SITE CONCEPTUAL MODEL AND ADDITIONAL SITE ASSESSMENT WORKPLAN

Alameda Islander Motel
2428 Central Avenue
Alameda, CA

Prepared By:
Strategic Engineering & Science, Inc.
110 11th Street
Oakland, California 94607
(510) 451-1761

SITE CONCEPTUAL MODEL AND ADDITIONAL SITE ASSESSMENT WORKPLAN

Alameda Islander Motel
2428 Central Avenue
Alameda, CA

PREPARED FOR:

City of Alameda Housing Development

PREPARED BY:

Strategic Engineering & Science, Inc.
110 11th Street, 2nd Floor
Oakland, California

May 26, 2011

Mark Trevor, P.G.
Senior Project Geologist

Mohammad Bazargani, P.E.
Principal Engineer

TABLE OF CONTENTS

SECTION Page

FIGURES

TABLES

APPENDICES

1.0 INTRODUCTION

On behalf of City of Alameda Housing Development, Strategic Engineering & Science, Inc. (SES) has prepared this site conceptual model and work plan for additional site assessment activities at the Alameda Islander Motel, located at 2428 Central Avenue, Alameda, California (Site) (Figure 1). The purpose of this report is to summarize the current understanding of Site conditions, identify requirements for additional investigation prior to evaluation of Site suitability for residential use, and to prepare a Workplan for any additional investigation deemed necessary. This scope of work is based on results of previous site investigations and discussions held with the Alameda County Environmental Health Services (ACEHS).

2.0 SITE DESCRIPTION AND BACKGROUND

The Site is located on the southern corner of the intersection of Central and Park Avenues in the City of Alameda, California. A multistory motel and office building currently occupy the Site (Figure 2). Properties to the north and east are developed for commercial uses. A residential neighborhood is situated to the west and south.

According to previous reports, a Chevron service station operated at the Site from 1947 until 1970. The station facilities were abandoned on January 27, 1970. One 7,500 gallon and three 3,000 gallon underground storage tanks (USTs) were removed from the Site along with the associated product piping. Confirmation soil samples were not collected at the time of the removal of the Site USTs and station abandonment. The Site was then leased to the post office from early 1970 until Chevron sold the Site to Stahl Wooldridge Construction Company in February 1971.

In 1973, a multi-story motel was constructed at the Site. The main motel structure consists of a three-story building constructed above an at-grade parking garage. The rear auxiliary building is a single-story structure constructed at grade. A concrete-paved parking lot is present between the two structures. An aged hydroelectric elevator is present at the northwestern corner of the main motel building.

3.0 GEOLOGY AND HYDROGEOLOGY

The Site is located at the western margin of the East Bay Plain, at the southern end of Alameda Island. San Francisco Bay is situated approximately ½ mile to the west, San Leandro Bay is situated approximately ½ mile to the south, and the Oakland Inner Harbor is situated approximately ¼ mile to the north and west. Local topography is flat at an elevation of approximately 10 feet above mean sea level. Soil in the vicinity of the Site is mapped as Pleistocene beach and dune sand deposits (Merit sand) that consist of loose well-sorted fin to medium sand. Soils encountered during previous investigations were described as silty sand and sand to the total explored depth of 21.5 fbg.

The groundwater table fluctuates seasonally. According to previous groundwater monitoring reports, depth to groundwater measurements have ranged from 4.66 fbg to 9.80 fbg. Groundwater flow direction also fluctuates. During the most recent groundwater

monitoring event, conducted on September 26, 1998, the groundwater flow direction was to the northwest at a gradient of 0.003 ft/ft. On December 16, 1994 the groundwater flow direction was to the northeast.

According to previous consultants, no municipal water wells are located within a ½ mile radius of the Site. One domestic well was identified approximately 1,000 feet to the northwest, located at the Alameda High School. The depth of this well is listed at 325 fbg and consists of a 16-inch diameter well casing. Current use of this well, if any, is unknown. A second well, listed by Alameda County as an irrigation well, is located approximately 400 feet north of the Site. The depth of the well is approximately 20 fbg. The current status of the well is not known by Alameda County.

4.0 PREVIOUS INVESTIGATIONS

In June 1993, two soil borings (EB-1 and EB-2) were advanced near the former dispenser island and former UST pit, respectively (Figure 2). Groundwater was encountered at approximately 10 feet below grade (fbg). Soil samples collected from borings EB-1 and EB-2 at 5 fbg did not contain detectable concentrations of Total Petroleum Hydrocarbons as gasoline (TPH-G), Total Petroleum Hydrocarbons as diesel (TPH-D), or benzene, toluene, ethylbenzene, and xylenes (BTEX) at the following detection limits:

- TPH-G/TPH-D: 0.05 mg/kg
- BTEX: 0.0005 mg/kg

The soil sample collected from boring EB-1 at 10 fbg contained 211 milligrams per kilogram (mg/kg) of TPH-D and 7.94 mg/kg of benzene. The grab groundwater sample collected from boring EB-1 contained 27,870 micrograms per liter (µg/l) of TPH-D and 1,782 µg/l of benzene. The grab groundwater sample collected from EB-2 did not contain detectable concentrations of TPH-G, TPH-D, or BTEX at the following detection limits:

- TPH-G/TPH-D: 50 µg/L
- BTEX: 0.5 µg/L

Groundwater monitoring wells MW-1 through MW-3 were installed in April 1994. Monitoring well locations are presented on Figure 2. Groundwater was encountered at approximately 7 fbg. Soil samples collected from borings MW-1 through MW-3 at 5 fbg and MW-3 at 10 fbg did not contain detectable concentrations of TPH-G, TPH-D, or BTEX. The soil sample collected from MW-1 at 10 fbg contained TPH-G (1,300 mg/kg) and TPH-D (3,000 mg/kg). The soil sample collected from boring MW-2 at 10 fbg contained detectable concentrations of TPH-G (3,000 mg/kg), TPH-D (340 mg/kg) and benzene (8 mg/kg). However, these soil samples were collected from below the static groundwater elevation at the time of installation. The groundwater sample collected from well MW-1 contained detectable concentrations of TPH-G (7,400 µg/l), TPH-D (840 µg/l), and benzene (120 µg/l). The groundwater sample collected from well MW-2

contained detectable concentrations of TPH-G (6,400 µg/l) and TPH-D (920 µg/l). The laboratory concluded that the TPH-D chromatogram pattern was indicative of weathered gasoline, not diesel. According to Gettler Ryan, as stated in their April 18, 1997 *Risk Based Corrective Action Report*, based on available records Chevron never distributed diesel at this Site. TPH-G, TPH-D, or BTEX were not detected in groundwater sample collected from MW-3.

Three offsite groundwater wells (MW-4, MW-5, and MW-6) were installed in August 1996. Monitoring well locations are presented on Figure 2. Groundwater was encountered at 7.5 fbg. Soil samples collected from borings MW-4 through MW-6 did not contain detectable concentrations of TPH-G, TPH-D, BTEX, or methyl tert butyl ether (MTBE). Groundwater samples collected from the newly installed wells did not contain TPH-G, TPH-D, BTEX, or MTBE compounds.

Quarterly groundwater monitoring and sampling was initiated at the Site in March 1994 and continued through September 1998. ORC was introduced into monitoring wells MW-1 and MW-2 on May 21, 1998. The introduction of ORC was to enhance natural attenuation processes in and around these wells. The effects of the remediation were not evaluated beyond the final monitoring and sampling event in September of that year. No further information was available.

During the last monitoring and sampling event (September 26, 1998), the groundwater sample collected from MW-1 contained TPH-G (1,400 µg/l), benzene (75 µg/l), ethylbenzene (1.1 µg/l), and total xylenes (2.2 µg/l). Groundwater samples collected from MW-2 contained detectable concentrations of TPH-G (610 µg/l), benzene (18 µg/l), toluene (0.58 µg/l), total xylenes (1.1 µg/l), and MTBE (10 µg/l). Hydrocarbons were not detected in monitoring wells MW-3 through MW-6 during the monitoring and sampling program.

A summary of groundwater concentrations over time is included as Table 1, and the concentration vs. time plots are included as Appendix A. A review of the primary COC concentrations over time suggests that in both wells (MW-1 and MW-2) TPH-G and MTBE decreased between 1996 and 1998, while benzene concentrations showed no clear trend.

In 1999, Gettler Ryan Inc. prepared a Risk Management Plan (RMP). The RMP included several risk management measures for the Site.

In 2001, the six monitoring wells associated with the Site were abandoned by pressure grouting. A “Fuel Leak Site Case Closure“ letter for the Site was issued by the Alameda County Health Care Services Agency on December 27, 2001, which accepted the risk management measures proposed by Gettler Ryan, Inc.

5.0 SITE CONCEPTUAL MODEL

5.1 Introduction

A Site Conceptual Model (SCM) describes the relationship between the chemical sources and human receptors that may be exposed to chemical constituents originating from environmental media impacted by anthropogenic (man-made) chemicals. The SCM integrates impacted environmental media, release mechanisms, retention and transport media, exposure points, and exposure routes to describe complete or potentially complete exposure pathways for potentially exposed populations.

A SCM for the Alameda Islander Motel property was constructed using information developed during previous environmental investigations conducted at the Site (See Section 3.0). The model illustrates the potential sources of contamination, the potential release mechanisms, the potential migration pathways for impacted media, and the routes of exposure for potentially hazardous chemical compounds.

The transport mechanisms for the site includes transport of dissolved phase chemicals through groundwater and transport subsurface gases through vapor phase migration in soil, groundwater, and air. The potential exposure pathways for human receptors at the Site include dermal contact, inhalation, and incidental ingestion.

The potential for human exposure to chemicals residing in soil, soil gas, and/or groundwater under the Site is influenced by at least four factors:

- The types of chemicals present at the Site;
- Chemical and physical interaction between the chemicals and the environment that act to move and transform the chemicals;
- Location and activities of human receptors that may place them in contact with either on-site or migrated chemicals; and
- Specific behaviors of these receptors that allow uptake of the chemicals, either currently or in the future.

The SCM developed for the subject property evaluates those exposure pathways that link the chemical sources and the types of releases with human and ecological receptor locations. An exposure pathway is considered complete if all the following components are present:

- A chemical source;
- A release and transport (i.e., chemical migration) mechanism;

- A receptor (i.e., a potentially exposed person);

- An exposure point at a receptor location (i.e., chemicals are present where receptors are located); and

- An exposure route through which a receptor may be exposed; (i.e., a chemical uptake route such as ingestion, inhalation, or dermal contact).

Each of these components and their interactions that may result in complete, incomplete, or insignificant exposure pathways are discussed below.

5.2 Chemical Sources

Chemicals of potential concern (COPCs) identified at the subject Site during previous investigations will be considered to be sources of chemicals that could come in contact with human receptors.

5.3 Chemical Release and Transport Mechanisms

Air, soil, and groundwater can all serve as potential transport media for chemicals to migrate from the Site to potential human receptors. However, the movement of a chemical in the environmental media will not necessarily result in actual human exposure. The rate of chemical movement and resulting concentration at a potential exposure point is dependent upon the characteristics of the chemicals and the environmental media through which the chemical passes.

There are a number of mechanisms by which chemicals are retained in environmental media or migrate from release points to other media and eventually to a human or ecological receptor. The following discussion outlines fate and transport mechanisms that could affect chemical exposure at the subject property, including the potential for the Site chemicals to migrate, persist, or be degraded in the environment.

5.3.1 Migration In Air

Chemicals can migrate from soil by volatilization, which is the mass transfer of a chemical from a specific medium to air. In general, volatile organic compounds (VOCs) could volatilize and migrate vertically and laterally through the soil via permeable zones or along man-made conduits such as buried utility lines. Through advection and dispersion, these vapors may be emitted to ambient air and indoor air of structures via foundation cracks. The potential for this transfer to occur is dependent on the physiochemical properties of the chemicals, such as water solubility, vapor pressure, and Henry's Law constant (air-water partition coefficient), as well as the chemical concentrations present at the site.

5.3.2 Migration from Soil to Groundwater

Chemical migration from Site soils to groundwater occurs by the infiltration of rainwater and/or by downward migration of free-phase product driven by gravitation and capillary forces and/or migration of chemicals from soil to water due to changing groundwater elevation. Historical Site investigation data has demonstrated the presence of Site related chemicals in groundwater under the Site. Therefore, the "Soil-to-Groundwater" chemical migration pathway is considered to be complete.

5.3.3 Migration in Groundwater

Chemicals dissolved in groundwater can migrate off Site with groundwater flow. This migration can take the chemicals to a human receptor if the groundwater discharges into a surface water body or if it is extracted through a well.

5.4 Potentially Exposed Populations

The identification of potentially exposed populations is based on the anticipated current and future land use of the site. For this SCM, two distinct current and future land use scenarios will be evaluated. The potential receptors to be evaluated under each exposure scenario are described below:

- *Current Commercial Land Use*. Potential receptors under this exposure scenario may include operations staff and guests at the Islander Motel. The employees may be engaged in the everyday operation of the motel. These employees work 40-hour weeks and about 250 days per year. Current onsite workers may also include specialized maintenance and operations personnel that work at the site on a part-time basis. Motel guests are considered transient potential receptors and would not be subject to long-term exposure.
- *Future Residential Land Use.* This exposure scenario assumes that entire site will be redeveloped to accommodate a residential apartment complex. Potential receptors under this exposure scenario includes adult and child residents as well as full-time and part-time employees.

Off-site receptors, such as off-site residents and commercial/industrial workers, are potentially exposed to chemical contaminants migrating from the subject property. Off-site receptors include:

- Adult and child residents living within residential developments (houses) that are located in the immediate vicinity of the site;
- Adult industrial/commercial workers; and
- Adult construction workers (mostly excavation workers).

The purpose of this SCM and Workplan is ultimately to determine the suitability of the site for a use re-designation from commercial (the Islander Motel) to a residential

development (apartment complex). The site received closure under the existing use (i.e. commercial). Therefore, the subsequent risk assessment will only receptors identified under the residential scenario. Accordingly, the workplan detailed below has been deisnged with that objective in mind.

5.5 Exposure Pathways Evaluated

It is possible that current onsite workers and future onsite residents will have the potential to breathe vapor emissions migrating upward through and dispersing from soil and into the air. Onsite workers would also be likely to have direct contact with soil. Thus in this CSM, the inhalation of vapors and the ingestion and dermal contact with soil particles have been included as potentially complete exposure pathways. A general description of each exposure pathway is provided below.

5.5.1 Air Pathways

VOCs may migrate to the surface in the form of vapors. Both on- and off-site respirable air may be impacted by chemicals volatilizing from soils, landfill gas and groundwater. Human intake factors such as characteristics of exposed receptors, inhalation rates, and exposure time and duration determine the potential dose received by an individual through the inhalation route.

5.5.2 Soil Pathways

In addition to the inhalation pathway, humans can also be exposed to chemicals in soil through the oral and dermal pathways. The oral and dermal pathways are of importance for chemicals with low volatility potential such as metals, semivolatile organic compounds (SVOCs) and polynuclear aromatic hydrocarbons (PAHs). Humans may be exposed to chemicals in soil when they accidentally ingest soil particles (through hand-to-mouth contact). Oral intake of soil particles is known to be of special significance in children because they are known to spend more time playing outdoors and in some cases (i.e., Pica Syndrome) are known to ingest soil voluntarily. Onsite workers are likely to come in contact with superficial soils at the subject property. However, superficial and shallow site soils may not be impacted by the chemicals of potential concern. Therefore, the oral exposure pathway is considered to be potentially complete for current and future onsite receptors.

The dermal pathway is especially important for on-site workers and residents engaged in outdoor activities. The dermal exposure pathway is a relatively minor pathway for VOCs superficial and shallow site soils may not be impacted by the chemicals of potential concern. Therefore the dermal exposure pathway is considered to be potentially complete for current and future onsite receptors.

5.5.3 Groundwater Pathways

Groundwater at the Site is not a domestic or industrial source; domestic water needs are supplied by a municipal system unaffected by the Site. Therefore, there is no pathway for exposure to groundwater and exposures to groundwater will not be evaluated.

5.5.4 Surface Water Pathways

Precipitation that falls within the site is discharged directly to the storm drain system in adjacent public roads. Current and future onsite receptors are not expected to be routinely exposed to surface water runoff.

As surface water runoff flows directly to City storm drains, off-site receptors do not (and will not) have contact with surface water that originates at the subject property. For this reason, off-site receptors do not have direct contact with surface water that is known to be impacted by site-related chemicals. Thus, exposure to surface water is considered to be complete but insignificant for off-site receptors.

6.0 DATA GAPS

Based on the review of site conditions and the results of the SCM using currently available data, the following data gaps have been identified:

1. The extent of impact to shallow soil at and near the location of the former UST's is not adequately defined.
2. The presence of vapor-phase hydrocarbons in shallow soil at and near the locations of the former UST's and the future building development site have not been adequately evaluated. Volatile organic vapor intrusion is the most likely exposure pathway to affect future Site residents. A thorough evaluation of this possibility will be required prior to re-designating the Site uses.
3. The extent of downgradient plume migration was not adequately characterized. As indicated in Section 3, the hydraulic gradient direction fluctuates almost 90-degrees between northwest and northeast. Monitoring wells installed during the Site's active period did not fully monitor potential contaminant migration directions.
4. A potential sensitive receptor has not been fully evaluated. According to Gettler Ryan, as stated in their April 18, 1997 *Risk Based Corrective Action Report*, a domestic well was reported to have existed at a high school located 1,000 feet west of the Site. Although the direction of the well is generally cross-gradient from the Site, the current status of this well should be determined.

7.0 ADDITIONAL SITE ASSESSMENT

Additional site assessment will be required prior to evaluating the Site's suitability for the proposed use. The additional assessment will be conducted to fill the data gaps identified in Section 6 above.

The following summarizes the planned additional site assessment activities:

- Complete approximately eight (8) direct-push soil borings to approximately 5 feet below grade or to the top of the first water bearing zone, which is anticipated to be encountered from 5 to 10 feet below grade (fbg). Grab groundwater samples will be collected from all eight soil borings. One to two soil samples will be collected from five borings. Groundwater and soil samples will be submitted to a state-certified laboratory for analysis;

- Collect soil gas samples at four (4) locations in proposed new development area and near former USTs and dispenser island; and

- Submittal of summary report documenting assessment activities and results.

8.0 SITE ASSESSMENT ACTIVITIES

8.1 Pre-Field Activities

Prior to the commencement of field activities, all necessary permits will be obtained from the applicable regulatory agencies. Underground Service Alert (USA) will be notified at least two business days prior to the commencement of field activities so that public utility companies will locate their lines.

A health and safety plan that promotes personnel safety and preparedness during the planned activities has been developed and is included in Appendix B. On the morning of the day that the field activities are to commence, a "tailgate" safety meeting will be conducted with applicable field workers to discuss the health and safety issues and concerns related to the specific work.

8.2 Direct Push Soil Borings

Eight (8) direct-push soil borings will be advanced at the locations depicted in Figure 3. The borings will be advanced to approximately 5 feet below grade or to the top of the first water bearing zone, which is anticipated to be encountered from 5 to 10 fbg.

Soil sampling will be completed by direct-push sampling techniques using a truck-mounted direct-push rig for the six soil borings. Soil samples will be collected continuously to the total depths drilled at each boring. Samples will be collected for soil description in accordance with the Unified Soil Classification System (ASTM D-2487).

Soil samples from the five borings will be collected from five-foot depth intervals. Approximately one to two soil samples will be selected from each of the five borings for chemical analyses. Additional samples may be collected based on field observations. Soil sampling locations are shown on Figure 3. General field procedures to be followed during this investigation are detailed in Appendix C.

Grab groundwater samples will be collected from all eight soil borings. When groundwater is encountered, a grab sample of water will be collected by placing a temporary ¾-inch PVC well screen into the boring and collecting a water sample using an appropriate bailer.

After sampling is completed, borings will be properly sealed with cement grout.

8.3 Soil and Groundwater Analysis

Select soil and groundwater samples from the soil borings will be submitted to a State-certified laboratory for analysis. The selected samples will be properly preserved and transported to the laboratory under appropriate chain-of-custody protocol.

The laboratory will analyze the selected soil and groundwater samples for the following constituents:

- Volatile Organic Compounds (VOCs) using EPA Method 8260B full-scan;
- TPH as gasoline (EPA 8015)
- TPH as diesel (EPA 8015)

Data collected during soil and groundwater sampling activities will be evaluated by comparing soil constituent concentrations to California Human Health Screening Levels (CHHSLs) for Residential Soil and groundwater constituent concentrations to Environmental Screening Levels (ESLs) for Groundwater (groundwater is not a current or potential drinking water source). Screening criteria will be included with data summarized in tables contained within the summary report.

8.4 Soil Gas Sampling

SES will collect four (4) soil gas samples at the location of the proposed new construction area on the northwestern portion of the Site and at the location of the former USTs and former dispenser island. Sample locations are shown on Figure 3. The samples will be collected from the subsurface by direct-push sampling techniques using a truck-mounted direct-push rig. Sample will be collected from a depth of approximately 3½ fbg. General field procedures to be followed during this investigation are detailed in Appendix C.

The samples will be collected in individual clean and certified 6-liter summa canisters and analyzed for TPH-G by EPA Test Method TO-3 MOD and for BTEX, MTBE, and

isopropyl alcohol (the leak detection compound) by EPA Test Method TO-15. To help evaluate if the soil gas samples are representative of subsurface conditions and did not have leakage to the atmosphere, the samples will also be analyzed for oxygen, carbon dioxide, and methane (ATSM D-1946).

Data collected during soil gas sampling activities will be evaluated by comparing constituent concentrations to CHHSLs for Residential Shallow Soil Gas. Screening criteria will be included with data summarized in tables contained within the summary report. If data exceeds CHHSLs screening levels, SES will prepare either a Risk Assessment or recommend risk management measures for the Site.

9.0 WASTE DISPOSAL

Waste generated during site assessment activities will be stored onsite in Department of Transportation (DOT) approved drums pending profiling and disposal to an approved disposal/recycling facility. Waste manifests will be prepared for proper transport and disposal of the waste.

10.0 SUMMARY REPORT

A report summarizing sampling activities will be prepared and will include the following elements:

- Site map showing sampling locations
- Description of field work performed
- Tabulated results of soil gas and groundwater sample analyses and copies of laboratory reports
- Evaluation of findings
- Recommendations for future action

11.0 WORK SCHEDULE

The planned activities will begin immediately upon ACEHS approval of the Workplan. A Summary Report will be submitted within three to four weeks of the receipt of all analytical results.

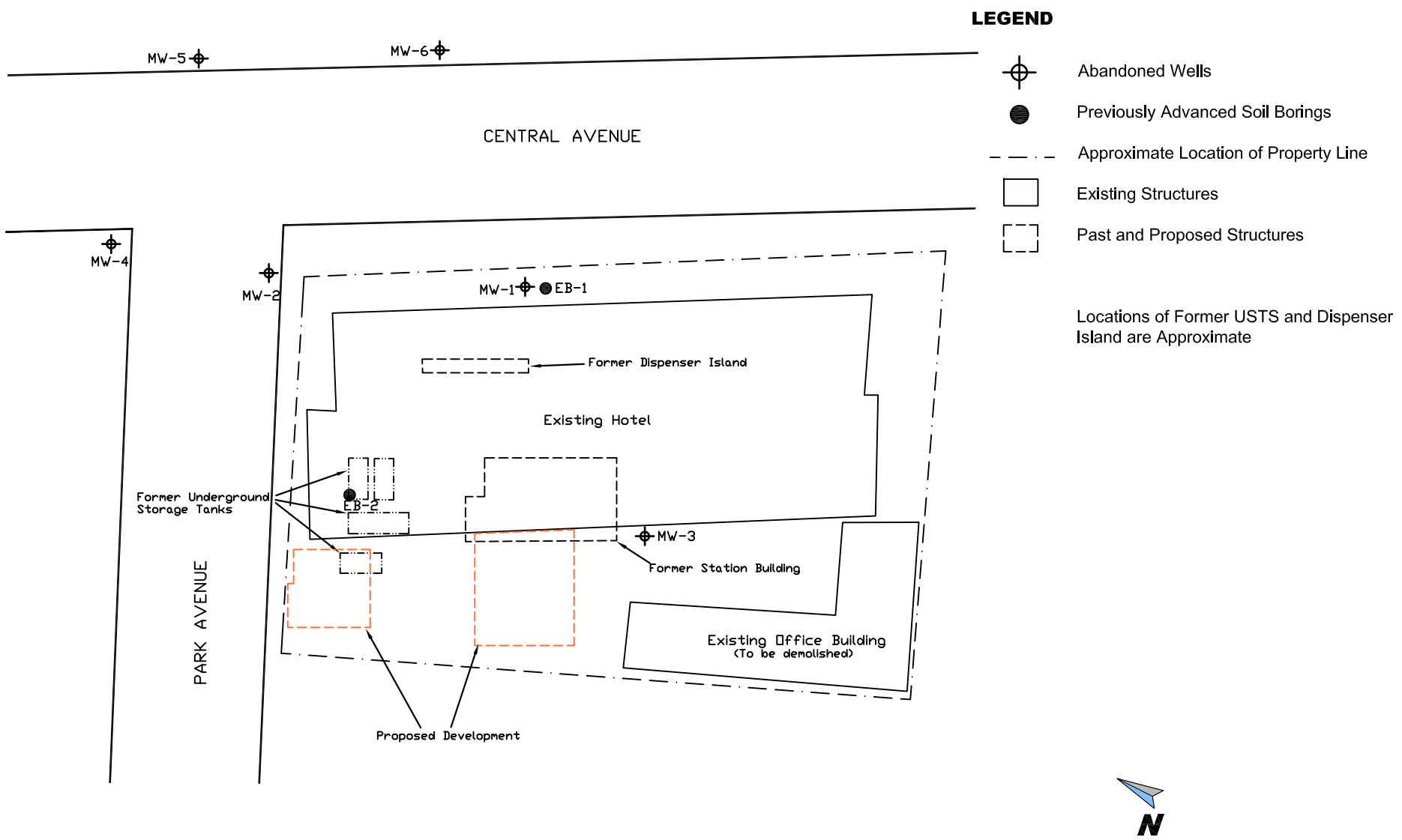
FIGURES

NOT TO SCALE

Vicinity Map
2428 Central Avenue
Alameda, California

Figure 1	05/24/11	SES

P:\CAD\0208 City of Alameda\2428CentralAve\Fig1_Vicinity_Map.dwg



APPROXIMATE GRAPHICAL SCALE (FEET)

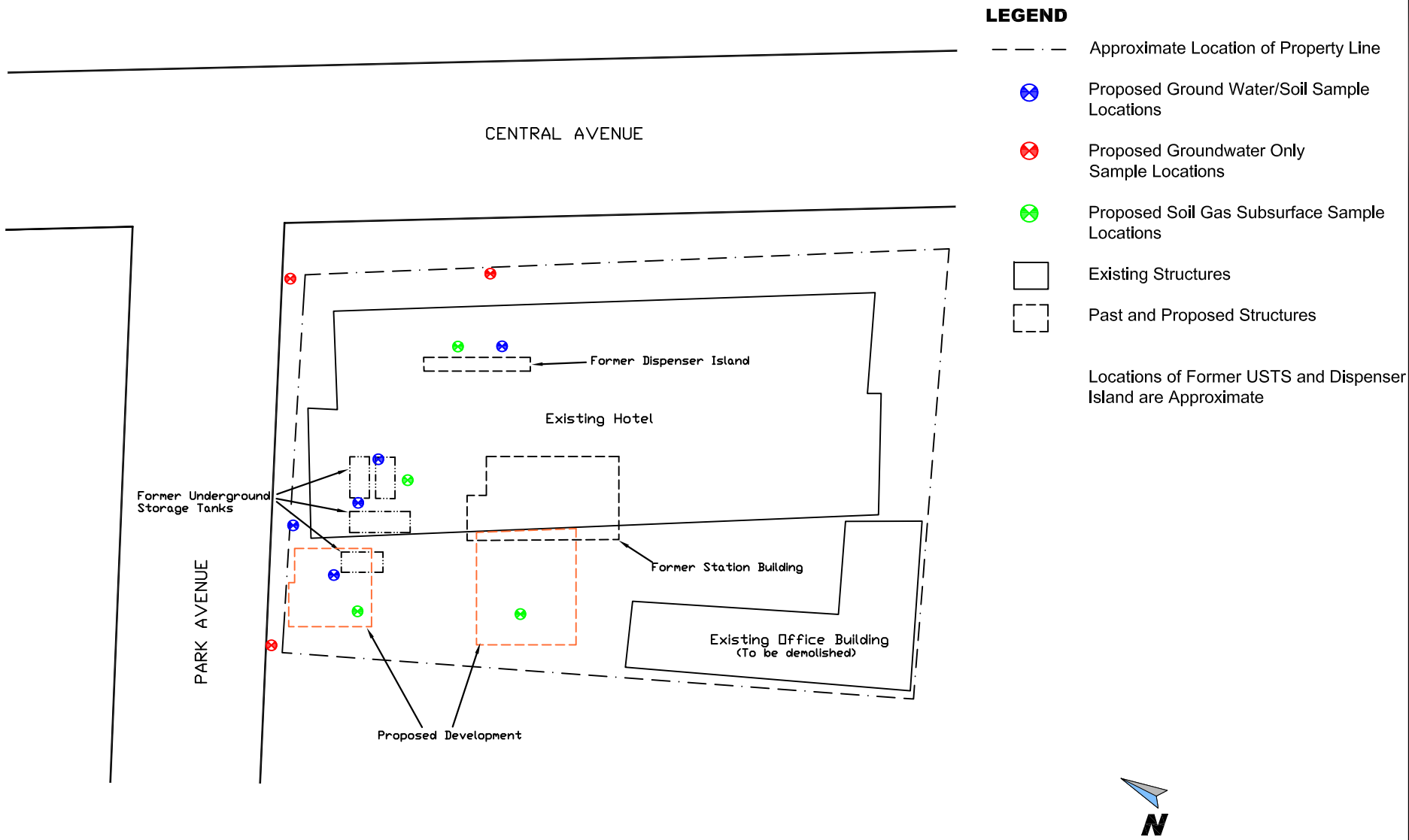
0 50 100

Site Plan Showing Abandoned Wells & Soil Borings

2428 Central Avenue
ALAMEDA, CALIFORNIA

Figure 2	05/24/11	SES STRATEGIC ENGINEERING & SCIENCE

P:\CAD\0208 City of Alameda\2428CentralAve\2428CentralAveAlameda.dwg



Site Plan Showing Proposed Sampling Locations

2428 Central Avenue
ALAMEDA, CALIFORNIA

Figure 3	05/24/11	SES STRATEGIC ENGINEERING & SCIENCE

P:\CAD\0208 City of Alameda\2428CentralAve\2428CentralAveAlameda.dwg

TABLES

Table 1

RESULTS OF LABORATORY ANALYSIS OF GROUNDWATER SAMPLES
Alameda Islander Motel (Former Chevron Service Station #9-0100)

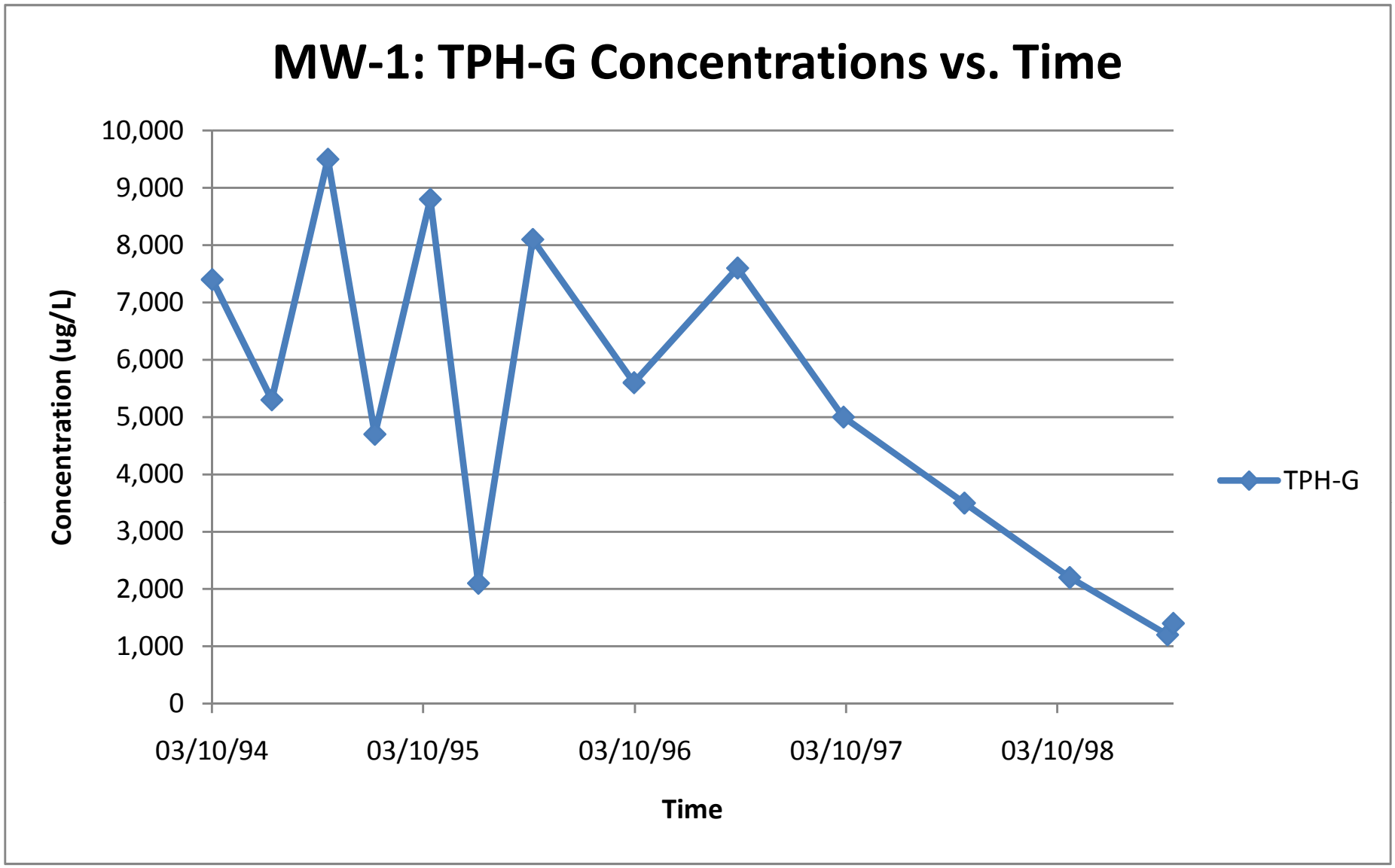
Well ID	Sample Date	Depth to Water (fbg)	Top of Casing Elevation (feet msl)	Groundwater Elevation (feet msl)	TPH-G (ug/L)	Benzene (ug/L)	Toluene (ug/L)	Ethylbenzene (ug/L)	Total Xylenes (ug/L)	MTBE (ug/L)
MW-1	03/10/94	6.79	29.25	22.46	7,400	120	120	33	72	--
MW-1	06/21/94	7.74	29.25	21.51	5,300	140	60	21	43	--
MW-1	09/26/94	8.94	29.25	20.31	9,500	ND<250	ND<250	ND<250	ND<250	--
MW-1	12/16/94	6.57	29.25	22.68	4,700	ND<0.5	46	15	48	--
MW-1	03/22/95	5.16	29.25	24.09	8,800	55	14	11	ND<10	--
MW-1	06/13/95	5.84	29.25	23.41	2,100	130	29	9.5	15	--
MW-1	09/15/95	7.65	29.25	21.60	8,100	110	26	6.0	13	--
MW-1	03/08/96	5.36	29.25	23.89	5,600	250	ND<5.0	ND<5.0	ND<5.0	60
MW-1	09/03/96	8.03	29.25	21.22	7,600	270	5.6	3.4	4.9	120
MW-1	03/05/97	5.33	29.25	23.92	5,000	130	5.2	3.7	5.7	31
MW-1	09/30/97	8.86	29.25	20.39	3,500	53	2.4	2.8	6.4	26
MW-1	03/31/98	4.38	29.25	24.87	2,200	210	ND<5.0	ND<5.0	14	60
MW-1	09/16/98	7.17	29.25	22.08	1,200	94	ND<0.50	ND<0.50	ND<0.50	ND<2.5
MW-1	09/26/98	7.30	29.25	21.95	1,400	75	ND<1.0	1.1	2.2	ND<5.0
MW-2	03/10/94	6.94	29.19	22.25	6,400	ND<5	64	58	17	--
MW-2	06/21/94	7.89	29.19	21.30	1,800	23	12	6.9	32	--
MW-2	09/26/94	8.98	29.19	20.21	8,400	ND<100	ND<100	ND<100	ND<100	--
MW-2	12/16/94	6.65	29.19	22.54	2,300	ND<0.5	29	8.9	33	--
MW-2	03/22/95	5.15	29.19	24.04	1,500	0.6	4.5	ND<0.5	2.5	--
MW-2	06/13/95	6.06	29.19	23.13	880	ND<0.5	ND<0.5	2.2	10	--
MW-2	09/15/95	7.72	29.19	21.47	2,700	ND<0.5	17	4.8	13	--
MW-2	03/08/96	5.38	29.19	23.81	1,300	42	2.0	0.7	2.2	10
MW-2	09/03/96	8.14	29.19	21.05	2,700	64	4.6	1.6	4.6	35
MW-2	03/05/97	5.43	29.19	23.76	1,200	25	3.0	ND<0.5	3.6	ND<5.0
MW-2	09/30/97	9.01	29.19	20.18	2,400	12	1.0	1.4	5.8	6.9
MW-2	03/31/98	4.66	29.19	24.53	490	12	1.2	ND<1.0	1.2	ND<5.0
MW-2	09/16/98	7.35	29.19	21.84	820	44	9.4	1.8	5.1	23
MW-2	09/26/98	8.20	29.19	20.99	610	18	0.58	ND<0.50	1.1	10
MW-3	03/10/94	7.30	30.10	22.80	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	--
MW-3	06/21/94	8.53	30.10	21.57	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	--
MW-3	09/26/94	9.80	30.10	20.30	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	--
MW-3	12/16/94	7.11	30.10	22.99	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	--
MW-3	03/22/95	5.54	30.10	24.56	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	--
MW-3	06/13/95	6.48	30.10	23.62	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	--
MW-3	09/15/95	8.40	30.10	21.70	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	--
MW-3	03/08/96	5.69	30.10	24.41	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5.0
MW-3	09/03/96	8.80	30.10	21.30	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5.0
MW-3	03/05/97	5.89	30.10	24.21	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5.0
MW-3	09/30/97	9.68	30.10	20.42	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5.0
MW-3	03/31/98	4.87	30.10	25.23	ND<50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<2.5
MW-3	09/16/98	8.13	30.10	21.97	ND<50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<2.5
MW-4	09/03/96	8.32	29.31	20.99	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5.0
MW-4	03/05/97	5.80	29.31	23.51	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5.0
MW-4	09/30/97	9.18	29.31	20.13	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5.0
MW-4	03/31/98	4.87	29.31	24.44	ND<50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<2.5
MW-4	09/16/98	7.45	29.31	21.86	ND<50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<2.5
MW-5	09/03/96	7.90	28.88	20.98	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5.0
MW-5	03/05/97	5.70	28.88	23.18	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5.0
MW-5	09/30/97	8.73	28.88	20.15	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5.0
MW-5	03/31/98	4.89	28.88	23.99	ND<50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<2.5
MW-5	09/16/98	6.72	28.88	22.16	ND<50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<2.5
MW-6	09/03/96	7.98	29.24	21.26	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5.0
MW-6	03/05/97	5.61	29.24	23.63	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5.0
MW-6	09/30/97	8.88	29.24	20.36	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5.0
MW-6	03/31/98	5.07	29.24	24.17	ND<50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<2.5
MW-6	09/16/98	7.05	29.24	22.19	ND<50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<2.5
				ESLs	NE	46	130	43	100	1,800

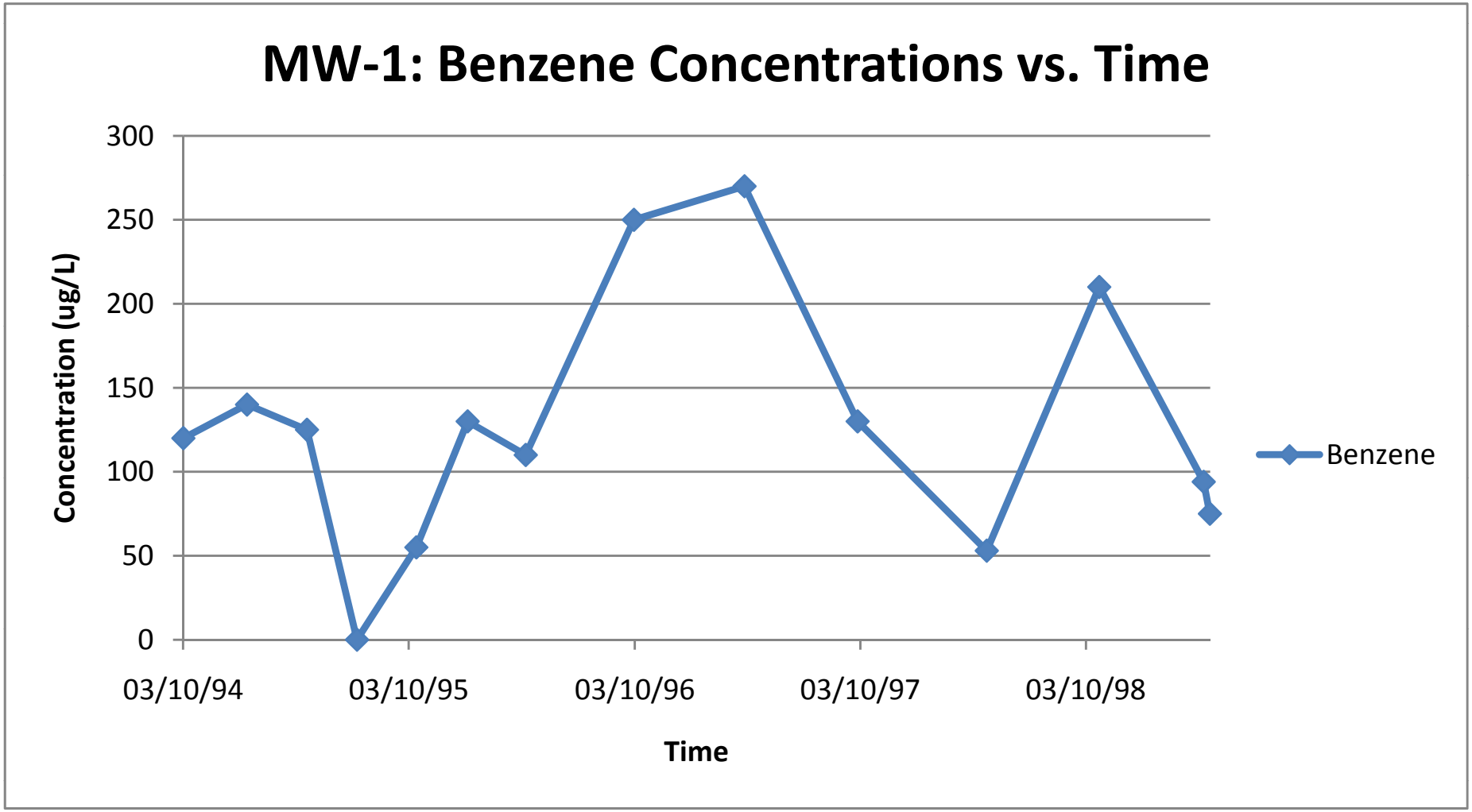
Notes:

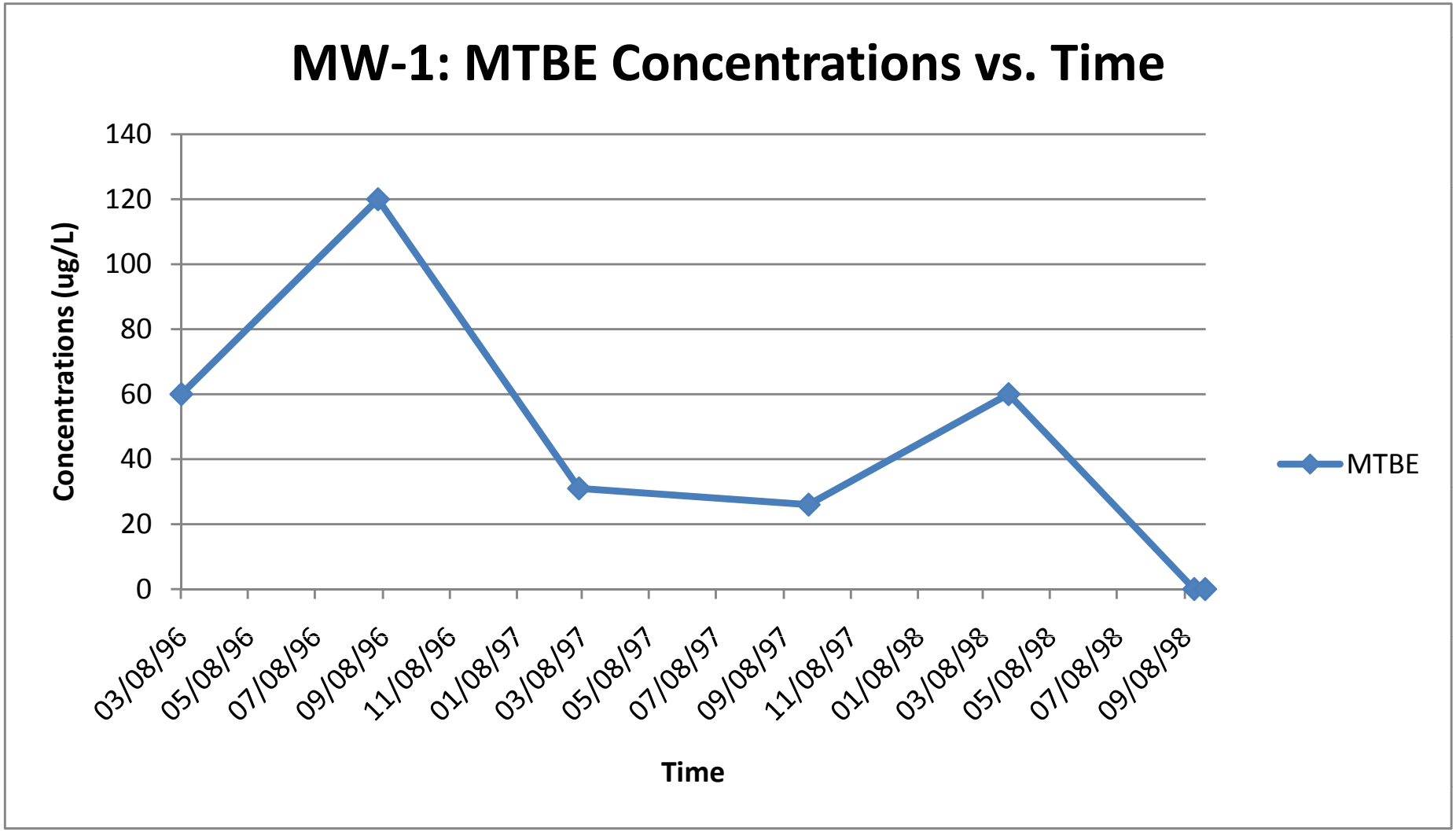
MCLs = Maximum Contaminant Levels
MTBE = methyl tertiary butyl ether
msl = mean sea level
ND<2.5 = non-detect at listed detection limit
ESLs = Environmental Screening Levels - Groundwater (groundwater is not a current or potential drinking water resource)
NE = Not Established
ug/L = micrograms per liter
-- = no data collected
fbg = feet below grade

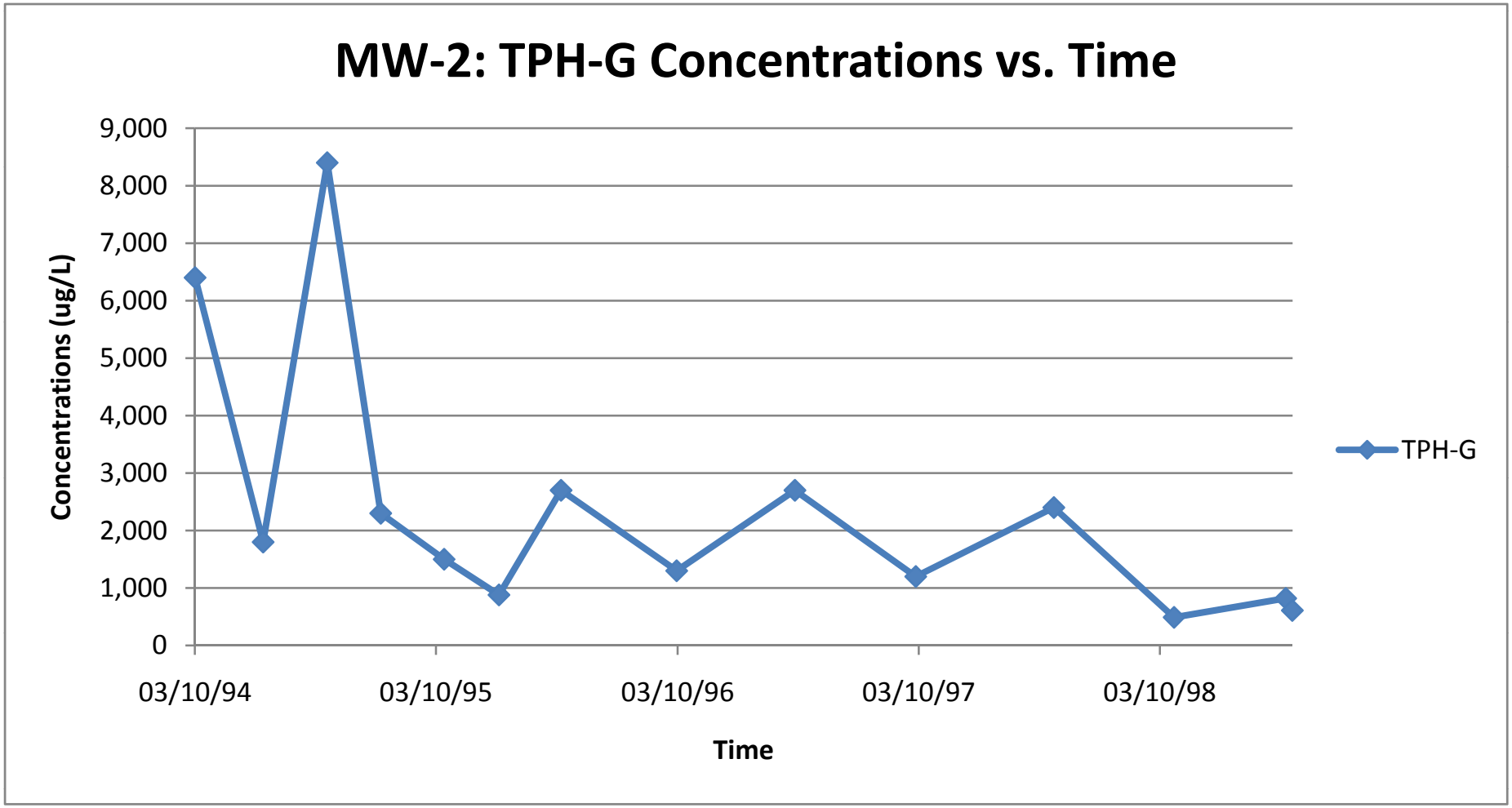
APPENDIX A

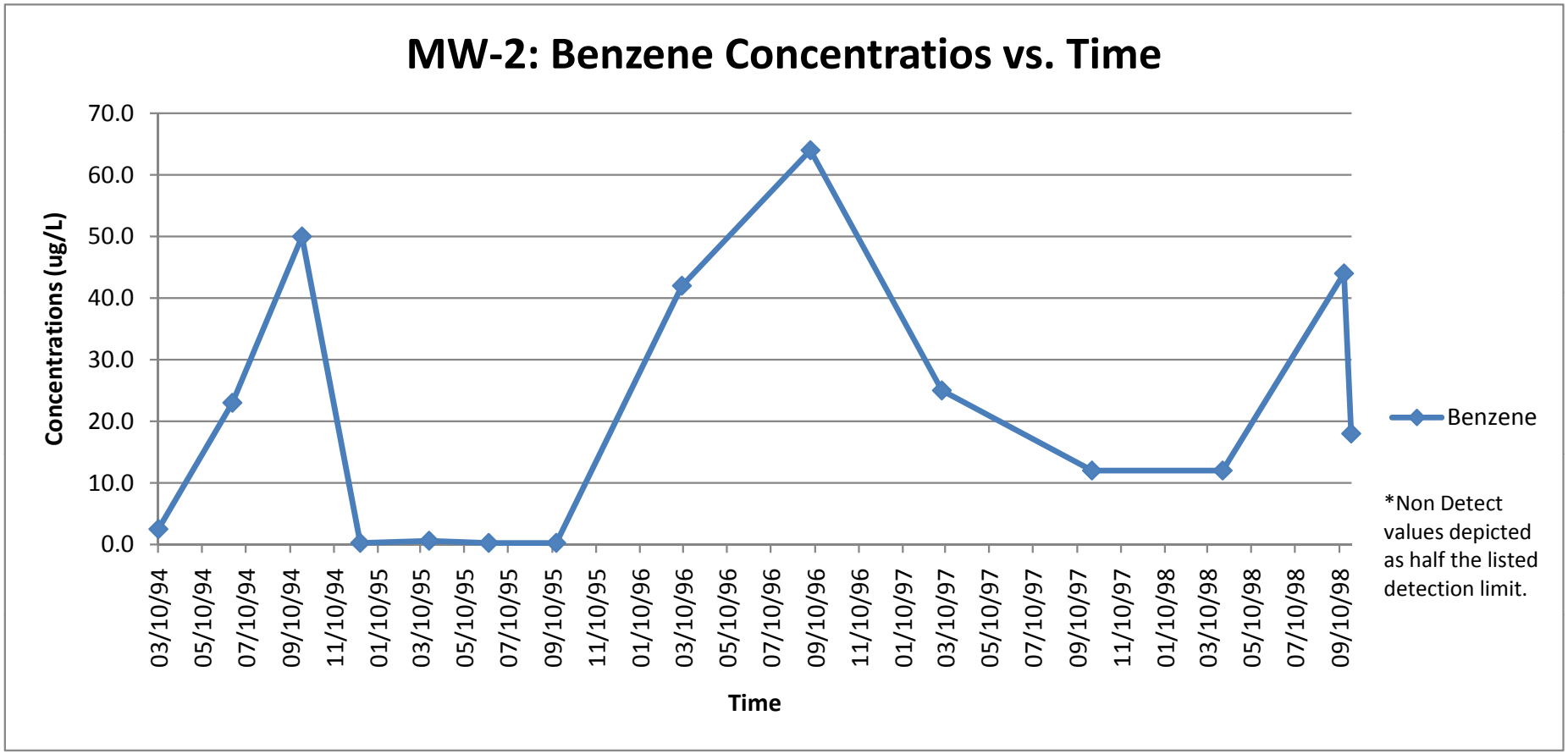
GROUNDWATER CONCENTRATION VS. TIME PLOTS

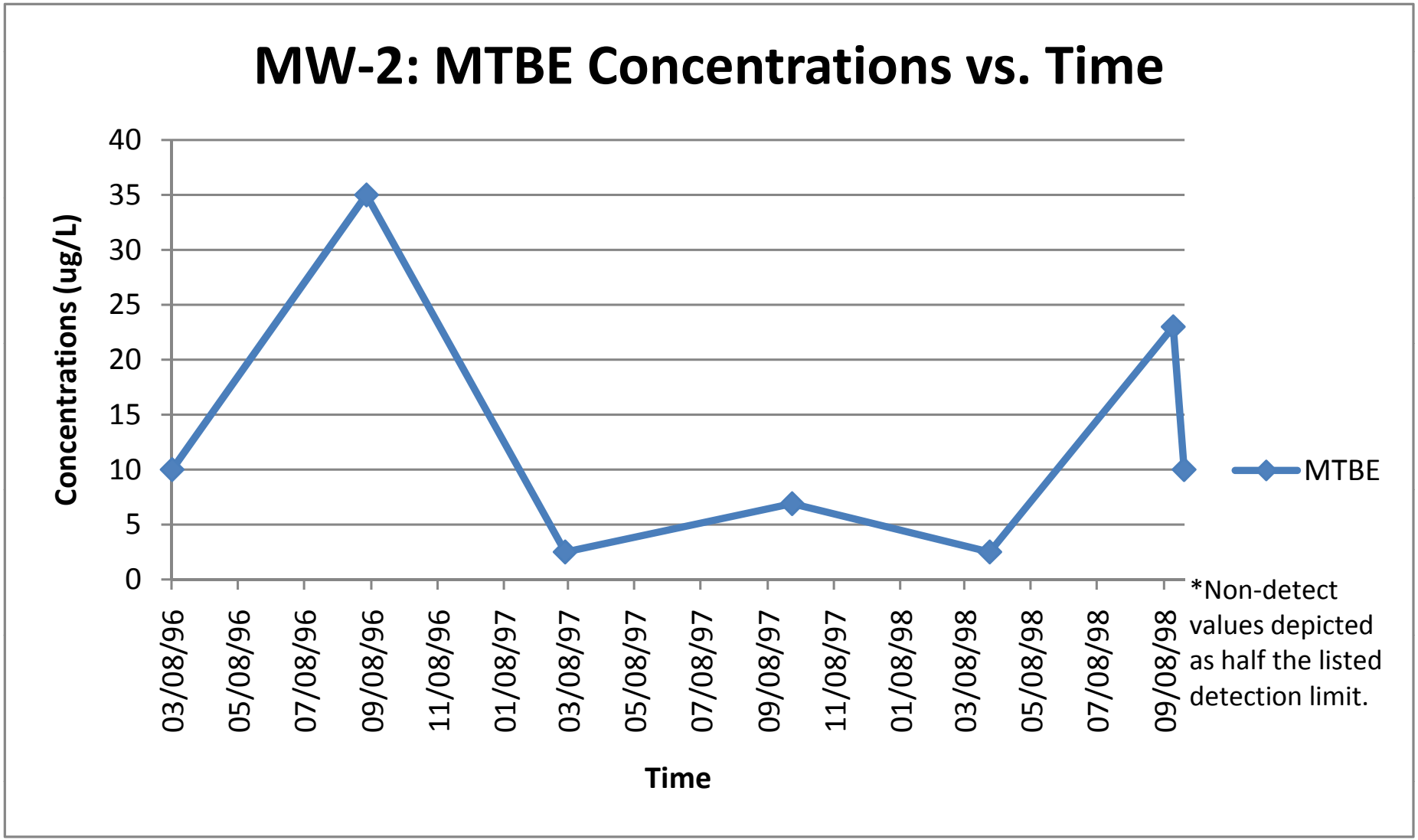

MW-1: TPH-G Concentrations vs. Time
Concentration (ug/L)
10,000
9,000
8,000
7,000
6,000
5,000
4,000
3,000
2,000
1,000
0
03/10/94
03/10/95
03/10/96
03/10/97
03/10/98
Time
TPH-G


MW-1: Benzene Concentrations vs. Time
300
250
200
150
100
50
0
Concentration (ug/L)
03/10/94
03/10/95
03/10/96
03/10/97
03/10/98
Time
Benzene


MW-1: MTBE Concentrations vs. Time
Concentrations (ug/L)
140
120
100
80
60
40
20
0
03/08/96
05/08/96
07/08/96
09/08/96
11/08/96
01/08/97
03/08/97
05/08/97
07/08/97
09/08/97
11/08/97
01/08/98
03/08/98
05/08/98
07/08/98
09/08/98
Time
MTBE


MW-2: TPH-G Concentrations vs. Time
9,000
8,000
7,000
6,000
5,000
4,000
3,000
2,000
1,000
0
Concentrations (ug/L)
03/10/94
03/10/95
03/10/96
03/10/97
03/10/98
Time
TPH-G


MW-2: Benzene Concentratios vs. Time
Concentrations (ug/L)
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0.0
03/10/94
05/10/94
07/10/94
09/10/94
11/10/94
01/10/95
03/10/95
05/10/95
07/10/95
09/10/95
11/10/95
01/10/96
03/10/96
05/10/96
07/10/96
09/10/96
11/10/96
01/10/97
03/10/97
05/10/97
07/10/97
09/10/97
11/10/97
01/10/98
03/10/98
05/10/98
07/10/98
09/10/98
Time
Benzene
*Non Detect values depicted as half the listed detection limit.


MW-2: MTBE Concentrations vs. Time
Concentrations (ug/L)
40
35
30
25
20
15
10
5
0
03/08/96
05/08/96
07/08/96
09/08/96
11/08/96
01/08/97
03/08/97
05/08/97
07/08/97
09/08/97
11/08/97
01/08/98
03/08/98
05/08/98
07/08/98
09/08/98
Time
MTBE
*Non-detect values depicted as half the listed detection limit.

APPENDIX B

HEALTH AND SAFETY PLAN

HEALTH AND SAFETY PLAN
ALAMEDA ISLANDER MOTEL
SITE ASSESSMENT ACTIVITIES
ALAMEDA, CA

Prepared by:
Strategic Engineering & Science, Inc.
110 11th Street - 2nd Floor
Oakland, California 94607

May 2011

Project Name: Alameda Island Motel
Alameda, Ca

Project Number: 231

This HASP, which must be kept on site, addresses the safety hazards of each phase of site operation, including the requirements and procedures for worker protection. Only the Site Health and Safety Officer (SHSO) can change or amend this document in agreement with the Environmental Health and Safety Coordinator (EHSC), Project Manager and Principal-in-Charge. The SHSO must initial any change made to the HASP at the relevant section. Major amendments (e.g., changes in fall protection not provided for in this plan, addition of tasks, etc.) must be documented by indicating the amendment date shown on this page.

Prepared by:

Steve Kemnitz Date

Reviewed by:

Mohammad Bazargani, P.E. Date

Approved by:

Mark Trevor, P.G Date

Brief Description of Amendment	**Amendment Date**

All SES site workers must read this HASP. A pre-entry briefing conducted by the SHSO must be held prior to initiating this project. All sections of this HASP must be reviewed during this briefing. Any SES worker not in attendance at the initial meeting must be trained by the SHSO on the information covered in the pre-entry briefing meeting. ***Tailgate meetings must be held at the beginning of the work shift by the SHSO to discuss important safety issues concerning tasks performed on that day. A brief description of topics discussed in tailgate meetings must be documented in the Field Logbook.*** After reading the HASP and attending a pre-entry briefing, workers must sign the following acknowledgment statement.

I have read, understand, and agree with the information set forth in this HASP. I have also attended a pre-entry briefing. I agree to perform my work in accordance with this HASP.

Name	**Date**	**Name**	**Date**

TABLE OF CONTENTS

TABLE OF CONTENTS (CONTINUED)

LIST OF FIGURES

LIST OF TABLES

LISTY OF APPENDICES

1. SITE/TASK DESCRIPTION

Brief description of site (including information as to current and previous site usage, location and approximate size of site, and a description of the tasks):

- Site Usage: Motel
- Site Location: 2428 Central Avenue, Alameda, California
- Size of Site: 0.64 acres
- Expected Field Dates: (Beginning / Ending date) Unknown
- Tasks for this project include:

① Drilling, Soil Sampling, Groundwater Sampling, Soil Vapor Sampling

④

⑤

⑥

⑦

⑧

Description of Surrounding Property/Population:

North	Commercial	East	Residential
South	Residential	West	Commercial

2. KEY PERSONNEL AND SAFETY RESPONSIBILITIES

Table 1 lists project personnel and their responsibilities in regard to safety concerns on this project.

3. WORKER TRAINING

All SES on-site workers have met the appropriate Health and Safety training. A pre-entry briefing and daily tailgate meetings are also conducted to facilitate onsite training.

4. SITE CONTROL

Site control procedures must be implemented **before** the start of site tasks to control worker exposures to safety hazards.

4.1 Site and Hospital Map

A site map is included as Figure 1. The site map includes the route to the nearest hospital or medical facility and will be posted, if possible, or readily available in the work area.

4.2 Buddy System

APPLIES TO TASK ☐ ① ☐ ② ☐ ③ ☐ ④ ☐ ⑤ ☐ ⑥ ☐ ⑦ ☐ ⑧

The Buddy System is required in the task(s) indicated above. The buddy system includes maintaining regular contact (see Section 4.6) with onsite SES personnel, clients and/or contractors.

In situations where task work does not require the buddy system, onsite personnel must have appropriate communication device(s) on his/her person(s) at all times, and shall maintain contact with office personnel, at a minimum, upon arriving at and departing from the site on a daily basis.

4.3 Work Zones

Two work zones must be established for each task. The Exclusion Zone is defined as the area on-site where tasks are to be performed. The Support Zone is defined as the command area and serves as a storage area for supplies. The exact location and extent of the work zones will be modified as necessary as site investigation information becomes available. The boundaries of the Exclusion Zone and Support Zone must be marked using the following methods:

☐ Warning tape ☒ Traffic cones

☐ Signs ☐ Fence

☐ Other_____

4.4 Site Access

Access to the site must be controlled using the following method:

☒ Sign in/Sign out log ☒ Guard

☐ Identification badges ☐ Other:_____

4.5 Visitors

Visitors to the site must be continually escorted in order to assure their safety since they may be unfamiliar with the site. Visitors must not be allowed past the Support Zone unless they read, understand, sign, and meet the requirements outlined in this HASP.

4.6 Communications

On-site communications must be conducted through the use of:

☒ Verbal

☐ Two-way radio ☐ Horn

☒ Cellular telephone ☐ Siren

☒ Hand signals ☐ Other:_____

Off-site communications must be conducted through the use of:

☒ Cellular telephone

☐ Pay phone: Location _____

☐ Other: _____

4.7 Safe Work Practices

General Safe Work Practices that must be implemented during work activities at this site are included in Table 2.

5. HAZARD ANALYSIS AND MITIGATORS

Site specific hazards must be identified (through hazard analysis) to determine the appropriate safety hazard mitigators needed to protect workers from the identified hazards. Hazard analysis involves a complete review of physical and biological hazards.

5.1 Physical Hazards

☒ APPLICABLE ☐ NOT APPLICABLE

Physical hazards associated with tasks to be performed (e.g., electrocution due to drilling, etc.) and site location (e.g., slips, trips, or falls due to rocky terrain, etc.) have been analyzed in Table 3. If, based on the hazard analysis, physical hazards exist, hazard mitigators (Appendix A) must be implemented.

5.2 Biological Hazards

☒ APPLICABLE ☐ NOT APPLICABLE

If, based on the hazard analysis (Table 3), biological hazards exist associated with tasks to be performed and site location (e.g., allergic reactions to poisonous plants or insects indigenous to the area, etc.), hazard mitigators (Appendix A) must be implemented.

6. PERSONAL PROTECTIVE EQUIPMENT

☒ APPLICABLE ☐ NOT APPLICABLE

The following personal protection equipment is required for this project:

☐ Tyvek
☒ Hard Hat
☒ Safety Glasses
☒ Hard-toe boots
☒ Hearing Protector (ear plugs)
☐ Other:_____

7. EMERGENCY PREPAREDNESS AND RESPONSE

A list of contacts and telephone numbers for the applicable local off-site emergency responders is provided in Table 4. The following emergency response equipment is required for this project:

☐ Fire Extinguisher: ☐ Type A ☐ Type B ☐ Type C ☐ Type ABC

☐ Eyewash (Note: 15 minutes of free-flowing fresh water)

☒ First Aid Kit

☐ Other:_____

The emergency response communication system for the site is:

☒ Verbal ☐ Two-way radio

☐ Hand signals:

Hands on top of head = "Need assistance"

Thumbs up = "OK; I am all right; I understand"

Thumbs down = "No; negative"

☐ Horn ☐ Siren ☐ Other_____

In the event that an on-site emergency develops, the procedures delineated in Table 5 are to be followed immediately.

8. CONFINED SPACE ENTRY

☐ APPLICABLE ☒ NOT APPLICABLE

The task(s) for this project involve confined-space entry. Workers must adhere to the company's Confined Space Entry Program [29 CFR §1910.120(j)].

9. HAZARD COMMUNICATION

☐ APPLICABLE ☒ NOT APPLICABLE

9.1 Chemicals

The following procedures must be followed for all chemicals brought on site (i.e., bentonite, gasoline, etc.):

- Label containers.
- Containers with gasoline or diesel fuel, if any, must be equipped with flame arrestors.
- A Material Safety Data Sheet (MSDS) for each chemical is included in Appendix B.
- Workers have reviewed and understood the hazards and the safe handling procedures of these chemicals as described in the respective MSDS.

9.2 Air Monitoring

☐ APPLICABLE ☒ NOT APPLICABLE

Figure 1

Site and Hospital Map

WRITTEN DIRECTIONS TO HOSPITAL:

Head Northwest on Central Avenue towards Park Street

Take Second Left onto Park Street

Turn Right at Clinton Avenue

Arrive: Alameda Hospital
2070 Clinton Avenue
Alameda, California

Table 1

Key Personnel and Health & Safety Responsibilities

Principal-in-Charge *Mohammad Bazargani*	***Project Manager (PM)*** *Mark Trevor*	***Site Health & Safety Officer (SHSO)*** *Steve Kemnitz*	***Project Personnel*** *Steve Kemnitz* *Hugo Vazquez*
• Approve this HASP and amendments, if any. • Ultimate responsibility that the elements of this HASP are implemented.	• Approve this HASP and amendments, if any. • Monitor the Field Logbooks for safety work practices employed. • Coordinate with SHSO so that emergency response procedures are implemented. • Verify corrective actions are implemented. • See to it that personnel receive this plan, are aware of its provisions, are aware of the potential hazards associated with site operations, are instructed in safe work practices, are familiar with emergency response procedures, and that this is documented. • Provide for appropriate personal protective equipment.	• Prepare and implement project (HASP) and amendments, if any, and report to the Project Manager for action if any deviations from the anticipated conditions exist, and authorize the cessation of work if necessary. • Confirm that site personnel meet the training requirements. • Conduct pre-entry briefing and daily tailgate safety meetings. • Verify that all personal protective equipment is operating correctly and such equipment is utilized by on-site personnel. • Implement site emergency response procedures. • Notify the EHSC in the event an emergency occurs.	• Provide verification of required safety training prior to arriving at the site. • Notify the SHSO of any special medical conditions (e.g., back injuries). • Attend pre-entry briefings and daily tailgate safety meetings. • Immediately report any accidents and/or unsafe conditions to the SHSO. • Be familiar with and abide by the HASP. • Individuals are responsible for their own safety.

Table 2

General Safe Work Practices

- Smoking, eating, or drinking after entering the work zone must not be allowed. Use of illegal drugs and alcohol are prohibited. Workers taking prescribed medication that may cause drowsiness should not be operating heavy equipment.
- Practice good housekeeping. Keep everything orderly and out of potentially harmful situations.
- The following conditions must be observed when operating a motor vehicle.
  - Wearing of seat belts is mandatory
  - During periods of rain, fog, or other adverse weather conditions, the use of headlights is mandatory
  - A backup warning system or use of vehicle horn is mandatory when the vehicle is engaged in a backward motion
  - All posted traffic signs and directions from flagmen must be observed
  - Equipment and/or samples transported in vehicles must be secured from movement
  - The use of SES acquired vehicles by non-SES personnel is prohibited
- In an unknown situation, always assume the worst conditions.
- Be observant of your immediate surroundings and the surroundings of others. It is a team effort to notice and warn of impending dangerous situations. Withdrawal from a hazardous situation to reassess procedures is the preferred course of action.
- Conflicting situations may arise concerning safety requirements and working conditions and must be addressed and resolved rapidly by the SHSO and PM to relieve any motivations or pressures to circumvent established safety policies.
- Unauthorized breaches of specified safety protocol must not be allowed. Workers unwilling or unable to comply with the established procedures must be discharged.

Table 3

Hazard Analysis

Tasks	
① Drilling	⑤
② Logging and Sampling	⑥
③	⑦
④	⑧

	①	②	③	④	⑤	⑥	⑦	⑧	*Mitigator Document Number*
I. Physical Hazards									
Eye Injury	X	X	X						Hazard-3
Hand/Foot Injury	X	X	X						Hazard-12
Slipping/Tripping/Falling	X	X	X						Hazard-7
Other:									
Drilling	X	X	X						Hazard-8
Insect/Vermin/Snake Bites	X	X	X						Hazard-9
Other:									

Table 4

Emergency Response Contacts

Name	***Telephone Numbers***	
	Office	***Cell***
Fire Department:	911	
Hospital: Alameda Hospital	911	
Police Department:	911	
Office Manager: *Rebecca DosSantos*	(949) 553-8417 Ext. 102	(949) 290-0572
Corporate Human Resources Manager: *Rebecca DosSantos*	(949) 553-8417 Ext. 102	(949) 290-0572
Project Manager: *Mohammad (Mo) Bazargani*	(510) 451-1761 Ext. 201	(510) 384-2680
Principal-in-Charge: *Ian Hutchison*	(949) 553-8417 Ext. 101	(949) 697-1127
Other:		
Other:		

Table 5

Emergency Response Procedures

- The SHSO (or alternate) should be immediately notified via the on-site communication system. The SHSO assumes control of the emergency response.
- The SHSO notifies the PM, Principal-in-Charge, and the Corporate Human Resources Manager. If an SES employee is injured, the SHSO must contact the worker's Office Manager immediately. If the Office Manager can not be contacted, then the Corporate Human Resources Department must be notified.
- If applicable, the SHSO must notify off-site emergency responders (i.e., fire department, hospital, police department, etc.) and must inform the response team as to the nature and location of the emergency on site.
- If applicable, the SHSO evacuates the site.
- For small fires, flames should be extinguished using the fire extinguisher. Large fires should be handled by the local fire department.
- If a worker is injured, first aid will be administered by workers certified in first aid.
- After the response, the SHSO must complete accident investigation reports obtained from the Corporate Human Resources Manager.

Appendix A

Hazard Mitigators Directory

Included in HASP	*Hazards*	*Mitigator Document Number*
I. Physical Hazards		
☐	Boating	
☐	Cold Stress	
☐	Compressed Gas Cylinder	
☒	Drilling	Hazard-8
☐	Drum Handling	
☐	Electrocution	
☐	Excavation/Trenching	
☒	Eye Injury	Hazard-3
☒	Hand/Foot Injury	Hazard-12
☐	Heat Stress	
☐	Heavy Equipment	
☐	Lifting Heavy Loads	
☐	Noise	
☐	Portable Power/Hand Tool	
☐	Radiation Exposure	
☒	Slipping/Tripping/Falling	Hazard-7
II. Biological Hazards		
☐	Allergic Reaction to Poisonous Plants	
☒	Insect/Vermin/Snake Bites	Hazard-9
☐	Medical Waste	

HAZARD MITIGATOR 3 - *EYE INJURY*

Applies to Task: ☒ ① ☐ ② ☐ ③ ☐ ④ ☐ ⑤ ☐ ⑥ ☐ ⑦ ☐ ⑧

- Wear appropriate eye protection according to the task at hand (e.g., goggles if liquid splash could occur, welding lenses, etc.).

HAZARD	TYPE OF PROTECTION
Impact	Safety glasses with side shield or vented safety goggles
Heat (Sparks)	Vented safety goggles or safety glasses with a face shield
Chemical	Hooded vented safety goggles or full-face respirator (if mild chemicals then safety glasses with side shield is acceptable)
Light Radiation	Tinted/reflective safety glasses or tinted/reflective face shield
Dust	Hooded vented safety goggles

- Apply anti-fog product to lens not previously treated.
- Minimize the amount of vapor or particulate matter generated, if possible.
- Avoid touching the face and eyes.
- Flush eyes with water for at least 15 minutes if chemicals do get into the eyes. If condition persists, seek medical attention.
- If dust or foreign objects are in your eyes, do not rub your eyes.
- If an object becomes embedded in the eye, do not attempt to remove, bandage, and immediately seek medical attention immediately.
- Do not wear contact lenses if chemical or dust hazard is present (e.g. decontamination or preservation chemicals used during sampling).

HAZARD MITIGATOR 7 - *SLIPING/TRIPPING/FALLING*

Applies to Task: ☒ ① ☐ ② ☐ ③ ☐ ④ ☐ ⑤ ☐ ⑥ ☐ ⑦ ☐ ⑧

- Wear the proper footwear for the task at hand.
- Pay attention to the environment and use caution when moving about onsite.
- Use caution when walking on sloped areas (especially geosynthetics), particularly when moisture is present. Use caution when walking on soft or uneven surfaces; e.g., marsh areas. Watch for icy conditions in cold weather.
- Follow the easiest and safest path to the destination.
- Follow good housekeeping procedures. Never assume that someone else will clean up a spill or put away an object.
- Remove objects that pose tripping hazards where practicable.
- Prevent water accumulation where practicable.
- Cables and/or wiring should be taped down, when possible.
- Mark or repair any opening or hole in the floor.
- Carry objects in a manner that allows you to see in the area you are moving in. Do not carry objects that are too large or bulky. Do not carry more weight than you can balance and keep stable. Understand that PPE can reduce or limit your field of vision and mobility.
- Use the proper ladder for the task at hand and do not exceed the recommended height. Do not use the top two rungs of a ladder. Utilize the buddy system to help secure the ladder. When working over 6 ft., utilize fall prevention measures. Obey height and weight guidelines and/or rules.

HAZARD MITIGATOR 7 - *SLIPING/TRIPPING/FALLING*

(continued)

- Use the handrail when using stairs. Be aware of stairway blockages.
- If conditions even slightly resemble an unsafe environment, do not make any assumptions that the integrity of a workplace is intact.
- Never jump over or into a trench or excavation.
- Close filing cabinets and drawers.
- Avoid becoming fatigued.
- Slow down. Do not run.

HAZARD MITIGATOR 8 – DRILLING

Applies to Task: ☒ ① ☐ ② ☐ ③ ☐ ④ ☐ ⑤ ☐ ⑥ ☐ ⑦ ☐ ⑧

- All members of the drilling crews shall be trained in the safety features and procedures to be utilized during operation, inspection, and maintenance of the equipment.
- Conduct a survey, prior to bringing drilling equipment to the job site, to identify overhead electrical hazards, potential subsurface hazards, and terrain hazard. Once on site, before drilling equipment is moved, the travel route shall again be visually surveyed for overhead and terrain hazards.
- Use only drilling equipment equipped with two easily-accessible emergency shutdown devices, one for the operator and one for the helper.
- Do not transport drilling equipment with the mast in the upward position.
- Set up equipment on stable ground. Cribbing (a system of timbers, arranged in a rectangular pattern, used to support and distribute the weight of the equipment) shall be used when necessary.
- Extend outriggers per the manufacturer's specifications.
- Monitor weather conditions. Operations shall cease during electrical storms or when electrical storms are imminent.
- Wearing of loose clothing or equipment is not permitted.
- Use auger guides on hard surfaces.
- Verbally alert employees and visually ensure employees are clear from dangerous parts of equipment prior to starting or engaging equipment.
- Channel the discharge of drilling fluids away from the work area to prevent the ponding of water.
- Use hoists only for their designed intent. Hoists shall not be loaded beyond their rated capacity. Steps shall be taken to prevent two-blocking of hoists (the condition when the lower load block or hook assembly comes in contact with the upper load block, or when the load block comes in contact with the boom tip).
- Follow the equipment manufacturer's procedures if ropes become caught in, or objects are pulled into a cathead.

- Do not run or rotate drill rods through rod slipping devices. No more than 1 foot of drill rod column shall be hoisted above the top of the drill mast. Drill rod tool joints shall not be made up, tightened, or loosened while the rod column is supported by a rod slipping device.
- Control dust using dust suppression techniques.
- Clean augers only when the rotating mechanism is in neutral and the auger is stopped. Tools such as long-handled shovels shall be used to remove cuttings from the auger.
- Cap and flag open boreholes; open excavations shall be barricaded.
- Keep all hand tool used during drilling operations clean and in good working condition.
- Wear hard hats and steeltoed boots at all times when performing drilling operations.
- Wear hearing protection when required.

HAZARD MITIGATOR 9 – *INSECT/VERMIN/SNAKE BITES*

Applies to Task: ☒ ① ☐ ② ☐ ③ ☐ ④ ☐ ⑤ ☐ ⑥ ☐ ⑦ ☐ ⑧

- Be able to recognize insects/vermin/snakes indigenous to the site location.
- Advise the SHSO if you have allergies to any insects prior to engaging in any field activities.
- Include the following controls:
  - Boots, hoods, netting, gloves, masks, or other personal protection.
  - Repellents.
  - Drainage or spraying of breeding areas.
  - Burning or destruction of nests.
  - Smudge pots and aerosols for protecting small areas.
  - Elimination of unsanitary conditions which propagate insects or vermin.
  - Extermination measures.
  - Inoculation.
- Report any bites or stings to the SHSO and seek first aid immediately.

HAZARD MITIGATOR 12 - *HAND/FOOT INJURY*

Applies to Task: ☒ ① ☐ ② ☐ ③ ☐ ④ ☐ ⑤ ☐ ⑥ ☐ ⑦ ☐ ⑧

- Be aware of "pinch points" when working with tools and heavy equipment.
- Use proper lifting techniques to avoid dropping heavy loads on hands and feet.
- Be aware of moving machinery and heavy equipment in the work area.
- Wear protective gloves as required in the Health and Safety Plan.
- Wear steeltoed boots as required in the Health and Safety Plan.

Appendix B

Material Safety Data Sheets (MSDS) Directory

Included in HASP	*Chemical*
☐	Bentonite
☐	Diesel Fuel Oil No. 2-D
☐	Gasoline, Lead-free
☐	Benzene
☐	MTBE
☐	Other: _____
☐	Other: _____
☐	Other: _____
☐	Other: _____
☐	Other: _____
☐	Other: _____

APPENDIX C

GENERAL FIELD PROCEDURES

APPENDIX C

GENERAL FIELD PROCEDURES

Descriptions of the general field procedures used during site investigation activities are presented below.

DIRECT PUSH SOIL SAMPLING

Soil sampling points are driven into the soil using hydraulically actuated "direct-push" and percussion equipment. The soil sampling points consist of 2-inch diameter hollow steel rods fitted with a hardened drive point. A dual-tube system will be used which advances an outer casing that remains in the boring while an inner casing with the soil samples are collected and removed during each sampling interval.

The subsurface soils will be collected continuously in the borings using a 4-foot long acetate liner. The soils will be logged for lithologic classification and described in accordance with the Unified Soil Classification System. For each sampling interval, field estimates of soil type, density/consistency, moisture, color, and grading will be recorded on the boring logs..

Following drilling and sampling activities, borings will be grouted to ground surface with a cement/bentonite slurry.

GROUNDWATER SAMPLING

Once the water-bearing zone is reached in the boring, a groundwater sample will be collected by first inserting a small-diameter slotted PVC casing into the center of the drive casing. A small diameter bailer will then be used to obtain a grab sample from inside the slotted casing. The bailer and all down-hole equipment will be thoroughly cleaned between borings to avoid cross-contamination between borings. The slotted PVC casing will not be reused between sampling locations.

SUBSURFACE SOIL VAPOR SAMPLING

The following soil vapor sampling procedures will be followed during this investigation. These protocols were taken from various guidance documents including Interim Guidance for Active Soil Gas Investigations (CRWQCB-LA Region, 1997), Advisory – Active Soil Gas Investigations (DTSC, 2003), and Subsurface Vapor Sampling Using a Geoprobe and Summa canisters (San Mateo County Draft GPP Guidance, 2004).

The soil vapor sampling will be performed using a truck-mounted drill rig equipped with Direct Push Technology equipment. A steel probe with an expendable point will be driven

to a depth of 3½ feet. The probes will then be withdrawn approximately 6 inches. The sampling line (Teflon tubing) will be installed and capped with a vapor tight valve. The expendable point will be released as the probe is withdrawn exposing the end of the probe. Prior to purging and sampling, hydrated bentonite will be placed around the drill rod at the ground surface to inhibit surface air infiltration into the system. Following assembly of the tubing, Swagelok® fittings, valve, and flow regulator to the sampling and purge Summa canisters, a leak test on the connections will be performed by connecting the purge canister to the assembly and opening and closing the purge canister valve to create a test vacuum. If a constant vacuum is maintained for at least 10 minutes, and it has been a minimum of 30 minutes since the drill rod was sealed at the surface with bentonite, three volumes of soil vapor will be purged from the probes prior to sample collection. The tubing will be connected directly to a laboratory cleaned and certified Summa canister for collection of a vapor sample.

The purging and sampling flow rate will be regulated to approximately 200 milliliters per minute to limit stripping, reduce the potential for ambient air dilution of the sample, and increase the likelihood that representative soil vapor samples will be collected. A sample will be collected until the sample canister gauge indicates approximately 5 inches Hg of vacuum remains in the canister.

For leak check purposes, gauze saturated with isopropyl alcohol will be hung below the valve connection, sampling manifold and Summa canister, pressure gauge and manifold connection, and the down-hole tubing and manifold connection. Isopropyl alcohol will be added periodically to the gauze throughout the sample collection.

DECONTAMINATION

Drilling equipment is decontaminated by steam cleaning before being used on the project. The direct push rods and all down-hole sampling equipment will also be steam cleaned before use between borings. The acetate liners will not be reused between borings.