

Prior to leaving the load-out area, each truck will be inspected by the contractor to ensure that the payloads are adequately covered, the trucks are cleaned of spilled soil, and the shipment is properly manifested. Proper hazardous waste placarding may be required for transportation of hazardous wastes. Soil being transported off-site will be taken to the approved facility under State, Federal and local regulations.

Detailed information on waste transportation and disposal is described in the Transportation Plan included in Appendix D.

The contaminated soil will be handled and transported as nonhazardous waste for recycling at one of the proposed facilities listed in the transportation plan. The final determination will be made once prior to commencement of the excavation.

All vehicles will be decontaminated prior to leaving the work area. For track-out prevention and control, all trucks will be dry brushed after loading to remove loose soil. The dump truck or roll-off bin portion of the truck will then be covered with a tarp to prevent soil and/or dust from spilling out of the truck during transport to the recycling facility.

Prior to leaving the load-out area, each truck will be inspected by the SET field staff to ensure that the payloads are adequately covered, the trucks are cleaned of spilled soil, and the shipment is properly manifested.

6.15 Manifests

The non-hazardous waste manifest form will be used to track the movement of soil sent off-site as designated non-hazardous waste from the point of generation to the point of ultimate disposition. The non-hazardous waste manifests will include information such as:

- Name and address of the generator, transporter, and the destination facility
- Description of the waste being transported and any associated hazards
- Waste quantity
- Name and phone number of a contact in case of an emergency
- Other information required either by the disposal facility or DTSC

Before transport of the excavated soil off-site, an authorized representative of ECI will sign each waste manifest. The removal action contractor's site manager will maintain one copy of the waste manifest on-site.

6.16 Traffic Control and Loading Procedures

It is anticipated that the trucks will enter the site from Normandie Avenue. Traffic control and a flag person will be located at the site to assist the truck drivers to safely drive onto the site. A truck staging area may be designated at the site. While on the property, all vehicles will be required to maintain slow speeds (i.e., less than 5 mph) for safety purposes and for dust control measures. The soil will be loaded from the stockpile areas into the end-dump trucks. While the soil is being loaded into the trucks, dust suppression will be performed by lightly spraying or misting the work areas with water. Efforts will be made to minimize the soil drop height from loader's bucket into the transport trucks. After the soil is loaded into the transport trucks, the soil will be covered and otherwise contained to prevent soil from blowing or spilling out of the truck during transport to the disposal facility. The trucking subcontractor will be required to provide trucks that do not allow soil to be spilled or blown out from the bottom, sides or tops of the trucks.

It is estimated that approximately 10 to 20 trucks per day will be loaded during the removal activities and sent to the selected facility for lawful disposal. Prior to and during removal activities, the excavation operations contractor will coordinate with the designated disposal facility regarding the daily number of truckloads to be sent to the facility. The trucks will exit the site toward the west onto Normandie Avenue. As the trucks leave, the flag person will assist the truck drivers so that they can safely merge into traffic. Prior to exiting, the truck drivers will be required to brush their tires clean and remove any overburdened soil from areas of their truck that is not covered or protected. This cleanup/decontamination area with tarping will be set up as close to the loading area as possible so as to minimize spreading the impacted soil. Before trucks leave the site, the removal action contractor's site manager will be responsible for inspecting each truck to ensure that the payloads are adequately covered, the trucks are cleaned of overburdened soil, and the soil is properly manifested. The anticipated routes of truck ingress and egress and truck staging area will be selected by SET prior to transport.

6.17 Backfill and Site Restoration

Based on site conditions and construction plans, the excavation will be backfilled with clean fill material from an offsite source. An off-site source of clean backfill material will be identified prior to the remedial action. These soils will be appropriately tested before backfilling activities commence.

6.17.1 Borrow Source Evaluation

The off-site source will be evaluated to ensure that material is free of contamination. Evaluation of the import soils for presence of contaminants must be concluded prior to their consideration for use as replacement fill at the site. Documentation and sampling may be used to verify that the material is free of contamination.

6.17.2 Load Checking

All loads of imported fill will be checked by a PID for each truckload entering the site and by visual screening for fuel/hydraulic oil leaks (or other staining) in soil placed for filling the site excavation.

6.17.3 Diversion of Unacceptable Borrow

If contaminated soil (exhibiting discoloration or detectable VOCs) are found or suspected, the imported fill soil will be isolated. The transporter of the prohibited materials will be identified, and the contractor will be contacted to determine what appropriate actions will be taken. Segregated, improper materials will be removed from the site immediately. These materials will be reloaded to the transporter's vehicle and transported back to the source facility.

6.17.4 Documentation of Rejected Loads

All loads, which enter the site and are subsequently rejected, will be recorded. Data compiled will include when the incident occurred, who the hauler was, why the load was rejected, whether the load was dumped prior to rejection, and what steps were taken to remove the rejected material. Additional data may be recorded as deemed necessary for the particular situation.

A separate area will always be maintained for the storage of unacceptable materials, pending removal by the original transporter or a properly licensed waste hauler. A temporary pad will be constructed for temporary storage of unacceptable soils segregated from dumped loads. The pad will be used to store these segregated materials solely for the length of time required to enlist the services of a licensed waste hauler for their removal.

6.17.5 Site Restoration

Site restoration may include backfilling the excavation areas with clean soil (from an off-site source or through grading operations) and returning any surface features to their current condition or in accordance with site construction/grading plans. Backfilling, if necessary, will proceed in approximately 1-foot lifts with compaction (by tracking with a dozer or other equipment) between each successive lift to the preexisting grade or level specified in the grading plans. Compaction will be certified by a licensed Soils Engineer. If weather conditions prevent immediate restoration of the excavation areas, erosion controls will be established as necessary.

6.18 Variance

As conditions in the field may vary, it may become necessary to implement minor modifications to soil excavation, stockpiling and sampling activities as presented in this RAW. Field personnel will notify the project manager when deviations from this RAW are necessary. ECI and DTSC as necessary will be notified of the modification immediately, and a verbal or written approval will be obtained from before the modifications are implemented, as appropriate. Modifications to the approved RAW will be documented in the field logbook.

6.19 Project Schedule and Summary Report

6.19.1 Project Schedule

The following schedule is anticipated to complete the proposed scope of work after authorization to proceed has been received and after the DTSC RAW approval (time to complete each task):

1.	Preparation of contract and approval	2–3 weeks
2.	Property access, permitting and utility clearance	8–12 weeks
1.	Trenching and shoring	1–2 weeks
2.	Excavation, stockpiling and off-site transportation	2–4 weeks
3.	Confirmation sampling and analysis	1–2 weeks
4.	Backfilling, compaction, and grading	1–2 weeks
5.	Removal action completion report	2–4 weeks

SET estimates that the entire project can be completed, including submittal of the report, in 17 to 29 weeks. This schedule is based on the assumption that access is readily available. The schedule is also based on the assumption that no significant modifications to this RAW are necessary.

6.19.2 Removal Action Completion Report

Following completion of the excavation, a summary report will be prepared in accordance with standard DTSC protocols and submitted to the DTSC for review and approval. The report will include a summary of the excavation activities, field logs, air monitoring results, dust control measurements, waste disposal manifests, verification of fill, compaction report, and site restoration procedures. The report will be prepared and certified by a PG. The report will include the following:

- Site description and background;
- Description of field procedures;
- Discussion of soil confirmation sampling results;
- Tabulated summary of laboratory analytical results;
- Site vicinity map;
- Site plan with sample locations and excavation area;
- Comparison of laboratory results with regulatory screening levels;
- Conclusions; and
- Recommendations.

7. REFERENCES

1. California Department of Water Resources, "*Planned Utilization of the Ground Water Basins of the Coastal Plain of Los Angeles County," Bulletin No. 104*, 1961, http://www.water.ca.gov/waterdatalibrary/docs/historic/Bulletins/Bulletin_104/Bulletin_104-A__1961.pdf

2. California Environmental Protection Agency (Cal/EPA), *Advisory – Active Soil Gas Investigation*, Cypress, California, 2012, https://dtsc.ca.gov/SiteCleanup/upload/VI_ActiveSoilGasAdvisory_FINAL_043012.pdf.

3. Cal/EPA, *Determination of a Southern California Regional Background Arsenic Concentration in Soil*, Department of Toxic Substances Control, undated, https://dtsc.ca.gov/upload/Background-Arsenic.pdf

4. Cal/EPA, *Guidance for Evaluation and Mitigation of Subsurface Vapor Intrusion to Indoor Air,* Department of Toxic Substances Control, Sacramento, California, 2011, https://dtsc.ca.gov/AssessingRisk/upload/Final_VIG_Oct_2011.pdf.

5. Cal/EPA, *Preliminary Endangerment Assessment Guidance Manual,* Department of Toxic Substances Control, 2013, http://www.dtsc.ca.gov/SiteCleanup/Brownfields/upload/Preliminary-Endangerment-Assessment-Guidance-Manual.pdf

6. Cal/EPA, *Use of California Human Health Screening Levels (CHHSLs) in Evaluation of Contaminated Properties*, 2005, http://www.calepa.ca.gov/brownfields/documents/2005/chhslsguide.pdf.

7. Cal/EPA Office of Environmental Health Hazard Assessment, *Risk Assessment – Soil and Soil Gas, Soil-Screening Numbers*, 2010, http://www.oehha.org/risk/chhsltable.html.

8. Earth Tech, *Revised Soil Investigation Report, Historic Storm Water Pathway – South Ecology Control Industries Property*, June 20, 2008.

9. Haley & Aldrich, *Environmental Site Assessment*, 2005.

10. Haley & Aldrich, *Summary Report – Human Health Risk Evaluation*, November 6, 2006.

11. Innovative Technical Solutions, Inc., *Final Human Health Risk Assessment, Historic Storm Water Pathway – South Ecology Control Industries Property*, August 2010.

12. Regional Water Quality Control Board, *Region 4, UST Closure Criteria (Draft)* (April 2004, rev Sept. 2006), http://www.waterboards.ca.gov/rwqcb4/water_issues/programs/ust/closure_criteria/closurecriteria.pdf

13. Sharp Environmental Technologies, Inc., *Site Assessment History Summary Report*, May 22, 2014.

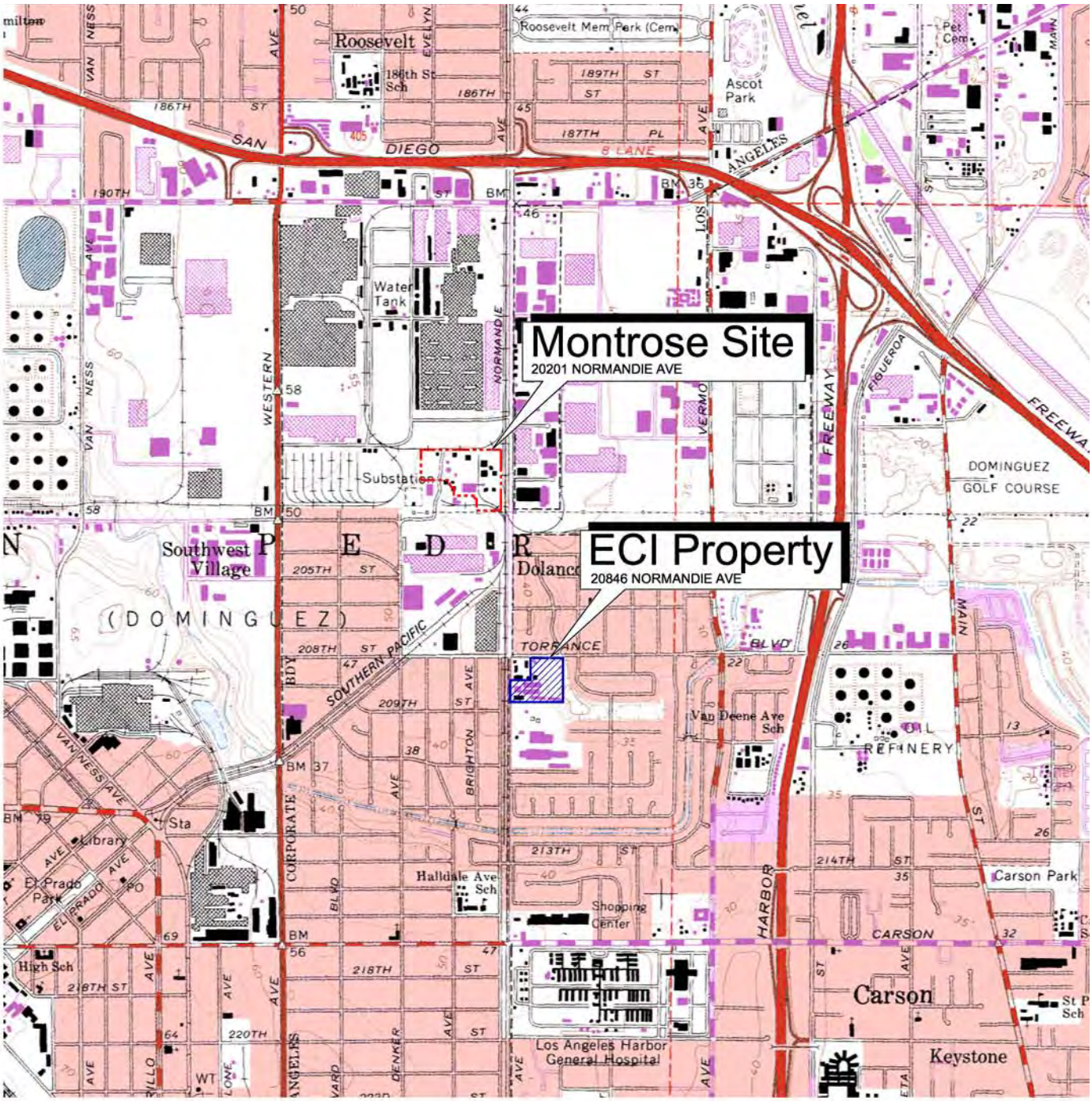
14. Sharp Environmental Technologies, Inc., *Phase II – Environmental Site Assessment*, June 2, 2014.

15. USEPA Region 9, *Regional Screening Levels (RSL) for Chemical Contaminants at Superfund Sites,* 2014, http://www.epa.gov/region9/superfund/prg/.

16. USEPA, *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW-846,* Office of Solid Waste and Emergency Response, Washington, DC, 2007, http://www.epa.gov/waste/hazard/testmethods/sw846/online/index.htm.

FIGURES

Figures 1 through 6



Reference:

1. U.S.G.S. Topographic Map, Torrance, California 7.5 Minute Quadrangle. Georeferenced using the State of California's CASIL On-line GIS Database, Copyright 2006.

Source: Soil Investigation Report, Historic Stormwater Pathway, Earth Tech, Inc. 2008

Sharp Environmental Technologies, Inc.

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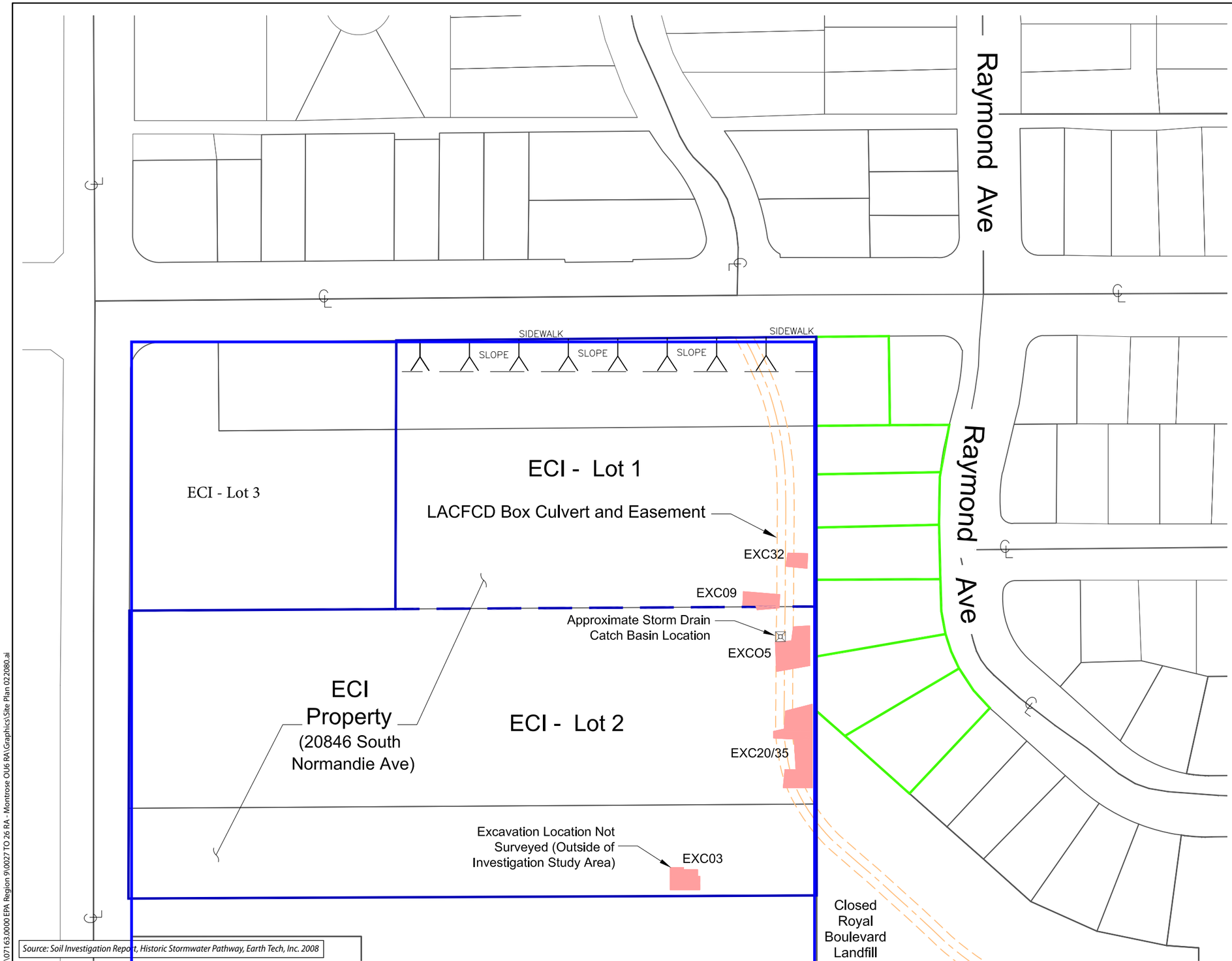
Historical Stormwater Pathway - South Montrose Chemical Superfund Site
U.S. EPA Region 9
Los Angeles County, California

FIGURE 1
Site Location

\\engineering\PROJECTS\07163.0000 EPA Region 9\0027 TO 26 RA - Montrose OU6 RA\Graphics\Site Location 1107.ai



Source: Soil Investigation Report, Historic Stormwater Pathway, Earth Tech, Inc. 2008

Explanation:

- ECI Property Boundary
- ECI Lot Subdivision Line
- Existing Excavation Pit (EXC03)
- LACFCD Box Culvert and Easement
- EPA Residential Investigation Area
- Soil and Soil-gas Investigation Area
- Proposed Soil/Soil-gas Sample

References:

1. Parcel Boundaries, Los Angeles County Assessors Office, Los Angeles City Department of Public Works On-line GIS Parcel Database, Copyright 2006.
2. Source of Flood Control / Storm Water Channel: Los Angeles Flood Control District Map, revision date May 6, 1970, Sheet No. 428-RW3.1.
3. Dulin and Boynton 2006, for locations of Eastern Excavations Only.

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Historical Stormwater Pathway - South
Montrose Chemical Superfund Site
U.S. EPA Region 9
Los Angeles County, California

FIGURE 2
Site Plan

\\engineering\PROJECTS\07163.0000 EPA Region 9\0027 TO 26 RA - Montrose OU6 RA\Graphics\Site Plan 022080.ai

Explanation:

- Current ECI Property Boundary
- Unimproved Slough on Current ECI Property
- EPA Estimated Extent of the Historical Stormwater Pathway

Source: Soil Investigation Report, Historic Storm Water Pathway, Earth Tech, Inc., 2008

NORTH

0 150 300 FEET

SCALE: 1"= 300'

Reference:

1. Aerial Photo dated 1947, from Fairchild.

Montrose Chemical Corporation — Revised 02/28/08

1947 Aerial Photograph of ECI Property and Historic Storm Water Pathway

Historical Stormwater Pathway

Date: 02-08	ECI Property	Figure
Project No. 99700	Sharp Environmental Technologies, Inc.	3

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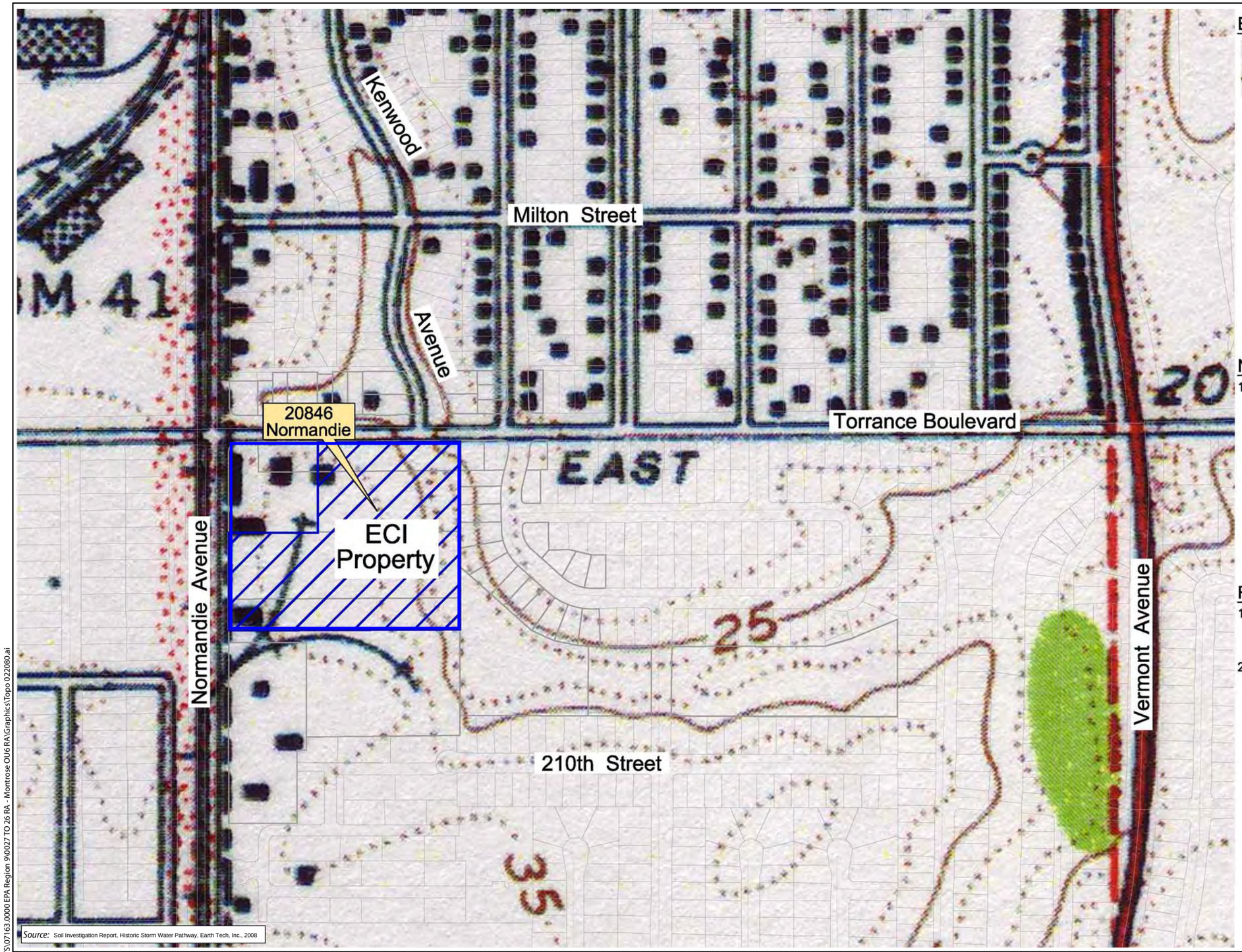
Z:\et\montrose\torrance\litigation\2008\sitemaps.0208\99700 Fig 3 Montrose ECI FSP.1947 Historical.Image.022808.dwg



Explanation:

25 Surface Elevation (Feet Above Mean Sea Level) from U.S.G.S. Topographic Map

Note:

1. Properties shown were identified by EPA in Letter dated September 12, 2005.

Reference:

1. Los Angeles County Assessors Office, Los Angeles City Department of Public Works On-line GIS Parcel Database, Copyright 2005.
2. U.S.G.S. 7.5 Minute Topographic Quadrangle Map, Torrance, California dated 1951.

NORTH

0 150 300 FEET

SCALE: 1"= 300'

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Historical Stormwater Pathway - South
Montrose Chemical Superfund Site
U.S. EPA Region 9
Los Angeles County, California

FIGURE 4
Topographic Map of ECI Property

\engineering\PROJECTS\07163.0000 EPA Region 9\0027 TO 26 RA - Montrose OU6 RA\Graphics\Topo 022080.ai

Kenwood

Torrance Boulevard

SIDEWALK

SIDEWALK

SLOPE

SLOPE

SLOPE

P-35B

P-49

P-36

P-04

P-02

P-37

P-38

P-35

P-01

P-03

P-05

P-06

P-06B

P-50

P-51

P-39

P-07

P-08

P-09

P-10

P-11

P-11B

30.0' (TYP.)

60.0' (TYP.)

P-40

P-12

P-13

P-14

P-15

P-16

P-41

P-17

P-18

P-19

P-20

P-21

P-42

P-43

P-22

P-30

P-23B

P-24

P-23

P-44

P-25

P-26

P-27

P-28

P-45

P-52

P-29

P-46

P-31

P-32

P-53

P-47

P-48/P-48B

P-33

P-34

ECI Property

Royal Boulevard Landfill

Explanation:

- ECI Property Boundary
- LACFCD Box Drain and Easement
- On-Site ECI Property Soil Boring Location (24' Depth), Drilled July 2006
- On-Site ECI Property Soil Boring Location (16' Depth), Drilled July 2006
- On-Site ECI Property Soil Boring Location (To Delineate Deeper), Drilled June 2007
- On-Site ECI Property Soil Boring Step-Out Location (To Delineate Laterally), Drilled June 2007
- On-Site ECI Property Soil Boring Step-Out Location (To Delineate Deeper), Drilled August 2007
- On-Site ECI Property Soil Boring Step-Out Location (To Delineate Laterally), Drilled August 2007
- Excavation Area (Surveyed Locations, July 2006)
- LACAO Parcel
- EPA Estimated Extent of the Historical Stormwater Pathway

References:

1. Los Angeles County Assessors Office, Los Angeles City Department of Public Works On-line GIS Parcel Database, Copyright 2006.
2. Source of Flood Control / Storm Water Channel: Los Angeles Flood Control District Map, revision date May 6, 1970, Sheet No. 428-RW3.1.
3. CH2M HILL FSP Report dated March 2006 for Excavation Areas.
4. USGS High Resolution Orthoimage, Los Angeles, CA dated March 29, 2004, 0.25 meter resolution Georeferenced from MS Terraserver, Copyright 2006.
5. On-Site ECI Soil Boring Locations Surveyed by Dulin & Boynton Surveyors, conducted July 26, 2006, June 14, 2007 and July 31, 2007.
6. Earth Tech, Draft Soil Investigation Report-Historic Storm Water Pathway, South ECI Industries Property, 20846 South Normandie Ave., Torrance, CA, December 21, 2006.

Source: Soil Investigation Report, Historic Storm Water Pathway, Earth Tech, Inc., 2008

NORTH

0 40 80 FEET

SCALE: 1"= 80'

Montrose Chemical Corporation — Revised 10/31/07

Final Soil Boring Location Map

Historical Stormwater Pathway

Date: 10-07

ECI Property

Project No. 99700

Sharp Environmental Technologies, Inc.

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Figure 5

FILE NAME: 91496 MONTROSE ECI FSP.SBLM.1007.DWG (1:1)

LEGEND

B14 — Approximate Soil Sample Locations, Sharp Environmental, 2013/2014

B4 — Soil Boring and Soil Gas Probes, Sharp Environmental, 2013/2014

Normandie Avenue

PROJECT NO.:21-336

DATE: 05/14

0 32.5 65
APPROXIMATE SCALE IN FEET

DRAWN BY: JES

REFERENCE: GOOGLE EARTH, 2014

SHARP ENVIRONMENTAL TECHNOLOGIES, INC.

839 S BEACON STREET #1967, SAN PEDRO, CA. 90733
(310) 505-3675, Fax (310) 548-3935

FIGURE 6

Site Plan with Borings and Vapor Probes
Ecology Control Industries
20846 Normandie Avenue
Torrance, California

TABLES

Tables 1

Table 3-1
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Montrose Chemcial Superfund Site - ECI Property

Scenario Timeframe:	Future
Medium:	Soil
Exposure Medium:	Soil, 0-2 ft bgs

Exposure Point	CAS Number	Chemical	Number of Samples	Number of Detections	Minimum Concentration	Maximum Concentration	95% UCL	Units	Concentration Used for Screening	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits[a]	Concentration Used for Screening	Background Value	USEPA RSL Screening Value[c]		Potential ARAR/TBC Value	COPC Flag (Y/N)	Rationale for Selection or Deletion[b]
0 - 2 ft bgs	53-19-0	2,4'-DDD	150	118	0.00079	1.9	0.118	mg/kg	Maximum	P37-0.5	79%	0.0034 - 0.8	Maximum	NA	2.00E+00		NA	N	Max<RSL
	72-54-8	4,4'-DDD	144	133	0.0016	9.1	0.59	mg/kg	Maximum	P37-0.5	92%	0.0034 - 0.8	Maximum	NA	2.00E+00		NA	Y	Max>RSL
	3424-82-6	2,4'-DDE	148	21	0.0027	0.39	0.02	mg/kg	Maximum	P37-0.5	14%	0.0034 - 0.8	Maximum	NA	1.40E+00		NA	N	Max<RSL
	72-55-9	4,4'-DDE	151	151	0.0024	1.5	0.27	mg/kg	Maximum	P47-0.5	100%	0.0034 - 0.8	Maximum	NA	1.40E+00		NA	Y	Max>RSL
	79-02-6	2,4'-DDT	141	118	0.0016	1.6	0.15	mg/kg	Maximum	P37-0.5	84%	0.0035 - 0.8	Maximum	NA	1.70E+00		NA	N	Max<RSL
	50-29-3	4,4'-DDT	148	147	0.0044	18	1.16	mg/kg	Maximum	P37-0.5	99%	0.0035 - 0.8	Maximum	NA	1.70E+00		NA	Y	Max>RSL
	319-84-6	alpha-BHC	152	0	<0.039	0	NC	mg/kg	Maximum	P14-0	0	0.0017 - 0.4	Maximum	NA	7.70E-02		NA	N	ND
	319-85-7	beta-BHC	152	3	0.0026	0.013	NC	mg/kg	Maximum	P14-0	2%	0.0017 - 0.4	Maximum	NA	2.70E-01		NA	N	Max<RSL
	319-86-8	delta-BHC	152	0	<0.0017	0	NC	mg/kg	Maximum	P38-0	0%	0.0017 - 0.4	Maximum	NA	7.70E-02	i	NA	N	ND
	58-89-9	gamma-BHC	152	1	0.00082	0.00082	NC	mg/kg	Maximum	P14-0	1%	0.0017 - 0.4	Maximum	NA	5.20E-01		NA	N	Max<RSL
	5103-71-9	alpha-Chlordane	152	100	0.0007	0.78	0.08	mg/kg	Maximum	P106-0	66%	0.0017 - 0.4	Maximum	NA	1.60E+00	d	NA	N	Max<RSL
	5103-74-2	gamma-Chlordane	152	116	0.0013	0.63	0.08	mg/kg	Maximum	P05-0	76%	0.0017 - 0.4	Maximum	NA	1.60E+00	d	NA	N	Max<RSL
	60-57-1	Dieldrin	152	81	0.0013	0.045	0.01	mg/kg	Maximum	P106-0	53%	0.0034 - 0.8	Maximum	NA	3.00E-02		NA	Y	Max>RSL
	959-98-8	Alpha-endosulfan	151	1	0.0051	0.0051	NC	mg/kg	Maximum	P111-0.5	1%	0.0017 - 0.4	Maximum	NA	3.70E+02	e	NA	N	Max<RSL
	33213-65-9	Beta-endosulfan	151	0	<0.0034	0	NC	mg/kg	Maximum	P37-0	0%	0.0034 - 0.8	Maximum	NA	3.70E+02	e	NA	N	ND
	1031-07-8	Endosulfan sulfate	151	1	0.0018	0.0018	NC	mg/kg	Maximum	P10-0	1%	0.0034 - 0.8	Maximum	NA	3.70E+02	e	NA	N	Max<RSL
	309-00-2	Aldrin	152	10	0.00031	0.0021	0.00096	mg/kg	Maximum	P18-0	7%	0.0017 - 0.4	Maximum	NA	2.90E-02		NA	N	Max<RSL
	72-20-8	Endrin	151	0	<0.0034	0	NC	mg/kg	Maximum	P37-0	0%	0.0034 - 0.8	Maximum	NA	1.80E+01		NA	N	ND
	7421-93-4	Endrin aldehyde	151	5	0.00022	0.0035	NC	mg/kg	Maximum	P18-0	3%	0.0034 - 0.8	Maximum	NA	1.80E+01	f	NA	N	Max<RSL
	53494-70-5	Endrin ketone	148	3	0.0051	0.0063	NC	mg/kg	Maximum	P01-0	2%	0.0035 - 0.8	Maximum	NA	1.80E+01	f	NA	N	Max<RSL
	8001-35-2	Toxaphene	144	0	<0.07	0	NC	mg/kg	Maximum	P37-0	0%	0.07 - 16	Maximum	NA	4.40E-01		NA	N	ND
	76-44-8	Heptachlor	151	56	0.00039	0.047	0.007	mg/kg	Maximum	P106-0	37%	0.0017 - 0.4	Maximum	NA	1.10E-01		NA	N	Max<RSL
	1024-57-3	Heptachlor epoxide	153	59	0.00051	0.068	0.067	mg/kg	Maximum	P106-0	39%	0.0017 - 0.4	Maximum	NA	1.10E-01	g	NA	N	Max<RSL
	72-43-5	Methoxychlor	148	1	0.019	0.019	NC	mg/kg	Maximum	P39-0	1%	0.018 - 4	Maximum	NA	3.10E+02		NA	N	Max<RSL
	12674-11-2	Aroclor 1016	89	0	<0.033	0	NC	mg/kg	Maximum	P106-0	0%	0.033 - 1.7	Maximum	NA	2.20E-01	h	NA	N	ND
	11104-28-2	Aroclor 1221	89	0	<0.033	0	NC	mg/kg	Maximum	P05-0	0%	0.033 - 1.7	Maximum	NA	2.20E-01	h	NA	N	ND
	11141-16-5	Aroclor 1232	89	0	<0.033	0	NC	mg/kg	Maximum	P106-0	0%	0.033 - 1.7	Maximum	NA	2.20E-01	h	NA	N	ND
	53469-21-9	Aroclor 1242	89	0	<0.033	0	NC	mg/kg	Maximum	P05-0	0%	0.033 - 1.7	Maximum	NA	2.20E-01	h	NA	N	ND
	12672-29-6	Aroclor 1248	89	0	<0.033	0	NC	mg/kg	Maximum	P05-0	0%	0.033 - 1.7	Maximum	NA	2.20E-01	h	NA	N	ND
	11097-69-1	Aroclor 1254	89	2	0.079	0.51	NC	mg/kg	Maximum	P35-0.5	2%	0.033 - 1.7	Maximum	NA	2.20E-01	h	NA	Y	Max>RSL
	11096-82-5	Aroclor 1260	89	7	0.01	0.06	0.026	mg/kg	Maximum	P25-0.5	8%	0.033 - 1.7	Maximum	NA	2.20E-01	h	NA	N	Max<RSL

a Range of reporting limits is for non-detected samples results only.
b Maximum detected concentration does not exceed the Residential RSL (concentration used for screening).
c Screening Toxicity Value is the Residential RSL (USEPA, 2009).
d RSL for chlordane used.
e RSL for endosulfan used.
f RSL for endrin used.
g RSL for heptachlor used.
h High risk RSL for Aroclor 1260 used to represent Total Aroclors.
i RSL for alpha-BHC used.
NA Not applicable.
ND Not detected.
NC Not calculated due to insufficient number of detections.

Table 3-2
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Montrose Chemcial Superfund Site - ECI Property

Scenario Timeframe:	Future
Medium:	Soil
Exposure Medium:	Soil, 0-5 ft bgs

Exposure Point	CAS Number	Chemical	Number of Samples	Number of Detections	Minimum Concentration	Maximum Concentration	95% UCL	Units	Location of Maximum Concentration	Detection Frequency	Range of Reporting Limits[a]	Concentration Used for Screening	Background Value	USEPA RSL Screening Value[c]		Potential ARAR/TBC Value	COPC Flag (Y/N)	Rationale for Selection or Deletion[b]
	53-19-0	2,4'-DDD	226	187	0.00079	4.4	0.37	mg/kg	P37-2	82.7%	0.0034 - 1.9	Maximum		2.00E+00		NA	Y	Max>RSL
0 - 5 ft bgs	72-54-8	4,4'-DDD	219	208	0.0016	18	1	mg/kg	P37-2	95.0%	0.0034 - 1.9	Maximum	NA	2.00E+00		NA	Y	Max>RSL
	3424-82-6	2,4'-DDE	222	51	0.002	0.82	0.0375	mg/kg	P37-2	23.0%	0.0034 - 1.9	Maximum	NA	1.40E+00		NA	N	Max<RSL
	72-55-9	4,4'-DDE	227	227	0.00085	3.8	0.465	mg/kg	P37-2	100.0%	0.0034 - 1.9	Maximum	NA	1.40E+00		NA	Y	Max>RSL
	79-02-6	2,4'-DDT	213	182	0.0016	11	0.736	mg/kg	P37-2	85.4%	0.0035 - 1.9	Maximum	NA	1.70E+00		NA	Y	Max>RSL
	50-29-3	4,4'-DDT	224	223	0.0025	60	0.736	mg/kg	P37-2	99.6%	0.0035 - 1.9	Maximum	NA	1.70E+00		NA	Y	Max>RSL
	319-84-6	alpha-BHC	228	1	0.039	0.039	NC	mg/kg	P14-0	0.4%	0.0017 - 0.97	Maximum	NA	7.70E-02		NA	N	Max<RSL
	319-85-7	beta-BHC	228	3	0.0026	0.013	NC	mg/kg	P14-0	1.3%	0.0017 - 0.97	Maximum	NA	2.70E-01		NA	N	Max<RSL
	319-86-8	delta-BHC	228	0	<0.0017	0	NC	mg/kg	NA	0.0%	0.0017 - 0.97	Maximum	NA	7.70E-02	i	NA	N	ND
	58-89-9	gamma-BHC	228	1	0.00082	0.00082	NC	mg/kg	P14-0	0.4%	0.0017 - 0.97	Maximum	NA	5.20E-01		NA	N	Max<RSL
	5103-71-9	alpha-Chlordane	228	138	0.00042	0.78	0.067	mg/kg	P106-0	60.5%	0.0017 - 0.97	Maximum	NA	1.60E+00	d	NA	N	Max<RSL
	5103-74-2	gamma-Chlordane	228	165	0.00054	0.63	0.07	mg/kg	P05-0	72.4%	0.0017 - 0.97	Maximum	NA	1.60E+00	d	NA	N	Max<RSL
	60-57-1	Dieldrin	228	108	0.0013	0.045	0.01	mg/kg	P106-0	47.4%	0.0034 - 1.9	Maximum	NA	3.00E-02		NA	Y	Max>RSL
	959-98-8	Alpha-Endosulfan	227	1	0.0051	0.0051	NC	mg/kg	P111-0.5	0.4%	0.0017 - 0.97	Maximum	NA	3.70E+02	e	NA	N	Max<RSL
	33213-65-9	Beta-Endosulfan	227	1	0.0034	0.0034	NC	mg/kg	P15-2	0.4%	0.0034 - 1.9	Maximum	NA	3.70E+02	e	NA	N	Max<RSL
	1031-07-8	Endosulfan Sulfate	227	2	0.00084	0.0018	NC	mg/kg	P10-0	0.9%	0.0034 - 1.9	Maximum	NA	3.70E+02	e	NA	N	Max<RSL
	309-00-2	Aldrin	228	10	0.00031	0.0021	0.001	mg/kg	P18-0	4.4%	0.0017 - 0.97	Maximum	NA	2.90E-02		NA	N	Max<RSL
	72-20-8	Endrin	227	0	<0.0034	0	NC	mg/kg	NA	0.0%	0.0034 - 1.9	Maximum	NA	1.80E+01		NA	N	ND
	7421-93-4	Endrin aldehyde	227	8	0.00022	1.9	0.225	mg/kg	P04-0.5	3.5%	0.0035 - 1.9	Maximum	NA	1.80E+01	f	NA	N	Max<RSL
	53494-70-5	Endrin ketone	224	4	0.0051	0.033	NC	mg/kg	P03-2	1.8%	0.0035 - 1.9	Maximum	NA	1.80E+01	f	NA	N	Max<RSL
	8001-35-2	Toxaphene	218	0	<0.07	0	NC	mg/kg	NA	0.0%	0.07 - 38	Maximum	NA	4.40E-01		NA	N	ND
	76-44-8	Heptachlor	228	70	0.00039	0.15	0.008	mg/kg	P11-2	30.7%	0.0017 - 0.97	Maximum	NA	1.10E-01		NA	Y	Max>RSL
	1024-57-3	Heptachlor epoxide	228	70	0.00051	0.068	0.006	mg/kg	P106-0	30.7%	0.0017 - 0.97	Maximum	NA	1.10E-01	g	NA	N	Max<RSL
	72-43-5	Methoxychlor	224	1	0.019	0.019	NC	mg/kg	P39-0	0.4%	0.018 - 9.7	Maximum	NA	3.10E+02		NA	N	Max<RSL
	12674-11-2	Aroclor 1016	135	0	<0.033	0	NC	mg/kg	NA	0.0%	0.033 - 1.8	Maximum	NA	2.20E-01	h	NA	N	ND
	11104-28-2	Aroclor 1221	135	0	<0.033	0	NC	mg/kg	NA	0.0%	0.033 - 1.8	Maximum	NA	2.20E-01	h	NA	N	ND
	11141-16-5	Aroclor 1232	135	0	<0.033	0	NC	mg/kg	NA	0.0%	0.033 - 1.8	Maximum	NA	2.20E-01	h	NA	N	ND
	53469-21-9	Aroclor 1242	135	0	<0.033	0	NC	mg/kg	NA	0.0%	0.033 - 1.8	Maximum	NA	2.20E-01	h	NA	N	ND
	12672-29-6	Aroclor 1248	135	0	<0.033	0	NC	mg/kg	NA	0.0%	0.033 - 1.8	Maximum	NA	2.20E-01	h	NA	N	ND
	11097-69-1	Aroclor 1254	135	3	0.079	0.51	NC	mg/kg	P35-0.5	2.2%	0.033 - 1.8	Maximum	NA	2.20E-01	h	NA	Y	Max>RSL
	11096-82-5	Aroclor 1260	135	10	0.01	0.067	0.02	mg/kg	P13-2	7.4%	0.033 - 1.8	Maximum	NA	2.20E-01	h	NA	N	Max<RSL

a Range of reporting limits is for non-detected samples results only.
b Maximum detected concentration does not exceed the Residential RSL (concentration used for screening).
c Screening Toxicity Value is the Residential RSL (USEPA, 2009).
d RSL for chlordane used.
e RSL for endosulfan used.
f RSL for endrin used.
g RSL for heptachlor used.
h High risk RSL for Aroclor 1260 used to represent Total Aroclors.
i RSL for alpha-BHC used.
NA Not applicable.
ND Not detected.
NC Not calculated due to insufficient number of detections.

Table 3-3
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Montrose Chemcial Superfund Site - ECI Property

Scenario Timeframe:	Future
Medium:	Soil
Exposure Medium:	Soil, 0-16 ft bgs

Exposure Point	CAS Number	Chemical	Number of Samples	Number of Detections	Minimum Concentration	Maximum Concentration	95% UCL	Units	Location of Maximum Concentration	Detection Frequency	Range of Reporting Limits[a]	Concentration Used for Screening	Background Value	USEPA RSL Screening Value[c]		Potential ARAR/TBC Value	COPC Flag (Y/N)	Rationale for Selection or Deletion[b]
0 - 16 ft bgs	53-19-0	2,4'-DDD	493	424	0.00079	18	0.74	mg/kg	P48-12	86%	0.0034 - 20	Maximum	NA	2.00E+00		NA	Y	Max>RSL
	72-54-8	4,4'-DDD	482	468	0.00042	55	2.2	mg/kg	P48-12	97%	0.0034 - 20	Maximum	NA	2.00E+00		NA	Y	Max>RSL
	3424-82-6	2,4'-DDE	487	130	0.002	1.3	0.07	mg/kg	P11-12	27%	0.0034 - 20	Maximum	NA	1.40E+00		NA	N	Max<RSL
	72-55-9	4,4'-DDE	497	493	0.0003	6.5	0.66	mg/kg	P15-12	99%	0.0034 - 20	Maximum	NA	1.40E+00		NA	Y	Max>RSL
	79-02-6	2,4'-DDT	467	380	0.0016	34	1.18	mg/kg	P11-12	81%	0.0035 - 20	Maximum	NA	1.70E+00		NA	Y	Max>RSL
	50-29-3	4,4'-DDT	488	485	0.00065	170	6.3	mg/kg	P11-12	99%	0.0035 - 20	Maximum	NA	1.70E+00		NA	Y	Max>RSL
	319-84-6	alpha-BHC	515	2	0.0034	0.039	NC	mg/kg	P14-0	0.4%	0.0017 - 10	Maximum	NA	7.70E-02		NA	N	Max<RSL
	319-85-7	beta-BHC	515	15	0.00077	0.45	0.007	mg/kg	P48-12	3%	0.0017 - 10	Maximum	NA	2.70E-01		NA	Y	Max>RSL
	319-86-8	delta-BHC	515	4	0.005	0.19	NC	mg/kg	P48-12	1%	0.0017 - 10	Maximum	NA	7.70E-02	i	NA	Y	Max>RSL
	58-89-9	gamma-BHC	515	4	0.00082	0.25	NC	mg/kg	P48-12	1%	0.0017 - 10	Maximum	NA	5.20E-01		NA	N	Max<RSL
	5103-71-9	alpha-Chlordane	515	236	0.00036	0.78	0.05	mg/kg	P106-0	46%	0.0017 - 10	Maximum	NA	1.60E+00	d	NA	N	Max<RSL
	5103-74-2	gamma-Chlordane	515	289	0.00027	0.63	0.05	mg/kg	P05-0	56%	0.0017 - 10	Maximum	NA	1.60E+00	d	NA	N	Max<RSL
	60-57-1	Dieldrin	515	183	0.00088	1.8	0.03	mg/kg	P17-8	36%	0.0034 - 20	Maximum	NA	3.00E-02		NA	Y	Max>RSL
	959-98-8	alpha-endosulfan	497	6	0.0011	0.0076	0.002	mg/kg	P148-8	1%	0.0017 - 10	Maximum	NA	3.70E+02	e	NA	N	Max<RSL
	33213-65-9	beta-endosulfan	497	1	0.0034	0.0034	NC	mg/kg	P15-2	0.2%	0.0034 - 20	Maximum	NA	3.70E+02	e	NA	N	Max<RSL
	1031-07-8	Endosulfan sulfate	497	10	0.00084	0.024	0.006	mg/kg	P26-5	2%	0.0034 - 20	Maximum	NA	3.70E+02	e	NA	N	Max<RSL
	309-00-2	Aldrin	515	16	0.00031	0.058	0.0016	mg/kg	P17-8	3%	0.0017 - 10	Maximum	NA	2.90E-02		NA	Y	Max>RSL
	72-20-8	Endrin	497	1	0.073	0.073	NC	mg/kg	P24-8	0.2%	0.0034 - 20	Maximum	NA	1.80E+01		NA	N	Max<RSL
	7421-93-4	Endrin aldehyde	497	18	0.00022	0.036	0.004	mg/kg	P04-0.5	4%	0.0034 - 20	Maximum	NA	1.80E+01	f	NA	N	Max<RSL
	53494-70-5	Endrin ketone	487	7	0.0033	0.033	NC	mg/kg	P03-2	1%	0.0035 - 20	Maximum	NA	1.80E+01	f	NA	N	Max<RSL
	8001-35-2	Toxaphene	468	0	0	0	NC	mg/kg	NA	0	0.07 - 400	Maximum	NA	4.40E-01		NA	N	ND
	76-44-8	Heptachlor	515	96	0.00039	10	0.36	mg/kg	P11-2	19%	0.0017 - 10	Maximum	NA	1.10E-01		NA	Y	Max>RSL
	1024-57-3	Heptachlor epoxide	514	110	0.00046	0.12	0.007	mg/kg	P12-12	21%	0.0017 - 10	Maximum	NA	1.10E-01	g	NA	Y	Max>RSL
	72-43-5	Methoxychlor	486	2	0.003	0.019	NC	mg/kg	P39-0	0.4%	0.018 - 100	Maximum	NA	3.10E+02		NA	N	Max<RSL
	12674-11-2	Aroclor 1016	285	0	0	0	NC	mg/kg	NA	0%	0.033 - 7.6	Maximum	NA	2.20E-01	h	NA	N	ND
	11104-28-2	Aroclor 1221	285	0	0	0	NC	mg/kg	NA	0%	0.033 - 7.6	Maximum	NA	2.20E-01	h	NA	N	ND
	11141-16-5	Aroclor 1232	285	0	0	0	NC	mg/kg	NA	0%	0.033 - 7.6	Maximum	NA	2.20E-01	h	NA	N	ND
	53469-21-9	Aroclor 1242	285	0	0	0	NC	mg/kg	NA	0%	0.033 - 7.6	Maximum	NA	2.20E-01	h	NA	N	ND
	12672-29-6	Aroclor 1248	285	0	0	0	NC	mg/kg	NA	0%	0.033 - 7.6	Maximum	NA	2.20E-01	h	NA	N	Max<RSL
	11097-69-1	Aroclor 1254	285	11	0.079	5.2	0.17	mg/kg	P32-8	4%	0.033 - 7.6	Maximum	NA	2.20E-01	h	NA	Y	Max>RSL
	11096-82-5	Aroclor 1260	285	17	0.01	0.59	0.03	mg/kg	P16-8	6%	0.033 - 7.6	Maximum	NA	2.20E-01	h	NA	Y	Max>RSL

a Range of deteciton limits is for non-detected samples results only.
b Maximum detected concentration does not exceed 1/10th of the Residential RSL (concentration used for screening).
c Screening Toxicity Value is 1/10th of the risk-based media concentration (Residential RSL: USEPA, 2009).
d RSL for chlordane used.
e RSL for endosulfan used.
f RSL for endrin used.
g RSL for heptachlor used.
h High risk RSL for Aroclor 1260 used to represent Total Aroclors.
NA Not applicable.
ND Not detected.
NC Not calculated due to insufficient number of detections.

APPENDIX A

DTSC Directive Letter

APPENDIX B

Health and Safety Plan

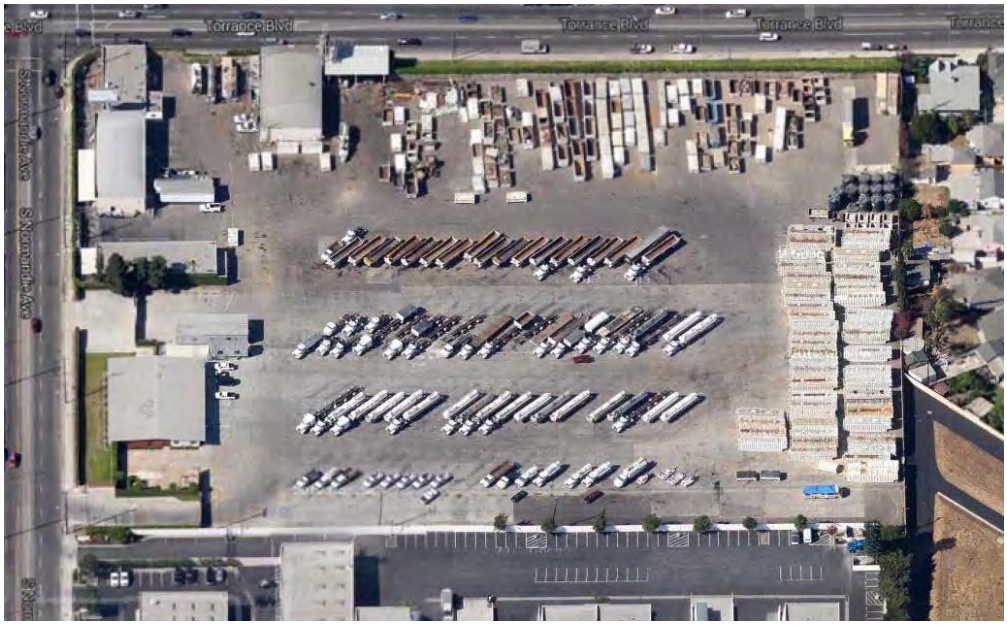
Sharp
Environmental
Technologies, Inc.

839 S. Beacon Street, #1967, San Pedro, California 90733 Tel (310) 505-3675 Fax (310) 548-3935

SITE HEALTH AND SAFETY PLAN

ECOLOGY CONTROL INDUSTRIES

20846 Normandie Avenue
Torrance, California 90502



Prepared for

MR. RON FLURY
ECOLOGY CONTROL INDUSTRIES
20846 Normandie Avenue
Torrance, California 90502

July 1, 2014

SITE HEALTH AND SAFETY PLAN
FIELD ACTIVITIES
ECOLOGY CONTROL INDUSTRIES, TORRANCE, CALIFORNIA 90502

Project Number	ECI Work Plan	Telephone
SET President	Jeff Sharp	310-505-3675
Project Manager	Jeff Sharp	310-505-3675
Site Contact	Ron Flury	310-354-9999
Site Health and Safety Supervisor	Jeff Sharp	310-505-3675
Plan Preparer	Gabriele Baader	626-712-0589
Health and Safety Manager	Jeff Sharp	310-505-3675
Plan Preparation Date	July 1, 2014	
Plan Review	July 1, 2014	

APPROVALS

Gabriele Baader (Professional Geologist, Plan Preparer) **Date**

Jeff Sharp (Health and Safety Manager) **Date**

Jeff Sharp (SET President) **Date**

This Site Health and Safety Plan is valid only for this specific project as described in Section 2. It is not to be used for other projects or subsequent phases of this project without the written approval of the Health and Safety Manager. The plan was prepared under the direct supervision of a certified industrial hygienist. A copy of this plan is to be maintained at the site at all times.

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1. SUMMARY INFORMATION

1.1 Administration Information

Site Name:	Ecology Control Industries
Site Location:	20846 Normandie Avenue, Torrance, California 90502
Site Contact Name/Phone:	Ron Flury, 310-354-9999
Project Manager:	Jeff Sharp, 310-505-3675
Site Health and Safety Supervisor:	Jeff Sharp, 310-505-3675

1.2 Emergency Information

Ambulance:	911
Fire:	911
Police:	911
Hospital:	LA County Harbor-UCLA Medical Center, 310-222-2345
SET Principal Geologist:	Jeff Sharp, 310-505-3675
Health and Safety Manager:	Jeff Sharp, 310-505-3675
Project Manager:	Jeff Sharp, 310-505-3675

1.3 Hospital Directions

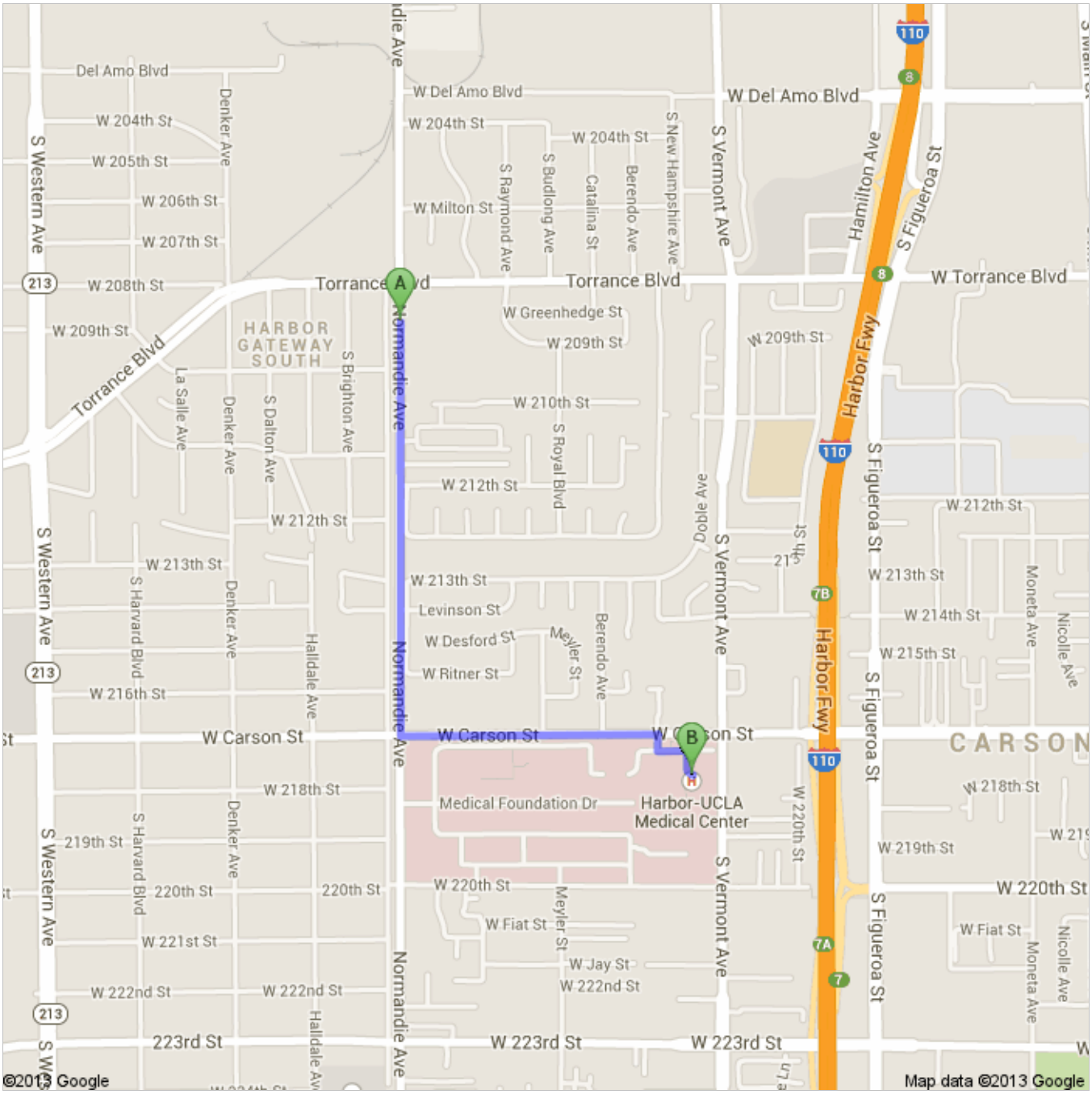
To reach the hospital at 1000 West Carson Street, Torrance, California from the site:

1. Start out heading south on Normandie Avenue and proceed for 0.7 miles,
2. Turn left (east) on West Carson Street and proceed for 0.4 miles,
3. Turn right (south) for 141 feet,
4. Turn left (east) for 243 feet,
5. The hospital is on the right (south) after 233 feet.

The route map to LA County Harbor-UCLA Medical Center is provided on the following page.

Note: Additional information concerning emergency procedures is provided in Section 11. A copy of the hospital route map must be readily available in each site vehicle that may be used to transport accident victims to the hospital.

Directions to 1000 W Carson St, Torrance, CA 90502
1.2 mi – about **3 mins**



20846 Normandie Ave, Torrance, CA 90502

1.	Head **south** on **Normandie Ave** About 1 min	go 0.7 mi total 0.7 mi
2.	Turn left onto **W Carson St** About 1 min	go 0.4 mi total 1.1 mi
3.	Turn right	go 141 ft total 1.1 mi
4.	Turn left	go 243 ft total 1.1 mi
5.	Turn right Destination will be on the right	go 233 ft total 1.2 mi

1000 W Carson St, Torrance, CA 90502

These directions are for planning purposes only. You may find that construction projects, traffic, weather, or other events may cause conditions to differ from the map results, and you should plan your route accordingly. You must obey all signs or notices regarding your route.

Map data ©2013 Google

Directions weren't right? Please find your route on maps.google.com and click "Report a problem" at the bottom left.

1.4 Constituents of Potential Concern

- Total petroleum hydrocarbons as carbons chain (TPHcc)
- Volatile organic compounds (VOCs)
- Polychlorinated biphenyls (PCBs)
- Polycyclic aromatic hydrocarbons (PAHs)
- Organochlorine pesticides (OCPs)
- California Code of Regulations, Title 22, metals (17 metals)

Additional information regarding site history, constituents of concern, and scope of work activities is located in Sections 3 and 4.

1.5 Safety Equipment Required

- Hard hat
- Eye protection (safety glasses)
- Ear plugs, disposable
- First aid kit
- Gloves, vinyl
- Fire extinguisher (ABC type)
- Safety boots/shoes
- Portable photo-ionization detector (PID)

1.6 Personal Protective Equipment Required

Task	Level of Protection (PPE)	
	Initial	Upgrade
Task 1 Soil/Soil-gas Sampling	Level D	Level C
Task 2 Air Monitoring	Level D	Level C
Task 3 Excavation	Level D	Level C
Task 4 Transportation	Level D	Level C

2. INTRODUCTION

This Site Health and Safety Plan (SHSP) prepared by Sharp Environmental technologies, Inc. (SET) establishes requirements and provides guidelines for worker safety and hazard identification during the Environmental Site Assessment (ESA) at the Ecology Control Industries located 20846 Normandie Avenue in Torrance, California 90502, Figure 1. This SHSP is intended to be in compliance with applicable Occupational Safety and Health Administration (OSHA) regulations found in the California Code of Regulations (CCR) Title 8 section 5192.

This SHSP is a site-specific document, which will be onsite, and addresses the safety and health hazards of specific phases of site operations designated and identified in this SHSP. This SHSP also

includes the requirements and procedures for employee protection. The information provided presents the minimum health and safety requirements for establishing and maintaining a safe working environment during the site operations designated in this SHSP. In the event of conflicting safety requirements, the procedures or practices that provide the highest degree of workplace safety will be implemented. SET will make the appropriate revisions to this SHSP if work plan specifications change, or if site conditions and/or health and safety hazards encountered during the designated site operations are found to differ substantially from the initial site information relied upon to prepare this SHSP.

This SHSP is prepared for the exclusive use by SET for personnel and site operations under the direction and control of SET. If expressly stated, this SHSP may also cover other specific designated tasks performed by subcontractors or other third parties at the site that otherwise are not under the direction and or control of SET. Under these circumstances, SET assumes no additional site safety responsibility nor direction nor control for the aforementioned subcontractors or third parties except for the specific and limited designated site operations and related tasks expressly covered in this SHSP. Furthermore, when expressly authorized by SET in writing, this SHSP may apply to the site operations performed by subcontractors retained by SET but only if this SHSP appropriately addresses their activity and potential safety and health hazards, however, under those circumstances, it is the responsibility of the subcontractor to determine if this SHSP appropriately addresses their activities and hazards. Otherwise, all subcontractors are responsible for preparing, maintaining, and implementing their individual SHSPs, health and safety programs, and for providing their own site safety supervision. All site visitors (i.e. client, agency personnel) are expected to observe the safety rules and regulations established by their respective organizations in addition to the requirements of this SHSP.

3. SITE BACKGROUND

The site is located at Ecology Control Industries (ECI), 20846 Normandie Avenue in Torrance, California 90502. The work will be performed at the eastern property boundary within the ECI property identified as the historic storm water drainage channel.

The site consists of a 7.34-acre property currently occupied by ECI as a vehicle and equipment dispatch yard and a temporary hazardous and non-hazardous waste storage facility. The site contains one 5,400-square foot building located along the northern property line and is approximately 90 percent covered with either concrete or paved asphalt, with the remaining area consisting of unpaved soils.

Prior to approximately 1969, the historic storm water pathway in the vicinity of the ECI property was an unlined linear topographic depression that acted as a local surface drainage feature. The drainage channel passed under Torrance Boulevard and traversed the eastern portion of the ECI Property before continuing east through what is now the closed Royal Boulevard Landfill (ARMCO Site).

During the late 1960s and early 1970s, the drainage ditch was replaced by the Los Angeles County Flood Control District (LACFCD) with an underground concrete storm water conveyance system. Project No. 685 (also known as the Kenwood Drain), a concrete box culvert, replaced the historic storm water drainage ditch from 204th Street, along Kenwood Avenue, through the ECI property, and eventually emptying into the Torrance Lateral, a large, open, and concrete-lined drainage channel. The

LACFCD maintains an easement for Project 685 within the properties it traverses, including the ECI property.

In 2005, pesticides and polychlorinated biphenyls (PCBs) were detected in soil by ECI as part of due diligence activities prior to sale of the property. The due diligence sampling activities detected several chemicals present in soils at concentrations exceeding residential action levels, including: dichlorodiphenyl-dichloroethane (DDD), dichlordiphenyl-dichloroethylene (DDE), dichlorodiphenyl-trichloroethane (DDT), chlordane, petroleum hydrocarbons, and PCBs. The sum of DDT, DDE, and DDD concentrations (referred to collectively as total DDT) were detected in subsurface soil samples collected from the eastern and southeastern portions of the ECI property in concentrations up to 325 mg/kg. Although contended by Montrose, EPA has attributed the presence of total DDT in these soils to former Montrose chemical manufacturing activities. From 1947 to 1982, Montrose manufactured technical grade DDT at a plant located approximately 0.5 miles north/northwest of the ECI property. EPA believes that DDT-impacted soils at the ECI property may be the result of contaminated storm water runoff from the former Montrose plant. The ECI property is located "downstream" from the former Montrose plant property, by way of the historical storm water drainage pathway.

Based on the data collected during previous investigations, preparation of a removal action work plan was recommended to address the removal of soils impacted with contaminants of concern at the site.

This Health and Safety Plan has been prepared as an Appendix and supplement to the *Removal Action Work Plan* for the proposed soil excavation at the site.

4. PLANNED WORK ACTIVITIES

This SHSP covers the following designated site operations that will be performed by SET. The northwestern area of the site will be investigation with by active soil-gas survey and a soil sampling and analysis program, the eastern area along the property boundary will be excavated to depths of 25 feet below grade surface.

4.1 Mobilization/Demobilization

Subcontractors will provide drill rig, mobile laboratory, excavating, loading and transportation equipment mobilization/demobilization. The sampling equipment and materials will be mobilized by SET.

4.2 Air Monitoring

SET will conduct air monitoring near the sampling areas using a PID.

4.3 Soil and Soil-gas Sampling

Soil and soil-gas samples will be collected according to the sampling and analysis plan and at changes in lithology (fine grained units) or where odors or discolorations are observed or as required by the DTSC. Samples will be labeled, submitted to a state-certified mobile laboratory or/and placed on ice and transported to a mobile and/or stationary laboratory for analysis.

4.4 Removal Action

Soil will be excavated, monitored and segregated as applicable, stockpiled and loaded for off-site transportation to a licensed disposal or recycling facility.

Soil samples will be collected according to the work plan from the excavated areas to confirm clean soil and stockpiled soil for profiling and disposal facility selection. Samples will be labeled, placed on ice and transported to a state-certified laboratory. Soil and samples will be analyzed as described in the work plan.

5. SITE HAZARD ANALYSIS

Site operations designated in this SHSP may result in exposure to the following general types of chemical, biological, or physical hazards.

5.1 Site Hazard Overview

A hazard analysis of the work activities that involves potential exposure to chemical contaminants or physical hazards is provided in the following table. The hazard analysis provides a general ranking of high, moderate or low based on anticipated site conditions.

Potential Hazard	Task 1 Soil/Soil-gas Sampling	Task 2 Air Monitoring	Task 3 Excavation	Task 4 Transportation
Inhalation of vapors	Moderate	Moderate	Moderate	Moderate
Skin and Eye contact	Moderate	Moderate	Moderate	Moderate
Ingestion	Low	Low	Low	Low
Inhalation of Dust	Moderate	Moderate	High	High
Heat Stress	Moderate	Moderate	Moderate	Moderate
Heavy Equipment	Moderate	Low	High	High
Traffic	Moderate	Moderate	High	High
Noise	Moderate	Low	High	High
Trips/Falls	Moderate	Low	High	High
Utilities	Low	Low	Moderate	Moderate
Electrical	Low	Low	Low	Low
Illumination	Low	Low	Low	Low
Flammable Hazards	Low	Low	Low	Low
Biological Hazards	Low	Low	Low	Low
Other	Low	Low	Low	Low

Exposure to elevated levels of hydrocarbon vapors presents potential health risks that need to be properly understood and controlled. These vapors constitute a health hazard when inhaled, and they

present a fire or explosion risk when they accumulate in an explosive mixture with oxygen. Where elevated exposures risks are determined to exist, respiratory protection will be the primary control method to protect personnel from inhalation of hydrocarbon vapors.

5.2 Chemical Hazards

Chemical hazards of concern (COCs) associated with the site operations that are covered by this SHSP include VOCs. Exposure to the aforementioned COCs can occur via inhalation of chemical vapors and gases, inhalation of contaminated dust and soil particles and dermal contact with contaminated soil.

In California, Permissible exposure limits (PELs) for COCs are found in CCR Title 8, Section 5155. PELs refer to the maximum allowable airborne concentrations of hazardous substances and represent concentrations at which it is believed that nearly all the workers may be repeatedly exposed, eight hours per day, for a 40-hour workweek, without adverse effect. However, due to the wide variation in individual susceptibility, a small number of workers may experience discomfort to some or all of these chemical substances at concentrations equal to or below the PEL. A still smaller percentage of persons may be affected more seriously from exposures at or below the PEL due to aggravation of a pre-existing condition or development of an occupational illness. The majority of PELs are expressed as a time-weighted average based on an eight-hour workday, five days a week or 40-hour workweek. The PEL is an average exposure concentration spread over a 480-minute exposure period. CAL/OSHA also has established short-term exposure limits (STEL) for certain substances that typically have strong irritant properties. STELs are based on a 15-minute average exposure limit. In addition some substances have ceiling exposure limits that establish exposure limits that cannot be exceeded at any time. In many cases, a specific chemical hazard will have an eight-hour PEL, a 15-minute STEL and a ceiling limit. Certain substances, which can readily enter the body via skin contact, are denoted by CAL/OSHA with "S" notation referring to skin absorption. The same notations and standards are used in this SHSP.

The following table lists the COCs associated with the site operations covered by this SHSP and includes routes of exposure, symptoms, PELs, immediately dangerous to life and health (IDLH) concentrations, and lower explosive limits (LEL).

Chemical Name	Route of Exposure	Symptoms	Target Organs
Total petroleum hydrocarbons (TPH)	Inhalation/ingestion/ skin absorption/skin or eye contact	Dizziness, drowsiness, headache, nausea; irritation of the eyes, nose, throat; dry cracked skin	Skin, eyes, respiratory system, central nervous system
Benzene	Inhalation/skin absorption/ingestion/ skin or eye contact	Giddiness, headache, nausea, staggered gait, fatigue, anorexia, lassitude, dermatitis, bone marrow depression (carcinogen)	Blood, central nervous system, skin, bone marrow, eyes, respiratory system
Toluene	Inhalation/ingestion/ skin absorption/skin or eye contact	Fatigue, weakness; confusion, euphoria, dizziness, headache; dilated pupils, lacrimation; nervousness, muscle fatigue; insomnia; paresthesia; dermatitis	Central nervous system, liver, kidneys, skin

Chemical Name	Route of Exposure	Symptoms	Target Organs
Ethylbenzene	Inhalation/ingestion	Irritation of the eyes, mucous membrane, headache; dermatitis; irritation of the eyes,	Eyes, upper respiratory system, skin, central nervous system
Xylenes	Inhalation/ingestion/ skin absorption/skin or eye contact	Dizziness, excitement drowsiness, incoordination, staggering gait; irritation of the eyes, nose, throat; corneal vacuolization; anorexia, nausea, vomit, abdominal pain; dermatitis	Central nervous system, eyes, GI tract, blood, liver, kidneys, skin
Naphthalene	Inhalation/ingestion/ skin absorption/skin or eye contact	Irritation of eyes, headache, confusion, excitement, malaise (vague feeling of discomfort), nausea, vomiting, abdominal pain, irritation bladder, profuse sweating, jaundice, hematuria (blood in urine), renal shutdown, dermatitis, optical neuritis, corneal damage	Eyes, skin, blood liver, kidneys, central nervous system
Methyl tertiary butyl ether (MTBE)	Inhalation/ingestion/ skin absorption	Irritation of eyes, skin, nose, throat; exposure can cause difficulty concentrating and thinking. Higher levels can cause headache, nausea, dizziness, weakness, lightheadedness. Cancer, reproductive organ hazard	Skin, lungs, liver, kidney, CNS
Di-isopropyl ether (DIPE)	Inhalation, ingestion, skin and/or eye contact	Irritation of eyes, skin, nose; respiratory discomfort; dermatitis; drowsiness, dizziness, unconsciousness, narcosis	Eyes, skin, respiratory system, CNS
Ethyl tertiary butyl ether (ETBE)	Inhalation, ingestion, skin and/or eye contact	Irritation of eyes, skin, nose; respiratory discomfort; dermatitis; drowsiness, dizziness, unconsciousness, narcosis	Eyes, skin, respiratory system, CNS
Tertiary amyl methyl ether (TAME)	Inhalation, ingestion, skin and/or eye contact	Irritation of eyes, skin, nose; respiratory discomfort; dermatitis; drowsiness, dizziness, unconsciousness, narcosis	Eyes, skin, respiratory system, CNS
Tertiary butyl alcohol (TBA)	Inhalation, ingestion, skin and/or eye contact	Irritation eyes, skin, nose, throat; drowsiness, narcosis	Eyes, skin, respiratory system, central nervous system
Ethanol	Inhalation/eye contact	Alcohol intoxication	Eye irritant

Chemical Name	Route of Exposure	Symptoms	Target Organs
Methane	Inhalation, skin adsorption, skin or eye contact	Rapid breathing, diminished mental alertness, impaired muscular coordination, faulty judgment, fatigue. As asphyxiation progresses, nausea, vomiting, prostration, loss of consciousness, convulsions, coma, death	Eyes, skin, CNS, respiratory system
Methyl ethyl ketone (MEK)	Inhalation/Ingestion	Irritation of the eyes, nose; headache; dizziness	CNS, lungs
Tetrachloro-ethene (PCE)	Inhalation, skin absorption, ingestion, skin or eye contact	Irritation of the eyes, nose, throat, nausea, headache, dizziness, liver damage (carcinogen)	Liver, kidneys, eyes, upper respiratory system, CNS
Acetone	Inhalation, ingestion, skin or eye contact	Irritation of the eyes, nose, throat; dizziness, CNS depression; dermatitis	Eyes, skin, respiratory system, CNS
Methylene Chloride	Inhalation, skin absorption, ingestion, skin or eye contact	Irritation of the eyes and skin; lassitude (weakness, exhaustion), drowsiness, dizziness; numbness, tingling of limbs; nausea (potential occupational carcinogen)	Eyes, skin, cardiovascular system, CNS
Di-n-octyl-phthalate	Inhalation, skin absorption, ingestion, skin or eye contact	Irritation of the eyes and skin	Eyes, skin, CNS
Trichloroethene (TCE)	Inhalation, skin absorption, ingestion, skin or eye contact	Irritation of the eyes, nose, throat, nausea, headache, dizziness, liver damage, tremors, irregular heartbeat (carcinogen)	Respiratory system, heart, liver
1,1,1-Trichloroethane (TCA)	Inhalation, skin absorption, ingestion, skin or eye contact	Irritation of the eyes, nose, throat, nausea, headache, dizziness, liver damage, tremors, irregular heartbeat (carcinogen)	Skin, CNS, CVS, eyes
1,1-Dichloroethene (1,1-DCE)	Inhalation, skin absorption, ingestion, skin or eye contact	Irritation of eyes, respiratory system, CNS depression	Respiratory system, eyes, CNS
Lead	Inhalation, ingestion, contact	Weakness; facial pallor, pale eyes, low weight; abdominal pain, colic; irritation of eyes	Eyes, skin, respiratory system, liver, kidney, CNS, reproductive system
PAHs	Inhalation, contact, ingestion	Reasonably anticipated to be a carcinogen; may cause birth defects.	CNS, cardiovascular system
Arsenic	Inhalation, contact, ingestion	Ulceration of nasal septum, respiratory irritation, hyperpigmentation of skin, dermatitis	Liver, kidney, skin, lungs, lymphatic system

Chemical Name	Route of Exposure	Symptoms	Target Organs
Lead	Inhalation, ingestion, contact	Weakness; facial pallor, pale eyes, low weight; abdominal pain, colic; irritation of eyes	Eyes, skin, respiratory system, liver, kidney, CNS, reproductive system
Asbestos	Inhalation, ingestion, contact	Irritation of eyes, breathing difficulty, intestinal fibrosis, asbestosis	Respiratory system, eyes
Carbon monoxide	Inhalation	Lowering of consciousness, death	CNS, cardiovascular system
Gamma-chlordane	Inhalation/skin absorption/ingestion/ congestion	Blurred vision, confusion, ataxia, delirium, cough, abdominal pain, nausea, vomiting, diarrhea, irritation	CNS, eyes, respiratory system, liver, kidneys
Alpha-chlordane	Inhalation/skin absorption/ingestion/ congestion	Blurred vision, confusion, ataxia, delirium, cough, abdominal pain, nausea, vomiting, diarrhea, irritation	CNS, eyes, respiratory system, liver, kidneys
4, 4'-DDD	Inhalation/ingestion/ absorption/congestion	Dizziness, drowsiness, headache, nausea; irritation of eyes, nose, throat; dry cracked skin	Skin, eyes, respiratory system, CNS
4,4'-DDE	Inhalation/ingestion/ absorption/congestion	Dizziness, excitement, drowsiness, incoordination, staggering gait; irritation of eyes, nose, throat; corneal vacuolization; anorexia, nausea, vomiting, abdominal pain; dermatitis	CNS, eyes, liver, kidneys, skin
4,4'-DDT	Inhalation/ingestion/ absorption/congestion	Dizziness, excitement, drowsiness, incoordination, staggering gait; irritation of eyes, nose, throat; corneal vacuolization; anorexia, nausea, vomiting, abdominal pain; dermatitis	CNS, eyes, liver, kidneys, skin
Dieldrin	Inhalation/ingestion/ skin absorption/ congestion	Headache, nausea, dizziness, nausea, vomiting, liver damage, kidney damage	CNS, liver, kidneys, skin
Toxaphene	Inhalation/ingestion/ skin absorption/skin or eye contact	Irritation of eyes, nose; loss of balance, drowsiness, headache, nausea, visual disturbances, nausea, dizziness, liver damage (carcinogen)	CNS, liver, kidneys, skin

Chemical Name	Route of Exposure	Symptoms	Target Organs
1,2,4-Trimethyl-benzene	Inhalation, ingestion, skin and/or eye contact	Irritation eyes, skin, nose, throat; respiratory system; bronchitis; hypochromic anemia; headache, drowsiness, lassitude (weakness, exhaustion), dizziness, nausea, incoordination; vomiting, confusion; chemical pneumonitis (aspiration liquid)	Eyes, skin, respiratory system, central nervous system, blood

5.3 Exposure Limits

Chemical name	TWA/STEL/Ceiling	IDLH/LEL
TPH-gasoline	85 ppm/400 ppm	10,000 ppm
Benzene	1 ppm/5 ppm	500 ppm (carcinogen)
Toluene	50 ppm/150 ppm/300 ppm	500 ppm
Ethylbenzene	100 ppm/125 ppm	800 ppm
Xylenes	100 ppm/150 ppm	900 ppm
Tetrachloroethene (PCE)	25 ppm/100 ppm/300 ppm	150 ppm (carcinogen)
Trichloroethene (TCE)	25 ppm/100 ppm/300 ppm	1,000 ppm (carcinogen)
1,1,1-Trichloroethane (TCA)	350 ppm/450 ppm/800 ppm	700 ppm
1,1-Dichloroethene (1,1-DCE)	1 ppm/NE/NE	NE
PAHs	0.1 mg/m3	1,750 mg/m3 (carbon)
Chlordanes	0.5 ppb	100 ppb
Dieldrin	0.25 ppb	50 ppb
4,4-DDD	0.5 ppb	500 ppb
4,4-DDE	0.5 ppb	500 ppb
4,4-DDT	0.5 ppb	500 ppb
Toxaphene	NA	NA
Naphthalene	10 ppm/15ppm/NE	250 ppm/0.9%
1,2,4-Trimethyl-benzene	25 ppm/NE/NE	NE/0.9%
Tertiary butyl alcohol (TBA)	100 ppm/150 ppm/NE	1,600 ppm
Arsenic	0.01 mg/m3	5 mg/m3
Lead	0.1 mg/m3	100 mg/m3

TWA = Time-weighted average (concentration should not be exceeded during an 8-hour workday during a 40-hour work-week)
STEL = Short-term exposure limit (15 -minute TWA exposure that should not be exceeded at any time during a workday)
IDLH = Immediately dangerous to life or health concentrations
LEL = Lower exposure limit
ppm = Parts per million
NE = None established

5.4 Explosive Limits

Chemical Name	LEL	UEL
TPH	1.1%	5.9%
Benzene	1.2%	7.8%
Toluene	1.1%	7.1%
Ethylbenzene	0.8%	6.7%
Xylenes	0.9%	6.7%
MTBE	1.6%	8.4%
DIPE	1.4%	7.9%
ETBE	NE	NE
TAME	NE	NE
TBA	2.4%	8%
Ethanol	3.3%	19%
Methane	5.0%	15.0%
Propane	2.1%	9.5%
MEK	1.4%	11.4%
PCE	NA	NA
Acetone	2.5%	12.8%
Methylene chloride	13%	23%
Di-n-octyl-phthalate	NE	NE
TCE	8%	10.5%
TCA	7.5%	12.5%
1,1-DCE	6.5%	15.5%
Arsenic	NA	NA
PAHs	NA*	NA*
Gamma-chlordane	NA	NA
Alpha-chlordane	NA	NA
4, 4'-DDD	NA	NA
4, 4'-DDE	NA	NA
4, 4'-DDT	NA	NA
Dieldrin	NA	NA
Toxaphene	NA	NA
Carbon monoxide	17.5%	74.2%
Naphthalene	0.9%	5.9%
1,2,4-Trimethyl-benzene	0.9%	6.4%
TBA	2.4%	8%

Chemical Name	LEL	UEL

LEL = Lower exposure limit
UEL = Upper exposure limit
NE = None established

5.5 Physical Hazards

The following potential health and safety hazards may be encountered during scheduled activities at the sites:

- Noise
- Heavy equipment
- Electrical sources
- Fire/explosion
- Slips, trips, and falls
- Illumination
- Cold stress
- Heat stress
- Underground and overhead utilities
- Fall protection
- Confined space hazards
- Materials and equipment handling
- Traffic
- Safety equipment failure
- Excavations
- Elevated work platforms
- Drilling

5.5.1 Noise

Hearing protection should be worn at the site if noise levels exceed 85 decibel. Hearing protection with a noise reduction rating of at least 25 decibel should be worn (i.e., earplugs or earmuffs). The SHSS will inform site personnel when and if hearing protection is required. High noise levels are usually associated with the operation of drill rigs, compressors, generators, pumps, motors, and portable hand tools including drills and jackhammers. If loud noise is apparent or if normal conversation becomes difficult, hearing protection should be worn. Follow manufacturers instructions on how to insert, wear and fit test hearing protectors.

5.5.2 Heavy Equipment

Equipment, including earth-moving equipment, drill rigs, or other heavy machinery, will be operated in accordance with the manufacturer's operating manual and with all applicable safety regulations and standard operating procedures. The operator is responsible for maintaining his/her equipment in good working condition and for inspecting the equipment daily to verify that it is functioning properly and

safely. The operator will ensure that a copy of the equipment-operating manual is kept with the equipment at all times. Prior to start up, the operator will inform the SHSS of any unique equipment hazards or safety concerns associated with the equipment. Unless otherwise specified, SET will not assume any direction or control over heavy equipment used at the site.

Operation of equipment at the site for the activities outlined above poses potential physical hazards. The following precautions should be observed whenever heavy equipment is in use:

- Personal Protective Equipment (PPE), including steel-toed boots, safety glasses, and hard hats, must be worn.
- Personnel must be aware of the location and operation of heavy equipment and take precautions to avoid getting in the way of its operation. Workers must never assume that the equipment operator sees them; eye contact and hand signals should be used to inform the operator of the location of site personnel working in the vicinity.
- Traffic safety vests are required for personnel working near mobile heavy equipment or near high traffic areas.
- Personnel should not walk directly behind, or to the side of, heavy equipment without the operator's knowledge or visual contact.

In addition, nonessential personnel will be kept out of any work area in which heavy equipment is operating.

5.5.3 Electrical Hazards

Electrocution may result from contact with overhead power lines, downed electrical wires, buried cables, lightning, use of electrical equipment in wet areas, and/or failure of electrical equipment. Location of all overhead and underground utility lines will be determined and mapped before commencing work. In case of a breach of an utility line, electricity supply to the site will be shut off. If adverse weather conditions develop, accompanied by lightning, work will stop promptly. Electrical repair/maintenance work must be done only by qualified personnel.

Electrical equipment to be used during field activities will be suitably grounded and insulated. Ground fault circuit interrupters, or equivalent, will be used with electrical equipment to reduce the potential for electrical shock.

Lockout/tag out procedures will be conducted in accordance with 8 CCR 3314 before activities begin on or near energized or mechanical equipment that may pose a hazard to site personnel. Workers conducting the operation will positively isolate the piece of equipment, lock/tag the energy source, and verify effectiveness of the isolation. Only employees who perform the lockout/tag out procedure may remove their own tags/locks. Workers will be thoroughly trained prior to initiating this procedure.

5.5.4 Explosion and Fire

The presence of flammable gases or vapors may cause a fire or explosion. Potential causes of explosion and fire include:

- Chemical reactions;

- Ignition of explosive or flammable chemicals; and,
- Sudden release of materials under pressure.

Any site activities that may involve the presence of flammable gases or vapors will require continuous air monitoring using a four gas direct reading instrument. All potential ignition sources will be kept away from an explosive or flammable environment, and only non-sparking, explosion proof equipment will be used. In addition, safe practices will be followed when performing any task that might result in the agitation or release of chemicals. Open flame or tobacco smoking will be strictly prohibited at the sites. All flammable liquids will be stored in approved containers and the quantities will be limited to one-day use.

If the four-gas instrument exceeds 10% of the LEL, all site activities will cease, equipment will be shut down and site personnel will be evacuated. In the event of a fire, work will cease, the area will be evacuated, and the local fire response team immediately will be notified. Only trained, experienced fire fighters will be allowed to extinguish substantial fires at the sites. Site personnel will not attempt to fight fires, unless properly trained and equipped to do so. At least one fully charged ABC dry chemical fire extinguisher will be readily available for use during all scheduled activities at the sites.

5.5.5 Slips, Trips, and Falls

These types of hazard result from unleveled or slippery surfaces, high-risk positioning, and the presence of hard-to-see objects (e.g., rope, cords, cables, above-ground piping, hills etc.) in areas where workers walk. Appropriate warning signs will be posted wherever this danger has been identified. Workers will take extra caution while working on steep slopes and in high-risk positions.

5.5.6 Illumination

If work activities occur before sunrise or after sunset, adequate lighting will be provided in each work area to meet the requirements of Title 8 CCR section 5192 (m).

5.5.7 Cold Stress

Workers performing activities during winter and spring months may encounter conditions such as extremely cold temperatures, snow and ice, which can make field activities difficult. Adequate cold weather gear, especially head and footwear, will be required under these conditions. Workers should be aware of signs and symptoms of hypothermia and frostbite, as well as first aid for these conditions. These signs and symptoms are summarized in the table below.

Condition	Signs	Symptoms	Response
Hypothermia	Confusion, slurred speech, slow movement.	Sleepiness, confusion, warm feeling.	Remove subject to warm area, such as truck cab; give warm fluids; warm body core as rapidly as possible; remove outer clothing and wrap torso in blankets with hot water bottle or other heat source. Get medical attention immediately.
Frostbite	Reddish area on skin, frozen skin.	Numbness or lack of feeling on	Place affected extremity in warm, not hot, water or wrap in warm towels. Get

Condition	Signs	Symptoms	Response
		exposed skin.	medical attention.

5.5.8 Heat Stress

Heat stress and associated complications can be the most prevalent health hazard at many sites, especially when PPE is used. Workers in PPE may experience varying degrees of heat stress if precautions are not taken. It is important to remember that individuals react to heat in different ways. Workers should be aware of signs and symptoms of heat-related illnesses, as well as first aid for these conditions. These signs and symptoms are summarized in the table.

Condition	Signs	Symptoms	Response
Heat Rash or Prickly Heat	Red rash on skin	Intense itching and inflammation	Increase fluid intake and observe affected worker.
Heat Cramps	Heavy sweating, lack of muscle coordination	Muscle spasms, and pain in hands, feet, or abdomen	Increase fluid uptake and rest periods. Closely observe affected worker for more serious symptoms.
Heat Exhaustion	Heavy sweating; pale, cool, moist skin; lack of coordination, fainting	Weakness, headache, dizziness, nausea	Remove worker to a cool, shady area. Administer fluids and allow worker to rest in cool area until fully recovered. Increase rest periods and closely observe worker for additional signs of heat exhaustion. If symptoms of heat exhaustion recur, treat as above and release worker from the day's activities after he/she has fully recovered.
Heat Stroke	Red, hot, dry skin; disorientation; unconsciousness	Sweating stops; nausea, dizziness and confusion; strong, rapid pulse	Immediately contact emergency medical services by dialing 911. Only certified first aid personnel should administer care. Remove the victim to a cool, shady location and observe for signs of shock. Attempt to comfort and cool the victim.

The following procedures will be used to reduce the potential that workers will experience symptoms of heat stress:

- Use administrative controls. Tasks will be scheduled to avoid heavy physical activity during the hottest period of the day and work will be performed in the shade whenever possible. Additional workers will be used during hot periods and the pace of work reduced whenever possible.
- Acclimatize the body. Workers will be allowed a period of adjustment to make heat exposure endurable.

- Drink liquids to replace body water lost during sweating. Workers will be encouraged to drink at least 1 cup of fluid every 20 minutes. To promote such consumption, fluids (i.e., water) will be located at or near where the work is being performed.
- Implement a work/rest regimen. This regimen will be increased (i.e., the frequency and duration of rest breaks) as needed to reduce overall heat exposure.
- Wear appropriate clothing. Worker clothing should be light in weight and in color, loose fitting where possible, and made of cotton or a synthetic fabric that allows perspiration to be wicked away from the skin to evaporate. Apply sunscreen to exposed if needed.

5.5.9 Underground and Overhead Utilities

The location of underground pipes, electrical conductors, and water and sewer lines must be determined before intrusive soil work is performed. Lines must be de-energized, blocked out, or blinded where feasible. Work is not permitted within 15 feet of any high voltage overhead power line. Equipment with articulated upright booms or masts will not be permitted to pass within 20 feet of an overhead utility line while the boom is in the upright position.

5.5.10 Materials and Equipment Handling

The movement and handling of equipment and materials on the site can pose a risk to workers in the form of muscle strains and minor injuries. These injuries can be avoided by using safe handling practices, proper lifting techniques, and proper personal safety equipment such as steel-toed boots and sturdy work gloves. Where practical, mechanical devices will be used to assist in the movement of equipment and materials, workers will not attempt to move heavy objects by themselves without using appropriate mechanical aids such as drum dollies or hydraulic lift gates.

5.5.11 Housekeeping and Sanitation

In order to promote safe and efficient work conditions, all work areas will be kept clean and free of debris. All hand tools will be kept out of the immediate work area until they are needed for use. Potable water will be made available for first aid, drinking, and personal hygiene purposes.

5.5.12 Traffic Safety

Vehicle traffic, unrelated to site activities may be present, particularly when working on streets and highways. When working in an area open to vehicular traffic, the work area will be clearly delineated by use of cones, signs and other appropriate warning devices to restrict vehicular access. Personnel exposed to vehicular traffic will use high-visibility clothing (e.g., bright orange vest) in accordance with the requirements of 8 CCR 1598(c). If necessary, the SHSS will require the use of a flagger or other appropriate traffic control measures.

5.5.13 Safety Equipment Failure

If monitoring instruments or any safety equipment fails, work will be suspended until repairs or replacements for that equipment can be found. In case of working equipment failure, field safety personnel will ensure that hazardous conditions have been abated before authorizing further work.

5.5.14 Drilling

Operation of drilling and sampling equipment during site activities presents potential physical hazards to personnel. During all site activities, PPE such as steel-toed shoes, safety glasses or goggles, and hardhats should be worn whenever such equipment is present. Personnel should be aware of the location and operation of drilling and sampling equipment at all times and take precautions to avoid obstructing operation of the equipment.

During setup of the drilling rig, overhead power lines pose a danger of shock or electrocution if the power line is contacted or severed during site operations. Before work is conducted in areas where overhead lines could be encountered, the appropriate utility company will be notified, and information will be obtained regarding the minimum separation distance required for work in this area. A minimum separation distance of 10 feet will be maintained at all times. Use of a spotter is required, at a minimum, to maintain proper clearance.

Water exposure to construction activities is a potential hazard. Heavy machinery, moving traffic and foot traffic must be watched out for. Workers on-site must wear hardhats and steel-toed boots. Barricades and caution tape will surround the construction. Adequate areas will be marked for traffic.

5.5.15 Excavation and Loading

Operation of excavation and loading equipment during site activities presents potential physical hazards to personnel. During all site activities, personal protective equipment (PPE) such as steel-toed shoes, safety glasses or goggles, and hard hats should be worn whenever such equipment is present. Personnel should be aware of the location and operation of excavation and loading equipment at all times and take precautions to avoid obstructing operation of the equipment.

During setup of the excavation and loading equipment, overhead power lines pose a danger of shock or electrocution if the power line is contacted or severed during site operations. Before work is conducted in areas where overhead lines could be encountered, the appropriate utility company will be notified, and information will be obtained regarding the minimum separation distance required for work in this area.

Water exposure to construction activities is a potential hazard. Heavy machinery, moving traffic and foot traffic need to be watched out for. Workers on-site need to wear hard hats and steel-toed boots. The construction will be surrounded by barricades and caution tape. Adequate areas will be marked for traffic.

Excavation and trenches are commonly found on hazardous waste site investigations or cleanups. Trenches are narrow excavations made below the surface of ground, generally deeper than they are wide and less than 15 feet in width. They are used in the risk assessment/feasibility study phase of a project and in the construction or cleanup phase. Activities in the trenches may include sampling buried containers; sampling subsurface soil, sludges, and other materials; and establishing control areas around extremely hot areas to prevent further contamination.

Employees working in trenches may be exposed to many hazards other than the chemicals that are to be removed in the cleanup operation. Workers may come in contact with underground utility lines or pipes, which can cause a potentially fatal electrical or fire hazard. Typical hazards include cave-in of

trench walls, oxygen-deficient atmospheres, accumulations of heavier-than-air gases or vapors, and objects falling on workers from a higher elevation. Slips and falls are also prevalent inside the trench or from ground level into the trench. Heavy equipment in operation around the trench can cause serious accidents if all employees are not observant of heavy equipment safety rules.

Injuries associated with trenching on hazardous waste sites can be minimized by following OSHA Construction Standards contained in Title 29 CFR 1926 Subpart P and Title 8 CCR, Sections 3203 and 1509 and Article 3, Sections 6507 and 6760.

Prior to excavation, the following precautions will be observed:

- Check the area to be excavated for any underground pipelines, transmission lines, etc. Consult with utility companies as needed.
- Determine soil composition (e.g., through soil sampling, soil maps, etc.) and other relevant site conditions, with special emphasis on conditions conducive to cave-ins.

During excavation and work in trenches, the following precautions will be observed:

- Follow standard construction safety procedures:
  - Heavy equipment safety.
  - Good housekeeping (e.g., keep tools and equipment clear of tops of trench walls).
  - Wear hard hats and other required protective equipment.
- Utilize ditches, dikes, pumps, or other means to keep surface water out of trenches.
- Water should not be allowed to accumulate in any excavation.
- Monitor the atmosphere in and around trenches on a regular basis to check for explosive, toxic, or otherwise dangerous gases and vapors:
  - Bear in mind that trenches represent a confined space hazard, as well as a low-lying area hazard.
  - Be especially cautious if heavier-than-air gases are encountered (i.e., gases having a vapor density in excess of one).
  - Utilize appropriate engineering controls (e.g., ventilation), work practices, and PPE as needed.
- Trenches in excess of 3 feet deep must have steps or ladders located so that all workers within the trench are within 25 feet of a place of exit [OSHA, Title 29 CFR 1926, Sections 651 and 652].
- Excavated material shall be placed at least 2 feet from the edges of excavations, unless effective barriers are in place to prevent the excavated material from falling into the excavation.

Precautions to prevent cave-in (as described below) should be strictly followed.

The following conditions increase the likelihood of cave-in:

- Soil materials composed of unconsolidated, uncompacted, and/or rounded particles. Special care must be used when trenching in areas which have previously been excavated and backfilled.
- Soils which have a high water content.
- Loading of trench walls by adjacent equipment, supplies, structures, backfill piles, etc.
- Vibration due to equipment operating near excavations.
- Trench walls which are steeper than the angle of repose of the material composing the walls.
- Deep trenches (i.e., high trench walls).

The following precautions should be used to prevent cave-ins in all trenches in excess of 5 feet deep. These precautions should also be used in trenches less than 5 feet deep whenever those site conditions just listed indicate the likelihood of a cave-in:

- *Sloping*. Trench walls should be sloped to the correct angle of repose.
- *Shoring*. Vertical trench walls (unless composed of solid rock) must be shored and braced, or restrained with movable trench boxes, to prevent cave-ins.
- Shoring systems must be designed by qualified person and meet accepted engineering requirements.
- Shoring must be installed from the top down and removed from the bottom up.
- Additional precautions (e.g., added shoring bracing or a flatter slope angle) should be utilized whenever site conditions indicate that they are needed to prevent cave-ins.
- Excavations should be inspected by a competent person daily, and after any event (e.g., rainfall) which may increase the likelihood of cave-in. If inspection indicates the potential for a cave-in, all work should cease until appropriate precautionary measures are taken.

Trenches which (1) will not be entered by workers; and (2) will be immediately backfilled (e.g., for permeable treatment walls) are exempted from the requirements listed here.

When the procedures outlined above are followed, trenching can be a useful control on a hazardous waste site. It should be emphasized that construction hazards must be avoided as much as chemical exposure hazards.

5.5.16 Confined Space Entry

This SHSP does not cover confined space entry. A separate site-specific confined space hazard plan must be prepared and implemented for any confined space work. The following is provided for informational purposes only.

Confined spaces may be described as having, but not being limited to, the following characteristics:

- Is large enough to permit a worker to enter and perform work;
- Has limited or restricted means of entry and exit; and,
- Is not equipped, designed, or intended for continuous human occupancy.

Confined spaces become permit-required confined spaces if any one of the following exists:

- Contains or has the potential to contain a hazardous atmosphere;
- Contains or has the potential to contain a material that could engulf or entrap a worker;
- Is configured such that a worker may become trapped, disoriented, or asphyxiated by wall configurations or smaller cross sections; and,
- Contains other safety or health hazards, such as energized equipment or moving parts.

Before workers may enter a permit-required confined space, an entry permit must be completed and approved by the project manager. All permit requirements for entry must be met (see Title 8 CCR sections 5157, 5158 and 5159 for details and guidance).

5.5.17 Elevated Work Platforms

When working at heights that expose workers to falls of greater than 6 feet, especially on sloping roofs and elevated platforms, the requirements of 8 CCR 1670 will be observed. Approved fall protection devices will be required. Elevated work platforms will be constructed, used, and maintained in accordance with Articles 21 and 22 of the Cal/OSHA Construction Safety Orders. Scaffolds and hoisting lines will be inspected daily by a competent person. All defective equipment may not be used for any purpose and will be replaced immediately.

5.6 Biological Hazards

The biological hazards that may be encountered at the site include possible exposure to:

Fur-bearing animals: Such animals (rats, skunks, raccoons) may potentially carry the rabies virus or ticks that may transmit Lyme disease to humans. Personnel should avoid contact and should not attempt to feed or touch such animals.

Poisonous reptiles: Snakes (e.g., rattlesnakes) are the most common poisonous reptiles. Personnel should avoid contact and areas that may harbor snake populations including high grass, shrubs, and crevices. If snakebite occurs, seek immediate medical attention.

Poisonous insects: Common examples include bees and wasps. Personnel should avoid contact with insects and their hives. Most bites and stings can be handled by first aid treatments. However, stings from insects such as bees and wasps can be fatal if a severe allergic reaction such as anaphylactic shock occurs. If the victim has medication to reverse the effects of the sting, it should be taken immediately. If the victim has a history of allergic reaction, they should be taken to the nearest medical facility. If the victim experiences a severe reaction, a constricting band should be placed between the sting and the heart. The bitten area should be kept below the heart if possible.

Spiders: The black widow and brown recluse spiders are the most venomous. Personnel should avoid contact with spiders and areas where they may hide. A bite by a black widow or brown recluse spider will require immediate medical attention.

Poisonous plants: Common examples include poison ivy and poison oak. Personnel should avoid contact. Long-sleeved shirts and pants will allow some protection against inadvertent contact. If contact occurs with a poisonous plant, all contaminated clothing should be removed and the exposed areas washed thoroughly with soap and water, followed by rubbing alcohol. Calamine lotion can be applied

if the rash is mild. Medical advice should be sought if a severe reaction occurs or there is a known history of previous sensitivity.

If any biological hazards are identified at the site, workers in the area should immediately notify the Site Health and Safety Supervisor (SHSS) and other site personnel. Workers who know they are sensitive to any specific biological hazard should not perform any task that would increase their risk of contact or an allergic reaction. Additionally, the SHSS should be informed of any heightened worker sensitivity to biological hazards.

6. AIR MONITORING PROTOCOLS

6.1 Monitoring During Site Operations

Air monitoring at the site will be conducted by the SHSS or other designated person according to the requirements of this SHSP and during designated site operations. Air monitoring will be performed where there may be a question of employee exposure to hazardous concentrations of hazardous substances. In general, air monitoring will be performed inside the work zone for employees likely to have the highest exposures to hazardous substances and health hazards likely to be present above PELs when soil and other materials/containers contaminated with the COCs are moved or disturbed. The aforementioned air monitoring will cover SET related site operations and personnel (i.e., site operations and personnel under the direction and control of SET). If expressly required by this SHSP, the SHSS may also perform air monitoring for other specific designated tasks performed by subcontractors or other third parties at the site that otherwise are not under the direction and or control of SET. Under these circumstances, SET assumes no additional site safety responsibility nor direction nor control for the aforementioned subcontractors or third parties except for the specific and limited assignment of performing air monitoring during the specific site operations expressly covered in this SHSP.

The air monitoring conducted by the SHSS or designee will be used to identify and quantify airborne levels of hazardous substances in order to determine the appropriate level of employee protection needed onsite and if possible to delineate work zones. Site-specific action level criteria must be established for all the instruments that may be used in making field health and safety determinations. Other data, such as the visible presence of contamination and/or odors, employee complaints, may also be used in making field health and safety decisions. As a result, the SHSS may establish exclusion zones and/or require a person to wear a respirator even though atmospheric air contaminant concentrations are below established SHSP action levels.

For sites containing petroleum hydrocarbons such as gasoline and related compounds, and/or certain chlorinated hydrocarbons such as tetrachloroethylene and/or trichloroethylene, monitoring can be accomplished using a PID with a 10.6 electron-volt lamp or equivalent calibrated to isobutylene. Monitoring for the aforementioned gases and vapors should be done at the source of emission as well as in the breathing zone of site personnel believed to represent the highest risk of exposure. The PID will be checked with a calibration gas standard (hexane or isobutylene) prior to each day's activities and at any other time when the instrument response is questionable. The instrument check procedure will be recorded in a logbook and initialed by the person performing the procedure. Other methods of air sampling using colorimetric detector tubes, and/or sampling pumps with charcoal tubes may also be used at the direction of the SHSS or if required by this SHSP. If benzene levels could exceed 1 part per million (ppm) for extended periods of time, colorimetric detector tubes specific for benzene will be

required. For certain chlorinated compounds (i.e. methyl chloroform), an 11.7 electron-volt lamp should be used in the PID. Consult the NIOSH pocket guide to chemical hazards for information on ionization potentials before selecting the appropriate electron-volt lamp.

For sites containing flammable or explosive gases and/or vapors (i.e. methane gas), and/or hydrogen sulfide and/or carbon monoxide, and/or oxygen deficiency atmospheres, monitoring will be accomplished using a four-gas direct reading instrument calibrated for methane, hydrogen sulfide, carbon monoxide and oxygen. Monitoring for the aforementioned gases and atmospheres should be done at the source as well as in the breathing zone of site personnel believed to represent the highest risk of exposure. The four-gas meter will be checked with a calibration gas standard prior to each day's activities and at any other time when the instrument response is questionable. The aforementioned instrument check procedure will be recorded in a logbook and initialed by the person performing the procedure.

For sites containing elevated concentrations of airborne dust that could exceed the applicable PEL, a real-time aerosol monitor will be used. Monitoring for the aforementioned dusts and atmospheres should be done in the breathing zone of site personnel believed to represent the highest risk of exposure. The instrument will be checked prior to each day's activities according to the manufacturers recommendations and procedures and at any other time when the instrument response is questionable. The aforementioned instrument check procedure will be recorded in a logbook and initialed by the person performing the procedure.

All monitoring instruments will be operated and maintained pursuant to the manufacturers written procedures. Instruments that exhibit an inappropriate field response or provide questionable results will not be used and sent out for servicing.

6.2 Air Monitoring Specifications

Instrument	Tasks	Action Levels [a]	PPE	Frequency [b]	Calibration
PID: OVM with 10.6eV lamp or equivalent	Sampling	<5 ppm >5 ppm >25 ppm	Level D Level C Stop work, contact HSM	Initially and periodically during task	Daily
CGI: MSA model 260 or 261 or equivalent	Drilling	0-10% 10-25% LEL >25% LEL	No explosion hazard Potential explosion hazard Explosion hazard; evacuate or vent	Continuous during advancement of boring or trench	Daily
Detector Tube: Draeger benzene specific 0.5/c (0.5 to 10 ppm range) with pre-tube, or equivalent	Sampling	<0.5 ppm 0.5-1 ppm >1 ppm	Level D Level C Level B	Initially and periodically when PID/FIB >1 ppm	Not applicable
Nose-Level Monitor [d]	Drilling	<85 dB(A) 85-120 dB(A) 120 dB(A)	No action required Hearing protection required Stop; re-evaluate	Initially and periodically during task	Daily
Dust Monitor: Miniram model PDM-3 or equivalent	Excavation, earthmoving	<0.05 mg/m3 >0.05 mg/m3	Level D Level C	Continuous during earthmoving tasks	Daily

a Action levels apply to sustained breathing-zone measurements above background.
b The exact frequency of monitoring depends on field conditions and is to be determined by SET; generally, every 5 to 15 minutes if acceptable; more frequently may be appropriate. Monitoring results should be recorded. Documentation should include instrument and calibration information, time, measurement results, personnel monitored, and place/location where measurement is taken (e.g., “breathing zone”, “at surface”, etc.).
c If the measured percent of O2 is less than 10, an accurate LEL reading will not be obtained. Percent LEL and percent O2 action levels apply only to ambient working atmospheres, and not to confined-space entry. More stringent percent LEL and O2 action levels are required for confined-space entry.
d Noise monitoring and audiometric testing also required.

6.3 Exposure Monitoring Plan

Before any field activities commence, wind direction indicator may be used to ensure the direction that personnel will move when instructed to do so or in an emergency. This wind measurement will be followed by the sampling of the general background levels of gasoline, VOCs, dust etc.

For areas where chemical hazards are suspected, the first person entering the work zone will carry the appropriate instrument and monitor concentration levels in the work area before anyone else is allowed into the work zone. Thereafter, periodic and ongoing air monitoring will be conducted during the following site operations in the work zone and for personnel likely to have the highest exposures to the COCs: drilling and sampling.

6.3.1 Petroleum Vapors Associated with Gasoline

The table below summarizes the various hydrocarbon vapor criteria and appropriate responses to potential vapor hazards. There are certain components, such as benzene vapors, that present significant hazards and must be properly controlled. Criteria for the use of respiratory protection are based on preventing potential exposures to benzene.

Hydrocarbon Vapor Criteria and Response	
Total Hydrocarbon Concentrations above Background Levels (parts per million by volume [ppmv] as measured by PID)	Response
<30 ppmv total hydrocarbon concentration (THC), verify that benzene concentration is below 1 ppm	Limited hazard, no special action.
30–100 ppmv THC for more than two minutes in general work area	Stop work, move upwind, monitor perimeter or don level C (half-face organic vapor respirator with P-100 filter) and continue work or wait until levels decrease.
100–900 ppmv THC in general work area	Wear full-face organic vapor respirators with P-100 filter in work area.
>900 ppmv THC in general work area	Stop work; procedures must be implemented to subdue excessive vapor levels.

7. PROJECT SAFETY PERSONNEL

7.1 Project Manager

The PM is an SET employee who has the responsibility and authority to direct all site operations covered under this SHSP. The PM has the authority to discipline personnel under his/her direction/control and the authority to shut down or stop any site operation under his/her direction/control. In general, the PM is responsible for the following:

- To ensure that a comprehensive work plan has been prepared which addresses the tasks and objectives of the site operations and the logistics and resources required to reach those tasks and objectives;
- To document all work progress;
- To execute the site work plan and SHSP;
- To ensure that a SHSP has been prepared for all appropriate site operations;
- To ensure that the SHSS has been designated and is onsite during all site operations covered by this SHSP;
- To take appropriate action in consultation with the SHSS, upon becoming aware of any deficiency in the implementation of SHSP;
- To become the incident commander during any site emergency until relieved by the appropriate chain in command.

In the event that the PM becomes aware of a deficiency in the implementation of the SHSP, he/she will take appropriate action by consulting with the SHSS.

7.2 Site Health and Safety Supervisor

The SHSS is the individual located at the site, which is responsible to SET and has the authority and knowledge necessary to implement this SHSP and verify compliance with applicable safety and health requirements. In general, the SHSS is responsible for personnel at the site who are under the direction and control of SET. In addition, the SHSS is responsible for the following:

- To observe personnel under the direction and control of SET as well as authorized visitors for indications of impaired health due to contaminant exposure, heat stress, or other hazards;
- To evaluate whether site conditions present hazards not previously predicted or expected;
- To inspect Personal Protective Equipment and verify its use;
- To assist the PM with onsite implementation of this SHSP, including performing air monitoring, maintaining safety equipment supplies and setting up site control and decontamination stations;
- To make daily assessments of health and safety practices at the site and administer the health and safety program outlined in this SHSP.
- To conduct the required tailgate safety meetings for all designated personnel permitted to enter the contaminated area (*i.e.*, the exclusion zone) regarding potential hazards, personal hygiene principles, PPE and emergency response procedures; and;
- To investigate all accidents, health and safety complaints, and violations/infractions of safety rules and/or the requirements of this SHSP and report findings to PM;
- To inform the PM of all safety and health hazards at the site that pose a serious and/or imminent threat; and
- To coordinate emergency response procedures and site evacuations.

The SHSS will have authority to suspend work or modify work practices under the direction and control of SET for safety reasons and to dismiss individuals under the direction and control of SET whose conduct on site endangers the health and safety of others. The SHSS will report directly to the PM.

8. PERSONAL PROTECTIVE EQUIPMENT

The purpose of PPE is to isolate or protect personnel from the chemical and physical hazards that may be encountered at during site activities. The amount and type of PPE required will be based on the nature of the hazard encountered or anticipated.

Personnel under the direction and control of SET will be provided with appropriate personal safety equipment and protective clothing as determined by the SHSS. In general, depending on the level of protection required by the SHSS for site operations, the following required PPE will be worn by all site personnel under the control and direction of the SHSS.

8.1 Level D Protection

- Work shirt and long pants (short pants may be worn with the approval of the PM);
- ANSI-approved steel-toed boots or safety shoes;

- ANSI-approved safety glasses; and,
- ANSI-approved hardhat.

Modified level D may be required by the SHSS and can consist of some and/or all of the following equipment:

- Outer nitrile gloves and inner nitrile surgical gloves when direct contact with chemically affected soils or groundwater is anticipated *(e.g.*, nitrile surgical gloves may be used for collecting or classifying samples as long as they are removed and disposed of immediately after each sampling event);
- Chemical-resistant clothing (*e.g.*, Tyvek or polycoated Tyvek coveralls) when contact with chemically affected soils or groundwater is anticipated. Paper coveralls are permissible when working in a dry dust environment;
- Safety shoes/boots with protective overboots or knee-high PVC polyblend boots when direct contact with chemically affected soils is anticipated;
- Hearing protection; and/or,
- Sturdy work gloves.

8.2 Level C Protection

If air monitoring or other site conditions indicates that the site-specific action levels defined above are exceeded, all workers under the direction and control of SET who are impacted by the elevated air monitoring readings will upgrade their PPE to level C. In addition to the protective equipment specified for level D, level C includes the use of the following equipment:

- NIOSH approved half-face air-purifying respirator (APR) or full face APR equipped with a P100 filter in combination with organic vapor cartridge; the use of any respirators must also be in compliance with the requirements of a written respiratory protection plan pursuant to Title 8 CCR section 5144.
- Chemical-resistant clothing (*e.g.*, Tyvek, polycoated Tyvek, or Saranex coveralls) when contact with chemically affected soils or groundwater is anticipated. Paper coveralls are permissible when working in a dry dust environment.
- Outer nitrile gloves and inner nitrile surgical gloves when direct contact with chemically affected soils or groundwater is anticipated (*e.g.*, nitrile surgical gloves may be used for collecting or classifying samples as long as they are removed and disposed of immediately after each sampling event).
- Safety shoes/boots with protective overboots or knee-high PVC polyblend boots when direct contact with chemically affected soils is anticipated.

8.3 Respiratory Protection

The standard respirator assigned to SET employees for level C work involving gasoline and/or chlorinated solvents consists of a half-face air-purifying respirator. The standard issue cartridge consists of the organic vapor cartridge in combination with a P100 filter.

All personnel under the direction and control of SET who have been assigned a respirator will comply with the written requirements of SET's written respiratory protection program. It is the responsibility of the SHSS to ensure compliance with SET's respiratory protection program. This written program which meets the minimum requirements of Title 8 CCR section 5144 includes but is not limited to the following:

- Individuals required to wear respiratory protection are responsible for inspecting and maintaining their own respirator.
- Procedures for cleaning, inspecting, maintenance, and storage of respirators.
- Individuals required to wear respiratory protection must have medical clearance from a physician or other licensed health care professional.
- Individuals required and approved to wear respiratory protection must be fit-tested at least annually.
- Individuals required to wear respiratory protection must be trained and must conduct a positive and negative pressure check each time they don the respirator.

9. INJURY ILLNESS PREVENTION PROGRAM

SET maintains a written Injury and Illness Prevention Program (IIPP) in addition to this site-specific SHSP. The IIPP addresses procedures for identifying, preventing and correcting workplace hazards. Although the IIPP is not site-specific, appropriate information that is applicable to this SHSP should be referred and used as supplemental information. Some of the information found in the IIPP that may apply to this SHSP includes but is not limited to the following:

- General safe work practices;
- Safety inspections;
- Tailgate safety meetings; and
- Methods for communicating safety concerns and complaints.

9.1 Medical Clearance and Monitoring

Access inside the specified work area will be limited to authorized personnel. Only personnel under the direction and control of SET and other subcontractors and individuals designated and authorized by the client, will be admitted to the work site. Only those workers possessing evidence of physician's authorization to conduct hazardous waste activities will be permitted in the work area designated as the exclusion zone. All project personnel who may be required to wear respirators must provide evidence that they have been cleared by a physician to wear respirators. Other medical surveillance procedures that may be required pursuant to Title 8 CCR section 5192 (f) will implemented and followed.

9.2 Safety Training and Communication

Individuals under the direction and control of SET will not participate in field activities until they have been trained to the level required by their job function and responsibility. The specific types of training required include the following:

- 24 or 40-hour initial OSHA Hazwoper training and annual 8-hr refresher training;
- Site specific hazard training;
- Proof of these required trainings must be kept onsite for each worker participating in field and supervisory activities; and
- Other health and safety trainings may also be conducted on pertinent topics depending on the job task such as fire safety and use of fire extinguishers, lockout/tagout and electrical safety, heat/cold stress, hand/power tools, back safety, slips, trips and falls, traffic safety, driving safety, etc. These training subjects may be included in the daily tailgate safety training.

9.3 Project Orientation

A copy of this SHSP must be made available to each individual under the direction and control of SET and all such personnel who will work on the site are required to read and become familiar with the pertinent and applicable sections this SHSP. Prior to commencing work, individuals must read, understand, and accept the requirements set forth in the SHSP.

To ensure personnel are informed of the potential hazards associated with the project, all personnel under the direction and control of SET as well as subcontractors retained by SET must attend a project initiation meeting prior to commencing fieldwork. The meeting will be scheduled and conducted by the PM, or designated project safety personnel. The project initiation meeting will include information on the site emergency response procedures, and any potential fire, explosion, health, safety or other hazards that have been identified by SET. An attendance sheet describing the contents of the project orientation will be signed and dated by each participant.

9.4 Daily Tailgate Meeting

All personnel under the direction and control of SET will attend a daily tailgate safety meeting prior to commencing a new day of work. The tailgate training will be provided by SET PM or designee. Topics for discussion may include, but not be limited to:

- Discussion of current work activities and associated safety and health hazards;
- Available air monitoring or site characterization data which relates to worker exposure;
- The type and frequency of environmental and personal monitoring (if any) to be performed;
- Task-specific levels of protection and anticipated potential for upgrading;
- Review of emergency procedures; and,
- Subcontractors retained by SET who are not otherwise under the direction and control of SET are required to hold their own tailgate safety meetings, but they are encouraged to also attend and participate in the aforementioned SET tailgate safety meetings.

9.5 Safety Inspections

The SHSS will conduct a safety inspection of the work site before each day's activities to verify compliance with the requirements of the SHSP. All issues of noncompliance must be addressed and immediately corrected, if possible.

9.6 Posting Requirements

The following information will be posted if applicable or will be readily available onsite:

- OSHA poster;
- Proposition 65 Notification;
- Emergency phone numbers; and
- Directions to the nearest hospital.

9.7 Required Site Safety Equipment

Safety equipment items required onsite include the following:

- A multi-class fire extinguisher. If the travel distance to the extinguisher from any point in the site where work is in progress is greater than 50 feet (15.3 m), then additional fire extinguishers will be furnished and strategically located so that the travel distance does not exceed 50 feet. Subcontractor employees will be provided appropriate training regarding the use of fire extinguishers and the hazards involved with incipient stage fire fighting.
- A portable emergency eyewash station if eye hazards are present;
- First-aid kit;
- Bottle of wash water;
- Construction tape, barriers, portable fencing etc. to delineate work zone;
- Spill containment equipment;
- Decontamination equipment; and,
- A vehicle will be kept onsite when personnel are working for the transport of slightly injured personnel to the hospital. Severely injured personnel must only be transported by paramedics.

9.8 Hazard Communication Program

All SET employees who may be exposed to hazardous chemicals in the work place must be provided training and education regarding these hazards. The hazardous communication program provides information about hazardous substances and their control in the workplace. A list identifying the current hazardous chemicals present in the workplace will be kept onsite along with the corresponding material safety data sheet for each chemical.

10. SITE CONTROL AND DECONTAMINATION PROCEDURES

In order to control activities and movements of personnel and equipment at the site, a site control program will be set up and implemented by SHSS. The basic components of a site control program include the establishment of work zones and site security. Decontamination procedures will be implemented to protect personnel and the surrounding community from the hazardous substances encountered during site activities.

10.1 Site Work Zones

The following established work zones will be established:

- Exclusion Zone; this is the area where the contaminated soil, groundwater, or other materials are disturbed, moved and/or handled;
- Contamination Reduction Zone; and
- Support Zone.

The aforementioned work zones will be established based on the extent of anticipated contamination, projected work activities, and the presence or absence of non-project personnel. The physical dimensions and applicability of work zones will be determined by the SHSS for each site operation based geography, available space, nature of job activity and hazards present. Where possible, decontamination and support zone will be set up upwind of exclusion zone. Within these zones, prescribed operations will occur using appropriate PPE. Movement between zones will be controlled at checkpoints.

Considerable judgment is needed to maintain a safe working area for each zone, balanced against practical work considerations. Physical and topographical barriers may constrain ideal locations. Field measurements combined with climatic conditions may, in part, determine the control zone distances. Even when work is performed in an area that does not require the use of chemical-resistant clothing, work zone procedures may still be necessary to limit the movement of personnel and retain adequate site control.

10.2 Site Security

Personnel and vehicle entry into the aforementioned work zones will be restricted by the SHSS or their designee. The SHSS or his/her designee will be responsible for site security while the designated site operations are being conducted. Site security at all other times will depend on site conditions and will be determined by the PM and/or client. Site security procedures include, but are not limited to the limiting of site access to authorized personnel only.

The SHSS will ensure that visitors entering work zones under the direction and control of SET have the appropriate training, and have read this SHSP. The SHSS will keep a daily security log including entry/exits log, vehicle log, results of security checks, and details of any security problems.

10.3 Decontamination Procedures

Decontamination procedures will be implemented as necessary by the SHSS to protect personnel from hazardous substances that may contaminate and/or eventually permeate protective clothing, respiratory protection equipment, tools, vehicles, and other equipment used onsite; and to minimize the transfer of harmful materials into clean areas; to prevent mixing of incompatible chemicals; and to protect the community by preventing uncontrolled transportation of contaminants from the site.

10.3.1 Personnel Decontamination

Personnel may encounter potentially hazardous compounds while performing work tasks. If so, decontamination needs to take place using an Alconox wash, followed by a rinse with clean water.

Standard decontamination procedures for levels C and D are as follows and take place inside the Contamination Reduction zone unless otherwise noted:

- Equipment and tool drop inside the exclusion zone;
- Boot cover and outer glove wash and rinse inside the exclusion zone;
- Boot cover and outer glove removal;
- Suit wash and rinse followed by suit removal;
- Inner glove wash and rinse;
- Respirator removal;
- Inner glove removal; and
- Field wash of hands and face inside support zone.

Workers should employ only those steps that are applicable with level of PPE worn and extent of contamination present and the SHSS will provide site-specific guidance on the required decontamination procedures. The SHSS will maintain adequate quantities of clean water to be used for personal decontamination *(i.e.*, field wash of hands and face), secondary containment (i.e. plastic tarps) and wash and rinse containers (i.e. buckets, wading pools etc.). PPE, wash and rinse solutions that are contaminated with site hazards will disposed of as hazardous waste in appropriate containers. Non-disposable items may need to be sanitized before reuse. Each site worker is responsible for the maintenance, decontamination, and sanitizing of their own PPE.

10.3.2 Equipment Decontamination

In certain circumstances, field equipment and vehicles may require decontamination as follows:

- An equipment decontamination pad or area shall be designated for cleaning large equipment;
- All sampling devices will be decontaminated by scrubbing or wiping a decontamination solution such as Alconox and water on the device. A clean water rinse shall be applied;
- Tools that are difficult to decontaminate will be kept in the exclusion zone and handled only by workers using the appropriate PPE;
- Following decontamination of equipment using steam cleaning, a final steam/water rinse shall be applied;
- The spent solutions, wash materials, brushes, and the like shall, until shown otherwise, be considered contaminated and so treated; and,
- All porous equipment, which is believed to be contaminated, shall be disposed of as hazardous waste.

Each worker must follow the above procedures to prevent the transport of chemically affected materials offsite.

11. EMERGENCY RESPONSE PROCEDURES

Emergency situations can include: a fire or explosion, an environmental release, damage of an underground conduit during excavation or drilling or accident or injury to one of the field personnel.

In the event of an emergency, site personnel will signal distress with three blasts of a horn (a vehicle horn will be sufficient). At the sound of three horn blasts, other personnel onsite must immediately come to the assistance of the person honking. For incidents such as a fire or explosion or major release of hazardous gas, evacuation of the work area will be completed. The SHSS/PM and/or their designee will be notified immediately in the event of an evacuation.

11.1 Incident Reporting Procedure

The quick and accurate transfer of information to all appropriate personnel is critical in the event of an emergency. The SHSS will coordinate all initial emergency response activities until relieved by the appropriate chain of command (i.e. PM, fire department, hazmat, police, client etc.).

To simplify the response procedure, an emergency can be reported by simply dialing 911. This approach can also be used for incidents requiring police or fire department assistance, or for medical emergencies.

When making such a 911 call, be sure to give the following information to the dispatcher:

- Your name, *i.e.*, "John Smith."
- The nature of the incident, *i.e.*, "Fire."
- The location of the incident, *i.e.*, "Street location and nearest intersection. The more specific you can make the address, the better.
- What you need, *i.e.*, "Fire Department & First Aid."
- If you are able, where you will meet emergency responders, *i.e.*, "At the front gate weigh station."
- If applicable, a call back number or your pager number, *e.g.*, "I'll be at the scene; my pager number is 123-4567."
- Is the situation stabilized? - *e.g.*, "I have the fire under control."
- Is anyone injured or in need of emergency assistance? - *e.g.*, "A mechanic working on a pump was burned."

11.2 Site Emergency Coordinator

The Site Emergency Coordinator is:

Jeff Sharp, cell phone: 310-505-3675

Alternate:

Jeff Sharp, cell phone: 310-505-3675

11.3 Fire or Explosion

In the event of fire or explosion, personnel should contact the local fire department immediately by dialing 911. When representatives of the fire department arrive, the SHSS, or designated representative, will advise the commanding fire officer of the location, nature, and identification of any hazardous

materials onsite. Only trained, experienced fire fighters should attempt to extinguish substantial fires at the site. Site personnel should not attempt to fight fires, unless properly trained and equipped to do so.

11.4 Underground Utilities

In the event that an underground conduit is damaged during excavation or drilling, mechanized equipment will immediately be shut off until the nature of the piping that was damaged can be determined. Depending on the nature of the broken conduit (e.g., natural gas, water, or electricity), the appropriate local utility will need to be contacted.

11.5 Evacuation

The SHSS will designate evacuation routes and refuge areas to be used in the event of an emergency. Site personnel will stay upwind from vapors or smoke and upgradient from spills. If workers are in an exclusion or contamination reduction zone at the start of an emergency, they should exit through the established decontamination areas whenever possible. If evacuation cannot be done through an established decontamination area, site personnel will go to the nearest safe location and remove contaminated clothing there or, if possible, leave it near the exclusion zone. Personnel will assemble at the predetermined refuge following evacuation and decontamination. The SHSS, or designated representative, will count and identify site personnel to verify that all have been evacuated safely.

11.6 Hazardous Material Spill

If a hazardous material spill occurs, site personnel should locate the source of the spill and determine the hazard it poses to the health and safety of site workers and the public. An attempt to stop or reduce the flow can be made, if it can be done without risk to personnel. Otherwise, the spill area should be isolated and entry by unauthorized personnel not allowed. All sources of ignition that are located within 100 feet of the spill, including vehicle engines, should be de-energized. If the spill is of such nature or extent that it cannot be safely contained, or poses an imminent threat to human health or the environment, an emergency cleanup contractor should be called as soon as possible. Additional spill containment measures are listed below.

- Containers may be up righted or rotated to stop the flow of liquids. This step should be accomplished as soon as the spill or leak occurs, providing it is safe to do so.
- Sorbent pads, booms, or adjacent soil may be used to dike or berm the spill, or to solidify liquids.
- Sorbent pads, soil, or booms, if used, should be placed in appropriate containers after use, pending disposal.
- Contaminated tools and equipment should also be collected for subsequent cleaning or disposal.

11.7 Communication Procedures

Emergency procedures listed in this plan are designed to give the field team instructions in handling medical emergencies, fires and explosions, and excessive emissions during the operational activities. These emergency procedures will be carefully reviewed with the field team during the health and safety training session.

Personnel in the exclusion zone should remain within sight of the SHSS.

Repeated horn blasts will be the emergency signal to indicate that all personnel should leave the exclusion zone.

The following standard hand signals will be used when vocal communication is not possible.

Hands gripping throat	**Out of air, can't breathe**
Grip partner's wrist or both hands around waist	**Leave area immediately**
Hands on top of head	**Need assistance**
Thumbs up	**OK, I am all right, I understand**
Thumbs down	**No, negative**

11.8 Emergency Safety Equipment

The following emergency and first aid equipment will be made available at the project work zone and/or the contaminant reduction zone, as appropriate.

- Fire Extinguishers with multipurpose dry chemical (rating of 20-A:120-B:C);
- Cell phone with extra battery;
- Industrial first aid kit; and
- Portable eye wash solution.

11.9 Directions to Hospital

LA County Harbor-UCLA Medical Center
1000 West Carson Street, Torrance, California
310-222-2345

To reach the hospital from the site:

1. Start out heading south on Normandie Avenue and proceed for 0.7 miles,

2. Turn left (east) on West Carson Street and proceed for 0.4 miles,

3. Turn right (south) for 141 feet,

4. Turn left (east) for 243 feet,

5. The hospital is on the right (south) after 233 feet.

Directions to the hospital and a route map are provided in Section 1.3 of this SHSP.

12. SAFE WORK PRACTICES

To maintain strong safety awareness and enforce safe procedures, the following personnel requirements and prohibitions have been established for the site:

- The work area will be restricted to authorized visitors and personnel. Daily tailgate safety meetings will be held on a daily basis at the beginning of each shift to discuss site conditions, field tasks being performed, planned modifications, and work concerns.
- All personnel entering the site will be required to identify themselves to the SHSS. Personnel who have not attended a tailgate safety meeting on that day will be required to do so with the SHSS or other authorized representative. Personnel unfamiliar with the site will be informed of site hazards and instructed to avoid contact with contaminated surfaces, soils, sample materials, or related equipment, and will be instructed to remain a minimum of 50 feet (15.3 m) upwind of all active work areas.
- All personnel will adhere to the decontamination procedures outlined in this SHSP.
- Removal of materials from protective clothing or equipment by blowing, shaking, or any other means that may disperse contaminated materials into the air is prohibited.
- Legible precautionary labels will be affixed to containers of raw materials, intermediate products, mixtures, waste debris, and contaminated PPE.
- Contaminated PPE will not be removed from the site until it has been cleaned or properly packaged and labeled.
- Hands will be thoroughly washed upon leaving contaminated or suspected contaminated areas before eating, drinking, or other such activity.
- All hazardous wastes, soil samples, and other contaminated materials, which are removed from the site, will be accompanied by appropriate shipping papers.
- No running or horseplay.
- Medicine and alcohol can worsen the effects from exposure to toxic chemicals. Prescribed drugs will not be taken by personnel on operations where the potential for absorption, inhalation, or ingestion of toxic substances exists, unless specifically approved by a qualified physician. Alcoholic beverage intake will not be allowed during breaks.
- Safety devices on equipment must be left intact and used as designed.
- Equipment and tools will be kept clean and in good repair, and used only for their intended purpose.
- Respiratory devices may not be worn with beards or long sideburns, or under other conditions that prevent a proper seal.
- Accidents and/or injuries associated with work at the site will be immediately reported to the SHSS. If necessary, an incident report will be initiated by the SHSS.
- The “buddy system” will be used whenever appropriate.
- To prevent head injury, ANSI-approved hard hats will be worn at all times while workers are in areas where overhead obstructions or falling objects may be encountered.
- To prevent eye injuries, workers must wear ANSI-approved safety glasses during field activities.

13. SITE SAFETY CHECKLIST

Site Safety Checklist	Yes	No	N/A	Remarks
Written Site Health and Safety Plan (SHSP) is onsite				_____
SHSP has been read and signed by all site personnel including visitors				_____
Daily tailgate safety meetings have been held and documented				_____
Site personnel have appropriate training and medical clearance				_____
Site zones are set up and observed where appropriate				_____
Access to the work area limited to authorized personnel				_____
Decontamination procedures are followed and match the requirements of the SHSP				_____
Decontamination stations (including hand/ face wash) are set up and used				_____
Personal Protective Equipment (PPE) used matches SHSP requirements				_____
Hearing protection used where appropriate				_____
Respirators are properly cleaned and stored				_____
Emergency and first aid equipment is onsite as described in SHSP				_____
Drinking water is readily available				_____
Phone is readily accessible for emergency use				_____
Proper drum and material handling techniques are used				_____
Drums and waste containers are labeled appropriately				_____
Extension cords are grounded and protected from water and vehicle				_____
Ground-fault circuit interrupters are used with electrical equipment				_____
Tools and equipment are in good working order				_____
Lighting is adequate				_____

14. TAILGATE SAFETY MEETING

Instructions: To be completed by supervisor prior to start of new job, when changes in work procedures occur, or when additional hazards are present.

Project no. & name: _____ **Task no.** _____

Project address: _____ **Date:** _____

Work activity: _____ **Time:** _____

Safety topics/hazards discussed:

_____

_____

_____

_____

Informal training conducted (name, topics):

_____

_____

_____

_____

_____

Attendee names and signatures:

Supervisor's signature and date: _____

15. NEAR-MISS REPORT

Project no. & name: _____ Task no. _____

Project address: _____

Date/time of near-miss: _____

Name of Preparer: _____ Date: _____

The following is an account of what happened:

I believe this could have resulted in injury and/or damage to (check all that apply):

☐ Personnel ☐ Property ☐ Equipment

If these circumstances occurred:

I recommend the following actions to prevent this from occurring in the future:

REVIEWED BY:

Project Manager: _____ Date: _____

Site Health and Safety Supervisor: _____ Date: _____

16. EMPLOYEE'S REPORT OF INJURY

(To be completed by employee only)

Employee name: _____ Male _____ Female _____
Last First Middle

Date of birth: _____ Home phone: ( ) _____

Home address: _____

City: _____ State: _____ Zip code: _____

Present title: _____ AA&A employee since: _____

Social Security no.: _____ – _____ – _____ Weekly salary: _____

Accident location: _____
Address Area (loading dock, bathroom, etc.)

Date of accident: _____ Time of accident: _____

Describe fully how accident occurred (including events that occurred immediately before accident):

_____

Describe bodily injury sustained (be specific about body part[s] affected):

_____

Recommendation on how to prevent this accident from recurring: _____

_____

Name of supervisor: _____ Phone: _____
Last First

Name(s) of witness(es): _____ Phone: _____
(Attach report[s] of witness[es])

When did you report the accident to your supervisor? _____

To whom did you report the injury? _____

Do you require medical attention? Yes _____ No _____ Maybe _____

Name of your treating physician: _____ Phone: _____

Employee signature: _____ Date: _____

17. ACCIDENT WITNESS STATEMENT

(To be completed by accident witness)

Name of injured employee: _____
Last First Middle

Name of witness: _____ Phone: _____
Last First Middle

Job title: _____ SET employee (Y/N) since: _____

Home address of witness: _____

City: _____ State: _____ Zip code _____

Accident location: _____
Address Area (loading dock, bathroom, etc.)

Date of accident: _____ Time of accident: _____

Describe fully how accident occurred (including events that occurred immediately before accident):

_____

_____

_____

_____

Describe bodily injury sustained (be specific about body part[s] affected): _____

_____

_____

_____

Recommendation on how to prevent this accident from recurring: _____

_____

Name of witness's supervisor: _____ Phone: _____
Last First

Witness signature: _____ Date: _____

18. SUPERVISOR'S ACCIDENT INVESTIGATION

(To be completed by employee's supervisor or other responsible administrative official)

Location where accident occurred		Employer's premises: Y ☐ N ☐ Jobsite: Y ☐ N ☐	Date of accident or illness
Who was injured?		☐ Employee ☐ Non-employee	Time of accident AM ☐ PM ☐
Length of time with firm	Job title or occupation	Dept. normally assigned to	How long has employee worked at job where injury or illness occurred?
What property/equipment was damaged?			Property/equipment owned by:
What was employee doing when injury/illness occurred? What machine or tool was being used? What type of operation?			
How did injury/illness occur? List all objects and substances involved.			
Part(s) of body affected/injured?		Any prior physical conditions? If so, what? Y ☐ N ☐	
Nature and extent of injury/illness and property damaged (be specific)			

Supervisor's corrective action to ensure this type of accident does not recur: _____

_____

_____

Was employee trained in appropriate use of personal protective equipment/proper safety procedures? Y ☐ N☐
Was employee cautioned for failure to use personal protective equipment/proper safety procedures?... Y ☐ N☐
Did employee promptly report the injury/illness? ..... Y ☐ N☐
Is there modified duty available? ..... Y ☐ N☐

19. APPROVAL / DISTRIBUTION OF SITE HEALTH AND SAFETY PLAN

Position	Name	Signature
Project Manager Tel: 310-505-3675	Jeff Sharp	_____
Site Health and Safety Supervisor Tel: 310-505-3675	Jeff Sharp	_____

The following have read this plan and understand its provisions:

Company	Name	Signature	Date

20. ACKNOWLEDGMENT OF POTENTIAL CHEMICAL HAZARDS

The companies identified below shall be responsible for the implementation of their own health and safety plans. Each member of the companies shall be 40-hour trained per 29 CFR 1910.120, including annual refreshers.

SET used a general knowledge of site history or specific data from prior site investigations to identify potential chemical hazards, which may be present at the site. Specific chemical criteria used by SET and provided to the company are shown below.

Chemical Criteria	Range in Concentration

SET's health and safety monitoring and communication to the subcontractors will be limited to the following information:

- ➔ vapor concentrations in breathing space
- ➔ dermal protection

Company	Name (print)	Signature	Date

By signing above, the subcontractors acknowledge that they have their own SHSPs in effect on this project. The subcontractors' SHSPs cover their own procedures, over which SET has no control. However, SET will advise subcontractors of any environmental conditions (such as vapor concentrations) which are monitored by SET.

APPENDIX C

Quality Assurance Project Plan

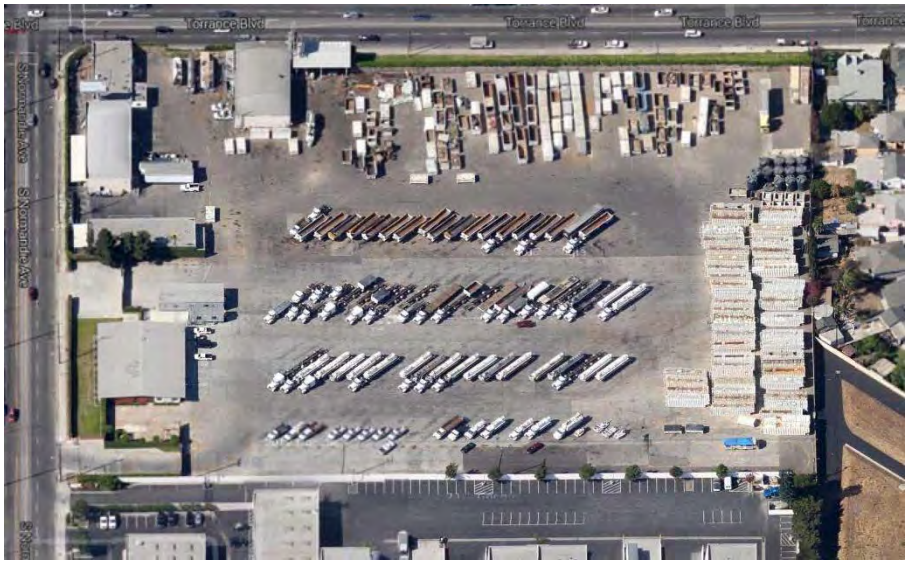
Sharp
Environmental
Technologies, Inc.

839 S. Beacon Street, #1967, San Pedro, California 90733 Tel (310) 505-3675 Fax (310) 548-3935

QUALITY ASSURANCE PROJECT PLAN

ECOLOGY CONTROL INDUSTRIES

20846 Normandie Avenue
Torrance, California 90502



Prepared for

MR. RON FLURY
ECOLOGY CONTROL INDUSTRIES
20846 Normandie Avenue
Torrance, California 90502

July 1, 2014

PROFESSIONAL CERTIFICATION

This plan has been prepared by

Jeffrey E. Sharp, PG, CEG
Supervising Geologist
Certified Engineering Geologist

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1. INTRODUCTION

This *Quality Assurance Project Plan* (QAPP) identifies the appropriate controls and responsibilities to ensure that collection and evaluation of field data throughout the environmental site assessment and removal action, as outlined in Sharp Environmental Technologies, Inc.'s, (SET's) *Removal Action Work Plan* (hereinafter referred to as the "work plan"), are carried out in a scientifically valid and defensible manner. United States Environmental Protection Agency (USEPA or EPA) policy requires a QAPP for all environmental data collection projects mandated or supported by the USEPA through regulations or other formalized means. The purpose of this QAPP is to identify the methods to be employed to establish technical accuracy, precision, and validity of data that is generated at the site.

The objective of the work is to delineate subsurface impacts and verify removal of contaminants of concern from the area to be excavated as identified in previous investigations. The work plan will be implemented under the oversight of the Department of Toxic Substance Control (DTSC). All field activities and sampling work to be conducted during the project will be performed by California-certified contractors with supervision of a Professional Geologist (PG) or a Professional Engineer (PE) registered in the State of California.

This QAPP is based on USEPA guidance and presents specific management, functional activities, and quality assurance and quality control (QA/QC) activities to achieve the data quality objectives presented in this QAPP.

1.1 Recent Site Investigations

Recent assessment reports for the site include the following:

- *Environmental Site Assessment* (Haley & Aldrich, Inc. (HAI), 2005)
- *Draft Soil Investigation Report* (Earth Tech, 2006)
- *Summary Report - Human Health Risk Evaluation* (HAI, 2006)
- *Revised Soil Investigation Report, Historic Storm Water Pathway* (Earth Tech, 2008)
- *Final Human Health Risk Assessment* (Innovative Technical Solutions, Inc. [ITSI]
- *Phase II – Environmental Site Assessment* (SET, 2014)

SET's work plan is based on the findings, conclusions, and recommendations of these previous investigations.

2. PROJECT BACKGROUND

The site is located at Ecology Control Industries (ECI), 20846 Normandie Avenue in Torrance, California 90502. The work will be performed at the eastern property boundary within the ECI property identified as the historic storm water drainage channel.

The site consists of a 7.34-acre property currently occupied by ECI as a vehicle and equipment dispatch yard and a temporary hazardous and non-hazardous waste storage facility. The site contains one 5,400-

square foot building located along the northern property line and is approximately 90 percent covered with either concrete or paved asphalt, with the remaining area consisting of unpaved soils.

Prior to approximately 1969, the historic storm water pathway in the vicinity of the ECI property was an unlined linear topographic depression that acted as a local surface drainage feature. The drainage channel passed under Torrance Boulevard and traversed the eastern portion of the ECI Property before continuing east through what is now the closed Royal Boulevard Landfill (ARMCO Site).

During the late 1960s and early 1970s, the drainage ditch was replaced by the Los Angeles County Flood Control District (LACFCD) with an underground concrete storm water conveyance system. Project No. 685 (also known as the Kenwood Drain), a concrete box culvert, replaced the historic storm water drainage ditch from 204th Street, along Kenwood Avenue, through the ECI property, and eventually emptying into the Torrance Lateral, a large, open, and concrete-lined drainage channel. The LACFCD maintains an easement for Project 685 within the properties it traverses, including the ECI property.

In 2005, pesticides and polychlorinated biphenyls (PCBs) were detected in soil by ECI as part of due diligence activities prior to sale of the property. The due diligence sampling activities detected several chemicals present in soils at concentrations exceeding residential action levels, including: dichlorodiphenyl-dichloroethane (DDD), dichlordiphenyl-dichloroethylene (DDE), dichlorodiphenyl-trichloroethane (DDT), chlordane, petroleum hydrocarbons, and PCBs. The sum of DDT, DDE, and DDD concentrations (referred to collectively as total DDT) were detected in subsurface soil samples collected from the eastern and southeastern portions of the ECI property in concentrations up to 325 mg/kg. Although contended by Montrose, EPA has attributed the presence of total DDT in these soils to former Montrose chemical manufacturing activities. From 1947 to 1982, Montrose manufactured technical grade DDT at a plant located approximately 0.5 miles north/northwest of the ECI property. EPA believes that DDT-impacted soils at the ECI property may be the result of contaminated storm water runoff from the former Montrose plant. The ECI property is located "down stream" from the former Montrose plant property, by way of the historical storm water drainage pathway.

Based on the data collected during previous investigations, preparation of a removal action work plan was recommended to address the removal of soils impacted with contaminants of concern at the site.

This QAPP has been prepared as an Appendix and supplement to the *Removal Action Work Plan*.

3. PROJECT ORGANIZATION, RESPONSIBILITIES, TRAINING

A well-organized project team, combined with adequate experience and proper training, will help to assure consistent quality throughout the project. This section describes the key members and their responsibilities within the project team organization.

3.1 Project Organization

The project team involved with the work consists of the following:

- Senior project manager
- Project manager

- Quality assurance manager (QAM)
- Health and safety manager
- Site safety and health supervisor (SSHS)

3.2 Responsibilities

The specific responsibilities of the team members listed above are described in this section. One individual may assume more than one responsibility.

3.2.1 Senior Project Manager

The senior project manager oversees all project operations and delegates authority and resolves conflicts and problems. The senior project manager is a PG registered in the State of California or a PE and is responsible for the following:

- Ensuring that all contract requirements are met;
- Ensuring that the scope of work in the work plan and this QAPP are being implemented;
- Establishing initial scheduling of subcontractors and project schedule;
- Establishing and maintaining communication between the Client, the Agency, and the Project Team;
- Providing technical oversight, reviewing correspondence and e-mail communication, and reviewing the draft and final reports;
- Providing guidance to the project team as needed; and
- Performing duties of the project manager and QAM as needed.

3.2.2 Project Manager

The project manager manages the day-to-day activities in the field and is responsible for the following:

- Maintaining project budget and schedule;
- Establishing and maintaining communication between the Client, the Agency, and the Project Team;
- Implementing the data quality objectives (Section 4.2);
- Providing technical oversight and preparing correspondence, e-mail communication, and draft and final reports;
- Providing guidance to the project team and subcontractors, and acting as main contact to the subcontractors; and
- Performing duties of the QAM as needed.

The project manager is also responsible for implementing various aspects of the field program and providing necessary resources to the project team to allow adequate response to all requirements of the investigation. The project manager will direct all on-site activities, including those of subcontractors, and will ensure that all procedures described in the QAPP are adhered to in the field.

The project manager will ensure that field equipment is properly calibrated and maintained, and that individual samples are properly handled and documented to allow tracing the possession and handling of the samples from collection to laboratory receipt. The project manager will also be responsible for the laboratory pickup and delivery schedules. Additionally, the project manager will be in contact with the senior project manager, as needed, to discuss questions and problems, as well as continually providing site progress information.

3.2.3 Quality Assurance Manager

Responsibilities of the project QAM will include, at a minimum:

- Ensuring that all field methods and sampling and QA protocols identified in the work plan and this QAPP are followed;
- Ensuring that all protocols described in the QAPP are met;
- Providing guidance or assistance and resolving problems on QA/QC topics;
- Verifying that the specified data collection methods comply with all QA/QC requirements and will yield data of desired quality and integrity;
- Reviewing, evaluating, and approving quality-related changes to the field sampling activities and QAPP and conducting field audits;
- Ensuring that all variations from the QAPP are identified and appropriate alternate actions are taken, and providing assistance to the project manager with regard to the scope of work;
- Communicating regularly with the project manager to ensure the progress of the QA tasks;
- Serving as the main contact for all project QA matters, and providing guidance on appropriate procedures to the project manager and support personnel;
- Conducting laboratory evaluations to ensure that analyses are performed in accordance with the QAPP;
- Coordinating with the laboratory and the project manager on QA/QC matters;
- Reviewing the draft laboratory data prior to issuance of the final laboratory report; and
- Coordinating data validation and review activities.

3.2.4 Health and Safety Manager

The project health and safety manager is responsible for developing, instituting, coordinating, and supervising the health and safety program on this project. The project health and safety manager's responsibilities include:

- Ensuring that the site health and safety plan (SHSP) complies with all federal, state, and local health requirements;
- Coordinating with the SSHS on all modifications to the SHSP and providing consultation, when required;
- Preparing materials to be used in the training program and ensuring that the SSHS is knowledgeable in all components of the SHSP;
- Conducting periodic on-site visits to verify that site personnel adhere to the site safety requirements;

- Establishing and maintaining communication between the SSHS and project manager; and
- Providing guidance on appropriate corrective action procedures to the project manager and support personnel.

3.2.5 Site Safety and Health Supervisor

The SSHS is responsible for implementation of the SHSP and has the authority to correct and change site control measures and the required health and safety protection. The SSHS has primary on-site enforcement authority, as delegated by the project manager, for the policies and provisions of the health and safety program and the SHSP. The SSHS will also hold daily tailgate health and safety meetings with all on-site subcontractors.

3.3 Subcontractors

The selected laboratory (Jones Environmental Laboratory of Fullerton, California) for analysis of soil-gas samples provided a copy of their *Laboratory Quality Assurance Manual* that is included in Appendix A. The laboratory is certified by the State of California, Department of Health Services, to conduct analysis of environmental samples.

The prime laboratory for sample analysis will assume responsibility for providing all analytical services specified in the laboratory subcontracting agreement. Should it be agreed in writing that the laboratory may use an additional subcontract laboratory facility, the primary laboratory will supply to the project manager the standard operating procedures (SOPs) and QA plans from the other laboratory that is used upon request. The laboratory will be responsible for communicating all analytical guidelines and QC requirements of the project to this laboratory. Both QA Officers will monitor the data from each subcontract laboratory and correct any QC nonconformance.

All other subcontractors, including the direct-push and hollow-stem auger drilling (as needed), and disposal subcontractors, will be identified prior to the commencement of fieldwork.

3.4 Training

All personnel scheduled for work will be trained in compliance with the Occupational Safety and Health Administration (OSHA) requirements (29 Code of Federal Regulations [CFR] 1910.120). Personnel will be experienced in hazardous waste site work, use of personal protective equipment, and emergency response procedures.

All field personnel assigned to this project will receive a copy of the work plan, the SHSP, and this QAPP in a timely manner to allow for a sufficient review period. The on-site subcontractors will receive the SHSP as well as information from the work plan pertaining to their specific on-site duties. A field team orientation and briefing will be held prior to the initiation of fieldwork on each day to acquaint personnel with the site, assign field responsibilities, and familiarize personnel with any potential site hazards (e.g., traffic, electrical, mechanical, etc.).

4. PROJECT OBJECTIVES

4.1 Specific Project Objectives

The specific project objectives of the work are to establish the amount, concentrations and extent of hazardous substances that may be present in soil and soil gas beneath the site.

Soil-gas sampling will be conducted to define the previously detected VOC concentrations at the site.

As indicated in the work plan, the work will consist of a soil-gas sampling program consisting of a minimum of 11 boring locations with collection of soil-gas samples for VOCs by EPA Method 8260 at depths of 15, 25, and 35 feet below ground surface (bgs). Two of the borings in the vicinity of the sewer will be advanced to 15 feet bgs and sampled at 5 and 15 feet bgs. At least one soil sample from each boring will be analyzed for VOCs by EPA Method 8260.

The results from the investigation will be used to determine the most cost-effective remediation option.

4.2 Data Quality Objectives

Data quality objectives (DQOs) are qualitative and quantitative statements developed by data users to specify the quality of data needed from a particular data collection activity to support specific decisions or regulatory actions. The three-stage process for developing DQOs, as described by USEPA guidance, is based on the following:

1. Identifying project objectives;
2. Specifying the data necessary to meet project objectives; and
3. Describing the methods that will yield data of acceptable quality and quantity to support required decisions.

The results of the first stage of the DQO development process are described in Section 4.1, above. The second stage is described in the work plan. The third stage of the process is the basis for preparing this QAPP and includes appropriate field techniques; appropriate analytical methods; and measurement objectives for precision, accuracy, representativeness, completeness, and comparability. These parameters are discussed below.

4.3 Data Quality Assessment Criteria

The overall QA objective for this project is to develop and implement procedures for field sampling, chain-of-custody, laboratory analysis, and reporting that will provide results, which are scientifically valid and legally defensible. Specific procedures for sampling, chain-of-custody, laboratory instrument calibration, laboratory analysis, reporting of data, internal quality control, preventive maintenance of field equipment, and corrective action are described in the work plan and other sections of this QAPP.

All laboratory analyses will be performed using approved EPA methods, to include all QA/QC requirements. Additionally, 100 percent of the data will be validated by EPA Level II criteria to ensure reliable data of defensible quality. Field monitoring will be performed using instruments that have

been calibrated at the beginning of each sampling day. Calibration information will be documented in the field logbook and/or calibration log.

4.3.1 Precision

Precision measures the reproducibility of repetitive measurements. It is strictly defined as the degree of mutual agreement among independent measurements as the result of repeated application of the sample process under similar conditions.

Analytical precision is a measurement of the variability associated with duplicate or replicate analyses of the same sample in the laboratory, and is determined by analysis of laboratory quality control samples, such as duplicate control samples, matrix spike duplicates, or sample duplicates. If the recoveries of analytes in the specified control samples are comparable within established control limits, then precision is within limits.

Total precision is a measurement of the variability associated with the entire sampling and analytical process. It is determined by analysis of duplicate or replicate field samples, and measures variability introduced by both the laboratory and field operations. Field duplicate samples are analyzed to assess field and analytical precision.

Duplicate results are assessed using the relative percent difference (RPD) between duplicate measurements. In general, the acceptance criteria for laboratory quality control samples (matrix spike/matrix spike duplicates [MS/MSD]) are dependent on the EPA method specified in Chapter 1 of EPA SW-846 (USEPA 1996, Final Update IV 2008). The acceptance criteria between primary and duplicate soil field samples will be five times the reporting limit, or less than of equal to an RPD value of 100. The RPD will be calculated as follows:

$$\text{RPD} = [(X_1 - X_2)/X][100]$$

where X_1 is the analyte concentration in the primary sample, X_2 is the analyte concentration in the duplicate sample, and X is the average analyte concentration of the primary and the duplicate sample $(X_1 + X_2)/2$.

Field precision will indicate information regarding sample acquisition, handling, preservation, shipping, storage, and if analyzed in the field, sample preparation, and analytical procedures. Passive soil-gas sample analysis will be used only as a field-screening tool during the work.

4.3.2 Accuracy

Accuracy is a statistical measurement of correctness and includes components of random error (variability due to imprecision) and systematic error. It reflects the total error associated with a measurement. A measurement is accurate when the value reported does not differ from the true value or known concentration of the spike or standard.

Accuracy of laboratory analyses will be assessed by laboratory control samples (LCS), surrogate standards, MS/MSDs, and initial and continuing calibrations of instruments. Laboratory accuracy is expressed as the percent recovery (%R). Accuracy limits are statistically generated by the laboratory or required by specified EPA methods. The calculation of percent recovery is provided below:

$$\% R = 100(X_S - X)/T$$

where X_S is the measured value of the spiked sample, X is the measured value of the un-spiked sample, and T is the true value of the spike solution added.

Accuracy in the field is assessed through the use of field equipment blanks and adherence to all sample handling, preservation, and holding time requirements. Analysis of blanks will monitor errors associated with the sampling process, field contamination, sample preservation, and sample handling.

4.4 Representativeness

Representativeness is the degree to which data accurately and precisely represent selected characteristics of the media sampled. Representativeness of data collection is addressed by careful preparation of sampling and analysis programs. This QAPP, together with the work plan, addresses representativeness by specifying sufficient and proper numbers and locations of samples; incorporating appropriate sampling methodologies; specifying proper sample collection techniques and decontamination procedures; selecting appropriate laboratory methods to prepare samples; and establishing proper field and laboratory QA/QC procedures.

Representative sampling of the soil matrix is addressed in Section 7.5.

4.5 Completeness

Completeness is the amount of valid data obtained compared to the amount that was expected under ideal conditions. The number of valid results divided by the number of possible results, expressed as a percentage, determines the completeness of the data set. The field objective for completeness is to recover 100 percent of the planned field measurements and samples to support field efforts. Laboratory completeness is a measure of the number of valid measurements obtained from all the measurements taken in the project. The objective for laboratory completeness for this project will be 100 percent. The acceptance criteria for field and laboratory completeness are greater than 90 percent.

The formula for calculation of completeness is presented, as follows:

$$\% \text{ Completeness} = 100 \text{ (number of valid results/number of expected results)}$$

4.6 Comparability

Comparability is an expression of confidence with which one data set can be compared to another. The objective of comparability is to ensure that data developed during the investigation are comparable to site knowledge and adequately address applicable criteria or standards established by the USEPA and the Cal/EPA. This QAPP addresses comparability by specifying field and laboratory methods that are consistent with the current standards of practice as approved by the USEPA and the Cal/EPA. Field and laboratory procedures are discussed in the work plan.

Field procedures are provided to ensure that tests performed at various locations across the site are conducted using accepted procedures, in a consistent manner between locations and over time, and include appropriate QA/QC procedures (i.e., instrument calibration) to ensure the validity of the data. Any limitations on the comparability of test data will be noted, and test results will be evaluated on

that basis. Sampling procedures for environmental matrices are provided in the work plan to ensure that samples are collected using accepted field techniques and in a consistent manner between locations and over time.

All soil samples collected will be analyzed using consistent protocols for holding times, sample preparation, analytical methods, and QC as described in the approved EPA analytical procedures. Table 1 (Tables section) presents method, quantity, container, preservation requirements, holding time, and reporting and method detection limits for soil and soil-gas samples.

The data will be reduced, reported, and documented consistently throughout the study. All parameters for soil analytical data will be reported using a consistent set of units for each sample collected. Any deviations from established protocols will be noted in the report so that data comparability can be maintained. However, no deviations are anticipated at this time.

5. QUALITY CONTROL ELEMENTS

This section presents QC requirements relevant to assessment of field operations and analysis of environmental samples that will be followed during all project analytical activities. The purpose of the QC program is to produce data of known quality that satisfy the project objectives and that meet or exceed the requirements of the standard methods of analysis.

5.1 Assessment Oversight

This section presents the internal and external checks that have been built into this project to assure that:

- Elements of this QAPP and the work plan have been correctly implemented as prescribed;
- The quality of the data generated is adequate and satisfies the DQOs that have been identified in this QAPP; and
- Corrective actions, when needed, are implemented in a timely manner and their effectiveness is confirmed.

The project manager may also identify additional assessment activities to be performed during the course of the project based upon findings of the planned assessment activities described below.

In general, internal assessments of field operations will be conducted by the project manager and/or other designated members of the project team where appropriate. The assessment activities will evaluate field operations performance issues such as:

- Are sampling operations being conducted in accordance with the work plan?
- Are the samples labeled accurately?
- Are the chain-of-custody records complete and accurate?
- Are the field notes being completed accurately?

Planned assessment activities to evaluate these and other field operations performance issues include surveillance (frequent review) of sample collection documentation, sample handling records (chain-of-

custody forms), field memoranda, and field measurements. Unannounced field operations audits may also be performed. The results of assessment activities will be reported to the project manager by the team member conducting the assessment activity. Assessment activity reports will include the findings and identification of corrective actions taken or planned.

5.2 Quality Control Procedures

It is critical that the chemical data be of the highest confidence and quality. Consequently, strict QA/QC procedures will be adhered to. These procedures include

- Adherence to strict protocols for field sampling and decontamination procedures;
- Collection and laboratory analysis of appropriate field equipment blanks to monitor for contamination of samples in the field or the laboratory;
- Laboratory analysis of MS/MSD, field duplicate, and equipment blank samples to evaluate analytical precision and accuracy; and
- Attainment of completeness goals.

5.3 Equipment Decontamination

Non-dedicated equipment will be decontaminated before and after each sample is collected. The equipment will be washed in a non-phosphate detergent (e.g., Alconox) and potable water, using a brush as necessary, rinsed in potable water, and then rinsed in distilled water. Decontamination of personal protective equipment (PPE) is addressed in the SHSP.

5.4 Standards

Standards used for calibration or to prepare samples will be certified by the National Institute of Standards and Technology (NIST), USEPA, or other equivalent source. The standards will be current. The expiration date will be established by the manufacturer, or based on chemical stability, possibility of contamination, and environmental and storage conditions. Standards will be labeled with expiration dates, and will reference primary standard sources, if applicable. Expired standards will be properly discarded.

5.5 Supplies

All supplies will be inspected prior to their use in the field or laboratory. The descriptions for sample collection and analysis contained in the methods will be used as a guideline for establishing the acceptance criteria for supplies. A current inventory and appropriate storage system for these materials will assure their integrity prior to use. Efficiency and purity of supplies will be monitored through the use of standards and blank samples.

5.6 Holding Time Compliance

Sample preparation and analysis will be completed within the required method holding time. Holding time begins at the time of sample collection (see summary of holding times in Table 1). The following definitions of extraction and analysis compliance are used to assess holding times:

- Preparation or extraction completion – completion of the sample preparation process as described in the applicable method, prior to any necessary extract cleanup; and
- Analysis completion – completion of all analytical runs, including dilutions, second-column confirmations, and any required re-analyses.

5.7 Preventive Maintenance

The project manager is responsible for documenting the maintenance of all field equipment (e.g., photo-ionization detector [PID]) as prescribed in the manufacturer's specifications. Trained personnel will perform scheduled maintenance. Procedures specific to the calibration, use, and maintenance of field equipment are presented in the manufacturer's manual or specifications. The analytical laboratory is responsible for all analytical equipment calibration and maintenance as described in their laboratory QA plan. Subcontractors are responsible for maintenance of all equipment needed to carry out subcontracted duties.

6. QUALITY CONTROL SAMPLES

The purpose of this QA/QC program is to produce data of known quality that satisfy the project objectives and that meet or exceed the requirements of the standard methods of analysis. This program provides a mechanism for ongoing control and evaluation of data quality measurements through the use of QC materials. QA and QC samples will be collected as part of the overall QA/QC program.

6.1 Field Quality Control Samples

Field control samples for this work include duplicate samples as discussed below and summarized in Table 2.

6.1.1 Duplicate Samples

Duplicate field samples will be collected for the purpose of assessing the precision of the primary laboratory. Duplicate samples are collected in precisely the same manner as the original sample and are collected from the same location as the corresponding primary field sample. Agreement between duplicate sample results will indicate acceptable sampling and analytical precision. The precision goal for field duplicate analyses will be less than or equal to 100 percent RPD.

6.1.1.1 Duplicate Soil-gas Samples

Field duplicate soil-gas samples will be collected at a minimum frequency of one per 10 primary samples submitted to the laboratory.

6.1.2 Assessment of Field Contamination

Field contamination is assessed through the collection of equipment blanks and trip blanks. The strategy for the blank samples is designed to provide documentation on the efficacy of equipment decontamination procedures (equipment blanks) as well as identify cross contamination during sample handling or transportation (trip blanks).

6.1.2.1 Field Equipment Blanks

A field equipment blank is a sample that is prepared in the field by passing de-ionized or distilled water through or over the decontaminated sampling equipment used that day. The water is then collected and analyzed as a sample. The field equipment blank gives an indication of contamination from field procedures (i.e., cross-contamination). Field equipment blanks will be collected at a minimum frequency of one per day when sample collection equipment is decontaminated in the field. The field equipment blanks will be analyzed using the same analyses requested for the associated primary samples collected (Table 2).

The equipment rinse blanks will be preserved, packaged, and sealed in the manner described for the environmental samples. A separate sample number will be assigned to each sample and submitted blind to the laboratory.

6.1.2.2 Trip Blanks

Trip blanks will be prepared to evaluate if the shipping and handling procedures are introducing contaminants into the samples, and if cross contamination in the form of VOC migration has occurred between the collected samples. A minimum of one trip blank will be submitted to the laboratory for analysis with every shipment of samples for VOC analysis.

Trip blanks for soil samples are laboratory-preserved 40- ml vials free of VOCs and are shipped with the empty sampling containers to the site or sampling area prior to sampling. The sealed trip blanks are not opened in the field and are shipped to the laboratory in the same cooler with the samples collected for VOC analyses. The trip blanks will be preserved, packaged, and sealed in the manner described for the environmental samples. A separate sample number will be assigned to each trip sample and it will be submitted blind to the laboratory.

Trip blanks for soil samples are not required at this stage of the work. None of the soil samples will be shipped in containers. VOC analysis will be performed on-site immediately after sample collection.

6.2 Laboratory QA/QC Samples

Laboratory QA/QC samples that will be analyzed during the proposed implementation include method blanks, LCS, MS samples, and potentially laboratory duplicates. These are discussed below.

6.2.1 Laboratory Control Samples

A LCS is a known matrix that has been spiked with a known concentration of specific target analytes. It is used to demonstrate the accuracy of the analytical process. A LCS will be analyzed at a frequency of one per preparation or analytical batch not to exceed 20 samples.

6.2.2 Laboratory Reagent Blanks/Method Blanks

A laboratory reagent blank is deionized, distilled water that is extracted by the laboratory and analyzed as a sample. Analysis of the reagent blank indicates potential sources of contamination from laboratory procedures (e.g., contaminated reagents, improperly cleaned laboratory equipment, or persistent

contamination due to presence of certain compounds in the ambient laboratory air). A reagent blank may be analyzed at least once each day for each method utilized by the laboratory for that day.

A laboratory method blank is clean soil or sand that is prepared or extracted by the laboratory and analyzed as a sample. Analysis of the method blank indicates potential sources of contamination from laboratory procedures. A method blank will be analyzed with each batch of samples for each method utilized by the laboratory.

6.2.3 Matrix Spike Samples

Matrix spikes are performed by the analytical laboratory to evaluate the efficiency of the sample extraction and analysis procedures, and are necessary because matrix interference (that is, interference from the sample matrix, water or soil) may have a widely varying impact on the accuracy and precision of the extraction analysis. The matrix spike is prepared by the addition of known quantities of target compounds to a sample. The sample is extracted and analyzed. The results of the analysis are compared with the known additions and a matrix spike recovery is calculated, giving an evaluation of the accuracy of the extraction and analysis procedures. Matrix spike recoveries are reviewed to check that they are within the laboratory's acceptable range. However, the acceptable ranges vary widely with both sample matrix and analytical method.

MS and MSDs (or LCS/laboratory control sample duplicates [LCSD], as applicable) will be analyzed by the laboratory at a frequency of at least one per 20 per batch. Typically, matrix spikes are performed in duplicate in order to evaluate the precision of the procedures as well as the accuracy. Precision objectives (represented by agreement between MS and MSD recoveries) and accuracy objectives (represented by matrix spike recovery results) are based on statistically generated limits established annually by the analytical laboratory. It is important to note that these objectives are to be viewed as goals, not as criteria. If matrix bias is suspected, the associated data will be qualified and the direction of the bias indicated in the data validation report.

A summary of all QA/QC samples to be collected in the field and analyzed in the laboratory is provided in Table 3.

6.2.4 Laboratory Duplicates

Duplicate samples are used to assess precision in the analytical method. An additional aliquot is extracted from a sample and analyzed using the identical procedures. The results are then compared to assess the precision. Duplicates may be of three kinds: LCSDs, MSDs, and laboratory sample duplicates. These duplicates are often used to evaluate and fulfill the precision DQO when there is matrix interference with the MS/MSD recoveries.

7. SAMPLING AND ANALYTICAL PROCEDURES

The defensibility of data is dependent on the use of well-defined, accepted sampling procedures. This section describes the sampling and handling procedures that will be followed for all soil samples.

7.1 Sampling Procedures

Collection of soil samples of high integrity is important to the quality of chemical data to be generated. To this end, strict field procedures have been developed as general descriptions of field methods that will be employed at various locations during phases of the field investigation. The procedures include

- Field sampling procedures;
- Sample containers, preservation and holding times;
- Sample packaging and shipment; and
- Sample documentation procedures.

The field sampling procedures for soil samples are identified in the work plan. The sample containers, preservation, and holding times are documented in Table 1 of this QAPP. The sample packaging, shipment, and documentation procedures are outlined below.

7.2 Sample Packaging and Shipment

To identify and manage soil samples obtained in the field, a sample label will be affixed to each sample container. The sample labels will include the following information:

- Project number;
- Site name;
- Sample identification (sample location number and depth);
- Date and time of collection; and
- Preservative, if any.

Following collection and labeling, soil samples for off-site analysis will be placed in a zipper-lock plastic bag and then immediately placed in a chilled sample cooler for temporary storage. The following protocol will be followed for packaging of soil samples to be analyzed off-site:

- A self-adhesive custody seal will be placed across the lid of each sample container.
- Samples to be shipped will be placed in the cooler and packed with packaging materials to minimize the potential for disturbance and/or breakage of the sample containers.
- Double-bagged ice will be placed in the coolers to keep samples at a chilled temperature during transport to the analytical laboratory (no chilling is required for passive soil-gas samplers).
- The chain-of-custody form will be placed in a water-resistant plastic bag and taped on the inside of the lid of the cooler.

Every effort will be made to transport the samples to the analytical laboratory at the end of each sampling day. However, if the sampling runs late and the laboratory is closed, the samples will be stored overnight in a secured location under appropriate chain-of-custody procedures, and the samples will be shipped to the laboratory the next day. Prior to overnight storage, the coolers will be restocked with new ice to maintain the samples in a chilled state.

Sample packaging for off-site shipment is not expected for this phase of the project. All samples will be analyzed on-site immediately after collection.

7.3 Field and Sample Documentation

7.3.1 Field Logs

Site visitation reports will document where, when, how, and from whom any vital project information was obtained. Log entries for site visitation reports will be complete and accurate enough to permit reconstruction of field activities. All information will be legible, written in black or blue ink, and will be factual, objective, and free of personal opinions or other terminology that might prove inappropriate. If an error is made, corrections will be made by crossing a line through the error and entering the correct information. Corrections will be dated and initialed. No entries will be obliterated or rendered unreadable. Site visitation reports will be compiled in a field folder.

Entries in a site visitation report will include, at a minimum, the following for each site visitation:

- Site name, address or location, and date;
- Recorder's name;
- Time of site arrival/entry on site and time of site departure;
- Summary of any on-site meetings;
- Deviations from sampling plans and site safety plans;
- Changes in personnel and responsibilities as well as reasons for the changes;
- Levels of safety protection; and
- Calibration readings for any equipment used and equipment model and serial number.

At a minimum, the following information will be recorded in the site visitation report or chain-of-custody form during the collection of each sample:

- Sample identification number;
- Sampler's name;
- Date and time of sample collection;
- Sample container;
- Type of sample (i.e., matrix);
- Type of preservation;
- Type of sampling equipment used;
- Instrument readings (e.g., PID);
- Recipient laboratory; and
- Field observations and details important to analysis or integrity of samples (e.g., heavy rain, odor, color).

A field folder will include the following forms:

- Daily field reports;

- Field maps showing proposed soil sampling locations and site measurements;
- Copies of chain-of-custody records;
- Field equipment calibration readings; and
- Drum inventory records, if any.

7.3.2 Photographs

Photographs will be taken during field activities. They will serve to verify information entered in the field logbook. When a photograph is taken, the following information will be written in the field logs or will be recorded in a separate field photography log:

- Time, date, location, and if appropriate, weather conditions;
- Description of the subject photographed; and
- Name of person taking the photograph.

7.3.3 Chain-of-Custody Records

Chain-of-custody records are used to document sample collection and shipment to the laboratory for analysis. Chain-of-custody record forms will be provided by the laboratory and will accompany all sample shipments for analyses. Forms will be completed and submitted with the samples for each laboratory and each shipment. If multiple coolers are submitted to one or more laboratories on a single day, chain-of-custody forms will be completed and sent with the samples for each cooler. The chain-of-custody record will identify the contents of each shipment and maintain the custodial integrity of the samples. Generally, a sample is considered to be in someone's custody if it is either in someone's physical possession, in someone's view, locked up, or kept in a secured area that is restricted to authorized personnel. Until the samples are shipped, the custody of the samples will be the responsibility of SET. The project manager or designee will sign the chain-of-custody form in the "relinquished by" box and note date, time, and air bill number. A copy will be retained in SET's project files.

7.4 Analytical Procedures

The analytical methods used for this project are primarily USEPA-approved methods and are listed in the work plan. The target parameters, analytical methods, quantity, container, preservation requirements, holding time, and method detection limits are provided in Table 1.

7.4.1 Method Detection Limit

The MDL is the minimum concentration of an analyte, or compound, that can be measured and reported with 99 percent confidence that the concentration is greater than zero. MDLs are established for each method, matrix and analyte, and for each instrument used to analyze project samples. The MDLs established by the Cal/EPA will be applied for this project. The USEPA requires that MDLs be established on an annual basis. A list of MDLs for each compound is included with the laboratory's Quality Assurance Manual (Appendix A).

8. DATA MANAGEMENT

The objective of data management is to establish procedures to be used during the field investigations for documenting, tracking, and presenting investigative data. Data generated during the field investigations, as well as previously existing data, will be used to form the basis for conclusions and recommendations. Efficient utilization and comprehensive consideration of available data requires that the data be properly organized for review. Organization of the data shall be planned prior to actual collection to assure the generation of identifiable and useable data. This section contains procedures necessary to assure the collection of sufficient data for accurate validation of raw data and transfer of validated data to a data management system with which it can be evaluated with minimal effort. This section also describes the operating practices to be followed by personnel during the collecting and reporting of data.

8.1.1 Data Recording

Observations made and measurements collected in the field are recorded on appropriate data sheets or in field memoranda. Soil sample data will be summarized in tabular form in the reports and will include sample location and depth where applicable. Upon completion of the field investigation, the data will be entered into a spreadsheet and tabulated for evaluation and presentation in the reports. Copies of the selected original data records will be attached to the report as appendices. Data used for analysis, presentation, and reporting on the project will be stored in an electronic format to facilitate the following processes:

- Tracking chain-of-custody and sample identification data;
- Reviewing and evaluating analytical data against project-specific criteria; and
- Production of data tables.

Each set of chemical analytical data reported by the laboratory will be submitted as a complete and single, electronic data deliverable (EDD). It is expected that the laboratory will perform a comparison of electronic data with the hard copy report prior to submittal to ensure that the EDD and hard copy data are identical. SET will check the EDD against the hard copy for detected analytes. The EDD should be submitted on a diskette or via email and will be revised as necessary.

8.1.2 Data Verification

Data verification is an integral part of the QA program and consists of reviewing and assessing the quality of data. Analytical data submitted by the laboratory in EDD form will be verified and, if necessary, exception reports will be produced. Qualified results will be reflected in the reports.

8.1.3 Data Transmittal

The integration of field data is completed by entering the data from field forms into a spreadsheet format . The spreadsheet is reviewed for completeness and accuracy by a geologist or engineer by comparing the electronic spreadsheet to the original field data. Analytical laboratory data are provided in both a hard copy and in EDD format. The electronic data are provided in a specified format that will be uploaded to intermediate files, reviewed for completeness and accuracy by the project manager before use by the project team.

8.1.4 Data Tracking

The project manager is ultimately responsible for activities conducted for this project, including data management. The project manager has the authority to enforce proper procedures as outlined in this plan and to implement corrective procedures to assure the accurate and timely flow and transfer of data. The project manager will review the final data reports.

Data will be generated from the geological investigations (drilling and sampling) and environmental sampling and analysis. The generators of data (geologists, samplers, and chemical analysts) will be responsible for accurate and complete documentation of data required under the task, and for assuring that these data are presented to their supervisor in a timely manner.

The project manager will be responsible for the day-to-day monitoring of data collected in the field. He/she assures that data are collected in the format specified in the task's work plan, assigns sample designations, and routes data to the project files. At least one copy of project documents will be retained by the project manager for use during the investigation. Original documents will be maintained in the project file.

The project manager will be responsible for the day-to-day monitoring of activities related to the generation and reporting of chemical data. The project manager ensures that samples are analyzed according to the specified procedures; that data are verified; and that the data are properly coded, checked for accuracy, and entered into the data management system. The project manager assures the data are then routed to the project files.

8.1.5 Data Storage and Retrieval

A project file will be established for the storage of original data, historical data, written documents, and data collected or generated during this work. SET maintains a central filing system in which the project file will be located. Documents relating to the project shall be controlled to assure proper distribution, filing, and retrieval. The document control shall also assure that revisions are properly recorded, distributed, and filed. The project manager maintains overall responsibility for the project files and assures that appropriate documents are filed. Once filed, documents are available to SET staff and may be removed from file for use by signing out the material.

9. INSTRUMENT OPERATION AND CALIBRATION PROCEDURES

9.1 Field Equipment Calibration Procedures and Frequency

Calibration procedures and operational and maintenance procedures of the instruments are specified in the manufacturers' instructions. All field equipment will be checked for proper operation and calibrated daily at the site prior to use. Equipment that operated improperly will be replaced as needed. A list of equipment used, calibration, service, and repairs (if applicable) will be documented in the site visitation report.

9.2 Laboratory Instrument Calibration

Analytical instruments will be calibrated in accordance with the procedures specified in the applicable method. All analytes that are reported must be present in the initial and continuing calibrations, and these calibrations must meet the acceptance criteria specified in the reference method. Records of standard preparation and instrument calibration will be maintained. Records will unambiguously trace the preparation of standards and their use in calibration and quantitation of sample results.

At the onset of analysis, instrument calibrations will be checked using all of the analytes of interest. This applies equally to multi-response analytes. At a minimum, calibration criteria will satisfy method requirements. Analyte concentrations can be determined with either calibration curves or response factors, as defined in the method. Guidance provided in SW-846 should be considered to determine appropriate evaluation procedures. The calibration data will be available upon request. Laboratory instrument and equipment calibration procedures and preparation of calibration standards are included in the laboratory subcontractor's QA manuals (Appendix A).

10. INTERNAL QUALITY CONTROL CHECKS

10.1 Field Quality Control Checks

QC procedures will include calibrating the instruments, and checking the reproducibility of the measurements by taking multiple readings on a single sample or reference standard.

10.2 Laboratory Quality Control Checks

The laboratories utilized in this project will have QC programs that are established to ensure the reliability and validity of the analysis performed at the laboratories. All analytical procedures are documented in writing as laboratory SOPs, or in respective EPA-approved methods, and each SOP or method includes a QC section that addresses the minimum QC requirements for the procedure. The internal QC checks might differ slightly for each individual procedure.

All data obtained will be properly recorded. The data package will include a full package capable of allowing the recipient to reconstruct QC information and compare it to QC criteria. Any samples analyzed in nonconformance with the QC criteria will be reanalyzed by the laboratory, if sufficient volume is available. It is expected that sufficient volumes/weights of samples will be collected to allow for reanalysis when necessary.

11. DATA QUALITY ASSESSMENT AND REPORTING

This section presents reporting requirements relevant to the data produced during all project analytical activities.

11.1 Data Reduction

Recording of field data is discussed in Section 7.3.1. Field data and chain-of-custody records will be reviewed by the project manager to evaluate completeness of the field records and appropriateness of the field methods employed.

All data produced during the investigation will be organized as tables of analytical results and stored in the project contractor's computer network system, as part of the project file reports. Hard copies of all analytical data will be stored in the project file.

Soil analytical results will be reported in micrograms per kilogram (µg/kg) or mg/kg. Soil-gas analytical results will be reported in micrograms per liter (µg/l). The procedures used to calculate concentrations will be the same as those specified in each analytical methodology used. Internal data reduction procedures by the laboratories will be performed in accordance with the laboratory QA manuals.

11.2 Data Validation

Field data validation will be accomplished by the QAM or equivalent. All laboratory data will be validated by the laboratory analyst, the laboratory QA/QC officer, and laboratory director. All field and laboratory data will be reviewed by the QAM (or designated staff) for completeness and accuracy and to determine whether the DQOs have been met. A preliminary review upon initial receipt of data will be performed to verify that all necessary paperwork (chain-of-custody forms, analytical reports, laboratory personnel signatures) and deliverables are present. Appropriate equations for precision, accuracy (bias), and completeness will be used for all analyses.

When the review has been completed, the QAM will submit the validated data to the project manager for subsequent evaluation and interpretation. If field or laboratory data are determined to be unusable, corrective action will be implemented as outlined in Section 13 of this document.

11.3 Data Deliverables

Analytical data will be summarized in tabular form by sample number, sample matrix description, parameters analyzed and their corresponding detected concentrations, and the detection limits. All analytical data manually entered into tables will be checked by the QAM to verify that the entered data are correct. The laboratory will be required to generate data packages that will provide all the necessary information for validation and use standard reporting forms for all data reporting.

The deliverables required for this project are in both hardcopy and electronic format. These formats are described below.

11.3.1 Hardcopy Data Deliverables

Complete Level II data packages may be required. The laboratory will be expected to provide data results (PDF format) in 10 working days and full Level II packages 20 workings days from the time of receipt of samples, as required.

11.3.2 Electronic Data Deliverables

To facilitate data handling and management, laboratory data may be entered into a computerized format. All data entered into the electronic data files will correspond identically to the data contained in the original laboratory reports and other documents associated with sampling and the laboratory hardcopy data deliverable packages. The format of the electronic data deliverable will be arranged between the SET project manager and the laboratory data management personnel.

11.3.3 Other Data Deliverables

The results from the sampling activities will be incorporated into the work as data tables and figures showing sampling locations and analyte concentrations (as applicable). The entire report will include an executive summary, site description, and background including current and previous site uses, summary of prior environmental assessments, environmental setting including local and regional geology and hydrogeology, identification of local subsurface aquifers and distances to nearest water production wells, a description of the field procedures, discussion of the soil and soil-gas sampling results including tabulated summary of laboratory analytical results, and conclusions and recommendations.

It is intended that data collected through implementation of this QAPP will satisfy the requirements of the USEPA and Cal/EPA. These data will be used to evaluate extent and concentrations of the COCs to determine further investigation and remediation in consultation with the USEPA and Cal/EPA.

The draft report will initially be prepared by the project manager. Figures will be prepared by the field geologist and drafting technician and reviewed by the project manager. The report will then be reviewed by the technical editor (for syntax, grammar, and report formatting), the QAM, and the senior project manager. All information duplicated in text, tables, and figures will be reviewed for accuracy by the QAM.

12. AUDITS

Performance and system audits may be conducted by the QAM or his designated representative, if requested by either the USEPA or the Cal/EPA, to ensure that the procedures used to conduct field operations and laboratory analyses are properly followed. The Cal/EPA may conduct an audit of either field or laboratory activities. The QAM will formulate corrective action acceptance reports and audit reports, and coordinate the recommended actions with the laboratory manager. Results of both the field and laboratory audits will be submitted to the project manager for review and incorporated into the reports. If the results of the audit necessitate further action, the Cal/EPA will be notified and will be apprised of any action taken.

12.1 Field Audits

Field audits may be conducted during the field investigation to evaluate appropriateness of personnel assignments and expertise; availability of field equipment; and adherence to the work plan and this QAPP for sample collection and identification, sample handling and transport, use of QA samples, chain-of-custody procedures, equipment decontamination, and documentation. An audit checklist will be prepared and completed. All nonconformance items will be documented and addressed. A written report or memorandum will be prepared for each audit and retained by the QAM and the project manager. The report will address adherence to the SOPs for sample collection, preparation, preservation, shipment, equipment decontamination, and the inspection of field equipment. Field audits are not required but may be performed in the event significant discrepancies are identified that warrant evaluation of field practices.

12.2 Laboratory Audits

To ensure that the laboratory is adhering to the QA/QC requirements established for this project, the QAM or a designated representative may conduct a laboratory audit during the investigation, if requested by either the USEPA or the Cal/EPA. The laboratory system audit will be conducted by visiting and examining all sections of the laboratory that are pertinent to the analysis of project-related analyses. After the visit, an audit report or memorandum will be generated, and the results will be evaluated to ensure acceptable laboratory performance. Performance audits for the laboratory activities may be carried out periodically during the investigation if the initial audit demonstrates major QC problems. Blind field duplicates will be sent to the laboratory for analysis to determine the data accuracy, precision, and completeness.

Laboratory audits include reviews of sample handling procedures, internal sample tracking, SOPs, analytical data documentation, QA/QC protocols, and data reporting. The selected mobile or off-site laboratory will be licensed by the State of California as a certified testing laboratory.

12.3 Data Audits

Data audits will be conducted on analytical results received from the laboratories. These audits will be accomplished through a process of data validation and review of laboratory analytical results. Data audits may require the laboratory to submit complete raw data files for validation. A detailed review of sample data may be performed, including verification of data calculations for calibration and quality control samples to assess whether these data are consistent with method requirements. Upon request, the laboratory will make available all supporting documentation in a timely fashion.

13. CORRECTIVE ACTION

Corrective action is the process of identifying, recommending, approving, and implementing measures to counter unacceptable procedures or out-of-QC performance that can affect data quality. Corrective actions will be initiated whenever data quality indicators suggest that DQOs have not been met. Corrective action can occur during field activities, laboratory analyses, data validation, and data assessment. Corrective action in the field may be needed when the scope of work is changed (e.g., significant increase or decrease of number of samples, sampling locations other than those specified in the work plan, sampling procedures and/or field analytical procedures require modification, etc.) due to unexpected conditions.

Corrective action in the laboratory may occur prior to, during and/or after initial analyses. A number of conditions may be identified during the analysis, from sample log-in to data review, that warrant corrective action. The bench chemist will identify the need for corrective action. The laboratory manager, in consultation with group supervisors and staff, will approve the required corrective action for the laboratory project. These corrective actions will be carried out before the data are released from the laboratory. The corrective action will be documented on an appropriate laboratory corrective action form (signed by the laboratory manager).

All corrective action proposed and implemented should be documented in the regular quality assurance reports to management. Corrective action should be implemented only after approval by the

project manager, or his/her designee. If immediate corrective action is required, approvals secured by electronic mail or telephone should be documented in an additional memorandum.

For noncompliance problems, a formal corrective action program will be determined and implemented at the time the problem is identified. The person who identifies the problem is responsible for notifying the project manager, who in turn will notify the USEPA. Concurrence and implementation of corrective action will be confirmed in writing through the USEPA and the Cal/EPA.

14. FINAL SAMPLE DISPOSITION

Upon completion of all required analyses and acceptance of the data reported, the laboratory will be responsible for proper disposal of any remaining samples, sample containers, shipping containers, and plastic packing materials in accordance with sound environmental practice, based on the sample analytical results. Unused samples and containers found to be nonhazardous generally will be disposed after 90 days following completion of the analysis. At 90 days, the laboratory will contact the project manager to obtain approval for the samples to be disposed. In cases where the data package meets the project QA/QC requirements and no apparent anomalies are present in the data set, the project manager may authorize the laboratory to dispose of the samples at an earlier date. The laboratory shall maintain proper records of waste disposal and shall have disposal company contracts on file for inspection. All raw and processed data generated during the analysis of project samples must be stored for a period of five years. Revised copies of the applicable SOPs and QAPPs must also be maintained and available should the data be required. Should the laboratory go out of business, all original records related to project samples shall be provided to project personnel.

15. REFERENCES

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TABLES

Tables 1 through 5

Table 1
Requirements for Soil Sample Analysis, Container, and Preservation

Target Parameter	EPA Method	Quantity	Container	Preservative	Maximum Holding Time	PQL	MDL
TPH(g) TPH (DRO) TPH (ORO)	8015M	1 x 6-inch	Acetate liner	4°C	14 days	TPH(g): 1 mg/kg TPH (DRO): 10 mg/kg TPH (ORO): 50 mg/kg	0.5 mg/kg 3 mg/kg 17 mg/kg
VOCs	8260B	2 x 5g 1 x 25g	En Core® sampler*	4°C	14 days**	VOCs: 2–50 µg/kg	0.38–12.7 µg/kg
PCBs	8082	1 x 6-inch	Acetate liner	Chilled with ice	14 days	33–67 µg/kg	1.22 µg/kg
Title 22 Metals	6010B/7471A	1 x 6-inch	Acetate liner	Chilled with ice	6 months	0.2–0.5 mg/kg	0.05–0.40 mg/kg
Lead†	6010B	1 x 6-inch	Acetate liner	Chilled with ice	2 months	0.25 mg/kg	0.10 mg/kg
PAHs	8310	1 x 6-inch	Acetate liner	Chilled with ice	14 days	2–100 µg/kg	2–100 µg/kg
OCPs	8081A	1 x 6-inch	Acetate liner	Chilled with ice	14 days	5–50 µg/kg	0.15–17 µg/kg
Ethylene glycol	8021B	1 x 6-inch	Acetate liner	Chilled with ice	14 days	10 mg/kg	10 mg/kg

PQL = Practical quantitation limit for undiluted samples, method detection limit same as PQL
MDL = Method detection limit
TPH(g) = Total petroleum hydrocarbons (gasoline-range organics)
TPH(DRO) = Total petroleum hydrocarbons (diesel-range organics)
TPH(ORO) = Total petroleum hydrocarbons (heavy oil-range organics)
VOC = Volatile organic compound
PCBs = Polychlorinated biphenyls
PAHs = Polycyclic aromatic hydrocarbons
OCPs = Organochlorine pesticides
µg/kg = Micrograms per kilogram
mg/kg = Milligrams per kilogram
* = Sample collection by EPA Method 5035, Update III of SW-846
** = Holding time is 14 days if samples are transferred into volatile organic ampoules (VOAs) preserved with sodium bisulfate within 48 hours of collection (samples will be submitted to the laboratory within 48 hours of collection). Holding time is 48 hours if samples are not transferred into VOAs.
† = Uppermost soil from core of acetate liner to be analyzed. Top of core to be labeled in the field.

Table 2
Requirements for Soil-gas Sample Analysis, Container, and Preservation

Target Parameter	EPA Method	Container	Preservative	Maximum Holding Time	MDL	RL
Mobile Laboratory						
VOCs	8260B	125-cc glass bulb	Keep away from light. Keep at same altitude. Maintain at room temperature.	30 minutes	0.1–10 µg/L of air (see Table 3)	1.0–50 µg/L of air (see Table 3)
Fixed Laboratory						
VOCs	TO-15	Summa canister	NA	3 days	See Table 4	See Table 4

VOCs = Volatile organic compounds
NA = Not applicable
MDL = Method detection limit
RL = Reporting limit
µg/L = Micrograms per liter
ppmv = parts per million by volume
A maximum of 16 samples per day will be analyzed by the mobile laboratory.

Table 3
Quality Control Sample Requirements

Sample Type	Typical Frequency	Purpose
Field duplicate	1 per 10 samples	Evaluate precision of sampling and analysis procedures
Equipment blank (distilled water)	1 per set of equipment cleaned, collect one sample at the beginning of sampling and one each day after decontamination	Evaluate cross-contamination caused by non-dedicated equipment
Trip blank	1 per sample cooler containing VOCs	Evaluate VOC contamination introduced during sampling, storage, or shipment.
Field blank	1 per day	Evaluate contaminants introduced by ambient air during sample collection
Temperature blank	1 per sample cooler	Evaluate sample preservation
MS/MSD sample or LCS/LCSD (laboratory)	1 per 20 samples or 1 per analytical batch	Evaluate accuracy of analytical procedures
Method blank (laboratory)	1 per analysis, per day	Assess contamination introduced during sample preparation

VOC = Volatile organic compounds
MS/MSD = Matrix spike/matrix spike duplicate
LCS/LCSD = Laboratory control sample/laboratory control sample duplicate

Table 4
Container and Preservation Requirements for Equipment Blank Water Samples

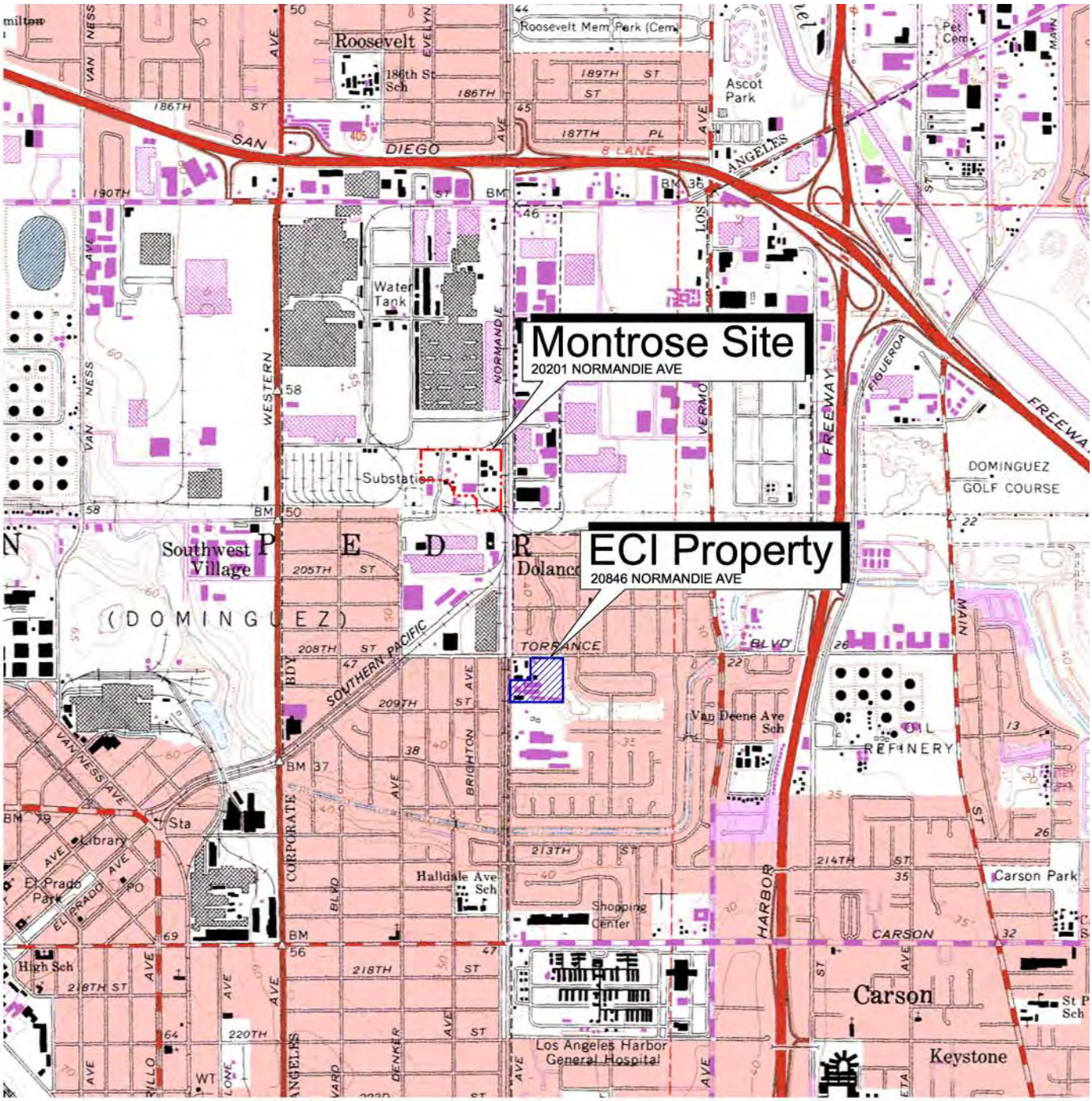
Target Parameter	EPA Method	Container	Preservative
TPH(DRO), TPH(ORO)	8015M	500-mL amber glass	Unpreserved
TPH(g) and VOCs	8260B	3 40-mL VOAs	4°C
PCBs	8082	1-liter amber glass	Chilled with ice
Title 22 Metals	6010B	500-mL plastic	Nitric acid
Lead	6010B	500-mL plastic	Nitric acid
PAHs	8310	1-liter amber glass	Chilled with ice
OCPs	8081A	1-liter amber glass	Chilled with ice
Ethylene glycol	8021B	3 40-mL VOAs	Chilled with ice

TPH(g) = Total petroleum hydrocarbons (gasoline-range organics)
TPH(DRO) = Total petroleum hydrocarbons (diesel-range organics)
TPH(ORO) = Total petroleum hydrocarbons (heavy oil-range organics)
VOC = Volatile organic compound
PCBs = Polychlorinated biphenyls
PAHs = Polycyclic aromatic hydrocarbons
OCPs = Organochlorine pesticides

Table 5 QA/QC Sample Collection Soil-gas Samples			
Type	**Sample Frequency**	**Sample Analysis**	**Containers**
Field Duplicates	One per day	Same as corresponding field samples	125-cc glass bulb
Method Blank	One per day	Same as corresponding field samples	125-cc glass bulb
Trip Blanks (for Summa canisters only at fixed lab)	One per day	EPA TO-15	Summa canisters

FIGURE

Figure 1



Reference:

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Source: Soil Investigation Report, Historic Stormwater Pathway, Earth Tech, Inc. 2008

Sharp Environmental Technologies, Inc.

839 S. Beacon Street, #1967, San Pedro, California 90733 Tel (310) 505-5675 Fax (310) 548-3935

Historical Stormwater Pathway - South Montrose Chemical Superfund Site
U.S. EPA Region 9
Los Angeles County, California

FIGURE 1
Site Location

\\engineering\PROJECTS\07163.0000 EPA Region 9\0027 TO 26 RA - Montrose OU6 RA\Graphics\Site Location 1107.ai

APPENDIX A

Laboratory Quality Assurance Manuals

APPENDIX D

Transportation Plan

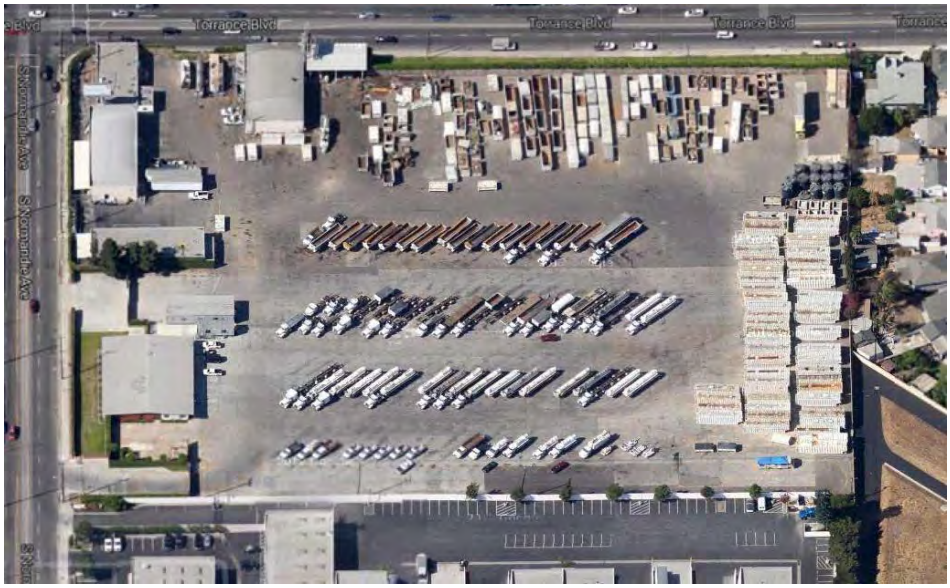
Sharp
Environmental
Technologies, Inc.

839 S. Beacon Street, #1967, San Pedro, California 90733 Tel (310) 505-3675 Fax (310) 548-3935

TRANSPORTATION PLAN

ECOLOGY CONTROL INDUSTRIES

20846 Normandie Avenue
Torrance, California 90502



Prepared for

MR. RON FLURY
ECOLOGY CONTROL INDUSTRIES
20846 Normandie Avenue
Torrance, California 90502

July 1, 2014

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Figure 1 – Site Vicinity

Appendices

Appendix A – Transportation Routes
Appendix B – Manifests

PROFESSIONAL CERTIFICATION

This *Transportation Plan* has been prepared, reviewed and approved by

Jeffrey Sharp, PG #6777, CEG #2160
Senior Geologist

STATEMENT OF LIMITATIONS

The services described in this *Transportation Plan* will be performed in accordance with generally accepted professional environmental consulting principles and practices.

Opinions and recommendations contained in this document apply to conditions existing at certain locations when services will be performed and are intended only for the specific purposes, locations, time frames, and project parameters indicated. Sharp Environmental Technologies, Inc., cannot be responsible for the impact of any changes in environmental standards, practices, or regulations after performance of services.

This document is valid only for this specific project as described herein. It is not to be used for other projects or subsequent phases of this project without the written approval by Sharp Environmental Technologies, Inc.

1. PROJECT SUMMARY

1.1 Administration Information

Site Name:	Ecology Control Industries
Site Location:	20846 Normandie Avenue
Site Contact Name/Phone:	Jeff Sharp, 310-505-3675
Project Manager:	Jeff Sharp, 310-505-3675
Site Health and Safety Supervisor:	Jeff Sharp, 310-505-3675

1.2 Emergency Information

Ambulance:	911
Fire:	911
Police:	911
Hospital:	
	LA County Harbor-UCLA Medical Center, 310-222-2345
Health and Safety Manager:	Jeff Sharp, 310-505-367
Project Manager:	Jeff Sharp, 310-505-367

2. INTRODUCTION

The site is located at Ecology Control Industries (ECI), 20846 Normandie Avenue in Torrance, California 90502. The work will be performed at the eastern property boundary within the ECI property identified as the historic storm water drainage channel.

The site consists of a 7.34-acre property currently occupied by ECI as a vehicle and equipment dispatch yard and a temporary hazardous and non-hazardous waste storage facility. The site contains one 5,400-square foot building located along the northern property line and is approximately 90 percent covered with either concrete or paved asphalt, with the remaining area consisting of unpaved soils.

Prior to approximately 1969, the historic storm water pathway in the vicinity of the ECI property was an unlined linear topographic depression that acted as a local surface drainage feature. The drainage channel passed under Torrance Boulevard and traversed the eastern portion of the ECI Property before continuing east through what is now the closed Royal Boulevard Landfill (ARMCO Site).

During the late 1960s and early 1970s, the drainage ditch was replaced by the Los Angeles County Flood Control District (LACFCD) with an underground concrete storm water conveyance system. Project No. 685 (also known as the Kenwood Drain), a concrete box culvert, replaced the historic storm water drainage ditch from 204th Street, along Kenwood Avenue, through the ECI property, and eventually emptying into the Torrance Lateral, a large, open, and concrete-lined drainage channel. The LACFCD maintains an easement for Project 685 within the properties it traverses, including the ECI property.

In 2005, pesticides and polychlorinated biphenyls (PCBs) were detected in soil by ECI as part of due diligence activities prior to sale of the property. The due diligence sampling activities detected several

chemicals present in soils at concentrations exceeding residential action levels, including: dichlorodiphenyl-dichloroethane (DDD), dichlordiphenyl-dichloroethylene (DDE), dichlorodiphenyl-trichloroethane (DDT), chlordane, petroleum hydrocarbons, and PCBs. The sum of DDT, DDE, and DDD concentrations (referred to collectively as total DDT) were detected in subsurface soil samples collected from the eastern and southeastern portions of the ECI property in concentrations up to 325 mg/kg. Although contended by Montrose, EPA has attributed the presence of total DDT in these soils to former Montrose chemical manufacturing activities. From 1947 to 1982, Montrose manufactured technical grade DDT at a plant located approximately 0.5 miles north/northwest of the ECI property. EPA believes that DDT-impacted soils at the ECI property may be the result of contaminated storm water runoff from the former Montrose plant. The ECI property is located "downstream" from the former Montrose plant property, by way of the historical storm water drainage pathway.

Based on the data collected during previous investigations, preparation of a removal action work plan was recommended to address the removal of soils impacted with contaminants of concern at the site.

This Transportation Plan has been prepared as an Appendix and supplement to the *Removal Action Work Plan*. A qualified waste transport and disposal contractor (licensed/registered and insured) will profile, excavate and load soil; transport; and dispose of the soil at an approved off-site facility that is licensed to accept this type of material. The waste volume is calculated to be approximately 10,000 cubic yards of soil impacted with contaminants of concern for transportation and lawful disposal at off-site waste management facilities.

All removal, transportation, disposal and site restoration activities will be performed in accordance with all applicable federal, state, and local laws, regulations, and ordinances.

3. WASTE CHARACTERIZATION AND QUANTITY

3.1 Waste Profile

Excavated soils will be profiled for acceptance by the selected disposal facility. Approval from the disposal facility will be obtained before any transportation and disposal activities commence. Additional documentation will be provided to the DTSC pertaining to waste disposal profiles and waste disposal acceptance prior to any off-site shipments of waste.

Soils excavated from the site will be managed (handled, transported and disposed of as one or more of the following definitions after the waste has been properly profiled and approved for acceptance by the selected disposal facility.

3.1.1 Definitions

Non-Hazardous Waste: Soil or aqueous liquid not characterized as a Resource Conservation and Recovery Act (RCRA) hazardous waste. per 40 CFR Parts 260 - 265, a Toxic Substances Control Act (TSCA) Polychlorinated Biphenyl (PCB) hazardous waste, per 40 CFR Part 761, or a non-RCRA (California-hazardous) waste per 22 CCR Section 66261.

Designated Waste: Non-hazardous waste as defined in California Water Code Section 13173 that consists of, or contains pollutants that, under ambient environmental conditions at a waste management unit, could be released in concentrations exceeding applicable water quality objectives or

that could reasonably be expected to affect beneficial uses of the waters of the state as contained in the appropriate state water quality control plan.

Hazardous Waste: Soil or aqueous liquid characterized as a Resource Conservation and Recovery Act (RCRA) hazardous waste, per 40 CFR Parts 260 - 265, a Toxic Substances Control Act (TSCA) Polychlorinated Biphenyl (PCB) hazardous waste, per 40 CFR Part 761, or a non-RCRA, California-hazardous waste per 22 CCR Section 66261.

Non-RCRA (California-Hazardous) Waste: Soil or aqueous liquid characterized as a Non-Resource Conservation and Recovery Act (non-RCRA), California hazardous waste per 22 CCR Section 66261.

When the waste soil is classified as a hazardous waste, ECI shall secure an EPA ID number from the USEPA or the DTSC for proper hazardous waste management. Compliance with DTSC requirements of hazardous waste generation, temporary on-site storage, transportation, and disposal is required.

3.2 Contaminated Soil Control

Based on the analytical data of samples collected during previous site investigations, the following contaminants of concern in excess of the health screening levels may be encountered during excavation operations

- Total petroleum hydrocarbons as carbons chain (TPHcc)
- Volatile organic compounds (VOCs)
- Polychlorinated biphenyls (PCBs)
- Organochlorine pesticides (OCPs)
- California Code of Regulations, Title 22, metals (17 metals)

Based on field experience, it is anticipated that on-site excavated soils may be classified into three waste categories: RCRA hazardous waste (for TCLP values above the regulatory level), non-RCRA California hazardous waste (for STLC values above the regulatory level), and non-hazardous waste (for TCLP and STLC values below the regulatory levels).

3.3 Waste Quantity

The estimated volume is 10,000 tons.

3.4 Import Fill Material

Any over-excavated material will be stockpiled pending laboratory analysis for contaminants of concern identified in the area were overburden may be removed from, to determine whether it is acceptable for re-use as backfill material at the site. Additional clean imported fill material will be transported to the site.

4. SOIL LOADING OPERATIONS

Soil will be removed with excavators or other types of earth moving equipment, as necessary. As soil is excavated, temporary stockpiling may be necessary; the excavated soil will be stored in soil staging

areas on-site. The proposed location of the temporary soil storage area will be determined prior to excavation commencement.

4.1 Soil Segregation Operations

Prior to stockpiling/staging, the excavated soil will be segregated to the extent possible to avoid any mixture of hazardous and non-hazardous soils. This segregation will minimize the amount of hazardous soils generated and their associated disposal cost. The soil segregation will be based upon criteria for hazardous and non-hazardous soils and the available sampling data. SET will segregate the stockpiles initially by field verification using a photo-ionization detector (PID).

RCRA hazardous soils will be transported to a licensed Class 1 landfill. Non-RCRA hazardous soils will be transported to a licensed Class 1 landfill or a properly permitted disposal facility. Non-hazardous soils will be transported to an approved facility or Class 3 landfill to be recycled for alternate daily cover.

4.2 Truck Loading Operations

In most cases, it is anticipated that trucks will be loaded directly at the area of excavation and driven to the designated disposal facility. Water spray or mist, as appropriate, will be applied during soil loading operations.

All vehicles will be covered with a tarp and decontaminated prior to leaving the work area. For track-out prevention and control, all trucks will be dry brushed after loading to remove loose soil. Due to large, open asphalt parking lots it is not anticipated that tread plates will be used. If deemed necessary, tread plates will be placed at the exit of the site. The dump truck or roll-off bin portion of the truck will then be covered with a tarp to prevent soil and/or dust from spilling out of the truck during transport to the disposal facility. Additionally, a street sweeper may be operating on the adjacent streets during the hours in which trucks are leaving the site as necessary and required by the DTSC.

Prior to leaving the load-out area, each truck will be inspected by SET to ensure that the payloads are adequately covered, the trucks are cleaned of spilled soil, and the shipment is properly manifested and covered with tarp. Proper hazardous waste placarding may be required for transportation of hazardous wastes.

4.3 Working Hours and Duration

In most cases, excavation, truck loading and unloading will be conducted between 7:00 AM and 6:00 PM Monday through Friday. Working hours may be amended based on permit requirements.

5. TRANSPORTATION CONTROL

5.1 Dust Control during Transportation

Soil for off-site disposal will be transported in tarp-covered end-dump trailers/trucks, drums, or roll-off bins to an approved land disposal facility. All waste-hauler vehicles will be decontaminated prior to leaving the work area. Clean fill materials will be transported in tarp-covered trailers/trucks to the site, as necessary.

5.2 Traffic Control

On-site traffic control signs and traffic management will be placed and performed by SET, as necessary. Transport drivers will follow the on-site traffic control plan and/or traffic control personnel and the SET Project Manager's directions during staging, ingress, and egress activities.

Truck Staging Area: Prior to loading or unloading at the site, all trucks will be staged at a designated area on-site, as much as possible to avoid impacts on the local streets. Careful coordination of trucks will be exercised to help avoid staging off-site and long wait times for trucks. Trucks will not be allowed to sit idling more than five minutes to avoid unnecessary exhaust fumes. Truck drivers will be provided a truck route map (selected facilities included in Appendix A) to the disposal facility along with specific route directions at the beginning of the project. Maps and directions will be available on-site for the duration of the project.

Site Access Control: Trucks to be loaded or unloaded at the site will access the designated soil loading/unloading areas or truck staging areas only as indicated by the SET Project Manager.

Waste-hauling vehicles will not be allowed to cross soil removal or staging areas without proper protection in place. An SET flag person will be located at the gate to assist the truck drivers to safely enter and depart the site.

On-site Traffic Flow: Traffic will be coordinated in such a manner that, at any given time, a limited number of transportation trucks will be on-site to reduce truck traffic on surrounding surface streets and reduce dust generation during on-site transportation.

Speed Limit: While on the site, all vehicles are required to maintain slow speeds, e.g., less than five miles per hour (5 mph), for safety purposes and for dust control measures. While on streets or freeways, all transporters will follow the speed limit requirements and defensive driving techniques (over traffic or road conditions) for traffic safety.

Rush Hours: Transportation trucks will be timed to avoid rush traffic hours.

5.3 Transportation Routes

There are numerous alternate routes that can be selected to the designated land disposal facilities. Selected proposed routes of transportation maps for off-site shipment of impacted soil are included in the Appendix A of this Transportation Plan and will be updated as necessary.

The SET Project Manager will instruct all drivers of the specific haul routes and alternate routes prior to commencing transport activities at the site. The transport route will be strictly adhered to with no exceptions. Should the route be closed due to inclement weather or other emergency road conditions, the transport driver will contact the SET Project Manager with the information, and the Project Manager will provide an alternate route until the original route is available.

The transportation route consists of primary surface streets, highways and improved roads that allow access to end-dump trucks and trailers. The general site ingress and egress route will be located on Normandie Avenue. Selected transportation routes are described in Appendix A.

Consultation with DTSC/City of Torrance: A "haul route permit" may be required and obtained from the City with a copy of the transportation route map at least three days prior to commencement of the proposed excavation. The City will be consulted for any additional traffic control measures.

Mobilization and demobilization of large earthmoving equipment may exceed allowable weight limits and would require additional permits from the State and the City. Heavier loads have higher permit fees and restrictions on time of travel.

Truck Routing

The waste transport and disposal contractor will route trucks to and from the site as described in the "Transportation Route" section of this plan. Trucks will use established public roads that accommodate daily commercial truck traffic. Truck arrivals and departures will be staggered to minimize traffic impacts in the project area. The on-site truck route may be modified based on field conditions.

Local Traffic Control: Transportation of impacted soils or fill materials will be on arterial streets and/or freeways, approved for truck traffic, to minimize any potential impact on the local neighborhood. Moving along the proposed transportation route, all street intersections (except those marked on the transportation route map) are controlled by traffic lights or stop signs. For those intersections without traffic control signs, an SET flag person may be located to assist or direct traffic flows during heavy traffic hours. Therefore, the number of daily truckloads during implementation of the off-site transport is not expected to cause a disruption in local traffic.

Street Maintenance: A "work notice" will be given to the street maintenance authority with a copy of the transportation route map at least three days prior to initiation of the proposed excavation action. All street surfaces along the transportation route (including the site) will be routinely inspected and, if necessary, maintained or repaired by the contractor, during implementation of the tasks. Contractor is responsible for cleaning streets or work yards from spilled soils and the final cleanup after completion of field activities, such as washing. The number of daily truckloads during implementation of the operations plan is not expected to cause damage to surface streets.

6. OFF-SITE LAND DISPOSAL FACILITIES

Based on the results of waste profile and classification, the excavated soil will be transported under hazardous or non-hazardous waste manifests or proper shipping documents to a proper off-site land disposal facility in California, Nevada or Arizona. Copies of blank manifests are included in Appendix B. Once the landfill has provided written acceptance, copies of waste profile reports used to secure disposal permission from the landfill will be provided to the DTSC. Compliance with the land disposal restrictions, as necessary, will be documented and provided to the DTSC once written acceptance from the landfill is obtained.

All hazardous wastes will be properly managed, manifested, and transported by a registered and licensed hazardous waste hauler, as necessary, to a proper waste management facility.

6.1 RCRA Hazardous Waste Facilities (Class I)

All RCRA hazardous wastes will be disposed of in a Class 1 hazardous waste land disposal facility permitted to accept such wastes. The facilities marked below may be selected for this project:

Chemical Waste Management
35251 Old Skyline Road
Kettleman, California 93239
Phone: 559-309-7688

CleanHarbors Westmorland
5295 South Garvey Road
Westmorland, California 92281
Phone: 760-344-9400

CleanHarbors Buttonwillow
2500 West Lokern Road
McKittrick, California 93251
Phone: 661-762-6200

6.2 Non-RCRA Hazardous Waste Facilities (Class I or II)

A non-RCRA hazardous waste is a California-only hazardous waste. When an asbestos waste is regulated as non-RCRA hazardous waste, it may be disposed of at a California Class 2 landfill or an out-of-state Class 3 landfill (permitted to accept such wastes). All other non-RCRA hazardous wastes will be disposed of at a California Class 1 land disposal facility or an out-of-state Class 3 landfill permitted to accept such wastes. The waste management facilities marked below,may be selected for this project:

Chemical Waste Management
35251 Old Skyline Road
Kettleman, California 93239
Phone: 559-386-9711

CleanHarbors Westmorland
5295 South Garvey Road
Westmorland, California 92281
Phone: 760-344-9400

CleanHarbors Buttonwillow
2500 West Lokern Road
McKittrick, California 93251
Phone: 661-762-6200

6.3 Non-Hazardous Waste Facilities (Class III)

Non-hazardous soils may be transported to a Class 3 landfill permitted to accept such wastes. The sanitary landfills, marked below, may be selected for this project:

Bradley Municipal Landfill
9081 Tujunga Avenue
Sun Valley, California 91352
Phone: 818-252-3247

The non-hazardous TPH-impacted soil may be transported to the following facility for proper disposal.

Thermal Remediation Solutions
1211 W. Gladstone Street
Azusa, California 91702
Phone: 626-815-0233

TPST Soil Recyclers of California
12328 Hibiscus Road
Adelanto, California 92301
Phone: 760-246-8001

7. SHIPMENT DOCUMENTATION

The excavated soil is managed based on the results of stockpile sample analysis, and proper shipping documents (manifests, bill of lading or invoice) from the selected waste transporter will be used to document and accompany each truck shipment. At a minimum, the shipping document will include the following information:

- Name and address of waste generator
- Name and address of waste transporter
- Name and address of disposal facility
- Description of the waste
- Quantity of waste shipped

Before the excavated soil is transported off-site, an authorized representative of ECI will sign each waste manifest. SET's Site Manager will maintain one copy of the waste manifest on-site. Copies of the waste manifests, signed by the receiving facilities, will be submitted to ECI and DTSC. While at the disposal facility, the truck will be weighed before the payload is off-loaded. Weight tickets or bills of lading will be provided to SET and ECI after the material has been shipped off-site.

7.1 Manifesting

The waste transport and disposal contractor will provide Uniform Hazardous and Non-Hazardous Waste Manifests for the generator's signature. Each load transported from the project site will be manifested. The waste transport and disposal contractor will pre-print manifests with generator's information for the project representative's signature. The Project Manager is responsible for on-site management of manifests. Each manifest will be signed at the project location and the appropriate copies left on-site. Trucks entering the receiving facility will have manifests signed by landfill personnel and the appropriate copies archived at the facility and the generator's copies forwarded to the contractor with certified weight tickets and invoices.

7.2 Recordkeeping

The contractor will be responsible for maintaining a field logbook during the removal and backfilling activities. The field logbook will serve to document observations, personnel on-site, truck arrival and departure times, and other vital project information.

8. HEALTH AND SAFETY

A site-specific health and safety plan (HSP) has been prepared and included as Appendix B in the workplan. Everyone working at the site will be required to be familiar with the HSP.

9. REQUIREMENTS OF TRANSPORTERS

Qualified transporters will be hired for hauling the excavated soil off-site or hauling fill materials to the site.

9.1 License and Insurance

The selected waste transport and disposal contractor and all lower-tier waste transport and disposal contractors will maintain the required insurance and license for the duration of the project and will maintain copies of insurance certificates for the duration of the project. Hazardous wastes must be shipped by a registered hazardous waste hauler. Prior to hiring, the contractor shall verify the status of registration and insurance policy of the selected transporters.

9.2 Contingency Plan

Each transporter is required to have a contingency plan prepared to deal with the following conditions:

a) When there are emergency situations (vehicle breakdown, accident, waste spill, waste leak, fire, explosion, etc.) during transportation of excavated soils from the site to the destined disposal facility or during transportation of fill materials from a source to the site;
b) When the volumes of excavated soil change; or
c) When waste characteristics change.

The contingency plan will be prepared in accordance with the DTSC guidance for preparing transportation plans for site remediation. Once the transporter is selected, a copy of its contingency plan will be attached to this Transportation Plan.

9.3 Transportation and Loading Coordinators

The waste transport and disposal contractor will provide a Program Manager to coordinate and manage all project activities throughout the project. The Program Manager is responsible for scope of work implementation including the transportation and disposal activities, and implementation of all aspects of the HSP.

9.4 Project Schedule

The waste transport and disposal contractor will provide a project and truck schedule prior to implementation of the workplan.

9.5 Drivers

The waste transport and disposal contractor will provide the necessary trucks to the project site each operating day for the duration of the transportation phase to complete the off-site removal of

hazardous waste soils. Transportation on the project is anticipated to run daily. Transportation includes one hour loading at the project site and one hour off-loading at the receiving facilities.

9.6 Training

The waste transport and disposal contractor will insure all drivers staffed for this project will have all the necessary DOT training, licenses and permits to complete the transportation phase of the project. Truck drivers will have been road tested and tested for dumping procedures.

9.7 Equipment

The waste transport and disposal contractor will maintain a consistent truck fleet for the duration of the project. This ensures consistent transportation procedures and minimizes training. All trucks will have been inspected by the California Highway Patrol. Every driver will perform and record daily safety inspections. Trucks also will be subject to monthly terminal inspections. Trucks are to be serviced and thoroughly inspected every 30 days.

9.8 DOT Certifications

The waste transport disposal contractor will maintain all DOT certifications and maintain copies of certifications for the duration of the project. The waste transport and disposal contractor will transport waste soils in accordance with all local, County, State, and Federal regulations (49 CFR Parts 100 to 177).

9.9 Placarding

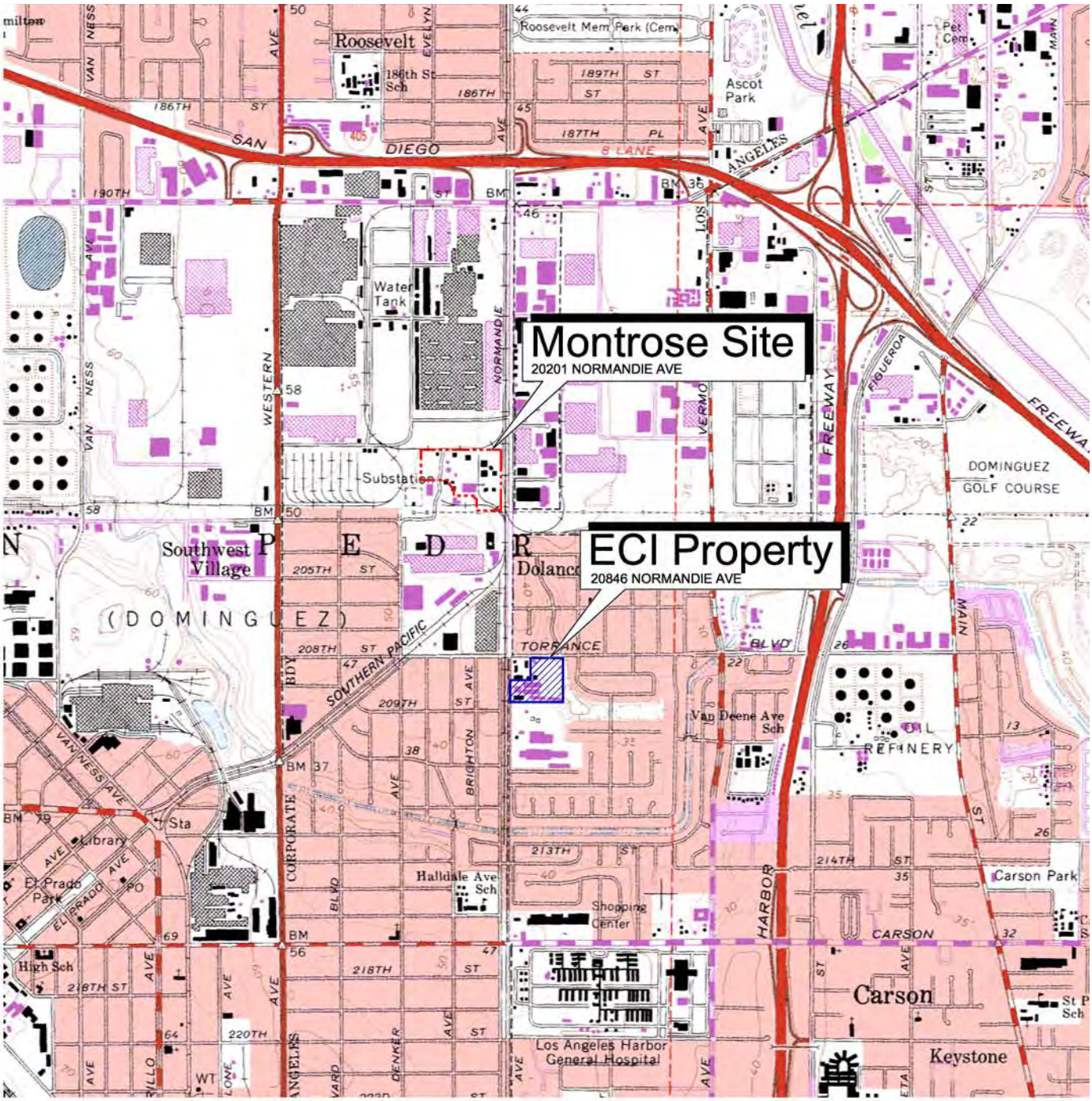
Trucks will have placards displayed according to DOT regulations.

9.10 Communication

Truck drivers will have CB Radios or cellular phones for accessibility during project activities. The transportation coordinator will have direct access to each driver at all times via one or both modes of communication.

FIGURES

Site Vicinity



Reference:

1. U.S.G.S. Topographic Map, Torrance, California 7.5 Minute Quadrangle. Georeferenced using the State of California's CASIL On-line GIS Database, Copyright 2006.

Source: Soil Investigation Report, Historic Stormwater Pathway, Earth Tech, Inc. 2008

Sharp Environmental Technologies, Inc.

839 S. Beacon Street, #1967, San Pedro, California 90733 Tel (310) 505-5675 Fax (310) 548-3935

Historical Stormwater Pathway - South Montrose Chemical Superfund Site
U.S. EPA Region 9
Los Angeles County, California

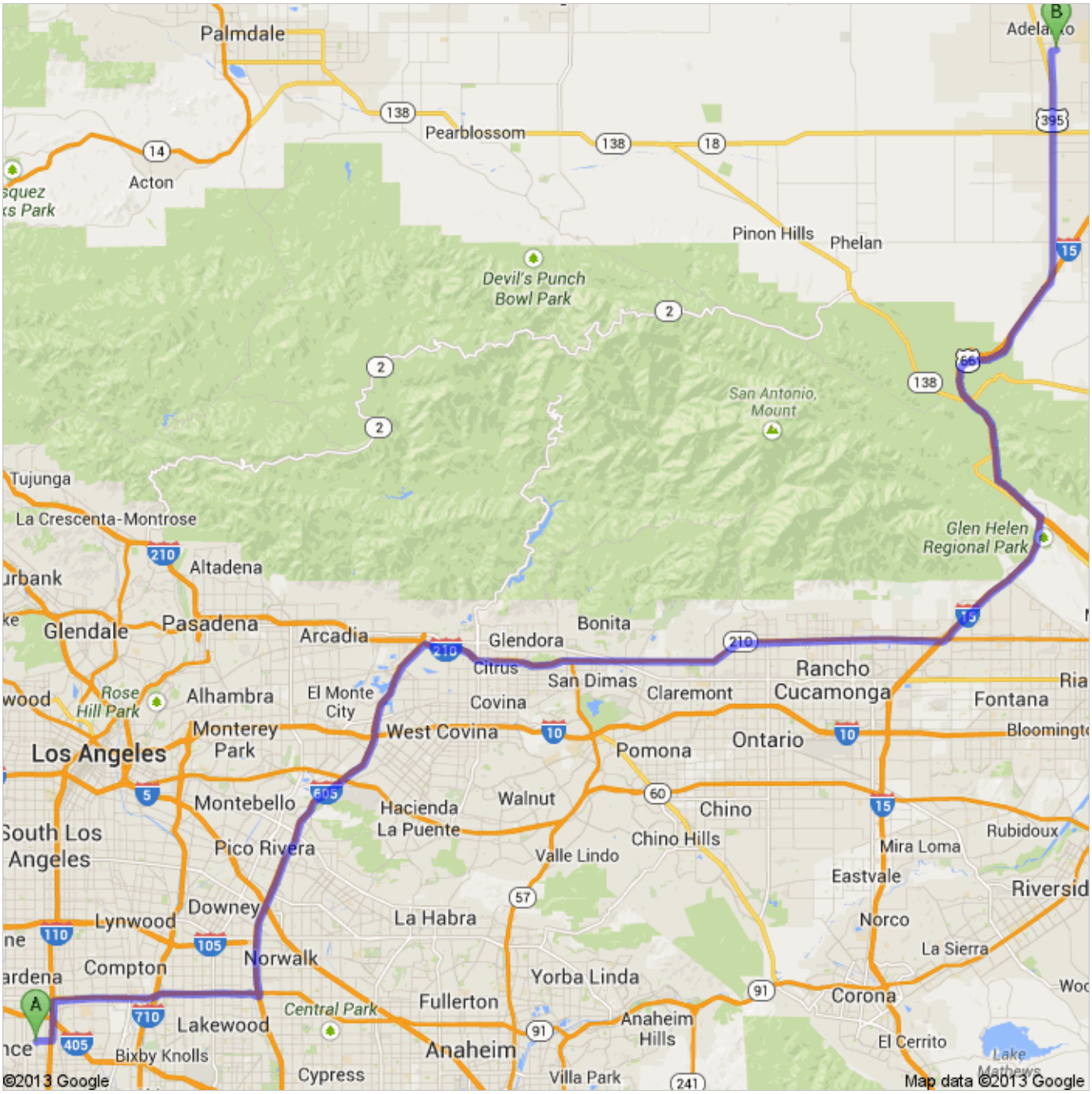
FIGURE 1
Site Location

\\engineering\PROJECTS\07163.0000 EPA Region 9\0027 TO 26 RA - Montrose OU6 RA\Graphics\Site Location 1107.ai

APPENDIX A

Transportation Routes

Directions to 12328 Hibiscus Rd, Adelanto, CA 92301
97.9 mi – about **1 hour 37 mins**



20846 Normandie Ave, Torrance, CA 90502

	1. Head **north** on **Normandie Ave** toward **Torrance Blvd**	go 322 ft total 322 ft
	2. Take the 1st right onto **Torrance Blvd** About 2 mins	go 0.8 mi total 0.9 mi
	3. Turn left onto **S Figueroa St** About 48 secs	go 0.2 mi total 1.0 mi
	4. Turn left to merge onto **I-110 N** toward **Los Angeles** About 2 mins	go 1.7 mi total 2.7 mi
	5. Take the exit onto **CA-91 E** About 10 mins	go 10.4 mi total 13.2 mi
	6. Take the **Interstate 605 N/Interstate 605 S** exit	go 0.2 mi total 13.4 mi
	7. Keep left at the fork, follow signs for **I-605 N** and merge onto **I-605 N** About 19 mins	go 20.6 mi total 33.9 mi
	8. Take the exit onto **I-210 E/Foothill Fwy** toward **Foothill Fwy/San Bernardino** About 7 mins	go 7.8 mi total 41.7 mi
	9. Continue onto **CA-210/Foothill Fwy** About 17 mins	go 19.0 mi total 60.7 mi
	10. Take the exit toward **Barstow** About 1 min	go 1.4 mi total 62.2 mi
	11. Merge onto **I-15 N** About 20 mins	go 23.2 mi total 85.4 mi
	12. Exit onto **US-395 N** toward **Adelanto/Bishop** About 13 mins	go 10.5 mi total 95.8 mi
	13. Slight right onto **Adelanto Rd** About 3 mins	go 1.7 mi total 97.6 mi
	14. Turn right onto **Hibiscus Rd** About 45 secs	go 0.3 mi total 97.8 mi
	15. Turn left Destination will be on the right	go 344 ft total 97.9 mi

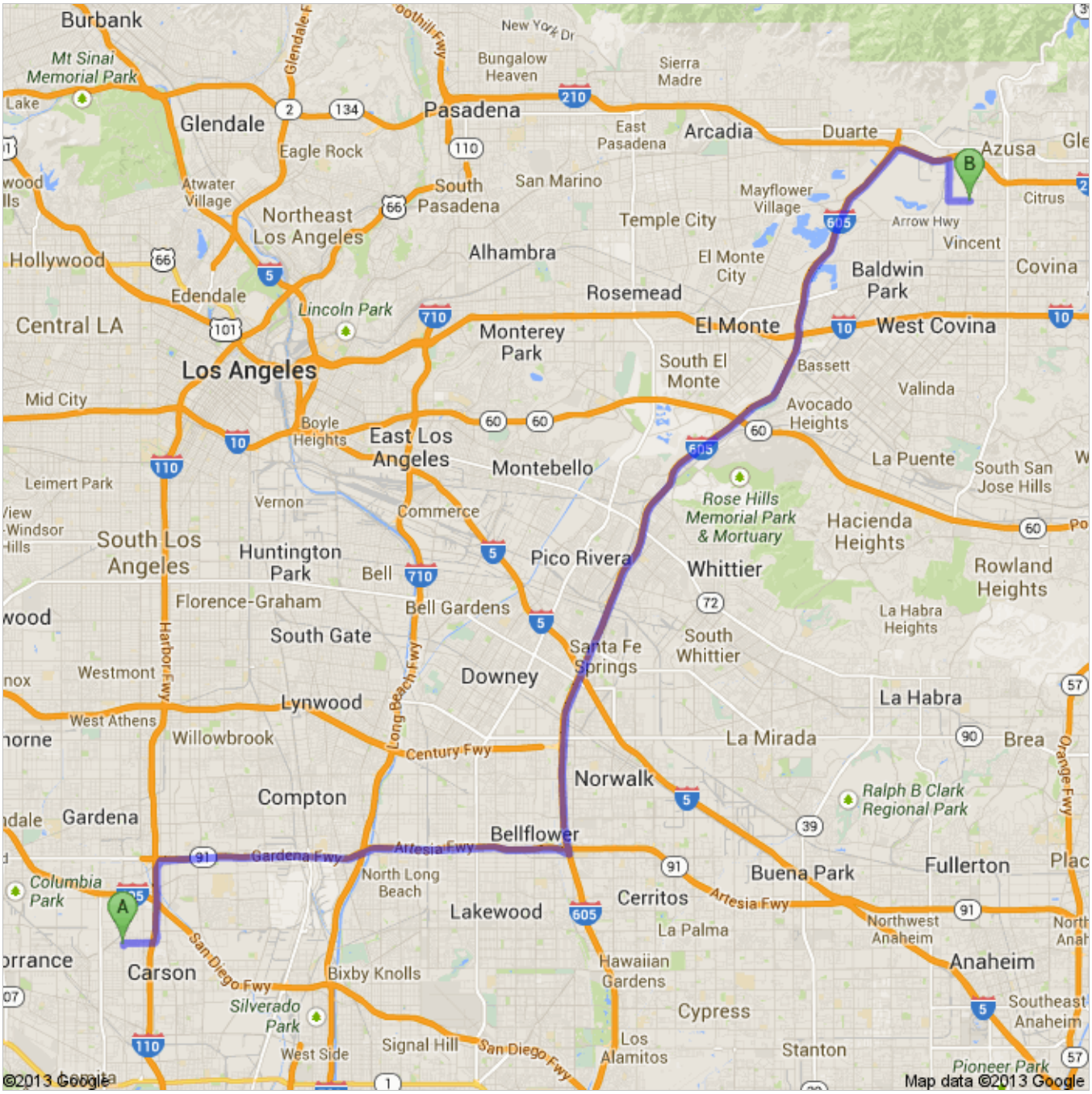
12328 Hibiscus Rd, Adelanto, CA 92301

These directions are for planning purposes only. You may find that construction projects, traffic, weather, or other events may cause conditions to differ from the map results, and you should plan your route accordingly. You must obey all signs or notices regarding your route.

Map data ©2013 Google

Directions weren't right? Please find your route on maps.google.com and click "Report a problem" at the bottom left.

Directions to Thermal Remediation Solutions
1211 W Gladstone St, Azusa, CA 91702
37.3 mi – about **41 mins**



20846 Normandie Ave, Torrance, CA 90502

	1. Head **north** on **Normandie Ave** toward **Torrance Blvd**	go 322 ft total 322 ft
	2. Take the 1st right onto **Torrance Blvd** About 2 mins	go 0.8 mi total 0.9 mi
	3. Turn left onto **S Figueroa St** About 48 secs	go 0.2 mi total 1.0 mi
	4. Turn left to merge onto **I-110 N** toward **Los Angeles** About 2 mins	go 1.7 mi total 2.7 mi
	5. Take the exit onto **CA-91 E** About 10 mins	go 10.4 mi total 13.2 mi
	6. Take the **Interstate 605 N/Interstate 605 S** exit	go 0.2 mi total 13.4 mi
	7. Keep left at the fork, follow signs for **I-605 N** and merge onto **I-605 N** About 19 mins	go 20.6 mi total 33.9 mi
	8. Take the exit onto **I-210 E/Foothill Fwy** toward **Foothill Fwy/San Bernardino** About 2 mins	go 1.6 mi total 35.5 mi
	9. Take the **Irwindale Avenue** exit	go 0.2 mi total 35.8 mi
	10. Turn right onto **N Irwindale Ave** About 2 mins	go 1.0 mi total 36.8 mi
	11. Turn left onto **W Gladstone St** Destination will be on the left About 1 min	go 0.5 mi total 37.3 mi

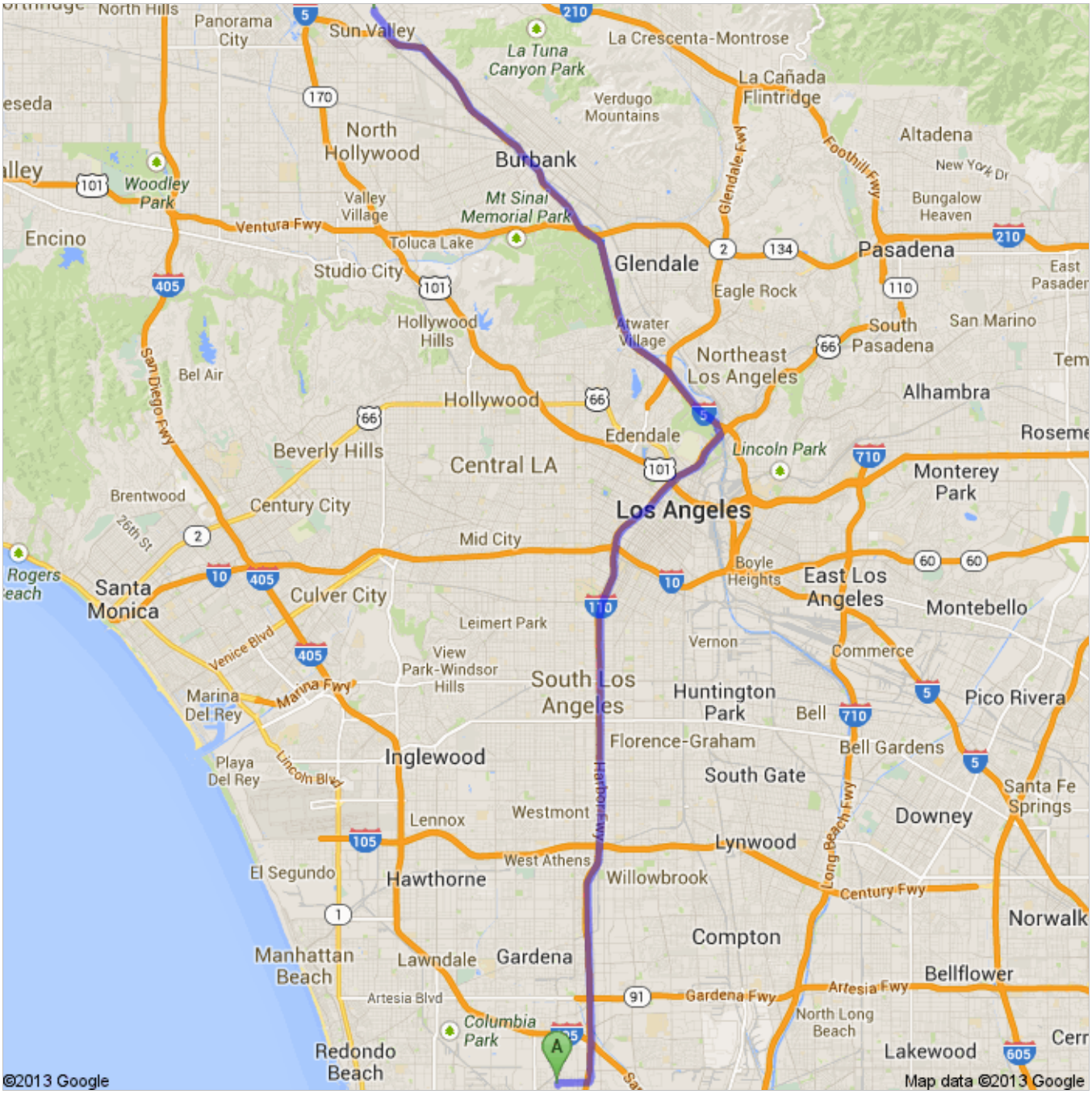
Thermal Remediation Solutions
1211 W Gladstone St, Azusa, CA 91702

These directions are for planning purposes only. You may find that construction projects, traffic, weather, or other events may cause conditions to differ from the map results, and you should plan your route accordingly. You must obey all signs or notices regarding your route.

Map data ©2013 Google

Directions weren't right? Please find your route on maps.google.com and click "Report a problem" at the bottom left.

Directions to 9081 Tujunga Ave, Sun Valley, CA 91352
33.3 mi – about **39 mins**



20846 Normandie Ave, Torrance, CA 90502

	1. Head **north** on **Normandie Ave** toward **Torrance Blvd**	go 322 ft total 322 ft
	2. Take the 1st right onto **Torrance Blvd** About 2 mins	go 0.8 mi total 0.9 mi
	3. Turn left onto **S Figueroa St** About 48 secs	go 0.2 mi total 1.0 mi
	4. Turn left to merge onto **I-110 N** toward **Los Angeles** About 14 mins	go 13.9 mi total 14.9 mi
	5. Continue onto **CA-110 N** About 4 mins	go 3.7 mi total 18.6 mi
	6. Take the **Interstate 5 N/Golden State Freeway** exit on the left toward **Sacramento**	go 0.3 mi total 19.0 mi
	7. Keep left at the fork and merge onto **I-5 N** About 13 mins	go 13.3 mi total 32.3 mi
	8. Take the **Penrose St** exit	go 0.2 mi total 32.5 mi
	9. Turn right onto **Penrose St**	go 0.1 mi total 32.6 mi
	10. Take the 1st left onto **Bradley Ave** About 2 mins	go 0.6 mi total 33.3 mi
	11. Continue straight onto **Tujunga Ave** Destination will be on the left	go 384 ft total 33.3 mi

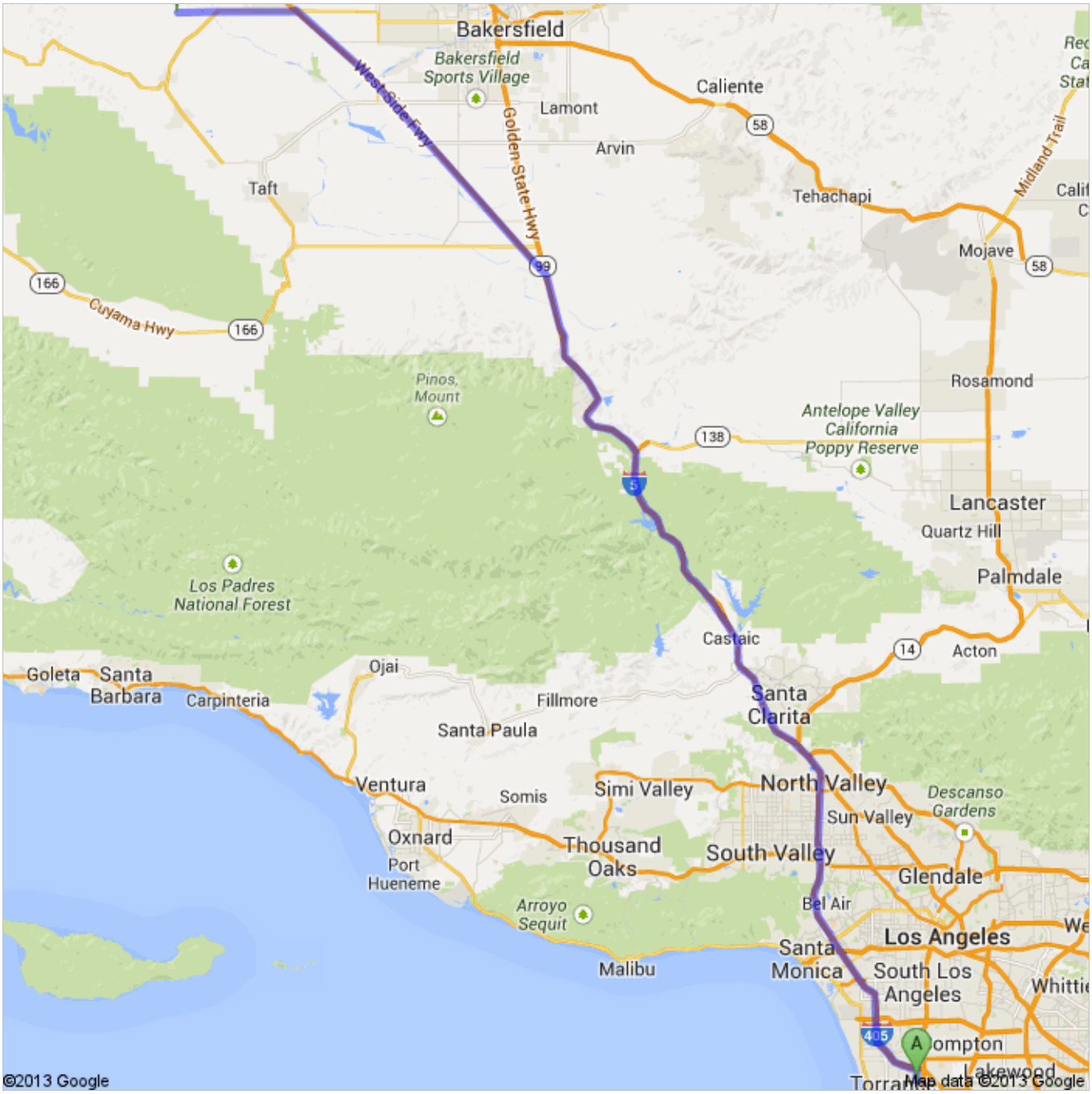
9081 Tujunga Ave, Sun Valley, CA 91352

These directions are for planning purposes only. You may find that construction projects, traffic, weather, or other events may cause conditions to differ from the map results, and you should plan your route accordingly. You must obey all signs or notices regarding your route.

Map data ©2013 Google

Directions weren't right? Please find your route on maps.google.com and click "Report a problem" at the bottom left.

Directions to Clean Harbors Environmental
2500 W Lokern Rd, McKittrick, CA 93251
148 mi – about **2 hours 20 mins**



20846 Normandie Ave, Torrance, CA 90502

1.	Head **north** on **Normandie Ave** toward **Torrance Blvd** About 3 mins	go 1.4 mi total 1.4 mi
2.	Turn right to merge onto **I-405 N/San Diego Fwy** toward **San Diego Fwy** About 35 mins	go 35.5 mi total 36.9 mi
3.	Merge onto **I-5 N** About 1 hour 27 mins	go 98.6 mi total 135 mi
4.	Take the exit toward **CA-58/Buttonwillow/McKitrick**	go 0.3 mi total 136 mi
5.	Turn right onto **Tracy Ave** About 57 secs	go 0.3 mi total 136 mi
6.	Turn right onto **CA-58 W** About 9 mins	go 8.0 mi total 144 mi
7.	Turn right onto **Lokern Rd** About 5 mins	go 4.1 mi total 148 mi

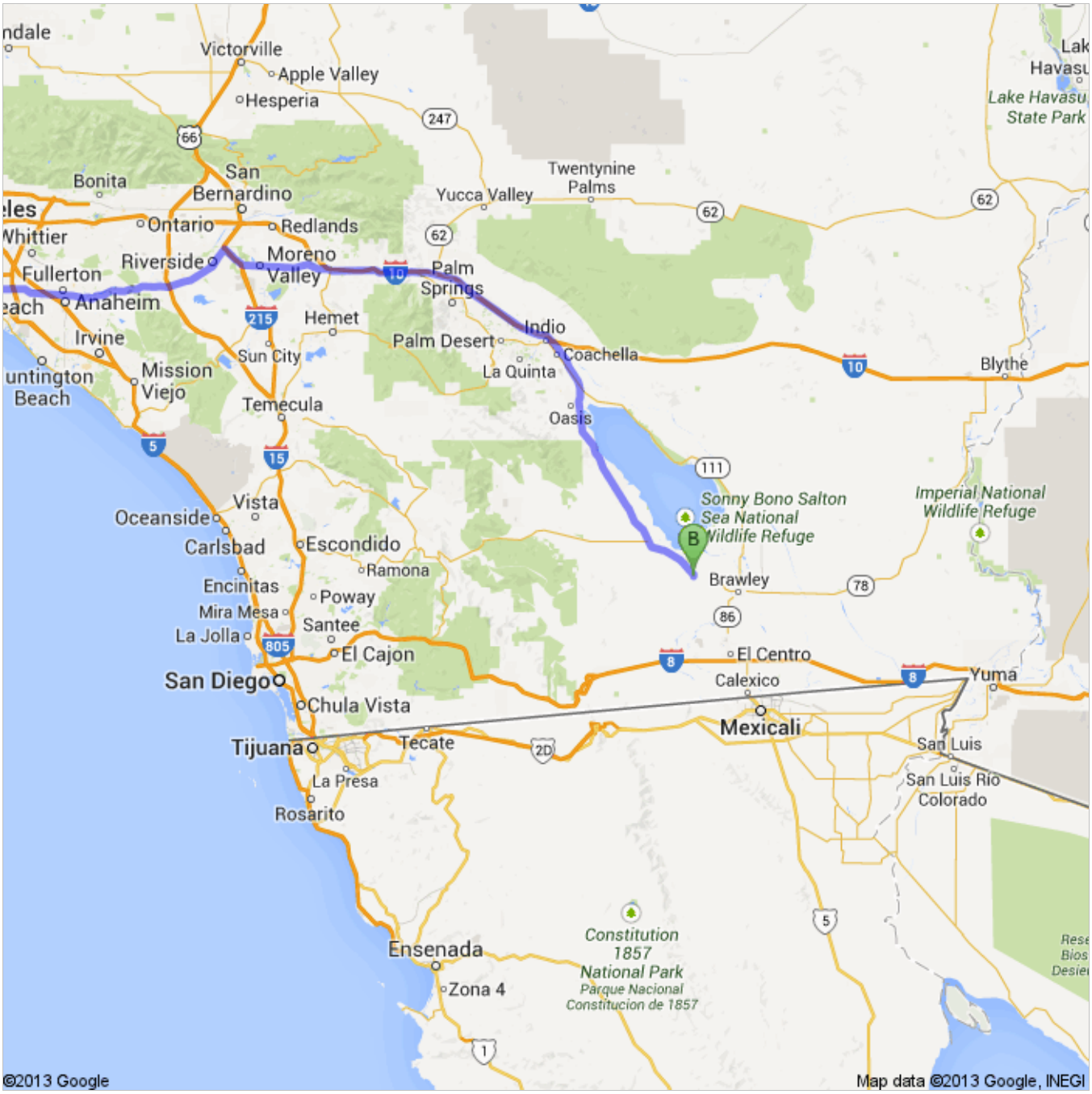
Clean Harbors Environmental
2500 W Lokern Rd, McKittrick, CA 93251

These directions are for planning purposes only. You may find that construction projects, traffic, weather, or other events may cause conditions to differ from the map results, and you should plan your route accordingly. You must obey all signs or notices regarding your route.

Map data ©2013 Google

Directions weren't right? Please find your route on maps.google.com and click "Report a problem" at the bottom left.

Directions to 5295 Garvey Rd, Westmorland, CA 92281
195 mi – about **2 hours 59 mins**



20846 Normandie Ave, Torrance, CA 90502

	1. Head **north** on **Normandie Ave** toward **Torrance Blvd**	go 322 ft total 322 ft
	2. Take the 1st right onto **Torrance Blvd** About 2 mins	go 0.8 mi total 0.9 mi
	3. Turn left onto **S Figueroa St** About 48 secs	go 0.2 mi total 1.0 mi
	4. Turn left to merge onto **I-110 N** toward **Los Angeles** About 2 mins	go 1.7 mi total 2.7 mi
	5. Take the exit onto **CA-91 E** About 54 mins	go 58.4 mi total 61.2 mi
	6. Take the **CA-60 E/I-215 S** exit toward **San Diego/Indio**	go 0.5 mi total 61.7 mi
	7. Merge onto **CA-60 E**	go 0.3 mi total 62.1 mi
	8. Merge onto **CA-60 E/I-215 S** About 4 mins	go 4.4 mi total 66.5 mi
	9. Keep left to continue on **CA-60 E** About 17 mins	go 18.2 mi total 84.6 mi
	10. Merge onto **I-10 E** About 41 mins	go 50.6 mi total 135 mi
	11. Keep right to continue on **CA-86 S**, follow signs for **Brawley/El Centro/865 Expy** About 42 mins	go 47.3 mi total 183 mi
	12. Merge onto **CA-78 E/CA-86 S** About 10 mins	go 11.8 mi total 194 mi
	13. Turn right onto **Buck Rd** About 4 mins	go 0.9 mi total 195 mi
	14. Turn right onto **Garvey Rd**	go 217 ft total 195 mi

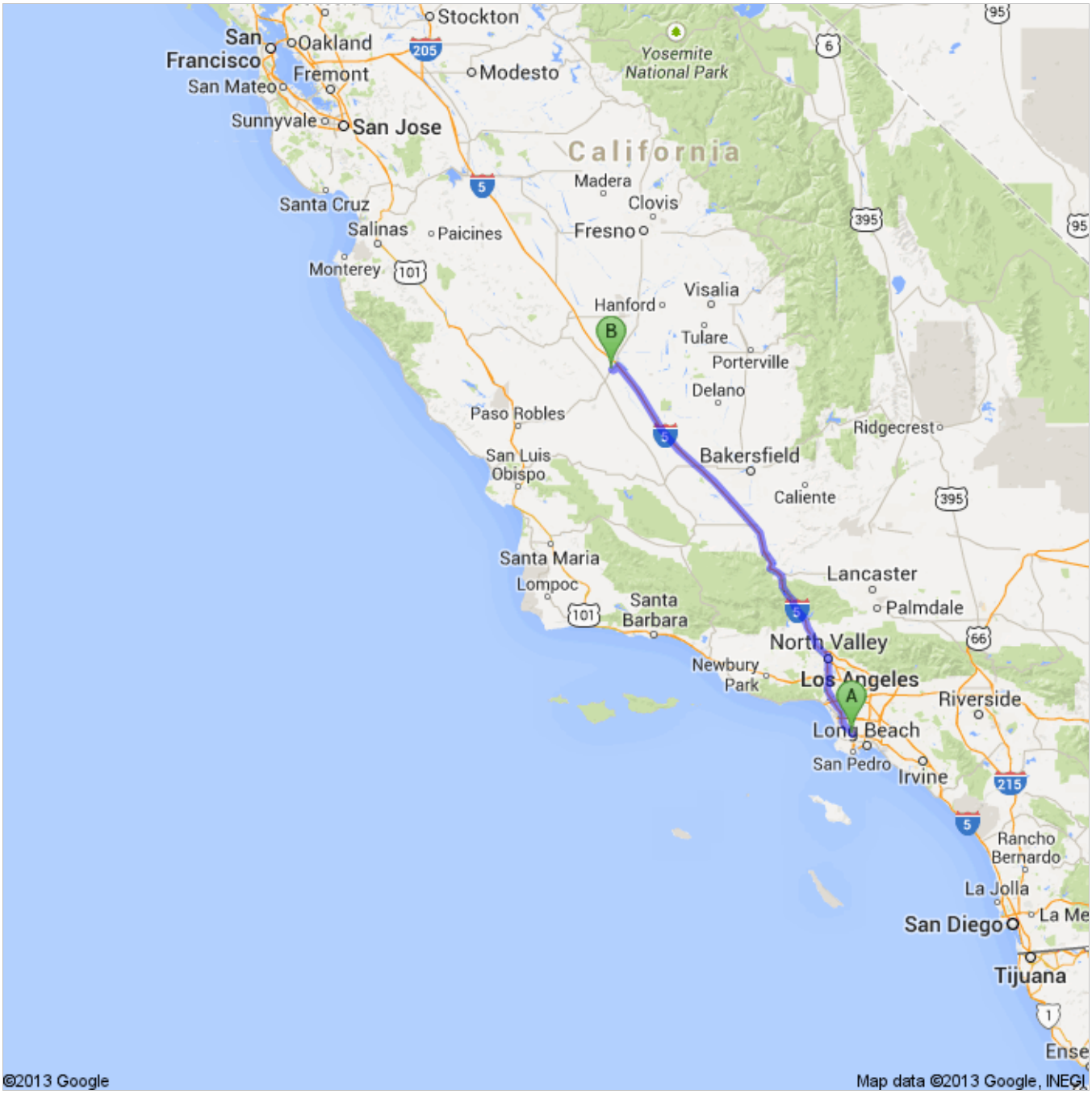
5295 Garvey Rd, Westmorland, CA 92281

These directions are for planning purposes only. You may find that construction projects, traffic, weather, or other events may cause conditions to differ from the map results, and you should plan your route accordingly. You must obey all signs or notices regarding your route.

Map data ©2013 Google, INEGI

Directions weren't right? Please find your route on maps.google.com and click "Report a problem" at the bottom left.

Directions to Waste Management Inc
35251 Skyline Rd, Kettleman City, CA 93239
191 mi – about **2 hours 55 mins**



20846 Normandie Ave, Torrance, CA 90502

1.	Head **north** on **Normandie Ave** toward **Torrance Blvd** About 3 mins	go 1.4 mi total 1.4 mi
2.	Turn right to merge onto **I-405 N/San Diego Fwy** toward **San Diego Fwy** About 35 mins	go 35.5 mi total 36.9 mi
3.	Merge onto **I-5 N** About 2 hours 8 mins	go 150 mi total 187 mi
4.	Take the exit toward **CA-41 S**	go 0.4 mi total 187 mi
5.	Keep left at the fork, follow signs for **CA-41 S**	go 174 ft total 187 mi
6.	Turn left onto **CA-41 S** About 5 mins	go 2.8 mi total 190 mi
7.	Turn right onto **Old State Hwy** Destination will be on the left About 2 mins	go 0.7 mi total 191 mi

Waste Management Inc
35251 Skyline Rd, Kettleman City, CA 93239

These directions are for planning purposes only. You may find that construction projects, traffic, weather, or other events may cause conditions to differ from the map results, and you should plan your route accordingly. You must obey all signs or notices regarding your route.

Map data ©2013 Google

Directions weren't right? Please find your route on maps.google.com and click "Report a problem" at the bottom left.

APPENDIX B

Manifests

Please print or type. (Form designed for use on elite (12-pitch) typewriter.)

Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator ID Number

2. Page 1 of

3. Emergency Response Phone

4. Manifest Tracking Number 000196020 **JJK**

GENERATOR

5. Generator's Name and Mailing Address

Generator's Site Address (if different than mailing address)

Generator's Phone:

6. Transporter 1 Company Name

U.S. EPA ID Number

7. Transporter 2 Company Name

U.S. EPA ID Number

8. Designated Facility Name and Site Address

U.S. EPA ID Number

Facility's Phone:

9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes
	1.					
	2.					
	3.					
	4.					

14. Special Handling Instructions and Additional Information

15. **GENERATOR'S/OFFEROR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name | Signature | Month | Day | Year

INT'L

16. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:

Transporter signature (for exports only): Date leaving U.S.:

TRANSPORTER

17. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name | Signature | Month | Day | Year

Transporter 2 Printed/Typed Name | Signature | Month | Day | Year

DESIGNATED FACILITY

18. Discrepancy

18a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection

Manifest Reference Number:

18b. Alternate Facility (or Generator)

U.S. EPA ID Number

Facility's Phone:

18c. Signature of Alternate Facility (or Generator) | Month | Day | Year

19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)

1.	2.	3.	4.

20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a

Printed/Typed Name | Signature | Month | Day | Year

EPA Form 8700-22 (Rev. 3-05) Previous editions are obsolete.

DESIGNATED FACILITY TO DESTINATION STATE (IF REQUIRED)

NON-HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No.

Manifest Doc. No.

2. Page 1 of

GENERATOR

3. Generator's Name and Mailing Address

4. Generator's Phone ( )

5. Transporter 1 Company Name

6. US EPA ID Number

A. Transporter's Phone

7. Transporter 2 Company Name

8. US EPA ID Number

B. Transporter's Phone

9. Designated Facility Name and Site Address

10. US EPA ID Number

C. Facility's Phone

11. Waste Shipping Name and Description	12. Containers No.	12. Containers Type	13. Total Quantity	14. Unit Wt/Vol
a.				
b.				
c.				
d.				

D. Additional Descriptions for Materials Listed Above

E. Handling Codes for Wastes Listed Above

15. Special Handling Instructions and Additional Information

16. **GENERATOR'S CERTIFICATION:** I certify the materials described above on this manifest are not subject to federal regulations for reporting proper disposal of Hazardous Waste.

Printed/Typed Name | Signature | Month | Day | Year

TRANSPORTER

17. Transporter 1 Acknowledgement of Receipt of Materials

Printed/Typed Name | Signature | Month | Day | Year

18. Transporter 2 Acknowledgement of Receipt of Materials

Printed/Typed Name | Signature | Month | Day | Year

FACILITY

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of waste materials covered by this manifest except as noted in Item 19.

Printed/Typed Name | Signature | Month | Day | Year

Printed by J. J. KELLER & ASSOCIATES, INC.

ORIGINAL – RETURN TO GENERATOR

APPENDIX E

Dust, Odor and VOC Air Monitoring Field Data Sheet for Excavation Activities

Dust, Odor and VOC Air Monitoring Field Data Sheet for Excavation Activities
(Includes Rule 1166 Requirements)
Ecology Control Industries
20846 Normandie Avenue, Torrance, California

Rule 1166 Plan #_____ ID #_____ _____ **Page of**

Monitor Information		***Calibration Data***		***Excavation Summary for Each Page***	
Brand:	_____	**Gas:**	_____	**Total cu. yd. this page:**	_____
Model:	_____	**Date:**	_____	**Total cu. yd. to date:**	_____
Type:		**By:**		**Total cu. yd. removed from site:**	

Time[1]	Location[2]	Activity[3]	PID reading[4]	Visual dust & odor observations (Y/N)		Comments

Notes:
1. In compliance with Rule 1166, VOC readings must be collected every 15 minutes during excavation activities.
2. Examples of location descriptions are 1 ft above excavation load, north property boundary, south property boundary, etc.
3. Activity examples are excavation, stockpile of material, working of stockpiles, loading, etc.
4. PID readings must be converted to hexane using the appropriate response factor for the calibration gas used, if hexane is not used.
5. See work plan for details regarding dust control and air monitoring.

I certify that the information contained in the above document is true and correct. I further certify that the above-listed hydrocarbon monitor was operated in a manner consistent with the manufacturer's specifications and the conditions specified within this plan. In addition, I certify that the above readings represent the actual measurements I observed and recorded during the excavation process.

Signature _____ Date _____

Name _____ Title _____

Company _____