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March 21, 2014

Mr. Mark Detterman
Alameda County Environmental Health
1131 Harbor Bay Parkway, Suite 250
Alameda, CA 94502

Dear Mr. Detterman:

Attached for your review is the *Site Conceptual Model and Data Gap Work Plan* for former Chevron-branded service station 90517, located at 3900 Piedmont Avenue in Oakland, California (**Case #:** RO0000138). This report was prepared by Stantec Consulting Services Inc. (Stantec), upon whose assistance and advice I have relied. I declare under penalty of perjury that the information and/or recommendations contained in the attached report are true and correct, to the best of my knowledge.

If you have any further questions, please do not hesitate to contact me or the Stantec project manager, Travis Flora, at (408) 356-6124 ext. 238, or travis.flora@stantec.com.

Sincerely,

Carryl MacLeod

Carryl MacLeod
Project Manager

Site Conceptual Model and Data Gap Work Plan

Former Chevron-branded
Service Station 90517
3900 Piedmont Avenue
Oakland, California
Case #: RO0000138

Prepared for:
Chevron Environmental
Management Company
6101 Bollinger Canyon Road
San Ramon, CA 94583

Prepared by:
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15575 Los Gatos Blvd., Building C
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March 21, 2014

SITE CONCEPTUAL MODEL AND DATA GAP WORK PLAN
Former Chevron-branded Service Station 90517, 3900 Piedmont Avenue, Oakland, California
Sign-off Sheet
March 21, 2014

This document entitled Site Conceptual Model and Data Gap Work Plan was prepared by Stantec Consulting Services Inc. for the account of Chevron Environmental Management Company. The material in it reflects Stantec's best judgment in light of the information available to it at the time of preparation. Any use which a third party makes of this report, or any reliance on or decisions made based on it, are the responsibilities of such third parties. Stantec Consulting Services Inc. accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

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Stantec

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1.0 Introduction

On behalf of Chevron Environmental Management Company (Chevron), Stantec Consulting Services Inc. (Stantec) is pleased to submit this *Site Conceptual Model and Data Gap Work Plan* for former Chevron-branded service station 90517, which was located at 3900 Piedmont Avenue, Oakland, Alameda County, California (the Site - shown on **Figure 1**). This report was prepared at the request of Alameda County Environmental Health (ACEH) in a letter dated December 18, 2013. The ACEH correspondence is included as **Appendix A**.

This report is organized into the following sections summarizing:

- Site background;
- Extent of petroleum hydrocarbons;
- Potential receptors and exposure pathways;
- Low-Threat Underground Storage Tank (UST) Case Closure Policy (LTCP) evaluation;
- Data gap analysis; and
- Data Gap Work Plan.

A focused Site conceptual model (SCM) was requested by ACEH and is included in **Appendix B**. The focused SCM includes many of the elements that would normally be described in the sections indicated above. So that information is not duplicated, the majority of the information is included in the focused SCM, with references to the appendix included in this text. In addition, ACEH provided guidance on sensitive receptor surveys, preferential pathways, and focused SCMs. Information from that guidance that is relevant to the LTCP evaluation has been included in the focused SCM and this report.

2.0 Site Background

2.1 SITE DESCRIPTION AND LAND USE

The Site is a former Chevron-branded service station located on the eastern corner at the intersection of Piedmont Avenue and Montell Street in Oakland, California. The Site is currently occupied by a one-story commercial building and associated parking areas. The Site background is summarized according to the *Case Closure Request*, prepared by Conestoga-Rovers & Associates (CRA) and dated October 12, 2010.

A Chevron-branded service station operated at the Site from at least 1940 until 1978. Based on a Site Plan from 1940, first-generation Site features consisted of three gasoline USTs (928-gallon, 440-gallon, and 550-gallon) located in the southwestern portion of the Site, a lubrication building with a waste oil sump in the eastern corner of the Site, two fuel dispenser islands located in the western portion of the Site, and a small station building located adjacent to the fuel dispenser islands. Based on a Site Plan from 1955, the first-generation gasoline USTs were removed and three second-generation gasoline USTs (3,000-gallon, 5,000-gallon, and 7,500-gallon) were installed to the northwest of the first-generation USTs. A 1,000-gallon waste oil UST is shown to the northwest of the lubrication building and two hydraulic hoists are shown within the building. In addition, the first-generation fuel dispenser islands were removed and second-generation fuel dispenser islands were installed to the east of the first-generation fuel dispenser islands. Based on a Site Plan from 1971, the mid-size gasoline UST is identified as 5,700-gallon instead of 5,000-gallon. In 1978, the service station was closed and all remaining Site features, including underground fuel structures, were removed. The existing commercial building was then constructed (CRA, 2010). A Site Plan is shown on **Figure 2**.

Land use near the Site consists of a mixture of commercial and residential properties. The Site is bounded on the northwest by Piedmont Avenue, to the northeast by a commercial building that appears to be vacant, to the southeast by residences, and on the southwest by Montell Street.

2.2 REGIONAL AND LOCAL GEOLOGY AND HYDROGEOLOGY

Historical soil boring and well construction logs are in **Appendix C**.

Well construction details and an assessment of whether First Quarter 2013 groundwater samples were collected when groundwater elevations were measured across the well screen intervals are presented in **Table 1**. Historical groundwater elevation data are presented in **Table 2**. A groundwater elevation contour map (based on First Quarter 2013 data) is shown on **Figure 3**, and a Rose Diagram illustrating the direction of groundwater flow from Third Quarter 1998 to First Quarter 2013 (33 sampling events) is shown on **Figure 4**. A description of the regional and local geology and hydrogeology is included in the focused SCM in **Appendix B**.

The Rose Diagram was revised to include additional historical data. Stantec began with Third Quarter 1998 data, when preparation of groundwater elevation contour maps began. With the

inclusion of additional historical data beginning in 1998, the vector mean groundwater flow direction shows less than 1 degree of variance than what it was utilizing historical data from 2010 to present.

2.3 RELEASE HISTORY

The release history is described in the focused SCM in **Appendix B**.

2.4 PREVIOUS INVESTIGATIONS AND REMEDIATION

Historical groundwater monitoring data and analytical results are summarized in **Table 2** through **Table 7**. Historical soil analytical results are summarized in **Table 8**. Locations of soil borings and monitoring wells are shown on **Figure 2**. Soil boring and well construction logs are included in **Appendix C**.

Based on a historical Site Plan from 1955, the three first-generation gasoline USTs (928-gallon, 440-gallon, and 550-gallon) were removed and the three second-generation gasoline USTs (3,000-gallon, 5,000-gallon or 5,700-gallon, and 7,500-gallon) were installed to the northwest of the first-generation gasoline USTs prior to or in 1955. In addition, the two first-generation fuel dispenser islands were removed and two second-generation fuel dispenser islands were installed to the east of the first-generation fuel dispenser islands (CRA, 2010). It is unknown if product piping associated with the first-generation fueling structures was replaced at the time of these activities. Further documentation on these activities could not be found and conditions of the tanks, dispenser islands, and soil during removal are unknown.

In 1978, the service station was closed and all remaining Site features associated with the service station were removed (CRA, 2010). This includes at least the three second-generation gasoline USTs (3,000-gallon, 5,000-gallon or 5,700-gallon, and 7,500-gallon), two second-generation fuel dispenser islands, associated product piping, and the station building. Further documentation on these activities could not be found and conditions of these Site features and soil during removal are unknown. It is unknown when the lubrication building, hydraulic hoists, waste oil sump, and 1,000-gallon waste oil UST were removed. They may have been removed when the service station was closed in 1978 or anytime between 1971 (date of most-recent Site Plan showing these features as existing) and 1978.

In October 1993, Environmental Science & Engineering, Inc. (ESE) oversaw advancement of eight on-site soil borings (FNBO-1 through FNBO-8) to total depths ranging from 7.5 to 16.5 feet below ground surface (bgs). A total of 11 soil samples were collected from the borings at depths ranging from 6 to 11 feet bgs. Soil samples were analyzed for total petroleum hydrocarbons as gasoline range organics (TPH-GRO), total petroleum hydrocarbons as diesel range organics (TPH-DRO), and benzene, toluene, ethylbenzene, and total xylenes (BTEX compounds). TPH-GRO was detected in eight of the soil samples at concentrations ranging from 1.4 milligrams per kilogram (mg/kg; boring FNBO-4 at 6 feet bgs) to 3,400 mg/kg (boring FNBO-5 at 6 feet bgs). The maximum TPH-GRO concentration in soil was detected in the sample collected at 6 feet bgs from boring FNBO-5, located immediately down-gradient of the former USTs. Benzene was

detected in the samples collected from boring FNBO-5 at 10 feet bgs (0.03 mg/kg) and boring FNBO-7 at 11 feet bgs (1.0 mg/kg). Five of the soil samples that surrounded the former USTs and dispenser islands were additionally analyzed for total recoverable petroleum hydrocarbons (TRPH) and volatile organic compounds (VOCs). TRPH was detected in all five of the samples, at concentrations ranging from 10.0 mg/kg (boring FNBO-6 at 10 feet bgs) to 350 mg/kg (boring FNBO-1 at 10.5 feet bgs) and VOCs were not detected above laboratory reporting limits (LRLs) in any of the samples. A groundwater sample was collected from boring FNBO-6, located in the southwest corner of the Site, and was analyzed for TPH-GRO, BTEX compounds, TRPH, and VOCs. TPH-GRO, TRPH, and BTEX compounds were detected in the groundwater sample at concentrations of 7,800 micrograms per liter [µg/L], 2,800 µg/L, 7.7 µg/L, 21 µg/L, 260 µg/L, and 260 µg/L, respectively. VOCs were generally not detected above LRLs in the groundwater sample, with the exception of acetone (30 µg/L) and carbon disulfide (33 µg/L) (ESE, 1993).

In July 1998, Gettler-Ryan Inc. (G-R) oversaw installation of two on-site monitoring wells (MW-1 and MW-2) and two off-site monitoring wells (MW-3 and MW-4) to further evaluate soil and groundwater quality associated with the Site. Boreholes MW-1, MW-2, and MW-4 were advanced to total depths of 16.5 feet bgs and borehole MW-3 was advanced to a total depth of 20 feet bgs. Groundwater was encountered in the boreholes at depths ranging from approximately 11 to 13 feet bgs. Soil samples were collected at depths of approximately 6, 11, and 16 feet bgs and analyzed for TPH-GRO, BTEX compounds, and methyl *tertiary*-butyl ether (MtBE). TPH-GRO and BTEX compounds were generally not detected above LRLs in the soil samples collected, with the exception of BTEX compounds (up to 0.010 mg/kg) in the sample collected from borehole MW-2 at 6 feet bgs, and TPH-GRO (80 mg/kg) and BTEX compounds (up to 5.8 mg/kg) in the sample collected from borehole MW-4 at 11 feet bgs. MtBE was not detected above LRLs in any of the soil samples (G-R, 1998).

In July 2008, CRA oversaw advancement of off-site exploratory soil boring SB-2 to further evaluate down-gradient soil and groundwater quality. In addition, three attempts were made to advance a soil boring in Montell Street; however, drilling refusal was reportedly encountered. Boring SB-2 was advanced to a total depth of 24 feet bgs and groundwater was encountered at approximately 18 feet bgs. Soil samples were collected at depths of 5, 10, 15, and 20 feet bgs and analyzed for TPH-GRO, BTEX compounds, MtBE, di-isopropyl ether (DIPE), ethyl *tertiary*-butyl ether (EtBE), *tertiary*-amyl methyl ether (TAME), *tertiary*-butyl alcohol (TBA), 1,2-dichloroethane (1,2-DCA), and 1,2-dibromoethane (1,2-DBA). None of the analytes were detected above LRLs in any of the soil samples. A groundwater sample was also collected from boring SB-2 and analyzed for the same constituents as the soil samples. Only TPH-GRO and MtBE were detected in this sample, at concentrations of 540 µg/L and 1 µg/L, respectively (CRA, 2008).

3.0 Extent of Petroleum Hydrocarbons

3.1 VERTICAL EXTENT OF PETROLEUM HYDROCARBONS

3.1.1 Vertical Extent of Petroleum Hydrocarbons in Soil

Historical soil sample analytical results are presented in **Table 8**. A description of the vertical extent of petroleum hydrocarbons in soil is included in the focused SCM in **Appendix B**.

3.1.2 Vertical Extent of Petroleum Hydrocarbons in Groundwater

A description of the vertical extent of petroleum hydrocarbons in groundwater is included in the focused SCM in **Appendix B**.

3.2 LATERAL EXTENT OF PETROLEUM HYDROCARBONS

3.2.1 Lateral Extent of Petroleum Hydrocarbons in Soil

A description of the lateral extent of petroleum hydrocarbons in soil is included in the focused SCM in **Appendix B**.

3.2.2 Lateral Extent of Petroleum Hydrocarbons in Groundwater

Historical groundwater analytical results are included in **Table 2** through **Table 7**. A figure showing the First Quarter 2013 groundwater analytical data plotted on a Site map is included as **Figure 5**. A TPH-GRO isoconcentration map is shown on **Figure 6**. A TPH-DRO (with silica gel cleanup) isoconcentration map is shown on **Figure 7**. A total petroleum hydrocarbons as motor oil (TPH-MO) isoconcentration map is shown on **Figure 8**. A benzene isoconcentration map is shown on **Figure 9**. These maps illustrate the approximate lateral extent of these compounds in groundwater based on the monitoring well network. A description of the lateral extent of petroleum hydrocarbons in groundwater is included in the focused SCM in **Appendix B**.

3.2.3 Plume Stability

Hydrographs based on current and historical groundwater elevations and analytical results are included in **Appendix D**. Plume stability is described in the focused SCM in **Appendix B**.

4.0 Potential Receptors and Exposure Pathways

An evaluation was conducted to identify complete and potentially complete exposure pathways relevant to human health risks at the Site based on analyses of the following components:

- Current and future land uses;
- Water well, surface water, and conduit surveys;
- Potentially exposed populations; and
- Complete and potentially complete exposure pathways.

4.1 CURRENT AND FUTURE LAND USES

A description of current and future land uses for the Site is included in the focused SCM in **Appendix B**.

4.2 WATER SURVEY

The Site is located in the East Bay Plain groundwater basin, which has been designated as having existing beneficial uses for municipal, domestic, industrial process, industrial service, and agricultural water supply (RWQCB, 2011).

4.2.1 Groundwater Wells

Information on historical well surveys is included in the focused SCM in **Appendix B**.

4.2.2 Surface Water Bodies

A description of the surface water bodies located within a 0.5-mile radius of the Site Is included in the focused SCM in **Appendix B**.

4.3 CONDUIT SURVEY

A Site Plan showing the location of utilities in the vicinity and down-gradient of the Site is shown on **Figure 10**. Information on historical conduit surveys is included in the focused SCM in **Appendix B**.

4.4 POTENTIALLY EXPOSED POPULATIONS

4.4.1 On-Site and Off-Site Current or Potential Populations

A description of on-site and off-site current or potential populations is included in the focused SCM in **Appendix B**.

4.4.2 Potential Sensitive Populations

A description of the potential sensitive populations located within 0.5-miles of the Site is included in the focused SCM in **Appendix B**. Additionally, the potential sensitive populations located within a 0.5-mile radius of the Site are listed in the following table:

Potential Sensitive Receptor	Address	Distance from Site (miles)	Direction from Site
Kaiser Permanente Medical Center	3801 Howe St.	0.12	W
Satellite Senior Homes	4030 Panama Ct.	0.13	E-SE
Snow White Pre-School	214 W. MacArthur Blvd.	0.15	SW
Baywood Apartments	225 41st St.	0.17	N
Piedmont Gardens	110 41st St.	0.20	NE
My Giving Hands	4139 Howe St.	0.20	N-NE
Archway School	250 41st St.	0.21	N-NW
Linda Glen	32 Linda Ave.	0.24	NE
Saint Leo The Great Catholic School	4238 Howe St.	0.29	NE
Pacific Boychoir Academy	215 Ridgeway Ave.	0.29	N-NE
Opal Home Care	3917 Opal St.	0.32	NW
Piedmont Avenue Elementary School	4314 Piedmont Ave.	0.37	NE
Beach Elementary School	100 Lake Ave.	0.39	E-SE
It Takes a Village Family Daycare	4167 Opal St.	0.43	NW
Oakland Technical High School	4351 Broadway	0.44	N
Edison School	3239 Kempton Ave. #1	0.44	S-SW
Park Day School	360 42nd St.	0.47	N-NW

4.5 EXPOSURE PATHWAY ANALYSIS

The exposure pathway analysis for the Site is detailed in the focused SCM in **Appendix B** and a graphical representation is shown on **Figure 11**.

4.6 RISK EVALUATION

A risk evaluation is included in the focused SCM in **Appendix B**.

5.0 Low-Threat UST Case Closure Policy Evaluation

This section presents the low-risk general and media-specific criteria defined by the State Water Resource Control Board's (SWRCB's) LTCP, effective August 17, 2012, under Resolution No. 2012-0016 (SWRCB, 2012) and includes an evaluation of the Site compared to these criteria. The completed SWRCB LTCP Checklist is included as **Appendix E**.

5.1 GENERAL CRITERIA

- **Is the unauthorized release is located within the service area of a public water system?**

  Yes. The Site is located within the service area of the East Bay Municipal Utility District.

- **Does the unauthorized release consist only of petroleum?**

  Yes. The constituents of concern (COCs) at the Site are dissolved-phase petroleum hydrocarbons associated with gasoline and waste oil from a former service station, including TPH-GRO, TPH-DRO, TPH-MO, BTEX compounds, and MtBE.

- **Has the unauthorized ("primary") release from the UST system has been stopped?**

  Yes. Based on a historical Site Plan from 1955, the three first-generation gasoline USTs (928-gallon, 440-gallon, and 550-gallon) were removed and the three second-generation gasoline USTs (3,000-gallon, 5,000-gallon or 5,700-gallon, and 7,500-gallon) were installed to the northwest of the first-generation gasoline USTs prior to or in 1955, if not sooner. In addition, the two first-generation fuel dispenser islands were removed and two second-generation fuel dispenser islands were installed to the east of the first-generation fuel dispenser islands (CRA, 2010). It is unknown if product piping associated with the first-generation fueling structures was replaced at the time of these activities. Further documentation on these activities could not be found and conditions of the tanks, dispenser islands, and soil during removal are unknown.

  In 1978, the service station was closed and all remaining Site features associated with the service station were removed (CRA, 2010). This includes at least the three second-generation gasoline USTs, two second-generation fuel dispenser islands, associated product piping, and the station building. Further documentation on these activities could not be found and conditions of these Site features and soil during removal are unknown. It is unknown when the lubrication building, hydraulic hoists, waste oil sump, and 1,000-gallon waste oil UST were removed. They may have been removed when the service station was closed in 1978 or anytime between 1971 (date of most-recent Site Plan showing these features as existing) and 1978.

Dissolved-phase petroleum hydrocarbon concentrations associated with the Site are decreasing, indicating that there is no longer a petroleum hydrocarbon source propagating on Site.

- **Has free product has been removed to the maximum extent practicable (per CCR Chapter 16 Section 2655 a-c)?**

  Not Applicable. Free product has not been observed or recorded in any Site wells to-date; therefore, no free product removal activities have been conducted at any Site wells.

- **Has a Conceptual Site Model (CSM) that assesses the nature, extent, and mobility of the release has been developed?**

  Yes. The focused SCM in **Appendix B** is the CSM assessing the nature, extent, and mobility of the release.

- **Has secondary source has been removed to the extent practicable?**

  Yes. No historical remedial efforts have been conducted at the Site to-date. Dissolved-phase petroleum hydrocarbon concentrations associated with the Site are decreasing, indicating that there is no longer a petroleum hydrocarbon source propagating on Site that would warrant further remediation.

- **Has soil or groundwater has been tested for MtBE and results reported in accordance with Health and Safety Code section 25296.15?**

  Yes. MtBE was analyzed in soil samples collected in associated with the Site beginning in July 1998. MtBE was routinely analyzed in groundwater during groundwater monitoring and sampling events since Third Quarter 1998. Results have been reported to the ACEH and updated to GeoTracker™.

- **Does nuisance as defined by Water Code section 13050 exist at the site? A "nuisance" is defined as anything which meets the following (1) Is injurious to health, or is indecent or offensive to the senses, or an obstruction to the free use of property; (2) Affects at the same time an entire community or neighborhood; (3) Occurs during, or as a result of, the treatment or disposal of wastes.**

  No. The conditions of "nuisance" as defined by Water Code section 13050 do not exist at the Site.

- **Are there unique site attributes or site-specific conditions that demonstrably increase the risk associated with residual petroleum constituents?**

  No.

5.2 MEDIA-SPECIFIC CRITERIA

5.2.1 Groundwater-Specific Criteria

Current Site conditions do not satisfy any of the LTCP groundwater-specific criteria scenarios as the dissolved-phase petroleum hydrocarbon plume is not defined in all directions, and therefore, the plume length is unknown.

5.2.2 Petroleum Vapor Intrusion to Indoor Air Criteria

Current Site conditions do not satisfy any of the petroleum vapor intrusion to indoor air criteria scenarios as conditions for a bioattenuation zone are unknown, and direct measurement of soil gas concentrations has not been conducted.

5.2.3 Direct Contact and Outdoor Air Exposure Criteria

Current Site conditions do not satisfy the LTCP direct contact and outdoor air exposure criteria.

The concentrations of benzene and ethylbenzene in the upper 10 feet of soil are less than the limits for direct contact and outdoor air exposure specified in Table 1 of the LTCP. However, per ACEH correspondence dated December 18, 2013, due to the presence of uncharacterized source areas near former fueling features, there is a potential to fail the direct contact and outdoor air exposure criteria.

In addition, it does not appear that on-site soil samples were analyzed for naphthalene and polynuclear aromatic hydrocarbons (PAHs) in soils from 0 to 5 feet bgs near the former waste oil UST. This data is also needed to confirm the direct contact and outdoor air exposure criteria are met.

6.0 Data Gap Analysis

Based on a review of the data associated with the Site, the following data gaps were identified:

- Dissolved-phase Plume Length is Unknown. Historical attempts have been unsuccessful at defining the plume length; however, this is largely in part due to the density of underground utilities down-gradient of the Site, as noted in the ACEH letter dated December 18, 2013. ACEH also states that they regard the dissolved-phase plume to be essentially stable and that further evaluation of the dissolved-phase plume should be focused on potential sensitive receptors that may be affected by the dissolved-phase plume. Therefore, a Sensitive Receptor Survey should be produced.

- Water Supply Well Survey. The last well survey was conducted in 2002 and does not include information from the California Department of Water Resources (DWR). An updated well survey should be completed with results included in the Sensitive Receptor Survey.

- Current shallow soil data. Soil contamination at shallow depths is not well characterized near former fueling features, and PAHs have not been evaluated near the former waste oil UST; therefore, direct contact and outdoor air exposure LTCP criteria are not met. An assessment should be conducted to obtain necessary soil data.

- Vapor intrusion evaluation. Petroleum vapor intrusion to indoor air and direct contact and outdoor air exposure LTCP criteria are not met and a vapor intrusion assessment is needed to evaluate potential risk to identified potential human receptors. An assessment should be conducted to obtain necessary soil vapor data.

7.0 Data Gap Work Plan

Stantec is proposing the advancement of six shallow soil borings (B-1 through B-6) and five soil vapor probes (VP-1 though VP-5) on-site, and one soil vapor probe (VP-6) off-site to evaluate petroleum hydrocarbons in soil near former fueling features, and to evaluate potential vapor concentrations on and off-site. Results will be used to evaluate whether the Site meets the media-specific criteria set forth in the LTCP. Locations of the proposed soil borings and soil vapor probes are shown on **Figure 10**.

If the results from sampling of the soil vapor probes VP-1 through VP-5 exhibit concentrations that suggest there is potential risk to indoor air quality, three additional sub-slab probes (SS-1 through SS-3) will be installed in the on-site building, and sub-slab, indoor air, and outdoor ambient air samples will be collected. The locations of the potential sub-slab probes are shown on **Figure 10**.

A sensitive receptor survey will also be conducted to evaluate building and occupancy types and conduct an updated well search.

7.1 PRELIMINARY FIELD ACTIVITIES

7.1.1 Permitting and Notifications

Stantec will obtain all necessary permits from Alameda County and the City of Oakland. The location of off-site soil vapor probe VP-6 may be located in the sidewalk or off the sidewalk on private property, depending on accessibility and utility clearance, so a right-of-way (ROW) encroachment permit or access agreement will be obtained as needed. Work on VP-1, VP-2, VP-3, B-1, B-2, and B-3 will occur adjacent to sidewalks; therefore, a ROW encroachment permit will likely be needed to establish a clear work area. A Traffic Control Plan will be prepared and implemented according to the guidelines established in the City of Oakland ROW encroachment permit. These permitting and access requirements can take several weeks to several months to complete.

A schedule of field activities will be communicated to the respective property owners and tenants a minimum of two weeks prior to field activities in order to minimize potential disruptions to normal activities.

As required by law, Underground Service Alert (USA) - North will be notified at least 48 hours prior to any intrusive activities. In addition to notifying USA - North, Stantec will retain the service of a private utility locating contractor to determine if underground utilities are located near the proposed locations.

7.1.2 Health and Safety Plan

Stantec will generate a Site-specific health and safety plan (HASP) as required by the State of California General Industry Safety Order 5192 and Title 29 of the Code of Federal Regulations,

Section 1910.120. The HASP will outline potential hazards to Stantec personnel and subcontractors during the field activities described herein. Job safety analyses (JSAs) for tasks to be performed by Stantec personnel (e.g., driving, oversight of boring advancement, sample collection, etc.) will be included. The HASP will also include required personal protective equipment (PPE) to be worn by all Stantec field personnel for each task. In addition, Stantec will produce a Journey Management Plan (JMP) in an attempt to prevent losses associated with motor vehicle incidents driving to and from the Site. A copy of Stantec's HASP and JMP will be available on Site during all field activities.

Subcontractors will also develop a Site-specific HASP and JSAs for tasks applicable to their scope of work (e.g., driving, advancing soil borings, etc.). Appropriate subcontractor HASPs will also be available on Site.

7.2 SOIL AND GROUNDWATER INVESTIGATION ACTIVITIES

7.2.1 Soil Boring Advancement

Stantec will contract a California-licensed (C-57) driller to advance proposed soil borings B-1 through B-5 (shown on **Figure 10**) to a total depth of approximately 10 feet bgs. Soil boring B-6 will be advanced to a total depth of approximately 5 feet bgs, as it is only designed to evaluate PAHs near the former waste oil UST, and the LTCP does not require PAH evaluation below 5 feet bgs. Field activities will be performed under the direction of a State of California professional geologist. Detailed field records of all activities will be recorded by Stantec field personnel and will include Site conditions, sampling processes, names of field personnel, pertinent dates and times, etc.

To minimize the risk of disturbance to potentially undetectable subsurface utilities and because of the shallow sample depths required for this assessment, the entire length of each boring will be advanced using a hand auger. The proposed locations may change slightly due to the presence of utilities at or near the proposed locations, and the completion depths may be adjusted based on conditions observed in the field.

7.2.2 Soil Sampling

Soil cores will be collected using a slide hammer with a stainless steel sleeve insert. Stantec field personnel will log soil cores for lithological content using the Unified Soil Classification System (USCS) as a guide and for relative moisture content, composition, first-encountered groundwater, photoionization detector (PID) readings, and other notable field observations. Portions of each soil core will be placed in a Ziploc® bag and field-screened using a PID to evaluate the presence of VOCs that may collect in the headspace of the bag.

Each soil boring will be logged, and soil samples will be collected at approximately 2.5-foot intervals to the targeted total depth (i.e., 2.5, 5, 7.5, and 10 feet bgs). Each soil sample collected will be sealed with Teflon® sheets, capped with plastic end caps, labeled with identifying

information, and stored in an ice-filled cooler for preservation before submittal for laboratory analysis.

7.2.3 Soil Sample Laboratory Analysis

Soil samples will be transported and submitted under chain-of-custody protocol to Eurofins Lancaster Laboratories, Inc. (Lancaster), a State of California-certified analytical laboratory, and analyzed for the following constituents of concern:

- TPH-GRO and TPH-DRO with and without silica gel cleanup by United States Environmental Protection Agency (US EPA) Method 8015B; and
- BTEX compounds, MtBE, DIPE, EtBE, TAME, TBA, 1,2-DCA, 1,2-DBA, and naphthalene by US EPA Method 8260B (SW-846).

In addition, soil samples collected from boring B-6, near the former waste oil UST, will be analyzed for PAHs by US EPA 8270C-SIM.

7.2.4 Soil Boring Completion Activities

After each soil boring has been advanced to the proposed depth and representative soil and groundwater samples have been collected, each soil boring will be completed to ground surface with Portland cement grout. The Portland cement grout will consist of approximately 95 percent Portland cement and 5 percent bentonite powder.

7.3 SOIL VAPOR INVESTIGATION ACTIVITIES

The proposed soil vapor investigation will be conducted to evaluate current soil vapor conditions and to determine if the Site meets petroleum vapor intrusion to indoor air and direct contact and outdoor air LTCP criteria. Stantec will install five on-site soil vapor probes (VP-1 through VP-5), and one off-site soil vapor probe (VP-6).

If the results from sampling of the soil vapor probes VP-1 through VP-5 exhibit concentrations that suggest there is potential risk to indoor air quality, three additional sub-slab probes (SS-1 through SS-3) will be installed in the on-site building, and sub-slab, indoor (IA-1 through IA-3), and outdoor ambient (OA-1) air samples will be collected.

Procedures described in the following sections regarding the installation of soil vapor probes and sub-slab probes, along with collection of soil vapor samples are based on technical guidelines detailed in the Chevron Energy Technology Company (Chevron ETC) *Soil Vapor & Indoor Air Sampling Technical Toolkit, Version 1.8* (**Appendix F**; not included in this document due to copyright protection, but may be provided separately to ACEH upon request). This toolkit follows guidance from several agencies and organizations including the American Petroleum Institute (API); American Society for Testing and Materials (ASTM), California Environmental Protection

Agency (Cal EPA), and US EPA (API, 2004; ASTM, 2001; Cal EPA, 2005; Cal EPA, 2012; US EPA, 2002).

Stantec personnel will maintain detailed field notes (e.g., Site conditions, weather, sampling processes, names of field personnel and visitors on Site, pertinent dates and times, etc.) during activities associated with the installation and sampling of the probes/wells.

7.3.1 Installation of Soil Vapor Probes

Stantec will contract a California-licensed (C-57) driller to install soil vapor probes VP-1 through VP-6 (shown on **Figure 10**) to depths of approximately 5.5 feet bgs using a 3.25-inch diameter stainless steel hand auger.

Drilling activities will be performed under the supervision of a State of California professional geologist. Detailed field records of all activities will be recorded by Stantec field personnel including Site conditions, sampling processes, names of field personnel, pertinent dates and times, etc.

A slide hammer with 6-inch long stainless steel sleeves will be used to collect soil samples from borehole VP-6 at depths of approximately 2.5 and 5.5 feet bgs. Soil samples will not be collected from boreholes VP-1 through VP-5, as soil samples will be collected from borings B-1 through B-5, which are adjacent to them. Stantec field personnel will log soil cores for lithological content using the USCS as a guide and for relative moisture content, composition, first-encountered groundwater, PID readings, and other notable field observations. Portions of each soil core will be placed in a Ziploc® bag and field-screened using a PID to evaluate the presence of VOCs that may collect in the headspace of the bag. Soil samples will be sealed with Teflon™ sheets and plastic end caps, labeled with identifying information, and stored in an ice-filled cooler for preservation.

After each borehole is advanced to its maximum depth of approximately 5.5 feet bgs, each soil vapor probe will be installed. Each soil vapor sampling probe will consist of a 6-inch screen section constructed of copper or stainless steel. The screen for the soil vapor probe will be approximately 6 inches long and set from approximately 4.75 to 5.25 feet bgs. Final screen intervals will be determined based on field observations. The vapor probe screen will be connected to 1/4-inch O.D. Teflon® tubing to complete the probe to the surface. Each tube will be fitted with a gas-tight cap (Swagelok® cap or equivalent) at the ground surface.

The screen filter pack for the probe will be constructed by pouring sieve size #3 graded Lapis Lustre sand from the bottom of the borehole annular space to approximately 3 inches above the top of the probe screen casing such that the probe is centered at the midpoint of the sand pack. An approximately 1-foot interval of 3/8-inch dry bentonite chips will be placed in the annular space above the sand filter pack, followed by approximately 1 foot of hydrated bentonite powder. The bentonite will be allowed to swell for approximately 1 hour. The remaining annular space will be filled with a neat Portland cement grout to approximately 1 foot bgs.

A traffic-rated, bolt-down, vault box will be placed around the tops of the probe casings and secured in place with concrete. Soil vapor probe construction details will be recorded onto soil vapor probe construction field logs. Upon completion of the soil vapor probe installations, probes will be allowed to equilibrate a minimum of 48 hours before soil vapor samples are collected.

7.3.2 Installation of Sub-Slab Probes

Depending on the results of the vapor probe sample analysis and access to building plans for utility assessment, Stantec will install three sub-slab probes (SS-1 through SS-3; shown on **Figure 10**). Installation activities will be performed under the supervision of a State of California professional geologist. Detailed field records of all activities will be recorded by Stantec field personnel including Site conditions, sampling processes, names of field personnel, pertinent dates and times, etc.

Due to the shallow depth and narrow diameter of the sub-slab probe, clearing with an air knife or hand auger will not occur. Stantec will contact the property owner ahead of the work to attempt to obtain information on the presence of a sub-slab moisture or vapor barrier, the slab thickness, the presence of post-slab tensioning, and indoor utilities prior to installation (as-built drawings). If a sub-slab moisture or vapor barrier is present, the installation of a sub-slab probe may be cancelled. If no moisture or vapor barrier is present, following utility clearance and confirmation that post-slab tensioning is not present, a small patch of floor covering (e.g., wood, carpet, linoleum, tile, etc.) will be removed from the proposed sub-slab probe location. If carpet or linoleum is present, a small "L-shaped" slit will be made to expose the slab surface. A small-diameter outer hole (approximately 7/8-inch diameter) will be advanced approximately 2 inches into the slab using a commercial rotary hammer drill. Dust and loose cuttings generated during drilling will be collected with a portable vacuum, and care will be taken to avoid applying suction directly (vertically) to the hole. The rotary hammer drill will then be used to create a smaller-diameter inner hole (approximately 5/16-inch diameter) through the remainder of the slab and extending approximately 3 inches into the sub-slab material. Drilling into the subsurface will create an open cavity which will prevent obstruction of the probe by small pieces of gravel.

Following drilling, the sub-slab probe will be installed and constructed according to the following description and as shown on **Figure 12**; however, actual construction may vary slightly based on field conditions. A stainless steel soil vapor implant will be inserted to such a depth that the vapor probe drive point will be set above the sub-slab material. The sub-slab probe will be completed with a Swagelok® fitting and recessed cap set flush with the slab so as not to interfere with day-to-day use of the building. The top 1 to 2 inches of the annulus below the cap will be filled with hydrated bentonite, which will be allowed to harden for at least 24 hours prior to initiating sub-slab vapor sample collection activities. All fittings will be attached before the probe is installed to help minimize stresses on the seal. In the event that sub-slab probe construction fails a leak test, the remaining area above the hydrated bentonite and below the Swagelok® fitting will be

sealed further with a thin layer (approximately ¼ inch) of quick-dry cement followed by Eco-Safe™ non-VOC caulking.

7.3.3 Soil Vapor, Sub-Slab, Indoor Air, and Outdoor Air Sample Collection

Prior to the soil vapor sampling event, weather reports will be checked to verify that a significant antecedent rain event (i.e., greater than or equal to 0.5 inches; Cal EPA, 2012) has not occurred within 24 hours. If a significant rain event has occurred, the sampling will be rescheduled for another date. Sampling immediately following a rain event increases the likelihood of soil pore occlusion by water, thereby potentially affecting soil vapor results.

Stantec personnel will maintain detailed notes during the soil vapor sample collection activities. Notes will include weather conditions, vacuum leak test data, purge data, and sample collection/tracer gas monitoring data. Soil vapor sample collection data logs are included in **Appendix G**.

7.3.3.1 Procuring Equipment and Supplies

Stantec will contact Eurofins Air Toxics, Inc. (Air Toxics), of Folsom, California, a State of California Department of Health Services-certified National Environmental Laboratory Accreditation Program (NELAP) and Chevron-approved laboratory, to coordinate shipment of the appropriate sample containers and equipment to perform soil vapor sampling. Coordination between Stantec and Air Toxics will include establishing arrival times of the samples to ensure Air Toxics has sufficient time to analyze soil vapor samples within the required hold time. If Air Toxics is unable to provide all required equipment, Stantec may subcontract an alternate laboratory.

For the initial sampling event, Stantec will request Air Toxics provide the following supplies for the sampling event:

- Nine 10% (batch) certified 1-liter (L) Summa™ canisters paired with nine laboratory-certified flow controllers (with built-in particulate filters) calibrated to deliver approximately 175 milliliters per minute (mL/min) – one for each soil vapor probe or sub-slab vapor sampling point, one each for a duplicate and an equipment blank, and one spare to be used in the event of canister failure;
- Sampling tee for duplicate sample collection;
- One pressurized canister filled with zero air to supply a source for the equipment blank;
- One 10% (batch) certified 6-L Summa™ canister – for use as a purge canister; and
- Seven Tedlar® bags – one for each newly installed soil vapor probes (VP-1 through VP-6) and one spare to be used in the event of Tedlar® bag failure. The Tedlar® bags will be used for field leak check measurements.

If it is determined that sub-slab, indoor air, and outdoor ambient air sampling will proceed, Stantec will request Air Toxics provide the following additional supplies for the sampling event:

- Six 100% (individually) certified 1-liter (L) Summa™ canisters paired with six laboratory-certified flow controllers (with built-in particulate filters) calibrated to deliver

approximately 50 mL/min – one for each sub-slab vapor sampling point, one each for a duplicate and an equipment blank, and one spare to be used in the event of canister failure;
- Four 100% (individually) certified 6-L Summa™ canisters paired with four laboratory-certified flow controllers (with built-in particulate filters) set to a flow rate sufficient to collect a time-integrated sample over an 8-hour duration (approximately 11.5 mL/min) – one for each indoor and outdoor ambient air sample;
- Sampling tee for duplicate sample collection;
- One pressurized canister filled with zero air to supply a source for the equipment blank;
- One 10% (batch) certified 6-L Summa™ canister – for use as a purge canister; and
- Four Tedlar® bags – one for each newly installed sub-slab probes (SS-1 through SS-3) and one spare to be used in the event of Tedlar® bag failure. The Tedlar® bags will be used for field leak check measurements.

Chevron ETC (2013) recommends use of 100% (individually) certified Summa™ canisters to minimize potential interferences in analyzing low concentrations for human health risk assessment. Individual certification means that each canister processed (i.e., cleaned using a combination of dilution, heat, and high vacuum) is sampled and analyzed for the project-specific target analyte list by GC/MS, and that concentrations of target compounds are below project reporting limits. Each Summa™ canister will be equipped with a laboratory-supplied certified flow controller set to collect samples at the desired flow rate and a vacuum gauge. Individual certification is made as a sampling train and must be sampled as such (i.e., a particular flow controller is matched with a particular canister). Accordingly, the laboratory provides unique identification numbers for each canister and flow controller, which will be entered on the field log and chain-of-custody form.

Air Toxics will measure and record canister vacuum using their fixed, calibrated equipment as well as the canister-assigned vacuum gauges. Upon receipt, the initial vacuum of each canister will be measured and recorded by Stantec using laboratory-supplied vacuum gauges. Laboratory and field vacuum measurements will be compared to determine if vacuum loss has occurred during shipment.

Stantec will notify Air Toxics of the request to analyze naphthalene by US EPA Method TO-15 prior to ordering the Summa™ canisters.

Stantec will procure the following equipment and supplies for the sampling event:
- Two-way ¼-inch Swagelok® valves;
- ¼-inch outer diameter (OD) Teflon® tubing (Nylon tubing marketed under the NylaFlow® name is also acceptable; however, Tygon®, rubber, and polyethylene tubing will be avoided);
- Tubing cutter;
- End caps for tubing;
- ¼-inch Swagelok® connectors and fittings (hose clamps and other types of connectors will be avoided as they may not provide an air-tight seal);

- Helium gas and helium detector/monitor; and
- Proper hand tools to secure connections and fittings.

A dedicated sampling train similar to the one shown on Figure 8 in the Chevron ETC *Soil Vapor Sampling & Indoor Air Technical Toolkit, Version 1.8* (**Appendix F**) will be assembled for each soil vapor probe and used for purging and sampling. To measure purge volume by vacuum drop, a Summa™ canister will be used for purging instead of an air pump.

7.3.3.2 Soil Vapor Sample Collection

7.3.3.2.1 Connecting Sampling Equipment

Upon arriving in the field for vapor sampling activities, the ambient air in close proximity to the probes (soil vapor and sub-slab) will be analyzed with a multi-meter/PID. Products that could potentially influence sample results will be removed from the area.

The sampling equipment will be assembled similar to the layout shown on Figure 8 in **Appendix F** (provided below with approval from Chevron) and connected to the soil vapor probe to be sampled. The soil vapor sampling systems will be purged prior to sample collection. Purging details are provided in Section 7.3.3.2.3.

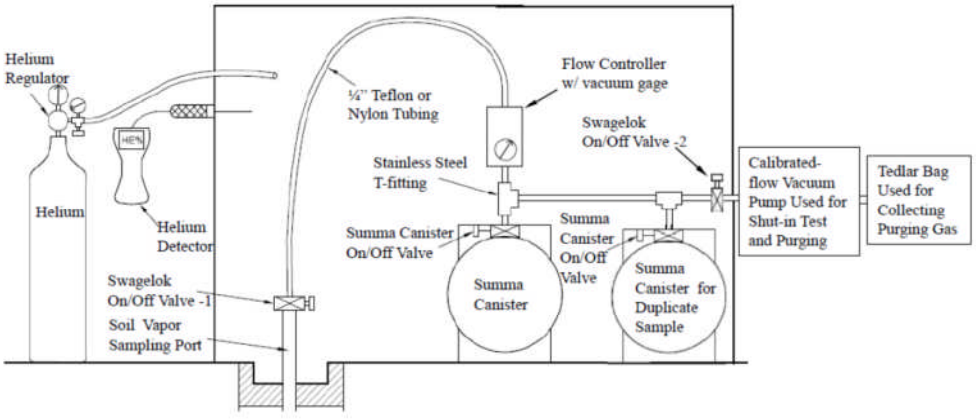

Figure 8. Soil vapor sampling train using two Summa canisters for a sample and a duplicate sample (Adapted from ENSR)

7.3.3.2.2 Leak Testing

Leakage of atmospheric air into the sampling equipment during sample collection can compromise sample integrity and dilute measured soil vapor petroleum hydrocarbon concentrations, possibly to the point that the concentration is below the method detection limit (i.e., a false negative). Contaminants in ambient air can also enter the sampling system and be detected in the sample from a non-contaminated sampling probe (i.e., a false positive). Air

leakage can occur at the land surface into the probe and, more likely, through loose fittings in the above-ground sampling equipment.

To avoid leaks, the connections, fittings, and other parts associated with the sampling equipment will be checked to verify that they are tightly fit. The soil vapor purging and sampling rate will be kept similar to each other.

To test for leaks, two methods will be used. The first method involves performing a vacuum test (shut-in test) on the above-ground sampling equipment. This test will be performed by closing all of the sampling valves and applying a vacuum (using the vacuum pump of approximately 100 inches water column [in W.C.]) on the sampling equipment. If constant vacuum pressure is maintained for at least 1 minute, the sampling equipment will pass the vacuum test. Results of the vacuum leak test will be recorded on the soil vapor sample collection data log provided in **Appendix G**.

The second method involves using a tracer gas to test for ambient air leakage into the sampling system. Chevron ETC (2013) recommends the use of helium as a tracer gas where practical to do so, primarily based low toxicity; it does not disrupt analytical measurements; is generally not found at fuel contaminated sites; and, has a high purity. Laboratory-grade helium is recommended and can be obtained from an analytical laboratory or directly from a helium supplier.

A sampling enclosure (shroud) will be constructed to facilitate leak testing during soil vapor sample collection. The sampling enclosure may be constructed with acrylic sheets, plastic bins, or plastic sheets covering a PVC frame. Regardless of the materials used to construct the enclosure, it will be large enough to cover sampling equipment from the tubing at the probe to the sample Summa™ canister. Pressure in the enclosure must remain at atmospheric pressure to ensure normal sampling conditions exist. The sampling enclosure will be filled and maintained to at least 10% helium, and a helium detector (e.g., Mark Products Model 1200) will be used to measure the percentage of helium in the enclosure during sample collection. The 10% helium concentration is at least 10 times higher than the typical lower reporting limit (0.15%) achieved for ASTM Method D-1946.

As described in Chevron ETC's *Soil Vapor Sampling Technical Toolkit, Version 1.8* (**Appendix F**), small amounts of sample train leakage may not invalidate sample results. A leakage of as much as 10% may allow back calculation of an adjusted soil vapor concentration.

7.3.3.2.3 Purging

After the sampling equipment passes the vacuum test, the probe will be purged to remove internal air from the sample train (tubing and vapor implant only). Three internal volumes will be purged from each probe. Note that the purge volumes calculated in **Table 9** are based on the anticipated lengths of the below- and above-ground sampling equipment. Purge volumes should be recalculated if final lengths are different than anticipated. Because each purge volume is anticipated to be less than 50 mL, purging will be performed at each location using a

dedicated 6-L purge canister. Due to the low volume of purge air, a 60 cubic centimeter gas-tight syringe will be used to remove purge air. The flow rate during purging will be approximately equivalent to the flow rate during sampling, which is set by the flow controller provided by the laboratory. Purge data for each probe will be recorded on the log provided in **Appendix G**. Each location will be sampled immediately following purging, as described in the following section. It is important to use the same purge rate and duration at a given probe for each subsequent sampling event.

7.3.3.2.4 Soil Vapor and Sub-Slab Vapor Sampling

With the leak test enclosure still in place, collection of soil vapor samples from a particular probe will begin within 10 minutes of purging. After the Summa™ canister valve is opened and the canister begins to fill, the pressure gauge on the flow controller will be observed to verify that the vacuum in the canister is decreasing over time. If the flow controller is working correctly, it will take approximately 20 minutes for the vacuum to decrease to 5 inches of mercury (in Hg); however, the actual sampling duration may be slightly more or less than 20 minutes. The Summa™ canister valve will be closed and sampling will cease when a vacuum of 5 in Hg is obtained.

A duplicate sample will be collected from one of the soil vapor probes concurrent with the primary sample using a separate Summa™ canister and flow valve and a laboratory-supplied sampling tee. An equipment blank sample will also be collected in the field. Stantec will attempt to collect all of the planned samples on the same day.

Sample collection and tracer gas monitoring data for each probe will be recorded on the soil vapor sample collection data log provided in **Appendix G**.

7.3.3.3 Indoor Air and Outdoor Ambient Air Sample Collection

If sub-slab probes are installed and sub-slab vapor sampling is necessary, indoor and outdoor air samples will be collected in conjunction with the sub-slab probe vapor samples to help fully evaluate Site vapor conditions. Collection of indoor air and outdoor ambient air samples will be completed concurrently with the sub-slab samples. One indoor air sample per sub-slab sample (IA-1, IA-2, and IA-3) will be collected in the Site building near and corresponding to sub-slab probes SS-1, SS-2, and SS-3, respectively. One outdoor ambient air sample (OA-1) will be collected at a location up-wind from the Site building. Outdoor air may contain background concentrations of constituents of concern that exceed risk-based indoor air target levels; therefore, the outdoor ambient air sample will be collected in conjunction with the indoor air samples to characterize the potential contribution from outdoor air. Indoor air and outdoor ambient air sample collection data will be recorded on the sample collection data log provided in **Appendix G**.

7.3.3.3.1 Indoor Air Sampling

Indoor air samples may contain BTEX compounds and other VOCs within the concentration ranges commonly seen as background values measured at sites where no subsurface petroleum hydrocarbon contamination is known to be present. Background concentrations can be within (or even greater than) the range of risk-based concentrations (RBC) associated with petroleum hydrocarbons (Dawson & McAlary, 2009). There are many sources of background contamination inside buildings that can potentially contribute to VOC detections in indoor air samples. Materials and substances commonly found in commercial and residential settings may include paints, paint thinners, gasoline-powered machinery, building materials, cleaning products, dry-cleaned clothing, and cigarette smoke.

To help identify and avoid these potential influences, a pre-sampling building survey will be arranged at least 24 hours prior to the sampling event (Cal EPA, 2005). The goal will be to interview the occupant of the Site and complete a building survey to document the following information as completely as possible:

- Contact information for the occupant and owner;
- Type of building construction;
- Foundation characteristics;
- Heating, ventilating, and air conditioning (HVAC) system details;
- Potential indoor sources of VOC vapors, particularly those containing hydrocarbons, such as fuels, combustion products, cleaners, solvents and lubricants containing petroleum distillates, and tobacco products;
- Water wells and sewage disposal;
- Sampling locations and pertinent information on floor layout including chemical storage areas, doorways, stairways, basement sumps, utility conduits/trenches, etc.; and
- Potential outdoor sources of VOCs such as chemical storage areas, service stations, retail shops, etc.

The indoor air samples (IA-1 through IA-3) will be collected under conditions considered to be representative of normal building use. HVAC systems will be operated normally for the season and time of day. To mimic the anticipated daily exposure for commercial buildings, the sampling duration will last approximately 8 hours.

The Summa™ canisters will be placed approximately 3 to 5 feet above floor level (normal breathing zone) and as close to the center of the room as practical. After the Summa™ canister valve is opened and the canister begins to fill, the pressure gauge on the flow controller will be observed to check that the vacuum in the canister is decreasing evenly over time. If the flow controller is working correctly, it will take approximately 8 hours for the vacuum to decrease to 5 in. Hg; however, the actual sampling duration may be slightly more or less than 8 hours. The Summa™ canister valve will be closed and sampling will cease when a vacuum of approximately 5 in. Hg is obtained.

7.3.3.3.2 Outdoor Ambient Air Sampling

The outdoor ambient air sample (OA-1) will be collected at the same time as the indoor air sample. This will provide information about possible outside influences on indoor air quality. The outdoor ambient air sample can identify vapors from automotive fuels and exhaust, point sources such as gasoline dispensers, stack emissions, and other possible unique situations (paving crews, forest fires, etc.). The Summa™ canister will be placed approximately 3 to 5 feet above grade at an up-wind location protected from the elements (wind, rain, etc.) on the up-wind side of the building at a distance of approximately twice the height of the building. The outdoor ambient air sampling will begin approximately 1 hour prior to the indoor air sampling, and will continue to within approximately 30 minutes of the completion of the indoor air sampling period.

7.3.4 Sample Storage and Transport

Soil vapor samples will be properly labeled and placed within secure packaging received from Air Toxics. Soil vapor samples will not be chilled since contaminants may condense in the canisters at low temperatures. Soil vapor samples will be shipped via Federal Express (FedEx) next-day air. Samples will be transported under chain-of-custody protocol (including noting the final canister vacuums and serial numbers of the canisters). Air Toxics will be notified of the expected arrival time of the samples. Pre-field planning will prevent sample shipments from arriving at the laboratory during weekends.

7.3.5 Laboratory Analyses

7.3.5.1 Soil Samples

Soil samples collected from soil vapor probe VP-6 will be transported via FedEx, submitted under chain-of-custody protocol to Lancaster, and analyzed for the following constituents of concern:

- TPH-GRO and TPH-DRO with and without silica gel cleanup by US EPA Method 8015B (SW-846); and
- BTEX compounds, MtBE, DIPE, EtBE, TAME, TBA, 1,2-DCA, 1,2-DBA, and naphthalene by US EPA Method 8260B (SW-846).

7.3.5.2 Soil Vapor Samples

Soil vapor samples collected from vapor probes VP-1 through VP-6 and sub-slab probes SS-1 through SS-3 will be transported via FedEx, submitted under chain-of-custody protocol to Air Toxics, and analyzed for the following constituents of concern:

- TPH-GRO, TPH-DRO, BTEX compounds, and naphthalene by US EPA Method TO-15 full scan; and
- Fixed gases (carbon dioxide, oxygen, methane, and helium) by ASTM Method D-1946. Note: Since the laboratory normally uses helium as a carrier gas, helium analysis must be specified on the chain-of-custody.

7.3.5.3 Indoor Air and Outdoor Ambient Air Samples

The indoor air and outdoor ambient air samples (IA-1, IA-2, IA-3, and OA-1) will be transported via FedEx, submitted under chain-of-custody protocol to Air Toxics, and analyzed for the following constituents of concern:

- TPH-GRO, TPH-DRO, BTEX compounds, and naphthalene by US EPA Method TO-15 SIM.

7.3.6 Quality Assurance/Quality Control

Quality assurance/quality control (QA/QC) measures will be implemented as appropriate. One duplicate soil vapor sample will be collected to evaluate the precision of analytical data. One equipment blank will be collected to evaluate quality of laboratory-supplied equipment. Laboratory blanks (e.g., method blank, instrument blank) will be prepared and analyzed as appropriate by Air Toxics.

7.4 DATA VERIFICATION

Upon receipt of all final laboratory analysis reports, Stantec will perform data verification, which will include:

- Verifying that batch QC samples were analyzed at the proper frequency and that results were within specifications;
- Verifying that holding times were met and that reporting units and quantitation limits are correct;
- Evaluating whether corrective action (reanalysis of QC or project samples) is needed and, if so, is performed and documented;
- Verifying that the project and QC sample results were properly reported and flagged; and
- Preparing batch narratives that adequately identify and discuss any problems encountered.

7.5 WASTE MANAGEMENT

Investigation-derived waste (e.g., soil cuttings, decontamination water, etc.) generated during the proposed field activities will be placed in Department of Transportation-approved 55-gallon drums. A composite soil sample will be collected from the drums and submitted to Lancaster for waste characterization purposes. The drums will be properly labeled and stored on Site pending receipt of analytical results and profile evaluation by CRA. CRA will arrange removal and disposal of all waste.

7.6 REPORT PREPARATION

Data gathered during the additional investigation activities proposed herein will be documented in an additional investigation report. The report will include a summary of field

activities; tabulated soil and groundwater analytical data; a Site location map; an updated Site Plan showing the final locations of the soil borings and vapor probes; soil boring and vapor probe construction logs with geologic descriptions; certified laboratory analysis reports and chain-of-custody documentation; a sensitive receptor survey based on available building and well data; a discussion of the findings based on the new data; and conclusions and recommendations, as appropriate.

Results from the additional investigation will be used to reevaluate identified data gaps and to determine whether the case complies with the media-specific LTCP criteria. If additional data gaps are identified, further assessment may be recommended. If it is determined that the Site meets LTCP criteria, the report will also include a low-threat closure request, and all further assessment will cease.

7.7 SCHEDULE OF ACTIVITIES

Stantec will begin planning and scheduling the proposed investigation activities following approval of this work plan by ACEH. Stantec anticipates completing the pre-field planning, health and safety plan, and access agreement and ROW encroachment permit acquisition over a span of approximately two months. Following pre-field activities, Stantec anticipates completing the field work over a span of approximately two weeks. Final certified laboratory analysis reports will be obtained approximately 2 to 4 weeks following submission of the samples to the laboratory. Stantec will submit the additional investigation report to ACEH approximately 45 days following the receipt of all final certified laboratory analysis reports.

If it is determined that sub-slab probes should be installed, Stantec will indicate that recommendation in the report but will not wait for ACEH approval before proceeding with the planning of the work. An updated access agreement may be required between Chevron and the property owner, which may take several weeks to months to complete. Stantec anticipates completing the second phase of work over a span of approximately one week. Final certified laboratory analysis reports will be obtained approximately 2 to 4 weeks following submission of the samples to the laboratory. Stantec will submit the vapor intrusion evaluation to ACEH approximately 45 days following the receipt of all final certified laboratory analysis reports.

8.0 References

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TABLES

Table 1
Well Details / Screen Interval Assessment
First Quarter 2013
Former Chevron-Branded Service Station 90517
3900 Piedmont Avenue, Oakland, California

Well ID	Date Installed	Well Type	Casing Diameter (inches)	Top of Casing (feet above msl)	Construction Well Depth (feet bgs)	Current Well Depth[1] (feet bgs)	Current Depth to Groundwater[1] (feet below TOC)	Screen Interval (feet bgs)	Screen Interval Assessment
MW-1	07/21/98	Monitoring	2	87.89	16.50	16.62	7.47	3.5-16.5	Depth-to-groundwater within screen interval.
MW-2	07/21/98	Monitoring	2	86.09	16.50	16.50	5.80	3.5-16.5	Depth-to-groundwater within screen interval.
MW-3	07/21/98	Monitoring	2	86.28	17.50	17.72	6.87	4.5-17.5	Depth-to-groundwater within screen interval.
MW-4	07/21/98	Monitoring	2	87.22	16.50	16.28	8.14	3.5-16.5	Depth-to-groundwater within screen interval.

Notes:
bgs = below ground surface
msl = mean sea level
TOC = top of casing
[1] = As measured prior to groundwater sampling on February 9, 2013.

Table 2
Groundwater Monitoring Data and Analytical Results
Former Chevron-branded Service Station 90517
3900 Piedmont Avenue
Oakland, California

WELL ID/ DATE	TOC* (ft.)	DTW (ft.)	GWE (msl)	TOTAL TPH (µg/L)	TPH-MO (µg/L)	HEM (µg/L)	TPH-DRO (µg/L)	TPH-GRO (µg/L)	B (µg/L)	T (µg/L)	E (µg/L)	X (µg/L)	MtBE (µg/L)
MW-1													
08/03/98	87.89	12.43	75.46	--	--		--	<50	<0.5	<0.5	<0.5	<0.5	<2.5
11/23/98	87.89	9.05	78.84	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	<2.0
02/08/99	87.89	6.50	81.39	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	<2.5
05/07/99	87.89	7.13	80.76	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	<5.0
08/23/99	87.89	9.15	78.74	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	<2.5
11/03/99	87.89	9.54	78.35	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	<2.5
02/15/00	87.89	5.90	81.99	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	<5.0
05/12/00[3]	87.89	7.05	80.84	--	--	--	--	<50	<0.50	<0.50	<0.50	<0.50	<2.5
07/31/00	87.89	8.40	79.49	--	--	--	--	<50	<0.50	<0.50	<0.50	<0.50	<2.5
10/30/00	87.89	8.65	79.24	--	--	--	--	<50	<0.50	<0.50	<0.50	<1.50	<2.50
02/27/01	87.89	5.83	82.06	--	--	--	--	<50	<0.50	<0.50	<0.50	<0.50	<2.50
05/15/01	87.89	7.71	80.18	--	--	--	--	<50	<0.50	<0.50	<0.50	<0.50	<2.50
08/23/01	87.89	DRY	--	--	--	--	--	--	--	--	--	--	--
02/25/02	87.89	6.71	81.18	--	--	--	--	<50	<0.50	<0.50	<0.50	<1.5	<2.5
08/05/02	87.89	8.89	79.00	--	--	--	--	<50	<0.50	<0.50	<0.50	<1.5	<2.5
02/11/03	87.89	7.36	80.53	--	--	--	--	<50	<0.50	<0.50	<0.50	<1.5	<2.5
08/09/03[5]	87.89	9.47	78.42	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	<0.5
02/25/04[5]	87.89	6.30	81.59	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	<0.5
08/23/04[5]	87.89	10.12	77.77	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	<0.5
02/11/05[5]	87.89	6.79	81.10	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	<0.5
08/15/05[5]	87.89	8.89	79.00	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	<0.5
02/10/06[5]	87.89	6.65	81.24	--	--	--	--	<50	1	<0.5	<0.5	<0.5	<0.5
08/02/06[5]	87.89	7.73	80.16	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	<0.5
02/09/07[5]	87.89	7.77	80.12	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	<0.5
08/23/07[5]	87.89	9.59	78.30	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	<0.5
02/18/08[5]	87.89	7.41	80.48	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	<0.5
08/12/08[5]	87.89	9.78	78.11	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	<0.5
02/19/09[5]	87.89	5.61	82.28	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	<0.5
08/07/09	87.89	10.22	77.67	NOT PART OF GROUNDWATER SAMPLING PROGRAM					--	--	--	--	--
01/29/10	87.89	6.04	81.85	NOT PART OF GROUNDWATER SAMPLING PROGRAM					--	--	--	--	--
08/11/10	87.89	8.35	79.54	NOT PART OF GROUNDWATER SAMPLING PROGRAM					--	--	--	--	--
02/02/11	87.89	6.54	81.35	NOT PART OF GROUNDWATER SAMPLING PROGRAM					--	--	--	--	--
01/31/12	INACCESSIBLE		--	--	--	--	--	--	--	--	--	--	--
05/10/12[5]	87.89	7.28	80.61	2,800[6]/ 1,300[6,7,8]	2,800[6]/ 1,300[6,7,8]	--	1,400/ 720[7,8]	<50	<0.5	<0.5	<0.5	<1	<0.5
02/09/13[5]	**87.89**	**7.47**	**80.42**	**1,400[6]/ 700[6,7,8]**	**1,400[6]/ 700[6,7,8]**	**1,600/ 2,400[7]**	**650/ 220[7,8]**	**<50**	**<0.5**	**<0.5**	**<0.5**	**<0.5**	**<0.5**

Table 2
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Former Chevron-branded Service Station 90517
3900 Piedmont Avenue
Oakland, California

WELL ID/ DATE	TOC* (ft.)	DTW (ft.)	GWE (msl)	TOTAL TPH (µg/L)	TPH-MO (µg/L)	HEM (µg/L)	TPH-DRO (µg/L)	TPH-GRO (µg/L)	B (µg/L)	T (µg/L)	E (µg/L)	X (µg/L)	MtBE (µg/L)
MW-2													
08/03/98	86.09	11.34	74.75	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	3.4
11/23/98	86.09	6.90	79.19	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	<2.0
02/08/99	86.09	5.23	80.86	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	<2.5
05/07/99	86.09	6.12	79.97	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	<5.0
08/23/99	86.09	6.41	79.68	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	<2.5
11/03/99	86.09	7.29	78.80	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	<2.5
02/15/00	86.09	4.49	81.60	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	<5.0
05/12/00	86.09	5.90	80.19	--	--	--	--	4,000[3]	240	26	100	76	<100
07/31/00	86.09	6.58	79.51	--	--	--	--	<50	<0.50	<0.50	<0.50	<0.50	<2.5
10/30/00	86.09	6.23	79.86	--	--	--	--	<51	<0.50	2.92	<0.50	1.88	4.89
02/27/01	86.09	4.60	81.49	--	--	--	--	<52	<0.50	<0.50	<0.50	<0.50	<2.50
05/15/01	86.09	6.3	79.79	--	--	--	--	<50	<0.50	<0.50	<0.50	<0.50	<2.50
08/23/01	86.09	7.28	78.81	--	--	--	--	<50	<0.50	<0.50	<0.50	<0.50	<2.5
02/25/02	86.09	5.61	80.48	--	--	--	--	<50	<0.50	<0.50	<0.50	<1.5	<2.5
08/05/02	86.09	7.10	78.99	--	--	--	--	<50	<0.50	<0.50	<0.50	<1.5	<2.5
02/11/03	86.09	7.45	78.64	--	--	--	--	<50	<0.50	<0.50	<0.50	<1.5	<2.5
08/09/03[5]	86.09	7.65	78.44	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	<0.5
02/25/04[5]	86.09	4.85	81.24	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	<0.5
08/23/04[5]	86.09	8.23	77.86	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	<0.5
02/11/05[5]	86.09	5.93	80.16	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	<0.5
08/15/05[5]	86.09	7.59	78.50	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	<0.5
02/10/06[5]	86.09	5.73	80.36	--	--	--	--	<50	0.6	<0.5	<0.5	<0.5	<0.5
08/02/06[5]	86.09	6.95	79.14	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	<0.5
02/09/07[5]	86.09	6.29	79.80	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	<0.5
08/23/07[5]	86.09	7.40	78.69	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	<0.5
02/18/08[5]	86.09	6.47	79.62	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	<0.5
08/12/08[5]	86.09	7.08	79.01	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	<0.5
02/19/09[5]	86.09	6.50	79.59	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	<0.5
08/07/09	86.09	8.51	77.58	NOT PART OF GROUNDWATER SAMPLING PROGRAM					--	--	--	--	--
01/29/10	86.09	6.29	79.80	NOT PART OF GROUNDWATER SAMPLING PROGRAM					--	--	--	--	--
08/11/10	86.09	7.20	78.89	NOT PART OF GROUNDWATER SAMPLING PROGRAM					--	--	--	--	--
02/02/11	86.09	6.87	79.22	NOT PART OF GROUNDWATER SAMPLING PROGRAM					--	--	--	--	--
01/31/12	86.09	6.81	79.28	NOT PART OF GROUNDWATER SAMPLING PROGRAM					--	--	--	--	--
02/09/13	**86.09**	**5.80**	**80.29**	**NOT PART OF GROUNDWATER SAMPLING PROGRAM**					**--**	**--**	**--**	**--**	**--**

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Former Chevron-branded Service Station 90517
3900 Piedmont Avenue
Oakland, California

WELL ID/ DATE	TOC* (ft.)	DTW (ft.)	GWE (msl)	TOTAL TPH (µg/L)	TPH-MO (µg/L)	HEM (µg/L)	TPH-DRO (µg/L)	TPH-GRO (µg/L)	B (µg/L)	T (µg/L)	E (µg/L)	X (µg/L)	MtBE (µg/L)
MW-3													
08/03/98	86.28	12.08	74.20	--	--	--	--	4,000	160	<5.0	<5.0	73	180
11/23/98	86.28	7.69	78.59	--	--	--	--	4,000	67.7	7.56	17.1	24.5	41.2
02/08/99	86.28	6.27	80.01	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	<2.5
05/07/99	86.28	6.96	79.32	--	--	--	--	1,800	53.6	8.96	33	18.6	21.4
08/23/99	86.28	7.92	78.36	--	--	--	--	3,970	155	24	88.8	39.8	185
11/03/99	86.28	7.92	78.36	--	--	--	--	3,320	108	19.9	98.4	44.8	<25
02/15/00	86.28	5.74	80.54	--	--	--	--	779	26.7	3.82	15.4	4.24	<12.5
05/12/00	86.28	6.76	79.52	--	--	--	--	12,000[3]	3,100	120	980	1,400	820
07/31/00	86.28	7.30	78.98	--	--	--	--	1,200[3]	32	<5.0	11	7.3	39
10/30/00	86.28	7.02	79.26	--	--	--	--	3,300[4]	119	<5.00	40	<15.0	<25.0
02/27/01	86.28	5.89	80.39	--	--	--	--	432[3]	15.5	1.53	14.9	1.06	15.7
05/15/01	86.28	7.07	79.21	--	--	--	--	3,220[3]	96.4	12.6	11.5	11.6	128
08/23/01	86.28	8.05	78.23	--	--	--	--	2,300	48	<10	<10	<10	100
02/25/02	86.28	6.73	79.55	--	--	--	--	3,100	27	2.1	4.8	6.6	<2.5
08/05/02	86.28	7.95	78.33	--	--	--	--	4,100	87	21	90	47	21
02/11/03	86.28	7.05	79.23	--	--	--	--	3,700	21	2.3	4.4	9	<20
08/09/03[5]	86.28	8.23	78.05	--	--	--	--	1,600	12	1	2	4	0.7
02/25/04[5]	86.28	5.85	80.43	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	<0.5
08/23/04[5]	86.28	9.05	77.23	--	--	--	--	3,000	21	3	3	9	<0.5
02/11/05[5]	86.28	7.02	79.26	--	--	--	--	540	15	1	<0.5	0.8	<0.5
08/15/05[5]	86.28	8.41	77.87	--	--	--	--	2,600	11	1	1	2	<0.5
02/10/06[5]	86.28	6.93	79.35	--	--	--	--	970	20	2	<0.5	3	<0.5
08/02/06[5]	86.28	8.00	78.28	--	--	--	--	1,000	16	1	<0.5	3	<0.5
02/09/07[5]	86.28	7.33	78.95	--	--	--	--	590	3	<0.5	<0.5	0.5	<0.5
08/23/07[5]	86.28	8.83	77.45	--	--	--	--	2,700	18	4	2	8	<0.5
02/18/08[5]	86.28	7.27	79.01	--	--	--	--	1,300	8	1	0.6	1	<0.5
08/12/08[5]	86.28	9.58	76.70	--	--	--	--	2,000	21	3	1	4	<0.5
02/19/09[5]	86.28	6.76	79.52	--	--	--	--	810	<0.5	<0.5	<0.5	1	<0.5
08/07/09[5]	86.28	9.17	77.11	--	--	--	--	900	4	0.9	3	3	<0.5
01/29/10[5]	86.28	6.57	79.71	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	<0.5
08/11/10[5]	86.28	8.61	77.67	--	--	--	--	1,800	9	2	6	5	<0.5
2/2/2011[5]	86.28	7.16	79.12	--	--	--	--	97	<0.5	<0.5	<0.5	<0.5	<0.5
01/31/12[5]	86.28	7.67	78.61	--	--	--	--	720	0.9	<0.5	<0.5	0.9	<0.5
02/09/13[5]	**86.28**	**6.87**	**79.41**	**86[6]/ <41[6,7,8]**	**86[6]/ <41[6,7,8]**	**<1,400/ 2,400[7]**	**120/ <50[7,8]**	**75**	**<0.5**	**<0.5**	**<0.5**	**<0.5**	**<0.5**

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Oakland, California

WELL ID/ DATE	TOC* (ft.)	DTW (ft.)	GWE (msl)	TOTAL TPH (µg/L)	TPH-MO (µg/L)	HEM (µg/L)	TPH-DRO (µg/L)	TPH-GRO (µg/L)	B (µg/L)	T (µg/L)	E (µg/L)	X (µg/L)	MtBE (µg/L)
MW-4													
08/03/98	87.22	12.92	74.30	--	--	--	--	1,900	110	12	<0.5	55	130
11/23/98	87.22	9.40	77.82	--	--	--	--	4,080	136	17.8	37.2	30.1	51.8
02/08/99[1]	87.22	7.82	79.40	--	--	--	--	2,900	150	16	<5.0	15	230/30.7[2]
05/07/99	87.22	7.42	79.80	--	--	--	--	6,050	161	<25	39.8	36.9	<250/30.2[2]
08/23/99	87.22	9.39	77.83	--	--	--	--	3,930	203	37.6	58.6	42.2	255
11/03/99	87.22	9.81	77.41	--	--	--	--	5,350	324	44.7	91.5	56.1	<50
02/15/00	87.22	7.72	79.50	--	--	--	--	4,080	161	27.7	31.1	39.1	73.9
05/12/00	87.22	7.91	79.31	--	--	--	--	3,600[3]	170	27	49	64	170
07/31/00	87.22	8.65	78.57	--	--	--	--	2,900[3]	160	20	15	56	170
10/30/00	87.22	9.08	78.14	--	--	--	--	5,630[4]	301	17.8	11.8	51.5	<25.0
02/27/01	87.22	7.30	79.92	--	--	--	--	2,140[3]	95.1	12.8	53.4	43.0	235
05/15/01	87.22	8.15	79.07	--	--	--	--	4,580[3]	200	44.1	46.3	51.7	172
08/23/01	87.22	9.33	77.89	--	--	--	--	2,700	250	44	21	72	130
02/25/02	87.22	7.80	79.42	--	--	--	--	4,100	100	18	27	39	<10
08/05/02	87.22	7.10	80.12	--	--	--	--	4,100	130	18	50	20	<10
02/11/03	87.22	8.12	79.10	--	--	--	--	4,100	100	23	20	51	<50
08/09/03[5]	87.22	9.55	77.67	--	--	--	--	3,700	110	24	10	45	8
02/25/04[5]	87.22	8.06	79.16	--	--	--	--	5,400	94	28	34	49	5
08/23/04[5]	87.22	10.19	77.03	--	--	--	--	5,100	100	26	7	43	5
02/11/05[5]	87.22	7.97	79.25	--	--	--	--	3,900	58	16	25	16	2
08/15/05[5]	87.22	8.82	78.40	--	--	--	--	2,400	76	16	11	26	3
02/10/06[5]	87.22	7.81	79.41	--	--	--	--	1,600	68	16	8	27	4
08/10/06[5]	87.22	8.58	78.64	--	--	--	--	2,500	100	19	5	30	3
02/09/07[5]	87.22	8.71	78.51	--	--	--	--	6,200	200	39	16	52	3
08/23/07[5]	87.22	10.38	76.84	--	--	--	--	5,800	190	48	20	61	3
02/18/08[5]	87.22	8.11	79.11	--	--	--	--	4,900	110	24	11	32	2
08/12/08[5]	87.22	10.58	76.64	--	--	--	--	6,100	180	31	9	52	3
02/19/09[5]	87.22	7.72	79.50	--	--	--	--	2,900	84	20	5	24	2
08/07/09[5]	87.22	10.42	76.80	--	--	--	--	4,900	120	34	11	36	2
01/29/10[5]	87.22	8.02	79.20	--	--	--	--	3,800	49	15	4	17	1
08/11/10[5]	87.22	10.19	77.03	--	--	--	--	5,400	110	36	11	36	1
2/2/2011[5]	87.22	8.65	78.57	--	--	--	--	3,800	76	29	16	31	1
01/31/12[5]	87.22	9.24	77.98	--	--	--	--	6,700	110	32	7	34	1
02/09/13[5]	**87.22**	**8.14**	**79.08**	**300[6,9]/ <40[6,7]**	**300[6,9]/ <40[6,7]**	**<1,400/ 1,900[7]**	**2,300/ 1,500[7,8]**	**1,800**	**77**	**17**	**4**	**10**	**0.8**

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WELL ID/ DATE	TOC* (ft.)	DTW (ft.)	GWE (msl)	TOTAL TPH (µg/L)	TPH-MO (µg/L)	HEM (µg/L)	TPH-DRO (µg/L)	TPH-GRO (µg/L)	B (µg/L)	T (µg/L)	E (µg/L)	X (µg/L)	MtBE (µg/L)
TRIP BLANK													
08/03/98	--	--	--	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	<2.5
11/23/98	--	--	--	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	<2.0
02/08/99	--	--	--	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	<2.5
05/07/99	--	--	--	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	<5.0
08/23/99	--	--	--	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	<2.5
11/03/99	--	--	--	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	<2.5
02/15/00	--	--	--	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	<5.0
05/12/00	--	--	--	--	--	--	--	<50	<0.50	<0.50	<0.50	<0.50	<2.5
07/31/00	--	--	--	--	--	--	--	<50	<0.50	<0.50	<0.50	<0.50	<2.5
10/30/00	--	--	--	--	--	--	--	<50	<0.50	<0.50	<0.50	<1.50	<2.50
02/27/01	--	--	--	--	--	--	--	<50	<0.50	<0.50	<0.50	<0.50	<2.50
05/15/01	--	--	--	--	--	--	--	<50	<0.50	<0.50	<0.50	<0.50	<2.50
08/23/01	--	--	--	--	--	--	--	<50	<0.50	<0.50	<0.50	<0.50	<2.5
QA													
02/25/02	--	--	--	--	--	--	--	<50	<0.50	<0.50	<0.50	<1.5	<2.5
08/05/02	--	--	--	--	--	--	--	<50	<0.50	<0.50	<0.50	<1.5	<2.5
02/11/03	--	--	--	--	--	--	--	<50	<0.50	<0.50	<0.50	<1.5	<2.5
08/09/03[5]	--	--	--	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	<0.5
02/25/04[5]	--	--	--	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	<0.5
08/23/04[5]	--	--	--	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	<0.5
02/11/05[5]	--	--	--	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	<0.5
08/15/05[5]	--	--	--	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	<0.5
02/10/06[5]	--	--	--	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	<0.5
08/02/06[5]	--	--	--	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	<0.5
02/09/07[5]	--	--	--	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	<0.5
08/23/07[5]	--	--	--	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	<0.5
02/18/08[5]	--	--	--	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	<0.5
08/12/08[5]	--	--	--	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	<0.5
02/19/09[5]	--	--	--	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	<0.5
08/07/09[5]	--	--	--	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	<0.5
02/09/13[5]	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**<50**	**<0.5**	**<0.5**	**<0.5**	**<0.5**	**<0.5**

Table 2
Groundwater Monitoring Data and Analytical Results
Former Chevron-branded Service Station 90517
3900 Piedmont Avenue
Oakland, California

EXPLANATIONS:

Groundwater monitoring data and laboratory analytical results prior to May 12, 2000 were compiled from reports prepared by Blaine Tech Services, Inc.
Groundwater monitoring data and laboratory analytical results from May 12, 2000 to May 12, 2012 were provided by Gettler-Ryan Inc.
Current groundwater monitoring data was provided by Gettler-Ryan Inc. Current laboratory analytical results were provided by Eurofins Lancaster Laboratories.

TOC = Top of Casing
(ft.) = Feet
GWE = Groundwater Elevation
(msl) = Mean sea level
DTW = Depth to Water
TPH = Total Petroleum Hydrocarbons
DRO = Diesel Range Organics
MO = Motor Oil
GRO = Gasoline Range Organics
HEM = N-Hexane Extractable Material (oil and grease)
B = Benzene
T = Toluene
E = Ethylbenzene
X = Xylenes (sum of m+p and o)
MtBE = Methyl tertiary-butyl ether
(µg/L) = Micrograms per liter
-- = Not Measured/Not Analyzed
QA = Quality Assurance/Trip Blank

* TOC elevations are referenced to msl.

[1] Chromatogram pattern indicates gas and an unidentified hydrocarbon.

[2] Confirmation run.

[3] Laboratory report indicates gasoline C_6-C_{12}.

[4] Laboratory report indicates hydrocarbon pattern present in the requested fuel quantitation range but does not resemble the pattern of the requested fuel.

[5] BTEX and MtBE by EPA Method 8260.

[6] TPH quantitation is based on peak area comparison of the sample pattern to that of a hydrocarbon component mix calibration in a range that includes C_8 (n-octane) through C_{40} (n-tetracontane) normal hydrocarbons.

[7] Analyzed with silica gel cleanup.

[8] Laboratory report indicates the reverse surrogate, capric acid, is present at <1%.

[9] Laboratory report indicates the surrogate data is outside the QC limits due to unresolvable matrix problems evident in the sample chromatogram.

Table 3
Groundwater Analytical Results - Oxygenate Compounds
Former Chevron-branded Service Station 90517
3900 Piedmont Avenue
Oakland, California

WELL ID/ DATE	ETHANOL (µg/L)	TBA (µg/L)	DIPE (µg/L)	EtBE (µg/L)	TAME (µg/L)	1,2-DCA (µg/L)	1,2-DBA (µg/L)
MW-1							
05/10/12	<50	<5	<0.5	<0.5	<0.5	<0.5	<0.5
02/09/13	**<50**	**<5**	**<0.5**	**<0.5**	**<0.5**	**<0.5**	**<0.5**
MW-3							
02/09/13	**<50**	**<5**	**<0.5**	**<0.5**	**<0.5**	**<0.5**	**<0.5**
MW-4							
02/09/13	**<50**	**5**	**<0.5**	**<0.5**	**<0.5**	**<0.5**	**<0.5**

Table 3
Groundwater Analytical Results - Oxygenate Compounds
Former Chevron-branded Service Station 90517
3900 Piedmont Avenue
Oakland, California

EXPLANATIONS:

Groundwater monitoring data and laboratory analytical results on May 12, 2012 were provided by Gettler-Ryan Inc.
Current groundwater monitoring data was provided by Gettler-Ryan Inc. Current laboratory analytical results were provided by Eurofins Lancaster Laboratories.

TBA = Tertiary-Butyl Alcohol
DIPE = Di-Isopropyl Ether
EtBE = Ethyl Tertiary-Butyl Ether
TAME = Tertiary-Amyl Methyl Ether
1,2-DCA = 1,2-Dichloroethane
1,2-DBA = 1,2-Dibromoethane
(µg/L) = Micrograms per liter

ANALYTICAL METHOD:

EPA Method 8260 for Oxygenate Compounds

Table 4
Groundwater Analytical Results - PPL Volatiles
Former Chevron-branded Service Station 90517
3900 Piedmont Avenue
Oakland, California

WELL ID/ DATE	Acetone (µg/L)	2-Butanone (µg/L)	sec-Butyl-benzene (µg/L)	Isopropyl-benzene (µg/L)	Naphth-alene (µg/L)	n-Propyl-benzene (µg/L)	p-Isopropyl-toluene (µg/L)	Diethylphthalate (µg/L)
MW-1								
05/10/12	<6	<3	<1	<1	7	<1	<1	2
02/09/13	**<6**	**<3**	**<1**	**<1**	**<1**	**<1**	**<1**	**--**
MW-3								
02/09/13	**<6**	**<3**	**<1**	**<1**	**<1**	**<1**	**<1**	**--**
MW-4								
02/09/13	**13**	**5**	**1**	**14**	**<1**	**7**	**1**	**--**

Table 4
Groundwater Analytical Results - PPL Volatiles
Former Chevron-branded Service Station 90517
3900 Piedmont Avenue
Oakland, California

EXPLANATIONS:

Groundwater monitoring data and laboratory analytical results on May 12, 2012 were provided by Gettler-Ryan Inc.
Current groundwater monitoring data was provided by Gettler-Ryan Inc. and current laboratory analytical results were provided by Eurofins Lancaster Laboratories.

Only constituents with currently or historically detected concentrations are shown. Complete analytical results for the current monitoring period can be found in Attachment B.

(µg/L) **=** Micrograms per liter
PPL = priority pollutant list
-- = Not Measured/Not Analyzed

Table 5
Groundwater Analytical Results - Metals
Former Chevron-branded Service Station 90517
3900 Piedmont Avenue
Oakland, California

WELL ID/ DATE	Cadmium (µg/L)	Chromium (µg/L)	Lead (µg/L)	Nickel (µg/L)	Zinc (µg/L)
MW-1					
05/10/12	<0.27	153	92.3	195	154
02/09/13	**<0.36**	**37.7**	**5.4**	**42.0**	**36.1**
MW-3					
02/09/13	**<0.36**	**34.6**	**8.4**	**40.6**	**52.1**
MW-4					
02/09/13	**0.49**	**54.7**	**17.5**	**145**	**664**

EXPLANATIONS:

(µg/L) = Micrograms per liter

ANALYTICAL METHOD:

Metals by EPA Method 6010B

Table 6
Groundwater Analytical Results - PCBs
Former Chevron-branded Service Station 90517
3900 Piedmont Avenue
Oakland, California

WELL ID/ DATE	PCB- 1016 (µg/L)	PCB- 1221 (µg/L)	PCB- 1232 (µg/L)	PCB- 1242 (µg/L)	PCB- 1248 (µg/L)	PCB- 1254 (µg/L)	PCB- 1260 (µg/L)
MW-1							
05/10/12	<0.095	<0.05	<0.19	<0.095	<0.095	<0.095	<0.14

EXPLANATIONS:

(µg/L) = Micrograms per liter
PCB = Polychlorinated Biphenyl

ANALYTICAL METHOD:

PCBs by EPA Method 8082

Table 7
Grab Groundwater Sample Analytical Results
Former Chevron-branded Service Station 90517
3900 Piedmont Avenue
Oakland, California

Borehole/ Sample ID	Sample Depth (feet bgs)	Date Collected	TPH-GRO (µg/L)	TRPH (µg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Total Xylenes (µg/L)	MtBE (µg/L)	DIPE (µg/L)	EtBE (µg/L)	TAME (µg/L)	TBA (µg/L)	1,2-DCA (µg/L)	1,2-DBA (µg/L)	VOCs (µg/L)
FNBO-6	16	10/21/1993	**7,800**	**2,800**	**7.7**	**21**	**260**	**260**	--	--	--	--	--	<0.5	--	ND[1]
SB-2	18	7/28/2008	**540**	--	<0.5	<0.5	<0.5	<0.5	**1**	<0.5	<0.5	<0.5	<2	<0.5	<0.5	--
Environmental Screening Levels [2]			**100**	**100**	**1.0**	**40**	**30**	**20**	**5**	**NS**	**NS**	**NS**	**12**	**0.5**	**0.05**	**NS**

Notes:

(1) VOCs were not detected above laboratory reporting limits except for acetone (30 µg/L) and carbon disulfide (33 µg/L). The acetone concentration is below the groundwater environmental screening level of 1,500 µg/L and there is no environmental screening level for carbon disulfide.

(2) California Regional Water Quality Control Board, San Francisco Bay Region, *Screening For Environmental Concerns at Sites with Contaminated Soil and Groundwater* , Interim Final - December 2013.

Bold text denotes detected concentrations. **Bold/blue** text denotes detected concentrations above Environmental Screening Levels for Commercial Land Use.

Abbreviations:

feet bgs = feet below ground surface
µg/L = micrograms per liter
TPH-GRO = total petroleum hydrocarbons as gasoline range organics
TRPH = total recoverable petroleum hydrocarbons
MtBE = methyl *tertiary* -butyl ether
DIPE = di-isopropyl ether
EtBE = ethyl *tertiary* -butyl ether
TAME = *tertiary* -amyl methyl ether
TBA = *tertiary* -butyl alcohol
1,2-DCA = 1,2-dichloroethane
1,2-DBA = 1,2-dibromoethane
VOCs = volatile organic compounds
-- = not analyzed
ND = not detected above laboratory reporting limit
NS = no standard

Table 8
Soil Sample Analytical Results
Former Chevron-branded Service Station 90517
3900 Piedmont Avenue
Oakland, California

Borehole/ Sample ID	Sample Depth (feet bgs)	Date Collected	TPH-GRO (mg/kg)	TPH-DRO (mg/kg)	TRPH (mg/kg)	Benzene (mg/kg)	Toluene (mg/kg)	Ethylbenzene (mg/kg)	Total Xylenes (mg/kg)	MtBE (mg/kg)	DIPE (mg/kg)	EtBE (mg/kg)	TAME (mg/kg)	TBA (mg/kg)	1,2-DCA (mg/kg)	1,2-DBA (mg/kg)	VOCs (mg/kg)
FNBO-1	10.5	10/20/1993	**1.9**	<5.0	**350**	<0.005	<0.005	<0.005	<0.005	--	--	--	--	--	<0.005	--	ND
FNBO-2	10	10/20/1993	<1.0	<5.0	**86**	<0.005	<0.005	<0.005	<0.005	--	--	--	--	--	<0.005	--	ND
FNBO-3	10.5	10/20/1993	<1.0	<5.0	--	<0.005	<0.005	<0.005	<0.005	--	--	--	--	--	<0.005	<0.005	--
FNBO-4	6	10/20/1993	**1.4**	<5.0	**320**	<0.005	<0.005	<0.005	<0.005	--	--	--	--	--	<0.005	--	ND
FNBO-5	6	10/21/1993	**3,400**	<500	--	<0.5	<0.5	**19.0**	**7.5**	--	--	--	--	--	<0.5	<0.5	--
FNBO-5	10	10/21/1993	**15.0**	<5.0	**160**	**0.03**	<0.005	**0.31**	**0.12**	--	--	--	--	--	<0.005	--	ND
FNBO-6	5.5	10/21/1993	**5.0**	<10	--	<0.02	<0.02	<0.02	<0.02	--	--	--	--	--	<0.02	<0.02	--
FNBO-6	10	10/21/1993	**3.6**	<5.0	**10.0**	<0.005	<0.005	**0.034**	**0.041**	--	--	--	--	--	<0.005	--	ND
FNBO-7	6	10/21/1993	**350**	<400	--	<0.40	<0.40	<0.40	<0.40	--	--	--	--	--	<0.4	<0.4	--
FNBO-7	11	10/21/1993	**400**	<500	--	**1.0**	**1.5**	**5.0**	**13.0**	--	--	--	--	--	<0.5	<0.5	--
FNBO-8	11	10/21/1993	<1.0	<5.0	--	<0.005	<0.005	<0.005	<0.005	--	--	--	--	--	<0.005	<0.005	--
MW-1	6	7/21/1998	<1.0	--	--	<0.0050	<0.0050	<0.0050	<0.0050	<0.025	--	--	--	--	--	--	--
MW-1	11	7/21/1998	<1.0	--	--	<0.0050	<0.0050	<0.0050	<0.0050	<0.025	--	--	--	--	--	--	--
MW-1	16	7/21/1998	<1.0	--	--	<0.0050	<0.0050	<0.0050	<0.0050	<0.025	--	--	--	--	--	--	--
MW-2	6	7/21/1998	<1.0	--	--	**0.0070**	<0.0050	**0.010**	**0.0090**	<0.025	--	--	--	--	--	--	--
MW-2	11	7/21/1998	<1.0	--	--	<0.0050	<0.0050	<0.0050	<0.0050	<0.025	--	--	--	--	--	--	--
MW-2	16	7/21/1998	<1.0	--	--	<0.0050	<0.0050	<0.0050	<0.0050	<0.025	--	--	--	--	--	--	--
MW-3	6	7/21/1998	<1.0	--	--	<0.0050	<0.0050	<0.0050	<0.0050	<0.025	--	--	--	--	--	--	--
MW-3	10.5	7/21/1998	<1.0	--	--	<0.0050	<0.0050	<0.0050	<0.0050	<0.025	--	--	--	--	--	--	--
MW-3	16	7/21/1998	<1.0	--	--	<0.0050	<0.0050	<0.0050	<0.0050	<0.025	--	--	--	--	--	--	--
MW-4	6	7/21/1998	<1.0	--	--	<0.0050	<0.0050	<0.0050	<0.0050	<0.025	--	--	--	--	--	--	--
MW-4	11	7/21/1998	**80**	--	--	**2.0**	**1.7**	**4.7**	**5.8**	<0.25	--	--	--	--	--	--	--
MW-4	16	7/21/1998	<1.0	--	--	<0.0050	<0.0050	<0.0050	<0.0050	<0.025	--	--	--	--	--	--	--
SB-2	5	7/28/2008	<1.0	--	--	<0.0005	<0.0009	<0.0009	<0.0009	<0.0005	<0.0009	<0.0009	<0.0009	<0.019	<0.0009	<0.0009	--
SB-2	10	7/28/2008	<1.0	--	--	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.001	<0.001	<0.001	<0.019	<0.001	<0.001	--
SB-2	15	7/28/2008	<1.0	--	--	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.001	<0.001	<0.001	<0.019	<0.001	<0.001	--
SB-2	20	7/28/2008	<1.0	--	--	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.001	<0.001	<0.001	<0.020	<0.001	<0.001	--
ESLs - Shallow Soil [1],[2]			**500**	**110**	**500**	**0.44**	**2.9**	**3.3**	**2.3**	**0.023**	**NS**	**NS**	**NS**	**0.075**	**0.00033**	**1.1**	**NS**
ESLs - Deep Soil [1],[2]			**500**	**110**	**500**	**0.44**	**2.9**	**3.3**	**2.3**	**0.023**	**NS**	**NS**	**NS**	**0.075**	**0.00033**	**1.1**	**NS**

Notes:

(1) California Regional Water Quality Control Board, San Francisco Bay Region, *Screening For Environmental Concerns at Sites with Contaminated Soil and Groundwater*, Interim Final - December 2013

(2) Shallow soil refers to soil above 9.84 feet bgs and deep soil refers to soil below 9.84 feet bgs.

Bold text denotes detected concentrations. **Bold/blue** text denotes detected concentrations above Environmental Screening Levels for Commercial Land Use.

Abbreviations:

feet bgs = feet below ground surface
mg/kg = milligrams per kilogram
TPH-GRO = total petroleum hydrocarbons as gasoline range organics
TPH-DRO = total petroleum hydrocarbons as diesel range organics
TRPH = total recoverable petroleum hydrocarbons
MtBE = methyl *tertiary* -butyl ether
DIPE = di-isopropyl ether
EtBE = ethyl *tertiary* -butyl ether
TAME = *tertiary* -amyl methyl ether
TBA = *tertiary* -butyl alcohol
1,2-DCA = 1,2-dichloroethane
1,2-DBA = 1,2-dibromoethane
VOCs = volatile organic compounds
-- = not analyzed
ND = not detected above laboratory reporting limit
NS = no standard

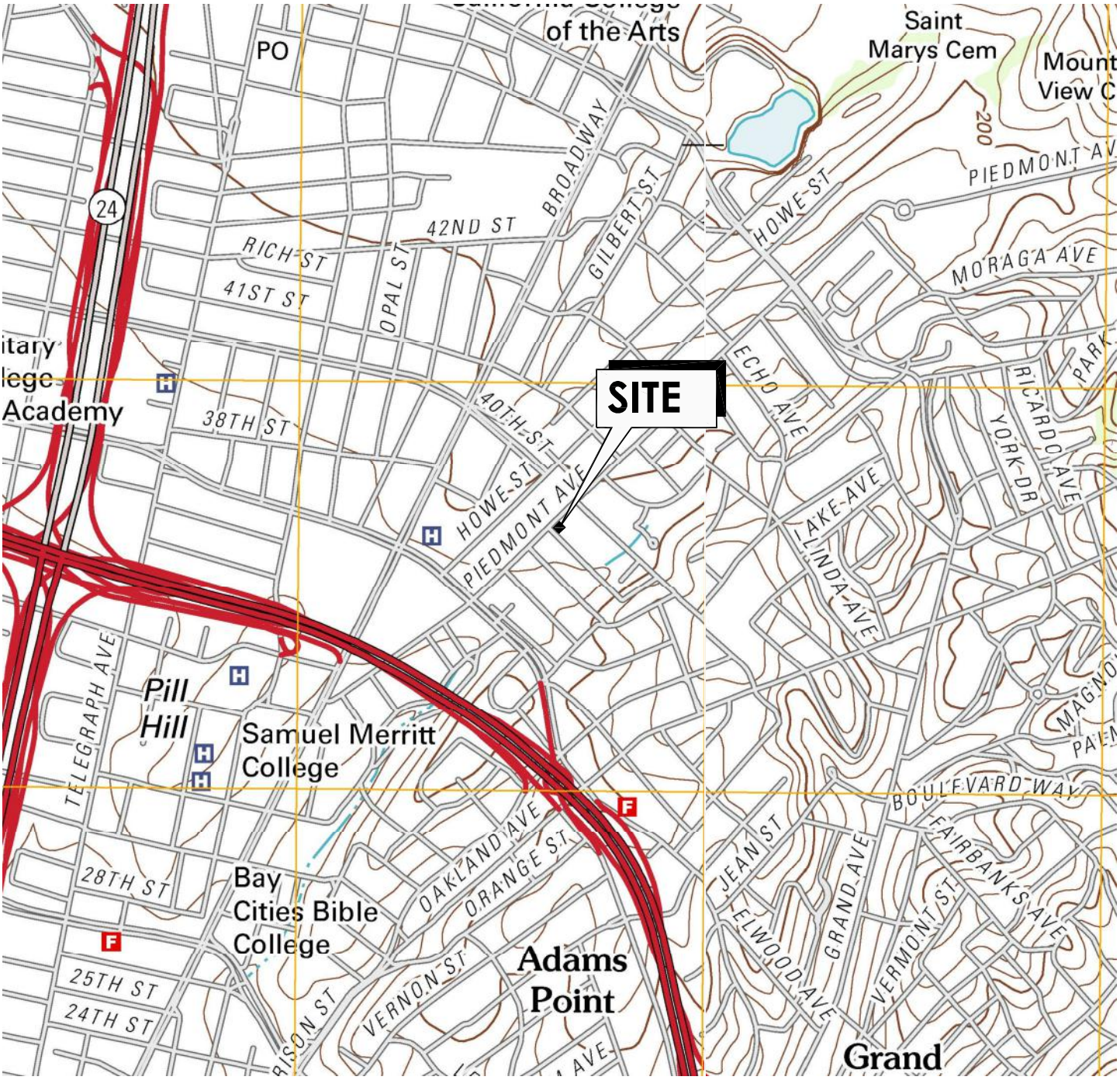
Table 9
Purge Volumes, Durations, and Associated Vacuum Drops
Former Chevron-branded Service Station
3900 Piedmont Avenue
Oakland, California

Part	ID (in)	ID (ft)	Length (ft)	Volume (ft^3)	Volume (L)	Volume (mL)	3 Volumes (mL)	Target Vacuum Drop (in Hg)
VP-1								
Probe Tubing	0.180	0.0150	4.75	8.39E-04	2.38E-02	23.8	71.3	--
Manifold Tubing	0.180	0.0150	3	5.30E-04	1.50E-02	15.0	45.0	--
						Total:	116.3	1
Purge duration at 50 mL/min = 2.3 minutes.								
VP-2								
Probe Tubing	0.180	0.0150	4.75	8.39E-04	2.38E-02	23.8	71.3	--
Manifold Tubing	0.180	0.0150	3	5.30E-04	1.50E-02	15.0	45.0	--
						Total:	116.3	1
Purge duration at 50 mL/min = 2.3 minutes.								
VP-3								
Probe Tubing	0.180	0.0150	4.75	8.39E-04	2.38E-02	23.8	71.3	--
Manifold Tubing	0.180	0.0150	3	5.30E-04	1.50E-02	15.0	45.0	--
						Total:	116.3	1
Purge duration at 50 mL/min = 2.3 minutes.								
VP-4								
Probe Tubing	0.180	0.0150	4.75	8.39E-04	2.38E-02	23.8	71.3	--
Manifold Tubing	0.180	0.0150	3	5.30E-04	1.50E-02	15.0	45.0	--
						Total:	116.3	1
Purge duration at 50 mL/min = 2.3 minutes.								
VP-5								
Probe Tubing	0.180	0.0150	4.75	8.39E-04	2.38E-02	23.8	71.3	--
Manifold Tubing	0.180	0.0150	3	5.30E-04	1.50E-02	15.0	45.0	--
						Total:	116.3	1
Purge duration at 50 mL/min = 2.3 minutes.								
VP-6								
Probe Tubing	0.180	0.0150	4.75	8.39E-04	2.38E-02	23.8	71.3	--
Manifold Tubing	0.180	0.0150	3	5.30E-04	1.50E-02	15.0	45.0	--
						Total:	116.3	1
Purge duration at 50 mL/min = 2.3 minutes.								
SS-1								
Probe Tubing	0.180	0.0150	1.0	1.77E-04	5.00E-03	5.0	15.0	--
Manifold Tubing	0.180	0.0150	3.0	5.30E-04	1.50E-02	15.0	45.0	--
						Total:	60.0	1
Purge duration at 26.6 mL/min = 2.3 minutes.								
SS-2								
Probe Tubing	0.180	0.0150	1.0	1.77E-04	5.00E-03	5.0	15.0	--
Manifold Tubing	0.180	0.0150	3.0	5.30E-04	1.50E-02	15.0	45.0	--
						Total:	60.0	1
Purge duration at 26.6 mL/min = 2.3 minutes.								
SS-3								
Probe Tubing	0.180	0.0150	1.0	1.77E-04	5.00E-03	5.0	15.0	--
Manifold Tubing	0.180	0.0150	3.0	5.30E-04	1.50E-02	15.0	45.0	--
						Total:	60.0	1
Purge duration at 26.6 mL/min = 2.3 minutes.								

Notes:
1/4-inch Teflon® tubing (outside diameter = 0.25 inches; inside diameter = 0.180 inches)
Lengths of tubing are approximate; it may be necessary to re-calculate purge duration if different lengths are used.

Abbreviations:
ft = feet
ft^3 = cubic feet
ID = inside diameter
in = inch
in Hg = inches of mercury
L = liter
mL = milliliter
mL/min = milliliters per minute

FIGURES



REFERENCE: USGS 7.5 MINUTE QUADRANGLE;
OAKLAND WEST, CALIFORNIA; 2012 AND OAKLAND EAST, CALIFORNIA; 2012

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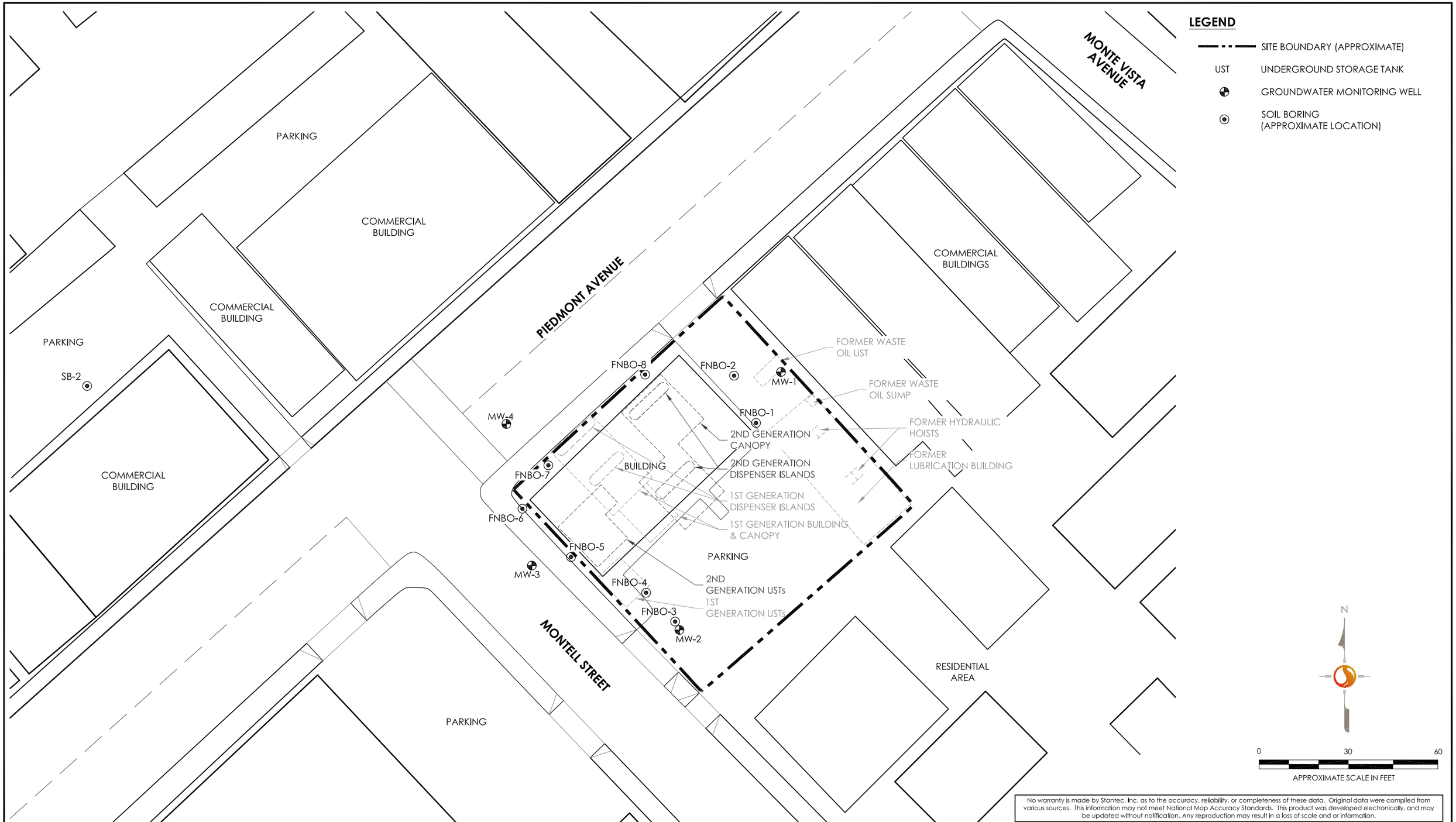
PHONE: (408) 356-6124 FAX: (408) 356-6138

FOR:				FIGURE:
FORMER CHEVRON-BRANDED SERVICE STATION 90517 3900 PIEDMONT AVENUE OAKLAND, CALIFORNIA		SITE LOCATION MAP		1
JOB NUMBER: 211602403	DRAWN BY: JRO	CHECKED BY: MRK	APPROVED BY: TLF	DATE: 02/21/14

FILEPATH:P:\Chevron\N. CA Marketing Sites\Carryl MacLeod Portfolio\90517\GWM\2013\1Q13\Figures\CAD\OLD\90517_2014.dwg | nbizjak | Feb 24, 2014 at 14:03 | Layout: Fig 1_SLM



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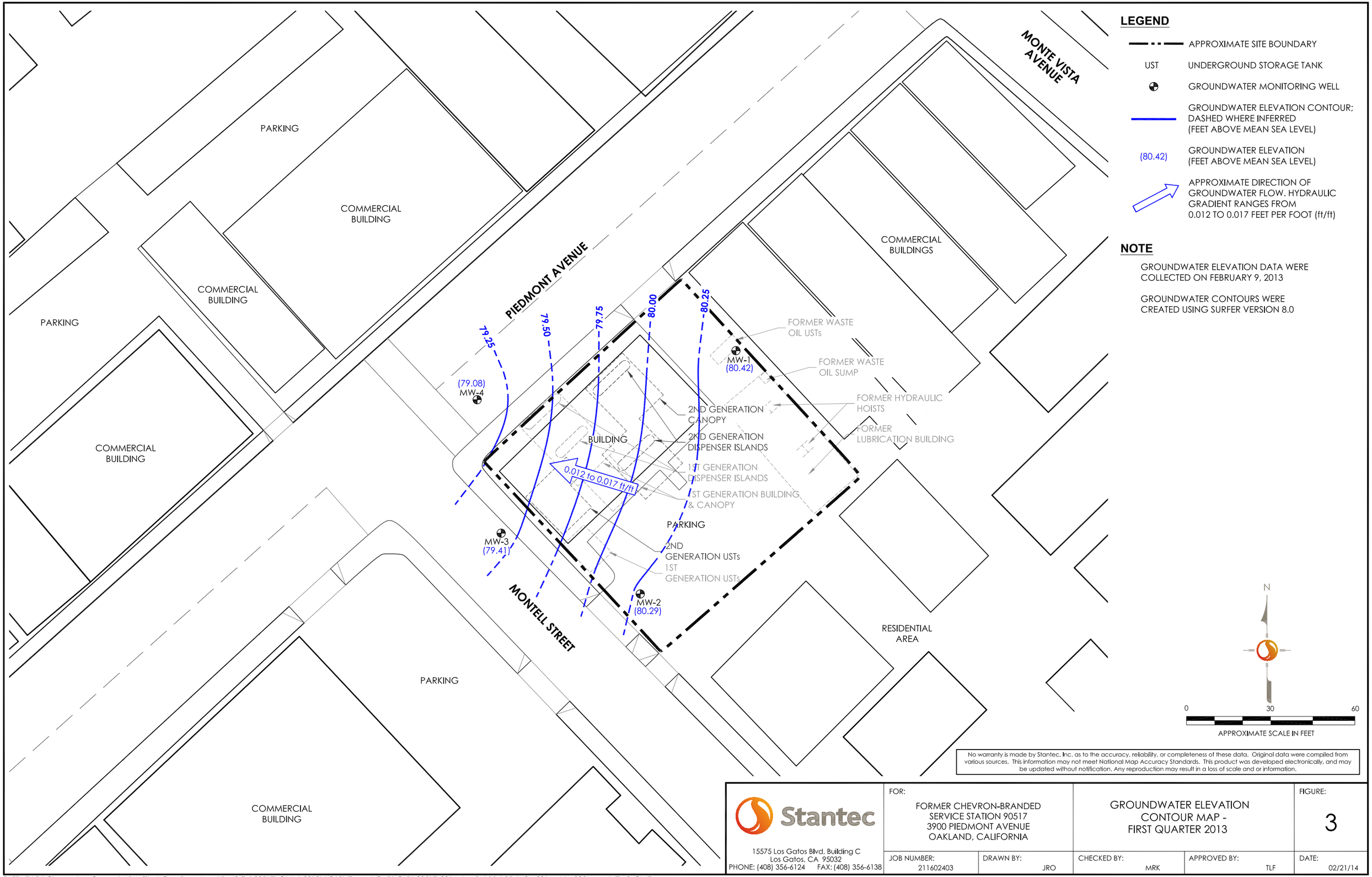
FOR:			FIGURE:
FORMER CHEVRON-BRANDED SERVICE STATION 90517 3900 PIEDMONT AVENUE OAKLAND, CALIFORNIA		SITE PLAN	2
JOB NUMBER: 211602403	DRAWN BY: NMB	CHECKED BY: EEO	APPROVED BY: TLF	DATE: 02/21/14

FILEPATH:P:\Chevron\N. CA Marketing Sites\Carryl MacLeod Portfolio\90517\SCM\Lean Sigma CSM\Figures\90517_2014.dwg | nbizjak | Feb 24, 2014 at 13:07 | Layout: Fig 2_SP



LEGEND

- APPROXIMATE SITE BOUNDARY
- UST — UNDERGROUND STORAGE TANK
- GROUNDWATER MONITORING WELL
- GROUNDWATER ELEVATION CONTOUR; DASHED WHERE INFERRED (FEET ABOVE MEAN SEA LEVEL)
- (80.42) — GROUNDWATER ELEVATION (FEET ABOVE MEAN SEA LEVEL)
- APPROXIMATE DIRECTION OF GROUNDWATER FLOW. HYDRAULIC GRADIENT RANGES FROM 0.012 TO 0.017 FEET PER FOOT (ft/ft)

NOTE

GROUNDWATER ELEVATION DATA WERE COLLECTED ON FEBRUARY 9, 2013

GROUNDWATER CONTOURS WERE CREATED USING SURFER VERSION 8.0

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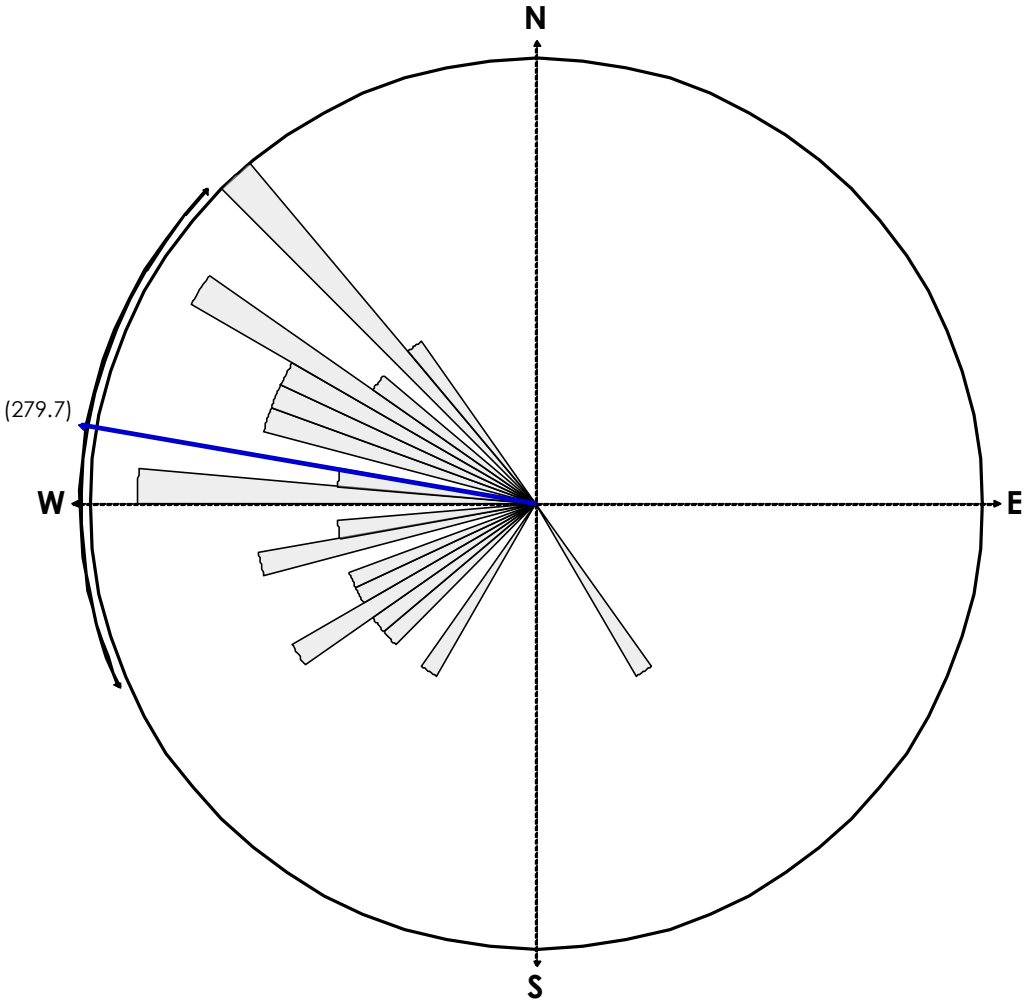
FOR: FORMER CHEVRON-BRANDED SERVICE STATION 90517
3900 PIEDMONT AVENUE
OAKLAND, CALIFORNIA

GROUNDWATER ELEVATION CONTOUR MAP - FIRST QUARTER 2013

FIGURE: 3

JOB NUMBER:	DRAWN BY:	CHECKED BY:	APPROVED BY:	DATE:
211602403	JRO	MRK	TLF	02/21/14

FILEPATH:P:\Chevron\N. CA Marketing Sites\Carryl MacLeod Portfolio\90517\GWM\2013\1Q13\Figures\CAD\OLD\90517_2014.dwg | nbizjak | Feb 24, 2014 at 14:02 | Layout: Fig 3_GWE



EQUAL AREA PLOT

Number of Points	33
Class Size	5
Vector Mean	279.70
Vector Magnitude	27.13
Consistency Ratio	0.82

NOTE: ROSE DIAGRAM IS BASED ON THE DIRECTION OF GROUNDWATER FLOW BEGINNING THIRD QUARTER 1998.

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FOR:
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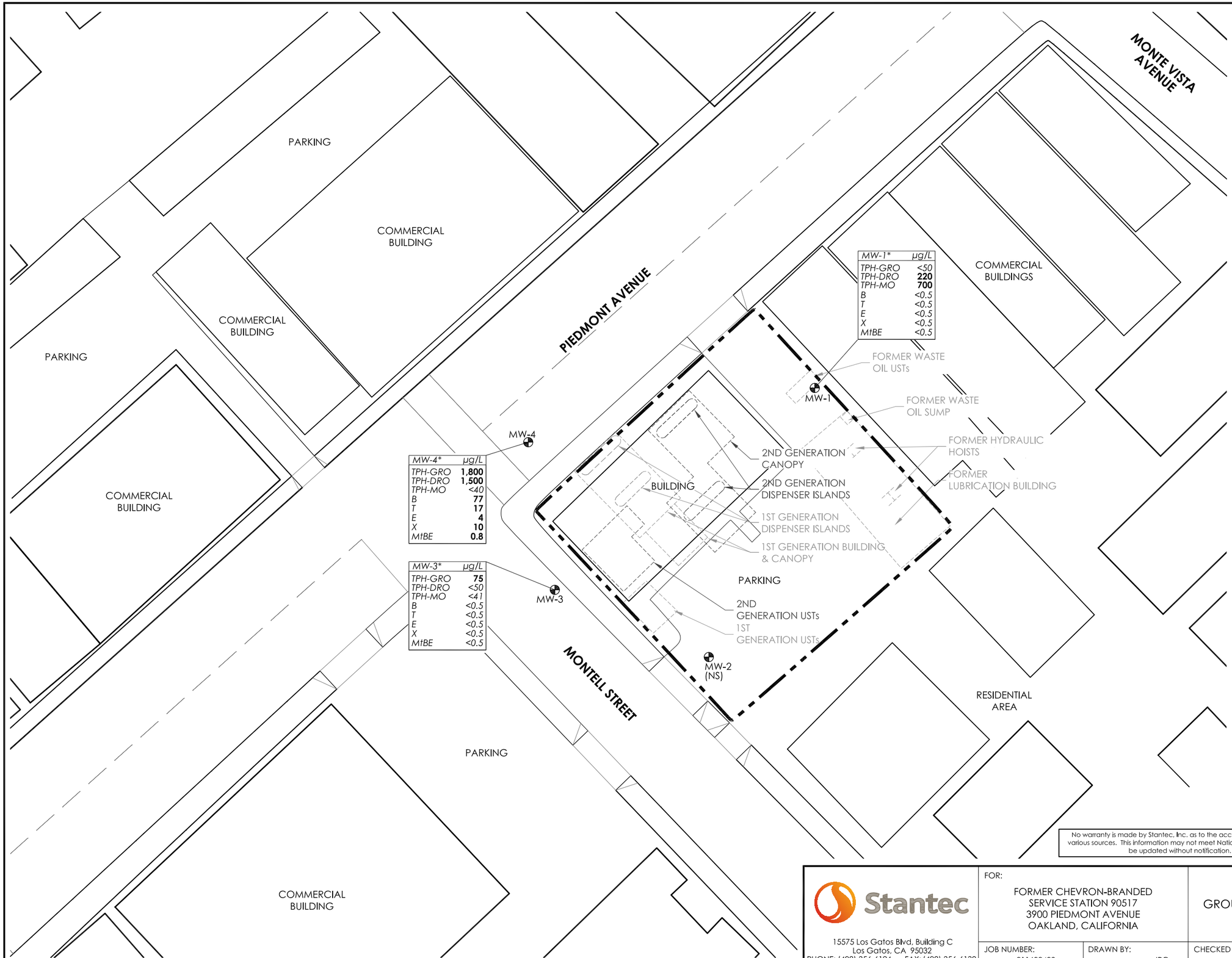
OAKLAND, CALIFORNIA

ROSE DIAGRAM -
FIRST QUARTER 2013

FIGURE: 4

JOB NUMBER:	DRAWN BY:	CHECKED BY:	APPROVED BY:	DATE:
211602403	JRO	EEO	TLF	02/21/14

FILEPATH:P:\Chevron\N. CA Marketing Sites\Carryl MacLeod Portfolio\90517\SCM\Figures\90517_2014.dwg | nbizjak | Feb 24, 2014 at 13:43 | Layout: Fig 4_Rose



LEGEND

- APPROXIMATE SITE BOUNDARY
- UST — UNDERGROUND STORAGE TANK
- GROUNDWATER MONITORING WELL
- (NS) — NOT SAMPLED

ANALYTES

- *TPH-GRO* — TOTAL PETROLEUM HYDROCARBONS AS GASOLINE RANGE ORGANICS
- *TPH-DRO* — TOTAL PETROLEUM HYDROCARBONS AS DIESEL RANGE ORGANICS
- *TPH-MO* — TOTAL PETROLEUM HYDROCARBONS AS MOTOR OIL
- *B* — BENZENE
- *T* — TOLUENE
- *E* — ETHYLBENZENE
- *X* — TOTAL XYLENES
- *MtBE* — METHYL TERTIARY-BUTYL ETHER

* = ADDITIONAL ANALYSES WERE RUN AND COMPLETE RESULTS ARE PRESENTED IN TABLES 2, 3, 4, & 5 AND ATTACHMENT B

µg/L = MICROGRAMS PER LITER

NOTE

TPH-DRO AND TPH-MO RESULTS ARE WITH SILICA GEL CLEANUP.

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FOR:
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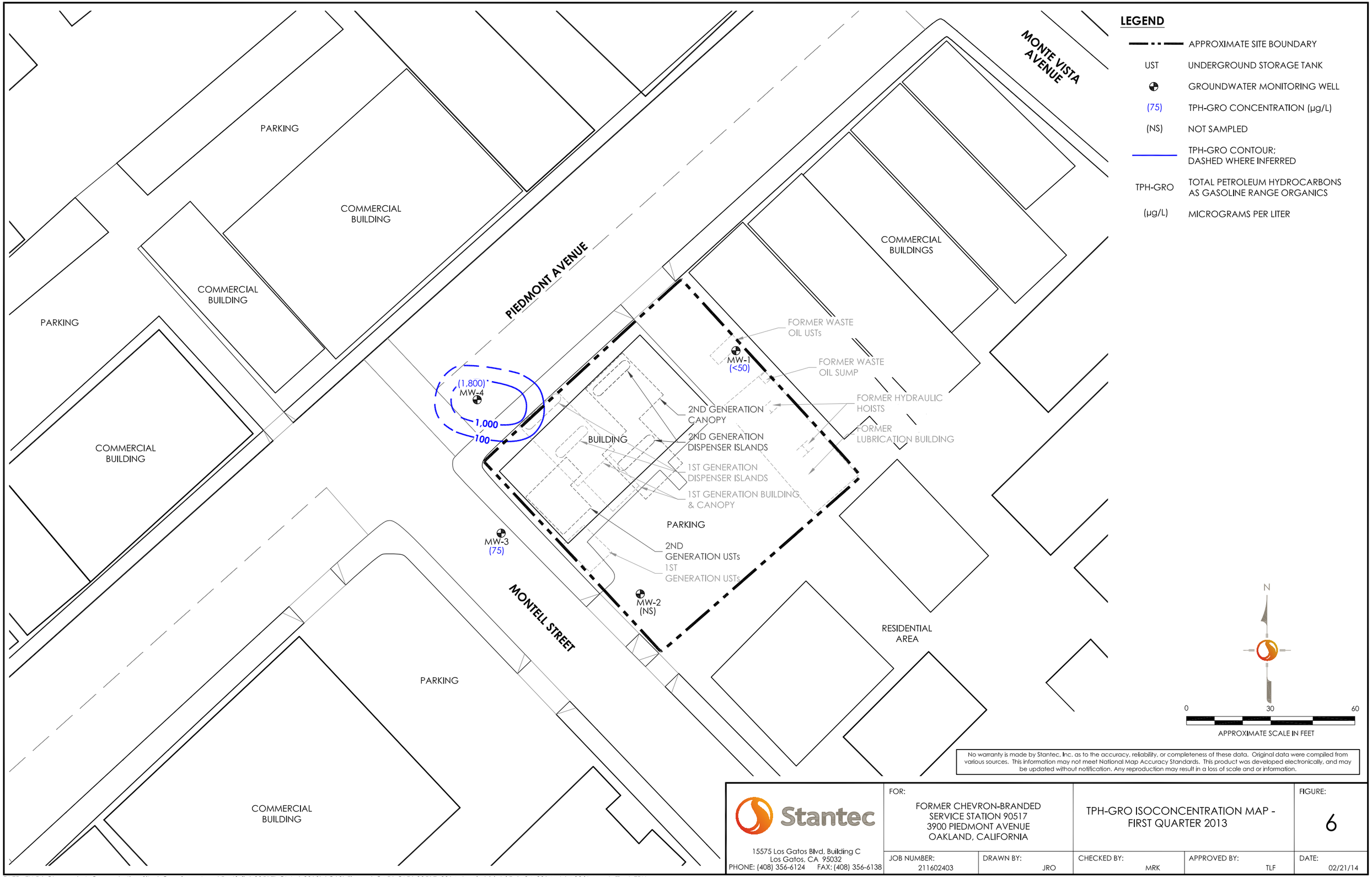
3900 PIEDMONT AVENUE
OAKLAND, CALIFORNIA

SITE PLAN SHOWING GROUNDWATER CONCENTRATIONS - FIRST QUARTER 2013

FIGURE: 5

JOB NUMBER:	DRAWN BY:	CHECKED BY:	APPROVED BY:	DATE:
211602403	JRO	MRK	TLF	02/21/14

FILEPATH:P:\Chevron\N. CA Marketing Sites\Carryl MacLeod Portfolio\90517\GWM\2013\1Q13\Figures\CAD\OLD\90517_2014.dwg | nbizjak | Feb 24, 2014 at 14:02 | Layout: Fig 5_GWC



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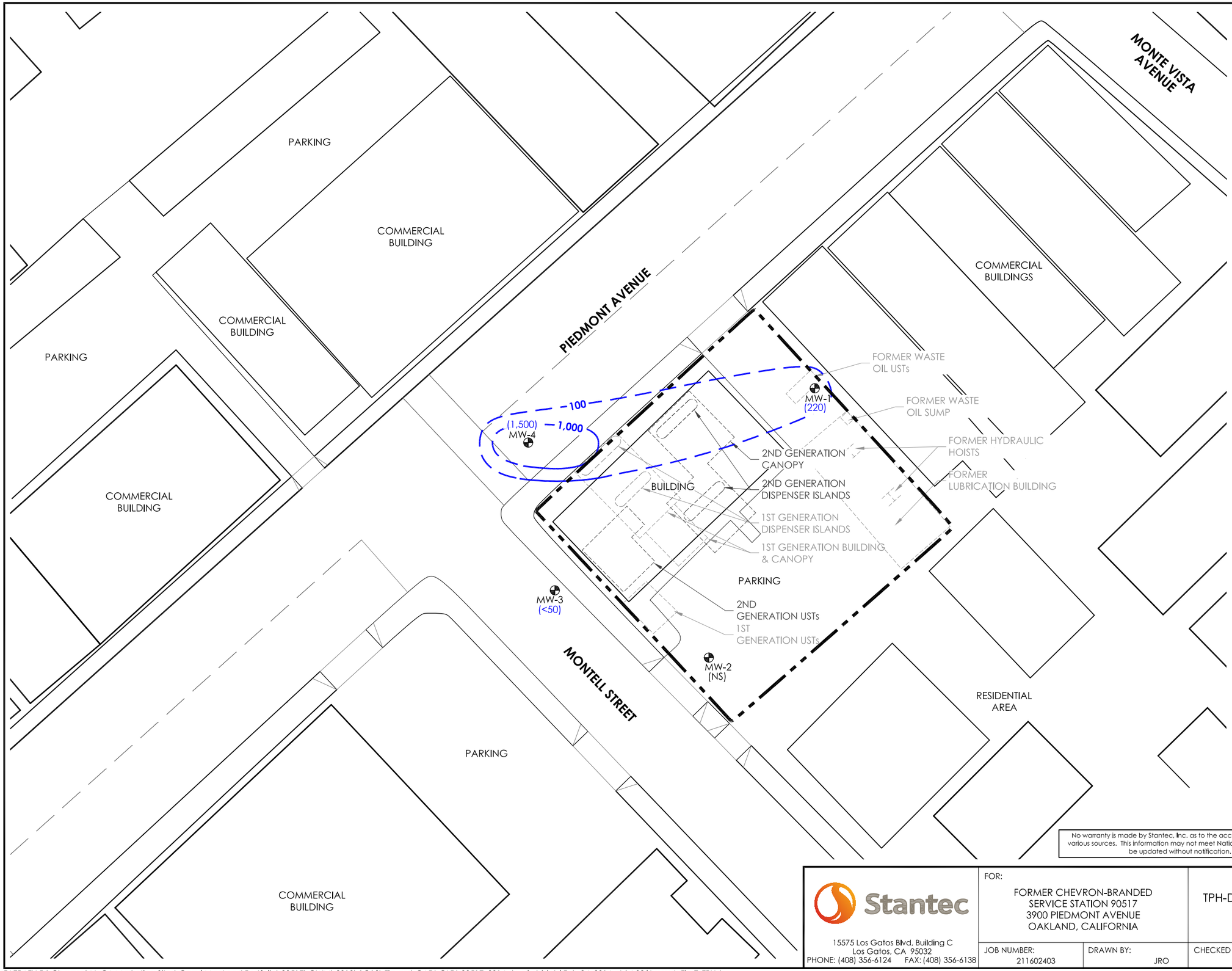
FOR:
FORMER CHEVRON-BRANDED SERVICE STATION 90517
3900 PIEDMONT AVENUE
OAKLAND, CALIFORNIA

TPH-GRO ISOCONCENTRATION MAP - FIRST QUARTER 2013

FIGURE: 6

JOB NUMBER:	DRAWN BY:	CHECKED BY:	APPROVED BY:	DATE:
211602403	JRO	MRK	TLF	02/21/14

FILEPATH:P:\Chevron\N. CA Marketing Sites\Carryl MacLeod Portfolio\90517\GWM\2013\1Q13\Figures\CAD\OLD\90517_2014.dwg | nbizjak | Feb 24, 2014 at 14:02 | Layout: Fig 6_TPHg



LEGEND

▬ · ▬	APPROXIMATE SITE BOUNDARY
UST	UNDERGROUND STORAGE TANK
⊕	GROUNDWATER MONITORING WELL
(220)	TPH-DRO CONCENTRATION (µg/L)
(NS)	NOT SAMPLED
———	TPH-DRO CONTOUR; DASHED WHERE INFERRED
TPH-DRO	TOTAL PETROLEUM HYDROCARBONS AS DIESEL RANGE ORGANICS
(µg/L)	MICROGRAMS PER LITER

NOTE

RESULTS ARE WITH SILICA GEL CLEANUP

N

0 30 60

APPROXIMATE SCALE IN FEET

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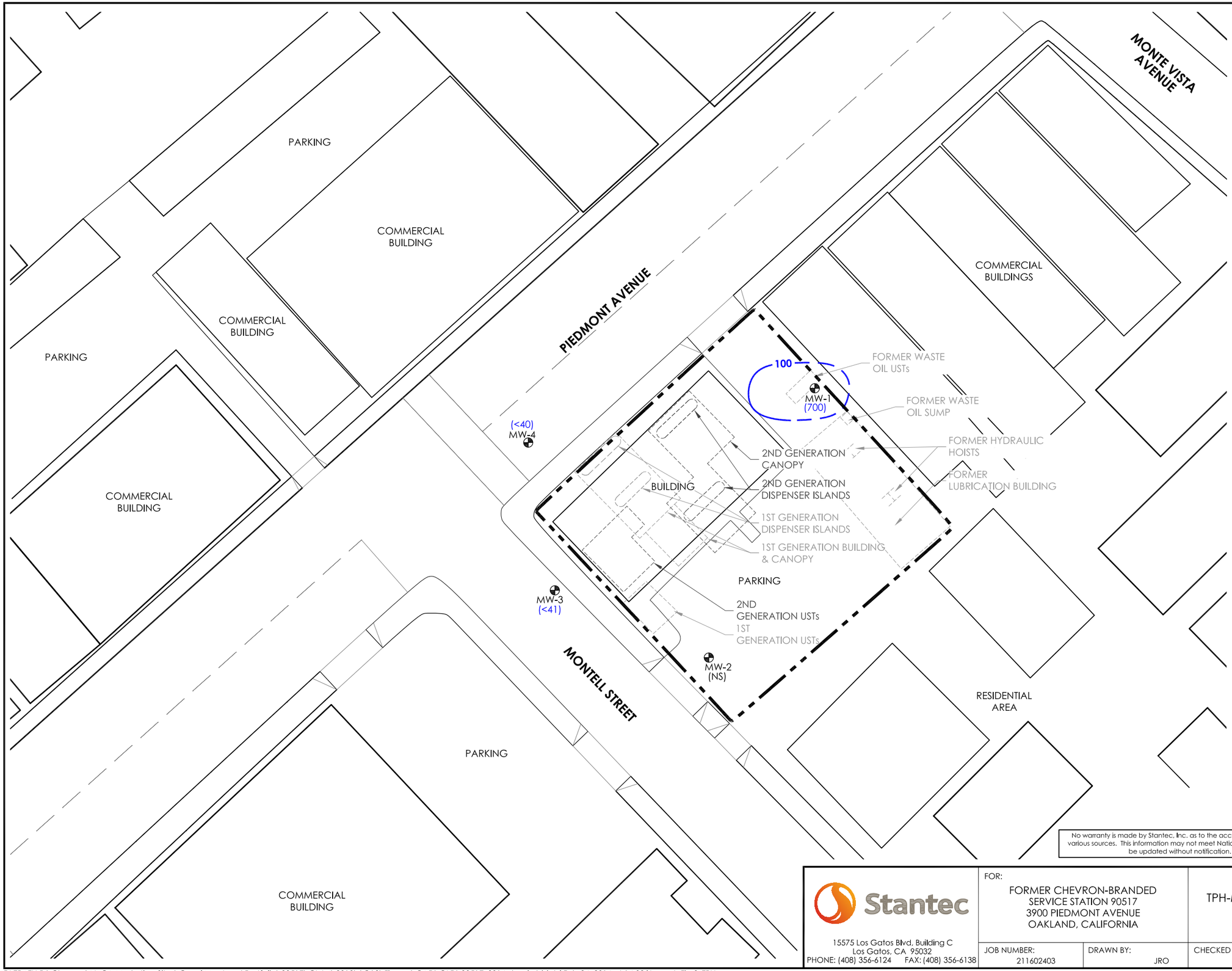
FOR:
FORMER CHEVRON-BRANDED SERVICE STATION 90517
3900 PIEDMONT AVENUE
OAKLAND, CALIFORNIA

TPH-DRO ISOCONCENTRATION MAP - FIRST QUARTER 2013

FIGURE: 7

JOB NUMBER:	DRAWN BY:	CHECKED BY:	APPROVED BY:	DATE:
211602403	JRO	MRK	TLF	02/21/14

FILEPATH:P:\Chevron\N. CA Marketing Sites\Carryl MacLeod Portfolio\90517\GWM\2013\1Q13\Figures\CAD\OLD\90517_2014.dwg | nbizjak | Feb 24, 2014 at 14:02 | Layout: Fig 7_TPHd



LEGEND

▬ · ▬	APPROXIMATE SITE BOUNDARY
UST	UNDERGROUND STORAGE TANK
⊕	GROUNDWATER MONITORING WELL
(700)	TPH-MO CONCENTRATION (µg/L)
(NS)	NOT SAMPLED
———	TPH-MO CONTOUR; DASHED WHERE INFERRED
TPH-MO	TOTAL PETROLEUM HYDROCARBONS AS MOTOR OIL
(µg/L)	MICROGRAMS PER LITER

NOTE

RESULTS ARE WITH SILICA GEL CLEANUP

N

0 30 60

APPROXIMATE SCALE IN FEET

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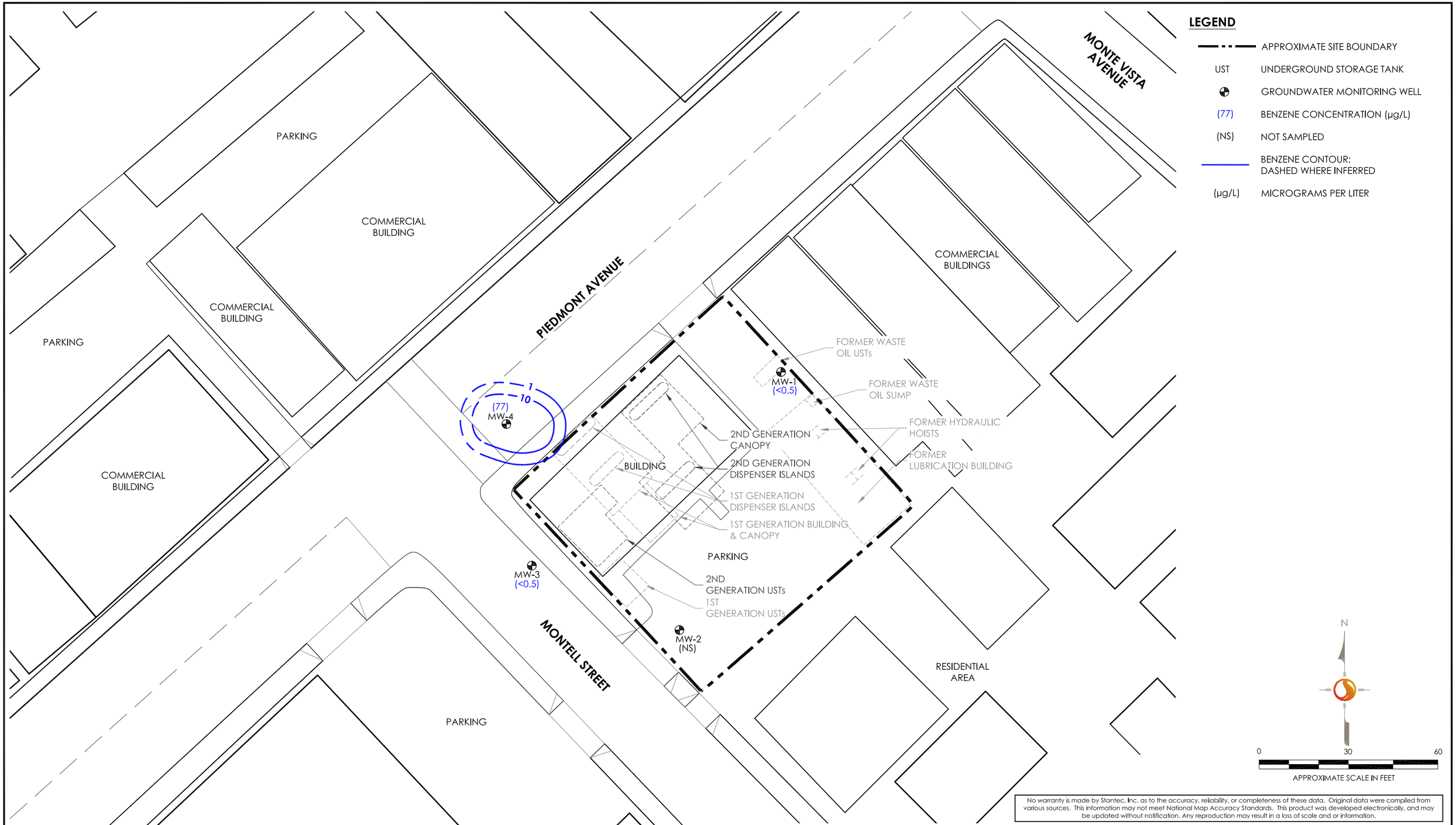
FOR:
FORMER CHEVRON-BRANDED SERVICE STATION 90517
3900 PIEDMONT AVENUE
OAKLAND, CALIFORNIA

TPH-MO ISOCONCENTRATION MAP - FIRST QUARTER 2013

FIGURE: 8

JOB NUMBER:	DRAWN BY:	CHECKED BY:	APPROVED BY:	DATE:
211602403	JRO	MRK	TLF	02/21/14

FILEPATH:P:\Chevron\N. CA Marketing Sites\Carryl MacLeod Portfolio\90517\GWM\2013\1Q13\Figures\CAD\OLD\90517_2014.dwg | nbizjak | Feb 24, 2014 at 14:02 | Layout: Fig 8_TPHm



No warranty is made by Stantec, Inc. as to the accuracy, reliability, or completeness of these data. Original data were compiled from various sources. This information may not meet National Map Accuracy Standards. This product was developed electronically, and may be updated without notification. Any reproduction may result in a loss of scale and or information.

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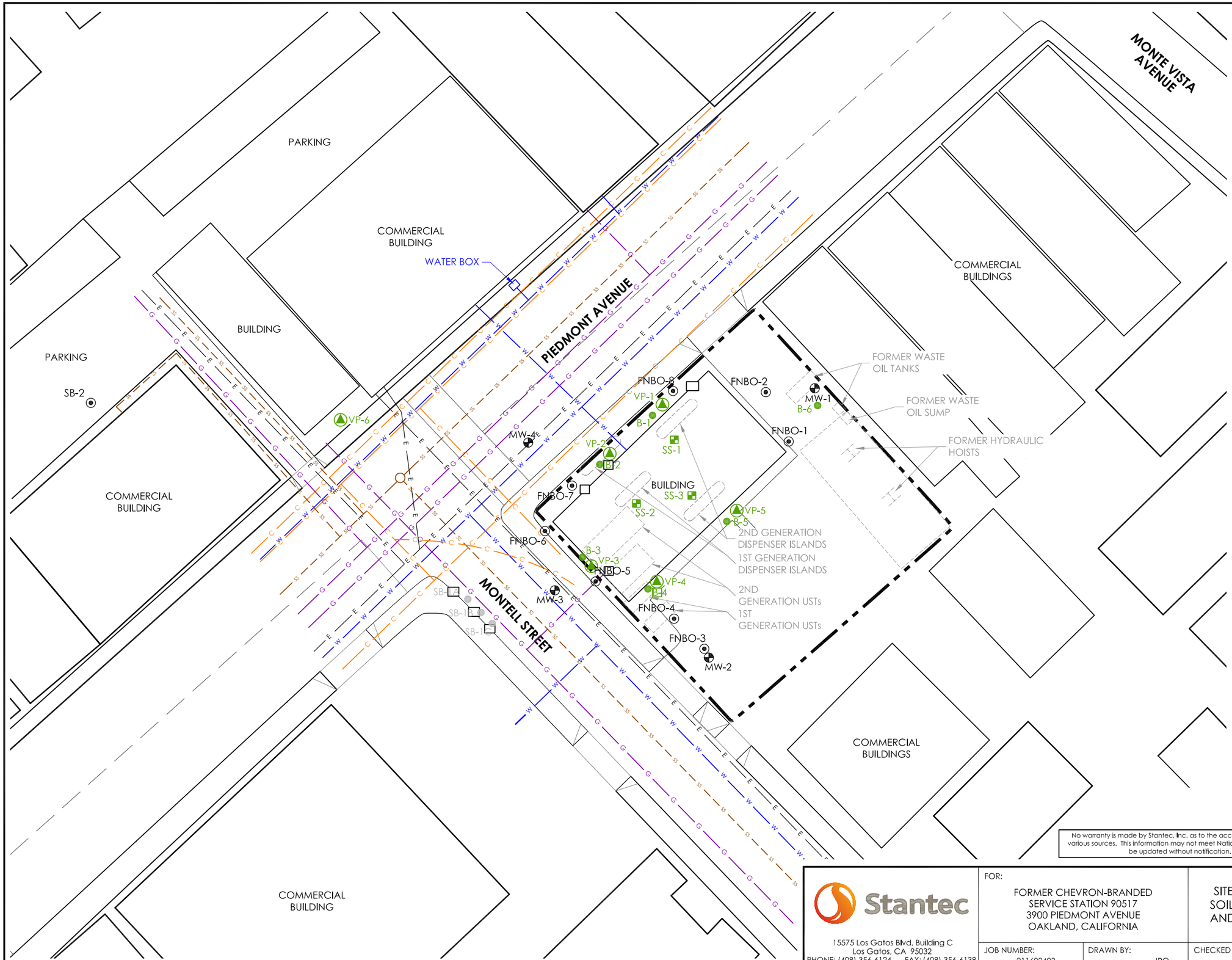
FOR:		FIGURE:
FORMER CHEVRON-BRANDED SERVICE STATION 90517 3900 PIEDMONT AVENUE OAKLAND, CALIFORNIA	BENZENE ISOCONCENTRATION MAP - FIRST QUARTER 2013	9

JOB NUMBER:	DRAWN BY:	CHECKED BY:	APPROVED BY:	DATE:
211602403	JRO	MRK	TLF	02/21/14

FILEPATH:P:\Chevron\N. CA Marketing Sites\Carryl MacLeod Portfolio\90517\GWM\2013\1Q13\Figures\CAD\OLD\90517_2014.dwg | nbizjak | Feb 24, 2014 at 14:01 | Layout: Fig 9_BZN



LEGEND

- PROPERTY BOUNDARY (APPROXIMATE)
- UST — UNDERGROUND STORAGE TANK
- E — ELECTRICAL LINE
- G — GAS LINE
- SS — SANITARY SEWER LINE
- W — WATER LINE
- C — SBC COMMUNICATION LINE
- MONITORING WELL
- SOIL BOREHOLE (APPROXIMATE LOCATION)
- ATTEMPTED BOREHOLE (REFUSAL)
- PROPOSED BOREHOLE
- PROPOSED SOIL VAPOR PROBE
- PROPOSED SUB-SLAB PROBE CONTINGENT ON RESULTS OF VAPOR PROBES

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FOR:
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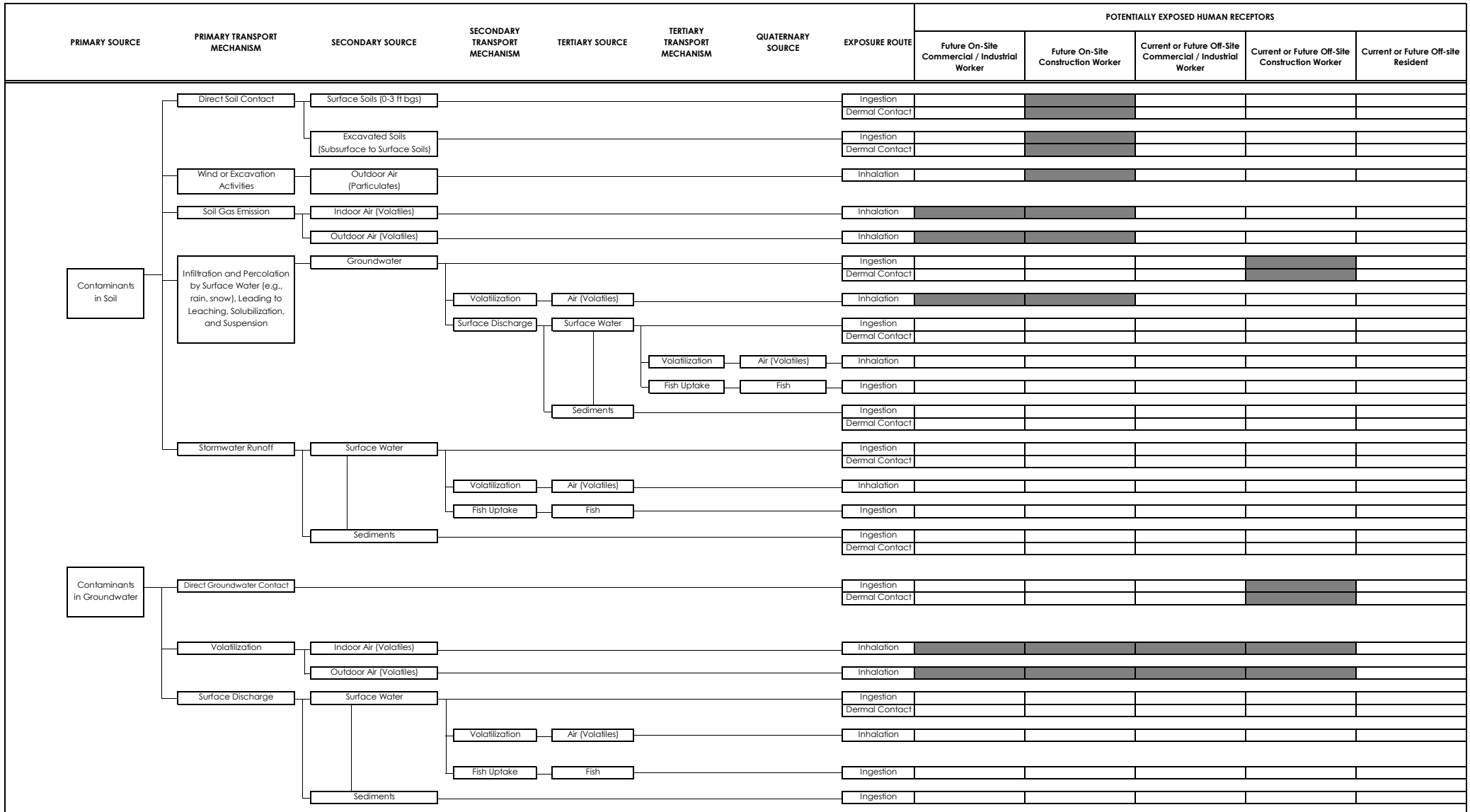
3900 PIEDMONT AVENUE
OAKLAND, CALIFORNIA

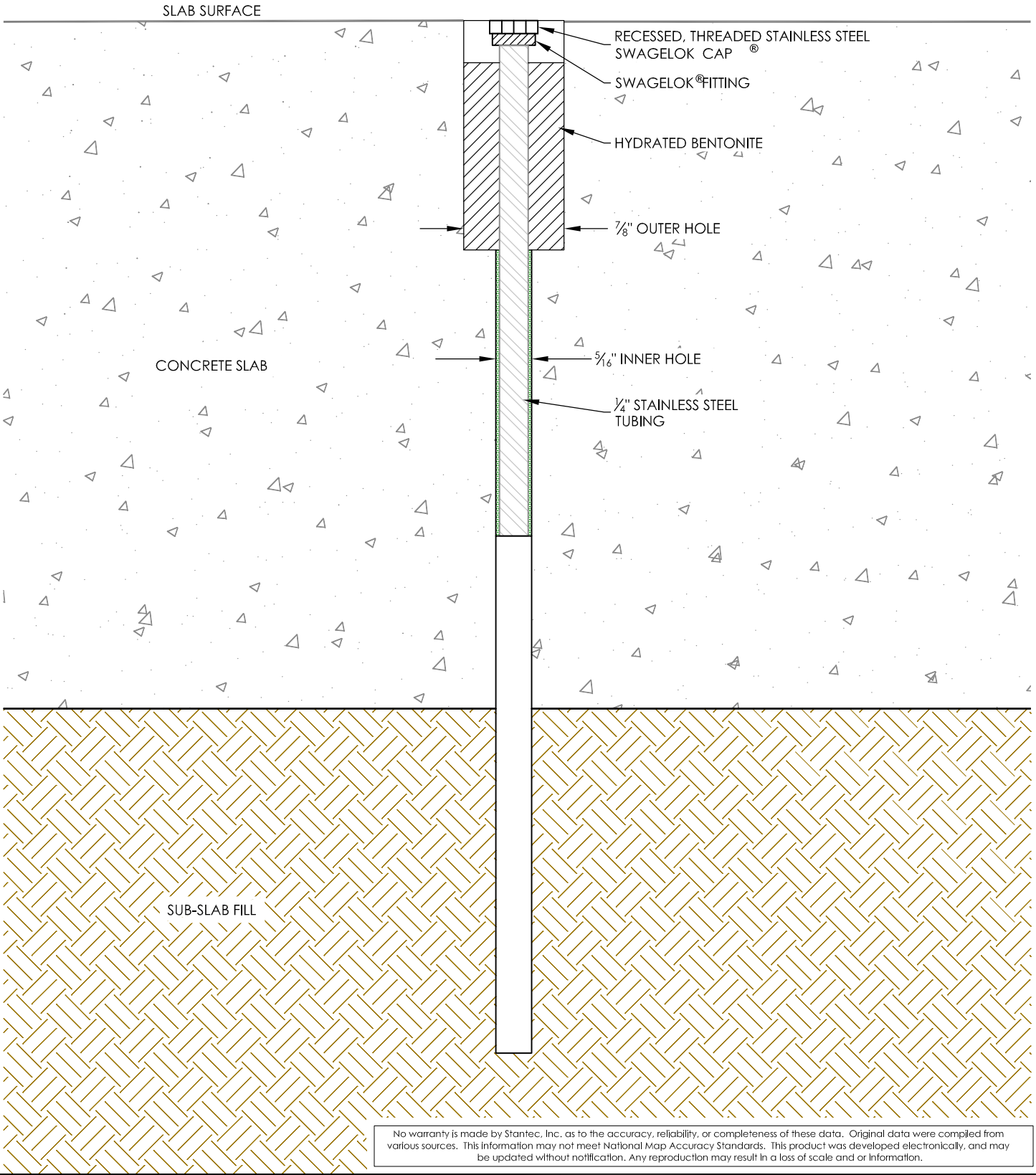
SITE PLAN SHOWING PROPOSED SOIL VAPOR PROBE, SOIL BORING, AND SUB-SLAB PROBE LOCATIONS

FIGURE: 10

JOB NUMBER:	DRAWN BY:	CHECKED BY:	APPROVED BY:	DATE:
211602403	JRO	MRK	TLF	02/21/14

FILEPATH:P:\Chevron\N. CA Marketing Sites\Carryl MacLeod Portfolio\90517\Figures\90517_2014.dwg | nbizjak | Feb 27, 2014 at 16:01 | Layout: Fig 10_PROPOSED


PRIMARY SOURCE
PRIMARY TRANSPORT MECHANISM
SECONDARY SOURCE
SECONDARY TRANSPORT MECHANISM
TERTIARY SOURCE
TERTIARY TRANSPORT MECHANISM
QUATERNARY SOURCE
EXPOSURE ROUTE
POTENTIALLY EXPOSED HUMAN RECEPTORS
Future On-Site Commercial / Industrial Worker
Future On-Site Construction Worker
Current or Future Off-Site Commercial / Industrial Worker
Current or Future Off-Site Construction Worker
Current or Future Off-site Resident
Contaminants in Soil
Direct Soil Contact
Surface Soils (0-3 ft bgs)
Ingestion
Dermal Contact
Excavated Soils (Subsurface to Surface Soils)
Wind or Excavation Activities
Outdoor Air (Particulates)
Inhalation
Soil Gas Emission
Indoor Air (Volatiles)
Outdoor Air (Volatiles)
Infiltration and Percolation by Surface Water (e.g., rain, snow), Leading to Leaching, Solubilization, and Suspension
Groundwater
Volatilization
Air (Volatiles)
Surface Discharge
Surface Water
Fish Uptake
Fish
Sediments
Stormwater Runoff
Contaminants in Groundwater
Direct Groundwater Contact
Volatilization
Indoor Air (Volatiles)
Outdoor Air (Volatiles)
Surface Discharge
Surface Water
Volatilization
Air (Volatiles)
Fish Uptake
Fish
Sediments
LEGEND
Exposure pathway is complete or potentially complete.
Exposure pathway is incomplete.
DATE: 06/25/13
DRAWN BY: EEO
APPROVED BY: TLF
Former Chevron-Branded Service Station 90517
3900 Piedmont Avenue
Oakland, California
FIGURE 11
EXPOSURE PATHWAY FLOW CHART



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FOR:
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SUB-SLAB PROBE CONSTRUCTION

FIGURE
12

JOB NUMBER:	DRAWN BY:	CHECKED BY:	APPROVED BY:	DATE:
211902400	JRO	CM	TLF	02/21/14

FILEPATH:P:\Chevron\N. CA Marketing Sites\Carryl MacLeod Portfolio\90517\SCM\Figures\90517 Sub-Slab Detail_2014.dwg | nbizjak | Feb 24, 2014 at 14:07 | Layout: Fig 12_SSPC

APPENDIX A
Alameda County Environmental Health Correspondence, December 18, 2013

Stantec

ALAMEDA COUNTY
HEALTH CARE SERVICES
AGENCY
ALEX BRISCOE, Agency Director

ENVIRONMENTAL HEALTH SERVICES
ENVIRONMENTAL PROTECTION
1131 Harbor Bay Parkway, Suite 250
Alameda, CA 94502-6577
(510) 567-6700
FAX (510) 337-9335

December 18, 2013

Ms. Carryl MacLeod
Chevron Environmental Management Co.
6101 Bollinger Canyon Road
San Ramon, CA 94583
(sent via electronic mail to CMacleod@chevron.com)

Ms. Leslie Riasanovsky
Unknown Address

Neil & Diane Goodhue
300 Hillside Avenue
Piedmont, CA 94611

Subject: Work Plan Addendum Request; Fuel Leak Case No. RO0000138; Global ID # T0600102248; Chevron #9-0517 / Homestead Federal Savings, 3900 Piedmont Avenue, Oakland CA 94610

Dear Mesdames MacLeod, Riasanovsky, and Mr. & Mrs. Goodhue:

Alameda County Environmental Health Department (ACEH) staff has reviewed the case file, including the *First Quarter 2013 Groundwater Monitoring Report,* dated March 22, 2013, and the *Revised Figure 2 Showing Proposed Borehole and Vapor Probe Locations,* dated October 31, 2012, prepared and submitted on your behalf by Stantec Consulting Services Inc. (Stantec). Thank you for submitting the documents.

ACEH has evaluated the data and recommendations presented in the above-mentioned reports, in conjunction with the case files, and the State Water Resources Control Board's (SWRCBs) Low Threat Underground Storage Tank Case Closure Policy (LTCP). Based on ACEH staff review, we have determined that the site fails to meet the LTCP General Criteria e (Site Conceptual Model), the Media-Specific Criteria for Groundwater, the Media-Specific Criteria for Vapor Intrusion to Indoor Air, and potentially the Direct Contact and Outdoor Air Exposure Criteria (see Geotracker for a copy of the LTCP checklist). ACEH's determination is based on insufficient data and analysis to support groundwater plume delineation coupled with a lack of knowledge of vicinity water supply well locations and potential other sensitive receptors, lack of understanding of the potential for vapor intrusion into existing onsite buildings, and the lack of sufficient shallow soil samples proximal to a number of the former UST-related structures.

Based on ACEH staff review of the case file, we request that you address the following technical comments in a Data Gap Work Plan Addendum and send us the reports described below.

However, prior to the implementation of the final scope of work, ACEH would like to invite you to meeting to discuss an efficient strategy for collecting data at the site in an effort to progress the site towards closure. ACEH requests notification of suitable dates and times for the meeting. Items to be discussed at the meeting are addressed in the Technical Comments below. Subsequent to the meeting, please submit the Data Gap Work Plan Addendum, as requested below (submittal dates can be modified based on the needs of the site).

TECHNICAL COMMENTS

1. **LTCP General Criteria e (Site Conceptual Model)** – According to the LTCP, the SCM is a fundamental element of a comprehensive site investigation. The SCM establishes the source and attributes of the unauthorized release, describes all affected media (including soil, groundwater, and soil vapor as appropriate), describes local geology, hydrogeology and other physical site

characteristics that affect contaminant environmental transport and fate, and identifies all confirmed and potential contaminant receptors (including water supply wells, surface water bodies, structures and their inhabitants). The SCM is relied upon by practitioners as a guide for investigative design and data collection. All relevant site characteristics identified by the SCM shall be assessed and supported by data so that the nature, extent and mobility of the release have been established to determine conformance with applicable criteria in this policy.

Our review of the case files indicates that insufficient data collection and analysis has been presented to assess the nature, extent, and mobility of the release and to support compliance with Media Specific Criteria for Groundwater, Vapor Intrusion to Indoor Air, and potentially with the Direct Contact and Outdoor Air Exposure as described in the following technical comments.

2. **LTCP Media Specific Criteria for Groundwater** – To satisfy the media-specific criteria for groundwater, the contaminant plume that exceeds water quality objectives must be stable or decreasing in areal extent, and meet all of the additional characteristics of one of the five classes of sites listed in the policy.

   Our review of the case files indicates that insufficient data collection and analysis has been presented to support the requisite characteristics of plume length as follows:

   a. **Plume Delineation Coupled with Lack of Knowledge of Vicinity Water Wells** - The downgradient extent of the groundwater dissolved-phase contaminant plume does not appear to have been adequately delineated, largely in part due to the density of underground utilities downgradient of the site; however, ACEH regards the dissolved-phase plume to be essentially stable. A water well survey was conducted in early 2002; however, it appears Department of Water Resources (DWR) records were not consulted. Consequently, in order to verify that additional water supply wells have not been installed in the intervening years and that all potential sources of water well records have been consulted, ACEH requests that a water well survey be conducted, using both DWR and Alameda County Public Works Agency well records. Any water supply wells located within ½-mile of the subject site are requested to be plotted on a figure for quick reference.

   b. **Other Sensitive Receptors** – Because of a lack of adequate plume delineation downgradient of the site, it appears appropriate to verify that there are no other sensitive receptors downgradient of the site. This should include basements or other underground structures, and sensitive populations. Consequently ACEH requests an effort be undertaken to assess the neighborhood for these potential receptors.

   Please present a strategy in the Data Gap Work Plan Addendum (described in Item 5 below) to address the items discussed above. Alternatively, please provide justification of why the site satisfies the Media-Specific Criteria for Groundwater in the focused SCM described in Item 5 below.

3. **LTCP Media Specific Criteria for Vapor Intrusion to Indoor Air** – The LTCP describes conditions, including bioattenuation zones, which if met will assure that exposure to petroleum vapors in indoor air will not pose unacceptable health risks to human occupants of existing or future site buildings, and adjacent parcels. Appendices 1 through 4 of the LTCP criteria illustrate four potential exposure scenarios and describe characteristics and criteria associated with each scenario.

   Our review of the case files indicates that the site data collection and analysis fail to support the requisite characteristics of one of the vapor intrusion four scenarios. The referenced revised figure 2 and associated work plan was submitted to address this data gap. Please see technical comments below for further details and requests.

4. **LTCP Media Specific Criteria for Direct Contact and Outdoor Air Criteria** – The LTCP describes conditions where direct contact with contaminated soil or inhalation of contaminants volatized to outdoor air poses a low threat to human health. According to the policy, release sites where human exposure may occur satisfy the media-specific criteria for direct contact and outdoor air exposure and shall be considered low-threat if the maximum concentrations of petroleum constituents in soil are less than or equal to those listed in Table 1 for the specified depth bgs. Alternatively, the policy allows for a site specific risk assessment that demonstrates that maximum concentrations of petroleum constituents in soil will have no significant risk of adversely affecting human health, or controlling exposure through the use of mitigation measures, or institutional or engineering controls.

Our review of the case files indicates that data collected to date appears to satisfy this criterion; however, due to the existence of uncharacterized source areas and the clear presence of residual source (as indicated by dissolved-phase groundwater concentrations) a potential to fail this criterion is present.

Therefore, please present a strategy in the Revised Data Gap Work Plan described in Item 5 below to collect sufficient data to satisfy the direct contact and outdoor air exposure criteria in the areas proximal to all former UST and dispenser locations. Sample and analyze soil int the five and ten foot intervals, at the groundwater interface, lithologic changes, and at areas of obvious impact. Also, collect a groundwater sample from each boring and propose the requisite analysis including naphthalene and polycyclic aromatic hydrocarbons (PAH) analysis.

Alternatively, please provide justification of why the site satisfies the Media-Specific Criteria for Direct Contact and Outdoor Air Exposure in the focused SCM described in Item 5 below that assures that exposure to petroleum constituents in soil will have no significant risk of adversely affecting human health.

5. **Data Gap Work Plan Addendum and Focused Site Conceptual Model** – Please prepare a Data Gap Work Plan Addendum to address the technical comments listed above, and those listed below. Please support the scope of work in the Data Gap Work Plan Addendum with a focused SCM and Data Quality Objectives (DQOs) that relate the data collection to each LTCP criteria. For example please clarify which scenario within each Media-Specific Criteria a sampling strategy is intended to apply to.

   In order to expedite review, ACEH requests the focused SCM be presented in a tabular format that highlights the major SCM elements and associated data gaps, which need to be addressed to progress the site to case closure under the LTCP. Please see Attachment A "Site Conceptual Model Requisite Elements". Please sequence activities in the proposed revised data gap investigation scope of work to enable efficient data collection in the fewest mobilizations possible.

   Please be aware that the *Revised Figure 2 Showing Proposed Borehole and Vapor Probe Locations* and associated documents contained a number of actions with which ACEH is in general agreement with; however, following the requested meeting, please submit a Data Gap Work Plan Addendum that incorporates technical comments contained in this letter.

   a. **Vapor Probe Construction** – The proposed vapor point locations were revised in Figure 2 in order to provide an initial assessment of potential residual soil and vapor contamination associated with first and second generation underground storage tanks (USTs) and dispenser islands, while avoiding access issues and utilities within the subject building. Their locations appear to be appropriate for this purpose; however, do not assess vapor concentrations associated with other potentially important release locations, and do not assess vapor concentrations beneath the building footprint which can be affected by a reduced-moisture shadow that can increase the potential for vapor intrusion.

      In order to assess seasonal and temporal vapor concentrations at the site, ACEH requests the vapor probes be installed as permanent vapor points. As specified in the LTCP, ACEH also requests that an effort be made to install the probes approximately five feet below the building foundation, not at a depth of 5 feet below grade surface (bgs). ACEH recognizes that the depth to groundwater beneath the site may require shallower installation modifications to this request.

   b. **Standardized Vapor Point Construction Protocols and Sampling Procedures** – Because the vapor points are requested to be permanent constructions, ACEH requests the submittal of standard vapor point construction protocols and sampling procedures in accordance with the Department of Substance Control (DTSC) *Active Soil Gas Investigations* Advisory (April 2012), by the date identified below.

   c. **Sub-Slab Vapor Points** – Given the absence of data beneath the onsite building foundation, and in an effort to move the site towards case closure, ACEH requests a minimum of three sub-slab vapor points be located in the vicinity of former fuel dispenser islands and USTs. Consequently, to incorporate this work scope, standard sub-slab vapor point construction and sampling protocols, in accordance with DTSC guidelines, are requested by the date identified below. Please also update site figures to reflect proposed locations.

TECHNICAL REPORT REQUEST

Please upload technical reports to the ACEH ftp site (Attention: Mark Detterman), and to the State Water Resources Control Board's Geotracker website, in accordance with the following specified file naming convention and schedule:

- **February 28, 2014** – Data Gap Work Plan Addendum
  File to be named: RO138_WP_ADEND_R_yyyy-mm-dd
- **March 21, 2014** – Annual Groundwater Monitoring Report
  File to be named: RO138_GWM_R_yyyy-mm-dd
- **60 Days After Work Plan Approval** – Subsurface Investigation
  File to be named: RO138_SWI_R_yyyy-mm-dd

These reports are being requested pursuant to California Health and Safety Code Section 25296.10. 23 CCR Sections 2652 through 2654, and 2721 through 2728 outline the responsibilities of a responsible party in response to an unauthorized release from a petroleum UST system, and require your compliance with this request.

Online case files are available for review at the following website: http://www.acgov.org/aceh/index.htm. If your email address does not appear on the cover page of this notification, ACEH is requesting you provide your email address so that we can correspond with you quickly and efficiently regarding your case.

Should you have any questions, please contact me at (510) 567--6876 or send me an electronic mail message at mark.detterman@acgov.org.

Sincerely,

Digitally signed by Mark Detterman
DN: cn=Mark Detterman, o, ou,
email=mark.detterman@acgov.org, c=US
Date: 2013.12.18 09:32:11 -08'00'

Mark E. Detterman, PG, CEG
Senior Hazardous Materials Specialist

Enclosures: Attachment 1 – Responsible Party (ies) Legal Requirements / Obligations
Electronic Report Upload (ftp) Instructions

Attachment A – Site Conceptual Model Requisite Elements

cc: Travis Flora, Stantec Consulting Services, Inc, 15575 Los Gatos Blvd, Bldg C, Los Gatos, CA 95032 (sent via electronic mail to: Travis.Flora@Stantec.com)

Dilan Roe (sent via electronic mail to dilan.roe@acgov.org)
Mark Detterman (sent via electronic mail to mark.detterman@acgov.org)
Electronic File, GeoTracker

Attachment 1

Responsible Party(ies) Legal Requirements/Obligations

REPORT/DATA REQUESTS

These reports/data are being requested pursuant to Division 7 of the California Water Code (Water Quality), Chapter 6.7 of Division 20 of the California Health and Safety Code (Underground Storage of Hazardous Substances), and Chapter 16 of Division 3 of Title 23 of the California Code of Regulations (Underground Storage Tank Regulations).

ELECTRONIC SUBMITTAL OF REPORTS

ACEH's Environmental Cleanup Oversight Programs (Local Oversight Program [LOP] for unauthorized releases from petroleum Underground Storage Tanks [USTs], and Site Cleanup Program [SCP] for unauthorized releases of non-petroleum hazardous substances) require submission of reports in electronic format pursuant to Chapter 3 of Division 7, Sections 13195 and 13197.5 of the California Water Code, and Chapter 30, Articles 1 and 2, Sections 3890 to 3895 of Division 3 of Title 23 of the California Code of Regulations (23 CCR). Instructions for submission of electronic documents to the ACEH FTP site are provided on the attached "Electronic Report Upload Instructions."

Submission of reports to the ACEH FTP site is in addition to requirements for electronic submittal of information (ESI) to the State Water Resources Control Board's (SWRCB) Geotracker website. In April 2001, the SWRCB adopted 23 CCR, Division 3, Chapter 16, Article 12, Sections 2729 and 2729.1 (Electronic Submission of Laboratory Data for UST Reports). Article 12 required electronic submittal of analytical laboratory data submitted in a report to a regulatory agency (effective September 1, 2001), and surveyed locations (latitude, longitude and elevation) of groundwater monitoring wells (effective January 1, 2002) in Electronic Deliverable Format (EDF) to Geotracker. Article 12 was subsequently repealed in 2004 and replaced with Article 30 (Electronic Submittal of Information) which expanded the ESI requirements to include electronic submittal of any report or data required by a regulatory agency from a cleanup site. The expanded ESI submittal requirements for petroleum UST sites subject to the requirements of 23 CCR, Division, 3, Chapter 16, Article 11, became effective December 16, 2004. All other electronic submittals required pursuant to Chapter 30 became effective January 1, 2005. Please visit the SWRCB website for more information on these requirements: (http://www.waterboards.ca.gov/water_issues/programs/ust/electronic_submittal/).

PERJURY STATEMENT

All work plans, technical reports, or technical documents submitted to ACEH must be accompanied by a cover letter from the responsible party that states, at a minimum, the following: "I declare, under penalty of perjury, that the information and/or recommendations contained in the attached document or report is true and correct to the best of my knowledge." This letter must be signed by an officer or legally authorized representative of your company. Please include a cover letter satisfying these requirements with all future reports and technical documents submitted for this fuel leak case.

PROFESSIONAL CERTIFICATION & CONCLUSIONS/RECOMMENDATIONS

The California Business and Professions Code (Sections 6735, 7835, and 7835.1) requires that work plans and technical or implementation reports containing geologic or engineering evaluations and/or judgments be performed under the direction of an appropriately registered or certified professional. For your submittal to be considered a valid technical report, you are to present site specific data, data interpretations, and recommendations prepared by an appropriately licensed professional and include the professional registration stamp, signature, and statement of professional certification. Please ensure all that all technical reports submitted for this fuel leak case meet this requirement.

UNDERGROUND STORAGE TANK CLEANUP FUND

Please note that delays in investigation, late reports, or enforcement actions may result in your becoming ineligible to receive grant money from the state's Underground Storage Tank Cleanup Fund (Senate Bill 2004) to reimburse you for the cost of cleanup.

AGENCY OVERSIGHT

If it appears as though significant delays are occurring or reports are not submitted as requested, we will consider referring your case to the Regional Board or other appropriate agency, including the County District Attorney, for possible enforcement actions. California Health and Safety Code, Section 25299.76 authorizes enforcement including administrative action or monetary penalties of up to $10,000 per day for each day of violation.

Alameda County Environmental Cleanup Oversight Programs (LOP and SCP)	**REVISION DATE:** July 25, 2012
	ISSUE DATE: July 5, 2005
	PREVIOUS REVISIONS: October 31, 2005; December 16, 2005; March 27, 2009; July 8, 2010
SECTION: Miscellaneous Administrative Topics & Procedures	**SUBJECT:** Electronic Report Upload (ftp) Instructions

The Alameda County Environmental Cleanup Oversight Programs (petroleum UST and SCP) require submission of all reports in electronic form to the county's FTP site. Paper copies of reports will no longer be accepted. The electronic copy replaces the paper copy and will be used for all public information requests, regulatory review, and compliance/enforcement activities.

REQUIREMENTS

- **Please do not submit reports as attachments to electronic mail.**
- Entire report including cover letter must be submitted to the ftp site as **a single Portable Document Format (PDF) with no password protection**.
- It is **preferable** that reports be converted to PDF format from their original format, (e.g., Microsoft Word) rather than scanned.
- **Signature pages and perjury statements must be included and have either original or electronic signature.**
- **Do not password protect the document**. Once indexed and inserted into the correct electronic case file, the document will be secured in compliance with the County's current security standards and a password. **Documents with password protection will not be accepted**.
- Each page in the PDF document should be rotated in the direction that will make it easiest to read on a computer monitor.
- Reports must be named and saved using the following naming convention:

  RO#_Report Name_Year-Month-Date (e.g., RO#5555_WorkPlan_2005-06-14)

Submission Instructions

1) Obtain User Name and Password
   a) Contact the Alameda County Environmental Health Department to obtain a User Name and Password to upload files to the ftp site.
      i) Send an e-mail to deh.loptoxic@acgov.org
   b) In the subject line of your request, be sure to include **"ftp PASSWORD REQUEST"** and in the body of your request, include the **Contact Information, Site Addresses**, and the **Case Numbers (RO# available in Geotracker) you will be posting for**.

2) Upload Files to the ftp Site
   a) Using Internet Explorer (IE4+), go to ftp://alcoftp1.acgov.org
      (i) Note: Netscape, Safari, and Firefox browsers will not open the FTP site as they are NOT being supported at this time.
   b) Click on Page located on the Command bar on upper right side of window, and then scroll down to Open FTP Site in Windows Explorer.
   c) Enter your User Name and Password. (Note: Both are Case Sensitive.)
   d) Open "My Computer" on your computer and navigate to the file(s) you wish to upload to the ftp site.
   e) With both "My Computer" and the ftp site open in separate windows, drag and drop the file(s) from "My Computer" to the ftp window.

3) Send E-mail Notifications to the Environmental Cleanup Oversight Programs
   a) Send email to deh.loptoxic@acgov.org notify us that you have placed a report on our ftp site.
   b) Copy your Caseworker on the e-mail. Your Caseworker's e-mail address is the entire first name then a period and entire last name @acgov.org. (e.g., firstname.lastname@acgov.org)
   c) The subject line of the e-mail must start with the RO# followed by **Report Upload**. (e.g., Subject: RO1234 Report Upload) If site is a new case without an RO#, use the street address instead.
   d) If your document meets the above requirements and you follow the submission instructions, you will receive a notification by email indicating that your document was successfully uploaded to the ftp site.

ATTACHMENT A

Site Conceptual Model Requisite Elements

ATTACHMENT A

Site Conceptual Model

The site conceptual model (SCM) is an essential decision-making and communication tool for all interested parties during the site characterization, remediation planning and implementation, and closure process. A SCM is a set of working hypotheses pertaining to all aspects of the contaminant release, including site geology, hydrogeology, release history, residual and dissolved contamination, attenuation mechanisms, pathways to nearby receptors, and likely magnitude of potential impacts to receptors.

The SCM is initially used to characterize the site and identify data gaps. As the investigation proceeds and the data gaps are filled, the working hypotheses are modified, and the overall SCM is refined and strengthened until it is said to be "validated". At this point, the focus of the SCM shifts from site characterization towards remedial technology evaluation and selection, and later remedy optimization, and forms the foundation for developing the most cost-effective corrective action plan to protect existing and potential receptors.

For ease of review, Alameda County Environmental Health (ACEH) requests utilization of tabular formats to (1) highlight the major SCM elements and their associated data gaps which need to be addressed to progress the site to case closure (see Table 1 of attached example), and (2) highlight the identified data gaps and proposed investigation activities (see Table 2 of the attached example). ACEH requests that the tables presenting the SCM elements, data gaps, and proposed investigation activities be updated as appropriate at each stage of the project and submitted with work plans, feasibility studies, corrective action plans, and requests for closures to support proposed work, conclusions, and/or recommendations.

The SCM should incorporate, but is not limited to, the topics listed below. Please support the SCM with the use of large-scaled maps and graphics, tables, and conceptual diagrams to illustrate key points. Please include an extended site map(s) utilizing an aerial photographic base map with sufficient resolution to show the facility, delineation of streets and property boundaries within the adjacent neighborhood, downgradient irrigation wells, and proposed locations of transects, monitoring wells, and soil vapor probes.

a. Regional and local (on-site and off-site) geology and hydrogeology. Include a discussion of the surface geology (e.g., soil types, soil parameters, outcrops, faulting), subsurface geology (e.g., stratigraphy, continuity, and connectivity), and hydrogeology (e.g., water-bearing zones, hydrologic parameters, impermeable strata). Please include a structural contour map (top of unit) and isopach map for the aquitard that is presumed to separate your release from the deeper aquifer(s), cross sections, soil boring and monitoring well logs and locations, and copies of regional geologic maps.

b. Analysis of the hydraulic flow system in the vicinity of the site. Include rose diagrams for depicting groundwater gradients. The rose diagram shall be plotted on groundwater elevation contour maps and updated in all future reports submitted for your site. Please address changes due to seasonal precipitation and groundwater pumping, and evaluate the potential interconnection between shallow and deep aquifers. Please include an analysis of vertical hydraulic gradients, and effects of pumping rates on hydraulic head from nearby water supply wells, if appropriate. Include hydraulic head in the different water bearing zones and hydrographs of all monitoring wells.

c. Release history, including potential source(s) of releases, potential contaminants of concern (COC) associated with each potential release, confirmed source locations, confirmed release locations, and existing delineation of release areas. Address primary leak source(s) (e.g., a tank, sump, pipeline, etc.) and secondary sources (e.g., high-

ATTACHMENT A

Site Conceptual Model (continued)

concentration contaminants in low-permeability lithologic soil units that sustain groundwater or vapor plumes). Include local and regional plan view maps that illustrate the location of sources (former facilities, piping, tanks, etc.).

d. Plume (soil gas and groundwater) development and dynamics including aging of source(s), phase distribution (NAPL, dissolved, vapor, residual), diving plumes, attenuation mechanisms, migration routes, preferential pathways (geologic and anthropogenic), magnitude of chemicals of concern and spatial and temporal changes in concentrations, and contaminant fate and transport. Please include three-dimensional plume maps for groundwater and two-dimensional soil vapor plume plan view maps to provide an accurate depiction of the contaminant distribution of each COC.

e. Summary tables of chemical concentrations in different media (i.e., soil, groundwater, and soil vapor). Please include applicable environmental screening levels on all tables. Include graphs of contaminant concentrations versus time.

f. Current and historic facility structures (e.g., buildings, drain systems, sewer systems, underground utilities, etc.) and physical features including topographical features (e.g., hills, gradients, surface vegetation, or pavement) and surface water features (e.g. routes of drainage ditches, links to water bodies). Please include current and historic site maps.

g. Current and historic site operations/processes (e.g., parts cleaning, chemical storage areas, manufacturing, etc.).

h. Other contaminant release sites in the vicinity of the site. Hydrogeologic and contaminant data from those sites may prove helpful in testing certain hypotheses for the SCM. Include a summary of work and technical findings from nearby release sites, including the two adjacent closed LUFT sites, (i.e., Montgomery Ward site and the Quest Laboratory site).

i. Land uses and exposure scenarios on the facility and adjacent properties. Include beneficial resources (e.g., groundwater classification, wetlands, natural resources, etc.), resource use locations (e.g., water supply wells, surface water intakes), subpopulation types and locations (e.g., schools, hospitals, day care centers, etc.), exposure scenarios (e.g. residential, industrial, recreational, farming), and exposure pathways, and potential threat to sensitive receptors. Include an analysis of the contaminant volatilization from the subsurface to indoor/outdoor air exposure route (i.e., vapor pathway). Please include copies of Sanborn maps and aerial photographs, as appropriate.

j. Identification and listing of specific data gaps that require further investigation during subsequent phases of work. Proposed activities to investigate and fill data gaps identified.

APPENDIX B
Focused Site Conceptual Model

Stantec

TABLE 1
Focused Site Conceptual Model
Former Chevron-branded Service Station 90517
3900 Piedmont Avenue, Oakland, California

CSM Element	CSM Sub-Element	Description	Data Gap Item #	Resolution
Geology and Hydrogeology	Regional	Former Chevron-branded service station 90517 was located at 3900 Piedmont Avenue, Oakland, Alameda County, California (the Site) and is located within the East Bay Plain, approximately 2.25 miles east of San Francisco Bay. Based on a review of the United States Geological Survey (USGS) 7.5-minute topographic map for the Oakland West Quadrangle and the adjoining Oakland East Quadrangle, the Site is located on a relatively flat surface with a gentle grade towards the west and is approximately 85 feet above mean sea level (msl). The Site sits conformably atop Holocene-age estuarine deposits, typically described as consisting of clays and silty clays with lenses of well-sorted fine-grained sands and gravels (Environmental Science & Engineering, Inc. [ESE], 1993).	None	NA
Geology and Hydrogeology	Site	Soil boring and well construction logs can be compiled as necessary. Geologic cross-section A-A' prepared by Delta is included in the *Site Conceptual Model and Risk-Based Corrective Action Evaluation*, dated December 14, 2000 (Delta, 2000). This cross-section shows stratigraphy across the Site and the depth-to-first encountered groundwater in select borings associated with the Site. As shown in the boring logs and illustrated on the cross-section, soils beneath the Site generally consist of clay and silt with non-continuous lenses of sand and gravel. Well construction details, an assessment of whether First Quarter 2013 groundwater samples were collected when groundwater elevations were measured across the well screen intervals, and historical groundwater elevation data	None	NA

TABLE 1
Focused Site Conceptual Model
Former Chevron-branded Service Station 90517
3900 Piedmont Avenue, Oakland, California

CSM Element	CSM Sub-Element	Description	Data Gap Item #	Resolution
		are presented in the *First Quarter 2013 Annual Groundwater Monitoring Report*, dated March 22, 2013. During First Quarter 2013, all four Site wells (MW-1 through MW-4 were screened across the prevailing groundwater table. The historical range of depth-to-groundwater (DTW) measurements for the Site is approximately 5 to 13 feet below top of casing (TOC). During First Quarter 2013, DTW measurements ranged from 5.80 to 8.14 feet below TOC. The direction of groundwater flow beneath the Site during First Quarter 2013 was towards the west-northwest at an approximate hydraulic gradient ranging from 0.012 to 0.017 feet per foot (ft/ft). This is generally consistent with the historical direction of groundwater flow (vector mean towards the west) (Stantec Consulting Services Inc. [Stantec], 2013; Stantec, 2014).		
Surface Water Bodies		The USGS 7.5-minute topographic map for the Oakland West Quadrangle, the adjoining Oakland East Quadrangle, and aerial photos from Google Earth® were reviewed to identify any surface water within a 0.5-mile radius of the Site. The nearest surface water body is Glen Echo Creek, located approximately 400 feet southeast (up-gradient) of the Site. Based on the distance to Glen Echo Creek, and its location and orientation up-gradient of the Site, it is unlikely that Glen Echo Creek will be impacted by the dissolved-phase petroleum hydrocarbon plume associated with the Site.	None	NA
Nearby Wells		A well survey was conducted in 2002 to identify water supply wells within a 2,000-foot radius of the Site. The records indicated four water supply wells within that radius, which include one irrigation well and three abandoned wells with an unknown purpose. The irrigation well is located approximately 750 feet northeast (cross-gradient) of the Site	1. Well survey does not include information from Department of Water Resources.	Conduct an updated well survey, and prepare a Sensitive Receptor Survey.

TABLE 1
Focused Site Conceptual Model
Former Chevron-branded Service Station 90517
3900 Piedmont Avenue, Oakland, California

CSM Element	CSM Sub-Element	Description	Data Gap Item #	Resolution
		and was advanced to a depth of approximately 198 feet below ground surface (bgs). One of the abandoned wells is located approximately 1,200 feet west (down-gradient) of the Site and two of the abandoned wells are located approximately 1,825 feet southwest (cross-gradient) of the Site. Total depth information was not available for these wells (Delta, 2002). A review of the California State Water Resources Control Board (SWRCB) GeoTracker™ GAMA Database did not identify any additional water supply wells within a 2,000-foot radius of the Site (SWRCB, 2014). Based on the limited extent of the plume as indicated by the well network and the distance of the water supply wells from the Site (750 feet and greater), the water supply wells are unlikely to be impacted by the dissolved-phase petroleum hydrocarbon plume associated with the Site		
Conduit Survey		In 2002, Delta conducted an underground utility survey. Results from the survey indicated that sewer lines located adjacent to the Site are buried at approximately 12 to 13 feet below ground surface (bgs). Specific burial depths of water, gas, and electrical lines were not available; however, it was stated in phone correspondence with a representative of the East Bay Municipal Utility District that these lines are usually buried no deeper than 5 feet bgs. Additionally, According to the East Bay Municipal Utility District, water lines are usually buried between 3 and 5 feet bgs (Delta, 2002). Based on the conduit burial depths and historical range of depth-to-water (DTW) (approximately 5 to 13 feet bgs), the nearby water, gas, and electrical trenches are not likely acting as preferential pathways; however, there is the potential for the	None	NA

TABLE 1
Focused Site Conceptual Model
Former Chevron-branded Service Station 90517
3900 Piedmont Avenue, Oakland, California

CSM Element	CSM Sub-Element	Description	Data Gap Item #	Resolution
		sewer lines to act as preferential pathways as they are installed below the current groundwater table (DTW range during First Quarter 2013 was approximately 6 to 8 feet bgs). On May 10, 2013, CRA performed a Site visit to determine if any storm drain lines are located at or in the near vicinity of the Site and none were identified. A City sanitary sewer and storm drain map obtained by CRA confirmed there are no storm drain lines at or in the vicinity of the Site (CRA, 2012).		
Release Source and Volume		A non-emergency hazardous substance release report, dated June 6, 1996, is on file with the California Department of Toxic Substances Control (DTSC) Site Mitigation Program. The report states that an unknown amount of petroleum hydrocarbons was released to the subsurface and was discovered during investigation work conducted at the Site in October 1993. The report states that the release possibly originated from former gas station operations, but does not state what former Site features may have caused the release.	None	NA
LNAPL		Light non-aqueous phase liquid (LNAPL) has not been observed or documented at the Site to-date. Additionally, with all former service station features removed from the Site in 1978, it is unlikely that LNAPL would be observed in future.	None	NA
Source Removal Activities		Based on a historical Site Plan from 1955, the three first-generation gasoline underground storage tanks (USTs; 928-gallon, 440-gallon, and 550-gallon) were removed and the three second-generation gasoline USTs (3,000-gallon, 5,000-gallon or 5,700-gallon, and 7,500-gallon) were installed to the northwest of the first-generation gasoline USTs prior to or in 1955. In addition, the two first-generation fuel dispenser islands	None	NA

TABLE 1
Focused Site Conceptual Model
Former Chevron-branded Service Station 90517
3900 Piedmont Avenue, Oakland, California

CSM Element	CSM Sub-Element	Description	Data Gap Item #	Resolution
		were removed and two second-generation fuel dispenser islands were installed to the east of the first-generation fuel dispenser islands (Conestoga-Rovers & Associates [CRA], 2010). It is unknown if product piping associated with the first-generation fueling structures was replaced at the time of these activities. Further documentation on these activities could not be found and conditions of the USTs, dispenser islands, and soil during removal are unknown. In 1978, the service station was closed and all remaining Site features associated with the service station were removed (CRA, 2010). This includes at least the three second-generation gasoline USTs (3,000-gallon, 5,000-gallon or 5,700-gallon, and 7,500-gallon), two second-generation fuel dispenser islands, associated product piping, and the station building. Further documentation on these activities could not be found and conditions of these Site features and soil during removal are unknown. It is unknown when the lubrication building, hydraulic hoists, waste oil sump, and 1,000-gallon waste oil UST were removed at this time. They may have been removed when the service station was closed in 1978 or anytime between 1971 (date of most-recent Site Plan showing these features as existing) and 1978. Dissolved-phase petroleum hydrocarbon concentrations associated with the Site are decreasing, indicating that there is no longer a petroleum hydrocarbon source area remaining on Site that would warrant further remediation.		
Contaminants of Concern		Only contaminants historically detected in soil or groundwater are considered constituents of concern (COCs): total petroleum hydrocarbons as gasoline range organics (TPH-	2. Naphthalene and PAHs not analyzed in soil.	Include naphthalene and PAH analyses in

TABLE 1
Focused Site Conceptual Model
Former Chevron-branded Service Station 90517
3900 Piedmont Avenue, Oakland, California

CSM Element	CSM Sub-Element	Description	Data Gap Item #	Resolution
		GRO), total petroleum hydrocarbons as diesel range organics (TPH-DRO), total recoverable petroleum hydrocarbons (TRPH; also known as total TPH), total petroleum hydrocarbons as motor oil (TPH-MO), benzene, toluene, ethylbenzene, and total xylenes (BTEX compounds), methyl *tertiary*-butyl ether (MtBE), *tertiary*-butyl alcohol (TBA), *n*-hexane extractable material (HEM; oil and grease), acetone, carbon disulfide, 2-butanone, *sec*-butylbenzene, isopropylbenzene, naphthalene, *n*-propylbenzene, *p*-isopropyltoluene, diethyl phthalate, and select metals (cadmium, chromium, lead, nickel, and zinc).		Data Gap Work Plan
Petroleum Hydrocarbons in Soil		Soil analytical results are compared to California Regional Water Quality Control Board – San Francisco Bay Region (RWQCB) Environmental Screening Levels (ESLs) for shallow soil with commercial/industrial land use where groundwater is a current or potential source of drinking water (RWQCB, 2013). Soil samples collected at 6 feet bgs from soil boring FNBO-5 (in the vicinity of the second-generation USTs) and 11 feet bgs from boring FNBO-7 and borehole MW-4 (in the vicinity of the first-generation fuel dispenser islands) are the only soil samples collected in association with the Site that exhibited concentrations of petroleum hydrocarbons above soil ESLs. The current and limited lateral extent of soil impacts is delineated by concentrations below laboratory reporting limits (LRLs) or ESLs in soil samples collected from borings FNBO-1 through FNBO-4, FNBO-6, FNBO-8, and SB-2, and boreholes MW-1, MW-2, MW-3. The lateral and vertical extents of petroleum hydrocarbons in	2. Soil contamination at shallow depths is not well characterized near former fueling features. Naphthalene and PAHs have not been evaluated near the former waste oil UST.	Additional soil borings should be advanced on Site to evaluate shallow soil conditions near former fueling features. Include naphthalene and PAH analyses near the former waste oil UST.

TABLE 1
Focused Site Conceptual Model
Former Chevron-branded Service Station 90517
3900 Piedmont Avenue, Oakland, California

CSM Element	CSM Sub-Element	Description	Data Gap Item #	Resolution
		soil are considered defined overall; although further refinement of the characterization of shallow soil conditions around the current on-site building in the vicinity of former fueling features is needed to evaluate potential risk to identified potential receptors. Furthermore, shallow soil samples have not been collected and analyzed for naphthalene and polynuclear aromatic hydrocarbons (PAHs) in the vicinity of former waste oil UST.		
Petroleum Hydrocarbons in Groundwater		Soil impacts extend vertically into groundwater and DTW at the Site has historically ranged from approximately 5 to 13 feet below TOC. Isoconcentration maps showing the estimated lateral extent of the dissolved-phase plume were prepared following the First Quarter 2013 groundwater monitoring and sampling event. The TPH-GRO plume is defined to the east and south by concentrations below LRLs or ESLs in monitoring wells MW-1 through MW-3, but available data do not delineate the plume to the west or north. Although well MW-2 hasn't been sampled since First Quarter 2009, there is an established history of groundwater samples collected from the well with concentrations below LRLs since Fourth Quarter 2000. The benzene plume is defined by concentrations below LRLs in wells MW-1 through MW-3 and boring SB-2. The benzene plume does not appear to be defined north of well MW-4; however, the benzene concentration in the grab groundwater sample collected from boring SB-2 was below the LRL and it is likely that the plume is limited in extent to the north.	3. Dissolved-phase petroleum hydrocarbon plume not defined to the north, east and west. Historical attempts have been unsuccessful at defining the plume length; however, this is largely in part due to the density of underground utilities down-gradient of the Site, as noted in the ACEH letter dated December	A Sensitive Receptor Survey should be produced.

TABLE 1
Focused Site Conceptual Model
Former Chevron-branded Service Station 90517
3900 Piedmont Avenue, Oakland, California

CSM Element	CSM Sub-Element	Description	Data Gap Item #	Resolution
		The TPH-DRO (with silica gel cleanup) and TPH-MO (without silica gel cleanup) plumes are defined to the south by concentrations below LRLs or ESLs in well MW-3. Well MW-2 and boring SB-2 were not historically analyzed for TPH-DRO or TPH-MO. The TPH-DRO and TPH-MO plumes do not appear to be defined to the west, north, or east of wells MW-1 and MW-4. Current and historical groundwater quality data indicate that the petroleum hydrocarbon plume associated with the Site is generally stable or decreasing in size and concentration. During First Quarter 2013, historical low concentrations of total xylenes and MtBE were observed in well MW-4. All other concentrations of TPH-GRO, BTEX compounds, and MtBE were within historical limits at all wells sampled. Trends were not evaluated for all other COCs analyzed as limited data were available. Concentrations of TPH-GRO, benzene, and MtBE appear to have an inverse relationship with changes in groundwater elevation; however, overall stable or decreasing concentration trends are still observed (Stantec, 2013).	18, 2013. ACEH also states that they regard the dissolved-phase plume to be essentially stable and that further evaluation of the dissolved-phase plume should be focused on potential sensitive receptors that may be affected by the dissolved-phase plume.	
Risk Evaluation		**On and Off Site Current or Potential Populations** Land use near the Site consists of a mixture of commercial and residential properties. The Site is bounded on the northwest by Piedmont Avenue followed by a commercial building housing various businesses, to the northeast by a commercial building that appears to be vacant, to the southeast by residences, and on the southwest by Montell Street followed by another commercial building that appears to be vacant. The Site and the properties to the northwest, northeast, and southwest are zoned for commercial purposes, while the properties to the southeast are zoned as residential.	3. Details of building construction type(s) for properties that may overly the dissolved-phase plume.	Research building construction type(s) for identified properties and include results and evaluation in the Sensitive Receptor Survey.

TABLE 1
Focused Site Conceptual Model
Former Chevron-branded Service Station 90517
3900 Piedmont Avenue, Oakland, California

CSM Element	CSM Sub-Element	Description	Data Gap Item #	Resolution
		Based on the current and likely future use of the Site and down-gradient properties as commercial, the current or future potentially exposed populations on and off Site include commercial workers, customers, and construction workers. Although a residential area is located southeast (up-gradient) of the Site, the properties that comprise the residential area are considered a safe distance (40 to 60 feet) from any former Site features with potential releases or impacted areas associated with the Site. In addition, groundwater data from well MW-2 suggests that the plume is defined on Site to the south and southeast. **Potential Sensitive Populations** Seventeen potentially sensitive populations (schools, child care facilities, senior living, and hospitals) were identified within a 0.5-mile radius of the Site. Distances ranged between 0.12 and 0.47 miles in north, northwest, north-northwest, northeast, north-northeast, east-southeast, southwest, south-southwest, and west directions. Only one of the identified sensitive populations within a 0.5-mile radius of the Site is located down-gradient of the Site. Kaiser Permanente Medical Center is located approximately 0.12 miles (634 feet) west (down-gradient) of the Site. Given its distance from the Site and the limited lateral extent of the dissolved-phase petroleum hydrocarbon plume associated with the Site as supported by groundwater data collected from boring SB-2, Kaiser Permanente Medical Center is unlikely to be at risk from exposure to Site-related contaminants.		

TABLE 1
Focused Site Conceptual Model
Former Chevron-branded Service Station 90517
3900 Piedmont Avenue, Oakland, California

CSM Element	CSM Sub-Element	Description	Data Gap Item #	Resolution
		Exposure Pathway Analysis An exposure pathway is considered complete or potentially complete if it meets four basic requirements: 1) presence of chemical sources; 2) release and transport within an environmental medium; 3) an exposure route; and 4) a potential receptor. Potentially complete pathways are summarized as follows: • The ingestion of groundwater and dermal contact with groundwater exposure pathways are considered potentially complete for off-site construction workers only, as sewer lines located adjacent to the Site are buried at approximately 12 to 13 feet bgs and current DTW is approximately 6 to 8 feet bgs. Excavation work to access the sewer line will likely encounter groundwater. • The ingestion and dermal contact surface soil exposure pathways are considered potentially complete for on-site construction workers only, due to shallow (less than 10 feet bgs) soil detections of petroleum hydrocarbons above ESLs near the second-generation gasoline USTs at boring FNBO-5. The Site is paved, so customers and commercial workers are not likely to contact shallow soil. The current building sits above the majority of former fueling features and access to impacted soil beneath or near the former fueling features is unlikely while the building is present. • The ingestion, dermal contact, and inhalation of outdoor particulates from excavated soil exposure		

TABLE 1
Focused Site Conceptual Model
Former Chevron-branded Service Station 90517
3900 Piedmont Avenue, Oakland, California

CSM Element	CSM Sub-Element	Description	Data Gap Item #	Resolution
		pathways are considered potentially complete for on-site construction workers only, due to historical shallow (less than 10 feet bgs) soil detections of petroleum hydrocarbons above ESLs on Site; however, the current building is placed above the majority of former fueling features and access to the impacted soil beneath or near the former fueling features is unlikely while the building is present. • The soil gas emission pathways (inhalation of indoor and outdoor air) are considered potentially complete for on-site receptors only due to the potential for petroleum hydrocarbons in shallow soil on Site to volatilize and be inhaled in the indoor or outdoor air. No on-site soil data are available from 0 to 5 feet bgs; therefore, a complete evaluation of Site conditions compared to the vapor intrusion to indoor air and outdoor air exposure criteria set forth in the SWRCB Low-Threat Underground Storage Tank (UST) Case Closure Policy (LTCP) cannot be conducted. • The groundwater emission pathways (inhalation of indoor and outdoor air) are considered potentially complete for on-site and off-site receptors, due to the potential for petroleum hydrocarbons in shallow groundwater to volatilize and be inhaled in the indoor or outdoor air. An evaluation of the depth of the on-site and off-site building foundation and construction type(s) will be necessary to fully evaluate the potential for groundwater vapor intrusion based on the criteria set forth in the SWRCB LTCP.	4. Vapor intrusion evaluation. Petroleum vapor intrusion to indoor air and direct contact and outdoor air LTCP criteria are not met and a vapor intrusion assessment is needed to evaluate risk to potential human receptors.	Install five on-site soil vapor probes (VP-1 though VP-5), and one off-site soil vapor probe (VP-6) to evaluate petroleum hydrocarbons in vapor. Depending on the results of soil vapor probe samples, sub-slab probes (SS-1 through SS-3) may be installed.

TABLE 1
Focused Site Conceptual Model
Former Chevron-branded Service Station 90517
3900 Piedmont Avenue, Oakland, California

CSM Element	CSM Sub-Element	Description	Data Gap Item #	Resolution
		• The ingestion, dermal contact, and inhalation pathways for shallow soil and excavated soil are considered potentially complete for on-site construction workers, and the ingestion and dermal contact pathways for groundwater are considered potentially complete for off-site construction workers. The Site and surrounding areas are paved and the current building is placed above the majority of former fueling features, so risk to construction workers is not likely at this time. However, groundwater and direct contact and outdoor air exposure LTCP criteria are not met. **Risk Evaluation** The ingestion, dermal contact, and inhalation pathways for shallow soil and excavated soil are considered potentially complete for on-site construction workers and the ingestion and dermal contact pathways for groundwater are considered potentially complete for off-site construction workers; however, the Site and surrounding areas are paved and the current building is placed above the majority of former fueling features, so risk to construction workers is not likely at this time. In the event of planned construction or excavation, care should be taken to safely manage exposed and excavated soil and groundwater. The soil gas and groundwater emission pathways (inhalation of indoor and outdoor air) are considered potentially complete, and additional information is needed to complete an evaluation of vapor intrusion risk to potential on-site and off-site human receptors.		

TABLE 2
Focused Site Conceptual Model
Former Chevron-branded Service Station 90517
3900 Piedmont Avenue, Oakland, California

Data Gaps Summary and Proposed Investigation

Item	Data Gap Item #	Proposed Investigation	Rationale	Analyses
1	Well survey does not include information from Department of Water Resources.	Conduct an updated well survey, and prepare a Sensitive Receptor Survey.	A clear understanding of potential receptors is important to evaluate potential risk associated with the dissolved-phase plume.	Request well data from Department of Water Resources and Alameda County to review current files of both departments.
2	Soil contamination at shallow depths is not well characterized near former fueling features. Naphthalene and PAHs have not been evaluated near the former waste oil UST.	Additional soil borings should be advanced on Site to evaluate shallow soil conditions near former fueling features. Include naphthalene and PAH analyses near the former waste oil UST.	Soil borings will be located as shown in the *Site Conceptual Model and Data Gap Work Plan*, dated March 21, 2014. Source area borings are located as close to former USTs and dispenser islands as Site configuration will allow.	Soil samples will be analyzed for: TPH-GRO and TPH-DRO both with and without silica gel cleanup by United States Environmental Protection Agency (US EPA) Method 8015B; and BTEX, MtBE, DIPE, EtBE, TAME, TBA, 1,2-DCA, 1,2-DBA, and naphthalene by US EPA Method 8260B (SW-846). In addition, soil samples collected from boring B-6, near the former waste oil UST, will be analyzed for PAHs by US EPA 8270C-SIM.

TABLE 2
Focused Site Conceptual Model
Former Chevron-branded Service Station 90517
3900 Piedmont Avenue, Oakland, California

Item	Data Gap Item #	Proposed Investigation	Rationale	Analyses
3	Details of building construction type(s) for properties that may overly the dissolved-phase plume.	Research building construction type(s) for identified properties and include results and evaluation in the Sensitive Receptor Survey. Conduct an updated well survey, and prepare a Sensitive Receptor Survey.	Historical attempts have been unsuccessful at defining the plume length; however, this is largely in part due to the density of underground utilities down-gradient of the Site, as noted in the ACEH letter dated December 18, 2013. ACEH also states that they regard the dissolved-phase plume to be essentially stable and that further evaluation of the dissolved-phase plume should be focused on potential sensitive receptors that may be affected by the dissolved-phase plume.	Attempt to obtain details on building construction type(s), occupancy classifications, etc. to evaluate potential risk to buildings and its occupants related to the dissolved-phase plume.
4	Vapor intrusion evaluation. Petroleum vapor intrusion to indoor air and direct contact and outdoor air LTCP criteria are not met and a vapor intrusion assessment is needed to evaluate risk to potential human receptors.	Install five on-site soil vapor probes (VP-1 though VP-5), and one off-site soil vapor probe (VP-6) to evaluate petroleum hydrocarbons in vapor. Depending on the results of soil vapor probe samples, sub-slab probes (SS-1 through SS-3) may be installed.	Shallow soil vapor probes will provide an initial indication of soil vapor concentrations in the vicinity of former fueling features, which can then be used to evaluate whether additional sub-slab sampling is necessary.	Vapor samples will be analyzed for: TPH-GRO, TPH-DRO, BTEX compounds, and naphthalene by US EPA Method TO-15 full scan; and fixed gases (carbon dioxide, oxygen, methane, and helium) by ASTM Method D-1946.

References

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Delta, 2000. *Site Conceptual Model and Risk-Based Corrective Action Evaluation*. December 14.

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RWQCB, 2013. *Screening for Environmental Concerns at Sites with Contaminated Soil and Groundwater, Interim Final*. November 2007, revised December 2013.

Stantec, 2013. *First Quarter 2013 Annual Groundwater Monitoring Report*. March 22.

SWRCB, 2014. GeoTracker™ GAMA, website download from http://geotracker.waterboards.ca.gov/gama/.

APPENDIX C
Soil Boring and Well Construction Logs

Environmental Science & Engineering, Inc.
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BORING LOG AND WELL COMPLETION SUMMARY

FNBO-1

Page 1 of 1

Project Name: First Nationwide Bank Project No: 6-93-5146
Location: 3900 Piedmont Avenue, Oakland, CA

Driller: Soils Exploration Services, Inc.
Method: Hollow Stem Auger
Hole Diameter: 6" Total Depth: 11.5 Feet
Ref. Elevations:
Logged By: Chris Valcheff

Dates:
Start: 10-20-93
Finish: 10-20-93

WELL COMPLETION

Completion Depth: N/A

	Size/Type	From	To
Casing:			
Screen:	N/A		
Filter:			
Seal:			

Well Cap or Box:

Lithologic Description	USC	Graphic Log: Sample/Blows	Graphic Log: Lithology	Graphic Log: Well Installation	Vapor	Remarks (Water, drilling/completion, summary, sample type)
ASPHALT						
SILTY GRAVEL FILL						
SANDY SILT, light brown, stiff, damp, 10-20% fine to medium grained sands, no odor.	SM					
CLAYEY GRAVEL, dark brown, very dense, 30-40% clay, coarse sand to 1/2" gravel, damp, no odor.	GC	36				
		40				
CLAY, light brown, very stiff, damp, no odor.	CL	38			0	SAMPLE @ 6.0 FEET
CLAYEY GRAVEL, dark brown, very dense, 30-40% clay, coarse sand, to 1/2" gravel, damp, no odor.	CL					
CLAYEY SAND, light brown, very dense, moist, 10-20% clay, medium to coarse grained, no odor.	SC					
As above, grey, fine to medium grained sand, strong hydrocarbon odor.	SC	10			25	SAMPLE @ 10.5 FEET
		15				▼ Water @ 11.0 feet
		20				TOTAL DEPTH = 11.5 FEET Backfilled with grout.

REGISTERED GEOLOGIST
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STATE OF CALIFORNIA

Environmental Science & Engineering, Inc.
A CILCORP Company

BORING LOG AND WELL COMPLETION SUMMARY

FNBO-2

Project Name: First Nationwide Bank Project No: 6-93-5146
Location: 3900 Piedmont Avenue, Oakland, CA

Page 1 of 1

WELL COMPLETION

Completion Depth: N/A

	Size/Type	From	To
Casing:			
Screen:	N/A		
Filter:			
Seal:			

Well Cap or Box:

Driller: Soils Exploration Services, Inc.
Method: Hollow Stem Auger
Hole Diameter: 6" Total Depth: 11.5 Feet
Ref. Elevations:
Logged By: Chris Valcheff

Dates:
Start: 10-20-93
Finish: 10-20-93

Depth	Lithologic Description	USC	Graphic Log: Sample/Blows	Graphic Log: Lithology	Graphic Log: Well Installation	Vapor	Remarks: Water, drilling/completion, summary, sample type
0	ASPHALT						
	SILTY GRAVEL FILL						
2	SANDY SILT, light brown, stiff, damp, 10-20% fine to medium grained sands, no odor.	SM					
5			7				
	SANDY CLAY, dark brown, stiff, damp, 20-30% fine to medium grained sand, no odor.	SC	22				
6			30			0	SAMPLE @ 6.0 FEET
8	SANDY CLAY, light brown, stiff, moist, 10-20% very fine to fine grained sand, no odor.	SC					
10			12				SAMPLE @ 10.0 FEET
	SILTY SAND, light brown, dense, moist, 10-20% silts, fine to medium grained sand, no odor.	SM	19			0	
11			22				Water @ 11.5 feet
12							TOTAL DEPTH = 11.5 FEET Backfilled with grout.

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Environmental Science & Engineering, Inc.
A CILCORP Company

BORING LOG AND WELL COMPLETION SUMMARY

FNBO-3

Page 1 of 1

Project Name: First Nationwide Bank Project No: 6-93-5146
Location: 3900 Piedmont Avenue
Oakland, CA

Driller: Soils Exploration Services, Inc.
Method: Hollow Stem Auger
Hole Diameter: 6" Total Depth: 16.5 Feet
Ref. Elevations:
Logged By: Chris Valchelf

Dates:
Start: 10-20-93
Finish: 10-20-93

WELL COMPLETION

Completion Depth: N/A

	Size/Type	From	To
Casing:			
Screen:	N/A		
Filter:			
Seal:			

Well Cap or Box:

Lithologic Description	USC	Graphic Log: Sample/Blows	Graphic Log: Lithology	Graphic Log: Well Installation	Vapor	Remarks: Water, drilling/completion, summary, sample type
ASPHALT						
SILTY GRAVEL FILL						
SANDY SILT, grey, stiff, damp, 10-20% fine to medium grained sand, slight hydrocarbon odor.	SM					
As above, black.	SM					
As above, brown, stiff, damp, 10-20% fine grained sand, no odor.	SM					
SANDY CLAY, light brown, very stiff, damp, 30-40% medium to coarse grained sand, no odor.	CL	15, 25, 25			0	SAMPLE @ 6.0 FEET
SANDY CLAY, light grey, stiff, damp, 5-10% fine grained sand, no odor.	CL					
SANDY SILT, light grey with brown mottles, stiff, moist, 10-20% very fine grained sand, no odor.	SM	7, 14			0	SAMPLE @ 10.5 FEET
As above, 20-30% very fine sand, saturated.		20				Water @ 11.0 feet
As above, saturated.	SM					SATURATED SAMPLES
						TOTAL DEPTH = 16.5 FEET Backfilled with grout.

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BORING LOG AND WELL COMPLETION SUMMARY

FNBO-4

Page 1 of 1

WELL COMPLETION

Completion Depth: **N/A**

	Size/Type	From	To
Casing:			
Screen:	N/A		
Filter:			
Seal:			

Well Cap or Box:

Project Name: First Nationwide Bank Project No: 6-93-5146
Location: 3900 Piedmont Avenue
Oakland, CA

Driller: Soils Exploration Services, Inc.
Method: Hollow Stem Auger
Hole Diameter: 6" Total Depth: 7.5 Feet
Ref. Elevations:
Logged By: Chris Valcheff

Dates:
Start: 10-20-93
Finish: 10-20-93

Lithologic Description	USC	Graphic Log: Sample/Blows	Graphic Log: Lithology	Graphic Log: Well Installation	Vapor	Remarks (Water, drilling/completion, summary, sample type)
ASPHALT						
SILTY GRAVEL FILL						
GRAVELLY SILT, dark brown, stiff, damp, 20-30% gravel, no odor.	GM					
SANDY SILT, dark brown, stiff, damp, 10-20% medium to coarse grained sand, no odor.	SM					
As above, black with brown mottles, slight hydrocarbon odor.		7 10 15			6.0	SAMPLE @ 6.0 FEET
OBSTRUCTED - Plastic (?)						OBSTRUCTED @ 7.0 FEET
						TOTAL DEPTH = 7.5 FEET Backfilled with grout.

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BORING LOG AND WELL COMPLETION SUMMARY

FNBO-5

WELL COMPLETION

Completion Depth: **N/A**

	Size/Type	From	To
Casing:			
Screen:	N/A		
Filter:			
Seal:			

Well Cap or Box:

Project Name: First Nationwide Bank Project No: 6-93-5146
Location: 3900 Piedmont Avenue, Oakland, CA

Driller: Soils Exploration Services, Inc.
Method: Hollow Stem Auger
Hole Diameter: 6" Total Depth: 11.5 Feet
Ref. Elevations:
Logged By: Chris Valcheff

Dates:
Start: 10-21-93
Finish: 10-21-93

Depth (ft)	Lithologic Description	USC	Graphic Log: Sample/Blows	Graphic Log: Lithology	Graphic Log: Well Installation	Vapor	Remarks (Water, drilling/completion, summary, sample type)
0	TOPSOIL						
1	CONCRETE						
2	BASE FILL						
3	SANDY CLAY, brown, stiff, damp, 20-30% fine to medium grained sand, no odor.	SC					
4	As above, grey, strong hydrocarbon odor.						
5			4				
6			5				SAMPLE @ 6.0 FEET
7			21			1784	
8	SILTY SAND, grey/blue, soft, wet, 10-20% silts, medium to coarse grained sand, strong hydrocarbon odor.	SM				2500	Looks like free product.
9							
10							SAMPLE @ 10.0 FEET
11	SILT, grey, stiff, wet, strong hydrocarbon odor.	ML	1				
12			4				▼ Water @ 11.0 feet
13			8			85	TOTAL DEPTH = 11.5 FEET Backfilled with grout.
14							
15							
16							
17							

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BORING LOG AND WELL COMPLETION SUMMARY

FNBO-6

WELL COMPLETION

Completion Depth: **N/A**

	Size/Type	From	To
Casing:			
Screen:			
Filter:	**N/A**		
Seal:			

Well Cap or Box:

Project Name: First Nationwide Bank Project No: 6-93-5146

Location: 3900 Piedmont Avenue
Oakland, CA

Driller: Soils Exploration Services, Inc.
Method: Hollow Stem Auger
Hole Diameter: 6" Total Depth: 16.5 Feet
Ref. Elevations:
Logged By: Chris Valcheff

Dates:
Start: 10-21-93
Finish: 10-21-93

Lithologic Description	USC	Graphic Log: Sample/Blows	Graphic Log: Lithology	Graphic Log: Well Installation	Vapor	Remarks: Water, drilling/completion, summary, sample type
TOPSOIL						
CONCRETE						
BASE FILL						
SANDY CLAY, brown, stiff, damp, 20-30% very fine to fine grained sand, no odor.	SC					
As above, grey, strong hydrocarbon odor.	SC					
As above, grey/green, "cedar"-like odor.	SC					
SANDY CLAY, green/brown, very stiff, damp, 30-40% coarse grained sand, strong hydrocarbon odor.	CL	12 20 34			696	SAMPLE @ 6.0 FEET
SANDY CLAY, grey/green, stiff, damp, 30-40% fine to medium grained sand, strong hydrocarbon odor.	CL					
As above.	CL	17 20 50			412	SAMPLE @ 10.0 FEET Water @ 11.0 feet
		17 20 34				NO RECOVERY TOTAL DEPTH = 16.5 FEET Backfilled with grout.

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BORING LOG AND WELL COMPLETION SUMMARY

FNBO-7

Page 1 of 1

WELL COMPLETION

Completion Depth: N/A

	Size/Type	From	To
Casing:			
Screen:	N/A		
Filter:			
Seal:			

Well Cap or Box:

Project Name: First Nationwide Bank Project No: 6-93-5146

Location: 3900 Piedmont Avenue, Oakland, CA

Driller: Soils Exploration Services, Inc.
Method: Hollow Stem Auger
Hole Diameter: 6" Total Depth: 11.5 Feet
Ref. Elevations:
Logged By: Chris Valcheff

Dates:
Start: 10-21-93
Finish: 10-21-93

Lithologic Description	USC	Graphic Log: Sample/Blows	Graphic Log: Lithology	Graphic Log: Well Installation	Vapor	Remarks: Water, drilling/completion, summary, sample type
CONCRETE						
BASE FILL						
SANDY SILT, brown, stiff, damp, 10-20% fine to medium grained sands, no odor.	SM					
SANDY SILT, grey, damp, soft, 20-30% medium to coarse grained sand, strong hydrocarbon odor.	SM					Water in hole @ 4 feet (broken pipe??)
		1			310	
As above, very wet sample but not ground water.	SM	2 1				SAMPLE @ 6.0 FEET
SANDY CLAY, grey, very stiff, moist, 30-40% medium grained sand, strong hydrocarbon odor.	SC	14 42 53			1533	SAMPLE @ 11.0 FEET Water @ 11.5 feet TOTAL DEPTH = 11.5 FEET Backfilled with grout.

REGISTERED GEOLOGIST
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STATE OF CALIFORNIA

Environmental Science & Engineering, Inc.

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BORING LOG AND WELL COMPLETION SUMMARY

FNBO-8

WELL COMPLETION

Completion Depth: **N/A**

Size/Type	From	To
Casing:		
Screen:		
Filter: **N/A**		
Seal:		

Well Cap or Box:

Project Name: First Nationwide Bank Project No: 6-93-5146

Location: 3900 Piedmont Avenue
Oakland, CA

Driller: Soils Exploration Services, Inc.
Method: Hollow Stem Auger
Hole Diameter: 6" Total Depth: 11.5 Feet
Ref. Elevations:
Logged By: Chris Valcheff

Dates:
Start: 10-21-93
Finish: 10-21-93

Lithologic Description	USC	Graphic Log: Sample/Blows	Graphic Log: Lithology	Graphic Log: Well Installation	Vapor	Remarks: Water, drilling/completion, summary, sample type
CONCRETE						
GRAVEL FILL						
SANDY SILT, dark brown, stiff, damp, 10-20% fine to medium grained sands, no odor.	SM					
SANDY CLAY, orange/brown, stiff, damp, 10-20% very fine to fine grained sands, no odor.	SC					Water in hole @ 4 feet (broken pipe??)
As above, 20-30% medium to coarse grained sand, no odor.	SC	5				
As above, brown with grey mottling.	SC	10 21			0	SAMPLE @ 6.0 FEET
SANDY CLAY, brown, stiff, damp, 20-30% very fine to fine grained sand, no odor.	SC					
		10				SAMPLE @ 10.0 FEET
SILTY SAND, brown, dense, medium to coarse grained sand, 10-20% silts, no odor.	SM	12 27			0	▼ Water @ 11.0 feet
						TOTAL DEPTH = 11.5 FEET Backfilled with grout.

REGISTERED GEOLOGIST
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STATE OF CALIFORNIA

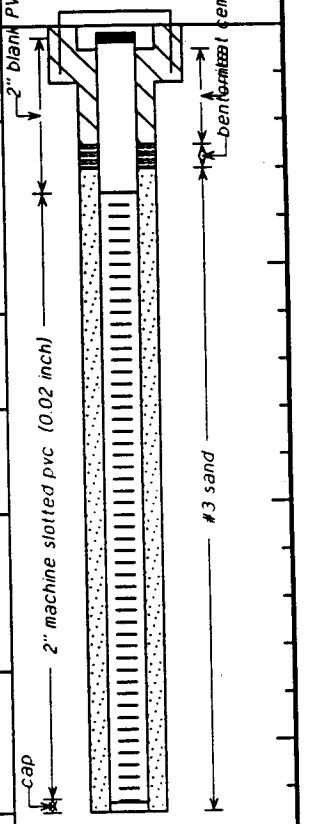
Gettler-Ryan, Inc.

Log of Boring MW-1

PROJECT: *Former Chevron Service Station #9-0517*	LOCATION: *3900 Piedmont Avenue, Oakland, CA*
G-R PROJECT NO. : *346420.02*	SURFACE ELEVATION: *87.89 feet MSL*
DATE STARTED: *07/21/98*	WL (ft. bgs): *10.2* DATE: *07/21/98* TIME: *15:25*
DATE FINISHED: *07/21/98*	WL (ft. bgs): *8.4* DATE: *07/22/98* TIME: *16:00*
DRILLING METHOD: *8 in. Hollow Stem Auger*	TOTAL DEPTH: *16.5 Feet*
DRILLING COMPANY: *Bay Area Exploration, Inc.*	GEOLOGIST: *Barbara Sieminski*

DEPTH feet	PID (ppm)	BLOWS/FT. *	SAMPLE NUMBER	SAMPLE INT.	GRAPHIC LOG	SOIL CLASS	GEOLOGIC DESCRIPTION
						ML	PAVEMENT - asphalt.
						GC	GRAVELLY SILT (ML) - very dark grayish brown (2.5Y 3/2), damp, medium stiff, low plasticity; 50% silt, 30% fine gravel, 20% fine to coarse sand.
5							CLAYEY GRAVEL (GC) - yellowish brown (10YR 5/4), damp, medium dense; 70% fine to coarse gravel, 15% fine to coarse sand, 15% clay.
	0	14	MW1-6			CL-ML	SILTY CLAY (CL-ML) - light yellowish brown (2.5Y 6/4), moist, stiff, low plasticity; 50% clay, 40% silt, 10% fine sand.
						GC	CLAYEY GRAVEL (GC) - dark yellowish brown (10YR 4/4), moist, medium dense; 50% fine to coarse gravel, 30% clay, 20% fine to coarse sand.
10			MW1-10				
	0	10	MW1-11			ML	SANDY SILT WITH CLAYEY SILT LENSES (ML) - dark greenish gray (5GY 4/1), saturated, stiff, low plasticity; 45% silt, 30% fine sand, 25% clay; clayey silt lenses up to 2 inches thick. Color changes to light olive brown (2.5Y 5/6) at 11.5 feet.
						CL	CLAY (CL) - brown (10YR 5/3), damp to moist, stiff, low plasticity; 90% clay, 10% fine sand.
15							
	0	13	MW1-16				
20							(* = converted to equivalent standard penetration blows/ft.)
25							

WELL DIAGRAM



JOB NUMBER: *346420.02*

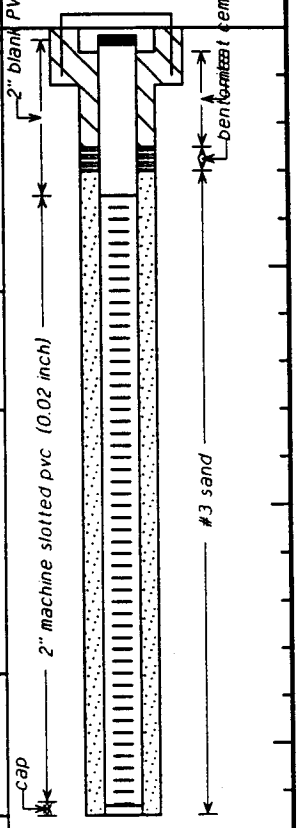
Gettler-Ryan, Inc.

Log of Boring MW-2

PROJECT: *Former Chevron Service Station #9-0517*	LOCATION: *3900 Piedmont Avenue, Oakland, CA*
G-R PROJECT NO. : *346420.02*	SURFACE ELEVATION: *86.09 feet MSL*
DATE STARTED: *07/21/98*	WL (ft. bgs): *12.0* DATE: *07/21/98* TIME: *13:55*
DATE FINISHED: *07/21/98*	WL (ft. bgs): *7.4* DATE: *07/22/98* TIME: *16:00*
DRILLING METHOD: *8 in. Hollow Stem Auger*	TOTAL DEPTH: *16.5 Feet*
DRILLING COMPANY: *Bay Area Exploration, Inc.*	GEOLOGIST: *Barbara Sieminski*

DEPTH feet	PID (ppm)	BLOWS/FT. *	SAMPLE NUMBER	SOIL CLASS	GEOLOGIC DESCRIPTION
				CL	PAVEMENT - asphalt.
					SANDY CLAY (CL) - dark brown (10YR 3/3), moist, stiff, low plasticity; 60% clay, 30% fine to coarse sand, 10% fine gravel.
					Color changes to yellowish brown (10YR 5/3) at 3 feet.
5	0	14	MW2-6	GC	CLAYEY GRAVEL WITH SAND (GC) - olive (5Y 5/4) mottled light olive brown (2.5Y 5/4), moist, dense; 50% fine to coarse gravel, 30% fine to coarse sand, 20% clay.
				ML	SANDY SILT (ML) - light olive brown (2.5Y 5/6) mottled light gray (2.5 Y 7/2), moist to saturated, stiff, low plasticity; 45% silt, 30% fine sand, 25% clay.
10	0	10	MW2-11		
				CL	CLAY (CL) - ligh olive brown (2.5Y 5/6), moist, stiff, low plasticity; 70% clay, 25% silt, 5% fine sand.
15	10	13	MW2-16		
					(* = converted to equivalent standard penetration blows/ft.)
20					
25					

WELL DIAGRAM



JOB NUMBER: *346420.02*

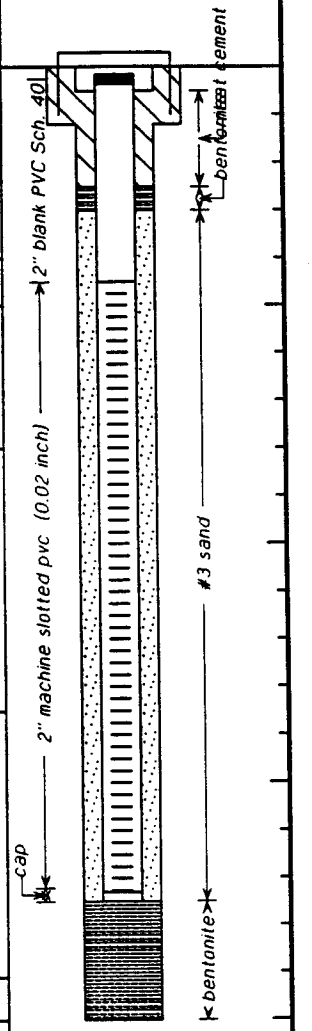
Gettler-Ryan, Inc.

Log of Boring MW-3

PROJECT: *Former Chevron Service Station #9-0517*	LOCATION: *3900 Piedmont Avenue, Oakland, CA*
G-R PROJECT NO. : *346420.02*	SURFACE ELEVATION: *86.28 feet MSL*
DATE STARTED: *07/21/98*	WL (ft. bgs): *11.0* DATE: *07/21/98* TIME: *10:55*
DATE FINISHED: *07/21/98*	WL (ft. bgs): *8.2* DATE: *07/22/98* TIME: *16:00*
DRILLING METHOD: *8 in. Hollow Stem Auger*	TOTAL DEPTH: *20 Feet*
DRILLING COMPANY: *Bay Area Exploration, Inc.*	GEOLOGIST: *Barbara Sieminski*

DEPTH feet	PID (ppm)	BLOWS/FT. *	SAMPLE NUMBER	SAMPLE INT.	GRAPHIC LOG	SOIL CLASS	GEOLOGIC DESCRIPTION
						GC	PAVEMENT – asphalt.
							CLAYEY GRAVEL WITH SAND (GC) – dark yellowish brown (10YR 4/6), moist, medium dense; 55% fine to coarse gravel, 25% fine to coarse sand, 20% clay.
						SC	CLAYEY SAND (SC) – light yellowish brown (10YR 6/4), moist, medium dense; 60% fine sand, 40% clay.
5			MW3-5			GC	
	32	15	MW3-6				CLAYEY GRAVEL WITH SAND (GC) – light yellowish brown (10YR 6/4), moist , medium dense; 55% fine to coarse gravel, 25% fine to coarse sand, 20 % clay.
						ML	SANDY SILT (ML) – greenish gray (5GY 4/1), moist to saturated, stiff, low plasticity; 55% silt, 30% fine sand, 15% clay.
10	15	10	MW3-10 MW3-10.5				Color changes to olive (5Y 5/3) mottled grenish gray (5GY 5/1) at 11 feet.
						CL	CLAY (CL) – brown (10YR 5/3), damp to moist, stiff, low plasticity; 90% clay, 10% fine sand.
15	4.5	14	MW3-16				
	0	15	MW3-19.5			CL/SC	SANDY CLAY WITH CLAYEY SAND LENSES (CL/SC) – brown (10YR 5/3), moist, stiff, low plasticity; 70% clay, 30% fine sand; clayey sand lenses up to 1 inch thick.
20							(* = converted to equivalent standard penetration blows/ft.)
25							

WELL DIAGRAM



JOB NUMBER: *346420.02*

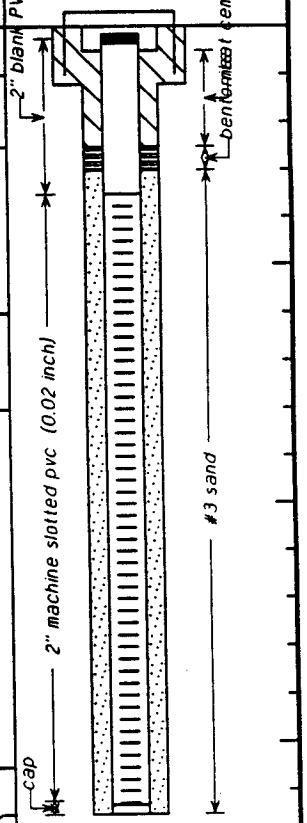
Gettler-Ryan, Inc.

Log of Boring MW-4

PROJECT: *Former Chevron Service Station #9-0517*	LOCATION: *3900 Piedmont Avenue, Oakland, CA*
G-R PROJECT NO. : *346420.02*	SURFACE ELEVATION: *87.22 feet MSL*
DATE STARTED: *07/21/98*	WL (ft. bgs): *12.0* DATE: *07/21/98* TIME: *12:20*
DATE FINISHED: *07/21/98*	WL (ft. bgs): *9.1* DATE: *07/22/98* TIME: *16:00*
DRILLING METHOD: *8 in. Hollow Stem Auger*	TOTAL DEPTH: *16.5 Feet*
DRILLING COMPANY: *Bay Area Exploration, Inc.*	GEOLOGIST: *Barbara Sieminski*

DEPTH feet	PID (ppm)	BLOWS/FT. *	SAMPLE NUMBER	SAMPLE INT.	GRAPHIC LOG	SOIL CLASS	GEOLOGIC DESCRIPTION
							PAVEMENT – asphalt.
						CL	SANDY CLAY (CL) – very dark gray (5Y 3/1), moist, medium stiff, low plasticity; 90% clay, 10% fine sand.
						CL	SANDY CLAY (CL) – dark greenish gray (5GY 4/1), moist, medium stiff, low plasticity; 70% clay, 30% fine to coarse sand.
5							Sand increases to 35–40%, trace fine gravel at 5 feet.
	0	14	MW4-6			GC	CLAYEY GRAVEL WITH SAND (GC) – dark gray (5Y 4/1) mottled brown (7.5YR 4/4), moist, medium dense; 50% fine to coarse gravel, 35% fine to coarse sand, 15% clay.
						ML	SANDY SILT (ML) – olive (5Y 5/3), moist to saturated, stiff, low plasticity; 55% silt, 30% fine sand, 15% clay.
10	126	11	MW4-11				
15							Sand increases to 40% at 15 feet.
	2.6	12	MW4-16			CL	CLAY (CL) – brown (10YR 5/3), damp, stiff, low plasticity; 90% clay, 10% fine sand.
20							(* = converted to equivalent standard penetration blows/ft.)
25							

WELL DIAGRAM



JOB NUMBER: *346420.02*

Conestoga-Rovers & Associates
2000 Opportunity Drive, Suite 110
Roseville, CA 95678
Telephone: (916) 677-3407
Fax: (916) 677-3687

BORING/WELL LOG

CLIENT NAME	Chevron Environmental Management Co.	**BORING/WELL NAME**	SB-2
JOB/SITE NAME	Former Chevron 9-0517	**DRILLING STARTED**	28-Jul-08
LOCATION	3900 Piedmont Avenue, Oakland, CA	**DRILLING COMPLETED**	28-Jul-08
PROJECT NUMBER	611995	**WELL DEVELOPMENT DATE (YIELD)**	NA
DRILLER	Gregg Drilling & Testing, Inc.	**GROUND SURFACE ELEVATION**	Not Surveyed
DRILLING METHOD	Hydraulic push	**TOP OF CASING ELEVATION**	N/A ft above msl
BORING DIAMETER	3 inches first 8 feet; 2 inches for remainder	**SCREENED INTERVAL**	NA
LOGGED BY	C. Benedict	**DEPTH TO WATER (First Encountered)**	18.0 fbg (28-Jul-08) ▽
REVIEWED BY	J. Kiernan, PE# C68498	**DEPTH TO WATER (Static)**	NA ▼
REMARKS	Hand-augered to 8 fbg		

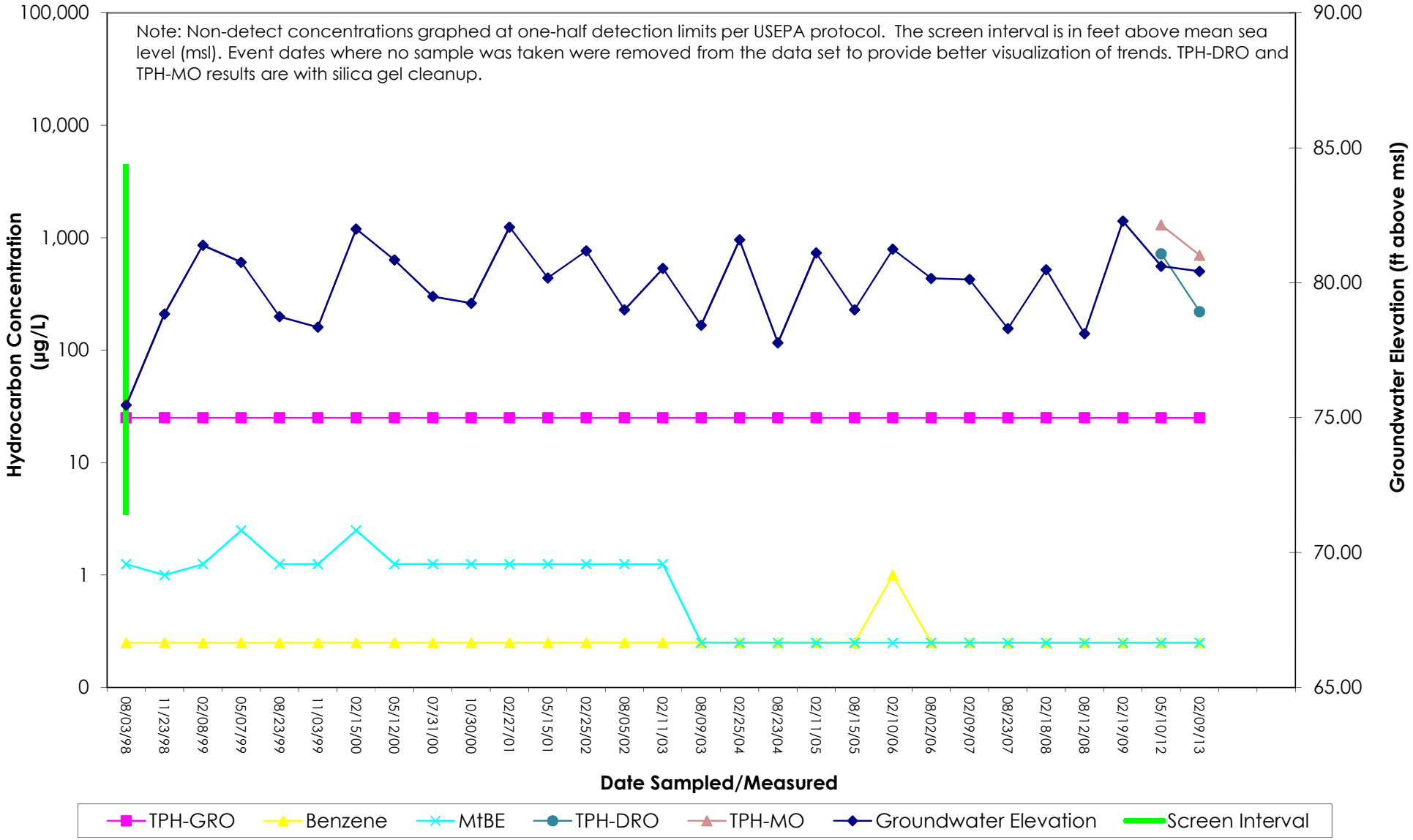
PID (ppm)	BLOW COUNTS	SAMPLE ID	EXTENT	DEPTH (fbg)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH (fbg)	WELL DIAGRAM
							Asphalt	0.5	Concrete
							Fill	1.0	
					ML		Sandy SILT:Brown; moist; 55% silt, 40% fine to medium grained sand, 5% clay; low plasticity.		
0		SB-2- 5		5					
					ML		Sandy SILT:Dark brown; moist; 55% silt, 35% fine to medium grained sand, 5% clay, 5% gravel; low plasticity.	7.0	
							Silty SAND with gravel:Light brown; moist; 60% fine to medium grained sand; 20% silt, 20% gravel; low plasticity.	9.0	
0		SB-2- 10		10					
					SM		Silty SAND:Light brown; moist; 70% fine, poorly graded sand; 30% silt; low plasticity.		Portland Type I/II
0		SB-2- 15		15					
					ML		Sandy SILT:Light brown; moist; 60% silt, 40% sand; medium plasticity.	16.0	
					SM		Silty SAND:Light brown; moist; 85% poorly graded sand, 15% silt; low plasiticity. ▽	17.0	
					SM		Silty SAND:Light brown; wet; 85% poorly graded sand, 15% silt; low plasiticity.	18.0	
					ML		SILT: Light brown; moist; 85% silt, 10% fine grained sand, 5% clay; low plasticity.	19.0	
0		SB-2- 20		20			Silty SAND:Light brown; wet; 85% sand, 15% silt; low plasticity.	20.0	
					SM				
					SW		SAND: Light brown; moist; 90% sand, 10% silt; low plasticity; dense. Refusal at 24 fbg.	23.8 24.0	Bottom of Boring @ 24 fbg

WELL LOG (PID) \\SAC-S1\SHARED\ROCKLI~1.CHE\611911~1\611995~2\611995~4\611995~2\9-0517 BORING LOGS.GPJ DEFAULT.GDT 11/20/08

APPENDIX D
Hydrographs

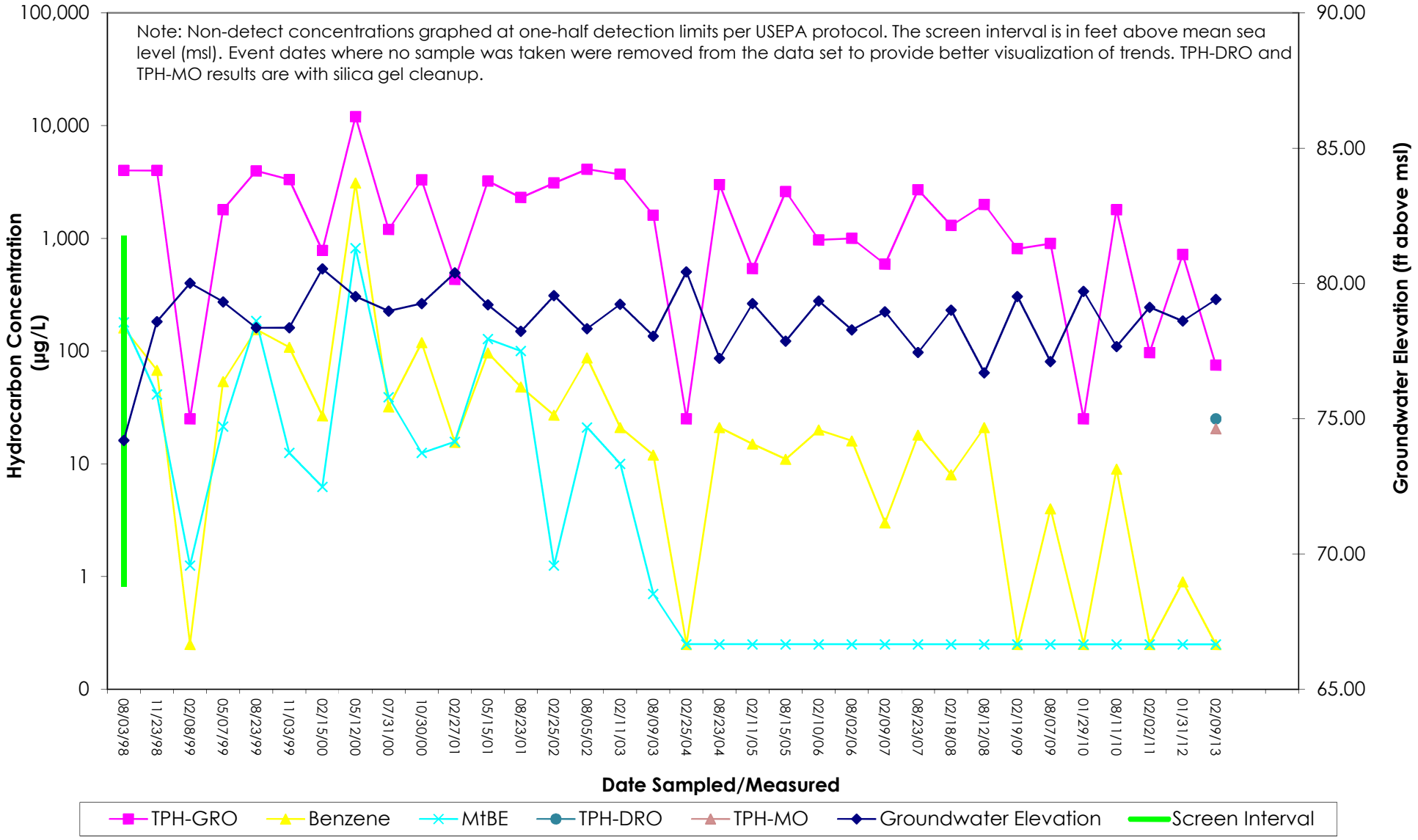
MW-1 TPH-GRO, TPH-DRO, TPH-MO, Benzene, & MtBE Concentrations and Groundwater Elevations vs. Time

Former Chevron-branded Service Station 90517
3900 Piedmont Avenue
Oakland, California



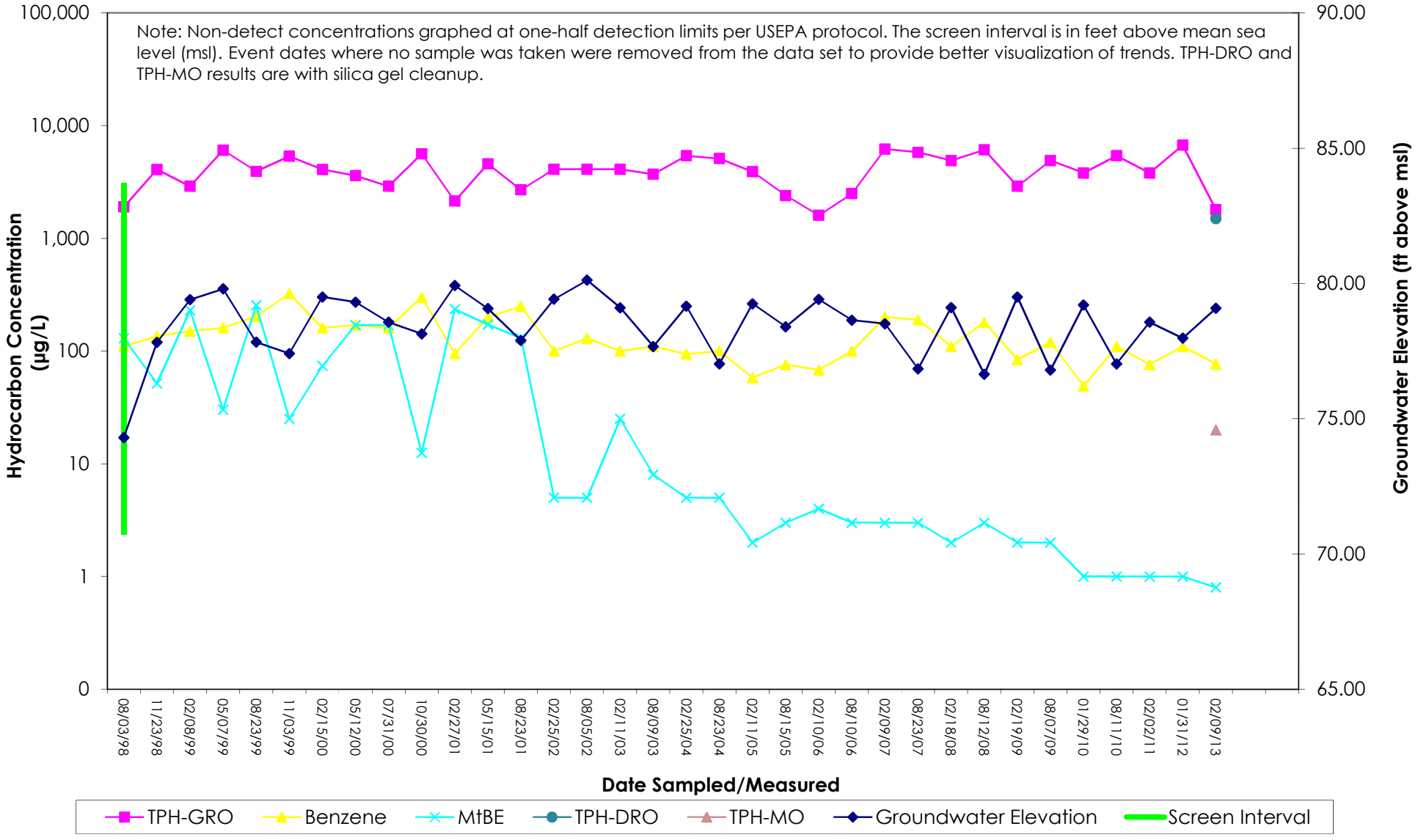
MW-3 TPH-GRO, TPH-DRO, TPH-MO, Benzene, & MtBE Concentrations and Groundwater Elevations vs. Time

Former Chevron-branded Service Station 90517
3900 Piedmont Avenue
Oakland, California



MW-4 TPH-GRO, TPH-DRO, TPH-MO, Benzene, & MtBE Concentrations and Groundwater Elevations vs. Time

Former Chevron-branded Service Station 90517
3900 Piedmont Avenue
Oakland, California



APPENDIX E
SWRCB LTCP Checklist

Site Name: Former Chevron-branded Service Station 90517
Site Address: 3900 Piedmont Avenue, Oakland, California

Site meets the criteria of the Low-Threat Underground Storage Tank (UST) Case Closure Policy as described below.[1]

General Criteria General criteria that must be satisfied by all candidate sites:	
Is the unauthorized release located within the service area of a public water system?	☒ Yes ☐ No
Does the unauthorized release consist only of petroleum?	☒ Yes ☐ No
Has the unauthorized ("primary") release from the UST system been stopped?	☒ Yes ☐ No
Has free product been removed to the maximum extent practicable?	☒ Yes ☐ No ☐ NA
Has a conceptual site model that assesses the nature, extent, and mobility of the release been developed?	☐ Yes ☒ No
Has secondary source been removed to the extent practicable?	☐ Yes ☒ No
Has soil or groundwater been tested for MTBE and results reported in accordance with Health and Safety Code Section 25296.15?	☒ Yes ☐ No
Does nuisance as defined by Water Code section 13050 exist at the site?	☐ Yes ☒ No
Are there unique site attributes or site-specific conditions that demonstrably increase the risk associated with residual petroleum constituents?	☐ Yes ☒ No
Media-Specific Criteria Candidate sites must satisfy all three of these media-specific criteria: **1. Groundwater:** To satisfy the media-specific criteria for groundwater, the contaminant plume that exceeds water quality objectives must be stable or decreasing in areal extent, and meet all of the additional characteristics of one of the five classes of sites:	
Is the contaminant plume that exceeds water quality objectives stable or decreasing in areal extent?	☒ Yes ☐ No ☐ NA
Does the contaminant plume that exceeds water quality objectives meet all of the additional characteristics of one of the five classes of sites?	☐ Yes ☒ No ☐ NA
If YES, check applicable class: ☐ **1** ☐ **2** ☐ **3** ☐ **4** ☐ **5**	

[1] Refer to the Low-Threat Underground Storage Tank Case Closure Policy for closure criteria for low-threat petroleum UST sites.

For sites with releases that have not affected groundwater, do mobile constituents (leachate, vapors, or light non-aqueous phase liquids) contain sufficient mobile constituents to cause groundwater to exceed the groundwater criteria?	☐ Yes ☐ No ☒ NA
2. Petroleum Vapor Intrusion to Indoor Air: The site is considered low-threat for vapor intrusion to indoor air if site-specific conditions satisfy all of the characteristics of one of the three classes of sites (a through c) or if the exception for active commercial fueling facilities applies. **Is the site an active commercial petroleum fueling facility?** Exception: Satisfaction of the media-specific criteria for petroleum vapor intrusion to indoor air is not required at active commercial petroleum fueling facilities, except in cases where release characteristics can be reasonably believed to pose an unacceptable health risk. **a. Do site-specific conditions at the release site satisfy all of the applicable characteristics and criteria of scenarios 1 through 3 or all of the applicable characteristics and criteria of scenario 4?** If YES, check applicable scenarios: ☐ **1** ☐ **2** ☐ **3** ☐ **4** **b. Has a site-specific risk assessment for the vapor intrusion pathway been conducted and demonstrates that human health is protected to the satisfaction of the regulatory agency?** **c. As a result of controlling exposure through the use of mitigation measures or through the use of institutional or engineering controls, has the regulatory agency determined that petroleum vapors migrating from soil or groundwater will have no significant risk of adversely affecting human health?**	 ☐ Yes ☒ No ☐Yes ☒ No ☐ NA ☐ Yes ☒ No ☐ NA ☐ Yes ☒ No ☐ NA
3. Direct Contact and Outdoor Air Exposure: The site is considered low-threat for direct contact and outdoor air exposure if site-specific conditions satisfy one of the three classes of sites (a through c). **a. Are maximum concentrations of petroleum constituents in soil less than or equal to those listed in Table 1 for the specified depth below ground surface (bgs)?** **b. Are maximum concentrations of petroleum constituents in soil less than levels that a site specific risk assessment demonstrates will have no significant risk of adversely affecting human health?** **c. As a result of controlling exposure through the use of mitigation measures or through the use of institutional or engineering controls, has the regulatory agency determined that the concentrations of petroleum constituents in soil will have no significant risk of adversely affecting human health?**	 ☐ Yes ☒ No ☐ NA ☐ Yes ☒ No ☐ NA ☐ Yes ☒ No ☐ NA

APPENDIX F
Soil Vapor Sampling Technical Toolkit
(Chevron ETC, Version 1.8)

[Note: Due to copyright protection, Stantec will not attach the Chevron ETC Toolkit, Version 1.8, to this work plan. With permission from Chevron, the toolkit will be sent privately to ACEH for reference.]

APPENDIX G
Soil Vapor Sampling Collection Data Log

Stantec

Soil Vapor Sample Collection Data Log

Stantec

Project: Chevron 90517

Address: 3900 Piedmont Ave., Oakland, CA

Date:

Field Personnel:

Weather:

Surface Soil Conditions:

Outdoor Environment Conditions:

		VP-1	VP-2	VP-3	VP-4	VP-5	VP-6	DUPLICATE
Preliminary Data	Sample ID:							
	Canister Serial No.:							
	Flow Controller Serial No.:							
	Sample Depth (ft):							
	Probe Tubing Length (ft):							
	Manifold Tubing Length (ft):							
	Calculated Purge Volume (mL):							
	Calculated Purge Duration (min):							
Vacuum Leak Testing	Start Time:							
	Initial Vacuum (in Hg):							
	End Time:							
	Final Vacuum (in Hg):							
	Duration of Leak Test (min):							
	Pass/Fail:							
Purging	Start Time:							
	End Time:							
	Purge Duration (min):							
	Start Vacuum:							
	End Vacuum:							
	Total Vacuum Drop:							
Sample Collection and Tracer Gas Monitoring	Initial Canister Vacuum (in Hg):							
	Start Time:							
	Helium @ Start (%):							
	Helium @ 5 min (%):							
	Helium @ 10 min (%):							
	Helium @ 15 min (%):							
	Helium @ 20 min (%):							
	Helium @ 25 min (%):							
	Helium @ 30 min (%):							
	Helium @ 35 min (%):							
	Helium @ 40 min (%):							
	Helium @ 45 min (%):							
	Helium @ 50 min (%):							
	Helium @ 55 min (%):							
	Helium @ 60 min (%):							
	End Time:							
	Final Canister Vacuum (in Hg):							
Comments								

Soil Vapor Sample Collection Data Log

Project: Chevron 90517

Address: 3900 Piedmont Ave., Oakland, CA

Date:

Field Personnel:

Weather:

Surface Soil Conditions:

Outdoor Environment Conditions:

		SS-1	SS-2	SS-3	DUPLICATE
Preliminary Data	Sample ID:				
	Canister Serial No.:				
	Flow Controller Serial No.:				
	Sample Depth (ft):				
	Probe Tubing Length (ft):				
	Manifold Tubing Length (ft):				
	Calculated Purge Volume (mL):				
	Calculated Purge Duration (min):				
Vacuum Leak Testing	Start Time:				
	Initial Vacuum (in Hg):				
	End Time:				
	Final Vacuum (in Hg):				
	Duration of Leak Test (min):				
	Pass/Fail:				
Purging	Start Time:				
	End Time:				
	Purge Duration (min):				
	Start Vacuum:				
	End Vacuum:				
	Total Vacuum Drop:				
Sample Collection and Tracer Gas Monitoring	Initial Canister Vacuum (in Hg):				
	Start Time:				
	Helium @ Start (%):				
	Helium @ 5 min (%):				
	Helium @ 10 min (%):				
	Helium @ 15 min (%):				
	Helium @ 20 min (%):				
	Helium @ 25 min (%):				
	Helium @ 30 min (%):				
	Helium @ 35 min (%):				
	Helium @ 40 min (%):				
	Helium @ 45 min (%):				
	Helium @ 50 min (%):				
	Helium @ 55 min (%):				
	Helium @ 60 min (%):				
	End Time:				
	Final Canister Vacuum (in Hg):				

Comments