Attachment I: Corrective Action Plan

CORRECTIVE ACTION PLAN

County File # RO 0003347

820 W MacArthur Blvd.

Oakland, CA

Prepared For:

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1.0 INTRODUCTION

This Corrective Action Plan (CAP) has been prepared by P&D Environmental, Inc. of Oakland, California (P&D) on behalf of 820 Macarthur, LLC (Owner) for activities associated with the redevelopment of the property identified for this project as Best Bay Apartments Development located at 820 W MacArthur Boulevard in Oakland, California (Site) (see ***Figures 1, 2, and 3***). The Site is bounded on the south by W MacArthur Boulevard and on the east by West Street. Residential structures are located to the north and west of the property. The Site is currently covered with asphalt and concrete, with two buildings and a storage structure associated with the former Big O tire store that operated at the Site until the end of 2018, when the Site was purchased by Owner. All Site contamination identified and addressed via remediation and mitigation measures in this plan are the result of historical site operations and predate the ownership and occupation of the Site by Owner.

The redevelopment project ("Project") includes the removal of the existing structures and surface cover materials, excavation of areas of soil impacted with petroleum and tetrachloroethene (PCE), onsite consolidation of shallow fill and lead-impacted soil, and the construction of a slab-on-grade multi-story residential building underlain with a vapor barrier (see ***Figures 4 and 5 and Appendix A***). No underground parking or elevators are proposed as part of Site development. All remediation work will be performed in accordance with a Voluntary Remedial Action Agreement # RO0003347-2019-03-13 between the Owner and Alameda County Dept. of Environmental Health. The proposed remediation and mitigation measures were developed based on the results of the subsurface investigation activities included as ***Appendix B*** and conditions described in the Site Conceptual Model (SCM) included as ***Appendix C***.

The proposed remediation and mitigation measures will provide short- and long term protection of on-site workers, future occupants and the surrounding community. Remediation measures proposed as part of this CAP include the following:

1. Excavation and disposal of historical contaminated soil.

Mitigation measures proposed as part of this CAP include the following:

Engineering Controls

2. Vapor Intrusion Mitigation System (VIMS) consisting of a vapor barrier, a vapor collection system with vents, and trench plugs.

3. Onsite consolidation and capping of the entire Site.

Administrative Controls

4. Site Management Plan.

Institutional Controls

5. Land use covenants / Deed restriction.

The CAP also proposes the destruction of existing groundwater monitoring and soil gas wells, installation of replacement wells, and monitoring and sampling of the replacement wells. Alternatively, existing wells will be modified where possible to incorporate the existing wells into the proposed site improvements. This will allow continued site monitoring to evaluate the effectiveness of the proposed corrective actions and evaluate, and if applicable mitigate, potential exposure risks to off-Site receptors.

As agreed to by ACDEH, off-Site contamination will be addressed separately is not addressed in this CAP.

1.1 Lead Regulatory Oversight Agency for Environmental Site Cleanup

Alameda County Department of Environmental Health's (ACDEH) Local Oversight Program for Hazardous Materials Releases (LOP) is the lead regulatory oversight agency for the environmental investigation and cleanup actions at the Site under Voluntary Site Cleanup Program Case (SCP) No. RO0003347.

Following submittal of acceptable documentation of the implementation of corrective actions for development of the Site, ACDEH will document that the Site is suitable for the proposed residential use.

2.0 SITE CONCEPTUAL MODEL SUMMARY

This section provides a brief summary of Site conditions. A detailed description of the physical setting, contaminant sources, distribution, transport mechanisms, exposure pathways and receptors are provided in the SCM in ***Appendix C***.

2.1 Site History

The Site was historically used for residential purposes (1902 to 1963) (see ***Figure 6***), as a gasoline station (1967 to 1975), and as a Big O tire store (1975 to 2019). Historical City building department plans identified three fuel underground storage tanks (USTs) and one waste oil UST, and associated fuel dispensers and underground piping from operation of the Site as a gasoline station (see ***Figure 7***). Figures in this CAP showing the USTs and UST-related features have been adjusted to move the USTs and UST features slightly westward so that the historical locations of the dispenser islands better align with the existing aerial photograph dispenser island concrete pads. Exploratory excavation at the locations of the former USTs and piping did not identify the presence of USTs or piping at the Site (see ***Figure 7***). The date of removal of the USTs and piping is unknown (a review of City Fire Department and County files did not reveal any UST removal permits or associated documentation), however it appears that the USTs and associated piping were removed from the Site sometime after the Site was no longer used as a gasoline station and before construction of the Big O tire store in 1975, long before the Owner purchased the Site.

The building located closest to West Street consists of the original gasoline station building and included two repair bays that each contained a hydraulic jack with one oil water separator located adjacent to the westernmost hydraulic jack. In addition to the two hydraulic jacks located in the original gasoline station building, four additional hydraulic jacks were located in the Big O tire store building that was constructed in 1975 (see ***Figure 7***). Under ACDEH oversight, the Owner removed all of the hydraulic jacks from the ground and collected soil samples from beneath each of the hydraulic jacks on July 25, 2019.

The bathrooms for the former gasoline station and tire store were located on the east side of the building located closest to West Street in the original gasoline station building. The sewer lateral is located approximately 15 to 20 feet south of the northern property boundary, and extends eastward from the oil water separator to the sewer main that is located beneath the west half of West Street, and is oriented approximately parallel to W MacArthur Boulevard (see ***Figure 7***).

2.2 Site Investigations

The results of soil, groundwater, and soil gas samples collected to date are summarized in ***Tables 1A through 6E*** (a total of 28 tables) attached with this CAP. The locations of historical residential structures at the Site, the locations of the historical UST features and hydraulic jacks at the Site, and the locations of soil, groundwater, and soil gas sample collection locations associated with investigation of the Site are shown in ***Figures 2 through 8*** of this CAP.

With oversight by the ACDEH, the Owner performed multiple subsurface investigations at and near the Site, documented as follows:

- August 31, 2018 Phase II Subsurface Investigation Report prepared by Partner Engineering and Science, Inc. (Partner).
  - Ground Penetrating Radar (GPR) survey performed on August 23, 2018 to look for evidence of historical Underground Storage Tanks (USTs) and clear boring locations for the presence of subsurface utilities. No anomalies were identified that were consistent with USTs or tank pits.
  - Drilled and collected soil and groundwater samples from 4 onsite boreholes, designated as B1 through B4 on August 24, 2018.
- October 31, 2018 Additional Subsurface Investigation Report prepared by Partner.
  - Drilled 8 onsite boreholes, designated as B5 through B12 for the collection of soil, groundwater, and soil gas samples on October 24, 2018. Groundwater samples were collected from boreholes B5, B7, and B9 through B12 and soil gas samples were collected from boreholes B5, B7, B8, and B10.

- February 28, 2019 Limited Subsurface Investigation Report prepared by P&D (document 0794.R1).
  - Drilled and collected groundwater grab samples from 4 boreholes, designated as B13, B14, B15, and B17 and soil samples from 2 additional boreholes, designated as B19 and B20 on December 11 and 12, 2018.
  - Installed 6 permanent soil gas wells onsite, designated as SG1 through SG6 on December 12 and 13, 2018 and collected soil gas samples from SG1 through SG3, SG5, and SG6 on January 3, 2019 (SG4 not sampled due to water in the soil gas well tubing).
- May 24, 2019 Limited Subsurface Investigation Report prepared by P&D (document 0794.R2).
  - GPR and magnetometer survey performed on April 11, 2019 to further evaluate the former UST, piping, and dispenser locations. The results of the GPR survey suggested the possible presence of dispenser piping at locations identified on City of Oakland Building Department drawings and also suggested the possible presence of the two smaller fuel USTs. The larger former fuel UST and the former waste oil UST were not identified.
  - Drilled and collected groundwater grab samples from 4 boreholes, designated as B21 through B24 and also collected soil samples from borehole B24 on April 16 and 17, 2019.
  - Installed 7 permanent soil gas wells, designated as SG7 through SG13 on April 17 and 18, 2019 and collected soil gas samples from SG7 through SG13 on May 6, 2019.
- October 8, 2019 Limited Subsurface Investigation Wok Plan and Site Investigation Data prepared by P&D (document 0794.W4).
  - Performed exploratory excavations to evaluate the presence of former USTs at the site on July 24 and 25, 2019. No USTs or UST piping were encountered in any of the excavated areas.
  - Groundwater monitoring wells MW1 through MW3 were installed on July 23 and 24, 2019, developed on July 31 and August 2, 2019, and monitored and sampled on August 12, 2019.
  - Shallow soil and fill samples were collected at locations S1 through S6 to evaluate for lead and asbestos on July 25, 2019.
  - Six hydraulic hoists were removed and soil samples were collected from beneath the hoists on July 25, 2019.
  - Exploratory excavation was performed adjacent to the oil water separator and a soil sample was collected at a depth equivalent to the bottom of the oil water separator on July 25, 2019.
  - Soil gas well SG14 was installed downgradient of the Site on July 22, 2019 and soil gas wells SG15 through SG21 installed upgradient of the Site on July 22 through 24, 2019. Soil gas samples were collected from soil gas wells SG4 and SG14 through SG21 on August 7 and 8, 2019.
- April 3, 2020 Limited Subsurface Investigation Report prepared by P&D (included with this CAP as ***Appendix B***).

- Shallow soil samples were collected on November 11, 2019 at locations S7 through S22 (see ***Figure 8***) to further delineate the extent of elevated lead concentrations in shallow fill and soil (see ***Table 2A***).
- Groundwater monitoring wells MW1 through MW3 (see ***Figure 6***) were monitored and sampled on November 12, 2019 and on February 25, 2020 (see ***Tables 5A and 5B***).
- Soil gas wells SG22 and SG25 through SG31 were installed on November 18 and 19, 2019 (see ***Figure 3***) and soil gas samples were collected from soil gas wells SG22, SG25, and SG28 through SG31 on January 7 and 8, 2020 (see ***Tables 6A through 6E).*** Soil gas samples were not collected from wells SG26 and SG27 due to the presence of water in the soil gas well tubing. The soil gas results to date for TPH-G, benzene, methylene chloride, and PCE are shown in ***Figures 9, 10, 11***, ***and 12***, respectively.

2.3 Geology and Hydrogeology

Review of ***Figure 1*** shows that the ground surface in the vicinity of the Site slopes to the southwest. Review of ***Figure 2*** shows groundwater flow directions obtained from water level measurements in groundwater monitoring wells during multiple events for two nearby sites. The southwesterly groundwater flow direction identified at the former Chevron gasoline station located at 890 W MacArthur Blvd is consistent with the regional ground surface slope, and is interpreted to be representative of the regional groundwater flow direction. Based on the variable nature of subsurface materials at and near the Site, local variations in groundwater flow direction may be encountered at the local scale and may be controlled locally by local geology, consistent with the more westerly groundwater flow direction observed at the former ARCO gasoline station located at 731 W MacArthur Blvd. San Francisco Bay is located approximately 7,700 feet to the west of the Site (see ***Figure 1***).

Semi-confined groundwater has been encountered at depths of approximately 15 to 23 feet bgs while drilling, and static groundwater levels are encountered at depths of approximately 8.3 to 12.1 feet bgs in groundwater monitoring wells at the Site. The depth to groundwater in groundwater monitoring wells at the Site is summarized in ***Table 7*** and is consistent with the depth to groundwater in groundwater monitoring wells at nearby sites.

The ground surface at and near the Site is sloped to the southwest, and fill material was used to level the ground surface beneath the floor slab for construction of the former Big O tire store on the west side of the Site, with fill beneath the south end of former Big O tire store building measuring approximately 2 to 3 feet in thickness and thinning to less than one foot in thickness beneath the north end of the former Big O tire store building.

The locations of geologic cross sections A-A' through G-G' at the Site are shown in ***Figure 13***, and geologic cross sections A-A' through G-G' are shown in ***Figures 14 through 20***, respectively. Fill material was not identified in boreholes B1 through B12 drilled by others. Review of boring logs and exploratory pits drilled or excavated by P&D, fill material is identified at the Site as follows:

- As a base rock layer beneath asphalt or concrete ground surface cover generally measuring approximately one half foot in thickness beneath most of the Site (see ***Figure 8***).
- In former UST pits and UST piping trenches.
- Beneath the former Big O tire store measuring in thickness from approximately 0.5 feet thick on the north side of the Site to approximately 3.0 feet on the south side of the Site.
- Beneath the ground surface cover on the east and west side of the southern half of the former Big O tire store where the ground surface was sloped to provide access to the service bays.

The subsurface materials in the northern portion of the Site (see ***cross section A-A' on Figure 14***) consist predominantly of clayey and silty soil mixtures to the total depths explored of approximately 25 feet below the ground surface (bgs), with discontinuous silt layers encountered between the depths of approximately 5 and 15 feet bgs. The subsurface materials in the southern portion of the Site (see ***cross section C-C' on Figure 16***) consist predominantly of silt to a depth of approximately 15 feet bgs which is underlain by clay. In the central portion of the Site (see ***cross section B-B' on Figure 15***) , a silt layer is encountered between clay layers at depths of between approximately 5 and 12 feet bgs, with the silt layer extending to the ground surface at the east end of the Site. Thin lenses of sand, silty sand, clayey sand, and silt measuring approximately 0.5 to 2.0 feet in thickness are encountered throughout the Site. Soil vapor is interpreted to move in the continuous silt and sand layers above the water table at and near the Site.

Coarse-grained materials consisting predominantly of silty sand and clayey sand between the depths of 10 and 25 feet bgs were encountered in the northwest corner of the Site and on the central western side of the Site (see ***cross section A-A' on Figure 14, cross section B-B' on Figure 15, and cross section G-G' on Figure 20***), and are interpreted to define the eastern edge of a southwesterly-trending historical buried stream channel segment. The extent of the suspected historical buried stream channel segment is unknown. Exploratory boreholes to further evaluate the presence or extent of the suspected historical buried stream channel are proposed adjacent to each of proposed off-Site soil gas wells SG32, SG33 and SG34 (see ***Figure 11***).

2.4 Chemicals of Potential Concern and Contaminant Distribution

Chemicals of Potential Concern (COPCs) at the Site include the following:

- Lead associated with historical use of lead based paint for residential structures and associated with lead deposited aerially from nearby roads, and metals associated with the former waste oil UST and the former oil water separator.
- Asbestos associated with historical residential and commercial structures at the Site.
- Petroleum hydrocarbons, including gasoline (TPH-G), Methyl tert-butyl ether (MTBE), benzene, toluene, ethylbenzene and xylenes (MBTEX), naphthalene, and the leaded gasoline anti-knock additive 1,2- dichloroethene (1,2-DCE) associated with the former fuel system USTs, piping, and dispensers. In addition, diesel (TPH-D) associated with the former waste oil UST and the former oil water separator, and hydraulic oil associated with the former hydraulic jacks. MBTEX and naphthalene are identified as Volatile Organic Compounds (VOCs).
- Polychlorinated biphenyls (PCBs) associated with the oil in the former hydraulic jacks,the former waste oil UST, and the former oil water separator.
- Semivolatile Organic Compounds (SVOCs), which include Polyaromatic Hydrocarbons (PAHs) associated with the oil in the former hydraulic jacks, the former waste oil UST, and the former oil water separator.
- Non-petroleum VOCs, including PCE, and the associated decomposition products trichloroethene (TCE), cis-1,2-Dichloroethene (cis-1,2-DCE), trans-1,2-dichloroethene (trans-1,2-DCE), and vinyl chloride associated with the former waste oil UST and the former oil water separator.

The results of soil, groundwater, and soil gas samples collected to date are summarized in ***Tables 1A through 6E*** (a total of 28 tables) attached with this CAP. Sample results with detection limits exceeding their associated Tier 1 screening levels are highlighted in the summary tables. Dry weight sample results were used for risk evaluation of soil samples where moisture analysis was performed.

The locations of soil, groundwater, and soil gas samples collected during investigation of the Site are shown in ***Figures 2 through 8*** of this CAP. The presence and distribution of each of the identified COPCs is discussed below:

2.4.1 Lead and Other Metals

Fill and shallow soil samples (see ***Figure 8*** and ***Tables 2A and 2B***) were analyzed for total lead. Based on the sample results, lead was identified in fill and shallow soil at the Site at concentrations exceeding the residential human health risk-based screening level of 80 milligrams per kilogram (mg/kg). Additional fill and soil samples will be collected prior to soil excavation at the Site to delineate the vertical extent of lead in onsite fill and soil at locations where the vertical extent of lead has not been fully defined at locations S3, S5, S7, S8, S9, S11, S12, S15, S17, S19, S20 and S22 (see ***Figure 8*** and ***Tables 2A and 2B***).

Based on the absence of evidence of staining, discoloration, odor, or elevated petroleum concentrations in the soil sample OWS1-3.0 that was collected at a depth of 3.0 feet bgs adjacent to the bottom of the former oil water separator (see ***Figure 7*** and ***Table 1E***), analysis for metals is not warranted.

Similarly, based on the absence of evidence of staining, discoloration, odor, or elevated petroleum concentrations in the soil samples collected from borehole B24 adjacent to the waste former oil UST pit at depths of 5.0, 9.5, and 14.5 feet bgs (see ***Figure 6*** and ***Table 1E***), analysis for metals is not warranted.

Based on the sample results, lead is identified as a Chemical of Concern in fill and shallow soil at the Site.

Prior to demolition of existing structures at the Site, all required testing of building materials and any necessary abatement of lead-containing materials will be performed.

2.4.2 Asbestos

Shallow soil samples (see ***Figure 8*** and ***Table 2A***) were analyzed for asbestos, however no asbestos was detected in any of the samples. Based on the sample results, asbestos was identified as not being a Chemical of Concern in subsurface materials at the Site.

Prior to demolition of existing structures at the Site, all required testing of building materials and any necessary abatement of asbestos-containing materials will be performed.

2.4.3 Petroleum Hydrocarbons (Including Petroleum VOCs)

Petroleum and associated petroleum VOCs were evaluated in soil, groundwater, and soil gas as follows.

2.4.3.1 Petroleum Hydrocarbons (Including Petroleum VOCs) in Soil

Petroleum and associated petroleum VOCs were evaluated in soil as follows:

- Wet weight soil sample results for boreholes B1 through B12 (see ***Figure 6*** and ***Tables 1A and 1B***). No dry weight results were available for soil samples from boreholes B1 through B12.
- Dry weight soil sample results for boreholes B13 through B24 (boreholes B16 and B18 were not drilled) (see ***Figure 6*** and ***Tables 1E and 1F***).
- Dry weight soil sample results for soil samples collected from beneath the former hydraulic jacks (see ***Figure 7*** and ***Tables 3E and 3F***).
- Borehole groundwater grab sample results (see ***Figure 6*** and ***Tables 4A and 4B***).
- Groundwater monitoring well groundwater sample results (see ***Figure 6*** and ***Table 5A***).
- Soil gas well soil gas sample results (see ***Figure 3*** and ***Tables 6A and 6B***).

Review of the borehole soil sample petroleum and petroleum VOC results in ***Tables 1A, 1B, 1E and 1F*** shows that the only soil sample results that exceed July 2019 soil Tier 1 screening level concentrations are as follows (the sample collection depth follows the sample location designation):

- B3-15 naphthalene at 0.15 mg/kg (wet weight).
- B7-20 benzene at 0.058 mg/kg and ethylbenzene at 0.73 mg/kg (wet weight).
- B12-10 TPH-G at 190 mg/kg (wet weight).
- B20-12.5 TPH-G at 270 mg/kg (dry weight).
- B24-5.0 TPH-G at 120 mg/kg (dry weight).
- MW1-14.0 TPH-G at 120 mg/kg (dry weight).

All of the borehole soil samples with petroleum and petroleum VOC concentrations exceeding Tier 1 soil screening level concentrations were collected at depths of 10 feet or greater with the exception of sample B24-5.0, where TPH-G was detected at a concentration of 120 mg/kg (dry weight). The depth to groundwater at the Site typically ranges from approximately 8 to 10 feet bgs, indicating that all of the identified soil samples are from depths below the water table with the exception of sample B24-5.0.

The Tier 1 soil screening levels of 0.042 mg/kg for naphthalene, of 0.025 mg/kg for benzene, and of 0.43 mg/kg for ethylbenzene are based on leaching to groundwater. The shallow soil direct exposure screening level value for residential land use for naphthalene, benzene, and ethylbenzene are 3.8, 0.33, and 5.9 mg/kg, respectively. The soil direct exposure screening level value for construction workers use for naphthalene, benzene, and ethylbenzene are 400, 33 and 540 mg/kg, respectively. None of the detected soil naphthalene, benzene, or ethylbenzene concentrations exceed residential or construction worker direct exposure soil screening levels.

Additionally, the TPH-G Tier 1 soil screening level of 100 mg/kg is based on odor/nuisance conditions. The TPH-G shallow soil direct exposure screening level value for residential land use is 430 mg/kg and for construction workers is 1,800 mg/kg. None of the detected TPH-G concentrations exceed residential or construction worker direct exposure soil screening levels.

Review of the hydraulic jack dry weight soil sample petroleum and petroleum VOC results in ***Tables 3E and 3F*** shows that the only soil sample results that exceed July 2019 soil Tier 1 screening level concentrations are as follows:

- H3-9.0 TPH-G at 690 mg/kg and TPH-D at 2,500 mg/kg (dry weight).
- H6-9.0 TPH-D at 850 mg/kg (dry weight).

Review of the laboratory reports and summary table footnotes identifies the TPH-G results as having no recognizable chromatogram pattern, and the TPH-D results as consisting of oil-range compounds with diesel-range compounds with no recognizable pattern and kerosene- and jet fuel-range compounds. The TPH-G results are interpreted to be related to TPH-D-range compounds.

The TPH-D Tier 1 soil screening level of 230 mg/kg is based on the shallow soil direct exposure screening level value for residential land use, and for construction workers is 1,100 mg/kg. The detected TPH-D concentration in hydraulic jack soil sample H3-9.0 of 2,500 mg/kg exceeds both the soil residential direct exposure screening level of 230 mg/kg and the soil construction worker direct exposure screening level of 1,100 mg/kg. The detected TPH-D concentration in the former hydraulic jack soil sample H6-9.0 of 850 mg/kg exceeds the soil residential direct exposure screening level of 230 mg/kg, but does not exceed the soil construction worker direct exposure screening level of 1,100 mg/kg.

No petroleum VOCs were identified above the water table at concentrations exceeding Tier 1 screening levels. Based on the review of the petroleum compounds detected in soil, petroleum identified as TPH-D is encountered at the former hydraulic jack locations H3 and H6 at concentrations exceeding direct exposure screening level concentrations, and is identified as a Chemical of Concern at the Site.

2.4.3.2 Petroleum Hydrocarbons (Including Petroleum VOCs) in Groundwater

Borehole groundwater grab samples were collected for screening purposes during initial Site investigation. Borehole groundwater grab sample results in ***Tables 4A and 4B*** are not considered to be representative of water quality based on the potential presence of analytes sorbed to the sediments in the borehole groundwater samples. Following initial evaluation of groundwater quality from borehole groundwater grab samples, groundwater monitoring wells were installed with the objective of collecting sediment-free groundwater samples for evaluation of groundwater quality and comparison of the well groundwater sample results with groundwater quality screening levels.

Review of petroleum and associated petroleum VOC groundwater sample results from the three groundwater monitoring wells designated as MW1, MW2 and MW3 at the Site (see ***Figure 6*** and ***Table 5A***) shows that petroleum and associated petroleum VOCs were not detected in groundwater monitoring wells MW2 and MW3. In groundwater monitoring well MW1, TPH-G, TPH-D, benzene, and 1,2-Dichloroethane (1,2-DCA) have been detected at concentrations exceeding the Tier 1 groundwater screening level. Based on the westerly to southwesterly groundwater flow direction for the Site vicinity and the absence of any detected analytes in wells MW2 and MW3, the extent of petroleum in groundwater at the Site appears to be limited and defined to within the boundaries of the Site.

2.4.3.3 Petroleum Hydrocarbons (Including Petroleum VOCs) in Soil Gas

TPH-G is identified as the volatile component of petroleum. TPH-G and petroleum VOCs are interpreted to move in soil gas in the silt and sand layers that are located above the water table at and near the Site.

Petroleum and associated petroleum VOCs were evaluated in soil gas at and near the Site using permanent soil gas wells that were all constructed to a depth of 7.0 feet bgs with a sand pack interval from 5 to 7 feet bgs (see ***Figure 3*** and ***Tables 6A and 6B***). Evaluation of helium tracer gas used during soil gas sample collection for soil gas samples from soil gas wells SG1 through SG31 shows that all of the samples are considered to be valid samples.

Additionally ***Tables 6A and 6B*** contain soil gas sample results for samples that were collected by others from temporary soil gas wells constructed in boreholes that were used for collection of soil and groundwater (samples B5-SG, B7-SG, B8-SG, and B10-SG). No TPH-G or MTBE analysis was performed for these samples. These soil gas samples were also collected without using tracer gas to evaluate sample validity, and for these collective reasons, these soil gas samples from the temporary soil gas wells are not included in the evaluation of the distribution of petroleum and petroleum VOCs in soil gas at the Site.

Review of ***Tables 6A and 6B*** shows that the only petroleum compounds detected in soil gas samples collected from soil gas wells SG1 through SG32 that exceed Tier 1 soil gas screening levels are TPH-G and benzene. The detected TPH-G concentrations in soil gas are shown in ***Figure 9***, and the extent of TPH-G concentrations exceeding the human health risk based concentration of 20,000 ug/m^3 is defined at the Site and the adjacent residential properties with an isoconcentration contour. The TPH-G soil gas isoconcentration contour identified in ***Figure 9*** is similar in distribution to the methylene chloride soil gas isoconcentration contour in ***Figure 11*** (see below), suggesting that the distribution of these compounds is controlled by the geology at and near the Site. The elevated TPH-G concentration detected at soil gas well SG7 suggests that there was likely an on-Site release of gasoline in the former gasoline UST pit in the vicinity of soil gas well SG7. The source of the TPH-G detected in off-Site upgradient soil gas well SG21 is unknown and is interpreted to not be related to the subject Site.

Review of ***Table 6A*** and ***Figure 10*** shows that benzene was detected in soil gas in soil gas wells SG1 through SG32 at concentrations exceeding the Tier 1 soil gas screening level of 3.2 ug/m^3 at a total of four locations. Three of these soil gas wells are located in West Street (SG15, SG16, and SG17), and the source of petroleum in soil gas at upgradient locations SG16 and SG17 is presently unknown. The benzene detected in soil gas well SG15 is located in the vicinity of the easternmost former fuel dispenser islands where petroleum in soil and groundwater have been detected at concentrations exceeding soil and groundwater screening levels, and is interpreted to be related to a gasoline release in the vicinity of the easternmost former fuel dispenser islands at the Site.

The highest benzene soil gas concentration detected at the Site is 1,800 ug/m^3 at soil gas well SG4. The source of this elevated benzene soil gas concentration is interpreted to be the gasoline release identified in the former gasoline UST pit in the vicinity of soil gas well SG7 (see ***Figures 9 and 10***). Based on the elevated TPH-G soil gas concentrations in the central portion of the Site, the detection limits of the benzene soil gas results are elevated for the majority of the soil gas samples at the Site. Additional soil gas wells SG23 and SG24 are proposed to the north of the subject Site to verify the delineation of the extent of TPH-G and benzene in soil gas to the north of the subject Site.

Based on the sample results, TPH-G and benzene in soil gas are identified as the Contaminants of Concern at the Site.

2.4.4 PCBs

PCBs were evaluated as follows:

- Dry weight soil sample results for soil samples collected from borehole B24 adjacent to the waste oil UST pit (see ***Figure 6*** and ***Table 1E***).
- Dry weight soil sample results for soil samples collected from beneath the hydraulic jacks (see ***Figure 7*** and ***Table 3E***).

PCBs were not detected in any of the soil samples collected from borehole B24 adjacent to the waste oil UST pit at depths of 5.0, 9.5, and 14.5 feet bgs. Additionally, PCBs were not detected in any of the hydraulic jack excavation soil samples collected from beneath each of the hydraulic jacks at depths ranging from 6.0 to 10.0 feet bgs.

Based on the absence of evidence of staining, discoloration, odor, or elevated petroleum concentrations in the soil sample collected adjacent to the bottom of the oil water separator (see ***Table 1E***), the absence of PCBs in the waste oil UST pit borehole B24 soil samples (see ***Table 1E***), and the absence of PCBs in the hydraulic jack soil samples (see ***Table 3E***), analysis for PCBs was not warranted for the soil sample OWS1-3.0 that was collected at a depth of 3.0 feet bgs adjacent to the bottom of the oil water separator.

Based on the absence of PCBs detected in soil samples collected from borehole B24 adjacent to the waste oil UST pit and from soil samples collected beneath each of the hydraulic jacks, and based on the absence of evidence of a petroleum release in the soil sample OWS1-3.0 collected adjacent to the bottom of the oil water separator, PCBs are not identified as being a Chemical of Concern in subsurface materials at the Site.

Prior to demolition of existing structures at the Site, all required testing of building materials and any necessary abatement of PCB-containing materials will be performed.

2.4.5 SVOCs

SVOCs were evaluated as follows:

- Dry weight soil sample results for soil samples collected from borehole B24 adjacent to the waste oil UST pit (see ***Figure 6*** and ***Table 1H***).
- Dry weight soil sample results for soil samples collected from beneath the hydraulic jacks (see ***Figure 7*** and ***Table 3H***).

SVOCs were not detected in any of the soil samples collected from borehole B24 adjacent to the waste oil UST pit at depths of 5.0, 9.5, and 14.5 feet bgs at concentrations exceeding July 2019 soil direct exposure human health risk screening levels for residential land use. Additionally, SVOCs were not detected in any of the hydraulic jack excavation soil samples which were collected from beneath each of the hydraulic jacks at depths ranging from 6.0 to 10.0 feet bgs at concentrations exceeding July 2019 soil direct exposure human health risk screening levels for residential land use.

Based on the absence of evidence of staining, discoloration, odor, or elevated petroleum concentrations in the soil sample collected adjacent to the bottom of the former oil water separator (see ***Figure 6*** and ***Table 1E***), analysis for SVOCs was not warranted for the soil sample OWS1-3.0 that was collected at a depth of 3.0 feet bgs adjacent to the bottom of the former oil water separator.

Based on the absence of SVOCs detected in soil samples collected from borehole B24 adjacent to the former waste oil UST pit and from soil samples collected beneath each of the former hydraulic jacks at concentrations exceeding July 2019 soil direct exposure human health risk screening levels for residential land use, and based on the absence of evidence of a petroleum release in the soil sample OWS1-3.0 collected adjacent to the bottom of the former oil water separator, SVOCs are not identified as being a Chemical of Concern at the Site.

2.4.6 Non-Petroleum VOCs

Non-Petroleum VOCs were evaluated as follows:

- Wet weight soil sample results for boreholes B1 through B12 (see ***Figure 6*** and ***Table 1C***). No dry weight results were available for soil samples from boreholes B1 through B12.
- Dry weight soil sample results for boreholes B13 through B24 (boreholes B16 and B18 were not drilled) (see ***Figure 6*** and ***Table 1G***).
- Dry weight soil sample results for soil samples collected from beneath the hydraulic jacks (see ***Figure 7*** and ***Table 3G***).
- Borehole groundwater grab sample results (see ***Figure 6*** and ***Table 4C***).
- Groundwater monitoring well groundwater sample results (see ***Figure 6*** and ***Table 5B***).
- Soil gas well soil gas sample results (see ***Figure 3*** and ***Table 6C***).

2.4.6.1 Non-Petroleum VOCs in Soil

Review of the non-petroleum VOC soil sample results for borehole soil samples in ***Tables 1C and 1G*** (see ***Figure 6***) and for hydraulic jack dry weight soil sample results in ***Table 3C*** (see ***Figure 7***) shows that none of the soil sample results exceed the respective July 2019 soil Tier 1 screening level concentrations.

The only non-petroleum VOC detected in any of the soil samples was PCE in samples B20-4.5 and MW1-9.0 at dry weight concentrations of 0.0080 and 0.080 mg/kg, respectively. Soil samples were collected at a depth of 5 feet below each of these samples and PCE was not detected in either of the deeper soil samples. PCE was not detected in any other soil samples collected at the Site and no PCE decomposition products were detected in any of the soil samples collected from the Site. Based on the absence of non-petroleum VOCs detected in soil at concentrations exceeding Tier 1 screening levels, non-petroleum VOCs in soil are not identified as a Contaminant of Concern at the Site.

2.4.6.2 Non-Petroleum VOCs in Groundwater

As discussed above for petroleum hydrocarbons in groundwater, borehole groundwater grab samples were collected for screening purposes during the initial Site investigation. Borehole groundwater grab sample results in ***Table 4C*** are not considered to be representative of water quality based on the potential presence of analytes sorbed to the sediments in the borehole groundwater samples. Following initial evaluation of groundwater quality from borehole groundwater grab samples, groundwater monitoring wells were installed with the objective of collecting sediment-free groundwater samples for evaluation of groundwater quality and comparison of the well groundwater sample results with groundwater quality screening levels.

Review of non-petroleum VOC groundwater sample results from the three groundwater monitoring wells designated as MW1, MW2 and MW3 at the Site (see ***Figure 6*** and ***Table 5B***) shows that non-petroleum VOCs were not detected in any of the groundwater monitoring wells. Based on the absence of non-petroleum VOCs detected in any of the groundwater samples collected at the Site, non-petroleum VOCs in groundwater are not identified as a Contaminant of Concern at the Site.

2.4.6.3 Non-Petroleum VOCs in Soil Gas

Non-petroleum VOCs are interpreted to move in soil gas at the Site in the silt and sand layers that are located above the water table at and near the Site. Non-petroleum VOCs were evaluated in soil gas at and near the Site using permanent soil gas wells that were all constructed to a depth of 7.0 feet bgs with a sand pack interval from 5 to 7 feet bgs (see ***Figure 3*** and ***Tables 6C and 6D***). Evaluation of helium tracer gas used during soil gas sample collection for soil gas samples from soil gas wells SG1 through SG31 shows that all of the samples are considered to be valid samples.

Additionally ***Tables 6C and 6D*** contain soil gas sample results for samples that were collected by others from temporary soil gas wells constructed in boreholes that were used for collection of soil and groundwater (samples B5-SG, B7-SG, B8-SG, and B10-SG). These soil gas samples were collected without using tracer gas to evaluate sample validity, and for these collective reasons, these soil gas samples from the temporary soil gas wells are not included in the evaluation of the distribution of non-petroleum VOCs in soil gas at the Site.

Review of ***Tables 6C and 6D*** shows that the only non-petroleum compounds detected in soil gas samples collected from soil gas wells SG1 through SG32 that exceed Tier 1 soil gas screening levels are limited to chloroform, methylene chloride, and PCE. Each is discussed below.

Chloroform

Review of ***Table 6C*** and ***Figure 3*** shows that the highest chloroform soil gas concentrations are encountered at off-Site upgradient locations SG18, SG19, SG20 and SG21 and off-Site downgradient location SG31, with substantially lower chloroform soil gas concentrations on the upgradient side of the Site at locations SG15, SG16 and SG17 and on the downgradient side of the Site at locations SG6, SG10, SG14, and SG22 separating the Site from the higher offsite methylene chloride soil gas concentrations. The chloroform soil gas concentrations detected in the soil gas wells are interpreted to be the result of releases of chlorinated municipal water to the subsurface. Based on the higher offsite chloroform soil gas concentrations, the Site is not considered to be a source for chloroform in soil gas.

Methylene Chloride

The detected methylene chloride soil gas concentrations are shown in ***Figure 11***, and the extent of methylene chloride concentrations exceeding the Tier 1 soil gas concentration of 34 ug/m^3 is defined at the Site and the adjacent residential properties with an isoconcentration contour. The methylene chloride soil gas isoconcentration in ***Figure 11*** is similar in distribution to the TPH-G soil gas isoconcentration contour identified in ***Figure 9***, suggesting that the distribution of these compounds is controlled by the geology at and near the Site. The elevated methylene chloride concentration detected at soil gas well SG7 suggests that there was an on-Site release of methylene chloride in the vicinity of soil gas well SG7.

The absence of detectable concentrations of methylene chloride in soil gas at concentrations exceeding the methylene chloride Tier 1 soil gas screening level at off-Site downgradient soil gas wells to the southwest of the Site (SG28, SG29, SG30) indicates that the off-Site extent of methylene chloride in soil gas is also defined to the southwest. Additional soil gas wells SG23 and SG24 are proposed to the north to verify the delineation of the extent of methylene chloride in soil gas to the north of the Site. Based on the sample results, methylene chloride in soil gas is identified as a Contaminant of Concern at the Site.

PCE

The detected PCE soil gas concentrations are shown in ***Figure 12***. Based on elevated TPH-G soil gas concentrations in the central portion of the Site and the elevated PCE detection limits for soil gas wells located in the southern half of the Site, there is an absence of information for interpretation of the presence or extent of PCE in soil gas in the southern half of the Site. Based on the available information, segments of isoconcentration contours showing the extent of PCE soil gas concentrations exceeding the Tier 1 soil gas concentration of 15 ug/m^3 are shown in ***Figure 12*** at the northeast, northwest, and southwest corners of the Site. The distribution of these compounds is assumed to be similarly distributed as identified for TPH-G and methylene chloride, with the distribution of PCE in soil gas interpreted to be controlled by geology at and near the Site.

The elevated PCE concentration of 1,400 ug/m^3 detected at soil gas well SG13 suggests that there was an on-Site release of PCE from the sewer lateral in the vicinity of soil gas well SG13, where PCE may have entered the sewer lateral at the former oil water separator. The elevated PCE soil gas concentration of 640 ug/m^3 at SG11 near the former waste oil UST is suspected of having originated at or near the former waste oil UST.

The elevated PCE concentration detected at off-Site upgradient soil gas well SG25 suggests that there was an off-Site upgradient release of PCE that was detected downgradient of the former gasoline station located at 3838 West Street (located at the southeast corner of the intersection of Apgar Street and West Street). The source of the PCE soil gas concentrations in upgradient soil gas wells SG16, SG17 and SG18 is unknown and is suspected of being related to the elevated PCE soil gas concentration detected at off-Site upgradient soil gas well SG25.

Similarly, the source of the PCE soil gas concentrations in downgradient soil gas wells SG28, SG29 and SG30 is unknown and is suspected of being related to the sanitary sewer that is located adjacent to these soil gas wells. Based on the absence of TPH-G and methylene chloride in off-Site downgradient soil gas wells SG28, SG29 and SG30, the PCE detected in soil gas at the Site is modeled to not have migrated off-Site to the southwest as far as off-Site downgradient soil gas wells SG28, SG29 and SG30.

Proposed soil gas wells SG23 and SG24 to the north and proposed soil gas wells SG32, SG33 and SG34 to the west are intended to complete the delineation of the extent of PCE in soil gas to the north and west of the Site. The soil gas results in soil gas wells SG28, SG29 and SG30 to the south of the Site will be further evaluated following receipt of the soil gas sample results from proposed soil gas wells SG32, SG33 and SG34.

Review of the PCE decomposition products TCE, cis-1,2-DCE, trans-1,2-DCE and vinyl chloride in soil gas in ***Table 6C*** shows that none of these compounds were detected with the exception of TCE in SG10-DUP at 3.5 15 ug/m^3 and SG15 at 7.4 15 ug/m^3, both of which are below the TCE Tier 1 soil gas ESL value of 16 ug/m^3. The absence of PCE decomposition products in soil gas is consistent with the absence of any detected PCE decomposition products in ***Table 1G*** soil from boreholes, ***Table 3G*** soil from beneath the former hydraulic hoists, and ***Table 5B*** groundwater from groundwater monitoring wells. The only PCE decomposition product detected in any of the borehole groundwater grab samples in ***Table 4C*** was 0.79 ug/L cis-1,2-DCE in borehole B24, which was drilled at the former waste oil UST pit.

Based on the sample results obtained to date, PCE in soil gas is identified as a Contaminant of Concern at the Site.

2.5 Contaminant Fate and Transport

The COPCs can be grouped into three families as follows:

- Metals
- Petroleum Hydrocarbons
- Non-Petroleum Volatile Organic Compounds

Metals are not volatile and do not naturally degrade or attenuate. Metals can be transported in air attached to dust. Metals are soluble and can be transported in groundwater.

Petroleum hydrocarbons and the non-petroleum VOCs are volatile, soluble, and will degrade or attenuate in the subsurface with appropriate conditions for degradation. Petroleum hydrocarbons will degrade with or without oxygen in the subsurface, but will degrade more quickly with greater amounts of oxygen in the subsurface. Non-petroleum VOCs will degrade in the subsurface with the appropriate conditions for degradation if the proper types of bacteria are present. The detected presence of PCE decomposition products at the Site indicates that the appropriate conditions and bacteria are present for naturally-occurring subsurface PCE degradation.

Compounds that are volatile can move as vapors in soil gas. Because the petroleum hydrocarbons and the non-petroleum VOCs are soluble, they can also move in groundwater.

2.6 Receptors and Exposure Pathways

The receptors associated with the Project include the following:

- Onsite construction workers.
- Onsite post-construction site occupants and visitors.
- Neighbors.

Potential exposure pathways include the following:

- Inhalation of airborne dust and vapors during construction.
- Direct exposure to soil or groundwater during construction.
- Ingestion of soil or groundwater during construction.
- Post-construction inhalation of vapors resulting from vapor intrusion.
- Inhalation of vapors resulting from vapor intrusion migrating along preferential pathways.

During construction, potential exposure to metals may occur from inhalation of lead in dust at the Site or surrounding locations. Following the completion of construction and implementation of the proposed corrective actions, there will be no complete pathways for exposure to metals.

During construction, exposure to petroleum hydrocarbons and non-petroleum VOCs may from potential inhalation of these COPCs from soil vapor at the Site or surrounding locations. Following the completion of construction and implementation of the proposed corrective actions, there will be no complete pathways for exposure to these COPCs other than from potential vapor intrusion, which the vapor barrier and other mitigation measures will prevent.

Future building occupants will not experience direct exposure because the entire Site will be covered with a concrete cap.

3.0 PROPOSED CLEANUP GOALS

Cleanup goals for the proposed corrective actions are as follows:

3.1 Soil

Soil cleanup goals for COPCs detected in on-Site soil are to remove or encapsulate soil with COPC concentrations exceeding San Francisco Bay Regional Water Quality Control Board (SFRWQCB) July 2019 (revision 2) Table S-1 Soil Direct Exposure Human Health Risk Screening Levels for residential land use. The proposed corrective actions will eliminate exposure to COPCs in soil by capping the Site and subsequently implementing the post-construction Site Management Plan (SMP) administrative and institutional controls.

3.2 Groundwater

There are no cleanup goals for COPCs in on-Site groundwater applicable to this CAP because exposure to COPCs in groundwater will be removed by capping the Site and subsequent implementation of the post-construction SMP administrative and institutional controls.

3.3 Soil Gas

Post-construction exposure to COPCs in soil gas will be controlled by implementation of engineering and administrative controls. Soil gas cleanup goals will be assumed to have been achieved if (1) post-construction indoor air quality at the Site meets or exceeds the SFRWQCB January 2019 Tier I Environmental Screening Levels (ESLs) for indoor air and (2) the migration of on-Site soil vapor is sufficiently controlled, so as not to represent an unacceptable risk to indoor air quality at off-Site locations.

4.0 PROPOSED CORRECTIVE ACTIONS

Detailed methods for implementation of proposed corrective actions are identified as follows.

4.1 Preliminary Activities

Prior to the implementation of the corrective actions identified in the CAP, preliminary activities that will be performed include, but not be limited to, the following:

- Implementation of the construction Soil and Groundwater Management Plan (SGMP) that was approved by the ACDEH.
- Preparation of a Site-specific Health and Safety Plan (HASP).
- Obtain any necessary permits.
- Provide notifications to any permitting or regulatory agencies that require notification.

- Contractor pre-construction meetings to define contractor work scope and coordinate contractor schedule with inspectors, regulators, and other on-Site contractors.
- Issue an ACDEH work notice to surrounding community.

4.2 Remediation Measures

The proposed remedial measures consist of excavation and off-Site disposal of PCE-impacted soil, TPH-D-impacted soil, and soil impacted by TPH-G soil gas as shown in ***Figure 4***. Soil will be managed in accordance with the construction SGMP. The depth of excavation in Figure 4 will be to the bottom of the silt layer identified in geologic cross sections A-A', B-B' and C-C' (see ***Figures 14, 15 and 16***). Soil will be managed in accordance with the construction SGMP.

4.2.1 General Excavation Procedures

It is anticipated that excavation activities will be conducted using conventional earthmoving equipment (e.g., track- or tire-mounted excavators), however, equipment selection and the means to implement the soil excavation will be at the discretion of the selected excavation contractor. All excavation and earth-work conducted as part of implementation of corrective actions or as part of the Project will be conducted in accordance with the requirements of the SGMP. The SGMP includes procedures and protocols to control and limit potential on-Site and off-Site exposure to contaminated environmental media during excavation and earth-moving activities. These exposure limiting protocols include (1) procedures for handling, staging, and disposal of contaminated soil and groundwater; (2) dust and odor control and suppression measures; (3) air and dust monitoring requirements; and (4) storm water management policies.

The SGMP also contains contingency measures in the event that unexpected conditions are encountered during excavation or earthmoving activities.

Following delineation of the vertical extent of lead-impacted fill and soil at the Site, and following demolition of Site structures and removal of Site surface cover materials, lead-impacted soil and fill will be stockpiled at the Site pending completion of excavation of TPH-G and PCE –impacted soil at locations identified on Figure 4. The depth of excavation at locations shown in Figure 4 will be as follows:

- To a depth of 5 feet bgs at the former oil water separator.
- To a depth of 6 feet at the former waste oil UST pit (boring log B24 at the former waste oil UST pit shows staining, discoloration, odor, and detectable organic vapor concentrations to a depth of 6 feet bgs. See also ***Figures 13 and 14*** for cross section A-A').
- To the bottom of the silty sand layer at a depth of approximately 7 feet bgs at the west end of the sanitary sewer lateral excavation and to the water table at a depth of approximately 8 to 10 feet bgs in the silty material that is encountered at the east end of the sanitary sewer lateral excavation (see ***Figures 13 and 14*** for cross section A-A').

- To the bottom of the silt layer in the area of excavation in the vicinity of the former gasoline USTs, which is at a depth of approximately 8 to 10 feet bgs (see ***Figures 13 and 15*** for cross section B-B'). At proposed areas of excavation where the former gasoline UST pits are present, excavation will be to the bottom of the former UST pits (an estimated depth of approximately 10 feet bgs).

4.2.2 Verification Sampling

Post-excavation confirmation soil samples will be collected from the sidewalls and pit bottom for the PCE-impacted soil excavation area and for the TPH-G-impacted soil excavation area in accordance with the Sampling and Analysis Plan (SAP) that is attached with this CAP as ***Appendix D***. The soil samples will be collected to document post-excavation PCE and TPH-G soil concentrations and to verify that removal of TPH-G and PCE-impacted soil has occurred. Groundwater encountered in the soil excavation areas will be managed in accordance with procedures identified in the SGMP. The SAP includes Standard Operating Procedures (SOPs) for collection of soil and groundwater samples during implementation of the proposed remedial corrective actions.

4.2.3 Over-Excavation Sampling

Additional PCE-impacted soil excavation and TPH-G-impacted soil excavation will be performed at locations where post-excavation confirmation soil samples indicate that cleanup goals have not been met. The area of impacted soil excavations will be expanded until subsequent verification sampling confirms that cleanup goals are met or until further excavation is no longer practicable.

4.2.4 Soil and Groundwater Transportation and Disposal

Procedures for transportation and disposal of soil and groundwater are provided in the SGMP. The waste management procedures include, but not be limited, to the following:

- Stockpiled soil management.
- Procedures for minimizing the spread of contaminated soil during remedial solution implementation.
- Groundwater containerization methods.
- Decontamination procedures.
- Transportation plan.
- Recording dates and weights or volumes of waste disposed of.
- Assembling and summarizing documentation of waste disposal such as manifests or flow meter totalizer logs.

4.2.5 Excavation Backfill and Soil Import

Following the completion of excavation of TPH-G and PCE-impacted soil, the excavated areas will be backfilled and compacted using the stockpiled lead-impacted soil and fill to a depth of 2 feet bgs or greater as discussed below or using material that satisfies the requirements for imported material identified in the construction Soil Import Management Plan (SIMP) that is attached with this CAP as ***Appendix E***.

Elements of the SIMP include, but are not be limited, to the following:

- Sample collection frequency.
- Composite or discrete sample analysis.
- Sample analytical methods.
- Soil acceptance criteria.
- Documentation of the acceptability of soil for import to the Site.

Procedures for use of Site soils for backfilling the impacted areas of excavation are identified in the SGMP.

Procedures for mitigating the spread of contaminated soil associated with trucks bringing clean fill to the Site are addressed in the SGMP.

Prior to initiation of foundation construction for the Project, the following document will be submitted for ACDEH review and approval:

1) Remedial Action Implementation Report (including imported soil acceptability documentation).

4.3 Engineering Controls

Engineering controls will consist of the installation of a Vapor Intrusion Mitigation System (VIMS), on-Site consolidation of lead-impacted soil and capping of the entire Site. Each of these is discussed below.

4.3.1 Vapor Intrusion Mitigation System

A VIMS will be designed and installed to mitigate potential vapor intrusion and associated potential inhalation exposure. The Vapor Mitigation Engineering Controls (VMECs) will consist of a vapor barrier, a vapor collection system with a passive vent system that includes vents that extend to the roof and that can be converted to an active system if necessary (see ***Figure 5***), and trench plugs to prevent preferential vapor migration in utility trenches. The VIMS will include subslab vapor sampling points, and the VIMS design will include placement of the vapor barrier beneath inhabited first floor structures, and any first floor storage and utility rooms. The current proposed Project does not include an elevator at the Site.   A vapor recovery system will be placed beneath portions of the Site where the vapor barrier is not installed (see ***Figure 5***). Sample specifications and drawings of the vapor barrier materials are provided in ***Appendix F.***

The locations of underground utilities for the Project have not yet been identified. Trench plugs will be installed at the time of Site development in utility trenches at the Project property boundary or where potential utility trench vapor intrusion concerns are identified to mitigate potential preferential vapor intrusion along utilities in utility trenches.

Engineering design and supporting engineering calculations for each of the elements of the VIMS will be provided as an element of the VMEC Basis of Design Report, Plan & Specifications which will be an element of the CAIP or will be provided to the ACDEH for review and approval under separate cover. The VMEC Basis of Design Report will include a Construction Quality Assurance Quality Control (CQA/QC) plan that will contain elements that will include but not be limited to the following:

- Procedures used for verification of VMEC construction in accordance with the VMEC design.
- Dates of inspections and documentation of testing performed.
- Results of inspections and testing.

Prior to initiation of foundation construction for the Project, the following documents will be submitted to the ACDEH for review and approval:

1) VMEC Basis of Design Report, Plans, & Specifications (including CQA/QC plan).
2) VMEC Record Report of Construction and Performance Evaluation.

After installation of the VIMS, but before occupancy of the Site, the following document will be prepared and submitted to ACDEH for review and approval.

3) VIMS Operations and Maintenance Plan.

The elements in the VIMS Operations and Maintenance Plan will include, but not be limited to, the following:

- VIMS monitoring procedures.
- VIMS monitoring frequency.
- Analysis to be performed for performance evaluation samples.
- Criteria for amendments to the VIMS based on the performance monitoring results.
- Record keeping and reporting requirements.

4.3.2 Consolidation and Capping In Place

Following the completion of PCE- and TPH-G-impacted soil excavation, the excavated areas will be backfilled and compacted using the stockpiled lead-impacted soil and fill to a depth of 2 feet bgs or greater. Lead-impacted soil that is consolidated on-Site will be bounded below, on the sides, and above with an orange non-woven non-biodegradable polypropylene geotextile to create a demarcation layer for identification of the boundaries of the consolidated lead-impacted soil.

The remaining portions of the excavated areas will be backfilled and compacted either using clean, imported soil that conforms to SIMP requirements or on-Site soil that conforms to SGMP requirements for onsite re-use. Following the completion of excavated area backfilling and installation of the VIMS, the entire Site will be capped with the first-floor building concrete floor slab to mitigate exposure to surface and subsurface COPCs at the Site.

Direct exposure to COPCs will be controlled by installation of a hardscape cap across the entire Site. Landscaped areas are presently designed to be lined with concrete. If non-hardscaped areas are constructed as part of the Project, orange non-woven non-biodegradable polypropylene geotextile will be placed onto the Site soil surface beneath the entire area of each non-hardscaped area as an excavation marker. Procedures associated with work below the excavation marker will be identified in the SMP.

Implementation of proposed remedial actions will not be conducted prior to ACDEH's review and approval of the CAP.

4.4 Administrative Controls

Prior to occupancy of the Site, a SMP will be developed and submitted to ACDEH for review and approval. The SMP will be implemented as an administrative control. The elements of the SMP will include, but not be limited to, the following:

- Procedures for penetrating and repairing the vapor barrier.
- Procedures for excavation beneath the vapor barrier or the excavation marker woven geotextile fabric.
- Procedures and frequency for vapor monitoring associated with the VIMS.
- Criteria for changing the VIMS from a passive system to an active system.
- Record keeping and reporting requirements associated with administration of the SMP.

4.5 Institutional Controls

Land use covenants will be summarized in a deed restriction document that will be prepared for review and approval by the ACDEH. The land use covenants will identify land use restrictions based on Site conditions identified in a Remedial Action Implementation Report documenting implementation of the CAP, and will provide conditions that will be required to be satisfied for future amendment of the land use restrictions. Upon approval of the land use restriction document by the ACDEH, the land use restriction document will be recorded at the County Recorder’s Office and copies of the recorded document, along with documentation of the recordation, will be provided to the ACDEH.

Prior to occupancy, the following documents will be submitted for ACDEH review and approval:

1) Report of Construction for Hardscape Cap
2) VMEC Operations and Maintenance Plan

3) SMP
4) Proposed Land Use Covenant and once approved by ACDEH, documentation of recording.

4.6 Additional CAP-Related Activities

The following additional CAP-related activities are proposed to (1) evaluate the effectiveness of the proposed corrective actions and (2) evaluate potential exposure risks to off-Site receptors:

4.6.1 Destruction of Existing Wells and Installation of Replacement Wells

All of the existing groundwater monitoring wells and soil gas wells at the Site will be destroyed and replacement groundwater monitoring wells and soil gas wells will be installed in accordance with Alameda County Public Works Agency (ACPWA) requirements. A work plan identifying proposed replacement well locations will be provided to the ACDEH for review and approval prior to destruction and replacement of the existing wells.

4.6.2 Additional Site Investigation

Based on the data gaps identified in the SCM (see ***Appendix C***), additional investigation will be performed using methods identified in work plans that were previously approved by ACDEH for the Site as follows:

- Collection of additional fill and soil samples to delineate the vertical extent of lead in onsite fill and soil at locations where the vertical extent of lead has not been fully defined at locations S3, S5, S7, S8, S9, S11, S12, S15, S17, S19, S20 and S22 (see ***Figure 5*** and ***Tables 2A and 2B***).
- Continued quarterly sampling of wells MW1, MW2 and MW3 to complete one full hydrologic cycle of quarterly sampling of water quality at the Site (see ***Figure 6*** and ***Tables 5A and 5B***) with subsequent semiannual sampling to evaluate monitored natural attenuation at well MW1, until authorized to discontinue sampling by the ACDEH.
- Installation of soil gas wells at proposed locations SG23, SG24, SG32, SG33, and SG34 at locations shown in ***Figures 9, 10, 11, and 12*** each to depths of 7 feet bgs.
- Sampling of proposed soil gas wells SG23, SG24, SG32, SG33, and SG34 to further delineate the extent of COPCs in soil gas and sampling of existing soil gas wells SG10, SG11, SG12, SG13, SG14, SG22, SG25 through SG31 to evaluate temporal variability for the soil gas wells (see ***Figure 3*** and ***Tables 6A through 6E***). The objective of sampling the proposed existing wells is to obtain temporal data from a selected number of strategically located soil gas wells that are not located in areas where elevated detection limits prevent meaningful interpretation of data or at locations that may not be related to on-Site releases.

5.0 PERFORMANCE EVALUATION AND OFFSITE EXPOSURE EVALUATION

The performance of remediation and mitigation measures will be evaluated as they relate to (1) closure of exposure pathways identified in the SCM and (2) cleanup goals. Monitoring and results evaluation will be performed as follows:

5.1 Dust and Vapors During Construction

To protect onsite workers and the community, perimeter monitoring and monitoring of on-Site workers with instruments and sample collection for quantitative analysis will be performed for dust and vapors in accordance with the construction SGMP and the site-specific HASP for Site development. In addition, visual monitoring for dust will be performed.

Monitoring results exceedance criteria will be identified in the SGMP and site-specific HASP, and monitoring results exceedances will be addressed in accordance with procedures set forth in the SGMP and the site-specific HASP.

5.2 Groundwater Monitoring Evaluation Criteria

Sample results from the replacement groundwater monitoring wells will be compared with SFRWQCB July 2019 (revision 2) Table GW-3 Groundwater Vapor Intrusion Screening Levels for groundwater for residential land use.

Sample results exceeding screening levels for locations where an VIMS is not present will be further evaluated for evidence of potential vapor intrusion concerns.

5.3 Indoor Air and Vapor Verification Sampling

Post-construction indoor air and subsurface vapor monitoring will be performed in accordance with the post-construction SMP. Exceedance of monitoring criteria set forth in the SMP may include, but not be limited to, each as required, verification re-sampling or conversion of the passive vent system to an active vent system with subsequent confirmation sampling to ensure that the mitigation solution remains effective.

6.0 PUBLIC NOTIFICATION

A Public Notice (fact sheet) describing the proposed corrective actions will be prepared and submitted for review and approval to the ACDEH. Upon approval by the ACDEH, the Public Notice will be distributed to the surrounding community for a 30-day public comment period.

An ACDEH work notice will be distributed to the surrounding community 7-days in advance of the start of remediation work.

7.0 REPORTING

A project construction and reporting schedule will be submitted to ACDEH for review and approval and an updated schedule will be submitted as appropriate.

Prior to initiation of construction activities, the following documents will be submitted for ACDEH review and approval:

1) Corrective Action Implementation Plan (including a SGMP, SAP and SIMP)
2) HASP

Prior to initiation of foundation work, the following documents will be submitted for ACDEH review and approval:

1) Remedial Action Implementation Report (including soil import documentation)
2) VMEC Basis of Design Report, Plans, & Specifications (including CQA/QC plan)
3) VMEC Record Report of Construction and Performance Evaluation

Prior to occupancy, the following documents will be submitted for ACDEH review and approval:

1) Record Report of Construction for Hardscape Cap
2) VMEC Operations and Maintenance Plan
3) SMP
4) Proposed Land Use Covenant and once approved by ACDEH, documentation of recording

Post occupancy, routine Operations and Maintenance and Evaluation Reports for the engineering controls, and, as-needed, updates to the SMP will be issued to ACDEH for review and approval as required in the SMP.

TABLES

Table 1A
Summary of Borehole Soil Sample Analytical Results - Petroleum and Petroleum VOCs, PCBs, and Percent Moisture - Wet Weight Basis

Sample ID	Sample Collection Date	Sample Collection Depth (ft bgs)	TPH-G	TPH-D	TPH-BO	TPH-MO	MTBE	Benzene	Toluene	Ethylbenzene	m,p-Xylenes	o-Xylenes	Naphthalene	PCBs	Percent Moisture
B1-11	8/24/2018	11.0	ND<10	11	--	ND<10	ND<0.019	ND<0.0047	ND<0.0047	ND<0.0047	ND<0.0094	ND<0.0047	ND<0.0047	--	--
B2-20	8/24/2018	20.0	ND<10	ND<10	--	ND<10	ND<0.019	ND<0.0047	ND<0.0047	ND<0.0047	ND<0.0093	ND<0.0047	ND<0.0047	--	--
B3-15	8/24/2018	15.0	16	15	--	ND<10	ND<0.020	ND<0.0050	ND<0.0050	0.035	0.14	0.017	**0.15**	--	--
B4-17	8/24/2018	17.0	81	30	--	ND<10	ND<0.013	0.024	ND<0.0034	0.25	0.0090	ND<0.0034	ND<0.0034	--	--
B5-10	10/24/2018	10.0	ND<10	ND<10	--	ND<10	ND<0.012	ND<0.0030	ND<0.0030	ND<0.0030	ND<0.0060	ND<0.0030	ND<0.0030	--	--
B6-20	10/24/2018	20.0	ND<10	ND<10	--	ND<10	ND<0.010	ND<0.0025	ND<0.0025	ND<0.0025	ND<0.0050	ND<0.0025	ND<0.0025	--	--
B7-20	10/24/2018	20.0	ND<10	ND<10	--	ND<10	ND<0.014	**0.058**	ND<0.0035	**0.73**	1.7	0.0059	0.011	--	--
B9-15	10/24/2018	15.0	ND<10	ND<10	--	ND<10	ND<0.0083	ND<0.0021	ND<0.0021	ND<0.0021	ND<0.0041	ND<0.0021	ND<0.0021	--	--
B10-20	10/24/2018	20.0	ND<10	ND<10	--	ND<10	ND<0.0082	ND<0.0021	ND<0.0021	ND<0.0021	ND<0.0021	ND<0.0021	ND<0.0021	--	--
B11-10	10/24/2018	10.0	39	16	--	ND<10	ND<0.67	ND<0.17	ND<0.17	ND<0.17	ND<0.34	ND<0.17	ND<0.17	--	--
B12-10	10/24/2018	10.0	**190**	95	--	ND<10	ND<0.50	ND<0.12	ND<0.12	0.35	ND<0.25	ND<0.12	ND<0.12	--	--
B19-4.5	12/12/2018	4.5	29, a	51, b,c	220, b,c	340, b,c	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	--	13.6
B19-9.5	12/12/2018	9.5	16, a	25, b,c	25, b,c	210, b,c	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	--	16.2
B19-12.5	12/12/2018	12.5	54, a	23, b,d,e	100, b,d,e	91, b,d,e	ND<0.020	ND<0.020	ND<0.020	ND<0.020	ND<0.020	ND<0.020	ND<0.020	--	17.5
B19-14.5	12/12/2018	14.5	ND<1.0	ND<1.0	ND<5.0	ND<5.0	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	--	21.9
B20-4.5	12/12/2018	4.5	ND<1.0	ND<1.0	ND<5.0	ND<5.0	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	--	16.0
B20-9.5	12/12/2018	9.5	ND<1.0	ND<1.0	ND<5.0	ND<5.0	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	--	14.2
B20-12.5	12/12/2018	12.5	**230, a**	8.0, d,c	8.0, d,c	ND<5.0	ND<0.050	ND<0.050	ND<0.050	ND<0.050	ND<0.050	ND<0.050	ND<0.050	--	14.7
B20-14.5	12/12/2018	14.5	7.5, a	ND<1.0, d	ND<5.0, d	ND<5.0, d	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	--	17.8
SG1-4.0	12/12/2018	4.0	ND<1.0	ND<1.0	ND<5.0	ND<5.0	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	--	12.5
SG1-6.0	12/12/2018	6.0	ND<1.0	ND<1.0	ND<5.0	ND<5.0	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	--	14.4
B23-10.0	4/17/2019	10.0	1.6, a	ND<1.0	ND<5.0	ND<5.0	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	--	18.1
B23-11.0	4/17/2019	11.0	34, a	ND<1.0	ND<5.0	ND<5.0	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	--	20.9
B23-12.0	4/17/2019	12.0	9.5, a	ND<1.0	ND<5.0	ND<5.0	ND<0.0065	ND<0.0065	ND<0.0065	ND<0.0065	ND<0.0065	ND<0.0065	ND<0.0065	--	22.7
B24-5.0	4/16/2019	5.0	98, a,f	77, c,b,d	340, c,b,d	340, c,b,d	ND<0.020	ND<0.020	ND<0.020	0.041	ND<0.020	ND<0.020	ND<0.020	All ND < 0.063	20.4
B24-9.5	4/16/2019	9.5	ND<1.0	1.7, c,b	8.7, c,b	8.7, c,b	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	All ND < 0.063	15.8
B24-14.5	4/16/2019	14.5	17, f	30, c,b,d	160, c,b,d	160, c,b,d	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	All ND < 0.063	20.3

Table 1A

Summary of Borehole Soil Sample Analytical Results - Petroleum and Petroleum VOCs, PCBs, and Percent Moisture - Wet Weight Basis

Sample ID	Sample Collection Date	Sample Collection Depth (ft bgs)	TPH-G	TPH-D	TPH-BO	TPH-MO	MTBE	Benzene	Toluene	Ethylbenzene	m,p-Xylenes	o-Xylenes	Naphthalene	PCBs	Percent Moisture
MW1-4.0	7/24/2019	4.0	24, a,b	1.6, c	ND<5.0	ND<5.0	ND<0.041	ND<0.041	ND<0.041	ND<0.041	ND<0.041	ND<0.041	ND<0.041	--	13.7
MW1-9.0	7/24/2019	9.0	15, a,b	1.5, c	ND<5.0	ND<5.0	ND<0.090	ND<0.090	ND<0.090	ND<0.090	ND<0.090	ND<0.090	ND<0.090	--	14.7
MW1-14.0	7/24/2019	14.0	**100, a,b**	5.9, c,d	5.9, c,d	ND<5.0	ND<0.017	ND<0.017	ND<0.017	ND<0.017	ND<0.017	ND<0.017	ND<0.017	--	18.2
MW2-4.0	7/23/2019	4.0	ND<1.0	ND<1.0	ND<5.0	ND<5.0	ND<0.0087	ND<0.0087	ND<0.0087	ND<0.0087	ND<0.0087	ND<0.0087	ND<0.0087	--	18.8
MW2-9.0	7/23/2019	9.0	ND<1.0	ND<1.0	ND<5.0	ND<5.0	ND<0.0091	ND<0.0091	ND<0.0091	ND<0.0091	ND<0.0091	ND<0.0091	ND<0.0091	--	16.9
MW2-14.0	7/23/2019	14.0	ND<1.0	ND<1.0	ND<5.0	ND<5.0	ND<0.0090	ND<0.0090	ND<0.0090	ND<0.0090	ND<0.0090	ND<0.0090	ND<0.0090	--	19.3
MW3-4.0	7/24/2019	4.0	ND<1.0	ND<1.0	ND<5.0	ND<5.0	ND<0.0093	ND<0.0093	ND<0.0093	ND<0.0093	ND<0.0093	ND<0.0093	ND<0.0093	--	14.6
MW3-9.0	7/24/2019	9.0	ND<1.0	ND<1.0	ND<5.0	ND<5.0	ND<0.0097	ND<0.0097	ND<0.0097	ND<0.0097	ND<0.0097	ND<0.0097	ND<0.0097	--	11.8
MW3-14.0	7/24/2019	14.0	ND<1.0	ND<1.0	ND<5.0	ND<5.0	ND<0.0077	ND<0.0077	ND<0.0077	ND<0.0077	ND<0.0077	ND<0.0077	ND<0.0077	--	18.3
OWS1-3.0	7/25/2019	3.0	ND<1.0	1.6, c,e	7.3, c,e	7.4, c,e	ND<0.0082	ND<0.0082	ND<0.0082	ND<0.0082	ND<0.0082	ND<0.0082	ND<0.0082	--	17.8
LTCP	Residential							0-5' = 1.9		0-5' = 21			0-5' = 9.7		
	Residential							5-10' = 2.8		5-10' = 32			5-10' = 9.7		
	Utility Worker							0-10' = 14		0-10' = 314			0-10' = 219		
Tier 1 ESL			100	260	1,600	1,600	0.028	0.025	3.2	0.43	Combined = 2.1		0.042	0.23	No Value

NOTES:
TPH-G = Total Petroleum Hydrocarbons as Gasoline.
TPH-D = Total Petroleum Hydrocarbons as Diesel.
TPH-BO = Total Petroleum Hydrocarbons as Bunker Oil.
TPH-MO = Total Petroleum Hydrocarbons as Motor Oil.
MTBE = Methyl tertiary-butyl ether.
VOCs = Volatile Organic Compounds.
SVOCs = Semi-Volatile Organic Compounds.
PCBs = Polychlorinated Biphenyls.
ft bgs = feet below ground surface.
ND = Not detected.
-- = Not analyzed.
a = Laboratory Note: no recognizable pattern.
b = Laboratory Note: oil range compounds are significant.
c = Laboratory Note: diesel range compounds are significant; no recognizable pattern.
d = Laboratory Note: pattern resembles kerosene/kerosene-range/jet fuel range diesel range.
e = Laboratory Note: gasoline range compounds are significant.
LTCP = Low Threat Closure Policy, by State Water Resources Control Board, effective August 17, 2012, from Table 1 - Concentrations of Petroleum Constituents in Soil That Will Have No Significant Risk of Adversely Affecting Human Health.
ESL = Environmental Screening Level, by San Francisco Bay – Regional Water Quality Control Board, updated July 2019 (Revision 2), Soil Tier 1 ESL from Summary of Soil ESLs.
Results in BOLD exceed the respective ESL value.
Green high light indicates that the sample detection limit exceeded the respective Tier 1 soil ESL value.
Results, LTCP values, and ESL values, reported in mg/kg (milligrams per kilogram), unless otherwise indicated.

Table 1B
Summary of Borehole Soil Sample Analytical Results - Other Petroleum VOCs - Wet Weight Basis

Sample ID	Sample Collection Date	Sample Collection Depth (ft bgs)	n-Butyl benzene	sec-Butyl benzene	Isopropyl-benzene	4-Isopropyl toluene	n-Propyl benzene	1,2,4-Trimethylbenzene	1,3,5-Trimethylbenzene	Other Petroleum VOCs by EPA 8260B
B1-11	8/24/2018	11.0	0.013	0.0085	0.015	ND<0.0047	0.027	ND<0.0047	ND<0.0047	All ND
B2-20	8/24/2018	20.0	ND<0.0047	ND<0.0047	ND<0.0047	ND<0.0047	ND<0.0047	ND<0.0047	ND<0.0047	All ND
B3-15	8/24/2018	15.0	ND<0.0050	0.011	0.02	0.027	0.068	11	0.19	All ND
B4-17	8/24/2018	17.0	0.10	0.056	0.13	0.017	0.30	ND<0.0034	0.038	All ND
B5-10	10/24/2018	10.0	ND<0.0030	0.017	0.019	0.0068	0.017	ND<0.0030	ND<0.0030	All ND
B6-20	10/24/2018	20.0	ND<0.0025	ND<0.0025	ND<0.0025	ND<0.0025	ND<0.0025	ND<0.0025	ND<0.0025	All ND
B7-20	10/24/2018	20.0	0.0059	0.013	0.0074	0.049	0.14	1.7	0.12	All ND
B9-15	10/24/2018	15.0	ND<0.0021	0.0096	0.0049	0.013	0.027	ND<0.0021	ND<0.0021	All ND
B10-20	10/24/2018	20.0	ND<0.0021	0.012	0.0069	0.008	0.017	ND<0.0021	ND<0.0021	All ND
B11-10	10/24/2018	10.0	ND<0.17	0.75	0.34	0.48	1.4	ND<0.17	ND<0.17	All ND
B12-10	10/24/2018	10.0	ND<0.12	9.5	4.4	6.8	21.0	ND<0.12	ND<0.12	All ND
B19-4.5	12/12/2018	4.5	ND<0.0050	0.0069	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	All ND
B19-9.5	12/12/2018	9.5	ND<0.0050	0.011	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	All ND
B19-12.5	12/12/2018	12.5	0.31	0.012	0.068	0.058	0.27	0.36	0.022	All ND
B19-14.5	12/12/2018	14.5	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	All ND
B20-4.5	12/12/2018	4.5	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	All ND
B20-9.5	12/12/2018	9.5	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	All ND
B20-12.5	12/12/2018	12.5	1.1	0.38	0.57	0.052	2.0	ND<0.050	ND<0.050	All ND
B20-14.5	12/12/2018	14.5	0.015	0.0070	ND<0.0050	ND<0.0050	0.0053	ND<0.0050	ND<0.0050	All ND
SG1-4.0	12/12/2018	4.0	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	All ND
SG1-6.0	12/12/2018	6.0	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	All ND
B23-10.0	4/17/2019	10.0	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	All ND
B23-11.0	4/17/2019	11.0	ND<0.0050	0.0078	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	All ND
B23-12.0	4/17/2019	12.0	ND<0.0065	ND<0.0065	ND<0.0065	ND<0.0065	0.0052	ND<0.0065	ND<0.0065	All ND
B24-5.0	4/16/2019	5.0	0.21	0.071	0.066	0.034	0.14	0.040	0.045	All ND
B24-9.5	4/16/2019	9.5	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	All ND
B24-14.5	4/16/2019	14.5	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	All ND

Table 1B
Summary of Borehole Soil Sample Analytical Results - Other Petroleum VOCs - Wet Weight Basis

Sample ID	Sample Collection Date	Sample Collection Depth (ft bgs)	n-Butyl benzene	sec-Butyl benzene	Isopropyl-benzene	4-Isopropyl toluene	n-Propyl benzene	1,2,4-Trimethylbenzene	1,3,5-Trimethylbenzene	Other Petroleum VOCs by EPA 8260B
MW1-4.0	7/24/2019	4.0	0.19	0.12	0.077	ND<0.041	0.42	ND<0.041	ND<0.041	All ND
MW1-9.0	7/24/2019	9.0	0.56	0.33	0.38	ND<0.090	1.8	ND<0.090	ND<0.090	All ND
MW1-14.0	7/24/2019	14.0	0.11	0.072	0.046	ND<0.017	0.13	ND<0.017	ND<0.017	All ND
MW2-4.0	7/23/2019	4.0	ND<0.0087	ND<0.0087	ND<0.0087	ND<0.0087	ND<0.0087	ND<0.0087	ND<0.0087	All ND
MW2-9.0	7/23/2019	9.0	ND<0.0091	ND<0.0091	ND<0.0091	ND<0.0091	ND<0.0091	ND<0.0091	ND<0.0091	All ND
MW2-14.0	7/23/2019	14.0	ND<0.0090	ND<0.0090	ND<0.0090	ND<0.0090	ND<0.0090	ND<0.0090	ND<0.0090	All ND
MW3-4.0	7/24/2019	4.0	ND<0.0093	ND<0.0093	ND<0.0093	ND<0.0093	ND<0.0093	ND<0.0093	ND<0.0093	All ND
MW3-9.0	7/24/2019	9.0	ND<0.0097	ND<0.0097	ND<0.0097	ND<0.0097	ND<0.0097	ND<0.0097	ND<0.0097	All ND
MW3-14.0	7/24/2019	14.0	0.013	ND<0.0077	ND<0.0077	ND<0.0077	ND<0.0077	ND<0.0077	ND<0.0077	All ND
OWS1-3.0	7/25/2019	3.0	ND<0.0082	ND<0.0082	ND<0.0082	ND<0.0082	ND<0.0082	ND<0.0082	ND<0.0082	All ND
Tier 1 ESL			No Value	No Value	No Value	No Value	No Value	No Value	No Value	Variable

NOTES:
ft bgs = feet below ground surface.
ND = Not detected.
-- = Not analyzed.
ESL = Environmental Screening Level, by San Francisco Bay – Regional Water Quality Control Board, updated July 2019 (Revision 2), Soil Tier 1 ESL from Summary of Soil ESLs.
Results and ESL values, reported in mg/kg (milligrams per kilogram), unless otherwise indicated.

Table 1C
Summary of Borehole Soil Sample Analytical Results - Non-Petroleum VOCs - Wet Weight Basis

Sample ID	Sample Collection Date	Sample Collection Depth (ft bgs)	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	Vinyl Chloride	Other Non-Petroleum VOCs by EPA Method 8260B
B1-11	8/24/2018	11.0	ND<0.0047	ND<0.0047	ND<0.0047	ND<0.0047	ND<0.0047	All ND
B2-20	8/24/2018	20.0	ND<0.0047	ND<0.0047	ND<0.0047	ND<0.0047	ND<0.0047	All ND
B3-15	8/24/2018	15.0	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	All ND
B4-17	8/24/2018	17.0	ND<0.0034	ND<0.0034	ND<0.0034	ND<0.0034	ND<0.0034	All ND
B5-10	10/24/2018	10.0	ND<0.0030	ND<0.0030	ND<0.0030	ND<0.0030	ND<0.0030	All ND
B6-20	10/24/2018	20.0	ND<0.0025	ND<0.0025	ND<0.0025	ND<0.0025	ND<0.0025	All ND
B7-20	10/24/2018	20.0	ND<0.0035	ND<0.0035	ND<0.0035	ND<0.0035	ND<0.0035	All ND
B9-15	10/24/2018	15.0	ND<0.0021	ND<0.0021	ND<0.0021	ND<0.0021	ND<0.0021	All ND
B10-20	10/24/2018	20.0	ND<0.0021	ND<0.0021	ND<0.0021	ND<0.0021	ND<0.0021	All ND
B11-10	10/24/2018	10.0	ND<0.17	ND<0.17	ND<0.17	ND<0.17	ND<0.17	All ND
B12-10	10/24/2018	10.0	ND<0.12	ND<0.12	ND<0.12	ND<0.12	ND<0.12	All ND
B19-4.5	12/12/2018	4.5	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	All ND
B19-9.5	12/12/2018	9.5	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	All ND
B19-12.5	12/12/2018	12.5	ND<0.020	ND<0.020	ND<0.020	ND<0.020	ND<0.020	All ND
B19-14.5	12/12/2018	14.5	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	All ND
B20-4.5	12/12/2018	4.5	0.0067	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	All ND
B20-9.5	12/12/2018	9.5	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	All ND
B20-12.5	12/12/2018	12.5	ND<0.050	ND<0.050	ND<0.050	ND<0.050	ND<0.050	All ND
B20-14.5	12/12/2018	14.5	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	All ND
SG1-4.0	12/12/2018	4.0	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	All ND
SG1-6.0	12/12/2018	6.0	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	All ND
B23-10.0	4/17/2019	10.0	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	All ND
B23-11.0	4/17/2019	11.0	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	All ND
B23-12.0	4/17/2019	12.0	ND<0.0065	ND<0.0065	ND<0.0065	ND<0.0065	ND<0.0065	All ND
B24-5.0	4/16/2019	5.0	ND<0.020	ND<0.020	ND<0.020	ND<0.020	ND<0.020	All ND

Table 1C

Summary of Borehole Soil Sample Analytical Results - Non-Petroleum VOCs - Wet Weight Basis

Sample ID	Sample Collection Date	Sample Collection Depth (ft bgs)	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	Vinyl Chloride	Other Non-Petroleum VOCs by EPA Method 8260B
B24-9.5	4/16/2019	9.5	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	All ND
B24-14.5	4/16/2019	14.5	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	All ND
MW1-4.0	7/24/2019	4.0	0.069	ND<0.041	ND<0.041	ND<0.041	ND<0.041	All ND
MW1-9.0	7/24/2019	9.0	ND<0.090	ND<0.090	ND<0.090	ND<0.090	ND<0.090	All ND
MW1-14.0	7/24/2019	14.0	ND<0.017	ND<0.017	ND<0.017	ND<0.017	ND<0.017	All ND
MW2-4.0	7/23/2019	4.0	ND<0.0087	ND<0.0087	ND<0.0087	ND<0.0087	ND<0.0087	All ND
MW2-9.0	7/23/2019	9.0	ND<0.0091	ND<0.0091	ND<0.0091	ND<0.0091	ND<0.0091	All ND
MW2-14.0	7/23/2019	14.0	ND<0.0090	ND<0.0090	ND<0.0090	ND<0.0090	ND<0.0090	All ND
MW3-4.0	7/24/2019	4.0	ND<0.0093	ND<0.0093	ND<0.0093	ND<0.0093	ND<0.0093	All ND
MW3-9.0	7/24/2019	9.0	ND<0.0097	ND<0.0097	ND<0.0097	ND<0.0097	ND<0.0097	All ND
MW3-14.0	7/24/2019	14.0	ND<0.0077	ND<0.0077	ND<0.0077	ND<0.0077	ND<0.0077	All ND
OWS1-3.0	7/25/2019	3.0	ND<0.0082	ND<0.0082	ND<0.0082	ND<0.0082	ND<0.0082	All ND
Tier 1 ESL			# 0.080	0.085	0.19	0.65	0.0015	Various
			2.7					

NOTES:

PCE = Tetrachloroethene.

TCE = Trichloroethene.

cis-1,2-DCE = cis-1,2-Dichloroethene.

trans-1,2-DCE = trans-1,2-Dichloroethene.

VOCs = Halogenated Volatile Organic Compounds.

ft bgs = feet below ground surface.

ND = Not detected.

-- = Not analyzed.

ESL = Environmental Screening Level, by San Francisco Bay – Regional Water Quality Control Board, updated July 2019 (Revision 2), Soil Tier 1 ESL from Summary of Soil ESLs.

= 2019 (Revision 2) Tier 1 Soil ESL for PCE is 0.080 mg/kg, but is based on leaching concerns. The Direct Exposure Human Health Risk Level for a Cancer Risk in a Residential Land Use scenario is 2.7 mg/kg.

Results and ESL values, reported in mg/kg (milligrams per kilogram), unless otherwise indicated.

Table 1D
Summary of Borehole Soil Sample Analytical Results - SVOCs - Wet Weight Basis

Sample ID	Sample Collection Date	Sample Collection Depth (ft bgs)	Acenaphthene	Acenaphthylene	Anthracene	Benzo (a) anthracene	Benzo (a) pyrene	Benzo (b) fluoranthene	Benzo (g,h,i) perylene	Benzo (k) fluoranthene	1,1-Biphenyl	Bis (2-ethylhexyl) Phthalate	Chrysene	Dibenzo (a,h) anthracene	Di-n-butyl Phthalate	Fluoranthene	Fluorene	Indeno (1,2,3-cd) pyrene	1-Methyl-naphthalene	2-Methyl-naphthalene	Naphthalene	Phenanthrene	Phenol	Pyrene	Other SVOCs by EPA 8270C
B24-5.0	4/16/2019	5.0	0.014	0.018	0.065	0.075	0.053	0.026	0.08	0.012	0.015	0.56	0.055	0.0097	0.0055	0.13	0.057	0.023	0.22	0.056	0.041	0.18	0.022	0.17	All ND
B24-9.5	4/16/2019	9.5	ND<0.0013	ND<0.0013	ND<0.0013	ND<0.0050	0.0019	ND<0.0013	0.0024	ND<0.0013	ND<0.0013	0.013	0.0012	ND<0.0025	0.0021	0.0047	ND<0.0025	0.0014	ND<0.0013	ND<0.0025	ND<0.0013	0.00068	0.052	0.0076	All ND
B24-14.5	4/16/2019	14.5	ND<0.0013	0.0019	ND<0.0013	0.03	0.017	0.0086	0.031	0.0041	0.008	0.19	0.019	0.0035	0.0039	0.047	0.0025	0.0074	ND<0.0013	ND<0.0025	ND<0.0013	ND<0.0050	0.021	0.073	All ND
LTCP	Residential																				Naphthalene 0-5' = 9.7				
	Residential																				Naphthalene 5-10' = 9.7				
	Utility Worker																				Naphthalene 0-10' = 219				
Tier 1 ESL			12	6.4	1.9	0.63	0.11	1.1	2.5	2.8	0.42	0.80	2.2	0.11	No Value	0.69	6.0	0.48	No Value	0.88	0.42	7.8	0.16	45	Various

NOTES:
ft bgs = feet below ground surface.
ND = Not detected.
-- = Not analyzed.
LTCP = Low Threat Closure Policy, by State Water Resources Control Board, effective August 17, 2012, from Table 1 - Concentrations of Petroleum Constituents in Soil That Will Have No Significant Risk of Adversely Affecting Human Health.
ESL = Environmental Screening Level, by San Francisco Bay – Regional Water Quality Control Board, updated July 2019 (Revision 2), Soil Tier 1 ESL from Summary of Soil ESLs.
Results, LTCP values, and ESL values, reported in mg/kg (milligrams per kilogram), unless otherwise indicated.

Table 1E
Summary of Borehole Soil Sample Analytical Results - Petroleum and Petroleum VOCs, and PCBs - Dry Weight Basis

Sample ID	Sample Collection Date	Sample Collection Depth (ft bgs)	TPH-G	TPH-D	TPH-BO	TPH-MO	MTBE	Benzene	Toluene	Ethylbenzene	m,p-Xylene	o-Xylene	Naphthalene	PCBs	Percent Moisture
B19-4.5	12/12/2018	4.5	34, a	59, b,c	250, b,c	390, b,c	ND<0.0058	ND<0.0058	ND<0.0058	ND<0.0058	ND<0.0058	ND<0.0058	ND<0.0058	--	Dry
B19-9.5	12/12/2018	9.5	19, a	30, b,c	30, b,c	250, b,c	ND<0.0060	ND<0.0060	ND<0.0060	ND<0.0060	ND<0.0060	ND<0.0060	ND<0.0060	--	Dry
B19-12.5	12/12/2018	12.5	65, a	28, b,d,e	120, b,d,e	110, b,d,e	ND<0.024	ND<0.024	ND<0.024	ND<0.024	ND<0.024	ND<0.024	ND<0.024	--	Dry
B19-14.5	12/12/2018	14.5	ND<1.3	ND<1.3	ND<6.4	ND<6.4	ND<0.0064	ND<0.0064	ND<0.0064	ND<0.0064	ND<0.0064	ND<0.0064	ND<0.0064	--	Dry
B20-4.5	12/12/2018	4.5	ND<1.2	ND<1.2	ND<6.0	ND<6.0	ND<0.0060	ND<0.0060	ND<0.0060	ND<0.0060	ND<0.0060	ND<0.0060	ND<0.0060	--	Dry
B20-9.5	12/12/2018	9.5	ND<1.2	ND<1.2	ND<5.8	ND<5.8	ND<0.0058	ND<0.0058	ND<0.0058	ND<0.0058	ND<0.0058	ND<0.0058	ND<0.0058	--	Dry
B20-12.5	12/12/2018	12.5	**270, a**	9.4, d,c	9.4, d,c	ND<5.9	ND<0.059	ND<0.059	ND<0.059	ND<0.059	ND<0.059	ND<0.059	ND<0.059	--	Dry
B20-14.5	12/12/2018	14.5	9.1, a	ND<1.2, d	ND<6.1, d	ND<6.1, d	ND<0.0061	ND<0.0061	ND<0.0061	ND<0.0061	ND<0.0061	ND<0.0061	ND<0.0061	--	Dry
SG1-4.0	12/12/2018	4.0	ND<1.1	ND<1.1	ND<5.7	ND<5.7	ND<0.0057	ND<0.0057	ND<0.0057	ND<0.0057	ND<0.0057	ND<0.0057	ND<0.0057	--	Dry
SG1-6.0	12/12/2018	6.0	ND<1.2	ND<1.2	ND<5.8	ND<5.8	ND<0.0058	ND<0.0058	ND<0.0058	ND<0.0058	ND<0.0058	ND<0.0058	ND<0.0058	--	Dry
B23-10.0	4/17/2019	10.0	2.0, a	ND<1.2	ND<6.1	ND<6.1	ND<0.0061	ND<0.0061	ND<0.0061	ND<0.0061	ND<0.0061	ND<0.0061	ND<0.0061	--	Dry
B23-11.0	4/17/2019	11.0	43, a	ND<1.3	ND<6.3	ND<6.3	ND<0.0063	ND<0.0063	ND<0.0063	ND<0.0063	ND<0.0063	ND<0.0063	ND<0.0063	--	Dry
B23-12.0	4/17/2019	12.0	12, a	ND<1.3	ND<6.5	ND<6.5	ND<0.0065	ND<0.0065	ND<0.0065	ND<0.0065	ND<0.0065	ND<0.0065	ND<0.0065	--	Dry
B24-5.0	4/16/2019	5.0	**120, a,f**	97, c,b,d	430, c,b,d	430, c,b,d	ND<0.025	ND<0.025	ND<0.025	0.052	ND<0.025	ND<0.025	ND<0.025	All ND<0.063	Dry
B24-9.5	4/16/2019	9.5	ND<1.2	2.0, c,b	10, c,b	10, c,b	ND<0.0059	ND<0.0059	ND<0.0059	ND<0.0059	ND<0.0059	ND<0.0059	ND<0.0059	All ND<0.063	Dry
B24-14.5	4/16/2019	14.5	21, f	38, c,b,d	200, c,b,d	200, c,b,d	ND<0.0063	ND<0.0063	ND<0.0063	ND<0.0063	ND<0.0063	ND<0.0063	ND<0.0063	All ND<0.063	Dry

Table 1E

Summary of Borehole Soil Sample Analytical Results - Petroleum and Petroleum VOCs, and PCBs - Dry Weight Basis

Sample ID	Sample Collection Date	Sample Collection Depth (ft bgs)	TPH-G	TPH-D	TPH-BO	TPH-MO	MTBE	Benzene	Toluene	Ethylbenzene	m,p-Xylene	o-Xylene	Naphthalene	PCBs	Percent Moisture
MW1-4.0	7/24/2019	4.0	28, a,b	1.9, c	ND<5.0	ND<5.0	ND<0.048	ND<0.048	ND<0.048	ND<0.048	ND<0.048	ND<0.048	ND<0.048	--	Dry
MW1-9.0	7/24/2019	9.0	18, a,b	1.8, c	ND<5.0	ND<5.0	ND<0.11	ND<0.11	ND<0.11	ND<0.11	ND<0.11	ND<0.11	ND<0.11	--	Dry
MW1-14.0	7/24/2019	14.0	**120, a,b**	7.2, c,d	7.2, c,d	ND<5.0	ND<0.021	ND<0.021	ND<0.021	ND<0.021	ND<0.021	ND<0.021	ND<0.021	--	Dry
MW2-4.0	7/23/2019	4.0	ND<1.2	ND<1.2	ND<6.2	ND<6.2	ND<0.011	ND<0.011	ND<0.011	ND<0.011	ND<0.011	ND<0.011	ND<0.011	--	Dry
MW2-9.0	7/23/2019	9.0	ND<1.2	ND<1.2	ND<6.0	ND<6.0	ND<0.011	ND<0.011	ND<0.011	ND<0.011	ND<0.011	ND<0.011	ND<0.011	--	Dry
MW2-14.0	7/23/2019	14.0	ND<1.2	ND<1.2	ND<6.2	ND<6.2	ND<0.011	ND<0.011	ND<0.011	ND<0.011	ND<0.011	ND<0.011	ND<0.011	--	Dry
MW3-4.0	7/24/2019	4.0	ND<1.2	ND<1.2	ND<5.9	ND<5.9	ND<0.011	ND<0.011	ND<0.011	ND<0.011	ND<0.011	ND<0.011	ND<0.011	--	Dry
MW3-9.0	7/24/2019	9.0	ND<1.1	ND<1.1	ND<5.7	ND<5.7	ND<0.011	ND<0.011	ND<0.011	ND<0.011	ND<0.011	ND<0.011	ND<0.011	--	Dry
MW3-14.0	7/24/2019	14.0	ND<1.2	ND<1.2	ND<6.1	ND<6.1	ND<0.0094	ND<0.0094	ND<0.0094	ND<0.0094	ND<0.0094	ND<0.0094	ND<0.0094	--	Dry
OWS1-3.0	7/25/2019	3.0	ND<1.2	1.9, c,e	8.9, c,e	9.0, c,e	ND<0.010	ND<0.010	ND<0.010	ND<0.010	ND<0.010	ND<0.010	ND<0.010	--	Dry
LTCP	Residential							0-5' = 1.9		0-5' = 21			0-5' = 9.7		
	Residential							5-10' = 2.8		5-10' = 32			5-10' = 9.7		
	Utility Worker							0-10' = 14		0-10' = 314			0-10' = 219		
Tier 1 ESL			100	260	1,600	1,600	0.028	0.025	3.2	0.43	Combined = 2.1		## 0.042 3.8	0.23	No Value

NOTES:
TPH-G = Total Petroleum Hydrocarbons as Gasoline.
TPH-D = Total Petroleum Hydrocarbons as Diesel.
TPH-BO = Total Petroleum Hydrocarbons as Bunker Oil.
TPH-MO = Total Petroleum Hydrocarbons as Motor Oil.
MTBE = Methyl tertiary-butyl ether.
VOCs = Volatile Organic Compounds.
PCBs = Polychlorinated Biphenyls.
ft bgs = feet below ground surface.
ND = Not detected.
a = Laboratory Note: no recognizable pattern.
b = Laboratory Note: oil range compounds are significant.
c = Laboratory Note: diesel range compounds are significant; no recognizable pattern.
d = Laboratory Note: pattern resembles kerosene/kerosene-range/jet fuel range diesel range.
e = Laboratory Note: gasoline range compounds are significant.
f = Laboratory Note: strongly aged gasoline or diesel range compounds are significant in the TPH-G chromatogram.
LTCP = Low Threat Closure Policy, by State Water Resources Control Board, effective August 17, 2012, from Table 1 - Concentrations of Petroleum Constituents in Soil That Will Have No Significant Risk of Adversely Affecting Human Health.
ESL = Environmental Screening Level, by San Francisco Bay – Regional Water Quality Control Board, updated July 2019 (Revision 2), Soil Tier 1 ESL from Summary of Soil ESLs.
= 2019 (Revision 2) Tier 1 Soil ESL for Naphthalene is 0.042 mg/kg, but is based on leaching concerns. The Direct Exposure Human Health Risk Level for a Cancer Risk in a Residential Land Use scenario is 3.8 mg/kg.
Green high light indicates that the sample detection limit exceeded the respective Tier 1 soil ESL value.
Results, LTCP values, and ESL values, reported in mg/kg (milligrams per kilogram), unless otherwise indicated.

Table 1F
Summary of Borehole Soil Sample Analytical Results - Other Petroleum VOCs - Dry Weight Basis

Sample ID	Sample Collection Date	Sample Collection Depth (ft bgs)	n-Butyl benzene	sec-Butyl benzene	Isopropylbenzene	4-Isopropyl toluene	n-Propyl benzene	1,2,4-Trimethylbenzene	1,3,5-Trimethylbenzene	Other Petroleum VOCs by EPA 8260B
B19-4.5	12/12/2018	4.5	ND<0.0058	0.0080	ND<0.0058	ND<0.0058	ND<0.0058	ND<0.0058	ND<0.0058	All ND
B19-9.5	12/12/2018	9.5	ND<0.0060	0.013	ND<0.0060	ND<0.0060	ND<0.0060	ND<0.0060	ND<0.0060	All ND
B19-12.5	12/12/2018	12.5	0.38	0.015	0.082	0.070	0.33	0.44	0.027	All ND
B19-14.5	12/12/2018	14.5	ND<0.0064	ND<0.0064	ND<0.0064	ND<0.0064	ND<0.0064	ND<0.0064	ND<0.0064	All ND
B20-4.5	12/12/2018	4.5	ND<0.0060	ND<0.0060	ND<0.0060	ND<0.0060	ND<0.0060	ND<0.0060	ND<0.0060	All ND
B20-9.5	12/12/2018	9.5	ND<0.0058	ND<0.0058	ND<0.0058	ND<0.0058	ND<0.0058	ND<0.0058	ND<0.0058	All ND
B20-12.5	12/12/2018	12.5	1.3	0.45	0.67	0.061	2.3	ND<0.059	ND<0.059	All ND
B20-14.5	12/12/2018	14.5	0.018	0.0085	ND<0.0061	ND<0.0061	0.0064	ND<0.0061	ND<0.0061	All ND
SG1-4.0	12/12/2018	4.0	ND<0.0057	ND<0.0057	ND<0.0057	ND<0.0057	ND<0.0057	ND<0.0057	ND<0.0057	All ND
SG1-6.0	12/12/2018	6.0	ND<0.0058	ND<0.0058	ND<0.0058	ND<0.0058	ND<0.0058	ND<0.0058	ND<0.0058	All ND
B23-10.0	4/17/2019	10.0	ND<0.0061	ND<0.0061	ND<0.0061	ND<0.0061	ND<0.0061	ND<0.0061	ND<0.0061	All ND
B23-11.0	4/17/2019	11.0	ND<0.0063	0.0099	ND<0.0063	ND<0.0063	ND<0.0063	ND<0.0063	ND<0.0063	All ND
B23-12.0	4/17/2019	12.0	ND<0.0065	ND<0.0065	ND<0.0065	ND<0.0065	0.0067	ND<0.0065	ND<0.0065	All ND
B24-5.0	4/16/2019	5.0	0.26	0.089	0.083	0.043	0.18	0.050	0.057	All ND
B24-9.5	4/16/2019	9.5	ND<0.0059	ND<0.0059	ND<0.0059	ND<0.0059	ND<0.0059	ND<0.0059	ND<0.0059	All ND
B24-14.5	4/16/2019	14.5	ND<0.0063	ND<0.0063	ND<0.0063	ND<0.0063	ND<0.0063	ND<0.0063	ND<0.0063	All ND
MW1-4.0	7/24/2019	4.0	0.22	0.14	0.089	ND<0.048	0.49	ND<0.048	ND<0.048	All ND
MW1-9.0	7/24/2019	9.0	0.66	0.39	0.45	ND<0.11	2.1	ND<0.11	ND<0.11	All ND
MW1-14.0	7/24/2019	14.0	0.13	0.088	0.056	ND<0.021	0.16	ND<0.021	ND<0.021	All ND
MW2-4.0	7/23/2019	4.0	ND<0.011	ND<0.011	ND<0.011	ND<0.011	ND<0.011	ND<0.011	ND<0.011	All ND
MW2-9.0	7/23/2019	9.0	ND<0.011	ND<0.011	ND<0.011	ND<0.011	ND<0.011	ND<0.011	ND<0.011	All ND
MW2-14.0	7/23/2019	14.0	ND<0.011	ND<0.011	ND<0.011	ND<0.011	ND<0.011	ND<0.011	ND<0.011	All ND
MW3-4.0	7/24/2019	4.0	ND<0.011	ND<0.011	ND<0.011	ND<0.011	ND<0.011	ND<0.011	ND<0.011	All ND
MW3-9.0	7/24/2019	9.0	ND<0.011	ND<0.011	ND<0.011	ND<0.011	ND<0.011	ND<0.011	ND<0.011	All ND
MW3-14.0	7/24/2019	14.0	0.016	ND<0.0094	ND<0.0094	ND<0.0094	ND<0.0094	ND<0.0094	ND<0.0094	All ND
OWS1-3.0	7/25/2019	3.0	ND<0.010	ND<0.010	ND<0.010	ND<0.010	ND<0.010	ND<0.010	ND<0.010	All ND
Tier 1 ESL			No Value	No Value	No Value	No Value	No Value	No Value	No Value	Various

NOTES:
ft bgs = feet below ground surface.
ND = Not detected.
ESL = Environmental Screening Level, by San Francisco Bay – Regional Water Quality Control Board, updated July 2019 (Revision 2), Soil Tier 1 ESL from Summary of Soil ESLs.
Results and ESL values, reported in mg/kg (milligrams per kilogram), unless otherwise indicated.

Table 1G
Summary of Borehole Soil Sample Analytical Results - Non-Petroleum VOCs - Dry Weight Basis

Sample ID	Sample Collection Date	Sample Collection Depth (ft bgs)	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	Vinyl Chloride	Other Non-Petroleum VOCs by EPA Method 8260B
B19-4.5	12/12/2018	4.5	ND<0.0058	ND<0.0058	ND<0.0058	ND<0.0058	ND<0.0058	All ND
B19-9.5	12/12/2018	9.5	ND<0.0060	ND<0.0060	ND<0.0060	ND<0.0060	ND<0.0060	All ND
B19-12.5	12/12/2018	12.5	ND<0.024	ND<0.024	ND<0.024	ND<0.024	ND<0.024	All ND
B19-14.5	12/12/2018	14.5	ND<0.0064	ND<0.0064	ND<0.0064	ND<0.0064	ND<0.0064	All ND
B20-4.5	12/12/2018	4.5	0.0080	ND<0.0060	ND<0.0060	ND<0.0060	ND<0.0060	All ND
B20-9.5	12/12/2018	9.5	ND<0.0058	ND<0.0058	ND<0.0058	ND<0.0058	ND<0.0058	All ND
B20-12.5	12/12/2018	12.5	ND<0.059	ND<0.059	ND<0.059	ND<0.059	ND<0.059	All ND
B20-14.5	12/12/2018	14.5	ND<0.0061	ND<0.0061	ND<0.0061	ND<0.0061	ND<0.0061	All ND
SG1-4.0	12/12/2018	4.0	ND<0.0057	ND<0.0057	ND<0.0057	ND<0.0057	ND<0.0057	All ND
SG1-6.0	12/12/2018	6.0	ND<0.0058	ND<0.0058	ND<0.0058	ND<0.0058	ND<0.0058	All ND
B23-10.0	4/17/2019	10.0	ND<0.0061	ND<0.0061	ND<0.0061	ND<0.0061	ND<0.0061	All ND
B23-11.0	4/17/2019	11.0	ND<0.0063	ND<0.0063	ND<0.0063	ND<0.0063	ND<0.0063	All ND
B23-12.0	4/17/2019	12.0	ND<0.0065	ND<0.0065	ND<0.0065	ND<0.0065	ND<0.0065	All ND
B24-5.0	4/16/2019	5.0	ND<0.025	ND<0.025	ND<0.025	ND<0.025	ND<0.025	All ND
B24-9.5	4/16/2019	9.5	ND<0.0059	ND<0.0059	ND<0.0059	ND<0.0059	ND<0.0059	All ND
B24-14.5	4/16/2019	14.5	ND<0.0063	ND<0.0063	ND<0.0063	ND<0.0063	ND<0.0063	All ND

Table 1G
Summary of Borehole Soil Sample Analytical Results - Non-Petroleum VOCs - Dry Weight Basis

Sample ID	Sample Collection Date	Sample Collection Depth (ft bgs)	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	Vinyl Chloride	Other Non-Petroleum VOCs by EPA Method 8260B
MW1-4.0	7/24/2019	4.0	0.080	ND<0.048	ND<0.048	ND<0.048	ND<0.048	All ND
MW1-9.0	7/24/2019	9.0	ND<0.11	ND<0.11	ND<0.11	ND<0.11	ND<0.11	All ND
MW1-14.0	7/24/2019	14.0	ND<0.021	ND<0.021	ND<0.021	ND<0.021	ND<0.021	All ND
MW2-4.0	7/23/2019	4.0	ND<0.011	ND<0.011	ND<0.011	ND<0.011	ND<0.011	All ND
MW2-9.0	7/23/2019	9.0	ND<0.011	ND<0.011	ND<0.011	ND<0.011	ND<0.011	All ND
MW2-14.0	7/23/2019	14.0	ND<0.011	ND<0.011	ND<0.011	ND<0.011	ND<0.011	All ND
MW3-4.0	7/24/2019	4.0	ND<0.011	ND<0.011	ND<0.011	ND<0.011	ND<0.011	All ND
MW3-9.0	7/24/2019	9.0	ND<0.011	ND<0.011	ND<0.011	ND<0.011	ND<0.011	All ND
MW3-14.0	7/24/2019	14.0	ND<0.0094	ND<0.0094	ND<0.0094	ND<0.0094	ND<0.0094	All ND
OWS1-3.0	7/25/2019	3.0	ND<0.010	ND<0.010	ND<0.010	ND<0.010	ND<0.010	All ND
Tier 1 ESL			# 0.080 2.7	0.085	0.19	0.65	0.0015	Various

NOTES:
PCE = Tetrachloroethene.
TCE = Trichloroethene.
cis-1,2-DCE = cis-1,2-Dichloroethene.
trans-1,2-DCE = trans-1,2-Dichloroethene.
VOCs = Volatile Organic Compounds.
ft bgs = feet below ground surface.
ND = Not detected.
ESL = Environmental Screening Level, by San Francisco Bay – Regional Water Quality Control Board, updated July 2019 (Revision 2), Soil Tier 1 ESL from Summary of Soil ESLs.
# = 2019 (Revision 2) Tier 1 Soil ESL for PCE is 0.080 mg/kg, but is based on leaching concerns. The Direct Exposure Human Health Risk Level for a Cancer Risk in a Residential Land Use scenario is 2.7 mg/kg.
Green high light indicates that the sample detection limit exceeded the respective Tier 1 soil ESL value
Results and ESL values, reported in mg/kg (milligrams per kilogram), unless otherwise indicated.

Table 1H

Summary of Borehole Soil Sample Analytical Results - SVOCs - Dry Weight Basis

Sample ID	Sample Collection Date	Sample Collection Depth (ft bgs)	Acenaphthene	Acenaphthylene	Anthracene	Benzo (a) anthracene	Benzo (a) pyrene	Benzo (b) fluoranthene	Benzo (g,h,i) perylene	Benzo (k) fluoranthene	1,1-Biphenyl	Bis (2-ethylhexyl) Phthalate	Chrysene	Dibenzo (a,h) anthracene	Di-n-butyl Phthalate	Fluoranthene	Fluorene	Indeno (1,2,3-cd) pyrene	1-Methyl-naphthalene	2-Methyl-naphthalene	Naphthalene	Phenanthrene	Phenol	Pyrene	Other SVOCs by EPA 8270C
B24-5.0	4/16/2019	5.0	0.018	0.023	0.082	0.094	0.067	0.033	0.10	0.015	0.019	0.70	0.069	0.012	0.0069	0.16	0.072	0.029	0.28	0.070	0.052	0.23	0.028	0.21	All ND
B24-9.5	4/16/2019	9.5	ND<0.0015	ND<0.0015	ND<0.0015	ND<0.0059	0.0023	ND<0.0015	0.0029	ND<0.0015	ND<0.0015	0.015	0.0014	ND<0.0030	0.0025	0.0056	ND<0.0030	0.0017	ND<0.0015	ND<0.0030	ND<0.0015	0.00081	0.062	0.0090	All ND
B24-14.5	4/16/2019	14.5	ND<0.0016	0.0024	ND<0.0016	0.038	0.021	0.011	0.039	0.0051	0.010	0.24	0.024	0.0044	0.0049	0.059	0.0031	0.0093	ND<0.0016	ND<0.0031	ND<0.0016	ND<0.0063	0.026	0.092	All ND
LTCP	Residential																				Naphthalene 0-5' = 9.7				
	Residential																				Naphthalene 5-10' = 9.7				
	Utility Worker																				Naphthalene 0-10' = 219				
Tier 1 ESL			12	6.4	1.9	0.63	0.11	1.1	2.5	2.8	0.42	0.80	2.2	0.11	No Value	0.69	6.0	0.48	No Value	0.88	* 3.8	7.8	0.16	45	Various

NOTES:

ft bgs = feet below ground surface.

ND = Not detected.

* = 2019 (Revision 2) Tier 1 Soil ESL for Naphthalene is 0.042 mg/kg, but is based on Leaching Concerns. The Direct Exposure Human Health Risk Level for a Cancer Risk in a Residential Land Use scenario is 3.8 mg/kg.

LTCP = Low Threat Closure Policy, by State Water Resources Control Board, effective August 17, 2012, from Table 1 - Concentrations of Petroleum Constituents in Soil That Will Have No Significant Risk of Adversely Affecting Human Health.

ESL = Environmental Screening Level, by San Francisco Bay – Regional Water Quality Control Board, updated July 2019 (Revision 2), Soil Tier 1 ESL from Summary of Soil ESLs.

Results, LTCP values, and ESL values, reported in mg/kg (milligrams per kilogram), unless otherwise indicated.

Table 2A

Summary of Shallow Soil Sample Analytical Results - Lead, Asbestos, and Percent Moisture - Wet Weight Basis

Sample ID	Sample Collection Date	Sample Collection Depth (ft bgs)	Total Lead	Lead STLC (mg/L)	Lead TCLP (mg/L)	Asbestos (Percent)	Percent Moisture
S1	7/25/2019	1.0	64	3.9	--	ND<1	15.8
S2	7/25/2019	1.0	41	--	--	ND<1	14.7
S3	7/25/2019	1.6	**450**	28	0.22	ND<1	16.2
S4	7/25/2019	0.8	12	--	--	ND<1	17.6
S5	7/25/2019	0.8	**110**	1.2	--	ND<1	18.0
S6	7/25/2019	0.8	8.8	--	--	ND<1	12.3
S7-0.5-F	11/11/2019	0.5	16	--	--	--	--
S7-1.0-N	11/11/2019	1.0	**430**	--	--	--	--
S8-0.5-F	11/11/2019	0.5	**320**	--	--	--	--
S8-1.0-N	11/11/2019	1.0	**85**	--	--	--	--
S9-0.5-F	11/11/2019	0.5	58	--	--	--	--
S9-1.0-N	11/11/2019	1.0	**150**	--	--	--	--
S10-0.8-F	11/11/2019	0.8	**1,200**	--	--	--	--
S10-1.0-N	11/11/2019	1.0	73	--	--	--	--
S11-0.5-F1	11/11/2019	0.5	36	--	--	--	--
S11-1.0-F2	11/11/2019	1.0	19	--	--	--	--
S11-1.5-N	11/11/2019	1.5	**210**	--	--	--	--
S12-0.5-F	11/11/2019	0.5	**100**	--	--	--	--
S12-2.0-N	11/11/2019	2.0	**250**	--	--	--	--
S13-1.0-F1	11/11/2019	1.0	9.4	--	--	--	--
S13-2.0-F2	11/11/2019	2.0	**110**	--	--	--	--
S13-2.5-N	11/11/2019	2.5	6.3	--	--	--	--
S14-0.5-F	11/11/2019	0.5	35	--	--	--	--
S14-1.0-N	11/11/2019	1.0	19	--	--	--	--

Table 2A

Summary of Shallow Soil Sample Analytical Results - Lead, Asbestos, and Percent Moisture - Wet Weight Basis

Sample ID	Sample Collection Date	Sample Collection Depth (ft bgs)	Total Lead	Lead STLC (mg/L)	Lead TCLP (mg/L)	Asbestos (Percent)	Percent Moisture
S15-0.4-F	11/11/2019	0.4	6.6	--	--	--	--
S15-0.8-N	11/11/2019	0.8	**180**	--	--	--	--
S16-0.8-F	11/11/2019	0.8	59	--	--	--	--
S16-1.0-N	11/11/2019	1.0	53	--	--	--	--
S17-0.4-F	11/11/2019	0.4	67	--	--	--	--
S17-0.8-N	11/11/2019	0.8	**110**	--	--	--	--
S18-0.4-F	11/11/2019	0.4	12	--	--	--	--
S18-0.8-N	11/11/2019	0.8	18	--	--	--	--
S19-0.5-F	11/11/2019	0.5	13	--	--	--	--
S19-0.8-N	11/11/2019	0.8	**230**	--	--	--	--
S20-0.4-F	11/11/2019	0.4	32	--	--	--	--
S20-0.6-N	11/11/2019	0.6	**130**	--	--	--	--
S21-0.4-F	11/11/2019	0.4	**150**	--	--	--	--
S21-0.6-N	11/11/2019	0.6	11	--	--	--	--
S22-0.5-F	11/11/2019	0.5	11	--	--	--	--
S22-0.8-N	11/11/2019	0.8	**160**	--	--	--	--
Tier 1 ESL			*80	No Value	No Value	No Value	No Value
Title 22 Hazardous Waste Criteria (TTLC)			50	5.0	5.0	No Value	No Value

NOTES:

ft bgs = feet below ground surface.

ND = Not detected.

-- = Not analyzed.

ESL = Environmental Screening Level, by San Francisco Bay – Regional Water Quality Control Board, updated July 2019 (Revision 2), Soil Tier 1 ESL from Summary of Soil ESLs.

TTLC = Total Threshold Limit Concentration.

TCLP = Toxicity Characteristic Leaching Procedure.

Title 22 Hazardous Waste Criteria - Values given are 10 times the respective Soluble Threshold Limit Concentration (STLC).

* = 2019 (Revision 2) Tier 1 Soil ESL for Lead is 32 mg/kg, but is based on Terrestrial Habitat Levels. The Direct Exposure Human Health Risk Level for a Non-Cancer Risk in a Residential Land Use scenario is 80 mg/kg.

Results in BOLD exceed the respective ESL value.

Underlined results exceed Title 22 Hazardous Waste Criteria.

Results, ESL values, and Title 22 criteria reported in mg/kg (milligrams per kilogram), unless otherwise indicated.

Table 2B
Summary of Shallow Soil Sample Analytical Results - Lead - Dry Weight Basis

Sample ID	Sample Collection Date	Sample Collection Depth (ft bgs)	Total Lead	Lead STLC (mg/L)	Lead TCLP (mg/L)	Asbestos (Percent)	Percent Moisture
S1	7/25/2019	1.0	76	3.9	--	No Value	Dry
S2	7/25/2019	1.0	48	--	--	No Value	Dry
S3	7/25/2019	1.6	**540**	28	0.22	No Value	Dry
S4	7/25/2019	0.8	15	--	--	No Value	Dry
S5	7/25/2019	0.8	**130**	1.2	--	No Value	Dry
S6	7/25/2019	0.8	10	--	--	No Value	Dry
S7-0.5-F	11/11/2019	0.5	--	--	--	--	--
S7-1.0-N	11/11/2019	1.0	--	--	--	--	--
S8-0.5-F	11/11/2019	0.5	--	--	--	--	--
S8-1.0-N	11/11/2019	1.0	--	--	--	--	--
S9-0.5-F	11/11/2019	0.5	--	--	--	--	--
S9-1.0-N	11/11/2019	1.0	--	--	--	--	--
S10-0.8-F	11/11/2019	0.8	--	--	--	--	--
S10-1.0-N	11/11/2019	1.0	--	--	--	--	--
S11-0.5-F1	11/11/2019	0.5	--	--	--	--	--
S11-1.0-F2	11/11/2019	1.0	--	--	--	--	--
S11-1.5-N	11/11/2019	1.5	--	--	--	--	--
S12-0.5-F	11/11/2019	0.5	--	--	--	--	--
S12-2.0-N	11/11/2019	2.0	--	--	--	--	--
S13-1.0-F1	11/11/2019	1.0	--	--	--	--	--
S13-2.0-F2	11/11/2019	2.0	--	--	--	--	--
S13-2.5-N	11/11/2019	2.5	--	--	--	--	--
S14-0.5-F	11/11/2019	0.5	--	--	--	--	--
S14-1.0-N	11/11/2019	1.0	--	--	--	--	--

Table 2B
Summary of Shallow Soil Sample Analytical Results - Lead - Dry Weight Basis

Sample ID	Sample Collection Date	Sample Collection Depth (ft bgs)	Total Lead	Lead STLC (mg/L)	Lead TCLP (mg/L)	Asbestos (Percent)	Percent Moisture
S15-0.4-F	11/11/2019	0.4	--	--	--	--	--
S15-0.8-N	11/11/2019	0.8	--	--	--	--	--
S16-0.8-F	11/11/2019	0.8	--	--	--	--	--
S16-1.0-N	11/11/2019	1.0	--	--	--	--	--
S17-0.4-F	11/11/2019	0.4	--	--	--	--	--
S17-0.8-N	11/11/2019	0.8	--	--	--	--	--
S18-0.4-F	11/11/2019	0.4	--	--	--	--	--
S18-0.8-N	11/11/2019	0.8	--	--	--	--	--
S19-0.5-F	11/11/2019	0.5	--	--	--	--	--
S19-0.8-N	11/11/2019	0.8	--	--	--	--	--
S20-0.4-F	11/11/2019	0.4	--	--	--	--	--
S20-0.6-N	11/11/2019	0.6	--	--	--	--	--
S21-0.4-F	11/11/2019	0.4	--	--	--	--	--
S21-0.6-N	11/11/2019	0.6	--	--	--	--	--
S22-0.5-F	11/11/2019	0.5	--	--	--	--	--
S22-0.8-N	11/11/2019	0.8	--	--	--	--	--
Tier 1 ESL			*80	No Value	No Value	No Value	No Value
Title 22 Hazardous Waste Criteria (TTLC)			50	5.0	5.0	No Value	No Value

NOTES:
ft bgs = feet below ground surface.
ND = Not detected.
-- = Not analyzed.
ESL = Environmental Screening Level, by San Francisco Bay – Regional Water Quality Control Board,
updated July 2019 (Revision 2), Soil Tier 1 ESL from Summary of Soil ESLs.
TTLC = Total Threshold Limit Concentration.
TCLP = Toxicity Characteristic Leaching Procedure.
Title 22 Hazardous Waste Criteria - Values given are 10 times the respective Soluble Threshold Limit Concentration (STLC).
* = 2019 (Revision 2) Tier 1 Soil ESL for Lead is 32 mg/kg, but is based on Terrestrial Habitat Levels. The Direct Exposure
Human Health Risk Level for a Non-Cancer Risk in a Residential Land Use scenario is 80 mg/kg.
Results in BOLD exceed the respective ESL value.
Underlined results exceed Title 22 Hazardous Waste Criteria.
Results, ESL values, and Title 22 criteria reported in mg/kg (milligrams per kilogram), unless otherwise indicated.

Table 3A
Summary of Hydraulic Jack Excavation Soil Sample Analytical Results - Petroleum and Petroleum VOCs, PCBs, and Percent Moisture - Wet Weight Basis

Sample ID	Sample Collection Date	Sample Collection Depth (ft bgs)	TPH-G	TPH-D	TPH-BO	TPH-MO	MTBE	Benzene	Toluene	Ethylbenzene	m,p-Xylenes	o-Xylenes	Naphthalene	PCBs	Percent Moisture
H1-6.0	7/25/2019	6.0	1.2, b	2.6, c,e	12, c,e	11, c,e	ND<0.0086	ND<0.0086	ND<0.0086	ND<0.0086	ND<0.0086	ND<0.0086	ND<0.0086	All ND<0.050	16.8
H1-10.0	7/25/2019	10.0	20, a,b	11, c,e	47, c,e	47, c,e	ND<0.0082	ND<0.0082	ND<0.0082	ND<0.0082	ND<0.0082	ND<0.0082	ND<0.0082	All ND<0.050	17.1
H2-10.0	7/25/2019	10.0	6.8, a,b	28, c,d,e	190, c,d,e	200, c,d,e	ND<0.0087	ND<0.0087	ND<0.0087	ND<0.0087	ND<0.0087	ND<0.0087	ND<0.0087	All ND<0.050	20.9
H3-9.0	7/25/2019	9.0	**580, a**	**2,100, c,d,e**	4,600, c,d,e	4,500, c,d,e	ND<0.079	ND<0.079	ND<0.079	ND<0.079	ND<0.079	ND<0.079	ND<0.079	All ND<0.050	15.5
H4-9.0	7/25/2019	9.0	ND<1.0	69, c,d,e	400, c,d,e	380, c,d,e	ND<0.0089	ND<0.0089	ND<0.0089	ND<0.0089	ND<0.0089	ND<0.0089	ND<0.0089	All ND<0.050	16.1
H5-9.0	7/25/2019	9.0	ND<1.0	6.7, c,e	33, c,e	35, c,e	ND<0.0089	ND<0.0089	ND<0.0089	ND<0.0089	ND<0.0089	ND<0.0089	ND<0.0089	All ND<0.050	13.6
H6-9.0	7/25/2019	9.0	16, b	**720, c,d,e**	3,500, c,d,e	3,500, c,d,e	ND<0.0082	ND<0.0082	0.021	0.062	0.14	0.11	0.028	All ND<0.050	15.6
LTCP	Residential							0-5' = 1.9		0-5' = 21			0-5' = 9.7		
	Residential							5-10' = 2.8		5-10' = 32			5-10' = 9.7		
	Utility Worker							0-10' = 14		0-10' = 314			0-10' = 219		
Tier 1 ESL			100	260	#1,600	#1,600	0.028	0.025	3.2	0.43	Combined = 2.1		##0.042	0.23	No Value
					12,000	12,000							3.8		

NOTES:
TPH-G = Total Petroleum Hydrocarbons as Gasoline.
TPH-D = Total Petroleum Hydrocarbons as Diesel.
TPH-BO = Total Petroleum Hydrocarbons as Bunker Oil.
TPH-MO = Total Petroleum Hydrocarbons as Motor Oil.
MTBE = Methyl tertiary-butyl ether.
PCBs = Polychlorinated Biphenyls.
ft bgs = feet below ground surface.
ND = Not detected.
a = Laboratory Note: no recognizable pattern.
b = Laboratory Note: strongly aged gasoline or diesel range compounds are significant in the TPH-G chromatogram.
c = Laboratory Note: diesel range compounds are significant; no recognizable pattern.
d = Laboratory Note: pattern resembles kerosene/kerosene-range/jet fuel range diesel range.
e = Laboratory Note: oil range compounds are significant.
LTCP = Low Threat Closure Policy, by State Water Resources Control Board, effective August 17, 2012, from Table 1 - Concentrations of Petroleum Constituents in Soil That Will Have No Significant Risk of Adversely Affecting Human Health.
ESL = Environmental Screening Level, by San Francisco Bay – Regional Water Quality Control Board, updated July 2019 (Revision 2), Soil Tier 1 ESL from Summary of Soil ESLs.
= 2019 (Revision 2) Tier 1 Soil ESL for TPH-MO is 1,600 mg/kg, but is based on Terrestrial Habitat Levels. The Direct Exposure Human Health Risk Level for a Non-Cancer Risk in a Residential Land Use scenario is 12,000 mg/kg.
= 2019 (Revision 2) Tier 1 Soil ESL for Naphthalene is 0.042 mg/kg, but is based on leaching concerns. The Direct Exposure Human Health Risk Level for a Cancer Risk in a Residential Land Use scenario is 3.8 mg/kg.
Results in BOLD exceed the respective ESL value.
Green high light indicates that the sample detection limit exceeded the respective Tier 1 soil ESL value.
Results, LTCP values, and ESL values, reported in mg/kg (milligrams per kilogram), unless otherwise indicated.

Table 3B
Summary of Hydraulic Jack Excavation Soil Sample Analytical Results - Other Petroleum VOCs - Wet Weight Basis

Sample ID	Sample Collection Date	Sample Collection Depth (ft bgs)	n-Butyl benzene	sec-Butyl benzene	Isopropylbenzene	4-Isopropyl toluene	n-Propyl benzene	1,2,4-Trimethylbenzene	1,3,5-Trimethylbenzene	Other Petroleum VOCs by EPA Method 8260B
H1-6.0	7/25/2019	6.0	0.14	0.081	ND<0.0086	ND<0.0086	ND<0.0086	ND<0.0086	ND<0.0086	All ND
H1-10.0	7/25/2019	10.0	0.14	0.082	ND<0.0082	ND<0.0082	ND<0.0082	ND<0.0082	ND<0.0082	All ND
H2-10.0	7/25/2019	10.0	ND<0.0087	ND<0.0087	ND<0.0087	ND<0.0087	ND<0.0087	ND<0.0087	ND<0.0087	All ND
H3-9.0	7/25/2019	9.0	0.14	ND<0.079	ND<0.079	ND<0.079	0.55	ND<0.079	ND<0.079	All ND
H4-9.0	7/25/2019	9.0	ND<0.0089	ND<0.0089	ND<0.0089	ND<0.0089	ND<0.0089	ND<0.0089	ND<0.0089	All ND
H5-9.0	7/25/2019	9.0	ND<0.0089	ND<0.0089	ND<0.0089	ND<0.0089	ND<0.0089	ND<0.0089	ND<0.0089	All ND
H6-9.0	7/25/2019	9.0	0.026	ND<0.0082	ND<0.0082	0.011	0.032	0.22	0.033	All ND
Tier 1 ESL			No Value	No Value	No Value	No Value	No Value	No Value	No Value	Various

NOTES:
ft bgs = feet below ground surface.
ND = Not detected.
ESL = Environmental Screening Level, by San Francisco Bay – Regional Water Quality Control Board, updated July 2019 (Revision 2), Soil Tier 1 ESL from Summary of Soil ESLs.
Results and ESL values, reported in mg/kg (milligrams per kilogram), unless otherwise indicated.

Table 3C

Summary of Hydraulic Jack Excavation Soil Sample Analytical Results - Non-Petroleum VOCs - Wet Weight Basis

Sample ID	Sample Collection Date	Sample Collection Depth (ft bgs)	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	Vinyl Chloride	Other Non-Petroleum VOCs by EPA Method 8260B
H1-6.0	7/25/2019	6.0	ND<0.0086	ND<0.0086	ND<0.0086	ND<0.0086	ND<0.0086	All ND
H1-10.0	7/25/2019	10.0	ND<0.0082	ND<0.0082	ND<0.0082	ND<0.0082	ND<0.0082	All ND
H2-10.0	7/25/2019	10.0	ND<0.0087	ND<0.0087	ND<0.0087	ND<0.0087	ND<0.0087	All ND
H3-9.0	7/25/2019	9.0	ND<0.079	ND<0.079	ND<0.079	ND<0.079	ND<0.079	All ND
H4-9.0	7/25/2019	9.0	ND<0.0089	ND<0.0089	ND<0.0089	ND<0.0089	ND<0.0089	All ND
H5-9.0	7/25/2019	9.0	ND<0.0089	ND<0.0089	ND<0.0089	ND<0.0089	ND<0.0089	All ND
H6-9.0	7/25/2019	9.0	ND<0.0082	ND<0.0082	ND<0.0082	ND<0.0082	ND<0.0082	All ND
Tier 1 ESL			# 0.080 2.7	0.085	0.19	0.65	0.0015	Various

NOTES:
PCE = Tetrachloroethene.
TCE = Trichloroethene.
cis-1,2-DCE = cis-1,2-Dichloroethene.
trans-1,2-DCE = trans-1,2-Dichloroethene.
VOCs = Volatile Organic Compounds.
ft bgs = feet below ground surface.
ND = Not detected.
# = 2019 (Revision 2) Tier 1 Soil ESL for PCE is 0.080 mg/kg, but is based on leaching concerns. The Direct Exposure Human Health Risk Level for a Cancer Risk in a Residential Land Use scenario is 2.7 mg/kg.
ESL = Environmental Screening Level, by San Francisco Bay – Regional Water Quality Control Board, updated July 2019 (Revision 2), Soil Tier 1 ESL from Summary of Soil ESLs.
Green high light indicates that the sample detection limit exceeded the respective Tier 1 soil ESL value.
Results and ESL values, reported in mg/kg (milligrams per kilogram), unless otherwise indicated.

Table 3D

Summary of Hydraulic Jack Excavation Soil Sample Analytical Results - SVOCs - Wet Weight Basis

Sample ID	Sample Collection Date	Sample Collection Depth (ft bgs)	Acenaphthylene	Anthracene	Benzo (a) anthracene	Benzo (a) pyrene	Benzo (b) fluoranthene	Benzo (g,h,i) perylene	Benzo (k) fluoranthene	Butylbenzyl Phthalate	Bis (2-ethylhexyl) Phthalate	Chrysene	Di-n-butyl Phthalate	Dimethyl Phthalate	Fluoranthene	Fluorene	Indeno (1,2,3-cd) pyrene	1-Methyl-naphthalene	2-Methyl-naphthalene	Naphthalene	Pyrene	Other SVOCs by EPA Method 8270C
H1-6.0	7/25/2019	6.0	ND<0.0013	ND<0.0013	ND<0.0050	ND<0.0025	ND<0.0013	ND<0.0025	ND<0.0013	ND<0.025	0.029	ND<0.0025	0.0038	ND<0.0025	ND<0.0013	ND<0.0025	ND<0.0025	ND<0.0013	ND<0.0025	ND<0.0013	ND<0.0025	All ND
H1-10.0	7/25/2019	10.0	ND<0.0013	0.0019	0.0069	0.0032	0.0017	ND<0.0025	0.0014	ND<0.025	0.33	0.0045	0.0061	ND<0.0025	0.0044	ND<0.0025	ND<0.0025	ND<0.0013	ND<0.0025	ND<0.0013	0.0064	All ND
H2-10.0	7/25/2019	10.0	ND<0.0013	ND<0.0013	ND<0.0050	ND<0.0025	ND<0.0013	ND<0.0025	ND<0.0013	ND<0.025	0.014	ND<0.0025	0.011	0.013	ND<0.0013	ND<0.0025	ND<0.0025	ND<0.0013	ND<0.0025	ND<0.0013	ND<0.0025	All ND
H3-9.0	7/25/2019	9.0	0.028	ND<0.010	ND<0.040	0.060	0.054	0.061	0.032	ND<0.20	**3.8**	ND<0.020	0.13	ND<0.020	0.16	0.16	0.037	0.10	0.080	0.023	0.28	All ND
H4-9.0	7/25/2019	9.0	ND<0.0013	ND<0.0013	ND<0.0050	ND<0.0025	0.0026	0.0033	ND<0.0013	ND<0.025	0.065	ND<0.0025	ND<0.0025	ND<0.0025	ND<0.0013	ND<0.0025	ND<0.0025	ND<0.0013	ND<0.0025	ND<0.0013	0.0025	All ND
H5-9.0	7/25/2019	9.0	ND<0.0013	ND<0.0013	0.0058	0.0036	0.0026	0.0050	0.0023	0.033	0.014	0.0034	0.0066	ND<0.0025	0.0064	ND<0.0025	0.0030	ND<0.0013	ND<0.0025	ND<0.0013	0.0076	All ND
H6-9.0	7/25/2019	9.0	ND<0.0013	ND<0.0013	ND<0.0050	ND<0.0025	ND<0.0013	ND<0.0025	ND<0.0013	ND<0.025	0.32	ND<0.0025	ND<0.0025	ND<0.0025	ND<0.0013	ND<0.0025	ND<0.0025	0.032	0.058	0.065	ND<0.0025	All ND
LTCP	Residential																			Naphthalene 0-5' = 9.7		
	Residential																			Naphthalene 5-10' = 9.7		
	Utility Worker																			Naphthalene 0-10' = 219		
Tier 1 ESL			6.4	1.9	0.63	0.11	1.1	2.5	2.8	No Value	#### 0.80 39	2.2	No Value	0.035	0.69	6	0.48	No Value	0.88	## 3.8	45	Various

NOTES:

ft bgs = feet below ground surface.

ND = Not detected.

LTCP = Low Threat Closure Policy, by State Water Resources Control Board, effective August 17, 2012, from Table 1 - Concentrations of Petroleum Constituents in Soil That Will Have No Significant Risk of Adversely Affecting Human Health.

ESL = Environmental Screening Level, by San Francisco Bay – Regional Water Quality Control Board, updated July 2019 (Revision 2), Soil Tier 1 ESL from Summary of Soil ESLs.

= 2019 (Revision 2) Tier 1 Soil ESL for Naphthalene is 0.042 mg/kg, but is based on leaching concerns. The Direct Exposure Human Health Risk Level for a Cancer Risk in a Residential Land Use scenario is 3.8 mg/kg and the Direct Exposure Human Health Non-cancer Hazard in a Residential Land Use scenario is 130 mg/kg.

= 2019 (Revision 2) Tier 1 Soil ESL for Bis (2-ethylhexyl) Phthalate is 0.80 mg/kg, but is based on Terrestrial Habitat Levels. The Direct Exposure Human Health Risk Level for a Cancer Risk in a Residential Land Use scenario is 39 mg/kg.

Results in BOLD exceed the respective ESL value.

Results, LTCP values, and ESL values, reported in mg/kg (milligrams per kilogram), unless otherwise indicated.

Table 3E

Summary of Hydraulic Jack Excavation Soil Sample Analytical Results - Petroleum and Petroleum VOCs and PCBs - Dry Weight Basis

Sample ID	Sample Collection Date	Sample Collection Depth (ft bgs)	TPH-G	TPH-D	TPH-BO	TPH-MO	MTBE	Benzene	Toluene	Ethylbenzene	m,p-Xylenes	o-Xylenes	Naphthalene	PCBs	Percent Moisture
H1-6.0	7/25/2019	6.0	1.4, b	3.1, c,e	14, c,e	13, c,e	ND<0.010	ND<0.010	ND<0.010	ND<0.010	ND<0.010	ND<0.010	ND<0.010	All ND<0.060	Dry
H1-10.0	7/25/2019	10.0	24, a,b	13, c,e	57, c,e	57, c,e	ND<0.0099	ND<0.0099	ND<0.0099	ND<0.0099	ND<0.0099	ND<0.0099	ND<0.0099	All ND<0.060	Dry
H2-10.0	7/25/2019	10.0	8.6, a,b	35, c,d,e	240, c,d,e	250, c,d,e	ND<0.011	ND<0.011	ND<0.011	ND<0.011	ND<0.011	ND<0.011	ND<0.011	All ND<0.060	Dry
H3-9.0	7/25/2019	9.0	**690, a**	**2,500, c,d,e**	5,400, c,d,e	5,300, c,d,e	ND<0.093	ND<0.093	ND<0.093	ND<0.093	ND<0.093	ND<0.093	ND<0.093	All ND<0.060	Dry
H4-9.0	7/25/2019	9.0	ND<1.2	82, c,d,e	450, c,d,e	480, c,d,e	ND<0.011	ND<0.011	ND<0.011	ND<0.011	ND<0.011	ND<0.011	ND<0.011	All ND<0.060	Dry
H5-9.0	7/25/2019	9.0	ND<1.2	7.8, c,e	38, c,e	41, c,e	ND<0.010	ND<0.010	ND<0.010	ND<0.010	ND<0.010	ND<0.010	ND<0.010	All ND<0.060	Dry
H6-9.0	7/25/2019	9.0	19, b	**850, c,d,e**	4,100, c,d,e	4,100, c,d,e	ND<0.0097	ND<0.0097	0.025	0.073	0.17	0.13	0.033	All ND<0.060	Dry
LTCP	Residential							0-5' = 1.9		0-5' = 21			0-5' = 9.7		
	Residential							5-10' = 2.8		5-10' = 32			5-10' = 9.7		
	Utility Worker							0-10' = 14		0-10' = 314			0-10' = 219		
Tier 1 ESL			100	260	#12,000	#12,000	0.028	0.025	3.2	0.43	Combined = 2.1		###0.042 3.8	0.23	No Value

NOTES:
TPH-G = Total Petroleum Hydrocarbons as Gasoline.
TPH-D = Total Petroleum Hydrocarbons as Diesel.
TPH-BO = Total Petroleum Hydrocarbons as Bunker Oil.
TPH-MO = Total Petroleum Hydrocarbons as Motor Oil.
MTBE = Methyl tertiary-butyl ether.
PCBs = Polychlorinated Biphenyls.
ft bgs = feet below ground surface.
ND = Not detected.
-- = Not analyzed.
a = Laboratory Note: no recognizable pattern.
b = Laboratory Note: strongly aged gasoline or diesel range compounds are significant in the TPH-G chromatogram.
c = Laboratory Note: diesel range compounds are significant; no recognizable pattern.
d = Laboratory Note: pattern resembles kerosene/kerosene-range/jet fuel range diesel range.
e = Laboratory Note: oil range compounds are significant.
LTCP = Low Threat Closure Policy, by State Water Resources Control Board, effective August 17, 2012, from Table 1 - Concentrations of Petroleum Constituents in Soil That Will Have No Significant Risk of Adversely Affecting Human Health.
ESL = Environmental Screening Level, by San Francisco Bay – Regional Water Quality Control Board, updated July 2019 (Revision 2), Soil Tier 1 ESL from Summary of Soil ESLs.
# = 2019 (Revision 2) Tier 1 Soil ESL for TPH-MO is 1,600 mg/kg, but is based on Terrestrial Habitat Levels. The Direct Exposure Human Health Risk Level for a Non-Cancer Risk in a Residential Land Use scenario is 12,000 mg/kg.
= 2019 (Revision 2) Tier 1 Soil ESL for Naphthalene is 0.042 mg/kg, but is based on leaching concerns. The Direct Exposure Human Health Risk Level for a Cancer Risk in a Residential Land Use scenario is 3.8 mg/kg.
Results in BOLD exceed the respective ESL value.
Results, LTCP values, and ESL values, reported in mg/kg (milligrams per kilogram), unless otherwise indicated.

Table 3F
Summary of Hydraulic Jack Excavation Soil Sample Analytical Results - Other Petroleum VOCs - Dry Weight Basis

Sample ID	Sample Collection Date	Sample Collection Depth (ft bgs)	n-Butyl benzene	sec-Butyl benzene	Isopropylbenzene	4-Isopropyl toluene	n-Propyl benzene	1,2,4-Trimethylbenzene	1,3,5-Trimethylbenzene	Other Petroleum VOCs by EPA Method 8260B
H1-6.0	7/25/2019	6.0	0.17	0.097	ND<0.010	ND<0.010	ND<0.010	ND<0.010	ND<0.010	All ND
H1-10.0	7/25/2019	10.0	0.17	0.099	ND<0.0099	ND<0.0099	ND<0.0099	ND<0.0099	ND<0.0099	All ND
H2-10.0	7/25/2019	10.0	ND<0.011	ND<0.011	ND<0.011	ND<0.011	ND<0.011	ND<0.011	ND<0.011	All ND
H3-9.0	7/25/2019	9.0	0.17	ND<0.093	ND<0.093	ND<0.093	0.65	ND<0.093	ND<0.093	All ND
H4-9.0	7/25/2019	9.0	ND<0.011	ND<0.011	ND<0.011	ND<0.011	ND<0.011	ND<0.011	ND<0.011	All ND
H5-9.0	7/25/2019	9.0	ND<0.010	ND<0.010	ND<0.010	ND<0.010	ND<0.010	ND<0.010	ND<0.010	All ND
H6-9.0	7/25/2019	9.0	0.031	ND<0.0097	ND<0.0097	0.013	0.038	0.26	0.039	All ND
Tier 1 ESL			No Value	No Value	No Value	No Value	No Value	No Value	No Value	Various

NOTES:
ft bgs = feet below ground surface.
ND = Not detected.
ESL = Environmental Screening Level, by San Francisco Bay – Regional Water Quality Control Board, updated July 2019 (Revision 2), Soil Tier 1 ESL from Summary of Soil ESLs.
Results and ESL values, reported in mg/kg (milligrams per kilogram), unless otherwise indicated.

Table 3G

Summary of Hydraulic Jack Excavation Soil Sample Analytical Results - Non-Petroleum VOCs - Dry Weight Basis

Sample ID	Sample Collection Date	Sample Collection Depth (ft bgs)	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	Vinyl Chloride	Other Non-Petroleum VOCs by EPA Method 8260B
H1-6.0	7/25/2019	6.0	ND<0.010	ND<0.010	ND<0.010	ND<0.010	ND<0.010	All ND
H1-10.0	7/25/2019	10.0	ND<0.0099	ND<0.0099	ND<0.0099	ND<0.0099	ND<0.0099	All ND
H2-10.0	7/25/2019	10.0	ND<0.011	ND<0.011	ND<0.011	ND<0.011	ND<0.011	All ND
H3-9.0	7/25/2019	9.0	ND<0.093	ND<0.093	ND<0.093	ND<0.093	ND<0.093	All ND
H4-9.0	7/25/2019	9.0	ND<0.011	ND<0.011	ND<0.011	ND<0.011	ND<0.011	All ND
H5-9.0	7/25/2019	9.0	ND<0.010	ND<0.010	ND<0.010	ND<0.010	ND<0.010	All ND
H6-9.0	7/25/2019	9.0	ND<0.0097	ND<0.0097	ND<0.0097	ND<0.0097	ND<0.0097	All ND
Tier 1 ESL			# 0.080 2.7	0.085	0.19	0.65	0.0015	Various

NOTES:

PCE = Tetrachloroethene.

TCE = Trichloroethene.

cis-1,2-DCE = cis-1,2-Dichloroethene.

trans-1,2-DCE = trans-1,2-Dichloroethene.

VOCs = Volatile Organic Compounds.

ft bgs = feet below ground surface.

ND = Not detected.

-- = Not analyzed.

= 2019 (Revision 2) Tier 1 Soil ESL for PCE is 0.080 mg/kg, but is based on leaching concerns. The Direct Exposure Human Health Risk Level for a Cancer Risk in a Residential Land Use scenario is 2.7 mg/kg.

ESL = Environmental Screening Level, by San Francisco Bay – Regional Water Quality Control Board, updated July 2019 (Revision 2), Soil Tier 1 ESL from Summary of Soil ESLs.

Green high light indicates that the sample detection limit exceeded the respective Tier 1 soil ESL value.

Results and ESL values, reported in mg/kg (milligrams per kilogram), unless otherwise indicated.

Table 3H
Summary of Hydraulic Jack Excavation Soil Sample Analytical Results - SVOCs - Dry Weight Basis

Sample ID	Sample Collection Date	Sample Collection Depth (ft bgs)	Acenaphthylene	Anthracene	Benzo (a) anthracene	Benzo (a) pyrene	Benzo (b) fluoranthene	Benzo (g,h,i) perylene	Benzo (k) fluoranthene	Butylbenzyl Phthalate	Bis (2-ethylhexyl) Phthalate	Chrysene	Di-n-butyl Phthalate	Dimethyl Phthalate	Fluoranthene	Fluorene	Indeno (1,2,3-cd) pyrene	1-Methyl-naphthalene	2-Methyl-naphthalene	Naphthalene	Pyrene	Other SVOCs by EPA Method 8270C
H1-6.0	7/25/2019	6.0	ND<0.0016	ND<0.0016	ND<0.0060	ND<0.0030	ND<0.0016	ND<0.0030	ND<0.0016	ND<0.030	0.035	ND<0.0030	0.0046	ND<0.0030	ND<0.0016	ND<0.0030	ND<0.0030	ND<0.0016	ND<0.0030	ND<0.0016	ND<0.0030	All ND
H1-10.0	7/25/2019	10.0	ND<0.0016	0.0023	0.0083	0.0039	0.0021	ND<0.0030	0.0017	ND<0.030	0.40	0.0054	0.0074	ND<0.0030	0.0053	ND<0.0030	ND<0.0030	ND<0.0016	ND<0.0030	ND<0.0016	0.0077	All ND
H2-10.0	7/25/2019	10.0	ND<0.0016	ND<0.0016	ND<0.0063	ND<0.0032	ND<0.0016	ND<0.0032	ND<0.0016	ND<0.032	0.018	ND<0.0032	0.014	0.016	ND<0.0016	ND<0.0032	ND<0.0032	ND<0.0016	ND<0.0032	ND<0.0016	ND<0.0032	All ND
H3-9.0	7/25/2019	9.0	0.0330	ND<0.0012	ND<0.047	0.0710	0.0640	0.0720	0.0380	ND<0.24	**4.5**	ND<0.024	0.15	ND<0.024	0.19	0.19	0.044	0.12	0.095	**0.027**	0.33	All ND
H4-9.0	7/25/2019	9.0	ND<0.0015	ND<0.0015	ND<0.0060	ND<0.0030	0.0031	0.0039	ND<0.0015	ND<0.030	0.077	ND<0.0030	ND<0.0030	ND<0.0030	ND<0.0015	ND<0.0030	ND<0.0030	ND<0.0015	ND<0.0030	ND<0.0015	0.0030	All ND
H5-9.0	7/25/2019	9.0	ND<0.0015	ND<0.0015	0.0067	0.0042	0.0030	0.0058	0.0027	0.038	0.016	0.0039	0.0076	ND<0.0029	0.0074	ND<0.0029	0.0035	ND<0.0015	ND<0.0029	ND<0.0015	0.0088	All ND
H6-9.0	7/25/2019	9.0	ND<0.0015	ND<0.0015	ND<0.0059	ND<0.0030	ND<0.0015	ND<0.0030	ND<0.0015	ND<0.030	0.38	ND<0.0030	ND<0.0030	ND<0.0030	ND<0.0015	ND<0.0030	ND<0.0030	0.038	0.069	**0.077**	ND<0.0030	All ND
LTCP	Residential																			Naphthalene 0-5' = 9.7		
	Residential																			Naphthalene 5-10' = 9.7		
	Utility Worker																			Naphthalene 0-10' = 219		
Tier 1 ESL			6.4	1.9	0.63	0.11	1.1	2.5	2.8	No Value	& 0.80	2.2	No Value	0.035	0.69	6	0.48	No Value	0.88	### 0.042	45	Various
											39									3.8		

NOTES:
ft bgs = feet below ground surface.
ND = Not detected.
LTCP = Low Threat Closure Policy, by State Water Resources Control Board, effective August 17, 2012, from Table 1 - Concentrations of Petroleum Constituents in Soil That Will Have No Significant Risk of Adversely Affecting Human Health.
ESL = Environmental Screening Level, by San Francisco Bay – Regional Water Quality Control Board, updated July 2019 (Revision 2), Soil Tier 1 ESL from Summary of Soil ESLs.
= 2019 (Revision 2) Tier 1 Soil ESL for Naphthalene is 0.042 mg/kg, but is based on leaching concerns. The Direct Exposure Human Health Risk Level for a Cancer Risk in a Residential Land Use scenario is 3.8 mg/kg.
& = 2019 (Revision 2) Tier 1 Soil ESL for Bis (2-ethylhexyl) Phthalate is 0.80 mg/kg, but is based on Terrestrial Habitat Levels. The Direct Exposure Human Health Risk Level for a Cancer Risk in a Residential Land Use scenario is 39 mg/kg.
Results in BOLD exceed the respective Tier 1 ESL value.
Results, LTCP values, and ESL values, reported in mg/kg (milligrams per kilogram), unless otherwise indicated.

Table 4A

Summary of Borehole Groundwater Grab Sample Analytical Results - Petroleum and Petroleum VOCs

Sample ID	Sample Collection Date	TPH-G	TPH-D	TPH-MO	TPH-BO	MTBE	Benzene	Toluene	Ethylbenzene	Xylenes	Naphthalene	1,2-DCA	TBA
B1-GW	8/24/2018	ND<50	ND<50	ND<100	--	ND<1.0	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<1.0	**4.1**	ND<10
B2-GW	8/24/2018	ND<50	ND<50	ND<100	--	ND<1.0	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<1.0	**4.4**	ND<10
B3-GW	8/24/2018	**850**	**860**	ND<100	--	ND<1.0	**3.0**	ND<0.50	**41**	**98**	**10**	**4.5**	ND<10
B4-GW	8/24/2018	**19,000**	**5,200**	ND<100	--	ND<1.0	**56**	1.8	**490**	**120**	**91**	ND<0.50	ND<10
B5-GW	10/24/2018	**11,000**	**2,300**	ND<100	--	**5.4**	**22**	6.5	**47**	**37**	**7.6**	ND<0.50	**30**
B7-GW	10/24/2018	**2,100**	**700**	ND<100	--	ND<1.0	**4.0**	ND<0.50	**65**	**220**	**9.8**	**14**	ND<10
B9-GW	10/24/2018	ND<50	ND<50	ND<100	--	ND<1.0	ND<0.50	ND<0.50	ND<0.50	ND<1.0	ND<1.0	**12**	ND<10
B10-GW	10/24/2018	ND<50	ND<50	ND<100	--	ND<1.0	**2.6**	ND<0.50	ND<0.50	ND<1.0	ND<1.0	**2.1**	ND<10
B11-GW	10/24/2018	ND<50	ND<50	ND<100	--	ND<1.0	ND<0.50	ND<0.50	ND<0.50	ND<1.0	ND<1.0	**1.6**	ND<10
B12-GW	10/24/2018	**2,900**	**410**	ND<100	--	ND<1.0	**1.2**	ND<0.50	**4.7**	ND<1.0	ND<1.0	ND<0.50	ND<10
B13-W	12/11/2018	ND<50	ND<50	ND<250	ND<100	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	All ND
B14-W	12/11/2018	ND<50	ND<50	ND<250	ND<100	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	All ND
B15-W	12/11/2018	ND<50	ND<50	ND<250	ND<100	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	All ND
B17-W	12/12/2018	ND<50	ND<50	ND<250	ND<100	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	All ND
B21-W	4/16/2019	ND<50	ND<50	ND<250	ND<100	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	All ND
B22-W	4/16/2019	ND<50	**250, b,c,d**	2,100, b,c,d	2,100, b,c,d	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	All ND
B23-W	4/17/2019	**150, a**	66, b,c	260, b,c	280, b,c	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	All ND
B24-W	4/16/2019	ND<50	97, b,c	390, b,c	380, b,c	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	All ND
LTCP Groundwater Specific Criteria	Scenario 2					1,000	3,000						
	Scenario 4					1,000	1,000						
ESL[1]		100	100	No Value	No Value	5.0	0.42	40	3.5	20	0.17	0.5	12
ESL[2]		No Value	No Value	No Value	No Value	450	0.42	No Value	3.5	No Value	4.6	2.2	No Value

NOTES:

TPH-G = Total Petroleum Hydrocarbons as Gasoline.

TPH-D = Total Petroleum Hydrocarbons as Diesel.

TPH-BO = Total Petroleum Hydrocarbons as Bunker Oil.

TPH-MO = Total Petroleum Hydrocarbons as Motor Oil.

MTBE = Methyl tertiary-butyl ether.

VOCs = Volatile Organic Compounds.

1,2,-DCA = 1,2-Dichloroethane.

TBA = Tertiary-Butyl Alcohol.

ND = Not detected.

-- = Not analyzed.

a = Laboratory Note: no recognizable pattern.

b = Laboratory Note: diesel range compounds are significant; no recognizable pattern.

c = Laboratory Note: oil range compounds are significant.

d = Laboratory Note: gasoline range compounds are significant.

LTCP = Low Threat Closure Policy, by State Water Resources Control Board, effective August 17, 2012, from Groundwater-Specific Criteria Scenarios 2 and 4.

ESL[1] = Environmental Screening Level, by San Francisco Bay – Regional Water Quality Control Board, updated July 2019 (Revision 2), Groundwater Tier 1 ESL from Summary of Groundwater ESLs.

ESL[2] = Environmental Screening Level, by San Francisco Bay – Regional Water Quality Control Board, updated July 2019 (Revision 2), from Table GW-3 – Groundwater Vapor Intrusion Human Health Risk Screening Levels.

Residential Land Use. Cancer Risk.

Results in BOLD exceed the respective ESL[1] value.

Underlined results exceed the respective ESL[2] value.

Green high light indicates that the sample detection limit exceeded the respective Tier 1 groundwater ESL value.

Results, LTCP values, and ESL values reported in µg/L (micrograms per Liter), unless otherwise indicated.

Table 4B

Summary of Borehole Groundwater Grab Sample Analytical Results - Other Petroleum VOCs

Sample ID	Sample Collection Date	n-Butyl benzene	sec-Butyl benzene	Isopropylbenzene	4-Isopropyl toluene	n-Propyl benzene	1,2,4-Trimethylbenzene	1,3,5-Trimethylbenzene	Other Petroleum VOCs by EPA Method 8260B
B1-GW	8/24/2018	ND<1.0	ND<1.0	ND<1.0	ND<1.0	ND<1.0	ND<1.0	ND<1.0	All ND
B2-GW	8/24/2018	ND<1.0	ND<1.0	ND<1.0	ND<1.0	ND<1.0	ND<1.0	ND<1.0	All ND
B3-GW	8/24/2018	ND<1.0	ND<1.0	6.2	3.4	ND<1.0	110	41	All ND
B4-GW	8/24/2018	ND<1.0	ND<1.0	72	5.9	ND<1.0	140	75	All ND
B5-GW	10/24/2018	ND<1.0	20	140	ND<1.0	240	16	2.5	All ND
B7-GW	10/24/2018	6.3	3.7	10	5.3	370	150	54	All ND
B9-GW	10/24/2018	1.2	ND<1.0	ND<1.0	ND<1.0	ND<1.0	ND<1.0	ND<1.0	All ND
B10-GW	10/24/2018	1.9	ND<1.0	ND<1.0	ND<1.0	ND<1.0	ND<1.0	ND<1.0	All ND
B11-GW	10/24/2018	1.2	ND<1.0	1.9	ND<1.0	5.4	ND<1.0	ND<1.0	All ND
B12-GW	10/24/2018	21	15	46	ND<1.0	120	ND<1.0	ND<1.0	All ND
B13-W	12/11/2018	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	All ND
B14-W	12/11/2018	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	All ND
B15-W	12/11/2018	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	All ND
B17-W	12/12/2018	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	All ND
B21-W	4/16/2019	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	All ND
B22-W	4/16/2019	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	All ND
B23-W	4/17/2019	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	All ND
B24-W	4/16/2019	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	All ND
ESL[1]		No Value	No Value	No Value	No Value	No Value	No Value	No Value	Various
ESL[2]		No Value	No Value	No Value	No Value	No Value	No Value	No Value	Various

NOTES:

VOCs = Volatile Organic Compounds.

ND = Not detected.

LTCP = Low Threat Closure Policy, by State Water Resources Control Board, effective August 17, 2012, from Groundwater-Specific Criteria Scenarios 2 and 4.

ESL[1] = Environmental Screening Level, by San Francisco Bay – Regional Water Quality Control Board, updated July 2019 (Revison 2), Groundwater Tier 1 ESL from Summary of Groundwater ESLs.

ESL[2] = Environmental Screening Level, by San Francisco Bay – Regional Water Quality Control Board, updated July 2019 (Revision 2), from Table GW-3 – Groundwater Vapor Intrusion Human Health Risk Screening Levels. Residential Land Use. Cancer Risk.

Results and ESL values reported in µg/L (micrograms per Liter), unless otherwise indicated.

Table 4C
Summary of Borehole Groundwater Grab Sample Analytical Results - Non-Petroleum VOCs

Sample ID	Sample Collection Date	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	Vinyl Chloride	1,1-DCA	Bromo dichloromethane	Other Non-Petroleum VOCs by EPA Method 8260B
B1-GW	8/24/2018	ND<1.0	ND<1.0	ND<1.0	ND<1.0	ND<1.0	ND<1.0	ND<1.0	All ND
B2-GW	8/24/2018	ND<1.0	ND<1.0	ND<1.0	ND<1.0	ND<1.0	ND<1.0	ND<1.0	All ND
B3-GW	8/24/2018	ND<1.0	ND<1.0	ND<1.0	ND<1.0	ND<1.0	ND<1.0	ND<1.0	All ND
B4-GW	8/24/2018	ND<1.0	ND<1.0	ND<1.0	ND<1.0	ND<1.0	ND<1.0	ND<1.0	All ND
B5-GW	10/24/2018	ND<1.0	ND<1.0	ND<1.0	ND<1.0	ND<1.0	ND<1.0	**2.8**	All ND
B7-GW	10/24/2018	ND<1.0	ND<1.0	ND<1.0	ND<1.0	ND<1.0	ND<1.0	ND<1.0	All ND
B9-GW	10/24/2018	ND<1.0	ND<1.0	ND<1.0	ND<1.0	ND<1.0	ND<1.0	ND<1.0	All ND
B10-GW	10/24/2018	ND<1.0	ND<1.0	ND<1.0	ND<1.0	ND<1.0	ND<1.0	ND<1.0	All ND
B11-GW	10/24/2018	ND<1.0	ND<1.0	ND<1.0	ND<1.0	ND<1.0	ND<1.0	ND<1.0	All ND
B12-GW	10/24/2018	ND<1.0	ND<1.0	ND<1.0	ND<1.0	ND<1.0	ND<1.0	ND<1.0	All ND
B13-W	12/11/2018	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	All ND
B14-W	12/11/2018	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	All ND
B15-W	12/11/2018	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	All ND
B17-W	12/12/2018	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	All ND
B21-W	4/16/2019	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	All ND
B22-W	4/16/2019	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	All ND
B23-W	4/17/2019	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	1.0	ND<0.50	All ND
B24-W	4/16/2019	ND<0.50	ND<0.50	0.79	ND<0.50	ND<0.50	3.0	ND<0.50	All ND
ESL[1]		0.64	1.2	6.0	10	0.0086	3.2	0.87	Various
ESL[2]		0.64	1.2	No Value	No Value	0.0086	3.2	0.87	Various

NOTES:
PCE = Tetrachloroethene.
TCE = Trichloroethene.
cis-1,2-DCE = cis-1,2-Dichloroethene.
trans-1,2-DCE = trans-1,2-Dichloroethene.
1,1-DCA = 1,1-Dichloroethane.
VOCs = Volatile Organic Compounds.
ND = Not detected.
-- = Not analyzed.
ESL[1] = Environmental Screening Level, by San Francisco Bay – Regional Water Quality Control Board, updated July 2019 (Revision 2), Groundwater Tier 1 ESL from Summary of Groundwater ESLs.
ESL[2] = Environmental Screening Level, by San Francisco Bay – Regional Water Quality Control Board, updated July 2019 (Revision 2), from Table GW-3 – Groundwater Vapor Intrusion Human Health Risk Screening Levels. Residential Land Use. Cancer Risk.
Results in BOLD exceed the respective ESL[1] value.
Underlined results exceed the respective ESL[2] value.
Green high light indicates that the sample detection limit exceeded the respective Tier 1 groundwater ESL value.
Results and ESL values reported in µg/L (micrograms per Liter), unless otherwise indicated.

Table 5A
Summary of Monitoring Well Groundwater Sample Analytical Results - Petroleum and Petroleum VOCs

Sample ID	Sample Collection Date	TPH-G	TPH-D	TPH-MO	TPH-BO	MTBE	Benzene	Toluene	Ethylbenzene	Xylenes	1,2-DCA	n-Butyl benzene	sec-Butyl benzene	Isopropylbenzene	n-Propyl benzene	Other Petroleum VOCs by EPA Method 8260B
MW1	2/25/2020	**390**	**200, b,c**	ND<250	450	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	**1.3**	1.7	4.7	1.2	0.55	All ND
MW1	11/12/2019	ND<50	**130, b,c**	ND<250	ND<250	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	**2.9**	ND<0.50	1.3	ND<0.50	ND<0.50	All ND
MW1	8/12/2019	**280**	**140, a**	ND<250	ND<250	ND<0.50	**0.50**	ND<0.50	ND<0.50	ND<0.50	**2.8**	ND<0.50	ND<0.50	0.80	ND<0.50	All ND
MW2	2/25/2020	ND<50	ND<50	ND<250	ND<250	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	All ND
MW2	11/12/2019	ND<50	ND<50	ND<250	ND<250	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	All ND
MW2	8/12/2019	ND<50	ND<50	ND<250	ND<250	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	All ND
MW3	2/25/2020	ND<50	ND<50	ND<250	ND<250	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	All ND
MW3	11/12/2019	ND<50	ND<50	ND<250	ND<250	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	All ND
MW3	8/12/2019	ND<50	ND<50	ND<250	ND<250	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	All ND
LTCP Groundwater Specific Criteria	Scenario 2					1,000	3,000									
	Scenario 4					1,000	1,000									
ESL[1]		100	100	No Value	No Value	5.0	0.42	40	3.5	20	0.5	No Value	No Value	No Value	No Value	Various
ESL[2]		No Value	No Value	No Value	No Value	450	0.42	No Value	3.5	No Value	2.2	No Value	No Value	No Value	No Value	Various

NOTES:
TPH-G = Total Petroleum Hydrocarbons as Gasoline.
TPH-D = Total Petroleum Hydrocarbons as Diesel.
TPH-BO = Total Petroleum Hydrocarbons as Bunker Oil.
TPH-MO = Total Petroleum Hydrocarbons as Motor Oil.
MTBE = Methyl tertiary-butyl ether.
1,2,-DCA = 1,2-Dichloroethane.
VOCs = Volatile Organic Compounds.
ND = Not detected.
a = Laboratory Note: gasoline range compounds are significant.
b = Laboratory Note: diesel range compounds are significant; no recognizable pattern.
c = Laboratory Note: pattern resembles kerosene/kerosene range/jet fuel range..
LTCP = Low Threat Closure Policy, by State Water Resources Control Board, effective August 17, 2012, from Groundwater-Specific Criteria Scenarios 2 and 4.
ESL[1] = Environmental Screening Level, by San Francisco Bay – Regional Water Quality Control Board, updated July 2019 (Revision 2), Groundwater Tier 1 ESL from Summary of Groundwater ESLs.
ESL[2] = Environmental Screening Level, by San Francisco Bay – Regional Water Quality Control Board, updated July 2019 (Revision 2), from Table GW-3 – Groundwater Vapor Intrusion Human Health Risk Screening Levels.
Residential Land Use. Cancer Risk.
Results in BOLD exceed the respective ESL[1] value.
Underlined results exceed the respective ESL[2] value.
Green high light indicates that the sample detection limit exceeded the respective Tier 1 groundwater ESL value.
Results, LTCP values, and ESL values reported in µg/L (micrograms per Liter), unless otherwise indicated.

Table 5B

Summary of Monitoring Well Groundwater Sample Analytical Results - Non-Petroleum VOCs

Sample ID	Sample Collection Date	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	Vinyl Chloride	Other Non-Petroleum VOCs by EPA Method 8260B
MW1	2/25/2020	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	All ND
MW1	11/12/2019	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	All ND
MW1	8/12/2019	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	All ND
MW2	2/25/2020	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	All ND
MW2	11/12/2019	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	All ND
MW2	8/12/2019	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	All ND
MW3	2/25/2020	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	All ND
MW3	11/12/2019	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	All ND
MW3	8/12/2019	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	All ND
ESL[1]		0.64	1.2	6.0	10	0.0086	Various
ESL[2]		0.64	1.2	No Value	No Value	0.0086	Various

NOTES:

PCE = Tetrachloroethene.

TCE = Trichloroethene.

cis-1,2-DCE = cis-1,2-Dichloroethene.

trans-1,2-DCE = trans-1,2-Dichloroethene.

VOCs = Volatile Organic Compounds.

ND = Not detected.

-- = Not analyzed.

ESL[1] = Environmental Screening Level, by San Francisco Bay – Regional Water Quality Control Board, updated July 2019 (Revision 2), Groundwater Tier 1 ESL from Summary of Groundwater ESLs.

ESL[2] = Environmental Screening Level, by San Francisco Bay – Regional Water Quality Control Board, updated July 2019 (Revision 2), from Table GW-3 – Groundwater Vapor Intrusion Human Health Risk Screening Levels. Residential Land Use. Cancer Risk.

Green high light indicates that the sample detection limit exceeded the respective Tier 1 groundwater ESL value.

Results and ESL values reported in µg/L (micrograms per Liter), unless otherwise indicated.

Table 6A
Summary of Soil Gas Sample Analytical Results - TPH-G and Petroleum VOCs

Sample ID	Sample Collection Date	TPH-G	MTBE	Benzene	Toluene	Ethylbenzene	m,p-Xylenes	o-Xylenes	Naphthalene	Sample Helium (Tracer Gas) (Percent)	Shroud Helium (Tracer Gas) (Percent)	Percent Shroud
B5-SG, *	10/24/2018	--	--	ND<160	ND<190	ND<220	**3,100**	**1,100**	--	--	--	--
B7-SG, *	10/24/2018	--	--	***270***	69	**1,800**	**4,200**	ND<220	--	--	--	--
B8-SG, *	10/24/2018	--	--	**34**	160	9.5	24	8.4	--	--	--	--
B10-SG, *	10/24/2018	--	--	ND<160	110	ND<220	ND<220	ND<220	--	--	--	--
SG1	1/3/2019	**370,000**	ND<72	ND<64	ND<76	ND<86	ND<86	ND<86	--	ND<0.19	20	0
SG1-DUP	1/3/2019	**370,000**	ND<72	ND<64	ND<76	ND<86	ND<86	ND<86	--	ND<0.19	20	0
SG2	1/3/2019	**1,300,000**	ND<1,440	ND<1,280	ND<1,520	ND<1,720	ND<1,720	ND<1,720	--	ND<0.21	20	0
SG3	1/3/2019	**73,000,000**	ND<14,400	ND<12,800	ND<15,200	ND<17,200	ND<17,200	ND<17,200	--	ND<0.19	20	0
SG4	8/7/2019	**60,000,000**	ND<900	***1,800***	ND<940	ND<1,100	ND<1,100	ND<1,100	ND<5,200	ND<0.19	20	0
SG5	1/3/2019	**27,000**	ND<360	ND<320	ND<380	ND<430	ND<430	ND<430	--	ND<0.19	20	0
SG6	1/3/2019	16,000, a	ND<3.6	ND<3.2	ND<3.8	ND<4.3	ND<4.3	ND<4.3	--	ND<0.19	20	0
SG7	5/6/2019	**120,000,000**	ND<144,000	ND<128,000	ND<152,000	ND<172,000	ND<172,000	ND<172,000	ND<208,000	ND<0.19	20	0
SG8	5/6/2019	**980,000**	ND<1,440	ND<1,280	ND<1,520	ND<1,720	ND<1,720	ND<1,720	ND<2,080	ND<0.23	20	0
SG9	5/6/2019	**1,200,000**	ND<1,440	ND<1,280	ND<1,520	ND<1,720	ND<1,720	ND<1,720	ND<2,080	ND<0.21	20	0
SG10	5/6/2019	190, a	ND<72	ND<64	ND<76	ND<86	ND<86	ND<86	ND<104	ND<0.22	20	0
SG10-DUP	5/6/2019	160, a	ND<3.6	ND<3.2	3.3, a	ND<4.3	1.4, a	1.3, a	ND<5.2	ND<0.21	20	0
SG11	5/6/2019	370, a	ND<72	ND<64	ND<76	ND<86	ND<86	ND<86	ND<104	ND<0.21	20	0
SG12	5/6/2019	**25,000**	ND<72	ND<64	ND<76	ND<86	ND<86	ND<86	ND<104	ND<0.21	20	0
SG13	5/6/2019	560	ND<18	ND<16	ND<19	ND<21.5	ND<21.5	ND<21.5	ND<26	ND<0.21	20	0
SG14	8/8/2019	1,600	ND<7.2	ND<1.6	ND<1.9	ND<2.2	ND<2.2	ND<2.2	ND<5.2	ND<0.21	20	0
SG15	8/7/2019	**25,000**	ND<7.2	**7.8**	6.7	ND<2.2	4.0	ND<2.2	ND<5.2	ND<0.24	20	0
SG16	8/7/2019	4,500	ND<7.2	3.1	ND<1.9	ND<2.2	ND<2.2	ND<2.2	ND<5.2	ND<0.22	20	0
SG16 DUP	8/7/2019	4,000	ND<7.2	3.0	ND<1.9	ND<2.2	ND<2.2	ND<2.2	ND<5.2	ND<0.22	20	0
SG17	8/7/2019	4,700	ND<7.2	**6.7**	ND<1.9	ND<2.2	ND<2.2	ND<2.2	ND<5.2	ND<0.25	20	0
SG18	8/7/2019	14,000	ND<7.2	**4.4**	ND<1.9	ND<2.2	ND<2.2	ND<2.2	ND<5.2	ND<0.20	20	0
SSG19	8/8/2019	1,800	ND<7.2	ND<1.6	ND<1.9	ND<2.2	ND<2.2	ND<2.2	ND<5.2	ND<0.19	20	0
SG20	8/8/2019	ND<180	ND<7.2	ND<1.6	ND<1.9	ND<2.2	ND<2.2	ND<2.2	ND<5.2	ND<0.18	20	0
SG21	8/8/2019	**61,000**	ND<7.2	ND<1.6	3.6	ND<2.2	ND<2.2	ND<2.2	ND<5.2	ND<0.21	20	0
SG22	1/8/2020	ND<210	ND<15	ND<3.3	ND<3.9	ND<4.5	ND<4.5	ND<4.5	ND<11	ND<0.21	20	0
SG25	1/8/2020	610	ND<14	ND<3.2	ND<3.7	ND<4.3	ND<4.3	ND<4.3	ND<10	ND<0.20	20	0

Table 6A
Summary of Soil Gas Sample Analytical Results - TPH-G and Petroleum VOCs

Sample ID	Sample Collection Date	TPH-G	MTBE	Benzene	Toluene	Ethylbenzene	m,p-Xylenes	o-Xylenes	Naphthalene	Sample Helium (Tracer Gas) (Percent)	Shroud Helium (Tracer Gas) (Percent)	Percent Shroud
SG28	1/7/2020	ND<210	ND<14	ND<3.2	ND<3.8	ND<4.4	ND<4.4	ND<4.4	ND<10	ND<0.20	20	0
SG29	1/7/2020	ND<200	ND<14	ND<3.0	ND<3.6	ND<4.1	ND<4.1	ND<4.1	ND<10	ND<0.19	20	0
SG30	1/7/2020	ND<190	ND<14	ND<3.0	ND<3.5	ND<4.1	ND<4.1	ND<4.1	ND<9.8	ND<0.19	20	0
SG31	1/8/2020	240	ND<14	ND<3.0	ND<3.6	ND<4.1	ND<4.1	ND<4.1	ND<10	ND<0.19	20	0
SG31-DUP	1/8/2020	240	ND<14	ND<3.1	ND<3.6	ND<4.2	ND<4.2	ND<4.2	ND<10	ND<0.19	20	0
LTCP[1] Soil Gas Specific Criteria	Residential No Bioattenuation Zone			85		1,100			93			
LTCP[2] Soil Gas Specific Criteria	Residential Bioattenuation Zone			85,000		1,100,000			93,000			
ESL		3,300, # 20,000	360	3.2	10,000	37	Combined = 3,500		2.8	No Value	No Value	No Value

NOTES:
TPH-G = Total Petroleum Hydrocarbons as Gasoline.
MTBE = Methyl tertiary-butyl ether.
VOCs = Volatile Organic Compounds.
MEK = Methyl Ethyl Ketone. (2-Butanone)
MIBK = Methyl Isobutyl Ketone.
ND = Not detected.
-- = Not analyzed.
* = Soil gas sample collected from temporary soil gas well.
# = The July 2019 (Revision 2) Tier 1 Soil Gas ESL for TPH-G of 3,300 ug/m^3 is based on odor nuisance levels. The July 2019 (Revision 2) Table SG-1 Non-cancer Human Health Risk Level ESL for TPH-G is 20,000 ug/m3.
Percent Shroud = The ratio of tracer gas concentration detected in the soil gas sample to the tracer gas concentration detected in the shroud, expressed as a percentage.
a = Laboratory note: reported value is estimated.
b = Laboratory note: exceeds instrument calibration range.
LTCP[1] = Low Threat Closure Policy, by State Water Resources Control Board, effective August 17, 2012, from Appendix 4 - Direct Measurement of Soil Gas. Residential Land Use. No Bioattenuation Zone.
LTCP[2] = Low Threat Closure Policy, by State Water Resources Control Board, effective August 17, 2012, from Appendix 4 - Direct Measurement of Soil Gas. Residential Land Use. With Bioattenuation Zone.
ESL = Environmental Screening Level, by San Francisco Bay – Regional Water Quality Control Board, updated July 2019 (Revision 2), Soil Gas Tier 1 ESL from Summary of Vapor ESLs.
Results in BOLD exceed the respective ESL value.
Italicized Results in exceed the respective LTCP [1] value.
Green high light indicates that the sample detection limit exceeded the respective Tier 1 soil gas ESL value.
Results, LTCP values, and ESL values reported in µg/m^3 (micrograms per cubic meter) unless otherwise indicated.

Table 6B
Summary of Soil Gas Sample Analytical Results - Other Petroleum VOCs

Sample ID	Sample Collection Date	1,3-Butadiene	Cyclohexane	Heptane	Hexane	4-Ethyltoluene	1,2,4-Trimethylbenzene	1,3,5-Trimethylbenzene	2,2,4-Trimethylpentane	Other Petroleum VOCs by TO-15	Sample Helium (Tracer Gas) (Percent)	Shroud Helium (Tracer Gas) (Percent)	Percent Shroud
B5-SG, *	10/24/2018	ND<110	ND<170	ND<210	ND<180	ND<250	ND<250	ND<250	--	All ND	--	--	--
B7-SG, *	10/24/2018	ND<110	ND<170	ND<210	89,000	2,200	2,000	680	--	All ND	--	--	--
B8-SG, *	10/24/2018	ND<4.5	53	45	ND<3.6	ND<5.0	ND<5.0	ND<5.0	--	All ND	--	--	--
B10-SG, *	10/24/2018	ND<110	ND<170	2,000	4,600	ND<250	ND<250	ND<250	--	All ND	--	--	--
SG1	1/3/2019	ND<44	ND<68	ND<82	ND<70	ND<98	ND<98	ND<98	--	All ND	ND<0.19	20	0
SG1-DUP	1/3/2019	ND<44	ND<68	ND<82	ND<70	ND<98	ND<98	ND<98	--	All ND	ND<0.19	20	0
SG2	1/3/2019	ND<880	ND<1,360	ND<1,640	375, a	ND<1,960	ND<1,960	ND<1,960	--	All ND	ND<0.21	20	0
SG3	1/3/2019	ND<8,800	ND<13,600	ND<16,400	34,000	ND<19,600	ND<19,600	ND<19,600	--	All ND	ND<0.19	20	0
SG4	8/7/2019	ND<550	ND<860	17,000	38,000	ND<1,200	ND<1,200	ND<1,200	2,600,000, b	All ND	ND<0.19	20	0
SG5	1/3/2019	ND<220	ND<340	ND<410	ND<350	ND<490	ND<490	ND<490	--	All ND	ND<0.19	20	0
SG6	1/3/2019	ND<2.2	ND<3.4	ND<4.1	ND<3.5	ND<4.9	ND<4.9	ND<4.9	--	All ND	ND<0.19	20	0
SG7	5/6/2019	ND<88,000	ND<136,000	ND<164,000	ND<140,000	ND<196,000	ND<196,000	ND<196,000	--	All ND	ND<0.19	20	0
SG8	5/6/2019	ND<880	ND<1,360	ND<1,640	ND<1,400	ND<1,960	ND<1,960	ND<1,960	--	All ND	ND<0.23	20	0
SG9	5/6/2019	ND<880	ND<1,360	ND<1,640	ND<1,400	ND<1,960	ND<1,960	ND<1,960	--	All ND	ND<0.21	20	0
SG10	5/6/2019	ND<44	1,300	ND<82	ND<70	ND<98	ND<98	ND<98	--	All ND	ND<0.22	20	0
SG10-DUP	5/6/2019	ND<2.2	ND<3.4	1.2, a	ND<3.5	1.4, a	3.3, a	1.5, a	--	All ND	ND<0.21	20	0
SG11	5/6/2019	ND<44	ND<68	ND<82	ND<70	ND<98	ND<98	ND<98	--	All ND	ND<0.21	20	0
SG12	5/6/2019	ND<44	ND<68	ND<82	ND<70	ND<98	ND<98	ND<98	--	All ND	ND<0.21	20	0
SG13	5/6/2019	ND<11	ND<17	ND<20.5	ND<17.5	ND<24.5	ND<24.5	ND<24.5	--	All ND	ND<0.21	20	0
SG14	8/8/2019	ND<1.1	ND<1.7	ND<2.0	ND<1.8	ND<2.4	ND<2.4	ND<2.4	2.7	All ND	ND<0.21	20	0
SG15	8/7/2019	5.2	14	ND<2.0	12	ND<2.4	ND<2.4	ND<2.4	27	All ND	ND<0.24	20	0
SG16	8/7/2019	1.1	ND<1.7	ND<2.0	ND<1.8	ND<2.4	ND<2.4	ND<2.4	ND<2.3	All ND	ND<0.22	20	0
SG16 DUP	8/7/2019	1.1	ND<1.7	ND<2.0	ND<1.8	ND<2.4	ND<2.4	ND<2.4	ND<2.3	All ND	ND<0.22	20	0
SG17	8/7/2019	5.3	ND<1.7	ND<2.0	1.8	ND<2.4	ND<2.4	ND<2.4	3.4	All ND	ND<0.25	20	0
SG18	8/7/2019	1.9	13	ND<2.0	2.4	ND<2.4	ND<2.4	ND<2.4	5.4	All ND	ND<0.20	20	0
SSG19	8/8/2019	ND<1.1	ND<1.7	ND<2.0	ND<1.8	ND<2.4	ND<2.4	ND<2.4	ND<2.3	All ND	ND<0.19	20	0
SG20	8/8/2019	ND<1.1	ND<1.7	ND<2.0	ND<1.8	ND<2.4	ND<2.4	ND<2.4	ND<2.3	All ND	ND<0.18	20	0

Table 6B
Summary of Soil Gas Sample Analytical Results - Other Petroleum VOCs

Sample ID	Sample Collection Date	1,3-Butadiene	Cyclohexane	Heptane	Hexane	4-Ethyltoluene	1,2,4-Trimethylbenzene	1,3,5-Trimethylbenzene	2,2,4-Trimethylpentane	Other Petroleum VOCs by TO-15	Sample Helium (Tracer Gas) (Percent)	Shroud Helium (Tracer Gas) (Percent)	Percent Shroud
SG21	8/8/2019	1.3	4.4	12	21	ND<2.4	ND<2.4	ND<2.4	ND<2.3	All ND	ND<0.21	20	0
SG22	1/8/2020	ND<2.3	ND<3.6	ND<4.2	ND<3.6	ND<5.1	ND<5.1	ND<5.1	ND<4.8	All ND	ND<0.21	20	0
SG25	1/8/2020	ND<2.2	ND<3.4	ND<4.0	ND<3.5	ND<4.9	ND<4.9	ND<4.9	ND<4.6	All ND	ND<0.20	20	0
SG28	1/7/2020	ND<2.2	ND<3.5	ND<4.1	ND<3.6	ND<5.0	ND<5.0	ND<5.0	ND<4.7	All ND	ND<0.20	20	0
SG29	1/7/2020	ND<2.1	ND<3.3	ND<3.9	ND<3.4	ND<4.7	ND<4.7	ND<4.7	ND<4.5	All ND	ND<0.19	20	0
SG30	1/7/2020	ND<2.1	ND<3.2	ND<3.8	ND<3.3	ND<4.6	ND<4.6	ND<4.6	ND<4.4	All ND	ND<0.19	20	0
SG31	1/8/2020	ND<2.1	ND<3.3	ND<3.9	ND<3.4	ND<4.7	ND<4.7	ND<4.7	ND<4.5	All ND	ND<0.19	20	0
SG31-DUP	1/8/2020	ND<2.1	ND<3.3	ND<4.0	ND<3.4	ND<4.7	ND<4.7	ND<4.7	ND<4.5	All ND	ND<0.19	20	0
ESL		No Value	No Value	No Value	No Value	No Value	No Value	No Value	No Value	Various	No Value	No Value	No Value

NOTES:
VOCs = Volatile Organic Compounds.
ND = Not detected.
-- = Not analyzed.
* = Soil gas sample collected from temporary soil gas well.
a = Laboratory note: reported value is estimated.
b = Laboratory note: exceeds instrument calibration range.
ESL = Environmental Screening Level, by San Francisco Bay – Regional Water Quality Control Board, updated July 2019 (Revision 2), Soil Gas Tier 1 ESL from Summary of Vapor ESLs.
Results and ESL values reported in $\mu g/m^3$ (micrograms per cubic meter) unless otherwise indicated.

Table 6C
Summary of Soil Gas Sample Analytical Results - Non-Petroleum VOCs

Sample ID	Sample Collection Date	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	Vinyl Chloride	Methylene Chloride	Chloroform	Other Non-Petroleum VOCs by TO-15	Sample Helium (Tracer Gas) (Percent)	Shroud Helium (Tracer Gas) (Percent)	Percent Shroud
B5-SG, *	10/24/2018	ND<350	ND<270	ND<200	ND<200	ND<130	ND<180	ND<250	All ND	--	--	--
B7-SG, *	10/24/2018	ND<350	ND<270	ND<200	ND<200	ND<130	ND<180	ND<250	All ND	--	--	--
B8-SG, *	10/24/2018	ND<6.9	ND<5.5	ND<4.0	ND<4.0	ND<2.6	ND<3.5	ND<5.0	All ND	--	--	--
B10-SG, *	10/24/2018	ND<350	ND<270	ND<200	ND<200	ND<130	ND<180	ND<250	All ND	--	--	--
SG1	1/3/2019	ND<136	ND<108	ND<80	ND<80	ND<52	ND<70	**47.6, a**	All ND	ND<0.19	20	0
SG1-DUP	1/3/2019	ND<136	ND<108	ND<80	ND<80	ND<52	21.1, a	**64.9, a**	All ND	ND<0.19	20	0
SG2	1/3/2019	ND<2,720	ND<2,160	ND<1,600	ND<1,600	ND<1,040	ND<1,400	ND<1,960	All ND	ND<0.21	20	0
SG3	1/3/2019	ND<27,200	ND<21,600	ND<16,000	ND<16,000	ND<10,400	ND<14,000	ND<19,600	All ND	ND<0.19	20	0
SG4	8/7/2019	ND<1,700	ND<1,300	ND<990	ND<990	ND<640	ND<3,500	ND<1,200	All ND	ND<0.19	20	0
SG5	1/3/2019	**381, a**	ND<540	ND<400	ND<400	ND<260	**165, a**	ND<490	All ND	ND<0.19	20	0
SG6	1/3/2019	**243**	ND<5.4	ND<4	ND<4	ND<2.6	3.3, a	3.4, a	All ND	ND<0.19	20	0
SG7	5/6/2019	ND<272,000	ND<216,000	ND<160,000	ND<160,000	ND<104,000	**110,000, a**	ND<196,000	All ND	ND<0.19	20	0
SG8	5/6/2019	ND<2,720	ND<2,160	ND<1,600	ND<1,600	ND<1,040	**1,300, a**	ND<1,960	All ND	ND<0.23	20	0
SG9	5/6/2019	ND<2,720	ND<2,160	ND<1,600	ND<1,600	ND<1,040	**1,400**	ND<1,960	All ND	ND<0.21	20	0
SG10	5/6/2019	**130, a**	ND<108	ND<80	ND<80	ND<52	ND<70	ND<98	All ND	ND<0.22	20	0
SG10-DUP	5/6/2019	**140**	3.5, a	ND<4	ND<4	ND<2.6	5.6	3.5, a	All ND	ND<0.21	20	0
SG11	5/6/2019	**640**	ND<108	ND<80	ND<80	ND<52	14.4, a	ND<98	All ND	ND<0.21	20	0
SG12	5/6/2019	**330**	ND<108	ND<80	ND<80	ND<52	16.8, a	**35.5, a**	All ND	ND<0.21	20	0
SG13	5/6/2019	**1,400**	ND<27	ND<20	ND<20	ND<13	7.3, a	**37.7**	All ND	ND<0.21	20	0
SG14	8/8/2019	5.9	ND<2.7	ND<2.0	ND<2.0	ND<1.3	ND<17	2.5	All ND	ND<0.21	20	0
SG15	8/7/2019	**220**	7.4	ND<2.0	ND<2.0	ND<1.3	ND<17	2.5	All ND	ND<0.24	20	0
SG16	8/7/2019	**48**	ND<2.7	ND<2.0	ND<2.0	ND<1.3	ND<17	**12**	All ND	ND<0.22	20	0
SG16 DUP	8/7/2019	**45**	ND<2.7	ND<2.0	ND<2.0	ND<1.3	ND<17	**12**	All ND	ND<0.22	20	0

Table 6C
Summary of Soil Gas Sample Analytical Results - Non-Petroleum VOCs

Sample ID	Sample Collection Date	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	Vinyl Chloride	Methylene Chloride	Chloroform	Other Non-Petroleum VOCs by TO-15	Sample Helium (Tracer Gas) (Percent)	Shroud Helium (Tracer Gas) (Percent)	Percent Shroud
SG17	8/7/2019	**45**	ND<2.7	ND<2.0	ND<2.0	ND<1.3	ND<17	**10**	All ND	ND<0.25	20	0
SG18	8/7/2019	**50**	ND<2.7	ND<2.0	ND<2.0	ND<1.3	ND<17	**76**	All ND	ND<0.20	20	0
SSG19	8/8/2019	ND<3.4	ND<2.7	ND<2.0	ND<2.0	ND<1.3	ND<17	**110**	All ND	ND<0.19	20	0
SG20	8/8/2019	ND<3.4	ND<2.7	ND<2.0	ND<2.0	ND<1.3	ND<17	**65**	All ND	ND<0.18	20	0
SG21	8/8/2019	ND<3.4	ND<2.7	ND<2.0	ND<2.0	ND<1.3	20	**72**	All ND	ND<0.21	20	0
SG22	1/8/2020	**16**	ND<5.6	ND<4.1	ND<4.1	ND<2.6	ND<36	**12**	All ND	ND<0.21	20	0
SG25	1/8/2020	**950**	ND<5.3	ND<3.9	ND<3.9	ND<2.5	ND<34	**17**	All ND	ND<0.20	20	0
SG28	1/7/2020	**37**	ND<5.4	ND<4.0	ND<4.0	ND<2.6	ND<35	**24**	All ND	ND<0.20	20	0
SG29	1/7/2020	**30**	ND<5.1	ND<3.8	ND<3.8	ND<2.4	ND<33	**12**	All ND	ND<0.19	20	0
SG30	1/7/2020	**52**	ND<5.0	ND<3.7	ND<3.7	ND<2.4	ND<33	**16**	All ND	ND<0.19	20	0
SG31	1/8/2020	**210**	ND<5.1	ND<3.8	ND<3.8	ND<2.4	ND<33	**76**	All ND	ND<0.19	20	0
SG31-DUP	1/8/2020	**210**	ND<5.2	ND<3.8	ND<3.8	ND<2.5	ND<34	**76**	All ND	ND<0.19	20	0
ESL		15	16	280	2,800	0.32	34	4.1	Various	No Value	No Value	No Value

NOTES:
PCE = Tetrachloroethene.
TCE = Trichloroethene.
cis-1,2-DCE = cis-1,2-Dichloroethene.
trans-1,2-DCE = trans-1,2-Dichloroethene.
VOCs = Volatile Organic Compounds.
ND = Not detected.
-- = Not analyzed.
* = Soil gas sample collected from temporary soil gas well.
# = The July 2019 (Revision 2) Tier 1 Soil Gas ESL for TPH-G of 3,300 ug/m^3 is based on odor nuisance levels. The July 2019 (Revision 2) Table SG-1 Non-cancer Human Health Risk Level ESL for TPH-G is 20,000 ug/m^3.
a = Laboratory note: reported value is estimated.
ESL = Environmental Screening Level, by San Francisco Bay – Regional Water Quality Control Board, updated July 2019 (Revision 2), Soil Gas Tier 1 ESL from Summary of Vapor ESLs.
Results in BOLD exceed the respective ESL value.
Green high light indicates that the sample detection limit exceeded the respective Tier 1 soil gas ESL value.
Results and ESL values reported in µg/m^3 (micrograms per cubic meter) unless otherwise indicated.

Table 6D

Summary of Soil Gas Sample Analytical Results - Other Non-Petroleum VOCs

Sample ID	Sample Collection Date	Acetone	MEK	MIBK	Carbon Disulfide	Dichlorodifluoro-methane	Other Non-Petroleum VOCs by TO-15	Sample Helium (Tracer Gas) (Percent)	Shroud Helium (Tracer Gas) (Percent)	Percent Shroud
B5-SG, *	10/24/2018	ND<120	ND<150	ND<210	ND<160	ND<250	All ND	--	--	--
B7-SG, *	10/24/2018	ND<120	ND<150	ND<210	230	ND<250	All ND	--	--	--
B8-SG, *	10/24/2018	420	110	23	260	ND<5.0	All ND	--	--	--
B10-SG, *	10/24/2018	ND<120	ND<150	ND<210	470	ND<250	All ND	--	--	--
SG1	1/3/2019	ND<236	ND<296	ND<82	20.2, a	ND<98	All ND	ND<0.19	20	0
SG1-DUP	1/3/2019	ND<236	ND<296	ND<82	ND<62	ND<98	All ND	ND<0.19	20	0
SG2	1/3/2019	ND<4,270	ND<5,920	ND<1,640	ND<1,240	ND<1,960	All ND	ND<0.21	20	0
SG3	1/3/2019	ND<47,200	ND<59,200	ND<16,400	ND<12,400	ND<19,600	All ND	ND<0.19	20	0
SG4	8/7/2019	ND<2,400	ND<2,900	ND<1,000	ND<3,100	ND<2.5	All ND	ND<0.19	20	0
SG5	1/3/2019	ND<1,180	ND<1,480	ND<410	ND<310	ND<490	All ND	ND<0.19	20	0
SG6	1/3/2019	ND<11.8	ND<14.8	ND<4.1	ND<3.1	1.3, a	All ND	ND<0.19	20	0
SG7	5/6/2019	ND<480,000	ND<600,000	ND<164,000	ND<124,000	ND<196,000	All ND	ND<0.19	20	0
SG8	5/6/2019	ND<4,800	ND<6,000	ND<1,640	ND<1,240	ND<1,960	All ND	ND<0.23	20	0
SG9	5/6/2019	ND<4,800	ND<6,000	ND<1,640	ND<1,240	ND<1,960	All ND	ND<0.21	20	0
SG10	5/6/2019	ND<240	ND<300	ND<82	ND<62	ND<98	All ND	ND<0.22	20	0
SG10-DUP	5/6/2019	ND<12	ND<15	ND<4.1	ND<3.1	ND<4.9	All ND	ND<0.21	20	0
SG11	5/6/2019	ND<240	ND<300	ND<82	ND<62	ND<98	All ND	ND<0.21	20	0
SG12	5/6/2019	ND<240	ND<300	ND<82	12.6, a	ND<98	All ND	ND<0.21	20	0
SG13	5/6/2019	ND<60	ND<75	ND<20.5	16.1	ND<24.5	All ND	ND<0.21	20	0
SG14	8/8/2019	ND<12	ND<5.9	ND<2.0	ND<6.2	ND<2.5	All ND	ND<0.21	20	0
SG15	8/7/2019	ND<12	ND<5.9	ND<2.0	64	ND<2.5	All ND	ND<0.24	20	0
SG16	8/7/2019	ND<12	ND<5.9	ND<2.0	28	ND<2.5	All ND	ND<0.22	20	0
SG16 DUP	8/7/2019	ND<12	ND<5.9	ND<2.0	29	ND<2.5	All ND	ND<0.22	20	0
SG17	8/7/2019	ND<12	ND<5.9	ND<2.0	40	ND<2.5	All ND	ND<0.25	20	0

Table 6D

Summary of Soil Gas Sample Analytical Results - Other Non-Petroleum VOCs

Sample ID	Sample Collection Date	Acetone	MEK	MIBK	Carbon Disulfide	Dichlorodifluoro-methane	Other Non-Petroleum VOCs by TO-15	Sample Helium (Tracer Gas) (Percent)	Shroud Helium (Tracer Gas) (Percent)	Percent Shroud
SG18	8/7/2019	ND<12	ND<5.9	ND<2.0	53	ND<2.5	All ND	ND<0.20	20	0
SSG19	8/8/2019	ND<12	ND<5.9	ND<2.0	ND<6.2	ND<2.5	All ND	ND<0.19	20	0
SG20	8/8/2019	ND<12	ND<5.9	ND<2.0	ND<6.2	3.1	All ND	ND<0.18	20	0
SG21	8/8/2019	ND<12	ND<5.9	ND<2.0	25	--	All ND	ND<0.21	20	0
SG22	1/8/2020	ND<24	ND<12	ND<4.2	ND<13	ND<5.1	All ND	ND<0.21	20	0
SG25	1/8/2020	ND<24	ND<12	ND<4.0	13	ND<4.9	All ND	ND<0.20	20	0
SG28	1/7/2020	ND<24	ND<12	ND<4.1	21	ND<5.0	All ND	ND<0.20	20	0
SG29	1/7/2020	ND<23	ND<11	ND<3.9	ND<12	ND<4.7	All ND	ND<0.19	20	0
SG30	1/7/2020	ND<22	ND<11	ND<3.8	ND<12	ND<4.6	All ND	ND<0.19	20	0
SG31	1/8/2020	ND<23	ND<11	ND<3.9	ND<12	ND<4.7	All ND	ND<0.19	20	0
SG31-DUP	1/8/2020	ND<23	ND<11	ND<4.0	ND<12	ND<4.8	All ND	ND<0.19	20	0
ESL		1,000,000	170,000	14,000	No Value	No Value	Various	No Value	No Value	No Value

NOTES:

MEK = Methyl Ethyl Ketone. (2-Butanone)

MIBK = Methyl Isobutyl Ketone.

VOCs = Volatile Organic Compounds.

ND = Not detected.

-- = Not analyzed.

* = Soil gas sample collected from temporary soil gas well.

a = Laboratory note: reported value is estimated.

b = Laboratory note: exceeds instrument calibration range.

ESL = Environmental Screening Level, by San Francisco Bay – Regional Water Quality Control Board, updated July 2019 (Revision 2), Soil Gas Tier 1 ESL from Summary of Vapor ESLs.

Green high light indicates that the sample detection limit exceeded the respective Tier 1 soil gas ESL value.

Results and ESL values reported in $\mu g/m^3$ (micrograms per cubic meter) unless otherwise indicated.

Table 6E
Summary of Soil Gas Sample Analytical Results - Fixed Gases

Sample ID	Sample Collection Date	Carbon Dioxide (Percent)	Oxygen (Percent)	Methane (Percent)	Sample Helium (Tracer Gas) (Percent)	Shroud Helium (Tracer Gas) (Percent)	Percent Shroud
B5-SG, *	10/24/2018	--	--	--	--	--	--
B7-SG, *	10/24/2018	--	--	--	--	--	--
B8-SG, *	10/24/2018	--	--	--	--	--	--
B10-SG, *	10/24/2018	--	--	--	--	--	--
SG1	1/3/2019	1.71	2.26	--	ND<0.19	20	0
SG1-DUP	1/3/2019	1.72	2.51	--	ND<0.19	20	0
SG2	1/3/2019	3.84	1.0	--	ND<0.21	20	0
SG3	1/3/2019	7.45	0.6	--	ND<0.19	20	0
SG4	8/7/2019	11	3.0	--	ND<0.19	20	0
SG5	1/3/2019	6.06	4.20	--	ND<0.19	20	0
SG6	1/3/2019	7.38	0.9	--	ND<0.19	20	0
SG7	5/6/2019	9.0	0.99	18	ND<0.19	20	0
SG8	5/6/2019	6.3	4.5	0.54	ND<0.23	20	0
SG9	5/6/2019	11	1.3	1.4	ND<0.21	20	0
SG10	5/6/2019	15	1.4	ND<0.22	ND<0.22	20	0
SG10-DUP	5/6/2019	14	1.4	ND<0.21	ND<0.21	20	0
SG11	5/6/2019	8.6	1.3	ND<0.21	ND<0.21	20	0
SG12	5/6/2019	0.91	16	ND<0.21	ND<0.21	20	0
SG13	5/6/2019	2.4	11	ND<0.21	ND<0.21	20	0
SG14	8/8/2019	7.7	6.2	--	ND<0.21	20	0
SG15	8/7/2019	ND<0.24	18	--	ND<0.24	20	0

Table 6E
Summary of Soil Gas Sample Analytical Results - Fixed Gases

Sample ID	Sample Collection Date	Carbon Dioxide (Percent)	Oxygen (Percent)	Methane (Percent)	Sample Helium (Tracer Gas) (Percent)	Shroud Helium (Tracer Gas) (Percent)	Percent Shroud
SG16	8/7/2019	0.26	18	--	ND<0.22	20	0
SG16 DUP	8/7/2019	0.26	18	--	ND<0.22	20	0
SG17	8/7/2019	ND<0.25	18	--	ND<0.25	20	0
SG18	8/7/2019	ND<0.20	18	--	ND<0.20	20	0
SSG19	8/8/2019	1.8	17	--	ND<0.19	20	0
SG20	8/8/2019	3.2	7.8	--	ND<0.18	20	0
SG21	8/8/2019	5.7	2.7	--	ND<0.21	20	0
SG22	1/8/2020	2.8	4.2	--	ND<0.21	20	0
SG25	1/8/2020	2.2	6.9	--	ND<0.20	20	0
SG28	1/7/2020	2.5	11	--	ND<0.20	20	0
SG29	1/7/2020	8.6	2.6	--	ND<0.19	20	0
SG30	1/7/2020	0.91	7.0	--	ND<0.19	20	0
SG31	1/8/2020	0.34	14	--	ND<0.19	20	0
SG31-DUP	1/8/2020	0.34	14	--	ND<0.19	20	0
ESL		No Value	No Value	No Value	No Value	No Value	No Value

NOTES:
ND = Not detected.
-- = Not analyzed.
* = Soil gas sample collected from temporary soil gas well.
Percent Shroud = The ratio of tracer gas concentration detected in the soil gas sample to the tracer gas concentration detected in the shroud, expressed as a percentage.
LTCP[1] = Low Threat Closure Policy, by State Water Resources Control Board, effective August 17, 2012, from Appendix 4 - Direct Measurement of Soil Gas. Residential Land Use. No Bioattenuation Zone.
LTCP[2] = Low Threat Closure Policy, by State Water Resources Control Board, effective August 17, 2012, from Appendix 4 - Direct Measurement of Soil Gas. Residential Land Use. With Bioattenuation Zone.
ESL = Environmental Screening Level, by San Francisco Bay – Regional Water Quality Control Board, updated July 2019 (Revision 2), Soil Gas Tier 1 ESL from Summary of Vapor ESLs.
Results, LTCP values, and ESL values reported in µg/m3 (micrograms per cubic meter) unless otherwise indicated.

Table 7
Summary of Well Water Level Monitoring Data

Well Number	Date Monitored	Top of Casing Elevation (ft-msl.)	Depth to Water (ft)	Water Table Elevation (ft-MSL.)
MW1	2/25/2020	Unknown	8.13	Unknown
	11/12/2019	Unknown	10.39	Unknown
	8/12/2019	Unknown	9.68	Unknown
	*8/2/2019	Unknown	9.52	Unknown
	*7/31/2019	Unknown	9.37	Unknown
MW2	2/25/2020	Unknown	8.32	Unknown
	11/12/2019	Unknown	10.68	Unknown
	8/12/2019	Unknown	9.94	Unknown
	*8/2/2019	Unknown	9.69	Unknown
	*7/31/2019	Unknown	10.87	Unknown
MW3	2/25/2020	Unknown	10.61	Unknown
	11/12/2019	Unknown	12.15	Unknown
	8/12/2019	Unknown	11.57	Unknown
	*8/2/2019	Unknown	11.50	Unknown
	*7/31/2019	Unknown	11.47	Unknown

Abbreviations and Notes:

* = Prior to well development.

ft-MSL = feet above mean sea level

ft = feet

FIGURES

- **Figure 1 – Site Location Map**
- **Figure 2 - Site Vicinity Aerial Photograph Showing Nearby Site Locations**
- **Figure 3 - Site Vicinity Aerial Photograph Detail Showing Soil Gas Well Locations**
- **Figure 4 - Proposed PCE and TPH-G Source Removal Areas**
- **Figure 5 – Site Map Showing Proposed First Floor Structure, Hardscape Cap, Vapor Barrier and Vapor Vent System Locations**
- **Figure 6 - Site Aerial Photograph Showing 1911 Property Boundaries, Historical Residential Structures, and Borehole Locations**
- **Figure 7 - Site Aerial Photograph Showing Historical UST Features and Hydraulic Jack Locations**
- **Figure 8 - Site Aerial Photograph Showing Total Lead Concentrations in Fill and Shallow Soil**
- **Figure 9 – Site Vicinity Aerial Photograph Detail Showing TPH-G in Soil Gas**
- **Figure 10 – Site Vicinity Aerial Photograph Detail Showing Benzene in Soil Gas**
- **Figure 11 – Site Vicinity Aerial Photograph Detail Showing Methylene Chloride in Soil Gas**
- **Figure 12 – Site Vicinity Aerial Photograph Detail Showing PCE in Soil Gas**
- **Figure 13 – Site Aerial Photorgraph Showing Geologic Cross Section Locations**
- **Figure 14 – Geologic Cross Section A-A'**
- **Figure 15 – Geologic Cross Section B-B'**
- **Figure 16 – Geologic Cross Section C-C'**
- **Figure 17 – Geologic Cross Section D-D'**
- **Figure 18 – Geologic Cross Section E-E'**
- **Figure 19 – Geologic Cross Section F-F'**
- **Figure 20 – Geologic Cross Section G-G'**

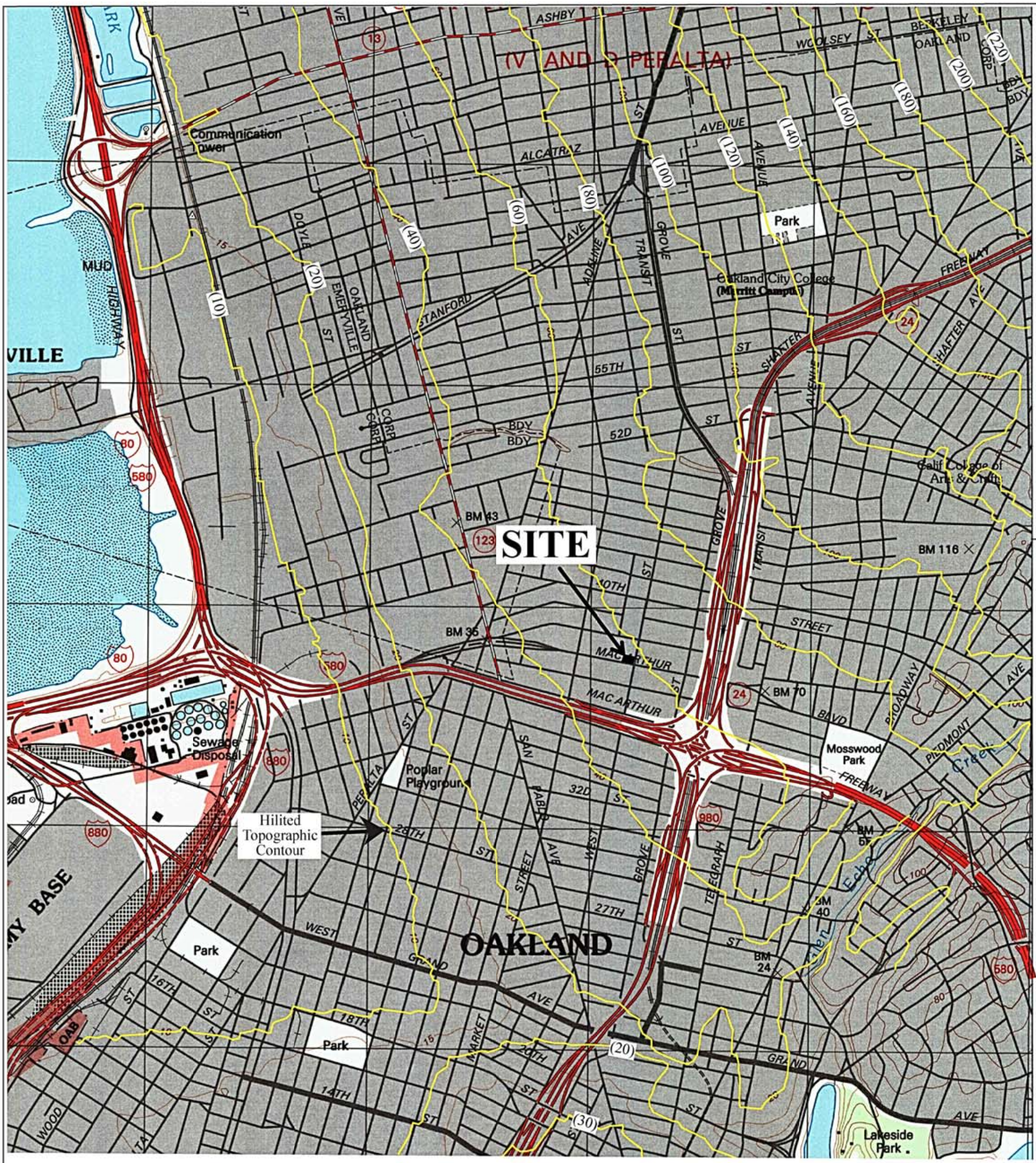


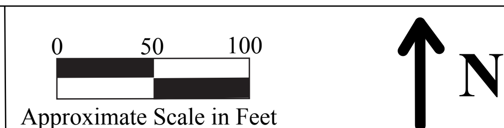
Figure 1
Site Location Map
820 W MacArthur Boulevard
Oakland, California

Base Map From: US Geological Survey Oakland West, California 7.5-Minute Quadrangles Map updated 1996	P&D Environmental, Inc. 55 Santa Clara Avenue, Suite 240 Oakland, CA 94610	0 1,000 2,000 Approximate Scale in Feet N

Figure 2
Site Vicinity Aerial Photograph Showing Nearby Site Locations
820 W MacArthur Boulevard
Oakland, California

Base Map from:
Partner Engineering and Science, Inc.
Additional Subsurace Investigation Report,
October 31, 2018, and Google Earth, 2020

P&D Environmental, Inc.
55 Santa Clara Ave., Suite 240
Oakland, CA 94610



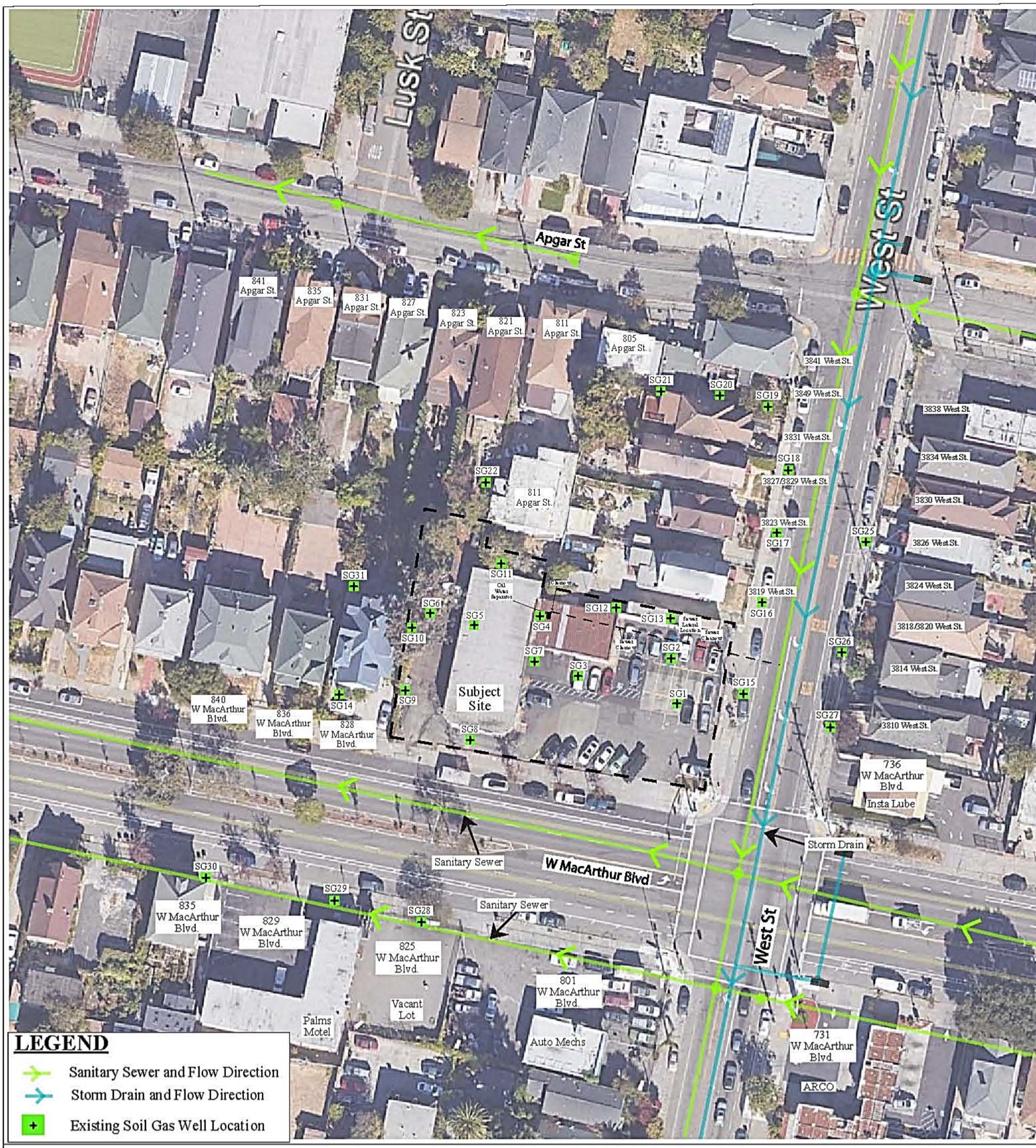


Figure 3
Site Vicinity Aerial Photograph Detail Showing Soil Gas Well Locations
820 W MacArthur Boulevard
Oakland, California

Base Map From: Partner Engineering and Science, Inc. Additional Subsurface Investigation Report, October 31, 2018, and Google Earth, 2020	P&D Environmental, Inc. 55 Santa Clara Avenue, Suite 240 Oakland, CA 94610	0 40 80 Approximate Scale in Feet	N

Figure 4
Site Aerial Photograph Showing Proposed PCE and TPH-G Source Removal Areas
820 W MacArthur Boulevard
Oakland, California

Base Map from: Partner Engineering and Science, Inc. Additional Subsurace Investigation Report, October 31, 2018, and Google Earth, 2020	P&D Environmental, Inc. 55 Santa Clara Ave., Suite 240 Oakland, CA 94610	0 15 30 Approximate Scale in Feet	N

Figure 5
Site Map Showing Proposed First Floor Structure, Hardscape Cap, Vapor Barrier and Vapor Vent System Locations
820 W MacArthur Boulevard
Oakland, California

Base Map from:
Levy Design Partners, 820 W MacArthur Oakland, CA, Site Plan, A1.1, dated 4/17/19.

P&D Environmental, Inc.
55 Santa Clara Ave., Suite 240
Oakland, CA 94610

0 15 30
Approximate Scale in Feet

N

Figure 6
Site Aerial Photograph Showing 1911 Property Boundaries, Historical Residential Structures, and Borehole Locations
820 W MacArthur Boulevard
Oakland, California

Base Map from: Sanborn Fire Insurance Map Volume 3, Sheet 354, and Volume 3, Sheet 353, and Google Earth, 2018	P&D Environmental, Inc. 55 Santa Clara Ave., Suite 240 Oakland, CA 94610	0 15 30 Approximate Scale in Feet N

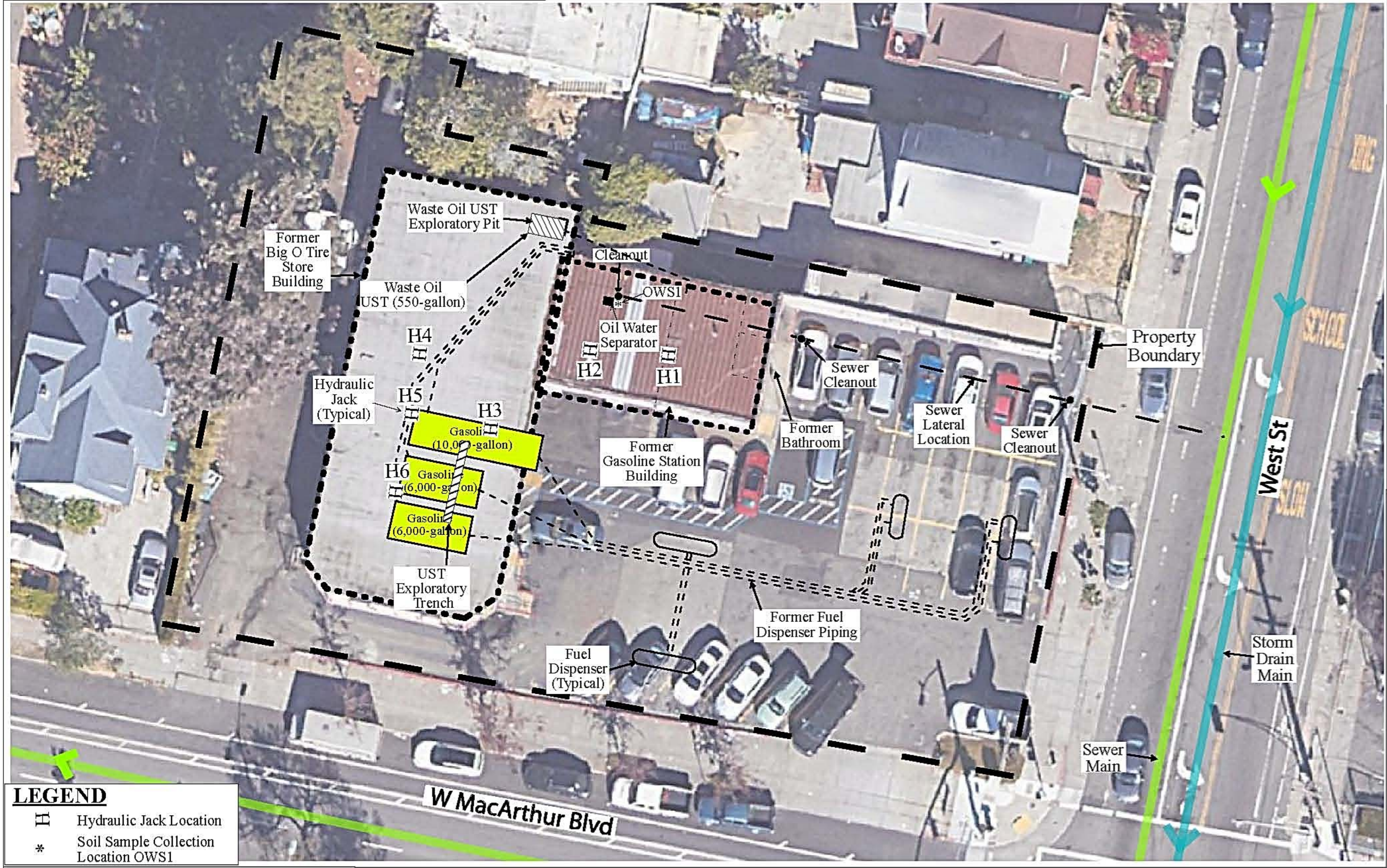
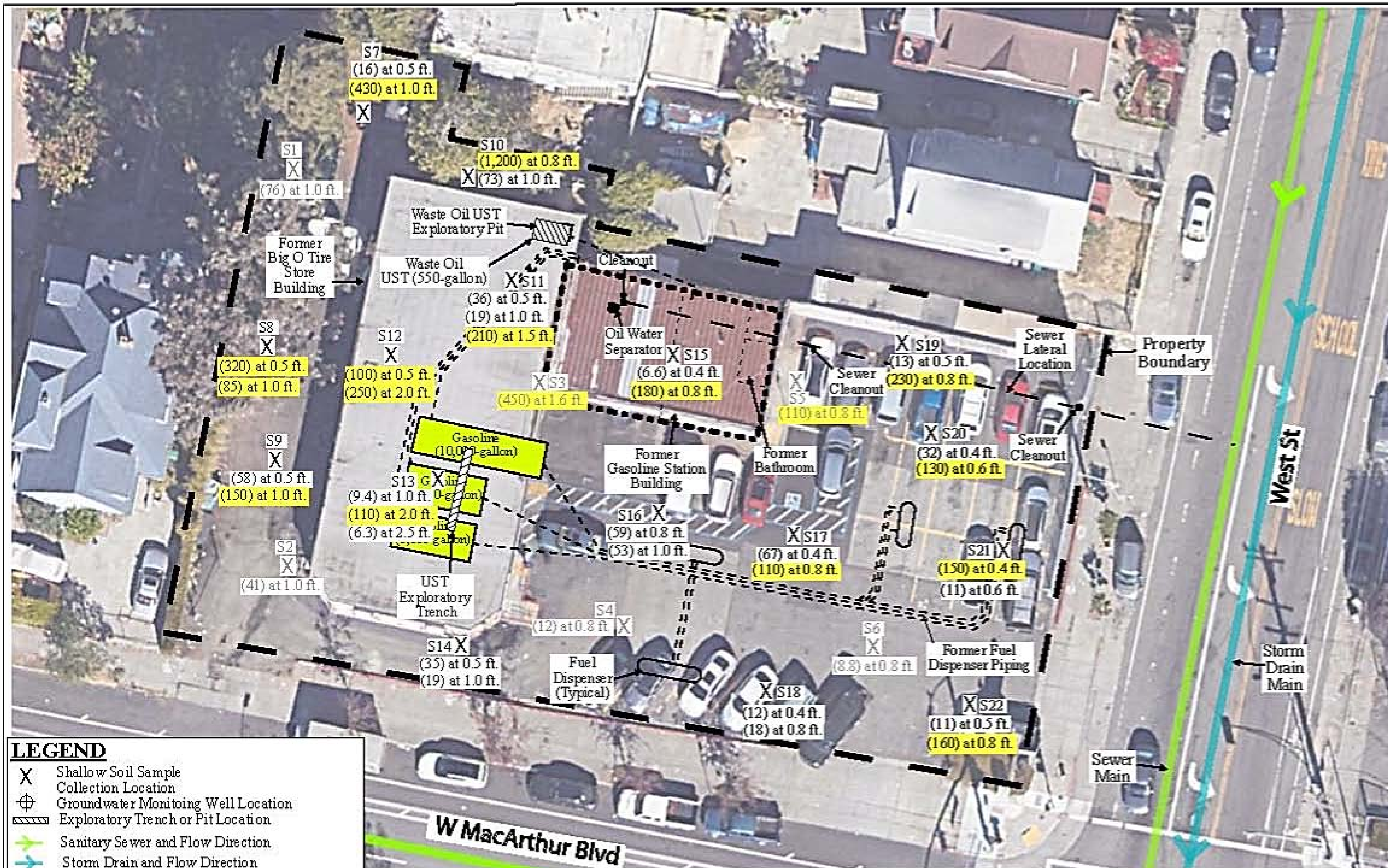


Figure 7
Site Aerial Photograph Showing Historical UST Features and Hydraulic Jack Locations
820 W MacArthur Boulevard
Oakland, California

Base Map from: Partner Engineering and Science, Inc. Additional Subsurace Investigation Report, October 31, 2018, and Google Earth, 2020	P&D Environmental, Inc. 55 Santa Clara Ave., Suite 240 Oakland, CA 94610	0 15 30 Approximate Scale in Feet N



LEGEND

- X Shallow Soil Sample Collection Location
- ⌖ Groundwater Monitoring Well Location
- Exploratory Trench or Pit Location
- Sanitary Sewer and Flow Direction
- Storm Drain and Flow Direction

(1,200) Total Lead in Soil (mg/kg)

Tier 1 Soil ESL for Lead = 32 mg/kg.
Table S-1 Direct Exposure Non-cancer Human Health Risk Level for Lead = 80 mg/kg.
July 2019 (Revision 2) Tier 1 Soil ESLs.

Concentrations Hi-Lited in Yellow Exceed the Respective July 2019 (Revision 2) Table S-1 Soil Risk Level Value.

Figure 8
Site Aerial Photograph Showing Total Lead Concentrations in Fill and Shallow Soil
820 W MacArthur Boulevard
Oakland, California

Base Map from: Partner Engineering and Science, Inc. Additional Subsurace Investigation Report, October 31, 2018, and Google Earth, 2020	P&D Environmental, Inc. 55 Santa Clara Ave., Suite 240 Oakland, CA 94610	0 15 30 Approximate Scale in Feet N

LEGEND

- Historical (Partner) Borehole Location
- * Soil Gas Sample Collected from Borehole
- Existing Soil Gas Well Location
- Proposed Soil Gas Well Location
- Sanitary Sewer and Flow Direction
- Storm Drain and Flow Direction

(120,000,000) Detected TPH-G Soil Gas Concentration (ug/m3)

(ND<210) Not Detected

(NA) Not Analyzed

(NS) No Sample Collected

TPH-G Soil Gas Isoconcentration Contour

TPH-G = Total Petroleum Hydrocarbons as Gasoline

Tier 1 Soil Gas ESL for TPH-G = 3,300 ug/m3, but is based on nuisance odor levels. The non-cancer Human Health Risk Level in a residential land use scenario for TPH-G = 20,000 ug/m3. July 2019 (Revision 2) Soil Gas ESLs.

Concentrations Hi-Lited in Yellow Exceed the Respective July 2019 (Revision 2) Soil Gas Human Health Risk Level Value.

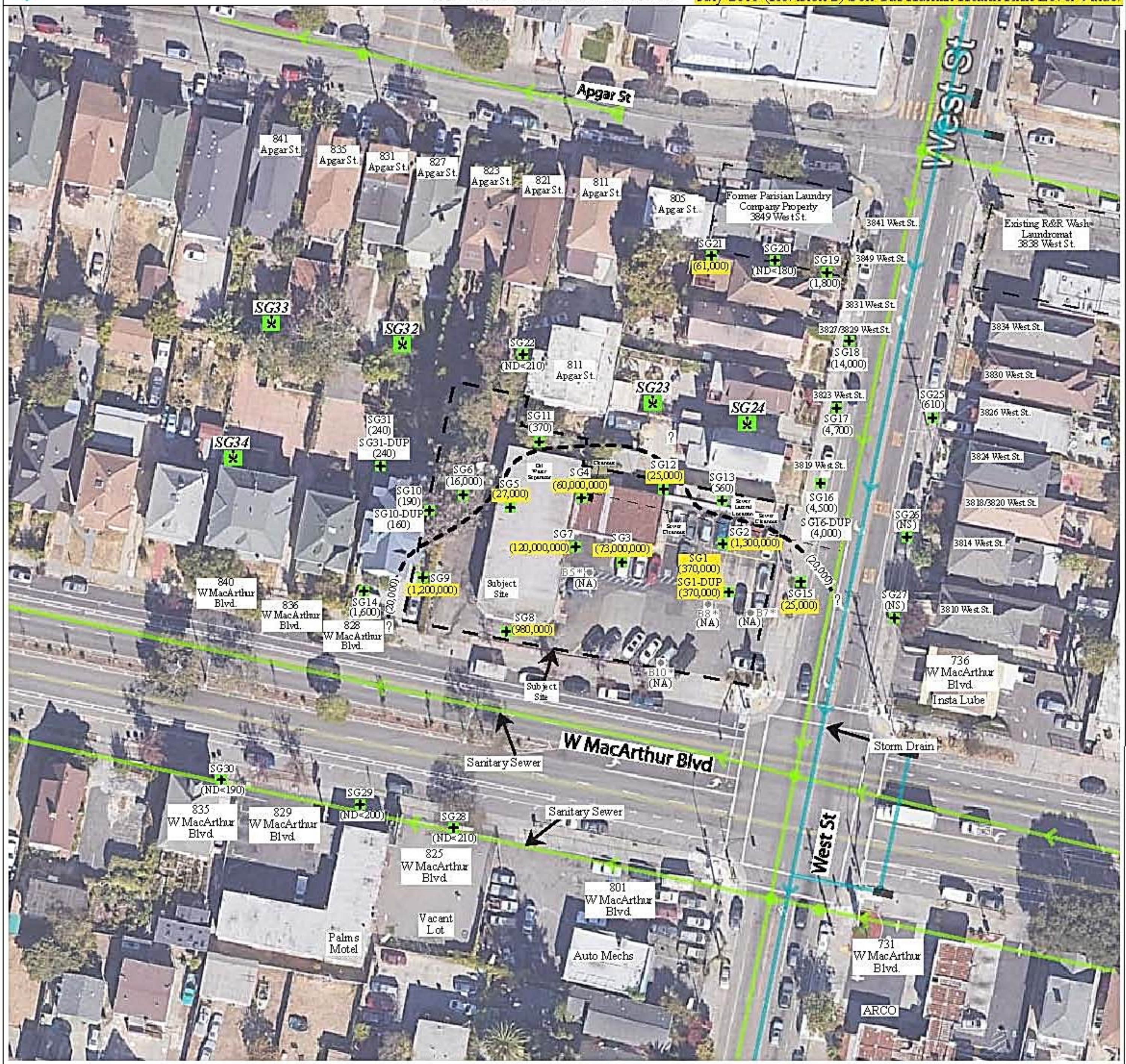


Figure 9
Site Vicinity Aerial Photograph Detail Showing TPH-G in Soil Gas
820 W MacArthur Boulevard
Oakland, California

Base Map From:
Partner Engineering and Science, Inc.
Additional Subsurface Investigation Report,
October 31, 2018, and Google Earth, 2018

P&D Environmental, Inc.
55 Santa Clara Avenue, Suite 240
Oakland, CA 94610

0 40 80
Approximate Scale in Feet

N

LEGEND

- Historical (Partner) Borehole Location
- * Soil Gas Sample Collected from Borehole
- Existing Soil Gas Well Location
- Proposed Soil Gas Well Location
- Sanitary Sewer and Flow Direction
- Storm Drain and Flow Direction

(1,800) Detected Benzene Soil Gas Concentration (ug/m3)

(ND<1.6) Not Detected

(NA) Not Analyzed

(NS) No Sample Collected

Tier 1 Soil Gas ESL for Benzene = 3.2 ug/m3.
July 2019 (Revision 2) Soil Gas ESLs.

Concentrations Hi-Lited in Yellow Exceed the Respective July 2019 (Revision 2) Soil Gas Human Health Risk Level Value.

Figure 10
Site Vicinity Aerial Photograph Detail Showing Benzene in Soil Gas
820 W MacArthur Boulevard
Oakland, California

Base Map From:
Partner Engineering and Science, Inc.
Additional Subsurface Investigation Report,
October 31, 2018, and Google Earth, 2018

P&D Environmental, Inc.
55 Santa Clara Avenue, Suite 240
Oakland, CA 94610

0 40 80
Approximate Scale in Feet

N

Figure 11
Site Vicinity Aerial Photograph Detail Showing Methylene Chloride in Soil Gas
820 W MacArthur Boulevard
Oakland, California

Base Map From: Partner Engineering and Science, Inc. Additional Subsurface Investigation Report, October 31, 2018, and Google Earth, 2018	P&D Environmental, Inc. 55 Santa Clara Avenue, Suite 240 Oakland, CA 94610	0 40 80 Approximate Scale in Feet N

LEGEND

Historical (Partner) Borehole Location		(1,400)	Detected PCE Soil Gas Concentration (ug/m³)
*	Soil Gas Sample Collected from Borehole	(ND<350)	Not Detected
	Existing Soil Gas Well Location	(NA)	Not Analyzed
	Proposed Soil Gas Well Location	(NS)	No Sample Collected
	Sanitary Sewer and Flow Direction		
	Storm Drain and Flow Direction		PCE Soil Gas Isoconcentration Contour

PCE = Tetrachloroethene

Tier 1 Soil Gas ESL for PCE = 15 ug/m³, July 2019 (Revision 2) Soil Gas ESLs.

Concentrations Hi-Lited in Yellow Exceed the Respective July 2019 (Revision 2) Soil Gas Human Health Risk Level Value.

Figure 12
Site Vicinity Aerial Photograph Detail Showing PCE in Soil Gas
820 W MacArthur Boulevard
Oakland, California

Base Map From: Partner Engineering and Science, Inc. Additional Subsurface Investigation Report, October 31, 2018, and Google Earth, 2018	P&D Environmental, Inc. 55 Santa Clara Avenue, Suite 240 Oakland, CA 94610	0 40 80 Approximate Scale in Feet N

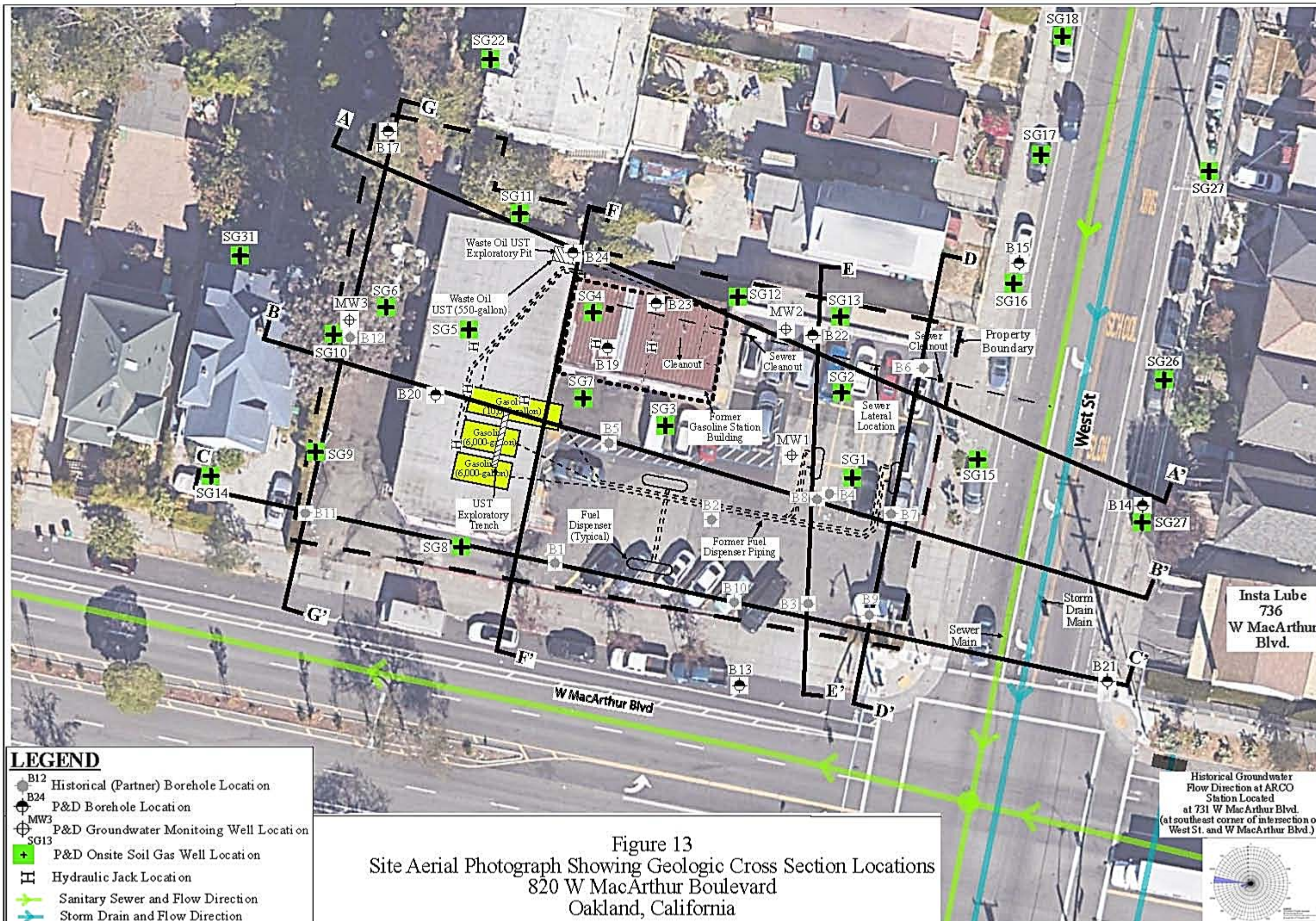


Figure 13
Site Aerial Photograph Showing Geologic Cross Section Locations
820 W MacArthur Boulevard
Oakland, California

Base Map from:
Partner Engineering and Science, Inc.
Additional Subsurace Investigation Report,
October 31, 2018, and Google Earth, 2020

P&D Environmental, Inc.
55 Santa Clara Ave., Suite 240
Oakland, CA 94610

0 20 40
Approximate Scale in Feet

N

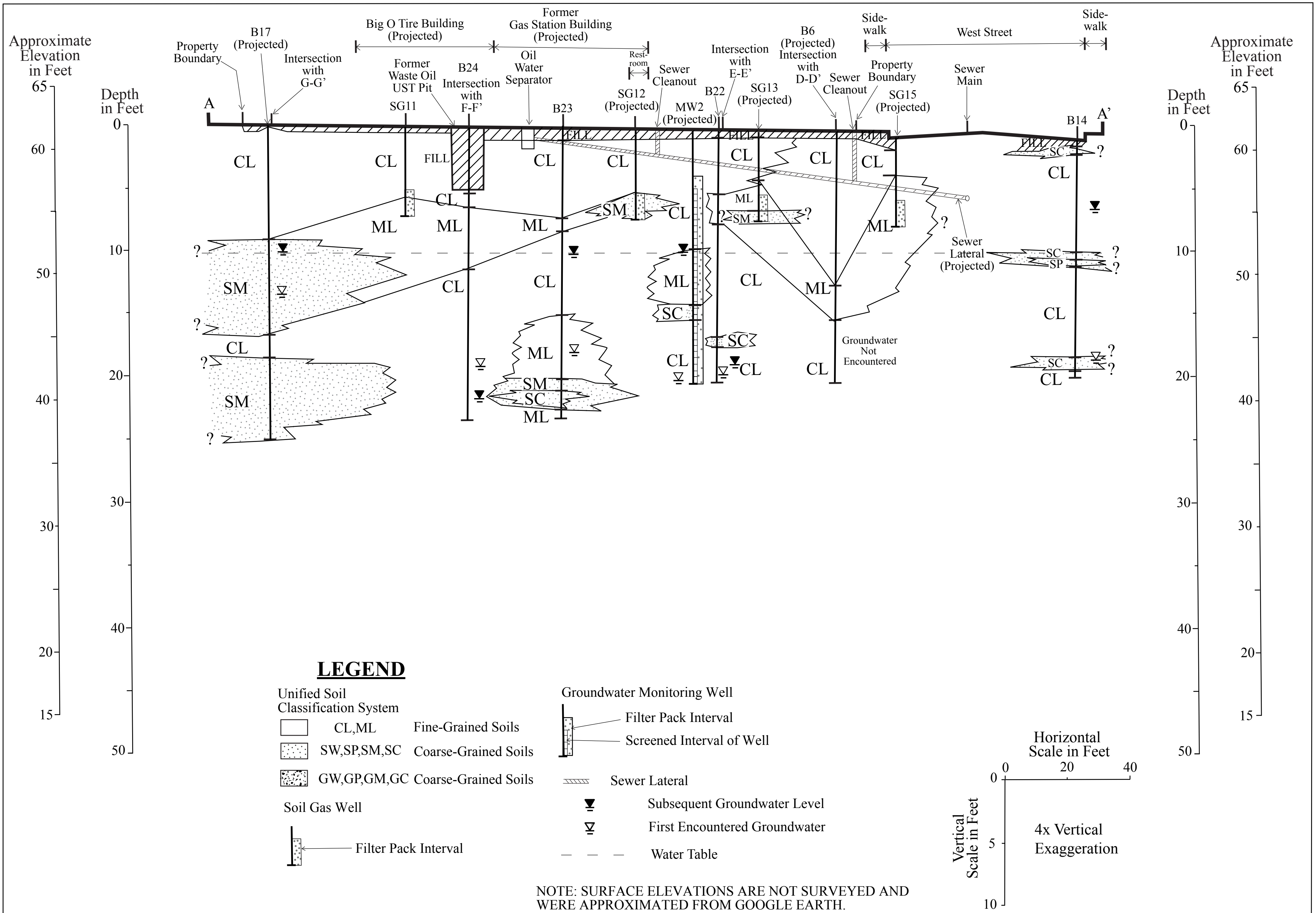


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Figure 14
Geologic Cross Section A-A'
820 W MacArthur Boulevard
Oakland, California

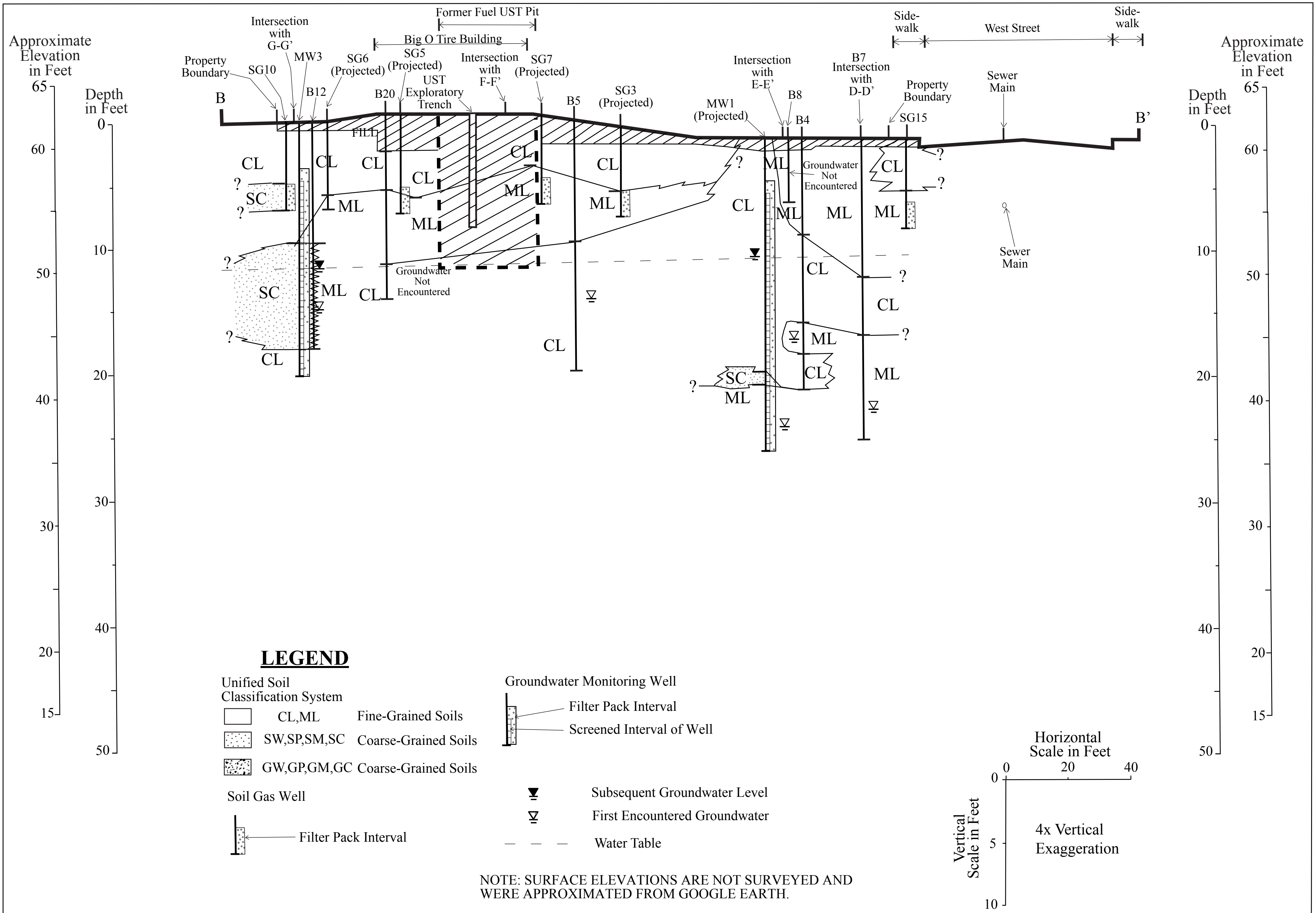

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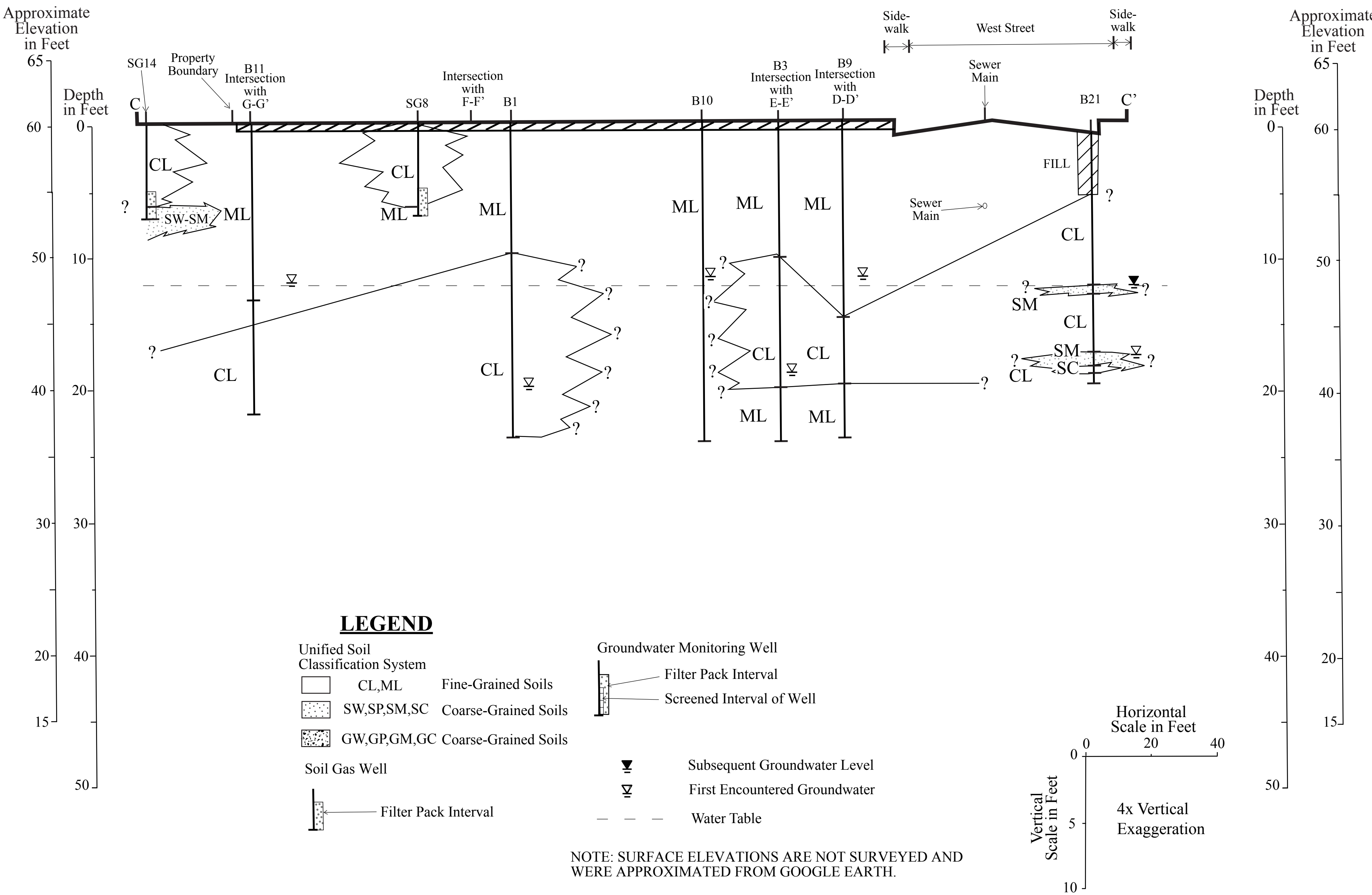
Figure 15
Geologic Cross Section B-B'
820 W MacArthur Boulevard
Oakland, California



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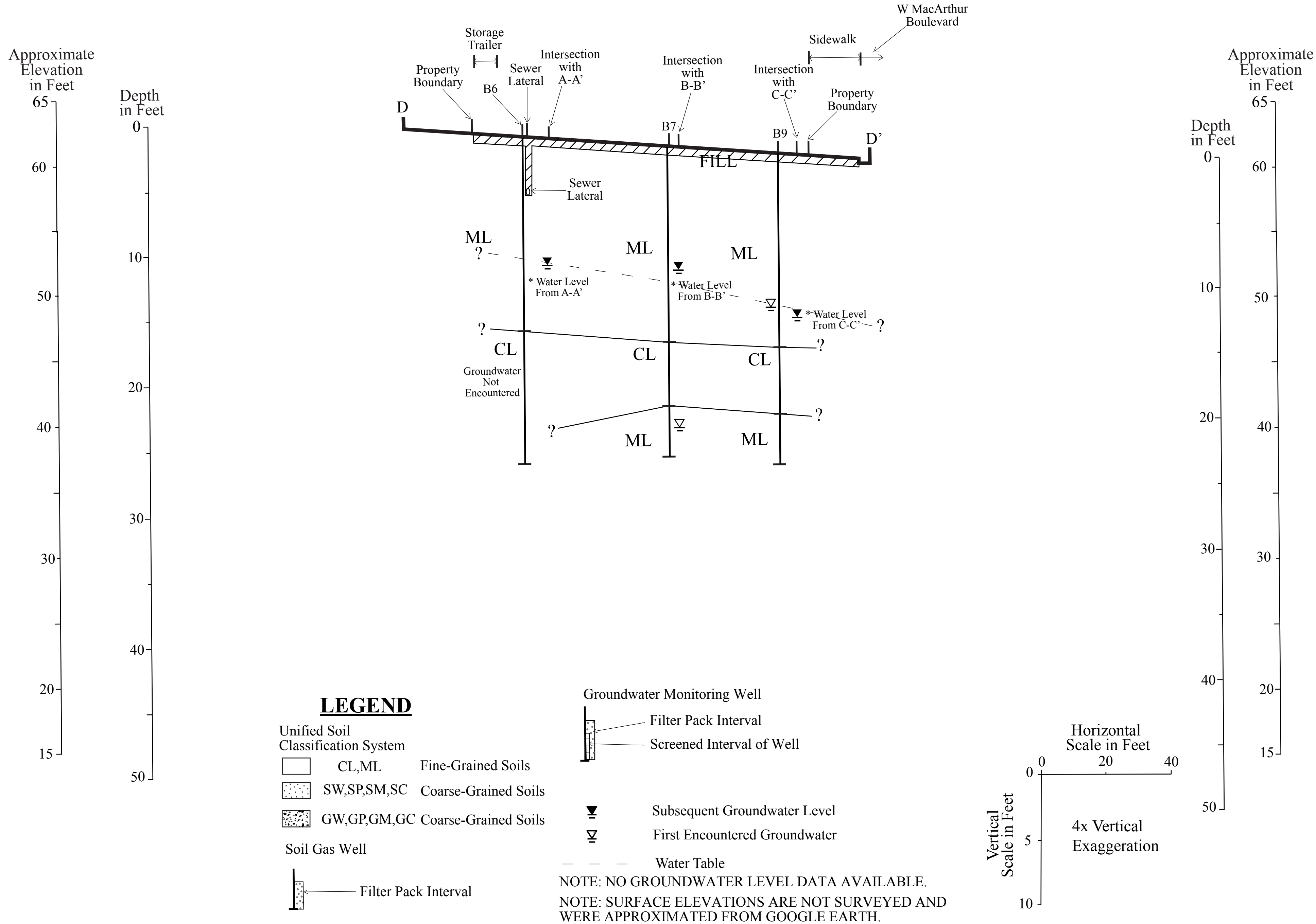
Oakland, CA 94610

Figure 16
Geologic Cross Section C-C'
820 W MacArthur Boulevard
Oakland, California



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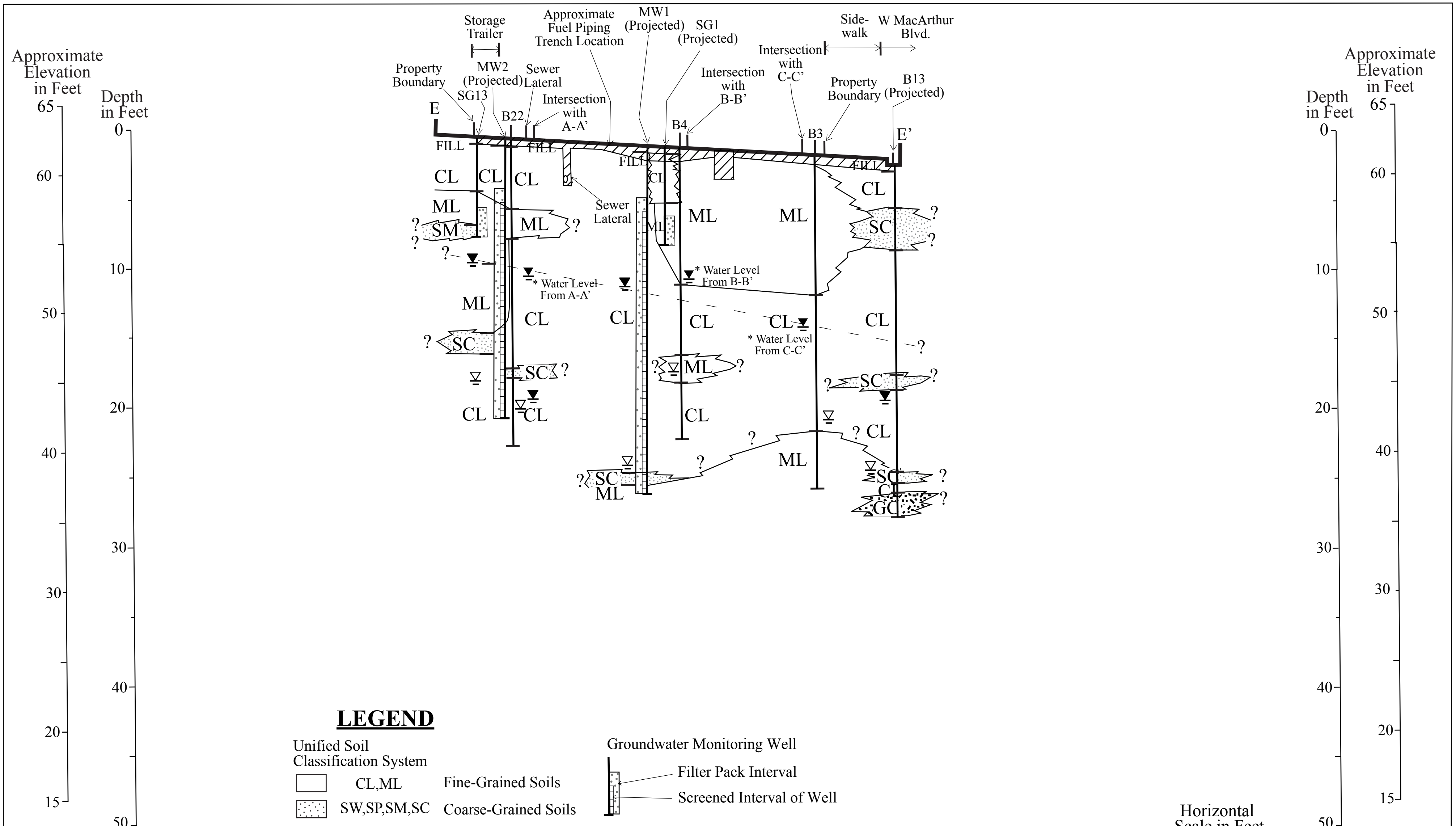
Oakland, CA 94610

Figure 17
Geologic Cross Section D-D'
820 W MacArthur Boulevard
Oakland, California



LEGEND

Unified Soil Classification System

	CL,ML	Fine-Grained Soils
	SW,SP,SM,SC	Coarse-Grained Soils
	GW,GP,GM,GC	Coarse-Grained Soils

Soil Gas Well

Filter Pack Interval

Groundwater Monitoring Well

Filter Pack Interval

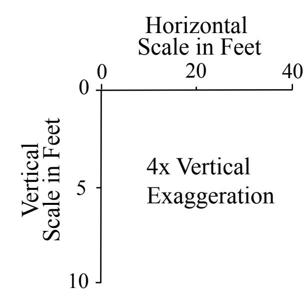
Screened Interval of Well

Subsequent Groundwater Level

First Encountered Groundwater

Water Table

NOTE: SURFACE ELEVATIONS ARE NOT SURVEYED AND WERE APPROXIMATED FROM GOOGLE EARTH.



P&D Environmental, Inc.
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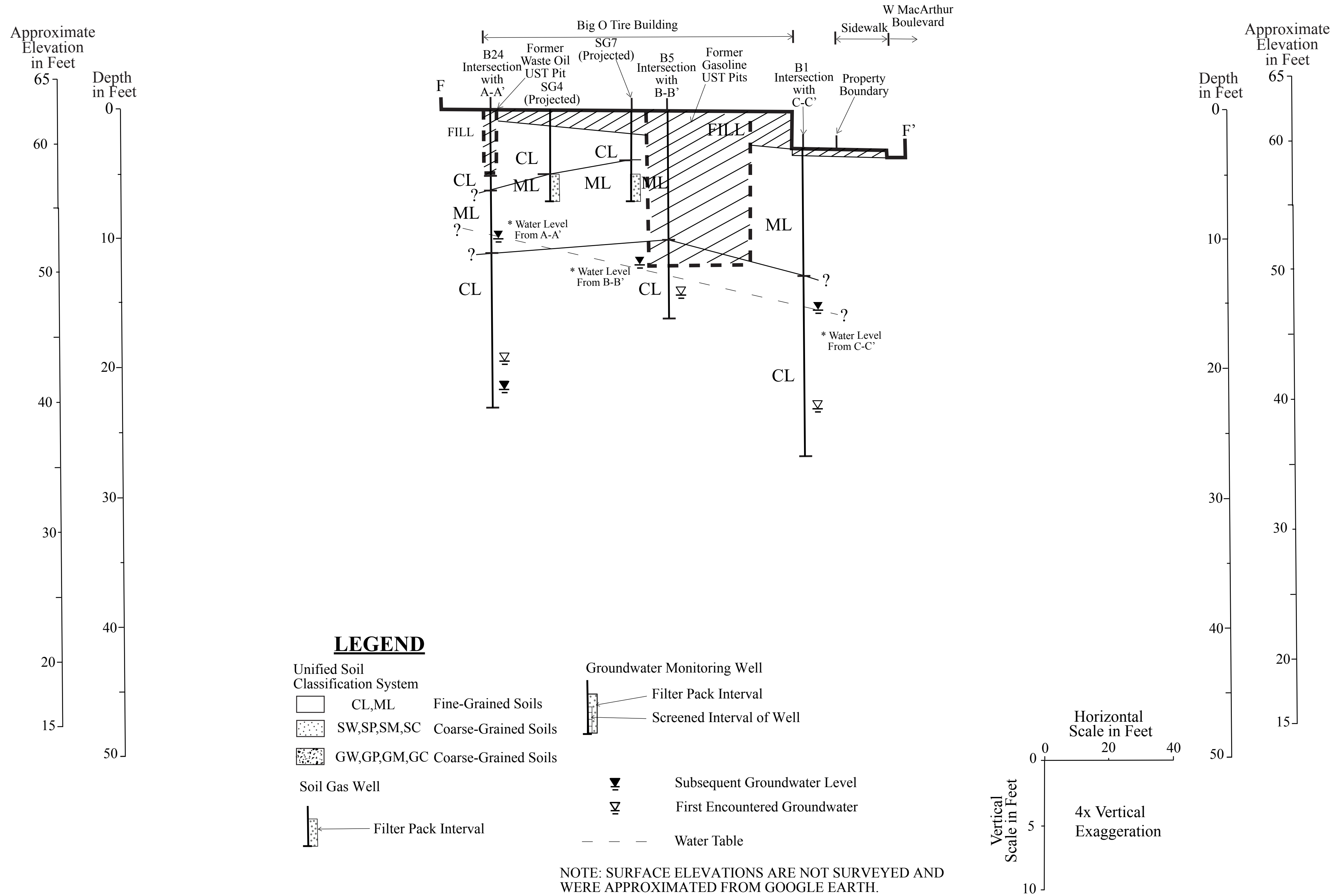
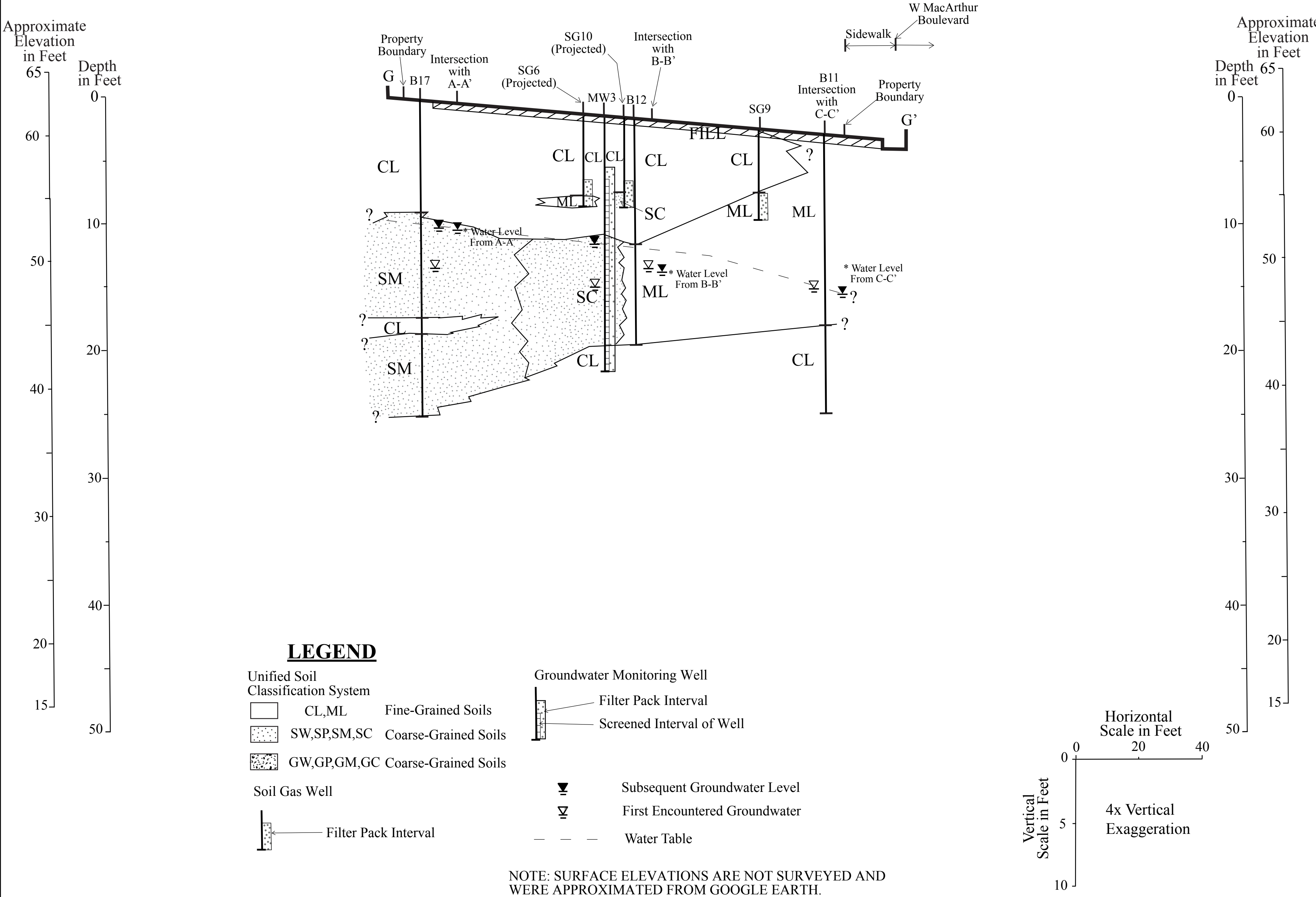
Figure 18
Geologic Cross Section E-E'
820 W MacArthur Boulevard
Oakland, California



P&D Environmental, Inc.
55 Santa Clara Ave., Suite 240
Oakland, CA 94610

Figure 19
Geologic Cross Section F-F'
820 W MacArthur Boulevard
Oakland, California



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Oakland, CA 94610

Figure 20
Geologic Cross Section G-G'
820 W MacArthur Boulevard
Oakland, California

APPENDIX A

Plan Set

820 WEST MACARTHUR BLVD

OAKLAND, CA

ABBREVIATIONS

A/C	AIR CONDITIONING
ADJ.	ADJUSTABLE
A.F.F.	ABOVE FINISH FLOOR
ALUM.	ALUMINUM
ALT.	ALTERNATE
ARCH.	ARCHITECT(URAL)
BLDG.	BUILDING
BLKG.	BLOCKING
BOT.	BOTTOM
℄ /CL	CENTER LINE
CAB.	CABINET
CLG.	CEILING
CLR.	CLEAR
C.M.U.	CONCRETE MASONRY UNIT
COL.	COLUMN
CONC.	CONCRETE
CONST.	CONSTRUCTION
CTR.	CENTER
DET.	DETAIL
DIA/ø	DIAMETER
DIM.	DIMENSION
DN.	DOWN
DWG.	DRAWING
DS.	DOWN SPOUT
(E)	EXISTING
EA.	EACH
ELEC.	ELECTRICAL
EQ.	EQUAL
EQUIP.	EQUIPMENT
EXT.	EXTERIOR
F.D.	FLOOR DRAIN
FIN.	FINISH
FL.	FLOOR
F.O.F.	FACE OF FINISH
F.O.S.	FACE OF STUD
GA.	GAGE
GALV.	GALVANIZED
G.C.	GENERAL CONTRACTOR
GL.	GLASS
GR.	GRADE
GYP. BD.	GYPSUM BOARD
H.B.	HOSE BIB
HDWR.	HARDWARE
HGT.	HEIGHT
H.W.	HOT WATER
INSUL.	INSULATION/INSULATED
INT.	INTERIOR
JT.	JOINT
MAX	MAXIMUM
M.D.	MOTION DETECTOR
MECH.	MECHANICAL
MIN	MINIMUM
MTD.	MOUNTED
MTL.	METAL
(N)	NEW
N.I.C.	NOT IN CONTRACT
NO.	NUMBER
N.T.S.	NOT TO SCALE
O.C.	ON CENTER
OPNG.	OPENING
OPP.	OPPOSITE
PR.	PAIR
PTD.	PAINTED
PLYWD.	PLYWOOD
R.D.	ROOF DRAIN
REQ.	REQUIRED
RM.	ROOM
R.O.	ROUGH OPENING
S.C.	SOLID CORE
STOR.	STORAGE
SHT.	SHEET
SIM.	SIMILAR
STRL.	STRUCTURAL
T&G	TONGUE AND GROOVE
TEL.	TELEPHONE
T.O.	TOP OF
TYP.	TYPICAL
U.O.N.	UNLESS OTHERWISE NOTED
V.I.F.	VERIFY IN FIELD
WD.	WOOD
W.P.	WATERPROOF

LEGEND

#/X.XX — DETAIL REFERENCE NUMBER; SHEET WHERE DETAIL IS LOCATED

#/X.XX — DIRECTION OF SECTION VIEW; INTERIOR SECTION IDENTIFICATION/; SHEET WHERE SECTION IS LOCATED

#/X.XX — SHEET WHERE ELEVATION IS LOCATED; ELEVATION REFERENCE NUMBER

101 — DOOR SYMBOL

W-01 — WINDOW SYMBOL

X.XX — WALL / FLOOR TYPE SYMBOL

ELEVATION DATUM

X'-X" — CEILING HEIGHT

REVISION SYMBOL

WALL-MOUNTED INCANDESCENT SCONCE LIGHT FIXTURE

WALL-MOUNTED COMPACT FLUORESCENT SCONCE LIGHT FIXTURE

RECESSED INCANDESCENT LIGHT FIXTURE AT CEILING

RECESSED COMPACT FLUORESCENT LIGHT FIXTURE AT CEILING

SURFACE-MOUNTED COMPACT FLUORESCENT LIGHT FIXTURE AT CEILING

COMBINATION EXHAUST FAN AND COMPACT FLUORESCENT LIGHT FIXTURE, RECESSED AT CEILING

X' — SURFACE-MOUNTED FLUORESCENT STRIP LIGHT FIXTURE, CEILING-MOUNTED (WITH LENGTH AS INDICATED)

X' — SURFACE-MOUNTED TRACK LIGHT FIXTURE, CEILING-MOUNTED (WITH LENGTH AS INDICATED)

EMERGENCY LIGHT FIXTURE WITH BATTERY PACK, CEILING OR WALL-MOUNTED

EXIT LIGHT FIXTURE WITH BATTERY BACK-UP, CEILING OR WALL-MOUNTED (WITH DIRECTIONAL ARROWS AS REQUIRED)

BUILD IT GREEN CHECKLIST

GENERAL NOTES

GENERAL CONDITIONS: AIA DOCUMENT A201, GENERAL CONDITIONS FOR THE PERFORMANCE OF THE CONTRACT IS HEREBY INCORPORATED INTO THESE DRAWINGS AND SHALL BE CONSIDERED AS PART OF THE REQUIREMENTS FOR THE COMPLETION OF THE WORK.

EXISTING CONDITIONS: CONDITIONS SHOWN OF THE DRAWINGS ARE AS SHOWN ON THE ORIGINAL DRAWINGS AND AS OBSERVED ON THE SITE, BUT THEIR ACCURACY IS NOT GUARANTEED. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND CONDITIONS AT THE SITE. ANY DISCREPANCIES SHALL BE REPORTED TO ARCHITECT PRIOR TO PROCEEDING WITH THE WORK. NOTE: DIMENSIONS SHALL TAKE PRECEDENCE OVER SCALE OF THE DRAWINGS.

PERMITS: THE CONTRACTOR SHALL OBTAIN AND PAY ALL CITY AND/OR COUNTY FEES RELATING TO PROJECT, EXCEPTING THE GENERAL PERMIT, WHICH IS THE RESPONSIBILITY OF THE OWNERS' AND IS REIMBURSABLE TO THE G.C.

CODES: ALL WORK SHALL BE DONE IN COMPLIANCE WITH ALL APPLICABLE CODES, INCLUDING BUT NOT LIMITED TO: UNIFORM BUILDING CODES, NATIONAL ELECTRICAL, MECHANICAL, AND PLUMBING CODES, HEALTH DEPARTMENT REGULATIONS, FIRE AND SAFETY CODES, CITY AND/OR COUNTY ORDINANCES AND REGULATIONS AND OTHER CODES GOVERNING CONSTRUCTION.

SITE RESPONSIBILITY: IN ACCORDANCE WITH GENERALLY ACCEPTED CONSTRUCTION PRACTICES, THE CONTRACTOR WILL BE SOLELY AND COMPLETELY RESPONSIBLE FOR CONDITIONS ON THE JOB SITE, INCLUDING HEALTH AND SAFETY OF ALL PERSONS AND PROPERTY DURING PERFORMANCE OF THE WORK. CONTRACTOR TO LIMIT TRAFFIC AND ACCESS TO THOSE AREAS WHERE WORK IS PERFORMED.

CLEAN UP AND REPAIRS: THE CONSTRUCTION SITE SHALL BE MAINTAINED IN AN ORDERLY MANNER AT ALL TIMES WITH ALL DEBRIS REMOVED AT THE END OF THE EACH DAY. AT THE COMPLETION OF THE CONSTRUCTION REMOVE ALL EXCESS MATERIALS AND REFUSE FROM SITE. LEAVE ALL SURFACES WITHIN CONSTRUCTION SITE FREE FROM DUST, DIRT AND STAINS. THE CONTRACTOR SHALL REPAIR OR REPLACE ANY SURFACES OR ITEMS DAMAGED BY CONSTRUCTION TO THE SATISFACTION OF THE ARCHITECT AND OWNER.

PATCHING: PROPERLY PREPARE SURFACES FOR RECEIVING THE SPECIFIED FINISHES INCLUDING PATCHING OF SURFACES ALTERED BY CONSTRUCTION. ON PATCHED AREAS OR AREAS WHERE A FINISH IS NOT SPECIFIED, THE FINISH SHALL MATCH ADJACENT MATERIAL IN CONSTRUCTION, COLOR AND TEXTURE.

ALL WORK NOTED "N.I.C." OR NOT IN CONTRACT IS TO BE PROVIDED BY A CONTRACTOR OTHER THAN THE GENERAL CONTRACTOR.

"ALIGN" AS USED IN THESE DOCUMENTS SHALL MEAN TO ACCURATELY LOCATE FINISH FACES ON THE SAME PLANE.

"TYPICAL" AS USED IN THESE DOCUMENTS SHALL MEAN THAT THE CONDITION IS THE SAME OR REPRESENTATIVE FOR SIMILAR CONDITIONS THROUGHOUT, U.O.N.

DETAILS ARE USUALLY KEYED AND NOTED "TYPICAL" ONLY ONCE, WHEN THEY FIRST OCCUR, AND ARE REPRESENTATIVE FOR SIMILAR CONDITIONS THROUGHOUT, U.O.N.

SCHEDULE: UPON SUBMITTAL OF THE FINAL CONSTRUCTION COSTS, THE CONTRACTOR SHALL ALSO SUBMIT A CONSTRUCTION SCHEDULE INDICATING THE REQUIRED CONSTRUCTION TIME FOR ALL SUBCONTRACTOR'S AND CONTRACTOR'S WORK AND A COST-BY-TRADE BREAKDOWN FOR USE IN SCHEDULING AND EVALUATING PAY REQUESTS.

SUBSTITUTIONS: SUBSTITUTIONS, REVISIONS, OR CHANGES MUST HAVE APPROVAL BY THE ARCHITECT PRIOR TO PROCEEDING WITH THE WORK.

DAMAGE: THE CONTRACTOR SHALL REPAIR OR REPLACE ANY SURFACES OR ITEMS DAMAGED BY CONSTRUCTION TO THE SATISFACTION OF THE ARCHITECT OR OWNER.

GUARANTEES: THE CONTRACTOR SHALL GUARANTEE THAT THE PROJECT WILL BE FREE OF DEFECTS OF WORKMANSHIP AND MATERIALS FOR A PERIOD OF ONE YEAR FROM THE DATE OF ACCEPTANCE BY THE OWNER. NO WORK DEFECTIVE IN CONSTRUCTION OR QUALITY DEFICIENT IN ANY REQUIREMENT OF THE DRAWINGS OR NOTES WILL BE ACCEPTABLE IN CONSEQUENCE OF THE OWNER'S OR ARCHITECT'S FAILURE TO POINT OUT DEFECTS OR DEFICIENCIES DURING CONSTRUCTION. DEFECTS OF WORKMANSHIP OR MATERIALS REVEALED WITHIN A PERIOD OF ONE YEAR FROM THE ACCEPTANCE SHALL BE REPLACED BY WORK CONFORMING WITH THE INTENT OF THE CONTRACT AT NO COST TO THE OWNER. NO PAYMENT, EITHER PARTIAL OR FINAL, SHALL BE CONSTRUED AS AN ACCEPTANCE OF DEFECTIVE WORK.

COLUMN CENTERLINES (ALSO REFERRED TO AS GRIDLINES) ARE SHOWN FOR DIMENSIONAL PURPOSES. (REFER TO BASE BUILDING DRAWINGS FOR EXACT LOCATIONS.

CONSTRUCTION HOURS:
VERIFY WITH CITY OF EMERYVILLE AND OAKLAND FOR CONSTRUCTION HOURS

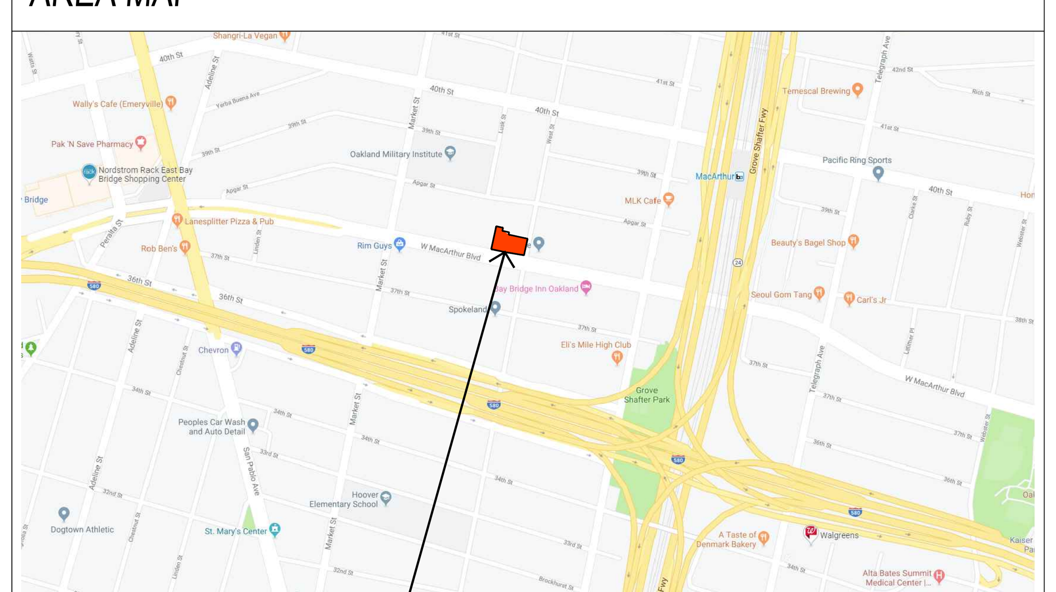
ANY HIDDEN CONDITIONS THAT REQUIRE WORK TO BE PERFORMED BEYOND THE SCOPE OF THE BUILDING PERMIT ISSUED FOR THESE PLANS MAY REQUIRE FURTHER CITY APPROVALS INCLUDING REVIEW BY THE PLANNING COMMISSION. THE BUILDING OWNER, PROJECT DESIGNER, AND/OR CONTRACTOR MUST SUBMIT A REVISION TO THE CITY FOR ANY WORK NOT GRAPHICALLY ILLUSTRATED ON THE JOB COPY OF THE PLANS PRIOR TO PERFORMING THE WORK.

AN OSHA PERMIT TO BE OBTAINED FOR THE SHORING* AT THE EXCAVATION IN THE BASEMENT PER CAL/OSHA REQUIREMENTS. SEE CAL/OSHA HANDBOOK.
*CONSTRUCTION SAFETY ORDERS: CHAPTER 4, SUBCHAPTER 4, ARTICLE 6, SECTION 1541.1.

GRADING PERMIT, IF REQUIRED, TO BE OBTAINED FROM THE DEPARTMENT OF PUBLIC WORKS.

WHEN PLANS ARE SUBMITTED FOR BUILDING CODE PLAN CHECK, THEY WILL INCLUDE A COMPLETE UNDERGROUND PLUMBING PLAN INCLUDING COMPLETE DETAILS FOR THE LOCATION OF ALL REQUIRED GREASE TRAPS AND CITY-REQUIRED BACKWATER PREVENTION DEVICES.

AREA MAP



PROJECT SITE

TRUE NORTH | PROJECT NORTH

RENDERING

APPLICABLE CODES AND REGULATIONS

2016 CBC CHAPTER 35: PROVIDE ALL THE APPLICABLE/ADOPTED STANDARDS. WHERE A PARTICULAR STANDARD IS REFERENCED IN THE CODE BUT DOES NOT APPEAR AS AN ADOPTED STANDARD IT STILL MAY BE USED. APPLY ONLY THE POTION OF THE STANDARD THAT IS APPLICABLE TO THE CODE SECTION WHERE STANDARD IS REFERENCED, NOT THE ENTIRE SECTION.

APPLICABLE CODES
- 2016 CALIFORNIA BUILDING STANDARDS ADMINISTRATIVE CODE, PART 1, TITLE 24, CCR
- 2016 CALIFORNIA BUILDING CODE, PART 2, TITLE 24, CCR
- 2016 CALIFORNIA ELECTRICAL CODE, PART 3, TITLE 24, CCR
- 2016 CALIFORNIA MECHANICAL CODE, PART 4, TITLE 24, CCR
- 2016 CALIFORNIA PLUMBING CODE, PART 5, TITLE 24, CCR
- 2016 CALIFORNIA ENERGY CODE, PART 6, TITLE 24, CCR
- 2016 SAFETY CODE FOR ELEVATORS AND ESCALATORS (ASME A17.1-2010)
- 2016 CALIFORNIA HISTORICAL BUILDING CODE, PART 8, TITLE 24, CCR
- 2016 CALIFORNIA FIRE CODE, PART 9, TITLE 24, CCR
- 2016 CALIFORNIA EXISTING BUILDING CODE, PART 10, TITTLES 24 CCR
- 2016 CALIFORNIA "GREEN" BUILDING REQUIREMENTS, PART 11, TITLE 24 CCR
- 2016 CALIFORNIA REFERENCED STANDARDS, PART 12, TITLE 24 CCR
- TITLE 8 CCR CH. 4 SUB-CH. 6 - ELEVATOR SAFETY ORDERS
- TITLE 19 CCR, PUBLIC SAFETY, STATE FIRE MARSHAL REGULATIONS
- THIS DESIGN IS IN COMPLIANCE WITH THE FAIR HOUSING ACT DESIGN REFERENCE MANUAL
- 2017 CALIFORNIA CODE OF REGULATIONS TITLE 8 ELEVATOR SAFETY ORDERS
- UNIFORM FEDERAL ACCESSIBILITY STANDARDS
- INCLUDING ANY AMENDMENTS AS ADOPTED IN ORDINANCE 1856-2010 AS WELL AS ANY OTHER APPLICABLE LOCAL AND STATE LAWS AND REGULATIONS

APPLICABLE STANDARDS
- NFPA 10 STANDARD FOR PORTABLE FIRE EXTINGUISHERS, 2013 EDITION
- NFPA 13 AUTOMATIC SPRINKLER SYSTEMS, 2016 EDITION
- NFPA 14 STANDPIPE SYSTEMS, 2016 EDITION
- NFPA 17 DRY CHEMICAL EXTINGUISHING SYSTEMS, 2017 EDITION
- NFPA 17a WET CHEMICAL SYSTEMS, 2017 EDITION
- NFPA 20 STATIONARY PUMPS, 2016 EDITION
- NFPA 24 PRIVATE FIRE MAINS, 2016 EDITION
- NFPA 72 NATIONAL FIRE ALARM CODE, 2016 EDITION
- NFPA 253 CRITICAL RADIANT FLUX OF FLOOR COVERING SYSTEMS, 2015 EDITION
- NFPA 2001 CLEAN AGENT FIRE EXTINGUISHING SYSTEMS, 2015 EDITION
- ASME 17.1 ELEVATOR STANDARD, 2013 EDITION
- ASME/ANSI A18.1 SAFETY STANDARD FOR PLATFORM LIFTS AND STAIRWAY CHAIR LIFTS
- ADA STANDARDS FOR ACCESSIBLE DESIGN; ACCESSIBILITY GUIDELINES FOR BUILDINGS AND FACILITIES (ADAAG), (28 CFR PART 36, APPENDIX A)

DRAWING INDEX

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- A0.1 SITE CONTEXT
- A0.2 EGRESS & ACCESS PLANS
- A0.3 OPEN SPACE CALCULATIONS

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- SHEET 2 LAND TITLE SURVEY PLAN

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- SCHEMATIC LANDSCAPE PLAN

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- A1.1 SITE PLAN: NEW
- A2.1 FLOOR PLAN: 1ST FLOOR
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- A2.3 FLOOR PLAN: 3RD FLOOR
- A2.4 ROOF PLAN
- A3.1 ELEVATIONS
- A3.2 ELEVATIONS
- A3.3 RENDERINGS
- A4.1 SECTIONS

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SUMMARY / SCOPE OF WORK

820 WEST MACARTHUR IS A PROPOSED PRIVATELY FUNDED 3 STORY BUILDING TO INCLUDE (21) NEW RESIDENTIAL UNITS, DEDICATED SURFACE VEHICLE PARKING, AND PRIVATE OPEN SPACE

PLANNING & BUILDING DATA

ADDRESS: 820 WEST MACARTHUR BLVD, OAKLAND, CA 94608

A.P.N: 012-0959-009-03

LOT SIZE: 22,679 SQ. FT.

ZONING DISTRICT: RU-4 & RU-5

DENSITY:
- ALLOWED: 1UNIT / 375 SF; 22,679 SF/375 SF = 60.47 UNITS
- PROPOSED: 21 UNITS

HEIGHT LIMIT:
- ALLOWED: 60'-0"
- PROPOSED: 40'-0"

SETBACKS:
- REQUIRED: FRONT SETBACKS: 5'-0"; SIDE SETBACKS: 0'-0"; REAR SETBACKS: 10'-0"
- PROPOSED: SEE ARCHITECTURAL PLANS (ALL MEET MIN. REQUIREMENTS)

PARKING:
- REQUIRED: 1 SPACE/UNIT. 1 SPACE/2 UNIT DUE TO PROXIMITY TO TRANSIT
- PROPOSED: 11 PARKING SPACES

OPEN SPACE:
- REQUIRED: 150 SF/UNIT IF PUBLIC OPEN SPACE; 2X IF PRIVATE OPEN SPACE
- PROPOSED: SEE A0.3 FOR OPEN SPACE CALCULATIONS

FIRE RATINGS:

PRIMARY STRUCTURAL FRAME:	1 HOUR (CBC TABLE 601)
BEARING EXTERIOR WALLS:	1 HOUR (CBC TABLE 601)
BEARING INTERIOR WALLS:	1 HOUR (CBC TABLE 601)
NON-BEARING EXTERIOR WALLS:	NO RATING (CBC TABLE 601)
NON-BEARING INTERIOR WALLS:	NO RATING (CBC TABLE 601)
FLOOR CONSTRUCTION:	1 HOUR (CBC TABLE 601)
ROOF CONSTRUCTION:	1 HOUR (CBC TABLE 601)
EXIT ENCLOSURES:	2 HOURS (CBC 1022.1)

BUILDING DATA

LOCATION	BUILDING 01	BUILDING 02	BUILDING 03
PROPOSED OCCUPANCY	R-2 (RESIDENTIAL)	R-2 (RESIDENTIAL)	R-2 (RESIDENTIAL)
CONSTRUCTION*	TYPE V-A	TYPE V-B	TYPE V-B
SPRINKLERED	YES	YES	YES
AREA			
ALLOWABLE AREA PER STORY (2016 CBC TABLE 506.2)	12,000 SF (S WITHOUT AREA INCREASE**)	7,000 SF (S WITHOUT AREA INCREASE**)	7,000 SF (S WITHOUT AREA INCREASE**)
ALLOWABLE AREA MODIFICATION (2016 CBC 506.2.3) ALLOWABLE AREA PER STORY : Aa=[At+(NSxIf)]xSa	Aa=[At+(NSxIf)]xSa Aa=[12,000+(12,000x0)]x2 Aa=24,000 SF	Aa=[At+(NSxIf)]xSa Aa=[7,000+(7,000x0)]x2 Aa=14,000 SF	Aa=[At+(NSxIf)]xSa Aa=[7,000+(7,000x0)]x2 Aa=14,000 SF
PROPOSED AREA	1ST FL: 6,730 SF 2ND FL: 6,830 SF 3RD FL: 7,090 SF	1ST FL: 2,400 SF 2ND FL: 2,450 SF 3RD FL: 2,520 SF	1ST FL: 3,600 SF 2ND FL: 3,650 SF 3RD FL: 3,750 SF
TOTAL PROPOSED AREA	20,650 SF	7,370 SF	11,000 SF
HEIGHT & STORIES			
ALLOWABLE HEIGHT (2016 CBC TABLE 504.3)	50'-0" (S WITHOUT AREA INCREASE**)	40'-0" (S WITHOUT AREA INCREASE**)	40'-0" (S WITHOUT AREA INCREASE**)
PROPOSED HEIGHT	40'-0" TO T.O. ROOF	40'-0" TO T.O. ROOF	40'-0" TO T.O. ROOF
ALLOWABLE STORIES (2016 CBC TABLE 504.4)	4 (S WITHOUT AREA INCREASE**)	3 (S WITHOUT AREA INCREASE**)	3 (S WITHOUT AREA INCREASE**)
PROPOSED STORIES	3	3	3

** FULLY SPRINKLERED WITH SPRINKLER SYSTEM PER 2016 CBC 903.3.1.1

LEVY DESIGN PARTNERS ARCHITECTURE
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San Francisco
CA 94107

820 WEST MACARTHUR
OAKLAND, CA

LICENSED ARCHITECT
TOBY STELLA LEVY
C-10527
REN. 6-30-21
STATE OF CALIFORNIA

820 WEST MACARTHUR

BLOCK/PARCEL/LOT:
APN: 012-0959-009-03
OAKLAND, CA
PROJECT NO. 2017-12.4

DATE	SET ISSUE
04-17-2019	DEMO PERMIT

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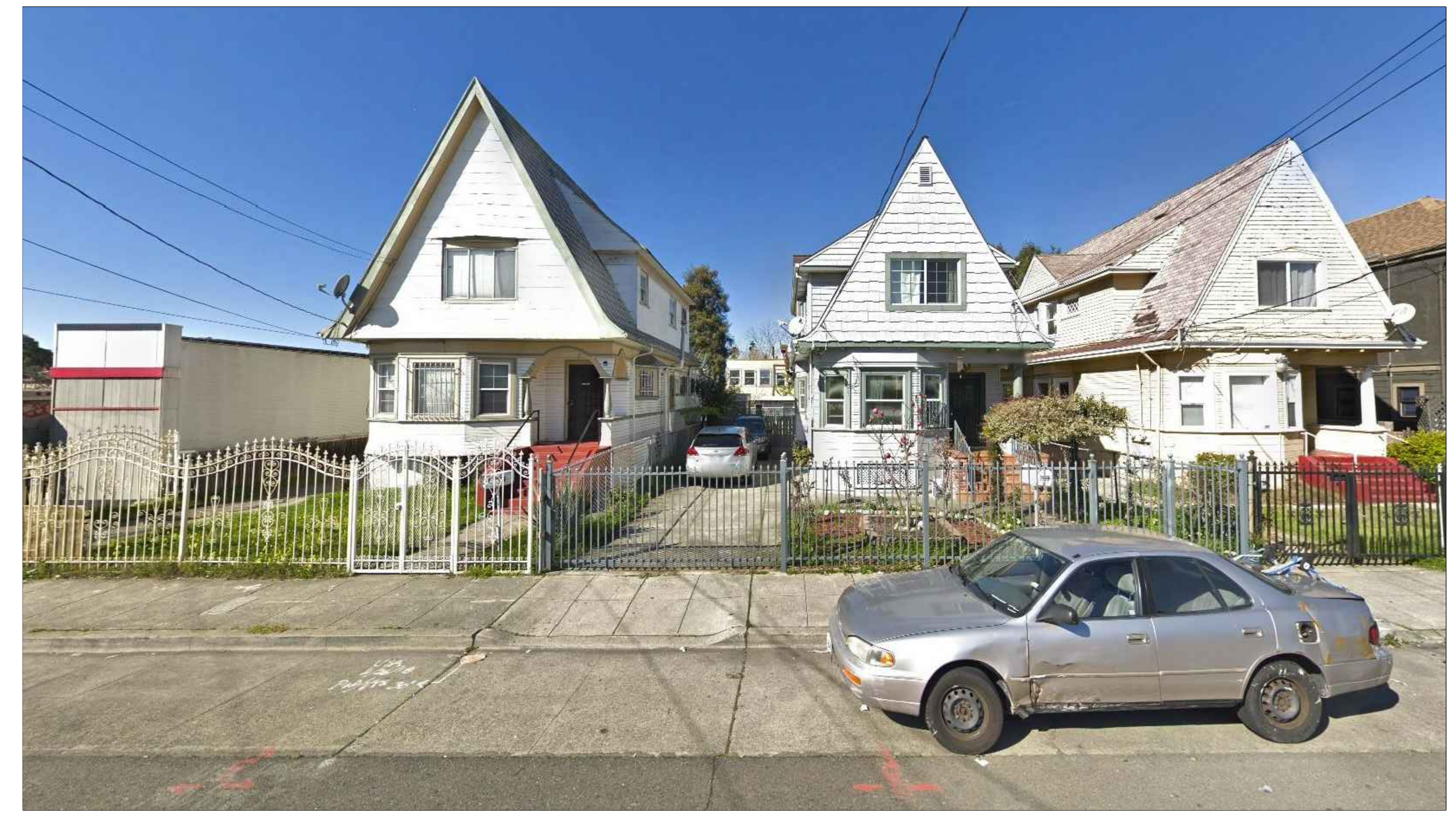
SCALE: AS NOTED

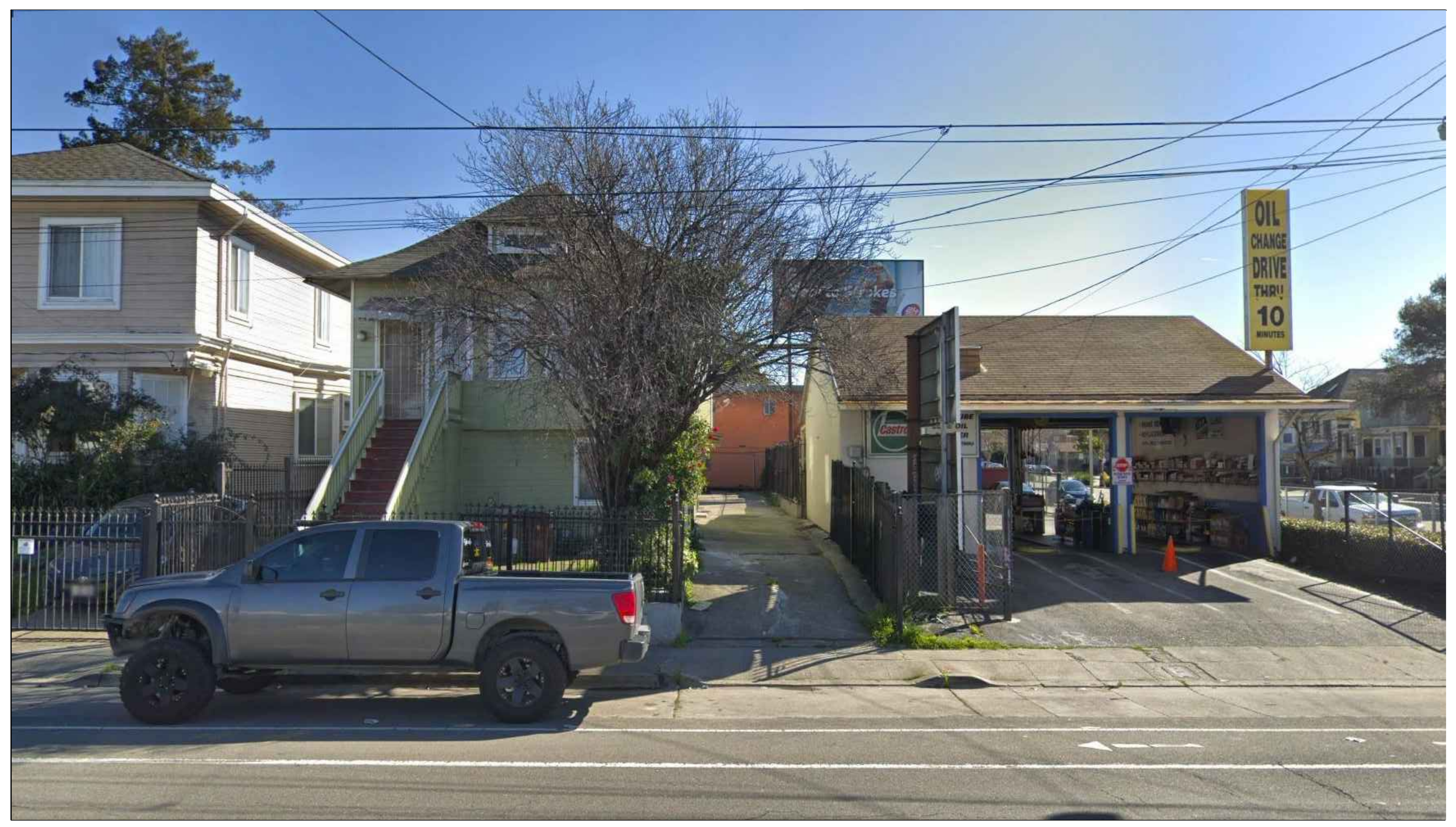
COVER SHEET

A0.0

1 828 & 836 W MACARTHUR BLVD



2 3819 & 3823 WEST ST



3 736 & 3810 WEST ST

4 801 W MACARTHUR BLVD

5 W MACARTHUR BLVD & WEST ST

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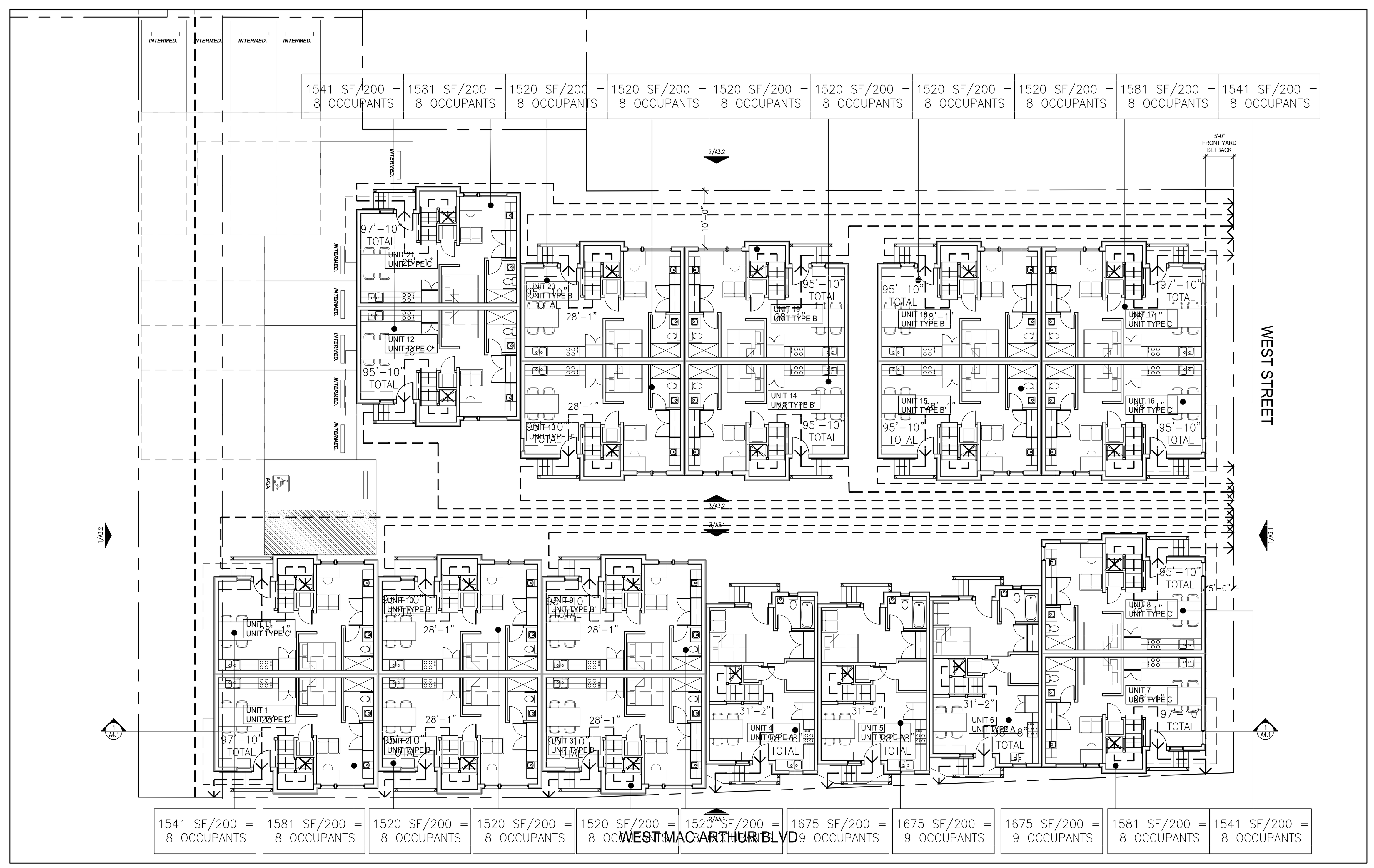
SCALE: AS NOTED

SITE CONTEXT

A0.1

RESIDENTIAL	
OCCUPANCY TYPE/USE	
AREA	
OCCUPANT LOAD FACTOR	
OCCUPANT LOAD*	
UNIT 01	
UNIT 02	
UNIT 03	
UNIT 04	
UNIT 05	
UNIT 06	
UNIT 07	
UNIT 08	
UNIT 09	
UNIT 10	
UNIT 11	
UNIT 12	
UNIT 13	
TOTAL	
EXITS REQUIRED***	
EXITS PROVIDED	
MIN. EGRESS WIDTH**	
MIN. STAIR WIDTH**	
EGRESS WIDTH PROVIDED	
STAIR WIDTH PROVIDED	
TRAVEL DISTANCE	
MAX. ALLOWED DISTANCE***	
TRAVEL DISTANCE	
LOBBY	
OCCUPANCY TYPE/USE	
AREA	
OCCUPANT LOAD FACTOR	
OCCUPANT LOAD*	
EXITS REQUIRED***	
EXITS PROVIDED	
MIN. EGRESS WIDTH**	
EGRESS WIDTH PROVIDED	



A GROUND FLOOR

*PER CBC TABLE 1004.1.2
**PER CBC 1005.3
***PER CBC TABLE 1006.3.1
– 36" STAIRWAY PER 1009.4

PROJECT NORTH

TRUE NORTH

1 *EGRESS & ACCESSIBILITY PLANS*

1/16"=1'-0"

LEVY DESIGN PARTNERS ARCHITECTURE

90 South Park
San Francisco
CA 94107

820 WEST MACARTHUR OAKLAND, CA

LICENSED ARCHITECT TOBY STELLA LEVY C-10527 REN. 6-30-21 STATE OF CALIFORNIA

820 WEST MACARTHUR

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SCALE: AS NOTED

EGRESS & ACCESS PLANS

A0.2

LEVY DESIGN PARTNERS
ARCHITECTURE
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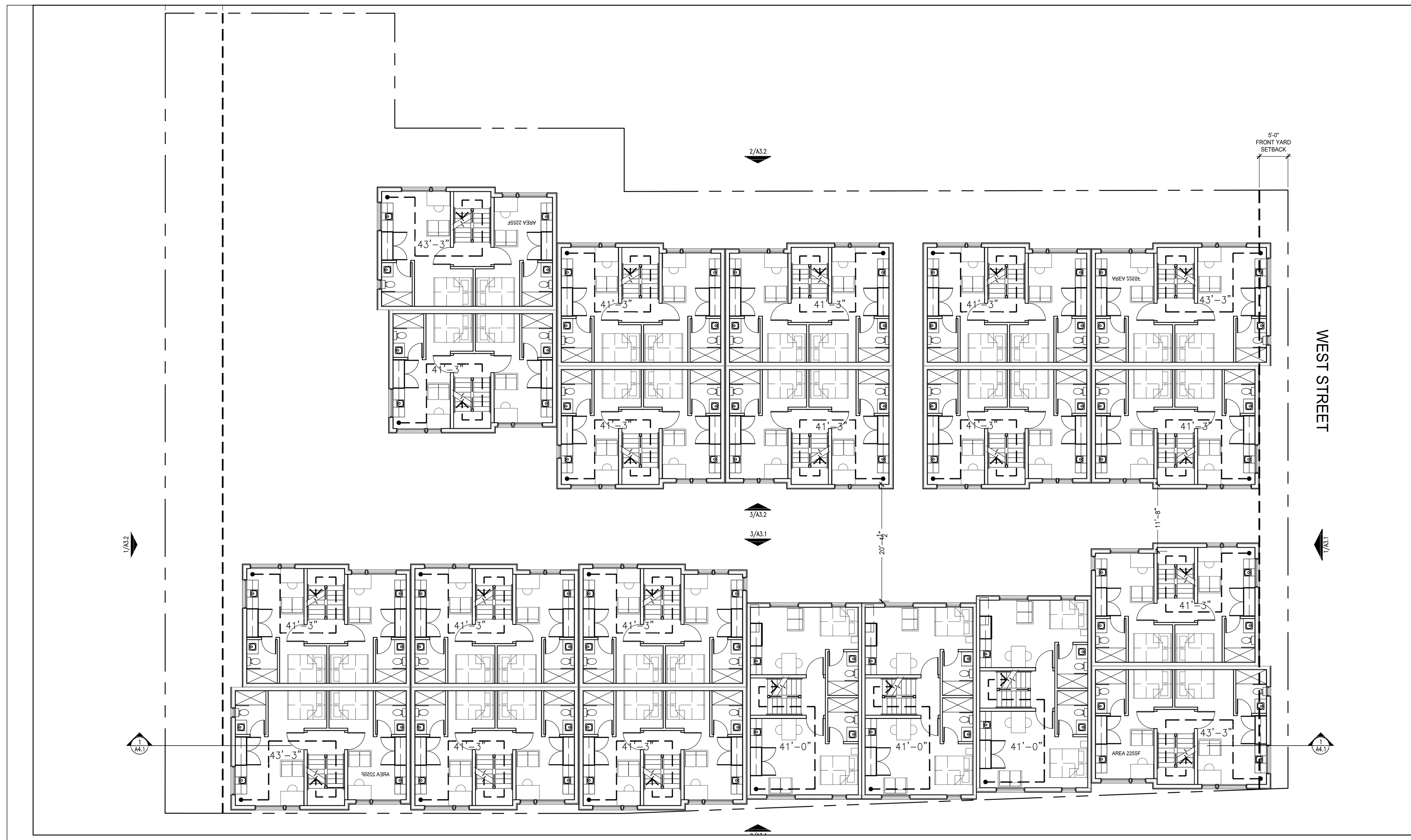
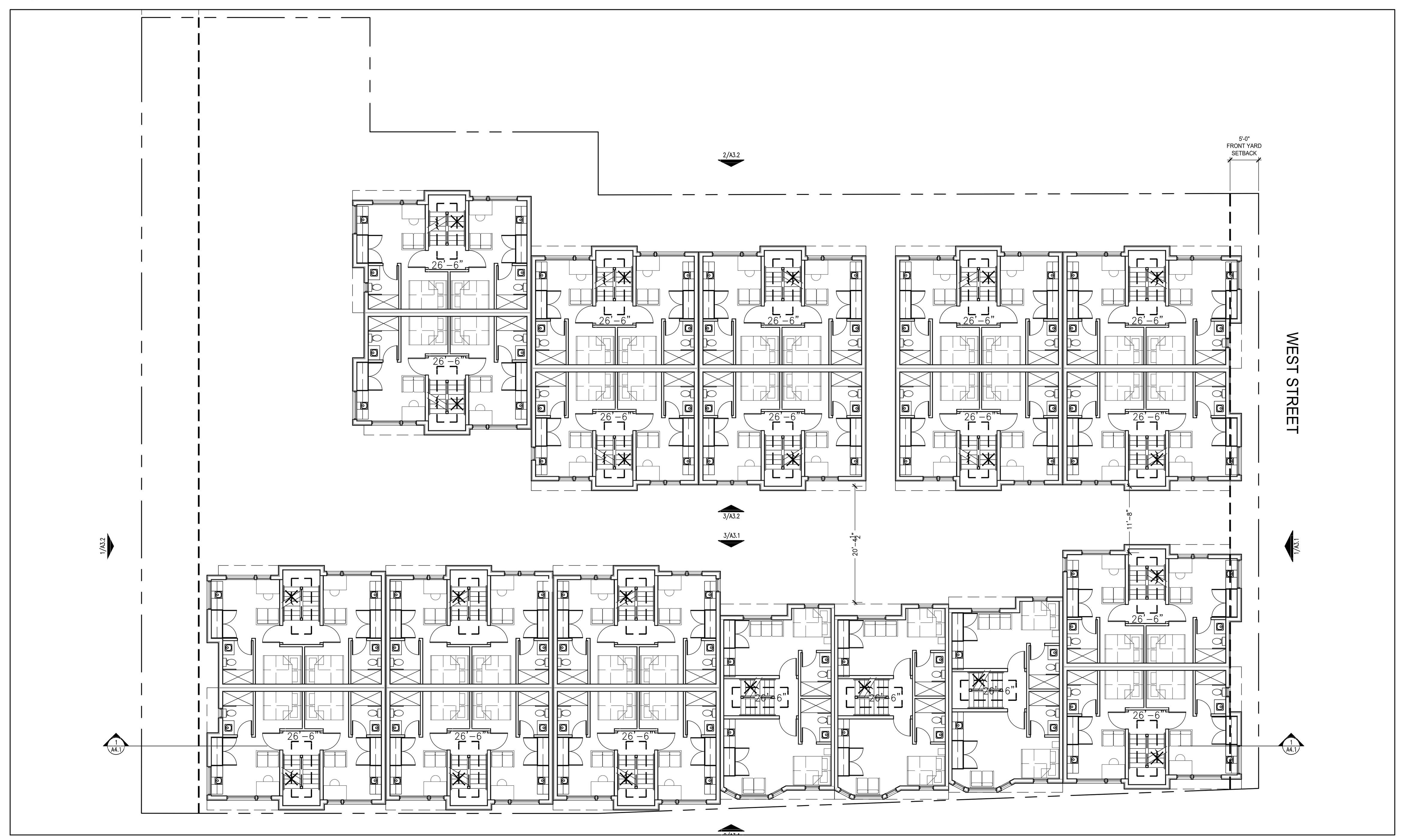
San Francisco
CA 94107

820 WEST MACARTHUR
OAKLAND, CA



B 3RD FLOOR



A 2ND FLOOR

RESIDENTIAL	
OCCUPANCY TYPE/USE	RESIDENTIAL
AREA	VARIES (SEE PLAN)
OCCUPANT LOAD FACTOR	200
OCCUPANT LOAD*	SEE GROUND FLR.
UNIT 01	8
UNIT 02	8
UNIT 03	8
UNIT 04	9
UNIT 05	9
UNIT 06	9
UNIT 07	8
UNIT 08	8
UNIT 09	8
UNIT 10	8
UNIT 11	8
UNIT 12	8
UNIT 13	8
UNIT 14	8
UNIT 15	8
UNIT 16	8
UNIT 17	8
UNIT 18	8
UNIT 19	8
UNIT 20	8
UNIT 21	8
TOTAL	171
EXITS REQUIRED***	2
EXITS PROVIDED	2
MIN. EGRESS WIDTH**	1.8
MIN. STAIR WIDTH**	2.7"
EGRESS WIDTH PROVIDED	36"
STAIR WIDTH PROVIDED	36"
TRAVEL DISTANCE	
MAX. ALLOWED DISTANCE***	125'
TRAVEL DISTANCE	SEE PLAN

*PER CBC TABLE 1004.1.2
**PER CBC 1005.3
***PER CBC TABLE 1006.3.1
– 36" STAIRWAY PER 1009.4

PROJECT NORTH | TRUE NORTH

820 WEST MACARTHUR

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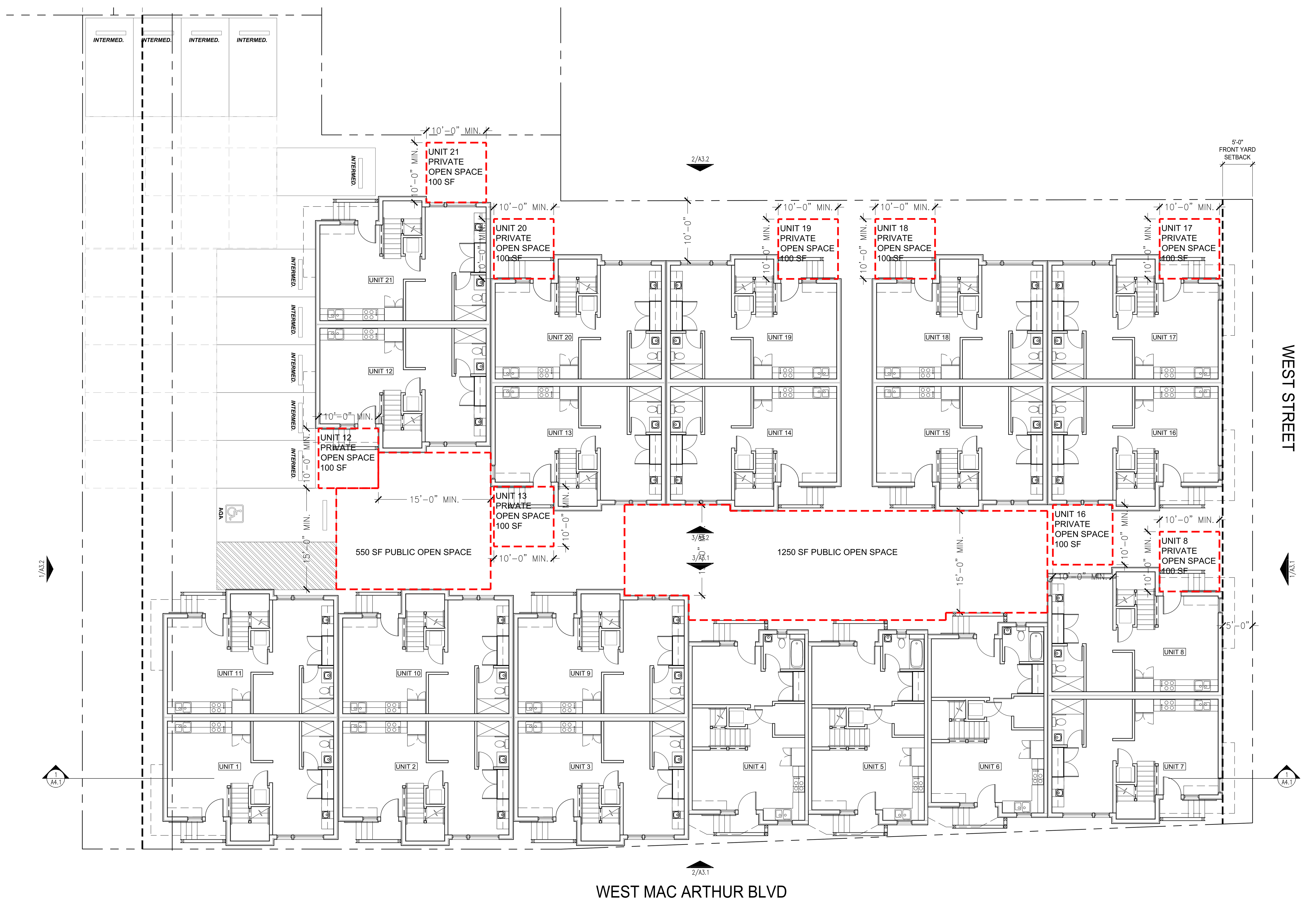
SCALE: AS NOTED

EGRESS & ACCESS PLANS

A0.3

1 *EGRESS & ACCESSIBILITY PLANS*
1/16"=1'-0"



1 PLAN: GROUND FLOOR
1/8"=1'-0"

OPEN SPACE REQUIREMENTS

150 SF/UNIT IF PUBLIC OPEN SPACE
EACH PUBLIC OPEN SPACE SHALL HAVE NO DIMENSION LESS THAN 15 FEET

30 SF/UNIT IF PRIVATE OPEN SPACE
EACH PRIVATE OPEN SPACE SHALL HAVE NO DIMENSION LESS THAN 10 FEET

OPEN SPACE CALCULATIONS

UNIT #	OPEN SPACE SQ. FT.
1	UNIT 1, 2, 3, 4, 5, 6, 7, 9, 10, 11, 14, & 15 SHARE PUBLIC OPEN SPACE OF 1800 SF
2	UNIT 1, 2, 3, 4, 5, 6, 7, 9, 10, 11, 14, & 15 SHARE PUBLIC OPEN SPACE OF 1800 SF
3	UNIT 1, 2, 3, 4, 5, 6, 7, 9, 10, 11, 14, & 15 SHARE PUBLIC OPEN SPACE OF 1800 SF
4	UNIT 1, 2, 3, 4, 5, 6, 7, 9, 10, 11, 14, & 15 SHARE PUBLIC OPEN SPACE OF 1800 SF
5	UNIT 1, 2, 3, 4, 5, 6, 7, 9, 10, 11, 14, & 15 SHARE PUBLIC OPEN SPACE OF 1800 SF
6	UNIT 1, 2, 3, 4, 5, 6, 7, 9, 10, 11, 14, & 15 SHARE PUBLIC OPEN SPACE OF 1800 SF
7	UNIT 1, 2, 3, 4, 5, 6, 7, 9, 10, 11, 14, & 15 SHARE PUBLIC OPEN SPACE OF 1800 SF
8	100 SF MIN. PRIVATE OPEN SPACE
9	UNIT 1, 2, 3, 4, 5, 6, 7, 9, 10, 11, 14, & 15 SHARE PUBLIC OPEN SPACE OF 1800 SF
10	UNIT 1, 2, 3, 4, 5, 6, 7, 9, 10, 11, 14, & 15 SHARE PUBLIC OPEN SPACE OF 1800 SF
11	UNIT 1, 2, 3, 4, 5, 6, 7, 9, 10, 11, 14, & 15 SHARE PUBLIC OPEN SPACE OF 1800 SF
12	100 SF MIN. PRIVATE OPEN SPACE
13	100 SF MIN. PRIVATE OPEN SPACE
14	UNIT 1, 2, 3, 4, 5, 6, 7, 9, 10, 11, 14, & 15 SHARE PUBLIC OPEN SPACE OF 1800 SF
15	UNIT 1, 2, 3, 4, 5, 6, 7, 9, 10, 11, 14, & 15 SHARE PUBLIC OPEN SPACE OF 1800 SF
16	100 SF MIN. PRIVATE OPEN SPACE
17	100 SF MIN. PRIVATE OPEN SPACE
18	100 SF MIN. PRIVATE OPEN SPACE
19	100 SF MIN. PRIVATE OPEN SPACE
20	100 SF MIN. PRIVATE OPEN SPACE
21	100 SF MIN. PRIVATE OPEN SPACE

PROJECT NORTH | TRUE NORTH

LEVY DESIGN PARTNERS ARCHITECTURE
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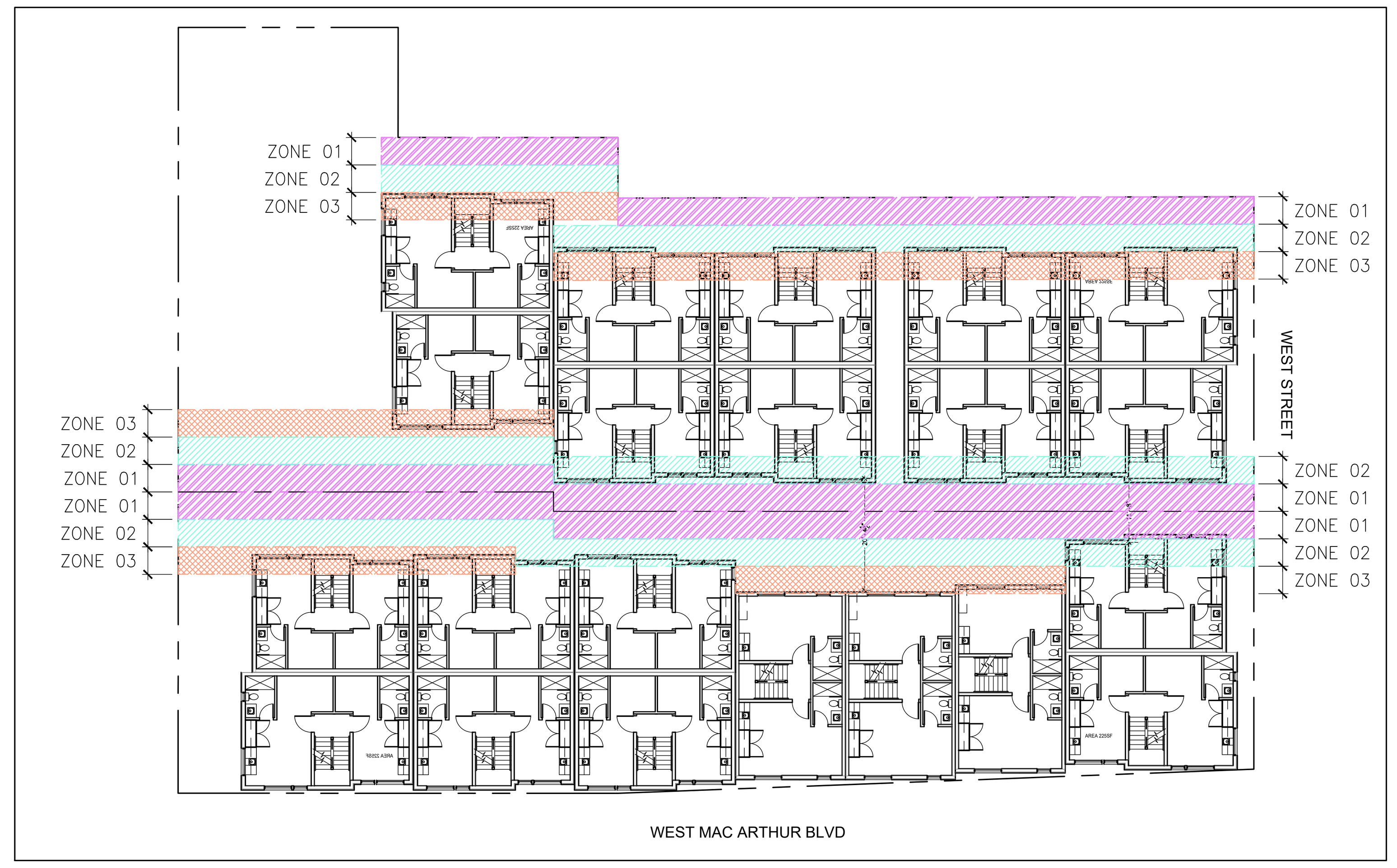
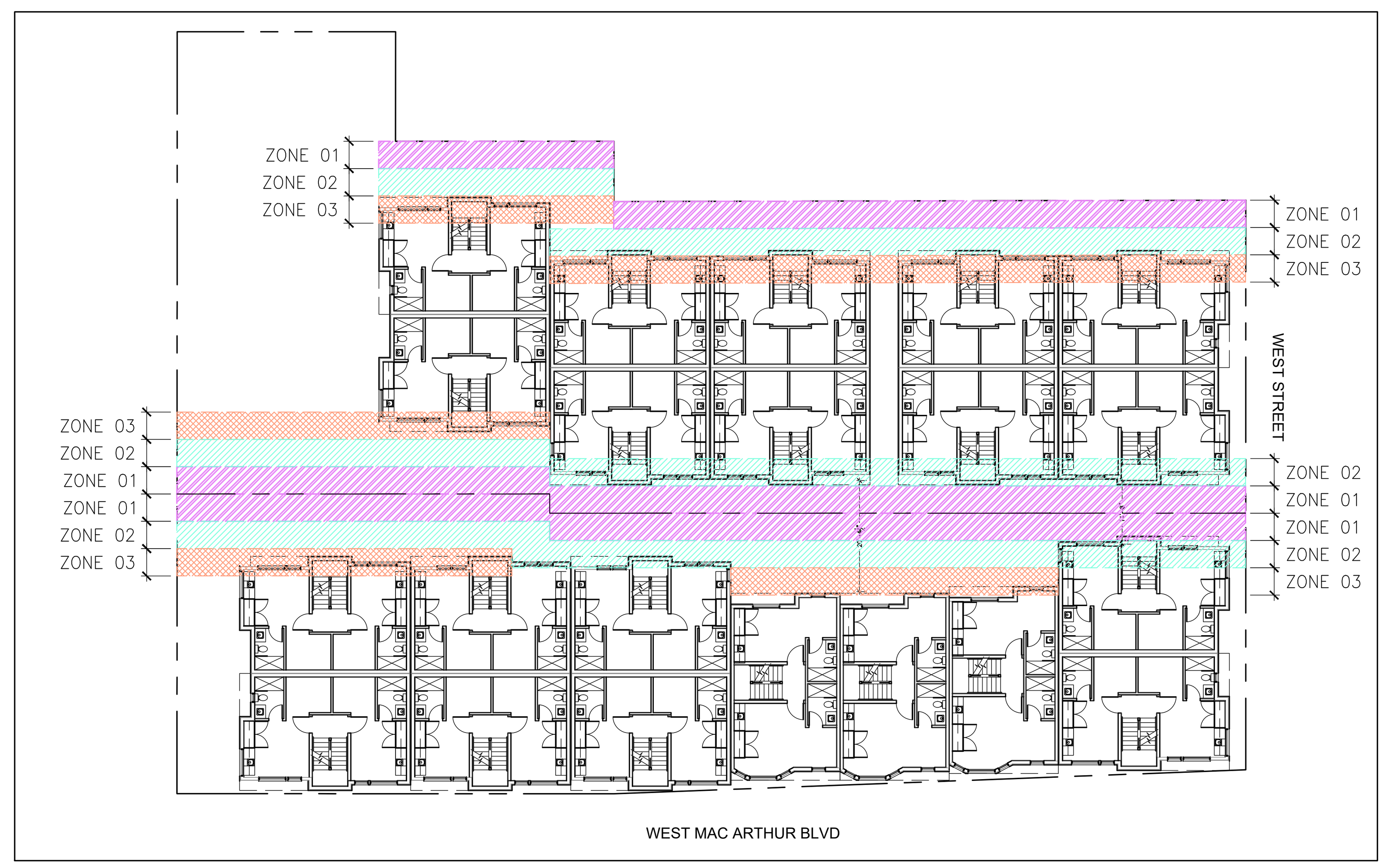
SCALE: AS NOTED

OPEN SPACE CALCULATIONS

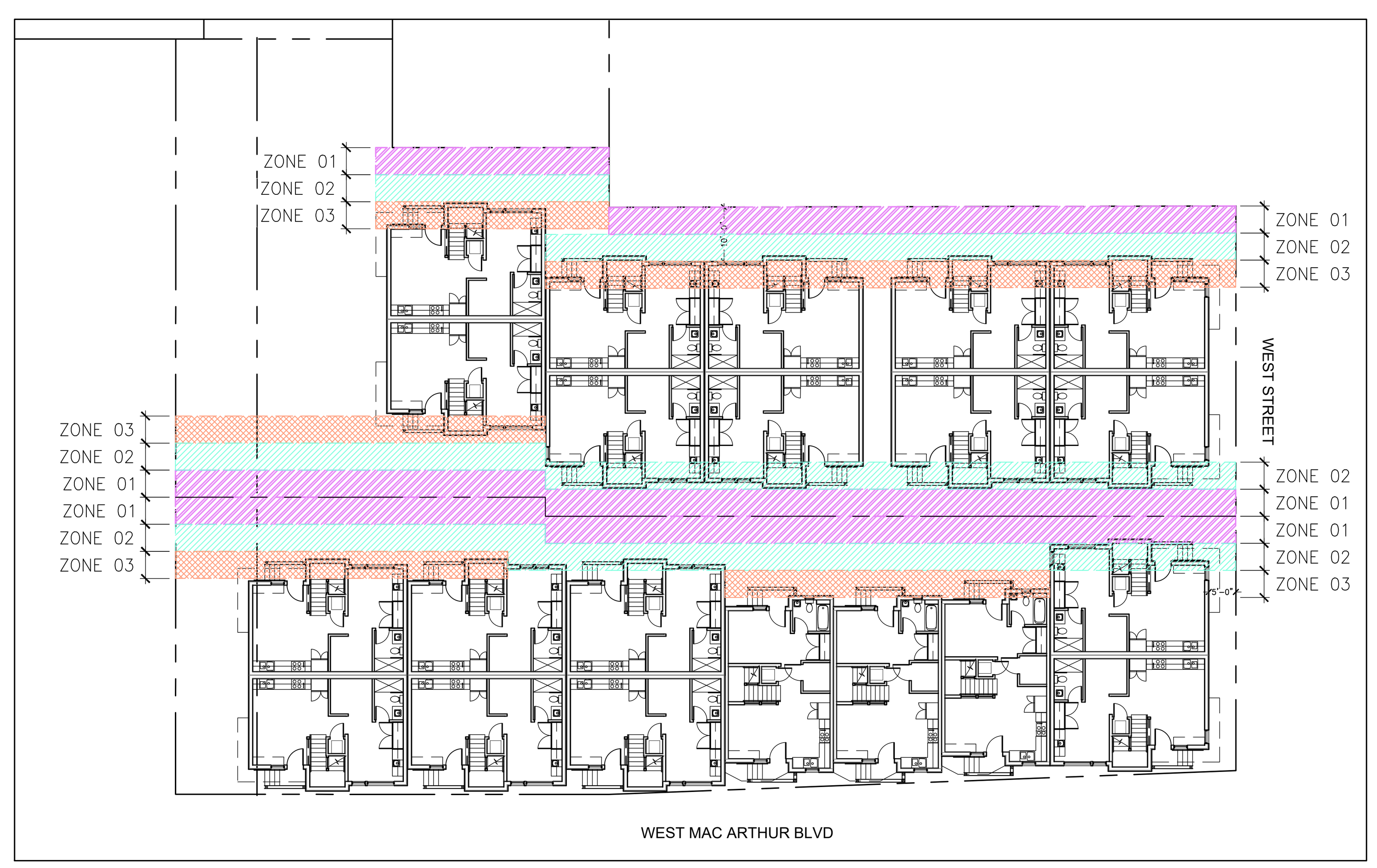
A0.4



(C) 3RD FLOOR



(B) 2ND FLOOR



(A) 1ST FLOOR

1 PLANS
1"=15'-0"

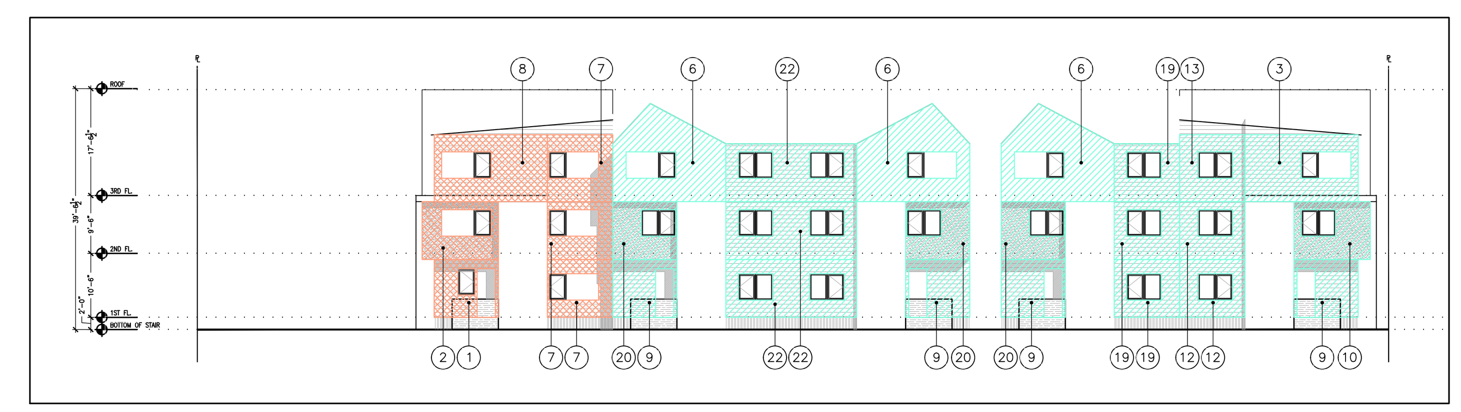
TABLE 705.8
MAXIMUM AREA OF EXTERIOR WALL OPENINGS BASED ON FIRE SEPARATION DISTANCE AND DEGREE OF OPENING PROTECTION

FIRE SEPARATION DISTANCE (feet)	DEGREE OF OPENING PROTECTION	ALLOWABLE AREA[a]	
0 to less than 3[b,c]	Unprotected, Nonsprinklered (UP, NS)	Not Permitted	
	Unprotected, Sprinklered (UP, S)[i]	Not Permitted	
	Protected (P)	Not Permitted	
3 to less than 5[d,e]	Unprotected, Nonsprinklered (UP, NS)	Not Permitted	
	Unprotected, Sprinklered (UP, S)[i]	15%	ZONE 01
	Protected (P)	15%	
5 to less than 10[e,f,j]	Unprotected, Nonsprinklered (UP, NS)	10%[h]	
	Unprotected, Sprinklered (UP, S)[i]	25%	ZONE 02
	Protected (P)	25%	
10 to less than 15[e,f,g]	Unprotected, Nonsprinklered (UP, NS)	15%[h]	
	Unprotected, Sprinklered (UP, S)[i]	45%	ZONE 03
	Protected (P)	45%	
15 to less than 20[f,g]	Unprotected, Nonsprinklered (UP, NS)	25%	
	Unprotected, Sprinklered (UP, S)[i]	75%	
	Protected (P)	75%	
20 to less than 25[f,g]	Unprotected, Nonsprinklered (UP, NS)	45%	
	Unprotected, Sprinklered (UP, S)[i]	No Limit	
	Protected (P)	No Limit	

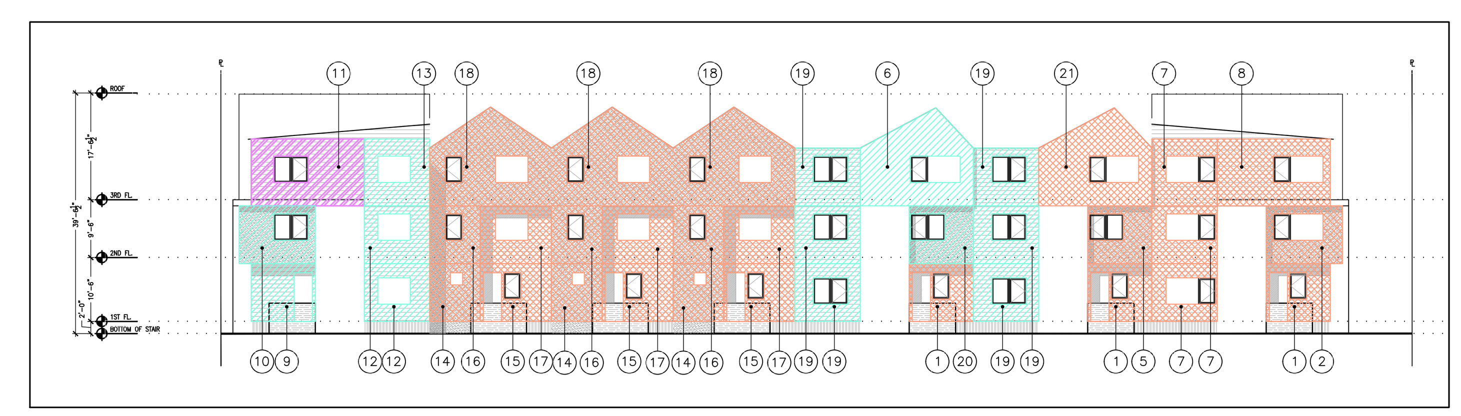
For SI: 1 foot = 304.8 mm.
UP, NS = Unprotected openings in buildings not equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1.
UP, S = Unprotected openings in buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1.
P = Openings protected with an opening protective assembly in accordance with Section 705.8.2.
a. Values indicated are the percentage of the area of the exterior wall, per story.

AREA	ZONE	WALL AREA (SF)	OPENING AREA (SF)	OPENING PERCENTAGE	ALLOWED OPENING PERCENTAGE	MEET CODE?
01	03	100	36	36.0%	45%	YES
02	03	119	35	29.4%	45%	YES
03	02	196	35	17.9%	25%	YES
04	03	204	70	34.3%	45%	YES
05	03	100	35	35.0%	45%	YES
06	02	238	35	14.7%	25%	YES
07	03	102	35	34.3%	45%	YES
08	03	196	35	17.9%	45%	YES
09	02	100	24	24.0%	25%	YES
10	02	119	25	21.0%	25%	YES
11	01	204	25	12.3%	15%	YES
12	02	102	23	22.5%	25%	YES
13	02	118	25	21.2%	25%	YES
14	03	79	4	5.1%	45%	YES
15	03	111	36	32.4%	45%	YES
16	03	79	12	15.2%	45%	YES
17	03	111	23	20.72%	45%	YES
18	03	771	105	13.62%	45%	YES
19	02	102	25	24.51%	25%	YES
20	02	100	25	25.00%	25%	YES
21	03	238	35	14.71%	45%	YES
22	02	204	50	24.51%	25%	YES

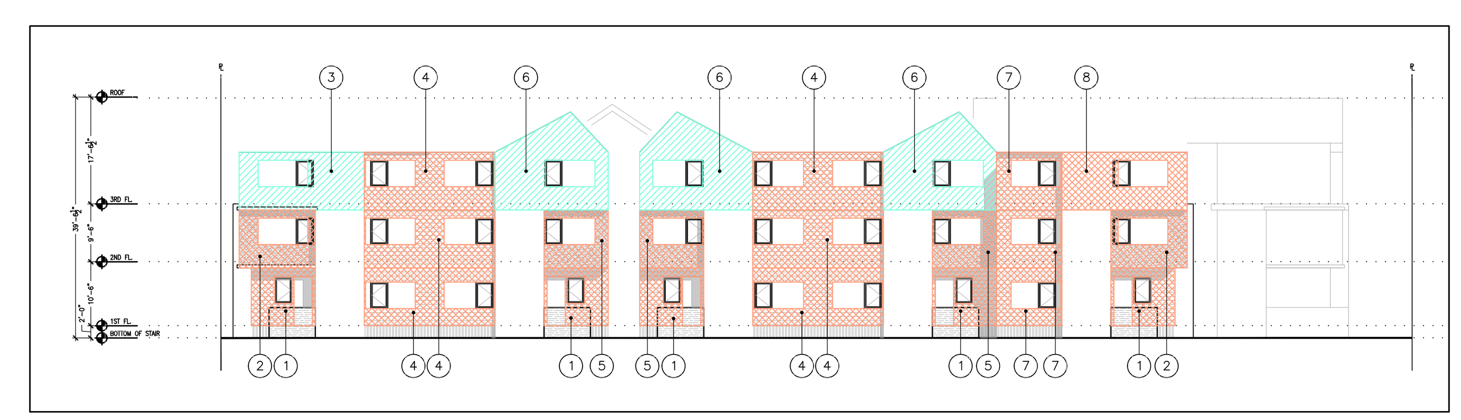
5 PERCENT OPENING CALCULATIONS
1"=15'-0"



4 ELEVATIONS: COURTYARD SOUTH ELEVATION
1"=15'-0"



3 ELEVATIONS: COURTYARD NORTH ELEVATION
1"=15'-0"



2 ELEVATIONS: NORTH ELEVATION
1"=15'-0"

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820 WEST MACARTHUR
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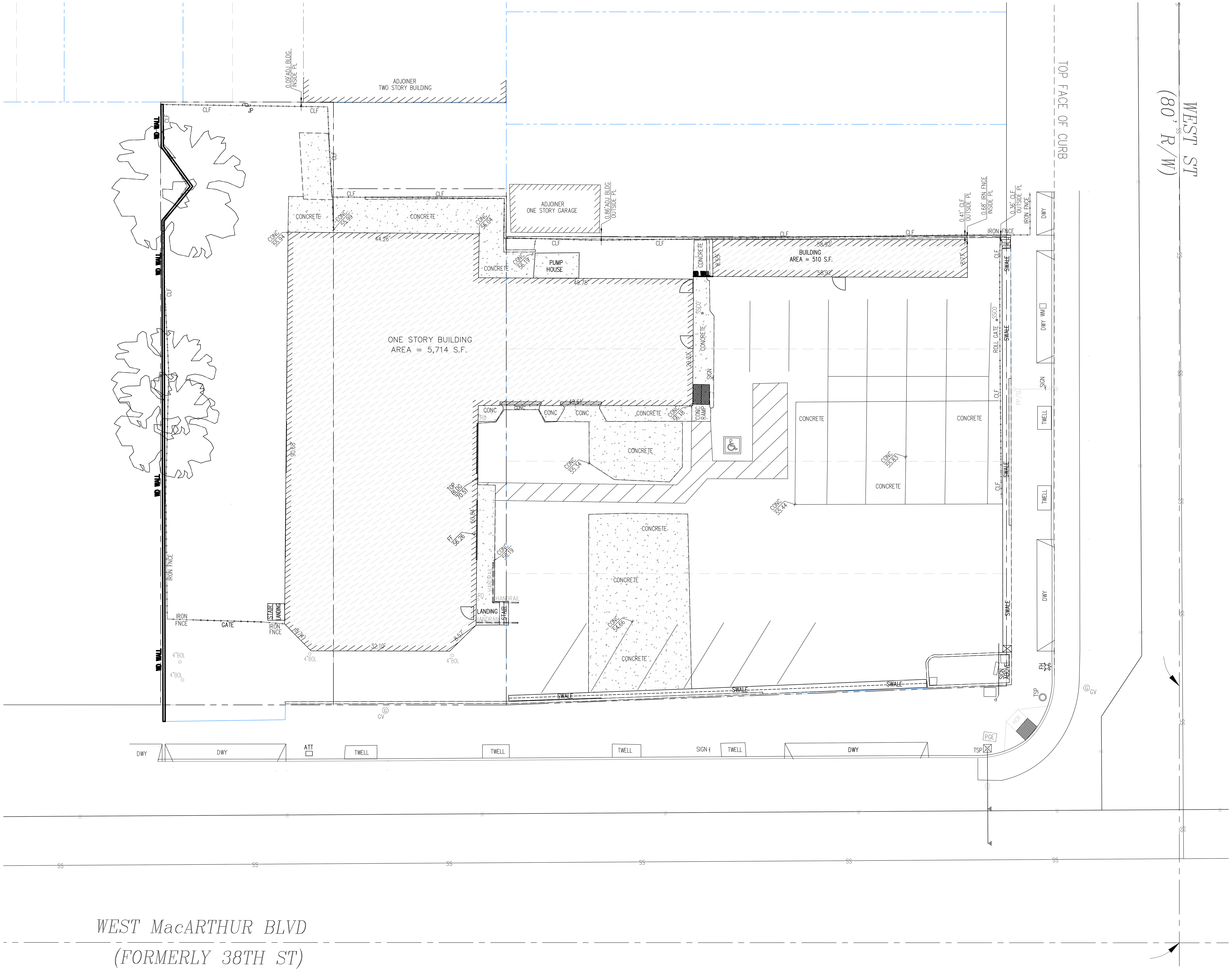
SCALE: AS NOTED

EXTERIOR WALL OPENING DISGRAMS

A0.5



1 SITE PLAN: DEMOLITION
3/32"=1'-0"

GENERAL NOTES

1. CONTRACTOR SHALL BE RESPONSIBLE FOR THE REMOVAL AND/OR PROTECTION OF THE EXISTING ITEMS AS NOTED IN THIS PLAN.
2. THE CONTRACTOR SHALL TAKE ALL PRECAUTIONS NECESSARY TO AVOID PROPERTY DAMAGE TO ADJACENT PROPERTIES DURING THE CONSTRUCTION PHASES OF THIS PROJECT. THE CONTRACTOR WILL BE HELD SOLELY RESPONSIBLE FOR ANY AND ALL DAMAGES.
3. CONTRACTOR IS TO DISPOSE OF ALL MATERIAL RESULTING FROM PREVIOUS AND CURRENT DEMOLITION IN ACCORDANCE WITH ALL LOCAL, STATE, AND/OR FEDERAL LAWS.
4. THE CONTRACTOR IS CAUTIONED TO LOCATE ALL EXISTING UTILITIES AND CONFLICTS. CONTRACTOR SHALL CONTACT THE APPROPRIATE UTILITY COMPANY AT LEAST 72 HOURS BEFORE ANY CONSTRUCTION ACTIVITY IN ORDER TO FIELD VERIFY EXISTING UTILITY INFORMATION.
5. LOCATION OF EXISTING ON-SITE UNDERGROUND UTILITIES HAVE NOT BEEN SURVEYED. EXACT LOCATIONS OF ALL UTILITIES MUST BE LOCATED IN THE FIELD BY THE CONTRACTOR. PROTECT ALL EXISTING UTILITIES IN PLACE.
6. CONTRACTOR TO CAP EXISTING WATER LINES AT THE PROPERTY LINE FOR FUTURE USE. CONTRACTOR TO VERIFY LOCATION, SIZE AND DEPTH AND PROVIDE TO ENGINEER.
7. CONTRACTOR TO PROTECT EXISTING STREET LIGHTS & POSTS, TRAFFIC SIGNALS & POSTS, TRAFFIC CONTROL DEVICES, SIGNS AND UTILITY BOXES IN THE SIDEWALK; UNLESS OTHERWISE NOTED.
8. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING DEMOLITION PERMITS AS REQUIRED FROM THE CITY OF OAKLAND, OR ANY OTHER AGENCY HAVING JURISDICTION.
9. CONTRACTOR SHALL FOLLOW ALL JURISDICTIONAL AIR QUALITY AND WASTE/RECYCLING REQUIREMENTS.

SHEET NOTES

1. DEMO AND REMOVE EXISTING BUILDING; CUT FRAMING ABOVE THE FOUNDATION. FOUNDATION/ASPHALT TO REMAIN
2. EXISTING ON-SITE ASPHALT PAVEMENT TO REMAIN
3. EXISTING ON-SITE CONCRETE TO REMAIN
4. EXISTING PUMP HOUSE TO REMAIN
5. EXISTING CARPORT TO REMAIN
6. DEMO AND REMOVE EXISTING FENCING AND GATES. FOUNDATIONS TO REMAIN. CONTRACTOR TO INSTALL NEW TEMP. FENCE ALONG PROPERTY LINE
7. EXISTING TREES AND VEGETATION TO REMAIN
8. DEMO AND REMOVE EXISTING STAIRS, LANDING, AND HANDRAILS AND/OR GUARDRAILS
9. DEMO AND REMOVE EXISTING CONCRETE CURB
10. EXISTING SWELL TO REMAIN
11. PROTECT NEIGHBORING BUILDING, LANDSCAPE, AND IRRIGATION; TYPICAL THROUGHOUT

LEGEND

—x—x—x—x— FENCE
—— — — —— PROPERTY LINE

PROJECT NORTH | TRUE NORTH

LEVY DESIGN PARTNERS ARCHITECTURE
90 South Park
San Francisco
CA 94107

820 WEST MACARTHUR
OAKLAND, CA

LICENSED ARCHITECT
TOBY STELLA LEVY
C-10527
REN. 6-30-21
STATE OF CALIFORNIA

820 WEST MACARTHUR

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PROJECT NO. 2017-12.4

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04-17-2019	DEMO PERMIT

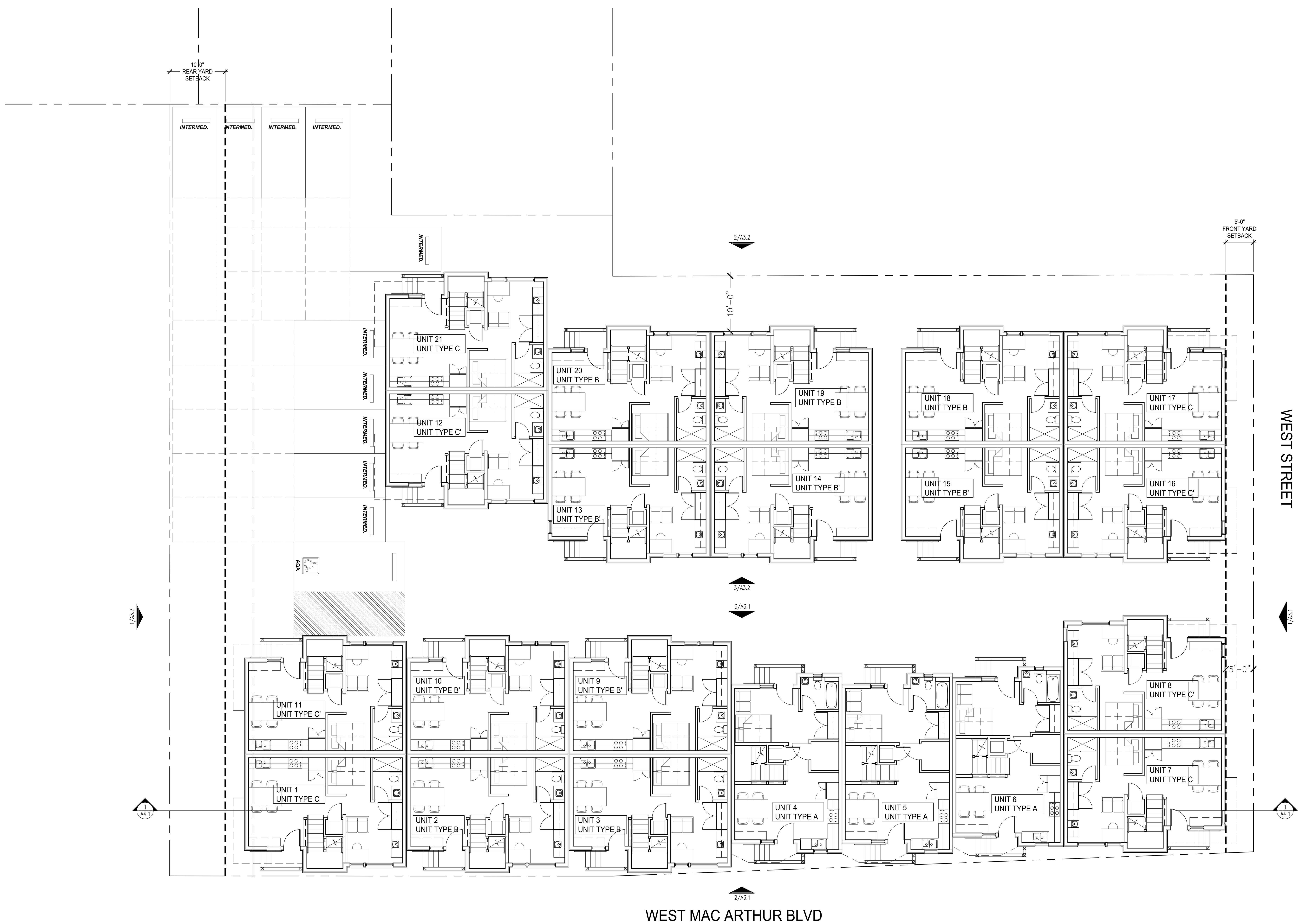
CONTACT: TOBY LEVY

(415) 777-0561 P
(415) 777-5117 F

SCALE: AS NOTED

SITE PLAN:
DEMOLITION

A1.0



1 *SITE PLAN: NEW*
3/32"=1'-0"

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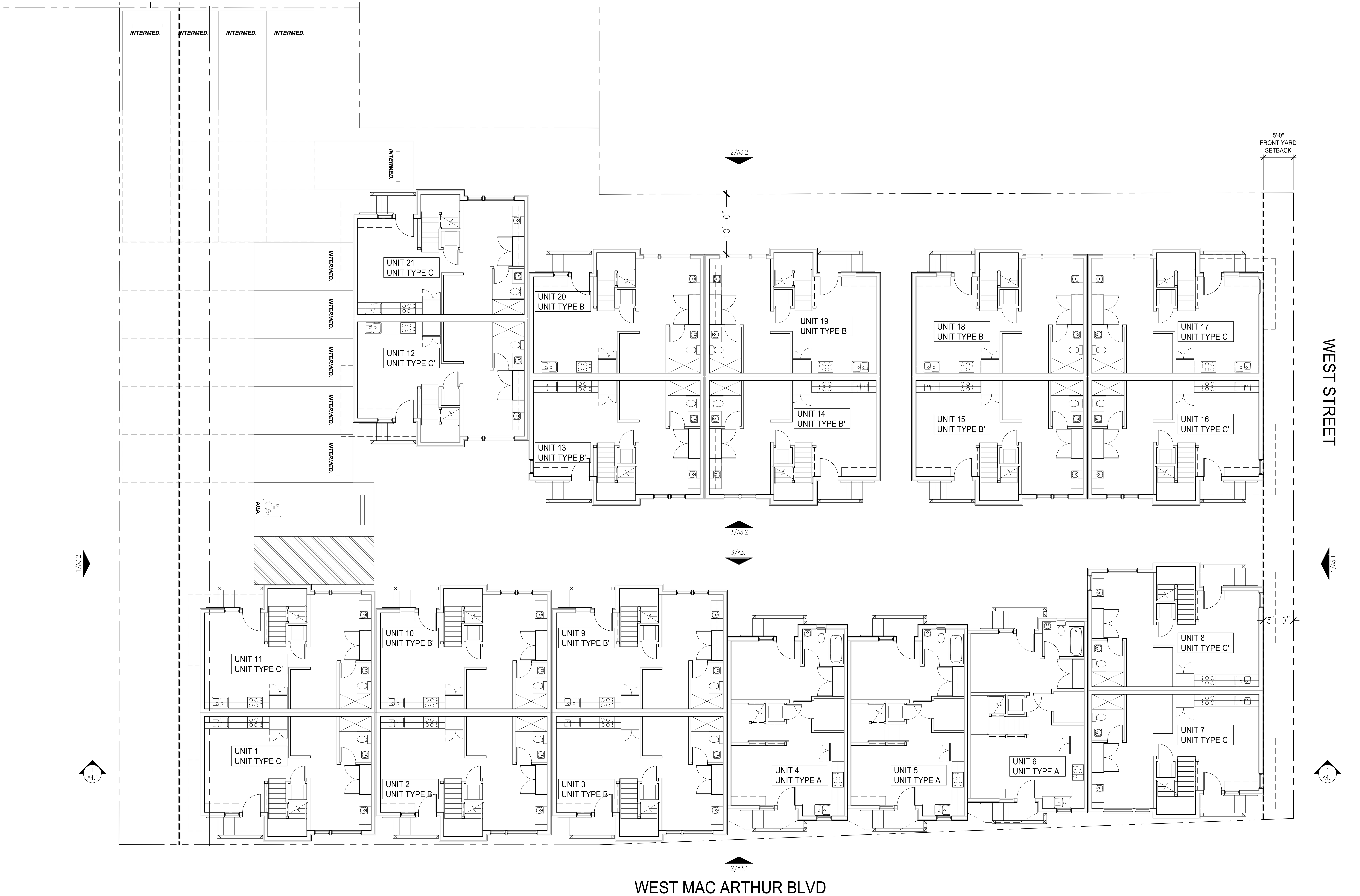
SCALE: AS NOTED

SITE PLAN:
NEW

A1.1



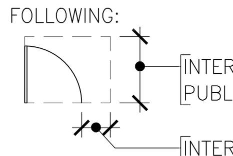
1 PLAN: 1ST FLOOR

1/8"=1'-0"

GENERAL NOTES

1. UNIT #5 IS AN ACCESSIBLE UNIT.
   - 1.1. GROUND FLOOR KITCHEN TO COMPLY WITH 2016 CBC 1133A
   - 1.2. GROUND FLOOR BATHROOM TO COMPLY WITH 2016 CBC 1134A
     - 1.2.1. MIN. 30"X48" CLR. SPACE IN FRONT OF SINK
     - 1.2.2. MIN. 30"X48" CLR. SPACE AT SIDE OF TUB
     - 1.2.3. MIN. 36"X48" CLR. SPACE IN FRONT OF TOILET

2. GROUND FLOOR DOORS IN ACCESSIBLE UNITS TO COMPLY WITH THE FOLLOWING:



2. CONTRACTOR TO PROVIDE SOLID CONTINUOUS BACKING FOR ALL WALL MTD. FIXTURES, ACCESSORIES, MILLWORK, EQUIPMENT RACKS, SHELVING, ETC. ALL BLOCKING TO BE SAME DIMENSION AS ASSOCIATED FRAMING

SHEET NOTES

1. (N) UNCOVERED SURFACE PARKING
2. PARKING STRIPING AND NUMBERING, SEE A0 SERIES FOR REQUIREMENTS AT ACCESSIBLE SPACES
3. (N) VEHICULAR GATE; SEE DOOR SCHEDULE
4. (N) LANDSCAPING, S.L.D.
5. REPLACE (E) SIDEWALK, CURBS & GUTTER
6. (N) PERIMETER FENCING
7. (N) BIKE RACKS
8. (N) STOOPS
9. (N) STREET TREE, TYP. OF 3; S.L.D.

UNIT BREAK DOWN

UNIT #	TYPE	SQ. FT.	UNIT #	TYPE	SQ. FT.	UNIT #	TYPE	SQ. FT.
1	5BD/5BA		8	5BD/5BA		15	5BD/5BA	
2	5BD/5BA		9	5BD/5BA		16	5BD/5BA	
3	5BD/5BA		10	5BD/5BA		17	5BD/5BA	
4	5BD/5BA		11	5BD/5BA		18	5BD/5BA	
5	5BD/5BA		12	5BD/5BA		19	5BD/5BA	
6	5BD/5BA		13	5BD/5BA		20	5BD/5BA	
7	5BD/5BA		14	5BD/5BA		21	5BD/5BA	

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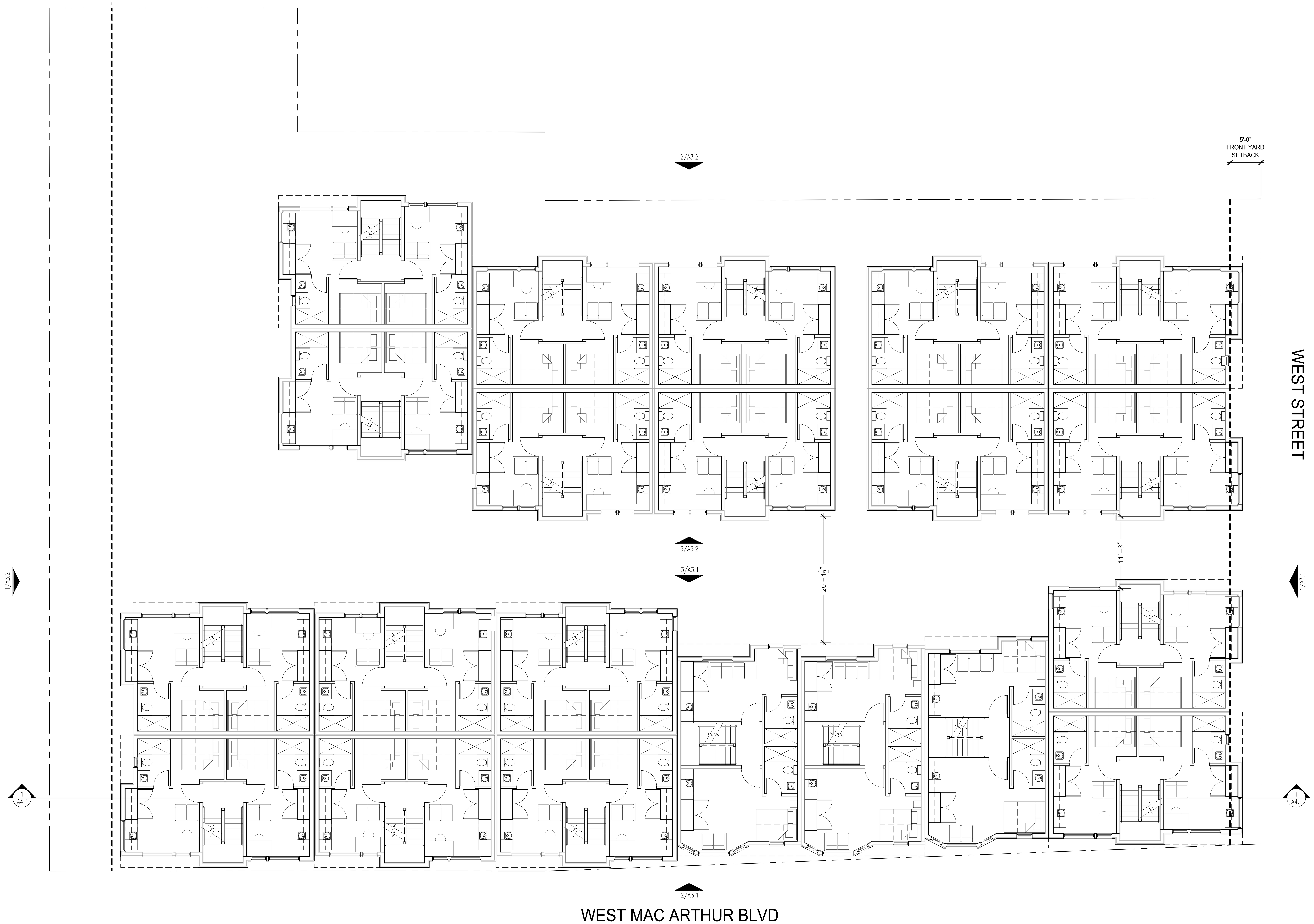
SCALE: AS NOTED

FLOOR PLAN:
GROUND FLOOR

A2.1



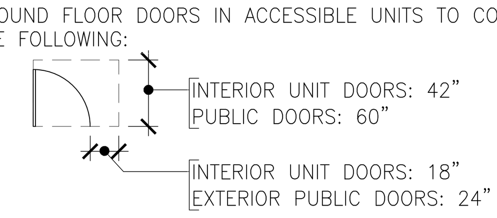
1 *PLAN: 2ND FLOOR*

1/8"=1'-0"

GENERAL NOTES

1. UNIT #5 IS AN ACCESSIBLE UNIT.
   - 1.1. GROUND FLOOR KITCHEN TO COMPLY WITH 2016 CBC 1133A
   - 1.2. GROUND FLOOR BATHROOM TO COMPLY WITH 2016 CBC 1134A
     - 1.2.1. MIN. 30"X48" CLR. SPACE IN FRONT OF SINK
     - 1.2.2. MIN. 30"X48" CLR. SPACE AT SIDE OF TUB
     - 1.2.3. MIN. 36"X48" CLR. SPACE IN FRONT OF TOILET

2. GROUND FLOOR DOORS IN ACCESSIBLE UNITS TO COMPLY WITH THE FOLLOWING:



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SHEET NOTES

1. (N) UNCOVERED SURFACE PARKING
2. PARKING STRIPING AND NUMBERING, SEE A0 SERIES FOR REQUIREMENTS AT ACCESSIBLE SPACES
3. (N) VEHICULAR GATE; SEE DOOR SCHEDULE
4. (N) LANDSCAPING, S.L.D.
5. REPLACE (E) SIDEWALK, CURBS & GUTTER
6. (N) PERIMETER FENCING
7. (N) BIKE RACKS
8. (N) STOOPS
9. (N) STREET TREE, TYP. OF 3; S.L.D.

UNIT BREAK DOWN

UNIT #	TYPE	SQ. FT.	UNIT #	TYPE	SQ. FT.	UNIT #	TYPE	SQ. FT.
1	5BD/5BA		8	5BD/5BA		15	5BD/5BA	
2	5BD/5BA		9	5BD/5BA		16	5BD/5BA	
3	5BD/5BA		10	5BD/5BA		17	5BD/5BA	
4	5BD/5BA		11	5BD/5BA		18	5BD/5BA	
5	5BD/5BA		12	5BD/5BA		19	5BD/5BA	
6	5BD/5BA		13	5BD/5BA		20	5BD/5BA	
7	5BD/5BA		14	5BD/5BA		21	5BD/5BA	

PROJECT NORTH

TRUE NORTH

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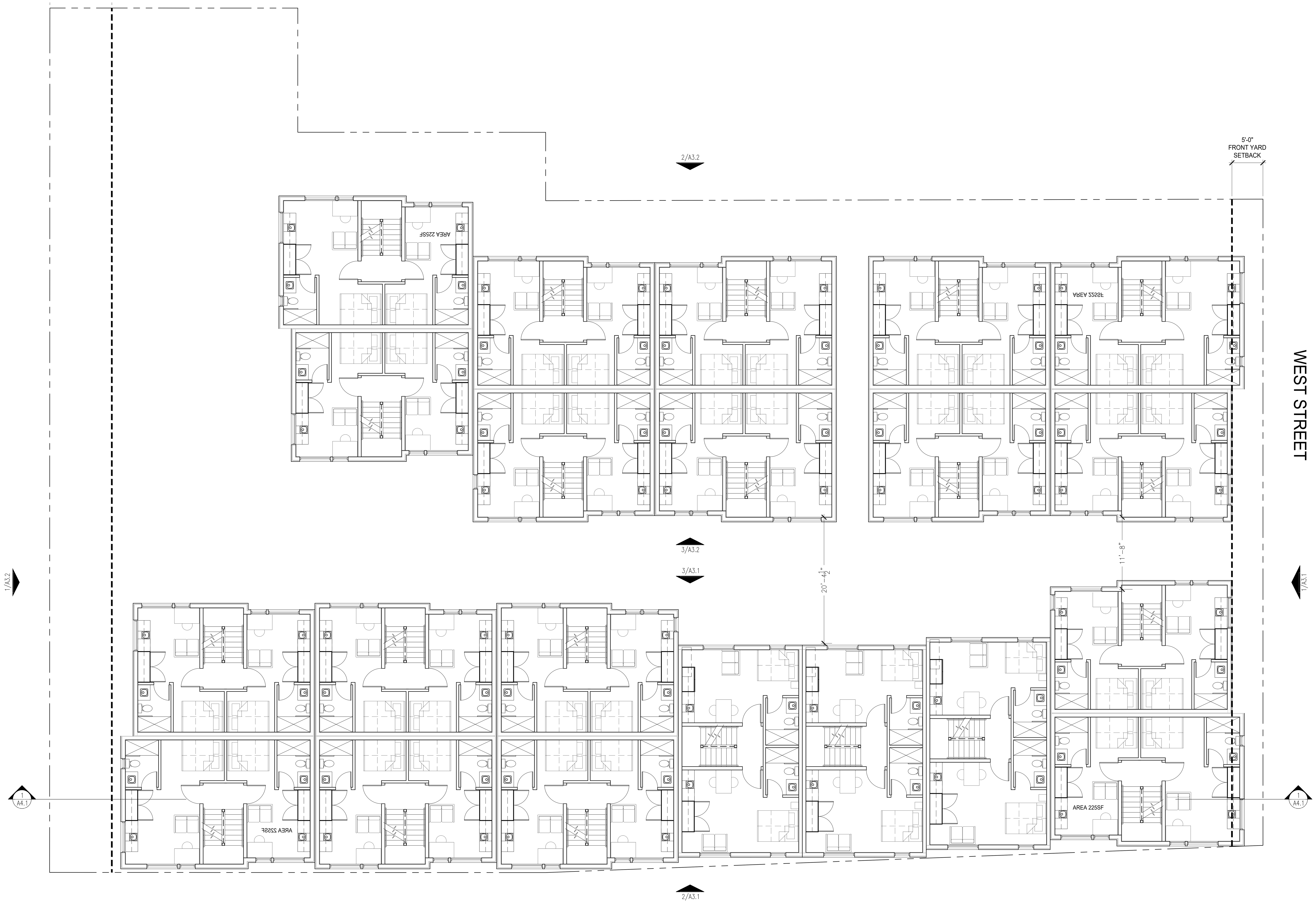
SCALE: AS NOTED

FLOOR PLAN:
2ND FLOOR

A2.2



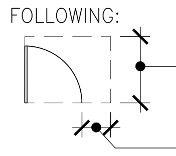
1 PLAN: 3RD FLOOR

1/8"=1'-0"

GENERAL NOTES

1. UNIT #5 IS AN ACCESSIBLE UNIT.
   - 1.1. GROUND FLOOR KITCHEN TO COMPLY WITH 2016 CBC 1133A
   - 1.2. GROUND FLOOR BATHROOM TO COMPLY WITH 2016 CBC 1134A
     - 1.2.1. MIN. 30"X48" CLR. SPACE IN FRONT OF SINK
     - 1.2.2. MIN. 30"X48" CLR. SPACE AT SIDE OF TUB
     - 1.2.3. MIN. 36"X48" CLR. SPACE IN FRONT OF TOILET

2. GROUND FLOOR DOORS IN ACCESSIBLE UNITS TO COMPLY WITH THE FOLLOWING:



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SHEET NOTES

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2. PARKING STRIPING AND NUMBERING, SEE A0 SERIES FOR REQUIREMENTS AT ACCESSIBLE SPACES
3. (N) VEHICULAR GATE; SEE DOOR SCHEDULE
4. (N) LANDSCAPING, S.L.D.
5. REPLACE (E) SIDEWALK, CURBS & GUTTER
6. (N) PERIMETER FENCING
7. (N) BIKE RACKS
8. (N) STOOPS
9. (N) STREET TREE, TYP. OF 3; S.L.D.

UNIT BREAK DOWN

UNIT #	TYPE	SQ. FT.	UNIT #	TYPE	SQ. FT.	UNIT #	TYPE	SQ. FT.
1	5BD/5BA		8	5BD/5BA		15	5BD/5BA	
2	5BD/5BA		9	5BD/5BA		16	5BD/5BA	
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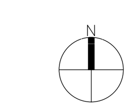
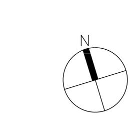
6	5BD/5BA		13	5BD/5BA		20	5BD/5BA	
7	5BD/5BA		14	5BD/5BA		21	5BD/5BA	





LEVY DESIGN PARTNERS
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CA 94107

820 WEST MACARTHUR OAKLAND, CA

LICENSED ARCHITECT
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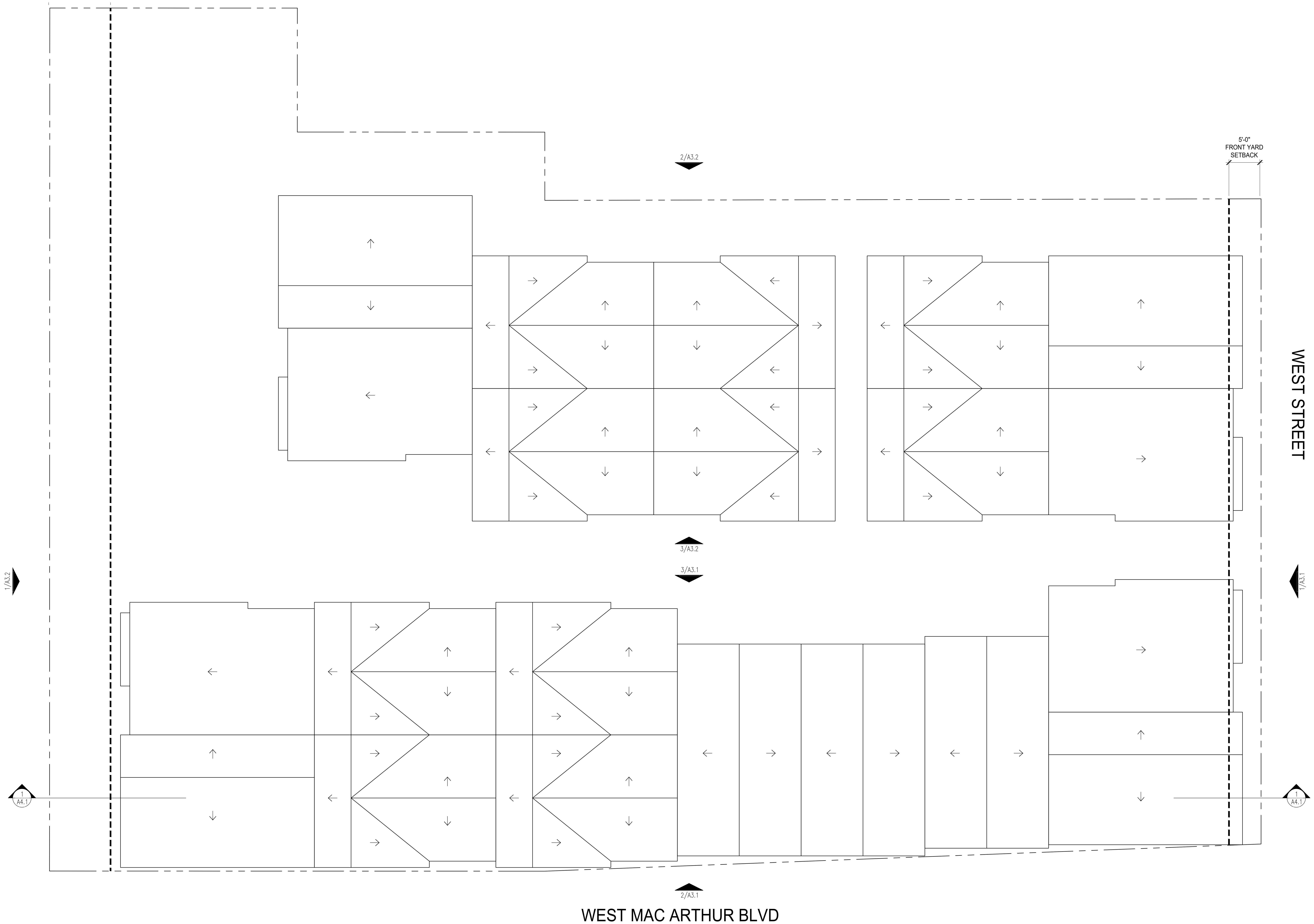
(415) 777-5117 F

SCALE: AS NOTED

FLOOR PLAN:
3RD FLOOR

A2.3



1 PLAN: ROOF
1/8"=1'-0"

GENERAL NOTES

1. UNIT #5 IS AN ACCESSIBLE UNIT.
   1.1. GROUND FLOOR KITCHEN TO COMPLY WITH 2016 CBC 1133A
   1.2. GROUND FLOOR BATHROOM TO COMPLY WITH 2016 CBC 1134A
      1.2.1. MIN. 30"X48" CLR. SPACE IN FRONT OF SINK
      1.2.2. MIN. 30"X48" CLR. SPACE AT SIDE OF TUB
      1.2.3. MIN. 36"X48" CLR. SPACE IN FRONT OF TOILET

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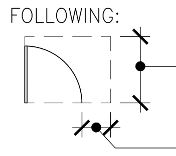

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5. REPLACE (E) SIDEWALK, CURBS & GUTTER
6. (N) PERIMETER FENCING
7. (N) BIKE RACKS
8. (N) STOOPS
9. (N) STREET TREE, TYP. OF 3; S.L.D.

UNIT BREAK DOWN

UNIT #	TYPE	SQ. FT.	UNIT #	TYPE	SQ. FT.	UNIT #	TYPE	SQ. FT.
1	5BD/5BA		8	5BD/5BA		15	5BD/5BA	
2	5BD/5BA		9	5BD/5BA		16	5BD/5BA	
3	5BD/5BA		10	5BD/5BA		17	5BD/5BA	
4	5BD/5BA		11	5BD/5BA		18	5BD/5BA	
5	5BD/5BA		12	5BD/5BA		19	5BD/5BA	
6	5BD/5BA		13	5BD/5BA		20	5BD/5BA	
7	5BD/5BA		14	5BD/5BA		21	5BD/5BA	

PROJECT NORTH

TRUE NORTH

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SCALE: AS NOTED

ROOF PLAN

A2.4

1 WEST STREET ELEVATION (EAST ELEVATION)
1/8"=1'-0"

2 WEST MACARTHUR ELEVATION (SOUTH ELEVATION)
1/8"=1'-0"

3 COURTYARD NORTH ELEVATION
1/8"=1'-0"

LEGEND

1. CEMENT PLASTER
2. HORIZONTAL FIBER CEMENT LAP SIDING
3. VERTICAL CORRUGATED METAL SIDING
4. WOOD FENCE
5. ARCHITECTURAL PROJECTION

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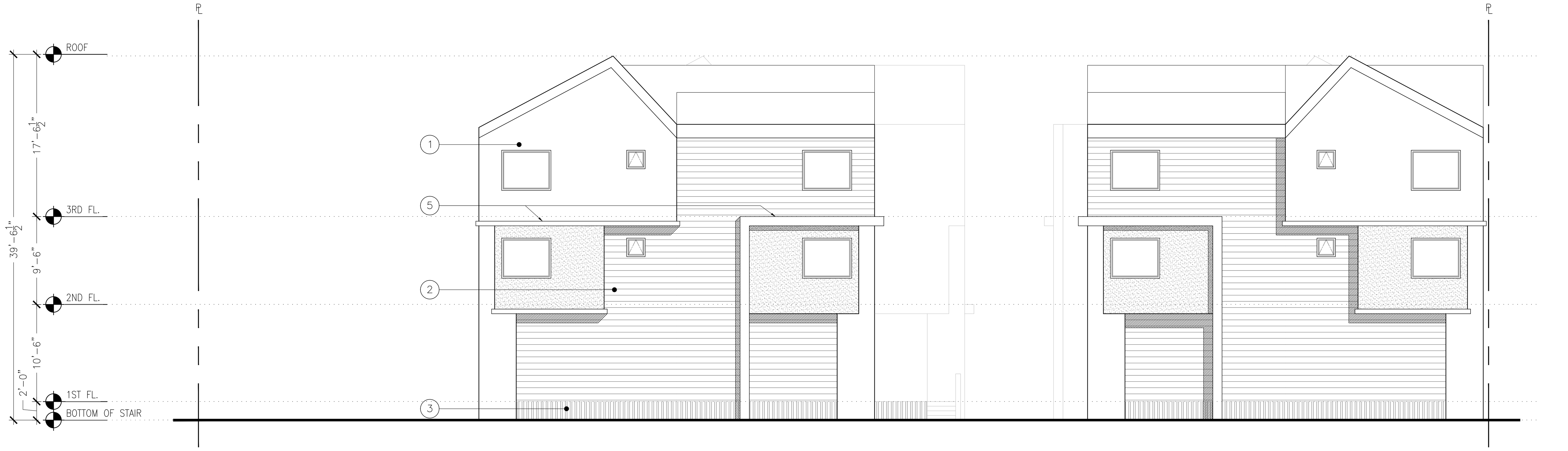
SCALE: AS NOTED

BUILDING ELEVATIONS

A3.1



1 WEST ELEVATION
1/8"=1'-0"

2 NORTH ELEVATION
1/8"=1'-0"

3 COURTYARD SOUTH ELEVATION
1/8"=1'-0"

LEGEND

1. CEMENT PLASTER
2. HORIZONTAL FIBER CEMENT LAP SIDING
3. VERTICAL CORRUGATED METAL SIDING
4. WOOD FENCE
5. ARCHITECTURAL PROJECTION

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SCALE: AS NOTED

BUILDING ELEVATIONS

A3.2

1 RENDERING OF CORNER OF W MACARTHUR BLVD & WEST ST

3 RENDERING OF WEST ST

2 RENDERING OF W MACARTHUR BLVD

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SCALE: AS NOTED

RENDERINGS

A3.3

1 BUILDING SECTION
1/8"=1'-0"

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SCALE: AS NOTED

BUILDING SECTION

A4.1

APPENDIX B

Recent Investigation Field Data

- **Appendix B1 - April 27, 2020 Limited Subsurface Investigation Report Text (10 pp)**
- **Appendix B2 - Groundwater Monitoring/ Well Purging Data Sheets (6 pp)**
- **Appendix B3 - Soil Boring Logs (8 pp)**
- **Appendix B4 - Soil Gas Well Construction Diagram (1 p)**
- **Appendix B5 - Enthalpy Field Guide and Soil Gas Sampling Data Sheets (15 pp)**
- **Appendix B6 - Weather Information (2 pp)**
- **Appendix B7 - Laboratory Analytical Reports and Chain of Custody Documentation (136 pp)**

APPENDIX B1

April 27, 2020 Limited Subsurface Investigation Report Text

P&D ENVIRONMENTAL, INC.
55 Santa Clara Ave, Suite 240
Oakland, CA 94610
(510) 658-6916

April 27, 2020
Report 0794.R6 Appendix B1

Ms. Claire Wang
820 Macarthur, LLC
1000 Brannan Street, Suite 402
San Francisco, CA 94103

SUBJECT: LIMITED SUBSURFACE INVESTIGATION REPORT
(S7 THROUGH S22, MW1 THROUGH MW3, SG22 AND SG25 THROUGH SG31)
RO Number 0003347
Former Big O Tire Facility
820 W MacArthur Boulevard
Oakland, California

Dear Ms. Wang:

P&D Environmental, Inc. (P&D) has prepared this limited subsurface investigation report for investigation at and near the subject Site. All work was performed in accordance with P&D's Limited Subsurface Investigation Work Plan and Site Investigation Data dated October 8, 2019 (document 0794.W4) and an email dated November 7, 2019 from the Alameda County Department of Environmental Health (ACDEH) approving the proposed work. The following investigation activities were performed:

- Shallow fill and soil samples were collected at locations S7 through S22 to further delineate the presence of lead in fill and shallow soil at the Site on November 11, 2019.
- Groundwater monitoring wells were monitored and sampled on November 12, 2019 and on February 25, 2020.
- Permanent soil gas wells SG22, SG25, and SG27 through SG31 were installed on November 18 and 19, 2019. Soil gas samples were collected from soil gas wells SG22, SG25, and SG28 through SG31 on January 7 and 8, 2020. A soil gas sample was not collected from wells SG26 and SG27 due to the presence of water in the soil gas well tubing.

Tables and figures referenced in this limited subsurface investigation report are provided in P&D's April 27, 2020 Corrective Action Plan (CAP) for the subject Site.

All work was performed under the direct supervision of a professional geologist.

BACKGROUND

Detailed discussions of the site background can be found in the following documents:

- July 20, 2018 Phase I Environmental Site Assessment (ESA) Report prepared by Partner Engineering and Science, Inc. (Partner).

- August 31, 2018 Phase II Subsurface Investigation Report prepared by Partner.
- October 31, 2018 Additional Subsurface Investigation Report prepared by Partner.
- February 28, 2019 Limited Subsurface Investigation Report prepared by P&D.
- March 25, 2019 Local Regulatory Agency File and Additional Historical Review Report prepared by Basics Environmental, Inc. (Basics).
- April 8, 2019 Limited Subsurface Investigation Work Plan prepared by P&D.
- May 24, 2019 Limited Subsurface Investigation Report prepared by P&D.
- June 25, 2019 Limited Subsurface Investigation Work Plan prepared by P&D.
- July 11, 2019 Additional Historical City Directory Review prepared by Basics.
- July 17, 2019 Soil and Groundwater Management Plan prepared by P&D.
- October 8, 2019 Limited Subsurface Investigation Work Plan and Site Investigation Data prepared by P&D.

A limited Ground Penetrating Radar (GPR) and magnetometer survey was previously performed by GeoTech Utility Locating of Moraga, California on April 11, 2019 to evaluate historical UST locations and associated underground piping and dispenser areas identified on site plans obtained during a review of City of Oakland Building Department files. During the survey, one vent pipe was observed secured to the building wall and one vent pipe was observed as having been cut off at the ground surface at locations identified as vent pipes on the City Building Department drawings. Additionally, the GPR and magnetometer survey suggested the possible presence of dispenser piping in areas where the ground surface cover consisted of asphaltic concrete at locations identified on City Building Department drawings showing the UST fuel system for the former gasoline station. Although rebar in concrete surface cover interfered with the magnetometer survey and generally interfered with the GPR survey, it appeared that the two smaller fuel USTs might still be at the site. The larger fuel UST and the waste oil UST were not identified during the magnetometer and GPR survey.

The July 20, 2018 Partner Phase I ESA included historical Sanborn Fire Insurance Maps, and the Sanborn Fire Insurance Map from 1911 identified The Parisian Laundry Company located at 3841 West Street the southwest corner of the intersection of Apgar Street and West Street (upgradient of the subject site). In addition, visual evaluation of nearby properties also identified the former R&R Laundromat - Wash and Fold located at 3838 West Street at the southeast corner of the same intersection. Basics was asked to perform a historical city directory review for these two properties to determine if there is any evidence of how long these businesses operated at these addresses. Basics prepared an Additional Historical City Directory Review dated July 11, 2019 for these two locations and determined that The Parisian Laundry Company operated in the location described above for approximately 16 years during the 1910s to 1920s and no information was identified regarding the operations at the former R&R Laundromat - Wash and Fold. However, the 3838 West Street property was identified as a former gas and oil station. Review of the online database GeoTracker identified the 3838 West Street property as a former fuel release case overseen by ACDEH (ACDEH case number RO 242).

FIELD ACTIVITIES

Prior to drilling, Alameda County Public Works Agency (ACPWA) drilling permits # W2019-0865 through W2019-0867 were obtained for installing soil gas wells SG22 and SG25 through SG31 and City of Oakland permits were obtained for work in the public right-of-way for installation of soil gas wells SG25 through SG30. Prior to drilling, the proposed drilling locations were marked with white paint, Underground Safety Alert was notified for buried utility location, a traffic control plan was prepared and approved by the City of Oakland, and a health and safety plan was prepared.

Fill and Shallow Soil Sample Collection

On November 11, 2019 a backhoe was used to excavate to a depth of approximately 1 to 2 feet below ground surface (bgs) at sixteen locations designated as S7 through S22 (see ***Figure 8 of the April 27, 2020 CAP***) for collection of undisturbed soil samples from beneath the concrete and asphalt surfaces in 1) the fill material, and 2) in the native material located directly below fill material, to further evaluate for the presence of lead in fill and shallow soil at the subject site. The samples were collected at depths ranging from 0.4 to 2.5 feet bgs from undisturbed material in the sidewall or bottom of the excavated areas into labeled ziplock baggies and stored in a cooler pending delivery to the laboratory. Chain of custody procedures were observed for all sample handling.

The fill and soil at each location was evaluated with a PID equipped with a 10.6 eV bulb and calibrated using a 100 part per million (ppm) isobutylene standard. The fill and soil was also evaluated for other evidence of contamination such as odors, staining, and discoloration. No staining or discoloration and no odors or detectable PID readings were encountered in any of the sample collection locations with the exception of location S16 where a petroleum hydrocarbon odor was encountered and a PID value of 51 ppm was recorded. The surface cover at all locations was approximately 3-inches of either asphalt or concrete with the exception of at location S10 where the surface cover was approximately 5-inches of concrete. The surface cover was underlain by gravelly sand fill at all locations except location S12 where the surface cover was underlain by gravel fill. The depth of fill ranged between the depths of 0.5 and 1.8 feet bgs except at location S13 (located in the former UST pit) where the fill extended to the total depth explored of 2.4 feet bgs. The fill material at all locations was underlain by clay or silty clay except at location S10 where the native material was described as clayey silt. The only locations where a second layer of concrete or asphalt was encountered was at S11 and S13 (located in the former Big O tire store building) where a layer of asphalt measuring approximately 2 to 3 inches thick was encountered at a depth of approximately 1.0 to 1.5 feet below the top of the concrete floor. No boring logs were prepared for the exploratory excavations.

Groundwater Well Monitoring and Sampling

Onsite groundwater monitoring wells MW1, MW2 and MW3 (see ***Figure 4 of the April 27, 2020 CAP***) were monitored for depth to water and the presence of free product or sheet and then purged and sampled on November 12, 2019 and on February 25, 2020 as follows.

The depth to water was measured to the nearest 0.01 foot using an electric water level indicator. The measured depth to water in the wells is summarized in Table 7 of the April 27, 2020 CAP. After well monitoring and prior to well sampling, wells MW1 through MW3 were purged for a minimum of 15 minutes. Purging was performed using a peristaltic pump and new or dedicated polyethylene tubing in each well with U.S. EPA low flow purging methods. Flow rates were maintained at approximately 200 milliliters per minute to minimize turbulence and minimize the likelihood of sediments in the samples. During purging operations, the field parameters of electrical conductivity, temperature, pH, dissolved oxygen, oxidation reduction potential, turbidity, and depth to water were monitored and recorded on a groundwater monitoring/well purging data sheet for each well (see Appendix B2 attached with this report).

The water samples for all of the wells were transferred directly from the peristaltic pump tubing to clear 40-milliliter glass VOA vials that contained hydrochloric acid, amber VOA vials that did not contain preservative, and 1-liter amber bottles that did not contain preservative. All of the VOAs were sealed with Teflon-lined screw caps and were overturned and tapped to ensure that no air bubbles were present. The VOA vials and 1-liter amber bottles were then labeled and transferred to a cooler with ice, until they were transported to the laboratory. Chain of custody procedures were observed for all sample handling.

November 12, 2019 Monitoring and Sampling Event

The measured depth to water in wells MW1, MW2, and MW3 on November 12, 2019 prior to purging and sampling was 10.39, 10.68, 12.15 feet, respectively.

No petroleum hydrocarbon sheen was detected in any of the wells. No odors were detected from the purge water from wells MW1, MW2 and MW3.

February 25, 2020 Monitoring and Sampling Event

The measured depth to water in wells MW1, MW2, and MW3 on February 25, 2020 prior to purging and sampling was 8.13, 8.32, 10.61 feet, respectively.

No petroleum hydrocarbon sheen was detected in any of the wells. No odors were detected from the purge water from wells MW2 and MW3 and a slight petroleum hydrocarbon odor was detected on the water purged from monitoring well MW1.

Soil Gas Well Construction

Soil gas wells SG22, SG25 through SG31 (see ***Figure 3 of the April 27, 2020 CAP***) were constructed on November 18 and 19, 2019 by Trinity Drilling, Inc. (Trinity) of Santa Cruz, California. The boreholes for soil gas wells SG22 and SG28 through SG31 were each hand augered to a depth of 7.0 feet bgs using a 6.0-inch outside diameter hand auger. The boreholes for soil gas wells SG25 through SG27 were first hand augered to a depth of 7.0-feet using a 3.0-inch diameter hand auger and then enlarged using a 6.0-inch diameter solid flight auger.

The soil for each borehole was logged in the field in accordance with standard geologic field techniques and the Unified Soil Classification System and was evaluated with a PID equipped with a 10.6 eV bulb and calibrated using a 100 ppm isobutylene standard. The soil was also evaluated for other evidence of contamination such as odors, staining, and discoloration. No staining or discoloration and no odors or detectable PID readings were encountered in any of the sample collection locations. No soil samples were retained for laboratory analysis from any of the boreholes for the soil gas wells. Copies of the boring logs for each borehole are attached with this report as Appendix B3.

Each soil gas well was constructed with a 2-foot long filter pack in the bottom of the borehole consisting of #2/12 Cemex sack sand. A 0.25-inch outside diameter (0.187-inch inside diameter) polyethylene tube measuring 8.0 feet in length with a HDPE filter at the bottom of the tube was placed in the center of the borehole during placement of the sand so that the HDPE filter was located in the center of the sand interval (1 foot above the bottom of the borehole). The annular space above the sand was filled with hydrated bentonite to a height of 0.5 feet above the top of the sand, and the remaining borehole annular space was filled with neat cement to approximately 0.5 feet bgs. The top of the tubing for each soil gas well was capped with a Swagelok nut and plug, and the top of each soil gas well was enclosed in a well box with a lid secured with bolts. A typical soil gas well construction diagram is attached with this report as Appendix B4.

All hand augering equipment was cleaned with an Alconox solution wash followed by a clean water rinse prior to use at each location. New polyethylene tubing, a new HDPE filter, and a new Swagelok nut and plug were used for construction of each soil gas well. Clean, unused vacuum gages and shrouds with stainless steel sampling manifolds were used at each sample collection location. All soil generated during soil gas well construction was stored in a labeled 55-gallon drum at the site pending characterization and proper disposal.

Soil Gas Well Sampling

New soil gas wells SG22, and SG25 through SG31 (see ***Figure 3 of the April 27, 2020 CAP***) were not sampled for a minimum of 2 weeks following their construction. Additionally, less than 0.5 inches of precipitation occurred during the five days prior to the soil gas well sampling date of January 8, 2020 and no precipitation occurred on the days of soil gas sample collection.

Due to the presence of water in soil gas wells SG26 and SG27, soil gas samples were not collected from these two wells.

Soil gas samples were collected from each soil gas well into 1-liter Summa canisters using a helium shroud provided by the laboratory in accordance with procedures identified in the September 2017 Enthalpy Analytical Field Guide for Use of the Helium Shrouds (see Appendix B5 of this report). One new shroud was used for each sampling location, and the soil gas samples were collected in accordance with procedures identified in the July 2015 DTSC Active Soil Gas Investigations Advisory Appendix C Quantitative Leak Testing Using a Tracer Gas. The sampling manifolds for the shrouds were provided by the laboratory under vacuum, and the vacuum was recorded to be undiminished immediately prior to sampling, satisfying shut-in test requirements.

Helium was introduced into the shroud as a tracer gas and maintained at a recommended concentration of approximately 20 percent beginning approximately 5 minutes before purging and until completion of sample collection. In accordance with the July 2015 DTSC Active Soil Gas Investigations Advisory Appendix D Soil Gas Sampling In Low Permeability Soil – Reinstallation Method procedures, a total volume of 200 milliliters was purged prior to soil gas sample collection. The purge time was calculated using a nominal flow rate provided by the flow controller of 150 milliliters per minute. During soil gas sample collection, the vacuum in the soil gas well was monitored to verify that the vacuum did not exceed 100 inches of water column (approximately 7.35 inches of mercury). Vacuums and shroud helium concentrations during sample collection were recorded on Soil Gas Sampling Data Sheets (see Appendix B5 of this report). No vacuums were observed in the remaining soil gas wells during soil gas sample collection that exceeded 100 inches of water column (approximately 7.35 inches of mercury).

One duplicate soil gas sample was collected into a 1-liter Summa canister from soil gas well SG31 using a shroud that was equipped with a stainless steel sampling tee for the Summa canisters which allowed for the simultaneous collection of the sample and the duplicate sample using methods described above. Following the completion of soil gas sample collection, the soil gas sample Summa canisters were stored in a box and promptly shipped to the laboratory for extraction and analysis. Chain of custody procedures were observed for all sample handling.

GEOLOGY AND HYDROGEOLOGY

The subject site is located at an elevation approximately 55 feet above mean sea level, and the topography slopes gently to the west-southwest (see ***Figure 1 of the April 27, 2020 CAP***).

Based on review of regional geologic maps from U. S. Geological Survey Professional Paper 943, "Flatland Deposits - Their Geology and Engineering Properties and Their Importance to Comprehensive Planning," by E. J. Helley and K. R. Lajoie, 1979, the subject site is underlain by

Late Pleistocene alluvium (Qpa). The Late Pleistocene alluvium is described as weakly consolidated slightly weathered poorly sorted irregularly interbedded clay, silt, sand and gravel.

Based on review of the Geologic Map and Map Database of the Oakland Metropolitan Area, Alameda, Contra Costa, and San Francisco Counties, California (U.S. Geological Survey Miscellaneous Field Studies MF-2342, Version 1.0) by R.W Graymer, 2000, the subject site is underlain by Holocene alluvial fan and fluvial deposits (Qhaf). The alluvial fan and fluvial deposits are described as brown or tan, medium dense to dense, gravely sand or sandy gravel that generally grades upward to sandy or silty clay. Near the distal fan edges, the fluvial deposits are typically brown, never reddish, medium dense sand that fines upward to sandy or silty clay, with the best developed Holocene alluvial fans being located on the San Francisco Bay plain.

Review of the subsurface materials encountered at shallow soil collection locations S7 through S21 during previous investigations shows that, besides fill material, the materials consisted predominantly of silty clay, clay, and clayey silt. No coarse-grained materials were encountered in boreholes SG22, or SG25 through SG31 with the exception of borehole SG27 where clayey sandy gravel was encountered between the depths of 3.0 and 6.0 feet bgs. No groundwater was encountered during drilling in any of the soil gas well boreholes.

Groundwater was first encountered during previous investigations in boreholes MW1 through MW3 during drilling at depths of approximately 23.0, 17.5, and 15.0 feet bgs, respectively. The measured depth to water after the wells were constructed and developed, and prior to groundwater sample collection on August 12, 2019 was 9.68, 9.94, and 11.57 feet, respectively. No groundwater flow direction was calculated using the water levels in onsite wells MW1 through MW3 because the well heads have not yet been surveyed pending determination of the need for installation of any additional wells.

Review of groundwater flow direction information obtained from groundwater monitoring wells at the former ARCO Station No. 4931 located at 731 W. MacArthur Blvd (approximately 200 feet southeast of the subject site at the southeast corner of the intersection of West Street and W MacArthur Blvd.) shows that the approximate depth to groundwater in groundwater monitoring wells as measured from the top of well casing typically ranged seasonally from approximately 5 to 10 feet and that the groundwater flow direction has historically been to the west with a gradient of 0.019. A rose diagram of historical groundwater flow directions at the 731 W. MacArthur Blvd ARCO station is shown on ***Figure 2 of the April 27, 2020 CAP***.

Review of groundwater flow direction information obtained from groundwater monitoring wells at the former Chevron Station No. 9-2029 located at 880 W. MacArthur Blvd (approximately 450 feet west of the subject site at the northeast corner of the intersection of Market Street and W MacArthur Blvd.) shows that the approximate depth to groundwater in groundwater monitoring wells as measured from the top of well casing ranged seasonally from about 5 to 10 feet and that the groundwater flow direction has historically been to the southwest (see ***Figure 2 of the April***

27, 2020 CAP). Review of ***Figure 1 of the April 27, 2020 CAP*** shows that San Francisco Bay is located approximately 7,700 feet to the west of the subject site.

WEATHER

Weather data, including precipitation and barometric pressure for all of the month of December 2019 and most of the month of January 2020, including the soil gas sample collection date January 8, 2020 is provided in Appendix B6 of this report. Less than 0.5 inches of precipitation occurred during the 5 days prior to soil gas sample collection, and no inches of precipitation occurred on the dates of soil gas sample collection.

The weather station is located on the south side of 56th Street immediately east of the intersection of 56th Street and Market Street in Emeryville at an elevation of 65 feet above sea level, approximately 0.8 miles to the north-northwest of the subject site. The subject site is located at an elevation of approximately 55 feet above sea level. An internet link to the weather station information is provided in Appendix B6 of this report.

LABORATORY ANALYSIS

All of the soil and groundwater samples were analyzed at McCampbell Analytical, Inc. of Pittsburg, California (McCampbell).

The fill and shallow soil samples S7 through S22 were analyzed for the following:

- Total Lead using EPA Method 6020.

The groundwater samples collected from groundwater monitoring wells MW1 through MW3 were analyzed for the following:

- Total Petroleum Hydrocarbons as Gasoline (TPH-G) using EPA Method 5030 in conjunction with EPA Method 8021 and modified EPA Method 8015B.
- Total Petroleum Hydrocarbons as Diesel (TPH-D), Total Petroleum Hydrocarbons as Bunker Oil (TPH-BO), and Total Petroleum Hydrocarbons as Motor Oil (TPH-MO) using EPA Method 3510 in conjunction with EPA Method 8015B.
- VOCs, including methyl tertiary-butyl ether (MTBE), benzene, toluene, ethylbenzene, and total xylenes (BTEX), lead scavengers, fuel oxygenates, and Halogenated Volatile Organic Compounds (HVOCs), including Tetrachloroethene (PCE) and Trichloroethene (TCE) using EPA Method 5030B in conjunction with EPA Method 8260B.

The soil gas samples collected from soil gas wells SG22 and SG25 through SG311, and duplicate soil gas sample SG31-DUP were analyzed at Enthalpy Analytical, Inc. (formerly Curtis & Tompkins, Ltd.) of Berkeley, California (Enthalpy) for the following:

- Oxygen, Carbon Dioxide, Methane, and Helium (the leak detector compound) using ASTM D1946-90.

The soil gas samples were subcontracted to Eurofins Air Toxics of Folsom, California and analyzed for the following:

- TPH-G using EPA Method TO-3.
- VOCs using EPA Method TO-15.

The fill and shallow soil sample results on a wet weight basis are summarized in Table 2A, groundwater monitoring well sample results are summarized in Tables 5A and 5B, and the soil gas sample results are summarized in Tables 6A through 6E of the April 27, 2020 CAP.

Copies of the laboratory analytical reports and chain of custody documentation are attached with this report as Appendix B7.

DISCUSSION AND RECOMMENDATIONS

A discussion of the sample results and recommendations for additional sample collection are provided in the April 27, 2020 CAP for the subject Site using methods previously approved by the ACDEH.

LIMITATIONS

This work plan was prepared solely for the use of 820 Macarthur, LLC. The content and conclusions provided by P&D in this assessment are based on information collected during our investigation, which may include, but not be limited to, visual site inspections; interviews with the site owner, regulatory agencies and other pertinent individuals; review of available public documents; subsurface exploration and our professional judgment based on said information at the time of preparation of this document. Any subsurface sample results and observations presented herein are considered to be representative of the area of investigation; however, geological conditions may vary between borings and may not necessarily apply to the general site as a whole. If future subsurface or other conditions are revealed which vary from these findings, the newly revealed conditions must be evaluated and may invalidate the findings of this work plan.

This work plan is issued with the understanding that it is the responsibility of the owner, or his representative, to ensure that the information contained herein is brought to the attention of the appropriate regulatory agencies, where required by law. Additionally, it is the sole responsibility of the owner to properly dispose of any hazardous materials or hazardous wastes left onsite, in accordance with existing laws and regulations.

This work plan has been prepared in accordance with generally accepted practices using standards of care and diligence normally practiced by recognized consulting firms performing services of a similar nature. P&D is not responsible for the accuracy or completeness of information provided by other individuals or entities which is used in this work plan. This work plan presents our professional judgment based upon data and findings identified in this work plan and interpretation of such data based upon our experience and background, and no warranty, either express or implied, is made. The conclusions presented are based upon the current regulatory climate and may require revision if future regulatory changes occur.

Should you have any questions, please do not hesitate to contact us at (510) 658-6916.

Sincerely,

P&D Environmental, Inc.

Paul H. King

PROFESSIONAL GEOLOGIST
PAUL H. KING
No. 5901
STATE OF CALIFORNIA

Paul H. King
California Professional Geologist #5901
Expires: 12/31/21

Attachments:

See April 27, 2020 Subject Site CAP for Tables and Figures

- Appendix B2 - Groundwater Monitoring/ Well Purging Data Sheets (6 pp)
- Appendix B3 - Soil Boring Logs (8 pp)
- Appendix B4 - Soil Gas Well Construction Diagram (1 p)
- Appendix B5 - Enthalpy Field Guide and Soil Gas Sampling Data Sheets (15 pp)
- Appendix B6 - Weather Information (2 pp)
- Appendix B7 - Laboratory Analytical Reports and Chain of Custody Documentation (136 pp)

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APPENDIX B2

Groundwater Monitoring/ Well Purging Data Sheets

- **November 12, 2019**
- **February 25, 2020**

APPENDIX B2

Groundwater Monitoring/ Well Purging Data Sheets

- **November 12, 2019**
- **February 25, 2020**

P&D Environmental, Inc.
Groundwater Monitoring/Well Purging Data Sheet

Site Name 820 W. MacArthur Blvd., Oakland

Well No. MW1

Job Number 0794

Date 11/12/19

TOC to Water (ft.) 10.39

Sheen NONE

Well Depth (ft.) 25.0

Free Product Thickness Ø

Well Diameter 2"

Sample Collection Method PERISTALTIC PUMP & NEW UNUSED PE TUBING

Flow Rate (mL/minute) 200

Start Purge Time 1338

Personnel Initials MLBD

Time	Vol. Purged (mL)	Depth to Water (ft.)	pH	Electrical Conductivity (µS/cm)	Temperature (C°)	Dissolved Oxygen (mg/L)	Oxidation/ Reduction Potential (mV)	Turbidity (NTU)
1339	200	10.54	8.01	849	23.3	1.48	-90.4	3.59
1342	800	10.78	8.08	847	23.3	0.68	-105.3	3.61
1345	1,400	10.98	8.12	841	23.3	0.45	-115.3	3.18
1348	2,000	11.21	8.08	843	23.4	0.35	-119.2	2.91
1350	2,600	11.34	8.05	843	23.4	0.31	-121.2	2.83
1353	3,200	11.55	8.02	844	23.4	0.30	-121.3	2.74

NOTES

MW1 COLLECTED AT 1400; NO ODOR OR SHEEN
PE TUBING SET AT 15.0 FT.

Stability Parameters
p.H. = +/- 0.1
Sp. Conductivity = +/-3%
Turbidity = +/- 10%
D.O. = +/- 10%

P&D Environmental, Inc.
Groundwater Monitoring/Well Purging Data Sheet

Site Name 820 W. MacArthur Blvd, Oakland

Job Number 0794

TOC to Water (ft.) 10.68

Well Depth (ft.) 20.0

Well Diameter 2"

Flow Rate (mL/minute) 200

Start Purge Time 12:40

Well No. MW2

Date 11/12/19

Sheen NONE

Free Product Thickness Ø

Sample Collection Method PERISTALTIC PUMP & NEW UNUSED PE TUBING

Personnel Initials KLBD.

Time	Vol. Purged (mL)	Depth to Water (ft.)	pH	Electrical Conductivity (µS/cm)	Temperature (C°)	Dissolved Oxygen (mg/L)	Oxidation/ Reduction Potential (mV)	Turbidity (NTU)
1241	200	10.84	7.72	843	23.1	1.59	-29.7	3.94
1244	800	11.07	7.76	836	23.0	1.17	-28.1	3.69
1247	1400	11.24	7.69	835	23.1	1.16	-22.3	3.24
1250	2,000	11.44	7.71	842	23.0	1.27	-29.0	3.68
1253	2,600	11.57	7.73	847	23.0	1.24	-21.8	3.71
1256	3,200	11.74	7.75	852	22.9	1.17	-24.7	3.64

NOTES

MW2 COLLECTED AT 1300; NO ODOR OR SHEEN.
PE TUBING SET AT 12.0 FT.

Stability Parameters
p.H. = +/- 0.1
Sp. Conductivity = +/-3%
Turbidity = +/- 10%
D.O. = +/- 10%

P&D Environmental, Inc.
Groundwater Monitoring/Well Purging Data Sheet

Site Name 820 W. MacArthur Blvd

Job Number 0794

TOC to Water (ft.) 12.15

Well Depth (ft.) 20.0

Well Diameter 2"

Flow Rate (mL/minute) 200

Start Purge Time 1148

Well No. MW3

Date 11/12/19

Sheen NONE

Free Product Thickness Ø

Sample Collection Method PERISTALTIC PUMP AND NEW UNUSED PE TUBING

Personnel Initials MLBD.

Time	Vol. Purged (mL)	Depth to Water (ft.)	pH	Electrical Conductivity (µS/cm)	Temperature (C°)	Dissolved Oxygen (mg/L)	Oxidation/ Reduction Potential (mV)	Turbidity (NTU)
1149	200	12.31	7.43	1231	19.4	0.89	-74.8	2.69
1152	800	12.49	7.42	1226	19.2	0.65	-84.4	2.95
1155	1,400	12.71	7.37	1197	19.2	0.46	-84.9	2.70
1158	2,000	12.87	7.35	1183	19.2	0.39	-88.0	2.35
1201	2,600	12.98	7.34	1181	19.3	0.38	-65.5	2.13
1204	3,200	13.09	7.33	1177	19.3	0.40	-60.0	2.05
1207	3,800	13.14	7.32	1174	19.3	0.41	-59.6	2.41

NOTES

MW3 COLLECTED AT 1210; NO ODOR OR SHEEN.
PE TUBING SET AT 15.0 FT.

Stability Parameters
p.H. = +/- 0.1
Sp. Conductivity = +/-3%
Turbidity = +/- 10%
D.O. = +/- 10%

P&D Environmental, Inc.
Groundwater Monitoring/Well Purging Data Sheet

Site Name 820 W. MacArthur Blvd, Oakland

Well No. MW1

Job Number 0794

Date 2/25/20

TOC to Water (ft.) 8.13

Sheen NONE

Well Depth (ft.) 25.0

Free Product Thickness Ø

Well Diameter 2"

Sample Collection Method PERISTALTIC PUMP AND NEW UNUSED PE TUBING

Flow Rate (mL/minute) 200

Start Purge Time 1113

Personnel Initials MLBD/JWH

Time	Vol. Purged (mL)	Depth to Water (ft.)	pH	Electrical Conductivity (µS/cm)	Temperature (C°)	Dissolved Oxygen (mg/L)	Oxidation/ Reduction Potential (mV)	Turbidity (NTU)
1114	200	8.34	6.55	1015	19.5	0.97	177.0	5.01
1117	806	8.53	6.45	1014	19.4	0.47	177.1	4.59
1120	1,400	8.73	6.49	1015	19.3	0.34	174.5	4.25
1123	2,000	8.93	6.51	1017	19.3	0.28	172.7	4.49
1126	2,600	9.11	6.53	1024	19.3	0.29	173.0	4.12
1129	3,200	9.32	6.57	1028	19.2	0.30	171.9	2.42

NOTES

MW1 COLLECTED AT 1135; SLIGHT PHC ODOR, NO SHEEN
PE TUBING SET AT 18.0 FT

Stability Parameters
p.H. = +/- 0.1
Sp. Conductivity = +/-3%
Turbidity = +/- 10%
D.O. = +/- 10%

P&D Environmental, Inc.
Groundwater Monitoring/Well Purging Data Sheet

Site Name 820 W. MacArthur Blvd, Oakland

Job Number 0794

TOC to Water (ft.) 8.32

Well Depth (ft.) 20.0

Well Diameter 2"

Flow Rate (mL/minute) 200

Start Purge Time 1027

Well No. MW2

Date 2/25/20

Sheen NONE

Free Product Thickness ø

Sample Collection Method PERISTALTIC PUMP AND NEW UNUSED PE TUBING

Personnel Initials MLBD/JWH

Time	Vol. Purged (mL)	Depth to Water (ft.)	pH	Electrical Conductivity (µS/cm)	Temperature (C°)	Dissolved Oxygen (mg/L)	Oxidation/ Reduction Potential (mV)	Turbidity (NTU)
1028	200	8.48	6.88	856	19.0	1.31	173.4	10.95
1031	800	8.70	6.78	850	18.9	1.24	175.3	11.77
1034	1,400	8.90	6.82	847	18.9	1.18	169.2	11.17
1037	2,000	9.05	6.87	847	18.9	1.17	166.2	8.08
1040	2,600	9.15	6.81	847	18.9	1.18	163.8	6.89
1043	3,200	9.31	6.90	847	18.9	1.20	162.7	6.61

NOTES

MW2 COLLECTED AT 1045; NO ODOR OR SHEEN
PE TUBING SET AT 15.0 FT.

Stability Parameters
p.H. = +/- 0.1
Sp. Conductivity = +/-3%
Turbidity = +/- 10%
D.O. = +/- 10%

P&D Environmental, Inc.
Groundwater Monitoring/Well Purging Data Sheet

Site Name 820 W. MacArthur Blvd. Oakland

Job Number 0794

TOC to Water (ft.) 10.61

Well Depth (ft.) 20.0

Well Diameter 2"

Flow Rate (mL/minute) 200

Start Purge Time 1209

Well No. MW3

Date 2/25/20

Sheen NONE

Free Product Thickness Ø

Sample Collection Method PERISTALTIC PUMP AND NEW UNUSED PE TUBING

Personnel Initials MLBD/JWH

Time	Vol. Purged (mL)	Depth to Water (ft.)	pH	Electrical Conductivity (µS/cm)	Temperature (C°)	Dissolved Oxygen (mg/L)	Oxidation/ Reduction Potential (mV)	Turbidity (NTU)
1210	200	10.85	6.83	1142	17.0	0.22	180.6	0.00
1213	800	10.93	6.68	1142	17.1	0.21	184.1	0.22
1216	1400	11.09	6.69	1141	17.0	0.17	181.9	1.77
1219	2000	11.20	6.70	1142	17.0	0.17	180.3	0.00
1222	2600	11.31	6.78	1143	17.0	0.16	178.2	0.53
1225	3200	11.40	6.77	1144	17.1	0.16	176.4	0.97
1228	3800	11.45	6.78	1143	17.2	0.16	175.1	0.00

NOTES

1. NO ODOR OR SHEEN.
2. PE TUBING SET AT 15.0 FT BGS.
3. MW3 SAMPLE COLLECTED AT: 1230

Stability Parameters
p.H. = +/- 0.1
Sp. Conductivity = +/-3%
Turbidity = +/- 10%
D.O. = +/- 10%

APPENDIX B3

Soil Boring Logs

APPENDIX B3

Soil Boring Logs

P&D ENVIRONMENTAL, INC.

BORING NO.: SG22	PROJECT NO.: 0794
PROJECT NAME: 820 W MacArthur Blvd., Oakland	
BORING LOCATION: Approximately 25 ft. north and 5 ft. west of southeast corner of property	ELEVATION AND DATUM: None
DRILLING AGENCY: Trinity Drilling	DRILLER: Henry
DRILLING EQUIPMENT: 6.0-inch O.D. Hand Auger	
DATE & TIME STARTED: 11/18/19 1500	DATE & TIME FINISHED: 11/18/19 1700
COMPLETION DEPTH: 7.0 Feet	BEDROCK DEPTH: Not Encountered
FIRST WATER DEPTH: Not Encountered	NO. OF SAMPLES: None
LOGGED BY: MLBD	CHECKED BY: PMK

DEPTH (FT.)	DESCRIPTION	GRAPHIC COLUMN	BLOW COUNT PER 6"	WELL CONSTRUCTION LOG	PID	REMARKS
	0.0 to 2.0 ft. Gray silt (ML); stiff, dry. No Petroleum Hydrocarbon (PHC) or solvent odors. (0,0,100)	ML		See Well Construction Description Below	0	Borehole hand augered from 0.0 to 7.0 ft. using 6.0-inch O.D. hand auger.
	2.0 to 4.0 ft. Black silty clay (CL); stiff, moist, with light brown mottling with roots. No PHC or solvent odors. (0,0,100)	CL			0	Groundwater was not encountered during hand augering or drilling.
	4.0 to 5.0 ft. Olive-brown silty clay (CL); stiff, moist, with black mottling. No PHC or solvent odors. (0,0,100)	CL			0	Borehole terminated at 7.0 ft. and soil gas well constructed in borehole on 11/18/19.
5	5.0 to 5.7 ft. Olive-brown silty clay (CL); stiff, moist, with gray mottling. No PHC or solvent odors. (0,0,100)	CL			0	
	5.7 to 7.0 ft. Orange-brown clayey silt (ML); stiff, moist. No PHC or solvent odors. (0,0,100) Increase in gravel content at 7.0 ft. (15,0,85)	ML			0	
10						Soil gas well constructed with Cemex #2/12 sack sand from 7.0 to 5.0 ft. bgs, hydrated bentonite from 5.0 to 4.5 ft. bgs, neat cement grout from 4.5 to 0.5 ft. bgs, and 8.0 ft. of 0.25-inch O.D. Teflon tubing with a HDPE filter at the bottom of the tubing at a depth of 6.0 ft. bgs. A Swagelok nut and plug were placed at the top of the tubing and the top of the well was enclosed in a traffic-rated vault.
15						Inspector Tony Xiong with Alameda County Public Works Agency gave verbal authorization to pour the sanitary seal.
						Drilling Notes:
						1) Field estimates of percent gravel, sand, and fines are shown in parentheses.
20						2) Density determinations are qualitative and are not based on quantitative evaluation.
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P&D ENVIRONMENTAL, INC.

BORING NO.: SG25	PROJECT NO.: 0794	PROJECT NAME: 820 W MacArthur Blvd., Oakland
BORING LOCATION: Approximately 175 ft. north of W MacArthur Blvd. in parking lane on east side of West St.		ELEVATION AND DATUM: None
DRILLING AGENCY: Trinity Drilling	DRILLER: Jeff	DATE & TIME STARTED: 11/18/19 1330
DRILLING EQUIPMENT: Truck-mounted Geoprobe 7800		DATE & TIME FINISHED: 11/18/19 1600
COMPLETION DEPTH: 7.0 Feet	BEDROCK DEPTH: Not Encountered	LOGGED BY: MLBD
FIRST WATER DEPTH: Not Encountered	NO. OF SAMPLES: None	CHECKED BY: PMK

DEPTH (FT.)	DESCRIPTION	GRAPHIC COLUMN	BLOW COUNT PER 6"	WELL CONSTRUCTION LOG	PID	REMARKS
0–1	0.0 to 1.0 ft. Concrete (8.0-inches) and base rock.	FILL		See Well Construction Description Below	0	Borehole hand augered from 1.0 to 7.0 ft. using 3.0-inch O.D. hand auger.
1–5	1.0 to 5.0 ft. Olive-brown silty clay (CL); medium stiff, moist, with few coarse angular gravel to 0.25-inch diameter and black mottling. No Petroleum Hydrocarbon (PHC) or solvent odors. (15,0,85)	CL			0 0 0	Borehole enlarged to 7.0 ft. using a truck-mounted 6.0-inch O.D. solid flight auger. Groundwater was not encountered during hand augering or drilling.
5–7	5.0 to 7.0 ft. Orange-brown gravelly sandy silt (ML); medium stiff, moist, with few coarse angular gravel to 0.5-inch diameter, orange and black mottling. No PHC or solvent odors. (15,35,50)	ML			0	

Depth scale: 5, 10, 15, 20, 25, 30

REMARKS (continued):

0.0 to 4.0 ft. 2.4 ft. recovery
4.0 to 7.0 ft. 3.4 ft. recovery

Borehole terminated at 7.0 ft. and soil gas well constructed in borehole on 11/18/19.

Soil gas well constructed with Cemex #2/12 sack sand from 7.0 to 5.0 ft. bgs, hydrated bentonite from 5.0 to 4.5 ft. bgs, neat cement grout from 4.5 to 0.5 ft. bgs, and 8.0 ft. of 0.25-inch O.D. Teflon tubing with a HDPE filter at the bottom of the tubing at a depth of 6.0 ft. bgs. A Swagelok nut and plug were placed at the top of the tubing and the top of the well was enclosed in a traffic-rated vault.

Inspector Tony Xiong with Alameda County Public Works Agency gave verbal authorization to pour the sanitary seal.

Drilling Notes:

1) Field estimates of percent gravel, sand, and fines are shown in parentheses.

2) Density determinations are qualitative and are not based on quantitative evaluation.

P&D ENVIRONMENTAL, INC.

BORING NO.: SG26	PROJECT NO.: 0794	PROJECT NAME: 820 W MacArthur Blvd., Oakland
BORING LOCATION: Approximately 105 ft. south of W MacArthur Blvd. in parking lane on east side of West St.		ELEVATION AND DATUM: None
DRILLING AGENCY: Trinity Drilling	DRILLER: Jeff	DATE & TIME STARTED: 11/18/19 1300
DRILLING EQUIPMENT: Truck-mounted Geoprobe 7800		DATE & TIME FINISHED: 11/18/19 1530
COMPLETION DEPTH: 7.0 Feet	BEDROCK DEPTH: Not Encountered	LOGGED BY: MLBD
FIRST WATER DEPTH: Not Encountered	NO. OF SAMPLES: None	CHECKED BY: PMK

DEPTH (FT.)	DESCRIPTION	GRAPHIC COLUMN	BLOW COUNT PER 6"	WELL CONSTRUCTION LOG	PID	REMARKS
	0.0 to 1.0 ft. Concrete (8.0-inches) and base rock.	FILL		See Well Construction Description Below	0	Borehole hand augered from 1.0 to 7.0 ft. using 3.0-inch O.D. hand auger.
	1.0 to 3.0 ft. Olive-brown silty clay (CL); medium stiff, moist. No Petroleum Hydrocarbon (PHC) or solvent odors. (0,0,100)	CL			0	Borehole enlarged to 7.0 ft. using a truck-mounted 6.0-inch O.D. solid flight auger.
					0	Groundwater was not encountered during hand augering or drilling.
5	3.0 to 7.0 ft. Orange-brown gravelly sandy silt (ML); medium stiff, moist, with some coarse angular gravel to 0.5-inch diameter, orange and black mottling, and abundant sand. No PHC or solvent odor. (15,35,50)	ML			0	
					0	
						0.0 to 4.0 ft. 2.4 ft. recovery 4.0 to 7.0 ft. 3.4 ft. recovery
10						Borehole terminated at 7.0 ft. and soil gas well constructed in borehole on 11/18/19.
						Soil gas well constructed with Cemex #2/12 sack sand from 7.0 to 5.0 ft. bgs, hydrated bentonite from 5.0 to 4.5 ft. bgs, neat cement grout from 4.5 to 0.5 ft. bgs, and 8.0 ft. of 0.25-inch O.D. Teflon tubing with a HDPE filter at the bottom of the tubing at a depth of 6.0 ft. bgs. A Swagelok nut and plug were placed at the top of the tubing and the top of the well was enclosed in a traffic-rated vault.
15						Inspector Tony Xiong with Alameda County Public Works Agency gave verbal authorization to pour the sanitary seal.
20						Drilling Notes: 1) Field estimates of percent gravel, sand, and fines are shown in parentheses. 2) Density determinations are qualitative and are not based on quantitative evaluation.
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P&D ENVIRONMENTAL, INC.

BORING NO.: SG27	PROJECT NO.: 0794 — PROJECT NAME: 820 W MacArthur Blvd., Oakland
BORING LOCATION: Approximately 55 ft. north of MacArthur Blvd. in parking lane on east side of West St.	ELEVATION AND DATUM: None
DRILLING AGENCY: Trinity Drilling	DRILLER: Jeff
DRILLING EQUIPMENT: Truck-mounted Geoprobe 7800	
DATE & TIME STARTED: 11/18/19 1020	DATE & TIME FINISHED: 11/18/19 1500
COMPLETION DEPTH: 7.0 Feet	BEDROCK DEPTH: Not Encountered
FIRST WATER DEPTH: Not Encountered	NO. OF SAMPLES: None
LOGGED BY: MLBD	CHECKED BY: PMK

DEPTH (FT.)	DESCRIPTION	GRAPHIC COLUMN	BLOW COUNT PER 6"	WELL CONSTRUCTION LOG	PID	REMARKS
	0.0 to 0.7 ft. Concrete (8.0-inches).	FILL		See Well Construction Description Below	0	Borehole hand augered from 0.7 to 7.0 ft. using 3.0-inch O.D. hand auger.
	0.7 to 3.0 ft. Olive-brown silty clay (CL); medium stiff, moist. No Petroleum Hydrocarbon (PHC) or solvent odors. (0,0,100)	CL			0	Borehole enlarged to 7.0 ft. using a truck-mounted 6.0-inch O.D. solid flight auger.
5	3.0 to 6.0 ft. Brown clayey sandy gravel (GC); medium dense, moist, with abundant coarse angular gravel to 0.25-inch diameter. No PHC or solvent odors.(40,30,30)	GC			0 0	Groundwater was not encountered during hand augering or drilling.
	6.0 to 7.0 ft. Brown gravelly sandy clay (CL); soft, wet, with some coarse angular gravel to 0.5-inch diameter. No PHC or solvent odors. (15,20,65)	CL			0	
10 15 20 25 30						Borehole terminated at 7.0 ft. and soil gas well constructed in borehole on 11/18/19. Soil gas well constructed with Cemex #2/12 sack sand from 7.0 to 5.0 ft. bgs, hydrated bentonite from 5.0 to 4.5 ft. bgs, neat cement grout from 4.5 to 0.5 ft. bgs, and 8.0 ft. of 0.25-inch O.D. Teflon tubing with a HDPE filter at the bottom of the tubing at a depth of 6.0 ft. bgs. A Swagelok nut and plug were placed at the top of the tubing and the top of the well was enclosed in a traffic-rated vault. Inspector Tony Xiong with Alameda County Public Works Agency gave verbal authorization to pour the sanitary seal. Drilling Notes: 1) Field estimates of percent gravel, sand, and fines are shown in parentheses. 2) Density determinations are qualitative and are not based on quantitative evaluation.

P&D ENVIRONMENTAL, INC.

BORING NO.: SG28	**PROJECT NO.:** 0794	**PROJECT NAME:** 820 W MacArthur Blvd., Oakland	
BORING LOCATION: Approximately 150 ft. west of West St. in parking lane on south side of W MacArthur Blvd.		**ELEVATION AND DATUM:** None	
DRILLING AGENCY: Trinity Drilling	**DRILLER:** Jeff/Henry	**DATE & TIME STARTED:** 11/19/19 1505	**DATE & TIME FINISHED:** 11/19/19 1705
DRILLING EQUIPMENT: 6.0-inch O.D. Hand Auger			
COMPLETION DEPTH: 7.0 Feet	**BEDROCK DEPTH:** Not Encountered	**LOGGED BY:** PHK	**CHECKED BY:** PHK
FIRST WATER DEPTH: Not Encountered	**NO. OF SAMPLES:** None		

DEPTH (FT.)	DESCRIPTION	GRAPHIC COLUMN	BLOW COUNT PER 6"	WELL CONSTRUCTION LOG	PID	REMARKS
	0.0 to 0.4 ft. Asphalt, Concrete (7.0-inches) Orange silty clayey gravelly sand (3.0-inches) (FILL); No Petroleum Hydrocarbon (PHC) or solvent odors.	FILL		See Well Construction Description Below	0	Borehole hand augered from 0.0 to 7.0 ft. using 6.0-inch O.D. hand auger.
	1.3 to 3.6 ft. Black clay (CL); stiff, moist. No PHC or solvent odors. (0,0,100)	CL			0	Groundwater was not encountered during hand augering or drilling.
	3.6 to 4.6 ft. Brown silty clay (CL); stiff, moist. No PHC or olvent odors. (0,0,100)				0	
5	4.6 to 7.0 ft. Light brown sandy gravelly silt (ML); stiff, moist. No PHC or solvent odors.(10,30,60)	ML			0	
					0	Borehole terminated at 7.0 ft. and soil gas well constructed in borehole on 11/19/19.
10						Soil gas well constructed with Cemex #2/12 sack sand from 7.0 to 5.0 ft. bgs, hydrated bentonite from 5.0 to 4.5 ft. bgs, neat cement grout from 4.5 to 0.5 ft. bgs, and 8.0 ft. of 0.25-inch O.D. Teflon tubing with a HDPE filter at the bottom of the tubing at a depth of 6.0 ft. bgs. A Swagelok nut and plug were placed at the top of the tubing and the top of the well was enclosed in a traffic-rated vault.
15						Drilling Notes: 1) Field estimates of percent gravel, sand, and fines are shown in parentheses. 2) Density determinations are qualitative and are not based on quantitative evaluation.
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P&D ENVIRONMENTAL, INC.

BORING NO.: SG29	**PROJECT NO.:** 0794 — **PROJECT NAME:** 820 W MacArthur Blvd., Oakland
BORING LOCATION: Approximately 205 ft. west of West St. in parking lane on south side of W MacArthur Blvd.	**ELEVATION AND DATUM:** None
DRILLING AGENCY: Trinity Drilling	**DRILLER:** Jeff/Henry
DRILLING EQUIPMENT: 6.0-inch O.D. Hand Auger	
DATE & TIME STARTED: 11/19/19 1110	**DATE & TIME FINISHED:** 11/19/19 1505
COMPLETION DEPTH: 7.0 Feet	**BEDROCK DEPTH:** Not Encountered
FIRST WATER DEPTH: Not Encountered	**NO. OF SAMPLES:** None
LOGGED BY: PHK	**CHECKED BY:** PHK

DEPTH (FT.)	DESCRIPTION	GRAPHIC COLUMN	BLOW COUNT PER 6"	WELL CONSTRUCTION LOG	PID	REMARKS
	0.0 to 0.4 ft. Asphalt, Concrete (7.0-inches) Orange silty clayey gravelly sand (3.0-inches) (FILL); No Petroleum Hydrocarbon (PHC) or solvent odors.	FILL		See Well Construction Description Below	0	Borehole hand augered from 0.0 to 7.0 ft. using 6.0-inch O.D. hand auger.
	1.3 to 3.0 ft. Black clay (CL); stiff, moist. No PHC or solvent odors. (0,0,100)	CL			0	Groundwater was not encountered during hand augering or drilling.
	3.0 to 4.0 ft. Brown silty clay (CL); stiff, moist. No PHC or olvent odors. (0,0,100)				0	
5	4.0 to 7.0 ft. Light brown sandy gravelly silt (ML); stiff, moist, with red mottling. No PHC or solvent odors.(10,30,60)	ML			0	
					0	Borehole terminated at 7.0 ft. and soil gas well constructed in borehole on 11/19/19.
10						Soil gas well constructed with Cemex #2/12 sack sand from 7.0 to 5.0 ft. bgs, hydrated bentonite from 5.0 to 4.5 ft. bgs, neat cement grout from 4.5 to 0.5 ft. bgs, and 8.0 ft. of 0.25-inch O.D. Teflon tubing with a HDPE filter at the bottom of the tubing at a depth of 6.0 ft. bgs. A Swagelok nut and plug were placed at the top of the tubing and the top of the well was enclosed in a traffic-rated vault.
15						Drilling Notes: 1) Field estimates of percent gravel, sand, and fines are shown in parentheses. 2) Density determinations are qualitative and are not based on quantitative evaluation.
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P&D ENVIRONMENTAL, INC.

BORING NO.: SG30	**PROJECT NO.:** 0794	**PROJECT NAME:** 820 W MacArthur Blvd., Oakland	
BORING LOCATION: Approximately 280 ft. west of West St. in parking lane on south side of W MacArthur Blvd.		**ELEVATION AND DATUM:** None	
DRILLING AGENCY: Trinity Drilling	**DRILLER:** Jeff/Henry	**DATE & TIME STARTED:** 11/19/19 0735	**DATE & TIME FINISHED:** 11/19/19 1100
DRILLING EQUIPMENT: 6.0-inch O.D. Hand Auger			
COMPLETION DEPTH: 7.0 Feet	**BEDROCK DEPTH:** Not Encountered	**LOGGED BY:** PHK	**CHECKED BY:** PHK
FIRST WATER DEPTH: Not Encountered	**NO. OF SAMPLES:** None		

DEPTH (FT.)	DESCRIPTION	GRAPHIC COLUMN	BLOW COUNT PER 6"	WELL CONSTRUCTION LOG	PID	REMARKS
	0.0 to 0.4 ft. Asphalt, Concrete (7.0-inches) Orange silty clayey gravelly sand (3.0-inches) (FILL); No Petroleum Hydrocarbon (PHC) or solvent odors.	FILL		See Well Construction Description Below	0	Borehole hand augered from 0.0 to 7.0 ft. using 6.0-inch O.D. hand auger.
	1.3 to 3.5 ft. Black clay (CL); stiff, moist. No PHC or solvent odors. (0,0,100)	CL			0	Groundwater was not encountered during hand augering or drilling.
					0	
5	3.5 to 7.0 ft. Light brown sandy gravelly silt (ML); stiff, moist. No PHC or solvent odors.(10,30,60)	ML			0	
					0	Borehole terminated at 7.0 ft. and soil gas well constructed in borehole on 11/19/19.
10						Soil gas well constructed with Cemex #2/12 sack sand from 7.0 to 5.0 ft. bgs, hydrated bentonite from 5.0 to 4.5 ft. bgs, neat cement grout from 4.5 to 0.5 ft. bgs, and 8.0 ft. of 0.25-inch O.D. Teflon tubing with a HDPE filter at the bottom of the tubing at a depth of 6.0 ft. bgs. A Swagelok nut and plug were placed at the top of the tubing and the top of the well was enclosed in a traffic-rated vault. <u>Drilling Notes:</u> 1) Field estimates of percent gravel, sand, and fines are shown in parentheses. 2) Density determinations are qualitative and are not based on quantitative evaluation.
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P&D ENVIRONMENTAL, INC.

BORING NO.: SG31 **PROJECT NO.:** 0794 **PROJECT NAME:** 820 W MacArthur Blvd., Oakland

BORING LOCATION: Behind the northwest rear corner of 828 W MacArthur Blvd. **ELEVATION AND DATUM:** None

DRILLING AGENCY: Trinity Drilling **DRILLER:** Jeff/Henry

DRILLING EQUIPMENT: 6.0-inch O.D. Hand Auger

DATE & TIME STARTED: 11/19/19 0730

DATE & TIME FINISHED: 11/19/19 0940

COMPLETION DEPTH: 7.0 Feet **BEDROCK DEPTH:** Not Encountered

FIRST WATER DEPTH: Not Encountered **NO. OF SAMPLES:** None

LOGGED BY: PHK

CHECKED BY: PHK

DEPTH (FT.)	DESCRIPTION	GRAPHIC COLUMN	BLOW COUNT PER 6"	WELL CONSTRUCTION LOG	PID	REMARKS
	0.0 to 1.0 ft. Black sandy silty fill material (FILL); Dry. No Petroleum Hydrocarbon (PHC) or solvent odors.	FILL		See Well Construction Description Below	0	Borehole hand augered from 0.0 to 7.0 ft. using 6.0-inch O.D. hand auger.
	1.0 to 3.0 ft. Black silty clay (CL); stiff, moist, with roots. No PHC or solvent odors. (0,0,100)	CL			0	Groundwater was not encountered during hand augering or drilling.
	3.0 to 5.0 ft. Black silty clay (CL); stiff, moist, with tan mottling increasing with depth. No PHC or solvent odors.(0,0,100)				0	
5	5.0 to 6.0 ft. Tan silty clay (CL); stiff, moist. No PHC or solvent odors. (0,0,100)				0	
	6.0 to 7.0 ft. Light brown sandy silt (ML); soft, moist. Fine to medium sand. No PHC or solvent odors.	ML			0	Borehole terminated at 7.0 ft. and soil gas well constructed in borehole on 11/19/19.
10						Soil gas well constructed with Cemex #2/12 sack sand from 7.0 to 5.0 ft. bgs, hydrated bentonite from 5.0 to 4.5 ft. bgs, neat cement grout from 4.5 to 0.5 ft. bgs, and 8.0 ft. of 0.25-inch O.D. Teflon tubing with a HDPE filter at the bottom of the tubing at a depth of 6.0 ft. bgs. A Swagelok nut and plug were placed at the top of the tubing and the top of the well was enclosed in a traffic-rated vault.
15						Drilling Notes: 1) Field estimates of percent gravel, sand, and fines are shown in parentheses. 2) Density determinations are qualitative and are not based on quantitative evaluation.
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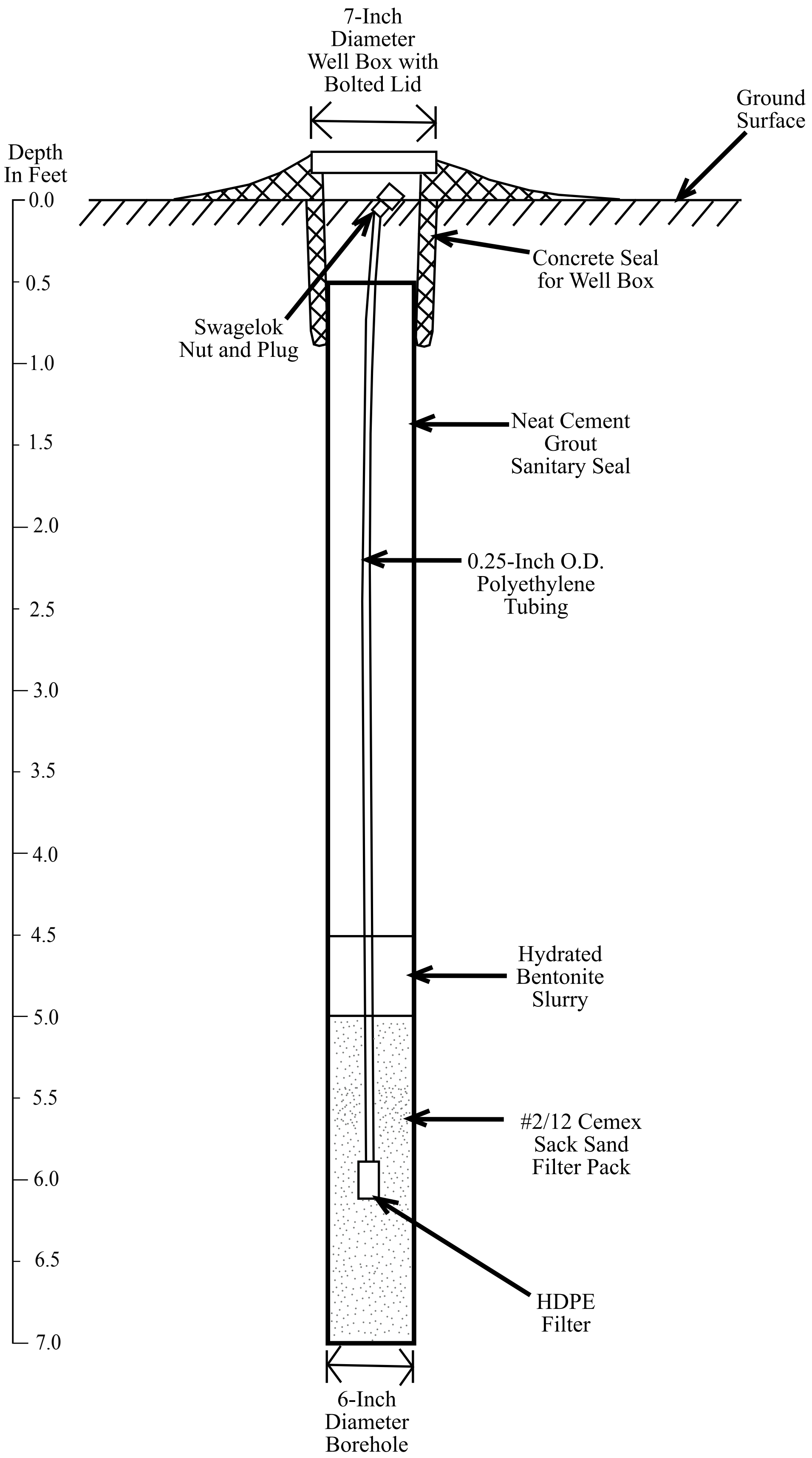
APPENDIX B4

Soil Gas Well Construction Diagram

APPENDIX B4

Soil Gas Well Construction Diagram



Typical Soil Gas Well Construction Diagram
820 W MacArthur Boulevard
Oakland, California

APPENDIX B5

Enthalpy Field Guide and Soil Gas Sampling Data Sheets

APPENDIX B5

Enthalpy Field Guide and Soil Gas Sampling Data Sheets

ENTHALPY ANALYTICAL

Field Guide for Use of the

HELIUM SHROUDS

Table of Contents

Figures & Diagrams

Introduction

Sampling soil gas wells using Helium leak tracer is not inherently difficult using Enthalpy Analytical's equipment, but it is relatively unforgiving of mistakes. The equipment has been field tested and through these tests we've learned that good results necessitate reviewing this document and following the procedures specified here. We strongly encourage our clients to practice set-up, Helium charging the shroud, using the detectors, and breakdown prior to sample collection. We've seen a very strong correlation between a thorough equipment orientation and successful sampling events. User errors related to a lack of orientation and preparation are the primary root cause of sampling errors and equipment failures.

The equipment supplied by Enthalpy Analytical's Berkeley laboratory has been cleaned, assembled, and leak tested using both pressurized Helium and vacuum decay methods. The preparation of all sampling equipment and media has been thoroughly documented.

If you suspect the sampling equipment is damaged or not functional, before using it please inform your laboratory Project Manager by calling the lab at 510-486-0900. Used and returned damaged equipment will be assessed cost for repair and replacement. Please do not disassemble and reassemble sampling trains and shrouds. They have been critically cleaned, assembled and leak checked for your use without further need for alteration. By breaking connections in sampling trains, users invalidate the lab's cleaning and prep effort.

Use of and Care for the EA-Berkeley Helium Detectors

When used properly, these diffusion cell He detectors provide real time measurement of Helium concentration in air from 1% to 99% Helium to accuracies of 0.1%. Prior to delivery, the He detectors are calibrated and performance verified. If, upon initial check, you discover the He gauge is apparently not working properly, call your C&T project manager immediately; repair and replacement costs will be assessed for all sensors returned damaged to the lab.

Figure 1: Diffusion Cell (left) and Flow-Through cell (right) Helium Detectors

Battery Charges last 4 hours: Helium Detectors using rechargeable NiCd batteries are fully charged before leaving the lab and hold a charge for 4 hours of use. Turn detectors on for use and off immediately after use and you'll make it through a day's sampling event without losing charge. The lab does not supply rechargers to users because the Diffusion and Flow-Through types require different voltages; using the wrong charger damages the detectors.

3 position switch: **On** is up, **Off** is neutral and down.

Required use technique for accurate Helium tracer measurements: These He detectors are sufficiently durable for portable field use; however they are precision measurement devices unforgiving of mistreatment or abuse, accordingly:

- Keep the He detector clean at all times, particularly around the white diffusion membrane cell opening. Dirt on, or in, the diffusion cell well will compromise calibration and result in extra fees for cleaning and recalibration.
- The He detectors are shock sensitive. Dropping the gauges onto a hard surface from a height of 2' or more can compromise calibration and may irreversibly damage the sensor and cause replacement or maintenance cost assessments. Please store and transport the gauges in the foam lined box provided.
- Helium detectors are moisture sensitive, don't get them wet

Accepting Enthalpy's Helium detectors binds your firm to the following conditions of use:

- Replacement costs are $900 + applicable shipping costs and sales tax.
- Minimum diagnostic, recalibration, and maintenance charges for damaged sensors are $120.

1. SETTING UP the Equipment

Equipment Supplied by EA-Berkeley

The following equipment should be present in the supply kit provided from the lab:

a. Integral shroud box and sampling train with 3 port valve
b. Helium supply components a) Helium bottle(s) (one bottle supplies enough for 4 wells), b) Braided steel Helium transfer tube with male QT connectors and; 3) Helium supply regulator with female QT connector
c. Helium Detector: Diffusion cell type (4 hours use on one charge)
d. Helium Detector: Flow-Through type (4 hours use on one charge)
e. Male QT ¼" OD Teflon tubing connector for connecting in port on flow through Helium detector to Purge port on Shroud
f. QT Vacuum gauge
g. 1.4 liter Sample canisters, one for each sample to be taken, some users request an extra to cover any aborted sampling events, well relocations etc…
h. Graphite or Ceramic ferules for joining ¼" OD Teflon tubing to well, one provided in each shroud/train inside the nut in the open port of the 3 port valve used to connect the soil gas well to the train.

Equipment NOT supplied by EA-Berkeley:

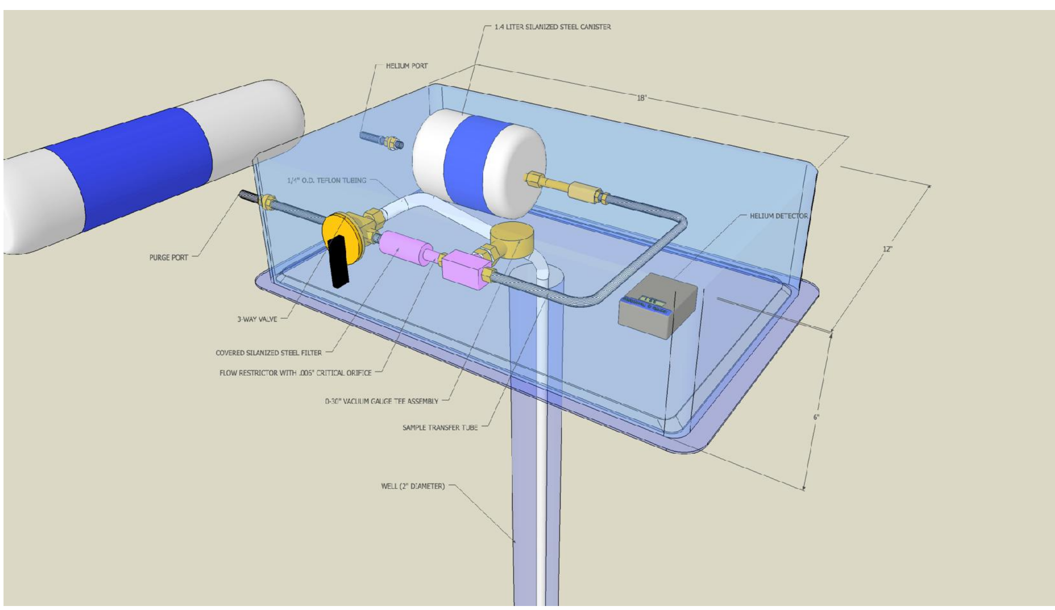
You will need the following items to complete your work; these items are not supplied by C&T unless specially requested:

a. Well purge suction source, alternatives available from the lab are: a) 50 ml disposable syringe with tubing adapters, b) evacuated 6 liter summa canister with 180 ml/min flow restrictor and filter, c) battery powered vacuum pump, d) 110V VAC powered vacuum pump
b. ½" x 9/16" open end combination wrench and one small crescent wrench. These are the tools needed to make compression fitting connections. C&T does not rent wrenches.
c. Extra Graphite or ceramic ferules as needed to insure you make a good well to train connection
d. ¼ OD Teflon tubing…Typically the well drillers have a lot of this stuff, if you need it
e. Knife (for cutting Teflon tubing)

1.1. **Position the shroud lid over the well.** Consistent Helium concentrations arise when the shrouds are used with the wellhead box lids provided. Some user protocols specify no box lid; in these cases, piling dirt around the edges of the box works to keep Helium inside the shroud. On windy days, a plastic windscreen employed either as a cover over the shroud or as an "air dam" has provided good results. We've experimented with using yoga mat material as "gaskets" for subslab sampling with mixed results.

If you're using the lid, and we recommend you do, position the lid over the wellhead with the tubing arising through the hole in the lid. There is an audible snap when the lid is optimally attached.

Figure 2: Helium Tracer Shroud Components



1.2. Once the shroud lid is positioned over the well, check that the 3-way valve is in the ***off*** position and the train pressure gauge showing a vacuum.

This is your indication that the train is leak-free since leaving the lab and all you need do is make a tight connection from the well to the open port on the 3-way valve. If the 3-way valve is not in the ***off*** position as a result of some error in shipment, there may be no vacuum on the gauge. At this point, your sampling protocols will determine whether the train can be used or not.

All trains leave the lab holding vacuum with decay rates less than 5” in 12 hours. Many shroud trains have inconsequentially slow leaks; trains are stored more than 3 days since being shipped from the lab may have no vacuum showing on the gauge. In these cases, you can check the vacuum decay rate by connecting an extra canister to the train and observing the vacuum decay rate.

2. CONNECTING the Well to the Train 3-port Valve

2.1. To connect the soil gas well to the sampling train, you will be joining ¼” Teflon tubing to the 3-port valve. Either a ceramic or graphite ferule has been provided inside the nut on the open port of the 3-port valve for you to make this connection. The most important component in a compression fitting is the ferrule, which is prone to damage. Care should be used when installing it although if ceramic or graphite ferules become defective, it is easy to install a replacement.

A “straight” even tubing end in the ¼” OD Teflon tubing from the well to the 3-port valve is important to making a “tight” connection. Use a knife rather than scissors to cut the tubing at a 90 degree angle to the tube axis. Remove any “burrs” or irregularities in the tubing end before attempting the connection. Slip the nut over the tubing, then the ferule. The ferule should “point” toward the 3-port valve. Usually, it is not possible to install ferules “backwards”.

2.2. Keeping the 3 way valve in the ***off*** position, attach the well tubing to the open 3 way valve port. Avoid excessive force when tightening the nut. Over-tightening is the most common cause of leaks in compression fittings. If the nut is over-tightened, the ceramic or graphite ferrule frequently deforms, improperly causing the joint to fail. A good way to make these connections is to tighten the nut first by hand, until it is too difficult to continue, and then use a 9/16” open end wrench to tighten the nut with a full 360 degree turn; no more than a 1 and 1/4 turn should be needed to create a leak tight connection.

3. ATTACHING the Sample Canister to the Train

3.1. **Check the vacuum** in the sample canister using the QT Vacuum gauge, it should read -30” of Hg (full vacuum) if it reads less, use another sample canister.

3.2. While keeping the 3 way valve in the off position, attach the canister to the female QT fitting at the rear of the sampling train as follows:

3.2.1. Pull the external sleeve of the female QT connector back to its stop, then

3.2.2. Insert the male valve stem and allow the sleeve to return to its spring loaded position. When the QT connection is made the canister (male) valve is open to the train.

3.2.3. Try to pull the canister off the train without retracting the female QT sleeve. A correctly made QT connection cannot be broken without retracting the sleeve on the female valve stem.

A word about Micro QT Fittings: Micro Quick connect valves (QT) offer superior performance and ease of use compared to alternative tubing connections and valves. QT fittings provide highly reliable leak free connections without tools especially for fittings that are made and broken frequently.

Fine sand and/or grit (such as dry bentonite) damages male and female QT valves and connections. Keep both male and female QT valve components scrupulously clean. Please use the orange or red plastic caps provided for the male QT fittings, they protect the valve stem while shipping and protect your sample during return shipment to the lab.

When removing or replacing orange plastic protective caps on the male QT fittings, <u>push them straight on and pull then straight off</u> the valve stem. Twisting the cap counterclockwise while removing or replacing on the valve stem can dissemble the valve stem causing vacuum and/or sample loss.

4. POSITIONING the Shroud over the Well

4.1. Position the diffusion Helium gauge out of the way on a portion of the lid that allows you a good view of the display with the shroud in place. Then invert the shroud assembly over the lid and snap lid into position.

4.2. With the shroud assembled in place, you should be able to view the vacuum gauge well enough to verify that vacuum is holding and you can see the Helium detector display. Our apologies for the opaque portions of the boxes, if you know of hard plastic boxes, with clear panels we'd love to learn about them.

5. CHARGING the Shroud with Helium

Enthalpy provides Aluminum lecture bottles filled with 300 psi Helium; each bottle of Helium contains 48 liters at atmospheric pressure, enough to easily supply 20% Helium atmospheres to 6 single Shrouds and 3 double shrouds. The amount of Helium used depends predominantly on wind and time required to sample the well, with experience, you'll use less Helium. Your protocol will specify the Helium concentration in the shroud. The following guidance is based on sampling under a 20-25% Helium in air atmosphere. Regardless of your target helium concentration, your objective should be to maintain a steady concentration of Helium during the sampling event at levels above 10% Helium in air.

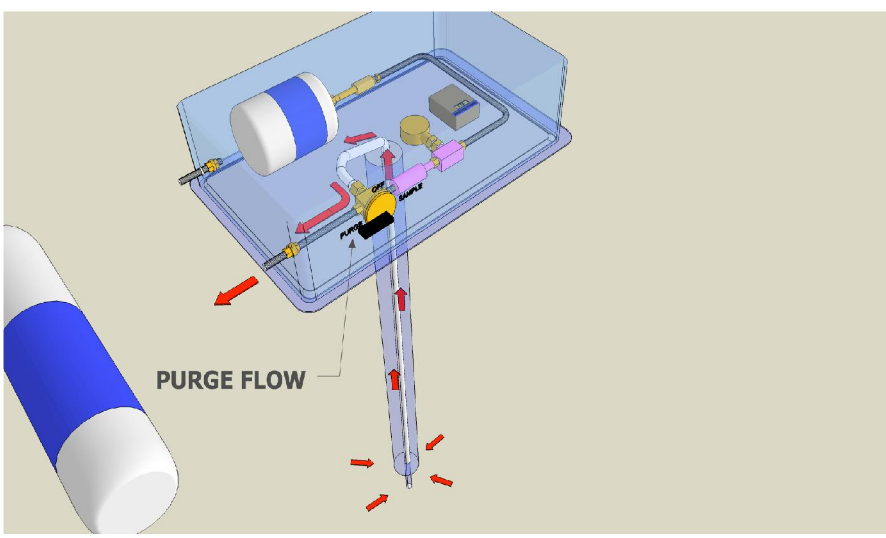
5.1. Locate and assemble the Lecture bottle, Helium transfer line, and the gas supply regulator. Tighten the brass nut attaching the regulator to the bottle one half turn past finger tight with a crescent or 9/16" open end wrench. The regulator is preset to deliver Helium at ideal pressure; ***you need not adjust the regulator***. Add Helium to the shroud by opening and closing the valve at the top of the bottle. Attach the Helium transfer line using the QT fittings at the regulator and at the Helium port on the shroud.

5.2. To provide Helium flow, slowly open the lecture bottle valve by twisting ***counterclockwise*** about ¼ turn.

5.3. Deliver 10 lbs of Helium at a time to the ***single*** shroud and 20 lbs to the ***double***. The diffusion cell Helium detector will respond in about 30 seconds to the new concentration. Unstable Helium detector readings reflect turbulent gas mixing inside the shroud. Plug holes between the shroud and the surface, use plastic sheeting to create an "air dam" or take other measures to air movement around the shroud and thus turbulence inside the shroud.

5.4. Monitor the Helium concentration displayed on the gauge in the shroud for about a minute in single shrouds, 90 seconds or longer in doubles. Under ideal conditions, 40 psi from the bottle will charge a single shroud to 25% helium concentration; double shrouds will require 80 psi. 25% Helium concentrations are maintained in the lab (zero wind) for 6-10 minutes. You may add more helium while purging and sampling. We suggest 10 psi increments for singles and 20 psi for doubles by opening the lecture bottle valve ¼ turn. We suggest users record/document the Helium concentration in the shroud at a minimum of 2 minute intervals during sampling.

Figure 3: Purge Flow Diagram



6. PURGE TESTING the Well under Helium

This test will help you establish the integrity of the well and the train to well connection. If no Helium is detected in the purge gas flow using this technique, one can assume the well is tight to breakthrough, and the train connections are all tight, and thus there will be no Helium detected in the sample that goes to the lab.

6.1. While getting the Helium concentration established, assemble the well purge train. Place the inline Helium detector between the shroud and whatever device (evacuated canister, syringe, or vacuum pump) that you're using to provide purge suction.

6.2. With the Helium atmosphere established in the shroud at 20% or more, and the purge system ready to operate, begin purging by moving the 3 way valve selector position to ***Purge*** and then establishing suction on the purge line.

6.3. Observe the inline Helium detector display while applying suction on the purge line. If you've purged enough vapors from the well to represent the entire volume of the path from the surface (under Helium atmosphere) to the distal end of the sampling tube and back up the tube and through the detector without detecting any Helium, your well shows signs of integrity and you may have a good leak free sample.

CA-DTSC guidance provides the opinion that a 5% ambient air dilution is inconsequential to sample integrity. When sampling under a 20% Helium in air atmosphere, 1% Helium detected in the purge gas represents a 5% ambient air sample dilution.

7. SAMPLING the Well under Helium

After you've completed purging the well, verify the reading on the Vacuum gauge of the train is -30 inches and that you have a steady state concentration of Helium between 20-25%, and then begin sampling by moving the 3 way selector valve to the ***Sample*** position.

Monitor the Helium concentration in the shroud by recording the reading on the diffusion cell detector inside the shroud every other minute or so. Add Helium from the bottle as needed to maintain a steady state concentration of Helium under the shroud.

Figure 4: Sampling Flow Diagram

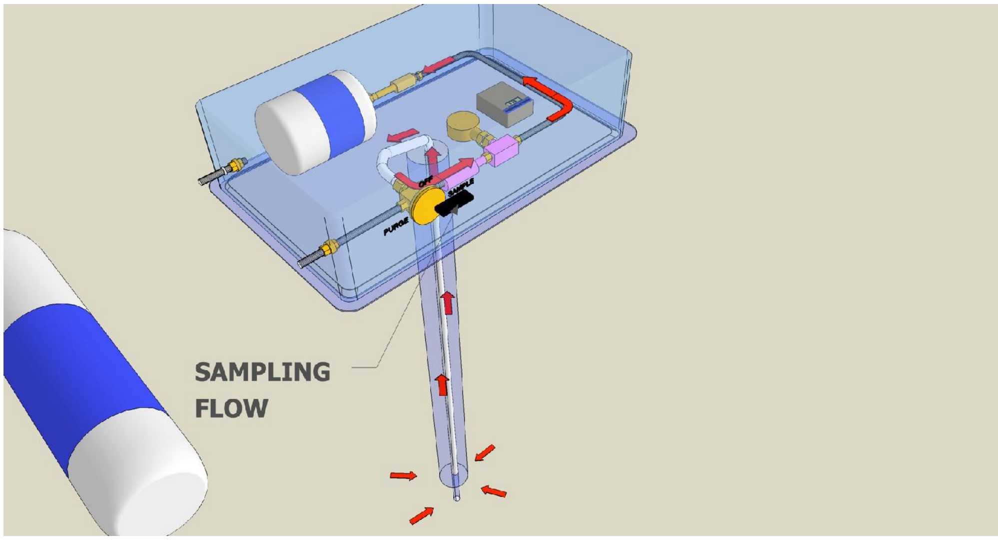
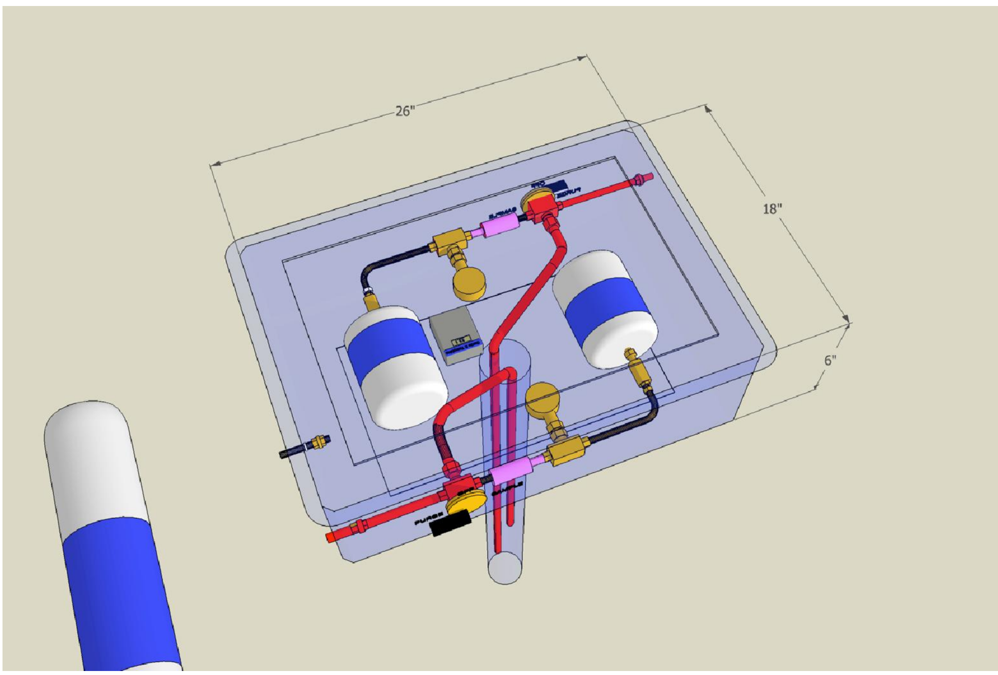


Figure 5: Dual Depth Well Sampling Shroud



SOIL GAS SAMPLING DATA SHEET

Site Address	820 W MacArthur Blvd, Oakland					Page 1 of 1
Job #	0794			Probe Method (check one)		
Date	1/8/20			o PRT		
Drilling Company	None			o Temp Well		
Laboratory	Enthalpy Analytical			■ Permanent Well		
P&D Sampler	MLBD			Summa Canister Number		518
				Duplicate Summa Canister Number		
				Shroud Number		RING AND BAG
Soil Gas Well Number	SG22			Helium Shroud (Y/N)		Y
				Initial manifold vacuum/ time		-30 1118
						MANIFOLD# A 00342

TIME	Activity	Shroud Helium Gage (Percent)	Purge Helium Gage (Percent)	Soil Gas Well Vacuum (In Hg)	Sampling Summa Vacuum (In Hg)	NOTES
112800	START SHUT-IN TEST -26					
113800	END SHUT-IN TEST -26					
114000	START TRACER GAS He	18.6				
114102		22.4				
114206		24.3				
114309		25.9				
114412		27.3				
114500	START PURGE	28.1	-03.9	~~03.9~~		
114620	END PURGE	27.5	-03.9			
114800	START SAMPLE	26.4		0	-30	
115022		25.1		0	-25	
115239		23.3		0	-20	
115403	ADD He	20.6		0	-17	
115501		27.4		0	-15	
115715		25.1		0	-10	
120014	END Sample	21.6		0	-5	
120212						PID: 0 ppm

SOIL GAS SAMPLING DATA SHEET

Site Address: 820 W MacArthur Blvd, Oakland

Page 1 of 1

Job #: 0794

Date: 1/7/20

Drilling Company: None

Laboratory: Enthalpy Analytical

P&D Sampler: MLBD

Soil Gas Well Number: SG25

Probe Method (check one)
o PRT
o Temp Well
o Permanent Well ✓

Summa Canister Number: 317

Duplicate Summa Canister Number

Shroud Number: RING AND PLASTIC BAG

Helium Shroud (Y/N): Y

Initial manifold vacuum/ time: -29 / 1405

MANIFOLD ~~A00346~~ A00339

TIME	Activity	Shroud Helium Gage (Percent)	Purge Helium Gage (Percent)	Soil Gas Well Vacuum (In Hg)	Sampling Summa Vacuum (In Hg)	NOTES
140800	START SHUT-IN TEST -28					
141800	END SHUT-IN TEST -28					
141900	START TRACER GAS He	19.1				
142012		22.9				
142106		24.6				
142202		25.2				
142301		26.9				
142406		27.3				
142500	START PURGE	27.6	-02.3			
142620	END PURGE	26.9	-02.4			
142700	START SAMPLE	24.7		0	-30	
142812		23.1		0	-25	
142944		22.8		0	-20	
143109	ADD He	20.2		0	-17	
143912		26.8		0	-15	
143402		23.5		0	-10	
143648	END SAMPLE	20.2		0	-5	
143750						PID= 0 PPM

SOIL GAS SAMPLING DATA SHEET						
Site Address	820 W MacArthur Blvd, Oakland					Page 1 of 1
Job #	0794			Probe Method (check one)		
Date	1/7/20			o PRT		
Drilling Company	None			o Temp Well		
Laboratory	Enthalpy Analytical			x Permanent Well		
P&D Sampler	MLBD			Summa Canister Number		107
				Duplicate Summa Canister Number		
				Shroud Number		RING AND PLASTIC BAG
Soil Gas Well Number	SG28			Helium Shroud (Y/N)		Y
				Initial manifold vacuum/ time		-30/1225
						MANIFOLD # A00334

TIME	Activity	Shroud Helium Gage (Percent)	Purge Helium Gage (Percent)	Soil Gas Well Vacuum (In Hg)	Sampling Summa Vacuum (In Hg)	NOTES
123500	START SHUT-IN TEST -24					
124500	END SHUT-IN TEST -24					
124600	START TRACER GAS He	17.9				
124702		24.1				
124806		26.7				
124912		28.2				
125004		27.8				
125100	START PURGE	25.6	-03.9			150cc/MIN FOR 1MIN 20SEC
125220	END PURGE	25.1	-03.8			
125300	START SAMPLE	24.3		0	-30	
125358		23.6		0	-25	
125528		22.8		0	-20	
125706	ADD He	20.4		0	-15	
125837		25.8		0	-10	
130012	END SAMPLE	20.4		0	-5	
130205						PID=0 PPM

SOIL GAS SAMPLING DATA SHEET						
Site Address	820 W MacArthur Blvd, Oakland					Page 1 of 1
Job #	0794			Probe Method (check one)		
Date	1/7/20			o PRT		
Drilling Company	None			o Temp Well		
Laboratory	Enthalpy Analytical			☒ Permanent Well		
P&D Sampler	MLBD			Summa Canister Number		189
				Duplicate Summa Canister Number		
				Shroud Number		RIG AND PLASTIC BAG
Soil Gas Well Number	SG29			Helium Shroud (Y/N)		Y
				Initial manifold vacuum/ time		-30/ 1108
						MANIFOLD # A 00337

TIME	Activity	Shroud Helium Gage (Percent)	Purge Helium Gage (Percent)	Soil Gas Well Vacuum (In Hg)	Sampling Summa Vacuum (In Hg)	NOTES
111000	START SHUT-IN TEST -26					
112000	END SHUT-IN TEST -26					
112100	START TRACER GAS He	18.2				
112204		24.6				
112310		26.1				
112408		28.2				
112502		27.9				
112600	START PURGE	27.2	-04.7			150 cc/MIN FOR 1 MIN 20 SEC
112720	END PURGE	26.4	-04.8			
112800	START SAMPLE	26.1		0	-30	
112728		25.3		0	-25	
112846		24.6		0	-20	
113024		21.9		0	-15	
113103	ADD He	20.4		0	-13	
113156		25.9		0	-10	
113349	END SAMPLE	22.3		0	-5	
113512						PID= 0PPM

SOIL GAS SAMPLING DATA SHEET						
Site Address	820 W MacArthur Blvd, Oakland					Page 1 of 1
Job #	0794			Probe Method (check one)		
Date	1/7/20			o PRT		
Drilling Company	None			o Temp Well		
Laboratory	Enthalpy Analytical			☒ Permanent Well		
P&D Sampler	MLBD			Summa Canister Number		418
				Duplicate Summa Canister Number		
				Shroud Number		RING AND PLASTIC BAG
Soil Gas Well Number	SG30			Helium Shroud (Y/N)		Y
				Initial manifold vacuum/ time		-30 10
						MANIFOLD # A00337

TIME	Activity	Shroud Helium Gage (Percent)	Purge Helium Gage (Percent)	Soil Gas Well Vacuum (In Hg)	Sampling Summa Vacuum (In Hg)	NOTES
100500	START SHUT-IN TEST -27					
101500	END SHUT-IN TEST -27					
101600	START TRACER GAS He	16.8				
101704		21.6				
101810		27.8				
101902		28.1				
102004		27.9				
102100	START PURGE	26.4	-03.4			150 CC/MIN FOR 1 MIN 20 SEC
102220	END PURGE	26.1	-03.5			
102615	START SAMPLE	25.6		0	-30	
103047		25.2		0	-25	
103241		24.4		0	-20	
103350		23.2		0	-15	
103537		21.6		0	-10	
103724	END SAMPLE	20.1		0	-5	
103912						PID = 0 PPM

SOIL GAS SAMPLING DATA SHEET

Site Address	820 W MacArthur Blvd, Oakland
Job #	0794
Date	1/8/20
Drilling Company	None
Laboratory	Enthalpy Analytical
P&D Sampler	MLBD
Soil Gas Well Number	SG31

Page 1 of 1

Probe Method (check one)
o PRT
o Temp Well
x Permanent Well

Summa Canister Number	158
Duplicate Summa Canister Number	276
Shroud Number	RING AND BAG
Helium Shroud (Y/N)	Y
Initial manifold vacuum/ time	-30/1015
	MANIFOLD# A00272

TIME	Activity	Shroud Helium Gage (Percent)	Purge Helium Gage (Percent)	Soil Gas Well Vacuum (In Hg)	Sampling Summa Vacuum (In Hg)	NOTES
110800	START SHUT-IN TEST -28					
111800	END SHOT-IN TEST -28					
102000	START TRACER GAS He	20.1				
102104		22.4				
102207		23.1				
102301		24.9				
102412		27.1				
102506		27.8				
102600	START PURGE	28.3	-03.7			150cc/MIN FOR 1MIN 20SEC
102720	END PURGE	27.9	-03.7			
102800	START SAMPLE	25.3		0	-30	
103412		22.6		0	-25	
103724	ADD He	20.1		0	-20	
104058		27.8		0	-15	
104524		24.1		0	-10	
104841	END SAMPLE	21.6		0	-5	
						PID= 0 ppm

APPENDIX B6

Weather Information

APPENDIX B6

Weather Information

https://www.wunderground.com/dashboard/pws/KCAEMERY19/graph/2019-12-3/2019-12-3/monthly

Weather Station ID: KCAEMERY19
Station Name: Santa Fe Neighborhood
Latitude / Longitude: 37.84° N, 122.274° E
Elevation: 98
City: Emeryville
State: CA
Hardware: Ambient Weather WS-2902
Software: AMBWeatherV4.0.2

December 1, 2019 - December 31, 2019

	Temperature			Dew Point			Humidity			Speed			Pressure		Precip. Accum.
Date	High	Avg	Low	High	Avg	Low	High	Avg	Low	High	Avg	Low	High	Low	Sum
12/1/2019	57.6 F	55.3 F	53.2 F	53.2 F	51.6 F	48.4 F	95 %	88 %	79 %	9.2 mph	2.5 mph	0.0 mph	30.15 in	30.02 in	0.43 in
12/2/2019	59.4 F	55.8 F	53.6 F	57.6 F	53.5 F	52.0 F	97 %	92 %	84 %	6.9 mph	1.2 mph	0.0 mph	30.33 in	30.13 in	0.39 in
12/3/2019	63.5 F	56.8 F	49.6 F	55.4 F	52.4 F	47.1 F	97 %	85 %	64 %	5.6 mph	0.6 mph	0.0 mph	30.33 in	30.08 in	0.02 in
12/4/2019	58.1 F	54.7 F	53.1 F	54.1 F	51.9 F	50.2 F	96 %	90 %	82 %	6.9 mph	0.6 mph	0.0 mph	30.17 in	29.99 in	0.24 in
12/5/2019	62.6 F	55.1 F	46.9 F	55.9 F	52.6 F	46.4 F	99 %	91 %	74 %	4.5 mph	0.2 mph	0.0 mph	30.29 in	30.17 in	0.01 in
12/6/2019	67.1 F	59.4 F	52.2 F	54.0 F	52.1 F	50.0 F	96 %	78 %	55 %	10.3 mph	2.2 mph	0.0 mph	30.23 in	30.09 in	0.49 in
12/7/2019	63.3 F	58.7 F	54.7 F	57.9 F	55.5 F	52.7 F	97 %	89 %	74 %	10.1 mph	2.2 mph	0.0 mph	30.16 in	30.07 in	1.11 in
12/8/2019	61.3 F	55.5 F	48.9 F	55.2 F	53.4 F	48.4 F	99 %	93 %	75 %	6.5 mph	0.5 mph	0.0 mph	30.32 in	30.13 in	0.27 in
12/9/2019	58.5 F	51.9 F	45.1 F	53.2 F	49.7 F	44.8 F	99 %	92 %	77 %	4.9 mph	0.4 mph	0.0 mph	30.42 in	30.30 in	0.01 in
12/10/2019	60.6 F	53.6 F	47.7 F	52.0 F	49.7 F	46.2 F	97 %	87 %	68 %	8.3 mph	0.7 mph	0.0 mph	30.47 in	30.35 in	0.26 in
12/11/2019	59.5 F	56.1 F	52.7 F	57.0 F	53.9 F	50.2 F	96 %	92 %	85 %	5.4 mph	0.4 mph	0.0 mph	30.43 in	30.34 in	0.08 in
12/12/2019	61.0 F	58.5 F	55.8 F	59.9 F	57.8 F	55.4 F	99 %	98 %	95 %	4.0 mph	0.4 mph	0.0 mph	30.51 in	30.37 in	0.11 in
12/13/2019	58.8 F	56.2 F	54.3 F	55.9 F	55.1 F	53.2 F	99 %	96 %	85 %	6.0 mph	0.7 mph	0.0 mph	30.48 in	30.27 in	0.10 in
12/14/2019	58.8 F	53.3 F	48.7 F	53.8 F	47.5 F	42.6 F	97 %	82 %	59 %	10.3 mph	2.3 mph	0.0 mph	30.30 in	30.20 in	0.02 in
12/15/2019	58.6 F	49.5 F	42.1 F	46.9 F	42.9 F	38.8 F	94 %	79 %	59 %	7.2 mph	0.8 mph	0.0 mph	30.48 in	30.25 in	0.00 in
12/16/2019	59.7 F	48.2 F	38.8 F	48.0 F	38.3 F	25.9 F	99 %	72 %	37 %	5.8 mph	0.7 mph	0.0 mph	30.57 in	30.44 in	0.01 in
12/17/2019	57.2 F	49.4 F	41.2 F	42.8 F	38.5 F	33.3 F	88 %	67 %	44 %	8.1 mph	0.6 mph	0.0 mph	30.45 in	30.18 in	0.00 in
12/18/2019	57.2 F	52.4 F	47.8 F	53.1 F	49.1 F	35.8 F	99 %	89 %	53 %	10.1 mph	1.8 mph	0.0 mph	30.31 in	30.14 in	0.57 in
12/19/2019	61.7 F	55.0 F	50.0 F	54.3 F	51.7 F	48.0 F	99 %	89 %	69 %	4.3 mph	0.5 mph	0.0 mph	30.45 in	30.30 in	0.04 in
12/20/2019	58.3 F	50.7 F	44.2 F	52.5 F	48.7 F	43.9 F	99 %	93 %	78 %	3.8 mph	0.4 mph	0.0 mph	30.45 in	30.30 in	0.01 in
12/21/2019	61.5 F	53.6 F	45.3 F	49.3 F	46.4 F	43.2 F	99 %	78 %	56 %	5.8 mph	0.7 mph	0.0 mph	30.31 in	29.96 in	0.00 in
12/22/2019	57.0 F	51.1 F	41.4 F	53.4 F	46.6 F	39.7 F	98 %	86 %	53 %	8.5 mph	1.3 mph	0.0 mph	30.12 in	29.82 in	0.72 in
12/23/2019	56.1 F	46.1 F	37.4 F	47.7 F	42.6 F	37.0 F	99 %	89 %	67 %	5.6 mph	0.6 mph	0.0 mph	30.15 in	30.04 in	0.00 in
12/24/2019	54.9 F	47.7 F	38.8 F	45.9 F	42.4 F	38.3 F	99 %	83 %	57 %	5.8 mph	0.7 mph	0.0 mph	30.17 in	30.07 in	0.02 in
12/25/2019	53.4 F	49.1 F	45.3 F	46.4 F	44.4 F	40.6 F	96 %	84 %	73 %	14.8 mph	2.3 mph	0.0 mph	30.09 in	29.91 in	0.41 in
12/26/2019	58.8 F	48.5 F	39.9 F	43.7 F	39.3 F	33.3 F	91 %	72 %	39 %	6.7 mph	0.7 mph	0.0 mph	30.22 in	29.99 in	0.00 in
12/27/2019	61.9 F	46.5 F	34.7 F	39.9 F	35.7 F	30.7 F	94 %	69 %	37 %	6.9 mph	0.6 mph	0.0 mph	30.32 in	30.21 in	0.00 in
12/28/2019	61.0 F	47.4 F	36.1 F	48.4 F	41.4 F	34.2 F	95 %	81 %	40 %	4.7 mph	0.3 mph	0.0 mph	30.42 in	30.30 in	0.00 in
12/29/2019	54.7 F	50.9 F	47.5 F	51.3 F	48.7 F	45.5 F	97 %	93 %	84 %	9.6 mph	1.4 mph	0.0 mph	30.37 in	30.17 in	0.69 in
12/30/2019	59.5 F	51.0 F	42.8 F	51.4 F	46.1 F	42.1 F	98 %	84 %	62 %	10.7 mph	0.9 mph	0.0 mph	30.38 in	30.22 in	0.00 in
12/31/2019	67.3 F	51.4 F	41.4 F	50.5 F	44.3 F	39.2 F	99 %	80 %	37 %	4.3 mph	0.3 mph	0.0 mph	30.38 in	30.30 in	0.01 in

https://www.wunderground.com/dashboard/pws/KCAEMERY19/table/2020-01-3/2020-01-3/monthly

Weather Station ID: KCAEMERY19
Station Name: Santa Fe Neighborhood
Latitude / Longitude: 37.84° N, 122.274° E
Elevation: 98
City: Emeryville
State: CA
Hardware: Ambient Weather WS-2902
Software: AMBWeatherV4.0.2

January 1, 2020 - January 31, 2020

	Temperature			Dew Point			Humidity			Speed			Pressure		Precip. Accum.
Date	High	Avg	Low	High	Avg	Low	High	Avg	Low	High	Avg	Low	High	Low	Sum
1/1/2020	61.9 F	53.2 F	45.9 F	55.2 F	50.8 F	44.8 F	97 %	92 %	75 %	5.4 mph	0.4 mph	0.0 mph	30.40 in	30.27 in	0.00 in
1/2/2020	64.4 F	51.5 F	42.1 F	51.4 F	45.1 F	41.7 F	99 %	81 %	49 %	5.8 mph	0.6 mph	0.0 mph	30.38 in	30.28 in	0.00 in
1/3/2020	60.4 F	50.3 F	41.7 F	50.2 F	46.0 F	41.0 F	99 %	86 %	63 %	5.4 mph	0.5 mph	0.0 mph	30.48 in	30.35 in	0.01 in
1/4/2020	59.5 F	51.1 F	44.1 F	53.2 F	48.3 F	43.3 F	99 %	91 %	73 %	6.0 mph	0.6 mph	0.0 mph	30.65 in	30.45 in	0.02 in
1/5/2020	61.5 F	50.2 F	40.5 F	49.1 F	43.1 F	37.6 F	98 %	78 %	53 %	5.6 mph	0.9 mph	0.0 mph	30.79 in	30.62 in	0.00 in
1/6/2020	59.7 F	49.3 F	39.0 F	46.2 F	41.7 F	37.0 F	94 %	76 %	46 %	5.8 mph	0.6 mph	0.0 mph	30.72 in	30.52 in	0.00 in
1/7/2020	59.4 F	48.4 F	37.0 F	51.1 F	43.2 F	36.1 F	97 %	83 %	58 %	5.8 mph	0.8 mph	0.0 mph	30.52 in	30.29 in	0.03 in
1/8/2020	57.6 F	51.5 F	43.9 F	52.2 F	47.6 F	43.5 F	99 %	87 %	72 %	6.9 mph	0.8 mph	0.0 mph	30.36 in	30.25 in	0.00 in
1/9/2020	56.1 F	50.0 F	42.3 F	50.2 F	46.2 F	40.8 F	98 %	87 %	67 %	9.6 mph	1.3 mph	0.0 mph	30.43 in	30.12 in	0.24 in
1/10/2020	61.2 F	48.5 F	38.1 F	48.6 F	43.5 F	37.6 F	99 %	84 %	43 %	5.8 mph	0.6 mph	0.0 mph	30.54 in	30.40 in	0.01 in
1/11/2020	58.8 F	50.2 F	41.9 F	53.2 F	45.5 F	39.7 F	99 %	85 %	55 %	9.6 mph	1.4 mph	0.0 mph	30.51 in	30.39 in	0.07 in
1/12/2020	58.3 F	47.3 F	37.9 F	49.8 F	42.6 F	36.5 F	97 %	85 %	60 %	6.9 mph	0.6 mph	0.0 mph	30.44 in	30.33 in	0.07 in
1/13/2020	56.8 F	50.0 F	41.5 F	49.6 F	46.5 F	41.2 F	99 %	88 %	69 %	8.1 mph	1.4 mph	0.0 mph	30.44 in	30.31 in	0.13 in
1/14/2020	56.5 F	50.2 F	41.4 F	50.7 F	43.7 F	38.3 F	98 %	79 %	63 %	8.1 mph	1.4 mph	0.0 mph	30.47 in	30.30 in	0.01 in
1/15/2020	54.5 F	46.0 F	37.4 F	45.0 F	40.7 F	36.7 F	98 %	82 %	60 %	6.9 mph	0.7 mph	0.0 mph	30.37 in	30.08 in	0.00 in
1/16/2020	51.3 F	47.3 F	43.2 F	46.6 F	43.5 F	40.5 F	97 %	87 %	72 %	11.2 mph	2.1 mph	0.0 mph	30.32 in	29.90 in	1.55 in
1/17/2020	55.2 F	46.8 F	37.2 F	47.1 F	41.8 F	36.7 F	99 %	84 %	67 %	6.0 mph	0.8 mph	0.0 mph	30.53 in	30.31 in	0.01 in
1/18/2020	58.5 F	50.1 F	42.8 F	43.9 F	39.6 F	32.9 F	89 %	68 %	48 %	7.4 mph	0.8 mph	0.0 mph	30.57 in	30.43 in	0.00 in
1/19/2020	55.9 F	49.8 F	44.8 F	45.1 F	40.7 F	32.5 F	84 %	71 %	47 %	4.9 mph	0.5 mph	0.0 mph	30.44 in	30.21 in	0.00 in
1/20/2020	57.4 F	50.7 F	46.6 F	47.8 F	44.5 F	42.8 F	91 %	80 %	60 %	5.1 mph	0.3 mph	0.0 mph	30.27 in	30.17 in	0.00 in
1/21/2020	58.1 F	53.2 F	49.8 F	52.9 F	49.9 F	45.9 F	99 %	89 %	76 %	6.9 mph	1.5 mph	0.0 mph	30.38 in	30.25 in	0.45 in
1/22/2020	63.0 F	53.8 F	46.9 F	53.6 F	50.3 F	45.5 F	99 %	89 %	61 %	5.6 mph	0.7 mph	0.0 mph	30.48 in	30.36 in	0.01 in
1/23/2020	62.2 F	52.6 F	45.1 F	52.7 F	49.3 F	44.4 F	98 %	89 %	69 %	4.0 mph	0.3 mph	0.0 mph	30.46 in	30.29 in	0.00 in
1/24/2020	64.4 F	54.3 F	44.6 F	55.6 F	51.4 F	44.2 F	99 %	91 %	69 %	5.8 mph	0.6 mph	0.0 mph	30.40 in	30.31 in	0.00 in
1/25/2020	64.8 F	57.1 F	52.7 F	57.7 F	54.9 F	52.3 F	99 %	93 %	76 %	4.9 mph	0.5 mph	0.0 mph	30.38 in	30.26 in	0.01 in
1/26/2020	61.9 F	55.4 F	46.0 F	57.2 F	52.4 F	43.9 F	99 %	90 %	74 %	7.8 mph	1.3 mph	0.0 mph	30.55 in	30.29 in	0.30 in
1/27/2020	62.6 F	53.0 F	45.9 F	55.0 F	49.9 F	44.4 F	97 %	89 %	74 %	6.0 mph	0.6 mph	0.0 mph	30.62 in	30.52 in	0.00 in
1/28/2020	59.0 F	53.1 F	46.0 F	55.9 F	50.8 F	45.5 F	98 %	92 %	78 %	5.1 mph	0.8 mph	0.0 mph	30.57 in	30.46 in	0.02 in
1/29/2020	64.0 F	51.6 F	42.8 F	51.3 F	46.5 F	42.3 F	99 %	84 %	60 %	5.8 mph	0.9 mph	0.0 mph	30.51 in	30.36 in	0.00 in

APPENDIX B7

Laboratory Analytical Reports and Chain of Custody Documentation

- **McCampbell Lab Report # 1911530 - November 11, 2019 Shallow Soil Samples Collected From Locations S7 Through S22 - Lead Results**
- **McCampbell Lab Report # 1911663 - November 12, 2019 Groundwater Monitoring Well MW1 Through MW3 Groundwater Samples**
- **McCampbell Lab Report # 2002A47 - February 25, 2020 Groundwater Monitoring Well MW1 Through MW3 Groundwater Samples**
- **Enthalpy Lab Report # 317234 - January 7 and 8, 2020 Soil Gas Samples Collected From Soil Gas Wells SG22, SG25, SG28 Through SG31**

APPENDIX B7

Laboratory Analytical Reports and Chain of Custody Documentation

- **McCampbell Lab Report # 1911530 - November 11, 2019 Shallow Soil Samples Collected From Locations S7 Through S22 - Lead Results**
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- **Enthalpy Lab Report # 317234 - January 7 and 8, 2020 Soil Gas Samples Collected From Soil Gas Wells SG22, SG25, SG28 Through SG31**

McCampbell Analytical, Inc.

"When Quality Counts"

Analytical Report

WorkOrder: 1911530

Report Created for: P & D Environmental

55 Santa Clara Ave, Ste.240
Oakland, CA 94610

Project Contact: Michael Deschenes
Project P.O.:
Project: 0794; 820 W. MacArthur Blvd Oakland, CA

Project Received: 11/12/2019

Analytical Report reviewed & approved for release on 11/19/2019 by:

Yen Cao

Yen Cao
Project Manager

The report shall not be reproduced except in full, without the written approval of the laboratory. The analytical results relate only to the items tested. Results reported conform to the most current NELAP standards, where applicable, unless otherwise stated in the case narrative.

NELAP ACCREDITED TNI LABORATORY

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http://www.mccampbell.com / E-mail: main@mccampbell.com

Glossary of Terms & Qualifier Definitions

Client: P & D Environmental
Project: 0794; 820 W. MacArthur Blvd Oakland, CA
WorkOrder: 1911530

Glossary Abbreviation

%D	Serial Dilution Percent Difference
95% Interval	95% Confident Interval
DF	Dilution Factor
DI WET	(DISTLC) Waste Extraction Test using DI water
DISS	Dissolved (direct analysis of 0.45 µm filtered and acidified water sample)
DLT	Dilution Test (Serial Dilution)
DUP	Duplicate
EDL	Estimated Detection Limit
ERS	External reference sample. Second source calibration verification.
ITEF	International Toxicity Equivalence Factor
LCS	Laboratory Control Sample
LQL	Lowest Quantitation Level
MB	Method Blank
MB % Rec	% Recovery of Surrogate in Method Blank, if applicable
MDL	Method Detection Limit
ML	Minimum Level of Quantitation
MS	Matrix Spike
MSD	Matrix Spike Duplicate
N/A	Not Applicable
ND	Not detected at or above the indicated MDL or RL
NR	Data Not Reported due to matrix interference or insufficient sample amount.
PDS	Post Digestion Spike
PDSD	Post Digestion Spike Duplicate
PF	Prep Factor
RD	Relative Difference
RL	Reporting Limit (The RL is the lowest calibration standard in a multipoint calibration.)
RPD	Relative Percent Deviation
RRT	Relative Retention Time
SPK Val	Spike Value
SPKRef Val	Spike Reference Value
SPLP	Synthetic Precipitation Leachate Procedure
ST	Sorbent Tube
TCLP	Toxicity Characteristic Leachate Procedure
TEQ	Toxicity Equivalents
TZA	TimeZone Net Adjustment for sample collected outside of MAI's UTC.
WET (STLC)	Waste Extraction Test (Soluble Threshold Limit Concentration)

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Glossary of Terms & Qualifier Definitions

Client: P & D Environmental
Project: 0794; 820 W. MacArthur Blvd Oakland, CA
WorkOrder: 1911530

Quality Control Qualifiers

F10	MS/MSD outside control limits. Physical or chemical interferences exist due to sample matrix.
F13	Indigenous sample results too high for a representative matrix spike analysis.

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Analytical Report

Client:	P & D Environmental	**WorkOrder:**	1911530
Date Received:	11/12/19 15:35	**Extraction Method:**	SW3050B
Date Prepared:	11/12/19	**Analytical Method:**	SW6020
Project:	0794; 820 W. MacArthur Blvd Oakland, CA	**Unit:**	mg/Kg

Lead

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
S7-0.5-F	**1911530-001A**	**Soil**	**11/11/2019 10:50**	**ICP-MS2 033SMPL.D**	**188764**

Analytes	Result	RL	DF	Date Analyzed
Lead	**16**	0.50	1	11/13/2019 18:20

Surrogates	REC (%)	Limits	Date Analyzed
Terbium	108	70-130	11/13/2019 18:20

Analyst(s): MIG

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
S7-1.0-N	**1911530-002A**	**Soil**	**11/11/2019 10:55**	**ICP-MS2 037SMPL.D**	**188764**

Analytes	Result	RL	DF	Date Analyzed
Lead	**430**	0.50	1	11/13/2019 18:44

Surrogates	REC (%)	Limits	Date Analyzed
Terbium	106	70-130	11/13/2019 18:44

Analyst(s): MIG

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
S8-0.5-F	**1911530-003A**	**Soil**	**11/11/2019 11:00**	**ICP-MS2 038SMPL.D**	**188764**

Analytes	Result	RL	DF	Date Analyzed
Lead	**320**	0.50	1	11/13/2019 18:50

Surrogates	REC (%)	Limits	Date Analyzed
Terbium	104	70-130	11/13/2019 18:50

Analyst(s): MIG

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
S8-1.0-N	**1911530-004A**	**Soil**	**11/11/2019 11:05**	**ICP-MS2 039SMPL.D**	**188764**

Analytes	Result	RL	DF	Date Analyzed
Lead	**85**	0.50	1	11/13/2019 18:56

Surrogates	REC (%)	Limits	Date Analyzed
Terbium	110	70-130	11/13/2019 18:56

Analyst(s): MIG

(Cont.)

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Analytical Report

Client:	P & D Environmental	**WorkOrder:**	1911530
Date Received:	11/12/19 15:35	**Extraction Method:**	SW3050B
Date Prepared:	11/12/19	**Analytical Method:**	SW6020
Project:	0794; 820 W. MacArthur Blvd Oakland, CA	**Unit:**	mg/Kg

Lead

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
S9-0.5-F	**1911530-005A**	**Soil**	**11/11/2019 11:10**	**ICP-MS2 040SMPL.D**	**188764**

Analytes	Result	RL	DF	Date Analyzed
Lead	**58**	0.50	1	11/13/2019 19:02

Surrogates	REC (%)	Limits	Date Analyzed
Terbium	104	70-130	11/13/2019 19:02

Analyst(s): MIG

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
S9-1.0-N	**1911530-006A**	**Soil**	**11/11/2019 11:15**	**ICP-MS2 041SMPL.D**	**188764**

Analytes	Result	RL	DF	Date Analyzed
Lead	**150**	0.50	1	11/13/2019 19:08

Surrogates	REC (%)	Limits	Date Analyzed
Terbium	105	70-130	11/13/2019 19:08

Analyst(s): MIG

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
S10-0.8-F	**1911530-007A**	**Soil**	**11/11/2019 10:40**	**ICP-MS4 247SMPL.d**	**188764**

Analytes	Result	RL	DF	Date Analyzed
Lead	**1200**	5.0	10	11/14/2019 00:08

Surrogates	REC (%)	Limits	Date Analyzed
Terbium	106	70-130	11/14/2019 00:08

Analyst(s): JC

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
S10-1.0-N	**1911530-008A**	**Soil**	**11/11/2019 10:46**	**ICP-MS3 030SMPL.D**	**188774**

Analytes	Result	RL	DF	Date Analyzed
Lead	**73**	0.50	1	11/13/2019 13:32

Surrogates	REC (%)	Limits	Date Analyzed
Terbium	110	70-130	11/13/2019 13:32

Analyst(s): MIG

(Cont.)

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Analytical Report

Client:	P & D Environmental	**WorkOrder:**	1911530
Date Received:	11/12/19 15:35	**Extraction Method:**	SW3050B
Date Prepared:	11/12/19	**Analytical Method:**	SW6020
Project:	0794; 820 W. MacArthur Blvd Oakland, CA	**Unit:**	mg/Kg

Lead

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
S11-0.5-F1	1911530-009A	Soil	11/11/2019 14:25	ICP-MS2 054SMPL.D	188774

Analytes	Result	RL	DF	Date Analyzed
Lead	**36**	0.50	1	11/13/2019 20:28

Surrogates	REC (%)	Limits	Date Analyzed
Terbium	106	70-130	11/13/2019 20:28

Analyst(s): MIG

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
S11-1.0-F2	1911530-010A	Soil	11/11/2019 14:30	ICP-MS2 055SMPL.D	188774

Analytes	Result	RL	DF	Date Analyzed
Lead	**19**	0.50	1	11/13/2019 20:34

Surrogates	REC (%)	Limits	Date Analyzed
Terbium	105	70-130	11/13/2019 20:34

Analyst(s): MIG

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
S11-1.5-N	1911530-011A	Soil	11/11/2019 14:35	ICP-MS2 098SMPL.D	188774

Analytes	Result	RL	DF	Date Analyzed
Lead	**210**	0.50	1	11/14/2019 00:56

Surrogates	REC (%)	Limits	Date Analyzed
Terbium	100	70-130	11/14/2019 00:56

Analyst(s): ND

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
S12-0.5-F	1911530-012A	Soil	11/11/2019 14:15	ICP-MS2 102SMPL.D	188774

Analytes	Result	RL	DF	Date Analyzed
Lead	**100**	0.50	1	11/14/2019 01:21

Surrogates	REC (%)	Limits	Date Analyzed
Terbium	100	70-130	11/14/2019 01:21

Analyst(s): ND

(Cont.)

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Analytical Report

Client:	P & D Environmental	**WorkOrder:**	1911530
Date Received:	11/12/19 15:35	**Extraction Method:**	SW3050B
Date Prepared:	11/12/19	**Analytical Method:**	SW6020
Project:	0794; 820 W. MacArthur Blvd Oakland, CA	**Unit:**	mg/Kg

Lead

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
S12-2.0-N	1911530-013A	Soil	11/11/2019 14:20	ICP-MS2 103SMPL.D	188774

Analytes	Result	RL	DF	Date Analyzed
Lead	**250**	0.50	1	11/14/2019 01:27

Surrogates	REC (%)	Limits	Date Analyzed
Terbium	102	70-130	11/14/2019 01:27

Analyst(s): ND

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
S13-1.0-F1	1911530-014A	Soil	11/11/2019 13:55	ICP-MS2 104SMPL.D	188774

Analytes	Result	RL	DF	Date Analyzed
Lead	**9.4**	0.50	1	11/14/2019 01:33

Surrogates	REC (%)	Limits	Date Analyzed
Terbium	113	70-130	11/14/2019 01:33

Analyst(s): ND

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
S13-2.0-F2	1911530-015A	Soil	11/11/2019 14:00	ICP-MS2 105SMPL.D	188774

Analytes	Result	RL	DF	Date Analyzed
Lead	**110**	0.50	1	11/14/2019 01:39

Surrogates	REC (%)	Limits	Date Analyzed
Terbium	112	70-130	11/14/2019 01:39

Analyst(s): ND

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
S13-2.5-N	1911530-016A	Soil	11/11/2019 14:05	ICP-MS2 106SMPL.D	188774

Analytes	Result	RL	DF	Date Analyzed
Lead	**6.3**	0.50	1	11/14/2019 01:45

Surrogates	REC (%)	Limits	Date Analyzed
Terbium	96	70-130	11/14/2019 01:45

Analyst(s): ND

(Cont.)

Analytical Report

Client:	P & D Environmental	**WorkOrder:**	1911530
Date Received:	11/12/19 15:35	**Extraction Method:**	SW3050B
Date Prepared:	11/12/19	**Analytical Method:**	SW6020
Project:	0794; 820 W. MacArthur Blvd Oakland, CA	**Unit:**	mg/Kg

Lead

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
S14-0.5-F	**1911530-017A**	**Soil**	**11/11/2019 11:20**	**ICP-MS2 107SMPL.D**	**188774**

Analytes	Result	RL	DF	Date Analyzed
Lead	**35**	0.50	1	11/14/2019 01:51

Surrogates	REC (%)	Limits	Date Analyzed
Terbium	114	70-130	11/14/2019 01:51

Analyst(s): ND

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
S14-1.0-N	**1911530-018A**	**Soil**	**11/11/2019 11:25**	**ICP-MS2 108SMPL.D**	**188774**

Analytes	Result	RL	DF	Date Analyzed
Lead	**19**	0.50	1	11/14/2019 01:57

Surrogates	REC (%)	Limits	Date Analyzed
Terbium	100	70-130	11/14/2019 01:57

Analyst(s): ND

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
S15-0.4-F	**1911530-019A**	**Soil**	**11/11/2019 11:40**	**ICP-MS4 169SMPL.d**	**188774**

Analytes	Result	RL	DF	Date Analyzed
Lead	**6.6**	0.50	1	11/13/2019 15:11

Surrogates	REC (%)	Limits	Date Analyzed
Terbium	112	70-130	11/13/2019 15:11

Analyst(s): ND

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
S15-0.8-N	**1911530-020A**	**Soil**	**11/11/2019 11:45**	**ICP-MS2 109SMPL.D**	**188774**

Analytes	Result	RL	DF	Date Analyzed
Lead	**180**	0.50	1	11/14/2019 02:03

Surrogates	REC (%)	Limits	Date Analyzed
Terbium	100	70-130	11/14/2019 02:03

Analyst(s): ND

(Cont.)

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Analytical Report

Client:	P & D Environmental	**WorkOrder:**	1911530
Date Received:	11/12/19 15:35	**Extraction Method:**	SW3050B
Date Prepared:	11/12/19	**Analytical Method:**	SW6020
Project:	0794; 820 W. MacArthur Blvd Oakland, CA	**Unit:**	mg/Kg

Lead

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
S16-0.8-F	1911530-021A	Soil	11/11/2019 11:30	ICP-MS2 110SMPL.D	188774

Analytes	Result	RL	DF	Date Analyzed
Lead	**59**	0.50	1	11/14/2019 02:09

Surrogates	REC (%)	Limits	Date Analyzed
Terbium	106	70-130	11/14/2019 02:09

Analyst(s): ND

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
S16-1.0-N	1911530-022A	Soil	11/11/2019 11:35	ICP-MS2 111SMPL.D	188774

Analytes	Result	RL	DF	Date Analyzed
Lead	**53**	0.50	1	11/14/2019 02:15

Surrogates	REC (%)	Limits	Date Analyzed
Terbium	108	70-130	11/14/2019 02:15

Analyst(s): ND

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
S17-0.4-F	1911530-023A	Soil	11/11/2019 11:50	ICP-MS2 115SMPL.D	188774

Analytes	Result	RL	DF	Date Analyzed
Lead	**67**	0.50	1	11/14/2019 02:40

Surrogates	REC (%)	Limits	Date Analyzed
Terbium	106	70-130	11/14/2019 02:40

Analyst(s): ND

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
S17-0.8-N	1911530-024A	Soil	11/11/2019 11:55	ICP-MS2 116SMPL.D	188774

Analytes	Result	RL	DF	Date Analyzed
Lead	**110**	0.50	1	11/14/2019 02:46

Surrogates	REC (%)	Limits	Date Analyzed
Terbium	104	70-130	11/14/2019 02:46

Analyst(s): ND

(Cont.)

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Toll Free Telephone: (877) 252-9262 / Fax: (925) 252-9269
http://www.mccampbell.com / E-mail: main@mccampbell.com

Analytical Report

Client:	P & D Environmental	**WorkOrder:**	1911530
Date Received:	11/12/19 15:35	**Extraction Method:**	SW3050B
Date Prepared:	11/12/19	**Analytical Method:**	SW6020
Project:	0794; 820 W. MacArthur Blvd Oakland, CA	**Unit:**	mg/Kg

Lead

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
S18-0.4-F	1911530-025A	Soil	11/11/2019 12:00	ICP-MS2 117SMPL.D	188774

Analytes	Result	RL	DF	Date Analyzed
Lead	**12**	0.50	1	11/14/2019 02:52

Surrogates	REC (%)	Limits	Date Analyzed
Terbium	108	70-130	11/14/2019 02:52

Analyst(s): ND

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
S18-0.8-N	1911530-026A	Soil	11/11/2019 12:05	ICP-MS2 118SMPL.D	188774

Analytes	Result	RL	DF	Date Analyzed
Lead	**18**	0.50	1	11/14/2019 02:58

Surrogates	REC (%)	Limits	Date Analyzed
Terbium	104	70-130	11/14/2019 02:58

Analyst(s): ND

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
S19-0.5-F	1911530-027A	Soil	11/11/2019 13:15	ICP-MS2 119SMPL.D	188774

Analytes	Result	RL	DF	Date Analyzed
Lead	**13**	0.50	1	11/14/2019 03:04

Surrogates	REC (%)	Limits	Date Analyzed
Terbium	111	70-130	11/14/2019 03:04

Analyst(s): ND

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
S19-0.8-N	1911530-028A	Soil	11/11/2019 13:30	ICP-MS3 024SMPL.D	188775

Analytes	Result	RL	DF	Date Analyzed
Lead	**230**	0.50	1	11/13/2019 12:56

Surrogates	REC (%)	Limits	Date Analyzed
Terbium	107	70-130	11/13/2019 12:56

Analyst(s): MIG

(Cont.)

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Analytical Report

Client:	P & D Environmental	**WorkOrder:**	1911530
Date Received:	11/12/19 15:35	**Extraction Method:**	SW3050B
Date Prepared:	11/12/19	**Analytical Method:**	SW6020
Project:	0794; 820 W. MacArthur Blvd Oakland, CA	**Unit:**	mg/Kg

Lead

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
S20-0.4-F	1911530-029A	Soil	11/11/2019 13:05	ICP-MS3 070SMPL.D	188775

Analytes	Result	RL	DF	Date Analyzed
Lead	**32**	0.50	1	11/13/2019 17:39

Surrogates	REC (%)	Limits	Date Analyzed
Terbium	130	70-130	11/13/2019 17:39

Analyst(s): MIG

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
S20-0.6-N	1911530-030A	Soil	11/11/2019 13:10	ICP-MS3 087SMPL.D	188775

Analytes	Result	RL	DF	Date Analyzed
Lead	**130**	0.50	1	11/13/2019 19:22

Surrogates	REC (%)	Limits	Date Analyzed
Terbium	119	70-130	11/13/2019 19:22

Analyst(s): MIG

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
S21-0.4-F	1911530-031A	Soil	11/11/2019 12:50	ICP-MS3 088SMPL.D	188775

Analytes	Result	RL	DF	Date Analyzed
Lead	**150**	0.50	1	11/13/2019 19:29

Surrogates	REC (%)	Limits	Date Analyzed
Terbium	109	70-130	11/13/2019 19:29

Analyst(s): MIG

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
S21-0.6-N	1911530-032A	Soil	11/11/2019 12:55	ICP-MS3 089SMPL.D	188775

Analytes	Result	RL	DF	Date Analyzed
Lead	**11**	0.50	1	11/13/2019 19:35

Surrogates	REC (%)	Limits	Date Analyzed
Terbium	121	70-130	11/13/2019 19:35

Analyst(s): MIG

(Cont.)

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Analytical Report

Client:	P & D Environmental	**WorkOrder:**	1911530
Date Received:	11/12/19 15:35	**Extraction Method:**	SW3050B
Date Prepared:	11/12/19	**Analytical Method:**	SW6020
Project:	0794; 820 W. MacArthur Blvd Oakland, CA	**Unit:**	mg/Kg

Lead

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
S22-0.5-F	**1911530-033A**	**Soil**	**11/11/2019 12:35**	**ICP-MS2 094SMPL.D**	**188775**

Analytes	Result	RL	DF	Date Analyzed
Lead	**11**	0.50	1	11/14/2019 00:32

Surrogates	REC (%)	Limits	Date Analyzed
Terbium	107	70-130	11/14/2019 00:32

Analyst(s): ND

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
S22-0.8-N	**1911530-034A**	**Soil**	**11/11/2019 12:40**	**ICP-MS3 091SMPL.D**	**188775**

Analytes	Result	RL	DF	Date Analyzed
Lead	**160**	0.50	1	11/13/2019 19:47

Surrogates	REC (%)	Limits	Date Analyzed
Terbium	105	70-130	11/13/2019 19:47

Analyst(s): MIG

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Quality Control Report

Client:	P & D Environmental	**WorkOrder:**	1911530
Date Prepared:	11/12/19	**BatchID:**	188764
Date Analyzed:	11/13/19	**Extraction Method:**	SW3050B
Instrument:	ICP-MS4	**Analytical Method:**	SW6020
Matrix:	Soil	**Unit:**	mg/Kg
Project:	0794; 820 W. MacArthur Blvd Oakland, CA	**Sample ID:**	MB/LCS/LCSD-188764

QC Summary Report for Metals

Analyte	MB Result	MDL	RL	SPK Val	MB SS %REC	MB SS Limits
Lead	ND	0.094	0.50	-	-	-
Surrogate Recovery						
Terbium	530			500	106	70-130

Analyte	LCS Result	LCSD Result	SPK Val	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Limit
Lead	51	51	50	102	101	75-125	0.700	20
Surrogate Recovery								
Terbium	540	540	500	109	109	70-130	0	20

(Cont.)

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Quality Control Report

Client:	P & D Environmental	**WorkOrder:**	1911530
Date Prepared:	11/12/19	**BatchID:**	188774
Date Analyzed:	11/13/19	**Extraction Method:**	SW3050B
Instrument:	ICP-MS3	**Analytical Method:**	SW6020
Matrix:	Soil	**Unit:**	mg/Kg
Project:	0794; 820 W. MacArthur Blvd Oakland, CA	**Sample ID:**	MB/LCS/LCSD-188774 1911530-008AMS/MSD

QC Summary Report for Metals

Analyte	MB Result	MDL	RL	SPK Val	MB SS %REC	MB SS Limits
Lead	ND	0.094	0.50	-	-	-
Surrogate Recovery						
Terbium	560			500	112	70-130

Analyte	LCS Result	LCSD Result	SPK Val	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Limit
Lead	49	54	50	98	108	75-125	9.56	20
Surrogate Recovery								
Terbium	550	600	500	109	121	70-130	10.2	20

Analyte	MS DF	MS Result	MSD Result	SPK Val	SPKRef Val	MS %REC	MSD %REC	MS/MSD Limits	RPD	RPD Limit
Lead	1	110	140	50	73.32	80	138,F10	75-125	23,F10	20
Surrogate Recovery										
Terbium	1	550	570	500		111	115	70-130	3.74	20

Analyte	DLT Result	DLTRef Val	%D	%D Limit
Lead	71	73.32	3.16	20

%D Control Limit applied to analytes with concentrations greater than 25 times the reporting limits.

(Cont.)

Quality Control Report

Client:	P & D Environmental	**WorkOrder:**	1911530
Date Prepared:	11/12/19	**BatchID:**	188775
Date Analyzed:	11/13/19	**Extraction Method:**	SW3050B
Instrument:	ICP-MS3	**Analytical Method:**	SW6020
Matrix:	Soil	**Unit:**	mg/Kg
Project:	0794; 820 W. MacArthur Blvd Oakland, CA	**Sample ID:**	MB/LCS/LCSD-188775 1911530-028AMS/MSD

QC Summary Report for Metals

Analyte	MB Result	MDL	RL	SPK Val	MB SS %REC	MB SS Limits
Lead	ND	0.094	0.50	-	-	-
Surrogate Recovery						
Terbium	540			500	108	70-130

Analyte	LCS Result	LCSD Result	SPK Val	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Limit
Lead	55	51	50	111	102	75-125	8.24	20
Surrogate Recovery								
Terbium	620	570	500	124	113	70-130	8.89	20

Analyte	MS DF	MS Result	MSD Result	SPK Val	SPKRef Val	MS %REC	MSD %REC	MS/MSD Limits	RPD	RPD Limit
Lead	1	340	390	50	231.0	211,F13	311,F13	75-125	13.9	20
Surrogate Recovery										
Terbium	1	540	540	500		107	107	70-130	0	20

Analyte	DLT Result	DLTRef Val	%D	%D Limit
Lead	210	231.0	9.09	20

%D Control Limit applied to analytes with concentrations greater than 25 times the reporting limits.

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CHAIN-OF-CUSTODY RECORD

WorkOrder: 1911530 **ClientCode: PDEO**

☐ WaterTrax ☐ WriteOn ☐ EDF ☐ Excel ☐ EQuIS ☑ Email ☐ HardCopy ☐ ThirdParty ☐ J-flag
☐ Detection Summary ☐ Dry-Weight

Report to:
Michael Deschenes
P & D Environmental
55 Santa Clara Ave, Ste.240
Oakland, CA 94610
(510) 658-6916 FAX: 510-834-0152

Email: lab@pdenviro.com; Paul.King@pdenviro.c
cc/3rd Party:
PO:
Project: 0794; 820 W. MacArthur Blvd Oakland, CA

Bill to:
Accounts Payable
P & D Environmental
55 Santa Clara Ave, Ste.240
Oakland, CA 94610

Requested TAT: 5 days;

Date Received: 11/12/2019
Date Logged: 11/12/2019

Lab ID	Client ID	Matrix	Collection Date	Hold	1	2	3	4	5	6	7	8	9	10	11	12
1911530-001	S7-0.5-F	Soil	11/11/2019 10:50	☐	A	A										
1911530-002	S7-1.0-N	Soil	11/11/2019 10:55	☐	A	A										
1911530-003	S8-0.5-F	Soil	11/11/2019 11:00	☐	A	A										
1911530-004	S8-1.0-N	Soil	11/11/2019 11:05	☐	A	A										
1911530-005	S9-0.5-F	Soil	11/11/2019 11:10	☐	A	A										
1911530-006	S9-1.0-N	Soil	11/11/2019 11:15	☐	A	A										
1911530-007	S10-0.8-F	Soil	11/11/2019 10:40	☐	A	A										
1911530-008	S10-1.0-N	Soil	11/11/2019 10:46	☐	A	A										
1911530-009	S11-0.5-F1	Soil	11/11/2019 14:25	☐	A	A										
1911530-010	S11-1.0-F2	Soil	11/11/2019 14:30	☐	A	A										
1911530-011	S11-1.5-N	Soil	11/11/2019 14:35	☐	A	A										
1911530-012	S12-0.5-F	Soil	11/11/2019 14:15	☐	A	A										
1911530-013	S12-2.0-N	Soil	11/11/2019 14:20	☐	A	A										
1911530-014	S13-1.0-F1	Soil	11/11/2019 13:55	☐	A	A										
1911530-015	S13-2.0-F2	Soil	11/11/2019 14:00	☐	A	A										

Test Legend:

1	PBMS_TTLC_S	2	PRDisposal Fee	3		4	
5		6		7		8	
9		10		11		12	

Project Manager: Angela Rydelius **Prepared by: Lilly Ortiz**

Comments: Always send reports to: lab@pdenviro.com; Paul.King@pdenviro.com; pdking0000@aol.com. P&D always gets charged $67 multi range price despite the extra analytes

NOTE: Soil samples are discarded 60 days after results are reported unless other arrangements are made (Water samples are 30 days).
Hazardous samples will be returned to client or disposed of at client expense.

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CHAIN-OF-CUSTODY RECORD

WorkOrder: 1911530 **ClientCode: PDEO**

☐ WaterTrax ☐ WriteOn ☐ EDF ☐ Excel ☐ EQuIS ☑ Email ☐ HardCopy ☐ ThirdParty ☐ J-flag
☐ Detection Summary ☐ Dry-Weight

Report to:
Michael Deschenes
P & D Environmental
55 Santa Clara Ave, Ste.240
Oakland, CA 94610
(510) 658-6916 FAX: 510-834-0152

Email: lab@pdenviro.com; Paul.King@pdenviro.c
cc/3rd Party:
PO:
Project: 0794; 820 W. MacArthur Blvd Oakland, CA

Bill to:
Accounts Payable
P & D Environmental
55 Santa Clara Ave, Ste.240
Oakland, CA 94610

Requested TAT: 5 days;

Date Received: 11/12/2019
Date Logged: 11/12/2019

Lab ID	Client ID	Matrix	Collection Date	Hold	1	2	3	4	5	6	7	8	9	10	11	12
1911530-016	S13-2.5-N	Soil	11/11/2019 14:05	☐	A	A										
1911530-017	S14-0.5-F	Soil	11/11/2019 11:20	☐	A	A										
1911530-018	S14-1.0-N	Soil	11/11/2019 11:25	☐	A	A										
1911530-019	S15-0.4-F	Soil	11/11/2019 11:40	☐	A	A										
1911530-020	S15-0.8-N	Soil	11/11/2019 11:45	☐	A	A										
1911530-021	S16-0.8-F	Soil	11/11/2019 11:30	☐	A	A										
1911530-022	S16-1.0-N	Soil	11/11/2019 11:35	☐	A	A										
1911530-023	S17-0.4-F	Soil	11/11/2019 11:50	☐	A	A										
1911530-024	S17-0.8-N	Soil	11/11/2019 11:55	☐	A	A										
1911530-025	S18-0.4-F	Soil	11/11/2019 12:00	☐	A	A										
1911530-026	S18-0.8-N	Soil	11/11/2019 12:05	☐	A	A										
1911530-027	S19-0.5-F	Soil	11/11/2019 13:15	☐	A	A										
1911530-028	S19-0.8-N	Soil	11/11/2019 13:30	☐	A	A										
1911530-029	S20-0.4-F	Soil	11/11/2019 13:05	☐	A	A										
1911530-030	S20-0.6-N	Soil	11/11/2019 13:10	☐	A	A										

Test Legend:

1	PBMS_TTLC_S	2	PRDisposal Fee	3		4	
5		6		7		8	
9		10		11		12	

Project Manager: Angela Rydelius **Prepared by: Lilly Ortiz**

Comments: Always send reports to: lab@pdenviro.com; Paul.King@pdenviro.com; pdking0000@aol.com. P&D always gets charged $67 multi range price despite the extra analytes

NOTE: Soil samples are discarded 60 days after results are reported unless other arrangements are made (Water samples are 30 days).
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(925) 252-9262

CHAIN-OF-CUSTODY RECORD

WorkOrder: 1911530 **ClientCode: PDEO**

☐ WaterTrax ☐ WriteOn ☐ EDF ☐ Excel ☐ EQuIS ☑ Email ☐ HardCopy ☐ ThirdParty ☐ J-flag
☐ Detection Summary ☐ Dry-Weight

Report to:
Michael Deschenes
P & D Environmental
55 Santa Clara Ave, Ste.240
Oakland, CA 94610
(510) 658-6916 FAX: 510-834-0152

Email: lab@pdenviro.com; Paul.King@pdenviro.c
cc/3rd Party:
PO:
Project: 0794; 820 W. MacArthur Blvd Oakland, CA

Bill to:
Accounts Payable
P & D Environmental
55 Santa Clara Ave, Ste.240
Oakland, CA 94610

Requested TAT: **5 days;**

Date Received: **11/12/2019**
Date Logged: **11/12/2019**

Lab ID	Client ID	Matrix	Collection Date	Hold	1	2	3	4	5	6	7	8	9	10	11	12
					Requested Tests (See legend below)											
1911530-031	S21-0.4-F	Soil	11/11/2019 12:50	☐	A	A										
1911530-032	S21-0.6-N	Soil	11/11/2019 12:55	☐	A	A										
1911530-033	S22-0.5-F	Soil	11/11/2019 12:35	☐	A	A										
1911530-034	S22-0.8-N	Soil	11/11/2019 12:40	☐	A	A										

Test Legend:

1	PBMS_TTLC_S	2	PRDisposal Fee	3		4	
5		6		7		8	
9		10		11		12	

Project Manager: Angela Rydelius **Prepared by: Lilly Ortiz**

Comments: Always send reports to: lab@pdenviro.com; Paul.King@pdenviro.com; pdking0000@aol.com. P&D always gets charged $67 multi range price despite the extra analytes

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http://www.mccampbell.com / E-mail: main@mccampbell.com

WORK ORDER SUMMARY

Client Name: P & D ENVIRONMENTAL
Project: 0794; 820 W. MacArthur Blvd Oakland, CA
Work Order: 1911530
Client Contact: Michael Deschenes
QC Level: LEVEL 2
Contact's Email: lab@pdenviro.com; Paul.King@pdenviro.com; pdking0000@aol.com
Comments: Always send reports to: lab@pdenviro.com; Paul.King@pdenviro.com; pdking0000@aol.com. P&D always
Date Logged: 11/12/2019

☐ WaterTrax ☐ WriteOn ☐ EDF ☐ Excel ☐ EQuIS ☑ Email ☐ HardCopy ☐ ThirdParty ☐ J-flag

Lab ID	Client ID	Matrix	Test Name	Containers /Composites	Bottle & Preservative	De-chlorinated	Collection Date & Time	TAT	Sediment Content	Hold	SubOut
1911530-001A	S7-0.5-F	Soil	SW6020 (Lead)	1	Plastic Baggie, Medium	☐	11/11/2019 10:50	5 days		☐	
1911530-002A	S7-1.0-N	Soil	SW6020 (Lead)	1	Plastic Baggie, Medium	☐	11/11/2019 10:55	5 days		☐	
1911530-003A	S8-0.5-F	Soil	SW6020 (Lead)	1	Plastic Baggie, Medium	☐	11/11/2019 11:00	5 days		☐	
1911530-004A	S8-1.0-N	Soil	SW6020 (Lead)	1	Plastic Baggie, Medium	☐	11/11/2019 11:05	5 days		☐	
1911530-005A	S9-0.5-F	Soil	SW6020 (Lead)	1	Plastic Baggie, Medium	☐	11/11/2019 11:10	5 days		☐	
1911530-006A	S9-1.0-N	Soil	SW6020 (Lead)	1	Plastic Baggie, Medium	☐	11/11/2019 11:15	5 days		☐	
1911530-007A	S10-0.8-F	Soil	SW6020 (Lead)	1	Plastic Baggie, Medium	☐	11/11/2019 10:40	5 days		☐	
1911530-008A	S10-1.0-N	Soil	SW6020 (Lead)	1	Plastic Baggie, Medium	☐	11/11/2019 10:46	5 days		☐	
1911530-009A	S11-0.5-F1	Soil	SW6020 (Lead)	1	Plastic Baggie, Medium	☐	11/11/2019 14:25	5 days		☐	
1911530-010A	S11-1.0-F2	Soil	SW6020 (Lead)	1	Plastic Baggie, Medium	☐	11/11/2019 14:30	5 days		☐	
1911530-011A	S11-1.5-N	Soil	SW6020 (Lead)	1	Plastic Baggie, Medium	☐	11/11/2019 14:35	5 days		☐	
1911530-012A	S12-0.5-F	Soil	SW6020 (Lead)	1	Plastic Baggie, Medium	☐	11/11/2019 14:15	5 days		☐	
1911530-013A	S12-2.0-N	Soil	SW6020 (Lead)	1	Plastic Baggie, Medium	☐	11/11/2019 14:20	5 days		☐	
1911530-014A	S13-1.0-F1	Soil	SW6020 (Lead)	1	Plastic Baggie, Medium	☐	11/11/2019 13:55	5 days		☐	
1911530-015A	S13-2.0-F2	Soil	SW6020 (Lead)	1	Plastic Baggie, Medium	☐	11/11/2019 14:00	5 days		☐	
1911530-016A	S13-2.5-N	Soil	SW6020 (Lead)	1	Plastic Baggie, Medium	☐	11/11/2019 14:05	5 days		☐	

NOTES:
- **STLC and TCLP extractions require 2 days to complete; therefore, all TATs begin after the extraction is completed (i.e., One-day TAT yields results in 3 days from sample submission).**
- **MAI assumes that all material present in the provided sampling container is considered part of the sample - MAI does not exclude any material from the sample prior to sample preparation unless requested in writing by the client.**

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WORK ORDER SUMMARY

Client Name: P & D ENVIRONMENTAL
Project: 0794; 820 W. MacArthur Blvd Oakland, CA
Work Order: 1911530

Client Contact: Michael Deschenes
QC Level: LEVEL 2

Contact's Email: lab@pdenviro.com; Paul.King@pdenviro.com; pdking0000@aol.com
Comments: Always send reports to: lab@pdenviro.com; Paul.King@pdenviro.com; pdking0000@aol.com. P&D always
Date Logged: 11/12/2019

[ ] WaterTrax [ ] WriteOn [ ] EDF [ ] Excel [ ] EQuIS [x] Email [ ] HardCopy [ ] ThirdParty [ ] J-flag

Lab ID	Client ID	Matrix	Test Name	Containers /Composites	Bottle & Preservative	De-chlorinated	Collection Date & Time	TAT	Sediment Content	Hold	SubOut
1911530-017A	S14-0.5-F	Soil	SW6020 (Lead)	1	Plastic Baggie, Medium		11/11/2019 11:20	5 days			
1911530-018A	S14-1.0-N	Soil	SW6020 (Lead)	1	Plastic Baggie, Medium		11/11/2019 11:25	5 days			
1911530-019A	S15-0.4-F	Soil	SW6020 (Lead)	1	Plastic Baggie, Medium		11/11/2019 11:40	5 days			
1911530-020A	S15-0.8-N	Soil	SW6020 (Lead)	1	Plastic Baggie, Medium		11/11/2019 11:45	5 days			
1911530-021A	S16-0.8-F	Soil	SW6020 (Lead)	1	Plastic Baggie, Medium		11/11/2019 11:30	5 days			
1911530-022A	S16-1.0-N	Soil	SW6020 (Lead)	1	Plastic Baggie, Medium		11/11/2019 11:35	5 days			
1911530-023A	S17-0.4-F	Soil	SW6020 (Lead)	1	Plastic Baggie, Medium		11/11/2019 11:50	5 days			
1911530-024A	S17-0.8-N	Soil	SW6020 (Lead)	1	Plastic Baggie, Medium		11/11/2019 11:55	5 days			
1911530-025A	S18-0.4-F	Soil	SW6020 (Lead)	1	Plastic Baggie, Medium		11/11/2019 12:00	5 days			
1911530-026A	S18-0.8-N	Soil	SW6020 (Lead)	1	Plastic Baggie, Medium		11/11/2019 12:05	5 days			
1911530-027A	S19-0.5-F	Soil	SW6020 (Lead)	1	Plastic Baggie, Medium		11/11/2019 13:15	5 days			
1911530-028A	S19-0.8-N	Soil	SW6020 (Lead)	1	Plastic Baggie, Medium		11/11/2019 13:30	5 days			
1911530-029A	S20-0.4-F	Soil	SW6020 (Lead)	1	Plastic Baggie, Medium		11/11/2019 13:05	5 days			
1911530-030A	S20-0.6-N	Soil	SW6020 (Lead)	1	Plastic Baggie, Medium		11/11/2019 13:10	5 days			
1911530-031A	S21-0.4-F	Soil	SW6020 (Lead)	1	Plastic Baggie, Medium		11/11/2019 12:50	5 days			
1911530-032A	S21-0.6-N	Soil	SW6020 (Lead)	1	Plastic Baggie, Medium		11/11/2019 12:55	5 days			

NOTES: **- STLC and TCLP extractions require 2 days to complete; therefore, all TATs begin after the extraction is completed (i.e., One-day TAT yields results in 3 days from sample submission).**

- MAI assumes that all material present in the provided sampling container is considered part of the sample - MAI does not exclude any material from the sample prior to sample preparation unless requested in writing by the client.

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WORK ORDER SUMMARY

Client Name: P & D ENVIRONMENTAL
Project: 0794; 820 W. MacArthur Blvd Oakland, CA
Work Order: 1911530

Client Contact: Michael Deschenes
QC Level: LEVEL 2

Contact's Email: lab@pdenviro.com; Paul.King@pdenviro.com; pdking0000@aol.com
Comments: Always send reports to: lab@pdenviro.com; Paul.King@pdenviro.com; pdking0000@aol.com. P&D always
Date Logged: 11/12/2019

☐ WaterTrax ☐ WriteOn ☐ EDF ☐ Excel ☐ EQuIS ☑ Email ☐ HardCopy ☐ ThirdParty ☐ J-flag

Lab ID	Client ID	Matrix	Test Name	Containers /Composites	Bottle & Preservative	De-chlorinated	Collection Date & Time	TAT	Sediment Content	Hold	SubOut
1911530-033A	S22-0.5-F	Soil	SW6020 (Lead)	1	Plastic Baggie, Medium	☐	11/11/2019 12:35	5 days		☐	
1911530-034A	S22-0.8-N	Soil	SW6020 (Lead)	1	Plastic Baggie, Medium	☐	11/11/2019 12:40	5 days		☐	

NOTES:
- **STLC and TCLP extractions require 2 days to complete; therefore, all TATs begin after the extraction is completed (i.e., One-day TAT yields results in 3 days from sample submission).**
- **MAI assumes that all material present in the provided sampling container is considered part of the sample - MAI does not exclude any material from the sample prior to sample preparation unless requested in writing by the client.**

CHAIN OF CUSTODY RECORD

1911530

P&D ENVIRONMENTAL, INC.
55 Santa Clara Ave., Suite 240
Oakland, CA 94610
(510) 658-6916

PROJECT NUMBER: 0794

PROJECT NAME: 820 W. MACARTHUR BLVD OAKLAND, CA

SAMPLED BY: (PRINTED & SIGNATURE) MICHAEL BASS-DESCHENES

ANALYSIS(ES): TOTAL LEAD

SAMPLE NUMBER	DATE	TIME	TYPE	SAMPLE LOCATION	NUMBER OF CONTAINERS	TOTAL LEAD								PRESERVATIVE	REMARKS
S7-0.5-F	11/11/19	1050	SOIL		1	X								NONE	NORMAL TAT
S7-1.0-N	"	1055	"		1	X								"	
S8-0.5-F	"	1100	"		1	X								"	
S8-1.0-N	"	1105	"		1	X								"	
S9-0.5-F	"	1110	"		1	X								"	
S9-1.0-N	"	1115	"		1	X								"	
S10-0.8-F	"	1040	"		1	X								"	
S10-1.0-N	"	1046	"		1	X								"	
S11-0.5-F1	"	1425	"		1	X								"	
S11-1.0-F2	"	1430	"		1	X								"	
S11-1.5-N	"	1435	"		1	X								"	
S12-0.5-F	"	1415	"		1	X								"	
S12-2.0-N	"	1420	"		1	X								"	
S13-1.0-F1	"	1355	"		1	X								"	
S13-2.0-F2	"	1400	"		1	X								"	
S13-2.5-N	"	1405	"		1	X								"	

RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)		
Michael Bass-Deschenes	11/12/19	1045	LAP 11/12/19 1045	Total No. of Samples (This Shipment): 34 / Total No. of Containers (This Shipment): 34	LABORATORY: McCAMPBELL ANALYTICAL
LAP	11/12/19	1535	[signature] 11/12/19 1535	LABORATORY CONTACT: ANGELA RYDELIUS	LABORATORY PHONE NUMBER: (925) 252-9262
			RECEIVED FOR LABORATORY BY: (SIGNATURE)	SAMPLE ANALYSIS REQUEST SHEET ATTACHED: ( ) YES (X) NO	0.9°c wet

Results and billing to:
P&D Environmental, Inc.
lab@pdenviro.com

REMARKS:

CHAIN OF CUSTODY RECORD

1911530 PAGE 2 OF 3

P&D ENVIRONMENTAL, INC.
55 Santa Clara Ave., Suite 240
Oakland, CA 94610
(510) 658-6916

PROJECT NUMBER: 0794

PROJECT NAME: 820 W. MACARTHUR BLVD. OAKLAND, CA

SAMPLED BY: (PRINTED & SIGNATURE) MICHAEL BASS-DESCHENES Michael Bass-Deschenes

ANALYSIS(ES): TOTAL LEAD

SAMPLE NUMBER	DATE	TIME	TYPE	SAMPLE LOCATION	NUMBER OF CONTAINERS	TOTAL LEAD								PRESERVATIVE	REMARKS
S14-0.5-F	11/11/19	1120	SOIL		1	X								NONE	NORMAL TAT
S14-1.0-N	"	1125	"		1	X								"	
S15-0.4-F	"	1140	"		1	X								"	
S15-0.8-N	"	1145	"		1	X								"	
S16-0.8-F	"	1130	"		1	X								"	
S16-1.0-N	"	1135	"		1	X								"	
S17-0.4-F	"	1150	"		1	X								"	
S17-0.8-N	"	1155	"		1	X								"	
S18-0.4-F	"	1200	"		1	X								"	
S18-0.8-N	"	1205	"		1	X								"	
S19-0.5-F	"	1315	"		1	X								"	
S19-0.8-N	"	1330	"		1	X								"	
S20-0.4-F	"	1305	"		1	X								"	
S20-0.6-N	"	1310	"		1	X								"	

RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)		
Michael Bass-Deschenes	11/12	1045	IAP 11/12/19 1045	Total No. of Samples (This Shipment): 34 Total No. of Containers (This Shipment): 34	LABORATORY: McCAMPBELL ANALYTICAL
RELINQUISHED BY: (SIGNATURE) IAP	DATE 11/12/19	TIME 1535	RECEIVED BY: (SIGNATURE) 1535 11/12/19	LABORATORY CONTACT: ANGELA RYDELIUS	LABORATORY PHONE NUMBER: (925) 252-9262
RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RECEIVED FOR LABORATORY BY: (SIGNATURE)	SAMPLE ANALYSIS REQUEST SHEET ATTACHED: ( ) YES (X) NO	

Results and billing to:
P&D Environmental, Inc.
lab@pdenviro.com

REMARKS:

CHAIN OF CUSTODY RECORD

1911530 PAGE 3 OF 3

P&D ENVIRONMENTAL, INC.
55 Santa Clara Ave., Suite 240
Oakland, CA 94610
(510) 658-6916

PROJECT NUMBER: 0794

PROJECT NAME: 820 W. MACARTHUR BLVD OAKLAND, CA

SAMPLED BY: (PRINTED & SIGNATURE) MICHAEL BASS-DESCHENES [signature]

ANALYSIS(ES): TOTAL LEAD

SAMPLE NUMBER	DATE	TIME	TYPE	SAMPLE LOCATION	NUMBER OF CONTAINERS	TOTAL LEAD								PRESERVATIVE	REMARKS
S21-0.4-F	11/11/19	1250	SOIL		1	X								NONE	NORMAL TAT
S21-0.6-N	"	1255	"		1	X								"	
S22-0.5-F	"	1235	"		1	X								"	
S22-0.8-N	"	1240	"		1	X								"	

RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)		
[signature]	11/12	1045	LAO 11/12/19 1045	Total No. of Samples (This Shipment) 34	LABORATORY: McCAMPBELL ANALYTICAL
				Total No. of Containers (This Shipment) 34	
RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	LABORATORY CONTACT:	LABORATORY PHONE NUMBER:
LAO	11/12/19	1535	[signature] 11/12/19 1535	ANGELA RYDELIUS	(925) 252-9262
RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RECEIVED FOR LABORATORY BY: (SIGNATURE)	SAMPLE ANALYSIS REQUEST SHEET ATTACHED: ( ) YES (X) NO	

Results and billing to:
P&D Environmental, Inc.
lab@pdenviro.com

REMARKS:

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Sample Receipt Checklist

Client Name:	**P & D Environmental**	Date and Time Received	**11/12/2019 15:35**
Project:	**0794; 820 W. MacArthur Blvd Oakland, CA**	Date Logged:	**11/12/2019**
		Received by:	Lilly Ortiz
WorkOrder №:	**1911530** Matrix: Soil	Logged by:	Lilly Ortiz
Carrier:	Lorenzo Perez (MAI Courier)		

Chain of Custody (COC) Information

	Yes	No	NA
Chain of custody present?	☑	☐	
Chain of custody signed when relinquished and received?	☑	☐	
Chain of custody agrees with sample labels?	☑	☐	
Sample IDs noted by Client on COC?	☑	☐	
Date and Time of collection noted by Client on COC?	☑	☐	
Sampler's name noted on COC?	☑	☐	
COC agrees with Quote?	☐	☐	☑

Sample Receipt Information

	Yes	No	NA
Custody seals intact on shipping container/cooler?	☐	☐	☑
Shipping container/cooler in good condition?	☑	☐	
Samples in proper containers/bottles?	☑	☐	
Sample containers intact?	☑	☐	
Sufficient sample volume for indicated test?	☑	☐	

Sample Preservation and Hold Time (HT) Information

	Yes	No	NA
All samples received within holding time?	☑	☐	☐
Samples Received on Ice?	☑	☐	
(Ice Type: WET ICE)			
Sample/Temp Blank temperature	Temp: 0.9°C		☐
Water - VOA vials have zero headspace / no bubbles?	☐	☐	☑
Sample labels checked for correct preservation?	☑	☐	
pH acceptable upon receipt (Metal: <2; Nitrate 353.2/4500NO3: <2; 522: <4; 218.7: >8)?	☐	☐	☑

UCMR Samples:

	Yes	No	NA
pH tested and acceptable upon receipt (200.8: ≤2; 525.3: ≤4; 530: ≤7; 541: <3; 544: <6.5 & 7.5)?	☐	☐	☑
Free Chlorine tested and acceptable upon receipt (<0.1mg/L)?	☐	☐	☑

Comments:

McCampbell Analytical, Inc.

"When Quality Counts"

Analytical Report

WorkOrder:	1911663
Report Created for:	P & D Environmental
	55 Santa Clara Ave, Ste.240 Oakland, CA 94610
Project Contact:	Michael Deschenes
Project P.O.:	
Project:	0794; 820 W. MacArthur Blvd Oakland, CA
Project Received:	11/13/2019

Analytical Report reviewed & approved for release on 11/19/2019 by:

Jennifer Lagerbom
Project Manager

__The report shall not be reproduced except in full, without the written approval of the laboratory. The analytical results relate only to the items tested. Results reported conform to the most current NELAP standards, where applicable, unless otherwise stated in the case narrative.__

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Glossary of Terms & Qualifier Definitions

Client: P & D Environmental
Project: 0794; 820 W. MacArthur Blvd Oakland, CA
WorkOrder: 1911663

Glossary Abbreviation

%D	Serial Dilution Percent Difference
95% Interval	95% Confident Interval
DF	Dilution Factor
DI WET	(DISTLC) Waste Extraction Test using DI water
DISS	Dissolved (direct analysis of 0.45 µm filtered and acidified water sample)
DLT	Dilution Test (Serial Dilution)
DUP	Duplicate
EDL	Estimated Detection Limit
ERS	External reference sample. Second source calibration verification.
ITEF	International Toxicity Equivalence Factor
LCS	Laboratory Control Sample
LQL	Lowest Quantitation Level
MB	Method Blank
MB % Rec	% Recovery of Surrogate in Method Blank, if applicable
MDL	Method Detection Limit
ML	Minimum Level of Quantitation
MS	Matrix Spike
MSD	Matrix Spike Duplicate
N/A	Not Applicable
ND	Not detected at or above the indicated MDL or RL
NR	Data Not Reported due to matrix interference or insufficient sample amount.
PDS	Post Digestion Spike
PDSD	Post Digestion Spike Duplicate
PF	Prep Factor
RD	Relative Difference
RL	Reporting Limit (The RL is the lowest calibration standard in a multipoint calibration.)
RPD	Relative Percent Deviation
RRT	Relative Retention Time
SPK Val	Spike Value
SPKRef Val	Spike Reference Value
SPLP	Synthetic Precipitation Leachate Procedure
ST	Sorbent Tube
TCLP	Toxicity Characteristic Leachate Procedure
TEQ	Toxicity Equivalents
TZA	TimeZone Net Adjustment for sample collected outside of MAI's UTC.
WET (STLC)	Waste Extraction Test (Soluble Threshold Limit Concentration)

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Glossary of Terms & Qualifier Definitions

Client: P & D Environmental
Project: 0794; 820 W. MacArthur Blvd Oakland, CA
WorkOrder: 1911663

Analytical Qualifiers

e2	Diesel range compounds are significant; no recognizable pattern
e8	Pattern resembles kerosene/kerosene range/jet fuel range

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Analytical Report

Client:	P & D Environmental	**WorkOrder:**	1911663
Date Received:	11/13/19 16:15	**Extraction Method:**	SW5030B
Date Prepared:	11/14/19-11/15/19	**Analytical Method:**	SW8260B
Project:	0794; 820 W. MacArthur Blvd Oakland, CA	**Unit:**	µg/L

Volatile Organics

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
MW1	**1911663-001B**	**Water**	**11/12/2019 14:00**	**GC18 11141914.D**	**188965**

Analytes	Result	RL	DF	Date Analyzed
Acetone	ND	10	1	11/14/2019 15:17
tert-Amyl methyl ether (TAME)	ND	0.50	1	11/14/2019 15:17
Benzene	ND	0.50	1	11/14/2019 15:17
Bromobenzene	ND	0.50	1	11/14/2019 15:17
Bromochloromethane	ND	0.50	1	11/14/2019 15:17
Bromodichloromethane	ND	0.50	1	11/14/2019 15:17
Bromoform	ND	0.50	1	11/14/2019 15:17
Bromomethane	ND	0.50	1	11/14/2019 15:17
2-Butanone (MEK)	ND	5.0	1	11/14/2019 15:17
t-Butyl alcohol (TBA)	ND	5.0	1	11/14/2019 15:17
n-Butyl benzene	ND	0.50	1	11/14/2019 15:17
sec-Butyl benzene	**1.3**	0.50	1	11/14/2019 15:17
tert-Butyl benzene	ND	0.50	1	11/14/2019 15:17
Carbon Disulfide	ND	0.50	1	11/14/2019 15:17
Carbon Tetrachloride	ND	0.50	1	11/14/2019 15:17
Chlorobenzene	ND	0.50	1	11/14/2019 15:17
Chloroethane	ND	0.50	1	11/14/2019 15:17
Chloroform	ND	0.50	1	11/14/2019 15:17
Chloromethane	ND	0.50	1	11/14/2019 15:17
2-Chlorotoluene	ND	0.50	1	11/14/2019 15:17
4-Chlorotoluene	ND	0.50	1	11/14/2019 15:17
Dibromochloromethane	ND	0.50	1	11/14/2019 15:17
1,2-Dibromo-3-chloropropane	ND	0.20	1	11/14/2019 15:17
1,2-Dibromoethane (EDB)	ND	0.50	1	11/14/2019 15:17
Dibromomethane	ND	0.50	1	11/14/2019 15:17
1,2-Dichlorobenzene	ND	0.50	1	11/14/2019 15:17
1,3-Dichlorobenzene	ND	0.50	1	11/14/2019 15:17
1,4-Dichlorobenzene	ND	0.50	1	11/14/2019 15:17
Dichlorodifluoromethane	ND	0.50	1	11/14/2019 15:17
1,1-Dichloroethane	ND	0.50	1	11/14/2019 15:17
1,2-Dichloroethane (1,2-DCA)	**2.9**	0.50	1	11/14/2019 15:17
1,1-Dichloroethene	ND	0.50	1	11/14/2019 15:17
cis-1,2-Dichloroethene	ND	0.50	1	11/14/2019 15:17
trans-1,2-Dichloroethene	ND	0.50	1	11/14/2019 15:17
1,2-Dichloropropane	ND	0.50	1	11/14/2019 15:17
1,3-Dichloropropane	ND	0.50	1	11/14/2019 15:17
2,2-Dichloropropane	ND	0.50	1	11/14/2019 15:17

(Cont.)

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Analytical Report

Client:	P & D Environmental	**WorkOrder:**	1911663
Date Received:	11/13/19 16:15	**Extraction Method:**	SW5030B
Date Prepared:	11/14/19-11/15/19	**Analytical Method:**	SW8260B
Project:	0794; 820 W. MacArthur Blvd Oakland, CA	**Unit:**	µg/L

Volatile Organics

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
MW1	1911663-001B	Water	11/12/2019 14:00	GC18 11141914.D	188965

Analytes	Result	RL	DF	Date Analyzed
1,1-Dichloropropene	ND	0.50	1	11/14/2019 15:17
cis-1,3-Dichloropropene	ND	0.50	1	11/14/2019 15:17
trans-1,3-Dichloropropene	ND	0.50	1	11/14/2019 15:17
Diisopropyl ether (DIPE)	ND	0.50	1	11/14/2019 15:17
Ethylbenzene	ND	0.50	1	11/14/2019 15:17
Ethyl tert-butyl ether (ETBE)	ND	0.50	1	11/14/2019 15:17
Freon 113	ND	0.50	1	11/14/2019 15:17
Hexachlorobutadiene	ND	0.50	1	11/14/2019 15:17
Hexachloroethane	ND	0.50	1	11/14/2019 15:17
2-Hexanone	ND	1.0	1	11/14/2019 15:17
Isopropylbenzene	ND	0.50	1	11/14/2019 15:17
4-Isopropyl toluene	ND	0.50	1	11/14/2019 15:17
Methyl-t-butyl ether (MTBE)	ND	0.50	1	11/14/2019 15:17
Methylene chloride	ND	2.0	1	11/14/2019 15:17
4-Methyl-2-pentanone (MIBK)	ND	0.50	1	11/14/2019 15:17
Naphthalene	ND	1.0	1	11/14/2019 15:17
n-Propyl benzene	ND	0.50	1	11/14/2019 15:17
Styrene	ND	2.0	1	11/14/2019 15:17
1,1,1,2-Tetrachloroethane	ND	0.50	1	11/14/2019 15:17
1,1,2,2-Tetrachloroethane	ND	0.50	1	11/14/2019 15:17
Tetrachloroethene	ND	0.50	1	11/14/2019 15:17
Toluene	ND	0.50	1	11/14/2019 15:17
1,2,3-Trichlorobenzene	ND	0.50	1	11/14/2019 15:17
1,2,4-Trichlorobenzene	ND	0.50	1	11/14/2019 15:17
1,1,1-Trichloroethane	ND	0.50	1	11/14/2019 15:17
1,1,2-Trichloroethane	ND	0.50	1	11/14/2019 15:17
Trichloroethene	ND	0.50	1	11/14/2019 15:17
Trichlorofluoromethane	ND	0.50	1	11/14/2019 15:17
1,2,3-Trichloropropane	ND	0.50	1	11/14/2019 15:17
1,2,4-Trimethylbenzene	ND	0.50	1	11/14/2019 15:17
1,3,5-Trimethylbenzene	ND	0.50	1	11/14/2019 15:17
Vinyl Chloride	ND	0.50	1	11/14/2019 15:17
m,p-Xylene	ND	0.50	1	11/14/2019 15:17
o-Xylene	ND	0.50	1	11/14/2019 15:17
Xylenes, Total	ND	0.50	1	11/14/2019 15:17

(Cont.)

Analytical Report

Client:	P & D Environmental	**WorkOrder:**	1911663
Date Received:	11/13/19 16:15	**Extraction Method:**	SW5030B
Date Prepared:	11/14/19-11/15/19	**Analytical Method:**	SW8260B
Project:	0794; 820 W. MacArthur Blvd Oakland, CA	**Unit:**	µg/L

Volatile Organics

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
MW1	**1911663-001B**	**Water**	**11/12/2019 14:00**	**GC18 11141914.D**	**188965**

Analytes	Result	RL	DF	Date Analyzed
Surrogates	REC (%)	Limits		
Dibromofluoromethane	100	78-112		11/14/2019 15:17
Toluene-d8	89	82-109		11/14/2019 15:17
4-BFB	92	63-121		11/14/2019 15:17

Analyst(s): AK

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Analytical Report

Client:	P & D Environmental	**WorkOrder:**	1911663
Date Received:	11/13/19 16:15	**Extraction Method:**	SW5030B
Date Prepared:	11/14/19-11/15/19	**Analytical Method:**	SW8260B
Project:	0794; 820 W. MacArthur Blvd Oakland, CA	**Unit:**	µg/L

Volatile Organics

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
MW2	1911663-002B	Water	11/12/2019 13:00	GC18 11141915.D	188965

Analytes	Result	RL	DF	Date Analyzed
Acetone	ND	10	1	11/14/2019 15:57
tert-Amyl methyl ether (TAME)	ND	0.50	1	11/14/2019 15:57
Benzene	ND	0.50	1	11/14/2019 15:57
Bromobenzene	ND	0.50	1	11/14/2019 15:57
Bromochloromethane	ND	0.50	1	11/14/2019 15:57
Bromodichloromethane	ND	0.50	1	11/14/2019 15:57
Bromoform	ND	0.50	1	11/14/2019 15:57
Bromomethane	ND	0.50	1	11/14/2019 15:57
2-Butanone (MEK)	ND	5.0	1	11/14/2019 15:57
t-Butyl alcohol (TBA)	ND	5.0	1	11/14/2019 15:57
n-Butyl benzene	ND	0.50	1	11/14/2019 15:57
sec-Butyl benzene	ND	0.50	1	11/14/2019 15:57
tert-Butyl benzene	ND	0.50	1	11/14/2019 15:57
Carbon Disulfide	ND	0.50	1	11/14/2019 15:57
Carbon Tetrachloride	ND	0.50	1	11/14/2019 15:57
Chlorobenzene	ND	0.50	1	11/14/2019 15:57
Chloroethane	ND	0.50	1	11/14/2019 15:57
Chloroform	ND	0.50	1	11/14/2019 15:57
Chloromethane	ND	0.50	1	11/14/2019 15:57
2-Chlorotoluene	ND	0.50	1	11/14/2019 15:57
4-Chlorotoluene	ND	0.50	1	11/14/2019 15:57
Dibromochloromethane	ND	0.50	1	11/14/2019 15:57
1,2-Dibromo-3-chloropropane	ND	0.20	1	11/14/2019 15:57
1,2-Dibromoethane (EDB)	ND	0.50	1	11/14/2019 15:57
Dibromomethane	ND	0.50	1	11/14/2019 15:57
1,2-Dichlorobenzene	ND	0.50	1	11/14/2019 15:57
1,3-Dichlorobenzene	ND	0.50	1	11/14/2019 15:57
1,4-Dichlorobenzene	ND	0.50	1	11/14/2019 15:57
Dichlorodifluoromethane	ND	0.50	1	11/14/2019 15:57
1,1-Dichloroethane	ND	0.50	1	11/14/2019 15:57
1,2-Dichloroethane (1,2-DCA)	ND	0.50	1	11/14/2019 15:57
1,1-Dichloroethene	ND	0.50	1	11/14/2019 15:57
cis-1,2-Dichloroethene	ND	0.50	1	11/14/2019 15:57
trans-1,2-Dichloroethene	ND	0.50	1	11/14/2019 15:57
1,2-Dichloropropane	ND	0.50	1	11/14/2019 15:57
1,3-Dichloropropane	ND	0.50	1	11/14/2019 15:57
2,2-Dichloropropane	ND	0.50	1	11/14/2019 15:57

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Analytical Report

Client:	P & D Environmental	**WorkOrder:**	1911663
Date Received:	11/13/19 16:15	**Extraction Method:**	SW5030B
Date Prepared:	11/14/19-11/15/19	**Analytical Method:**	SW8260B
Project:	0794; 820 W. MacArthur Blvd Oakland, CA	**Unit:**	µg/L

Volatile Organics

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
MW2	1911663-002B	Water	11/12/2019 13:00	GC18 11141915.D	188965

Analytes	Result	RL	DF	Date Analyzed
1,1-Dichloropropene	ND	0.50	1	11/14/2019 15:57
cis-1,3-Dichloropropene	ND	0.50	1	11/14/2019 15:57
trans-1,3-Dichloropropene	ND	0.50	1	11/14/2019 15:57
Diisopropyl ether (DIPE)	ND	0.50	1	11/14/2019 15:57
Ethylbenzene	ND	0.50	1	11/14/2019 15:57
Ethyl tert-butyl ether (ETBE)	ND	0.50	1	11/14/2019 15:57
Freon 113	ND	0.50	1	11/14/2019 15:57
Hexachlorobutadiene	ND	0.50	1	11/14/2019 15:57
Hexachloroethane	ND	0.50	1	11/14/2019 15:57
2-Hexanone	ND	1.0	1	11/14/2019 15:57
Isopropylbenzene	ND	0.50	1	11/14/2019 15:57
4-Isopropyl toluene	ND	0.50	1	11/14/2019 15:57
Methyl-t-butyl ether (MTBE)	ND	0.50	1	11/14/2019 15:57
Methylene chloride	ND	2.0	1	11/14/2019 15:57
4-Methyl-2-pentanone (MIBK)	ND	0.50	1	11/14/2019 15:57
Naphthalene	ND	1.0	1	11/14/2019 15:57
n-Propyl benzene	ND	0.50	1	11/14/2019 15:57
Styrene	ND	2.0	1	11/14/2019 15:57
1,1,1,2-Tetrachloroethane	ND	0.50	1	11/14/2019 15:57
1,1,2,2-Tetrachloroethane	ND	0.50	1	11/14/2019 15:57
Tetrachloroethene	ND	0.50	1	11/14/2019 15:57
Toluene	ND	0.50	1	11/14/2019 15:57
1,2,3-Trichlorobenzene	ND	0.50	1	11/14/2019 15:57
1,2,4-Trichlorobenzene	ND	0.50	1	11/14/2019 15:57
1,1,1-Trichloroethane	ND	0.50	1	11/14/2019 15:57
1,1,2-Trichloroethane	ND	0.50	1	11/14/2019 15:57
Trichloroethene	ND	0.50	1	11/14/2019 15:57
Trichlorofluoromethane	ND	0.50	1	11/14/2019 15:57
1,2,3-Trichloropropane	ND	0.50	1	11/14/2019 15:57
1,2,4-Trimethylbenzene	ND	0.50	1	11/14/2019 15:57
1,3,5-Trimethylbenzene	ND	0.50	1	11/14/2019 15:57
Vinyl Chloride	ND	0.50	1	11/14/2019 15:57
m,p-Xylene	ND	0.50	1	11/14/2019 15:57
o-Xylene	ND	0.50	1	11/14/2019 15:57
Xylenes, Total	ND	0.50	1	11/14/2019 15:57

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Analytical Report

Client:	P & D Environmental	**WorkOrder:**	1911663
Date Received:	11/13/19 16:15	**Extraction Method:**	SW5030B
Date Prepared:	11/14/19-11/15/19	**Analytical Method:**	SW8260B
Project:	0794; 820 W. MacArthur Blvd Oakland, CA	**Unit:**	µg/L

Volatile Organics

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
MW2	**1911663-002B**	**Water**	**11/12/2019 13:00**	**GC18 11141915.D**	**188965**

Analytes	Result	RL	DF	Date Analyzed
Surrogates	REC (%)	Limits		
Dibromofluoromethane	100	78-112		11/14/2019 15:57
Toluene-d8	89	82-109		11/14/2019 15:57
4-BFB	92	63-121		11/14/2019 15:57

Analyst(s): AK

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Analytical Report

Client:	P & D Environmental	**WorkOrder:**	1911663
Date Received:	11/13/19 16:15	**Extraction Method:**	SW5030B
Date Prepared:	11/14/19-11/15/19	**Analytical Method:**	SW8260B
Project:	0794; 820 W. MacArthur Blvd Oakland, CA	**Unit:**	µg/L

Volatile Organics

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
MW3	1911663-003B	Water	11/12/2019 12:10	GC18 11141932.D	188965

Analytes	Result	RL	DF	Date Analyzed
Acetone	ND	10	1	11/15/2019 03:39
tert-Amyl methyl ether (TAME)	ND	0.50	1	11/15/2019 03:39
Benzene	ND	0.50	1	11/15/2019 03:39
Bromobenzene	ND	0.50	1	11/15/2019 03:39
Bromochloromethane	ND	0.50	1	11/15/2019 03:39
Bromodichloromethane	ND	0.50	1	11/15/2019 03:39
Bromoform	ND	0.50	1	11/15/2019 03:39
Bromomethane	ND	0.50	1	11/15/2019 03:39
2-Butanone (MEK)	ND	5.0	1	11/15/2019 03:39
t-Butyl alcohol (TBA)	ND	5.0	1	11/15/2019 03:39
n-Butyl benzene	ND	0.50	1	11/15/2019 03:39
sec-Butyl benzene	ND	0.50	1	11/15/2019 03:39
tert-Butyl benzene	ND	0.50	1	11/15/2019 03:39
Carbon Disulfide	ND	0.50	1	11/15/2019 03:39
Carbon Tetrachloride	ND	0.50	1	11/15/2019 03:39
Chlorobenzene	ND	0.50	1	11/15/2019 03:39
Chloroethane	ND	0.50	1	11/15/2019 03:39
Chloroform	ND	0.50	1	11/15/2019 03:39
Chloromethane	ND	0.50	1	11/15/2019 03:39
2-Chlorotoluene	ND	0.50	1	11/15/2019 03:39
4-Chlorotoluene	ND	0.50	1	11/15/2019 03:39
Dibromochloromethane	ND	0.50	1	11/15/2019 03:39
1,2-Dibromo-3-chloropropane	ND	0.20	1	11/15/2019 03:39
1,2-Dibromoethane (EDB)	ND	0.50	1	11/15/2019 03:39
Dibromomethane	ND	0.50	1	11/15/2019 03:39
1,2-Dichlorobenzene	ND	0.50	1	11/15/2019 03:39
1,3-Dichlorobenzene	ND	0.50	1	11/15/2019 03:39
1,4-Dichlorobenzene	ND	0.50	1	11/15/2019 03:39
Dichlorodifluoromethane	ND	0.50	1	11/15/2019 03:39
1,1-Dichloroethane	ND	0.50	1	11/15/2019 03:39
1,2-Dichloroethane (1,2-DCA)	ND	0.50	1	11/15/2019 03:39
1,1-Dichloroethene	ND	0.50	1	11/15/2019 03:39
cis-1,2-Dichloroethene	ND	0.50	1	11/15/2019 03:39
trans-1,2-Dichloroethene	ND	0.50	1	11/15/2019 03:39
1,2-Dichloropropane	ND	0.50	1	11/15/2019 03:39
1,3-Dichloropropane	ND	0.50	1	11/15/2019 03:39
2,2-Dichloropropane	ND	0.50	1	11/15/2019 03:39

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Analytical Report

Client:	P & D Environmental	**WorkOrder:**	1911663
Date Received:	11/13/19 16:15	**Extraction Method:**	SW5030B
Date Prepared:	11/14/19-11/15/19	**Analytical Method:**	SW8260B
Project:	0794; 820 W. MacArthur Blvd Oakland, CA	**Unit:**	µg/L

Volatile Organics

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
MW3	1911663-003B	Water	11/12/2019 12:10	GC18 11141932.D	188965

Analytes	Result	RL	DF	Date Analyzed
1,1-Dichloropropene	ND	0.50	1	11/15/2019 03:39
cis-1,3-Dichloropropene	ND	0.50	1	11/15/2019 03:39
trans-1,3-Dichloropropene	ND	0.50	1	11/15/2019 03:39
Diisopropyl ether (DIPE)	ND	0.50	1	11/15/2019 03:39
Ethylbenzene	ND	0.50	1	11/15/2019 03:39
Ethyl tert-butyl ether (ETBE)	ND	0.50	1	11/15/2019 03:39
Freon 113	ND	0.50	1	11/15/2019 03:39
Hexachlorobutadiene	ND	0.50	1	11/15/2019 03:39
Hexachloroethane	ND	0.50	1	11/15/2019 03:39
2-Hexanone	ND	1.0	1	11/15/2019 03:39
Isopropylbenzene	ND	0.50	1	11/15/2019 03:39
4-Isopropyl toluene	ND	0.50	1	11/15/2019 03:39
Methyl-t-butyl ether (MTBE)	ND	0.50	1	11/15/2019 03:39
Methylene chloride	ND	2.0	1	11/15/2019 03:39
4-Methyl-2-pentanone (MIBK)	ND	0.50	1	11/15/2019 03:39
Naphthalene	ND	1.0	1	11/15/2019 03:39
n-Propyl benzene	ND	0.50	1	11/15/2019 03:39
Styrene	ND	2.0	1	11/15/2019 03:39
1,1,1,2-Tetrachloroethane	ND	0.50	1	11/15/2019 03:39
1,1,2,2-Tetrachloroethane	ND	0.50	1	11/15/2019 03:39
Tetrachloroethene	ND	0.50	1	11/15/2019 03:39
Toluene	ND	0.50	1	11/15/2019 03:39
1,2,3-Trichlorobenzene	ND	0.50	1	11/15/2019 03:39
1,2,4-Trichlorobenzene	ND	0.50	1	11/15/2019 03:39
1,1,1-Trichloroethane	ND	0.50	1	11/15/2019 03:39
1,1,2-Trichloroethane	ND	0.50	1	11/15/2019 03:39
Trichloroethene	ND	0.50	1	11/15/2019 03:39
Trichlorofluoromethane	ND	0.50	1	11/15/2019 03:39
1,2,3-Trichloropropane	ND	0.50	1	11/15/2019 03:39
1,2,4-Trimethylbenzene	ND	0.50	1	11/15/2019 03:39
1,3,5-Trimethylbenzene	ND	0.50	1	11/15/2019 03:39
Vinyl Chloride	ND	0.50	1	11/15/2019 03:39
m,p-Xylene	ND	0.50	1	11/15/2019 03:39
o-Xylene	ND	0.50	1	11/15/2019 03:39
Xylenes, Total	ND	0.50	1	11/15/2019 03:39

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Analytical Report

Client:	P & D Environmental	**WorkOrder:**	1911663
Date Received:	11/13/19 16:15	**Extraction Method:**	SW5030B
Date Prepared:	11/14/19-11/15/19	**Analytical Method:**	SW8260B
Project:	0794; 820 W. MacArthur Blvd Oakland, CA	**Unit:**	µg/L

Volatile Organics

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
MW3	**1911663-003B**	**Water**	**11/12/2019 12:10**	**GC18 11141932.D**	**188965**

Analytes	Result	RL	DF	Date Analyzed
Surrogates	REC (%)	Limits		
Dibromofluoromethane	98	78-112		11/15/2019 03:39
Toluene-d8	91	82-109		11/15/2019 03:39
4-BFB	84	63-121		11/15/2019 03:39

Analyst(s): AK

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Analytical Report

Client:	P & D Environmental	**WorkOrder:**	1911663
Date Received:	11/13/19 16:15	**Extraction Method:**	SW5030B
Date Prepared:	11/14/19-11/15/19	**Analytical Method:**	SW8021B/8015Bm
Project:	0794; 820 W. MacArthur Blvd Oakland, CA	**Unit:**	µg/L

Gasoline Range (C6-C12) Volatile Hydrocarbons as Gasoline with BTEX and MTBE

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
MW1	1911663-001A	Water	11/12/2019 14:00	GC3 11141923.D	188886

Analytes	Result	RL	DF	Date Analyzed
TPH(g) (C6-C12)	ND	50	1	11/14/2019 23:14
MTBE	---	5.0	1	11/14/2019 23:14
Benzene	---	0.50	1	11/14/2019 23:14
Toluene	---	0.50	1	11/14/2019 23:14
Ethylbenzene	---	0.50	1	11/14/2019 23:14
m,p-Xylene	---	1.0	1	11/14/2019 23:14
o-Xylene	---	0.50	1	11/14/2019 23:14
Xylenes	---	0.50	1	11/14/2019 23:14

Surrogates	REC (%)	Limits	
aaa-TFT	95	76-115	11/14/2019 23:14

Analyst(s): IA

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
MW2	1911663-002A	Water	11/12/2019 13:00	GC3 11141926.D	188886

Analytes	Result	RL	DF	Date Analyzed
TPH(g) (C6-C12)	ND	50	1	11/15/2019 00:46
MTBE	---	5.0	1	11/15/2019 00:46
Benzene	---	0.50	1	11/15/2019 00:46
Toluene	---	0.50	1	11/15/2019 00:46
Ethylbenzene	---	0.50	1	11/15/2019 00:46
m,p-Xylene	---	1.0	1	11/15/2019 00:46
o-Xylene	---	0.50	1	11/15/2019 00:46
Xylenes	---	0.50	1	11/15/2019 00:46

Surrogates	REC (%)	Limits	
aaa-TFT	93	76-115	11/15/2019 00:46

Analyst(s): IA

(Cont.)

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Analytical Report

Client:	P & D Environmental	**WorkOrder:**	1911663
Date Received:	11/13/19 16:15	**Extraction Method:**	SW5030B
Date Prepared:	11/14/19-11/15/19	**Analytical Method:**	SW8021B/8015Bm
Project:	0794; 820 W. MacArthur Blvd Oakland, CA	**Unit:**	µg/L

Gasoline Range (C6-C12) Volatile Hydrocarbons as Gasoline with BTEX and MTBE

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
MW3	**1911663-003A**	**Water**	**11/12/2019 12:10**	**GC3 11141927.D**	**188886**

Analytes	Result	RL	DF	Date Analyzed
TPH(g) (C6-C12)	ND	50	1	11/15/2019 01:16
MTBE	---	5.0	1	11/15/2019 01:16
Benzene	---	0.50	1	11/15/2019 01:16
Toluene	---	0.50	1	11/15/2019 01:16
Ethylbenzene	---	0.50	1	11/15/2019 01:16
m,p-Xylene	---	1.0	1	11/15/2019 01:16
o-Xylene	---	0.50	1	11/15/2019 01:16
Xylenes	---	0.50	1	11/15/2019 01:16

Surrogates	REC (%)	Limits	
aaa-TFT	91	76-115	11/15/2019 01:16

Analyst(s): IA

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Analytical Report

Client:	P & D Environmental	**WorkOrder:**	1911663
Date Received:	11/13/19 16:15	**Extraction Method:**	SW3510C
Date Prepared:	11/13/19	**Analytical Method:**	SW8015B
Project:	0794; 820 W. MacArthur Blvd Oakland, CA	**Unit:**	µg/L

Total Extractable Petroleum Hydrocarbons w/out SG Clean-Up

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
MW1	**1911663-001A**	**Water**	**11/12/2019 14:00**	**GC11A 11161980.D**	**188835**

Analytes	Result	RL	DF	Date Analyzed
TPH-Diesel (C10-C23)	**130**	50	1	11/17/2019 15:08
TPH-Motor Oil (C18-C36)	ND	250	1	11/17/2019 15:08
TPH-Bunker Oil (C10-C36)	ND	250	1	11/17/2019 15:08

Surrogates	REC (%)	Limits	Date Analyzed
C9	105	61-139	11/17/2019 15:08

Analyst(s): JIS   Analytical Comments: e2,e8

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
MW2	**1911663-002A**	**Water**	**11/12/2019 13:00**	**GC11A 11161982.D**	**188835**

Analytes	Result	RL	DF	Date Analyzed
TPH-Diesel (C10-C23)	ND	50	1	11/17/2019 15:48
TPH-Motor Oil (C18-C36)	ND	250	1	11/17/2019 15:48
TPH-Bunker Oil (C10-C36)	ND	250	1	11/17/2019 15:48

Surrogates	REC (%)	Limits	Date Analyzed
C9	102	61-139	11/17/2019 15:48

Analyst(s): JIS

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
MW3	**1911663-003A**	**Water**	**11/12/2019 12:10**	**GC11A 11161984.D**	**188835**

Analytes	Result	RL	DF	Date Analyzed
TPH-Diesel (C10-C23)	ND	50	1	11/17/2019 16:28
TPH-Motor Oil (C18-C36)	ND	250	1	11/17/2019 16:28
TPH-Bunker Oil (C10-C36)	ND	250	1	11/17/2019 16:28

Surrogates	REC (%)	Limits	Date Analyzed
C9	103	61-139	11/17/2019 16:28

Analyst(s): JIS

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Quality Control Report

Client:	P & D Environmental	**WorkOrder:**	1911663
Date Prepared:	11/14/19	**BatchID:**	188965
Date Analyzed:	11/14/19	**Extraction Method:**	SW5030B
Instrument:	GC18	**Analytical Method:**	SW8260B
Matrix:	Water	**Unit:**	µg/L
Project:	0794; 820 W. MacArthur Blvd Oakland, CA	**Sample ID:**	MB/LCS/LCSD-188965

QC Summary Report for SW8260B

Analyte	MB Result	MDL	RL	SPK Val	MB SS %REC	MB SS Limits
Acetone	ND	5.9	10	-	-	-
tert-Amyl methyl ether (TAME)	ND	0.22	0.50	-	-	-
Benzene	ND	0.051	0.50	-	-	-
Bromobenzene	ND	0.060	0.50	-	-	-
Bromochloromethane	ND	0.090	0.50	-	-	-
Bromodichloromethane	ND	0.20	0.50	-	-	-
Bromoform	ND	0.066	0.50	-	-	-
Bromomethane	ND	0.16	0.50	-	-	-
2-Butanone (MEK)	ND	2.0	5.0	-	-	-
t-Butyl alcohol (TBA)	ND	1.7	5.0	-	-	-
n-Butyl benzene	ND	0.084	0.50	-	-	-
sec-Butyl benzene	ND	0.060	0.50	-	-	-
tert-Butyl benzene	ND	0.050	0.50	-	-	-
Carbon Disulfide	ND	0.28	0.50	-	-	-
Carbon Tetrachloride	ND	0.069	0.50	-	-	-
Chlorobenzene	ND	0.050	0.50	-	-	-
Chloroethane	ND	0.31	0.50	-	-	-
Chloroform	ND	0.064	0.50	-	-	-
Chloromethane	ND	0.13	0.50	-	-	-
2-Chlorotoluene	ND	0.070	0.50	-	-	-
4-Chlorotoluene	ND	0.070	0.50	-	-	-
Dibromochloromethane	ND	0.080	0.50	-	-	-
1,2-Dibromo-3-chloropropane	ND	0.12	0.20	-	-	-
1,2-Dibromoethane (EDB)	ND	0.12	0.50	-	-	-
Dibromomethane	ND	0.080	0.50	-	-	-
1,2-Dichlorobenzene	ND	0.080	0.50	-	-	-
1,3-Dichlorobenzene	ND	0.071	0.50	-	-	-
1,4-Dichlorobenzene	ND	0.072	0.50	-	-	-
Dichlorodifluoromethane	ND	0.063	0.50	-	-	-
1,1-Dichloroethane	ND	0.060	0.50	-	-	-
1,2-Dichloroethane (1,2-DCA)	ND	0.090	0.50	-	-	-
1,1-Dichloroethene	ND	0.086	0.50	-	-	-
cis-1,2-Dichloroethene	ND	0.050	0.50	-	-	-
trans-1,2-Dichloroethene	ND	0.060	0.50	-	-	-
1,2-Dichloropropane	ND	0.055	0.50	-	-	-
1,3-Dichloropropane	ND	0.10	0.50	-	-	-
2,2-Dichloropropane	ND	0.10	0.50	-	-	-
1,1-Dichloropropene	ND	0.060	0.50	-	-	-

(Cont.)

Quality Control Report

Client:	P & D Environmental	**WorkOrder:**	1911663
Date Prepared:	11/14/19	**BatchID:**	188965
Date Analyzed:	11/14/19	**Extraction Method:**	SW5030B
Instrument:	GC18	**Analytical Method:**	SW8260B
Matrix:	Water	**Unit:**	µg/L
Project:	0794; 820 W. MacArthur Blvd Oakland, CA	**Sample ID:**	MB/LCS/LCSD-188965

QC Summary Report for SW8260B

Analyte	MB Result	MDL	RL	SPK Val	MB SS %REC	MB SS Limits
cis-1,3-Dichloropropene	ND	0.090	0.50	-	-	-
trans-1,3-Dichloropropene	ND	0.070	0.50	-	-	-
Diisopropyl ether (DIPE)	ND	0.070	0.50	-	-	-
Ethylbenzene	ND	0.050	0.50	-	-	-
Ethyl tert-butyl ether (ETBE)	ND	0.070	0.50	-	-	-
Freon 113	ND	0.066	0.50	-	-	-
Hexachlorobutadiene	ND	0.085	0.50	-	-	-
Hexachloroethane	ND	0.060	0.50	-	-	-
2-Hexanone	ND	0.41	1.0	-	-	-
Isopropylbenzene	ND	0.070	0.50	-	-	-
4-Isopropyl toluene	ND	0.050	0.50	-	-	-
Methyl-t-butyl ether (MTBE)	ND	0.10	0.50	-	-	-
Methylene chloride	ND	1.2	2.0	-	-	-
4-Methyl-2-pentanone (MIBK)	ND	0.24	0.50	-	-	-
Naphthalene	ND	0.45	1.0	-	-	-
n-Propyl benzene	ND	0.060	0.50	-	-	-
Styrene	ND	0.59	2.0	-	-	-
1,1,1,2-Tetrachloroethane	ND	0.070	0.50	-	-	-
1,1,2,2-Tetrachloroethane	ND	0.11	0.50	-	-	-
Tetrachloroethene	ND	0.082	0.50	-	-	-
Toluene	ND	0.25	0.50	-	-	-
1,2,3-Trichlorobenzene	ND	0.25	0.50	-	-	-
1,2,4-Trichlorobenzene	ND	0.086	0.50	-	-	-
1,1,1-Trichloroethane	ND	0.050	0.50	-	-	-
1,1,2-Trichloroethane	ND	0.18	0.50	-	-	-
Trichloroethene	ND	0.060	0.50	-	-	-
Trichlorofluoromethane	ND	0.047	0.50	-	-	-
1,2,3-Trichloropropane	ND	0.14	0.50	-	-	-
1,2,4-Trimethylbenzene	ND	0.065	0.50	-	-	-
1,3,5-Trimethylbenzene	ND	0.070	0.50	-	-	-
Vinyl Chloride	ND	0.070	0.50	-	-	-
m,p-Xylene	ND	0.11	0.50	-	-	-
o-Xylene	ND	0.060	0.50	-	-	-

(Cont.)

Quality Control Report

Client:	P & D Environmental	**WorkOrder:**	1911663
Date Prepared:	11/14/19	**BatchID:**	188965
Date Analyzed:	11/14/19	**Extraction Method:**	SW5030B
Instrument:	GC18	**Analytical Method:**	SW8260B
Matrix:	Water	**Unit:**	µg/L
Project:	0794; 820 W. MacArthur Blvd Oakland, CA	**Sample ID:**	MB/LCS/LCSD-188965

QC Summary Report for SW8260B

Analyte	MB Result	MDL	RL	SPK Val	MB SS %REC	MB SS Limits
Surrogate Recovery						
Dibromofluoromethane	24			25	96	76-110
Toluene-d8	23			25	91	84-111
4-BFB	2.1			2.5	85	64-121

(Cont.)

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Quality Control Report

Client:	P & D Environmental	**WorkOrder:**	1911663
Date Prepared:	11/14/19	**BatchID:**	188965
Date Analyzed:	11/14/19	**Extraction Method:**	SW5030B
Instrument:	GC18	**Analytical Method:**	SW8260B
Matrix:	Water	**Unit:**	µg/L
Project:	0794; 820 W. MacArthur Blvd Oakland, CA	**Sample ID:**	MB/LCS/LCSD-188965

QC Summary Report for SW8260B

Analyte	LCS Result	LCSD Result	SPK Val	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Limit
Acetone	38	34	40	94	85	32-138	9.96	20
tert-Amyl methyl ether (TAME)	3.4	3.2	4	86	81	62-119	6.34	20
Benzene	3.8	3.6	4	96	91	71-126	4.79	20
Bromobenzene	3.4	3.3	4	84	81	66-117	3.67	20
Bromochloromethane	3.5	3.4	4	88	84	67-124	4.80	20
Bromodichloromethane	3.4	3.2	4	85	81	63-119	4.40	20
Bromoform	3.1	3.0	4	79	75	46-117	5.33	20
Bromomethane	4.5	4.4	4	113	109	32-171	3.69	20
2-Butanone (MEK)	16	15	16	100	94	48-136	6.20	20
t-Butyl alcohol (TBA)	16	14	16	97	85	40-131	13.3	20
n-Butyl benzene	4.3	4.1	4	107	103	75-125	3.68	20
sec-Butyl benzene	4.0	3.8	4	99	94	72-120	4.78	20
tert-Butyl benzene	3.6	3.4	4	89	85	63-118	5.13	20
Carbon Disulfide	3.7	3.5	4	93	88	64-126	5.88	20
Carbon Tetrachloride	3.4	3.3	4	86	82	67-122	4.80	20
Chlorobenzene	3.8	3.6	4	95	90	71-117	4.60	20
Chloroethane	4.3	4.1	4	108	101	53-136	5.96	20
Chloroform	3.6	3.5	4	90	86	67-126	4.36	20
Chloromethane	3.9	3.8	4	98	94	42-148	3.64	20
2-Chlorotoluene	3.9	3.7	4	96	92	70-117	4.64	20
4-Chlorotoluene	3.6	3.4	4	91	86	67-117	5.88	20
Dibromochloromethane	3.3	3.1	4	82	77	52-120	5.31	20
1,2-Dibromo-3-chloropropane	1.6	1.5	2	79	74	38-128	6.76	20
1,2-Dibromoethane (EDB)	1.8	1.7	2	90	85	58-117	5.63	20
Dibromomethane	3.4	3.2	4	85	80	66-120	6.49	20
1,2-Dichlorobenzene	3.9	3.7	4	98	93	71-117	4.76	20
1,3-Dichlorobenzene	4.1	3.9	4	102	97	74-116	5.35	20
1,4-Dichlorobenzene	4.1	3.9	4	102	98	71-115	3.71	20
Dichlorodifluoromethane	3.9	3.6	4	98	90	29-145	8.79	20
1,1-Dichloroethane	3.7	3.5	4	93	88	68-128	4.90	20
1,2-Dichloroethane (1,2-DCA)	3.7	3.5	4	93	88	61-123	4.95	20
1,1-Dichloroethene	3.5	3.4	4	88	84	65-126	4.64	20
cis-1,2-Dichloroethene	3.7	3.4	4	92	85	71-122	8.39	20
trans-1,2-Dichloroethene	3.7	3.5	4	92	88	70-126	4.57	20
1,2-Dichloropropane	3.6	3.4	4	90	86	67-124	4.47	20
1,3-Dichloropropane	3.6	3.5	4	91	86	65-120	4.84	20
2,2-Dichloropropane	3.9	3.7	4	97	93	71-127	4.86	20
1,1-Dichloropropene	3.7	3.5	4	92	88	69-122	4.99	20

(Cont.)

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Quality Control Report

Client:	P & D Environmental	**WorkOrder:**	1911663
Date Prepared:	11/14/19	**BatchID:**	188965
Date Analyzed:	11/14/19	**Extraction Method:**	SW5030B
Instrument:	GC18	**Analytical Method:**	SW8260B
Matrix:	Water	**Unit:**	µg/L
Project:	0794; 820 W. MacArthur Blvd Oakland, CA	**Sample ID:**	MB/LCS/LCSD-188965

QC Summary Report for SW8260B

Analyte	LCS Result	LCSD Result	SPK Val	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Limit
cis-1,3-Dichloropropene	3.5	3.3	4	87	83	63-119	4.89	20
trans-1,3-Dichloropropene	3.6	3.4	4	90	86	63-116	5.09	20
Diisopropyl ether (DIPE)	3.8	3.6	4	95	89	64-128	6.15	20
Ethylbenzene	4.0	3.8	4	100	96	69-120	4.46	20
Ethyl tert-butyl ether (ETBE)	3.7	3.5	4	93	87	63-120	6.83	20
Freon 113	3.7	3.5	4	93	87	67-126	6.34	20
Hexachlorobutadiene	3.5	3.3	4	87	82	50-140	4.96	20
Hexachloroethane	3.6	3.4	4	89	86	52-122	4.26	20
2-Hexanone	3.4	3.1	4	85	78	39-121	8.16	20
Isopropylbenzene	3.9	3.8	4	98	95	69-120	3.68	20
4-Isopropyl toluene	4.0	3.8	4	100	95	72-122	5.17	20
Methyl-t-butyl ether (MTBE)	3.7	3.5	4	92	86	60-121	6.16	20
Methylene chloride	3.4	3.2	4	86	80	40-148	6.87	20
4-Methyl-2-pentanone (MIBK)	3.7	3.5	4	92	86	48-115	6.37	20
Naphthalene	3.8	3.4	4	95	86	62-124	10.2	20
n-Propyl benzene	3.9	3.7	4	97	92	70-118	5.41	20
Styrene	3.8	3.6	4	95	89	57-118	6.09	20
1,1,1,2-Tetrachloroethane	3.5	3.4	4	89	84	63-117	5.35	20
1,1,2,2-Tetrachloroethane	3.3	3.1	4	82	78	60-116	4.96	20
Tetrachloroethene	3.4	3.2	4	85	81	60-131	5.62	20
Toluene	3.7	3.6	4	94	89	67-115	5.11	20
1,2,3-Trichlorobenzene	3.8	3.5	4	96	88	60-128	8.68	20
1,2,4-Trichlorobenzene	3.9	3.6	4	97	89	61-133	8.68	20
1,1,1-Trichloroethane	3.6	3.4	4	89	86	67-124	4.50	20
1,1,2-Trichloroethane	3.4	3.2	4	84	80	62-117	5.00	20
Trichloroethene	3.4	3.2	4	84	81	69-120	4.11	20
Trichlorofluoromethane	3.8	3.6	4	95	89	60-134	6.20	20
1,2,3-Trichloropropane	1.8	1.7	2	92	87	56-120	5.38	20
1,2,4-Trimethylbenzene	4.0	3.8	4	100	94	67-124	6.37	20
1,3,5-Trimethylbenzene	3.9	3.7	4	98	94	69-122	4.91	20
Vinyl Chloride	2.1	2.0	2	103	99	52-145	4.43	20
m,p-Xylene	7.5	7.1	8	94	89	67-119	5.83	20
o-Xylene	4.0	3.9	4	101	96	68-120	4.90	20

(Cont.)

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Quality Control Report

Client:	P & D Environmental	**WorkOrder:**	1911663
Date Prepared:	11/14/19	**BatchID:**	188965
Date Analyzed:	11/14/19	**Extraction Method:**	SW5030B
Instrument:	GC18	**Analytical Method:**	SW8260B
Matrix:	Water	**Unit:**	µg/L
Project:	0794; 820 W. MacArthur Blvd Oakland, CA	**Sample ID:**	MB/LCS/LCSD-188965

QC Summary Report for SW8260B

Analyte	LCS Result	LCSD Result	SPK Val	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Limit
Surrogate Recovery								
Dibromofluoromethane	24	24	25	95	95	76-110	0	20
Toluene-d8	23	23	25	91	91	84-111	0	20
4-BFB	2.1	2.2	2.5	85	86	64-121	0.872	20

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Quality Control Report

Client:	P & D Environmental	**WorkOrder:**	1911663
Date Prepared:	11/14/19	**BatchID:**	188886
Date Analyzed:	11/14/19	**Extraction Method:**	SW5030B
Instrument:	GC3	**Analytical Method:**	SW8021B/8015Bm
Matrix:	Water	**Unit:**	µg/L
Project:	0794; 820 W. MacArthur Blvd Oakland, CA	**Sample ID:**	MB/LCS/LCSD-188886

QC Summary Report for SW8021B/8015Bm

Analyte	MB Result	MDL	RL	SPK Val	MB SS %REC	MB SS Limits
TPH(g) (C6-C12)	ND	20	50	-	-	-
MTBE	ND	1.2	5.0	-	-	-
Benzene	ND	0.20	0.50	-	-	-
Toluene	ND	0.19	0.50	-	-	-
Ethylbenzene	ND	0.23	0.50	-	-	-
m,p-Xylene	ND	0.40	1.0	-	-	-
o-Xylene	ND	0.13	0.50	-	-	-
Surrogate Recovery						
aaa-TFT	8.9			10	89	74-117

Analyte	LCS Result	LCSD Result	SPK Val	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Limit
TPH(btex)	62	59	60	103	98	78-116	4.57	20
MTBE	8.4	8.5	10	84	85	72-122	0.658	20
Benzene	9.9	10	10	99	104	81-123	4.45	20
Toluene	10	11	10	104	107	83-129	2.84	20
Ethylbenzene	10	11	10	102	106	88-126	4.00	20
m,p-Xylene	21	21	20	103	107	80-120	3.73	20
o-Xylene	9.9	10	10	99	102	80-120	2.78	20
Surrogate Recovery								
aaa-TFT	9.5	9.7	10	95	97	74-117	2.36	20

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Quality Control Report

Client:	P & D Environmental	**WorkOrder:**	1911663
Date Prepared:	11/13/19	**BatchID:**	188835
Date Analyzed:	11/14/19	**Extraction Method:**	SW3510C
Instrument:	GC6B	**Analytical Method:**	SW8015B
Matrix:	Water	**Unit:**	µg/L
Project:	0794; 820 W. MacArthur Blvd Oakland, CA	**Sample ID:**	MB/LCS/LCSD-188835

QC Report for SW8015B w/out SG Clean-Up

Analyte	MB Result	MDL	RL	SPK Val	MB SS %REC	MB SS Limits
TPH-Diesel (C10-C23)	ND	35	50	-	-	-
TPH-Motor Oil (C18-C36)	ND	140	250	-	-	-
Surrogate Recovery						
C9	620			625	99	68-127

Analyte	LCS Result	LCSD Result	SPK Val	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Limit
TPH-Diesel (C10-C23)	1100	980	1000	106	98	86-142	7.53	20
Surrogate Recovery								
C9	600	590	625	96	95	68-127	0.642	20

McCampbell Analytical, Inc.
1534 Willow Pass Rd
Pittsburg, CA 94565-1701
(925) 252-9262

CHAIN-OF-CUSTODY RECORD

WorkOrder: 1911663 **ClientCode: PDEO**

☐ WaterTrax ☐ WriteOn ☐ EDF ☐ Excel ☐ EQuIS ☑ Email ☐ HardCopy ☐ ThirdParty ☐ J-flag
☐ Detection Summary ☐ Dry-Weight

Report to:
Michael Deschenes
P & D Environmental
55 Santa Clara Ave, Ste.240
Oakland, CA 94610
(510) 658-6916 FAX: 510-834-0152

Email: lab@pdenviro.com; Paul.King@pdenviro.c
cc/3rd Party:
PO:
Project: 0794; 820 W. MacArthur Blvd Oakland, CA

Bill to:
Accounts Payable
P & D Environmental
55 Santa Clara Ave, Ste.240
Oakland, CA 94610

Requested TAT: 5 days;

Date Received: 11/13/2019
Date Logged: 11/13/2019

Lab ID	Client ID	Matrix	Collection Date	Hold	1	2	3	4	5	6	7	8	9	10	11	12
					Requested Tests (See legend below)											
1911663-001	MW1	Water	11/12/2019 14:00	☐	B	A	A	A								
1911663-002	MW2	Water	11/12/2019 13:00	☐	B	A	A	A								
1911663-003	MW3	Water	11/12/2019 12:10	☐	B	A	A	A								

Test Legend:

1	8260B_W	2	G-MBTEX_W	3	PRDisposal Fee	4	TPH(DMO)_W
5		6		7		8	
9		10		11		12	

Project Manager: Angela Rydelius **Prepared by: Lilly Ortiz**

The following SampIDs: 001A, 002A, 003A contain testgroup Multi Range_W.

Comments: Always send reports to: lab@pdenviro.com; Paul.King@pdenviro.com; pdking0000@aol.com. P&D always gets charged $67 multi range price despite the extra analytes

NOTE: Soil samples are discarded 60 days after results are reported unless other arrangements are made (Water samples are 30 days).
Hazardous samples will be returned to client or disposed of at client expense.

McCampbell Analytical, Inc.
"When Quality Counts"

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WORK ORDER SUMMARY

Client Name: P & D ENVIRONMENTAL

Project: 0794; 820 W. MacArthur Blvd Oakland, CA

Work Order: 1911663

Client Contact: Michael Deschenes

QC Level: LEVEL 2

Contact's Email: lab@pdenviro.com; Paul.King@pdenviro.com; pdking0000@aol.com

Comments: Always send reports to: lab@pdenviro.com; Paul.King@pdenviro.com; pdking0000@aol.com. P&D always

Date Logged: 11/13/2019

☐ WaterTrax ☐ WriteOn ☐ EDF ☐ Excel ☐ EQuIS ☑ Email ☐ HardCopy ☐ ThirdParty ☐ J-flag

Lab ID	Client ID	Matrix	Test Name	Containers /Composites	Bottle & Preservative	De-chlorinated	Collection Date & Time	TAT	Sediment Content	Hold	SubOut
1911663-001A	MW1	Water	Multi-Range TPH	4	1 VOAs w/HCL + 3-aVOAs (multi-range)	☐	11/12/2019 14:00	5 days	None	☐	
1911663-001B	MW1	Water	SW8260B (VOCs)	2	VOA w/ HCl	☐	11/12/2019 14:00	5 days	None	☐	
1911663-002A	MW2	Water	Multi-Range TPH	4	1 VOAs w/HCL + 3-aVOAs (multi-range)	☐	11/12/2019 13:00	5 days	Trace	☐	
1911663-002B	MW2	Water	SW8260B (VOCs)	2	VOA w/ HCl	☐	11/12/2019 13:00	5 days	Trace	☐	
1911663-003A	MW3	Water	Multi-Range TPH	4	1 VOAs w/HCL + 3-aVOAs (multi-range)	☐	11/12/2019 12:10	5 days	Trace	☐	
1911663-003B	MW3	Water	SW8260B (VOCs)	2	VOA w/ HCl	☐	11/12/2019 12:10	5 days	Trace	☐	

NOTES:
- **STLC and TCLP extractions require 2 days to complete; therefore, all TATs begin after the extraction is completed (i.e., One-day TAT yields results in 3 days from sample submission).**
- **MAI assumes that all material present in the provided sampling container is considered part of the sample - MAI does not exclude any material from the sample prior to sample preparation unless requested in writing by the client.**

CHAIN OF CUSTODY RECORD

1911663 PAGE 1 OF 1

P&D ENVIRONMENTAL, INC.
55 Santa Clara Ave., Suite 240
Oakland, CA 94610
(510) 658-6916

PROJECT NUMBER: 0794

PROJECT NAME: 820 W. MacArthur Blvd Oakland, CA

SAMPLED BY: (PRINTED & SIGNATURE) MICHAEL BASS-DESCHENES Michael Bass-Deschenes

SAMPLE NUMBER	DATE	TIME	TYPE	SAMPLE LOCATION	NUMBER OF CONTAINERS	ANALYSIS(ES): TPH-G,D,BO,MO	VOCs BY EPA 8260B						PRESERVATIVE	REMARKS
MW1	11/12/19	1400	H2O		6	X	X						ICE	NORMAL TAT
MW2	"	1300	"		6	X	X						"	" "
MW3	"	1210	"		6	X	X						"	" "

RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)		
Michael Bass-Deschenes	11/13/19	1145	LAP 11/13/19 1145	Total No. of Samples (This Shipment): 3 / Total No. of Containers (This Shipment): 18	LABORATORY: McCAMPBELL ANALYTICAL, INC
LAP	11/13/19	1615	[illegible] 11/13/19 1615	LABORATORY CONTACT: ANGELA RYDELIUS	LABORATORY PHONE NUMBER: (925) 252-9262
			RECEIVED FOR LABORATORY BY: (SIGNATURE) [illegible]	SAMPLE ANALYSIS REQUEST SHEET ATTACHED: ( ) YES (X) NO	

Results and billing to:
P&D Environmental, Inc.
lab@pdenviro.com

REMARKS: 3 40ML VOAs WITH HCL
3 40ML AMBER VOAS UNPRESERVED

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Sample Receipt Checklist

Client Name:	**P & D Environmental**	Date and Time Received	**11/13/2019 16:15**
Project:	**0794; 820 W. MacArthur Blvd Oakland, CA**	Date Logged:	**11/13/2019**
		Received by:	Lilly Ortiz
WorkOrder №:	**1911663** Matrix: Water	Logged by:	Lilly Ortiz
Carrier:	Lorenzo Perez (MAI Courier)		

Chain of Custody (COC) Information

	Yes	No	NA
Chain of custody present?	☑	☐	
Chain of custody signed when relinquished and received?	☑	☐	
Chain of custody agrees with sample labels?	☑	☐	
Sample IDs noted by Client on COC?	☑	☐	
Date and Time of collection noted by Client on COC?	☑	☐	
Sampler's name noted on COC?	☑	☐	
COC agrees with Quote?	☐	☐	☑

Sample Receipt Information

	Yes	No	NA
Custody seals intact on shipping container/cooler?	☐	☐	☑
Shipping container/cooler in good condition?	☑	☐	
Samples in proper containers/bottles?	☑	☐	
Sample containers intact?	☑	☐	
Sufficient sample volume for indicated test?	☑	☐	

Sample Preservation and Hold Time (HT) Information

	Yes	No	NA
All samples received within holding time?	☑	☐	☐
Samples Received on Ice?	☑	☐	
(Ice Type: WET ICE)			
Sample/Temp Blank temperature	Temp: 1.5°C		☐
Water - VOA vials have zero headspace / no bubbles?	☐	☐	☑
Sample labels checked for correct preservation?	☑	☐	
pH acceptable upon receipt (Metal: <2; Nitrate 353.2/4500NO3: <2; 522: <4; 218.7: >8)?	☐	☐	☑

UCMR Samples:

	Yes	No	NA
pH tested and acceptable upon receipt (200.8: ≤2; 525.3: ≤4; 530: ≤7; 541: <3; 544: <6.5 & 7.5)?	☐	☐	☑
Free Chlorine tested and acceptable upon receipt (<0.1mg/L)?	☐	☐	☑

Comments:

McCampbell Analytical, Inc.

"When Quality Counts"

Analytical Report

WorkOrder: 2002A47

Report Created for: P & D Environmental

55 Santa Clara Ave, Ste.240
Oakland, CA 94610

Project Contact: Paul King
Project P.O.:
Project: 0794; 820 W. MacArthur Blvd. Oakland, CA

Project Received: 02/26/2020

Analytical Report reviewed & approved for release on 03/04/2020 by:

Susan Thompson
Project Manager

NELAP ACCREDITED TNI LABORATORY

1534 Willow Pass Rd. Pittsburg, CA 94565 ♦ TEL: (877) 252-9262 ♦ FAX: (925) 252-9269 ♦ www.mccampbell.com
CA ELAP 1644 ♦ NELAP 4033 ORELAP

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Glossary of Terms & Qualifier Definitions

Client: P & D Environmental
Project: 0794; 820 W. MacArthur Blvd. Oakland, CA
WorkOrder: 2002A47

Glossary Abbreviation

%D	Serial Dilution Percent Difference
95% Interval	95% Confident Interval
CPT	Consumer Product Testing not NELAP Accredited
DF	Dilution Factor
DI WET	(DISTLC) Waste Extraction Test using DI water
DISS	Dissolved (direct analysis of 0.45 µm filtered and acidified water sample)
DLT	Dilution Test (Serial Dilution)
DUP	Duplicate
EDL	Estimated Detection Limit
ERS	External reference sample. Second source calibration verification.
ITEF	International Toxicity Equivalence Factor
LCS	Laboratory Control Sample
LQL	Lowest Quantitation Level
MB	Method Blank
MB % Rec	% Recovery of Surrogate in Method Blank, if applicable
MDL	Method Detection Limit
ML	Minimum Level of Quantitation
MS	Matrix Spike
MSD	Matrix Spike Duplicate
N/A	Not Applicable
ND	Not detected at or above the indicated MDL or RL
NR	Data Not Reported due to matrix interference or insufficient sample amount.
PDS	Post Digestion Spike
PDSD	Post Digestion Spike Duplicate
PF	Prep Factor
RD	Relative Difference
RL	Reporting Limit (The RL is the lowest calibration standard in a multipoint calibration.)
RPD	Relative Percent Deviation
RRT	Relative Retention Time
SPK Val	Spike Value
SPKRef Val	Spike Reference Value
SPLP	Synthetic Precipitation Leachate Procedure
ST	Sorbent Tube
TCLP	Toxicity Characteristic Leachate Procedure
TEQ	Toxicity Equivalents
TZA	TimeZone Net Adjustment for sample collected outside of MAI's UTC.
WET (STLC)	Waste Extraction Test (Soluble Threshold Limit Concentration)

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Glossary of Terms & Qualifier Definitions

Client: P & D Environmental
Project: 0794; 820 W. MacArthur Blvd. Oakland, CA
WorkOrder: 2002A47

Analytical Qualifiers

S	Spike recovery outside accepted recovery limits
c4	Surrogate recovery outside of the control limits due to coelution with another peak(s) / cluttered chromatogram.
d1	Weakly modified or unmodified gasoline is significant
d17	Reporting limit for MTBE raised due to co-elution with non-target peaks.
e2	Diesel range compounds are significant; no recognizable pattern
e8	Pattern resembles kerosene/kerosene range/jet fuel range

Quality Control Qualifiers

F2	LCS/LCSD recovery and/or RPD/RSD is out of acceptance criteria.

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Analytical Report

Client:	P & D Environmental	**WorkOrder:**	2002A47
Date Received:	02/26/2020 15:50	**Extraction Method:**	SW5030B
Date Prepared:	03/04/2020	**Analytical Method:**	SW8260B
Project:	0794; 820 W. MacArthur Blvd. Oakland, CA	**Unit:**	µg/L

Volatile Organics

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
MW1	**2002A47-001B**	**Water**	**02/25/2020 11:35**	**GC18 03042007.D**	**194991**

Analytes	Result	RL	DF	Date Analyzed
Acetone	ND	10	1	03/04/2020 10:38
tert-Amyl methyl ether (TAME)	ND	0.50	1	03/04/2020 10:38
Benzene	ND	0.50	1	03/04/2020 10:38
Bromobenzene	ND	0.50	1	03/04/2020 10:38
Bromochloromethane	ND	0.50	1	03/04/2020 10:38
Bromodichloromethane	ND	0.70	1	03/04/2020 10:38
Bromoform	ND	0.50	1	03/04/2020 10:38
Bromomethane	ND	0.50	1	03/04/2020 10:38
2-Butanone (MEK)	ND	5.0	1	03/04/2020 10:38
t-Butyl alcohol (TBA)	ND	5.0	1	03/04/2020 10:38
n-Butyl benzene	**1.7**	0.50	1	03/04/2020 10:38
sec-Butyl benzene	**4.7**	0.50	1	03/04/2020 10:38
tert-Butyl benzene	ND	0.50	1	03/04/2020 10:38
Carbon Disulfide	ND	0.50	1	03/04/2020 10:38
Carbon Tetrachloride	ND	0.50	1	03/04/2020 10:38
Chlorobenzene	ND	0.50	1	03/04/2020 10:38
Chloroethane	ND	0.50	1	03/04/2020 10:38
Chloroform	ND	0.65	1	03/04/2020 10:38
Chloromethane	ND	0.50	1	03/04/2020 10:38
2-Chlorotoluene	ND	0.50	1	03/04/2020 10:38
4-Chlorotoluene	ND	0.50	1	03/04/2020 10:38
Dibromochloromethane	ND	0.50	1	03/04/2020 10:38
1,2-Dibromo-3-chloropropane	ND	0.20	1	03/04/2020 10:38
1,2-Dibromoethane (EDB)	ND	0.50	1	03/04/2020 10:38
Dibromomethane	ND	0.50	1	03/04/2020 10:38
1,2-Dichlorobenzene	ND	0.50	1	03/04/2020 10:38
1,3-Dichlorobenzene	ND	0.50	1	03/04/2020 10:38
1,4-Dichlorobenzene	ND	0.50	1	03/04/2020 10:38
Dichlorodifluoromethane	ND	0.50	1	03/04/2020 10:38
1,1-Dichloroethane	ND	0.50	1	03/04/2020 10:38
1,2-Dichloroethane (1,2-DCA)	**1.3**	0.50	1	03/04/2020 10:38
1,1-Dichloroethene	ND	0.50	1	03/04/2020 10:38
cis-1,2-Dichloroethene	ND	0.50	1	03/04/2020 10:38
trans-1,2-Dichloroethene	ND	0.50	1	03/04/2020 10:38
1,2-Dichloropropane	ND	0.50	1	03/04/2020 10:38
1,3-Dichloropropane	ND	0.50	1	03/04/2020 10:38
2,2-Dichloropropane	ND	0.50	1	03/04/2020 10:38

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Analytical Report

Client:	P & D Environmental	**WorkOrder:**	2002A47
Date Received:	02/26/2020 15:50	**Extraction Method:**	SW5030B
Date Prepared:	03/04/2020	**Analytical Method:**	SW8260B
Project:	0794; 820 W. MacArthur Blvd. Oakland, CA	**Unit:**	µg/L

Volatile Organics

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
MW1	**2002A47-001B**	**Water**	**02/25/2020 11:35**	**GC18 03042007.D**	**194991**

Analytes	Result	RL	DF	Date Analyzed
1,1-Dichloropropene	ND	0.50	1	03/04/2020 10:38
cis-1,3-Dichloropropene	ND	0.50	1	03/04/2020 10:38
trans-1,3-Dichloropropene	ND	0.50	1	03/04/2020 10:38
Diisopropyl ether (DIPE)	ND	0.50	1	03/04/2020 10:38
Ethylbenzene	ND	0.50	1	03/04/2020 10:38
Ethyl tert-butyl ether (ETBE)	ND	0.50	1	03/04/2020 10:38
Freon 113	ND	0.50	1	03/04/2020 10:38
Hexachlorobutadiene	ND	0.50	1	03/04/2020 10:38
Hexachloroethane	ND	4.2	1	03/04/2020 10:38
2-Hexanone	ND	1.0	1	03/04/2020 10:38
Isopropylbenzene	**1.2**	0.50	1	03/04/2020 10:38
4-Isopropyl toluene	ND	0.50	1	03/04/2020 10:38
Methyl-t-butyl ether (MTBE)	ND	0.50	1	03/04/2020 10:38
Methylene chloride	ND	2.0	1	03/04/2020 10:38
4-Methyl-2-pentanone (MIBK)	ND	0.50	1	03/04/2020 10:38
Naphthalene	ND	4.9	1	03/04/2020 10:38
n-Propyl benzene	**0.55**	0.50	1	03/04/2020 10:38
Styrene	ND	2.0	1	03/04/2020 10:38
1,1,1,2-Tetrachloroethane	ND	0.50	1	03/04/2020 10:38
1,1,2,2-Tetrachloroethane	ND	0.50	1	03/04/2020 10:38
Tetrachloroethene	ND	0.50	1	03/04/2020 10:38
Toluene	ND	0.50	1	03/04/2020 10:38
1,2,3-Trichlorobenzene	ND	0.50	1	03/04/2020 10:38
1,2,4-Trichlorobenzene	ND	0.50	1	03/04/2020 10:38
1,1,1-Trichloroethane	ND	0.50	1	03/04/2020 10:38
1,1,2-Trichloroethane	ND	0.50	1	03/04/2020 10:38
Trichloroethene	ND	0.50	1	03/04/2020 10:38
Trichlorofluoromethane	ND	0.50	1	03/04/2020 10:38
1,2,3-Trichloropropane	ND	0.50	1	03/04/2020 10:38
1,2,4-Trimethylbenzene	ND	0.50	1	03/04/2020 10:38
1,3,5-Trimethylbenzene	ND	0.50	1	03/04/2020 10:38
Vinyl Chloride	ND	0.50	1	03/04/2020 10:38
m,p-Xylene	ND	0.50	1	03/04/2020 10:38
o-Xylene	ND	0.50	1	03/04/2020 10:38
Xylenes, Total	ND	0.50	1	03/04/2020 10:38

(Cont.)

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Analytical Report

Client:	P & D Environmental	**WorkOrder:**	2002A47
Date Received:	02/26/2020 15:50	**Extraction Method:**	SW5030B
Date Prepared:	03/04/2020	**Analytical Method:**	SW8260B
Project:	0794; 820 W. MacArthur Blvd. Oakland, CA	**Unit:**	µg/L

Volatile Organics

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
MW1	**2002A47-001B**	**Water**	**02/25/2020 11:35**	**GC18 03042007.D**	**194991**

Analytes	Result	RL	DF	Date Analyzed
Surrogates	REC (%)	Limits		
Dibromofluoromethane	100	78-112		03/04/2020 10:38
Toluene-d8	91	82-109		03/04/2020 10:38
4-BFB	86	63-121		03/04/2020 10:38

Analyst(s): KF

(Cont.)

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Analytical Report

Client: P & D Environmental
Date Received: 02/26/2020 15:50
Date Prepared: 03/04/2020
Project: 0794; 820 W. MacArthur Blvd. Oakland, CA
WorkOrder: 2002A47
Extraction Method: SW5030B
Analytical Method: SW8260B
Unit: µg/L

Volatile Organics

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
MW2	2002A47-002B	Water	02/25/2020 10:45	GC10 03032028.D	194991

Analytes	Result	RL	DF	Date Analyzed
Acetone	ND	10	1	03/04/2020 01:19
tert-Amyl methyl ether (TAME)	ND	0.50	1	03/04/2020 01:19
Benzene	ND	0.50	1	03/04/2020 01:19
Bromobenzene	ND	0.50	1	03/04/2020 01:19
Bromochloromethane	ND	0.50	1	03/04/2020 01:19
Bromodichloromethane	ND	0.50	1	03/04/2020 01:19
Bromoform	ND	0.50	1	03/04/2020 01:19
Bromomethane	ND	0.50	1	03/04/2020 01:19
2-Butanone (MEK)	ND	5.0	1	03/04/2020 01:19
t-Butyl alcohol (TBA)	ND	5.0	1	03/04/2020 01:19
n-Butyl benzene	ND	0.50	1	03/04/2020 01:19
sec-Butyl benzene	ND	0.50	1	03/04/2020 01:19
tert-Butyl benzene	ND	0.50	1	03/04/2020 01:19
Carbon Disulfide	ND	0.50	1	03/04/2020 01:19
Carbon Tetrachloride	ND	0.50	1	03/04/2020 01:19
Chlorobenzene	ND	0.50	1	03/04/2020 01:19
Chloroethane	ND	0.50	1	03/04/2020 01:19
Chloroform	ND	0.50	1	03/04/2020 01:19
Chloromethane	ND	0.50	1	03/04/2020 01:19
2-Chlorotoluene	ND	0.50	1	03/04/2020 01:19
4-Chlorotoluene	ND	0.50	1	03/04/2020 01:19
Dibromochloromethane	ND	0.50	1	03/04/2020 01:19
1,2-Dibromo-3-chloropropane	ND	0.20	1	03/04/2020 01:19
1,2-Dibromoethane (EDB)	ND	0.50	1	03/04/2020 01:19
Dibromomethane	ND	0.50	1	03/04/2020 01:19
1,2-Dichlorobenzene	ND	0.50	1	03/04/2020 01:19
1,3-Dichlorobenzene	ND	0.50	1	03/04/2020 01:19
1,4-Dichlorobenzene	ND	0.50	1	03/04/2020 01:19
Dichlorodifluoromethane	ND	0.50	1	03/04/2020 01:19
1,1-Dichloroethane	ND	0.50	1	03/04/2020 01:19
1,2-Dichloroethane (1,2-DCA)	ND	0.50	1	03/04/2020 01:19
1,1-Dichloroethene	ND	0.50	1	03/04/2020 01:19
cis-1,2-Dichloroethene	ND	0.50	1	03/04/2020 01:19
trans-1,2-Dichloroethene	ND	0.50	1	03/04/2020 01:19
1,2-Dichloropropane	ND	0.50	1	03/04/2020 01:19
1,3-Dichloropropane	ND	0.50	1	03/04/2020 01:19
2,2-Dichloropropane	ND	0.50	1	03/04/2020 01:19

(Cont.)

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Analytical Report

Client:	P & D Environmental	**WorkOrder:**	2002A47
Date Received:	02/26/2020 15:50	**Extraction Method:**	SW5030B
Date Prepared:	03/04/2020	**Analytical Method:**	SW8260B
Project:	0794; 820 W. MacArthur Blvd. Oakland, CA	**Unit:**	µg/L

Volatile Organics

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
MW2	2002A47-002B	Water	02/25/2020 10:45	GC10 03032028.D	194991

Analytes	Result	RL	DF	Date Analyzed
1,1-Dichloropropene	ND	0.50	1	03/04/2020 01:19
cis-1,3-Dichloropropene	ND	0.50	1	03/04/2020 01:19
trans-1,3-Dichloropropene	ND	0.50	1	03/04/2020 01:19
Diisopropyl ether (DIPE)	ND	0.50	1	03/04/2020 01:19
Ethylbenzene	ND	0.50	1	03/04/2020 01:19
Ethyl tert-butyl ether (ETBE)	ND	0.50	1	03/04/2020 01:19
Freon 113	ND	0.50	1	03/04/2020 01:19
Hexachlorobutadiene	ND	0.50	1	03/04/2020 01:19
Hexachloroethane	ND	0.50	1	03/04/2020 01:19
2-Hexanone	ND	1.0	1	03/04/2020 01:19
Isopropylbenzene	ND	0.50	1	03/04/2020 01:19
4-Isopropyl toluene	ND	0.50	1	03/04/2020 01:19
Methyl-t-butyl ether (MTBE)	ND	0.50	1	03/04/2020 01:19
Methylene chloride	ND	2.0	1	03/04/2020 01:19
4-Methyl-2-pentanone (MIBK)	ND	0.50	1	03/04/2020 01:19
Naphthalene	ND	1.0	1	03/04/2020 01:19
n-Propyl benzene	ND	0.50	1	03/04/2020 01:19
Styrene	ND	2.0	1	03/04/2020 01:19
1,1,1,2-Tetrachloroethane	ND	0.50	1	03/04/2020 01:19
1,1,2,2-Tetrachloroethane	ND	0.50	1	03/04/2020 01:19
Tetrachloroethene	ND	0.50	1	03/04/2020 01:19
Toluene	ND	0.50	1	03/04/2020 01:19
1,2,3-Trichlorobenzene	ND	0.50	1	03/04/2020 01:19
1,2,4-Trichlorobenzene	ND	0.50	1	03/04/2020 01:19
1,1,1-Trichloroethane	ND	0.50	1	03/04/2020 01:19
1,1,2-Trichloroethane	ND	0.50	1	03/04/2020 01:19
Trichloroethene	ND	0.50	1	03/04/2020 01:19
Trichlorofluoromethane	ND	0.50	1	03/04/2020 01:19
1,2,3-Trichloropropane	ND	0.50	1	03/04/2020 01:19
1,2,4-Trimethylbenzene	ND	0.50	1	03/04/2020 01:19
1,3,5-Trimethylbenzene	ND	0.50	1	03/04/2020 01:19
Vinyl Chloride	ND	0.50	1	03/04/2020 01:19
m,p-Xylene	ND	0.50	1	03/04/2020 01:19
o-Xylene	ND	0.50	1	03/04/2020 01:19
Xylenes, Total	ND	0.50	1	03/04/2020 01:19

(Cont.)

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Analytical Report

Client:	P & D Environmental	**WorkOrder:**	2002A47
Date Received:	02/26/2020 15:50	**Extraction Method:**	SW5030B
Date Prepared:	03/04/2020	**Analytical Method:**	SW8260B
Project:	0794; 820 W. MacArthur Blvd. Oakland, CA	**Unit:**	µg/L

Volatile Organics

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
MW2	**2002A47-002B**	**Water**	**02/25/2020 10:45**	**GC10 03032028.D**	**194991**

Analytes	Result	RL	DF	Date Analyzed
Surrogates	REC (%)	Limits		
Dibromofluoromethane	94	78-112		03/04/2020 01:19
Toluene-d8	96	82-109		03/04/2020 01:19
4-BFB	101	63-121		03/04/2020 01:19

Analyst(s): KF

(Cont.)

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Analytical Report

Client:	P & D Environmental	**WorkOrder:**	2002A47
Date Received:	02/26/2020 15:50	**Extraction Method:**	SW5030B
Date Prepared:	03/04/2020	**Analytical Method:**	SW8260B
Project:	0794; 820 W. MacArthur Blvd. Oakland, CA	**Unit:**	µg/L

Volatile Organics

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
MW3	2002A47-003B	Water	02/25/2020 12:30	GC10 03032029.D	194991

Analytes	Result	RL	DF	Date Analyzed
Acetone	ND	10	1	03/04/2020 01:58
tert-Amyl methyl ether (TAME)	ND	0.50	1	03/04/2020 01:58
Benzene	ND	0.50	1	03/04/2020 01:58
Bromobenzene	ND	0.50	1	03/04/2020 01:58
Bromochloromethane	ND	0.50	1	03/04/2020 01:58
Bromodichloromethane	ND	0.50	1	03/04/2020 01:58
Bromoform	ND	0.50	1	03/04/2020 01:58
Bromomethane	ND	0.50	1	03/04/2020 01:58
2-Butanone (MEK)	ND	5.0	1	03/04/2020 01:58
t-Butyl alcohol (TBA)	ND	5.0	1	03/04/2020 01:58
n-Butyl benzene	ND	0.50	1	03/04/2020 01:58
sec-Butyl benzene	ND	0.50	1	03/04/2020 01:58
tert-Butyl benzene	ND	0.50	1	03/04/2020 01:58
Carbon Disulfide	ND	0.50	1	03/04/2020 01:58
Carbon Tetrachloride	ND	0.50	1	03/04/2020 01:58
Chlorobenzene	ND	0.50	1	03/04/2020 01:58
Chloroethane	ND	0.50	1	03/04/2020 01:58
Chloroform	ND	0.50	1	03/04/2020 01:58
Chloromethane	ND	0.50	1	03/04/2020 01:58
2-Chlorotoluene	ND	0.50	1	03/04/2020 01:58
4-Chlorotoluene	ND	0.50	1	03/04/2020 01:58
Dibromochloromethane	ND	0.50	1	03/04/2020 01:58
1,2-Dibromo-3-chloropropane	ND	0.20	1	03/04/2020 01:58
1,2-Dibromoethane (EDB)	ND	0.50	1	03/04/2020 01:58
Dibromomethane	ND	0.50	1	03/04/2020 01:58
1,2-Dichlorobenzene	ND	0.50	1	03/04/2020 01:58
1,3-Dichlorobenzene	ND	0.50	1	03/04/2020 01:58
1,4-Dichlorobenzene	ND	0.50	1	03/04/2020 01:58
Dichlorodifluoromethane	ND	0.50	1	03/04/2020 01:58
1,1-Dichloroethane	ND	0.50	1	03/04/2020 01:58
1,2-Dichloroethane (1,2-DCA)	ND	0.50	1	03/04/2020 01:58
1,1-Dichloroethene	ND	0.50	1	03/04/2020 01:58
cis-1,2-Dichloroethene	ND	0.50	1	03/04/2020 01:58
trans-1,2-Dichloroethene	ND	0.50	1	03/04/2020 01:58
1,2-Dichloropropane	ND	0.50	1	03/04/2020 01:58
1,3-Dichloropropane	ND	0.50	1	03/04/2020 01:58
2,2-Dichloropropane	ND	0.50	1	03/04/2020 01:58

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Analytical Report

Client:	P & D Environmental	**WorkOrder:**	2002A47
Date Received:	02/26/2020 15:50	**Extraction Method:**	SW5030B
Date Prepared:	03/04/2020	**Analytical Method:**	SW8260B
Project:	0794; 820 W. MacArthur Blvd. Oakland, CA	**Unit:**	µg/L

Volatile Organics

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
MW3	2002A47-003B	Water	02/25/2020 12:30	GC10 03032029.D	194991

Analytes	Result	RL	DF	Date Analyzed
1,1-Dichloropropene	ND	0.50	1	03/04/2020 01:58
cis-1,3-Dichloropropene	ND	0.50	1	03/04/2020 01:58
trans-1,3-Dichloropropene	ND	0.50	1	03/04/2020 01:58
Diisopropyl ether (DIPE)	ND	0.50	1	03/04/2020 01:58
Ethylbenzene	ND	0.50	1	03/04/2020 01:58
Ethyl tert-butyl ether (ETBE)	ND	0.50	1	03/04/2020 01:58
Freon 113	ND	0.50	1	03/04/2020 01:58
Hexachlorobutadiene	ND	0.50	1	03/04/2020 01:58
Hexachloroethane	ND	0.50	1	03/04/2020 01:58
2-Hexanone	ND	1.0	1	03/04/2020 01:58
Isopropylbenzene	ND	0.50	1	03/04/2020 01:58
4-Isopropyl toluene	ND	0.50	1	03/04/2020 01:58
Methyl-t-butyl ether (MTBE)	ND	0.50	1	03/04/2020 01:58
Methylene chloride	ND	2.0	1	03/04/2020 01:58
4-Methyl-2-pentanone (MIBK)	ND	0.50	1	03/04/2020 01:58
Naphthalene	ND	1.0	1	03/04/2020 01:58
n-Propyl benzene	ND	0.50	1	03/04/2020 01:58
Styrene	ND	2.0	1	03/04/2020 01:58
1,1,1,2-Tetrachloroethane	ND	0.50	1	03/04/2020 01:58
1,1,2,2-Tetrachloroethane	ND	0.50	1	03/04/2020 01:58
Tetrachloroethene	ND	0.50	1	03/04/2020 01:58
Toluene	ND	0.50	1	03/04/2020 01:58
1,2,3-Trichlorobenzene	ND	0.50	1	03/04/2020 01:58
1,2,4-Trichlorobenzene	ND	0.50	1	03/04/2020 01:58
1,1,1-Trichloroethane	ND	0.50	1	03/04/2020 01:58
1,1,2-Trichloroethane	ND	0.50	1	03/04/2020 01:58
Trichloroethene	ND	0.50	1	03/04/2020 01:58
Trichlorofluoromethane	ND	0.50	1	03/04/2020 01:58
1,2,3-Trichloropropane	ND	0.50	1	03/04/2020 01:58
1,2,4-Trimethylbenzene	ND	0.50	1	03/04/2020 01:58
1,3,5-Trimethylbenzene	ND	0.50	1	03/04/2020 01:58
Vinyl Chloride	ND	0.50	1	03/04/2020 01:58
m,p-Xylene	ND	0.50	1	03/04/2020 01:58
o-Xylene	ND	0.50	1	03/04/2020 01:58
Xylenes, Total	ND	0.50	1	03/04/2020 01:58

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Analytical Report

Client:	P & D Environmental	**WorkOrder:**	2002A47
Date Received:	02/26/2020 15:50	**Extraction Method:**	SW5030B
Date Prepared:	03/04/2020	**Analytical Method:**	SW8260B
Project:	0794; 820 W. MacArthur Blvd. Oakland, CA	**Unit:**	µg/L

Volatile Organics

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
MW3	**2002A47-003B**	**Water**	**02/25/2020 12:30**	**GC10 03032029.D**	**194991**

Analytes	Result	RL	DF	Date Analyzed
Surrogates	REC (%)	Limits		
Dibromofluoromethane	95	78-112		03/04/2020 01:58
Toluene-d8	96	82-109		03/04/2020 01:58
4-BFB	101	63-121		03/04/2020 01:58

Analyst(s): KF

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Analytical Report

Client:	P & D Environmental	**WorkOrder:**	2002A47
Date Received:	02/26/2020 15:50	**Extraction Method:**	SW5030B
Date Prepared:	02/29/2020	**Analytical Method:**	SW8021B/8015Bm
Project:	0794; 820 W. MacArthur Blvd. Oakland, CA	**Unit:**	µg/L

Gasoline Range (C6-C12) Volatile Hydrocarbons as Gasoline with BTEX and MTBE

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
MW1	**2002A47-001A**	**Water**	**02/25/2020 11:35**	**GC3 02292013.D**	**194868**

Analytes	Result		RL	DF	Date Analyzed
TPH(g) (C6-C12)	**390**		50	1	02/29/2020 17:15
MTBE	---		5.0	1	02/29/2020 17:15
Benzene	---		0.50	1	02/29/2020 17:15
Toluene	---		0.50	1	02/29/2020 17:15
Ethylbenzene	---		0.50	1	02/29/2020 17:15
m,p-Xylene	---		1.0	1	02/29/2020 17:15
o-Xylene	---		0.50	1	02/29/2020 17:15
Xylenes	---		0.50	1	02/29/2020 17:15

Surrogates	REC (%)	Qualifiers	Limits		
aaa-TFT	139	S	76-115		02/29/2020 17:15

Analyst(s): IA   Analytical Comments: d1,d17,c4

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
MW2	**2002A47-002A**	**Water**	**02/25/2020 10:45**	**GC3 02292014.D**	**194868**

Analytes	Result		RL	DF	Date Analyzed
TPH(g) (C6-C12)	ND		50	1	02/29/2020 17:45
MTBE	---		1.0	1	02/29/2020 17:45
Benzene	---		0.50	1	02/29/2020 17:45
Toluene	---		0.50	1	02/29/2020 17:45
Ethylbenzene	---		0.50	1	02/29/2020 17:45
m,p-Xylene	---		1.0	1	02/29/2020 17:45
o-Xylene	---		0.50	1	02/29/2020 17:45
Xylenes	---		0.50	1	02/29/2020 17:45

Surrogates	REC (%)		Limits		
aaa-TFT	91		76-115		02/29/2020 17:45

Analyst(s): IA

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Analytical Report

Client:	P & D Environmental	**WorkOrder:**	2002A47
Date Received:	02/26/2020 15:50	**Extraction Method:**	SW5030B
Date Prepared:	02/29/2020	**Analytical Method:**	SW8021B/8015Bm
Project:	0794; 820 W. MacArthur Blvd. Oakland, CA	**Unit:**	µg/L

Gasoline Range (C6-C12) Volatile Hydrocarbons as Gasoline with BTEX and MTBE

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
MW3	**2002A47-003A**	**Water**	**02/25/2020 12:30**	**GC3 02292015.D**	**194868**

Analytes	Result	RL	DF	Date Analyzed
TPH(g) (C6-C12)	ND	50	1	02/29/2020 18:15
MTBE	---	1.0	1	02/29/2020 18:15
Benzene	---	0.50	1	02/29/2020 18:15
Toluene	---	0.50	1	02/29/2020 18:15
Ethylbenzene	---	0.50	1	02/29/2020 18:15
m,p-Xylene	---	1.0	1	02/29/2020 18:15
o-Xylene	---	0.50	1	02/29/2020 18:15
Xylenes	---	0.50	1	02/29/2020 18:15

Surrogates	REC (%)	Limits	
aaa-TFT	90	76-115	02/29/2020 18:15

Analyst(s): IA

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Analytical Report

Client:	P & D Environmental	**WorkOrder:**	2002A47
Date Received:	02/26/2020 15:50	**Extraction Method:**	SW3510C
Date Prepared:	02/26/2020	**Analytical Method:**	SW8015B
Project:	0794; 820 W. MacArthur Blvd. Oakland, CA	**Unit:**	µg/L

Total Extractable Petroleum Hydrocarbons w/out SG Clean-Up

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
MW1	**2002A47-001A**	**Water**	**02/25/2020 11:35**	**GC9b 02282081.D**	**194707**

Analytes	Result	RL	DF	Date Analyzed
TPH-Diesel (C10-C23)	**200**	50	1	02/29/2020 19:05
TPH-Motor Oil (C18-C36)	ND	250	1	02/29/2020 19:05
TPH-Bunker Oil (C10-C36)	**450**	250	1	02/29/2020 19:05

Surrogates	REC (%)	Limits	Date Analyzed
C9	92	70-130	02/29/2020 19:05

Analyst(s): JIS   Analytical Comments: e8,e2

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
MW2	**2002A47-002A**	**Water**	**02/25/2020 10:45**	**GC9b 02282083.D**	**194707**

Analytes	Result	RL	DF	Date Analyzed
TPH-Diesel (C10-C23)	ND	50	1	02/29/2020 19:44
TPH-Motor Oil (C18-C36)	ND	250	1	02/29/2020 19:44
TPH-Bunker Oil (C10-C36)	ND	250	1	02/29/2020 19:44

Surrogates	REC (%)	Limits	Date Analyzed
C9	91	70-130	02/29/2020 19:44

Analyst(s): JIS

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
MW3	**2002A47-003A**	**Water**	**02/25/2020 12:30**	**GC9b 02282085.D**	**194707**

Analytes	Result	RL	DF	Date Analyzed
TPH-Diesel (C10-C23)	ND	50	1	02/29/2020 20:23
TPH-Motor Oil (C18-C36)	ND	250	1	02/29/2020 20:23
TPH-Bunker Oil (C10-C36)	ND	250	1	02/29/2020 20:23

Surrogates	REC (%)	Limits	Date Analyzed
C9	91	70-130	02/29/2020 20:23

Analyst(s): JIS

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Quality Control Report

Client:	P & D Environmental	**WorkOrder:**	2002A47
Date Prepared:	03/03/2020	**BatchID:**	194991
Date Analyzed:	03/03/2020	**Extraction Method:**	SW5030B
Instrument:	GC10	**Analytical Method:**	SW8260B
Matrix:	Water	**Unit:**	µg/L
Project:	0794; 820 W. MacArthur Blvd. Oakland, CA	**Sample ID:**	MB/LCS/LCSD-194991 2002A47-002BMS/MSD

QC Summary Report for SW8260B

Analyte	MB Result	MDL	RL	SPK Val	MB SS %REC	MB SS Limits
Acetone	ND	5.90	10.0	-	-	-
tert-Amyl methyl ether (TAME)	ND	0.220	0.500	-	-	-
Benzene	ND	0.0510	0.500	-	-	-
Bromobenzene	ND	0.0600	0.500	-	-	-
Bromochloromethane	ND	0.0900	0.500	-	-	-
Bromodichloromethane	ND	0.200	0.500	-	-	-
Bromoform	ND	0.0660	0.500	-	-	-
Bromomethane	ND	0.160	0.500	-	-	-
2-Butanone (MEK)	ND	2.00	5.00	-	-	-
t-Butyl alcohol (TBA)	ND	1.70	5.00	-	-	-
n-Butyl benzene	ND	0.0840	0.500	-	-	-
sec-Butyl benzene	ND	0.0600	0.500	-	-	-
tert-Butyl benzene	ND	0.0500	0.500	-	-	-
Carbon Disulfide	ND	0.280	0.500	-	-	-
Carbon Tetrachloride	ND	0.0690	0.500	-	-	-
Chlorobenzene	ND	0.0500	0.500	-	-	-
Chloroethane	ND	0.310	0.500	-	-	-
Chloroform	ND	0.0640	0.500	-	-	-
Chloromethane	ND	0.130	0.500	-	-	-
2-Chlorotoluene	ND	0.0700	0.500	-	-	-
4-Chlorotoluene	ND	0.0700	0.500	-	-	-
Dibromochloromethane	ND	0.0800	0.500	-	-	-
1,2-Dibromo-3-chloropropane	ND	0.120	0.200	-	-	-
1,2-Dibromoethane (EDB)	ND	0.120	0.500	-	-	-
Dibromomethane	ND	0.0800	0.500	-	-	-
1,2-Dichlorobenzene	ND	0.0800	0.500	-	-	-
1,3-Dichlorobenzene	ND	0.0710	0.500	-	-	-
1,4-Dichlorobenzene	ND	0.0720	0.500	-	-	-
Dichlorodifluoromethane	ND	0.0630	0.500	-	-	-
1,1-Dichloroethane	ND	0.0600	0.500	-	-	-
1,2-Dichloroethane (1,2-DCA)	ND	0.0900	0.500	-	-	-
1,1-Dichloroethene	ND	0.0860	0.500	-	-	-
cis-1,2-Dichloroethene	ND	0.0500	0.500	-	-	-
trans-1,2-Dichloroethene	ND	0.0600	0.500	-	-	-
1,2-Dichloropropane	ND	0.0550	0.500	-	-	-
1,3-Dichloropropane	ND	0.100	0.500	-	-	-
2,2-Dichloropropane	ND	0.100	0.500	-	-	-
1,1-Dichloropropene	ND	0.0600	0.500	-	-	-

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Quality Control Report

Client:	P & D Environmental	**WorkOrder:**	2002A47
Date Prepared:	03/03/2020	**BatchID:**	194991
Date Analyzed:	03/03/2020	**Extraction Method:**	SW5030B
Instrument:	GC10	**Analytical Method:**	SW8260B
Matrix:	Water	**Unit:**	µg/L
Project:	0794; 820 W. MacArthur Blvd. Oakland, CA	**Sample ID:**	MB/LCS/LCSD-194991 2002A47-002BMS/MSD

QC Summary Report for SW8260B

Analyte	MB Result	MDL	RL	SPK Val	MB SS %REC	MB SS Limits
cis-1,3-Dichloropropene	ND	0.0900	0.500	-	-	-
trans-1,3-Dichloropropene	ND	0.0700	0.500	-	-	-
Diisopropyl ether (DIPE)	ND	0.0700	0.500	-	-	-
Ethylbenzene	ND	0.0500	0.500	-	-	-
Ethyl tert-butyl ether (ETBE)	ND	0.0700	0.500	-	-	-
Freon 113	ND	0.0660	0.500	-	-	-
Hexachlorobutadiene	ND	0.0850	0.500	-	-	-
Hexachloroethane	ND	0.0600	0.500	-	-	-
2-Hexanone	ND	0.410	1.00	-	-	-
Isopropylbenzene	ND	0.0700	0.500	-	-	-
4-Isopropyl toluene	ND	0.0500	0.500	-	-	-
Methyl-t-butyl ether (MTBE)	ND	0.100	0.500	-	-	-
Methylene chloride	ND	1.20	2.00	-	-	-
4-Methyl-2-pentanone (MIBK)	ND	0.240	0.500	-	-	-
Naphthalene	ND	0.450	1.00	-	-	-
n-Propyl benzene	ND	0.0600	0.500	-	-	-
Styrene	ND	0.590	2.00	-	-	-
1,1,1,2-Tetrachloroethane	ND	0.0700	0.500	-	-	-
1,1,2,2-Tetrachloroethane	ND	0.110	0.500	-	-	-
Tetrachloroethene	ND	0.0820	0.500	-	-	-
Toluene	ND	0.250	0.500	-	-	-
1,2,3-Trichlorobenzene	ND	0.250	0.500	-	-	-
1,2,4-Trichlorobenzene	ND	0.0860	0.500	-	-	-
1,1,1-Trichloroethane	ND	0.0500	0.500	-	-	-
1,1,2-Trichloroethane	ND	0.180	0.500	-	-	-
Trichloroethene	ND	0.0600	0.500	-	-	-
Trichlorofluoromethane	ND	0.0470	0.500	-	-	-
1,2,3-Trichloropropane	ND	0.140	0.500	-	-	-
1,2,4-Trimethylbenzene	ND	0.0650	0.500	-	-	-
1,3,5-Trimethylbenzene	ND	0.0700	0.500	-	-	-
Vinyl Chloride	ND	0.0700	0.500	-	-	-
m,p-Xylene	ND	0.110	0.500	-	-	-
o-Xylene	ND	0.0600	0.500	-	-	-

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Quality Control Report

Client:	P & D Environmental	**WorkOrder:**	2002A47
Date Prepared:	03/03/2020	**BatchID:**	194991
Date Analyzed:	03/03/2020	**Extraction Method:**	SW5030B
Instrument:	GC10	**Analytical Method:**	SW8260B
Matrix:	Water	**Unit:**	µg/L
Project:	0794; 820 W. MacArthur Blvd. Oakland, CA	**Sample ID:**	MB/LCS/LCSD-194991 2002A47-002BMS/MSD

QC Summary Report for SW8260B

Analyte	MB Result	MDL	RL	SPK Val	MB SS %REC	MB SS Limits
Surrogate Recovery						
Dibromofluoromethane	22.8			25	91	76-110
Toluene-d8	24.6			25	98	84-111
4-BFB	2.53			2.5	101	64-121

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Quality Control Report

Client:	P & D Environmental	**WorkOrder:**	2002A47
Date Prepared:	03/03/2020	**BatchID:**	194991
Date Analyzed:	03/03/2020	**Extraction Method:**	SW5030B
Instrument:	GC10	**Analytical Method:**	SW8260B
Matrix:	Water	**Unit:**	µg/L
Project:	0794; 820 W. MacArthur Blvd. Oakland, CA	**Sample ID:**	MB/LCS/LCSD-194991 2002A47-002BMS/MSD

QC Summary Report for SW8260B

Analyte	LCS Result	LCSD Result	SPK Val	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Limit
Acetone	44.7	82.2	40	112	205,F2	32-138	59.0,F2	20
tert-Amyl methyl ether (TAME)	3.75	3.75	4	94	94	62-119	0.0800	20
Benzene	4.17	4.10	4	104	102	71-126	1.79	20
Bromobenzene	3.48	3.45	4	87	86	66-117	0.812	20
Bromochloromethane	3.87	3.79	4	97	95	67-124	2.16	20
Bromodichloromethane	3.64	3.61	4	91	90	63-119	0.666	20
Bromoform	3.38	3.37	4	84	84	46-117	0.282	20
Bromomethane	5.48	5.61	4	137	140	32-171	2.23	20
2-Butanone (MEK)	17.3	20.8	16	108	130	48-136	18.4	20
t-Butyl alcohol (TBA)	15.4	14.9	16	96	93	40-131	2.99	20
n-Butyl benzene	3.79	3.72	4	95	93	75-125	1.95	20
sec-Butyl benzene	3.68	3.59	4	92	90	72-120	2.51	20
tert-Butyl benzene	3.67	3.58	4	92	90	63-118	2.44	20
Carbon Disulfide	4.32	4.26	4	108	106	64-126	1.47	20
Carbon Tetrachloride	4.15	4.09	4	104	102	67-122	1.49	20
Chlorobenzene	3.70	3.65	4	93	91	71-117	1.45	20
Chloroethane	3.72	3.80	4	93	95	53-136	2.23	20
Chloroform	4.10	4.07	4	102	102	67-126	0.730	20
Chloromethane	4.82	4.88	4	121	122	42-148	1.07	20
2-Chlorotoluene	3.64	3.60	4	91	90	70-117	1.19	20
4-Chlorotoluene	3.81	3.80	4	95	95	67-117	0.310	20
Dibromochloromethane	4.01	3.96	4	100	99	52-120	1.23	20
1,2-Dibromo-3-chloropropane	2.05	2.24	2	103	112	38-128	8.67	20
1,2-Dibromoethane (EDB)	1.85	1.84	2	92	92	58-117	0.538	20
Dibromomethane	3.71	3.71	4	93	93	66-120	0.0690	20
1,2-Dichlorobenzene	3.69	3.62	4	92	90	71-117	2.05	20
1,3-Dichlorobenzene	3.65	3.60	4	91	90	74-116	1.58	20
1,4-Dichlorobenzene	3.78	3.72	4	95	93	71-115	1.68	20
Dichlorodifluoromethane	4.56	4.62	4	114	115	29-145	1.23	20
1,1-Dichloroethane	4.03	3.99	4	101	100	68-128	0.922	20
1,2-Dichloroethane (1,2-DCA)	3.98	4.02	4	99	100	61-123	1.01	20
1,1-Dichloroethene	3.94	3.88	4	98	97	65-126	1.42	20
cis-1,2-Dichloroethene	3.86	3.78	4	96	94	71-122	2.10	20
trans-1,2-Dichloroethene	4.25	4.20	4	106	105	70-126	1.13	20
1,2-Dichloropropane	3.80	3.76	4	95	94	67-124	0.908	20
1,3-Dichloropropane	3.70	3.66	4	92	91	65-120	1.05	20
2,2-Dichloropropane	3.90	3.85	4	97	96	71-127	1.19	20
1,1-Dichloropropene	4.09	4.06	4	102	102	69-122	0.700	20

(Cont.)

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Quality Control Report

Client:	P & D Environmental	**WorkOrder:**	2002A47
Date Prepared:	03/03/2020	**BatchID:**	194991
Date Analyzed:	03/03/2020	**Extraction Method:**	SW5030B
Instrument:	GC10	**Analytical Method:**	SW8260B
Matrix:	Water	**Unit:**	µg/L
Project:	0794; 820 W. MacArthur Blvd. Oakland, CA	**Sample ID:**	MB/LCS/LCSD-194991 2002A47-002BMS/MSD

QC Summary Report for SW8260B

Analyte	LCS Result	LCSD Result	SPK Val	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Limit
cis-1,3-Dichloropropene	3.95	3.87	4	99	97	63-119	2.13	20
trans-1,3-Dichloropropene	3.70	3.66	4	92	91	63-116	1.17	20
Diisopropyl ether (DIPE)	3.64	3.60	4	91	90	64-128	1.09	20
Ethylbenzene	3.80	3.75	4	95	94	69-120	1.33	20
Ethyl tert-butyl ether (ETBE)	3.71	3.67	4	93	92	63-120	0.979	20
Freon 113	3.47	3.44	4	87	86	67-126	0.768	20
Hexachlorobutadiene	3.73	3.60	4	93	90	50-140	3.53	20
Hexachloroethane	3.75	3.66	4	94	91	52-122	2.52	20
2-Hexanone	3.74	4.87	4	93	122,F2	39-121	26.3,F2	20
Isopropylbenzene	3.79	3.78	4	95	94	69-120	0.432	20
4-Isopropyl toluene	3.32	3.24	4	83	81	72-122	2.59	20
Methyl-t-butyl ether (MTBE)	3.80	3.77	4	95	94	60-121	0.799	20
Methylene chloride	3.99	3.97	4	100	99	40-148	0.339	20
4-Methyl-2-pentanone (MIBK)	3.57	3.71	4	89	93	48-115	3.95	20
Naphthalene	3.71	3.55	4	93	89	62-124	4.52	20
n-Propyl benzene	3.90	3.85	4	98	96	70-118	1.42	20
Styrene	3.77	3.73	4	94	93	57-118	0.867	20
1,1,1,2-Tetrachloroethane	3.61	3.57	4	90	89	63-117	1.10	20
1,1,2,2-Tetrachloroethane	3.77	3.74	4	94	94	60-116	0.816	20
Tetrachloroethene	3.89	3.85	4	97	96	60-131	0.963	20
Toluene	3.94	3.86	4	99	97	67-115	1.95	20
1,2,3-Trichlorobenzene	3.58	3.47	4	89	87	60-128	3.00	20
1,2,4-Trichlorobenzene	3.55	3.46	4	89	87	61-133	2.30	20
1,1,1-Trichloroethane	4.12	4.10	4	103	102	67-124	0.584	20
1,1,2-Trichloroethane	3.80	3.76	4	95	94	62-117	1.15	20
Trichloroethene	3.77	3.72	4	94	93	69-120	1.15	20
Trichlorofluoromethane	4.36	4.33	4	109	108	60-134	0.618	20
1,2,3-Trichloropropane	2.07	2.06	2	103	103	56-120	0.350	20
1,2,4-Trimethylbenzene	3.89	3.82	4	97	95	67-124	1.97	20
1,3,5-Trimethylbenzene	3.67	3.61	4	92	90	69-122	1.62	20
Vinyl Chloride	2.18	2.22	2	109	111	52-145	1.62	20
m,p-Xylene	7.61	7.50	8	95	94	67-119	1.43	20
o-Xylene	3.76	3.76	4	94	94	68-120	0.105	20

(Cont.)

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Quality Control Report

Client:	P & D Environmental	**WorkOrder:**	2002A47
Date Prepared:	03/03/2020	**BatchID:**	194991
Date Analyzed:	03/03/2020	**Extraction Method:**	SW5030B
Instrument:	GC10	**Analytical Method:**	SW8260B
Matrix:	Water	**Unit:**	µg/L
Project:	0794; 820 W. MacArthur Blvd. Oakland, CA	**Sample ID:**	MB/LCS/LCSD-194991 2002A47-002BMS/MSD

QC Summary Report for SW8260B

Analyte	LCS Result	LCSD Result	SPK Val	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Limit
Surrogate Recovery								
Dibromofluoromethane	22.8	22.8	25	91	91	76-110	0.109	20
Toluene-d8	24.5	24.6	25	98	98	84-111	0.389	20
4-BFB	2.52	2.52	2.5	101	101	64-121	0.0941	20

Analyte	MS DF	MS Result	MSD Result	SPK Val	SPKRef Val	MS %REC	MSD %REC	MS/MSD Limits	RPD	RPD Limit
Acetone	1	43.2	41.2	40	ND	108	103	32-183	4.77	20
tert-Amyl methyl ether (TAME)	1	4.56	4.38	4	ND	114	109	52-152	4.12	20
Benzene	1	4.85	4.69	4	ND	121	117	62-143	3.31	20
Bromobenzene	1	3.95	3.86	4	ND	99	96	52-139	2.23	20
Bromochloromethane	1	4.56	4.47	4	ND	114	112	53-154	1.93	20
Bromodichloromethane	1	4.27	4.17	4	ND	107	104	49-147	2.30	20
Bromoform	1	3.94	3.83	4	ND	99	96	32-153	2.86	20
Bromomethane	1	5.63	5.30	4	ND	141	132	18-181	6.03	20
2-Butanone (MEK)	1	19.2	18.8	16	ND	120	117	46-173	2.25	20
t-Butyl alcohol (TBA)	1	18.9	17.8	16	ND	118	112	25-198	5.48	20
n-Butyl benzene	1	4.25	4.01	4	ND	106	100	53-147	5.79	20
sec-Butyl benzene	1	4.08	3.91	4	ND	102	98	54-138	4.25	20
tert-Butyl benzene	1	4.08	3.93	4	ND	102	98	48-134	3.78	20
Carbon Disulfide	1	4.66	4.52	4	ND	117	113	46-148	3.03	20
Carbon Tetrachloride	1	4.65	4.54	4	ND	116	114	50-143	2.25	20
Chlorobenzene	1	4.17	4.04	4	ND	104	101	56-139	3.12	20
Chloroethane	1	4.00	3.83	4	ND	100	96	31-158	4.32	20
Chloroform	1	4.75	4.66	4	ND	119	117	38-161	1.84	20
Chloromethane	1	4.84	4.72	4	ND	121	118	24-158	2.47	20
2-Chlorotoluene	1	4.04	3.89	4	ND	101	97	53-136	3.59	20
4-Chlorotoluene	1	4.32	4.10	4	ND	108	103	51-136	5.18	20
Dibromochloromethane	1	4.60	4.50	4	ND	115	112	55-135	2.16	20
1,2-Dibromo-3-chloropropane	1	3.00	2.66	2	ND	150	133	26-168	12.1	20
1,2-Dibromoethane (EDB)	1	2.15	2.07	2	ND	107	104	50-146	3.41	20
Dibromomethane	1	4.45	4.36	4	ND	111	109	54-152	2.15	20
1,2-Dichlorobenzene	1	4.22	4.06	4	ND	106	102	55-143	3.92	20
1,3-Dichlorobenzene	1	4.17	4.02	4	ND	104	100	56-139	3.67	20
1,4-Dichlorobenzene	1	4.27	4.12	4	ND	107	103	54-138	3.65	20
Dichlorodifluoromethane	1	3.19	2.95	4	ND	80	74	15-152	7.69	20

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Quality Control Report

Client:	P & D Environmental	**WorkOrder:**	2002A47
Date Prepared:	03/03/2020	**BatchID:**	194991
Date Analyzed:	03/03/2020	**Extraction Method:**	SW5030B
Instrument:	GC10	**Analytical Method:**	SW8260B
Matrix:	Water	**Unit:**	µg/L
Project:	0794; 820 W. MacArthur Blvd. Oakland, CA	**Sample ID:**	MB/LCS/LCSD-194991 2002A47-002BMS/MSD

QC Summary Report for SW8260B

Analyte	MS DF	MS Result	MSD Result	SPK Val	SPKRef Val	MS %REC	MSD %REC	MS/MSD Limits	RPD	RPD Limit
1,1-Dichloroethane	1	4.81	4.66	4	ND	114	111	52-151	3.01	20
1,2-Dichloroethane (1,2-DCA)	1	4.68	4.62	4	ND	117	115	46-154	1.46	20
1,1-Dichloroethene	1	4.44	4.25	4	ND	111	106	47-149	4.26	20
cis-1,2-Dichloroethene	1	4.82	4.69	4	ND	110	107	41-158	2.68	20
trans-1,2-Dichloroethene	1	4.87	4.69	4	ND	122	117	51-151	3.86	20
1,2-Dichloropropane	1	4.45	4.34	4	ND	111	108	52-150	2.44	20
1,3-Dichloropropane	1	4.26	4.15	4	ND	106	104	53-149	2.71	20
2,2-Dichloropropane	1	4.46	4.34	4	ND	112	109	51-150	2.62	20
1,1-Dichloropropene	1	4.66	4.55	4	ND	117	114	53-142	2.46	20
cis-1,3-Dichloropropene	1	4.42	4.38	4	ND	111	109	49-143	1.02	20
trans-1,3-Dichloropropene	1	4.23	4.16	4	ND	106	104	49-145	1.76	20
Diisopropyl ether (DIPE)	1	4.24	4.12	4	ND	106	103	51-155	2.83	20
Ethylbenzene	1	4.26	4.13	4	ND	106	103	63-130	3.13	20
Ethyl tert-butyl ether (ETBE)	1	4.40	4.29	4	ND	110	107	50-153	2.63	20
Freon 113	1	3.89	3.77	4	ND	97	94	50-146	3.28	20
Hexachlorobutadiene	1	4.19	3.87	4	ND	105	97	30-163	7.96	20
Hexachloroethane	1	4.13	4.02	4	ND	103	100	26-157	2.79	20
2-Hexanone	1	4.40	4.13	4	ND	110	103	21-180	6.43	20
Isopropylbenzene	1	4.28	4.15	4	ND	107	104	50-140	3.29	20
4-Isopropyl toluene	1	3.75	3.54	4	ND	94	89	53-142	5.64	20
Methyl-t-butyl ether (MTBE)	1	4.58	4.42	4	ND	115	111	51-157	3.57	20
Methylene chloride	1	4.58	4.42	4	ND	115	110	23-177	3.74	20
4-Methyl-2-pentanone (MIBK)	1	4.34	4.13	4	ND	109	103	43-155	5.13	20
Naphthalene	1	4.38	4.16	4	ND	109	104	47-166	5.09	20
n-Propyl benzene	1	4.37	4.17	4	ND	109	104	45-146	4.82	20
Styrene	1	4.21	4.09	4	ND	105	102	26-150	2.88	20
1,1,1,2-Tetrachloroethane	1	4.09	4.00	4	ND	102	100	49-141	2.34	20
1,1,2,2-Tetrachloroethane	1	4.47	4.34	4	ND	112	108	44-159	3.06	20
Tetrachloroethene	1	4.49	4.37	4	ND	107	104	22-164	2.76	20
Toluene	1	4.44	4.32	4	ND	111	108	50-135	2.86	20
1,2,3-Trichlorobenzene	1	4.08	3.88	4	ND	102	97	40-165	4.88	20
1,2,4-Trichlorobenzene	1	4.04	3.85	4	ND	101	96	44-162	4.70	20
1,1,1-Trichloroethane	1	4.69	4.60	4	ND	117	115	51-144	2.02	20
1,1,2-Trichloroethane	1	4.43	4.34	4	ND	111	109	50-149	1.95	20
Trichloroethene	1	4.66	4.50	4	ND	109	105	33-159	3.58	20
Trichlorofluoromethane	1	4.69	4.56	4	ND	117	114	47-151	2.77	20
1,2,3-Trichloropropane	1	2.52	2.38	2	ND	126	119	45-158	5.33	20
1,2,4-Trimethylbenzene	1	4.35	4.18	4	ND	109	105	61-132	3.80	20

(Cont.)

Quality Control Report

Client:	P & D Environmental	**WorkOrder:**	2002A47
Date Prepared:	03/03/2020	**BatchID:**	194991
Date Analyzed:	03/03/2020	**Extraction Method:**	SW5030B
Instrument:	GC10	**Analytical Method:**	SW8260B
Matrix:	Water	**Unit:**	µg/L
Project:	0794; 820 W. MacArthur Blvd. Oakland, CA	**Sample ID:**	MB/LCS/LCSD-194991 2002A47-002BMS/MSD

QC Summary Report for SW8260B

Analyte	MS DF	MS Result	MSD Result	SPK Val	SPKRef Val	MS %REC	MSD %REC	MS/MSD Limits	RPD	RPD Limit
1,3,5-Trimethylbenzene	1	4.12	3.96	4	ND	103	99	35-159	3.77	20
Vinyl Chloride	1	2.21	2.07	2	ND	111	104	34-161	6.69	20
m,p-Xylene	1	8.56	8.24	8	ND	107	103	63-126	3.88	20
o-Xylene	1	4.28	4.14	4	ND	107	103	43-153	3.41	20
Surrogate Recovery										
Dibromofluoromethane	1	23.3	23.4	25		93	93	78-112	0.365	20
Toluene-d8	1	23.7	24.0	25		95	96	82-109	1.07	20
4-BFB	1	2.52	2.50	2.5		101	100	63-121	0.674	20

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Quality Control Report

Client:	P & D Environmental	**WorkOrder:**	2002A47
Date Prepared:	02/29/2020	**BatchID:**	194868
Date Analyzed:	02/29/2020	**Extraction Method:**	SW5030B
Instrument:	GC3	**Analytical Method:**	SW8021B/8015Bm
Matrix:	Water	**Unit:**	µg/L
Project:	0794; 820 W. MacArthur Blvd. Oakland, CA	**Sample ID:**	MB/LCS/LCSD-194868

QC Summary Report for SW8021B/8015Bm

Analyte	MB Result	MDL	RL	SPK Val	MB SS %REC	MB SS Limits
TPH(g) (C6-C12)	ND	20.0	50.0	-	-	-
MTBE	ND	0.530	1.00	-	-	-
Benzene	ND	0.200	0.500	-	-	-
Toluene	ND	0.190	0.500	-	-	-
Ethylbenzene	ND	0.230	0.500	-	-	-
m,p-Xylene	ND	0.400	1.00	-	-	-
o-Xylene	ND	0.130	0.500	-	-	-
Surrogate Recovery						
aaa-TFT	8.90			10	89	74-117

Analyte	LCS Result	LCSD Result	SPK Val	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Limit
TPH(btex)	58.0	63.2	60	97	105	78-116	8.53	20
MTBE	9.10	9.84	10	91	98	72-122	7.72	20
Benzene	9.78	9.40	10	98	94	81-123	4.01	20
Toluene	10.1	9.97	10	101	100	83-129	1.17	20
Ethylbenzene	9.95	9.75	10	100	97	88-126	2.05	20
m,p-Xylene	19.9	19.6	20	99	98	80-120	1.26	20
o-Xylene	9.62	9.36	10	96	94	80-120	2.74	20
Surrogate Recovery								
aaa-TFT	9.00	9.06	10	90	91	74-117	0.625	20

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Quality Control Report

Client:	P & D Environmental	**WorkOrder:**	2002A47
Date Prepared:	02/26/2020	**BatchID:**	194707
Date Analyzed:	02/28/2020	**Extraction Method:**	SW3510C
Instrument:	GC9b	**Analytical Method:**	SW8015B
Matrix:	Water	**Unit:**	µg/L
Project:	0794; 820 W. MacArthur Blvd. Oakland, CA	**Sample ID:**	MB/LCS/LCSD-194707

QC Report for SW8015B w/out SG Clean-Up

Analyte	MB Result	MDL	RL	SPK Val	MB SS %REC	MB SS Limits
TPH-Diesel (C10-C23)	ND	29.0	50.0	-	-	-
TPH-Motor Oil (C18-C36)	ND	130	250	-	-	-
Surrogate Recovery						
C9	566			625	91	70-130

Analyte	LCS Result	LCSD Result	SPK Val	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Limit
TPH-Diesel (C10-C23)	790	857	1000	79	86	70-130	8.17	20
Surrogate Recovery								
C9	573	579	625	92	93	70-130	1.05	20

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CHAIN-OF-CUSTODY RECORD

WorkOrder: 2002A47 **ClientCode: PDEO**

☐ WaterTrax ☐ WriteOn ☐ EDF ☐ Excel ☐ EQuIS ☑ Email ☐ HardCopy ☐ ThirdParty ☐ J-flag
☐ Detection Summary ☐ Dry-Weight

Report to:
Paul King
P & D Environmental
55 Santa Clara Ave, Ste.240
Oakland, CA 94610
(510) 658-6916 FAX: 510-834-0152

Email: lab@pdenviro.com; Paul.King@pdenviro.c
cc/3rd Party:
PO:
Project: 0794; 820 W. MacArthur Blvd. Oakland, CA

Bill to:
Accounts Payable
P & D Environmental
55 Santa Clara Ave, Ste.240
Oakland, CA 94610

Requested TAT: **5 days;**

Date Received: **02/26/2020**
Date Logged: **02/26/2020**

Lab ID	Client ID	Matrix	Collection Date	Hold	1	2	3	4	5	6	7	8	9	10	11	12
					Requested Tests (See legend below)											
2002A47-001	MW1	Water	2/25/2020 11:35	☐	B	A	A	A								
2002A47-002	MW2	Water	2/25/2020 10:45	☐	B	A	A	A								
2002A47-003	MW3	Water	2/25/2020 12:30	☐	B	A	A	A								

Test Legend:

1	8260B_W	2	G-MBTEX_W	3	PRDisposal Fee	4	TPH(DMO)_W
5		6		7		8	
9		10		11		12	

Project Manager: Angela Rydelius **Prepared by: Kena Ponce**

The following SampIDs: 001A, 002A, 003A contain testgroup Multi Range_W.

Comments: Always send reports to: lab@pdenviro.com; Paul.King@pdenviro.com; pdking0000@aol.com. P&D always gets charged $67 multi range price despite the extra analytes

NOTE: Soil samples are discarded 60 days after results are reported unless other arrangements are made (Water samples are 30 days).
Hazardous samples will be returned to client or disposed of at client expense.

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WORK ORDER SUMMARY

Client Name: P & D ENVIRONMENTAL
Project: 0794; 820 W. MacArthur Blvd. Oakland, CA
Work Order: 2002A47

Client Contact: Paul King
QC Level: LEVEL 2

Contact's Email: lab@pdenviro.com; Paul.King@pdenviro.com; pdking0000@aol.com
Comments: Always send reports to: lab@pdenviro.com; Paul.King@pdenviro.com; pdking0000@aol.com. P&D always
Date Logged: 2/26/2020

☐ WaterTrax ☐ WriteOn ☐ EDF ☐ Excel ☐ EQuIS ☑ Email ☐ HardCopy ☐ ThirdParty ☐ J-flag

Lab ID	Client ID	Matrix	Test Name	Containers /Composites	Bottle & Preservative	De-chlorinated	Collection Date & Time	TAT	Sediment Content	Hold	SubOut
2002A47-001A	MW1	Water	Multi-Range TPH	5	2 VOAs w/HCL +3-aVOAs (multi-range)	☐	2/25/2020 11:35	5 days	Present	☐	
2002A47-001B	MW1	Water	SW8260B (VOCs)	1	VOA w/ HCL	☐	2/25/2020 11:35	5 days	Present	☐	
2002A47-002A	MW2	Water	Multi-Range TPH	5	2 VOAs w/HCL +3-aVOAs (multi-range)	☐	2/25/2020 10:45	5 days	Trace	☐	
2002A47-002B	MW2	Water	SW8260B (VOCs)	1	VOA w/ HCL	☐	2/25/2020 10:45	5 days	Trace	☐	
2002A47-003A	MW3	Water	Multi-Range TPH	5	2 VOAs w/HCL +3-aVOAs (multi-range)	☐	2/25/2020 12:30	5 days	None	☐	
2002A47-003B	MW3	Water	SW8260B (VOCs)	1	VOA w/ HCL	☐	2/25/2020 12:30	5 days	None	☐	

NOTES: - STLC and TCLP extractions require 2 days to complete; therefore, all TATs begin after the extraction is completed (i.e., One-day TAT yields results in 3 days from sample submission).

- MAI assumes that all material present in the provided sampling container is considered part of the sample - MAI does not exclude any material from the sample prior to sample preparation unless requested in writing by the client.

CHAIN OF CUSTODY RECORD

P&D ENVIRONMENTAL, INC.
55 Santa Clara Ave., Suite 240
Oakland, CA 94610
(510) 658-6916

2002A47

PROJECT NUMBER: 0794

PROJECT NAME: 820 W. MacArthur BLVD OAKLAND, CA

SAMPLED BY: (PRINTED & SIGNATURE) JESSICA W. HARRIS MICHAEL BASS-DESCHENES

SAMPLE NUMBER	DATE	TIME	TYPE	SAMPLE LOCATION	NUMBER OF CONTAINERS	ANALYSIS(ES): TPH-G, D, BO, MO	VOCS BY EPA 8260B	PRESERVATIVE	REMARKS
MW1	2-25-20	1135	H_2O		6	X	X	ICE	NORMAL TAT
MW2	⊥	1045			6	X	X	ICE	
MW3	⊥	1230	⊥		6	X	X	ICE	⊥

RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)		
[signature]	2/26/20	1330	WAP 2/26/20 1330	Total No. of Samples (This Shipment): 3; Total No. of Containers (This Shipment): 18	LABORATORY: MCCAMBELL ANALYTICAL INC
RELINQUISHED BY: (SIGNATURE) WAP	2/26/20	1850	RECEIVED BY: (SIGNATURE) [signature]	LABORATORY CONTACT: ANGELA RYDELIUS	LABORATORY PHONE NUMBER: (925) 252-9262
RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RECEIVED FOR LABORATORY BY: (SIGNATURE)	SAMPLE ANALYSIS REQUEST SHEET ATTACHED: ( ) YES (X) NO	2.7C

Results and billing to:
P&D Environmental, Inc.
lab@pdenviro.com

REMARKS: 1. THREE (3) 40 mL VOAs w/ HCl
THREE (3) 40 mL AMBER VOAs (UNPRESERVED)
ON ICE.

McCampbell Analytical, Inc.
"When Quality Counts"

1534 Willow Pass Road, Pittsburg, CA 94565-1701
Toll Free Telephone: (877) 252-9262 / Fax: (925) 252-9269
http://www.mccampbell.com / E-mail: main@mccampbell.com

Sample Receipt Checklist

Client Name:	**P & D Environmental**	Date and Time Received:	**2/26/2020 15:50**
Project:	**0794; 820 W. MacArthur Blvd. Oakland, CA**	Date Logged:	**2/26/2020**
		Received by:	Kena Ponce
WorkOrder №:	**2002A47** Matrix: Water	Logged by:	Kena Ponce
Carrier:	Lorenzo Perez (MAI Courier)		

Chain of Custody (COC) Information

	Yes	No	NA
Chain of custody present?	☑	☐	
Chain of custody signed when relinquished and received?	☑	☐	
Chain of custody agrees with sample labels?	☑	☐	
Sample IDs noted by Client on COC?	☑	☐	
Date and Time of collection noted by Client on COC?	☑	☐	
Sampler's name noted on COC?	☑	☐	
COC agrees with Quote?	☐	☐	☑

Sample Receipt Information

	Yes	No	NA
Custody seals intact on shipping container/cooler?	☐	☐	☑
Shipping container/cooler in good condition?	☑	☐	
Samples in proper containers/bottles?	☑	☐	
Sample containers intact?	☑	☐	
Sufficient sample volume for indicated test?	☑	☐	

Sample Preservation and Hold Time (HT) Information

	Yes	No	NA
All samples received within holding time?	☑	☐	☐
Samples Received on Ice?	☑	☐	
	(Ice Type: WET ICE)		
Sample/Temp Blank temperature	Temp: 2.7°C		☐
Water - VOA vials have zero headspace / no bubbles?	☑	☐	☐
Sample labels checked for correct preservation?	☑	☐	
pH acceptable upon receipt (Metal: <2; Nitrate 353.2/4500NO3: <2; 522: <4; 218.7: >8)?	☐	☐	☑
UCMR Samples:			
pH tested and acceptable upon receipt (200.8: ≤2; 525.3: ≤4; 530: ≤7; 541: <3; 544: <6.5 & 7.5)?	☐	☐	☑
Free Chlorine tested and acceptable upon receipt (<0.1mg/L)?	☐	☐	☑

Comments:

ENTHALPY ANALYTICAL

Enthalpy Analytical
2323 Fifth Street
Berkeley, CA 94710
(510) 486-0900

enthalpy.com

Lab Job Number: 317234
Report Level: II
Report Date: 01/23/2020

Analytical Report *prepared for:*

Paul H. King
P&D Environmental
55 Santa Clara Avenue
Suite 240
Oakland, CA 94610

Project: 0794 - 820 MacArthur Blvd, Oakland, Ca.

Authorized for release by:

Jessica Silberman

Jess Silberman, Project Manager
(510) 204-2223
Jessica.Silberman@enthalpy.com

CA ELAP# 2896, NELAP# 4044-001

ENTHALPY ANALYTICAL

Sample Summary

Paul H. King		Lab Job #:	317234
P&D Environmental		Project No:	0794
55 Santa Clara Avenue		Location:	820 MacArthur Blvd, Oakland, Ca.
Suite 240		Date Received:	01/08/20
Oakland, CA 94610			

Sample ID	Lab ID	Collected	Matrix
SG22	317234-001	01/08/20 12:00	Air
SG25	317234-002	01/08/20 14:36	Air
SG28	317234-003	01/08/20 13:00	Air
SG29	317234-004	01/08/20 11:33	Air
SG30	317234-005	01/08/20 10:26	Air
SG31	317234-006	01/08/20 10:48	Air
SG31-DUP	317234-007	01/08/20 10:48	Air

ENTHALPY ANALYTICAL

Case Narrative

P&D Environmental	Lab Job Number:	317234
55 Santa Clara Avenue	Project No:	0794
Suite 240	Location:	820 MacArthur Blvd, Oakland, Ca.
Oakland, CA 94610	Date Received:	01/08/20
Paul H. King		

This data package contains sample and QC results for seven air samples, requested for the above referenced project on 01/08/20. The samples were received intact.

Volatile Organics in Air GC (ASTM D1946-90 and EPA TO-3):
Air Toxics in Folsom, CA performed the analysis (not NELAP certified). Please see the Air Toxics case narrative.

Volatile Organics in Air (EPA TO-15):
Air Toxics in Folsom, CA performed the analysis (not NELAP certified). Please see the Air Toxics case narrative.

Detection Summary for 317234

Client: P&D Environmental
Project: 0794
Location 820 MacArthur Blvd, Oakland, Ca.

Sample ID: SG22								Lab ID: 317234-001
Analyte	**Result**	**Flags**	**RL**	**Units**	**Basis**	**IDF**	**Method**	**Prep Method**
Carbon Dioxide	28,000		2,100	ppmv	As Recd	2.070	ASTM D1946-90	METHOD
Oxygen	42,000		2,100	ppmv	As Recd	2.070	ASTM D1946-90	METHOD

Sample ID: SG25								Lab ID: 317234-002
Analyte	**Result**	**Flags**	**RL**	**Units**	**Basis**	**IDF**	**Method**	**Prep Method**
Carbon Dioxide	22,000		2,000	ppmv	As Recd	1.980	ASTM D1946-90	METHOD
Oxygen	69,000		2,000	ppmv	As Recd	1.980	ASTM D1946-90	METHOD

Sample ID: SG28								Lab ID: 317234-003
Analyte	**Result**	**Flags**	**RL**	**Units**	**Basis**	**IDF**	**Method**	**Prep Method**
Carbon Dioxide	25,000		2,000	ppmv	As Recd	2.020	ASTM D1946-90	METHOD
Oxygen	110,000		2,000	ppmv	As Recd	2.020	ASTM D1946-90	METHOD

Sample ID: SG29								Lab ID: 317234-004
Analyte	**Result**	**Flags**	**RL**	**Units**	**Basis**	**IDF**	**Method**	**Prep Method**
Carbon Dioxide	86,000		1,900	ppmv	As Recd	1.910	ASTM D1946-90	METHOD
Oxygen	26,000		1,900	ppmv	As Recd	1.910	ASTM D1946-90	METHOD

Sample ID: SG30								Lab ID: 317234-005
Analyte	**Result**	**Flags**	**RL**	**Units**	**Basis**	**IDF**	**Method**	**Prep Method**
Carbon Dioxide	9,100		1,900	ppmv	As Recd	1.880	ASTM D1946-90	METHOD
Oxygen	70,000		1,900	ppmv	As Recd	1.880	ASTM D1946-90	METHOD

Sample ID: SG31								Lab ID: 317234-006
Analyte	**Result**	**Flags**	**RL**	**Units**	**Basis**	**IDF**	**Method**	**Prep Method**
Carbon Dioxide	3,400		1,900	ppmv	As Recd	1.910	ASTM D1946-90	METHOD
Oxygen	140,000		1,900	ppmv	As Recd	1.910	ASTM D1946-90	METHOD

Results for any subcontracted analyses are not included in this summary. Data qualifiers and additional information necessary for the interpretation of the test results are contained in the PDF file and may not be included in this summary.

ENTHALPY ANALYTICAL

Detection Summary for 317234

Sample ID: SG31-DUP								Lab ID: 317234-007
Analyte	**Result**	**Flags**	**RL**	**Units**	**Basis**	**IDF**	**Method**	**Prep Method**
Carbon Dioxide	3,400		1,900	ppmv	As Recd	1.930	ASTM D1946-90	METHOD
Oxygen	140,000		1,900	ppmv	As Recd	1.930	ASTM D1946-90	METHOD

Results for any subcontracted analyses are not included in this summary. Data qualifiers and additional information necessary for the interpretation of the test results are contained in the PDF file and may not be included in this summary.

CHAIN OF CUSTODY RECORD

31234

PAGE 1 OF 1

P&D ENVIRONMENTAL, INC.
55 Santa Clara Ave., Suite 240
Oakland, CA 94610
(510) 658-6916

PROJECT NUMBER: 0794

PROJECT NAME: 820 W. MACARTHUR BLVD OAKLAND, CA

SAMPLED BY: (PRINTED & SIGNATURE) MICHAEL BASS-DESCHENES *Michael Bass-Deschenes*

ANALYSIS(ES): TPH-G BY TO-3; VOCs BY TO-15 WITH NAPHTHALENE; OXYGEN, CARBON DIOXIDE AND TRACER GAS HELIUM BY ASTM D-1946

	SAMPLE NUMBER	DATE	TIME	TYPE	INIT VAC	FINAL VAC	SUMMA #	PID (PPM)	NUMBER OF CONTAINERS	TPH-G BY TO-3	VOCs BY TO-15 WITH NAPHTHALENE	OXYGEN, CARBON DIOXIDE AND TRACER GAS HELIUM BY ASTM D-1946						PRESERVATIVE	REMARKS
1	SG22	1/8/20	114800 120014	SOIL/GAS	-30	-5	518	0	1	X	X	X						NONE	1 WEEK TAT
2	SG25	1/8/20	142700 143648	SOIL/GAS	-30	-5	317	0	1	X	X	X						"	
3	SG28	1/7/20	125300 130012	SOIL/GAS	-30	-5	107	0	1	X	X	X						"	
4	SG29	1/7/20	112800 113349	SOIL/GAS	-30	-5	189	0	1	X	X	X						"	
5	SG30	1/7/20	102615	SOIL/GAS	-30	-5	418	0	1	X	X	X						"	
6	SG31	1/8/20	102800 104841	SOIL/GAS	-30	-5	158	0	1	X	X	X						"	
7	SG31-DUP	1/8/20	102800 104841	SOIL/GAS	-30	-5	276	0	1	X	X	X						"	

RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)		
Michael Bass-Deschenes	1/8/20	1455	*[signature]*	Total No. of Samples (This Shipment): 7 Total No. of Containers (This Shipment): 7	LABORATORY: ENTHALPY ANALYTICAL
RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	LABORATORY CONTACT: JESSICA SILBERMAN	LABORATORY PHONE NUMBER: (510) 486-0900
RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RECEIVED FOR LABORATORY BY: (SIGNATURE)	SAMPLE ANALYSIS REQUEST SHEET ATTACHED: ( ) YES (X) NO	

Results and billing to:
P&D Environmental, Inc.
lab@pdenviro.com

REMARKS: DETECTION LIMITS LESS THAN OR EQUAL TO JAN 2019 SFRWQCB RESIDENTIAL SOIL GAS ESL.
PID: 10.6 eV BULB CALIBRATED WITH 100 PPM ISOBUTYLENE STANDARD

SAMPLE RECEIPT CHECKLIST

Section 1: Login # ST 317234 Client: PDE

Date Received: 1/8/20 Project: ____________

ENTHALPY

Section 2: Shipping info (if applicable) ____________

Are custody seals present? ☐ No, or ☐ Yes. If yes, where? ☐ on cooler, ☐ on samples, ☐ on package

☐ Date: ________ How many ________ ☐ Signature, ☐ Initials, ☐ None

Were custody seals intact upon arrival? ☐ Yes ☐ No ☐ N/A

Samples received in a cooler? ☐ Yes, how many? ________ ☐ No (**skip Section 3 below**)

If no cooler Sample Temp (°C): ________ using IR Gun # ☐ B, or ☐ C

☐ Samples received on ice directly from the field. Cooling process had begun

If in cooler: Date Opened ________ By (print) ________ (sign) ________

Section 3: ***Important*: Notify PM if temperature exceeds 6°C or arrive frozen.**

Packing in cooler: (if other, describe) ________

☐ Bubble Wrap, ☐ Foam blocks, ☐ Bags, ☐ None, ☐ Cloth material, ☐ Cardboard, ☐ Styrofoam, ☐ Paper towels

☐ Samples received on ice directly from the field. Cooling process had begun

Type of ice used : ☐ Wet, ☐ Blue/Gel, ☐ None Temperature blank(s) included? ☐ Yes, ☐ No

Temperature measured using ☐ Thermometer ID: ________, or IR Gun # ☐ B ☐ C

Cooler Temp (°C): #1: ____, #2: ____, #3: ____, #4: ____, #5: ____, #6: ____, #7: ____

Section 4:	YES	NO	N/A
Were custody papers dry, filled out properly, and the project identifiable	✓		
Were Method 5035 sampling containers present?		✓	
If YES, what time were they transferred to freezer? ________			
Did all bottles arrive unbroken/unopened?	✓		
Are there any missing / extra samples?		✓	
Are samples in the appropriate containers for indicated tests?	✓		
Are sample labels present, in good condition and complete?	✓		
Does the container count match the COC?	✓		
Do the sample labels agree with custody papers?	✓		
Was sufficient amount of sample sent for tests requested?	✓		
Did you change the hold time in LIMS for unpreserved VOAs?			✓
Did you change the hold time in LIMS for preserved terracores?			✓
Are bubbles > 6mm present in VOA samples?			✓
Was the client contacted concerning this sample delivery?		✓	
If YES, who was called? ________ By ________ Date: ________			

Section 5:	YES	NO	N/A
Are the samples appropriately preserved? (if N/A, skip the rest of section 5)			✓
Did you check preservatives for all bottles for each sample?			
Did you document your preservative check?			

pH strip lot# ________, pH strip lot# ________, pH strip lot# ________

Preservative added:

☐ H2SO4 lot# ________ added to samples ________ on/at ________

☐ HCL lot# ________ added to samples ________ on/at ________

☐ HNO3 lot# ________ added to samples ________ on/at ________

☐ NaOH lot# ________ added to samples ________ on/at ________

Section 6:

Explanations/Comments: ________

Date Logged in 1/8/20 **By (print)** AC **(sign)** [signature]

Date Labeled 1/8/20 **By (print)** AC **(sign)** [signature]

ENTHALPY ANALYTICAL

Fixed Gas Analysis

Lab #: 317234 **Project#:** 0794

Client: P&D Environmental **Location:** 820 MacArthur Blvd, Oakland, Ca.

Field ID: SG22 **Diln Fac:** 2.070 **Analyzed:** 01/08/20
Type: SAMPLE **Batch#:** 277485 **Prep:** METHOD
Lab ID: 317234-001 **Sampled:** 01/08/20 **Analysis:** ASTM D1946-90
Matrix: Air **Received:** 01/08/20

Analyte	Result	RL	Units	Result	RL	Units
Helium	ND	2,100	ppmv	ND	0.21	MOL %
Carbon Dioxide	**28,000**	2,100	ppmv	2.8	0.21	MOL %
Oxygen	**42,000**	2,100	ppmv	4.2	0.21	MOL %

Field ID: SG25 **Diln Fac:** 1.980 **Analyzed:** 01/08/20
Type: SAMPLE **Batch#:** 277485 **Prep:** METHOD
Lab ID: 317234-002 **Sampled:** 01/08/20 **Analysis:** ASTM D1946-90
Matrix: Air **Received:** 01/08/20

Analyte	Result	RL	Units	Result	RL	Units
Helium	ND	2,000	ppmv	ND	0.20	MOL %
Carbon Dioxide	**22,000**	2,000	ppmv	2.2	0.20	MOL %
Oxygen	**69,000**	2,000	ppmv	6.9	0.20	MOL %

Field ID: SG28 **Diln Fac:** 2.020 **Analyzed:** 01/08/20
Type: SAMPLE **Batch#:** 277485 **Prep:** METHOD
Lab ID: 317234-003 **Sampled:** 01/08/20 **Analysis:** ASTM D1946-90
Matrix: Air **Received:** 01/08/20

Analyte	Result	RL	Units	Result	RL	Units
Helium	ND	2,000	ppmv	ND	0.20	MOL %
Carbon Dioxide	**25,000**	2,000	ppmv	2.5	0.20	MOL %
Oxygen	**110,000**	2,000	ppmv	11	0.20	MOL %

Field ID: SG29 **Diln Fac:** 1.910 **Analyzed:** 01/08/20
Type: SAMPLE **Batch#:** 277485 **Prep:** METHOD
Lab ID: 317234-004 **Sampled:** 01/08/20 **Analysis:** ASTM D1946-90
Matrix: Air **Received:** 01/08/20

Analyte	Result	RL	Units	Result	RL	Units
Helium	ND	1,900	ppmv	ND	0.19	MOL %
Carbon Dioxide	**86,000**	1,900	ppmv	8.6	0.19	MOL %
Oxygen	**26,000**	1,900	ppmv	2.6	0.19	MOL %

ENTHALPY ANALYTICAL

Fixed Gas Analysis

Lab #: 317234 **Project#:** 0794
Client: P&D Environmental **Location:** 820 MacArthur Blvd, Oakland, Ca.

Field ID: SG30 **Diln Fac:** 1.880 **Analyzed:** 01/08/20
Type: SAMPLE **Batch#:** 277485 **Prep:** METHOD
Lab ID: 317234-005 **Sampled:** 01/08/20 **Analysis:** ASTM D1946-90
Matrix: Air **Received:** 01/08/20

Analyte	Result	RL	Units	Result	RL	Units
Helium	ND	1,900	ppmv	ND	0.19	MOL %
Carbon Dioxide	**9,100**	1,900	ppmv	0.91	0.19	MOL %
Oxygen	**70,000**	1,900	ppmv	7.0	0.19	MOL %

Field ID: SG31 **Diln Fac:** 1.910 **Analyzed:** 01/08/20
Type: SAMPLE **Batch#:** 277485 **Prep:** METHOD
Lab ID: 317234-006 **Sampled:** 01/08/20 **Analysis:** ASTM D1946-90
Matrix: Air **Received:** 01/08/20

Analyte	Result	RL	Units	Result	RL	Units
Helium	ND	1,900	ppmv	ND	0.19	MOL %
Carbon Dioxide	**3,400**	1,900	ppmv	0.34	0.19	MOL %
Oxygen	**140,000**	1,900	ppmv	14	0.19	MOL %

Field ID: SG31-DUP **Diln Fac:** 1.930 **Analyzed:** 01/08/20
Type: SAMPLE **Batch#:** 277485 **Prep:** METHOD
Lab ID: 317234-007 **Sampled:** 01/08/20 **Analysis:** ASTM D1946-90
Matrix: Air **Received:** 01/08/20

Analyte	Result	RL	Units	Result	RL	Units
Helium	ND	1,900	ppmv	ND	0.19	MOL %
Carbon Dioxide	**3,400**	1,900	ppmv	0.34	0.19	MOL %
Oxygen	**140,000**	1,900	ppmv	14	0.19	MOL %

Type: BLANK **Matrix:** Air **Batch#:** 277485 **Prep:** METHOD
Lab ID: QC1004667 **Diln Fac:** 1.000 **Analyzed:** 01/08/20 **Analysis:** ASTM D1946-90

Analyte	Result	RL	Units	Result	RL	Units
Helium	ND	1,000	ppmv	ND	0.10	MOL %
Carbon Dioxide	ND	1,000	ppmv	ND	0.10	MOL %
Oxygen	ND	1,000	ppmv	ND	0.10	MOL %

Legend
ND: Not Detected
RL: Reporting Limit

ENTHALPY ANALYTICAL

Fixed Gas Analysis: Batch QC

Lab #: 317234 **Project#:** 0794

Client: P&D Environmental **Location:** 820 MacArthur Blvd, Oakland, Ca.

Type: BS **Lab ID:** QC1004664 **Matrix:** Air

Analyte	Spiked	Result	%REC	Limits	Units	Diln Fac	Batch#	Analyzed	Prep	Analysis
Helium	100,000	97,840	98	70-130	ppmv	1.000	277485	01/08/20	METHOD	ASTM D1946-90
Carbon Dioxide		NA								
Oxygen		NA								

Type: BSD **Lab ID:** QC1004665 **Matrix:** Air

Analyte	Spiked	Result	%REC	Limits	Units	RPD	Lim	Diln Fac	Batch#	Analyzed	Prep	Analysis
Helium	100,000	97,500	97	70-130	ppmv	0	20	1.000	277485	01/08/20	METHOD	ASTM D1946-90
Carbon Dioxide		NA										
Oxygen		NA										

Legend

NA: Not Analyzed

RPD: Relative Percent Difference

ENTHALPY ANALYTICAL

Fixed Gas Analysis: Batch QC

Lab #: 317234 **Project#:** 0794

Client: P&D Environmental **Location:** 820 MacArthur Blvd, Oakland, Ca.

Type: LCS **Lab ID:** QC1004666 **Matrix:** Air

Analyte	Spiked	Result	%REC	Limits	Units	Diln Fac	Batch#	Analyzed	Prep	Analysis
Helium		NA								
Carbon Dioxide	2,000	1,960	98	70-130	ppmv	1.000	277485	01/08/20	METHOD	ASTM D1946-90
Oxygen	2,000	2,021	101	70-130	ppmv	1.000	277485	01/08/20	METHOD	ASTM D1946-90

Legend

NA: Not Analyzed

ENTHALPY ANALYTICAL

Fixed Gas Analysis: Batch QC

Lab #: 317234 **Project#:** 0794

Client: P&D Environmental **Location:** 820 MacArthur Blvd, Oakland, Ca.

Field ID:	SG22	**Matrix:**	Air	**Received:**	01/08/20
Type:	SDUP	**Diln Fac:**	2.070	**Analyzed:**	01/08/20
MSS Lab ID:	317234-001	**Batch#:**	277485	**Prep:**	METHOD
Lab ID:	QC1004668	**Sampled:**	01/08/20	**Analysis:**	ASTM D1946-90

Analyte	MSS Result	Result	RL	Units	Result	RL	Units	RPD	Lim
Helium	<2,070	ND	2,070	ppmv	ND	0.2070	MOL %	NC	30
Carbon Dioxide	28,310	**28,290**	2,070	ppmv	2.829	0.2070	MOL %	0	30
Oxygen	41,930	**41,890**	2,070	ppmv	4.189	0.2070	MOL %	0	30

Legend

NC: Not Calculated

ND: Not Detected

RL: Reporting Limit

RPD: Relative Percent Difference

Laboratory Job Number 317234

Subcontracted Products

Air Toxics

Air Toxics

1/16/2020
Ms. Jess Silberman
Enthalpy (Formerly Curtis & Tompkins, Ltd)
2323 Fifth Street

Berkeley CA 94710

Project Name: 820 MacArthur Blvd, Oakland, Ca.
Project #: 317234
Workorder #: 2001190B

Dear Ms. Jess Silberman

The following report includes the data for the above referenced project for sample(s) received on 1/10/2020 at Air Toxics Ltd.

The data and associated QC analyzed by Modified TO-3 are compliant with the project requirements or laboratory criteria with the exception of the deviations noted in the attached case narrative.

Thank you for choosing Eurofins Air Toxics Inc. for your air analysis needs. Eurofins Air Toxics Inc. is committed to providing accurate data of the highest quality. Please feel free to contact the Project Manager: Sarah Westerman at 916-985-1000 if you have any questions regarding the data in this report.

Regards,

Sarah Westerman
Project Manager

eurofins | Air Toxics

WORK ORDER #: 2001190B

Work Order Summary

CLIENT:	Ms. Jess Silberman Enthalpy (Formerly Curtis & Tompkins, Ltd) 2323 Fifth Street Berkeley, CA 94710	**BILL TO:**	Accounts Payables Enthalpy (Formerly Curtis & Tompkins, Ltd) 2323 Fifth Street Berkeley, CA 94710
PHONE:	510-486-0925	**P.O. #**	317234
FAX:	510-486-0532	**PROJECT #**	317234 820 MacArthur Blvd, Oakland, Ca.
DATE RECEIVED:	01/10/2020	**CONTACT:**	Sarah Westerman
DATE COMPLETED:	01/16/2020		

FRACTION #	NAME	TEST	RECEIPT VAC./PRES.	FINAL PRESSURE
01A	SG22	Modified TO-3	9.6 psi	9.6 psi
02A	SG25	Modified TO-3	10.3 psi	10.3 psi
03A	SG28	Modified TO-3	10.1 psi	10.1 psi
04A	SG29	Modified TO-3	9.9 psi	9.9 psi
05A	SG30	Modified TO-3	9.6 psi	9.6 psi
06A	SG31	Modified TO-3	10.2 psi	10.2 psi
07A	SG31-DUP	Modified TO-3	10.3 psi	10.3 psi
08A	Lab Blank	Modified TO-3	NA	NA
09A	LCS	Modified TO-3	NA	NA
09AA	LCSD	Modified TO-3	NA	NA

CERTIFIED BY: Heidi Hayes DATE: 01/16/20

Technical Director

Certification numbers: AZ Licensure AZ0775, FL NELAP – E87680, LA NELAP – 02089, NH NELAP - 209218, NJ NELAP - CA016, NY NELAP - 11291, TX NELAP - T104704434-18-13, UT NELAP – CA009332019-11, VA NELAP - 460197, WA NELAP - C935
Name of Accreditation Body: NELAP/ORELAP (Oregon Environmental Laboratory Accreditation Program)
Accreditation number: CA300005-011, Effective date: 10/18/2019, Expiration date: 10/17/2020.
Eurofins Air Toxics, LLC certifies that the test results contained in this report meet all requirements of the NELAC standards

180 BLUE RAVINE ROAD, SUITE B FOLSOM, CA - 95630
(916) 985-1000 . (800) 985-5955 . FAX (916) 351-8279

LABORATORY NARRATIVE
Modified TO-3
Enthalpy (Formerly Curtis & Tompkins, Ltd)
Workorder# 2001190B

Seven Client Canister samples were received on January 13, 2020. The laboratory performed analysis for volatile organic compounds in air via modified EPA Method TO-3 using gas chromatography with flame ionization detection. The TPH results are calculated using the response of Gasoline. A molecular weight of 100 is used to convert the TPH ppmv result to ug/L. The method involves concentrating up to 200 mL of sample. The concentrated aliquot is then dry purged to remove water vapor prior to entering the chromatographic system.

Method modifications taken to run these samples are summarized in the table below. Specific project requirements may over-ride the ATL modifications.

Requirement	***TO-3***	***ATL Modifications***
Daily Calibration Standard Frequency	Prior to sample analysis and every 4 - 6 hrs	Prior to sample analysis and after the analytical batch </= 20 samples.
Initial Calibration Calculation	4-point calibration using a linear regression model	5-point calibration using average Response Factor
Initial Calibration Frequency	Weekly	When daily calibration standard recovery is outside 75 - 125 %, or upon significant changes to procedure or instrumentation
Moisture Control	Nafion system	Sorbent system
Minimum Detection Limit (MDL)	Calculated using the equation DL = A+3.3S, where A is intercept of calibration line and S is the standard deviation of at least 3 reps of low level standard	40 CFR Pt. 136 App. B
Preparation of Standards	Levels achieved through dilution of gas mixture	Levels achieved through loading various volumes of the gas mixture

Receiving Notes

There were no receiving discrepancies.

Analytical Notes

All samples in this workorder were pressurized prior to receiving. Dilution factors were provided by the client.

All samples were collected in client provided canisters. Media validation, cleanliness, certification and hold time information should be obtained by the data user separate from this report.

Definition of Data Qualifying Flags

Seven qualifiers may have been used on the data analysis sheets and indicate as follows:

B - Compound present in laboratory blank greater than reporting limit.
J - Estimated value.
E - Exceeds instrument calibration range.
S - Saturated peak.
Q - Exceeds quality control limits.
U - Compound analyzed for but not detected above the detection limit.
M - Reported value may be biased due to apparent matrix interferences.

File extensions may have been used on the data analysis sheets and indicates as follows:
a-File was requantified
b-File was quantified by a second column and detector
r1-File was requantified for the purpose of reissue

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Summary of Detected Compounds
MODIFIED EPA METHOD TO-3 GC/FID

Client Sample ID: SG22

Lab ID#: 2001190B-01A

No Detections Were Found.

Client Sample ID: SG25

Lab ID#: 2001190B-02A

Compound	Rpt. Limit (ppmv)	Rpt. Limit (ug/L)	Amount (ppmv)	Amount (ug/L)
TPH (Gasoline Range)	0.050	0.20	0.15	0.61

Client Sample ID: SG28

Lab ID#: 2001190B-03A

No Detections Were Found.

Client Sample ID: SG29

Lab ID#: 2001190B-04A

No Detections Were Found.

Client Sample ID: SG30

Lab ID#: 2001190B-05A

No Detections Were Found.

Client Sample ID: SG31

Lab ID#: 2001190B-06A

Compound	Rpt. Limit (ppmv)	Rpt. Limit (ug/L)	Amount (ppmv)	Amount (ug/L)
TPH (Gasoline Range)	0.048	0.20	0.059	0.24

Client Sample ID: SG31-DUP

Lab ID#: 2001190B-07A

Compound	Rpt. Limit (ppmv)	Rpt. Limit (ug/L)	Amount (ppmv)	Amount (ug/L)
TPH (Gasoline Range)	0.048	0.20	0.058	0.24

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Client Sample ID: SG22

Lab ID#: 2001190B-01A

MODIFIED EPA METHOD TO-3 GC/FID

File Name:	**d011409**	**Date of Collection:**	**1/8/20 12:00:00 PM**
Dil. Factor:	**2.07**	**Date of Analysis:**	**1/14/20 11:34 AM**

Compound	Rpt. Limit (ppmv)	Rpt. Limit (ug/L)	Amount (ppmv)	Amount (ug/L)
TPH (Gasoline Range)	0.052	0.21	Not Detected	Not Detected

Container Type: Client Canister

Surrogates	%Recovery	Method Limits
Fluorobenzene (FID)	97	75-150

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Client Sample ID: SG25

Lab ID#: 2001190B-02A

MODIFIED EPA METHOD TO-3 GC/FID

File Name:	**d011410**	**Date of Collection: 1/8/20 2:36:00 PM**
Dil. Factor:	**1.98**	**Date of Analysis: 1/14/20 12:06 PM**

Compound	Rpt. Limit (ppmv)	Rpt. Limit (ug/L)	Amount (ppmv)	Amount (ug/L)
TPH (Gasoline Range)	0.050	0.20	0.15	0.61

Container Type: Client Canister

Surrogates	%Recovery	Method Limits
Fluorobenzene (FID)	96	75-150

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Client Sample ID: SG28

Lab ID#: 2001190B-03A

MODIFIED EPA METHOD TO-3 GC/FID

File Name:	**d011411**	**Date of Collection: 1/8/20 1:00:00 PM**
Dil. Factor:	**2.02**	**Date of Analysis: 1/14/20 12:44 PM**

Compound	Rpt. Limit (ppmv)	Rpt. Limit (ug/L)	Amount (ppmv)	Amount (ug/L)
TPH (Gasoline Range)	0.050	0.21	Not Detected	Not Detected

Container Type: Client Canister

Surrogates	%Recovery	Method Limits
Fluorobenzene (FID)	96	75-150

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Client Sample ID: SG29

Lab ID#: 2001190B-04A

MODIFIED EPA METHOD TO-3 GC/FID

File Name:	**d011412**	**Date of Collection: 1/8/20 11:33:00 AM**
Dil. Factor:	**1.91**	**Date of Analysis: 1/14/20 01:31 PM**

Compound	Rpt. Limit (ppmv)	Rpt. Limit (ug/L)	Amount (ppmv)	Amount (ug/L)
TPH (Gasoline Range)	0.048	0.20	Not Detected	Not Detected

Container Type: Client Canister

Surrogates	%Recovery	Method Limits
Fluorobenzene (FID)	97	75-150

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Client Sample ID: SG30

Lab ID#: 2001190B-05A

MODIFIED EPA METHOD TO-3 GC/FID

File Name:	**d011413**	**Date of Collection:**	**1/8/20 10:26:00 AM**
Dil. Factor:	**1.88**	**Date of Analysis:**	**1/14/20 02:04 PM**

Compound	Rpt. Limit (ppmv)	Rpt. Limit (ug/L)	Amount (ppmv)	Amount (ug/L)
TPH (Gasoline Range)	0.047	0.19	Not Detected	Not Detected

Container Type: Client Canister

Surrogates	%Recovery	Method Limits
Fluorobenzene (FID)	96	75-150

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Client Sample ID: SG31

Lab ID#: 2001190B-06A

MODIFIED EPA METHOD TO-3 GC/FID

File Name:	**d011414**	**Date of Collection:**	**1/8/20 10:48:00 AM**
Dil. Factor:	**1.91**	**Date of Analysis:**	**1/14/20 02:39 PM**

Compound	Rpt. Limit (ppmv)	Rpt. Limit (ug/L)	Amount (ppmv)	Amount (ug/L)
TPH (Gasoline Range)	0.048	0.20	0.059	0.24

Container Type: Client Canister

Surrogates	%Recovery	Method Limits
Fluorobenzene (FID)	96	75-150

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Client Sample ID: SG31-DUP

Lab ID#: 2001190B-07A

MODIFIED EPA METHOD TO-3 GC/FID

File Name:	**d011415**	**Date of Collection: 1/8/20 10:48:00 AM**
Dil. Factor:	**1.93**	**Date of Analysis: 1/14/20 03:12 PM**

Compound	Rpt. Limit (ppmv)	Rpt. Limit (ug/L)	Amount (ppmv)	Amount (ug/L)
TPH (Gasoline Range)	0.048	0.20	0.058	0.24

Container Type: Client Canister

Surrogates	%Recovery	Method Limits
Fluorobenzene (FID)	96	75-150

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Client Sample ID: Lab Blank

Lab ID#: 2001190B-08A

MODIFIED EPA METHOD TO-3 GC/FID

File Name:	**d011406**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 1/14/20 09:02 AM**	

Compound	Rpt. Limit (ppmv)	Rpt. Limit (ug/L)	Amount (ppmv)	Amount (ug/L)
TPH (Gasoline Range)	0.025	0.10	Not Detected	Not Detected

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Fluorobenzene (FID)	104	75-150

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Client Sample ID: LCS

Lab ID#: 2001190B-09A

MODIFIED EPA METHOD TO-3 GC/FID

File Name:	**d011402**	**Date of Collection: NA**
Dil. Factor:	**1.00**	**Date of Analysis: 1/13/20 08:44 PM**

Compound	%Recovery	Method Limits
TPH (Gasoline Range)	113	75-125

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Fluorobenzene (FID)	122	75-150

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Client Sample ID: LCSD

Lab ID#: 2001190B-09AA

MODIFIED EPA METHOD TO-3 GC/FID

File Name:	**d011403**	**Date of Collection: NA**
Dil. Factor:	**1.00**	**Date of Analysis: 1/13/20 09:22 PM**

Compound	%Recovery	Method Limits
TPH (Gasoline Range)	113	75-125

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Fluorobenzene (FID)	124	75-150

1/23/2020
Ms. Jess Silberman
Enthalpy (Formerly Curtis & Tompkins, Ltd)
2323 Fifth Street

Berkeley CA 94710

Project Name: 820 MacArthur Blvd, Oakland, Ca.
Project #: 317234
Workorder #: 2001190A

Dear Ms. Jess Silberman

The following report includes the data for the above referenced project for sample(s) received on 1/10/2020 at Air Toxics Ltd.

The data and associated QC analyzed by TO-15 are compliant with the project requirements or laboratory criteria with the exception of the deviations noted in the attached case narrative.

Thank you for choosing Eurofins Air Toxics Inc. for your air analysis needs. Eurofins Air Toxics Inc. is committed to providing accurate data of the highest quality. Please feel free to contact the Project Manager: Sarah Westerman at 916-985-1000 if you have any questions regarding the data in this report.

Regards,

Sarah Westerman
Project Manager

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WORK ORDER #: 2001190A

Work Order Summary

CLIENT:	Ms. Jess Silberman Enthalpy (Formerly Curtis & Tompkins, Ltd) 2323 Fifth Street Berkeley, CA 94710	**BILL TO:**	Accounts Payables Enthalpy (Formerly Curtis & Tompkins, Ltd) 2323 Fifth Street Berkeley, CA 94710
PHONE:	510-486-0925	**P.O. #**	317234
FAX:	510-486-0532	**PROJECT #**	317234 820 MacArthur Blvd, Oakland, Ca.
DATE RECEIVED:	01/10/2020	**CONTACT:**	Sarah Westerman
DATE COMPLETED:	01/23/2020		

FRACTION #	NAME	TEST	RECEIPT VAC./PRES.	FINAL PRESSURE
01A	SG22	TO-15	9.6 psi	9.6 psi
02A	SG25	TO-15	10.3 psi	10.3 psi
03A	SG28	TO-15	10.1 psi	10.1 psi
04A	SG29	TO-15	9.9 psi	9.9 psi
05A	SG30	TO-15	9.6 psi	9.6 psi
06A	SG31	TO-15	10.2 psi	10.2 psi
07A	SG31-DUP	TO-15	10.3 psi	10.3 psi
08A	Lab Blank	TO-15	NA	NA
09A	CCV	TO-15	NA	NA
10A	LCS	TO-15	NA	NA
10AA	LCSD	TO-15	NA	NA

CERTIFIED BY: Heidi Hayes DATE: 01/23/20

Technical Director

Certification numbers: AZ Licensure AZ0775, FL NELAP – E87680, LA NELAP – 02089, NH NELAP - 209218, NJ NELAP - CA016, NY NELAP - 11291, TX NELAP - T104704434-18-13, UT NELAP – CA009332019-11, VA NELAP - 460197, WA NELAP - C935
Name of Accreditation Body: NELAP/ORELAP (Oregon Environmental Laboratory Accreditation Program)
Accreditation number: CA300005-011, Effective date: 10/18/2019, Expiration date: 10/17/2020.
Eurofins Air Toxics, LLC certifies that the test results contained in this report meet all requirements of the NELAC standards

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LABORATORY NARRATIVE
EPA Method TO-15
Enthalpy (Formerly Curtis & Tompkins, Ltd)
Workorder# 2001190A

Seven Client Canister samples were received on January 13, 2020. The laboratory performed analysis via EPA Method TO-15 using GC/MS in the full scan mode.

Receiving Notes

There were no receiving discrepancies.

Analytical Notes

All samples in this workorder were pressurized prior to receiving. Dilution factors were provided by the client.

All samples were collected in client provided canisters. Media validation, cleanliness, certification and hold time information should be obtained by the data user separate from this report.

Definition of Data Qualifying Flags

Ten qualifiers may have been used on the data analysis sheets and indicates as follows:
B - Compound present in laboratory blank greater than reporting limit (background subtraction not performed).
J - Estimated value.
E - Exceeds instrument calibration range.
S - Saturated peak.
Q - Exceeds quality control limits.
U - Compound analyzed for but not detected above the reporting limit, LOD, or MDL value. See data page for project specific U-flag definition.
UJ- Non-detected compound associated with low bias in the CCV
N - The identification is based on presumptive evidence.
M - Reported value may be biased due to apparent matrix interferences.
CN - See Case Narrative.

File extensions may have been used on the data analysis sheets and indicates as follows:
a-File was requantified
b-File was quantified by a second column and detector
r1-File was requantified for the purpose of reissue

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Summary of Detected Compounds
EPA METHOD TO-15 GC/MS FULL SCAN

Client Sample ID: SG22

Lab ID#: 2001190A-01A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Chloroform	1.0	2.5	5.0	12
Tetrachloroethene	1.0	2.3	7.0	16

Client Sample ID: SG25

Lab ID#: 2001190A-02A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Carbon Disulfide	4.0	4.1	12	13
Chloroform	0.99	3.4	4.8	17
Tetrachloroethene	0.99	140	6.7	950

Client Sample ID: SG28

Lab ID#: 2001190A-03A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Carbon Disulfide	4.0	6.8	12	21
Chloroform	1.0	5.0	4.9	24
Tetrachloroethene	1.0	5.5	6.8	37

Client Sample ID: SG29

Lab ID#: 2001190A-04A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Chloroform	0.96	2.5	4.7	12
Tetrachloroethene	0.96	4.4	6.5	30

Client Sample ID: SG30

Lab ID#: 2001190A-05A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Chloroform	0.94	3.2	4.6	16
Tetrachloroethene	0.94	7.7	6.4	52

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Summary of Detected Compounds
EPA METHOD TO-15 GC/MS FULL SCAN

Client Sample ID: SG31

Lab ID#: 2001190A-06A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Chloroform	0.96	16	4.7	76
Tetrachloroethene	0.96	31	6.5	210

Client Sample ID: SG31-DUP

Lab ID#: 2001190A-07A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Chloroform	0.96	16	4.7	76
Tetrachloroethene	0.96	31	6.5	210

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Client Sample ID: SG22

Lab ID#: 2001190A-01A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3011422**	**Date of Collection: 1/8/20 12:00:00 PM**
Dil. Factor:	**2.07**	**Date of Analysis: 1/14/20 11:17 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	1.0	Not Detected	5.1	Not Detected
Freon 114	1.0	Not Detected	7.2	Not Detected
Chloromethane	10	Not Detected	21	Not Detected
Vinyl Chloride	1.0	Not Detected	2.6	Not Detected
1,3-Butadiene	1.0	Not Detected	2.3	Not Detected
Bromomethane	10	Not Detected	40	Not Detected
Chloroethane	4.1	Not Detected	11	Not Detected
Freon 11	1.0	Not Detected	5.8	Not Detected
Ethanol	4.1	Not Detected	7.8	Not Detected
Freon 113	1.0	Not Detected	7.9	Not Detected
1,1-Dichloroethene	1.0	Not Detected	4.1	Not Detected
Acetone	10	Not Detected	24	Not Detected
2-Propanol	4.1	Not Detected	10	Not Detected
Carbon Disulfide	4.1	Not Detected	13	Not Detected
3-Chloropropene	4.1	Not Detected	13	Not Detected
Methylene Chloride	10	Not Detected	36	Not Detected
Methyl tert-butyl ether	4.1	Not Detected	15	Not Detected
trans-1,2-Dichloroethene	1.0	Not Detected	4.1	Not Detected
Hexane	1.0	Not Detected	3.6	Not Detected
1,1-Dichloroethane	1.0	Not Detected	4.2	Not Detected
2-Butanone (Methyl Ethyl Ketone)	4.1	Not Detected	12	Not Detected
cis-1,2-Dichloroethene	1.0	Not Detected	4.1	Not Detected
Tetrahydrofuran	1.0	Not Detected	3.0	Not Detected
Chloroform	1.0	2.5	5.0	12
1,1,1-Trichloroethane	1.0	Not Detected	5.6	Not Detected
Cyclohexane	1.0	Not Detected	3.6	Not Detected
Carbon Tetrachloride	1.0	Not Detected	6.5	Not Detected
2,2,4-Trimethylpentane	1.0	Not Detected	4.8	Not Detected
Benzene	1.0	Not Detected	3.3	Not Detected
1,2-Dichloroethane	1.0	Not Detected	4.2	Not Detected
Heptane	1.0	Not Detected	4.2	Not Detected
Trichloroethene	1.0	Not Detected	5.6	Not Detected
1,2-Dichloropropane	1.0	Not Detected	4.8	Not Detected
1,4-Dioxane	4.1	Not Detected	15	Not Detected
Bromodichloromethane	1.0	Not Detected	6.9	Not Detected
cis-1,3-Dichloropropene	1.0	Not Detected	4.7	Not Detected
4-Methyl-2-pentanone	1.0	Not Detected	4.2	Not Detected
Toluene	1.0	Not Detected	3.9	Not Detected
trans-1,3-Dichloropropene	1.0	Not Detected	4.7	Not Detected
1,1,2-Trichloroethane	1.0	Not Detected	5.6	Not Detected
Tetrachloroethene	1.0	2.3	7.0	16
2-Hexanone	4.1	Not Detected	17	Not Detected

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Client Sample ID: SG22

Lab ID#: 2001190A-01A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3011422**	**Date of Collection: 1/8/20 12:00:00 PM**
Dil. Factor:	**2.07**	**Date of Analysis: 1/14/20 11:17 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	1.0	Not Detected	8.8	Not Detected
1,2-Dibromoethane (EDB)	1.0	Not Detected	8.0	Not Detected
Chlorobenzene	1.0	Not Detected	4.8	Not Detected
Ethyl Benzene	1.0	Not Detected	4.5	Not Detected
m,p-Xylene	1.0	Not Detected	4.5	Not Detected
o-Xylene	1.0	Not Detected	4.5	Not Detected
Styrene	1.0	Not Detected	4.4	Not Detected
Bromoform	1.0	Not Detected	11	Not Detected
Cumene	1.0	Not Detected	5.1	Not Detected
1,1,2,2-Tetrachloroethane	1.0	Not Detected	7.1	Not Detected
Propylbenzene	1.0	Not Detected	5.1	Not Detected
4-Ethyltoluene	1.0	Not Detected	5.1	Not Detected
1,3,5-Trimethylbenzene	1.0	Not Detected	5.1	Not Detected
1,2,4-Trimethylbenzene	1.0	Not Detected	5.1	Not Detected
1,3-Dichlorobenzene	1.0	Not Detected	6.2	Not Detected
1,4-Dichlorobenzene	1.0	Not Detected	6.2	Not Detected
alpha-Chlorotoluene	1.0	Not Detected	5.4	Not Detected
1,2-Dichlorobenzene	1.0	Not Detected	6.2	Not Detected
1,2,4-Trichlorobenzene	4.1	Not Detected	31	Not Detected
Hexachlorobutadiene	4.1	Not Detected	44	Not Detected
Naphthalene	2.1	Not Detected	11	Not Detected

Container Type: Client Canister

Surrogates	%Recovery	Method Limits
Toluene-d8	106	70-130
1,2-Dichloroethane-d4	98	70-130
4-Bromofluorobenzene	96	70-130

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Client Sample ID: SG25

Lab ID#: 2001190A-02A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3011421**	**Date of Collection:**	**1/8/20 2:36:00 PM**
Dil. Factor:	**1.98**	**Date of Analysis:**	**1/14/20 10:50 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	0.99	Not Detected	4.9	Not Detected
Freon 114	0.99	Not Detected	6.9	Not Detected
Chloromethane	9.9	Not Detected	20	Not Detected
Vinyl Chloride	0.99	Not Detected	2.5	Not Detected
1,3-Butadiene	0.99	Not Detected	2.2	Not Detected
Bromomethane	9.9	Not Detected	38	Not Detected
Chloroethane	4.0	Not Detected	10	Not Detected
Freon 11	0.99	Not Detected	5.6	Not Detected
Ethanol	4.0	Not Detected	7.5	Not Detected
Freon 113	0.99	Not Detected	7.6	Not Detected
1,1-Dichloroethene	0.99	Not Detected	3.9	Not Detected
Acetone	9.9	Not Detected	24	Not Detected
2-Propanol	4.0	Not Detected	9.7	Not Detected
Carbon Disulfide	4.0	4.1	12	13
3-Chloropropene	4.0	Not Detected	12	Not Detected
Methylene Chloride	9.9	Not Detected	34	Not Detected
Methyl tert-butyl ether	4.0	Not Detected	14	Not Detected
trans-1,2-Dichloroethene	0.99	Not Detected	3.9	Not Detected
Hexane	0.99	Not Detected	3.5	Not Detected
1,1-Dichloroethane	0.99	Not Detected	4.0	Not Detected
2-Butanone (Methyl Ethyl Ketone)	4.0	Not Detected	12	Not Detected
cis-1,2-Dichloroethene	0.99	Not Detected	3.9	Not Detected
Tetrahydrofuran	0.99	Not Detected	2.9	Not Detected
Chloroform	0.99	3.4	4.8	17
1,1,1-Trichloroethane	0.99	Not Detected	5.4	Not Detected
Cyclohexane	0.99	Not Detected	3.4	Not Detected
Carbon Tetrachloride	0.99	Not Detected	6.2	Not Detected
2,2,4-Trimethylpentane	0.99	Not Detected	4.6	Not Detected
Benzene	0.99	Not Detected	3.2	Not Detected
1,2-Dichloroethane	0.99	Not Detected	4.0	Not Detected
Heptane	0.99	Not Detected	4.0	Not Detected
Trichloroethene	0.99	Not Detected	5.3	Not Detected
1,2-Dichloropropane	0.99	Not Detected	4.6	Not Detected
1,4-Dioxane	4.0	Not Detected	14	Not Detected
Bromodichloromethane	0.99	Not Detected	6.6	Not Detected
cis-1,3-Dichloropropene	0.99	Not Detected	4.5	Not Detected
4-Methyl-2-pentanone	0.99	Not Detected	4.0	Not Detected
Toluene	0.99	Not Detected	3.7	Not Detected
trans-1,3-Dichloropropene	0.99	Not Detected	4.5	Not Detected
1,1,2-Trichloroethane	0.99	Not Detected	5.4	Not Detected
Tetrachloroethene	0.99	140	6.7	950
2-Hexanone	4.0	Not Detected	16	Not Detected

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Client Sample ID: SG25

Lab ID#: 2001190A-02A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3011421**	**Date of Collection: 1/8/20 2:36:00 PM**
Dil. Factor:	**1.98**	**Date of Analysis: 1/14/20 10:50 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	0.99	Not Detected	8.4	Not Detected
1,2-Dibromoethane (EDB)	0.99	Not Detected	7.6	Not Detected
Chlorobenzene	0.99	Not Detected	4.6	Not Detected
Ethyl Benzene	0.99	Not Detected	4.3	Not Detected
m,p-Xylene	0.99	Not Detected	4.3	Not Detected
o-Xylene	0.99	Not Detected	4.3	Not Detected
Styrene	0.99	Not Detected	4.2	Not Detected
Bromoform	0.99	Not Detected	10	Not Detected
Cumene	0.99	Not Detected	4.9	Not Detected
1,1,2,2-Tetrachloroethane	0.99	Not Detected	6.8	Not Detected
Propylbenzene	0.99	Not Detected	4.9	Not Detected
4-Ethyltoluene	0.99	Not Detected	4.9	Not Detected
1,3,5-Trimethylbenzene	0.99	Not Detected	4.9	Not Detected
1,2,4-Trimethylbenzene	0.99	Not Detected	4.9	Not Detected
1,3-Dichlorobenzene	0.99	Not Detected	6.0	Not Detected
1,4-Dichlorobenzene	0.99	Not Detected	6.0	Not Detected
alpha-Chlorotoluene	0.99	Not Detected	5.1	Not Detected
1,2-Dichlorobenzene	0.99	Not Detected	6.0	Not Detected
1,2,4-Trichlorobenzene	4.0	Not Detected	29	Not Detected
Hexachlorobutadiene	4.0	Not Detected	42	Not Detected
Naphthalene	2.0	Not Detected	10	Not Detected

Container Type: Client Canister

Surrogates	%Recovery	Method Limits
Toluene-d8	105	70-130
1,2-Dichloroethane-d4	98	70-130
4-Bromofluorobenzene	99	70-130

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Client Sample ID: SG28

Lab ID#: 2001190A-03A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3011423**	**Date of Collection: 1/8/20 1:00:00 PM**
Dil. Factor:	**2.02**	**Date of Analysis: 1/14/20 11:43 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	1.0	Not Detected	5.0	Not Detected
Freon 114	1.0	Not Detected	7.1	Not Detected
Chloromethane	10	Not Detected	21	Not Detected
Vinyl Chloride	1.0	Not Detected	2.6	Not Detected
1,3-Butadiene	1.0	Not Detected	2.2	Not Detected
Bromomethane	10	Not Detected	39	Not Detected
Chloroethane	4.0	Not Detected	11	Not Detected
Freon 11	1.0	Not Detected	5.7	Not Detected
Ethanol	4.0	Not Detected	7.6	Not Detected
Freon 113	1.0	Not Detected	7.7	Not Detected
1,1-Dichloroethene	1.0	Not Detected	4.0	Not Detected
Acetone	10	Not Detected	24	Not Detected
2-Propanol	4.0	Not Detected	9.9	Not Detected
Carbon Disulfide	4.0	6.8	12	21
3-Chloropropene	4.0	Not Detected	13	Not Detected
Methylene Chloride	10	Not Detected	35	Not Detected
Methyl tert-butyl ether	4.0	Not Detected	14	Not Detected
trans-1,2-Dichloroethene	1.0	Not Detected	4.0	Not Detected
Hexane	1.0	Not Detected	3.6	Not Detected
1,1-Dichloroethane	1.0	Not Detected	4.1	Not Detected
2-Butanone (Methyl Ethyl Ketone)	4.0	Not Detected	12	Not Detected
cis-1,2-Dichloroethene	1.0	Not Detected	4.0	Not Detected
Tetrahydrofuran	1.0	Not Detected	3.0	Not Detected
Chloroform	1.0	5.0	4.9	24
1,1,1-Trichloroethane	1.0	Not Detected	5.5	Not Detected
Cyclohexane	1.0	Not Detected	3.5	Not Detected
Carbon Tetrachloride	1.0	Not Detected	6.4	Not Detected
2,2,4-Trimethylpentane	1.0	Not Detected	4.7	Not Detected
Benzene	1.0	Not Detected	3.2	Not Detected
1,2-Dichloroethane	1.0	Not Detected	4.1	Not Detected
Heptane	1.0	Not Detected	4.1	Not Detected
Trichloroethene	1.0	Not Detected	5.4	Not Detected
1,2-Dichloropropane	1.0	Not Detected	4.7	Not Detected
1,4-Dioxane	4.0	Not Detected	14	Not Detected
Bromodichloromethane	1.0	Not Detected	6.8	Not Detected
cis-1,3-Dichloropropene	1.0	Not Detected	4.6	Not Detected
4-Methyl-2-pentanone	1.0	Not Detected	4.1	Not Detected
Toluene	1.0	Not Detected	3.8	Not Detected
trans-1,3-Dichloropropene	1.0	Not Detected	4.6	Not Detected
1,1,2-Trichloroethane	1.0	Not Detected	5.5	Not Detected
Tetrachloroethene	1.0	5.5	6.8	37
2-Hexanone	4.0	Not Detected	16	Not Detected

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Client Sample ID: SG28

Lab ID#: 2001190A-03A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3011423**	**Date of Collection: 1/8/20 1:00:00 PM**
Dil. Factor:	**2.02**	**Date of Analysis: 1/14/20 11:43 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	1.0	Not Detected	8.6	Not Detected
1,2-Dibromoethane (EDB)	1.0	Not Detected	7.8	Not Detected
Chlorobenzene	1.0	Not Detected	4.6	Not Detected
Ethyl Benzene	1.0	Not Detected	4.4	Not Detected
m,p-Xylene	1.0	Not Detected	4.4	Not Detected
o-Xylene	1.0	Not Detected	4.4	Not Detected
Styrene	1.0	Not Detected	4.3	Not Detected
Bromoform	1.0	Not Detected	10	Not Detected
Cumene	1.0	Not Detected	5.0	Not Detected
1,1,2,2-Tetrachloroethane	1.0	Not Detected	6.9	Not Detected
Propylbenzene	1.0	Not Detected	5.0	Not Detected
4-Ethyltoluene	1.0	Not Detected	5.0	Not Detected
1,3,5-Trimethylbenzene	1.0	Not Detected	5.0	Not Detected
1,2,4-Trimethylbenzene	1.0	Not Detected	5.0	Not Detected
1,3-Dichlorobenzene	1.0	Not Detected	6.1	Not Detected
1,4-Dichlorobenzene	1.0	Not Detected	6.1	Not Detected
alpha-Chlorotoluene	1.0	Not Detected	5.2	Not Detected
1,2-Dichlorobenzene	1.0	Not Detected	6.1	Not Detected
1,2,4-Trichlorobenzene	4.0	Not Detected	30	Not Detected
Hexachlorobutadiene	4.0	Not Detected	43	Not Detected
Naphthalene	2.0	Not Detected	10	Not Detected

Container Type: Client Canister

Surrogates	%Recovery	Method Limits
Toluene-d8	106	70-130
1,2-Dichloroethane-d4	100	70-130
4-Bromofluorobenzene	97	70-130

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Client Sample ID: SG29

Lab ID#: 2001190A-04A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3011424**	**Date of Collection: 1/8/20 11:33:00 AM**
Dil. Factor:	**1.91**	**Date of Analysis: 1/15/20 12:10 AM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	0.96	Not Detected	4.7	Not Detected
Freon 114	0.96	Not Detected	6.7	Not Detected
Chloromethane	9.6	Not Detected	20	Not Detected
Vinyl Chloride	0.96	Not Detected	2.4	Not Detected
1,3-Butadiene	0.96	Not Detected	2.1	Not Detected
Bromomethane	9.6	Not Detected	37	Not Detected
Chloroethane	3.8	Not Detected	10	Not Detected
Freon 11	0.96	Not Detected	5.4	Not Detected
Ethanol	3.8	Not Detected	7.2	Not Detected
Freon 113	0.96	Not Detected	7.3	Not Detected
1,1-Dichloroethene	0.96	Not Detected	3.8	Not Detected
Acetone	9.6	Not Detected	23	Not Detected
2-Propanol	3.8	Not Detected	9.4	Not Detected
Carbon Disulfide	3.8	Not Detected	12	Not Detected
3-Chloropropene	3.8	Not Detected	12	Not Detected
Methylene Chloride	9.6	Not Detected	33	Not Detected
Methyl tert-butyl ether	3.8	Not Detected	14	Not Detected
trans-1,2-Dichloroethene	0.96	Not Detected	3.8	Not Detected
Hexane	0.96	Not Detected	3.4	Not Detected
1,1-Dichloroethane	0.96	Not Detected	3.9	Not Detected
2-Butanone (Methyl Ethyl Ketone)	3.8	Not Detected	11	Not Detected
cis-1,2-Dichloroethene	0.96	Not Detected	3.8	Not Detected
Tetrahydrofuran	0.96	Not Detected	2.8	Not Detected
Chloroform	0.96	2.5	4.7	12
1,1,1-Trichloroethane	0.96	Not Detected	5.2	Not Detected
Cyclohexane	0.96	Not Detected	3.3	Not Detected
Carbon Tetrachloride	0.96	Not Detected	6.0	Not Detected
2,2,4-Trimethylpentane	0.96	Not Detected	4.5	Not Detected
Benzene	0.96	Not Detected	3.0	Not Detected
1,2-Dichloroethane	0.96	Not Detected	3.9	Not Detected
Heptane	0.96	Not Detected	3.9	Not Detected
Trichloroethene	0.96	Not Detected	5.1	Not Detected
1,2-Dichloropropane	0.96	Not Detected	4.4	Not Detected
1,4-Dioxane	3.8	Not Detected	14	Not Detected
Bromodichloromethane	0.96	Not Detected	6.4	Not Detected
cis-1,3-Dichloropropene	0.96	Not Detected	4.3	Not Detected
4-Methyl-2-pentanone	0.96	Not Detected	3.9	Not Detected
Toluene	0.96	Not Detected	3.6	Not Detected
trans-1,3-Dichloropropene	0.96	Not Detected	4.3	Not Detected
1,1,2-Trichloroethane	0.96	Not Detected	5.2	Not Detected
Tetrachloroethene	0.96	4.4	6.5	30
2-Hexanone	3.8	Not Detected	16	Not Detected

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Client Sample ID: SG29

Lab ID#: 2001190A-04A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3011424**	**Date of Collection: 1/8/20 11:33:00 AM**
Dil. Factor:	**1.91**	**Date of Analysis: 1/15/20 12:10 AM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	0.96	Not Detected	8.1	Not Detected
1,2-Dibromoethane (EDB)	0.96	Not Detected	7.3	Not Detected
Chlorobenzene	0.96	Not Detected	4.4	Not Detected
Ethyl Benzene	0.96	Not Detected	4.1	Not Detected
m,p-Xylene	0.96	Not Detected	4.1	Not Detected
o-Xylene	0.96	Not Detected	4.1	Not Detected
Styrene	0.96	Not Detected	4.1	Not Detected
Bromoform	0.96	Not Detected	9.9	Not Detected
Cumene	0.96	Not Detected	4.7	Not Detected
1,1,2,2-Tetrachloroethane	0.96	Not Detected	6.6	Not Detected
Propylbenzene	0.96	Not Detected	4.7	Not Detected
4-Ethyltoluene	0.96	Not Detected	4.7	Not Detected
1,3,5-Trimethylbenzene	0.96	Not Detected	4.7	Not Detected
1,2,4-Trimethylbenzene	0.96	Not Detected	4.7	Not Detected
1,3-Dichlorobenzene	0.96	Not Detected	5.7	Not Detected
1,4-Dichlorobenzene	0.96	Not Detected	5.7	Not Detected
alpha-Chlorotoluene	0.96	Not Detected	4.9	Not Detected
1,2-Dichlorobenzene	0.96	Not Detected	5.7	Not Detected
1,2,4-Trichlorobenzene	3.8	Not Detected	28	Not Detected
Hexachlorobutadiene	3.8	Not Detected	41	Not Detected
Naphthalene	1.9	Not Detected	10	Not Detected

Container Type: Client Canister

Surrogates	%Recovery	Method Limits
Toluene-d8	106	70-130
1,2-Dichloroethane-d4	96	70-130
4-Bromofluorobenzene	95	70-130

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Client Sample ID: SG30
Lab ID#: 2001190A-05A
EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3011425**	**Date of Collection: 1/8/20 10:26:00 AM**
Dil. Factor:	**1.88**	**Date of Analysis: 1/15/20 12:36 AM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	0.94	Not Detected	4.6	Not Detected
Freon 114	0.94	Not Detected	6.6	Not Detected
Chloromethane	9.4	Not Detected	19	Not Detected
Vinyl Chloride	0.94	Not Detected	2.4	Not Detected
1,3-Butadiene	0.94	Not Detected	2.1	Not Detected
Bromomethane	9.4	Not Detected	36	Not Detected
Chloroethane	3.8	Not Detected	9.9	Not Detected
Freon 11	0.94	Not Detected	5.3	Not Detected
Ethanol	3.8	Not Detected	7.1	Not Detected
Freon 113	0.94	Not Detected	7.2	Not Detected
1,1-Dichloroethene	0.94	Not Detected	3.7	Not Detected
Acetone	9.4	Not Detected	22	Not Detected
2-Propanol	3.8	Not Detected	9.2	Not Detected
Carbon Disulfide	3.8	Not Detected	12	Not Detected
3-Chloropropene	3.8	Not Detected	12	Not Detected
Methylene Chloride	9.4	Not Detected	33	Not Detected
Methyl tert-butyl ether	3.8	Not Detected	14	Not Detected
trans-1,2-Dichloroethene	0.94	Not Detected	3.7	Not Detected
Hexane	0.94	Not Detected	3.3	Not Detected
1,1-Dichloroethane	0.94	Not Detected	3.8	Not Detected
2-Butanone (Methyl Ethyl Ketone)	3.8	Not Detected	11	Not Detected
cis-1,2-Dichloroethene	0.94	Not Detected	3.7	Not Detected
Tetrahydrofuran	0.94	Not Detected	2.8	Not Detected
Chloroform	0.94	3.2	4.6	16
1,1,1-Trichloroethane	0.94	Not Detected	5.1	Not Detected
Cyclohexane	0.94	Not Detected	3.2	Not Detected
Carbon Tetrachloride	0.94	Not Detected	5.9	Not Detected
2,2,4-Trimethylpentane	0.94	Not Detected	4.4	Not Detected
Benzene	0.94	Not Detected	3.0	Not Detected
1,2-Dichloroethane	0.94	Not Detected	3.8	Not Detected
Heptane	0.94	Not Detected	3.8	Not Detected
Trichloroethene	0.94	Not Detected	5.0	Not Detected
1,2-Dichloropropane	0.94	Not Detected	4.3	Not Detected
1,4-Dioxane	3.8	Not Detected	14	Not Detected
Bromodichloromethane	0.94	Not Detected	6.3	Not Detected
cis-1,3-Dichloropropene	0.94	Not Detected	4.3	Not Detected
4-Methyl-2-pentanone	0.94	Not Detected	3.8	Not Detected
Toluene	0.94	Not Detected	3.5	Not Detected
trans-1,3-Dichloropropene	0.94	Not Detected	4.3	Not Detected
1,1,2-Trichloroethane	0.94	Not Detected	5.1	Not Detected
Tetrachloroethene	0.94	7.7	6.4	52
2-Hexanone	3.8	Not Detected	15	Not Detected

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Client Sample ID: SG30

Lab ID#: 2001190A-05A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3011425**	**Date of Collection: 1/8/20 10:26:00 AM**
Dil. Factor:	**1.88**	**Date of Analysis: 1/15/20 12:36 AM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	0.94	Not Detected	8.0	Not Detected
1,2-Dibromoethane (EDB)	0.94	Not Detected	7.2	Not Detected
Chlorobenzene	0.94	Not Detected	4.3	Not Detected
Ethyl Benzene	0.94	Not Detected	4.1	Not Detected
m,p-Xylene	0.94	Not Detected	4.1	Not Detected
o-Xylene	0.94	Not Detected	4.1	Not Detected
Styrene	0.94	Not Detected	4.0	Not Detected
Bromoform	0.94	Not Detected	9.7	Not Detected
Cumene	0.94	Not Detected	4.6	Not Detected
1,1,2,2-Tetrachloroethane	0.94	Not Detected	6.4	Not Detected
Propylbenzene	0.94	Not Detected	4.6	Not Detected
4-Ethyltoluene	0.94	Not Detected	4.6	Not Detected
1,3,5-Trimethylbenzene	0.94	Not Detected	4.6	Not Detected
1,2,4-Trimethylbenzene	0.94	Not Detected	4.6	Not Detected
1,3-Dichlorobenzene	0.94	Not Detected	5.6	Not Detected
1,4-Dichlorobenzene	0.94	Not Detected	5.6	Not Detected
alpha-Chlorotoluene	0.94	Not Detected	4.9	Not Detected
1,2-Dichlorobenzene	0.94	Not Detected	5.6	Not Detected
1,2,4-Trichlorobenzene	3.8	Not Detected	28	Not Detected
Hexachlorobutadiene	3.8	Not Detected	40	Not Detected
Naphthalene	1.9	Not Detected	9.8	Not Detected

Container Type: Client Canister

Surrogates	%Recovery	Method Limits
Toluene-d8	101	70-130
1,2-Dichloroethane-d4	99	70-130
4-Bromofluorobenzene	97	70-130

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Client Sample ID: SG31

Lab ID#: 2001190A-06A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3011426**	**Date of Collection:**	**1/8/20 10:48:00 AM**
Dil. Factor:	**1.91**	**Date of Analysis:**	**1/15/20 01:02 AM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	0.96	Not Detected	4.7	Not Detected
Freon 114	0.96	Not Detected	6.7	Not Detected
Chloromethane	9.6	Not Detected	20	Not Detected
Vinyl Chloride	0.96	Not Detected	2.4	Not Detected
1,3-Butadiene	0.96	Not Detected	2.1	Not Detected
Bromomethane	9.6	Not Detected	37	Not Detected
Chloroethane	3.8	Not Detected	10	Not Detected
Freon 11	0.96	Not Detected	5.4	Not Detected
Ethanol	3.8	Not Detected	7.2	Not Detected
Freon 113	0.96	Not Detected	7.3	Not Detected
1,1-Dichloroethene	0.96	Not Detected	3.8	Not Detected
Acetone	9.6	Not Detected	23	Not Detected
2-Propanol	3.8	Not Detected	9.4	Not Detected
Carbon Disulfide	3.8	Not Detected	12	Not Detected
3-Chloropropene	3.8	Not Detected	12	Not Detected
Methylene Chloride	9.6	Not Detected	33	Not Detected
Methyl tert-butyl ether	3.8	Not Detected	14	Not Detected
trans-1,2-Dichloroethene	0.96	Not Detected	3.8	Not Detected
Hexane	0.96	Not Detected	3.4	Not Detected
1,1-Dichloroethane	0.96	Not Detected	3.9	Not Detected
2-Butanone (Methyl Ethyl Ketone)	3.8	Not Detected	11	Not Detected
cis-1,2-Dichloroethene	0.96	Not Detected	3.8	Not Detected
Tetrahydrofuran	0.96	Not Detected	2.8	Not Detected
Chloroform	0.96	16	4.7	76
1,1,1-Trichloroethane	0.96	Not Detected	5.2	Not Detected
Cyclohexane	0.96	Not Detected	3.3	Not Detected
Carbon Tetrachloride	0.96	Not Detected	6.0	Not Detected
2,2,4-Trimethylpentane	0.96	Not Detected	4.5	Not Detected
Benzene	0.96	Not Detected	3.0	Not Detected
1,2-Dichloroethane	0.96	Not Detected	3.9	Not Detected
Heptane	0.96	Not Detected	3.9	Not Detected
Trichloroethene	0.96	Not Detected	5.1	Not Detected
1,2-Dichloropropane	0.96	Not Detected	4.4	Not Detected
1,4-Dioxane	3.8	Not Detected	14	Not Detected
Bromodichloromethane	0.96	Not Detected	6.4	Not Detected
cis-1,3-Dichloropropene	0.96	Not Detected	4.3	Not Detected
4-Methyl-2-pentanone	0.96	Not Detected	3.9	Not Detected
Toluene	0.96	Not Detected	3.6	Not Detected
trans-1,3-Dichloropropene	0.96	Not Detected	4.3	Not Detected
1,1,2-Trichloroethane	0.96	Not Detected	5.2	Not Detected
Tetrachloroethene	0.96	31	6.5	210
2-Hexanone	3.8	Not Detected	16	Not Detected

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Client Sample ID: SG31

Lab ID#: 2001190A-06A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3011426**	**Date of Collection:**	**1/8/20 10:48:00 AM**
Dil. Factor:	**1.91**	**Date of Analysis:**	**1/15/20 01:02 AM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	0.96	Not Detected	8.1	Not Detected
1,2-Dibromoethane (EDB)	0.96	Not Detected	7.3	Not Detected
Chlorobenzene	0.96	Not Detected	4.4	Not Detected
Ethyl Benzene	0.96	Not Detected	4.1	Not Detected
m,p-Xylene	0.96	Not Detected	4.1	Not Detected
o-Xylene	0.96	Not Detected	4.1	Not Detected
Styrene	0.96	Not Detected	4.1	Not Detected
Bromoform	0.96	Not Detected	9.9	Not Detected
Cumene	0.96	Not Detected	4.7	Not Detected
1,1,2,2-Tetrachloroethane	0.96	Not Detected	6.6	Not Detected
Propylbenzene	0.96	Not Detected	4.7	Not Detected
4-Ethyltoluene	0.96	Not Detected	4.7	Not Detected
1,3,5-Trimethylbenzene	0.96	Not Detected	4.7	Not Detected
1,2,4-Trimethylbenzene	0.96	Not Detected	4.7	Not Detected
1,3-Dichlorobenzene	0.96	Not Detected	5.7	Not Detected
1,4-Dichlorobenzene	0.96	Not Detected	5.7	Not Detected
alpha-Chlorotoluene	0.96	Not Detected	4.9	Not Detected
1,2-Dichlorobenzene	0.96	Not Detected	5.7	Not Detected
1,2,4-Trichlorobenzene	3.8	Not Detected	28	Not Detected
Hexachlorobutadiene	3.8	Not Detected	41	Not Detected
Naphthalene	1.9	Not Detected	10	Not Detected

Container Type: Client Canister

Surrogates	%Recovery	Method Limits
Toluene-d8	105	70-130
1,2-Dichloroethane-d4	97	70-130
4-Bromofluorobenzene	95	70-130

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Client Sample ID: SG31-DUP

Lab ID#: 2001190A-07A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	3011427	**Date of Collection:**	1/8/20 10:48:00 AM
Dil. Factor:	1.93	**Date of Analysis:**	1/15/20 01:29 AM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	0.96	Not Detected	4.8	Not Detected
Freon 114	0.96	Not Detected	6.7	Not Detected
Chloromethane	9.6	Not Detected	20	Not Detected
Vinyl Chloride	0.96	Not Detected	2.5	Not Detected
1,3-Butadiene	0.96	Not Detected	2.1	Not Detected
Bromomethane	9.6	Not Detected	37	Not Detected
Chloroethane	3.9	Not Detected	10	Not Detected
Freon 11	0.96	Not Detected	5.4	Not Detected
Ethanol	3.9	Not Detected	7.3	Not Detected
Freon 113	0.96	Not Detected	7.4	Not Detected
1,1-Dichloroethene	0.96	Not Detected	3.8	Not Detected
Acetone	9.6	Not Detected	23	Not Detected
2-Propanol	3.9	Not Detected	9.5	Not Detected
Carbon Disulfide	3.9	Not Detected	12	Not Detected
3-Chloropropene	3.9	Not Detected	12	Not Detected
Methylene Chloride	9.6	Not Detected	34	Not Detected
Methyl tert-butyl ether	3.9	Not Detected	14	Not Detected
trans-1,2-Dichloroethene	0.96	Not Detected	3.8	Not Detected
Hexane	0.96	Not Detected	3.4	Not Detected
1,1-Dichloroethane	0.96	Not Detected	3.9	Not Detected
2-Butanone (Methyl Ethyl Ketone)	3.9	Not Detected	11	Not Detected
cis-1,2-Dichloroethene	0.96	Not Detected	3.8	Not Detected
Tetrahydrofuran	0.96	Not Detected	2.8	Not Detected
Chloroform	0.96	16	4.7	76
1,1,1-Trichloroethane	0.96	Not Detected	5.3	Not Detected
Cyclohexane	0.96	Not Detected	3.3	Not Detected
Carbon Tetrachloride	0.96	Not Detected	6.1	Not Detected
2,2,4-Trimethylpentane	0.96	Not Detected	4.5	Not Detected
Benzene	0.96	Not Detected	3.1	Not Detected
1,2-Dichloroethane	0.96	Not Detected	3.9	Not Detected
Heptane	0.96	Not Detected	4.0	Not Detected
Trichloroethene	0.96	Not Detected	5.2	Not Detected
1,2-Dichloropropane	0.96	Not Detected	4.4	Not Detected
1,4-Dioxane	3.9	Not Detected	14	Not Detected
Bromodichloromethane	0.96	Not Detected	6.5	Not Detected
cis-1,3-Dichloropropene	0.96	Not Detected	4.4	Not Detected
4-Methyl-2-pentanone	0.96	Not Detected	4.0	Not Detected
Toluene	0.96	Not Detected	3.6	Not Detected
trans-1,3-Dichloropropene	0.96	Not Detected	4.4	Not Detected
1,1,2-Trichloroethane	0.96	Not Detected	5.3	Not Detected
Tetrachloroethene	0.96	31	6.5	210
2-Hexanone	3.9	Not Detected	16	Not Detected

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Client Sample ID: SG31-DUP

Lab ID#: 2001190A-07A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3011427**	**Date of Collection:**	**1/8/20 10:48:00 AM**
Dil. Factor:	**1.93**	**Date of Analysis:**	**1/15/20 01:29 AM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	0.96	Not Detected	8.2	Not Detected
1,2-Dibromoethane (EDB)	0.96	Not Detected	7.4	Not Detected
Chlorobenzene	0.96	Not Detected	4.4	Not Detected
Ethyl Benzene	0.96	Not Detected	4.2	Not Detected
m,p-Xylene	0.96	Not Detected	4.2	Not Detected
o-Xylene	0.96	Not Detected	4.2	Not Detected
Styrene	0.96	Not Detected	4.1	Not Detected
Bromoform	0.96	Not Detected	10	Not Detected
Cumene	0.96	Not Detected	4.7	Not Detected
1,1,2,2-Tetrachloroethane	0.96	Not Detected	6.6	Not Detected
Propylbenzene	0.96	Not Detected	4.7	Not Detected
4-Ethyltoluene	0.96	Not Detected	4.7	Not Detected
1,3,5-Trimethylbenzene	0.96	Not Detected	4.7	Not Detected
1,2,4-Trimethylbenzene	0.96	Not Detected	4.7	Not Detected
1,3-Dichlorobenzene	0.96	Not Detected	5.8	Not Detected
1,4-Dichlorobenzene	0.96	Not Detected	5.8	Not Detected
alpha-Chlorotoluene	0.96	Not Detected	5.0	Not Detected
1,2-Dichlorobenzene	0.96	Not Detected	5.8	Not Detected
1,2,4-Trichlorobenzene	3.9	Not Detected	29	Not Detected
Hexachlorobutadiene	3.9	Not Detected	41	Not Detected
Naphthalene	1.9	Not Detected	10	Not Detected

Container Type: Client Canister

Surrogates	%Recovery	Method Limits
Toluene-d8	104	70-130
1,2-Dichloroethane-d4	99	70-130
4-Bromofluorobenzene	95	70-130

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Client Sample ID: Lab Blank

Lab ID#: 2001190A-08A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3011406**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 1/14/20 12:54 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	0.50	Not Detected	2.5	Not Detected
Freon 114	0.50	Not Detected	3.5	Not Detected
Chloromethane	5.0	Not Detected	10	Not Detected
Vinyl Chloride	0.50	Not Detected	1.3	Not Detected
1,3-Butadiene	0.50	Not Detected	1.1	Not Detected
Bromomethane	5.0	Not Detected	19	Not Detected
Chloroethane	2.0	Not Detected	5.3	Not Detected
Freon 11	0.50	Not Detected	2.8	Not Detected
Ethanol	2.0	Not Detected	3.8	Not Detected
Freon 113	0.50	Not Detected	3.8	Not Detected
1,1-Dichloroethene	0.50	Not Detected	2.0	Not Detected
Acetone	5.0	Not Detected	12	Not Detected
2-Propanol	2.0	Not Detected	4.9	Not Detected
Carbon Disulfide	2.0	Not Detected	6.2	Not Detected
3-Chloropropene	2.0	Not Detected	6.3	Not Detected
Methylene Chloride	5.0	Not Detected	17	Not Detected
Methyl tert-butyl ether	2.0	Not Detected	7.2	Not Detected
trans-1,2-Dichloroethene	0.50	Not Detected	2.0	Not Detected
Hexane	0.50	Not Detected	1.8	Not Detected
1,1-Dichloroethane	0.50	Not Detected	2.0	Not Detected
2-Butanone (Methyl Ethyl Ketone)	2.0	Not Detected	5.9	Not Detected
cis-1,2-Dichloroethene	0.50	Not Detected	2.0	Not Detected
Tetrahydrofuran	0.50	Not Detected	1.5	Not Detected
Chloroform	0.50	Not Detected	2.4	Not Detected
1,1,1-Trichloroethane	0.50	Not Detected	2.7	Not Detected
Cyclohexane	0.50	Not Detected	1.7	Not Detected
Carbon Tetrachloride	0.50	Not Detected	3.1	Not Detected
2,2,4-Trimethylpentane	0.50	Not Detected	2.3	Not Detected
Benzene	0.50	Not Detected	1.6	Not Detected
1,2-Dichloroethane	0.50	Not Detected	2.0	Not Detected
Heptane	0.50	Not Detected	2.0	Not Detected
Trichloroethene	0.50	Not Detected	2.7	Not Detected
1,2-Dichloropropane	0.50	Not Detected	2.3	Not Detected
1,4-Dioxane	2.0	Not Detected	7.2	Not Detected
Bromodichloromethane	0.50	Not Detected	3.4	Not Detected
cis-1,3-Dichloropropene	0.50	Not Detected	2.3	Not Detected
4-Methyl-2-pentanone	0.50	Not Detected	2.0	Not Detected
Toluene	0.50	Not Detected	1.9	Not Detected
trans-1,3-Dichloropropene	0.50	Not Detected	2.3	Not Detected
1,1,2-Trichloroethane	0.50	Not Detected	2.7	Not Detected
Tetrachloroethene	0.50	Not Detected	3.4	Not Detected
2-Hexanone	2.0	Not Detected	8.2	Not Detected

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Client Sample ID: Lab Blank

Lab ID#: 2001190A-08A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3011406**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 1/14/20 12:54 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	0.50	Not Detected	4.2	Not Detected
1,2-Dibromoethane (EDB)	0.50	Not Detected	3.8	Not Detected
Chlorobenzene	0.50	Not Detected	2.3	Not Detected
Ethyl Benzene	0.50	Not Detected	2.2	Not Detected
m,p-Xylene	0.50	Not Detected	2.2	Not Detected
o-Xylene	0.50	Not Detected	2.2	Not Detected
Styrene	0.50	Not Detected	2.1	Not Detected
Bromoform	0.50	Not Detected	5.2	Not Detected
Cumene	0.50	Not Detected	2.4	Not Detected
1,1,2,2-Tetrachloroethane	0.50	Not Detected	3.4	Not Detected
Propylbenzene	0.50	Not Detected	2.4	Not Detected
4-Ethyltoluene	0.50	Not Detected	2.4	Not Detected
1,3,5-Trimethylbenzene	0.50	Not Detected	2.4	Not Detected
1,2,4-Trimethylbenzene	0.50	Not Detected	2.4	Not Detected
1,3-Dichlorobenzene	0.50	Not Detected	3.0	Not Detected
1,4-Dichlorobenzene	0.50	Not Detected	3.0	Not Detected
alpha-Chlorotoluene	0.50	Not Detected	2.6	Not Detected
1,2-Dichlorobenzene	0.50	Not Detected	3.0	Not Detected
1,2,4-Trichlorobenzene	2.0	Not Detected	15	Not Detected
Hexachlorobutadiene	2.0	Not Detected	21	Not Detected
Naphthalene	1.0	Not Detected	5.2	Not Detected

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Toluene-d8	98	70-130
1,2-Dichloroethane-d4	101	70-130
4-Bromofluorobenzene	97	70-130

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Client Sample ID: CCV

Lab ID#: 2001190A-09A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3011402**	**Date of Collection: NA**
Dil. Factor:	**1.00**	**Date of Analysis: 1/14/20 11:04 AM**

Compound	%Recovery
Freon 12	102
Freon 114	101
Chloromethane	100
Vinyl Chloride	94
1,3-Butadiene	80
Bromomethane	103
Chloroethane	98
Freon 11	102
Ethanol	97
Freon 113	102
1,1-Dichloroethene	101
Acetone	101
2-Propanol	98
Carbon Disulfide	97
3-Chloropropene	99
Methylene Chloride	100
Methyl tert-butyl ether	98
trans-1,2-Dichloroethene	101
Hexane	94
1,1-Dichloroethane	99
2-Butanone (Methyl Ethyl Ketone)	99
cis-1,2-Dichloroethene	102
Tetrahydrofuran	94
Chloroform	98
1,1,1-Trichloroethane	98
Cyclohexane	97
Carbon Tetrachloride	104
2,2,4-Trimethylpentane	96
Benzene	98
1,2-Dichloroethane	102
Heptane	98
Trichloroethene	102
1,2-Dichloropropane	99
1,4-Dioxane	96
Bromodichloromethane	101
cis-1,3-Dichloropropene	101
4-Methyl-2-pentanone	92
Toluene	93
trans-1,3-Dichloropropene	102
1,1,2-Trichloroethane	101
Tetrachloroethene	102
2-Hexanone	95

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Client Sample ID: CCV

Lab ID#: 2001190A-09A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3011402**	**Date of Collection: NA**
Dil. Factor:	**1.00**	**Date of Analysis: 1/14/20 11:04 AM**

Compound	%Recovery
Dibromochloromethane	104
1,2-Dibromoethane (EDB)	103
Chlorobenzene	101
Ethyl Benzene	101
m,p-Xylene	102
o-Xylene	100
Styrene	100
Bromoform	106
Cumene	100
1,1,2,2-Tetrachloroethane	98
Propylbenzene	100
4-Ethyltoluene	101
1,3,5-Trimethylbenzene	99
1,2,4-Trimethylbenzene	99
1,3-Dichlorobenzene	101
1,4-Dichlorobenzene	101
alpha-Chlorotoluene	100
1,2-Dichlorobenzene	100
1,2,4-Trichlorobenzene	98
Hexachlorobutadiene	100
Naphthalene	90

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Toluene-d8	99	70-130
1,2-Dichloroethane-d4	97	70-130
4-Bromofluorobenzene	97	70-130

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Client Sample ID: LCS

Lab ID#: 2001190A-10A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3011403**	**Date of Collection: NA**
Dil. Factor:	**1.00**	**Date of Analysis: 1/14/20 11:29 AM**

Compound	%Recovery	Method Limits
Freon 12	95	70-130
Freon 114	96	70-130
Chloromethane	91	70-130
Vinyl Chloride	93	70-130
1,3-Butadiene	80	70-130
Bromomethane	98	70-130
Chloroethane	95	70-130
Freon 11	99	70-130
Ethanol	78	70-130
Freon 113	99	70-130
1,1-Dichloroethene	98	70-130
Acetone	99	70-130
2-Propanol	89	70-130
Carbon Disulfide	90	70-130
3-Chloropropene	90	70-130
Methylene Chloride	96	70-130
Methyl tert-butyl ether	94	70-130
trans-1,2-Dichloroethene	88	70-130
Hexane	92	70-130
1,1-Dichloroethane	96	70-130
2-Butanone (Methyl Ethyl Ketone)	93	70-130
cis-1,2-Dichloroethene	106	70-130
Tetrahydrofuran	87	70-130
Chloroform	97	70-130
1,1,1-Trichloroethane	95	70-130
Cyclohexane	93	70-130
Carbon Tetrachloride	102	70-130
2,2,4-Trimethylpentane	93	70-130
Benzene	93	70-130
1,2-Dichloroethane	97	70-130
Heptane	93	70-130
Trichloroethene	101	70-130
1,2-Dichloropropane	94	70-130
1,4-Dioxane	91	70-130
Bromodichloromethane	96	70-130
cis-1,3-Dichloropropene	98	70-130
4-Methyl-2-pentanone	86	70-130
Toluene	90	70-130
trans-1,3-Dichloropropene	98	70-130
1,1,2-Trichloroethane	96	70-130
Tetrachloroethene	99	70-130
2-Hexanone	88	70-130

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Client Sample ID: LCS

Lab ID#: 2001190A-10A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3011403**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 1/14/20 11:29 AM**	

Compound	%Recovery	Method Limits
Dibromochloromethane	100	70-130
1,2-Dibromoethane (EDB)	97	70-130
Chlorobenzene	94	70-130
Ethyl Benzene	96	70-130
m,p-Xylene	98	70-130
o-Xylene	96	70-130
Styrene	93	70-130
Bromoform	98	70-130
Cumene	95	70-130
1,1,2,2-Tetrachloroethane	89	70-130
Propylbenzene	93	70-130
4-Ethyltoluene	92	70-130
1,3,5-Trimethylbenzene	93	70-130
1,2,4-Trimethylbenzene	93	70-130
1,3-Dichlorobenzene	95	70-130
1,4-Dichlorobenzene	93	70-130
alpha-Chlorotoluene	87	70-130
1,2-Dichlorobenzene	94	70-130
1,2,4-Trichlorobenzene	79	70-130
Hexachlorobutadiene	80	70-130
Naphthalene	66	60-140

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Toluene-d8	99	70-130
1,2-Dichloroethane-d4	100	70-130
4-Bromofluorobenzene	97	70-130

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Client Sample ID: LCSD

Lab ID#: 2001190A-10AA

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3011404**	**Date of Collection: NA**
Dil. Factor:	**1.00**	**Date of Analysis: 1/14/20 11:53 AM**

Compound	%Recovery	Method Limits
Freon 12	96	70-130
Freon 114	98	70-130
Chloromethane	91	70-130
Vinyl Chloride	92	70-130
1,3-Butadiene	80	70-130
Bromomethane	100	70-130
Chloroethane	95	70-130
Freon 11	98	70-130
Ethanol	78	70-130
Freon 113	99	70-130
1,1-Dichloroethene	98	70-130
Acetone	98	70-130
2-Propanol	90	70-130
Carbon Disulfide	90	70-130
3-Chloropropene	90	70-130
Methylene Chloride	96	70-130
Methyl tert-butyl ether	93	70-130
trans-1,2-Dichloroethene	88	70-130
Hexane	92	70-130
1,1-Dichloroethane	98	70-130
2-Butanone (Methyl Ethyl Ketone)	93	70-130
cis-1,2-Dichloroethene	106	70-130
Tetrahydrofuran	87	70-130
Chloroform	96	70-130
1,1,1-Trichloroethane	94	70-130
Cyclohexane	93	70-130
Carbon Tetrachloride	101	70-130
2,2,4-Trimethylpentane	92	70-130
Benzene	94	70-130
1,2-Dichloroethane	98	70-130
Heptane	93	70-130
Trichloroethene	101	70-130
1,2-Dichloropropane	94	70-130
1,4-Dioxane	91	70-130
Bromodichloromethane	95	70-130
cis-1,3-Dichloropropene	98	70-130
4-Methyl-2-pentanone	86	70-130
Toluene	90	70-130
trans-1,3-Dichloropropene	99	70-130
1,1,2-Trichloroethane	95	70-130
Tetrachloroethene	99	70-130
2-Hexanone	87	70-130

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Client Sample ID: LCSD
Lab ID#: 2001190A-10AA
EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3011404**	**Date of Collection: NA**
Dil. Factor:	**1.00**	**Date of Analysis: 1/14/20 11:53 AM**

Compound	%Recovery	Method Limits
Dibromochloromethane	100	70-130
1,2-Dibromoethane (EDB)	97	70-130
Chlorobenzene	94	70-130
Ethyl Benzene	96	70-130
m,p-Xylene	97	70-130
o-Xylene	97	70-130
Styrene	93	70-130
Bromoform	98	70-130
Cumene	94	70-130
1,1,2,2-Tetrachloroethane	90	70-130
Propylbenzene	92	70-130
4-Ethyltoluene	92	70-130
1,3,5-Trimethylbenzene	93	70-130
1,2,4-Trimethylbenzene	93	70-130
1,3-Dichlorobenzene	94	70-130
1,4-Dichlorobenzene	92	70-130
alpha-Chlorotoluene	87	70-130
1,2-Dichlorobenzene	95	70-130
1,2,4-Trichlorobenzene	80	70-130
Hexachlorobutadiene	81	70-130
Naphthalene	68	60-140

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Toluene-d8	100	70-130
1,2-Dichloroethane-d4	99	70-130
4-Bromofluorobenzene	98	70-130

APPENDIX C

Site Conceptual Model

Sec No	Section / Sub-Section Name	Details	References	Data Gap	Method to Address Data Gap
1	**Introduction**				
		This Site Conceptual Model (SCM) was prepared by P&D Environmental, Inc. (P&D) on behalf of 820 Macarthur, LLC for the 820 W MacArthur Blvd case. Alameda County Department of Environmental Health (ACDEH) is the lead regulatory oversight agency for this case. Case identifiers are provided below: **Site Name:** 820 W MacArthur Blvd; **GeoTracker ID:** T10000012542 **Site Address:** 820 W MacArthur Blvd; **ACDEH Case No.:** RO0003347 This SCM was prepared by or under the oversight of a licensed professional as certified in Attachment A in accordance with industry best practices and SWRCB LTCP and SFRWQCB ESL standards.	Attachment A	No	
1.1	**Change log**	This document has been updated to reflect new data collected for the Site. A summary of previous versions of the SCM for the Site are listed below: **Prepared By** / **Date**: P&D Environmental, Inc. / 4/27/2020 Revisions the most recent previous version of this tabular SCM are indicated using ~~strikethrough~~ to denote deleted text and underline to denote added text.		No	
1.2	**Responsible Party Identification**	**Responsible Party Name** / **Relationship** / **Method of Identification**: 820 Macarthur, LLC / Owner / VRRA NOR: Notice of Responsibility; VRAA: Voluntary Remedial Action Agreement	Reference #1	No	

Site Conceptual Model

820 W MacArthur Boulevard

4/27/20

Sec No	Section / Sub-Section Name	Details	References	Data Gap	Method to Address Data Gap

2 Site Location and Land Use

2.1 Site Location

APN (s)	12-959-9-3
Physical Address	820 W MacArthur Boulevard
Cross Street(s)	West Street
Site Size (acres)	0.52

References: Figures 1-3 of 4/27/20 CAP. Data Gap: [yes/no] Method to Address Data Gap: No Gap; cell not working

2.2 Surrounding Property Descriptions and Land Use

Direction & Distance from Site (feet)	Property and Operations Description	Address	Sensitive Receptors	Use(s)	Tenants
	The subject site consists of an auto service building, an office and customer waiting area, and an asphalt-covered parking lot.	820 W MacArthur Blvd.	None Identified	Commercial	N/A
South West adjacent	W MacArthur Boulevard	N/A	None Identified	Roadway	N/A
South West 110	Auto Repair Shop	801 W MacArthur Blvd.	None Identified	Commercial	Auto Mechs
South West 110	Motel	829 W MacArthur Blvd.	None Identified	Improved Commercial	Palms Motel
South East adjacent	West Street	N/A	None Identified	Roadway	N/A
South East 75	Oil Change Station	736 W MacArthur Blvd.	None Identified	Commercial	Insta Lube
South East 75	Single family home	3810 West St.	None Identified	Residential	Unknown
South East 75	Single family home	3814 West St.	None Identified	Residential	Unknown
North East adjacent	Multiple Residential, 2-4 Units	3819 West St.	None Identified	Residential	Unknown
North East adjacent	Multiple Residential of 5 or more Units	811 Apgar St.	None Identified	Residential	Unknown
North East adjacent	Single family home	821 Apgar St.	None Identified	Residential	Unknown
North Wast adjacent	Duplex	828 W MacArthur Blvd.	None Identified	Residential	Unknown

References: Figures 2-3 of 4/27/20 CAP. Data Gap: No

2.3 Description of Site Improvements and Land Use

Total Building Footprint	385
Hardscape	220
Landscape	30
Exposed Earth	0

Building ID	Footprint (square feet)	No. Floors	Foundation Type	Subgrade Components	Year of Construction / Demolition
Tire Service Building	4275	1	Slab-on-grade	4 hydraulic jacks (removed)	1975
Original gasoline station building	1500	1	Slab-on-grade	2 hydraulic jacks (removed); existing oil water separator	1967

References: Figure 4 of 4/27/20 CAP.

Anthropogenic Preferential Pathways	Sanitary sewer lateral extends from the cleanout located adjacent to the oil water separator east to sewer main in West Street.
Other Improvements	New utilities for redevelopment of site have not been planned yet.

References: Figure 4 of 4/27/20 CAP. Data Gap: No

References: Figure 5 of 4/27/20 CAP.

2.4 Site Use History

Known previous historical environmental and geotechnical reports been uploaded to GeoTracker:	Yes

Data Gap: No

Sec No	Section / Sub-Section Name	Details	References	Data Gap	Method to Address Data Gap

Time Period	Operation Description	Tenant/Operator Name	Building IDs or Location	Associated Primary PCOCs	Associated Environmental Cases
<1897	Unknown or undeveloped	N/A	N/A	N/A	N/A
1897-1899	Non-descript structure (most likely residential) on east portion of subject site	Unk.	Unk.	N/A	N/A
1902	Developed with 3 residences.	Unk.	820 38th St. (current W MacArthur Blvd.), 3801 West St., & 3803 West St.	N/A	N/A
1911	Developed with 6 residences and an outbuilding.	Unk.	820 38th St., 824 38th St., 3801 West St., 3803-3805 West St., & 3807 West St.	N/A	N/A
<1939 to 1963	Developed with residences and outbuildings.	Unk.	Unk.	N/A	N/A
<1967-1975	Developed with a gasoline service station.	American Oil Company	Office/Customer Waiting Area	TPH-G, TPH-D, MBTEX, VOCs, and HVOCs	NA
1975-2018	Big O Tires	Big O Tires	Auto Service Building	NA	NA
2018-Present	Vacant pending development of the site.	N/A	Auto Service Building	TPH-G, TPH-D, MBTEX, VOCs, and HVOCs	Alameda County LOP SCP case # RO0003347

References: Reference #2; Figure 6 of 4/27/20 CAP.; Reference #3

2.5 UST Systems Infrastructure

System Component	Material Stored/Conveyed	Size/Quantity	Status	Installation Date	URF Filing Date
UST	Gasoline	10,000-gallon	Removed	~1967	Unk.
UST	Gasoline	6,000-gallon	Removed	~1967	Unk.
UST	Gasoline	6,000-gallon	Removed	~1967	Unk.
Piping	Gasoline	Unk.	Removed	~1967	Unk.
Fuel Dispensers (4)	Gasoline	N/A	Removed	~1967	N/A

References: Figure 7 of 4/27/20 CAP. Data Gap: No

2.6 Other Hazardous Materials or Waste Infrastructure

System Component	Material Stored/Conveyed	Size/Quantity	Status	Installation Date	Removal Date
UST	Waste Oil	550-gallon	Removed	Unk.	Unk.

References: Figure 7 of 4/27/20 CAP. Data Gap: No

2.7 Subsurface Fill and Excavations

Backfill Purpose	Description	Location	Date of Fill	Certified Clean Documentation on GeoTracker	Date of Certification	References	Data Gap	Method to Address Data Gap
Hydraulic Hoists (6)	Each hydraulic hoist was removed and observed prior to disposal offsite. The depths of removal for the six hoists ranged from 8 to 9 feet bgs and confirmation samples were collected 1 foot below the bottom of each excavated hoist. Some residual contamination remained at the extents of the excavations and the excavated soil was used to backfill where the hoists were removed. Further excavation and characterization will occur prior to site redevelopment.	Both Buildings	TBD	N/A	N/A	Figure 7 of 4/27/20 CAP.	Yes	Further characterization of soil to be excavated and proposed import materials prior to redevelopment.
UST System	An exploratory trench was excavated to a depth of 6 feet bgs to evaluate for the presence of the former fuel USTs. Residual contamination remains in place and will be further characterized and disposed of offsite prior to site redevelopment. Material imported to backfill future excavations will be characterized prior to use at the site.	Fuel UST Pit and Waste Oil UST Pit	TBD	N/A	N/A	Figure 7 of 4/27/20 CAP.	Yes	Further characterization of soil to be excavated and proposed import materials prior to redevelopment.

2.8 Other Recognized Environmental Conditions (RECs)

Sec No	Section / Sub-Section Name	Details		References	Data Gap	Method to Address Data Gap
		REC Type	**Description**			
		REC	The former gasoline station operations are considered a REC.	Reference #2	No	
		REC	Elevated lead in shallow soil has been detected during preliminary investigations.	Reference #3	Yes	Further lead delineation in shallow soil is proposed.

2.9 Exposure Controls and Remediation Systems

		References
Engineering controls currently employed at the Site to control otherwise complete exposure pathways:	None	
Institutional controls currently employed at the Site to control otherwise complete exposure pathways or to protect identified engineering controls:	Soil and Groundwater Management Plan	Reference #4
Identify remediation systems and remediation system components at the Site:	None	

Sec No	Section / Sub-Section Name	Details	References	Data Gap	Method to Address Data Gap
3	**Physical Setting**				
3.1	**Regional Geology and Hydrogeology**	Based on review of regional geologic maps from U. S. Geological Survey Professional Paper 943, "Flatland Deposits - Their Geology and Engineering Properties and Their Importance to Comprehensive Planning," by E. J. Helley and K. R. Lajoie, 1979, the subject site is underlain by Late Pleistocene alluvium (Qpa). The Late Pleistocene alluvium is described as weakly consolidated slightly weathered poorly sorted irregularly interbedded clay, silt, sand and gravel.			
3.2	**Local Geology and Hydrogeology**				

Subsurface Lithology:	Review of the subsurface materials encountered in boreholes B13 through B15, B17, B19, B20 through B24, MW1 through MW3, and SG1 through SG21 shows that the materials consisted predominantly of silty clay, sandy clay, clay, and clayey silt with coarse-grained materials encountered intermittently.

References # 5-7

Water Bearing Zone ID	Media Type and Classification	Prevailing Hydraulic Gradient Direction and Magnitude	Top & Bottom of Zone [feet bgs]	Min & Max Static Depth to Groundwater in Wells [feet bgs]	Min & Max Depth to First Encountered Groundwater [feet bgs]
Shallow	Groundwater was encountered during drilling of boreholes B13, B14, B15, B17, B21 through B24, and MW1 through MW3 at depths ranging from 13.5 to 23.5 feet bgs, and was also encountered during drilling in borehole B14 at a depth of 9.5 feet bgs, but this groundwater is interpreted to be perched water.	WSW	[10 to 25]	9.68 11.57	13.5 23.5

Figures 13-20 of 4/27/20 CAP.

		References	Data Gap
Groundwater Sources and Sinks:	Former fuel dispenser or fuel dispenser piping on east side of site are considered groundwater source for gasoline. The source for any PCE in soil gas is considered to be the former waste oil tank.	Figure 7 of 4/27/20 CAP.	No
Variations in Magnitude and Direction of Lateral and Vertical Groundwater Gradient Within Each Water Bearing Zone:	N/A		

3.3 Monitoring Well Network Evaluation

Monitoring Well ID	Screened Interval & Associated Water Bearing Zone ID(s)	Is the well appropriatly screened to evaluate LNAPL?	Is the well appropriatly sceened to evaluate DNAPL?	Is the well appropriatly developed and maintained?	Is the well location known, accessible and survey data is uploaded to GeoTracker?	Data Gap	Method to Address Data Gap
MW1	5-25 Shallow	Yes	Yes	Yes	No	Yes	survey wells upon completion of soil gas well installation
MW2	5-20 Shallow	Yes	Yes	Yes	Yes		
MW3	5-20 Shallow	Yes	Yes	Yes	Yes		

		Data Gap	Method to Address Data Gap
Identify wells that are routinely excluded from calculations of potentiometric surface or groundwater elevation:	MW1-MW3	Yes	survey wells upon completion of soil gas well installation
Identify wells that are excluded from calculation of isoconcentration contours in for each water bearing zone:	N/A		
Is the monitoring well network sufficient to delineate the lateral extents of the groundwater plume that exceeds water quality standards?	Yes		

Sec No	Section / Sub-Section Name	Details			References	Data Gap	Method to Address Data Gap
		Is the monitoring well network sufficient to delineate the vertical extents of the groundwater plume that exceeds water quality standards?	Yes				

Sec No	Section / Sub-Section Name	Details	References	Data Gap	Method to Address Data Gap
4	Release and Source				

4.1 Release Occurrence

Releases Material:	Gasoline, hydraulic oil, PCE, chloroform, methylene chloride, lead
Release Date:	Unknown
Release Source:	Former fuel dispenser or fuel dispenser piping on east side of site are considered source for gasoline. The source for any PCE in soil gas is considered to be the former waste oil tank and effluent from the oil water separator into the sewer lateral. Lead source is unknown.
Description:	The gasoline (and associated petroleum products of MBTEX and 1,2-DCA) was released from the UST fuel system, the hydraulic oil was released from the hydraulic jacks, the PCE was released from the former waste oil UST and the oil water separator to the sewer lateral, the chloroform is attributed to domestic water supplies, the methylene chloride source is unknown and is suspected to be onsite in the vicinity of the gasoline UST pit at the east end of the large gasoline UST, and the lead is suspected of originating from lead-based paint on historical structures or being Aerially Deposited Lead. It is not known when the releases occurred.

4.2 Constituents of Concern and Data Quality Objectives

		References	Data Gap	Method to Address Data Gap
An evaluation summary table for potential constituents of concern (PCOCs) has been prepared:	No			COPCs are all referenced here in section 4.0 of the 4/27/20 SCM.
Data quality objectives (DQO) been clearly identified and reported for each PCOC and potentially impacted media:	Yes	Reference # 7		
Data that does not meet data quality objectives is denoted as indefensible in summary tables and figures:	Yes			
Data that does not meet DQOs is not relied upon for the delineation or risk evaluation portions of this SCM:	Yes			

Chemicals of Concern that drive risk and/or closure (COCs)	PCOCs have been evaluate in the following media: Soil	Groundwater	Soil Vapor	Surface Water
TPH-G	Yes	Yes	Yes	N/A
TPH-D	Yes	Yes	No	N/A
TPH-MO	Yes	Yes	No	N/A
TPH-BO	Yes	Yes	No	N/A
MTBE	Yes	Yes	Yes	N/A
TBA	Yes	Yes	Yes	N/A
Benzene	Yes	Yes	Yes	N/A
Toluene	Yes	Yes	Yes	N/A
Ethylbenzene	Yes	Yes	Yes	N/A
Xylenes	Yes	Yes	Yes	N/A
Naphthalene	Yes	Yes	Yes	N/A
1,2-DCA	Yes	Yes	Yes	N/A
PCE	Yes	Yes	Yes	N/A
TCE	Yes	Yes	Yes	N/A
Chloroform	Yes	Yes	Yes	N/A
Methylene Chloride	Yes	Yes	Yes	N/A
Bromodichloromethane	Yes	Yes	Yes	N/A
PCBs	Yes	No	No	N/A
SVOCs	Yes	No	No	N/A
Lead	Yes	No	No	N/A
Asbestos	Yes	No	No	N/A

4.3 Distribution and Transport of Contaminants of Concern:Soil

		References	Data Gap	Method to Address Data Gap
Comprehensive Soil Analytical Table(s) and Figure(s) are provided for all COCs:		Reference #7		Bad cell - 'yes' there are tables
Soil analytical data used for delineation or risk assessment meets DQOs:	Yes			
Laterally delineated COCs:	TPH-G, TPH-D, TPH-MO, TPH-BO, MTBE, Benzene, Toluene, Ethylbenzene, Xylenes, Naphthalene, 1,2-DCA, PCE, TCE, Chloroform, Methylene Chloride, PCBs, SVOCs, Asbestos		No	Additional soil samples to be collected from former fuel UST pit for delineation of petroleum.
Laterally undelineated COCs:	Lead, PCE		Yes	Lead: additional soil samples. PCE: additional soil gas wells for soil gas samples.
Vertically delineated COCs:	TPH-G, TPH-D, TPH-MO, TPH-BO, MTBE, Benzene, Toluene, Ethylbenzene, Xylenes, Naphthalene, 1,2-DCA, PCE, TCE, Chloroform, Methylene Chloride, PCBs, SVOCs, Asbestos		No	Additional soil samples to be collected from former fuel UST pit for delineation of petroleum.
Vertically undelineated COCs:	Lead		Yes	additional soil sample collection

Maximum concentration reported in untreated/unremoved soil	Surface Soil ≤ 5 ft bgs (mg/kg)	Sample ID/ Depth (ft bgs)	Subsurface Soil 5 - 10 ft bgs (mg/kg)	Sample ID / Depth (ft bgs)	References
TPH-G	120	B24-5.0 (5.0)	690	H3-9.0 (9.0)	Reference #7

Sec No	Section / Sub-Section Name	Details	References	Data Gap	Method to Address Data Gap

TPH-D	97	B24-5.0 (5.0)	2,500	H3-9.0 (9.0)
TPH-MO	430	B24-5.0 (5.0)	5,300	H3-9.0 (9.0)
TPH-BO	430	B24-5.0 (5.0)	5,400	H3-9.0 (9.0)
MTBE	Not Detected in Soil.			
TBA	Not Detected in Soil.			
Benzene	ND<0.0050	--	ND<0.0050	--
Toluene	ND<0.0050	--	0.025	H6-9.0 (9.0)
Ethylbenzene	0.052	B24-5.0 (5.0)	0.35	B12-10 (10.0)
Xylenes	ND<0.0050	--	0.30	H6-9.0 (9.0)
Naphthalene	0.052	B24-5.0 (5.0)	0.077	H6-9.0 (9.0)
1,2-DCA	Not Detected in Soil.			
PCE	0.080	MW1-4.0 (4.0)	ND<0.0050	--
TCE	Not Detected in Soil.			
Chloroform	Not Detected in Soil.			
Methylene Chloride	Not Detected in Soil.			
Bromodichloromethane	Not Detected in Soil.			
PCBs	Not Detected in Soil.			
SVOCs	Bis(2-ethylhexyl)Phthalate (0.70)	B24-5.0 (5.0)	Bis(2-ethylhexyl)Phthalate (4.5)	H3-9.0 (9.0)
Lead	1,200	S10-0.8-F	--	--
Asbestos	Not Detected in Soil.			

NAPL COCs	Location(s) and weathering	Source	Direct Evidence of NAPL	Indirect Evidence of NAPL	Mobility
	None Identified	N/A	None	None	N/A

Preferential pathways capable of intercepting and conveying mobile NAPL are present:	No
Preferential pathways within the extents of soil contamination that are capable of intercepting and conveying vapor phase COCs are present:	No
Preferential pathways located beneath the extents of soil contamination that are capable of intercepting and conveying leachate are present:	No

Describe any of the preferential pathways identified above:	N/A

4.4 Distribution and Transport of Contaminants of Concern: Groundwater

		References	Data Gap	Method to Address Data Gap
Comprehensive groundwater analytical table(s)/figure(s) are provided for all COCs :	Yes	Reference #7		
Groundwater analytical data used for delineation or risk assessment meets DQOs:	Yes			
Indicate COCs that are sufficiently delineated laterally:	TPH-G, TPH-D, TPH-MO, TPH-BO, MTBE, Benzene, Toluene, Ethylbenzene, Xylenes, Naphthalene, 1,2-DCA, PCE, TCE, Chloroform, Methylene Chloride			
Indicate COCs that are undelineated laterally:				
Indicate COCs that are sufficiently delineated vertically:	TPH-G, TPH-D, TPH-MO, TPH-BO, MTBE, Benzene, Toluene, Ethylbenzene, Xylenes, Naphthalene, 1,2-DCA, PCE, TCE, Chloroform, Methylene Chloride			
Indicate COCs that are undelineated vertically:				
Sufficient groundwater data has been collected to demonstrate that the groundwater plume is stable or decreasing in Size:	[Yes/No]		Gap (bad cell)	Collect additional groundwater monitoring well samples.
Hydro- and chemo-graphs have been provided for each monitoring well:	[Yes/No]		No Gap (bad cell)	MWs have only been sampled three times
Describe any observed patterns in groundwater concentrations (e.g. seasonal variations, effects of groundwater elevation, natural attenuation):	None			
Describe evidence to indicate that microbial communities capable of metabolizing aqueous phase COCs to a safe endpoint are present:				

Maximum concentration reported in stable groundwater for each water bearing zone (i.e., concentrations are in equilibrium and not undergoing rebound)	Water bearing Zone	Sample ID	Sample Date	Concentration (µg/L)
TPH-G	Shallow	MW1	8/12/2019	280
TPH-D	Shallow	MW1	8/12/2019	140
TPH-MO	Shallow	MW1, MW2, MW3	8/12/2019	ND<250

Sec No	Section / Sub-Section Name	Details					References	Data Gap	Method to Address Data Gap
		TPH-BO	Shallow	MW1, MW2, MW3	8/12/2019	ND<250			
		MTBE	Shallow	MW1, MW2, MW3	8/12/2019	ND<0.50			
		TBA	Shallow	MW1, MW2, MW3	8/12/2019	ND<0.50			
		Benzene	Shallow	MW1	8/12/2019	0.50			
		Toluene	Shallow	MW1, MW2, MW3	8/12/2019	ND<0.50			
		Ethylbenzene	Shallow	MW1, MW2, MW3	8/12/2019	ND<0.50			
		Xylenes	Shallow	MW1, MW2, MW3	8/12/2019	ND<0.50			
		Naphthalene	Shallow	MW1, MW2, MW3	8/12/2019	ND<0.50			
		1,2-DCA	Shallow	MW1	8/12/2019	2.8			
		PCE	Shallow	MW1, MW2, MW3	8/12/2019	ND<0.50			
		TCE	Shallow	MW1, MW2, MW3	8/12/2019	ND<0.50			
		Chloroform	Shallow	MW1, MW2, MW3	8/12/2019	ND<0.50			
		Methylene Chloride	Shallow	MW1, MW2, MW3	8/12/2019	ND<0.50			
		Bromodichloromethane	Shallow	MW1, MW2, MW3	8/12/2019	ND<0.50			

NAPL COCs	Location(s) and weathering	Source	Direct Evidence of NAPL	Indirect Evidence of NAPL	Mobility
	None identified.	N/A	None	None	N/A

Submerged (fully, partially, or seasonally) preferential pathways capable of intercepting and conveying free phase, aqueous phase, or vapor phase COCs are present within the extents of the groundwater plume:	No
Preferential pathways capable of intercepting and conveying vapor phase COCs are present above the extents of the volatile groundwater contamination plume:	No
The lateral distribution of COCs in groundwater concurs with identified historic groundwater gradient direction:	No
The vertical distribution of COCs in groundwater concurs with identified historic groundwater gradient direction:	No

4.5 Distribution and Transport of Contaminants of Concern: Soil Vapor

Details		References	Data Gap	Method to Address Data Gap
Vapor probe network adequacy:	The soil vapor probe network is not adequate to **spatially** and **temporally** evaluate the lateral and vertical extent of COCs in the vapor phase.	Reference #7/8	Yes	Additional soil gas wells proposed.
Preferential pathways evaluation complete:	The soil vapor probe network is not adequate to **spatially** and **temporally** evaluate the migration of COCs along identified preferential pathways.			
Comprehensive soil vapor analytical table(s) and figure(s) are provided for all COCs:	No			
Soil Vapor analytical data used for delineation or risk assessment meets DQOs:	Yes			
Indicate COCs that are sufficiently delineated laterally:	TPH-G, MTBE, Benzene, Toluene, Ethylbenzene, Xylenes, Naphthalene, 1,2-DCA, PCE, TCE, Chloroform, Methylene Chloride			
Indicate COCs that are undelineated laterally:				
Indicate COCs that are sufficiently delineated vertically:	TPH-G, MTBE, Benzene, Toluene, Ethylbenzene, Xylenes, Naphthalene, 1,2-DCA, PCE, TCE, Chloroform, Methylene Chloride			
Indicate COCs that are undelineated vertically:				
Soil vapor plumes for COCs are spatially and temporally stable or decreasing in Size:	Unknown			
Chemo-graphs for each soil vapor probe have been provided:	[Yes/No]	No Gap (bad cell)		Soil Gas wells have only been sampled once.
Describe any observed patterns in soil vapor concentrations (e.g. seasonal variations, effects of groundwater elevation, natural attenuation):	Unknown			
Describe evidence to indicate that microbial communities capable of metabolizing vapor phase COCs to a safe endpoint are present:	Oxygen was >4 % in 11 of 21 soil gas wells indicating a bioattenuation zone.			
Identify the vapor intrusion scenario that is applicable for the Site:	VI to indoor air for proposed construction	Does not meet LTCP scenarios at SG4; benzene exceeds LTCP Res. Criteria w/ no bioattenuation zone (Oxygen<4%). Does not meet ESL - Res. VI Human Health Risk Screening Levels for several COPCs.		

3.6 Distribution of Contaminants of Concern: Indoor Air

Sec No	Section / Sub-Section Name	Details		References	Data Gap	Method to Address Data Gap
		Comprehensive indoor air analytical table(s) and figure(s) are provided for all COCs:	N/A	Reference #7/8		
		Indoor air analytical data used to evaluate risk meets DQO :	No			
		A hazardous materials survey has been completed for the Site and updated during each indoor air sampling event:	No			
		Tenants and occupants have been provided with appropriate notification	N/A			
		Indoor air has been evaluated during HVAC on and HVAC off conditions:	No			
		COCs in indoor air are temporally stable:	N/A			
		Sampling has been conducted to evaluate migration of subsurface contaminants into indoor air via identified preferential pathways:	No			

Maximum concentration reported in Indoor Air	Concentration ($\mu g/m^3$)	Sample Date	Building ID	Sample ID

Sec No	Section / Sub-Section Name	Details	References	Data Gap	Method to Address Data Gap
5	Points of Exposure and Receptors				

	Distance (feet)	Description/Name	References
Water utility servicing the Site and Surrounding Properties		East Bay Municipal Utility District/CA0110005	Reference #8
Nearest water supply well	15,840	municipal well/SF-43	
Nearest surface water body	4,000	The nearest surface water body is a portion of Glen Echo Creek is	
Nearest discharge to surface water body (e.g., storm drain, creek)	65	storm drain grate	
Identified sensitive receptors or conditions atypical of the assumptions of standard exposure scenarios:	N/A	None	

	Potentially complete exposure pathways	Residential	Occupational	Construction/ Excavation	Ecological Receptors
Surface Soils (i.e. 0-5 feet below ground surface)	Inhalation	Complete & Unacceptable	Complete & Unacceptable	Complete & Unacceptable	Incomplete
	Ingestion	Complete & Unacceptable	Complete & Unacceptable	Complete & Unacceptable	Incomplete
	Dermal Contact	Complete & Unacceptable	Complete & Unacceptable	Complete & Unacceptable	Incomplete
Subsurface Soils (i.e. 5-10 feet below ground surface)	Inhalation	Controlled	Controlled	Controlled	Incomplete
	Ingestion	Controlled	Controlled	Controlled	Incomplete
	Dermal Contact	Controlled	Controlled	Controlled	Incomplete
Groundwater	Inhalation	Controlled	Controlled	Controlled	Incomplete
	Ingestion	Controlled	Controlled	Controlled	Incomplete
	Dermal Contact	Controlled	Controlled	Controlled	Incomplete
Surface Water	Inhalation	Incomplete	Incomplete	Incomplete	Incomplete
	Ingestion	Incomplete	Incomplete	Incomplete	Incomplete
	Dermal Contact	Incomplete	Incomplete	Incomplete	Incomplete
Soil Vapor	Inhalation	Complete & Unacceptable	Complete & Unacceptable	Complete & Acceptable	Incomplete

TABLES

See 4/27/20 Corrective Action Plan

FIGURES

See 4/27/20 Corrective Action Plan

ATTACHMENTS

Attachment A Professional Seals

REFERENCES

1 Voluntary Remedial Action Agreement (VRAA) executed 03/15/2019
2 Phase I Environmental Site Assessment prepared by Partner Engineering and Science, Inc. (Partner) dated 08/3/2018
3 Local Regulatory Agency File and Additional Historical Review prepared by Basics Environmental, Inc. (Basics) dated 03/25/2019
4 Soil and Groundwater Management Plan prepared by P&D Environmental, Inc. (P&D) dated 07/17/2019 (document 0794.W3)
5 Limited Subsurface Investigation Report prepared by P&D and dated 02/28/2019 (document 0794.R1)
6 Limited Subsurface Investigation Report prepared by P&D and dated 05/22/2019 (document 0794.R2)
7 Limited Subsurface Investigation Work Plan and Site Investigation Data prepared by P&D and dated 10/08/2019 (document 0794.W4)
8 Offsite Well and Sensitive Receptor Survey Report prepared by P&D and dated 10/11/2019 (document 0794.R4)
9 Corrective Action Plan prepared by P&D and dated 04/27/2020 (document 0794.W5A)
10 Limited Subsurface Investigation Report prepared by P&D and dated 04/27/2019 (document 0794.R6 Appendix B1 of Reference 9)

ATTACHMENT A

Professional Seals

P&D ENVIRONMENTAL, INC.

55 Santa Clara Avenue, Suite 240
Oakland, CA 94610
(510) 658-6916

April 27, 2020
Letter 0794.L8

Ms. Claire Wang
820 Macarthur, LLC
1000 Brannan Street, Suite 402
San Francisco, CA 94103

SUBJECT: SITE CONCEPTUAL MODEL PREPARATION CERTIFICATION
County Case No. RO 3347
Former Big O Tire Facility
820 W MacArthur Boulevard
Oakland, California a

Dear Ms Wang:

The attached tabular Site Conceptual Model has been prepared using a template prepared by the Alameda County Department of Environmental Health, and was prepared under the oversight of the appropriately licensed California professional Paul H. King of P&D Environmental, Inc.

If you have any questions, please do not hesitate to contact me at (510) 658-6916.

Sincerely,

P&D Environmental, Inc.

Paul H. King

PROFESSIONAL GEOLOGIST
PAUL H. KING
No. 5901
STATE OF CALIFORNIA

Paul H. King
Professional Geologist #5901
Expires: 12/31/21

PHK/sjc
0794.L8

APPENDIX D

Sampling and Analysis Plan

SAMPLING AND ANALYSIS PLAN

County File # RO 0003347

Former Big O Tire Facility

820 W MacArthur Boulevard

Oakland, CA

Prepared For:

820 W MacArthur, LLC

1000 Brannan St. Suite 402

Oakland, CA 94103

Prepared By:

P&D Environmental, Inc.

55 Santa Clara Avenue, Suite 240

Oakland, CA 94610

Paul H. King

Professional Geologist

Expiration 12/31/21

April 27, 2020

Project # 0794

Table of Contents

List of Attachments

See April 27, 2020 Subject Site CAP for Figures

Appendices

Appendix D1 – Disposable Encore Sampler Sampling Procedures

1.0 INTRODUCTION

This Sampling and Analysis Plan (SAP) has been prepared by P&D Environmental, Inc. of Oakland, California (P&D) on behalf of 820 MacArthur, LLC (Owner) for activities associated with the redevelopment of the property identified for this project as 820 W MacArthur Boulevard in Oakland, California (see ***Figure 2 of the April 27, 2020 CAP***). The site is bounded on the south by W MacArthur Boulevard and on the east by West Street. Residential structures are located to the north and west of the property. The Site is currently covered with asphalt and concrete, with two buildings and a storage structure associated with the former Big O tire store that operated at the Site until the end of 2018, when the Site was purchased by the current Owner.

The redevelopment project ("Project") consists of 1) the removal of the existing structures and surface cover; 2) grading and soil excavation for utilities, and foundations; removal of soil impacted by tetrachloroethene (PCE) and Total Petroleum Hydrocarbons as Gasoline (TPH-G); (3) installation of a vapor barrier; and (4) and the construction of a slab-on-grade multi-story residential building (see ***Figure 5 of the April 27, 2020 CAP***). No underground parking is proposed for development of the Site. This SAP presents proposed Standard Operating Procedures (SOPs) for sample collection associated with the development of the Site. Data Quality Objectives (DQOs) and procedures associated with sample collection described in this SAP include the following:

1. Excavation confirmation and stockpiled soil sample collection.
2. Water sample collection.
3. Soil boring soil and groundwater sample collection.
4. Groundwater monitoring well construction, development, surveying, monitoring, and sampling.
5. Soil gas well construction and sampling.
6. Air sample collection.

The proposed project corrective actions include both remediation and mitigation measures and were developed based on the conditions described in the Site Conceptual Model (SCM) that was included as an appendix in P&D's Corrective Action Plan (CAP) dated April 27, 2020 (document 0794.W5A).

1.1 Lead Regulatory Oversight Agency

Soil and groundwater at the Site has been impacted from historical land use practices on-Site and potentially off-Site. Alameda County Department of Environmental Health's (ACDEH) Local Oversight Program for Hazardous Materials Releases (LOP) is the lead regulatory oversight agency for the environmental investigation and cleanup actions at the Site under Site Cleanup Program Case (SCP) No. RO0003347 which was assigned when a new development was proposed for the Site.

Historical site investigation documents are available for review on the internet site GeoTracker.

2.0 DATA QUALITY OBJECTIVES

This section provides a brief summary of project DQOs associated with corrective action for residential development of the subject Site. Post-remedial confirmation samples are to be collected to demonstrate that remedial actions have resulted in conditions acceptable for residential land use at the subject Site. Perimeter monitoring is to be performed to verify that onsite residual contamination is not migrating to adjacent properties, and for comparison of offsite downgradient conditions with commercial land use exposure scenario criteria.

3.0 FIELD METHODS AND PROCEDURES

Field methods and procedures include field equipment calibration, field screening using field equipment, and collection of representative samples from different media including soil, surface water, groundwater, soil gas and air.

3.1 Field Equipment Calibration

All field equipment will be calibrated using non-expired calibration media prior to each day of use in accordance with equipment manufacturer recommended procedures. Instrument calibration logs will be maintained with the storage case for each instrument.

- The multi-parameter water meter will be calibrated according to the following methods:
    - pH – 3 point calibration using buffer solutions pH 4, pH 7, and pH 10.
    - D.O., ORP, and SPC – ≥2 point calibration
- The turbidity meter will be calibrated using:
    - 3 point calibration using ≈0.0 NTU, ≈10 NTU, and ≥100 NTU solutions
- The photoionization detector (PID) will be calibrated using:
    - 2 point calibration with Zero Air or ambient air (0.0 ppmv) followed by 100 ppmv isobutylene gas.
    - Following calibration the PID will be tested using the calibration gas to verify that the results are +/- 5% of the calibration gas concentration. If the results are not +/- 5% of the calibration gas the PID will be recalibrated.

3.2 Field Screening

Field screening will be performed during soil sample collection for Volatile Organic Compounds (VOCs) using field Photoionization Detector (PID) equipped with a 10.6 eV bulb or with a Flame Ionization Detector (FID) by evaluating fresh soil surfaces to identify areas where elevated VOC-impacted soil will be sampled.

3.3 Well Construction

Well construction addressed in this SAP includes groundwater monitoring well and soil gas well construction. Each of these is discussed below.

3.3.1 Groundwater Monitoring Well Construction

The boreholes for groundwater monitoring wells will be drilled with a truck-mounted hollow stem auger drill rig and 8-inch outside diameter hollow stem augers for 2-inch diameter groundwater monitoring wells. Soil samples will be collected at 5-foot intervals for lithologic logging purposes using a California modified split-spoon sampler driven by a 140 pound hammer falling 30 inches. Blow counts will be recorded every 6 inches. The boreholes will be logged in accordance with the Unified Soil Classified System and standard geologic field techniques. All of the samples will be evaluated with a PID equipped with a 10.6 eV bulb and calibrated using a 100 ppm isobutylene standard. Soil samples retained for laboratory analysis will be handled as described below in Section 3.4.2 Borehole Soil Sample Collection for soil boring soil sample collection.

Based on review of available boring logs for the site, the boreholes for the groundwater monitoring wells will be drilled to a depth of 20 feet for wells MW2 & MW3 and 25 ft. for well MW1, with the screened interval from the depths of 15 to 20 feet. The groundwater monitoring wells will be constructed using 2-inch diameter Schedule 40 PVC pipe with the screened interval constructed of 0.020-inch factory slot screen unless otherwise specified. The well screen will be surrounded with #2/16 washed sack sand to a height of one foot above the top of the screen. Bentonite pellets will be placed in the borehole above the filter sand to a height of one foot above the sand. The remaining annular space will be filled with neat cement grout to approximately one foot below the ground surface. The tops of the wells will be covered with traffic-rated locking well vaults. All drilling and sampling equipment will be steam cleaned or washed with an Alconox solution followed by a clean water rinse prior to use in each borehole. Soil and water generated during well installation will be stored in labeled 55-gallon steel drums and stored at the site pending appropriate disposal.

3.3.1.1 Groundwater Monitoring Well Surveying

The groundwater monitoring wells will be surveyed horizontally and vertically by a State-licensed surveyor in accordance with GeoTracker requirements. At the time that the new wells are surveyed if any previously existing wells are present at the site one of the existing wells will also be surveyed to verify that the survey information for all of the wells is consistent.

3.3.1.2 Groundwater Monitoring Well Development

At least 48 hours after construction of the groundwater monitoring wells, the wells will be developed by surging and overpumping until the water from the wells is 100 Nepholmetric Turbidity Units (NTUs) or less. Prior to development, the depth to water in the wells will be measured using an electric water level indicator to the nearest 0.01 foot. Water discharged from the wells during development will be stored in drums at the site pending appropriate disposal.

3.3.2 Soil Gas Well Construction

Permanent soil gas wells will be constructed and soil gas samples will be collected in accordance with procedures recommended in the following DTSC documents:

- July 2015 Advisory - Active Soil Gas Investigations.
- August 2015 - FAQ for the 2012 Active Soil Gas Investigations Advisory.
- October 2011 - Vapor Intrusion Guidance.
- October 2011 - Vapor Intrusion Mitigation Advisory.

Permanent soil gas wells will be constructed with the top of the filter pack below a depth of 5 feet below the ground surface (bgs) or greater (unless otherwise specified) using a 6.0-inch outside diameter hand auger. The soil from each boring will be logged in the field as described above in Section 3.3.1 Groundwater Monitoring Well Construction.

Each soil gas well will be constructed with a 1-foot long filter pack in the bottom of the borehole consisting of #2/12 Cemex sack sand. A 0.250-inch outside diameter (0.187-inch inside diameter) polyethylene tube with a HDPE filter at the bottom of the tube will be placed in the center of the borehole during placement of the sand so that the HDPE filter is located in the center of the sand interval. The annular space above the sand will be filled with hydrated bentonite to a height of 0.5 feet above the top of the sand, and the remaining borehole annular space will be filled with neat cement to approximately 0.5 feet below the ground surface. The top of the tubing for each soil gas well will be enclosed with a Swagelok nut and the top of each soil gas well will be enclosed in a well box with a lid that is secured with bolts.

3.3.2.1 Soil Gas Well Surveying

The soil gas wells will be surveyed horizontally by a State-licensed surveyor in accordance with GeoTracker requirements. At the time that the new wells are surveyed if any previously existing wells are present at the site one of the existing wells will also be surveyed to verify that the survey information for all of the wells is consistent.

3.4 Soil Sampling

Soil will be field screened with a PID or FID prior to sample collection when sampling for VOCs. Soil sample collection will be performed at locations where field instrumentation indicates the highest VOC concentrations are present when sampling for VOCs.

Soil sample collection for VOCs will be performed for low-VOC concentrations using Encore sampling methods as identified in ***Appendix D1***, or using equivalent methods (US EPA Method 5035). If required by the laboratory, three samples will be collected at each sample collection location using EPA Method 5035.

3.4.1 Excavation Confirmation Soil Sample Collection

Soil samples may be collected from relatively undisturbed soil in an excavator bucket, or directly from the ground surface. A 2-inch diameter 6-inch long stainless steel tube will be driven into a freshly exposed surface of soil at selected sample collection locations using a slide hammer. The tube will then be evaluated to confirm that it is completely filled (zero headspace). Once the tube is confirmed to be completely filled the tube will be removed from the sampler and soil samples will be collected from the soil in the tube using methods described in ***Appendix D1***. The ends of the tube will then be sequentially covered with aluminum foil and plastic end caps, and the Encore and stainless steel tube samples will then be labeled and stored in a cooler with ice pending delivery to the laboratory. Chain of custody procedures will be observed for all sample handling.

3.4.2 Borehole Soil Sample Collection

Continuously cored boreholes will be drilled using Geoprobe direct-push technology to drive a 2.5-inch outside diameter Geoprobe Macrocore barrel sampler lined with transparent PVC sleeves. The soil from the borings will be logged in the field in accordance with standard geologic field techniques and the Unified Soil Classification System.

Soil samples will be retained for laboratory analysis as follows. A 6-inch long section of PVC liner will be cut corresponding to the desired sample collection depth, and the ends of the tubes will be sequentially capped with aluminum foil and plastic endcaps. Hand augered boreholes will be sampled using the same procedures as described above for excavation confirmation sample collection.

Soil samples collected using truck-mounted hollow stem auger drill rig drilling methods will be collected using a California modified split-spoon sampler lined with stainless steel tubes driven by a 140 pound hammer falling 30 inches. The stainless steel tubes will be removed from the sampler and retained using procedures as described above for excavation confirmation sample collection.

Samples will be labeled and stored in a cooler with ice pending delivery to a State-accredited hazardous waste testing laboratory. Chain of custody procedures will be observed for all sample handling.

3.5 Water Sample Collection

Water sample collection consists of surface water and groundwater sampling.

3.5.1 Surface Water Sample Collection

Water samples will be collected using either a new unused disposable bailer, peristaltic pump with new polyethylene tubing, or directly into a new unused sample containers provided by the laboratory. VOAs will be overturned and tapped to ensure that no air bubbles were present. The samples will be then stored in a cooler with ice, pending delivery to the laboratory. Chain of custody procedures will be observed for all sample handling.

3.5.2 Groundwater Sample Collection

Groundwater sample collection may be performed from boreholes or from wells.

3.5.2.1 Groundwater Sample Collection from Boreholes

Groundwater grab samples will be collected from boreholes using a 1-inch diameter temporary slotted PVC pipe that will be placed in the borehole. The groundwater sample will be collected from the PVC pipe using new unused disposable polyethylene tubing and a peristaltic pump. The groundwater samples will be transferred to sample containers that will be supplied by the laboratory. All of the bottles will have screw-on caps. All of the VOAs will be overturned and tapped to ensure that bubbles are not present. The sample bottles will be labeled and placed in a cooler with ice pending delivery to the laboratory. Chain of custody procedures will be observed for all sample handling.
Following the initial sampling of the groundwater, additional purging of the groundwater will be performed while monitoring field parameters of pH, conductivity, temperature, oxygen, and ORP, in accordance with U.S. EPA low flow sampling methods. Once the parameters have been observed to stabilize as indicated by a change of less than 0.1 pH units and less than 10 percent change in the value of the other field parameters, an additional sample will be collected from the borehole using containers and methods described above and the initial sample will be disposed of in the drum for investigation-derived waste.

3.5.2.2 Groundwater Sample Collection from Groundwater Monitoring Wells

Groundwater samples collected from groundwater monitoring wells will be collected following the monitoring of the water level in the groundwater monitoring wells to the nearest 0.01 foot using an electric water level indicator and will then be purged and sampled in accordance with U.S. EPA low flow sampling methods and DTSC protocols identified in the Representative Sampling of Groundwater for Hazardous Substances guidance document dated July 1995 (revised February 2008). Well purging will be performed at a rate not to exceed 300 milliliters per minute for a minimum of 15 minutes and until field parameters referenced below stabilize using a peristaltic pump and polyethylene tubing where the bottom of the tubing is placed in the center of the screened interval of the well. New polyethylene tubing and new silicon tubing will be used in the peristaltic pump rollers for each well.

During purging operations, the field parameters of electrical conductivity, temperature, pH, dissolved oxygen (DO), oxidation reduction potential (ORP), turbidity, and depth to water will be monitored and recorded at 600 milliliter intervals on a groundwater monitoring/well purging data sheet for each well. Field observations of odor or sheen will also be recorded on the groundwater monitoring/well purging data sheet for each well. In accordance with DTSC protocols identified in the Representative Sampling of Groundwater for Hazardous Substances guidance document dated July 1995 (revised February 2008), stabilization of field parameters will be defined as follows:

- Temperature = +/- 3 % of reading
- pH = +/- 0.1
- Electrical conductivity = +/- 3 %
- ORP = +/- 10 millivolts
- DO = +/- 0.3 milligrams per liter

The water sample for each well will be transferred directly from the peristaltic pump tubing to sample containers provided by the laboratory. All of the VOAs will be sealed with Teflon-lined screw caps and overturned and tapped to ensure that no air bubbles are present. The sample containers will then be labeled and transferred to a cooler with ice pending transportation to the laboratory. Chain of custody documentation will accompany the samples to the laboratory.

3.6 Soil Gas Sample Collection

Following construction, the soil gas wells will not be sampled for a minimum of 2 weeks. In addition, soil gas samples will not be collected if more than ½ inch of precipitation has occurred during the five days prior to the scheduled sampling date. One soil gas sampling event will occur during the dry season and one soil gas sampling event will occur during the wet season for evaluation of seasonal soil gas variability, unless otherwise specified.

Soil gas samples will be collected from each soil gas well into 1-liter Summa canisters using a helium shroud provided by the laboratory in accordance with procedures identified in the September 2017 Enthalpy Analytical Field Guide for Use of the Helium Shrouds. One new shroud will be used for each sampling location, and the soil gas samples will be collected in accordance with procedures identified in the July 2015 DTSC Active Soil Gas Investigations Advisory Appendix C Quantitative Leak Testing Using a Tracer Gas. The sampling manifolds for the shrouds will be provided by the laboratory under vacuum, and the vacuum will be recorded to be undiminished immediately prior to sampling, satisfying shut-in test requirements.

Helium will be introduced into the shroud as a tracer gas and maintained at a recommended concentration of approximately 20 percent beginning approximately 5 minutes before purging and until completion of sample collection. In accordance with the July 2015 DTSC Active Soil Gas Investigations Advisory Appendix D Soil Gas Sampling In Low Permeability Soil – Reinstallation Method procedures, a total volume of 200 milliliters will be purged prior to soil gas sample collection. The purge time will be calculated using a nominal flow rate provided by the flow controller of 150 milliliters per minute. During soil gas sample collection, the vacuum in the soil gas well will be monitored to verify that the vacuum does not exceed 100 inches of water column (approximately 7.35 inches of mercury). Vacuums and shroud helium concentrations during sample collection will be recorded on Soil Gas Sampling Data Sheets.

One duplicate soil gas sample will be collected into a 1-liter Summa canister from one of the soil gas wells using a shroud that will be equipped with a stainless steel sampling tee for the Summa canisters which allow for the simultaneous collection of the sample and the duplicate sample using methods described above. Following the completion of soil gas sample collection, the soil gas sample Summa canisters will be stored in a box and promptly shipped to the laboratory for extraction and analysis. Chain of custody procedures will be observed for all sample handling.

3.7 Air Sample Collection

Air samples will be collected using procedures described below. A minimum of one ambient air sample will be collected during each indoor air sampling event. Indoor air samples will be collected at a height of approximately 5 feet above the floor and ambient air samples will be collected at a height of approximately 5 feet above the ground. Ambient air samples will be located in upwind locations if possible, and not in areas that might be affected by site conditions that are being evaluated by indoor air samples.

Indoor and ambient air samples will be collected into SIM-certified 6-liter Summa canisters equipped with SIM-certified 24-hour flow controllers. Any duplicate samples will be collected with a SIM-certified stainless steel tee or a tee constructed of Teflon tubing with stainless steel fittings. The ambient air samples will be collected beginning at a time before indoor air samples are collected and ending after the indoor air samples have been collected.

One end of a Teflon tube will be placed at the desired sample collection location and the other end of the tube will be connected to the flow controller inlet. The valve to the Summa canister will then be opened for each of the samples. For the duplicate sample, the end of the tube will be connected to the stainless steel tee or stainless steel fitting that was used for construction of the Teflon tube tee. After 24 hours, the valve to the Summa canisters will be closed, and the Summa canisters will be stored in a box and promptly shipped to the laboratory for extraction and analysis. Chain of custody procedures will be observed for all sample handling.

4.0 SAMPLE CONTAINERS, PRESERVATION, PACKAGING AND SHIPPING

This section describes the types of containers to be used and the procedures for preserving, packaging and shipping samples for soil, water (including groundwater), soil gas and air.

4.1 Soil

VOLATILE ORGANIC COMPOUNDS: Soil samples to be analyzed for volatile organic compounds will be stored in their sealed Encore samplers for no more than two days prior to extraction for analysis. Samples will be chilled to 4°C immediately upon collection.

OTHER ORGANIC COMPOUNDS: Soil samples to be analyzed for other organic compounds will be collected in stainless steel tubes as described above. The samples will be chilled to 4°C immediately upon collection.

METALS: Soil samples collected from metals can be collected into ziplock baggies or into stainless steel tubes as described above. It is not necessary to chill samples collected for metals analysis.

MOISTURE CONTENT: Soil samples to be analyzed for moisture content will be collected in stainless steel tubes as described above. The samples will be chilled to 4°C immediately upon collection.

4.2 Water (Including Groundwater)

VOLATILE ORGANIC COMPOUNDS: Water samples collected for VOC analysis will be collected in 40-ml glass vials preserved with hydrochloric acid provided by the laboratory. The sample vials will be filled so that there is no headspace. The vials will be inverted and tapped to ensure that no air bubbles are present. If a bubble appears, the vial will be discarded and a new sample will be collected. The samples will be chilled to 4°C immediately upon collection. A minimum of three vials of each water sample are required for each laboratory.

OTHER ORGANIC COMPOUNDS: Water samples to be analyzed for other organic compounds will be collected into containers with preservatives as specified by the receiving laboratory. Samples will be chilled to 4°C immediately upon collection.

METALS: Water samples collected for metals analysis will be collected in 0.5-liter polyethylene bottles. The samples will not be filtered or preserved in the field. The laboratory will be directed to filter the samples for dissolved metals analysis, and the laboratory will be directed to not filter the samples for total metals analysis prior to preserving the sample container by adding nitric acid to the sample bottle. The bottle will be capped with threaded caps. The samples will be chilled to 4°C immediately upon collection. One bottle of each water sample is required for each laboratory.

4.3 Soil Gas

Soil gas samples will be collected into 1-liter Summa canisters provided by the laboratory, unless otherwise specified in writing to the ACDEH.

4.4 Air

Air samples will be collected into SIM-certified 6-liter Summa canisters provided by the laboratory, unless otherwise specified in writing to the ACDEH.

5.0 QUALITY CONTROL

The following conditions and sample collection will occur for soil gas and air sampling events for quality control purposes.

5.1 Soil Gas Samples

One duplicate soil gas sample will be collected into a 1-liter Summa canister from one of the soil gas wells using a stainless steel sampling tee for the Summa canisters using methods described above for every 10 soil gas samples collected.

Soil gas samples will not be collected if greater than 0.5 inches of precipitation has occurred during the 5 days preceding the soil gas sampling event.

5.2 Air Samples

One duplicate air sample will be collected into a 6-liter Summa canister at one of the air sample collection locations using a stainless steel sampling tee or Teflon tubing tee with stainless steel fittings for the Summa canisters using methods described above for every 10 air samples collected.

A minimum of one background air sample will be collected for each air sampling event.

6.0 HEALTH AND SAFETY

All sample collection will be performed in accordance with the site-specific Health and Safety Plan for the Project.

APPENDIX D1

DISPOSABLE ENCORE SAMPLER SAMPLING PROCEDURES

Disposable En Core® Sampler

Sampling Procedures

Using The En Core® T-Handle

NOTE:

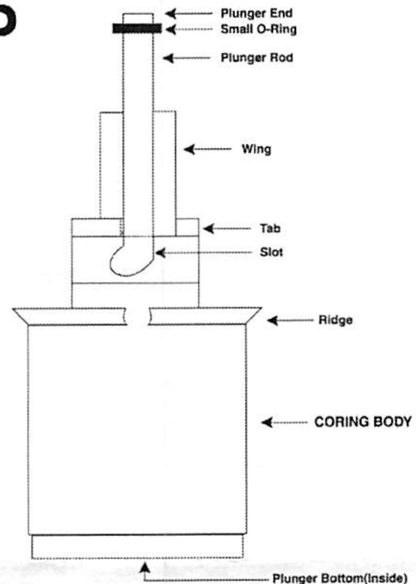
1. En Core® Sampler is a SINGLE USE device. It cannot be cleaned and/or reused.

2. En Core® Sampler is designed to store soil. Do not use En Core Sampler to store solvent or free product!

3. En Core® Sampler must be used with En Core® T-Handle and/or En Core® Extrusion Tool exclusively. (These items are sold separately.)

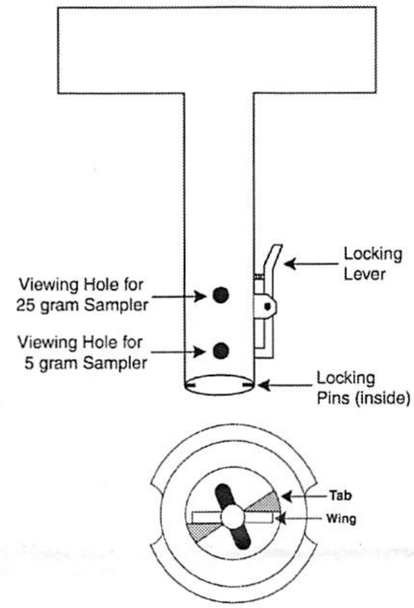
En Core®

Top



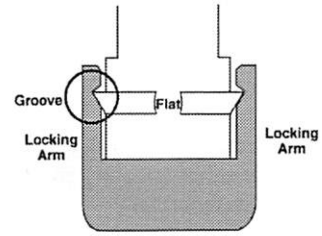
Bottom

En Core® T-Handle



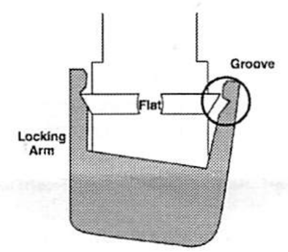
Sampler Correctly Capped

(Locking arm grooves seated over coring body ridge.)



Sampler Incorrectly Capped

(Cap appears crooked; locking arm grooves not fully seated over coring body ridge.)



BEFORE TAKING SAMPLE:

1. Hold **coring body** and push **plunger rod** down until **small o-ring** rests against **tabs.** This will assure that plunger moves freely.

2. Depress **locking lever** on En Core T-Handle. Place coring body, **plunger end first,** into open end of T-Handle, *aligning the (2)* ***slots*** *on the coring body with the (2)* ***locking pins*** *in the T-Handle.* Twist coring body clockwise to lock pins in slots. Check to ensure Sampler is locked in place. Sampler is ready for use.

TAKING SAMPLE:

3. Turn T-Handle with T-up and coring body down. This positions plunger bottom flush with bottom of coring body (ensure that plunger bottom is in position). Using T-Handle, push Sampler into soil until coring body is completely full. When full, small o-ring will be centered in T-Handle **viewing hole.** Remove Sampler from soil. Wipe excess soil from coring body exterior.

4. Cap coring body while it is still on T-handle. *Push* **cap** over **flat** area of **ridge** *and twist* to lock **cap** in place. **CAP MUST BE SEATED TO SEAL SAMPLER (see diagram).**

PREPARING SAMPLER FOR SHIPMENT:

5. Remove the capped Sampler by depressing locking lever on T-Handle while twisting and pulling Sampler from T-Handle.

6. Lock plunger by rotating extended plunger rod fully counter-clockwise until **wings** rest firmly against tabs (see plunger diagram).

7. Fill in sample description on the back of the En Core Sampler bag.

8. Return full En Core Sampler to zipper bag. Seal bag and put on ice.

En Novative Technologies®

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Disposable En Core® Sampler

EXTRUSION PROCEDURES

USING THE En Core® EXTRUSION TOOL

CAUTION! Always use the Extrusion Tool to extrude soil from the En Core Sampler. If the Extrusion Tool is not used, the Sampler may fragment, causing injury.

1. To attach En Core Sampler to En Core Extrusion Tool: Depress locking lever on Extrusion Tool and place Sampler, plunger end first, into open end of Extrusion Tool, aligning slots on coring body with pins in Extrusion Tool. Turn coring body clockwise until it locks into place. Release locking lever.

2. Rotate and gently push Extrusion Tool plunger knob clockwise until plunger slides over wings of coring body. (When properly positioned plunger will not rotate further.)

3. Hold Extrusion Tool with capped Sampler pointed upward so soil does not fall out when cap is removed. Remove cap from Sampler by rotating cap until locking arms are aligned with the flat area of ridge and pull cap off. To release soil core push down on plunger knob of En Core Extrusion Tool. Remove and properly dispose of En Core Sampler.

Warranty and Disclaimers

IMPORTANT: FAILURE TO USE THE EN CORE® SAMPLER IN COMPLIANCE WITH THE WRITTEN INSTRUCTIONS PROVIDED HEREIN VOIDS ALL EXPRESS AND IMPLIED WARRANTIES, INCLUDING WARRANTY OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

PRINCIPLE OF USE. The En Core Sampler Cartridge System is a volumetric sampling system designed to collect, store and deliver a soil sample. The En Core Sampler comes in two sizes for sample volumes of approximately 25 or 5 grams. There are four components: the cartridge with a movable plunger; a cap with two locking arms; a T-handle (purchased separately); and an extrusion handle (purchased separately). NOTE: The En Core Sampler is designed to store soil. It is not designed to store solvent or free product.

The soil is stored in a sealed headspace-free state. The seals are achieved by three special Viton® * o-rings, two located on the plunger and one on the cap of the Sampler. At no time and under no condition should these o-rings be removed or disturbed.

QUALITY CONTROL. The cartridge is sealed in an airtight package to prevent contamination prior to use. Due to the stringent quality control requirements associated with the use of this system, the disposable cartridge is designed to be used only once.

WARRANTY. En Novative Technologies warrants that the En Core Sampler shall perform consistent with the research conducted under En Novative Technologies' approval, within thirty (30) days from the date of delivery, provided that the Customer gives En Novative Technologies prompt notice of any defect or failure to perform and satisfacto-ry proof thereof. THIS WARRANTY DOES NOT APPLY TO THE FOLLOWING, AS SOLELY DETERMINED BY EN NOVATIVE TECHNOLOGIES: (a) Damage caused by accident, abuse, mishandling or dropping; (b)Samplers that have been opened, taken apart or mishandled; (c)Samplers not used in accordance with the directions; and (d)Damages exceeding the cost of the sampler. Seller war-rants that all En Core Samplers shall be free from defects in title. THE FORE-GOING WARRANTIES ARE IN LIEU OF ALL OTHER WARRANTIES, WHETHER ORAL, WRITTEN, EXPRESSED, IMPLIED OR STATUTORY, INCLUDING ANY INFORMATION PROVIDED BY SALES REPRESENTATIVES OR IN MARKETING LITERATURE. IMPLIED WARRANTIES OF FITNESS AND MERCHANTABILITY SHALL NOT APPLY. En Novative Technologies' warranty obligations and Customer's remedies, except as to title, are solely and exclusively as stated herein.

LIMITATION OF LIABILITY. IN NO EVENT SHALL EN NOVATIVE TECHNOLOGIES BE LIABLE FOR ANTICIPATED PROFITS, INCIDENTAL, SPECIAL OR CONSEQUENTIAL DAMAGES, INCLUDING, BUT NOT LIMITED TO, DAMAGES FOR LOSS OF REVENUE, DOWN TIME, REMEDIATION ACTIVITIES, REMOBILIZATION OR RESAMPLING, COST OF CAPITAL, SERVICE INTERRUPTION OR FAILURE OF SUPPLY, LIABILITY OF CUSTOMER TO A THIRD PARTY, OR FOR LABOR, OVERHEAD, TRANSPORTATION, SUBSTITUTE SUPPLY SOURCES OR ANY OTHER EXPENSE, DAMAGE OR LOSS, INCLUDING PERSONAL INJURY OR PROPERTY DAMAGE. En Novative Technologies' liability on any claim of any kind shall be replacement of the En Core Sampler or refund of the purchase price. En Novative Technologies shall not be liable for penalties of any description whatsoever. In the event the En Core Sampler will be utilized by Customer on behalf of a third party, such third party shall not occupy the position of a third-party beneficiary of the obligation or warranty provided by En Novative Technologies, and no such third party shall have the right to enforce same. All claims must be brought within one (1) year of shipment, regardless of their nature.

The En Core™ Sampler is covered by One or More of the Following U.S. Patents: 5,343,771; 5,505,098; 5,517,868; 5,522,271. Other U.S. and Foreign Patents Pending.

* Viton® is a registered trademark of DuPont Dow Elastomers.

En Novative Technologies®

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PHONE (920) 465-3960
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TOLLFREE (888) 411-0757

En Core® Sampler

Sampler size: 5 Gram Sampler
Lot number: 16201

Approved by:
Adam Michael
Quality Manager

En Core® Samplers are placed in precleaned 2 oz glass jars, filled with DI water, and held at 4°C for 2 days. The water is decanted into 40 ml VOA vials and analyzed by EPA Method 5030B/8260. En Core® Samplers selected from this lot tested at or below the following concentrations for the following compounds:

Analyte	Conc. (ug/l)	Analyte	Conc (ug/l)
Chloromethane	<1	Trichloroethene	<1
Bromomethane	<1	Dibromochlormethane	<1
Vinyl Chloride	<1	1,1,2-Trichloroethane	<1
Chloroethane	<1	Benzene	<1
Methylene Chloride	<10	trans-1,3-Dichloropropene	<1
Acetone	<10	Bromoform	<1
Carbon Disulfide	<1	4-Methyl-2-pentanone	<5
1,1-Dichloroethene	<1	2-Hexanone	<5
1,1-Dichloroethane	<1	Tetrachloroethene	<1
cis-1,2-Dichloroethene	<1	1,1,2,2-Tetrachloroethane	<1
trans-1,2-Dichloroethene	<1	1,2-Dibromoethane	<1
Chloroform	<1	Toluene	<1
1,2-Dichloroethane	<1	Chlorobenzene	<1
2-Butanone	<5	Ethylbenzene	<1
Bromochloromethane	<1	Styrene	<1
1,1,1-Trichloroethane	<1	Xylenes (total)	<3
Carbon Tetrachloride	<1	1,3-Dichlorobenzene	<1
Bromodichloromethane	<1	1,4-Dichlorobenzene	<1
1,2-Dichloropropane	<1	1,2-Dichlorobenzene	<1
cis-1,3-Dichloropropene	<1	1,2-Dibromo-3-chloropropane	<1

The En Core® Sampler is a single use soil storage device. Under no circumstances may the En Core® Sampler be cleaned and/or reused, or used to store solvent or free product. Any improper use voids any expressed or implied warranties (see "Warranties and Disclaimers" which accompany the En Core® Sampler).

En Novative Technologies®

En Novative Technologies
2355 Bishop Circle West
Dexter, MI 48130
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APPENDIX E

Soil Import Management Plan

SOIL IMPORT MANAGEMENT PLAN

County File # RO 0003347

Former Big O Tire Facility

820 W MacArthur Boulevard

Oakland, CA

Prepared For:

820 MacArthur, LLC

1000 Brannan Street, Suite 402

San Francisco, CA 94103

Prepared By:

P&D Environmental, Inc.

55 Santa Clara Avenue, Suite 240

Oakland, CA 94610

Paul H. King

Professional Geologist

Expiration 12/31/21

April 27, 2020

Project # 0794

Table of Contents

List of Attachments

See April 27, 2020 Subject Site CAP for Figures

Appendices

1.0 INTRODUCTION

This Soil Import Management Plan (SIMP) has been prepared by P&D Environmental, Inc. of Oakland, California (P&D) on behalf of 820 MacArthur, LLC (Owner) for earthwork activities associated with the redevelopment of the property identified for this project as 820 W MacArthur Boulevard in Oakland, California (see ***Figure 2 of the April 27, 2020 CAP***). The Site is identified with Alameda County Assessor Parcel Number (APN) 12-959-9-3 for what is identified on the Alameda County parcel viewer page as having an address of 820 W MacArthur Boulevard in Oakland, California. The site is bounded on the south by W MacArthur Boulevard and on the east by West Street. Residential structures are located to the north and west of the property. The Site is currently covered with asphalt and concrete, with two buildings and a storage structure associated with the former Big O tire store that operated at the Site until the end of 2018, when the Site was purchased by Owner. The redevelopment project ("Project") consists of 1) the removal of the existing structures and surface cover; 2) grading and soil excavation for utilities, and foundations; removal of soil impacted by tetrachloroethene (PCE) and Total Petroleum Hydrocarbons as Gasoline (TPH-G); (3) installation of a vapor barrier; and (4) and the construction of a slab-on-grade multi-story residential building.

This SIMP is intended to augment the existing Soil and Groundwater Management Plan (SGMP) for the site.

1.1 Lead Regulatory Oversight Agency for Environmental Site Cleanup

Soil and groundwater at the Site has been impacted from historical land use practices on-Site and potentially off-Site. Alameda County Department of Environmental Health's (ACDEH) Local Oversight Program for Hazardous Materials Releases (LOP) is the lead regulatory oversight agency for the environmental investigation and cleanup actions at the Site under Site Cleanup Program Case (SCP) No. RO0003347 which was assigned when a new development was proposed for the Site.

Due to the presence soil and groundwater contamination at the Site corrective actions are necessary to safely prepare the Site for development. Corrective actions include: (1) excavation and disposal of PCE-impacted and TPH-G-impacted soil; (2) installation of a vapor mitigation barrier beneath the concrete foundation slab; and (3) installation of trench plugs in utility trenches where required to mitigate vapor migration.

A site aerial photograph showing proposed first floor structure locations is shown as ***Figure 5 of the April 27, 2020 CAP,*** a site aerial photograph showing total lead concentrations in fill and shallow soil is shown as ***Figure 5 of the April 27, 2020 CAP,*** and an aerial photograph showing the approximate location of excavations for PCE-impacted and TPH-G-impacted in soil is shown as ***Figure 4 of the April 27, 2020 CAP.*** A complete record of environmental Site investigations at the Site may be obtained in the case files for RO0003347 (i.e., available regulatory directives and correspondence, reports, analytical data, etc.) through review of the State Water Resources Control Board's GeoTracker database, with documents also available at the ACDEH website at http://www.acgov.org/aceh/index.htm.

1.2 SIMP Purpose & Objectives

This SIMP is intended to provide the Owner and the construction team with guidance for the proper characterization and management of imported clean fill during redevelopment activities so that clean fill can be imported to the site without additional review, if the acceptance criteria are met. This SIMP applies to environmental criteria for clean fill import, and does not include project geotechnical criteria or construction material corrosivity criteria. It is recommended that project geotechnical and construction material corrosivity criteria should also be evaluated prior to import to the site of fill material that meets environmental criteria identified in this SIMP.

The objectives of this SIMP are to provide the following:

- Methods for evaluation of conditions for consideration for suitability of material for import to the site.

- Identification of the number of samples to be collected, the types of analyses to be performed, and the sampling methods for sample collection for characterization of material for import to the site to be used as fill material.

- Acceptance criteria for fill import acceptability for use at the site.

2.0 IMPORT EVALUATION

Representative samples of material proposed for import to the subject site will be collected under the supervision of an appropriately licensed professional in accordance with collection and analysis criteria set forth in the ACDEH LOP – *Soil Import/Export Characterization Requirements* (August 9, 2019). A copy of the ACDEH guidance is attached as **Appendix E1**.

If recycled concrete is proposed for use as import material, sampling and analysis of the recycled concrete will be performed in accordance with criteria set forth in the Jew Jersey Department of Environmental Protection (NJDEP) January 12, 2010 Guidance for Characterization of Concrete and Clean Material Certification for Recycling. A copy of the NJDEP guidance is attached as **Appendix E2**.

2.1 Import Source Site Background

The type of sample analysis performed will be determined by the licensed professional overseeing the sample collection based on a review of available information for historical land use. Available information for the import source site may include historical investigations of the import source site. Required information for evaluation for each proposed import source site includes the following:

- Location/address.

- Historical and current land use, including any available historical site investigation reports.

- A map showing the location of the proposed material for import, including dimensions of stockpiles and dimensions and depth of material that has not yet been excavated.

- Laboratory reports for samples used to characterize the proposed import material with a comparison of the sample results with SIMP acceptance criteria.

- Any known schedule for removal of the proposed import material from the import source site.

Any available historical laboratory analytical results for samples collected at the import source site will be evaluated for evidence of import source site contamination. If sample results from historical import source site investigations are to be considered for compliance with SIMP acceptance criteria, the sample results must be evaluated to verify that the samples were collected from the proposed import source area, that they were collected in a manner that the samples are considered valid and representative, and that the sample locations, frequency, and analyses conform to acceptance criteria identified in this SIMP.

If no historical import source site information is available, samples will be analyzed for all of the analyses identified in Section 2.2 below.

2.2 Import Material Sampling and Analysis

Characterization of material for import to the site will be performed in accordance with Tables 1a, 2a and 3 of the ACDEH LOP – *Soil Import/Export Characterization Requirements* (August 9, 2019).

Samples will be collected at different depths from soil stockpiles to characterize different portions of the stockpiles. Samples will be collected into stainless steel tubes with zero head space in the tube prior to covering the ends of the tubes with aluminum foil and plastic endcaps and using Encore sampling procedures or equivalent for VOC analysis. Following soil sample collection, the containers will be labeled for identification and immediately placed in a chilled, thermally insulated cooler containing ice. The cooler containing the samples will then be delivered under chain-of-custody protocol to a state-certified laboratory. Any sample compositing will be performed at the laboratory.

Sample analysis will be performed in accordance with the ACDEH LOP *Soil Import/Export Characterization Requirements* (August 9, 2019).

2.3 Acceptance Criteria

Laboratory sample results will be compared with the most current version of the San Francisco Bay Regional Water Quality Control Board (SFRWQCB) soil Tier 1 Environmental Screening Levels (ESLs), except as identified below, to determine acceptability for use at the subject site. The most current version at the writing of this SIMP are the July 2019 (revision 2) ESLs.

- Arsenic. The acceptance criteria for arsenic is 11 milligrams per kilogram (mg/kg) based on the findings of the December 2011 Establishing Background Arsenic Concentrations in Soil of the Urbanized San Francisco Bay Region document prepared by Dylan Jacques Duverge. A copy of the document is available for review on the internet at the SFRWQCB website.

- Asbestos. The acceptance criteria for arsenic is a result of not detected with a reporting limit of no more than 0.25% regulated asbestos fibers analyzed by California Air Resources Board (CARB) Method 435, in accordance with DTSC September 2004 Interim Guidance Naturally-Occurring Asbestos at School Sites.

- Toxaphene. The acceptance criteria for toxaphene is 0.005 mg/kg based on the lowest obtainable laboratory reporting limits.

- Bis (2-chloroethyl) ether. The acceptance criteria for bis (2-chloroethyl) ether is 0.0013 mg/kg based on the lowest obtainable laboratory reporting limits.

- 2,4-Dinitrotoluene. The acceptance criteria for 2,4-Dinitrotoluene is 0.0063 mg/kg based on the lowest obtainable laboratory reporting limits.

- 2,4-Dinitrophenol. The acceptance criteria for 2,4-Dinitrophenol is 0.13 mg/kg based on the lowest obtainable laboratory reporting limits.

Detected compounds that do not have a corresponding Tier 1 ESL value will be compared with the most current available screening levels as follows:

- DTSC Human Health Risk Assessment (HHRA) Note Number 3 Screening Levels for Residential Soil. The most current version of the HHRA Note Number 3 Screening Levels at the writing of this SIMP are the April 2019 Screening Levels.

- United States Environmental Protection Agency (USEPA) Region 9 Regional Screening Levels (RSLs) for Resident Soil (TR-1E-06, THQ = 1.0). The most current version of the RSLs at the writing of this SIMP are the November 2019 RSLs.

The order of priority for multiple sources of a screening level are SFRWQCB Tier 1 ESLs, followed by DTSC HHRA Note Number 3 Screening Levels, followed by USEPA RSLs. If a compound is detected but does not have a corresponding screening level, notification of the detected compound will be provided to the ACDEH for approval prior to import of the material to the subject site.

In the event that sample results exceed Tier 1 ESL values, alternate proposed SFRWQCB soil screening levels can be proposed to the ACDEH for approval prior to import of the material to the subject site.

3.0 REPORTING

Upon project completion a report documenting fill evaluation and import to the site will be prepared for review by the ACDEH. The following documentation will be included in the report.

- Available historical information for the site where the fill material is obtained, including a summary of any historical site investigations, the property address, and known historical land use.

- A figure showing the site, the location where the fill material was obtained, and the locations and depths of samples collected for characterization of the material.

- A summary table of the volume or weight of the material imported to the site.

- A figure showing locations and depths where the imported material was placed at the subject site.

- A summary of the laboratory analytical reports for the characterized material with a comparison of the sample results with acceptance criteria.

A copy of the report documenting material evaluation, characterization, and placement will be stamped by an appropriately licensed professional and will be uploaded to GeoTracker.

APPENDIX E1

ACDEH LOP - Import/Export Characterization Requirements

ALAMEDA COUNTY DEPARTMENT OF ENVIRONMENTAL HEALTH LOCAL OVERSIGHT PROGRAM	**Revision Date:** August 9, 2019
	ISSUE DATE: August 1, 2018
	Previous Revisions: October 25, 2018
SUBJECT: Soil Import/Export Characterization Requirements	

INTRODUCTION:

This document has been prepared by Alameda County Department of Environmental Health (ACDEH) for environmental cleanup sites regulated by ACDEH to provide requirements for the characterization of soil to determine its suitability for use at another site. These requirements have been prepared by ACDEH to ensure that unsuitable soil is not imported to environmental cleanup sites or exported from environmental cleanup sites to properties with sensitive land uses. This document is for characterization of soil only and does not address requirements for characterization of other fill material including, but not limited to: crushed rock, pea gravel, recycled concrete, or flowable material.

This document addresses both human health and ecological risk associated with exposure pathways to fill material and identifies fill sources which are unsuitable for use as fill material based on current and historic land use activities. The protocols and criteria presented in this document are intended to be sufficiently conservative to be applicable to all soil fill import sites regardless of land use or other site characteristics. Alternative criteria for soil characterization and suitability may be proposed for consideration by ACDEH via submittal of a site-specific soil import/export management plan and associated supporting technical documents.

This document was prepared using the structure presented in the California Environmental Protection Agency, Department of Toxic Substances Control (DTSC) Clean Imported Fill Material Information Advisory (October 2001) and modified to incorporate use of the San Francisco Bay Regional Water Quality Control Boards (Water Board's) Environmental Screening Levels (ESLs), criteria provided to ACDEH by designated Groundwater Basin Managers within Alameda County; and accepted industry practices for soil characterization.

Section 1 of this document discusses criteria for assessing and identifying potentially suitable fill material sources. **Section 2** discusses the evaluation of the suitability of potential fill material. **Section 3** discusses ACDEH's fill import suitability determination process. **Section 4** describes the conditions and reporting requirements for importing suitable fill material.

1. ASSESSMENT OF POTENTIALLY SUITABLE FILL MATERIAL SOURCES

Suitable fill material ("Clean Soil") as defined in this document is soil that will not have an adverse effect on human health or the environment when imported to the receiving site. Clean Soil must consist solely of natural earth material (e.g., soil, clay, silt, sand, gravel, rock) and must have concentrations of naturally occurring chemicals that do not exceed background levels at the receiving site and concentrations of man-made chemicals that do not exceed applicable risk based screening levels for human health risk, ecological risk (aquatic and terrestrial receptors), and concerns for nuisance and gross contamination.

Prior to collecting analytical data to confirm suitability of potential fill material, potential source areas should be screened based on historical land use and material composition. Historic and current land use at, and in the vicinity of, the parcel containing the proposed fill material should be evaluated for environmental impacts to determine the applicable laboratory analysis that should be conducted to characterize the fill material. This assessment consists of the review of historical records and typically includes conducting a phase one environmental site assessment (Phase I ESA) or preliminary environmental assessment (PEA) within six months of the assessment. The assessment should be sufficient to identify Recognized Environmental Conditions (RECs). RECs are typically associated with the production, use, storage, transport, recycling, or disposal of hazardous material or waste at or in the vicinity of the parcel being evaluated and are used to determine what potential contaminants may be present and therefore should be analyzed for.

Fill material from parcels with the following conditions are not suitable for use as a proposed fill material source without additional evaluation and approval from ACDEH beyond what is required in this guidance:

a. Regulated environmental cleanup sites; or
b. Unaddressed or insufficiently addressed RECs; or
c. Current or historic industrial land uses; or
d. Current or historic unacceptable commercial land uses. Unacceptable commercial land uses are operations that generate revenue through, or that significantly involve:
    i. Manufacturing, repairing, or restoring operations; or
    ii. Providing maintenance services; or
    iii. The use, storage, transport, or disposal of hazardous material or waste.
e. Material containing animal or human waste or debris such as lumber, metal, or refuse.

2. EVALUATION OF FILL MATERIAL SUITABILITY

Proposed fill material source areas that are considered potentially suitable based on the initial screening of historic and current land use must be sampled, analyzed, and meet applicable environmental and human health risk levels before a final determination of the suitability of the proposed fill material can be made. Sampling protocols and strategies, and laboratory analyses vary based on conditions at the location being sampled, the type of compounds that are being evaluated, and the volume of fill material. Samples must be collected and analyzed in a manner sufficient to characterize the lateral and vertical extents of the proposed fill material source area. Minimum sampling and analysis requirements to evaluate the suitability of a proposed fill material source area are derived from various regulatory guidance documents, industry best practices, and requirements from designated Groundwater Basin Managers within Alameda County which are described in further detail below.

2.1. Minimum Analytical Requirements

Minimum analytical requirements for characterization of potentially suitable fill material proposed for import to a destination (a) outside of the jurisdiction of Zone 7 Water Agency (Zone 7); or (b) within the jurisdiction of Zone 7 are provided in Table 1a and Table 1b, respectively. Sampling and laboratory analysis must be conducted in accordance with the following requirements:

a. All analysis must performed in accordance with the United States Environmental Protection Agency's (USEPA's) SW-864 Compendium;
b. Analysis of samples must be completed and reported by an analytical laboratory accredited by the California State Environmental Laboratory Accreditation Program and the National Environmental Laboratory Accreditation Program;
c. The laboratory reporting limits must not exceed the screening levels adopted by ACDEH as described in Section 2.4 below;
d. The laboratory reporting limits must be reported on a dry-weight basis; and
e. The results of the laboratory analysis must be reported in a standard laboratory data package, including a summary of the quality control and quality assurance sample results and chain of custody documentation.

2.2. Minimum Sampling Requirements

Sampling for the characterization of potentially suitable fill material must be conducted under the direct charge of a professional engineer or geologist licensed in the state of California ("Qualified Professional") and in accordance with industry best practices including, but not limited to those discussed in the subsections below.

2.2.1. Vapor Forming Compounds

Vapor forming compounds consist of volatile organic compounds (VOCs) and semi-volatile organic compounds (SVOCs) that readily form a vapor when exposed to air. In order to minimize volatilization of VOCs and SVOCs during sample collection, and ensure that analytical results are representative of the proposed fill material, discrete samples must be collected and analyzed in accordance with USEPA Method 5035. Composite sampling is not acceptable for the evaluation of VOCs and SVOCs.

2.2.2. Composite Sampling

Composite sampling is acceptable under the following conditions:

a. Analysis is for non-vapor forming chemicals;

b. The composite sample is comprised of roughly equivalent masses of each of the discrete samples;

c. Sufficient mass of discrete samples from each of the composited locations are submitted so as to allow for analysis of the discrete samples; and

d. Each of the discrete samples that comprise the composite sample must be analyzed in the event that the composite sample exceeds the applicable screening level.

2.2.3. In Situ Characterization

Pre-excavation (e.g., In Situ) characterization of potentially suitable fill material must meet the minimum requirements provided in Table 2a (for import to a destination outside of the jurisdiction of Zone 7 Water Agency's jurisdiction) and Table 2b (for import to a destination within the Zone 7 Water Agency's jurisdiction). Additional requirements include:

- Characterization of soil lithology in the proposed source area using the Unified Soil Classification System from the ground surface to the total depth of the proposed excavation for the fill material. The characterized soil lithology at each sample location must be presented as a soil boring log and must be reviewed and stamped by a Qualified Professional.
- Collection and analysis of at least one sample from each sample location for every five feet below ground surface that the proposed fill area extends.
- Characterization of layers of proposed fill material that exhibit significantly different geological characteristics or lithologies as separate sources. For example, if soil at a site generally consists of clay from the ground surface to a depth of 3 feet below ground surface with interbedded silts and sands beyond, the clay layer should be characterized and managed as one source and the interbedded silts and sands should be characterized as a second source.
- Use of direct push technology for sample collection and analyses for VOCs and SVOCs. Samples collected for analysis of non-vapor forming compounds may be collected using direct push technology, augers, or from a bucket, sidewall, or base sample from "pot hole" excavations.

2.2.4. Stockpile Characterization

The minimum sample quantities for the characterization of potentially suitable fill material that have been excavated and stockpiled are based on the total volume of the stockpiled fill material and are summarized in Table 3. Stockpiles must be generated from the same source area, must be segregated by fill material composition, and be located on the parcel generating the proposed fill material. Samples being analyzed for VOCs and SVOCs must be collected from at least 1 foot below the exposed surface of the stockpile.

2.3. Conditions Requiring Additional Sampling and Analysis

In addition to the minimum sampling requirements identified above, the following conditions, if present, require additional sampling and analysis as indicated:

1. **Evidence of Contamination** – Samples must be collected and analyzed from any locations where there is evidence of contamination such as strong odors, staining, observable sheen or free product, stressed vegetation, and/or elevated responses from field screening instruments such as a photoionization detector.
2. **Contaminants Associated with Surface Deposition** – When characterization for contaminants associated with surface deposition (e.g., pesticides, herbicides, fungicides, asbestos, and lead) are required for fill material characterization, representative samples must be collected from surface and near surface soils in accordance with the following:
    - For in situ characterization, one sample should be collected from each of the following intervals from each sample location: 0 to 6 inches below ground surface; 6 inches to 2 feet below ground surface; and 2 feet to 3 feet below ground surface; and
    - For stockpiled fill material, fill material from the surface and near surface (0 to 3 feet below ground surface) must be segregated from other fill material and characterized as a separate potential fill source.
3. **Groundwater and Saturated Soil** – If groundwater or saturated soil is encountered during fill characterization or excavation, the following additional samples must be collected and analyzed:
    - One soil sample per sample location from immediately above the saturated soil (i.e., the capillary fringe); and
    - One groundwater sample from each soil boring, excavation, or dewatering well in which groundwater is encountered.
4. **Dewatering** – If dewatering is conducted to support excavation of potentially suitable fill material, characterization of the fill material must be conducted after dewatering has been implemented and soil is no longer saturated.

2.4. Screening Levels

To be considered suitable fill material, analytical results of the fill characterization sampling must be less than applicable environmental and human health risk based screening levels.

2.4.1. Default Screening Levels

ACDEH has adopted the Regional Water Board's Tier 1 Environmental Screening Levels (ESLs) dated January 2019 (Revison 2) as default screening levels for all constituents with the following exception:

- **Arsenic**: the screening level for arsenic adopted by ACDEH is 11.00 milligrams of arsenic per kilogram of sample. This concentration is based on the upper estimate (99th percentile) for regional background levels of arsenic in the urbanized San Francisco bay region[3].

The use of Tier 1 ESLs as a default screening level is applicable to all sites regardless of land use or other site characteristics.

2.4.2. Alternative Screening Levels

In the event that fill characterization fails the default screening levels, alternative screening levels may be proposed for consideration by ACDEH via submittal of a site-specific soil import/export management plan. The soil import management plan must include a site-specific risk assessment for the receiving location and associated supporting technical documents.

The use of hazardous waste characteristic of toxicity levels (California Code of Regulations Title 22 Section 66261.24) as a screening level to evaluate the suitability of the import of soils is unacceptable for all sites except for appropriately designed and permitted treatment, storage, disposal, or recycling facilities.

3. ACDEH FILL MATERIAL IMPORT SUITABILITY DETERMINATION PROCESS

To obtain a determination from ACDEH that a proposed fill material is suitable, ACDEH requires submittal of a technical report (the "Fill Material Characterization Report") documenting the characterization of the proposed fill material. This technical report must contain, at a minimum, the following elements:

1. A cover letter from the owner of the proposed fill source material with the following statement: "I have read and acknowledge the content, recommendations, and/or conclusions contained in the attached document or report submitted on my behalf to ACDEH". This cover letter must be signed by the owner of the proposed fill source material or a legally authorized representative of the owner of the proposed fill source material;
2. A statement that fill material characterization was conducted under the responsible charge of a Qualified Professional. This statement must be accompanied by the signed and dated seal of the Qualified Professional with responsible charge;
3. Narrative identifying and summarizing the following elements:
    a. The location, assessor's parcel number, and physical address of the proposed fill material source area;
    b. A summary of historical land uses and operations conducted at and in the vicinity of the proposed fill material source area with citations for supporting documentation;
    c. Identification and description of any identified RECs;
    d. A summary of fill material characterization efforts conducted, including a description of sampling and analysis and applicable geology and hydrogeology within the proposed fill material source area;
    e. A summary of the results of analytical sampling; and
    f. Recommendations and conclusions for the suitability of the proposed fill material.
4. Tables summarizing the site characterization analytical data;
5. A completed Proposed Fill Material Source Characterization Summary Form. A copy of this form is provided in pdf in Attachment A. An excel spreadsheet of this form is available on request;
6. Figure(s) depicting the following elements:
    a. Sample locations;

b. Parcel lines and parcel numbers;

c. Lateral extent(s) and depth(s) of the proposed fill material source area(s);

d. Location of any identified RECs;

e. Location of known current and historic infrastructure including structures, roadways, utilities, and any above ground or below ground storage tanks.

7. Boring logs depicting the geology, sample depths, and any encountered groundwater from each sample location;

8. Copies of laboratory analytical data;

9. Copies of supporting environmental documents such as Phase I ESA, PEA, or historic subsurface investigation reports.

The Fill Material Characterization Report and supporting documentation must be submitted to ACDEH via email to deh.loptoxic@acgov.org and uploaded to the State Water Resources Control Board's GeoTracker database. ACDEH will review the Fill Material Characterization Report and will issue a directive letter that (a) determines that the proposed fill material is suitable for import/export; (b) requests additional characterization; or (c) determines that the proposed fill material is not suitable for import/export. ACDEH's determination will include conditions described in Section 4 and may include additional conditions or requirements.

4. CONDITIONS OF ACDEH FILL MATERIAL IMPORT SUITABILITY DETERMINATION

As a condition of import/export, a technical report be submitted to ACDEH via email and uploaded to GeoTracker documenting the import/export of soil (the "Soil Import Summary Report"). The report must be uploaded to the GeoTracker information repositories for both the fill material source area and the destination. Please note that for locations importing soil from multiple sources, a single report can be submitted that documents import from multiple sources. For locations in which soil import activities last more than one year, a Soil Import Summary Report must be submitted on a semi-annual basis for the duration of import activities. The Soil Import Summary Report must contain the following elements at a minimum:

1. A cover letter from the owner of the proposed fill source material that states, at a minimum, the following: "I have read and acknowledge the content, recommendations, and/or conclusions contained in the attached document or report submitted on my behalf to ACDEH." This cover letter must be signed by the owner of the proposed fill source material or a legally authorized representative of the owner of the proposed fill source material;

2. The technical report must include a statement that fill material characterization was conducted under the responsible charge of a Qualified Professional. This statement must be accompanied by the signed and dated seal of the Qualified Professional with responsible charge;

3. Summary tables of soil import logs. These logs must include the following information for each delivery of fill material: arrival date, manifest number or truck tag, quantity of fill material delivered, originating facility, and profile number;

4. A figure depicting the location and depth of imported soil. If fill material from multiple sources has been imported, the location and depth of imported soil from each source must be distinguished;

5. Copies of all manifests or other documentation of soil import as an appendix; and

6. Copies of all fill characterization profiles as an appendix.

5. CLOSING

If you have questions or comments regarding the requirements presented in this document, please contact ACDEH's Local Oversight Program for Releases of Hazardous Materials at 510-567-6700.

This document was prepared by, or under the direction of, the undersigned.

Dilan Roe

Dilan Roe, P.E. C73703
Chief
Land Water Division

Jonathan Sanders
Senior Hazardous Materials Specialist
Local Oversight and Site Cleanup Program

ENCLOSURES

Tables

Table 1a	Minimum Required Analyses for Characterization of Fill Material for Off-Site Reuse for Receiving Facilities Located outside of Zone 7 Water Agency Jurisdictional Boundaries
Table 1b	Minimum Required Analyses for Characterization of Fill Material for Off-Site Reuse for Receiving Facilities Located within Zone 7 Water Agency Jurisdictional Boundaries
Table 2a	Minimum Required Sample Density and Spacing for In Situ (Pre-excavation) Characterization of Proposed Fill Material Sources for Receiving Facilities Located outside of Zone 7 Water Agency's Jurisdictional Boundaries
Table 2b	Minimum Required Sample Density and Spacing for In Situ (Pre-excavation) Characterization of Proposed Fill Material Sources for Receiving Facilities Located within Zone 7 Water Agency's Jurisdictional Boundaries
Table 3	Minimum Required Sample Density and Spacing for Stockpile (Post-Excavation) Characterization of Proposed Fill Material Sources

Appendices

Appendix A	Proposed Fill Material Source Characterization Summary Form

REFERENCES

1. DRAFT Technical Reference Document: Characterization and Reuse of Petroleum Hydrocarbon Impact Soil as Inert Waste. San Francisco Bay Regional Water Quality Control Board. October 2006.
2. Environmental Screening Levels (ESLs) revision 2. San Francisco Bay Regional Water Quality Control Board. January 2019.
3. Establishing Background Arsenic in Soil of the Urbanized San Francisco Bay Region. Duverge. December 2011
4. Information Advisory: Clean Imported Fill Material. Department of Toxic Substances Control (DTSC). October 2001.
5. Interim Guidance for Sampling Agricultural Properties revision 3. Department of Toxic Substances Control. August 7, 2008.
6. Preliminary Endangerment Assessment Guidance Manual. Department of Toxic Substances Control. January 1994. Revised October 2015.

TABLES

Table 1a
Minimum Required Analyses for Characterization of Fill Material for Off-Site Reuse
for Receiving Facilities Located outside of Zone 7 Water Agency Jurisdictional Boundaries

		Current and Historic Land Use At or Within 500 Feet of Fill Source Area			Current and Historic Land Use at Parcel(s) Containing Fill Source Area			
Laboratory Analysis(1)	**Analytical Method**	Major Roadway or Freeway	Mining Area or Rock Quarry	Regulated Cleanup Site and RECs	Agricultural	Residential / Acceptable Commercial(2)	Existing Historic Engineered Fill(3)	Industrial / Unacceptable Commercial
California Title 22 Metals (4)	USEPA 6010B and/or USEPA 7471A	X (Lead Only)	X	Additional As Required	X	X	X(5)	N/A
Asbestos	PLM or OSHA 191		X (PLM)	Additional As Required		X (OSHA 191)	X(5)	N/A
pH	USEPA 9045D		X	Additional As Required			X(5)	N/A
Pesticides	USEPA 8141A; and USEPA 8151A; and USEPA 8081A or 8080A			Additional As Required	X		X(5)	N/A
VOCs	USEPA 8260B with collection by USEPA 5035			Additional As Required		X	X(5)	N/A
SVOCs & PAHs	USEPA 8270C SIM	X (PAHs Only)		Additional As Required		X	X(5)	N/A
TPH	USEPA 8015M	X(5)	X(5)	Additional As Required	X(5)	X	X(5)	N/A
PCBs	USEPA 8082 or 8080A			Additional As Required		X	X(5)	N/A

Adapted from Department of Toxic Substances Control's Information Advisory Clean Imported Fill Material dated October 2001.

Notes:

(1) All analysis should be performed in accordance with USEPA SW-846 methods. A standard laboratory data package, including a summary of the QA/QC (Quality Assurance/Quality Control) sample results must accompany all analytical reports;
(2) Acceptable commercial land use excludes any commercial use that generates revenue from manufacturing, repair/restoration, maintenance/cleaning, or the storage/transport of hazardous materials;
(3) Existing homogeneous engineered fill. Fill containing waste or debris or that is heterogeneous is not acceptable for off-site reuse.
(4) Include when Hexavalent Chromium analysis required by USEPA method 7199
(5) Analysis required by Alameda County Department of Environmental Health;

Abbreviations:

USEPA -United States Environmental Protection Agency
N/A – Not Acceptable for off-site re-use
PLM – Polarized Light Microscopy
OSHA – Occupational Safety and Health Administration Testing Method Number
SIM – Selected Ion Monitoring
VOCs – Volatile Organic Compounds
SVOCs – Semi-Volatile Organic Compounds
PAHs – Poly Aromatic Hydrocarbons
TPH – Total Petroleum Hydrocarbons as reported for gasoline range, diesel range, and motor oil range
PCBs – Polychlorinated Biphenyls;

Table 1b
Minimum Required Analyses for Characterization of Fill Material for Off-Site Reuse for Receiving Facilities Located within Zone 7 Water Agency Jurisdictional Boundaries

		Current and Historic Land Use At or Within 500 Feet of Fill Source Area			Current and Historic Land Use at Parcel(s) Containing Fill Source Area			
Laboratory Analysis(1)	**Analytical Method**	Major Roadway or Freeway	Mining Area or Rock Quarry	Regulated Cleanup Site and RECs	Agricultural	Residential / Acceptable Commercial(2)	Existing Historic Engineered Fill(3)	Industrial / Unacceptable Commercial
California Title 22 Metals (4)	USEPA 6010B and/or USEPA 7471A	X (Lead Only)	X	Additional As Required	X	X	X(5, 6)	N/A
Asbestos	PLM or OSHA 191		X (PLM)	Additional As Required		X (OSHA 191)	X(5, 6)	N/A
pH	USEPA 9045D		X	Additional As Required			X(5, 6)	N/A
Pesticides	USEPA 8141A; and USEPA 8151A; and USEPA 8081A or 8080A	X(6)	X(6)	Additional As Required	X	X(6)	X(5, 6)	N/A
VOCs	USEPA 8260B with collection by USEPA 5035			Additional As Required		X	X(5, 6)	N/A
SVOCs & PAHs	USEPA 8270C SIM	X (PAHs Only)		Additional As Required		X	X(5, 6)	N/A
TPH	USEPA 8015M	X(5, 6)	X(5, 6)	Additional As Required	X(5, 6)	X	X(5, 6)	N/A
PCBs	USEPA 8082 or 8080A			Additional As Required		X	X(5, 6)	N/A

Adapted from Department of Toxic Substances Control's Information Advisory Clean Imported Fill Material dated October 2001.

Notes:

(1) All analysis should be performed in accordance with USEPA SW-846 methods. A standard laboratory data package, including a summary of the QA/QC (Quality Assurance/Quality Control) sample results must accompany all analytical reports;
(2) Acceptable commercial land use consist excludes any commercial use that generates revenue from manufacturing, repair/restoration, maintenance/cleaning, or the storage/transport of hazardous materials;
(3) Existing homogeneous engineered fill. Fill containing waste or debris or that is heterogeneous is not acceptable for off-site reuse.
(4) Include when Hexavalent Chromium analysis required by USEPA method 7199
(5) Analysis required by Alameda County Department of Environmental Health;
(6) Analysis required by Zone 7 Water Agency

Abbreviations:

USEPA -United States Environmental Protection Agency
N/A – Not Acceptable for off-site re-use
PLM – Polarized Light Microscopy
OSHA – Occupational Safety and Health Administration Testing Method Number
SIM – Selected Ion Monitoring
VOCs – Volatile Organic Compounds
SVOCs – Semi-Volatile Organic Compounds
PAHs – Poly Aromatic Hydrocarbons
TPH – Total Petroleum Hydrocarbons as reported for gasoline range, diesel range, and motor oil range
PCBs – Polychlorinated Biphenyls;

Table 2a

Minimum Required Sample Density and Spacing for In Situ (Pre-excavation) Characterization of Proposed Fill Material Sources for Receiving Facilities Located outside of Zone 7 Water Agency's Jurisdictional Boundaries

Requirements	Size of Contiguous Fill Source	Minimum Lateral Sample Distribution	Minimum Vertical Sample Distribution
(1) Additional lateral sample locations may be required to address identified RECs; (2) Additional samples must be collected from fill material that exhibits signs of potential contamination (*e.g.*, strong odor, staining, presence of sheen or free product, stressed vegetation in the vicinity, elevated response from photo-ionization detector); (3) Fill source area cannot be located on parcel(s) with historic industrial or unacceptable commercial land uses or parcel(s) associated with regulated environmental cleanup sites unless approved by regulatory oversight agency; (4) Samples that are collected, but not planned for analysis must be submitted with the samples planned for analysis under chain of custody to an appropriately certified analytical laboratory. The samples that are not planned for analysis must remain on hold with the laboratory until ACDEH has issued a determination regarding the suitability of fill material for import and released the un-analyzed samples for disposal; (5) When contaminants associated with surface deposition (e.g. pesticides, asbestos, and lead) are required to be evaluated, ACDEH requires the following additional samples be collected from each sample location: One sample from 0 to 6 inches bgs, One sample from 6 inches to 2 feet bgs, One sample from 2 feet to 3 feet bgs. One of these samples must be selected for analysis for each sample location; (6) If groundwater is encountered, ACDEH requires the following additional samples be collected and analyzed: One sample per Sample Location from immediately above the saturated fill material (i.e., the capillary fringe); One groundwater sample must be collected and analyzed for each boring, excavation, or dewatering well in which groundwater is encountered. (7) If dewatering will be conducted to support excavation below an existing water table, ACDEH requires that historically saturated fill material be samples after dewatering is in effect. (8) Composite sampling may or may not be appropriate, depending on the quality and homogeneity of the source/borrow area and compounds of concern.	≤2.0 acres	**4** sample locations. **AND** Sample Locations must be distributed throughout the fill material source area.	**1** sample collected and analyzed per sample location. **AND** **1** sample collected and analyzed for every 5 feet bgs. **AND** **1** sample collected from each layer exhibiting different geological characteristics or lithology encountered.
	≥2.0 acres <4.0 acres	**1** sample location per 0.5 acre. **AND** Sample Locations must be distributed throughout the fill material source area.	**1** sample collected and analyzed per sample location. **AND** **1** sample collected and analyzed for every 5 feet bgs. **AND** **1** sample collected from each layer exhibiting different geological characteristics or lithology encountered.
	≥4 acres <10.0 acres	**8** sample locations. **AND** Sample Locations must be distributed throughout the fill material source area.	**1** sample collected and analyzed per sample location. **AND** **1** sample collected and analyzed for every 5 feet bgs. **AND** **1** sample collected from each layer exhibiting different geological characteristics or lithology encountered.
	≥10.0 acres	**8** sample locations. **AND** Sample Locations must be distributed throughout the fill material source area.	**4** sample collected and analyzed per sample location. **AND** **1** sample collected and analyzed for every 5 feet bgs. **AND** **1** sample collected from each layer exhibiting different geological characteristics or lithology encountered.

Table 2b

Minimum Required Sample Density and Spacing for In Situ (Pre-excavation) Characterization of Proposed Fill Material Sources for Receiving Facilities Located within Zone 7 Water Agency's Jurisdictional Boundaries

Requirements	Size of Contiguous Fill Source	Minimum Lateral Sample Distribution	Minimum Vertical Sample Distribution
(1) Additional lateral sample locations may be required to address identified RECs (2) Additional samples must be collected from fill material that exhibits signs of potential contamination (*e.g.*, strong odor, staining, presence of sheen or free product, stressed vegetation in the vicinity, elevated response from photo-ionization detector) (3) Fill source area cannot be located on parcel(s) with historic industrial or unacceptable commercial land uses or parcel(s) associated with regulated environmental cleanup sites unless approved by regulatory oversight agency; (4) Samples that are collected, but not planned for analysis must be submitted with the samples planned for analysis under chain of custody to an appropriately certified analytical laboratory. The samples that are not planned for analysis must remain on hold with the laboratory until ACDEH has issued a determination regarding the suitability of fill material for import and released the un-analyzed samples for disposal; (5) When contaminants associated with surface deposition (e.g. pesticides, asbestos, and lead) are required to be evaluated, ACDEH requires the following additional samples be collected from each sample location: One sample from 0 to 6 inches bgs; One sample from 6 inches to 2 feet bgs; and One sample from 2 feet to 3 feet bgs. One of these samples must be selected for analysis for each sample location; (6) If groundwater is encountered, ACDEH requires the following additional samples be collected and analyzed: One sample per Sample Location from immediately above the saturated fill material (i.e., the capillary fringe); One groundwater samples must be collected and analyzed for each boring, excavation, or dewatering well in which groundwater is encountered. (7) If dewatering will be conducted to support excavation below an existing water table, ACDEH requires that, historically saturated fill material be samples after dewatering is in effect. (8) Composite sampling may or may not be appropriate, depending on the quality and homogeneity of the fill material and compounds of concern.	≤2.0 acres	**8** sample locations. **AND** Sample Locations must be distributed throughout the fill material source area.	**1** sample collected and analyzed per sample location. **AND** **1** sample collected and analyzed for every 5 feet bgs. **AND** **1** sample collected from each layer exhibiting different geological characteristics or lithology encountered.
	≥2.0 acres <4.0 acres	**1** sample location per 0.25 acre. **AND** Sample Locations must be distributed throughout the fill material source area.	**1** sample collected and analyzed per sample location. **AND** **1** sample collected and analyzed for every 5 feet bgs. **AND** **1** sample collected from each layer exhibiting different geological characteristics or lithology encountered.
	≥4 acres <10.0 acres	**16** sample locations. **AND** Sample Locations must be distributed throughout the fill material source area.	**1** sample collected and analyzed per sample location. **AND** **1** sample collected and analyzed for every 5 feet bgs. **AND** **1** sample collected from each layer exhibiting different geological characteristics or lithology encountered.
	≥10.0 acres	**16** sample locations. **AND** Sample Locations must be distributed throughout the fill material source area.	**4** sample collected and analyzed per sample location. **AND** **1** sample collected and analyzed for every 5 feet bgs. **AND** **1** sample collected from each layer exhibiting different geological characteristics or lithology encountered.

Table 3

Minimum Required Sample Density and Spacing for Stockpile (Post-Excavation) Characterization of Proposed Fill Material Sources for Receiving Facilities

<table>
<tr><th>Requirements</th><th>Size of Fill Source</th><th>Minimum Number of Fill Material Samples to be Collected</th></tr>
<tr><td rowspan="3">(1) Top Soil (0 to 6 inches bgs) and near surface soil (6 inches to 3 feet bgs) must be stockpiled separately if sampling for contaminants associated with surface deposition (e.g. pesticides, asbestos, and lead) (0-6 inches below ground surface) is required;
(2) 4-point composite samples may be used in lieu of discrete samples for analysis other than VOCs and SVOCs, however, the total number of samples must be preserved;
(3) VOC and SVOC samples are to be collected from fill material at least 1 foot into the stockpile;</td><td>$\leq$1,000 yd^3</td><td>1 sample collected and analyzed per 250 cubic yards of stockpiled fill material.</td></tr>
<tr><td>>1,000 yd^3 & <5,000 yd^3</td><td>4 samples collected and analyzed for first 1,000 cubic yards
<u>AND</u>
1 sample for each additional 500 cubic yards.</td></tr>
<tr><td>$\geq$5,000 yd^3</td><td>12 samples collected and analyzed for first 5,000 cubic yards
<u>AND</u>
1 sample for each additional 1,000 cubic yards.</td></tr>
</table>

ATTACHMENT A

Proposed Fill Material Source Characterization Summary Form

Proposed Fill Material Source Characterization Summary Form

	Phase 1 ESA or PEA Conducted	Undeveloped	Agricultural	Residential	Acceptable Commercial (1)	Unacceptable Commercial (2)	Industrial	Existing Historic Fill	Regulated Environmental Cleanup Site (3)	Major Roadway / Freeway (3)	Mining Area or Rock Quarry (3)	Cell ID	Excavation Width (feet)	Excavation Length (feet)	Excavation Depth (feet)	Number of Soil Layers Identified	Stockpile ID	Stockpile Volume (yd^3)	Soil Pit	Quarry	Construction Site	Stockpile Yard	Recycling Facility	Soil	Aggregate (sand and/or gravel)	Crushed Asphalt	Crushed Concrete	Construction Debris	Unknown	Property within jurisdiction of Zone 7	Property within jurisdiction of ACWD	Property outside Zone 7 or ACWD jurisdiction	Permitted TSDF	California Title 22 Metals	Asbestos	pH	Pesticides	VOCs	SVOCs	PAHs	TPH	PCBs
Associated APN	Historic Land Use and identification of RECs (check all that apply)											In-situ [e.g. Unexcavated] Fill Source Information (if applicable)					Stockpiled Fill Source Information (if applicable)		Fill Source Classification (check all that apply)					Fill Type (check all that apply)					Fill Destination (check all that apply)					Minimum Required Sampling[4]/ Actual Number of samples collected								
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Are RECs, CRECs, or HRECs associated with any parcels? If so, what parcels, and what are the associated COCs?	
If Fill Source Area is a regulated environmental cleanup site, provide case identification information and regulatory oversight agency soil export requirements	

Notes:

(1)	Commercial activities that do not meet the Unacceptable Commercial criteria. Typically, Acceptable Commercial facilities are retail, restaurants or service providers (professional, legal, integrated technology, etc..).
(2)	Commercial activities that generate revenue through or that significantly involve manufacturing, repairing, restoring, or providing maintenance services or the transport, storage, and disposal of hazardous materials.
(3)	Land use at or within 500 feet of the parcel(s) containing the fill source
(4)	Does not include additional sampling that may be required by the regulatory oversight agency overseeing the environmental cleanup site where the fill source is located
*	Fill inappropriate or not proposed for off-site reuse at this time and must be disposed of at a permitted TSDF. Please consult with a permitted TSDF for sampling requirements for acceptance by the TSDR.
ACWD	Alameda County Water District
APN	Assessors Parcel Number
AR	As required by accepting permitted TSDR
CRECs	Controlled Recognized Environmental Condition as defined in ASTM E1527-13
HREC	Historic Recognized Environmental Condition as defined in ASTM E1527-13
REC	Recognized Environmental Condition as defined in ASTM E1527-13
TSDF	Treatment, Storage, or Disposal Facility, defined as a "Designated Facility" in Title 22, Section 66260.10 of the California Code of Regulations.
Zone 7	Zone 7 Water Agency

APPENDIX E2

NJDEP Guidance for Characterization of Concrete and Clean Material Certification for Recycling

The New Jersey Department of Environmental Protection
Solid and Hazardous Waste Management Program

Guidance for Characterization of Concrete and Clean Material Certification for Recycling

(Updated January 12, 2010)

I. Overview:

The New Jersey Department of Environmental Protection (Department or NJDEP) is requiring the characterization, preferably by in situ predemolition sampling, or post-demolition sampling, through the laboratory analysis of concrete, post-demolition concrete-processing fines and brick and block (referred to herein as concrete) at all New Jersey demolition and construction sites that have the Department's Site Remediation Program's and Licensed Site Remediation Professional Program's, (SRP) oversight when the concrete is designated for: 1) recycling pursuant to N.J.A.C. 7:26A *et seq*.; or, 2) beneficial use pursuant to N.J.A.C. 7:26-1.7(g), rather than disposal as solid waste. This characterization requirement applies to demolished buildings, concrete roadways and related structures such as, but not limited to, sidewalks and curbing. The Department is taking this step to ensure that the concrete entering the State's concrete recycling system is clean and will not contaminate otherwise clean sites. The Department is also outlining in the, "Guidance for Characterization of Concrete and Clean Material Certification for Recycling" (Guidance), how site owners can self-certify building materials as clean prior to demolition without sampling and analysis. See Section VI for information on clean building certification compliance procedures.

The Sampling and Analysis Protocol outlined below is for certain contaminants that the Department recognizes may be found in concrete from contaminated sites. Only uncontaminated concrete will normally qualify for unrestricted recycling, while some minimally contaminated concrete or concrete fines may qualify for beneficial uses but only with Department approval.

For example, asphalt-contaminated concrete or concrete mixed with soils may meet beneficial use requirements for certain conditional uses at roadways. No sampling of the concrete from a site is required under this guidance if the property owner chooses to dispose of all of the material as solid waste. Note that Department approval pursuant to N.J.A.C. 7:26-1.7(g)8 is required for the beneficial use of materials out of state, which may require sampling and analysis of the material to meet the receiving State's requirements.

II. Concrete Materials Characterization:

Through either in situ, which is the preferred approach, or post demolition sampling the site owner is responsible for characterizing the concrete in the structures the owner is demolishing. In situ sampling and analysis is sampling prior to demolition at targeted areas of the structure, which are known and suspected areas of contamination, in order to determine contamination levels. More detailed information concerning in situ sampling requirements is described in Section V below.

Alternatively, the owner may elect to conduct post-demolition sampling and analysis of the concrete from a structure or consolidation of concrete from roadway and related structures. The concrete material must be stockpiled on the property where it is generated if it is to be considered for either recycling or beneficial use. The material should be staged in Sampling Areas of segregated material based on any knowledge of contamination and sampled according to the Sampling and Analysis Protocol below in Section V. Otherwise the concrete must be managed as solid waste per the solid waste regulatory requirements at N.J.A.C. 7:26 *et seq*. All sampling must take place where the material is generated in accordance with the Department's Technical Requirements for Site Remediation at N.J.A.C. 7:26E, including the Field Sampling Procedures Manual.

III. <u>Criteria for Materials Disposition</u>:

The disposition of all concrete material from contaminated sites with the Department's **SRP's** oversight at contaminated sites shall be determined by characterization of the material using the results of sampling and analysis conducted according to this Guidance. The analytical results shall be compared to the Department's most recent Soil Remediation Standards (SRS) at N.J.A.C. 7:26D, which are publicly available at the following website: http://www.nj.gov/dep/srp/regs/rs/ .

Note that the Impact to Groundwater Soil Remediation Standards are not applicable to the materials addressed in this guidance.

Data averaging is not permitted in order to achieve compliance with the standards.

For material that is intended to be used on the site of generation sampling and management of material must be conducted in compliance with the requirements of the Department's case manager.

Concrete materials containing contamination entirely <u>below</u> the Department's Residential Direct Contact Soil Remediation Standards (RDCSRS) shall be considered eligible for transfer: 1) to a Class B Recycling Center holding a General or Limited Approval for recycling, 2) for recycling per the recycling site approval exemption requirements at N.J.A.C. 7:26A-1.4(a)2, 7, or 20, or 3) for direct unrestricted use on or off site in compliance with all other requirements. Compliance with any Federal, State, and local requirements is still required for all uses of concrete materials.

Materials containing any contaminant <u>above</u> the Department's RDCSRS are considered solid wastes and must be managed in accordance with all statutory and Department regulatory requirements including, but not limited to, the full requirements for solid waste pursuant to the Solid Waste Regulations at N.J.A.C. 7:26 *et seq*. including classification as hazardous waste as necessary, or at specific Class B recycling centers authorized to accept the material, or beneficial use in accordance with Department requirements. Department guidance for conducting Beneficial Use Projects and a project application form are available at http://www.state.nj.us/dep/dshw/rrtp/bud.htm . These contaminated materials do <u>not</u> qualify for the following: 1) recycling at the State's Class B, or other, Recycling Centers holding a General Approval or at Class B Limited Recycling Centers approved in accordance with the requirements at N.J.A.C. 7:26A-3.7 unless the facilities are specifically authorized to accept the material; 2) recycling at sites operating per the recycling approval exemption requirements at N.J.A.C. 7:26A-1.4(a)2, 7, or 20; and, 3) for direct reuse or recycling on or off of the site of generation without Department approval.

IV. Separation of Distinct Demolition Areas and Materials:

The sampling and analysis protocol specified in this document in Section V is based on defining distinct areas of the structure for initial in situ sampling or demolition based on known and suspected areas of contamination within or on a structure, roadway or pad or any other "area of concern". Demolition shall be planned to prevent the mixing of areas of demolition that are contaminated with uncontaminated areas in the form of a demolition workplan. The site owner is obligated to develop and implement a plan to segregate contaminated materials from uncontaminated materials. Demolition practices should separate out materials that may be contaminated prior to and/or concurrent with demolition, for proper manifesting and/or disposal as solid waste.

V. Sampling and Analysis:

1. **What Demolition Materials to Sample:** Source Separated Concrete, Block, Brick and Concrete Fines (processed concrete fines or concrete mixed with soil, sand, stone, etc.) at all New Jersey demolition and construction sites that have the Department's Site Remediation Program's oversight at a contaminated site.

2. **How to Sample**:
   a. **Biased Sampling**: All sampling, including in situ sampling, shall be biased toward visible staining or other indication of potential contamination: such as the source of the material, coloration or odor.

   b. **Sampling Methods:** the Department is specifying approved sampling methods as either chip or core samples. Core samples shall be no deeper than 1 inch unless staining or discoloration indicates that contamination is below that depth. Sampling logs shall record the depth of core samples. This would further support the Self Certification Process discussed below. Confirmatory sampling is required of material intended for recycling if suspected contaminated sections of material are removed.

   c. **Sampling Areas**: Sampling areas shall be determined based on each distinct area of demolition such as separate properties, separate structures on the same property, known or suspected areas of contamination within a structure or roadway, or designated Areas of Concern (AOC). The Department case manager may be consulted as an option for advice, or a determination, of which structures to sample.

   Sampling Frequency: In situ sampling frequency is dependent on the number of areas of biased sampling and whether contamination is found at sampling locations. Material used for samples shall not exceed 1 (one) inch maximum in depth. If additional material is needed for a sample additional sample(s) should be colocated at the sampling point. In situ samples shall always be discrete samples and not composited.

Each post-demolition Sampling Area, such as accumulated concrete material in individual staged stockpiles, shall be sampled at the following rate. Material used for individual samples shall not exceed 1 (one) inch maximum in size, and depth. If additional material is needed for a sample additional sample(s) should be colocated at the sampling point.

(Each composite sample must include 1 sample for each 20 yds^3.)

Quantity		Number of Composite Samples
Less than 400 yds^3	-	1/100 total yds^3
400 yds^3 – 2000 yds^3	-	1/200 total yds^3 + 2
Over 2000 yds^3	-	1/500 total yds^3 + 8

(Ex. 1: 310 total yds^3 project requires: (310/100) = 4 samples.)
(Ex. 2: 735 total yds^3 project requires: (735/200) + 2 = 6 samples.)
(Ex. 3: 1,750 total yds^3 project requires: (1750/200) + 2 = 11 samples.)
(Ex. 4: 5,000 total yds^3 project requires: (5000/500) + 8 = 18 samples.)

(Note: for any amount over a volume increment round up to the next highest number of samples as in ex. 1 and 2.)

3. What Contaminants to Analyze: (Analysis Profile)

All sampling and sample analyses shall be conducted in accordance with the criteria and methods specified in the Technical Requirements for Site Remediation at N.J.A.C. 7:26E *et seq*. The Department sanctions composite sampling for the purposes of post-demolition materials characterized for management per this Guidance. In situ samples shall always be discrete samples and not composited.

For all sites:

a. **PCBs & PAHs**: **:**

Sample and analyze in all concrete and concrete fine materials. If the recycled concrete is going to be used as road base, the requirement to analyze for PAHs may be eliminated by the site case manager.

Based on site-specific factors, or as directed by the SRP Manager:

b. **TCLP, TAL/TCL+30, TPH:**

If known or suspected at industrial, mining or other sites, or as directed by the Department's Case Manager for the site, analyze for VOCs, SVOCs, TCLP Pesticides, Herbicides; TAL/TCL+30, TPH, and as required on a case-specific basis RCRA TCLP including TCLP metals.

c. **Dioxins/Furans**:

If known or suspected at industrial, mining or other sites, or as directed by the site Case Manager for the site, use USEPA Method 1613B, 1ppt detection limit, 17-congener profile, or the latest Department-approved method. Consult the Department for a case-specific determination for use of materials containing elevated levels of dioxins/furans above a screening level of 50 parts per trillion (ppt) total 17-congener Toxicity Equivalents (TEQ) off site.

d. **Radionuclides as** Naturally Occurring Radioactive Material (NORM): If known or suspected at industrial, mining or other sites, or as directed by the Department's Case Manager for the site, analyze by gamma spectroscopy for the natural series of radionuclides. The representative samples should be dried, sealed and counted after 21 days. The minimum detectable concentration requirement for Ra-226 and Th-232 daughter nuclides should be 0.5 picoCuries per gram (pCi/g) on dried material. Provide laboratory documentation of analysis and methodology. The laboratories must be certified by the Department's Office of Quality Assurance (OQA) for radionuclides in soil analysis DOE 4.5.2.3. Contact Mr. Vas Komanduri of OQA at (609)984-0855 for a current list of certified laboratories.

   The following industries are recognized by the Department's Bureau of Environmental Radiation as having the potential to have technologically enhanced Naturally Occurring Radioactive Material (NORM) contamination potential: Paper and pulp facilities; Ceramics manufacturing; Paint and pigment manufacturing; Metal foundry facilities; Optical glass; Fertilizer plants; Aircraft manufacture; Munitions and armament manufacture; Scrap metal recycling; Zirconium manufacturing; Oil and gas production, refining, and storage; Electricity generation; Cement and concrete product manufacture; Radiopharmaceutical manufacturing; Geothermal energy production.

   If material is from a radioactive materials licensee or a former licensee, or is a radioactively contaminated site, contact the Bureau of Environmental Radiation case manager for assistance.

VI. Clean Building Self Certification Compliance:

This section discusses the procedures for the owner of a structure self certifying that the structure is clean. The Department will allow the owner of a site that is a demolition and construction site with the **SRP**'s oversight that is required to comply with this Guidance, to self certify the site, or a portion or portions of the site's structures, as clean either based on the results of in situ or post-demolition sampling and analysis prior to concrete material disposition per this guidance document or by reviewing the historical uses and construction features of the site. Note that each individual building or structure at the site from which concrete will be generated for recycling or use as outlined above must undergo either sampling and analysis per the guidance in sections I through V of the "Guidance for Characterization of Concrete and Clean Material Certification for Recycling," or one of the two self-certification procedures described in this section.

The person completing the certification must be a principal executive officer, general partner or proprietor of the company or a high level official of a government-owned site. The site owner has the option of providing a delegation of authority, which assigns responsibility for signing the Certification Statement from the officer or high ranking official to the local site manager, to the Department with the Certification Statement.

1. **Self Certification with Sampling/Analysis**:

   The self Certification process with sampling specifies that all of the concrete and concrete materials contain contamination of PCBs and PAHs, and other contaminants based on site-specific factors or as directed by the SRP's Case Manager, below the Department's Soil Remediation Standards. The site owner shall base the self Certification on analytical data from the testing of the concrete in accordance with this Guidance and certify that the concrete was fully characterized and also managed according to the requirements of this Guidance. The owner of the site is responsible for compliance with this Guidance, maintaining all documentation related to the demolition and material characterization process including demolition and sampling plans, analytical testing documentation and material disposition after self Certification and filing self Certification documents with the Department.

   The owner of the property where the concrete sampling was conducted shall complete the Certification in Addendum 2 of this Guidance, which the owner shall have notarized and retain with the characterization documentation on site for a minimum of five years. The owner of the property is responsible for submitting a copy of the executed Certification to the SRP Case Manager for the site.

2. **Self Certification without Sampling/Analysis using the "Clean Building Checklist":**

   The self Certification process without sampling specifies that all of the concrete and concrete materials contain contamination of PCBs and PAHs, and other contaminants based on site specific factors or as directed by the SRP's Case Manager, below the Department's Soil Remediation Standards based on an assessment of the historical uses of the site and building construction materials. The site owner shall base the self Certification on the results of the "Clean Building Checklist" in accordance with this Guidance and certify that the concrete is clean based on the assessment of the building and also managed according to the requirements of this Guidance. The owner of the site is responsible for compliance with this Guidance, maintaining all documentation related to the demolition and assessment process including demolition and sampling plans, analytical testing documentation and material disposition after self certification and filing self Certification documents with the Department.

   The owner of the property for which the, "Clean Building Checklist for Recycling" was used to assess the status of material contamination in the building shall complete the Certification in Addendum 2 of this Guidance, noting that the "Clean Building Checklist" was used to determine the building's concrete and related materials are clean. The owner shall have the Certification notarized and retain with the other related facility documentation. The owner of the property is responsible for submitting a copy of the executed Certification to the SRP Case Manager for the site.

ADDENDUM 1
The New Jersey Department of Environmental Protection
Solid and Hazardous Waste Management Program
CLEAN BUILDING CHECKLIST for RECYCLING

Activity	Yes	No	* If "Yes", Include Detailed Comments
1. Was the building constructed or concrete poured in the year 2000 or later?			
2. Was the building constructed or the concrete poured between 1990 and 1999?			
3. The following questions apply to the current and historic use of the building (including prior owners and operators):			
a. Did the building contain liquid filled transformers?			
b. Did the building contain liquid filled PCB equipment?			
c. Did the building contain oil filled equipment?			
d. Did the building contain chemicals?			
e. Did the building contain heat transfer equipment?			
f. Was the building utilized for an industrial process where chemicals may have been manufactured or used?			
4. Does the building have doorways that are caulked?			
5. Does the building have windows that are caulked?			
6. Does the building have exterior panels with joints that are caulked?			
7. Does the building have floor concrete expansion joints that are caulked?			
8. Are there any sumps, floor drains or pits in a chemical room or process area (include current and historic operations)?			
9. Did the building have chemical waste collection areas (current and historic operations)?			
10. Did the building have storage areas for raw materials or finished products that contained liquids (include current and historic operations)?			

(March 2007)

Sampling and Analysis Summary: (Detailed direction for sampling and analysis is described in the Guidance.)

- No sampling or analysis is required for any buildings or concrete poured 2000 or later
- Buildings constructed between 1990 and 1999; sampling is only required in areas with an affirmative response as required in the, "Clean Building Checklist for Recycling"
- Buildings containing caulking, expansion joints and constructed between 1990 and 1999, sampling for PCBs is required
- Nonbuilding structures (i.e., sidewalks, curbs, driveways, etc.) constructed between 1990 and 1999, analysis of PCBs & PAHs is required

* Include or attach appropriate documentation to support claims.

<u>ADDENDUM 1 (cont.)</u>

<u>CLEAN BUILDING CHECKLIST for RECYCLING - INSTRUCTIONS</u>

<u>Clean Building Checklist Determination</u>:
To certify that a nonindustrial use building (i.e., cafeterias, offices hotels, etc.) or structure (i.e., sidewalks, etc.) are free of contamination (a.k.a., clean) because of the building's historical uses and operations, the owner of the facility should, at a minimum, conduct the following:

For nonindustrial use buildings or structures constructed in the year 1990 or later, complete the Department's "Clean Building Checklist", a series of questions related to the historical use(s) of such structures and buildings, the age, etc. If, after completing the checklist, the owner determines that no evidence of industrial use has occurred, the building or structure is considered clean and no sampling will be required. If the building or structure can not be documented as clean, then targeted sampling is required using the protocol below. Follow the Certification process in the Guidance.

<u>Building Self Certification Process Summary</u>:
For nonindustrial use buildings and structures constructed prior to 1990 or if the completion of the "Clean Building Checklist" revealed possible industrial uses, targeted sampling shall be performed of the caulking from windows, doorways, expansion joints in floors and external panels, spacers from other structures, transformers and electrical supply areas and other known or suspected contaminated building components;

<u>Targeted sampling shall be completed as follows</u>: the caulking from one outer doorway will be sampled for PCBs and PAHs. If it can be documented that all the doorways were installed at the same time and no physical alterations were made since installation, then the one sample shall be representative. Otherwise, samples will be taken from multiple outer doorways and composited into one sample. At a minimum, at least one 5-sample composite from different doorways shall be analyzed from each building's doorway caulking for PCBs. The same sampling protocol shall be followed for windows, expansion joints in floors and external panels, spacers from other structures, transformers and electrical supply areas or other known or suspected contaminated building components;

A copy of the results shall be retained for five years and shall be certified by the site operations manager or the ranking corporate officer at the site according to the procedure in the Department's "Guidance for Characterization of Concrete and Clean Material Certification for Recycling" available at:
http://www.state.nj.us/dep/dshw/resource/techman.htm#concrete .

<u>Note</u>: that this is the recommended Guidance at this time only for determining that concrete and related materials are suitable for recycling in the State's recycling system.

<u>**ADDENDUM 2:**</u>

The New Jersey Department of Environmental Protection
Solid and Hazardous Waste Management Program

<u>CERTIFICATION STATEMENT FOR CONCRETE DESIGNATED FOR RECYCLING</u>

"I certify under penalty of law that I have personally examined and am familiar with the information related to this material characterization documentation concerning the self Certification of the site named herein and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, complete and meets the requirements of the latest, **"Guidance for Characterization of Concrete and Clean Material Certification for Recycling"** issued by the New Jersey Department of Environmental Protection that all of the concrete and concrete materials contain contamination of PCBs and PAHs, and other contaminants as directed by the SRP Case Manager, below the Department's Soil Remediation Standards. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment. I understand that, in addition to criminal penalties, I may be liable for a civil administrative penalty pursuant to N.J.A.C. 7:26-5 and that submitting false information may be grounds for denial, revocation or termination of any solid waste facility permit, vehicle registration or other Department authorization for which I may be seeking approval or now hold."

<u>Note below whether Sampling was conducted and/or the "Clean Building Checklist" was completed:</u>

<u>**Sampling Conducted: ___________Complete "Clean Building Checklist:___________**</u>

NAME OF SITE

____

ADDRESS

____

CITY, STATE & ZIP CODE

____

NAME OF CERTIFYING PERSON (must be a corporate officer) **TITLE**

____

SIGNATURE OF CERTIFYING PERSON (must be a corporate officer) **DATE**

____

TELEPHONE **FAX**

____

INTERNET WEBSITE ADDRESS **EMAIL**

____

IMPORTANT

Pursuant to N.J.S.A. 47:lA-1 et seq. the information provided in this form and its attachments shall be available to the public for review unless a specific claim of confidentiality is submitted pursuant to the procedures set forth in N.J.A.C. 7:26-17 et seq. and is approved by the Department. For assistance regarding confidentiality claims, please contact the Solid and Hazardous Waste Management Program at (609) 984-6985.

SIGNATURES. IN WITNESS WHEREOF, Owner has executed this Certification of Concrete Sampling as of the date first written above.

[If Owner is an individual]

WITNESS:

___________________________	___________________________
[Signature]	[Print name below signature]

[If Owner is a corporation]

ATTEST:	[Name of corporation]
___________________________	By________________________
___________________________	___________________________
[Print name and title]	[Signature]

[If Owner is a general or limited partnership]

WITNESS:	[Name of partnership]
___________________________	
___________________________	By_________________________, General
[Signature]	[Print name] Partner

[If Owner is an individual]

STATE OF [State where document is executed] SS.:
COUNTY OF [County where document is executed]

I certify that on ________, 20__, [Name of Owner] personally came before me, and this person acknowledged under oath, to my satisfaction, that this person [or if more than one person, each person]

(a) is named in and personally signed this document; and

(b) signed, sealed and delivered this document as his or her act and deed.

____

______________________________, Notary Public
[Print Name and Title]

[If Owner is a corporation]

STATE OF [State where document is executed] SS.:
COUNTY OF [County where document is executed]

I certify that on ________, 20__, [Name of person executing document on behalf of Owner] personally came before me, and this person acknowledged under oath, to my satisfaction, that:

(a) this person is the [secretary/assistant secretary] of [Owner], the corporation named in this document;

(b) this person is the attesting witness to the signing of this document by the proper corporate officer who is the [president/vice president] of the corporation;

(c) this document was signed and delivered by the corporation as its voluntary act and was duly authorized;

(d) this person knows the proper seal of the corporation which was affixed to this document; and

(e) this person signed this proof to attest to the truth of these facts.

____

[Signature]

____
[Print name and title of attesting witness]

Signed and sworn before me on ________, 20__

__________________________________, Notary Public

____
[Print name and title]

[If Owner is a partnership]

STATE OF [State where document is executed]   SS.:
COUNTY OF [County where document is executed]

I certify that on ________, 20__, [Name of person executing document on behalf of Owner] personally came before me, and this person acknowledged under oath, to my satisfaction, that this person:

(a) is a general partner of [Owner], the partnership named in this document;

(b) signed, sealed and delivered this document as his or her act and deed in his capacity as a general partner of [owner]; and

(c) this document was signed and delivered by such partnership as its voluntary act, duly authorized.

____
[Signature]

_____________________, General Partner
[Print Name]

__________________________________, Notary Public

____
[Print name and title]

APPENDIX F

Vapor Barrier Specifications

Land Science®
a division of REGENESIS®

Geo-Seal® Vapor Intrusion Barrier
02 56 19.13
Fluid-Applied Gas Barrier
Version 1.30

Note: If membrane will be subjected to hydrostatic pressure, please contact Land Science Technologies™ for proper recommendations.

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the contract, including general and supplementary conditions and Division 1 specification sections, apply to this section.

1.2 SUMMARY

A. This section includes the following:

1. Substrate preparation:
2. Vapor intrusion barrier components:
3. Seam sealer and accessories.

B. Related Sections: The following sections contain requirements that relate to this section:

1. Division 2 Section “Earthwork”, “Pipe Materials”, “Sub-drainage Systems”, “Gas Collection Systems”:
2. Division 3 Section “Cast-in-Place Concrete” for concrete placement, curing, and finishing:
3. Division 5 Section “Expansion Joint Cover Assemblies”, for expansion-joint covers assemblies and installation.

1.3 PERFORMANCE REQUIREMENTS

A. General: Provide a vapor intrusion barrier system that prevents the passage of methane gas and/or volatile organic compound vapors and complies with physical requirements as demonstrated by testing performed by an independent testing agency of manufacturer’s current vapor intrusion barrier formulations and system design.

1.4 SUBMITTALS

A. Submit product data for each type of vapor intrusion barrier, including manufacturer’s printed instructions for evaluating and preparing the substrate, technical data, and tested physical and performance properties.

B. Project Data - Submit shop drawings showing extent of vapor intrusion barrier, including details for overlaps, flashing, penetrations, and other termination conditions.

C. Samples – Submit representative samples of the following for approval:

1. Vapor intrusion barrier components.

D. Certified Installer Certificates – Submit certificates signed by manufacturer certifying that installers comply with requirements under the “Quality Assurance” article.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Engage an experienced installer who has been trained and certified in writing by the membrane manufacturer, Land Science Technologies™ for the installation of the Geo-Seal® System.

B. Manufacturer Qualification: Obtain vapor intrusion barrier materials and system components from a single manufacturer source Land Science Technologies.

C. Field Sample: Apply vapor intrusion barrier system field sample to 100 ft^2 (9.3 m^2) of field area demonstrate application, detailing, thickness, texture, and standard of workmanship.

1. Notify engineer or special inspector one week in advance of the dates and times when field sample will be prepared.

2. If engineer or special inspector determines that field sample, does not meet requirements, reapply field sample until field sample is approved.

3. Retain and maintain approved field sample during construction in an undisturbed condition as a standard for judging the completed methane and vapor intrusion barrier. An undamaged field sample may become part of the completed work.

D. Pre-installation Conference: A pre-installation conference shall be held prior to application of the vapor intrusion barrier system to assure proper site and installation conditions, to include contractor, applicator, architect/engineer, other trades influenced by vapor intrusion barrier installation and special inspector (if any).

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to project site as specified by manufacturer labeled with manufacturer's name, product brand name and type, date of manufacture, shelf life, and directions for storing and mixing with other components.

B. Store materials as specified by the manufacturer in a clean, dry, protected location and within the temperature range required by manufacturer. Protect stored materials from direct sunlight. If freezing temperatures are expected, necessary steps should be taken to prevent the freezing of the Geo-Seal CORE and Geo-Seal CORE Detail components.

C. Remove and replace material that cannot be applied within its stated shelf life.

1.7 PROJECT CONDITIONS

A. Protect all adjacent areas not to be installed on. Where necessary, apply masking to prevent staining of surfaces to remain exposed wherever membrane abuts to other finish surfaces.

B. Perform work only when existing and forecasted weather conditions are within manufacturer's recommendations for the material and application method used.

C. Minimum clearance of 24 inches is required for application of product. For areas with less than 24-inch clearance, the membrane may be applied by hand using Geo-Seal CORE Detail.

D. Ambient temperature shall be within manufacturer's specifications. (Greater than +45ºF/+7ºC.) Consult manufacturer for the proper requirements when desiring to apply Geo-Seal CORE below 45ºF/7ºC.

E. All plumbing, electrical, mechanical and structural items to be under or passing through the vapor intrusion barrier system shall be positively secured in their proper positions and appropriately protected prior to membrane application.

F. Vapor intrusion barrier shall be installed before placement of fill material and reinforcing steel. When not possible, all exposed reinforcing steel shall be masked by general contractor prior to membrane application.

G. Stakes used to secure the concrete forms **shall not penetrate** the vapor intrusion barrier system after it has been installed. If stakes need to puncture the vapor intrusion barrier system after it has been installed, the necessary repairs need to be made by a certified Geo-Seal applicator. To confirm the staking procedure is in agreement with the manufactures recommendation, contact Land Science Technologies.

1.8 WARRANTY

A. General Warranty: The special warranty specified in this article shall not deprive the owner of other rights the owner may have under other provisions of the contract documents, and shall be in addition to, and run concurrent with, other warranties made by the contractor under requirements of the contract documents.

B. Special Warranty: Submit a written warranty signed by vapor intrusion barrier manufacturer agreeing to repair or replace vapor intrusion barrier that does not meet requirements or that does not remain methane gas and/or volatile organic compound vapor tight within the specified warranty period. Warranty does not include failure of vapor intrusion barrier due to failure of substrate prepared and treated according to requirements or formation of new joints and cracks in the attached to structures that exceed 1/16 inch (1.58 mm) in width.

   1. Warranty Period: 1 year after date of substantial completion. Longer warranty periods are available upon request to the manufacturer.

C. Labor and material warranties are available upon request to the manufacturer.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

A. Geo-Seal; Land Science Technologies™, San Clemente, CA. (949) 481-8118

   1. Geo-Seal BASE sheet layer
   2. Geo-Seal CORE spray layer and Geo-Seal CORE Detail
   3. Geo-Seal BOND protection layer

2.2 VAPOR INTRUSION BARRIER SPRAY MATERIALS

A. Fluid applied vapor intrusion barrier system – Geo-Seal CORE; a single course, high build, polymer modified, asphalt emulsion. Waterborne and spray applied at ambient temperatures. A nominal thickness of 60 dry mils, unless specified otherwise. Non-toxic and odorless. Geo-Seal CORE Detail has similar properties with greater viscosity and is roller or brush applied. Manufactured by Land Science Technologies.

B. Fluid applied vapor intrusion barrier physical properties.

Geo-Seal CORE – TYPICAL CURED PROPERTIES

Properties	Test Method	Results
Tensile Strength - CORE only	ASTM 412	32 psi
Tensile Strength - Geo-Seal System	ASTM 412	662 psi
Elongation	ASTM 412	4140%
Resistance to Decay	ASTM E 154 Section 13	4% Perm Loss
Accelerated Aging	ASTM G 23	No Effect
Moisture Vapor Transmission	ASTM E 96	.026 g/ft^2/hr
Hydrostatic Water Pressure	ASTM D 751	26 psi
Perm rating	ASTM E 96 (US Perms)	0.21
Methane transmission rate	ASTM D 1434	Passed
Adhesion to Concrete & Masonry	ASTM C 836 & ASTM C 704	11 lbf./inch
Hardness	ASTM C 836	80
Crack Bridging	ASTM C 836	No Cracking
Heat Aging	ASTM D 4068	Passed
Environmental Stress Cracking	ASTM D 1693	Passed
Oil Resistance	ASTM D543	Passed
Soil Burial	ASTM D 4068	Passed
Low Temp. Flexibility	ASTM C 836-00	No Cracking at –20°C
Resistance to Acids:		
Acetic		30%
Sulfuric and Hydrochloric		13%
Temperature Effect:		
Stable		248°F
Flexible		13°F

Geo-Seal CORE Detail – TYPICAL CURED PROPERTIES

Properties	Test Method	Results
Tensile Strength	ASTM 412	32 psi
Elongation	ASTM 412	3860%
Resistance to Decay	ASTM E 154 Section 13	9% Perm Loss
Accelerated Aging	ASTM G 23	No Effect
Moisture Vapor Transmission	ASTM E 96	.026 g/ft^2/hr
Hydrostatic Water Pressure	ASTM D 751	28 psi
Perm rating (US Perms)	ASTM E 96	0.17
Methane transmission rate	ASTM D 1434	Passed
Adhesion to Concrete & Masonry	ASTM C 836	7 lbf./inch
Hardness	ASTM C 836	85
Crack Bridging	ASTM C 836	No Cracking
Low Temp. Flexibility	ASTM C 836-00	No Cracking at –20ºC
Resistance to Acids:		
Acetic		30%
Sulfuric and Hydrochloric		13%
Temperature Effect:		
Stable		248°F
Flexible		13°F

2.3 VAPOR INTRUSION BARRIER SHEET MATERIALS

A. The Geo-Seal BASE layer and Geo-Seal BOND layer are chemically resistant sheets comprised of a 5 mil high density polyethylene sheet thermally bonded to a 3 ounce non woven geotextile.

B. Sheet Course Usage

1. As foundation base layer, use Geo-Seal BASE course and/or other base sheet as required or approved by the manufacturer.

2. As top protective layer, use Geo-Seal BOND layer and/or other protection as required or approved by the manufacturer.

C. Geo-Seal BOND and Geo-Seal BASE physical properties.

Properties	Test Method	Results
Film Thickness		5 mil
Composite Thickness		18 mil
Water Vapor Permeability	ASTM E 96	0.214
Adhesion to Concrete	ASTM D 1970	9.2 $lbs/inch^2$
Dart Impact	ASTM D 1790	>1070 gms, method A
		594 gms, method B
Puncture Properties Tear	ASTM B 2582 MD	11,290 gms
	ASTM B 2582 TD	13,150 gms

2.4 AXILLARY MATERIALS

A. Sheet Flashing: 60-mil reinforced modified asphalt sheet good with double-sided adhesive.

B. Reinforcing Strip: Manufacturer's recommended polypropylene and polyester fabric.

C. Gas Venting Materials: Geo-Seal Vapor-Vent HD or Geo-Seal Vapor-Vent Poly, and associated fittings.

D. Seam Detailing Sealant Mastic: Geo-Seal CORE Detail, a high or medium viscosity polymer modified water based asphalt material.

1. Back Rod: Closed-cell polyethylene foam.

PART 3 – EXECUTION

3.1 AUXILIARY MATERIALS

A. Examine substrates, areas, and conditions under which vapor intrusion barrier will be applied, with installer present, for compliance with requirements. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 SUBGRADE SURFACE PREPARATION

A. Verify substrate is prepared according to manufacturer's recommendations. On a horizontal surface, the substrate should be free from material that can potentially puncture the vapor intrusion barrier. Additional protection or cushion layers might be required if the earth or gravel substrate contains too many jagged points and edges that could puncture one or more of the system components. Contact manufacturer to confirm substrate is within manufactures recommendations.

B. Geo-Seal can accommodate a wide range of substrates, including but not limited to compacted earth, sand, aggregate, and mudslabs.

1. Compacted Earth: Remove pieces of debris, gravel and/or any other material that can potentially puncture the Geo-Seal BASE. Remove any debris from substrate that can potentially puncture the Geo-Seal system prior to application.

2. Sand: A sand subgrade requires no additional preparation, provided any material that can potentially puncture the Geo-Seal BASE layer is not present.

3. Aggregate: Contact the manufacturer to ensure the aggregate layer will not be detrimental to the membrane. **The gravel layer must be compacted and rolled flat.** Ideally a ¾" minus gravel layer with rounded edges should be specified; however the Geo-Seal system can accommodate a wide variety of different substrates. Contact Land Science Technologies if there are questions regarding the compatibility of Geo-Seal and the utilized substrate. Exercise caution when specifying pea gravel under the membrane, if not compacted properly, pea gravel can become an unstable substrate.

4. Mudslabs: The use of a mubslab under the Geo-Seal system is acceptable, contact Land Science Technologies for job specific requirements.

C. Mask off adjoining surface not receiving the vapor intrusion barrier system to prevent the spillage or over spray affecting other construction.

D. Earth, sand or gravel subgrades should be prepared and compacted to local building code requirements.

3.3 CONCRETE SURFACE PREPARATION

A. Clean and prepare concrete surface to manufacturer's recommendations. In general, only apply the Geo-Seal CORE material to dry, clean and uniform substrates. Concrete surfaces must be a light trowel, light broom or equivalent finish. Remove fins, ridges and other projections and fill honeycomb, aggregate pockets, grout joints and tie holes, and other voids with hydraulic cement or rapid-set grout. It is the applicator's responsibility to point out unacceptable substrate conditions to the general contractor and ensure the proper repairs are made.

B. When applying the Geo-Seal CORE or Geo-Seal CORE Detail material to concrete it is important to not apply the product over standing water. Applying over standing water will result in the membrane not setting up properly on the substrate

C. Surfaces may need to be wiped down or cleaned prior to application. This includes, but is not limited to, the removal of forming oils, concrete curing agents, dirt accumulation, and other debris. Contact form release agent manufacturer or concrete curing agent manufacturer for VOC content and proper methods for removing the respective agent.

D. Applying the Geo-Seal CORE to "green" concrete is acceptable and can be advantageous in creating a superior bond to the concrete surface. To help reduce blistering, apply a primer coat of only the asphalt component of the Geo-Seal CORE system. Some blistering of the membrane will occur and may be more severe on walls exposed to direct sunlight. Blistering is normal and will subside over time. Using a needle nose depth gauge confirm that the specified mil thickness has been applied.

3.4 PREPARATIONS AND TREATMENT OF TERMINATIONS

A. Prepare the substrate surface in accordance with Section 3.3 of this document. Concrete surfaces that are not a light trowel, light broom or equivalent finish, will need to be repaired.

B. Terminations on horizontal and vertical surfaces should extend 6" onto the termination surface. Job specific conditions may prevent a 6" termination. In these conditions, contact manufacturer for recommendations.

C. Apply 30 mils of Geo-Seal CORE to the terminating surface and then embed the Geo-Seal BASE layer by pressing it firmly into the Geo-Seal CORE layer. Next, apply 60 mils of Geo-Seal CORE to the BASE layer. When complete, apply the Geo-Seal BOND layer. After the placement of the Geo-Seal BOND layer is complete, apply a final 30 mil seal of the Geo-Seal CORE layer over the edge of the termination. For further clarification, refer to the termination detail provided by manufacturer.

D. The stated termination process is appropriate for terminating the membrane onto exterior footings, pile caps, interior footings and grade beams. When terminating the membrane to stem walls or vertical surfaces the same process should be used.

3.5 PREPARATIONS AND TREATMENT OF PENETRATIONS

A. All pipe penetrations should be securely in place prior to the installation of the Geo-Seal system. Any loose penetrations should be secured prior to Geo-Seal application, as loose penetrations could potentially exert pressure on the membrane and damage the membrane after installation.

B. To properly seal around penetrations, cut a piece of the Geo-Seal BASE layer that will extend 6" beyond the outside perimeter of the penetration. Cut a hole in the Geo-Seal BASE layer just big enough to slide over the penetration, ensuring the Geo-Seal BASE layer fits snug against the penetration, this can be done by cutting an "X" no larger than the inside diameter of the penetration. There should not be a gap larger than a 1/8" between the Geo-Seal BASE layer and the penetration.   Other methods can also be utilized, provided, there is not a gap larger than 1/8" between the Geo-Seal BASE layer and the penetration.

C. Seal the Geo-Seal BASE layer using Geo-Seal CORE or Geo-Seal CORE Detail to the underlying Geo-Seal BASE layer.

D. Apply one coat of Geo-Seal CORE Detail or Geo-Seal CORE spray to the Geo-Seal BASE layer and around the penetration at a thickness of 30 mils. Penetrations should be treated in a 6-inch radius around penetration and 3 inches onto penetrating object.

E. Embed a fabric reinforcing strip after the first application of the Geo-Seal CORE spray or Geo-Seal CORE Detail material and then apply a second 30 mil coat over the embedded joint reinforcing strip ensuring its complete saturation of the embedded strip and tight seal around the penetration.

F. After the placement of the Geo-Seal BOND layer, a cable tie should then be placed around the finished penetration. The cable tie should be snug, but not overly tight so as to slice into the finished seal.

OPTION: A final application of Geo-Seal CORE may be used to provide a finishing seal after the Geo-Seal BOND layer has been installed.

NOTE: Metal or other slick penetration surfaces may require treatment in order to achieve proper adhesion. For plastic pipes, sand paper may be used to achieve a profile, an emery cloth is more appropriate for metal surfaces. An emery cloth should also be used to remove any rust on metal surfaces.

3.6 GEO-SEAL BASE LAYER INSTALLATION

A. Install the Geo-Seal BASE layer over substrate material in one direction with six-inch overlaps and the geotextile (fabric side) facing down.

B. Secure the Geo-Seal BASE seams by applying 60 mils of Geo-Seal CORE between the 6" overlapped sheets with the geotextile side down.

C. Visually verify there are no gaps/fish-mouths in seams.

D. For best results, install an equal amount of Geo-Seal BASE and Geo-Seal CORE in one day. Leaving unsprayed Geo-Seal BASE overnight might allow excess moisture to collect on the Geo-Seal BASE. If excess moisture collects, it needs to be removed.

NOTE: In windy conditions it might be necessary to encapsulate the seam by spraying the Geo-Seal CORE layer over the completed Geo-Seal BASE seam.

3.7 GEO-SEAL CORE APPLICATION

A. Set up spray equipment according to manufacturer's instructions.

B. Mix and prepare materials according to manufacturer's instructions.

C. The two catalyst nozzles (8001) should be adjusted to cross at about 18" from the end of the wand. This apex of catalyst and emulsion spray should then be less than 24" but greater than 12" from the desired surface when spraying. When properly sprayed the fan pattern of the catalyst should range between 65° and 80°.

D. Adjust the amount of catalyst used based on the ambient air temperature and surface temperature of the substrate receiving the membrane. In hot weather use less catalyst as hot conditions will quickly "break" the emulsion and facilitate the curing of the membrane. In cold conditions and on vertical surfaces use more catalyst to "break" the emulsion quicker to expedite curing and set up time in cold conditions.

E. To spray the Geo-Seal CORE layer, pull the trigger on the gun. A 42° fan pattern should form when properly sprayed. Apply one spray coat of Geo-Seal CORE to obtain a seamless membrane free from pinholes or shadows, with an average dry film thickness of 60 mils (1.52 mm).

F. Apply the Geo-Seal CORE layer in a spray pattern that is perpendicular to the application surface. The concern when spraying at an angle is that an area might be missed. Using a perpendicular spray pattern will limit voids and thin spots, and will also create a uniform and consistent membrane.

G. Verify film thickness of vapor intrusion barrier every 500 ft^2. (46.45 m^2), for information regarding Geo-Seal quality control measures, refer to the quality control procedures in Section 3.9 of this specification.

H. The membrane will generally cure in 24 to 48 hours. As a rule, when temperature decreases or humidity increases, the curing of the membrane will be prolonged. The membrane does not need to be fully cured prior the placement of the Geo-Seal BOND layer, provided mil thickness has been verified and a smoke test will be conducted.

I. **Do not penetrate** membrane after it has been installed. If membrane is penetrated after the membrane is installed, it is the responsibility of the general contractor to notify the certified installer to make repairs.

J. If applying to a vertical concrete wall, apply Geo-Seal CORE directly to concrete surface and use manufacturer's recommended protection material based on site specific conditions. If applying Geo-Seal against shoring, contact manufacturer for site specific installation instructions.

NOTE: Care should be taken to not trap moisture between the layers of the membrane. Trapping moisture may occur from applying a second coat prior to the membrane curing. Repairs and detailing may be done over the Geo-Seal CORE layer when not fully cured.

3.8 GEO-SEAL BOND PROTECTION COURSE INSTALLATION

A. Install Geo-Seal BOND protection course perpendicular to the direction of the Geo-Seal BASE course with overlapped seams over nominally cured membrane no later than recommended by manufacturer and before starting subsequent construction operations.

B. Sweep off any water that has collected on the surface of the Geo-Seal CORE layer, prior to the placement of the Geo-Seal BOND layer.

C. Overlap and seam the Geo-Seal BOND layer in the same manner as the Geo-Seal BASE layer.

D. To expedite the construction process, the Geo-Seal BOND layer can be placed over the Geo-Seal CORE immediately after the spray application is complete, provided the Geo-Seal CORE mil thickness has been verified.

3.9 QUALITY ASSURANCE

A. The Geo-Seal system must be installed by a trained and certified installer approved by Land Science Technologies.

B. For projects that will require a material or labor material warranty, Land Science Technologies will require a manufacturer's representative or certified 3rd party inspector to inspect and verify that the membrane has been installed per the manufacturer's recommendations.

The certified installer is responsible for contacting the inspector for inspection. Prior to application of the membrane, a notice period for inspection should be agreed upon between the applicator and inspector.

C. The measurement tools listed below will help verity the thickness of the Geo-Seal CORE layer. As measurement verification experience is gained, these tools will help confirm thickness measurements that can be obtained by pressing one's fingers into the Geo-Seal CORE membrane.

To verify the mil thickness of the Geo-Seal CORE, the following measurement devices are required.

1. Mil reading caliper: Calipers are used to measure the thickness of coupon samples. To measure coupon samples correctly, the thickness of the Geo-Seal sheet layers (18 mils each) must be taken into account. Mark sample area for repair.

2. Wet mil thickness gauge: A wet mil thickness gauge may be used to quickly measure the mil thickness of the Geo-Seal CORE layer. The thickness of the Geo-Seal sheet layers do not factor into the mil thickness reading.

   NOTE: When first using a wet mil thickness gauge on a project, collect coupon samples to verify the wet mil gauge thickness readings.

3. Needle nose digital depth gauge: A needle nose depth gauge should be used when measuring the Geo-Seal CORE thickness on vertical walls or in field measurements. Mark measurement area for repair.

To obtain a proper wet mil thickness reading, take into account the 5 to 10 percent shrinkage that will occur as the membrane fully cures. Not taking into account the thickness of the sheet layers, a freshly sprayed membrane should have a minimum wet thickness of 63 (5%) to 66 (10%) mils.

Methods on how to properly conduct Geo-Seal CORE thickness sampling can be obtained by reviewing literature prepared by Land Science Technologies.

D. It should be noted that taking too many destructive samples can be detrimental to the membrane. Areas where coupon samples have been removed need to be marked for repair.

E. Smoke Testing is highly recommended and is the ideal way to test the seal created around penetrations and terminations. Smoke Testing is conducted by pumping non-toxic smoke underneath the Geo-Seal vapor intrusion barrier and then repairing the areas where smoke appears. Refer to smoke testing protocol provided by Land Science Technologies. For projects that will require a material or labor material warranty, Land Science Technologies will require a smoke test.

F. Visual inspections prior to placement of concrete, but after the installation of concrete reinforcing, is recommended to identify any punctures that may have occurred during the installation of rebar, post tension cables, etc. Punctures in the Geo-Seal system should be easy to indentify due to the color contrasting layers of the system.

Vapor-Vent™
SOIL GAS COLLECTION SYSTEM
Version 1.5

SECTION 02 56 19 – GAS CONTROL

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Substrate preparation.
2. Vapor-Vent™ installation.
3. Vapor-Vent accessories.

B. Related Sections: The following Sections contain requirements that relate to this Section:

1. Division 2 Section “Earthwork”, “Pipe Materials”, “Sub-drainage systems”, ”Gas Control System”, “Fluid-Applied gas barrier”.
2. Division 3 Section “Cast-in-Place Concrete” for concrete placement, curing, and finishing.
3. Division 5 Section “Expansion Joint Cover Assemblies”, for expansion-joint covers assemblies and installation.

1.3 PERFORMANCE REQUIREMENTS

A. General: Provide a gas venting material that collects gas vapors and directs them to discharge or to collection points as specified in the gas vapor collection system drawings and complies with the physical requirements set forth by the manufacturer.

1.4 SUBMITTALS

A. Submit Product Data for each type of gas venting system specified, including manufacturer’s specifications.

B. Sample – Submit representative samples of the following for approval:

1. Gas venting, Vapor-Vent.
2. Vapor-Vent accessories.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Engage an experienced Installer who is certified in writing and approved by vapor intrusion barrier manufacturer Land Science Technologies for the installation of the Geo-Seal® vapor intrusion barrier system.

B. Manufacturer Qualification: Obtain gas venting, vapor intrusion barrier and system components from a single manufacturer Land Science Technologies

C. Pre-installation Conference: A pre-installation conference shall be held prior to installation of the venting system, vapor intrusion barrier and waterproofing system to assure proper site and installation conditions, to include contractor, applicator, architect/engineer and special inspector (if any).

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to project site as specified by manufacturer labeled with manufacturer’s name, product brand name and type, date of manufacture, shelf life, and directions for handling.

B. Store materials as specified by the manufacturer in a clean, dry, protected location and within the temperature range required by manufacturer. Protect stored materials from direct sunlight.

C. Remove and replace material that is damaged.

PART 2 – PRODUCTS

2.1 MANUFACTURER

A. Land Science Technologies, San Clemente, CA. (949) 481-8118

1. Vapor-Vent™

2.2 GAS VENT MATERIALS

A. Vapor-Vent – Vapor-Vent is a low profile, trenchless, flexible, sub slab vapor collection system used in lieu or in conjunction with perforated piping. Vapor-Vent is offered with two different core materials, Vapor-Vent POLY is recommended for sites with inert methane gas and Vapor-Vent is recommended for sites with aggressive chlorinated volatile organic or petroleum vapors. Manufactured by Land Science Technologies

B. Vapor-Vent physical properties

VENT PROPERTIES	TEST METHOD	VAPOR-VENT POLY	VAPOR-VENT
Material		Polystyrene	HDPE
Comprehensive Strength	ASTM D-1621	9,000 lbs / ft^2	11,400 lbs / ft^2
In-plane flow (Hydraulic gradient-0.1)	ASTM D-4716	30 gpm / ft of width	30 gpm / ft of width
Chemical Resistance		N/A	Excellent
FABRIC PROPERTIES	**TEST METHOD**	**VAPOR-VENT POLY**	**VAPOR-VENT**
Grab Tensile Strength	ASTM D-4632	100 lbs.	110 lbs.
Puncture Strength	ASTM D-4833	65 lbs.	30 lbs.
Mullen Burst Strength	ASTM D-3786	N/A	90 PSI
AOS	ASTM D-4751	70 U.S. Sieve	50 U.S. Sieve
Flow Rate	ASTM D-4491	140 gpm / ft^2	95 gpm / ft^2
UV Stability (500 hours)	ASTM D-4355	N/A	70% Retained
DIMENSIONAL DATA			
Thickness		1”	1”
Standard Widths		12”	12”
Roll Length		165 ft	165 ft
Roll Weight		65 lbs	68 lbs

2.3 AUXILIARY MATERIALS

A. Vapor-Vent End Out

B. Reinforced Tape.

PART 3 – EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions under which gas vent system will be installed, with installer present, for compliance with requirements. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 SUBSTRATE PREPARATION

A. Verify substrate is prepared according to project requirements.

3.3 PREPARATION FOR STRIP COMPOSITE

A. Mark the layout of strip geocomposite per layout design developed by engineer.

3.4 STRIP GEOCOMPOSITE INSTALLATION

A. Install Vapor-Vent over substrate material where designated on drawings with the flat base of the core placed down and shall be overlapped in accordance with manufacturer's recommendations.

B. At areas where Vapor-Vent strips intersect cut and fold back fabric to expose the dimpled core. Arrange the strips so that the top strip interconnects into the bottom strip. Unfold fabric to cover the core and use reinforcing tape, as approved by the manufacturer, to seal the connection to prevent sand or gravel from entering the core.

C. When crossing Vapor-Vent over footings or grade beams, **consult with the specifying environmental engineer and structural engineer for appropriate use and placement of solid pipe materials**. Place solid pipe over or through concrete surface and attach a Vapor-Vent End Out at both ends of the pipe before connecting the Vapor-Vent to the pipe reducer. Seal the Vapor-Vent to the Vapor-Vent End Out using fabric reinforcement tape. Refer to Vapor-Vent detail provided by Land Science Technologies.

D. Place vent risers per specifying engineer's project specifications. Connect Vapor-Vent to Vapor-Vent End Out and seal with fabric reinforced tape. Use Vapor-Vent End Out with the specified diameter piping as shown on system drawings.

3.5 PLACEMENT OF OVERLYING AND ADJACENT MATERIALS

A. All overlying and adjacent material shall be placed or installed using approved procedures and guidelines to prevent damage to the strip geocomposite.

B. Equipment shall not be directly driven over and stakes or any other materials may not be driven through the strip geocomposite.

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Product Data Sheet

Geo-Seal® CORE

Geo-Seal® CORE is an elastic water-based co-polymer modified asphaltic membrane spray applied to a minimum dry thickness of 60 mils. The CORE material has exceptional bonding to a wide variety of substrates and will build up to the specified thickness in a single application. Since the CORE material is water-based, there is little or no odor during or after product application, making it safe for use in sensitive areas. This material can also be applied to green concrete as it exhibits exceptional bonding capability that will not delaminate from the intended substrate. The seamless application of the CORE material makes for easy installation around penetrations, uneven surfaces and oddly shaped areas.

COVERAGES	TEST METHOD	UNITS
Application to BASE Layer		60 mils (17 ft^2/gal)
Typical Uncured Properties		
Specific Gravity	ASTM D 244	1.00
Viscosity	ASTM D 1200	>25 centipoise
PH		12.3
Flammability	ASTM D 3143	500^0 F
Color		Brown to Black
Non-Toxic		No Solvents
Shelf Life		6 months
Typical Cured Properties		
Tensile Strength	ASTM 412	32 psi
Elongation	ASTM 412	4140%
Resistance to Decay	ASTM E 125 Section 13	4% Perm Loss
Accelerated Aging	ASTM G 23	No Effect
Moisture Vapor Transmission	ASTM E 96	0.026 g / ft^2 per hour
Hydraulic Water Pressure	ASTM D 751	26 psi
Perm Rating	ASTM E 96 (US Perms)	0.21
Methane Transmission Rate	ASTM D 1434	Passed
Adhesion to Concrete & Masonry	ASTM C 836 & ASTM C 704	11 lbf / inch
Hardness	ASTM C 836	80
Crack Bridging	ASTM C 836	No Cracking
Low Temp Flexibility	ASTM C 836-00	No Cracking at -20^0 C
Resistance to Acids		
Acetic		30%
Sulfuric and Hydrochloric		13%
Temperature Effect:		
Stable		248^0 F
Flexible		13^0 F
Packaging: 330 gal. totes or 55 gal. drums		

Approvals: City of Los Angeles RR# 25478, NSF

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Product Data Sheet

Geo-Seal® CORE DETAIL

Geo-Seal® CORE DETAIL is ideally used to perform detailing and repairs to the Geo-Seal system. It is also ideal for those areas where the necessary clearance is not available for the application of the Geo-Seal spray. This proprietary and unique material can be used all at once or over a period of a few days without breaking down or hardening. Geo-Seal CORE DETAIL is water-based and can be applied to green concrete with exceptional bonding capability that will not delaminate from the intended substrate. Geo-Seal CORE DETAIL's viscosity allows high build applications to be done easily due to its ability to set quickly and get jobs done fast.

PROPERTIES	TEST METHOD	UNITS
TYPICAL UNCURED PROPERTIES		
Specific Gravity		1.034
Viscosity		9m-13m centipoise
PH		11.5
Flammability		270^0 F
Color		Brown to Black
Non-Toxic		No Solvents
Shelf Life		6 months
TYPICAL CURED PROPERTIES		
Initial Cure		30 minutes
Final Cure		24-24 hours
Tensile Strength	ASTM 412	32 psi
Elongation	ASTM 412	3860%
Resistance to Decay	ASTM E 125 Section 13	9% Perm Loss
Accelerated Aging	ASTM G 23	No Effect
Moisture Vapor Transmission	ASTM E 96	0.026 gal/ft^2 per hour
Hydrostatic Water Pressure	ASTM D 751	28 psi
Perm Rating (US Perms)	ASTM E 96	0.17
Methane Transmission Rate	ASTM D 1434	0
Adhesion to Concrete & Masonry	ASTM C 836	7 lbf/inch
Hardness	ASTM C 836	85
Crack Bridging	ASTM C 836	No Cracking
Low Temp Flexibility	ASTM C 836-00	No Cracking at -20^0 C
Resistance to Acids		
Acetic		30%
Sulfuric and Hydrochloric		13%
COVERAGES		
60-mils (dry)		19 ft^2/gal
Packaging: Available in 1 or 5 gal. buckets		

Approvals: City of Los Angeles RR# 25478 (for methane and waterproofing), NSF Standard 61 for potable water containment

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Product Data Sheet

Geo-Seal® BASE Layer

The Geo-Seal™ BASE layer is comprised of a high strength laminated HDPE membrane that is thermally bonded to a polypropylene geotextile giving the BASE layer a high puncture resistance (Class A Rating) as well as high chemical resistance. The BASE layer is installed over the substrate with the HDPE side facing up and provides the ideal surface for the application of the Geo-Seal CORE component.

PROPERTIES	TEST METHOD	Geo-Seal BASE
Film Thickness		5 mil
Composite Thickness		18 mil
Tensile @ ULT	ASTM D 882 MD	37.3 lbs / in
	ASTM D 882 TD	32.0 lbs / in
Elongation @ ULT	ASTM D 882 MD	51.00%
	ASTM D 882 TD	55.30%
Dart Impact	ASTM D 1709	
	Method A	>1070 gms
	Method B	594 gms
Modulus	ASTM D 882 MD	295.5 lbs / in
	ASTM D 882 TD	270.6 lbs / in
Elmendorf Tear	ASTM D 1922 MD	5,260 gms
	ASTM D 1922 TD	5,140 gms
Puncture Prop. Tear	ASTM B 2582 MD	11,290 gms
	ASTM B 2582 TD	13,150 gms
Beach Puncture Tear	ASTM D 751 MD	160 lb / in
	ASTM D 751 TD	165 lb / in
Permeability (water vapor)	ASTM E96	0.214
Chemical Resistance		Excellent
Packaging: 15’x150’ = 100 lbs		

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Product Data Sheet

Geo-Seal® BOND Layer

The Geo-Seal™ BOND layer is comprised of a high strength laminated HDPE membrane that is thermally bonded to a polypropylene geotextile giving the BASE layer a high puncture resistance (Class A Rating) as well as high chemical resistance. The BOND layer is installed as a protection course over the BASE and CORE layers with the geotextile side facing up. The BOND layer also provides an excellent substrate and friction surface for concrete to adhere to.

PROPERTIES	TEST METHOD	Geo-Seal BOND
Film Thickness		5 mil
Composite Thickness		18 mil
Tensile @ ULT	ASTM D 882 MD	37.3 lbs / in
	ASTM D 882 TD	32.0 lbs / in
Elongation @ ULT	ASTM D 882 MD	51.00%
	ASTM D 882 TD	55.30%
Dart Impact	ASTM D 1709	
	Method A	>1070 gms
	Method B	594 gms
Modulus	ASTM D 882 MD	295.5 lbs / in
	ASTM D 882 TD	270.6 lbs / in
Elmendorf Tear	ASTM D 1922 MD	5,260 gms
	ASTM D 1922 TD	5,140 gms
Puncture Prop. Tear	ASTM B 2582 MD	11,290 gms
	ASTM B 2582 TD	13,150 gms
Beach Puncture Tear	ASTM D 751 MD	160 lb / in
	ASTM D 751 TD	165 lb / in
Permeability (water vapor)	ASTM E96	0.214
Chemical Resistance		Excellent
Packaging: 15’x150’ = 100 lbs		

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Product Data Sheet

Geo-Seal® Reinforcement Fabric

The Geo-Seal™ Reinforcement Fabric is a textile material composed of staple fibers hydraulically entangled, which is composed of 100% polyester. The basic use of the Geo-Seal Reinforcement Fabric is designed to act as reinforcement when used in conjunction with Geo-Seal CORE spray applied membrane.

CHEMICAL	EXPOSURE (at room temperature)	% STRENGTHENED RETAINED
Dimethyl Formamide	1000 hours	100%
Ethylene Glycol	1000 hours	100%
1% Sodium Hydroxide	6 hours	100%
60% Sulfuric Acid	150 hours	54%
Perchlorethylene	1000 hours	100%
Acetone	1000 hours	100%
Distilled Water	1000 hours	100%
PHYSICAL PROPERTY DATA		
Weight/Square (lbs.)	ASTM D 3776	1.1
Oz./Sq./Yd. (oz.)	ASTM D 3776	1.6
Bulk (mills)		22
Dry Tensile-MD (lbs.)	ASTM D1777	25
Dry Tensile-CD (lbs.)	ASTM D 1777	18
Elongation-MD (per/cent)	ASTM D 1682	45
Elongation-CD (per/cent)	ASTM D 1682	100
Mullen Burst (P. S. I.)	ASTM D 3786	35
Packaging: 6” x 360’, 12” x 360’		

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Product Data Sheet

Vapor-Vent™

Vapor-Vent™ is a low profile, trenchless, flexible, sub slab vapor collection system used in lieu of perforated piping. Installation of Vapor-Vent increases construction productivity as it eliminates time consuming trench digging and costly gravel importation. Vapor-Vent is offered with two different core materials, Vapor-Vent POLY is recommended for sites with inert methane gas and Vapor-Vent is recommended for sites with aggressive chlorinated volatile organic or petroleum vapors.

VENT PROPERTIES	**TEST METHOD**	**Vapor-Vent POLY**	**Vapor-Vent**
Material		Polystyrene	HDPE
Comprehensive Strength	ASTM D-1621	9,500 lbs / ft^2	11,400 psf
Flow Rate (Hydraulic gradient = .1)	ASTM D-4716	30 gpm/ft width	30 gpm/ft width
Chemical Resistance		N/A	Excellent
FABRIC PROPERTIES	**TEST METHOD**	**Vapor-Vent POLY**	**Vapor-Vent**
Grab Tensile Strength	ASTM D-4632	100 lbs.	110 lbs.
Puncture Strength	ASTM D-4833	65 lbs.	30 lbs.
Mullen Burst Strength	ASTM D-3786	N/A	90 PSI
AOS	ASTM D-4751	70 U.S. Sieve	50 U.S. Sieve
Flow Rate	ASTM D-4491	140 gpm / ft2	95 gpm / ft2
UV Stability (500 hours)	ASTM D-4355	N/A	70% Retained
DIMENSIONAL DATA		**Vapor-Vent POLY**	**Vapor-Vent**
Thickness		1”	1”
Standard Widths		12”	12”
Roll Length		165 ft	165 ft
Roll Weight		65 lbs	68 lbs

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GEOSEAL CORE MATERIAL SAFETY DATA SHEET

LAND SCIENCE TECHNOLOGIES
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949.366.8000

1. PRODUCT IDENTIFICATION

Trade Names: Geo-Seal CORE, Geo-Seal CORE Detail
Chemical Name: Asphalt Emulsion
Synonyms: N/A
Hazardous Ingredients/OSHA: CHEMICAL FAMILIES:

A. Bitumen/Asphalt
B. Synthetic rubber
C. Fatty acids
D. Polymers

Hazard: No evidence of serious health hazards exists.
Carcinogenic ingredients/OSHA/NTP: Bitumen IARC: None

Ingredient	Percentage	C. A. S. #
Asphalt	50-60%	8052-42-4
Water	20-40%	7732-18-5
Latex:		9003-55-8
Styrene Latex	0-15%	100-42-5
Butadiene Latex	0-15%	106-99-0
Sodium Hydroxide	.1-1%	1310-73-2
Amino Ethanol	.01-.1%	34375-28-5

2. WARNING STATEMENTS

Avoid prolonged or frequent skin contact, as the presence of emulsifying and de-emulsifying agents during application may irritate the skin.

3. PHYSICAL AND CHEMICAL DATA

Appearance: Brown to black
Specific Gravity: (H_2O = 1): 1.028 (S) 1.034 (R) 1.13 (T)
Solubility in Water: Insoluble
Percent Volatiles: None
Boiling Point: N/A
Vapor Pressure (mm Hg): N/A
Vapor Density (Air = 1): N/A
Evaporation Rate: N\A

4. FIRE PROTECTION

Bitumen emulsions are water based products and as such will not burn. In cases of fire in the vicinity of drums, cool with water.

5. REACTIVITY DATA

Contact with strong oxidizing agents may create geling and water condensation.

6. **HEALTH HAZARD DATA**
Exposure Limits: Avoid prolonged or frequent skin contact.

7. **PHYSIOLOGICAL EFFECTS SUMMARY**
Acute: Skin irritation and rash
Chronic: Dermatitis

8. **PRECAUTIONS FOR SAFE HANDLING**
Avoid contact with eyes.
Avoid inhalation.
Avoid prolonged or frequent skin contact.
Avoid ingestion.

9. **PROTECTION AND CONTROL MEASURES**
Protective Equipment: Use of clothing, gloves, and/or barrier cream is recommended for skin protection.
Respiratory Protection: Inhalation should be avoided, but is not considered to be hazardous.
Ventilation: Use local exhaust ventilation when applying in an enclosed area.

10. **EMERGENCY AND FIRST AID PROCEDURES**
For ingestion: DO NOT induce vomiting. Keep at rest and get prompt medical attention.
For eye contamination: Irrigate eyes with water.
For skin contact: Wash affected areas of the body with proprietary hand cleaner, then wash with soap and water.

Contact physician as needed for any of the above occurrences.

11. **SPILL AND DISPOSAL PROCEDURES**
Contain spillages with sand or earth and remove by normal methods. Dispose of according to State and Local regulations. If the Bitumen enters a water course or sewer, advise respective water authority. The non-cured and cured material is non-toxic and non-flammable and can be disposed of in land fill sites.

Other Precautions: For Additional Information Contact:

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Geo-Seal BASE and BOND: Material Safety Data Sheet

Land Science Technologies PHONE: 949-366-8000
1011 Calle Sombra
San Clemente, CA 92673

1. PRODUCT IDENTIFICATION

Trade Name: Geo-Seal BASE, Geo-Seal BOND
Chemical Name: POLYMERIC COMPONENTS, GEOTEXTILE FABRIC
Synonyms: N/A
Hazardous Ingredients/OSHA: NO HAZARDOUS INGREDIENTS

THIS PRODUCT IS SUPPLIED IN COMPLIANCE WITH THE TSCA REPORTING REUQIREMENTS.

Carcinogenic Ingredients/OSHA/NTP: NONE
IARC: NONE
Transportation information: CONTAINS NO HAZARDOUS INGREDIENTS
Transportation emergency: Land Science Technologies, 949-366-8000

2. PHYSICAL AND CHEMICAL DATA

Appearance and Odor: White Solid Sheet, Odorless
Specific Gravity (Water = 1): 0.90
Vapor Pressure (mm Hg): Not Determined
Vapor Density (Air = 1): Not Determined
Evaporation Rate: (Butyl Acetate - 1): N/A
Auto Ignition Temperature: Not Determined

Solubility in Water: Negligible, below 0.1%
Percent Volatiles: None
Boiling Point: Degrees: Not Determined
Melting Point: 320° F

3. FIRE AND EXPLOSION DATA

Flash Point: N/A
Flammable limits %: Lower N/A Upper N/A
Extinguishing Media: Agents approved for Class A hazards (e.g. foam, steam) or water fog.
Special Fire Fighting Procedures: Firefighters should wear full bunker gear, including a positive pressure self-contained breathing apparatus.
Unusual Fire and Explosion Hazards: None identified.

4. REACTIVITY DATA

Stability: Stable Conditions to avoid: Keep away from ignition sources (e.g. heat, sparks and open flames).
Incompatibility (materials to avoid): None Identified
Hazardous Decomposition or Byproducts: Incomplete burning can produce carbon monoxide and/or carbon dioxide and other harmful products.
Hazardous Polymerization: Will not occur

5. HEALTH HAZARD DATA

Route(s) of Entry: Inhalation: No Skin: No Ingestion: No
Health Hazards (Acute & Coronic): Will not present any health hazards under normal processing conditions.
Eye & Skin Contact: None Identified.
Skin Absorption: Non-toxic.
Inhalation: No significant irritation expected.
Ingestion: No significant health hazards identified.
Carcinogenicity: Unrelated NTP: No IARC: No OSHA Regulated: No

6. PROTECTION AND CONTROL MEASURES

Precautions to be taken in handling and storing: Store away from heat, ignition sources and open flame in accordance with applicable regulations.
Respiratory Protection: Not required under normal process conditions.
Ventilation: Local Exhaust

Protective Gloves: Not required.
Eye Protection: Not required.
Other Protective clothing or equipment: Not required.
Work/Hygienic Practices: Wash hands after handling and before eating.

7. EMERGENCY AND FIRST AID PROCEDURES

In Case of Combustion (550°)" Eye Contamination: Flush with large amounts of water for 20 minutes lifting upper and lower lids occasionally. Get medical attention.
Skin contact: Thoroughly wash exposed area with soap and water. Remove contaminated clothing. Launder contaminated clothing before reuse.
Inhalation: If overexposure occurs, remove individual to fresh air. If breathing stops, administer artificial respiration. Get medical attention.
Ingestion: If a large amount of material is swallowed **DO NOT INDUCE VOMITING**. If vomiting begins lower victim's head in an effort to prevent vomit from entering lungs and get medical attention.

8. SPILL AND DISPOSAL PROCEDURES

Spill is not applicable. Material is normally in solid form.

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Geo-Seal
Vapor Intrusion Barrier

Geo-Seal® Quality Control

Certified Applicator

Authorized installation of Geo-Seal can only be accomplished by one of Land Science Technologies Certified Applicators.

Membrane Inspections

For projects that will require a material or system (workmanship and material) warranty, Land Science Technologies will require a manufacturer's representative or certified 3rd party inspector to inspect and verify that the membrane has been installed per the manufacturer's recommendations.

The applicator is responsible for contacting the inspector for inspection. Prior to application of the membrane, a notice period for inspection should be agreed upon between the applicator and inspector.

Material Yield

Material yield is one of the first indicators in determining if the Geo-Seal CORE layer has been installed correctly. A baseline standard for yield is as follows:

Material Container	60 dry mils	80 dry mils	100 dry mils
55 Gallon Drum	935 ft^2	660 ft^2	550 ft^2
275 Gallon Tote	4,675 ft^2	3,300 ft^2	2,750 ft^2
330 Gallon Tote	5,610 ft^2	3,960 ft^2	3,300 ft^2

The estimated yield is 17 ft^2 per gallon for a 60 dry mil application using the recommended thickness, unless otherwise noted by a specified engineer or regulatory agency.

Yields can decrease based on the complexity of the foundation. Projects containing many penetrations and areas where a lot of detailing is required might reduce the material yield to 16 ft^2 or 15 ft^2 per gallon for a 60 mil membrane.

Millage Verification

The measurement tools listed below will help verify the thickness of the Geo-Seal CORE layer. As measurement verification experience is gained, these tools will help confirm thickness measurements that can be obtained by pressing one's fingers into the Geo-Seal CORE membrane.

To verify the mil thickness of the Geo-Seal CORE, the following measurement devices are required:

Mil reading caliper: Calipers are used to measure the thickness of coupon samples. To measure coupon samples correctly, the thickness of the Geo-Seal sheet layers must be taken into account (This is best done by obtaining a sample of the Geo-Seal BASE layer and then zeroing out the caliper to the Geo-Seal BASE layer). Mark sample area for repair.

Wet mil thickness gauge: A wet mil thickness gauge may be used to quickly measure the mil thickness of the Geo-Seal CORE layer. The thickness of the Geo-Seal sheet layers do not factor into the mil thickness reading, but the softness of the subgrade might result in inaccurate readings.

NOTE: When first using a wet mil thickness gauge on a project, collect coupon samples to verify the wet mil gauge thickness readings.

Needle nose digital depth gauge: A needle nose depth gauge can be used when measuring the Geo-Seal CORE thickness on vertical walls or in field measurements. Mark measurement area for repair.

To obtain a proper wet mil thickness reading, take into account the 5 to 10 percent shrinkage that will occur as the membrane fully cures. Not taking into account the thickness of the sheet layers, a freshly sprayed membrane should have a minimum wet thickness of 63 (5%) to 66 (10%) mils.

Visual Inspections

The guidelines outlined in this section provide ways to quantify and observe the proper installation of the Geo-Seal system. However, a visual inspection should also be done to ensure any visual imperfections are not present, i.e. fish-mouths, punctures, voids, etc. During a visual inspection, punctures in the Geo-Seal system should be easy to indentify due to the color contrasting layers of the system.

Membrane Testing Log

To aid in the inspection process and properly document the Geo-Seal membrane inspection, create a membrane testing log. We recommend creating the log by using the foundation plan (plan view) of the structure and then creating a 500 square foot grid over the foundation. If this is not able to be done, enclosed is a membrane testing log template that can also be used. (Appendix E)

Wet Mil Thickness Readings

A wet mil thickness gauge is one method to verify the mil thickness of the Geo-Seal CORE layer. An advantage to this method is the ability to verify the Geo-Seal CORE thickness by minimizing destructive coupon sampling.

1. Create a membrane testing log by obtaining a copy of the foundation plan and then draw a 500 square foot grid over the foundation plan. Make two copies of the membrane testing log; one should be used when collecting coupon samples and the other should be used when conducting the smoke test.

2. Note time, date, project name, inspector name, temperature and weather conditions on testing log.

3. Number each quadrant and inspect sequentially.

4. When arriving at each quadrant quickly assess if there are any conditions that might present any challenges in establishing a proper seal. Note areas and discuss with applicator.

5. Conduct a visual inspection of the membrane. Look for areas where a proper seal was not created, i.e. a fish-mouth at the termination and areas where the membrane might be sprayed thin. Mark areas needed for repair in the field with florescent paint or with chalk. Also make a note on the testing log.

6. Conduct a thickness sample in the area that is suspected to be sprayed thin and take three readings within 3” of one another. **When beginning a project, verify the wet mil gauge thickness reading by cutting a coupon sample and measuring the thickness with a caliper.** Once wet mil thickness readings have been confirmed and established, confirm wet mil thickness periodically by taking a coupon sample and caliper measurement.

7. After sampling 5 quadrants it is at the discretion of the inspector to continue collecting samples every 500 ft^2 or 1,000 ft^2.

8. This method will verify the thickness of the Geo-Seal CORE layer prior to it fully curing. Observed shrinkage of the Geo-Seal CORE layer during the curing process ranges from 5% to 10%. When taking uncured samples assume a minimum of 10% loss for horizontal surfaces and 5% for vertical surfaces. Assuming a 10% loss, the gauge should read a mil thickness between 65 and 70 mils (≥66 mils).

9. If using a wet mil gauge to verify a fully cured membrane the gauge should read 60 mils.

10. When testing is complete, send a copy of the membrane testing log to Land Science Technologies. Keep the coupon samples for the file, or send them to Land Science Technologies.

Coupon Sampling

Coupon sampling is the most accurate way to verify the Geo-Seal CORE thickness. However, please note that taking too many coupon samples, or destructive samples, can be counter-productive. To collect a coupon sample the following steps should be followed:

1. Create a membrane testing log by obtaining a copy of the foundation plan and then draw a 500 square foot grid over the foundation plan. Make two copies of the membrane testing log, one should be used when collecting coupon samples and the other should be used when conducting the smoke test.

2. Note time, date, project name, inspector name, temperature and weather conditions on testing log.

3. Number each quadrant and inspect sequentially.

4. When arriving at each quadrant quickly assess if there are any conditions that might present any challenges in establishing a proper seal. Note areas and discuss with applicator.

5. Conduct a visual inspection of the membrane. Look for areas where a proper seal was not created, i.e. a fish-mouth at the termination and areas where the membrane might be sprayed thin. Mark areas needed for repair in the field with florescent paint or with chalk. Also make a note on the testing log.

6. Calibrate mil reading caliper to account for the thickness of the Geo-Seal BASE layer. This is best done by obtaining a sample of the Geo-Seal BASE layer and then zeroing out the caliper to the Geo-Seal BASE layer.

7. Collect a coupon sample in the area that is suspected to be sprayed thin. Use a box cutter to cut a 3 square inch sample from the membrane. Measure each side to confirm the specified minimum thickness has been obtained. Number each sample and save in the job file. Mark the area for repair in the field and on the site plan.

8. After sampling 5 quadrants it is at the discretion of the inspector to continue collecting samples every 500 ft^2 or 1,000 ft^2.

9. Samples may be collected prior to the Geo-Seal CORE layer fully curing. Observed shrinkage of the Geo-Seal CORE layer during the curing process for horizontal surfaces is 10%. Assuming a 10% loss, a minimum of 66 mills thickness should be measured for a cured measurement of 60 mils.

10. When testing is complete, send a copy of the membrane testing log to Land Science Technologies. Keep the coupon samples for the file, or send them to Land Science Technologies.

Smoke Testing

This test is intended to visually verify and confirm the proper installation of the Geo-Seal system. Land Science Technologies requires a smoke test on all projects in order to obtain a warranty. The smoke test will be performed by the applicator.

Smoke testing should occur after the Geo-Seal CORE layer has been installed and mil thickness verified. Smoke testing may occur after the Geo-Seal BOND layer is installed, if preferred by the applicator. Upon completion of the original smoke test, additional smoke tests can be conducted per the membrane manufacturer's, specifying engineer or regulatory agency's request. To conduct a smoke test follow these steps:

1. One smoke test can cover between 2000-3000 square feet per test. However, coverage will greatly depend on the sub grade under the membrane. On sites where multiple smoke tests will be needed, use the first two smoke tests to estimate the coverage area per test.

2. Visual verification of soundness of seams, terminations and penetrations should be performed. Identify/correct any apparent deficiencies and/or installation problems.

3. Note time, date, project name, inspector name, temperature and weather conditions on testing log. In addition, record humidity, barometric pressure, and wind speed/direction. Confirm wind speed is below 15 mph. Visual identification of leaks becomes more difficult with increasing wind speed.

4. Cap other vent outlet(s) not being used. If the installation has no sub-slab vent system or the membrane is isolated from the vent system, connect the smoke testing system directly to the membrane using a temporary boot collar or other method. Insert the smoke test hose into coupon sampling locations, creating a seal around the smoke test hose with a rag.

5. Activate the smoke generator/blower system and connect to sub-slab vent riser or directly to the membrane.

6. To confirm the adequate flow of smoke under the membrane cut a 2” vent in the membrane to facilitate the purging of air pockets under it. If working properly, smoke will consistently flow though the 2” vent. If a low rate of smoke flow is observed it is an indication of poor smoke flow under the membrane. If low flow does occur, insert the smoke testing hose into the 2” membrane vent.

7. Mark sampling locations with fluorescent paint or chalk. Repair sampling locations per Land Science Technologies recommendations

8. Maintain operation of smoke generator/blower system for at least 15 minutes following purging of membrane. Thoroughly inspect entire membrane surface. Use fluorescent paint or chalk to mark/label any leak locations. Mark/label leak locations on testing log. NOTE: The duration of the smoke test will vary depending on the size of the area being tested. To help determine the duration, monitor the pressure building up under the membrane. If excessive lifting of the membrane occurs, decrease the duration or pressure of the smoke test.

9. Prepare membrane inspection log. Identify the type of leak found, i.e. poor seal around penetration, fish-mouth, puncture, etc.

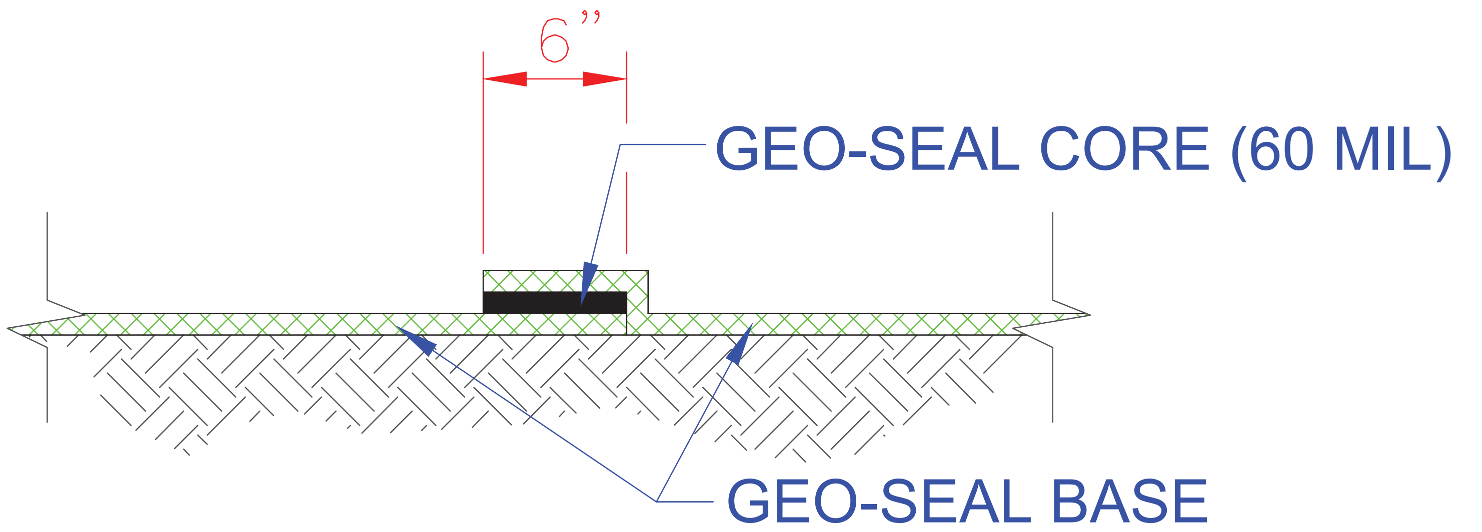
10. Repair leak locations marked in step 7 and step 8 per procedures outlined in “Geo-Seal Repair Procedures” section using Geo-Seal CORE or Geo-Seal DETAIL.

11. Repeat steps 4 through 10 as necessary to confirm the integrity of the membrane.

12. Complete the smoke testing inspection form indicating the successful completion of the smoke test.

Post Installation Inspection

After a manufacturer’s representative or 3rd party inspector signs off on the membrane installation and the steel workers begin to install the rebar, it is recommended to conduct a visual inspection prior to the pouring of concrete. Damages are most likely to occur during this time and it is imperative that punctures are indentified prior to the placement of the slab. The system configuration of Geo-Seal, the top white Geo-Seal BOND layer with a middle black layer, will make rebar punctures easy to identify when conducting a visual inspection.



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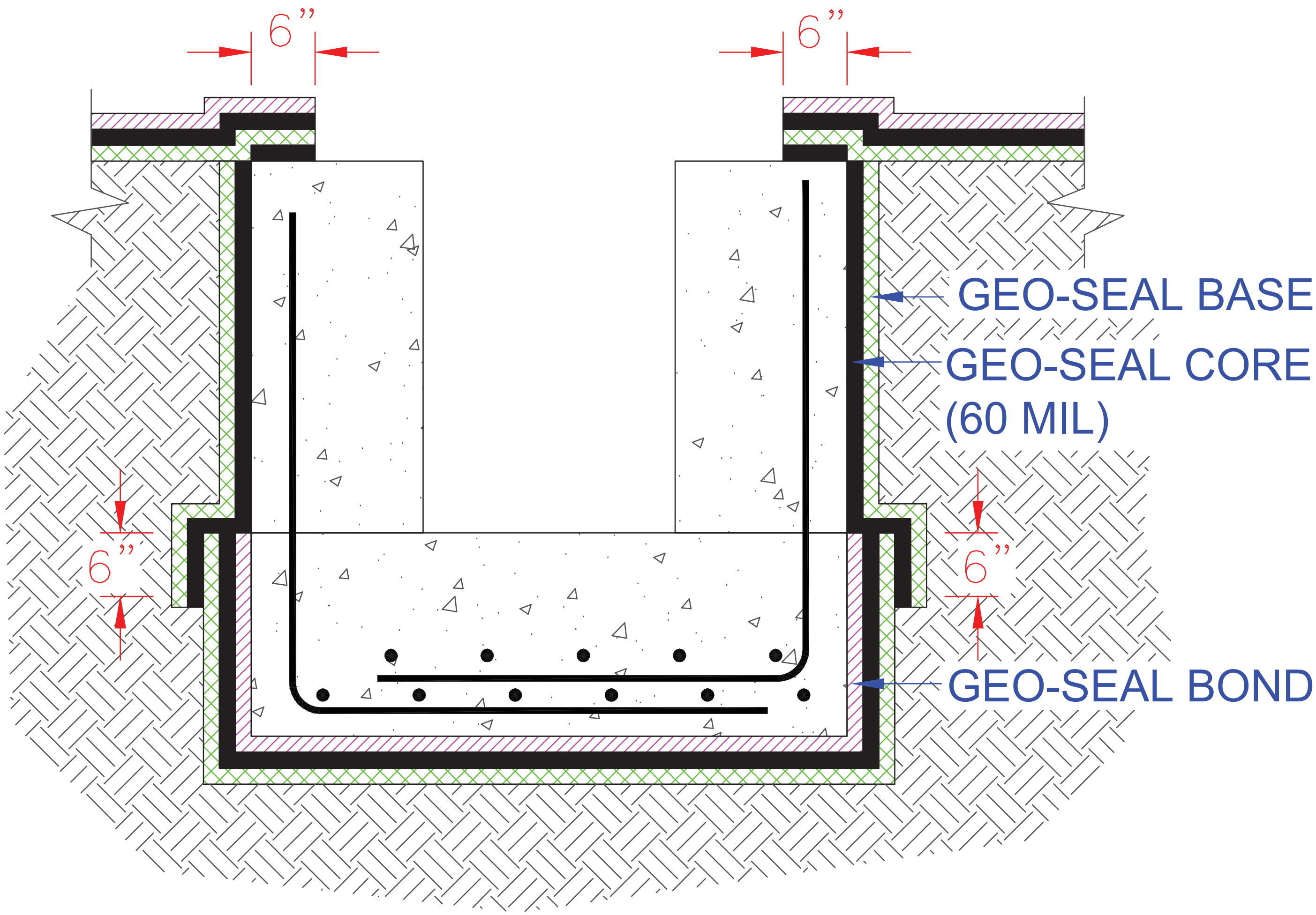
Geo-Seal® Vapor Intrusion Barrier

DATE

SCALE

TITLE

BASE OVERLAP DETAIL



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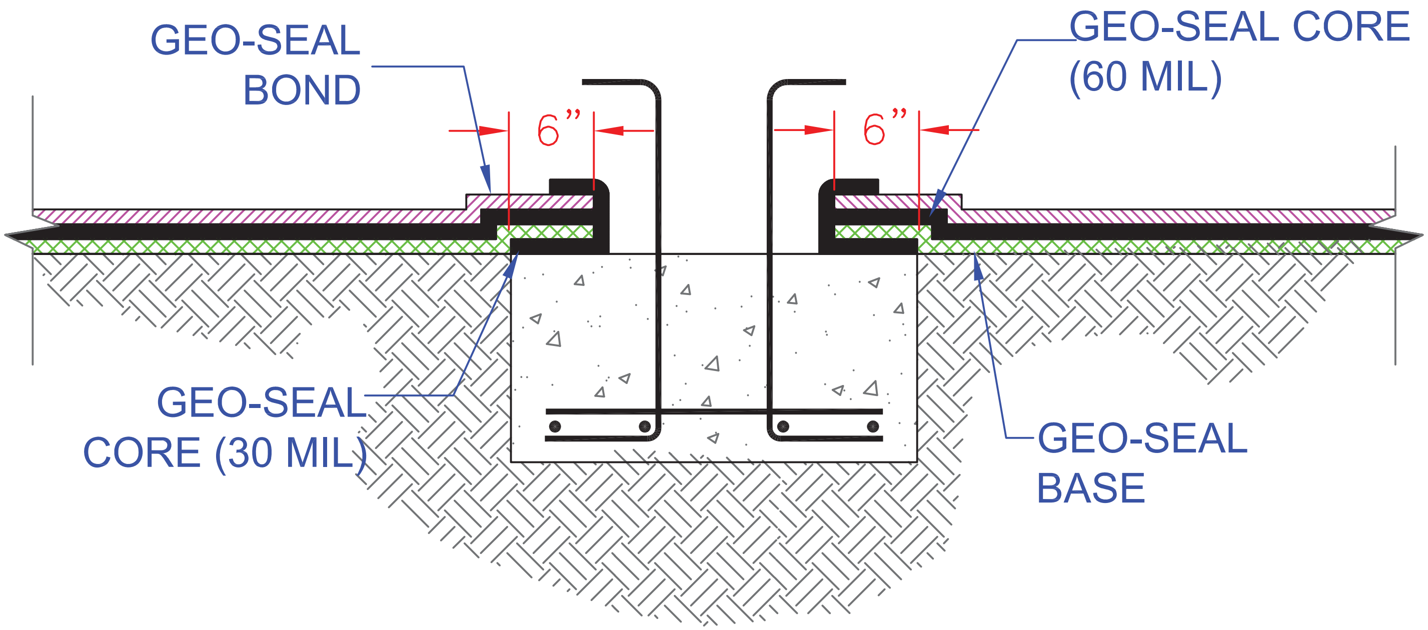
ELEVATOR PIT DETAIL



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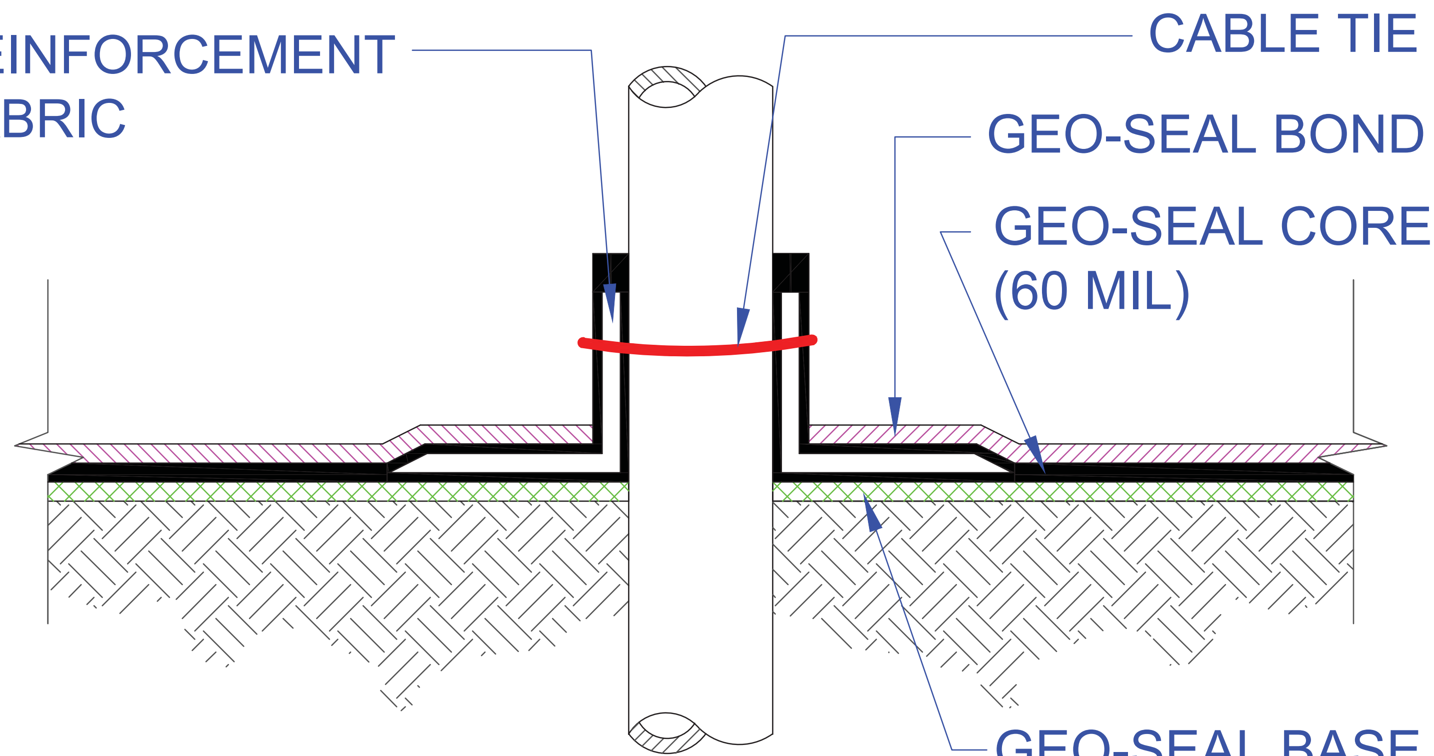
FOOTING TERMINATION



STEP 5

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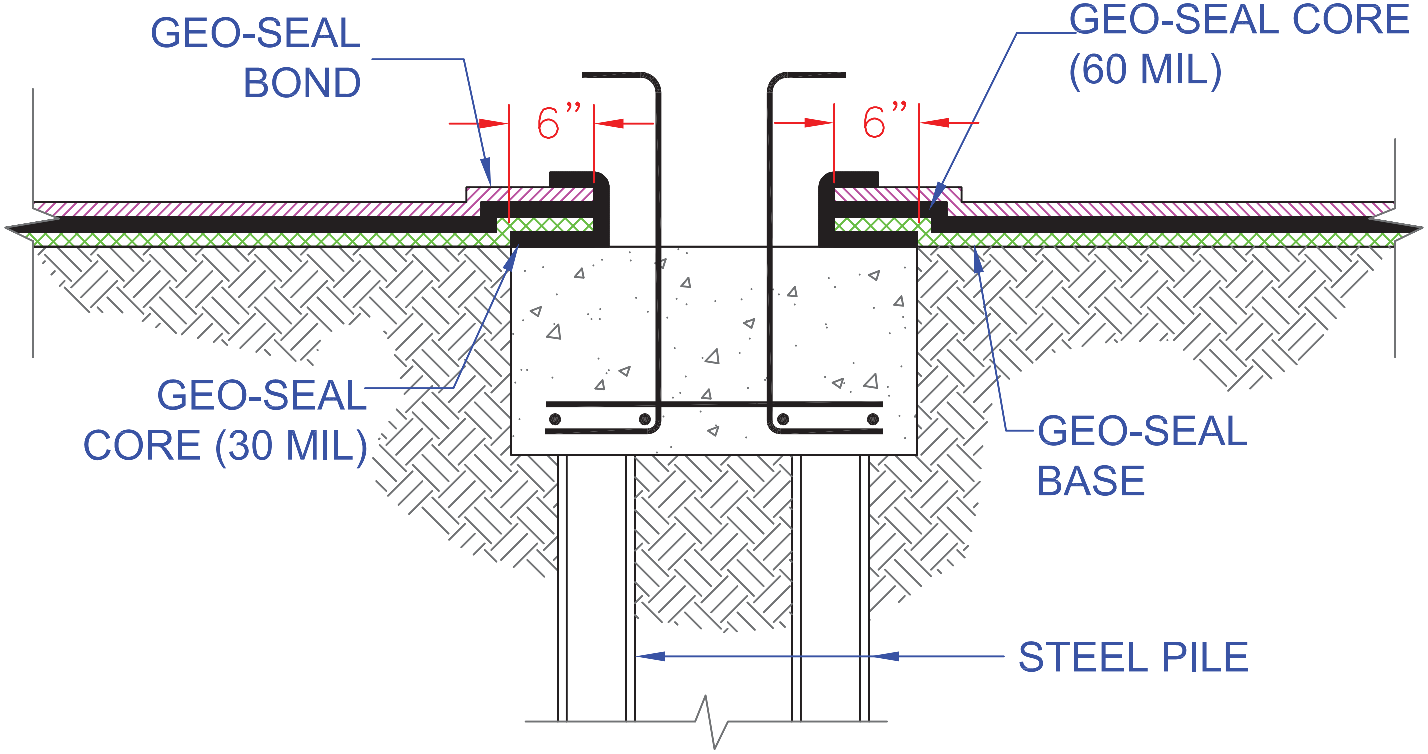
TITLE

PENETRATION SEQUENCE

STEP 5



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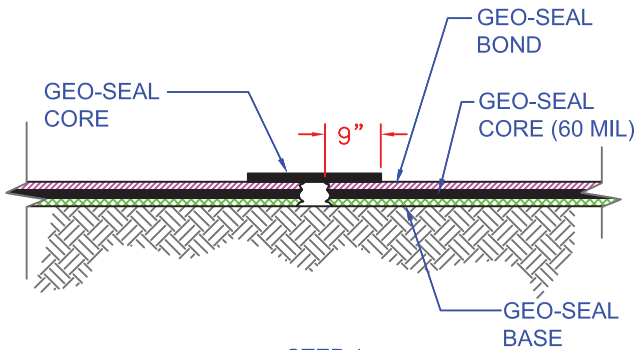
TITLE

PILE CAP DETAIL



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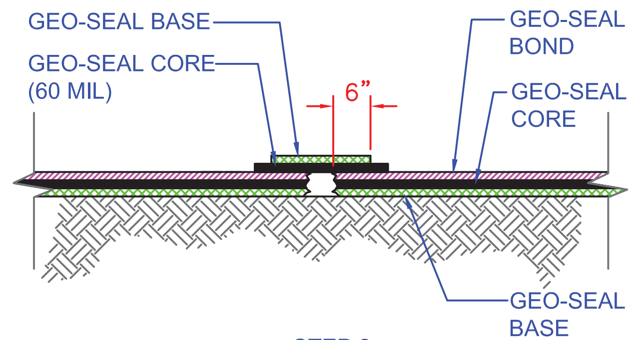

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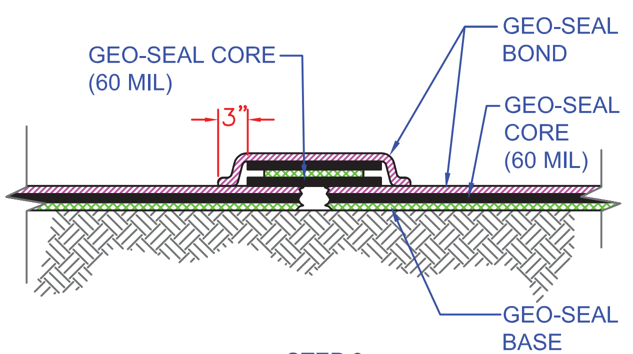

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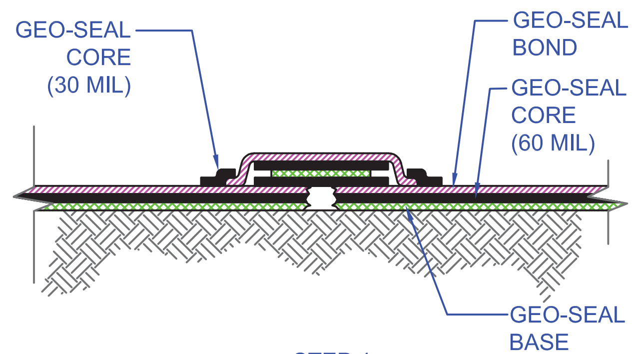

STEP 4

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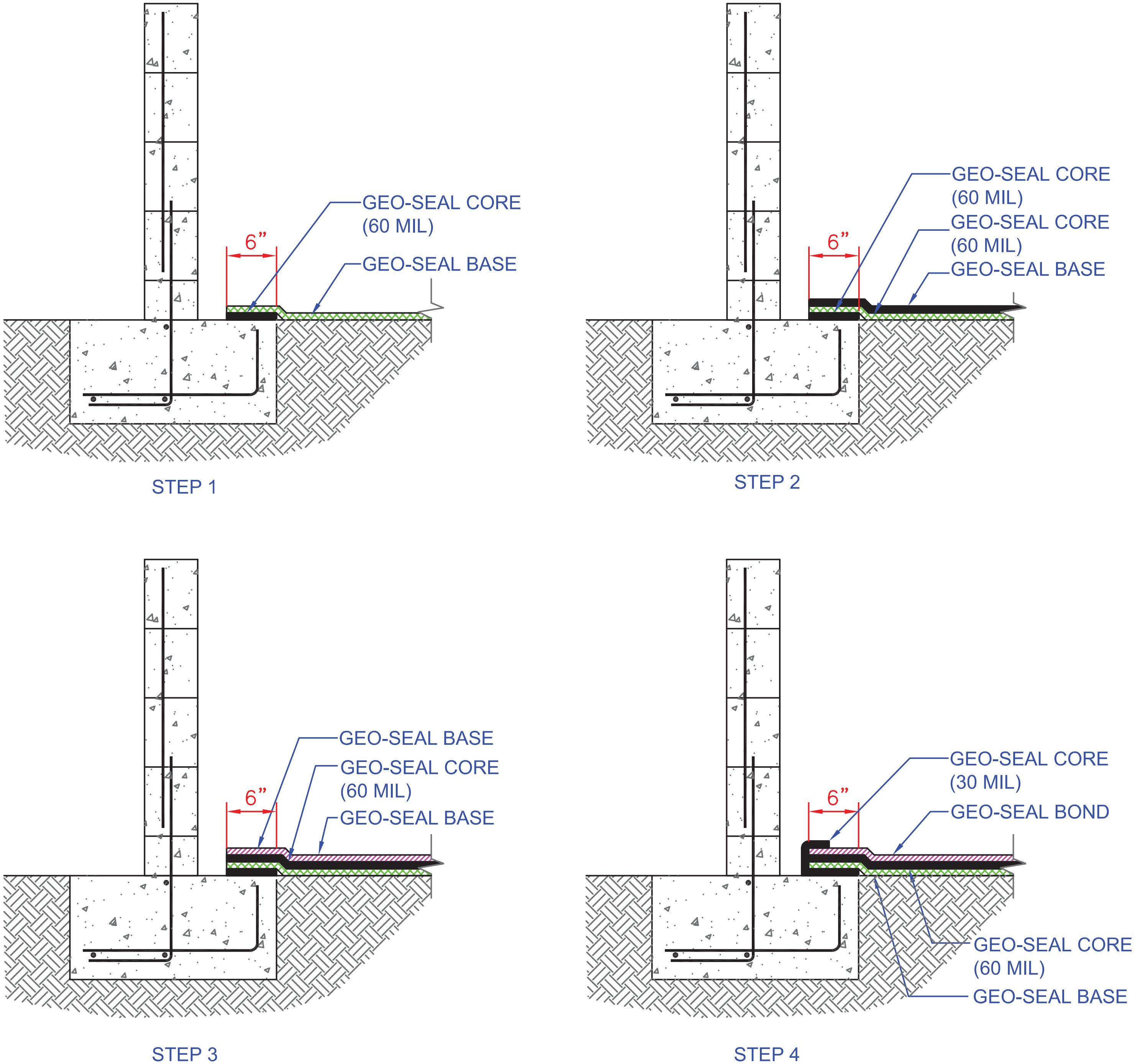
SCALE

TITLE

REPAIR SEQUENCE



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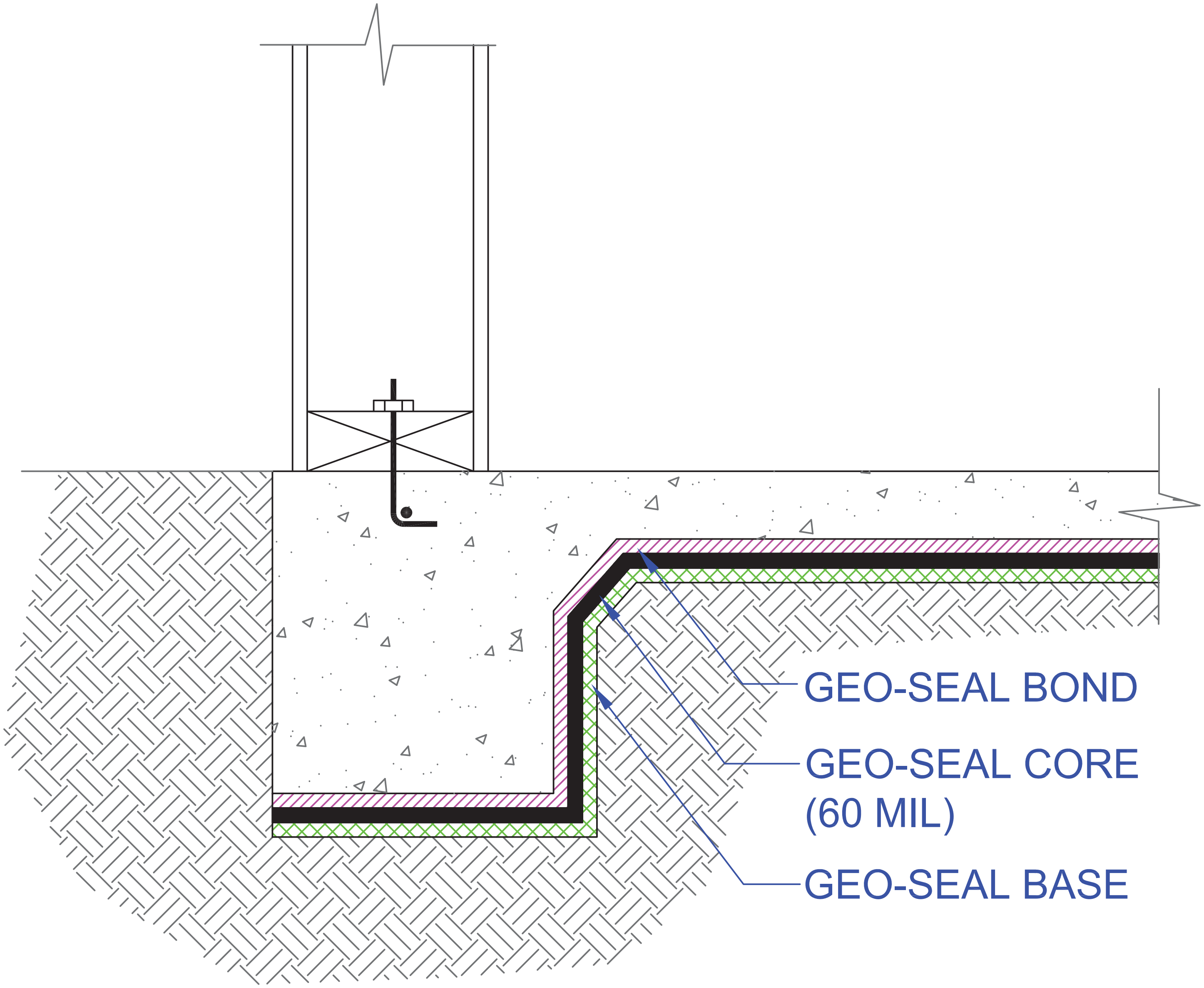
TERMINATION SEQUENCE



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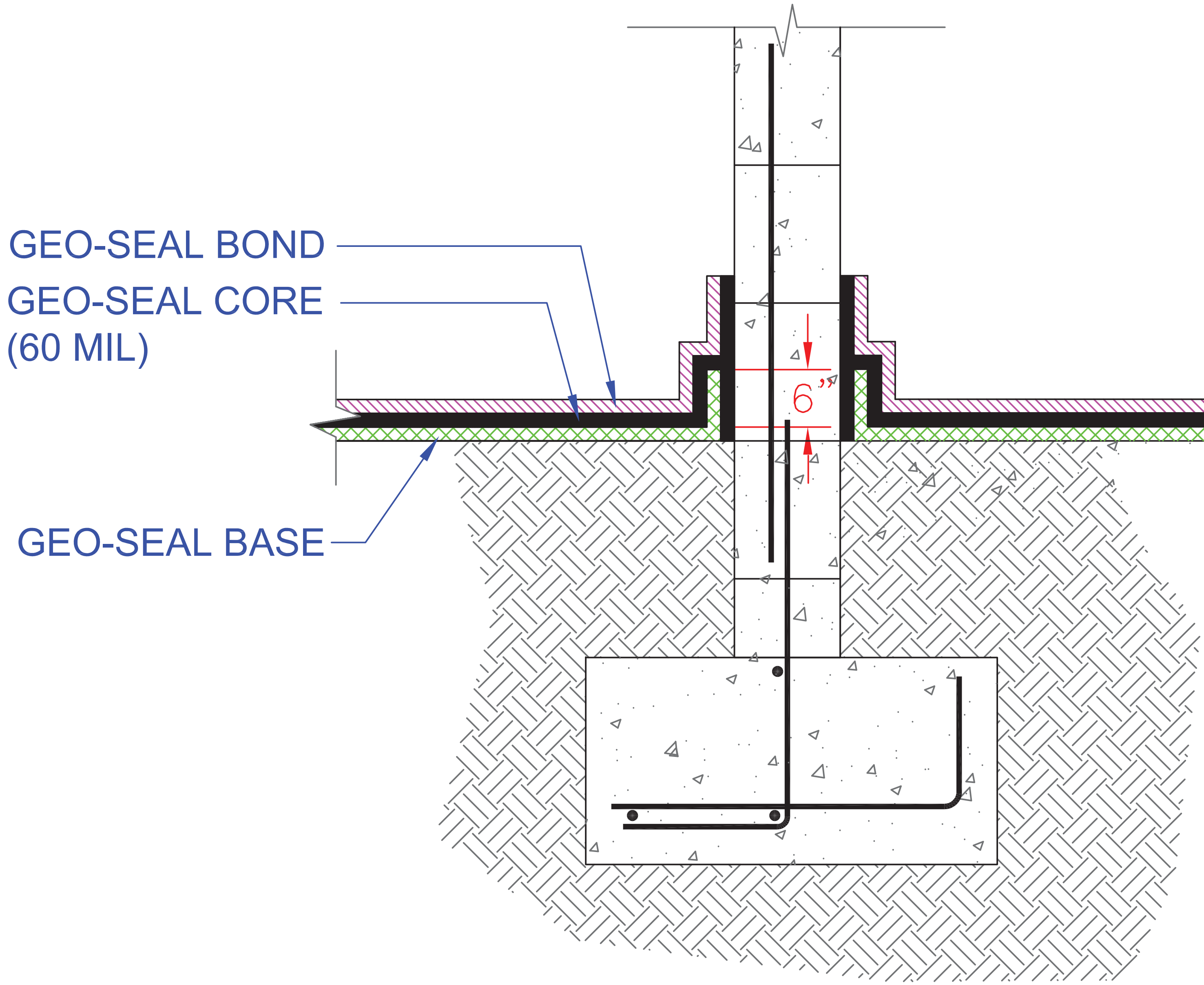
SCALE

TITLE

UNDER FOOTING DETAIL



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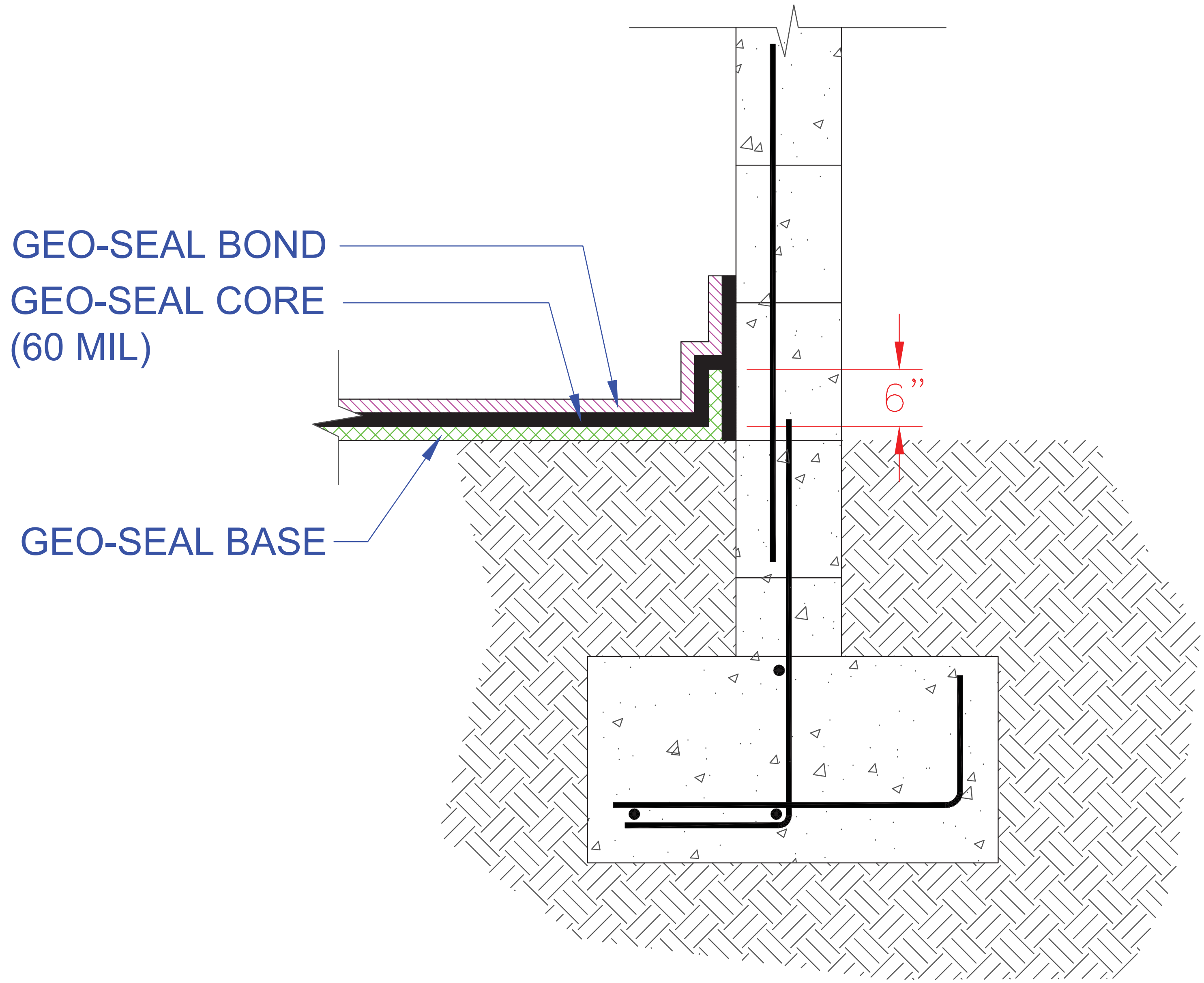
SCALE

TITLE

VERTICAL TERMINATION DETAIL



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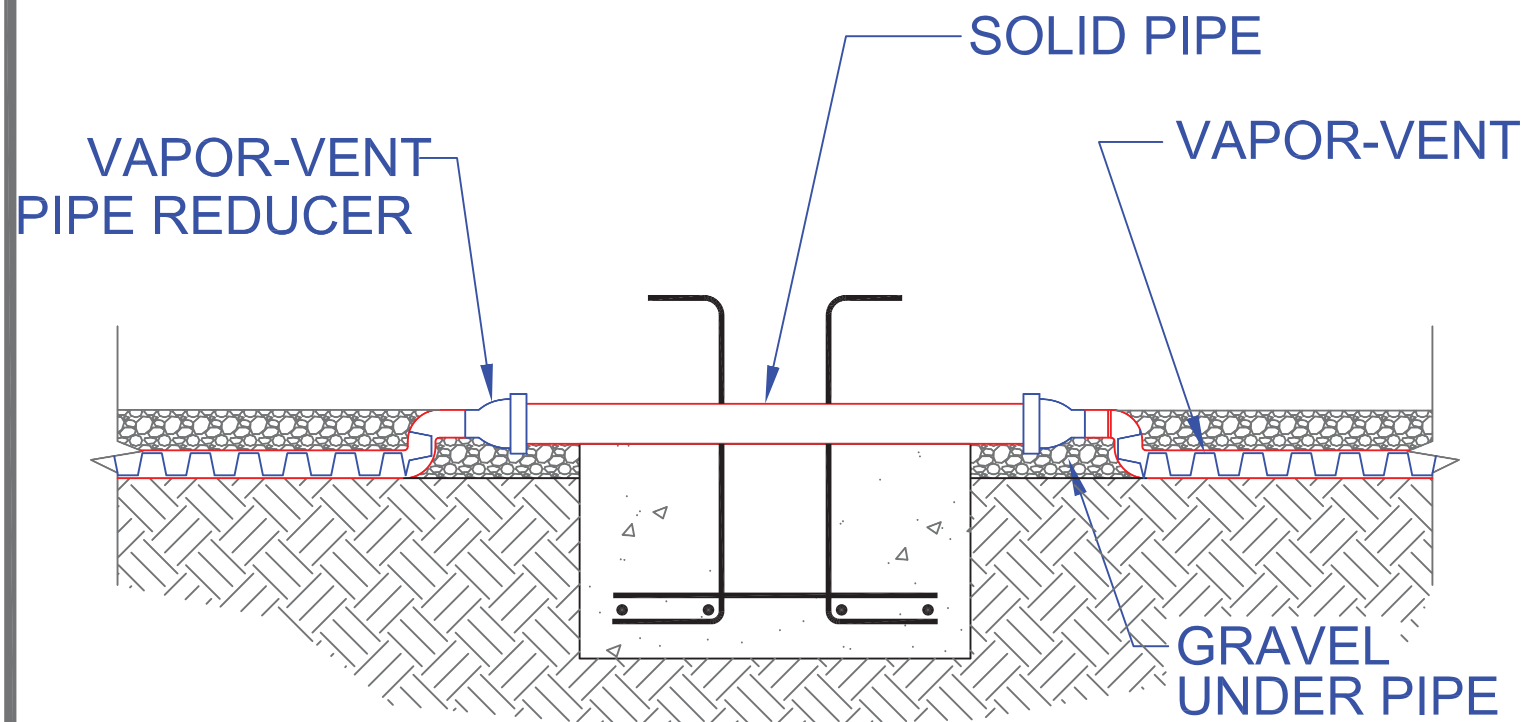
VERTICAL TERMINATION DETAIL



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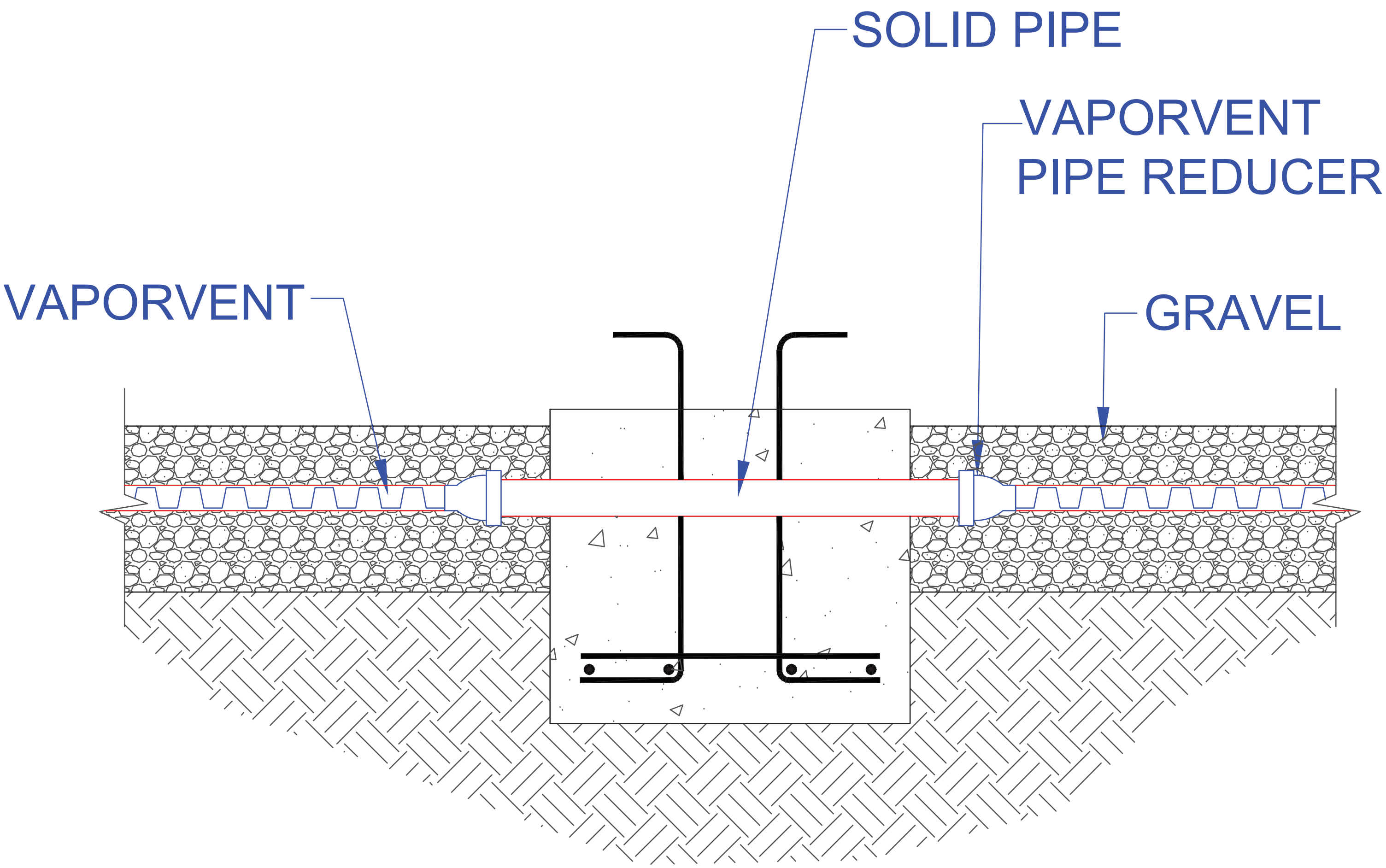
SCALE

TITLE

VAPOR-VENT OVER FOOTING



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SCALE

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VAPORVENT THROUGH FOOTING