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**WORKPLAN
HAZARDOUS WASTE PRELIMINARY
SITE INVESTIGATION
TASK ORDER NUMBER 04-987901-VC
CONTRACT NUMBER 43A0078**

**SOUTH OAKLAND MAINTENANCE STATION
1112 29th AVENUE
OAKLAND, CALIFORNIA**

8-23-01

prepared for

**CALIFORNIA DEPARTMENT OF
TRANSPORTATION
District 4
111 Grand Avenue
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prepared by

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575-1G026

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STATEMENT OF LIMITATIONS AND PROFESSIONAL CERTIFICATION

Information provided in this Workplan, prepared by Professional Service Industries, Inc. (PSI), is intended exclusively for the use of Caltrans for the evaluation of subsurface conditions as it pertains to the subject site. The professional services provided have been performed in accordance with practices generally accepted by other geologists, hydrologists, hydrogeologists, engineers, and environmental scientists practicing in this field. No other warranty, either expressed or implied, is made. As with all subsurface investigations, there is no guarantee that the work conducted will identify any or all sources or locations of contamination.

PSI reserves the right to deviate from the proposed scope of services outlined in this Workplan as needed to obtain the required information. If such deviation is necessary, PSI will seek prior approval from the client and the regulatory agency overseeing this project.

This Workplan is issued with the understanding that Caltrans is responsible for ensuring that the information contained herein is brought to the attention of the appropriate regulatory agency. This Workplan has been reviewed by a geologist who is registered in the State of California and whose signature and license number appears below.



Frank R. Poss, REA
Senior Hydrogeologist



Chris Merritt, RG
Project Geologist

1.0 INTRODUCTION

Professional Service Industries, Inc. (PSI) has been retained by the California Department of Transportation (Caltrans), under Task Order Number 04-987901-VC and Contract Number 43A0078, to prepare this Workplan to assess current soil and groundwater at the All-Aboard Mini Storage and to conduct quarterly groundwater monitoring for two quarters at the Caltrans South Oakland Maintenance Station in the City of Oakland, California (Figure 1). The All-Aboard Mini-Storage site is hydraulically down gradient of the Caltrans South Oakland Maintenance Station.

The scope of work for this investigation includes:

- Drill 3 soil borings at the All-Aboard Mini-Storage,
- Chemical analyses of soil and groundwater samples,
- Quarterly Groundwater Sampling, and
- Prepare a technical report describing the investigation and interpretation of the data generated.

1.1 PROJECT OBJECTIVE

The objective of the project is to evaluate the concentrations of selected potentially hazardous constituents in soil and groundwater. Analytical results from the soil and groundwater investigation will be examined with respect to regulatory criteria and published guidelines.

1.2 SITE DESCRIPTION AND HISTORY

The site is currently used as a maintenance station by Caltrans. The maintenance station includes offices, a repair shop, a sign shop, and several material storage bins. The entire property covers approximately two acres. The site is paved with asphalt and is relatively flat. The Alameda/Oakland Estuary is approximately 0.5 miles southwest of the site.

One 4,000-gallon diesel underground storage tank (UST) and one 2,000-gallon gasoline UST were removed from the site on March 11, 1997. The tank pit was over-excavated and soil samples were collected. Sidewall and bottom samples collected from the excavation contained concentrations of Total Petroleum Hydrocarbons as Gasoline (TPH-G, [as high as 380 milligrams per kilogram (mg/kg)]), and Total Petroleum Hydrocarbons as Diesel (TPH-D, [as high as 21 mg/kg]). Concentrations of Benzene, Toluene, Ethylbenzene, and Total Xylenes (BTEX), ranged from 0.010 to 48 mg/kg. Methyl

Tertiary Butyl Ether (MTBE) concentrations ranged from 0.041 to 9.15 mg/kg. Groundwater samples were not collected (Caltrans, 1999).

On April 6 and 7, 1999, Borings B1 through B6 were drilled at the site. The boring locations are presented in Figure 2. All of the borings were converted to 1.3-centimeter (cm) (0.5-inch) inside diameter temporary groundwater monitoring wells. Soil samples were collected from each boring at depths of 1.52, 3, and 4.56 meters (5, 10, and 15 feet) below ground surface (bgs). *not present*

Soil samples were analyzed for TPH-G, TPH-D, and Volatile Organic Compounds (VOCs), by EPA Method 8260. TPH-G was detected in one soil sample (B6-10 [13 mg/kg]). None of the soil samples contained detectable concentrations of TPH-D. MTBE was the only VOC detected in the soil samples analyzed. MTBE was detected in the sample B5-1.5 meters (0.16 mg/kg). No other soil sample contained a detectable concentration of MTBE (PSI, 1999).

TPH-G was detected in groundwater samples from temporary Wells B3 (520 µg/l) and B4 (520 µg/l). No other groundwater samples contained detectable concentrations of TPH-G. No TPH-D was detected in any of the groundwater samples. Benzene was detected in the water sample from Well WB3 (6.3 µg/l). ~~MTBE was detected in the samples from Well WB5 (8,600 µg/l) and WB6 (24 µg/l).~~ Concentrations of other gasoline related compounds were detected in samples from Wells WB1, WB3, WB4, and WB5. Chloroform was detected in water samples from Wells WB4 (2.4 µg/l) and WB6 (2.7 µg/l). Tetrachloroethene (synonym Perchloroethene [PCE]) was detected in the water sample from Well WB6 (12 µg/l) (PSI, 1999).

On August 13, 1999, Borings B7 through B9 were drilled at the site (Figure 2). The borings were drilled on the property boundary. The results of the sampling indicated the following: *not present*

- TPH-G concentrations were detected in one soil sample [B9-15 (0.54 mg/kg)] at the site.
- TPH-D was detected in one groundwater sample [WB7 (0.73 mg/l)]
- MTBE was detected in grab groundwater samples WB7 (5,600 µg/l) and WB8 (9.0 µg/l). The downgradient extent of MTBE has not been established. *HVOC's ?*

In June and July 2000, PSI completed a supplemental investigation, which included the installation of four monitoring wells at the site. The conclusions and recommendations of the investigation follows:

- None of the soil samples contained detectable concentrations of TPH-G, while TPH-D was detected in two soil samples at concentrations below regulatory concern.
- None of the soil samples contained detectable concentrations of VOCs with the exception of MTBE. The highest MTBE concentration detected was 0.52 mg/kg in soil sample B3-10. [REDACTED]
- None of the groundwater samples contained detectable concentrations of TPH-D, while TPH-G was detected in two groundwater samples at a maximum concentration of 2.7 mg/l.
- Numerous VOCs were detected in the groundwater with only benzene and MTBE being at concentrations greater than the State of California Primary Drinking Water Standard (PDWS) or Secondary Drinking Water Standard (SDWS). Based on the concentrations detected, MTBE appears to be the primary contaminant of concern (COC). The lateral extent of MTBE has not been defined.
- The report recommended continued groundwater monitoring and the installation of additional monitoring wells down gradient of monitoring well MW-3. Additionally, as TPH-D was not detected in the groundwater sample from monitoring well MW-3, the report recommended that the analyses for TPH-D in this well be eliminated.

This investigation is designed to determine whether MTBE has migrated down gradient on to the All-Aboard Mini Storage site.

2.0 PRE-FIELD ACTIVITIES

This section describes the tasks PSI will perform prior to initiating any field activities. These tasks include: 1) attending the Caltrans Task Order Meeting; 2) identifying borehole locations; 3) preparing the Pre-Work Site Visit Checklist; and 4) locating any underground utility lines in conjunction with Underground Service Alert (USA).

2.1 TASK ORDER MEETING

A Task Order Meeting was completed on May 21, 2000, with Mr. Chris Merritt of PSI and Ms. Frances Maroni of Caltrans in attendance. The primary purpose of the meeting was to familiarize PSI with site conditions that may impact field operations.

At the Task Order Meeting, the boring locations were determined and a Pre-Work Site Visit Checklist was completed. Topics specified in the checklist included identification of borehole locations, confirmation of underground utility clearance, location of water/power supply sources, and storage areas for drill cuttings.

2.2 HEALTH AND SAFETY PLAN

Prior to the commencement of field activities at the site, a site-specific Health and Safety Plan (HSP) will be developed in compliance with 29 CFR 1910.120, under the supervision of a Certified Industrial Hygienist. The HSP is designed to address the potential hazardous materials that may be encountered during field activities at the site. Further, the HSP will be designed to minimize the exposure to potentially hazardous materials and unsafe working conditions to on-site personnel.

2.3 UTILITY CLEARANCE

At least 48 hours prior to drilling activities, PSI will contact Underground Service Alert (USA) to identify utility lines that may underlie the areas of investigation. Additionally, a line locating company, Cruz Brothers of Scotts Valley, California, will clear the borings prior to drilling activities

3.0 SUBSURFACE INVESTIGATION

This section describes the methodology that will be implemented during the soil and groundwater investigation. The objectives of the sampling procedures are to provide an accurate assessment of the current soil and groundwater conditions and to minimize the potential for cross-contamination during sampling operations.

3.1 SOIL BORINGS

Three soil borings are scheduled to be drilled to investigate the soil and groundwater quality at the All-Aboard Mini Storage (hydraulically downgradient of the Caltrans South Oakland Maintenance Yard). The boring locations are presented in Figures 2 and were selected by Caltrans. A State of California licensed driller will provide the drilling services.

The borings will be drilled by the Geoprobe direct-push drilling technique. Soil samples will be collected at 1.5-meter intervals (5 foot) to 6.0 meters (20 feet) or to first groundwater. Fieldwork for drilling and soil sampling activities will be conducted in accordance with the field procedures described in Appendix A. Following drilling, the borings will be grouted with neat cement according to State and local guidelines.

3.2 SOIL SAMPLING PROTOCOL

Soil samples will be collected by a PSI geologist working under the supervision of a State of California Registered Geologist. The samples will be collected in 0.6-meter (2.0-foot) long stainless steel tubes. Upon retrieval of the sampler, a representative soil sample will be preserved for chemical analyses.

The soil samples will be logged on chain-of-custody records and transported to a State of California certified hazardous materials testing laboratory, following chain-of-custody protocol.

• which samples will be analyzed?

3.3 SOIL CLASSIFICATION

Soil will be described by a PSI geologist and recorded on a field-boring log for each boring drilled. The data recorded on the logs will be based on examination of soil samples retrieved and drilling conditions observed in the field. Boring logs will include information regarding the location of the boring, type of sampler used, and geologic descriptions of materials encountered.

Soils will be classified according to the "Soil and Rock Logging Classification Manual" prepared by the State of California, Department of Transportation. The Soil and Rock Logging Classification Manual is consistent with the unified soil classification system. Other information to be recorded on the logs will include indications of contamination and the occurrence of groundwater. Organic vapor analyzer (OVA) measurements for soil samples will be recorded on the field boring logs.

3.4 GROUNDWATER SAMPLING

Groundwater samples will be collected from each of the borings (Figure 2). The groundwater samples will be collected using temporary well points with samples obtained using disposable polyethylene tubing lowered through the drill stem. Groundwater samples will be collected using positive displacement and a check valve. Groundwater sampling will be conducted in accordance with the procedures described in Appendix A.

Following groundwater sample collection, the samples will be logged on a chain-of-custody record and placed in an ice chest at 4 degrees Celsius and handed to an on-site mobile laboratory for analysis in an ice chest at 4 degrees Celsius. Sample preservatives will be utilized as instructed by the analytical laboratory.

3.5 DECONTAMINATION PROCEDURES

Decontamination procedures will be implemented to maintain sample integrity and to prevent cross-contamination between sampling locations. All re-usable equipment will be cleaned with a non-phosphate detergent and rinsed twice with deionized water prior to use at a new sampling location. Sampling equipment includes:

- Stainless-steel sampling equipment,
- Drilling equipment, and
- Groundwater sampling equipment

3.6 STORAGE AND DISPOSAL OF GENERATED WASTES

Water from equipment cleaning activities will be stored in individually labeled 55-gallon drums. Disposition of the water will be determined upon receipt of laboratory analytical results of the soil and water samples. PSI will arrange for the management and appropriate disposal of soil and water generated during the field activities under Contract 43A0078.

3.7 MONITORING WELL SAMPLING

For the third and fourth quarter, 2001, the four-groundwater monitoring wells will be sampled for chemical analyses. Prior to groundwater sampling, the groundwater elevation will be measured from the top of the well casing. This data will be collected to allow calculation of the hydraulic gradient. The monitoring well will be purged of a minimum of three well volumes until pH, conductivity, and temperature stabilizes. The purging will be completed by bailing or pumping. Samples to be chemically analyzed for volatile organic compounds will be collected first. The groundwater samples will be collected according to PSI's standard protocol, presented in Appendix A.

Following groundwater sample collection, the samples will be logged on a chain-of-custody record and stored in an ice chest at 4 degrees Celsius. Sample preservatives will be utilized as instructed by the analytical laboratory. All transportation and handling of the groundwater samples will follow chain-of-custody protocol.

4.0 LABORATORY ANALYSIS PROGRAM

The soil and groundwater samples collected during this investigation will be submitted to a State of California Department of Health Services certified hazardous waste laboratory. A summary of the types of analyses and analytical methods is presented below.

The soil and groundwater samples collected will be analyzed for the following constituents:

- EPA Method 8015 modified – Total Petroleum Hydrocarbons as Gasoline (TPH-G);
- EPA Method 8260 – Volatile Organic Compounds (VOC); including MTBE and oxygenates.

✓ *besure this includes HVOEs.*

During groundwater sampling the following parameters will be measured.

- pH (field measurement)
- Conductivity (field measurement)
- Temperature (field measurement)

5.0 FIELD QUALITY ASSURANCE/QUALITY CONTROL

The following equipment calibration procedure and field documentation procedures will be implemented by PSI field personnel.

5.1 SAMPLE IDENTIFICATION

Soil samples collected in the field will be labeled according to standard protocol, as described in Appendix A.

5.2 CHAIN-OF-CUSTODY PROCEDURES

Chain-of-Custody records will be used to document sample handling and shipping procedures. Chain-of-Custody records will trace the samples from collection, through any custody transfers to the analytical laboratory. Information recorded on the Chain-of-Custody records will include location of sample collection, sample identification, number, date and time of collection, number and type of sample containers, and analyses requested. The shipping conditions will also be described on the Chain-of-Custody records. The name of the sampler(s) as well as the name of the person relinquishing the samples will be documented. Chain-of-Custody procedures are described in Appendix A.

5.3 FIELD INSTRUMENTS

An organic-vapor analyzer (OVA) will be used in the field for health and safety monitoring, as well as site assessment purposes. An OVA will be calibrated daily using a reference calibration gas. Calibration gas is pre-bottled by a laboratory supply house and has a listed calibration value in parts per million for each specific gas. The OVA will be used as an indicator of total petroleum hydrocarbons in soil samples and for health and safety purposes.

6.0 DATA MANAGEMENT

In accordance Contract 43A0078, a Daily Work Force Log will be completed by on-site personnel for each day in the field. The log will include the following items listed below:

- Task order number and contract number;
- Project name and location;
- Name, title, and company of person performing the work;
- Date work is being performed;
- Actual begin and end times of work;
- Description of work being performed;
- Additional notations, observations, or remarks to further characterize or clarify work being performed;
- Equipment utilized on site; and
- Change orders issued during site activities.

6.1 DATA STORAGE

Project correspondence, field notes, maps, and data will be filed within the main Project File at PSI's Hayward office. Chemical data will be entered onto a spreadsheet program for ease of organization, review, and presentation of data in the report. Hard copy files within the main Project File may include, but not be limited to:

- Basic Data: Soil boring logs, field procedures, forms, maps, analytical data.
- Project Field Logs: The project notebook and all field memorandums.
- Correspondence: All written correspondence and telephone conversation records.
- Data Presentation: All maps and tables generated from basic data analyses.
- Data Verification: Documentation that all tables, maps and texts using basic information have been reviewed.

7.0 SITE INVESTIGATION REPORT PREPARATION

Upon completion of the field activities described in this workplan, a draft report will be prepared presenting the investigative methodology implemented, findings, and conclusions for the subject site. The report will include the following elements:

- Title sheet,
- Signature page,
- Table of contents,
- Investigative summary,
- Introductory narrative of the project,
- File review Information,
- Investigative methods,
- Investigative results and field observations,
- Data evaluation and discussion,
- Graphs, Tables and Figures,
- Summary table (s) indicating laboratory results,
- Contaminant concentrations, analytical methods, and detection limits,
- Copies of original laboratory documentation,
- Field procedure forms, and chain-of-custody records,
- Conclusions, and
- Recommendations.

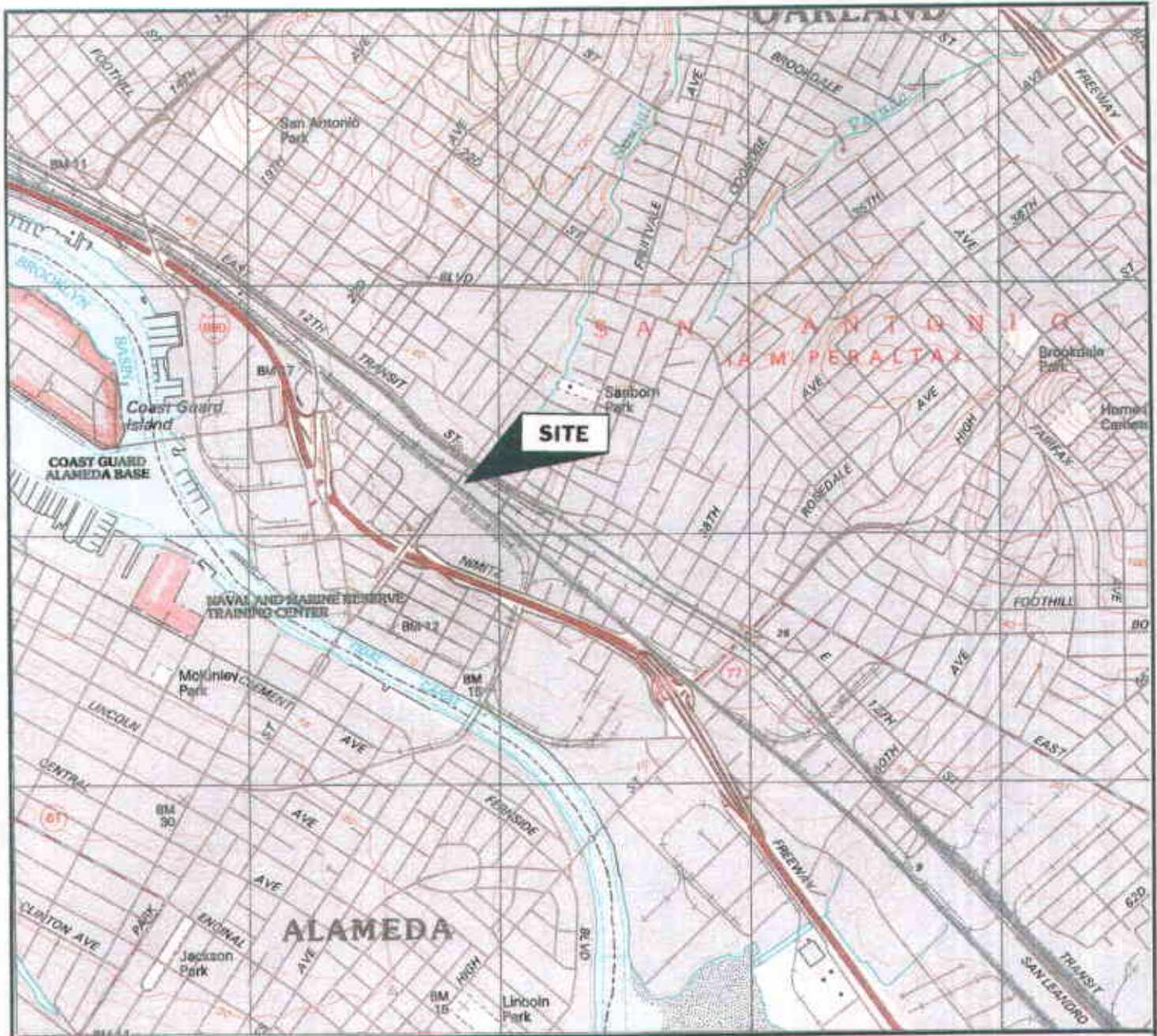
REFERENCES

Caltrans, 2001, Task Order # 04-987901-VC, Hazardous Waste Preliminary Site Investigation, prepared for Caltrans, August 14, 2001.

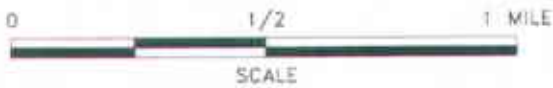
Caltrans, 1999, Contract NO. 43A0012.

Caltrans, 1996, Soil and Rock Logging Classification Manual (Field Guide), prepared for Office of Structural Foundations, August.

USGS, 1997, 7.5 minute topographical map titled, "Oakland East".



NORTH



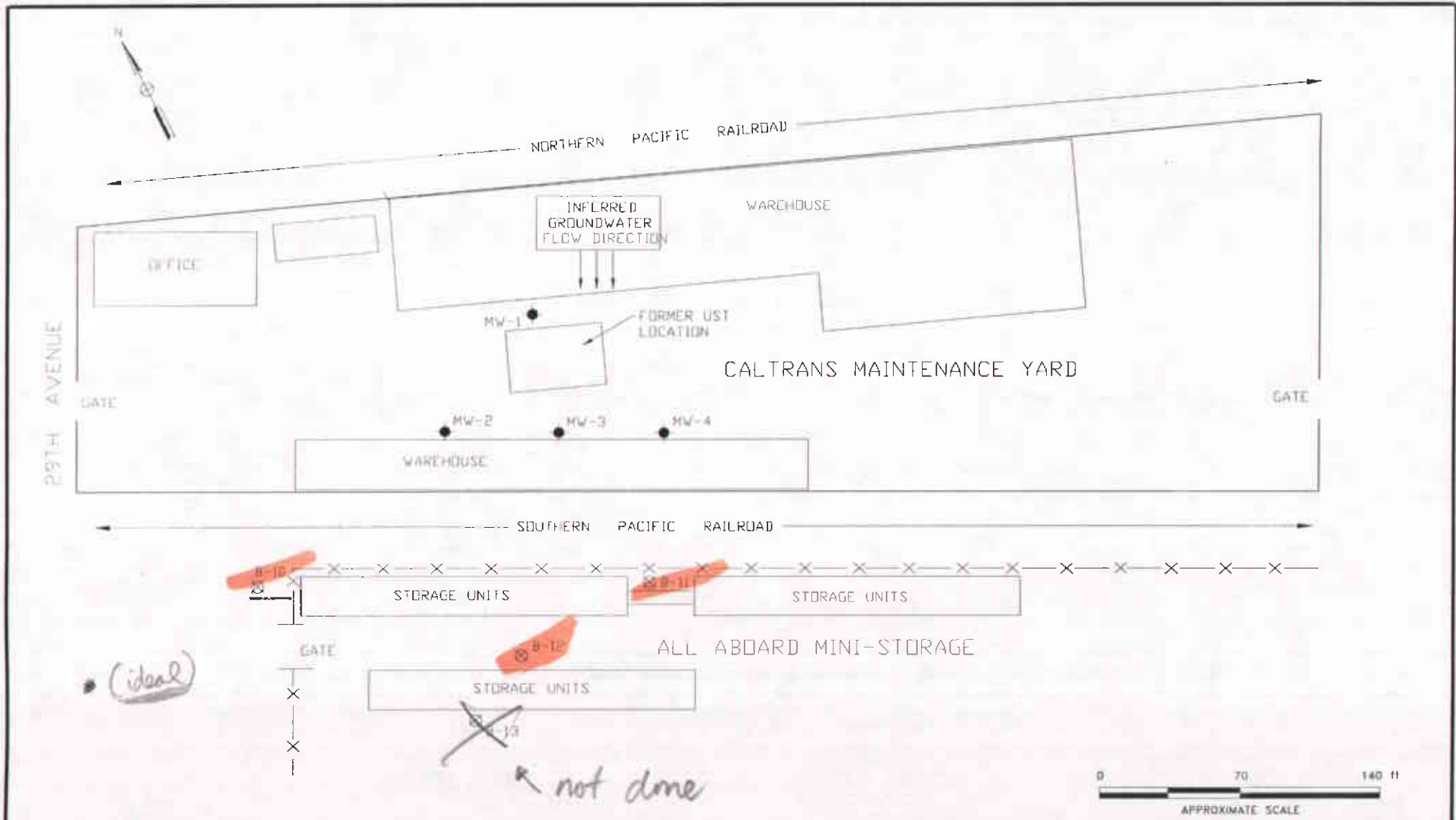
SCALE

REFERENCE:
U.S.G.S. OAKLAND EAST, CALIFORNIA, 1997

PSI ENVIRONMENTAL
GEOTECHNICAL
CONSTRUCTION
CONSULTING • ENGINEERING • TESTING


SITE LOCATION
CALTRANS MAINTENANCE STATION
1112 29TH AVENUE
OAKLAND, CALIFORNIA
PROJECT NUMBER: 575-90014

DATE: 3/23/99	CK'D BY:	FIGURE NO.: 1
FILE NO.: 90014-1		DRAWN BY: S. BOWERS



LEGEND

- MW-4 MONITORING WELL LOCATION
- ⊗ B-13 PROPOSED DRILLING LOCATIONS

 Information To Build On Engineering • Consulting • Testing	4703 Tidewater Avenue, Suite B Oakland, California 94601 (510) 434-9200		
	Project Name: CALTRANS MAINTENANCE STATION 1112 29th AVENUE, OAKLAND, CALIFORNIA	Drawn By: B.W.B.	Date: 8/01
Title: PROPOSED DRILLING LOCATIONS	Approved By: F.P.	Project No.: 575-0C019	2

APPENDIX A

FIELD PROCEDURES

APPENDIX A
FIELD PROCEDURES

I. DRILLING OF SOIL BORINGS AND COLLECTION OF SOIL SAMPLES

The following procedures will be used for the drilling and sampling of the soil borings drilled at the site:

1. Drilling will be conducted by a licensed State of California driller under the supervision of PSI. Drilling equipment will be pressure washed at the beginning of the day and between soil borings.
2. Prior to the commencement of drilling activities at the site, Underground Service Alert (USA) will be contacted to identify underground utilities in the areas that the borings will be located.
3. Boring logs for the soil borings drilled at the site will be prepared under the supervision of a State of California Registered Geologist. The soil cuttings observed during drilling will be described in accordance with the Unified Soil Classification System.
4. Soil samples will be collected using a 2.5-inch diameter stainless steel sampler. When the boring has been advanced to the appropriate sampling depth, a 2.5-inch diameter sampler lined with 2.5-inch diameter stainless steel tubes, will be placed in the open boring. When the sampler is advanced to the appropriate depth, the tip will be retracted and an undisturbed soil sample will be collected by driving the sampler into the subsurface using a percussion hammer.
5. Once the sampler has been retrieved the ends of the sample tube will be covered with Teflon sheets and capped with polyethylene end caps. The sample will be labeled and placed in a zip-lock bag in a chilled cooler pending delivery to the laboratory for analysis.
6. Soil samples will be assigned identification numbers such as B1-0.9, where B1 indicates the parcel address, boring 1 and -0.9 indicates that the sample was collected at 0.9 meters bgs from boring 1 at that address. The samples will be labeled with the sampling designation, depth, date, client name, and project number.

7. Soil samplers will be washed between sampling intervals with Alconox soap followed by two deionized-water rinses.
8. Chain-of-custody procedures using chain-of-custody forms will be used to document sample handling and transportation.
9. A Century 128 organic vapor analyzer (OVA) will be used to monitor volatile organic compounds (VOCs) in the ambient air during drilling at the site in accordance with the site health and safety plan. VOC concentrations in the soil will be measured and recorded on the borings logs for depths that soil samples were collected. VOCs in the soil will be measured at the sampling depths by partially filling a zip-loc bag with soil. The components of the soil are allowed to volatilize and fill the headspace in the tube for approximately 30 minutes prior to inserting the OVA probe through one of the end caps and recording the measurements.
10. Soil cuttings and steam wash water generated during drilling activities at the site will be contained in Department of Transportation (DOT) approved 55-gallon drums. The drums will be labeled with the contents, date, well or boring number, client name, and project number.

II FIELD DOCUMENTATION OF SAMPLING PROCEDURES

The following outline describes the procedures adhered by PSI for proper sampling documentation.

1. Sampling procedures will be documented in a field notebook that will contain:
 1. Sample collection procedures
 2. Date and time of collection
 3. Date of shipping
 4. Sample collection location
 5. Sample identification number(s)
 6. Intended analysis
 7. Quality control samples
 8. Sample preservation
 9. Name of sampler
 10. Any pertinent observations

2. Samples will be labeled with the following information:

1. Sample number
2. Well number
3. Date and time sample was collected
4. Sampler's name
5. Sample preservatives (if required)

3. The following is the sample designation system for the site:

For Borings, the samples will be labeled B-(Boring Number)-(Depth) (i.e. sample collected from boring 4 at 5 feet would be B4-5)

For groundwater samples (W) (Boring Number) (i.e. WB4)

4. Handling of the samples will be recorded on a chain of custody form, which shall include:

1. Site name
2. Signature of Collector
3. Date and time of collection
4. Sample identification number
5. Number of containers in sample set
6. Description of sample and container
7. Name and signature of persons, and the companies or agencies they represent, who are involved in the chain of possession
8. Inclusive dates and times of possession
9. Analyses to be completed

III. GROUNDWATER SAMPLING

The following are procedures ~~were~~ implemented while performing water sampling.

1. All equipment will be washed prior to entering the well with an Alconox solution, followed by two tap water rinses and a deionized water rinse.
2. Prior to sampling, depth-to-water was measured using a Solinst groundwater interface probe to an accuracy of approximately 0.01 foot.

3. Water samples will be collected with a single-use Teflon bailer. The water collected was immediately decanted into laboratory-supplied vials and bottles. The containers were overfilled, capped, labeled, and placed in a chilled cooler prior to delivery to the laboratory for analysis.
4. Chain-of-custody procedures, including chain-of-custody forms, were used to document water sample handling and transport from collection to delivery to the laboratory for analyses.
5. Groundwater samples were delivered to the State-certified hazardous waste laboratory within approximately 48-hours of collection.