REMEDIAL ACTION PLAN
5th Street and Magnolia Street
Oakland, California
ACDEH Case No.: RO3194

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Prepared for

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1.0 INTRODUCTION

This *Remedial Action Plan* ("*RAP*") has been prepared by West Environmental Services & Technology, Inc., (WEST), on behalf of Holliday Development for the 5th Street and Magnolia Street property located in Oakland, California ("Site;" Figure 1-1). The Site is to be redeveloped for mixed commercial retail and multi-family residential use, with landscape areas and hardscapes. This *RAP* presents the proposed remedial actions to address: total petroleum hydrocarbons (TPH), polycyclic aromatic hydrocarbons (PAHs) and metals in soil; and volatile organic compounds (VOCs) in soil gas, during Site construction activities. The *RAP* includes: a summary of the Site investigations; data evaluation and data gap analysis; evaluation of remedial technologies; and details of the recommended remedial action implementation.

The recommended remedial action includes excavation of soil containing TPH, PAHs and metals during Site grading, building foundation construction and utility trenches for on-Site reuse as engineered fill and/or off-Site disposal; vapor mitigation to address VOCs in soil gas; preparation of a Residual Risk Management Plan (RRMP); and institutional controls (i.e., land use covenant). Soil containing TPH, PAHs and metals will also be removed from the landscape areas to approximately 3-feet below ground surface. A geotextile marker fabric will then placed in the landscape areas prior to placement of clean fill for planting.

Approximately 450 cubic yards of soil excavated during mass grading will be placed beneath the proposed buildings as engineered fill. Approximately 1,200 cubic yards of soil removed during excavation for foundations, landscaping and utility trenches will be reused on-Site as engineered fill and/or transported off-Site for disposal. The extent of the vapor mitigation deployment will be determined based on the findings of additional soil gas sampling conducted prior to construction activities. Implementation of the *RAP* is being overseen by the Alameda County Department of Environmental Health (ACDEH).

2.0 BACKGROUND

2.1 SITE DESCRIPTION AND HISTORICAL USE

The approximately 0.5-acre Site is an undeveloped asphalt paved lot bounded by: 5th Street to the south; Union Street to the west; commercial businesses to the north; and Magnolia Street to the east; and is located within a commercial zone. The Site was formerly part of the California Department of Transportation's (Caltrans) Interstate 880 (Cypress Freeway) right-of-way that was demolished following the 1989 Loma Prieta earthquake. As part of the demolition, the freeway support columns were demolished to approximately 4-feet below ground surface. In August 2015, Caltrans auctioned the Site for redevelopment. Prior to freeway construction, the Site was occupied residential dwelling between at least the 1900s to the 1950s.

Historical uses of adjoining properties have included: steam laundry and cleaners (1910s to 1970s); automobile repair (1920s-present); and a gasoline service station (1950s-2000s) (AEI, 2017). Neighboring commercial businesses include automobile repair and service operations. Releases to soil and groundwater occurred on the adjacent commercial properties (1225 7th Street and 1211 7th Street) from underground storage tanks (USTs) containing petroleum products. In June 1997, the releases from the USTs at 1225 7th Street were closed by the Alameda County Health Care Services Agency (ACHCSA, 1997). Investigations of the UST releases at 1211 7th Street are currently ongoing.

2.2 SITE DEVELOPMENT

The Site will be a mixed-use development comprised of: a single story commercial/retail building; a multi-story residential apartment building with two elevators; an at-grade open-air parking garage; landscaping; and hardscape (Figure 2-1; Appendix A). The residential units will be constructed above the at-grade open-air parking garage (WEST, 2017). As part of the construction, excavation activities will include: mass grading of approximately 450 cubic yards and reuse on-Site as engineered fill beneath the buildings; removal of approximately 1,200 cubic yards for the utility trenches and building wall and column foundation footings for on-Site reuse or transported off-Site for disposal. Soil will be removed within the footprints of commercial building, parking garage/residential building and for subsurface utility trenches between approximately 1-feet and 4-feet below ground surface. The landscape areas will be completed at or above final grade. Additional soil will be removed to accommodate planting of trees within the at-grade planter areas. Copies of the plans for the proposed development are included in Appendix A.

2.3 GEOLOGIC AND HYDROGEOLOGIC CONDITIONS

The geology encountered in borings at the Site is comprised of fill and unconsolidated sands, silty sands and clay sands of the Merritt Formation. The fill material is approximately three-feet thick and comprised of sands and gravels with brick, wood, charcoal and concrete debris. Unconsolidated sands, silty sands and clayey sands of the Merritt Formation were encountered beneath the fill material to approximately 16-feet below ground surface (WEST, 2015).

Groundwater was encountered in the borings advanced at the Site between approximately 10-feet and 12-feet below ground surface. The groundwater flow direction measured at nearby sites is to the west-southwest (AEC, 1995).

2.4 SUMMARY OF INVESTIGATIONS

Investigations have been conducted at the Site since 2015. The investigations included collection of soil, soil gas and groundwater samples. Summaries of the Site investigations are presented below. Summaries of the analytical results are summarized in Tables 2-1 to 2-6 and presented on Figures 2-3 and 2-4. Cross-sections depicting the proposed building foundations and residual chemicals to remain in the subsurface following construction are depicted on Figures 2-5 to 2-7.

2.4.1 Site Investigation – 2015

In September 2015, WEST conducted Site investigations to characterize the environmental conditions at the Site and potential impacts from the UST releases on the adjacent properties. The field activities included drilling of eight borings (W-1 to W-8) to 16-feet below ground surface for collection of soil, soil gas and groundwater samples.

2.4.1.1 SOIL SAMPLING

Soil samples were collected from the Site between one- and six-feet below ground surface. Laboratory analysis of the soil samples revealed the presence of: PAHs including benzo(a)pyrene (BaP) up to 119 micrograms per kilogram (μg/kg); pesticides including chlordane up to 18.4 μg/kg and 4,4-DDE up to 7.54 μg/kg; and metals including arsenic up to 7.21 milligrams per kilogram (mg/kg) and lead up to 2,180 mg/kg (Tables 2-2 to 2-4).

2.4.1.2 SOIL GAS SAMPLING

Soil gas samples have been collected from four temporary vapor wells (W-1, W-2, W-4 and W-7) installed to five-feet below ground surface at the Site on September 17, 2015. Laboratory analysis of the soil gas samples revealed the presence of VOCs including: PCE up to 352 micrograms per cubic meter (μg/m^3)(W-4); benzene up to 9.14 μg/m^3 (W-1); toluene up to 15.8 μg/m^3 (W-1); ethyl benzene up to 4.60 μg/m^3 (W-1); xylenes up to 19.11 μg/m^3 (W-1); and trichlorofluoromethane (TCFM) up to 16.7 μg/m^3 (W-1)(Table 2-5 and Figure 2-4). The helium leak tracer gas was not detected in the soil gas samples above the laboratory-reporting limit of 0.100-percent.

2.4.1.3 GROUNDWATER SAMPLING

Three groundwater samples were collected from borings W-1, W-2 and W-4 on September 17, 2015. Laboratory analysis of the groundwater samples did not reveal the presence of TPHg above its laboratory-reporting limit of 0.050 milligrams per liter (mg/l)(Table 2-6). VOCs were not detected in the groundwater samples above their laboratory-reporting limits, except for PCE at 0.850 micrograms per liter (µg/l) (W-2)(Table 2-6).

2.4.2 Soil and Soil Gas Investigation – 2017

In May 2017, WEST conducted a soil and soil gas investigation at the Site. Nine soil borings (B-1 to B-9) were advanced for collection of soil samples between 1-foot and 2.5-feet within the proposed building foundation areas. Five soil gas samples (SG-1 to SG-5) were collected from temporary vapor probes installed at approximately 5-feet below ground surface. In addition, pursuant to a request by the ACDEH, two soil gas samples were collected from temporary vapor probes installed near previous soil gas sample locations W-2 and W-4. Summaries of the analytical data are presented in Tables 2-1 to 2-5 and depicted on Figures 2-3 and 2-4.

2.4.2.1 SOIL SAMPLING

2.4.2.1.1 Petroleum Hydrocarbons and VOCs

Soil samples collected from the borings advanced at the Site on May 8, 2017 were reported to contain TPHd up to 423 mg/kg (B-6; collected from one-foot below ground surface) and TPHmo up to 2,000 mg/kg (B-6; collected from one-foot below ground surface)(Table 2-1). Laboratory analysis of the soil samples did not reveal TPHg, benzene, toluene, ethyl benzene, xylenes and methyl tert-butyl ether (MTBE) above their respective laboratory-reporting limits (Table 2-1).

2.4.2.1.2 PAHs

Laboratory analysis of the soil samples collected between 1.5-feet and 2.5-feet below ground surface from borings B-1, B-2, B-4, B-6, B-7, B-8 and B-9 revealed PAHs above the laboratory-reporting-limits, including: benzo(a)anthracene up to 311 µg/kg (B-9); benzo(b)fluoranthene up to 404 µg/kg (B-9); BaP up to 399 µg/kg (B-9); dibenzo(a,h)anthracene up to 216 µg/kg (B-9); and indeno(1,2,3-c,d)pyrene up to 453 µg/kg (B-9)(Table 2-2).

2.4.2.1.3 Metals

Metals were reported present in the soil samples collected from the nine borings advanced at the Site with: arsenic up to 4.57 mg/kg (B-9); barium up to 214 mg/kg (B-2); chromium up to 43.2 mg/kg (B-9); cobalt up to 11.5 mg/kg (B-9); copper up to 30.8 mg/kg (B-2); lead up to 1,080 mg/kg (B-4); mercury up to 0.306 mg/kg (B-2); nickel up to 38.8 mg/kg (B-9); vanadium up to 36.6 mg/kg (B-9); and zinc up to 265 mg/kg (B-2)(Table 2-4). Other metals were not reported present in the soil samples above the laboratory-reporting limit of 2.50 mg/kg (Table 2-4).

2.4.2.2 SOIL VAPOR INVESTIGATION

Soil gas samples were collected at five-feet below ground surface from the temporary vapor probes, SG-1 to SG-5, W-2 and W-4, on May 8 and 9, 2017. The temporary vapor probes were installed in borings advanced using direct push technology. The soil gas samples were collected pursuant to the California Environmental Protection Agency (CalEPA) Department of Toxic Substances Control (DTSC) *Advisory – Active Soil Gas Investigation* (DTSC, 2015) guidelines a minimum of two-hours following vapor probe installation.

Laboratory analysis of the soil gas samples revealed VOCs including: PCE up to 182 $\mu g/m^3$ (W-4); benzene up to 18.6 $\mu g/m^3$ (SG-2); toluene up to 38.4 $\mu g/m^3$ (SG-2); methylene chloride up to 24.2 $\mu g/m^3$ (SG-3); and TCFM up to 14.2 $\mu g/m^3$ (SG-4) (Table 2-5 and Figure 2-4).

2.5 SUMMARY

Based on the investigations conducted at the Site, the contaminants of concern and associated media include: TPH, PAHs, pesticides and metals in soil; and VOCs in soil gas. Laboratory analysis of groundwater samples collected at the Site did not reveal TPH or VOCs above applicable screening levels and/or laboratory-reporting limits.

3.0 DATA EVALUATION

Consistent with Regional Water Board guidance, a screening level assessment was performed to assist in assessing the adequacy of the existing data (Regional Water Board, 2007). The screening level assessment consisted of three components: (1) identification of potential exposure pathways; (2) identification of appropriate screening levels for each media; and (3) a comparative analysis. The screening level assessment has been used to evaluate conditions of potential concern and identify areas for additional investigations, i.e., data gaps.

3.1 CONCEPTUAL SITE MODEL

Pursuant to the DTSC guidance documents, a CSM has been prepared for the Site (CalEPA, 1999). The CSM represents the assemblage of the existing Site data and the general physical conditions that influence contaminant transport.

The CSM presents the primary and secondary sources of TPH, VOCs, PAHs and metals and their release mechanisms to soil, soil gas and/or groundwater. The CSM was developed based on: known historical operations at the Site and adjacent properties; investigation results; properties of the chemicals present; suspected chemical release mechanisms; transport mechanisms; and potential exposure scenarios. The CSM is depicted on Figure 3-1.

3.1.1 Sources of Chemicals

3.1.1.1 HISTORICAL SITE USE

Between at least the 1900s and the 1950s, the Site was comprised of residential dwellings (AEI, 2017). In the 1950s, the residential buildings were demolished for construction of the Cypress Freeway. The Cypress Freeway was an elevated roadway supported on columns. In 1989, the Cypress Freeway was damaged during the Loma Prieta Earthquake. During the 1990s, the Cypress Freeway structure was demolished. The support columns were removed to approximately 3-feet below ground surface, approximately level with 5th Street. Approximately 3-feet of fill material appears to have been placed on the Site following the freeway demolition. The source of the fill material is unknown. Based on the historical Site use, the presence of TPH, PAHs, pesticides and lead in Site soil appears attributable to the former residential buildings (lead-based paint), automobile exhaust from leaded gasoline (aerially-deposited lead) and/or the fill material.

3.1.1.2 HISTORICAL USE OF ADJOINING PROPERTIES

Between at least the 1920s and the 1970s, commercial laundering and cleaning operations; automobile repair and a gasoline service station have operated on the adjoining properties to the north (AEI, 2017). The laundering and cleaning operations might have used cleaning agents containing PCE. The automobile repair operations might have used solvents that contain PCE for degreasing automobile parts including brakes and engines. Underground storage tanks (USTs) were used for gasoline and waste oil storage as part of the gasoline service station. Releases to soil and groundwater from the USTs were documented in the 1990s.

In addition, wastewaters containing waste cleaners and solvents generated from the laundering and cleaning operations and the automobile repair operations might have historically been discharged to the sanitary sewers or to the ground surface. Investigations conducted at the Site revealed PCE up to 352 $\mu g/m^3$ in the soil gas sample W-4 advanced near the proposed commercial building and within the west-central portion of the Site. Lower concentrations of PCE were detected between 13.5 $\mu g/m^3$ (SG-4) and 109 $\mu g/m^3$ (SG-1) advanced along the northern Site boundary with the adjacent commercial operations (Figure 2-4). However, based on the Site historical use (residential and Cypress Freeway right-of-way), the source of PCE in soil gas appears attributable to releases from the historical commercial operations adjacent to the Site.

3.1.2 Nature and Extent of Chemicals

3.1.2.1 Soil

The highest concentrations of TPH, PAHs, pesticides and lead in soil were detected in the samples collected within the upper 3-feet, within the fill material, at the Site. TPHd and TPHmo were detected up to 423 mg/kg and 2,000 mg/kg, respectively in the soils samples collected at 1-foot below ground surface. PAHs were detected in soil including BaP up to 399 μg/kg in the sample collected from boring B-9 at 1-foot below ground surface. Lower concentrations of PAHs were detected in the samples collected at 2.5-feet below ground surface including BaP up to 74.2 μg/kg. The pesticides 4,4-DDE and chlordane were detected up to 7.54 μg/kg (W-5) and 18.4 μg/kg (W-8) in the samples collected at 1-foot below ground surface. Similarly, the highest concentration of lead in soil was detected at 2,180 mg/kg (W-4) within the upper 3-feet (Figure 2-3). Based on the Site conditions and historical Site use, the presence of TPH, PAHs pesticides and lead in soil appear attributable to the fill material.

3.1.2.2 Soil Gas

The highest concentration of PCE was detected at 352 $\mu g/m^3$ (September 2017) in the soil gas sample collected from boring W-4, located within the west central portion of the Site (near the proposed commercial building; Figure 2-4). Lower concentrations of PCE were detected at: 109 $\mu g/m^3$ to the north-northeast and adjacent to the northern Site boundary (SG-1; May 2017); up to 224 $\mu g/m^3$ to the northeast within the footprint of the proposed parking garage (W-2; September 2017); 21.3 $\mu g/m^3$ to the east within the footprint of the proposed elevators for the parking garage and residential building (SG-5; May 2017); less than 13.6 $\mu g/m^3$ to the south (SG-3); and at 14 $\mu g/m^3$ to the west within the footprint of the proposed commercial building (Figure 2-4).

Based on the historical Site use, the source of PCE in soil gas appears attributable to releases associated with historical uses of the adjoining properties. The distribution of PCE in soil gas at the Site indicates the highest concentration was detected within the western central portion of the Site.

3.1.2.3 GROUNDWATER

Laboratory analysis of groundwater samples collected from the Site did not reveal TPHg or VOCs above their respective laboratory-reporting limits; except for PCE at 0.850 μg/l in the sample collected from boring W-2. Boring W-2 was advanced within the northern central portion of the Site near the northern Site boundary. The Site is located hydraulically downgradient of the adjoining commercial properties as the groundwater flow direction is the south-southwest. Based on the groundwater flow direction and the historical Site use, the presence of PCE in groundwater appears attributable to releases from the upgradient and adjoining commercial properties.

3.2 SCREENING LEVEL ASSESSMENT

3.2.1 Exposure Pathways Evaluation

Exposure pathways for: TPH, PAHs, pesticides and metals in soil; VOCs in soil gas; and VOCs in groundwater, at the Site have been evaluated to assess the potential impacts to human health and the environment (Figure 3-2). Direct contact and ingestion of soil is identified as complete exposure pathway for future construction and maintenance workers. Direct contact and ingestion of soil was not identified as complete exposure pathway for future occupants due to the proposed hardscapes and buildings to be constructed on the Site. Inhalation of VOCs is identified as a potentially complete exposure pathway for future Site occupants. Direct exposure to VOCs in groundwater is not identified as a potentially complete exposure pathway as the Site is served by municipal water supply.

3.2.1.1 EXPOSURE CONCENTRATIONS

The maximum-detected concentrations of the chemicals detected at the Site were used to compare with the screening levels. The United States Environmental Protection Agency (USEPA) recommends that maximum beneficial uses of a property be the basis for evaluation. Based on the development plans for ground floor commercial offices, above grade residential, parking garage, landscaping and hardscape, the Site soil conditions have been screened using the methods described below based on a commercial/construction worker exposure scenario. The Site soil gas conditions wee screened based on a residential and commercial exposure scenario.

3.2.1.2 COMMERCIAL/INDUSTRIAL WORKER

The commercial/industrial scenario uses the conservative assumption that on-Site workers spend all or most their workday outdoors. The exposure for commercial/industrial workers is presumed to include: (1) a full time employee of a company operating on-site who spends most of the work day conducting maintenance or manual labor activities outdoors or (2) a worker who is assumed to regularly perform grounds-keeping activities as part of his/her daily responsibilities (Regional Water Board, 2007). Exposure to surface and shallow subsurface soils (i.e., at depths between zero- and 3-feet below ground surface) is expected to occur during excavation of foundations, subsurface utilities and landscaping areas as part of the Site construction and moderate digging associated with routine post-construction maintenance and grounds-keeping. The commercial/industrial worker scenario is based on a worker that is exposed to chemicals at the Site for 24-hours per day during 250-days per year for 25-years.

3.2.2 Identification of Screening Levels

Based on the identified exposure pathways, screening levels were identified for chemicals in soil, soil gas and groundwater as non-drinking water source. Chemical-specific screening levels were developed from concentrations based on published environmental screening criteria. The screening levels that were considered include the Regional Water Board Environmental

Screening Levels (ESLs) and the California Department of Public Health (CDPH) maximum contaminant levels (MCLs). Exceeding a screening level "does not necessarily indicate that adverse impact to human health or the environment are occurring, [it] simply indicates that potential for adverse impacts may exist and that additional evaluation is warranted" (Regional Water Board, 2007).

3.2.2.1 REGIONAL WATER BOARD ESLS

The Regional Water Board has identified ESLs for TPH, PAHs, pesticides and metals in soil, VOCs in soil gas and VOCs in groundwater (Regional Water Board, 2016). The Regional Water Board ESLs "are intended to be conservative" and "the presence of a chemical at […] concentrations below the corresponding ESL can be assumed to not pose a significant threat to human health and the environment." While a chemical may be measured at concentrations above the Regional Water Board ESL, it "does not necessarily indicate adverse effects on human health or the environment are occurring, rather that additional evaluation is warranted." In developing the ESLs, the Regional Water Board has considered exposure pathways to humans, including inhalation of VOCs in indoor air from migration of contaminated soil gas.

3.2.2.2 CALIFORNIA DEPARTMENT OF PUBLIC HEALTH – MAXIMUM CONTAMINANT LEVELS

The CDPH MCL is the maximum concentration of a chemical that is allowed in public drinking water systems. The MCL is established by either the USEPA or the CDPH. Currently, there are fewer than 100 chemicals for which MCLs have been established; however, these represent chemicals that are thought to pose the most serious risk.

The USEPA guidance for establishing an MCL states that "MCLs are enforceable standards and are to be set as close to the maximum contaminant level goals (MCLGs) as is feasible and are based upon treatment technologies, costs (affordability) and other feasibility factors, such as availability of analytical methods, treatment technology and costs for achieving various levels of removal." The process of determining an MCL starts with an evaluation of the adverse effects caused by the chemical in question and the doses needed to cause such effects.

The result of this process is a safe dose (the dose thought to provide protection against adverse effects including a margin of safety), now called a Reference Dose (RfD) by the EPA. This evaluation is based on the results of animal experiments, and the research results are extrapolated to humans using standard EPA methods.

3.3 COMPARATIVE ANALYSIS

An evaluation between the identified screening levels and the soil laboratory analytical results was performed to characterize the Site conditions.

3.3.1 Soil Conditions

3.3.1.1 TPH AND VOCS

TPHg was not detected in soil above its laboratory-reporting limit of 1.00 mg/kg. TPHd was detected up to 423 mg/kg (boring B-6 at 1-foot below ground surface), above its unrestricted use ESL of 230 mg/kg but below its commercial ESL of 1,100 mg/kg. TPHd was not detected in the soil sample collected from boring B-6 at 2.5-feet below ground surface above its laboratory-reporting limit of 10 mg/kg.

TPHmo was detected up to 2,000 mg/kg (boring B-6 at one-foot below ground surface) and co-present with TPHd at 423 mg/kg, below its unrestricted use ESL of 5,100 mg/kg. TPHmo was detected in the soil sample collected from boring B-6 at 2.5-feet below ground surface at a lower concentration of 10.8 mg/kg, below its unrestricted use ESL of 5,100 mg/kg (Table 2-1).

VOCs including benzene, toluene, ethyl benzene, xylenes and MTBE were not detected in the soil samples collected at the Site above their respective laboratory-reporting limits (Table 2-1).

3.3.1.2 PAHs

Benzo(a)anthracene was reported present in the soil samples up to 311 μg/kg (boring B-9 at one-foot below ground surface), above its unrestricted use ESL of 160 μg/kg but below its commercial ESL of 2,900 μg/kg. Benzo(b)fluoranthene was detected in soil up to 404 μg/kg (boring B-9 at one-foot below ground surface), above its unrestricted use ESL of 160 μg/kg but below its commercial ESL of 2,900 μg/kg. Benzo(a)pyrene was detected in the soil samples collected at the Site up to 399 μg/kg (boring B-9 at one-foot below ground surface), above its unrestricted use and commercial ESLs of 16 μg/kg and 290 μg/kg (Table 2-2 and Figure 2-3).

Dibenzo(a,h)anthracene was detected up to 430 μg/kg (boring W-6 at one-foot below ground surface), above its unrestricted use and commercial ESLs of 16 μg/kg and 290 μg/kg. Indeno(1,2,3-c,d)pyrene was detected up to 453 μg/kg (boring B-9 at one-foot below ground surface), which is above its unrestricted use ESL of 160 μg/kg but below its commercial ESL of 2,900 μg/kg. Other PAHs were detected in the soil samples collected at the Site but at concentrations below their respective unrestricted use ESLs (Table 2-2).

3.3.1.3 Organochlorine Pesticides

The organochlorine pesticides chlordane and 4,4-DDE were detected in the soil samples above the laboratory-reporting limits. Chlordane was detected up to 18.4 μg/kg (boring W-8 at one-foot below ground surface), which is below its unrestricted use ESL of 480 μg/kg. 4,4-DDE was detected up to 7.54 μg/kg (boring W-5 at one-foot below ground surface), which is below its unrestricted use ESL of 1,900 μg/kg (Table 2-3).

3.3.1.4 Metals

Metals were detected in the soil samples including arsenic and lead. Arsenic was detected up to 7.21 mg/kg (boring W-2 at one-foot below ground surface), which is consistent with the range of background arsenic concentrates up to 11 mg/kg for the San Francisco Bay Area (Duverge, 2011). Lead was detected in soil up to 2,180 mg/kg (boring W-4 at three-feet below ground surface), which is above its unrestricted use and commercial ESLs of 80 mg/kg and 320 mg/kg (Table 2-4 and Figure 2-3). Other metals were detected in the soil samples but at concentrations below their respective unrestricted use ESLs.

3.3.2 Soil Gas Conditions

VOCs were detected in the soil gas samples collected at the Site. PCE was detected up to 352 $\mu g/m^3$ (boring W-4; September 2015), which is above its unrestricted use ESL of 240 $\mu g/m^3$, but below its commercial ESL of 2,100 $\mu g/m^3$. However, during the May 2017 investigation, PCE was detected in the soil gas sample collected from the boring W-4 location at a lower concentration of 182 $\mu g/m^3$, which is below its unrestricted use ESL of 240 $\mu g/m^3$ (Table 2-5 and Figure 2-4).

Benzene was detected up to 18.6 $\mu g/m^3$ (boring SG-2), which is below its unrestricted use ESL of 48 $\mu g/m^3$ (Table 2-5; Figure 2-4). Toluene was detected up to 38.4 $\mu g/m^3$ (boring SG-2), which is below its unrestricted use ESL of 160,000 $\mu g/m^3$. Methylene chloride was detected up to 24.2 $\mu g/m^3$ (boring SG-3), below its unrestricted use ESL of 510 $\mu g/m^3$. Vinyl chloride was not detected in the soil gas samples above its laboratory-reporting limits; however the laboratory-reporting limits for soil gas samples collected from borings W-2, W-4, SG-2, SG-3 and SG-4 were above the Regional Water Board unrestricted use ESL of 4.7 $\mu g/m^3$. Other VOCs were either not detected in soil gas above their respective laboratory-reporting limits or unrestricted use ESLs (Table 2-5).

3.3.3 Groundwater Conditions

Groundwater samples were collected from borings W-1, W-2 and W-4. Laboratory analysis of the groundwater samples did not reveal the presence of TPHg above its laboratory-reporting limit of 0.050 mg/l. The VOC PCE was detected up to 0.850 $\mu g/l$, which is below its MCL of 5 $\mu g/l$.

Other VOCs were not detected in the groundwater samples above their respective laboratory-reporting limits (Table 2-6).

3.4 DATA GAP ANALYSIS

The findings of the investigations identified:

- TPH, PAHs and lead in Site soil above their respective Regional Water Board unrestricted use ESLs but below their respective Regional Water Board commercial use ESLs;

- The VOC PCE in soil gas above its Regional Water Board unrestricted use ESL but below its Regional Water Board commercial use ESL near the proposed commercial building. PCE was detected in soil gas below its unrestricted use Regional Water Board ESL near the elevator and proposed at-grade open air parking garage. Vinyl chloride was not detected above its laboratory-reporting limits; however, the laboratory-reporting limit in the soil gas sample collected near the elevator was above the Regional Water Board unrestricted use ESL; and

- TPHg and VOCs were not detected in groundwater above their respective laboratory-reporting limits and /or applicable screening levels.

Based on the investigation findings, the distribution of TPH, PAHs, pesticides and lead in soil has been adequately characterized. However, additional soil gas investigations appear warranted to further characterize the presence of VOCs near the proposed commercial building and elevators. Therefore, additional soil gas sampling to further characterize the extent of VOCs within the subsurface is needed.

3.5 SUMMARY

The proposed Site use is a mixed commercial/residential development comprised of: an at-grade commercial building; and at-grade open-air parking garage with residential units constructed above the parking garage; landscaping and hardscapes. Approximately 450 cubic yards of soil will be excavated during mass grading and placed beneath the proposed buildings as engineered fill. Approximately 1,200 cubic yards of soil will be removed during excavation for foundations (1,100 cubic yards) and utility trenches (100 cubic yards) and will be reused on-Site as engineered fill and/or transported off-Site for disposal.

The landscape areas will be completed as at-grade or above grade planters. Soil will be over-excavated within the at-grade landscaping areas to accommodate tree plantings. The soil removed will be reused on-Site as engineered fill or transported off-Site for disposal. Prior to planting of the trees and other plants, a marker fabric will be placed within the tree excavations then backfilled with imported soil. A marker fabric will also be placed within the at-grade landscaping areas prior to covering with imported soil. The remaining portions of the Site will be completed as hardscapes (i.e., sidewalks, pavers and patios).

PCE was detected in soil gas near: the proposed commercial building up to 352 $\mu g/m^3$ (W-4), below its commercial use ESL of 2,000 $\mu g/m^3$; and the proposed elevator 21.3 $\mu g/m^3$ within the parking garage/residential building below its unrestricted use ESL of 240 $\mu g/m^3$. However, additional soil gas sampling is needed to further define the extent of PCE in soil gas to the north and northeast of the proposed commercial building and evaluate the potential presence of vinyl chloride in soil gas due to elevated detection limits near the elevator for the residential building.

4.0 EVALUATION OF REMEDIAL TECHNOLOGIES

Pursuant to the requirements of *Resolution No. 92-49 Policies and Procedures for Investigation and Cleanup and Abatement of Dischargers Under Water Code Section 13304*, remedial technologies were identified and evaluated with respect to effectiveness, feasibility and relative costs of applicable alternative methods for cleanup. Based on previous analysis of analogous sites, remedial technologies have been selected. The selected technologies included: soil excavation; engineering controls; and institutional controls, to address TPHd, PAHs and lead in soil; and VOCs in soil gas. The additional soil gas data, as identified in Section 3.5, will be used to determine the extent of engineering control deployment to address VOCs in the subsurface. The supporting rationale for the selected technologies is presented below.

4.1 EXCAVATION

Vadose zone excavation can be an effective technology in removing both source material bound to geologic material, as well as the gas phase contaminants present in the interstitial soil voids. Excavation can be accomplished using conventional equipment, including excavators, backhoes or other equipment.

4.2 ENGINEERING CONTROLS

Engineering controls encompass a variety of barriers (e.g., soil capping, hardscapes, subsurface venting systems, fences, etc.) to contain or prevent exposure to contamination on a property (USEPA, 2010). To address potential direct contact to TPH, PAHs and lead in soil, engineering controls include placement of excavated soil on-Site as engineered fill beneath buildings and hardscapes and using marker fabrics to demarcate soil beneath at-grade landscape areas.

To address VOCs in soil gas, engineering controls can include both active and passive techniques. Vapor intrusion mitigation may be taken as a proactive measure to avoid a costly characterization study (USEPA, 2008) and include passive and active subslab venting/barrier systems.

4.3 INSTITUTIONAL CONTROLS

Institutional controls are legal and/or physical means of limiting or eliminating potential human exposures. Institutional controls include deed restrictions and land use covenants that limit Site access and land uses to protect human health. Institutional controls also can be effective, especially, when used in conjunction with other remedial technologies. In addition, if the cleanup does not result in unrestricted use, institutional controls can be used to limit potential exposure to subsurface contaminants by limiting activities on a property.

4.4 PREFERRED REMEDIAL ACTION

Based on the technical analyses, the remedial actions have been selected to address the presence of TPH, PAHs and lead in soil and VOCs in soil gas. The remedial actions include:

- Excavation of soil containing TPH, PAHs and lead during Site grading, foundation excavation and utility trenching activities;
- On-Site reuse of excavated soil as engineered fill beneath buildings and hardscapes and/or off-Site disposal of soil generated from the excavations not used as engineered fill;
- Placement of a marker fabric within the at-grade landscape planters and backfilling with clean imported soil;
- Installation of subslab vapor mitigation system beneath occupied building(s), elevator pits, etc., if shown to be necessary, to control vapor intrusion;
- Installation of trench dams within utility trenches to control vapor migration, if shown to be necessary;

- Land use controls to limit exposure to subsurface contaminants to future Site occupants and workers; and

- Preparation of a Residual Risk Management Plan (RRMP), which details the procedures and protocols for managing soil and soil gas, if needed, during post-construction maintenance activities.

5.0 REMEDIAL ACTION IMPLEMENTATION

The preferred remedial actions include: soil excavation and on-Site reuse as engineered fill and/or off-Site disposal; installation of subslab vapor mitigation system for VOCs; land use restrictions; and preparation of a *RRMP*. The proposed building foundations and vapor mitigation system areas are depicted on Figure 5-1. A remedial action implementation plan will be prepared and submitted to the ACDEH for review and approval providing additional details of the remedial actions provided below.

Prior to implementation of the remedial actions, the following activities will be conducted: obtaining necessary permits and agency approvals; conducting proper notification; and obtaining approval from the ACDEH. Details of the implementation activities are presented below.

- Supplemental soil gas sampling to further characterize the presence of VOCs in the subsurface;
- Excavation of soil containing TPH, PAHs and lead above screening levels during Site construction activities for reuse on-Site beneath buildings and hardscapes and/or transported off-Site for disposal;
- Placement of a geotextile marker fabric following excavation of soil between 0-feet and 3-feet below ground surface within landscape areas;
- Install vapor mitigation system, if required;
- Prepare a Residual Risk Management Plan (RRMP) to present the requirements for post-development soil and vapor mitigation system management;
- Record a Land Use Covenant (LUC), which incorporates the RRMP requirements; and
- Task 6: Remedial Action Completion Report.

5.1 TASK 1: SUPPLEMENTAL SOIL GAS SAMPLING

As identified in Section 3.5, additional soil gas samples will be collected to further characterize the presence of VOCs in the subsurface near the northern and central portions of the Site (Figure 5-1). The soil gas samples will be collected prior to commencement of Site construction activities. The findings from the supplemental soil gas sampling will be forwarded the ACDEH for review and concurrence on the necessity for vapor mitigation measures. A work plan detailing the sample collection methodology and suite of chemicals to be analyzed will be submitted to the ACDEH for review and approval prior to implementation.

5.2 TASK 2: SOIL EXCAVATION

5.2.1 Permitting and Utility Clearance

Prior to implementation, a Site Management Plan (SMP) will be prepared which details the procedures and protocols for managing soil during Site construction. In addition, approvals, permits and licenses required by local, state and federal agencies, as necessary, will be obtained. In addition, affected parties will be notified of the scheduled work dates approximately one week prior to commencing work.

Prior to implementation of the actions, appropriate notifications will be made to USA to locate and clear work areas for underground utilities at the Site. The work areas will also be cleared for underground utilities using a private underground utility locating contractor.

5.2.2 Worker Health and Safety

Due to the potential exposure to TPH, PAHs and lead in soil, prior to Site development activities, a HASP will be prepared and followed by on-Site personnel. The HASP will be prepared to address the requirements of the Occupational Health and Safety Administration (OSHA) 29 CFR 1910.120 guidelines and Title 8 CCR Section 5192. The HASP will be read by Site workers and visitors to apprise them of the Site conditions and provide instructions for implementing proper safety training and procedures during development activities.

As phases of work proceed, the HASP will be updated to reflect: Site organizational structure; names of key personnel; personnel training requirements; medical surveillance program; summary of risk assessment; a task-specific hazard analysis; Site control program; personal protective equipment use; air monitoring plan; decontamination procedures; emergency response plan; spill containment; Site sanitation facilities; and standard operating procedures. The contractor conducting the development activities will also use their Injury and Illness Prevention Program (IIPP) in conjunction with the HASP.

5.2.3 Site Preparation

Prior to soil excavation, the asphalt will be removed to expose the underlying soil. Pursuant to AB 939 requirements, asphalt will be recycled to the extent possible. Fencing will also be installed and maintained around the Site to control unauthorized Site access and provide protection to the community.

5.2.4 Soil Excavation

The proposed excavation depths will be determined based on the proposed grading and building foundation plans using hydraulic excavating equipment operated by a California Class A Hazardous Waste licensed contractor (Figure 5-1; Appendix A). The excavated soil will then be temporarily stockpiled on-Site for future placement as engineered fill beneath the buildings and hardscapes and/or transported off-Site for disposal.

5.2.5 Soil Handling

It is anticipated that the excavated soil will be stockpiled prior to on-Site reuse. The soil will be handled in a manner to minimize the potential for airborne dust to be generated. During soil handling, air monitoring will be conducted and used to confirm the efficacy of soil handling procedures. As appropriate, procedures will be modified to control emissions of dust. Disturbed areas that are inactive for seven days or more will also be wetted to minimize potential airborne entrainment and generation of dust.

5.2.5.1 Air Monitoring

Visual and real-time air monitoring for respirable dust will be performed during excavation and soil handling activities. The objective of the air-monitoring program is to document conditions, and as appropriate, adjust work activities to protect the health and safety of the on-Site construction workers and nearby community. The real-time dust monitoring will be conducted at upwind and downwind locations. The upwind and downwind monitoring locations will be adjusted, a necessary, depending on the direction of the prevailing winds.

Real-time respirable dust air monitoring will be performed using a Monitoring Instruments for the Environment, Inc. (MIE) data logging real time monitor, model PDR-1000 respirable air monitor (RAM) or equivalent. The PDR 1000 is designed to measure the concentration of airborne particulate matter using a high sensitivity nephelometer (photometer) using a light scatter sensor. Sensitivity of the PDR 1000 is reported to range from 0.001 milligrams per cubic meter (mg/m^3) to 400 mg/m^3. The RAM will be calibrated daily.

5.2.5.1.1 Worker Dust Action Levels

Lead has a California Occupational Safety and Health Administration (CalOSHA) Permissible Exposure Limit (PEL) of 0.05 mg/m^3 and an Action Level (AL) of 0.03 mg/m^3. Based on the maximum concentration for lead in soil at 2,180 mg/kg, approximately 11.5 mg/m^3 of total dust would need to be generated to exceed the lead AL of 0.03 mg/m^3 (Appendix B).

Respirable dust has an OSHA PEL of 5.0 mg/m^3 and an AL of 2.5 mg/m^3. The respirable dust action level of 2.5 mg/m^3 is below the concentration of total dust needed to exceed the lead AL.

Therefore, if visible dust is observed, engineering controls, i.e., soil wetting, should be implemented to control fugitive dust emissions.

5.2.5.1.2 Community Protection

The California Air Resources Control Board (CARB) sets 24-hour 10 micron or smaller dust particulate matter (PM10) California Ambient Air Quality Standard (CAAQS) concentration of 0.05 mg/m^3 at the Site perimeter. Therefore, engineering controls, i.e., soil wetting, should be implemented during excavation activities if dust levels at the Site perimeter exceed the CARB CAAQS concentration.

5.2.5.2 DUST CONTROL

Dust control will be performed by applying water with a low-pressure spray system. Low volumes of potable water will be routinely spread in areas where dust may be generated because of excavation activities. If monitoring indicates that the dust control measures are not adequate, then additional engineering control measures will be implemented. These additional measures will include, but are not limited to: 1) change of work procedures; 2) soil wetting during and excavation, stockpiling, backfilling and loading; 3) tarping of trucks; and 4) covering of exposed excavations and stockpiles with plastic sheeting; and 5) use of dust palliatives.

5.2.6 Geotextile Placement

Following Site grading within the at-grade landscaped areas, a non-biodegradable woven geotextile fabric (Mirafi Orange Delineation Non-woven Geotextile or equivalent) will be placed at the base of the tree excavations and landscaping as a marker. A copy of a geotextile specification is included in Appendix C.

5.2.7 Off-Site Soil Disposal

Excavated soil not reused on-Site for engineered fill will be stockpiled, characterized and profiled for off-Site transportation and disposal. Procedures for characterizing the excavated soil are presented below.

5.2.7.1 DISPOSAL CHARACTERIZATION

Samples will be collected to properly characterize the soil prior to off-Site disposal. The final destination of excavated soil will be selected based on the waste analytical results and acceptance criteria provided by the waste management facilities. The soil samples results will be evaluated using the procedures outlined in *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods* (SW-846). USEPA's SW-846 identifies that the statistically representative concentration will be used when characterizing solid wastes with potentially variable concentrations, i.e., the 90 percent upper confidence level (UCL) concentration. The 90 percent UCL concentration represents the concentration that it is expected that 90 out of 100 samples will have concentrations equal to or less than. The number of samples and suite of analytes will be determined based on the nature and source of the contamination and waste facility requirements.

A statistical analysis using a Student's "t-test" will be performed using the sample results to determine the 90 percent UCL concentration of the regulated constituents in the samples. The results of the sampling will also be evaluated to determine whether an appropriate number of samples have been collected to characterize the waste using methodologies as outlined in USEPA's SW-846. The results of the stockpile soil sampling and statistical analysis will be forwarded to landfills or other appropriate facilities for profiling and acceptance.

5.2.7.2 STOCKPILE SAMPLE COLLECTION METHODOLOGY

Discrete samples will be collected from the stockpiled soil for characterization. The frequency of sampling will be conducted in general following the California Department of Toxic Substances' (DTSC) *Information Advisory – Clean Imported Fill Material* and in accordance with the waste management facility for soil requiring off-Site disposal. The discrete soil samples will be collected from at least three to six-inches below the surface of the stockpile by hand pushing brass-lined tubes into each portion of the stockpile. The ends of the brass-lined tubes will be covered with Teflon© sheets and plastic end caps, labeled, sealed in a plastic bag and placed in a chilled ice chest. Following appropriate sample collection protocols, the soil samples will be transported to a CDPH ELAP certified laboratory for chemical analysis, following ASTM D 4840 chain-of-custody protocols. The stockpiled samples will be analyzed for the constituents required by the waste management facility for soil requiring off-Site disposal.

5.2.7.3 OFF-SITE SOIL TRANSPORT

Following acceptance by the disposal facility, the stockpiled soil will be loaded into trucks operated by licensed transporters for off-Site disposal. Non-hazardous soils will be transported off-Site using appropriate bills of lading. Hazardous wastes will be manifested off-Site on Uniform Hazardous Waste Manifests in accordance with regulatory requirements. It is expected that the excavated soil will be segregated and disposed at Class I and/or Class II waste management facilities. Appropriately, designated and licensed trucks will be used to convey the soil from the Site to the disposal facilities. In addition, trucks transporting soil off-Site will not be loaded above the side or rear of the truck bed. The truckload will be covered with a tarp prior to leaving the Site to prevent particulate emissions to the atmosphere.

5.2.7.4 RECORDKEEPING

A log sheet will be maintained that documents the date, time, estimated volume, waste/material, trucking company, driver and vehicles used for the trip. The log will also document the decontamination procedures of the trucks. Log sheets will be kept at the Site. In addition, copies of bills-of-lading, analytical results representing the load, hazardous waste manifests (as appropriate), route maps and directions, emergency instructions and contacts will be carried with each load leaving the Site.

5.2.8 Import Soil Characterization

Imported soil used for backfilling of excavations and landscaping will be characterized prior to transportation to the Site. Soil samples will be collected from the off-Site borrow areas for characterization. The laboratory analytical results of the soil samples collected from the proposed borrow areas will be compared to the Regional Water Board Tier 1 ESLs, with concurrence from the ACDEH. A summary of the imported fill material soil sample collection methodology is presented below.

5.2.8.1 SOIL SAMPLE COLLECTION METHODOLOGY

The contractor will identify borrow areas and soil samples will be collected as appropriate. The frequency of sampling will be conducted in general following the California Department of Toxic Substances' (DTSC) *Information Advisory – Clean Imported Fill Material*. The borrow area soil samples will be collected in pre-cleaned brass liners or glass jars, labeled and placed in a chilled cooler for transportation to a CDPH ELAP laboratory following ASTM D 4840 chain-of-custody protocols. The soil samples will be analyzed for the suite of analytes in accordance with DTSC's *Advisory for Clean Imported Fill Material*.

5.2.9 Soil Stockpile Management

The following procedures will be used for management of soil stockpiles. The soil stockpiles will be covered with plastic sheeting to control dust. Stockpiled areas will also be bermed to prevent storm water erosion and/or runoff. Uncovered stockpiles will be watered pursuant to dust control requirements to minimize airborne particulate emissions. The berms surrounding the stockpiled area will be inspected and maintained when the stockpiles are uncovered and water is applied for dust control.

Any portions of the stockpile not being actively worked on during a given day will remain covered with plastic sheeting. Plastic sheeting will be held in place by tires, concrete or other appropriate weighted material. Excavations, stockpiles and inactive work areas will be inspected regularly to assess the potential for dust generation. Stockpiles will be inspected daily for proper cover.

5.2.10 Groundwater Management

While not anticipated, if groundwater is encountered in excavations advanced during Site development, the groundwater will be removed from the excavations, as necessary, containerized on-Site and managed for off-Site disposal. Groundwater management options include off-Site transportation to an appropriate disposal facility or discharge to the sanitary sewer under a permit obtained from the wastewater treatment plant in accordance with local permit requirements.

5.3 TASK 3: VAPOR MITIGATION SYSTEM

A vapor mitigation system will be installed, as necessary; to control subsurface migration of VOC vapors into future occupied spaces (Figures 5-1 and 5-2). Based on the findings of the additional vapor investigation and concurrence with the ACDEH, the vapor mitigation system will be deployed, if VOCs are detected above applicable screening levels in areas beneath the proposed commercial or residential buildings (i.e., elevator pit).

The vapor mitigation system will be comprised of a dispersion vent layer and vent riser, vapor barrier and foundation seals typically installed between the backfill and the floor slab of the buildings. Figure 5-2 illustrates a typical design. Additionally, utility trench vapor dams will be installed. The vapor mitigation system will be adaptable for active ventilation, if post-construction monitoring warrant such modification. The developer/owner's licensed professional engineer shall prepare engineering drawings and specifications for the vapor mitigation system. The drawings and specifications will be submitted to the ACDEH for review and approval prior to installation. Details of vapor mitigation system are presented below.

5.3.1 Dispersion Vent Layer

A dispersion layer vent system will be installed to provide a higher permeability zone, i.e., preferential pathway, for the gas to migrate and vent to atmosphere. The dispersion layer will be comprised of a minimum of 4-inches of coarse aggregate meeting ASTM 57, with 85 percent of the surface consisting of fractured faces. The coarse aggregate shall have an open gradation with 100 percent passing the 1.5-inch sieve; 95 to 100 percent passing the 1.0-inch sieve; 26 to 60 percent passing the 0.5-inch sieve; 0 to 10 percent passing the No. 4 sieve; and 0 to 5 percent passing the No. 8 sieve. A Geovent™ gas venting core or equivalent will be installed within the dispersion vent layer and connected to a vent riser which will extend vertically to the building roof (Figure 5-2). A copy of the Geovent™ specification is included in Appendix C.

5.3.2 Vapor Barrier

The overlying building foundation in conjunction with membranes and other barriers will be used to retard upward migration of vapors. The vapor barrier layers will include a permeable vented zone overlaid with: a 16 mil high-density polyethylene (HDPE) membrane; 40 mil spray applied asphalt/rubber barrier; and a 100 mil non-woven geotextile.

5.3.2.1 VAPOR BARRIER INSTALLATION

Proper installation of the vapor barrier is essential for optimal performance. Small imperfections in the barriers (e.g., due to holes, tears, or incomplete seals at the footings or pipe penetrations) can provide a migration route for soil gas when buildings are under negative relative pressure (compared to soil gas pressure).

The vapor barrier must be tested following construction of the vapor barrier and before the placement of concrete over the barrier. The testing will be performed by blowing smoke or some tracer gas under the membrane. If smoke is detected outside of the barrier, additional measures will be undertaken. Methods will be developed to pinpoint imperfections and repair them after installation, e.g., smoke and/or tracer gas testing. Once smoke tested and receiving approval/passing test, the concrete slab/pads may be poured completing the foundation.

The construction will follow quality control procedures, including training of construction workers, to minimize barrier damage during installation and subsequent construction. The installation requirements will include the use of: certified installers; certified inspectors; and smoke testing.

A construction quality assurance plan (CQA Plan) will be used during the installation and testing of the vapor barrier. The CQA Plan will be submitted to ACDEH as part of the engineering drawings and specifications. The CQA Plan will follow the applicable ASTM standards for underslab vapor retarders; including those for material specifications with specific criteria that the material has to meet; both applicable to new materials as well as materials that are conditioned or exposed to simulate service conditions; and the placement and installation of the vapor retarder. Specifically, the following ASTM standards will be followed, as applicable:

- ASTM E1993: Standard Specification for Bituminous Water Vapor Retarders Used in Contact with Soil or Granular Fill Under Concrete Slabs;
    - This covers bituminous membrane water vapor retarders and specifies requirements for water vapor permeance, tensile strength, puncture resistance, and thickness.
- ASTM E1745: Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill Under Concrete Slabs;

  - This covers plastic water vapor retarders and classifies the material into either Class A, B, and C based on: water vapor permeance; tensile strength; puncture resistance.

  - Water Vapor Permeance requirements per ASTM E1745-11 call for a vapor retarder material to have a maximum permeance rating of 0.1 perms.

- ASTM E1643: Standard Practice for Selection, Design, Installation, and Inspection of Water Vapor Retarders Used in Contact with Earth or Granular Fill under Concrete Slabs.

5.3.3 Foundation Seals

The design also requires sealing of foundation penetrations. Penetrations of the foundation include plumbing, electrical conduits and expansion joints installed during construction. Improper sealing may also increase operational costs due to excessive indoor air flow relative to soil gas capture.

5.3.4 Utility Trench Vapor Dams

Vapor dams will be installed in utility trenches that extend beneath the building foundation from areas outside the perimeter of the buildings to mitigate preferential migration of vapors. The trench dams will consist of a cement, bentonite and water slurry or controlled low-strength material placed within the utility trench extending a minimum of five feet beginning immediately adjacent to the exterior perimeter of the building foundation and placed a minimum of six inches above the bottom of the perimeter footing to the base of the trench.

5.3.5 Post-Construction Monitoring

To document the effectiveness of the vapor mitigation system, post-construction sampling will be conducted. The sampling will include collection of subslab samples one time prior to building occupancy following building completion. Details of the post-construction monitoring will be presented in the RRMP to be submitted separately.

5.4 TASK 4: RESIDUAL RISK MANAGEMENT PLAN

The RRMP will be prepared which specifies procedures and protocols for future maintenance workers for managing soil beneath the buildings, hardscapes and marker fabric. The RRMP will be used in conjunction with the installed engineering controls, i.e., vapor mitigation system, to control potential exposures to chemicals in the subsurface. The RRMP will be submitted to the ACDEH for review and approval separately. Implementation of this RRMP will be the responsibility of the Site owner including its construction manager, contractors, subcontractors and future maintenance workers.

5.5 TASK 5: LAND USE COVENANT

Following completion of Site remedial actions, a land use covenant (LUC) will be prepared and recorded with the Alameda County Recorders Office. The LUC identifies restrictions that are reasonably necessary to protect human health and safety or the environment due to the presence of hazardous materials beneath the Site including but not limited to:

- Site use shall be for commercial, office space, retail, restaurant, and/or multi-family residential, in conformance with local zoning code;

- All uses and development of the Site shall be consistent with the RRMP, which shall be included into the LUC by reference;

- No wells for the purpose of extracting water for any use, including but not limited to, domestic, potable, or industrial uses, shall be allowed on the Site or any portion thereof unless expressly permitted in writing by the ACDEH;

- ACDEH shall have reasonable access to the Site for the purposes of inspection, surveillance, maintenance, or monitoring, as provided for in Division 7 of the Water Code; and

- No owner or occupant of the Site shall act in any manner that will aggravate or contribute to the existing environmental conditions of the Site. All use and development of the Site shall preserve the integrity of any remedial measures or installations.

5.6 TASK 6: COMPLETION REPORT

Following completion of the remedial actions a report will be prepared that details the RAP implementation activities. The report will include:

- Introduction and executive summary; including remedial actions, and any changes to the remedial design or field activities;
- Field data sheets with all observations (i.e., notes, charts, sketches, or photographs), air monitoring results, and a record of field and/or laboratory tests;
- Details of the activities, including: soil excavation areas; engineered fill placement areas; soil disposal documentation; post-grading and foundation excavation soil sample results; vapor mitigation system installation; trench dam installations; sample locations; laboratory data certificates; and copies of the chain-of-custody forms; and
- Summary of deviations from the RAP.

The *Completion Report* will be prepared under the supervision of a California Professional Civil Engineer and Geologist, with appropriate qualifications.

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7.0 DISTRIBUTION LIST

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TABLES

TABLE 2-1
SUMMARY OF SOIL ANALYTICAL RESULTS - TPHS & PVOCS
5th Street and Magnolia Street
West Oakland, California

Area of Development	Sample ID	Date	Depth (feet)	Depth Relative to Foundation / Slab (feet below)	Petroleum Hydrocarbons			Petroleum Related VOCs				
					TPHg	TPHd	TPHmo	Benzene	Toluene	Ethyl Benzene	Xylenes	MTBE
					(mg/kg)	(mg/kg)	(mg/kg)	(µg/kg)	(µg/kg)	(µg/kg)	(µg/kg)	(µg/kg)
Commercial Building	B-1	5/8/17	~~1.5~~	--	~~<1.00~~	~~58.3~~	~~334~~	~~<1.65~~	~~<1.65~~	~~<1.65~~	~~<1.65~~	~~<1.65~~
Commercial Building	B-2	5/8/17	~~1~~	--	~~<1.00~~	~~10.8~~	~~43.8~~	~~<1.71~~	~~<1.71~~	~~<1.71~~	~~<1.71~~	~~<1.71~~
			2.5	1	<1.00	<10.0	<10.0	<1.68	<1.68	<1.68	<1.68	<1.68
Elevator	B-3	5/8/17	~~1.5~~	--	~~<1.00~~	~~59.6~~	~~498~~	~~<1.72~~	~~<1.72~~	~~<1.72~~	~~<1.72~~	~~<1.72~~
			3	0.5	<1.00	<10.0	<10.0	<1.77	<1.77	<1.77	<1.77	<1.77
Lobby	B-4	5/8/17	~~1.5~~	--	~~<1.00~~	~~36.3~~	~~45.9~~	~~<1.57~~	~~<1.57~~	~~<1.57~~	~~<1.57~~	~~<1.57~~
Parking Garage	B-5	5/8/17	~~1.5~~	--	~~<1.00~~	~~22.6~~	~~77.6~~	~~<1.68~~	~~<1.68~~	~~<1.68~~	~~<1.68~~	~~<1.68~~
Parking Garage	B-6	5/8/17	~~1~~	--	~~<1.00~~	**~~423~~**	~~2,000~~	~~<1.85~~	~~<1.85~~	~~<1.85~~	~~<1.85~~	~~<1.85~~
			~~2.5~~	--	~~<1.00~~	~~<10.0~~	~~10.8~~	~~<1.72~~	~~<1.72~~	~~<1.72~~	~~<1.72~~	~~<1.72~~
Parking Garage	B-7	5/8/17	~~1.5~~	--	~~<1.00~~	~~<10.0~~	~~29.3~~	~~<1.80~~	~~<1.80~~	~~<1.80~~	~~<1.80~~	~~<1.80~~
			~~2.5~~	--	~~<1.00~~	~~<10.0~~	~~21.0~~	~~<1.81~~	~~<1.81~~	~~<1.81~~	~~<1.81~~	~~<1.81~~
Parking Garage	B-8	5/8/17	~~1.5~~	--	~~<1.00~~	~~12.1~~	~~64.4~~	~~<1.70~~	~~<1.70~~	~~<1.70~~	~~<1.70~~	~~<1.70~~
Landscaping	B-9	5/8/17	~~1~~	--	~~<1.00~~	~~63.1~~	~~455~~	~~<1.79~~	~~<1.79~~	~~<1.79~~	~~<1.79~~	~~<1.79~~
			2	0.5	<1.00	<10.0	<10.0	<1.65	<1.65	<1.65	<1.65	<1.65
ESLs-Commercial					3,900	1,100	140,000	24,000	4,600,000	22,000	2,400,000	180,000
ESLs-Construction Worker					2,800	880	32,000	1,000	4,100,000	480,000	2,400,000	3,700,000
ESLs-Unrestricted Use					740	230	5,100	230	970,000	5,100	560,000	42,000

Notes:

VOCs: Volatile organic compounds
TPHg: Total petroleum hydrocarbons as gasoline
TPHd: Total petroleum hydrocarbons as diesel
TPHmo: Total petroleum hydrocarbons as motor oil
MTBE: Methyl tert-butyl ether
mg/kg: milligrams per kilogram
µg/kg: micrograms per kilogram
<1.00: Less than the laboratory-reporting limit of 1.00
ESLs: California Regional Water Quality Control Board - San Francisco Bay Region Environmental Screening Levels, Rev. 3
~~<58.3:~~ Strikethrough indicates to be excavated during Site development

TABLE 2-2
SUMMARY OF SOIL ANALYTICAL RESULTS - PAHS
5th Street and Magnolia Street
West Oakland, California

Area of Development	Sample ID	Date	Depth (feet bgs)	Depth Relative to Foundation/ Slab (feet below)	Acenaph- thene	Acenaph- thylene	Anthracene	Benzo(a) anthracene	Benzo(b) fluoran- thene	Benzo(k) fluoran- thene	Benzo(a) pyrene	Benzo(g,h,i) perylene	Chrysene	Dibenz(a,h) anthracene	Fluoran- thene	Fluorene	Indeno (1,2,3-c,d) pyrene	Naphthalene	Phenan- threne	Pyrene
					(µg/kg)	(µg/kg)	(µg/kg)	(µg/kg)	(µg/kg)	(µg/kg)	(µg/kg)	(µg/kg)	(µg/kg)	(µg/kg)	(µg/kg)	(µg/kg)	(µg/kg)	(µg/kg)	(µg/kg)	(µg/kg)
Parking Garage	W-1	9/17/15	~~1~~	--	~~<2.50~~	~~9.42~~	~~5.46~~	~~14.8~~	~~80~~	~~15.6~~	**~~47.1~~**	~~209~~	~~53.4~~	**~~36.5~~**	~~8.07~~	~~<2.50~~	~~41.8~~	~~14~~	~~19.3~~	~~29.5~~
Parking Garage	W-2	9/17/15	~~1~~	--	~~<2.50~~	~~14.8~~	~~10.1~~	~~55.1~~	~~132~~	~~35.8~~	**~~99.8~~**	~~255~~	~~79.6~~	**~~59.3~~**	~~31.5~~	~~<2.50~~	~~103~~	~~26.2~~	~~36~~	~~97.1~~
Commercial Building	W-3	9/17/15	~~1~~	--	~~<2.50~~	~~11.3~~	~~6.73~~	~~26~~	**~~176~~**	~~27~~	**~~87.4~~**	~~240~~	~~130~~	**~~98.1~~**	~~14.4~~	~~23~~	~~87.3~~	~~12.3~~	~~49.2~~	~~101~~
Commercial Building	W-4	9/17/15	~~1~~	--	~~<2.50~~	~~32~~	~~25.9~~	**~~105~~**	**~~178~~**	~~60.7~~	**~~119~~**	~~287~~	~~91.9~~	**~~70.6~~**	~~87~~	~~28.2~~	~~107~~	~~13.9~~	~~129~~	~~184~~
Landscaping	W-5	9/17/15	~~1~~	--	~~<2.50~~	~~20.3~~	~~18.3~~	~~67.5~~	~~130~~	~~47.2~~	**~~81.5~~**	~~159~~	~~75.9~~	**~~26~~**	~~74~~	~~<2.50~~	~~99.6~~	~~11.4~~	~~49.7~~	~~127~~
Parking Garage	W-6	9/17/15	~~1~~	--	~~<2.50~~	~~17.7~~	~~9.44~~	~~36.9~~	~~74.5~~	~~28.3~~	**~~44.4~~**	~~226~~	~~40.5~~	**~~430~~**	~~28.2~~	~~19.5~~	~~59.2~~	~~11.7~~	~~38.3~~	~~72.6~~
Parking Garage	W-7	9/17/15	~~1~~	--	~~<2.50~~	~~18.8~~	~~15.7~~	~~61.2~~	**~~187~~**	~~45.2~~	**~~111~~**	~~264~~	~~97.2~~	**~~77.3~~**	~~50.7~~	~~9.02~~	~~120~~	~~13.5~~	~~84.2~~	~~144~~
Parking Garage	W-8	9/17/15	~~1~~	--	~~<2.50~~	~~13.9~~	~~6.45~~	~~41.7~~	~~134~~	~~38.5~~	**~~78.2~~**	~~234~~	~~80.1~~	**~~73.1~~**	~~17.1~~	~~13~~	~~99.7~~	~~23.6~~	~~30.9~~	~~48.4~~
Commercial Building	B-1	5/8/17	~~1.5~~	--	~~<2.50~~	~~14.2~~	~~16.5~~	~~42.1~~	~~70.5~~	~~39.8~~	**~~24.7~~**	~~114~~	~~46.4~~	**~~28.4~~**	~~55.5~~	~~<2.50~~	~~59.4~~	~~5.44~~	~~36.1~~	~~134~~
Commercial Building	B-2	5/8/17	~~2.5~~	--	~~<2.50~~	~~43.8~~	~~98.9~~	~~70.9~~	**~~185~~**	~~115~~	**~~74.2~~**	~~231~~	~~165~~	**~~48.0~~**	~~321~~	~~<2.50~~	**~~169~~**	~~103~~	~~125~~	~~309~~
Lobby	B-4	5/8/17	~~1.5~~	--	~~<2.50~~	~~15.4~~	~~26.4~~	~~41.1~~	~~70.1~~	~~42.7~~	**~~33.9~~**	~~86.3~~	~~64.6~~	**~~28.7~~**	~~112~~	~~<2.50~~	~~61.0~~	~~7.32~~	~~36.2~~	~~94.9~~
Parking Garage	B-6	5/8/17	~~2.5~~	--	~~<2.50~~	~~19.6~~	~~40.4~~	~~22.2~~	~~65.8~~	~~43.6~~	**~~21.0~~**	~~66.5~~	~~51.1~~	**~~14.3~~**	~~98.2~~	~~<2.50~~	~~45.1~~	~~40.2~~	~~33.7~~	~~71.1~~
Parking Garage	B-7	5/8/17	~~2.5~~	--	~~<2.50~~	~~14.6~~	~~40.3~~	~~27.1~~	~~36.0~~	~~24.9~~	**~~15.7~~**	~~47.9~~	~~50.2~~	~~<10.0~~	~~77.4~~	~~<2.50~~	~~31.4~~	~~184~~	~~53.5~~	~~70.2~~
Parking Garage	B-8	5/8/17	~~1.5~~	--	~~<2.50~~	~~6.46~~	~~17.1~~	~~21.7~~	~~36.2~~	~~25.9~~	**~~17.0~~**	~~47.5~~	~~34.9~~	**~~22.6~~**	~~35.0~~	~~<2.50~~	~~27.7~~	~~6.60~~	~~19.6~~	~~56.6~~
Landscaping	B-9	5/8/17	~~1~~	--	~~4.77~~	~~97.3~~	~~122~~	~~311~~	**~~404~~**	~~151~~	**~~399~~**	~~662~~	~~241~~	**~~216~~**	~~559~~	~~9.07~~	**~~453~~**	~~13.0~~	~~249~~	~~1,720~~
ESLs-Commercial					4.5.E+04	--	2.3E+08	2,900	2,900	29,000	290	--	2.6.E+05	290	3.0E+07	3.0E+07	2,900	14,000	--	2.3E+07
ESLs-Contruction Worker					1.0.E+07	--	5.0E+07	16,000	16,000	150,000	1,600	--	1.5.E+07	1,600	6.7E+06	6.7E+06	16,000	350,000	--	5.0E+06
ESLs-Unrestricted Use					3.6.E+06	--	1.8E+07	160	160	1,600	16	--	1.5.E+04	16	2.4E+06	2.4E+06	160	3,300	--	1.8E+06

Notes:

PAHs: Polycyclic aromatic hydrocarbons
µg/kg: micrograms per kilogram
--: Not promulgated
ESLs: California Regional Water Quality Control Board - San Francisco Bay Region Environmental Screening Levels, Rev. 3
<2.50: Less than the laboratory-reporting limit of 2.50
~~<2.50~~: Strikethrough indicates to be excavated during Site development

TABLE 2-3
SUMMARY OF SOIL ANALYTICAL RESULTS - PESTICIDES
5th Street and Magnolia Street
West Oakland, California

Area of Development	Sample ID	Date	Depth (feet)	Depth Relative to Foundation /Slab (feet below)	Pesticides																		
					Alpha-BHC	Beta-BHC	Gamma-BHC (Lindane)	Heptachlor	Delta-BHC	Aldrin	Heptachlor epoxide	Endosulfan I	4,4-DDE	Dieldrin	Endrin	4,4-DDD	Endosulfan II	4,4-DDT	Endrin aldehyde	Endosulfan Sulfate	Methoxychlor	Chlordane	Toxaphene
					(µg/kg)	(µg/kg)	(µg/kg)	(µg/kg)	(µg/kg)	(µg/kg)	(µg/kg)	(µg/kg)	(µg/kg)	(µg/kg)	(µg/kg)	(µg/kg)	(µg/kg)	(µg/kg)	(µg/kg)	(µg/kg)	(µg/kg)	(µg/kg)	(µg/kg)
Parking Garage	W-1	9/17/15	~~1~~	--	~~<2.50~~	~~<2.50~~	~~<2.50~~	~~<2.50~~	~~<2.50~~	~~<2.50~~	~~<2.50~~	~~<2.50~~	~~<5.00~~	~~<5.00~~	~~<5.00~~	~~<5.00~~	~~<5.00~~	~~<5.00~~	~~<5.00~~	~~<5.00~~	~~<12.5~~	~~<12.5~~	~~<62.5~~
Parking Garage	W-2	9/17/15	~~1~~	--	~~<2.50~~	~~<2.50~~	~~<2.50~~	~~<2.50~~	~~<2.50~~	~~<2.50~~	~~<2.50~~	~~<2.50~~	~~<5.00~~	~~<5.00~~	~~<5.00~~	~~<5.00~~	~~<5.00~~	~~<5.00~~	~~<5.00~~	~~<5.00~~	~~<12.5~~	~~17.6~~	~~<62.5~~
Commercial Building	W-3	9/17/15	~~1~~	--	~~<2.50~~	~~<2.50~~	~~<2.50~~	~~<2.50~~	~~<2.50~~	~~<2.50~~	~~<2.50~~	~~<2.50~~	~~<5.00~~	~~<5.00~~	~~<5.00~~	~~<5.00~~	~~<5.00~~	~~<5.00~~	~~<5.00~~	~~<5.00~~	~~<12.5~~	~~<12.5~~	~~<62.5~~
Commercial Building	W-4	9/17/15	~~1~~	--	~~<2.50~~	~~<2.50~~	~~<2.50~~	~~<2.50~~	~~<2.50~~	~~<2.50~~	~~<2.50~~	~~<2.50~~	~~<5.00~~	~~<5.00~~	~~<5.00~~	~~<5.00~~	~~<5.00~~	~~<5.00~~	~~<5.00~~	~~<5.00~~	~~<12.5~~	~~15.2~~	~~<62.5~~
Landscaping	W-5	9/17/15	~~1~~	--	~~<2.50~~	~~<2.50~~	~~<2.50~~	~~<2.50~~	~~<2.50~~	~~<2.50~~	~~<2.50~~	~~<2.50~~	~~7.54~~	~~<5.00~~	~~<5.00~~	~~<5.00~~	~~<5.00~~	~~<5.00~~	~~<5.00~~	~~<5.00~~	~~<12.5~~	~~<12.5~~	~~<62.5~~
Parking Garage	W-6	9/17/15	~~1~~	--	~~<2.50~~	~~<2.50~~	~~<2.50~~	~~<2.50~~	~~<2.50~~	~~<2.50~~	~~<2.50~~	~~<2.50~~	~~<5.00~~	~~<5.00~~	~~<5.00~~	~~<5.00~~	~~<5.00~~	~~<5.00~~	~~<5.00~~	~~<5.00~~	~~<12.5~~	~~15.8~~	~~<62.5~~
Parking Garage	W-7	9/17/15	~~1~~	--	~~<2.50~~	~~<2.50~~	~~<2.50~~	~~<2.50~~	~~<2.50~~	~~<2.50~~	~~<2.50~~	~~<2.50~~	~~<5.00~~	~~<5.00~~	~~<5.00~~	~~<5.00~~	~~<5.00~~	~~<5.00~~	~~<5.00~~	~~<5.00~~	~~<12.5~~	~~15.3~~	~~<62.5~~
Parking Garage	W-8	9/17/15	~~1~~	--	~~<2.50~~	~~<2.50~~	~~<2.50~~	~~<2.50~~	~~<2.50~~	~~<2.50~~	~~<2.50~~	~~<2.50~~	~~<5.00~~	~~<5.00~~	~~<5.00~~	~~<5.00~~	~~<5.00~~	~~<5.00~~	~~<5.00~~	~~<5.00~~	~~<12.5~~	~~18.4~~	~~<62.5~~
ESLs-Commercial					--	--	2,500	--	--	160	300	5.8E+06	8,500	170	290,000	12,000	5.8E+06	8,500	--	5.8E+06	4.8E+06	2,200	2,200
ESLs-Construction worker					--	--	16,000	--	--	1,000	1,900	1.5E+06	57,000	1,100	74,000	81,000	1.5E+06	57,000	--	1.5E+06	1.2E+06	14,000	14,000
ESLs-Unrestricted Use					--	--	550	--	--	36	67	4.2E+05	1,900	38	21,000	2,700	4.2E+05	1,900	--	4.2E+05	3.5E+05	480	510

Notes:

µg/kg: micrograms per kilogram
--: not promulgated
ESLs: California Regional Water Quality Control Board - San Francisco Bay Region Environmental Screening Levels
<2.50: Less than the laboratory-reporting limit of 2.50
~~<2.50~~: Strikethrough indicates to be excavated during Site development

TABLE 2-4
SUMMARY OF SOIL ANALYTICAL RESULTS - METALS
5th Street and Magnolia Street
West Oakland, California

Area of Development	Sample ID	Date	Depth (feet)	Depth Relative to Foundation/ Slab (feet below)	Metals																
					Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Lead	Mercury	Molybdenum	Nickel	Selenium	Silver	Thallium	Vanadium	Zinc
					(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)
Parking Garage	W-1	9/17/15	~~1~~	--	--	~~3.58~~	--	--	--	--	--	--	~~25.9~~	--	--	--	--	--	--	--	--
			~~3~~	--	--	~~<2.50~~	--	--	--	--	--	--	~~**119**~~	--	--	--	--	--	--	--	--
			6	3	--	<2.50	--	--	--	--	--	--	3.45	--	--	--	--	--	--	--	--
Parking Garage	W-2	9/17/15	~~1~~	--	--	~~7.21~~	--	--	--	--	--	--	~~36.4~~	--	--	--	--	--	--	--	--
			3	2	<2.50	6.91	1,790	<2.50	<2.50	25.6	3.92	37.7	**661**	0.38	<2.50	20	<2.50	<2.50	<2.50	28.5	688
			6	5	--	<2.50	--	--	--	--	--	--	<2.50	--	--	--	--	--	--	--	--
Commercial Building	W-3	9/17/15	~~1~~	--	~~<2.50~~	~~2.61~~	~~99.1~~	~~<2.50~~	~~<2.50~~	~~23.1~~	~~8.18~~	~~40.1~~	~~19.6~~	~~0.127~~	~~<2.50~~	~~27.8~~	~~<2.50~~	~~<2.50~~	~~<2.50~~	~~43.2~~	~~87.1~~
			3	2	--	<2.50	--	--	--	--	--	--	**169**	--	--	--	--	--	--	--	--
			6	5	--	<2.50	--	--	--	--	--	--	**1,360**	--	--	--	--	--	--	--	--
Commercial Building	W-4	9/17/15	~~1~~	--	--	~~3.54~~	--	--	--	--	--	--	~~24.7~~	--	--	--	--	--	--	--	--
			~~3~~	--	~~<2.50~~	~~7.17~~	~~990~~	~~<2.50~~	~~<2.50~~	~~29.9~~	~~6.35~~	~~43.4~~	~~**2,180**~~	~~0.344~~	~~<2.50~~	~~34.5~~	~~<2.50~~	~~<2.50~~	~~<2.50~~	~~26.7~~	~~701~~
			6	3	--	<2.50	--	--	--	--	--	--	<2.50	--	--	--	--	--	--	--	--
Landscaping	W-5	9/17/15	~~1~~	--	--	~~5.60~~	--	--	--	--	--	--	~~**510**~~	--	--	--	--	--	--	--	--
			~~3~~	--	--	~~<2.50~~	--	--	--	--	--	--	~~50.2~~	--	--	--	--	--	--	--	--
			6	3	--	<2.50	--	--	--	--	--	--	<2.50	--	--	--	--	--	--	--	--
Parking Garage	W-6	9/17/15	~~1~~	--	--	~~4.34~~	--	--	--	--	--	--	~~25.5~~	--	--	--	--	--	--	--	--
			~~3~~	--	--	~~4.36~~	--	--	--	--	--	--	~~**316**~~	--	--	--	--	--	--	--	--
			6	3	<2.50	<2.50	36.1	<2.50	<2.50	22.3	<2.50	4.04	7.87	<0.100	<2.50	11.9	<2.50	<2.50	<2.50	15.6	12.8
Parking Garage	W-7	9/17/15	~~1~~	--	--	~~4.90~~	--	--	--	--	--	--	~~18.9~~	--	--	--	--	--	--	--	--
			~~3~~	--	--	~~2.50~~	--	--	--	--	--	--	~~**199**~~	--	--	--	--	--	--	--	--
			6	3	--	2.64	--	--	--	--	--	--	2.87	--	--	--	--	--	--	--	--
Parking Garage	W-8	9/17/15	~~1~~	--	--	~~3.28~~	--	--	--	--	--	--	~~20.1~~	--	--	--	--	--	--	--	--
			~~3~~	--	--	~~2.76~~	--	--	--	--	--	--	~~**174**~~	--	--	--	--	--	--	--	--
			6	3	--	2.93	--	--	--	--	--	--	3.58	--	--	--	--	--	--	--	--
Commercial Building	B-1	5/8/17	~~1.5~~	--	--	--	--	--	--	--	--	--	~~**102**~~	--	--	--	--	--	--	--	--
Commercial Building	B-2	5/8/17	~~1~~	--	--	--	--	--	--	--	--	--	~~**107**~~	--	--	--	--	--	--	--	--
			2.5	1.5	<2.50	4.5	214	<2.50	<2.50	31.4	4.05	30.8	**314**	0.306	<2.50	18.1	<2.50	<2.50	<2.50	20.8	265
Elevator	B-3	5/8/17	~~1.5~~	--	--	--	--	--	--	--	--	--	~~36.5~~	--	--	--	--	--	--	--	--
			3	0	<2.50	4.02	141	<2.50	<2.50	17.2	7.07	20.2	**98**	0.110	<2.50	15.4	<2.50	<2.50	<2.50	36.1	72.8
Lobby	B-4	5/8/17	~~1.5~~	--	--	--	--	--	--	--	--	--	~~**1,080**~~	--	--	--	--	--	--	--	--
Parking Garage	B-5	5/8/17	~~1.5~~	--	--	--	--	--	--	--	--	--	~~**191**~~	--	--	--	--	--	--	--	--
Parking Garage	B-6	5/8/17	~~1~~	--	--	--	--	--	--	--	--	--	~~43.9~~	--	--	--	--	--	--	--	--
			~~2.5~~	--	~~<2.50~~	~~3.40~~	~~104~~	~~<2.50~~	~~<2.50~~	~~30.0~~	~~4.39~~	~~15.4~~	~~**206**~~	~~0.200~~	~~<2.50~~	~~20.5~~	~~<2.50~~	~~<2.50~~	~~<2.50~~	~~22.2~~	~~110~~
Parking Garage	B-7	5/8/17	~~1.5~~	--	--	--	--	--	--	--	--	--	~~76.9~~	--	--	--	--	--	--	--	--
			~~2.5~~	--	--	--	--	--	--	--	--	--	~~**228**~~	--	--	--	--	--	--	--	--
Parking Garage	B-8	5/8/17	~~1.5~~	--	~~<2.50~~	~~3.34~~	~~106~~	~~<2.50~~	~~<2.50~~	~~32.8~~	~~6.22~~	~~18.7~~	~~**113**~~	~~0.186~~	~~<2.50~~	~~20.8~~	~~<2.50~~	~~<2.50~~	~~<2.50~~	~~30.2~~	~~119~~
Landscaping	B-9	5/8/17	~~1~~	--	--	--	--	--	--	--	--	--	~~**96**~~	--	--	--	--	--	--	--	--
			2	0.5	<2.50	4.57	122	<2.50	<2.50	43.2	11.5	26.1	13.6	<0.100	<2.50	38.8	<2.50	<2.50	<2.50	36.6	43.9
ESLs-Commercial					470	bg	220,000	2,200	580	1,800,000	350	47,000	320	190	5,800	11,000	5,800	5,800	12	5,800	350,000
ESLs-Construction Worker					140	bg	3,000	42	43	530,000	28	14,000	160	44	1,800	86	1,700	1,800	3.5	470	110,000
ESLs-Unrestricted Use					31	bg	15,000	150	39	120,000	23	3,100	80	13	390	820	390	390	0.78	390	23,000

Notes:
--: Not analyzed
mg/kg: milligrams per kilogram
ESLs: California Regional Water Quality Control Board - San Francicsco Bay Region Environmental Screening Levels, Rev. 3
<2.50: Less than the laboratory-reporting limit of 2.50
~~1,080:~~ Strikethrough indicates to be excavated during Site development

TABLE 2-5
SUMMARY OF SOIL GAS ANALYTICAL RESULTS
5th Street and Magnolia Street
West Oakland, California

Area of Development	Sample ID	Depth (feet bgs)	Depth Relative to Foundation /Slab (feet below)	Date	Dichlorodifluoromethmane	Chloromethane	Dichlorotetrafluoroethane	Vinyl Chloride	Bromomethane	Chloroethane	Trichlorofluoromethane	1,1-Dichloroethene	Trichlorotrifluoroethane	Methylene chloride	1,1-Dichloroethane	cis-1,2-Dichloroethene	Chloroform	1,1,1-Trichloroethane	1,2-Dichloroethane	Benzene	Carbon Tetrachloride	1,2-Dichloropropane	Trichloroethene	cis-1,3-Dichloropropene	trans-1,3-Dichloropropene	Toluene	1,1,2-Trichloroethane	1,2-Dibromomethane	Tetrachloroethene
					($\mu g/m^3$)																								
Parking Garage	W-1	5	2	9/17/15	<4.95	<2.07	<6.99	<2.56	<3.88	<2.64	16.7	<3.97	<7.66	<3.47	<4.05	<3.97	<4.88	<5.46	<4.05	9.14	<6.29	<4.62	<5.37	<4.54	<4.54	15.8	<5.46	<7.68	29.4
Parking Garage	W-2	5	4	9/17/15	<24.7	<10.3	<35	**<12.8**	<19.4	<13.2	<28.1	<19.8	<38.3	<17.4	<20.2	<19.8	<24.4	<27.3	<20.2	<16.0	<31.5	<23.1	<26.9	<22.7	<22.7	<18.8	<27.3	<38.4	224
				5/8/17	<4.95	<2.07	<6.99	<2.56	<3.88	<2.64	6.52	<3.97	<7.66	5.07	<4.05	<3.97	<4.88	<5.46	<4.05	<3.19	<6.29	<4.62	<5.37	<4.54	<4.54	<3.77	<5.46	<7.68	45
Commerical Building	W-4	5	2	9/17/15	<24.7	<10.3	<35	**<12.8**	<19.4	<13.2	<28.1	<19.8	<38.3	<17.4	<20.2	<19.8	<24.4	<27.3	<20.2	<16.0	<31.5	<23.1	<26.9	<22.7	<22.7	<18.8	<27.3	<38.4	**352**
				5/9/17	<9.89	<4.13	<14.0	**<5.11**	<7.77	<5.28	<11.2	<7.93	<15.3	<6.95	<8.10	<7.93	<9.77	<10.9	<8.09	<6.39	<12.6	<9.24	<10.7	<9.08	<9.08	<7.54	<10.9	<15.4	182
Parking Garage	W-7	5	2	9/17/15	<24.7	<10.3	<35	**<12.8**	<19.4	<13.2	<28.1	<19.8	<38.3	<17.4	<20.2	<19.8	<24.4	<27.3	<20.2	<16.0	<31.5	<23.1	<26.9	<22.7	<22.7	<18.8	<27.3	<38.4	64
Parking Garage	SG-1	5	2	5/8/17	<4.95	<2.07	<6.99	<2.56	<3.88	<2.64	6.24	<3.97	<7.66	<3.47	<4.05	<3.97	<4.88	<5.46	<4.05	<3.19	<6.29	<4.62	<5.37	<9.08	<9.08	4.86	<5.46	<7.68	109
Commercial Building	SG-2	5	4	5/8/17	<9.89	<4.13	<14.0	**<5.11**	<7.77	<5.28	<11.2	<7.93	<15.3	<6.95	<8.10	<7.93	<9.77	<10.9	<8.09	18.6	<12.6	<9.24	<10.7	<9.08	<9.08	38.4	<10.9	<15.4	14
Lobby	SG-3	5	2	5/9/17	<9.89	<4.13	<14.0	**<5.11**	<7.77	<5.28	<11.2	<7.93	<15.3	24.2	<8.10	<7.93	<9.77	<10.9	<8.09	<6.39	<12.6	<9.24	<10.7	<9.08	<9.08	<7.54	<10.9	<15.4	<13.6
Parking Garage	SG-4	5	2	5/9/17	<4.95	<2.07	<6.99	<2.56	<3.88	<2.64	14.2	<3.97	<7.66	<3.47	<4.05	<3.97	<4.88	<5.46	<4.05	<3.19	<6.29	<4.62	<5.37	<9.08	<9.08	<3.77	<5.46	<7.68	13.5
Elevator	SG-5	5	2	5/9/17	<9.89	<4.13	<14.0	**<5.11**	<7.77	<5.28	<11.2	<7.93	<15.3	<6.95	<8.10	<7.93	<9.77	<10.9	<8.09	<6.39	<12.6	<9.24	<10.7	<9.08	<9.08	<7.54	<10.9	<15.4	21.3
ESLs-Commercial					--	3.9E+05	--	160	22,000	4.4E+07	--	3.1E+05	--	12,000	7,700	35,000	530	4.4E+06	470	420	290	1,200	3,000	770	3.5E+05	1.3E+06	--	--	2,100
ESLs-Unrestricted Use					--	47,000	--	4.7	2,600	5.2E+06	--	37,000	--	510	880	4,200	61	5.2E+05	54	48	33	140	240	88	420	1.6E+05	--	--	240

Notes:
$\mu g/m^3$: micrograms per meter cubed
<21.8: Less than the laboratory-reporting limit of 21.8 $\mu g/m^3$
--: not available
ESLs: California Regional Water Quality Control Board - San Franicsco Bay Region Environmental Screening Levels (Rev. 3)

TABLE 2-5
SUMMARY OF SOIL GAS ANALYTICAL RESULTS
5th Street and Magnolia Street
West Oakland, California

Area of Development	Sample ID	Depth (feet bgs)	Depth Relative to Foundation /Slab (feet below)	Date	Chlorobenzene	Ethyl Benzene	Xylenes	Styrene	1,1,2,2-Tetrachloroethane	1,3,5-Trimethylbenzene	1,2,4-Trimethylbenzene	1,3-Dichlorobenzene	1,4-Dichlorobenzene	1,2-Dichlorobenzene	1,2,4-Trichlorobenzene	Hexachlorobutadiene	Helium
					($\mu g/m^3$)												(%)
Parking Garage	W-1	5	2	9/17/15	<4.60	4.60	19.11	<4.26	<6.87	<4.92	<4.92	<6.01	<6.01	<6.01	<14.8	<10.7	<0.100
Parking Garage	W-2	5	4	9/17/15	<23	<21.7	<21.7	<21.3	**<34.3**	<24.6	<24.6	<30.1	<30.1	<30.1	<74.2	<53.3	<0.100
				5/8/17	<4.60	<4.34	<4.34	<4.26	<6.87	<4.92	<4.92	<6.01	<6.01	<6.01	<7.42	<10.7	<0.100
Commerical Building	W-4	5	2	9/17/15	<23	<21.7	<21.7	<21.3	**<34.3**	<24.6	<24.6	<30.1	<30.1	<30.1	<74.2	<53.3	<0.100
				5/9/17	<9.21	<8.68	<8.68	<8.52	<13.7	<9.83	<9.83	<12.0	<12.0	<12.0	<14.8	<21.3	<0.100
Parking Garage	W-7	5	2	9/17/15	<23	<21.7	<21.7	<21.3	**<34.3**	<24.6	<24.6	<30.1	<30.1	<30.1	<74.2	<53.3	<0.100
Parking Garage	SG-1	5	2	5/8/17	<4.60	<4.34	<4.34	<4.26	<6.87	<4.92	<4.92	<6.01	<6.01	<6.01	<7.42	<10.7	<0.100
Commercial Building	SG-2	5	4	5/8/17	<9.21	<8.68	<8.68	<8.52	<13.7	<9.83	<9.83	<12.0	<12.0	<12.0	<14.8	<21.3	<0.100
Lobby	SG-3	5	2	5/9/17	<9.21	<8.68	<8.68	<8.52	<13.7	<9.83	<9.83	<12.0	<12.0	<12.0	<14.8	<21.3	<0.100
Parking Garage	SG-4	5	2	5/9/17	<9.21	<8.68	<8.68	<8.52	<13.7	<9.83	<9.83	<12.0	<12.0	<12.0	<14.8	<21.3	<0.100
Elevator	SG-5	5	2	5/9/17	<9.21	<8.68	<8.68	<8.52	<13.7	<9.83	<9.83	<12.0	<12.0	<12.0	<14.8	<21.3	<0.100
ESLs-Commercial					2.2E+05	4,900	4.4E+05	3.9E+06	210	--	--	--	1,100	8.8E+05	8,800	--	--
ESLs-Unrestricted Use					26,000	560	5.2E+04	4.7E+05	24	--	--	--	130	1.0E+05	1,000	--	--

Notes:

$\mu g/m^3$: micrograms per meter cubed

<21.8: Less than the laboratory-reporting limit of 21.8 $\mu g/m^3$

--: not available

ESLs: California Regional Water Quality Control Board - San Francisco Bay Region Environmental Screening Levels (Rev.

TABLE 2-6
SUMMARY OF GROUNDWATER ANALYTICAL RESULTS
5th Street and Magnolia Street
West Oakland, California

Sample ID	Date	TPHg	Dichlorodifluoromethmane	Chloromethane	Chloroethene	Bromomethane	Chloroethane	Trichlorofluoromethane	1,1-Dchloroethene	Trichlorotrifluoroethane	Methylene chloride	trans-1,2-Dichloroethene	1,1-Dichloroethane	cis-1,2-Dichloroethene	2-2Dichloropropane	Bromochloromnethane	Chloroform	1,1,1-Trichloroethane	Carbon Tetrachloride	1,1-Dichlorpropene	Benzene	1,2-Dichloroethane	Trichloroethene	1,2-Dichloropropane	Dibromomethane	Bromodichloromethane	trans-1,3-Dichloroprpene	Toluene	cis-1,3-Dichloroprpene	1,1,2-Tetrachloroethane	Tetrachloroethene	1,3-Dichloropropene	Dibromochloromethane	1,2-Dibromomethane
		(mg/l)	(µg/l)																															
W-1	9/17/15	<0.050	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500
W-2	9/17/15	<0.050	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	0.850	<0.500	<0.500	<0.500
W-4	9/17/15	<0.050	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500
MCLs			220	190	0.5	7.5	21,000	--	6	--	5	10	5	6	--	--	80	200	--	--	1	0.5	5	5	--	80	--	40	--	5	5	0.5	80	0.05

Notes:

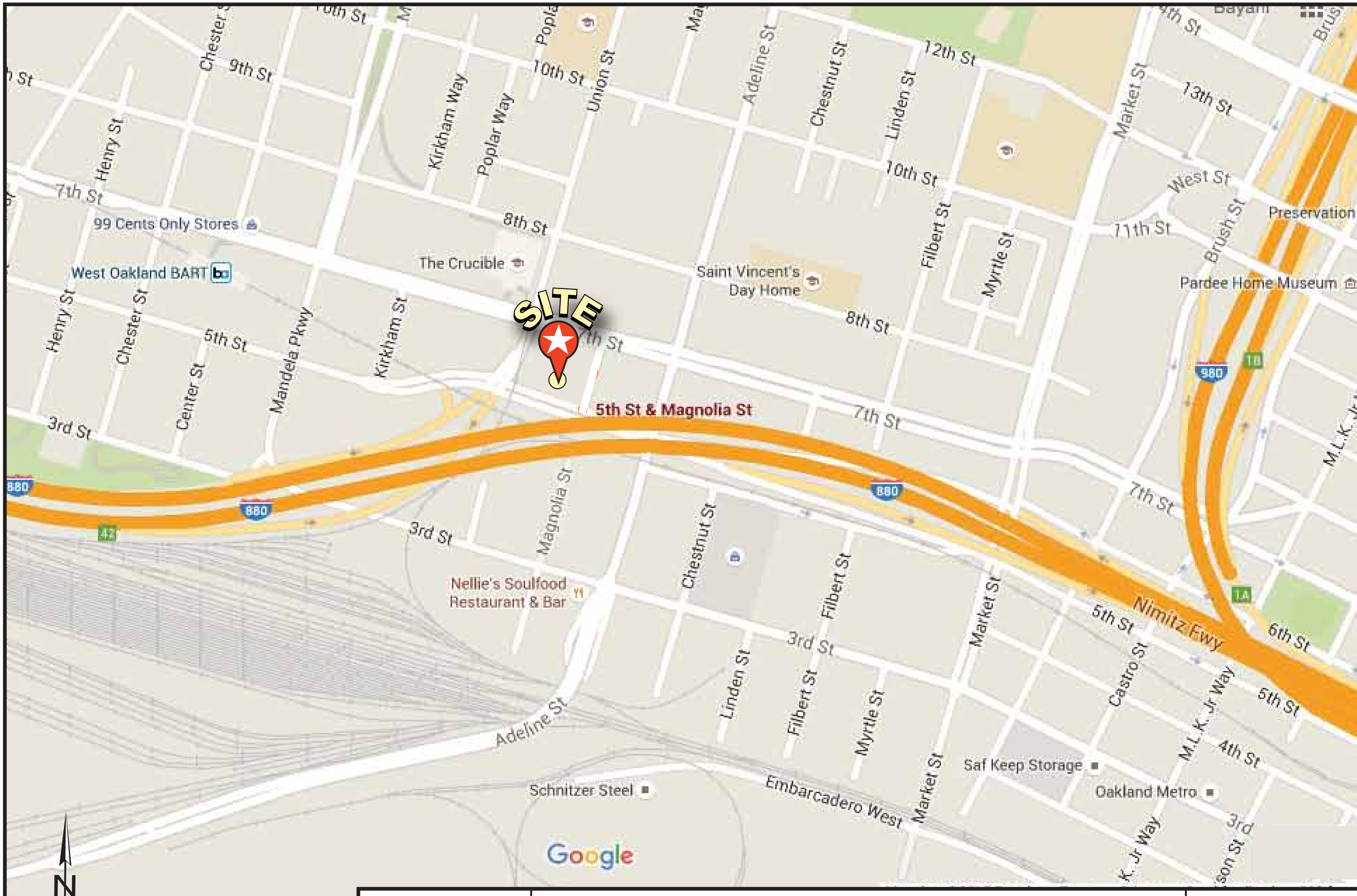
µg/l: micrograms per liter
mg/l: milligrams per liter
<0.500: Less than the laboratory-reporting limit of 0.500
MCLs: Maximum Contaminant Levels

TABLE 2-6
SUMMARY OF GROUNDWATER ANALYTICAL RESULTS
5th Street and Magnolia Street
West Oakland, California

Sample ID	Date	Chlorobenzene	1,1,1,2-Tetrachloroethane	Ethyl Benzene	Xylenes	Styrene	Bromoform	Isoprpylbenzene	1,1,2,2-Tetrachloroethane	Bromomethane	1,2,3-Trichloropropane	n-Propylbenzene	2-Chlorotoluene	1,3,5-Trimethylbenzene	4-Chlorotoluene	Tert-Butylbenzene	1,2,4-Trimethylbenzene	sec-Butylbenzene	1,3-Dichlorobenzene	4-Isopropyltoluene	1,4-Dichlorobenzene	n-Butylbenzene	1,2-Dichlorbenzene	1,2-Dibromo-3-chloropropane	1,2,4-Trichlorobenzene	Hexachlorobutadiene	Naphthalene	1,2,3-Trichlorobenzene
		(μg/l)																										
W-1	9/17/15	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500
W-2	9/17/15	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500
W-4	9/17/15	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500
MCLs		--	0.57	30	20	--	80	--	1	--	--	--	--	--	--	--	--	--	60	--	5	--	100	--	5	0.14	0.17	--

Notes:
μg/l: microgra
mg/l: milligran
<0.500: Less than
MCLs: Maximur

FIGURES

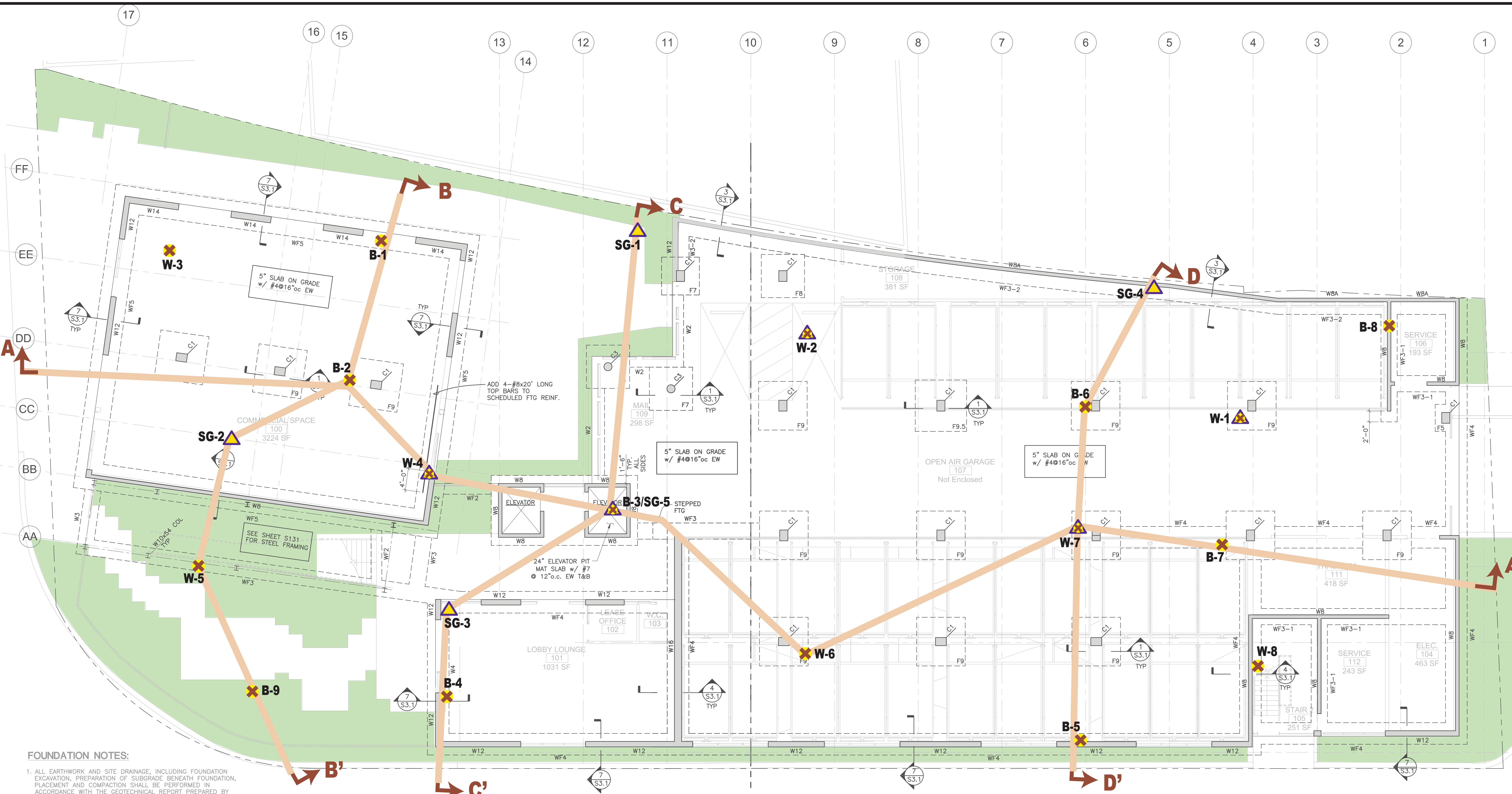


N

0 FEET 500

Figure 1-1	SITE LOCATION MAP
October 2017	5th Street and Magnolia Street, West Oakland, California

WEST
Environmental Services & Technology



FOUNDATION NOTES:

1. ALL EARTHWORK AND SITE DRAINAGE, INCLUDING FOUNDATION EXCAVATION, PREPARATION OF SUBGRADE BENEATH FOUNDATION, PLACEMENT AND COMPACTION SHALL BE PERFORMED IN ACCORDANCE WITH THE GEOTECHNICAL REPORT PREPARED BY EARTH SYSTEMS PACIFIC.
2. NOTIFY THE GEOTECHNICAL ENGINEER AT LEAST 48 HOURS PRIOR TO START OF ALL GRADING EARTHWORK AND FOUNDATION EXCAVATION.
3. THE GEOTECHNICAL ENGINEER SHALL BE RETAINED TO PROVIDE ON-SITE OBSERVATION AND TESTING DURING SITE PREPARATION, GRADING, PLACEMENT, AND COMPACTION OF FILL, AND FOUNDATION INSTALLATION.
4. ALL FOOTINGS TO BEAR ON IMPROVED SUBGRADE. REFER TO SOILS REPORT FOR ACCEPTED PROCEDURES.
5. SPREAD FOOTINGS TO BE SUNK TO ELEVATION AT B.O. PIT WHERE CONFLICTS WITH ELEVATOR PITS OCCUR.
6. FOUNDATION DESIGN IS BASED ON THE SOILS REPORT :

   A. ALLOWABLE SOIL PRESSURE FOR:
   DEAD PLUS LIVE LOADS: 6,000 PSF
   DEAD PLUS LIVE PLUS SEISMIC: 8,000 PSF

LEGEND

C1 INDICATES TYPE OF CONCRETE COLUMN, SEE S3.1

W12 INDICATES TYPE OF CONCRETE WALL, SEE S3.1

INDICATES DEPRESSED SLAB AREA OR SLAB ELEVATION CHANGED

F1 INDICATES TYPE OF CONCRETE COLUMN FOOTING, SEE S3.1

WF1 INDICATES TYPE OF WALL FOOTING OR GRADE BEAM, SEE S3.1

EXPLANATION

SOIL SAMPLE LOCATION

SOIL/SOIL GAS SAMPLE LOCATION

SOIL GAS SAMPLE LOCATION

LANDSCAPING/PLANTER AREAS

A A' CROSS-SECTION LOCATION

0 FEET 16

SITE PLAN AND GEOLOGIC CROSS-SECTION LOCATION

5th and Magnolia Street
Oakland, California

WEST
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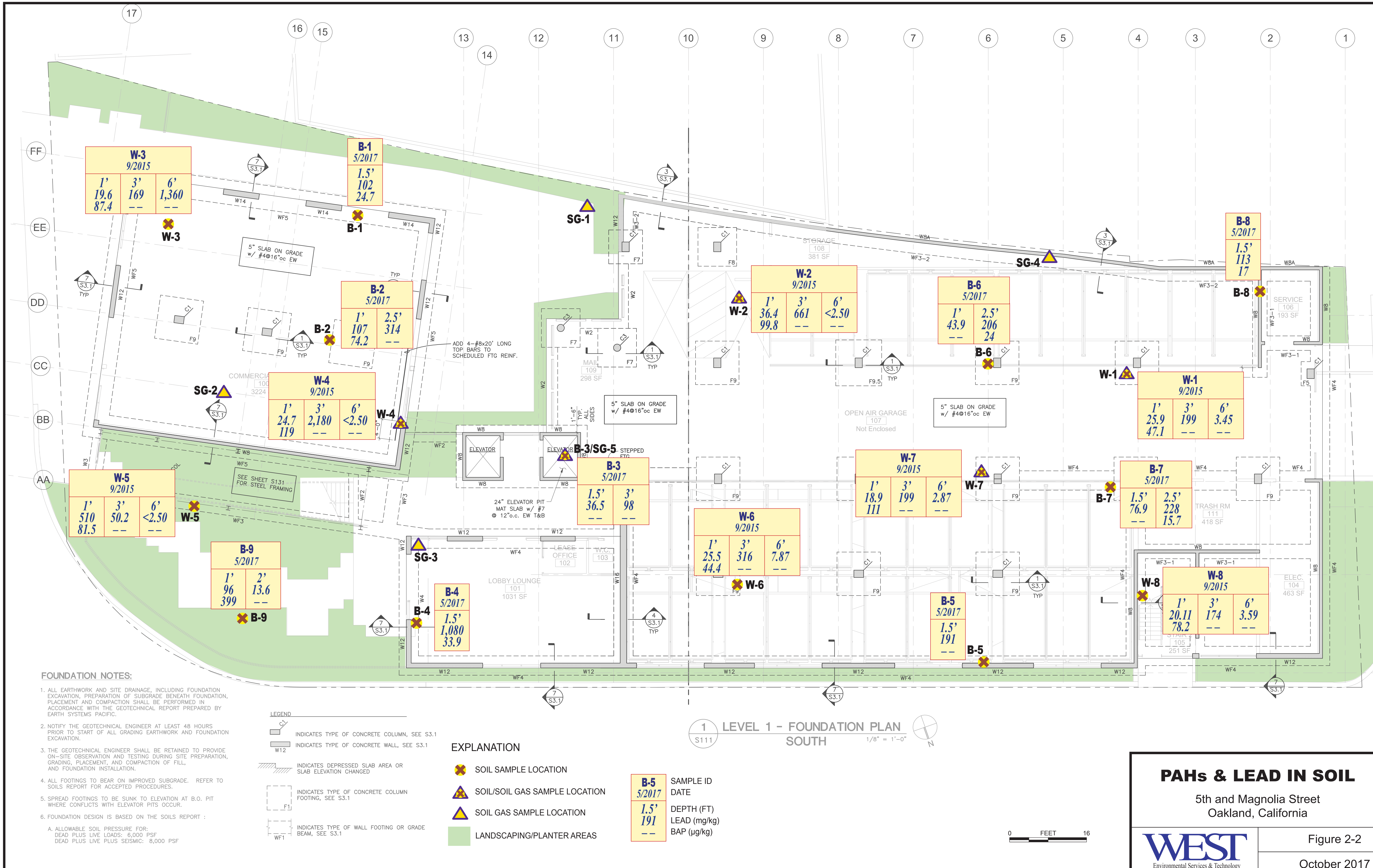
Figure 2-1

October 2017



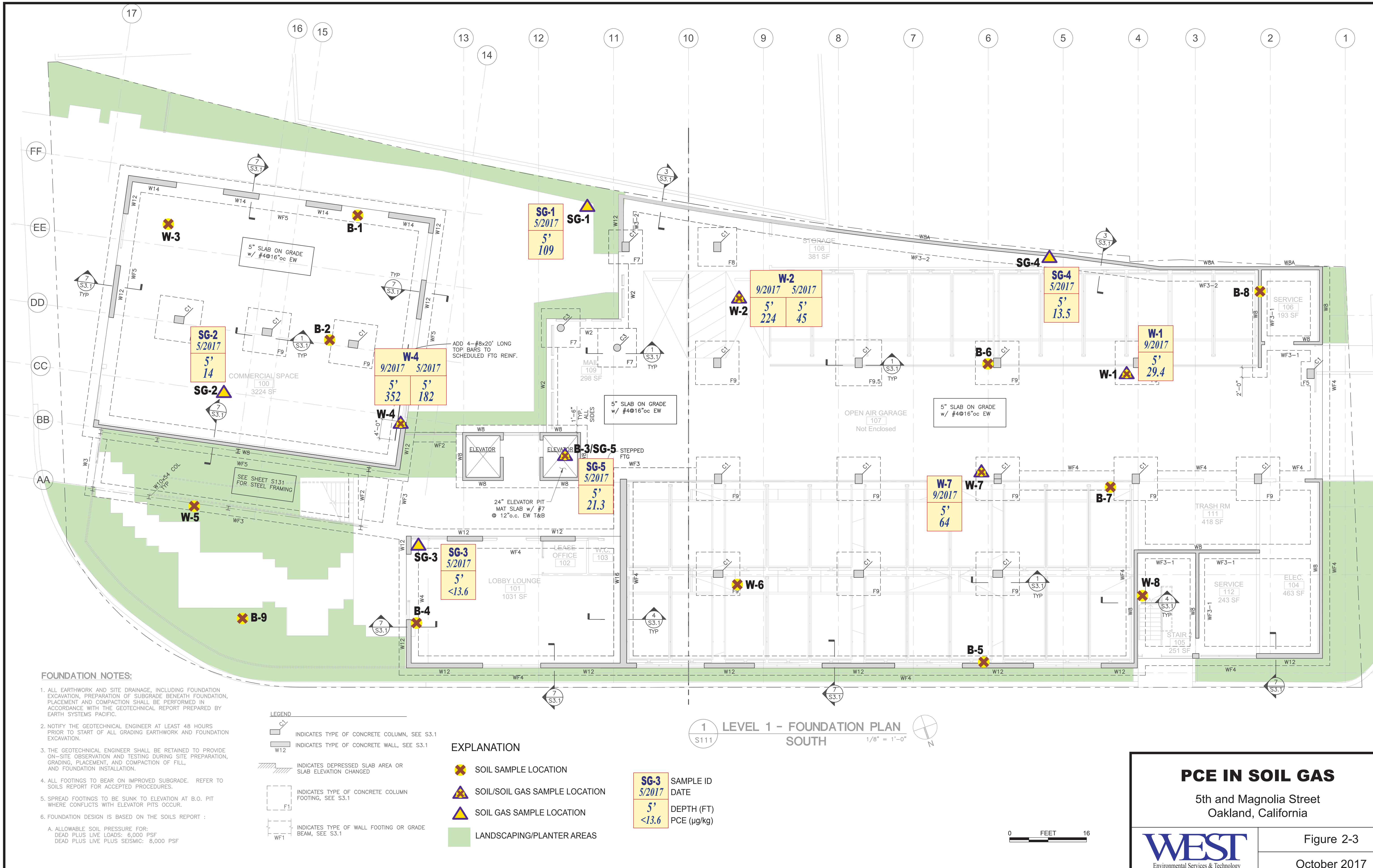
PAHs & LEAD IN SOIL

5th and Magnolia Street
Oakland, California

WEST
Environmental Services & Technology

Figure 2-2

October 2017


SG-1
5/2017
5'
109
SG-4
5/2017
5'
13.5
W-2
9/2017 5/2017
5' 224
5' 45
W-1
9/2017
5'
29.4
SG-2
5/2017
5'
14
W-4
9/2017 5/2017
5' 352
5' 182
SG-5
5/2017
5'
21.3
W-7
9/2017
5'
64
SG-3
5/2017
5'
<13.6
W-3
B-1
B-2
W-5
B-9
B-4
B-3/SG-5
W-6
B-5
B-6
B-7
B-8
W-8
COMMERCIAL SPACE 100 3224 SF
OPEN AIR GARAGE 107 Not Enclosed
LOBBY LOUNGE 101 1031 SF
5" SLAB ON GRADE w/ #4@16"oc EW
24" ELEVATOR PIT MAT SLAB w/ #7 @ 12"o.c. EW T&B
1 LEVEL 1 - FOUNDATION PLAN SOUTH S111 1/8" = 1'-0"
FOUNDATION NOTES:
1. ALL EARTHWORK AND SITE DRAINAGE, INCLUDING FOUNDATION EXCAVATION, PREPARATION OF SUBGRADE BENEATH FOUNDATION, PLACEMENT AND COMPACTION SHALL BE PERFORMED IN ACCORDANCE WITH THE GEOTECHNICAL REPORT PREPARED BY EARTH SYSTEMS PACIFIC.
2. NOTIFY THE GEOTECHNICAL ENGINEER AT LEAST 48 HOURS PRIOR TO START OF ALL GRADING EARTHWORK AND FOUNDATION EXCAVATION.
3. THE GEOTECHNICAL ENGINEER SHALL BE RETAINED TO PROVIDE ON-SITE OBSERVATION AND TESTING DURING SITE PREPARATION, GRADING, PLACEMENT, AND COMPACTION OF FILL, AND FOUNDATION INSTALLATION.
4. ALL FOOTINGS TO BEAR ON IMPROVED SUBGRADE. REFER TO SOILS REPORT FOR ACCEPTED PROCEDURES.
5. SPREAD FOOTINGS TO BE SUNK TO ELEVATION AT B.O. PIT WHERE CONFLICTS WITH ELEVATOR PITS OCCUR.
6. FOUNDATION DESIGN IS BASED ON THE SOILS REPORT :
A. ALLOWABLE SOIL PRESSURE FOR:
DEAD PLUS LIVE LOADS: 6,000 PSF
DEAD PLUS LIVE PLUS SEISMIC: 8,000 PSF
LEGEND
INDICATES TYPE OF CONCRETE COLUMN, SEE S3.1
INDICATES TYPE OF CONCRETE WALL, SEE S3.1
INDICATES DEPRESSED SLAB AREA OR SLAB ELEVATION CHANGED
INDICATES TYPE OF CONCRETE COLUMN FOOTING, SEE S3.1
INDICATES TYPE OF WALL FOOTING OR GRADE BEAM, SEE S3.1
EXPLANATION
SOIL SAMPLE LOCATION
SOIL/SOIL GAS SAMPLE LOCATION
SOIL GAS SAMPLE LOCATION
LANDSCAPING/PLANTER AREAS
SG-3 SAMPLE ID
5/2017 DATE
5' DEPTH (FT)
<13.6 PCE (µg/kg)
0 FEET 16
PCE IN SOIL GAS
5th and Magnolia Street
Oakland, California
WEST Environmental Services & Technology
Figure 2-3
October 2017

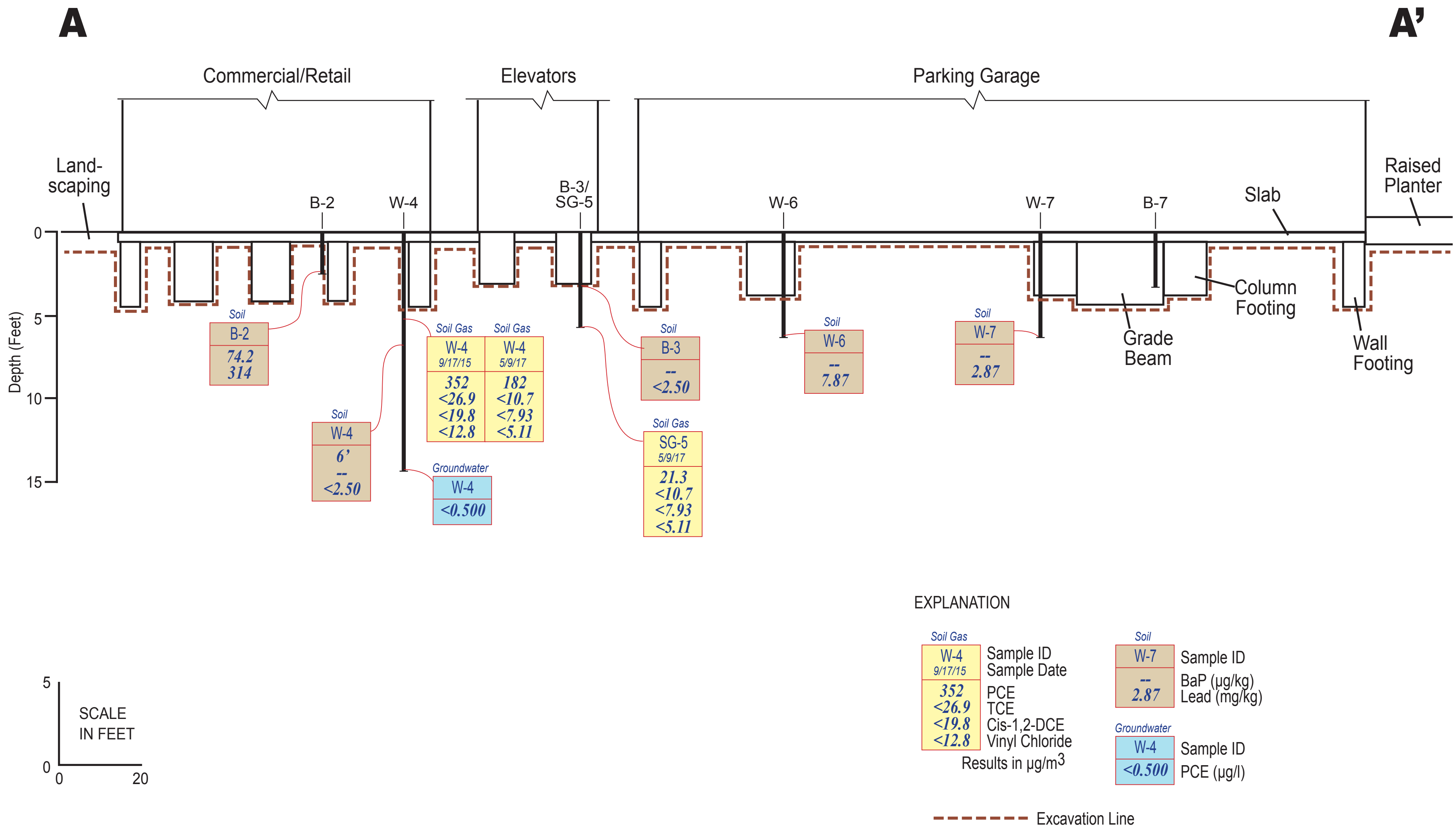


Figure 2-4	CROSS SECTION A-A
October 2017	5th and Magnolia Streets, Oakland, California

WEST
Environmental Services & Technology

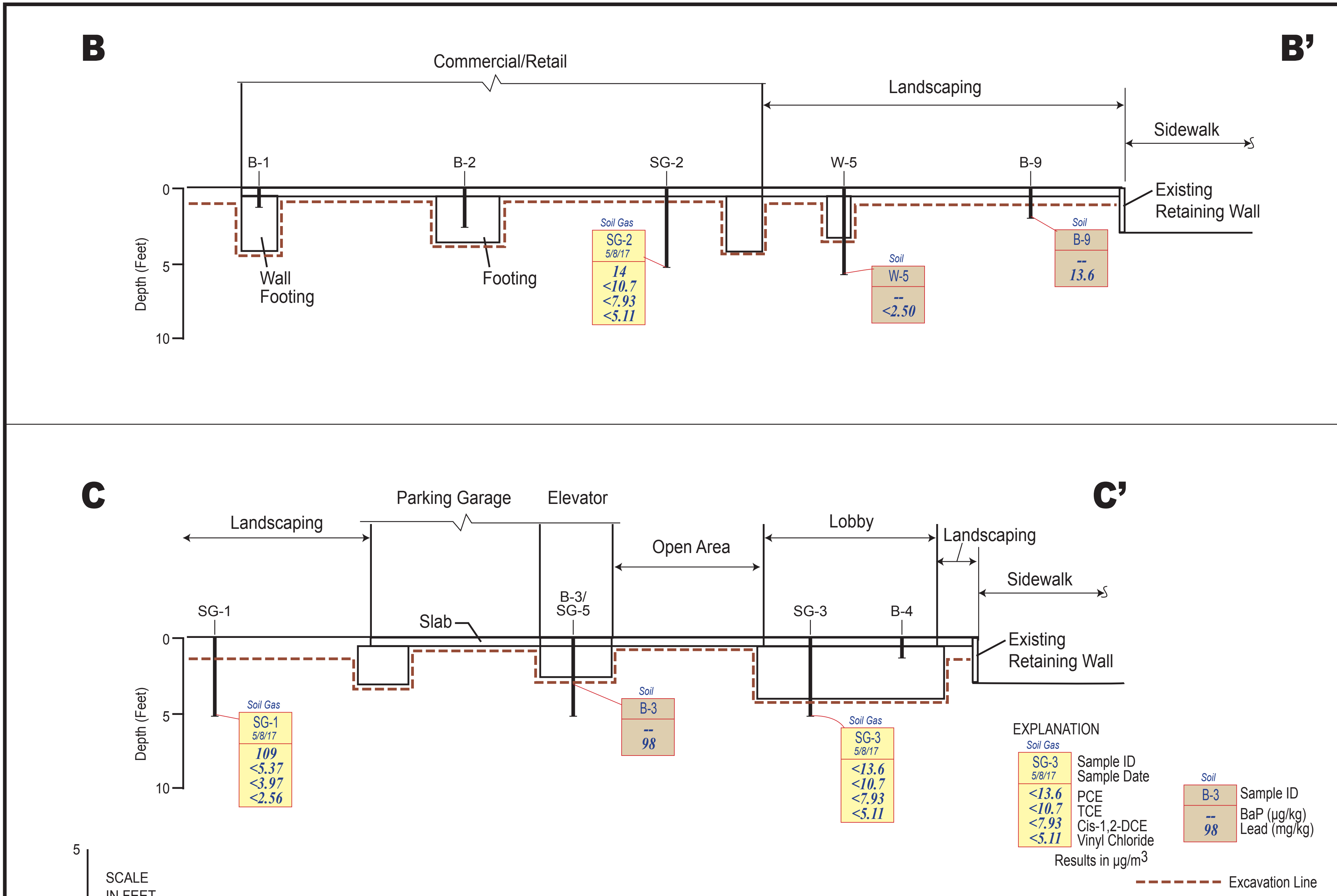


Figure 2-5	CROSS SECTION B-B' AND C-C'
October 2017	5th and Magnolia Streets, Oakland, California

WEST
Environmental Services & Technology

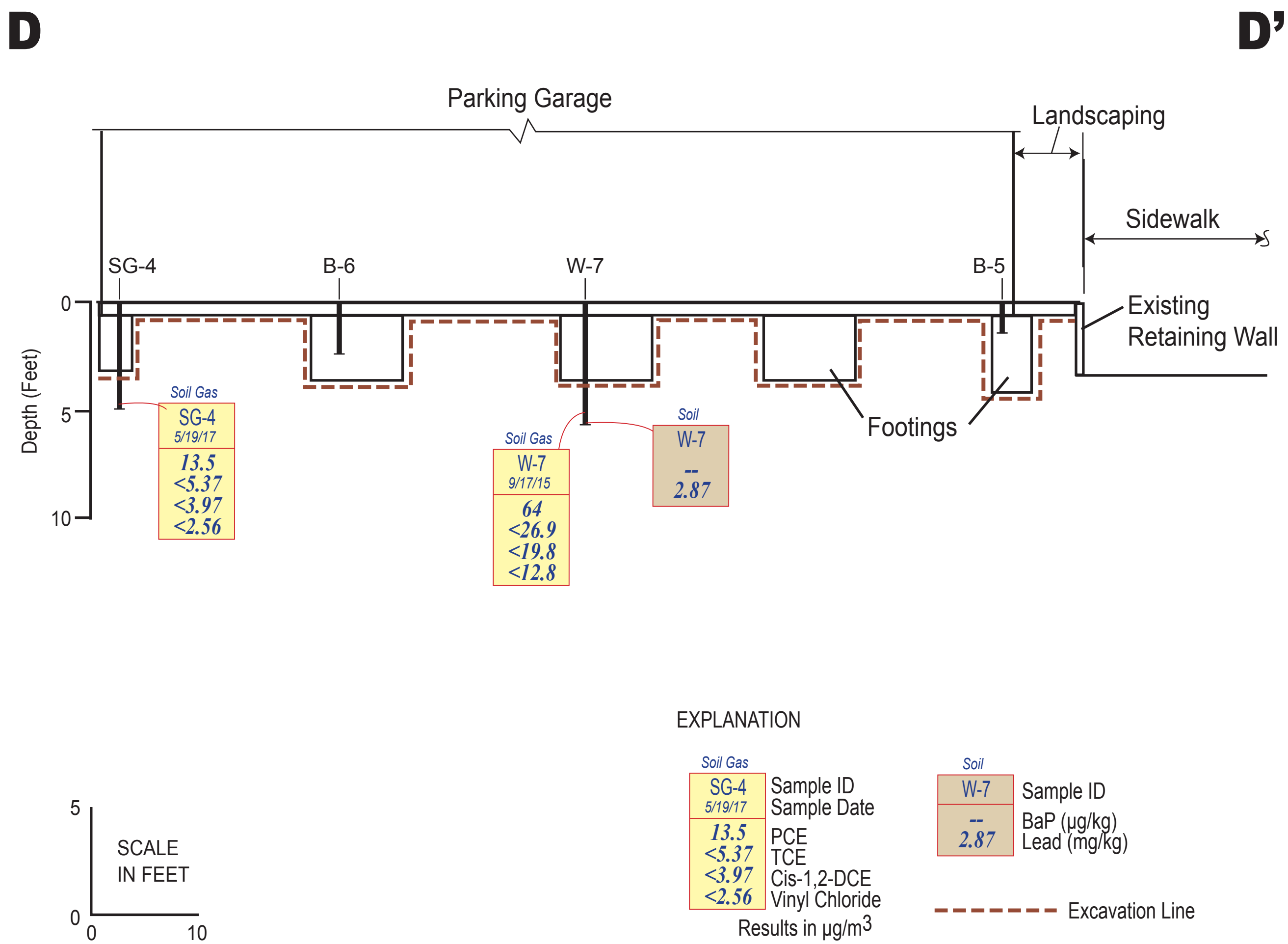


Figure 2-6	**CROSS SECTION D-D’**
October 2017	5th and Magnolia Streets, Oakland, California

WEST Environmental Services & Technology

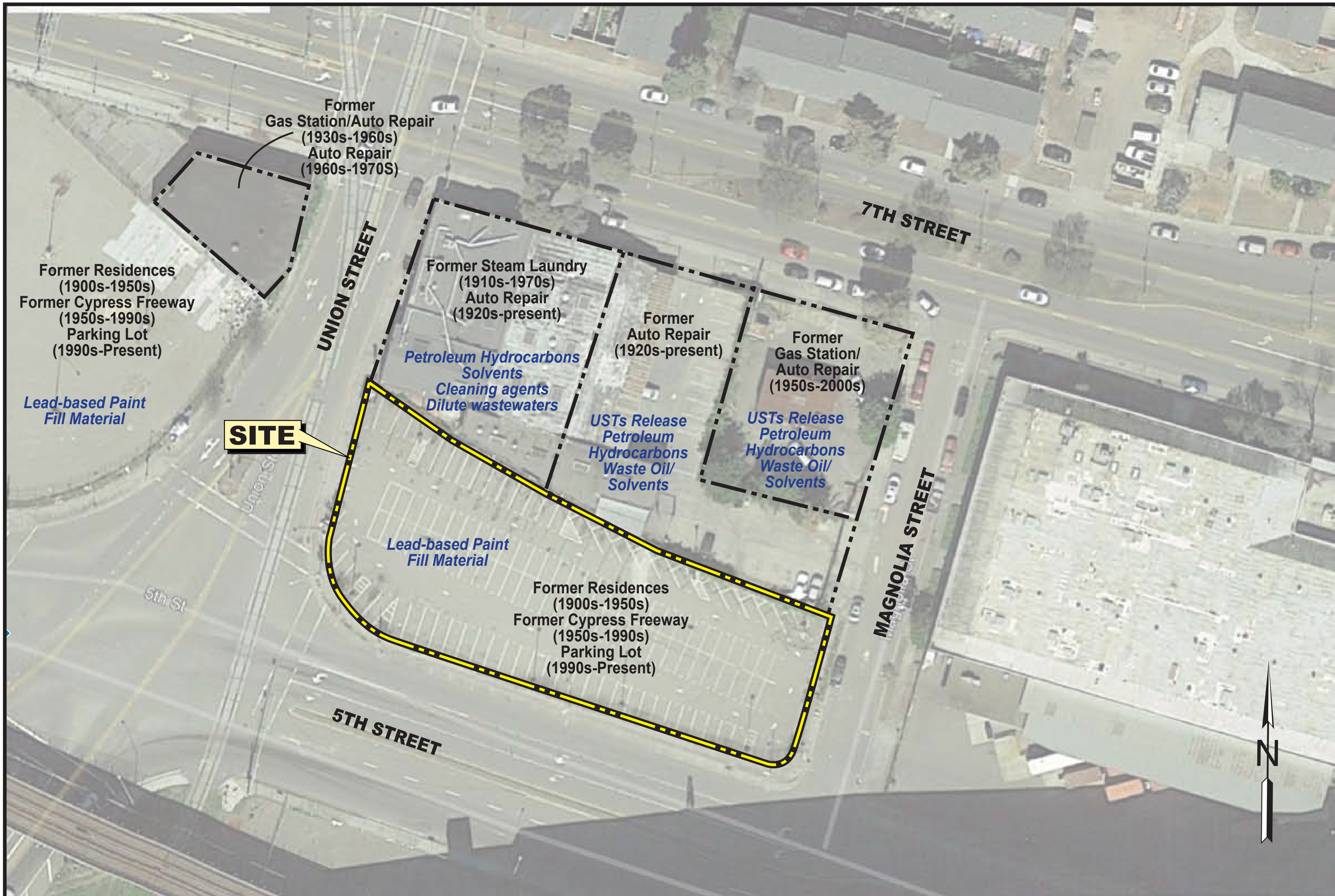
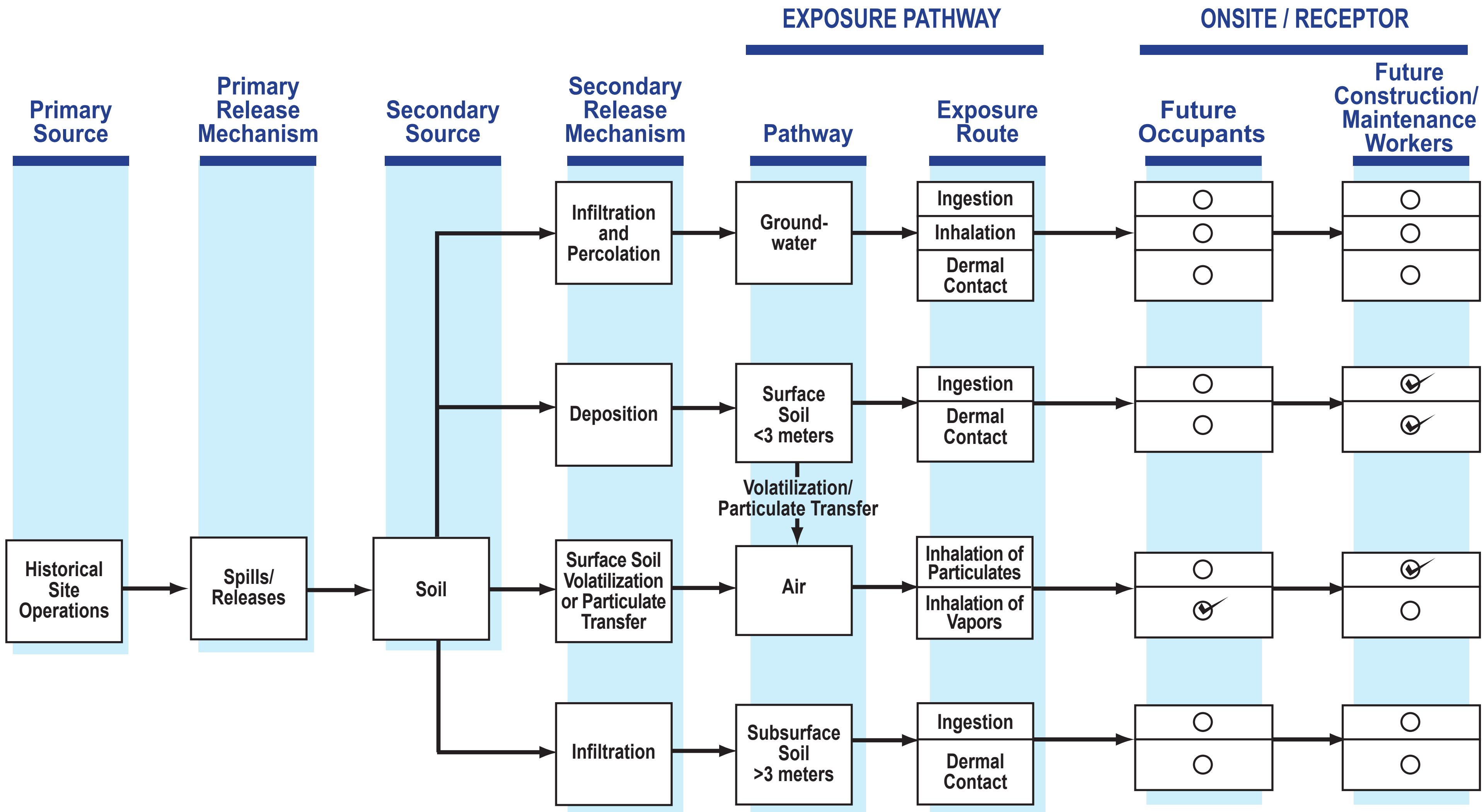


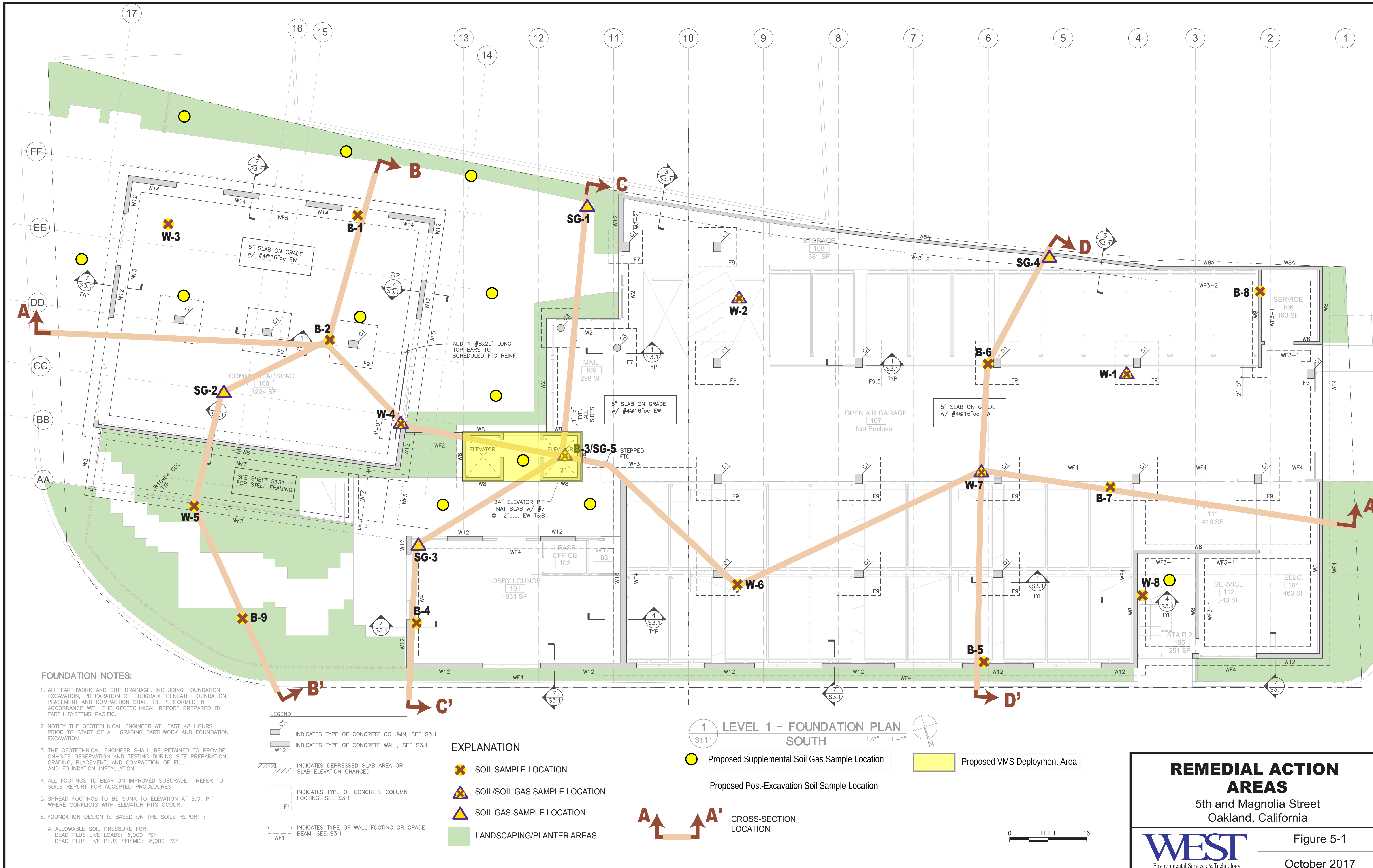
	Figure 3-1	**CONCEPTUAL SITE MODEL**	WEST Environmental Services & Technology
	October 2017	5th and Magnolia Streets, Oakland, California	

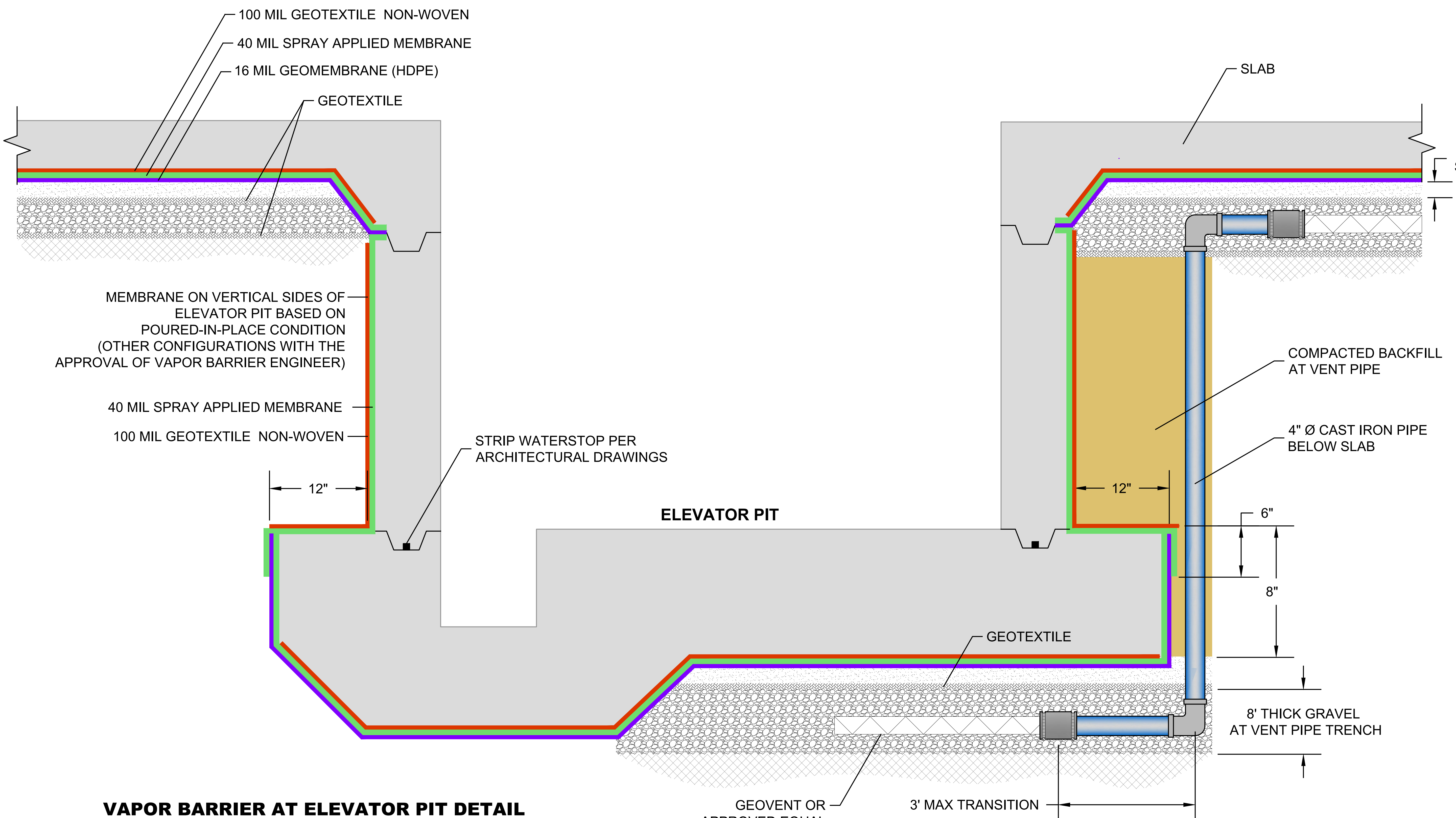


○ Incomplete exposure pathway

✓ Complete exposure pathway

Figure 3-2	EXPOSURE PATHWAY CHART	WEST Environmental Services & Technology
October 2017	5th Street and Magnolia Street, West Oakland, California	


A
A'
B
B'
C
C'
D
D'
W-1
W-2
W-3
W-4
W-5
W-6
W-7
W-8
B-1
B-2
B-3/SG-5
B-4
B-5
B-6
B-7
B-8
B-9
SG-1
SG-2
SG-3
SG-4
FOUNDATION NOTES:
LEVEL 1 - FOUNDATION PLAN
SOUTH
EXPLANATION
SOIL SAMPLE LOCATION
SOIL/SOIL GAS SAMPLE LOCATION
SOIL GAS SAMPLE LOCATION
LANDSCAPING/PLANTER AREAS
Proposed Supplemental Soil Gas Sample Location
Proposed Post-Excavation Soil Sample Location
Proposed VMS Deployment Area
CROSS-SECTION LOCATION
FEET
REMEDIAL ACTION AREAS
5th and Magnolia Street
Oakland, California
WEST
Environmental Services & Technology
Figure 5-1
October 2017



VAPOR BARRIER AT ELEVATOR PIT DETAIL

N.T.S.

CONCEPTUAL VMS ELEVATOR PIT

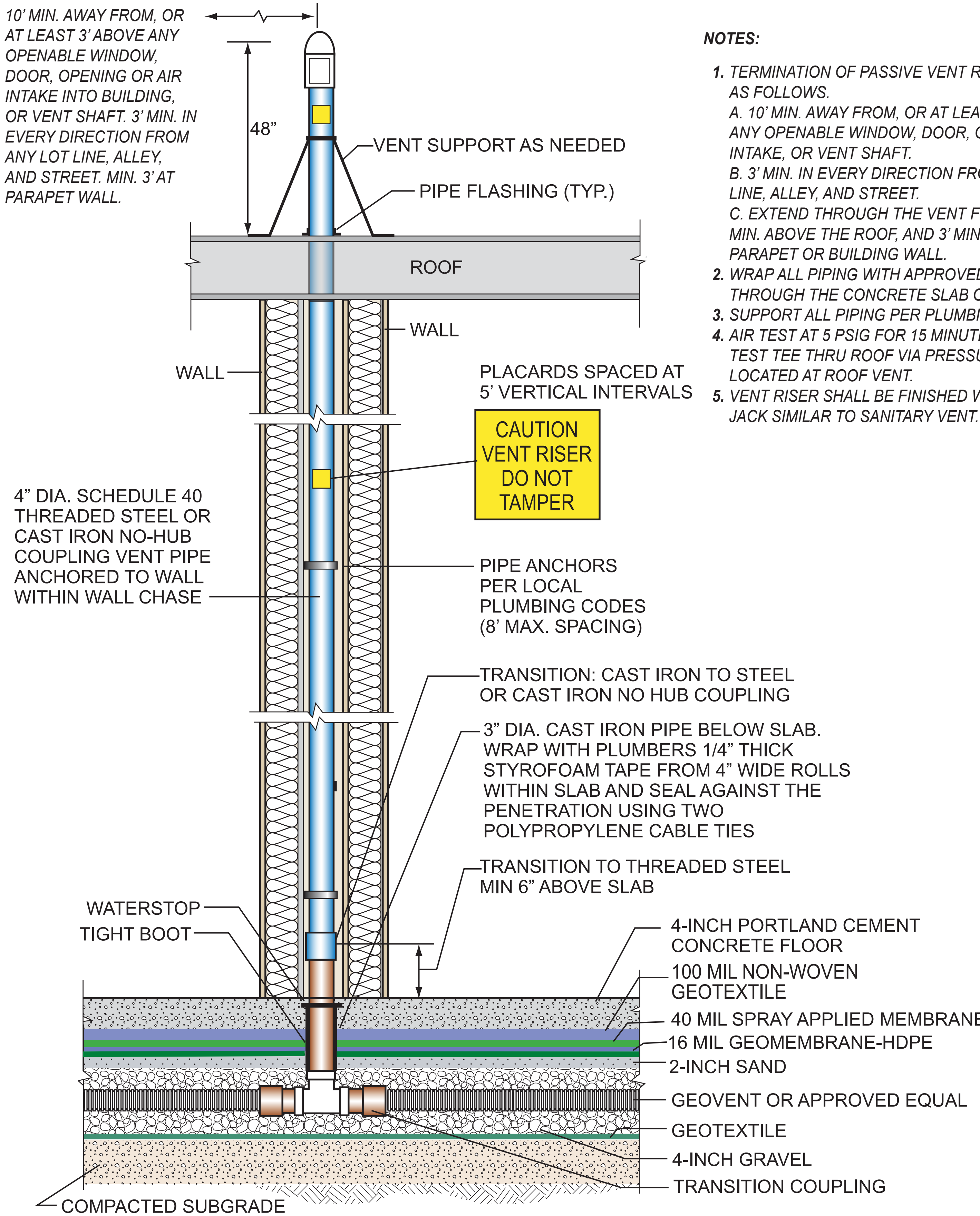
5th and Magnolia Streets
Oakland, California

WEST Environmental Services & Technology

Figure 5-3

October 2017

Regis.SSF.dwg, 11/15/2016 - 03:27 PM

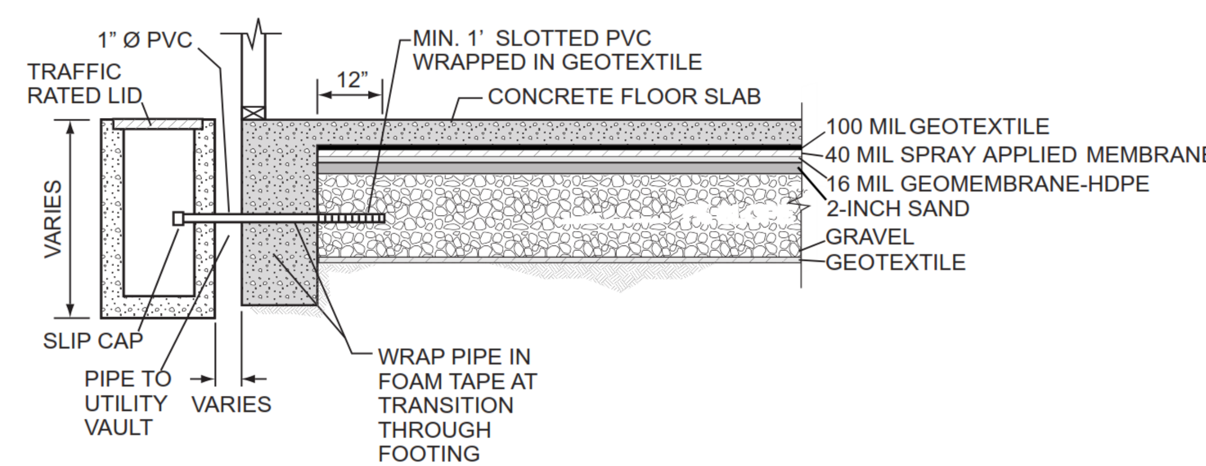


SUBSLAB VAPOR COLLECTION / VENT RISER DETAIL

N.T.S.

NOTES:

1. *TERMINATION OF PASSIVE VENT RISER SHALL BE AS FOLLOWS.*
   A. 10' MIN. AWAY FROM, OR AT LEAST 3' ABOVE ANY OPENABLE WINDOW, DOOR, OPENING OR AIR INTAKE, OR VENT SHAFT.
   B. 3' MIN. IN EVERY DIRECTION FROM ANY LOT LINE, ALLEY, AND STREET.
   C. EXTEND THROUGH THE VENT FLASHING. 12" MIN. ABOVE THE ROOF, AND 3' MIN. FROM ANY PARAPET OR BUILDING WALL.
2. *WRAP ALL PIPING WITH APPROVED MATERIAL THROUGH THE CONCRETE SLAB OR FLOOR.*
3. *SUPPORT ALL PIPING PER PLUMBING CODES.*
4. *AIR TEST AT 5 PSIG FOR 15 MINUTES. TEST FROM TEST TEE THRU ROOF VIA PRESSURE GAUGE LOCATED AT ROOF VENT.*
5. *VENT RISER SHALL BE FINISHED WITH ROOF JACK SIMILAR TO SANITARY VENT.*



SUBSLAB MONITORING PORT DETAIL

N.T.S.

CONCEPTUAL VMS VENT RISER

5th and Magnolia Streets
Oakland, California

WEST Environmental Services & Technology

Figure 5-4

October 2017

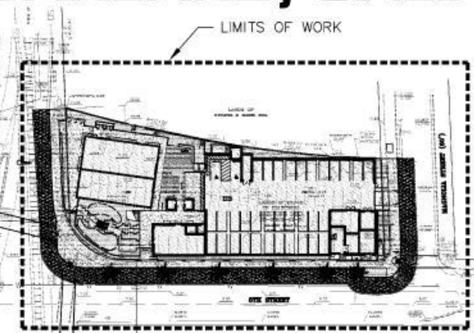
APPENDIX A

DEVELOPMENT PLANS

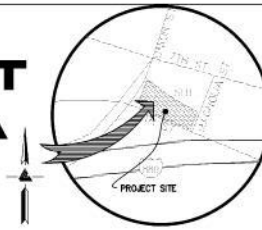
THE UNION
5TH AND UNION STREET
OAKLAND, CALIFORNIA

LEGEND

EXISTING	PROPOSED	DESCRIPTION
		BOUNDARY
		PROPERTY LINE
		RETAINING WALL
		LANDSCAPE RETAINING WALL
	RW	RAINWATER TIGHTLINE
	SUB	SUBDRAIN LINE
	TL	TIGHTLINE
SD	SD	STORM DRAIN LINE
SS	SS	SANITARY SEWER LINE
W	W	WATER LINE
G	G	GAS LINE
P	P	PRESSURE LINE
JT	JT	JOINT TRENCH
		SET BACK LINE
		CONCRETE VALLEY GUTTER
		EARTHEN SWALE
	CB	CATCH BASIN
	JB	JUNCTION BOX
		AREA DRAIN
		CURB INLET
	SDMH	STORM DRAIN MANHOLE
		FIRE HYDRANT
	SSMH	SANITARY SEWER MANHOLE
		STREET SIGN
	222.57 BW	SPOT ELEVATION
		FLOW DIRECTION
		DEMOLISH/REMOVE
		BENCHMARK
	200	CONTOURS
		TREE TO BE REMOVED



KEY MAP
1" = 50'



VICINITY MAP
NTS

ABBREVIATIONS

AB	AGGREGATE BASE	MAX	MAXIMUM
AC	ASPHALT CONCRETE	MH	MANHOLE
ACC	ACCESSIBLE	MIN	MINIMUM
AD	AREA DRAIN	MON.	MONUMENT
BC	BEGINNING OF CURVE	(N)	NEW
B & D	BEARING & DISTANCE	NO.	NUMBER
BM	BENCHMARK	NTS	NOT TO SCALE
BW/FG	BOTTOM OF WALL/FINISH GRADE	O.C.	ON CENTER
CB	CATCH BASIN	O/	OVER
C & G	CURB AND GUTTER	(PA)	PLANTING AREA
℄	CENTER LINE	PED	PEDESTRIAN
CPP	CORRUGATED PLASTIC PIPE (SMOOTH INTERIOR)	PIV	POST INDICATOR VALVE
		PSS	PUBLIC SERVICES EASEMENT
CO	CLEANOUT	ℙ	PROPERTY LINE
COTG	CLEANOUT TO GRADE	PP	POWER POLE
CONC	CONCRETE	PUE	PUBLIC UTILITY EASEMENT
CONST	CONSTRUCT or -TION	PVC	POLYVINYL CHLORIDE
CONC COR	CONCRETE CORNER	R	RADIUS
CY	CUBIC YARD	RCP	REINFORCED CONCRETE PIPE
D	DIAMETER	RIM	RIM ELEVATION
DI	DROP INLET	RW	RAINWATER
DIP	DUCTILE IRON PIPE	R/W	RIGHT OF WAY
EA	EACH	S	SLOPE
EC	END OF CURVE	S.A.D.	SEE ARCHITECTURAL DRAWINGS
EG	EXISTING GRADE	SAN	SANITARY
EL	ELEVATIONS	SD	STORM DRAIN
EP	EDGE OF PAVEMENT	SDMH	STORM DRAIN MANHOLE
EQ	EQUIPMENT	SHT	SHEET
EW	EACH WAY	S.L.D.	SEE LANDSCAPE DRAWINGS
(E)	EXISTING	SPEC	SPECIFICATION
FC	FACE OF CURB	SS	SANITARY SEWER
FF	FINISHED FLOOR	SSCO	SANITARY SEWER CLEANOUT
FG	FINISHED GRADE	SSMH	SANITARY SEWER MANHOLE
FH	FIRE HYDRANT	ST.	STREET
FL	FLOW LINE	STA	STATION
FS	FINISHED SURFACE	STD	STANDARD
G	GAS	STRUCT	STRUCTURAL
GA	GAGE OR GAUGE	T	TELEPHONE
GB	GRADE BREAK	TC	TOP OF CURB
HDPE	HIGH DENSITY CORRUGATED POLYETHYLENE PIPE	TEMP	TEMPORARY
		TP	TOP OF PAVEMENT
HORIZ	HORIZONTAL	TW/FG	TOP OF WALL/FINISH GRADE
HI PT	HIGH POINT	TYP	TYPICAL
H&T	HUB & TACK	VC	VERTICAL CURVE
ID	INSIDE DIAMETER	VCP	VITRIFIED CLAY PIPE
INV	INVERT ELEVATION	VERT	VERTICAL
JB	JUNCTION BOX	W/	WITH
JT	JOINT TRENCH	W, WL	WATER LINE
JP	JOINT UTILITY POLE	WM	WATER METER
L	LENGTH	WWF	WELDED WIRE FABRIC
LNDG	LANDING		
LF	LINEAR FEET		

ESTIMATED EARTHWORK QUANTITIES

CUBIC YARDS	WITHIN BUILDING FOOTPRINT	OUTSIDE BUILDING FOOTPRINT	TOTAL CUBIC YARDS
CUT	0	458	458
FILL	0	512	512
IMPORT			54

NOTE:
GRADING QUANTITIES REPRESENT BANK YARDAGE. IT DOES NOT INCLUDE ANY SWELLING OR SHRINKAGE FACTORS AND IS INTENDED TO REPRESENT IN-SITU CONDITIONS. QUANTITIES DO NOT INCLUDE OVER-EXCAVATION, TRENCHING, STRUCTURAL FOUNDATIONS OR PIERS, OR POOL EXCAVATION (IF ANY). NOTE ADDITIONAL EARTHWORKS, SUCH AS KEYWAYS OR BENCHING MAY BE REQUIRED BY THE GEOTECHNICAL ENGINEER IN THE FIELD AT TIME OF CONSTRUCTION. CONTRACTOR TO VERIFY QUANTITIES.

ENGINEER'S STATEMENT–GEOTECHNICAL DESIGN

INITIAL STATEMENT OF THE ENGINEER (DIVIDED RESPONSIBILITY)

I HAVE BEEN RETAINED BY HOLLIDAY DEVELOPMENT TO BE IN RESPONSIBLE CHARGE OF THE PORTIONS OF GRADING WORK ENUMERATED BELOW. I WILL ASSUME FULL RESPONSIBILITY AS RESPONSIBILITY IS DEFINED IN SECTION 2-6.075 OF THE OAKLAND MUNICIPAL CODE FOR CARRYING OUT THE FOLLOWING TO THE BEST OF MY KNOWLEDGE AND ABILITY:

(A) ASSURING THAT TESTING AND INSPECTION REQUIRED FOR THE WORK IN PROGRESS AND THE COMPLETED WORK SHALL BE ACCOMPLISHED IN A PROFESSIONAL MANNER TO DETERMINE WHETHER ALL THE WORK IS BEING/WAS DONE IN ACCORDANCE WITH THE PLANS AND SPECIFICATIONS APPROVED BY THE DIRECTOR OF PUBLIC WORKS.

(B) NOTIFYING THE APPLICANT, VERBALLY AND IN WRITING (WITH A COPY TO THE DIRECTOR OF PUBLIC WORKS), OF ANY WORK NOT BEING PERFORMED IN ACCORDANCE WITH THE APPROVED PLANS AND SPECIFICATIONS.

(C) NOTIFYING THE APPLICANT, VERBALLY AND IN WRITING (WITH A COPY TO THE DIRECTOR OF PUBLIC WORKS), OF ANY WORK NOT MEETING THE REQUIREMENTS OF THE APPROVED PLANS AND SPECIFICATIONS.

(D) NOTIFYING THE APPLICANT, VERBALLY AND IN WRITING, OF THE MODIFICATION(S) REQUIRED IN HIS PERFORMANCE AND THE NECESSARY CORRECTIVE MEASURES TO BE TAKEN TO CURE ALL DEFICIENCIES.

(E) (BY PROJECT CIVIL ENGINEER)

(F) (BY PROJECT CIVIL ENGINEER)

(G) (BY PROJECT CIVIL ENGINEER)

(H) (BY PROJECT CIVIL ENGINEER)

IF MY SERVICES ON THE JOB ARE TERMINATED, I WILL, AT SAID TIME OF TERMINATION, SUBMIT TO THE DIRECTOR OF PUBLIC WORKS, A STATEMENT OF PARTIAL COMPLETION ADDRESSING THE PROGRESS AND CONDITIONS OF ALL OF THE APPLICABLE ITEMS ABOVE AND ATTACH THERETO THE RESULTS OF SUCH INSPECTIONS AND TESTS WHICH HAVE BEEN COMPLETED.

SIGNED: ______________
REGISTERED CIVIL ENGINEER NO. _______ (EXP. _______)

(TO BE STAMPED AND SIGNED BY PROJECT GEOTECHNICAL CONSULTAN

ENGINEER'S STATEMENT – CIVIL DESIGN

INITIAL STATEMENT OF THE ENGINEER (DIVIDED RESPONSIBILITY)

I HAVE BEEN RETAINED BY HOLLIDAY DEVELOPMENT TO BE IN RESPONSIBLE CHARGE OF THE PORTIONS OF GRADING WORK ENUMERATED BELOW. I WILL ASSUME FULL RESPONSIBILITY AS RESPONSIBILITY IS DEFINED IN SECTION 2-6.075 OF THE OAKLAND MUNICIPAL CODE FOR CARRYING OUT THE FOLLOWING TO THE BEST OF MY KNOWLEDGE AND ABILITY:

(A) (BY PROJECT GEOTECHNICAL CONSULTANT)

(B) (BY PROJECT GEOTECHNICAL CONSULTANT)

(C) (BY PROJECT GEOTECHNICAL CONSULTANT)

(D) (BY PROJECT GEOTECHNICAL CONSULTANT)

(E) SUBMITTING AN AMENDED GRADING PLAN (THROUGH THE APPLICANT) TO THE CITY ENGINEER FOR HIS REVIEW AND APPROVAL FOR ANY SIGNIFICANT CHANGES CAUSED BY UNFORESEEN CONDITIONS, ALONG WITH A REPORT SETTING FORTH THE REASONS FOR THESE CHANGES AND THE RECOMMENDED CHANGES TO THE IMPROVEMENT PLANS ENGENDERED AS A RESULT OF THE AMENDED GRADING PLAN.

(F) NOTIFYING THE APPLICANT, VERBALLY AND IN WRITING (WITH A COPY TO THE CITY ENGINEER), OF ANY PORTION OF THE GRADING WORK AFFECTED BY THE AMENDED PLANS AND SHALL RECOMMEND WHETHER OR NOT THE APPLICANT SHOULD PROCEED WITH THE WORK BEFORE THE AMENDED PLANS ARE APPROVED BY THE CITY ENGINEER.

(G) SUBMITTING UPON THE APPLICANT'S SATISFACTORY COMPLETION OF WORK UNDER THE PERMIT, A STATEMENT OF COMPLETION PURSUANT TO SECTION 2-6.111 OF THE OAKLAND MUNICIPAL CODE WITH THE RESULTS OF ALL TESTS AND INSPECTIONS ATTACHED THERETO.

(H) STATING IN WRITING, ALONG WITH THE STATEMENT OF COMPLETION, THAT THE INTERIM EROSION CONTROL AND SEDIMENT CONTROL MEASURES APPEAR TO BE ADEQUATE IF PROPERLY MAINTAINED UNTIL THE PERMANENT EROSION CONTROL MEASURES ARE FULLY ESTABLISHED, IF ANY ARE REQUIRED.

IF MY SERVICES ON THE JOB ARE TERMINATED, I WILL, AT SAID TIME OF TERMINATION, SUBMIT TO THE CITY ENGINEER, A STATEMENT OF PARTIAL COMPLETION ADDRESSING THE PROGRESS AND CONDITIONS OF ALL OF THE APPLICABLE ITEMS ABOVE AND ATTACH THERETO THE RESULTS OF SUCH INSPECTIONS AND TESTS WHICH HAVE BEEN COMPLETED.

SIGNED: RAY
REGISTERED C 3 (EXP. 09-30-17)

SITE BENCHMARK

SURVEY CONTROL POINT
MAG AND SHINER SET IN ASPHALT
ELEVATION = 8.68'

1-800-227-2600 CALL BEFORE YOU DIG USA UNDERGROUND SERVICE ALERT

* BUILDING PAD NOTE: ADJUST PAD LEVEL AS REQUIRED. REFER TO STRUCTURAL PLANS FOR SLAB SECTION OR CRAWL SPACE DEPTH TO ESTABLISH PAD LEVEL.

SHEET

NOTE:
FOR CONSTRUCTION STAKING SCHEDULING OR QUOTATIONS PLEASE CONTACT GREG BRAZE AT LEA & BRAZE ENGINEERING (510)887-4086 EXT 103.
gbraze@leabraze.com

OWNER'S INFORMATION

OWNER: KEVIN BROWN
HOLLIDAY DEVELOPMENT
1201 PINE STREET, SUITE 151
OAKLAND, CA 94607

APN: 004-0049-004-00

REFERENCES

THIS GRADING AND DRAINAGE PLAN IS SUPPLEMENTAL TO:

1. TOPOGRAPHIC SURVEY BY LEA AND BRAZE ENGINEERING, ENTITLED; "TOPOGRAPHICAL SURVEY" 123 MAIN ST ANYTOWN, USA DATED: JOB# 2151068
2. SITE PLAN BY DAVID BAKER ARCHITECTS, ENTITLED; "SITE PLAN" 461 SECOND STREET #127 SAN FRANCISCO, CA
3. SOIL REPORT BY WEST ENVIRONMENTAL SERVICES & TECHNOLOGY, ENTITLED; "SITE INVESTIGATION WORK PLAN" 711 GRAND AVENUE, SUITE 220 SAN RAFAEL, CA DATE: APRIL 2016
4. LANDSCAPE PLAN BY MILLER COMPANY LANDSCAPE ARCHITECTS, ENTITLED: "LANDSCAPE PLANS" 1585 FOLSOM STREET SAN FRANCISCO, CA

THE CONTRACTOR SHALL REFER TO THE ABOVE NOTED SURVEY AND PLAN, AND SHALL VERIFY BOTH EXISTING AND PROPOSED ITEMS ACCORDING TO THEM.

BENCHMARK

CITY OF OAKLAND BENCHMARK 8 SW 38-R PIN MONUMENT 5 FEET NORTH OF CENTER LINE OF 10TH STREET. 5 FEET WEST OF CENTER LINE OF MAGNOLIA STREET.
ELEVATION = 15.133'
(CITY OF OAKLAND DATUM)

EASEMENT NOTE

EASEMENTS ARE SHOWN PER TITLE REPORT PREPARED BY CHICAGO TITLE COMPANY, TITLE NO. 15-58206368-KD, DATED SEPTEMBER 3, 2015.

EXCEPTION #5-"EASEMENTS OR LESSER SERVITUDES, IF ANY, AS MAY EXISTS FOR SEWER PURPOSES OVER THE SOUTHERLY PORTION OF PREMISES AS DISCLOSED BY OFF RECORD INFORMATION (CITY OF OAKLAND SEWER MAP. NO. 201)". SAID MAP SHOWS A STORM CONDUIT OVER THE PROPERTY BUT DOES NOT LIST AN EASEMENT.

REGISTERED PROFESSIONAL ENGINEER RAYMOND L. BARRO No. 68283 CIVIL STATE OF CALIFORNIA

LEA & BRAZE ENGINEERING, INC.
CIVIL ENGINEERS • LAND SURVEYORS
BAY AREA REGION 2495 INDUSTRIAL PKWY WEST HAYWARD, CALIFORNIA 94545 (P) (510) 887-4086 (F) (510) 887-3019
SACRAMENTO REGION 3017 DOUGLAS BLVD. # 300 ROSEVILLE, CA 95661 (P) (916)966-1338 (F) (916)797-7363
WWW.LEABRAZE.COM

BUILDING PERMIT

david baker architects
dbarchitect.com
461 second street loft 127
san francisco california 94107
415 896 6700 fax 415 896 6103

LICENSE STAMP

THE UNION
Holliday Development
532 Union Street Oakland, CA

DRAWING RELEASE STATUS	DATE

ADDENDA	DATE
1	
2	
3	
4	
5	

SHEET TITLE

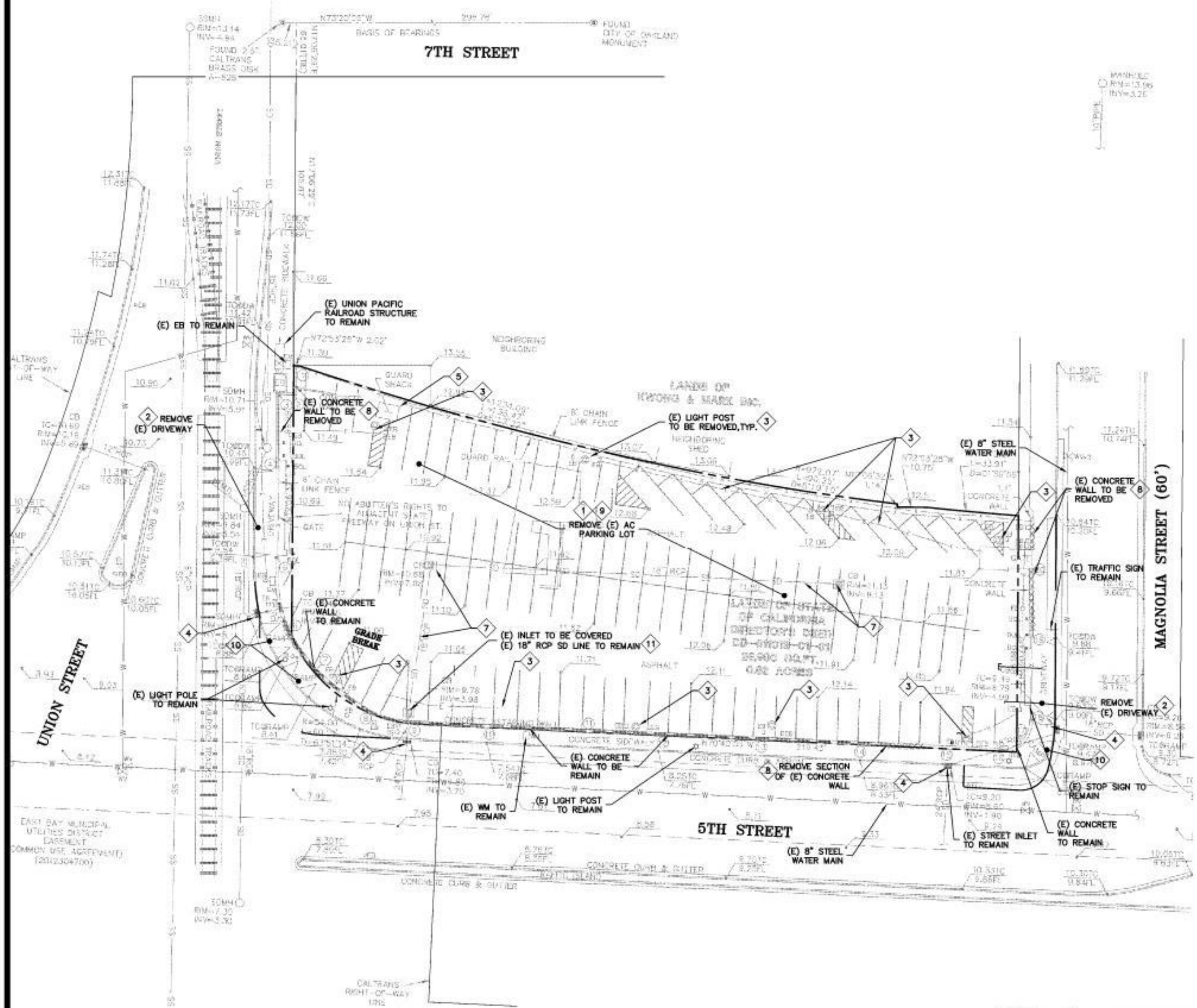
TITLE SHEET

SCALE	AS NOTED
JOB NUMBER 21526	RELEASE DATE 08/24/2016

C-1.0

1 OF 13 SHEETS

PLOT DATE 08-24-16



RETAINING WALL SPOTGRADES

	TW	BW
1	12.08	11.38
2	11.08	11.38
3	11.88	11.18
4	11.32	10.52
5	10.38	10.09
6	10.41	9.31
7	10.37	8.67
8	11.37	7.97
9	11.19	7.49
10	11.78	7.68

	TW	BW
11	11.91	8.01
12	12.07	8.37
13	12.31	8.81
14	12.26	9.06
15	12.27	9.27
16	12.36	9.36
17	12.34	9.64
18	9.02	9.02
19	10.66	10.16
20	12.04	10.54

NOTE:
FOR CONSTRUCTION STAKING SCHEDULING OR QUOTATIONS PLEASE CONTACT ALEX ABAYA AT LEA & BRAZE ENGINEERING (510)887-4086 EXT 116. aabaya@leabraze.com

*** BUILDING PAD NOTE:** ADJUST PAD LEVEL AS REQUIRED. REFER TO STRUCTURAL PLANS FOR SLAB SECTION OR CRAWL SPACE DEPTH TO ESTABLISH PAD LEVEL.

CALL BEFORE YOU DIG 1-800-227-2600

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ROSEVILLE, CA 95661
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532 Union Street Oakland, CA

DRAWING RELEASE STATUS	DATE

ADDENDA	DATE
1	
2	
3	
4	
5	
6	

SHEET TITLE

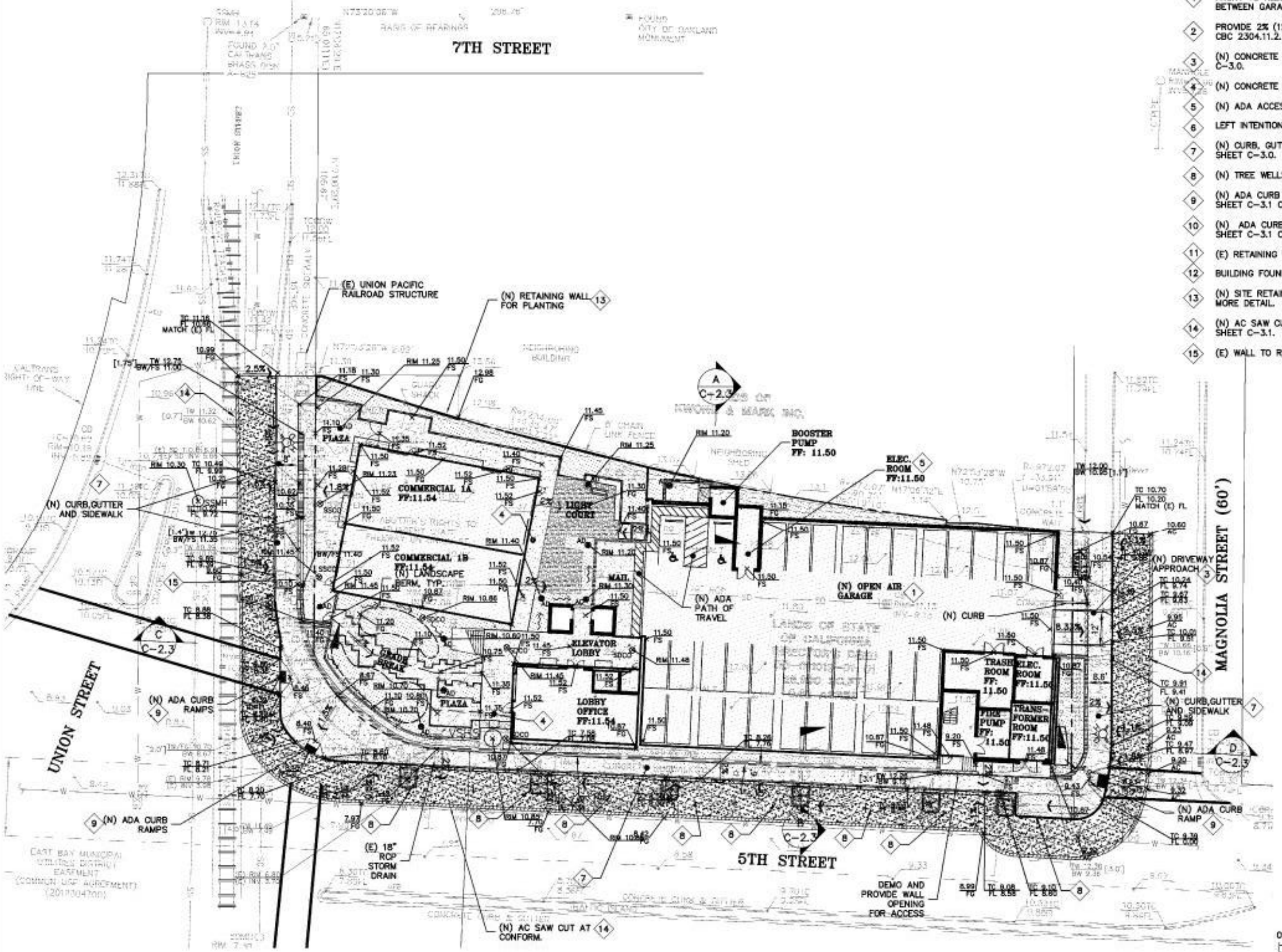
DEMOLITION PLAN

SCALE	
AS NOTED	
JOB NUMBER 21525	RELEASE DATE 08/24/2016

C-2.0

2 OF 13 SHEETS

PLOT DATE 08-24-16



GRADING KEYNOTES 1 TO 16

1. SLOPE GARAGE SLAB 1% MINIMUM (1/8" PER FOOT) FROM BACK TO FRONT TO ALLOW FOR ADEQUATE DRAINAGE. MAINTAIN 1/2" TO 1" LIP BETWEEN GARAGE SLAB AND DRIVEWAY. SEE PLANS FOR SPECIFIC DROP
2. PROVIDE 2% (1% MIN.) SLOPE ACROSS FLAT WORK AND/OR PAVING PER CBC 2304.11.2. SLOPE TOWARDS POSITIVE DRAINAGE AS SHOWN ON PLAN.
3. (N) CONCRETE DRIVEWAY PER CITY STANDARD. SEE DETAIL ON SHEET C-3.0.
4. (N) CONCRETE PATIOS/WALKWAYS. SEE DETAIL 1 SHEET C-3.0.
5. (N) ADA ACCESSIBLE WALKWAY. CROSS SLOPE NOT TO EXCEED 2%.
6. LEFT INTENTIONALLY BLANK
7. (N) CURB, GUTTER, AND SIDEWALK PER CITY STANDARDS. SEE DETAIL ON SHEET C-3.0.
8. (N) TREE WELLS. SEE LANDSCAPE PLANS AND DETAIL 6 ON SHEET C-3.0.
9. (N) ADA CURB RAMPS PER 2015 CALTRANS STANDARDS. SEE DETAIL ON SHEET C-3.1 CASE B DETAIL B.
10. (N) ADA CURB RAMPS PER 2015 CALTRANS STANDARDS. SEE DETAIL ON SHEET C-3.1 CASE B DETAIL A.
11. (E) RETAINING WALL TO REMAIN
12. BUILDING FOUNDATION WALL SEE STRUCTURAL PLANS FOR MORE DETAIL.
13. (N) SITE RETAINING WALL. SEE STRUCTURAL AND LANDSCAPE PLANS FOR MORE DETAIL.
14. (N) AC SAW CUT AND PAVEMENT TIE IN AT CONFORM. SEE DETAIL 6 ON SHEET C-3.1.
15. (E) WALL TO REMAIN.

RETAINING WALL SPOTGRADES

	TW	BW
1	12.08	11.58
2	11.08	11.38
3	11.05	11.18
4	11.32	10.67
5	10.39	10.09
6	10.41	9.31
7	10.37	8.67
8	11.37	7.97
9	11.19	7.19
10	11.78	7.68

	TW	BW
11	11.91	8.01
12	12.07	8.37
13	12.31	8.81
14	12.26	9.06
15	12.27	9.27
16	12.36	9.36
17	12.34	9.64
18	9.97	9.97
19	10.00	10.10
20	12.04	10.54

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ADDENDA	DATE
1	
2	
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5	

SHEET TITLE

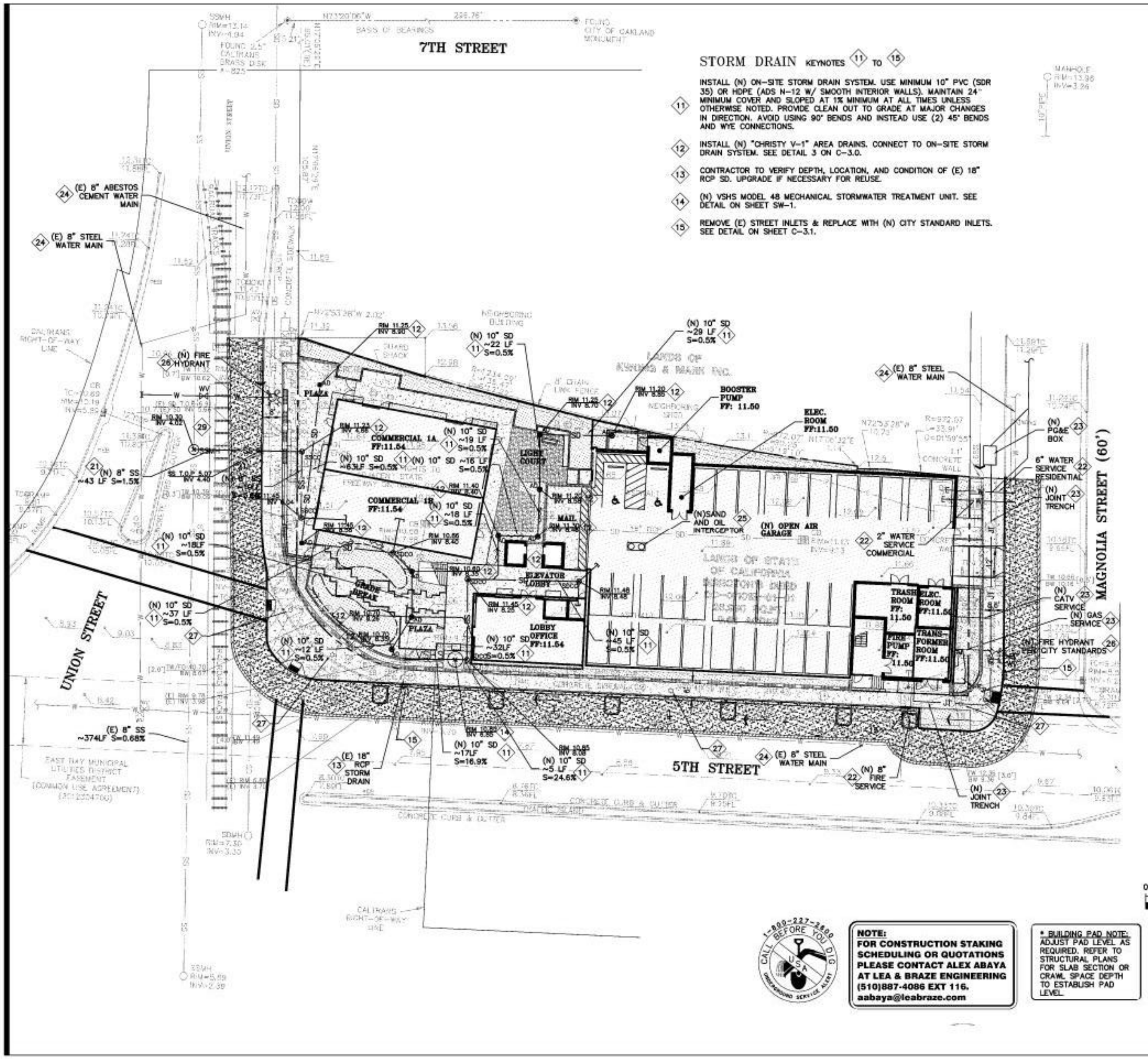
GRADING AND DRAINAGE PLAN

SCALE	AS NOTED
JOB NUMBER 21325	RELEASE DATE 08/24/2016

C-2.1

3 OF 13 SHEETS

PLOT DATE 08-24-16



STORM DRAIN KEYNOTES 11 TO 15

11. INSTALL (N) ON-SITE STORM DRAIN SYSTEM. USE MINIMUM 10" PVC (SDR 35) OR HDPE (ADS N-12 W/ SMOOTH INTERIOR WALLS). MAINTAIN 24" MINIMUM COVER AND SLOPED AT 1% MINIMUM AT ALL TIMES UNLESS OTHERWISE NOTED. PROVIDE CLEAN OUT TO GRADE AT MAJOR CHANGES IN DIRECTION. AVOID USING 90° BENDS AND INSTEAD USE (2) 45° BENDS AND WYE CONNECTIONS.
12. INSTALL (N) "CHRISTY V-1" AREA DRAINS. CONNECT TO ON-SITE STORM DRAIN SYSTEM. SEE DETAIL 3 ON C-3.0.
13. CONTRACTOR TO VERIFY DEPTH, LOCATION, AND CONDITION OF (E) 18" RCP SD. UPGRADE IF NECESSARY FOR REUSE.
14. (N) VSHS MODEL 48 MECHANICAL STORMWATER TREATMENT UNIT. SEE DETAIL ON SHEET SW-1.
15. REMOVE (E) STREET INLETS & REPLACE WITH (N) CITY STANDARD INLETS. SEE DETAIL ON SHEET C-3.1.

RETAINING WALL SPOTGRADES

	TW	BW
1	12.08	11.38
2	11.98	11.38
3	11.88	11.18
4	11.32	10.62
5	10.39	10.09
6	10.41	9.31
7	10.37	8.67
8	11.37	7.97
9	11.49	7.49
10	11.78	7.68

	TW	BW
11	11.91	8.01
12	12.07	8.37
13	12.31	8.81
14	12.26	9.06
15	12.27	9.27
16	12.36	9.36
17	12.34	9.64
18	9.92	9.92
19	10.66	10.16
20	12.04	10.54

0 10 20 40
SCALE: 1" = 20'

CALL BEFORE YOU DIG 1-800-227-2600 USA UNDERGROUND SERVICE ALERT

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LICENSE STAMP

THE UNION

Holliday Development
532 Union Street Oakland, CA

DRAWING RELEASE STATUS	DATE

ADDENDA	DATE
1	
2	
3	
4	
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SHEET TITLE

UTILITY PLAN

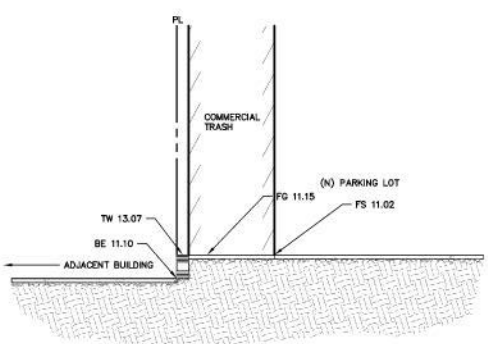
SCALE AS NOTED

JOB NUMBER 21525

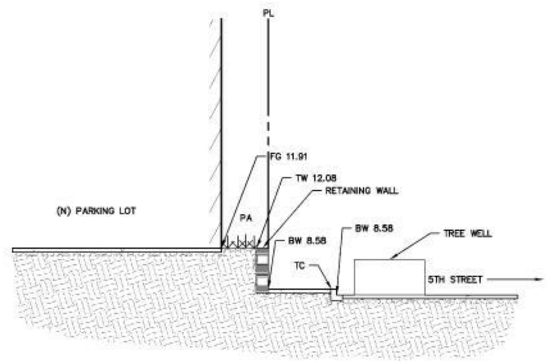
RELEASE DATE 08/24/2016

C-2.2

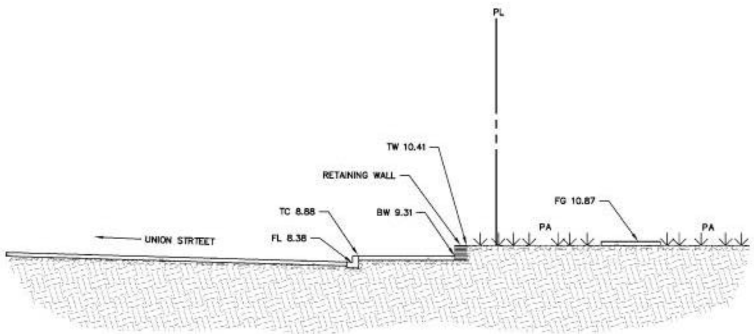
PLOT DATE 08-24-16



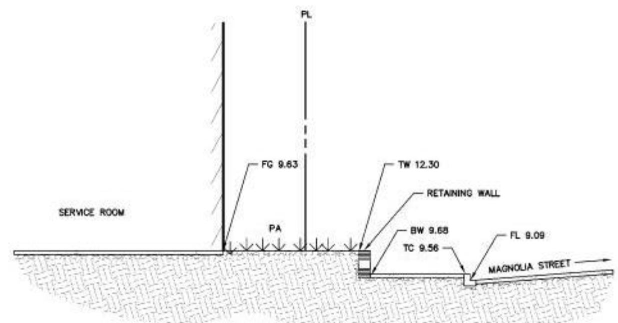
1 C-2.2 **SECTION A**
1"=10'



2 C-2.2 **SECTION B**
1"=10'



3 C-2.2 **SECTION C**
1"=10'

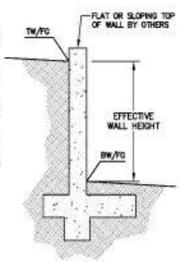


4 C-2.2 **SECTION D**
1"=10'

0 10 20 40
SCALE: 1" = 20'

RETAINING WALL NOTES

1. TW/FG REPRESENTS FINISHED EARTHEN GRADE OR PAVEMENT ELEVATION AT TOP OF WALL, NOT ACTUAL TOP OF WALL MATERIAL. BW/FG REPRESENTS FINISH EARTHEN GRADE OR PAVEMENT ELEVATION AT BOTTOM OF WALL NOT INCLUDING FILL FOUNDATION. GRADES INDICATED ON THESE PLANS REFER TO THE FINISHED GRADES ADJACENT TO THE RETAINING WALL, NOT INCLUDING FOOTING, FREEBOARD, ETC.
2. DIMENSIONS SHOWN IN BRACKETS SHOWN AS [X.X'] DENOTE THE EFFECTIVE WALL HEIGHT ONLY. THE ACTUAL WALL HEIGHT AND DEPTH MAY DIFFER DUE TO CONSTRUCTION REQUIREMENTS.
3. REFER TO SPECIFIC WALL CONSTRUCTION DETAIL FOR STRUCTURAL ELEMENTS, FREEBOARD, AND EMBEDMENT.
4. REFER TO ARCHITECTURAL, LANDSCAPE ARCHITECTURE, AND/OR STRUCTURAL PLANS FOR DETAILS, WALL ELEVATIONS, SUBDRAINAGE, WATERPROOFING, FINISHES, COLORS, STEEL REINFORCING, MATERIALS, ETC. PROVIDE CLIPS OR OTHER MEANS OF SECURING FINISH MATERIALS AS NECESSARY (WET SET INTO THE WALL).
5. ALL RETAINING WALLS SHOULD HAVE A BACK-OF-WALL SUB-SURFACE DRAINAGE SYSTEM INCLUDING WEEPHOLES TO PREVENT HYDROSTATIC PRESSURE.
6. SEE DETAIL SHEET FOR SPECIFIC INFORMATION.
7. PROVIDE GUARDRAIL (WHERE APPLICABLE AND DESIGNED BY OTHERS) AS REQUIRED FOR GRADE SEPARATION OF 30 INCHES OR MORE MEASURED 5' HORIZONTALLY FROM FACE OF WALL, PER CBC.



CALL BEFORE YOU DIG 1-800-227-2600 USA UNDERGROUND SERVICE ALERT

NOTE:
FOR CONSTRUCTION STAKING SCHEDULING OR QUOTATIONS PLEASE CONTACT ALEX ABAYA AT LEA & BRAZE ENGINEERING (510)887-4086 EXT 116.
aabaya@leabraze.com

* BUILDING PAD NOTE:
ADJUST PAD LEVEL AS REQUIRED. REFER TO STRUCTURAL PLANS FOR SLAB SECTION OR CRAWL SPACE DEPTH TO ESTABLISH PAD LEVEL.

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SHEET TITLE

SECTIONS

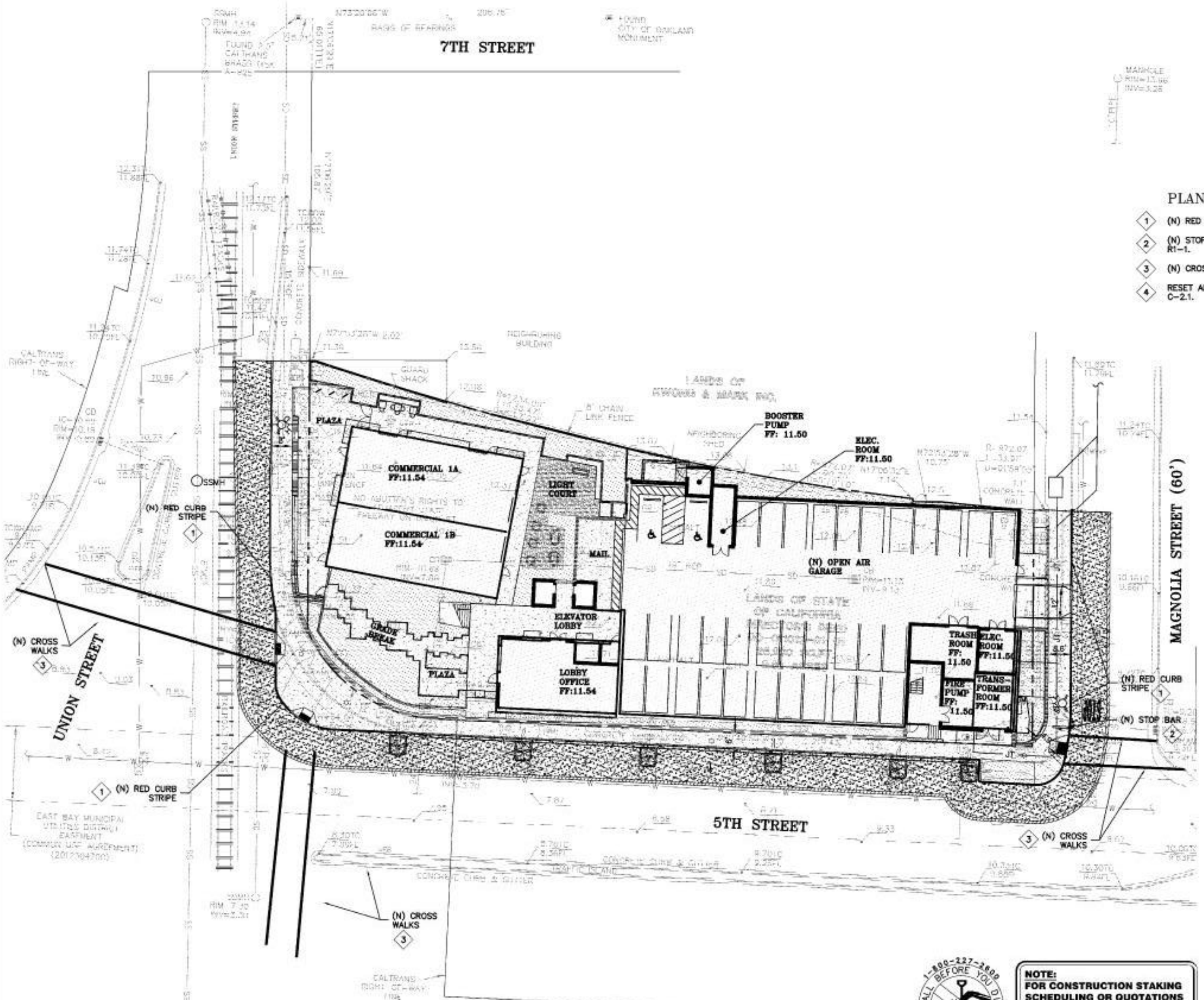
SCALE AS NOTED

JOB NUMBER	RELEASE DATE
21325	08/24/2016

C-2.4

6 OF 13 SHEETS

PLOT DATE 08-24-16



PLAN NOTES KEYNOTES 1 TO 4

1. (N) RED STRIPE PAINTING DESIGNATING "NO PARKING AREA".
2. (N) STOP BAR AND SIGNAGE PER CALTRANS A24D AND SIGN MUTED R1-1.
3. (N) CROSSWALK STRIPING PLAN 2015. SEE DETAIL ON SHEET C-3.1.
4. RESET ALL (E) SIGNAGE TO (N) GRADES PER GRADING PLANS SHEET C-2.1.

RETAINING WALL SPOTGRADES

	TW	BW
1	12.08	11.38
2	11.98	11.38
3	11.88	11.18
4	11.32	10.62
5	10.59	10.09
6	10.41	9.31
7	10.37	8.67
8	11.37	7.97
9	11.19	7.49
10	11.78	7.68

	TW	BW
11	11.91	8.01
12	12.07	8.37
13	12.31	8.81
14	12.26	9.06
15	12.27	9.27
16	12.36	9.36
17	12.34	9.64
18	9.92	9.92
19	10.66	10.16
20	12.04	10.54

0 10 20 40

SCALE: 1" = 20'

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SHEET TITLE

PARKING AND STRIPING PLAN

SCALE AS NOTED

JOB NUMBER 21325

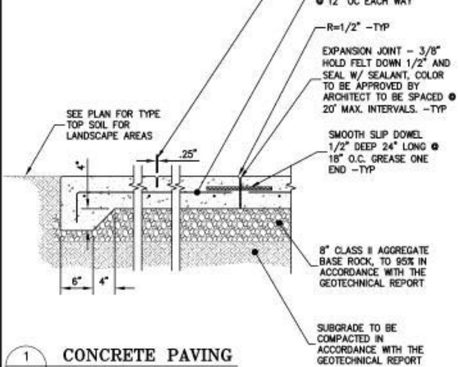
RELEASE DATE 08/24/2016

C-2.3

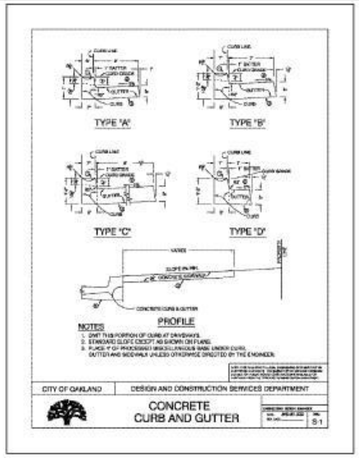
PLOT DATE 08-24-16

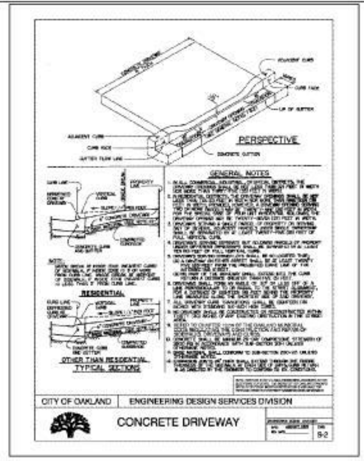
NOTES:

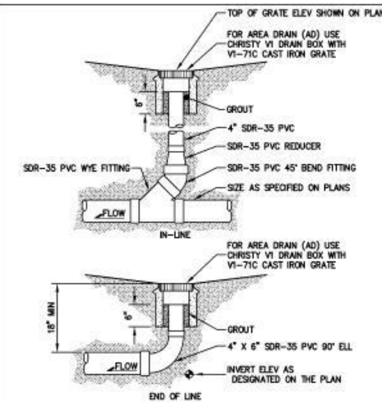
1. SLOPE ALL CONCRETE TO DRAIN 1% MIN.
2. SEE LANDSCAPE OR ARCHITECTURAL PLANS FOR CONCRETE COLORS AND FINISHES.
3. EASE ALL EDGES R=1/2"
4. FELT SHALL BE NON-ASPHALTIC IMPREGNATED.



1 C-3.0 CONCRETE PAVING
NTS

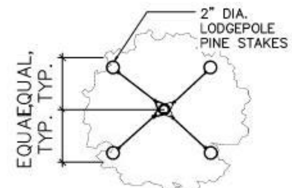


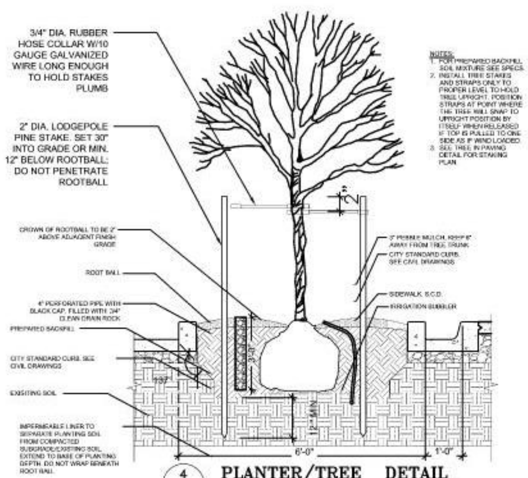




NOTE:
GLUED FITTINGS MAY BE SUBSTITUTED FOR GASKETED FITTINGS AT THE OPTION OF THE INSTALLATION CONTRACTOR.

3 C-3.0 AREA DRAIN
NTS





NOTES:
1. FOR PREPARED BACKFILL SOIL MIXTURE SEE SPECS.
2. INSTALL TREE STAKES AND STRAPS ONLY TO PROPER LEVEL TO HOLD TREE UPRIGHT. POSITION STRAPS AT POINT WHERE THE TREE WILL SNAP TO UPRIGHT POSITION BY ITSELF WHEN RELEASED IF TOP IS PULLED TO ONE SIDE AS IF WIND LOADED.
3. SEE TREE IN PAVING DETAIL FOR STAKING PLAN

4 C-3.0 PLANTER/TREE DETAIL
NTS

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SHEET TITLE

DETAILS

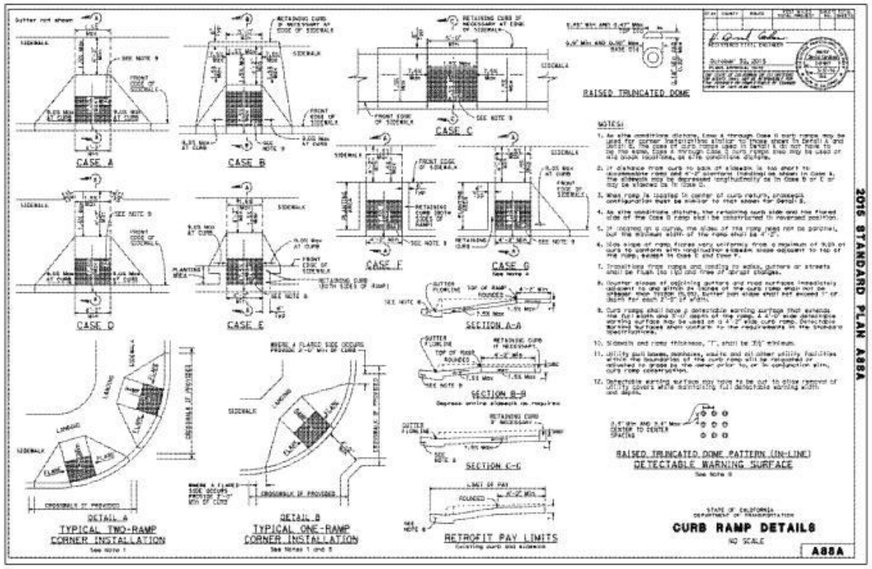
SCALE

JOB NUMBER	RELEASE DATE
21525	08/24/2016

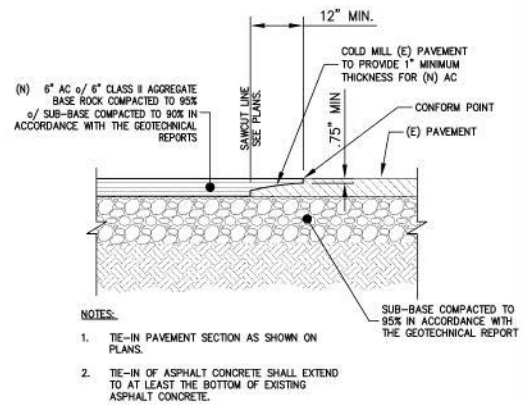
C-3.0

7 OF 13 SHEETS

PLOT DATE 08-24-16



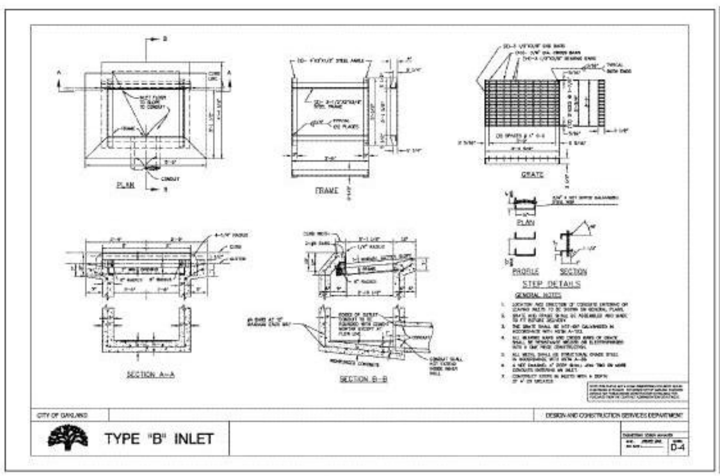
5 / C-3.1 **ADA CURB RAMP**
NTS



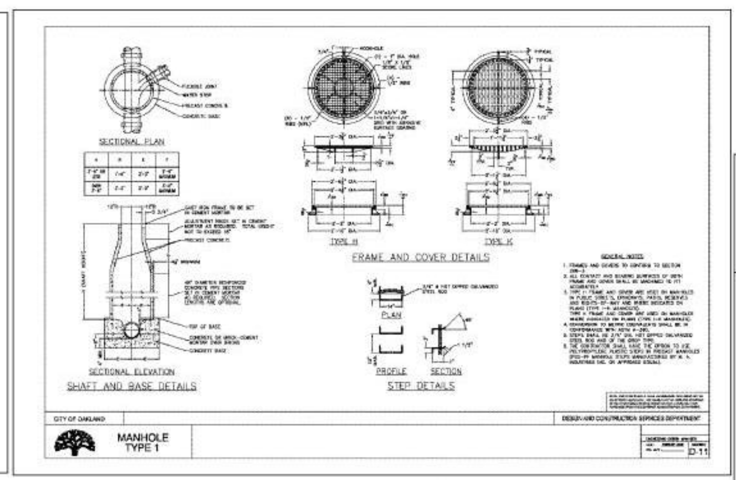
NOTES:

1. TIE-IN PAVEMENT SECTION AS SHOWN ON PLANS.
2. TIE-IN OF ASPHALT CONCRETE SHALL EXTEND TO AT LEAST THE BOTTOM OF EXISTING ASPHALT CONCRETE.

6 / C-3.1 **PAVEMENT TIE-IN**
NTS



7 / C-3.1 **TYPE B INLET DETAIL**
NTS



8 / C-3.1 **MANHOLE DETAIL**
NTS

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SHEET TITLE

DETAILS

SCALE

JOB NUMBER	RELEASE DATE
21525	08/24/2016

C-3.1

8 OF 13 SHEETS

PLOT DATE 08-24-16

CAUTION:

GENERAL SITE NOTES:

EXISTING CONDITIONS:

SITE FENCING NOTES:

SURVEYOR'S NOTES:

HORIZONTAL CONTROL NOTES:

DEMOLITION NOTES:

TREE/PLANT PROTECTION NOTES:

SANITARY SEWER NOTES:

GRADING AND EARTHWORK NOTES:

SITE MAINTENANCE:

PAVEMENT SECTION:

STORM WATER POLLUTIONS PREVENTION REQUIREMENTS:

SUPPLEMENTAL MEASURES:

GENERAL UTILITY SYSTEM NOTES:

STORM DRAIN NOTES:

DUST CONTROL NOTES:

EARTHWORK QUANTITY NOTES:

RECORD DRAWINGS:

SIGNING & STRIPING NOTES:

GENERAL UTILITY SYSTEM NOTES:

WATER NOTES:

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SHEET TITLE

GRADING
SPECIFICATIONS

SCALE	
NO SCALE	
JOB NUMBER 21525	RELEASE DATE 08/24/2016

C-4.0

9 OF 13 SHEETS

PLOT DATE 08-24-16

PURPOSE:

THE PURPOSE OF THIS PLAN IS TO STABILIZE THE SITE TO PREVENT EROSION OF GRADED AREAS AND TO PREVENT SEDIMENTATION FROM LEAVING THE CONSTRUCTION AREA AND AFFECTING NEIGHBORING SITES, NATURAL AREAS, PUBLIC FACILITIES OR ANY OTHER AREA THAT MIGHT BE AFFECTED BY SEDIMENTATION. ALL MEASURES SHOWN ON THIS PLAN SHOULD BE CONSIDERED THE MINIMUM REQUIREMENTS NECESSARY. SHOULD FIELD CONDITIONS DICTATE ADDITIONAL MEASURES, SUCH MEASURES SHALL BE PER CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD'S FIELD MANUAL FOR EROSION AND SEDIMENTATION CONTROL AND THE CALIFORNIA STORM WATER QUALITY ASSOCIATION BEST MANAGEMENT PRACTICES HANDBOOK FOR CONSTRUCTION. LEA & BRAZE ENGINEERING SHOULD BE NOTIFIED IMMEDIATELY SHOULD CONDITIONS CHANGE.

EROSION CONTROL NOTES:

1. IT SHALL BE THE OWNER'S/CONTRACTOR'S RESPONSIBILITY TO MAINTAIN CONTROL OF THE ENTIRE CONSTRUCTION OPERATION AND TO KEEP THE ENTIRE SITE IN COMPLIANCE WITH THIS EROSION CONTROL PLAN.
2. THE INTENTION OF THIS PLAN IS FOR INTERIM EROSION AND SEDIMENT CONTROL ONLY. ALL EROSION CONTROL MEASURES SHALL CONFORM TO CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD'S FIELD MANUAL FOR EROSION AND SEDIMENTATION CONTROL, THE CALIFORNIA STORM WATER QUALITY ASSOCIATION BEST MANAGEMENT PRACTICES HANDBOOK FOR CONSTRUCTION, AND THE LOCAL GOVERNING AGENCY FOR THIS PROJECT.
3. OWNER/CONTRACTOR SHALL BE RESPONSIBLE FOR MONITORING EROSION AND SEDIMENT CONTROL MEASURES PRIOR TO, DURING, AND AFTER STORM EVENTS. PERSON IN CHARGE OF MAINTAINING EROSION CONTROL MEASURES SHOULD WATCH LOCAL WEATHER REPORTS AND ACT APPROPRIATELY TO MAKE SURE ALL NECESSARY MEASURES ARE IN PLACE.
4. SANITARY FACILITIES SHALL BE MAINTAINED ON THE SITE AT ALL TIMES.
5. DURING THE RAINY SEASON, ALL PAVED AREAS SHALL BE KEPT CLEAR OF EARTH MATERIAL AND DEBRIS. THE SITE SHALL BE MAINTAINED SO AS TO MINIMIZE SEDIMENT-LADEN RUNOFF TO ANY STORM DRAINAGE SYSTEM, INCLUDING EXISTING DRAINAGE SWALES AND WATERCOURSES.
6. CONSTRUCTION OPERATIONS SHALL BE CARRIED OUT IN SUCH A MANNER THAT EROSION AND WATER POLLUTION WILL BE MINIMIZED. COMPLIANCE WITH FEDERAL, STATE AND LOCAL LAWS CONCERNING POLLUTION SHALL BE MAINTAINED AT ALL TIMES.
7. CONTRACTOR SHALL PROVIDE DUST CONTROL AS REQUIRED BY THE APPROPRIATE FEDERAL, STATE AND LOCAL AGENCY REQUIREMENTS.
8. ALL MATERIALS NECESSARY FOR THE APPROVED EROSION CONTROL MEASURES SHALL BE IN PLACE BY OCTOBER 15TH.
9. EROSION CONTROL SYSTEMS SHALL BE INSTALLED AND MAINTAINED THROUGHOUT THE RAINY SEASON, OR FROM OCTOBER 15TH THROUGH APRIL 15TH, WHICHEVER IS LONGER.
10. IN THE EVENT OF RAIN, ALL GRADING WORK IS TO CEASE IMMEDIATELY AND THE SITE IS TO BE SEALED IN ACCORDANCE WITH THE APPROVAL EROSION CONTROL MEASURES AND APPROVED EROSION CONTROL PLAN.
11. THE CONTRACTOR SHALL BE RESPONSIBLE FOR CHECKING AND REPAIRING EROSION CONTROL SYSTEMS AFTER EACH STORM.
12. ADDITIONAL EROSION CONTROL MEASURES MAY BE REQUIRED BY LOCAL JURISDICTION'S ENGINEERING DEPARTMENT OR BUILDING OFFICIALS.
13. MEASURES SHALL BE TAKEN TO COLLECT OR CLEAN ANY ACCUMULATION OR DEPOSIT OF DIRT, MUD, SAND, ROCKS, GRAVEL OR DEBRIS ON THE SURFACE OF ANY STREET, ALLEY OR PUBLIC PLACE OR IN ANY PUBLIC STORM DRAIN SYSTEMS. THE REMOVAL OF AFORESAID SHALL BE DONE BY STREET SWEEPING OR HAND SWEEPING. WATER SHALL NOT BE USED TO WASH SEDIMENTS INTO PUBLIC OR PRIVATE DRAINAGE FACILITIES.
14. EROSION CONTROL MEASURES SHALL BE ON-SITE FROM SEPTEMBER 15TH THRU APRIL 15TH.
15. ALL EROSION CONTROL MEASURES SHALL BE INSTALLED AND MAINTAINED THROUGHOUT THE RAINY SEASON OR FROM OCTOBER 15 THRU APRIL 15, WHICHEVER IS GREATER.
16. PLANS SHALL BE DESIGNED TO MEET C3 REQUIREMENTS OF THE MUNICIPAL STORMWATER REGIONAL PERMIT("MRP") NPDES PERMIT CAS 612008.
17. THE CONTRACTOR TO NPDES (NATIONAL POLLUTION DISCHARGE ELIMINATION SYSTEM) BEST MANAGEMENT PRACTICES (BMP) FOR SEDIMENTATION PREVENTION AND EROSION CONTROL TO PREVENT DELETERIOUS MATERIALS OR POLLUTANTS FROM ENTERING THE TOWN OR COUNTY STORM DRAIN SYSTEMS.
18. THE CONTRACTOR MUST INSTALL ALL EROSION AND SEDIMENT CONTROL MEASURES PRIOR TO THE INCEPTION OF ANY WORK ONSITE AND MAINTAIN THE MEASURES UNTIL THE COMPLETION OF ALL LANDSCAPING.
19. THE CONTRACTOR SHALL MAINTAIN ADJACENT STREETS IN A NEAT, CLEAN DUST FREE AND SANITARY CONDITION AT ALL TIMES AND TO THE SATISFACTION OF THE TOWN INSPECTOR. THE ADJACENT STREET SHALL AT ALL TIMES BE KEPT CLEAN OF DEBRIS, WITH DUST AND OTHER NUISANCE BEING CONTROLLED AT ALL TIMES. THE CONTRACTOR BE RESPONSIBLE FOR ANY CLEAN UP ON ADJACENT STREETS AFFECTED BY THE BY THEIR CONSTRUCTION, METHOD OF STREET CLEANING SHALL BE BY DRY SWEEPING OF ALL PAVED AREAS. NO STOCKPILING OF BUILDING MATERIALS WITHIN THE TOWN RIGHT-OF-WAY.
20. SEDIMENTS AND OTHER MATERIALS SHALL NOT BE TRACKED FROM THE SITE BY VEHICLE TRAFFIC. THE CONTRACTOR SHALL INSTALL A STABILIZED CONSTRUCTION ENTRANCE PRIOR TO THE INSPECTION OF ANY WORK ONSITE AND MAINTAIN IT FOR THE DURATION OF THE CONSTRUCTION PROCESS SO AS TO NOT INHIBIT SEDIMENTS FROM BEING DEPOSITED INTO THE PUBLIC RIGHT-OF-WAY UNTIL THE COMPLETION OF ALL LANDSCAPING.
21. THE CONTRACTOR SHALL PROTECT DOWN SLOPE DRAINAGE COURSES, STREAMS AND STORM DRAINS WITH ROCK FILLED SAND BAGS, TEMPORARY SWALES, SILT FENCES, AND EARTH PERMS IN CONJUNCTION OF ALL LANDSCAPING.
22. STOCKPILED MATERIALS SHALL BE COVERED WITH VISQUEEN OR A TARPAULIN UNTIL THE MATERIAL IS REMOVED FROM THE SITE. ANY REMAINING BARE SOIL THAT EXISTS AFTER THE STOCKPILE HAS BEEN REMOVED SHALL BE COVERED UNTIL A NATURAL GROUND COVER IS ESTABLISHED OR IT IS SEEDED OR PLANTED TO PROVIDE GROUND COVER PRIOR TO THE FALL RAINY SEASON.
23. EXCESS OR WASTE CONCRETE MUST NOT BE WASHED INTO THE PUBLIC RIGHT-OF-WAYOR ANY OTHER DRAINAGE SYSTEM. PROVISIONS SHALL BE MADE TO RETAIN CONCRETE WASTES ON SITE UNTIL THEY CAN BE DISPOSED OF AS SOLID WASTE.
24. TRASH AND CONSTRUCTION RELATED SOLID WASTES MUST BE DEPOSITED INTO A COVERED RECEPTACLE TO PREVENT CONTAMINATION AND DISPERSAL BY WIND

EROSION CONTROL NOTES CONTINUED:

24. FUELS, OILS, SOLVENTS AND OTHER TOXIC MATERIALS MUST BE STORED IN ACCORDANCE WITH THEIR LISTING AND ARE NOT TO CONTAMINATE THE SOIL AND SURFACE WATERS. ALL APPROVED STORAGE CONTAINERS ARE TO BE PROTECTED FROM THE WEATHER. SPILLS MUST BE CLEANED UP IMMEDIATELY AND DISPOSED OF IN A PROPER MANNER. SPILLS MUST NOT BE WASHED INTO THE DRAINAGE SYSTEM,
25. DUST CONTROL SHALL BE DONE BY WATERING AND AS OFTEN AS REQUIRED BY THE TOWN INSPECTOR.
26. SILT FENCE(S) AND/OR FIBER ROLL(S) SHALL BE INSTALLED PRIOR TO SEPTEMBER 15TH AND SHALL REMAIN IN PLACE UNTIL THE LANDSCAPING GROUND COVER IS INSTALLED. CONTRACTOR SHALL CONTINUOUSLY MONITOR THESE MEASURES, FOLLOWING AND DURING ALL RAIN EVENTS,TO PUBLIC OWNED FACILITIES.

EROSION CONTROL MEASURES:

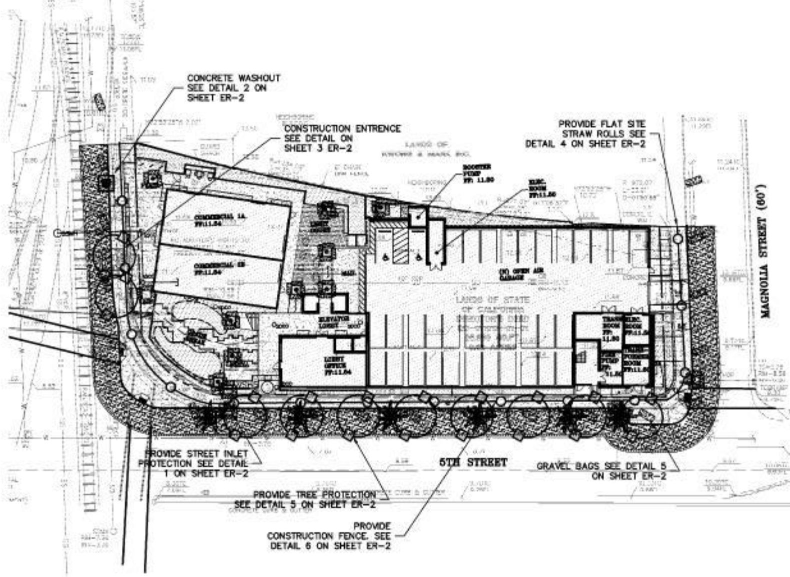
1. THE FACILITIES SHOWN ON THIS PLAN ARE DESIGNED TO CONTROL EROSION AND SEDIMENT DURING THE RAINY SEASON, OCTOBER 15TH TO APRIL 15. EROSION CONTROL FACILITIES SHALL BE IN PLACE PRIOR TO OCTOBER 15TH OF ANY YEAR. GRADING OPERATIONS DURING THE RAINY SEASON WHICH LEAVE DENUDED SLOPES SHALL BE PROTECTED WITH EROSION CONTROL MEASURES IMMEDIATELY FOLLOWING GRADING ON THE SLOPES.
2. SITE CONDITIONS AT TIME OF PLACEMENT OF EROSION CONTROL MEASURES WILL VARY. APPROPRIATE ACTION INCLUDING TEMPORARY SWALES, INLETS, HYDROSEEDING, STRAW BALES, ROCK SACKS, ETC. SHALL BE TAKEN TO PREVENT EROSION AND SEDIMENTATION FROM LEAVING SITE. EROSION CONTROL MEASURES SHALL BE ADJUSTED AS THE CONDITIONS CHANGE AND THE NEED OF CONSTRUCTION SHIFT.
3. CONSTRUCTION ENTRANCES SHALL BE INSTALLED PRIOR TO COMMENCEMENT OF GRADING. ALL CONSTRUCTION TRAFFIC ENTERING ONTO THE PAVED ROADS MUST CROSS THE STABILIZED CONSTRUCTION ENTRANCES. CONTRACTOR SHALL MAINTAIN STABILIZED ENTRANCE AT EACH VEHICLE ACCESS POINT TO EXISTING PAVED STREETS. ANY MUD OR DEBRIS TRACKED ONTO PUBLIC STREETS SHALL BE REMOVED DAILY AND AS REQUIRED BY THE GOVERNING AGENCY.
4. ALL EXPOSED SLOPES THAT ARE NOT VEGETATED SHALL BE HYDROSEEDED. IF HYDROSEEDING IS NOT USED OR IS NOT EFFECTIVE BY OCTOBER 15, THEN OTHER IMMEDIATE METHODS SHALL BE IMPLEMENTED, SUCH AS EROSION CONTROL BLANKETS, OR A THREE-STEP APPLICATION OF 1) SEED, MULCH, FERTILIZER 2) BLOWN STRAW 3) TACKIFIER AND MULCH. HYDROSEEDING SHALL BE IN ACCORDANCE WITH THE PROVISIONS OF SECTION 20" EROSION CONTROL AND HIGHWAY PLANTING" OF THE STANDARD SPECIFICATION OF THE STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION, AS LAST REVISED. REFER TO THE EROSION CONTROL SECTION OF THE GRADING SPECIFICATIONS THAT ARE A PART OF THIS PLAN SET FOR FURTHER INFORMATION.
5. INLET PROTECTION SHALL BE INSTALLED AT OPEN INLETS TO PREVENT SEDIMENT FROM ENTERING THE STORM DRAIN SYSTEM. INLETS NOT USED IN CONJUNCTION WITH EROSION CONTROL ARE TO BE BLOCKED TO PREVENT ENTRY OF SEDIMENT. MINIMUM INLET PROTECTION SHALL CONSIST OF A ROCK SACKS OR AS SHOWN ON THIS PLAN
6. THIS EROSION AND SEDIMENT CONTROL PLAN MAY NOT COVER ALL THE SITUATIONS THAT MAY ARISE DURING CONSTRUCTION DUE TO UNANTICIPATED FIELD CONDITIONS. VARIATIONS AND ADDITIONS MAY BE MADE TO THIS PLAN IN THE FIELD. A REPRESENTATIVE OF LEA & BRAZE ENGINEERING SHALL PERFORM A FIELD REVIEW AND MAKE RECOMMENDATIONS AS NEEDED. CONTRACTOR IS RESPONSIBLE TO NOTIFY LEA & BRAZE ENGINEERING AND THE GOVERNING AGENCY OF ANY CHANGES.
7. THE EROSION CONTROL MEASURES SHALL CONFORM TO THE LOCAL JURISDICTION'S STANDARDS AND THE APPROVAL OF THE LOCAL JURISDICTION'S ENGINEERING DEPARTMENT.
8. STRAW ROLLS SHALL BE PLACED AT THE TOE OF SLOPES AND ALONG THE DOWN SLOPE PERIMETER OF THE PROJECT. THEY SHALL BE PLACED AT 25 FOOT INTERVALS ON GRADED SLOPES. PLACEMENT SHALL RUN WITH THE CONTOURS AND ROLLS SHALL BE TIGHTLY END BUTTED. CONTRACTOR SHALL REFER TO MANUFACTURES SPECIFICATIONS FOR PLACEMENT AND INSTALLATION INSTRUCTIONS.

REFERENCES:

1. CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD'S FIELD MANUAL FOR EROSION AND SEDIMENTATION CONTROL
2. CALIFORNIA STORM WATER QUALITY ASSOCIATION BEST MANAGEMENT PRACTICES HANDBOOK FOR CONSTRUCTION

PERIODIC MAINTENANCE:

1. MAINTENANCE IS TO BE PERFORMED AS FOLLOWS:
   A. DAMAGES CAUSED BY SOIL EROSION OR CONSTRUCTION SHALL BE REPAIRED AT THE END OF EACH WORKING DAY.
   B. SWALES SHALL BE INSPECTED PERIODICALLY AND MAINTAINED AS NEEDED.
   C. SEDIMENT TRAPS, BERMS, AND SWALES ARE TO BE INSPECTED AFTER EACH STORM AND REPAIRS MADE AS NEEDED.
   D. SEDIMENT SHALL BE REMOVED AND SEDIMENT TRAP RESTORED TO ITS ORIGINAL DIMENSIONS WHEN SEDIMENT HAS ACCUMULATED TO A DEPTH OF 1' FOOT.
   E. SEDIMENT REMOVED FROM TRAP SHALL BE DEPOSITED IN A SUITABLE AREA AND IN SUCH A MANNER THAT IT WILL NOT ERODE.
   F. RILLS AND GULLIES MUST BE REPAIRED.
2. GRAVEL BAG INLET PROTECTION SHALL BE CLEANED OUT WHENEVER SEDIMENT DEPTH IS ONE HALF THE HEIGHT OF ONE GRAVEL BAG.
3. STRAW ROLLS SHALL BE PERIODICALLY CHECKED TO ASSURE PROPER FUNCTION AND CLEANED OUT WHENEVER THE SEDIMENT DEPTH REACHED HALF THE HEIGHT OF THE ROLL.
4. SILT FENCE SHALL BE PERIODICALLY CHECKED TO ASSURE PROPER FUNCTION AND CLEANED OUT WHENEVER THE SEDIMENT DEPTH REACHES ONE FOOT IN HEIGHT.
5. CONSTRUCTION ENTRANCE SHALL BE REGRAVELED AS NECESSARY FOLLOWING SILT/SOIL BUILDUP.
6. ANY OTHER EROSION CONTROL MEASURES SHOULD BE CHECKED AT REGULAR INTERVALS TO ASSURE PROPER FUNCTION



EROSION CONTROL LEGEND

	GRAVEL BAG
	INLET PROTECTION
	STRAW ROLL
	CONSTRUCTION FENCE
	CONCRETE WASHOUT
	CONSTRUCTION ENTRANCE
	TREE PROTECTION

0 15 30 60

SCALE: 1" = 30'

NOTE:
SEAL ALL OTHER INLETS NOT INTENDED TO ACCEPT STORM WATER AND DIRECT FLOWS TEMPORARILY TO FUNCTIONAL SEDIMENTATION BASIN INLETS. -TYP

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DRAWING RELEASE STATUS	DATE

ADDENDA	DATE

SHEET TITLE

EROSION CONTROL PLAN

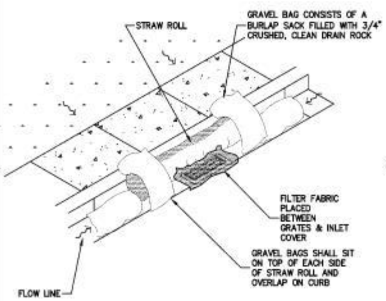
SCALE	AS NOTED
JOB NUMBER 21525	RELEASE DATE 08/24/2016

ER-1

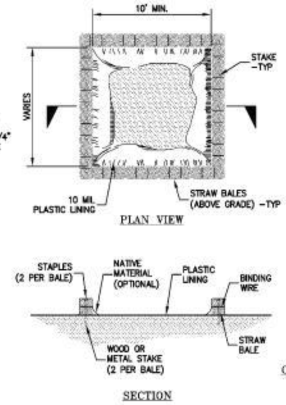
10 OF 13 SHEETS

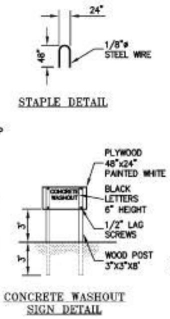
BUILDING PERMIT

PLOT DATE 08-24-16



1 ER-2 **INLET PROTECTION**
NTS

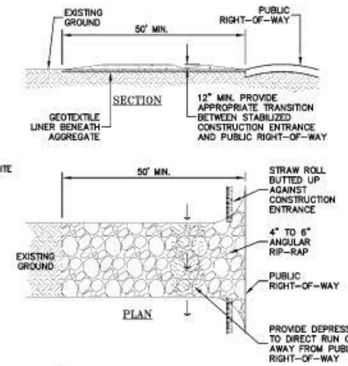




NOTES:
ACTUAL LAYOUT DETERMINED IN FIELD.

THE CONCRETE WASHOUT SIGN SHALL BE INSTALLED WITHIN 10' OF THE TEMPORARY CONCRETE WASHOUT FACILITY.

2 ER-2 **CONCRETE WASHOUT**
NTS



NOTES:

STABILIZED CONSTRUCTION SITE ACCESS SHALL BE CONSTRUCTED OF 3" TO 4" WASHED, FRACTURED STONE AGGREGATE.

MATERIAL SHALL BE PLACED TO A MINIMUM THICKNESS OF 12". LENGTH OF ENTRANCE SHALL BE A MINIMUM OF 50'.

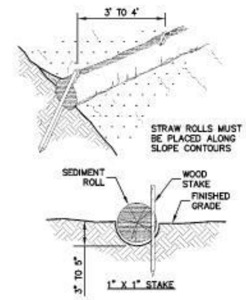
WIDTH SHALL BE A MIN. OF 15' OR GREATER IF NECESSARY TO COVER ALL VEHICULAR INGRESS AND EGRESS. PROVIDE AMPLE TURNING RADII.

THE ENTRANCE SHALL BE KEPT IN GOOD CONDITION BY OCCASIONAL TOP DRESSING WITH MATERIAL AS SPECIFIED IN ABOVE NOTE.

ACCESSES SHALL BE INSPECTED WEEKLY DURING PERIODS OF HEAVY USAGE, MONTHLY DURING NORMAL USAGE, AND AFTER EACH RAINFALL, WITH MAINTENANCE PROVIDED AS NECESSARY.

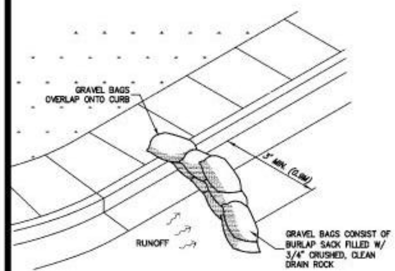
PERIODIC TOP DRESSING SHALL BE DONE AS NEEDED.

3 ER-2 **CONSTRUCTION ENTRANCE**
NTS



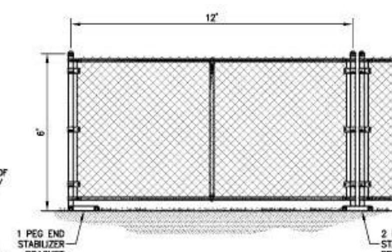
NOTE:
1. STRAW ROLL INSTALLATION REQUIRES THE PLACEMENT AND SECURE STAKING OF THE ROLL IN A TRENCH, 3" TO 5" DEEP, DUG ON CONTOUR. RUNOFF MUST NOT BE ALLOWED TO RUN UNDER OR AROUND ROLL.
2. CONTRACTOR IS RESPONSIBLE FOR REGULAR MAINTENANCE AND INSPECTION. THE SILT SHALL BE CLEANED OUT WHEN IT REACHES HALF THE HEIGHT OF THE ROLL.

4 ER-2 **FLAT SITE STRAW ROLLS**
NTS

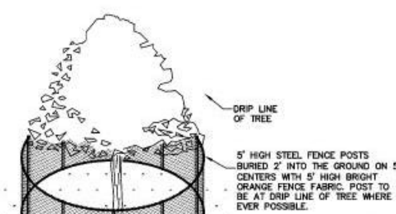


NOTE:
THREE LAYERS OF GRAVEL BAGS WITH ENDS OVERLAPPED

5 ER-2 **GRAVEL BAG AT STREET FLOW LINE**
NTS



6 ER-2 **CONSTRUCTION FENCE**
NTS



NOTE:
REFER TO LANDSCAPE ARCHITECTURAL PLANS FOR ADDITIONAL TREE PROTECTION INFORMATION.

NOTE:
LOCAL JURISDICTION MAY HAVE MORE STRINGENT REQUIREMENTS. CONTRACTOR IS RESPONSIBLE FOR COORDINATING W/ INSPECTOR TO ENSURE PROPER PROCEDURES ARE BEING FOLLOWED.

7 ER-2 **EXISTING TREE PROTECTION**
NTS

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DRAWING RELEASE STATUS	DATE

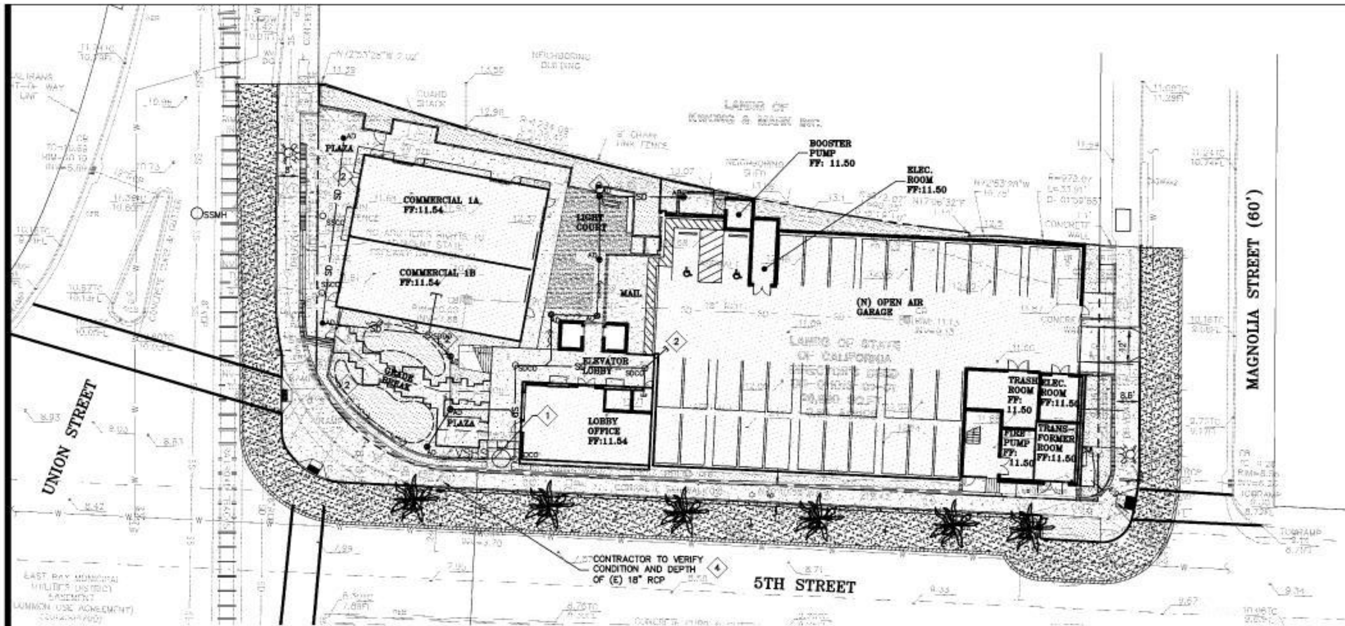
ADDENDA	DATE
1	
2	
3	
4	
5	
6	

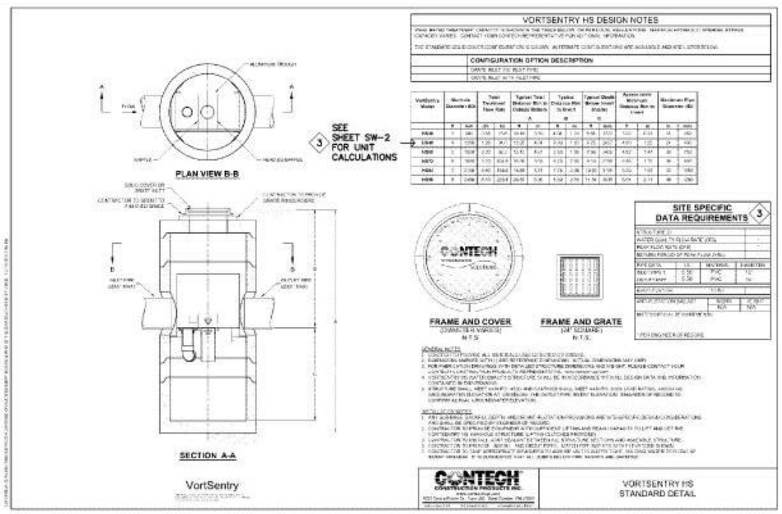
SHEET TITLE
EROSION CONTROL DETAILS

SCALE: AS NOTED
JOB NUMBER: 21325
RELEASE DATE: 08/24/2016

ER-2

PLOT DATE 08-24-16





CONTECH "STORMFILTER" MEDIA FILTER UNIT – VORTSENTRY HS48

PLAN NOTES:

1. ONE HUNDRED PERCENT (100%) OF THE IMPERVIOUS SITE AREA IS TO BE TREATED BY WAY OF MECHANICAL TREATMENT. SEE TYPICAL DETAIL ON THIS SHEET.
2. ALL BUILDING STORM LINES ARE TO BE DIRECTED TO THE MECHANICAL TREATMENT UNIT.
3. SEE SHEET SW-2 FOR VORTSENTRY HS48 SITE DATA, CALCULATIONS, AND SPECIFICATIONS. UNIT HAS BEEN SIZED FOR A RAINFALL INTENSITY OF 0.2 IN/HR.
4. (E) 18" RCP TO BE REUSED AT TIE IN TO (E) STORM DRAIN SYSTEM. CONTRACTOR TO VERIFY CONDITION AND DEPTH. UPGRADE IF NECESSARY.

NOTE: CONTRACTOR TO PROVIDE LEA & BRAZE ENGINEERING A FINAL COPY OF THE SHOP DRAWINGS BY CONTECH BEFORE INSTALLING THE UNIT.

NOTE:
FOR CONSTRUCTION STAKING SCHEDULING OR QUOTATIONS PLEASE CONTACT ALEX ABAYA AT LEA & BRAZE ENGINEERING (510)887-4086 EXT 116.
aabaya@leabraze.com

* BUILDING PAD NOTE: ADJUST PAD LEVEL AS REQUIRED. REFER TO STRUCTURAL PLANS FOR SLAB SECTION OR CRAWL SPACE DEPTH TO ESTABLISH PAD LEVEL.

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ADDENDA	DATE

SHEET TITLE

STORMWATER TREATMENT PLAN

SCALE	AS NOTED
JOB NUMBER 21525	RELEASE DATE 08/24/2016

SW-1

12 OF 13 SHEETS

PLOT DATE 08-24-16

CONTECH
ENGINEERED SOLUTIONS

SECTION [____]
STORMWATER TREATMENT DEVICE

PART 1 – GENERAL

1.1 DESCRIPTION

A. Work Included

1.2 QUALITY CONTROL INSPECTION

1.3 SUBMITTALS

CONTECH
ENGINEERED SOLUTIONS

A. Shop Drawings

PART 2 – PRODUCTS

2.1 MATERIALS AND DESIGN

CONTECH
ENGINEERED SOLUTIONS

2.1 PERFORMANCE

Table 2.1

CONTECH
ENGINEERED SOLUTIONS

2.2 MANUFACTURER

Contech Engineered Solutions
9025 Centre Pointe Dr., Suite 400
West Chester, OH 45069
(800) 338-1122

PART 3 – EXECUTION

3.1 INSTALLATION

CONTECH
ENGINEERED SOLUTIONS

END OF SECTION

NOTE: CONTRACTOR TO PROVIDE LEA & BRAZE ENGINEERING A FINAL COPY OF THE SHOP DRAWINGS BY CONTECH BEFORE INSTALLING THE UNIT.

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aabaya@leabraze.com

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ADDENDA | DATE

SHEET TITLE

STORMWATER TREATMENT PLAN SPECS AND CALCULATIONS

SCALE: AS NOTED

JOB NUMBER: 21525

RELEASE DATE: 08/24/2016

SW-2

13 OF 13 SHEETS

PLOT DATE 08-24-16

TOPOGRAPHIC SURVEY

UNION, MAGNOLIA & 5TH STREET
OAKLAND, CALIFORNIA
ALAMEDA COUNTY

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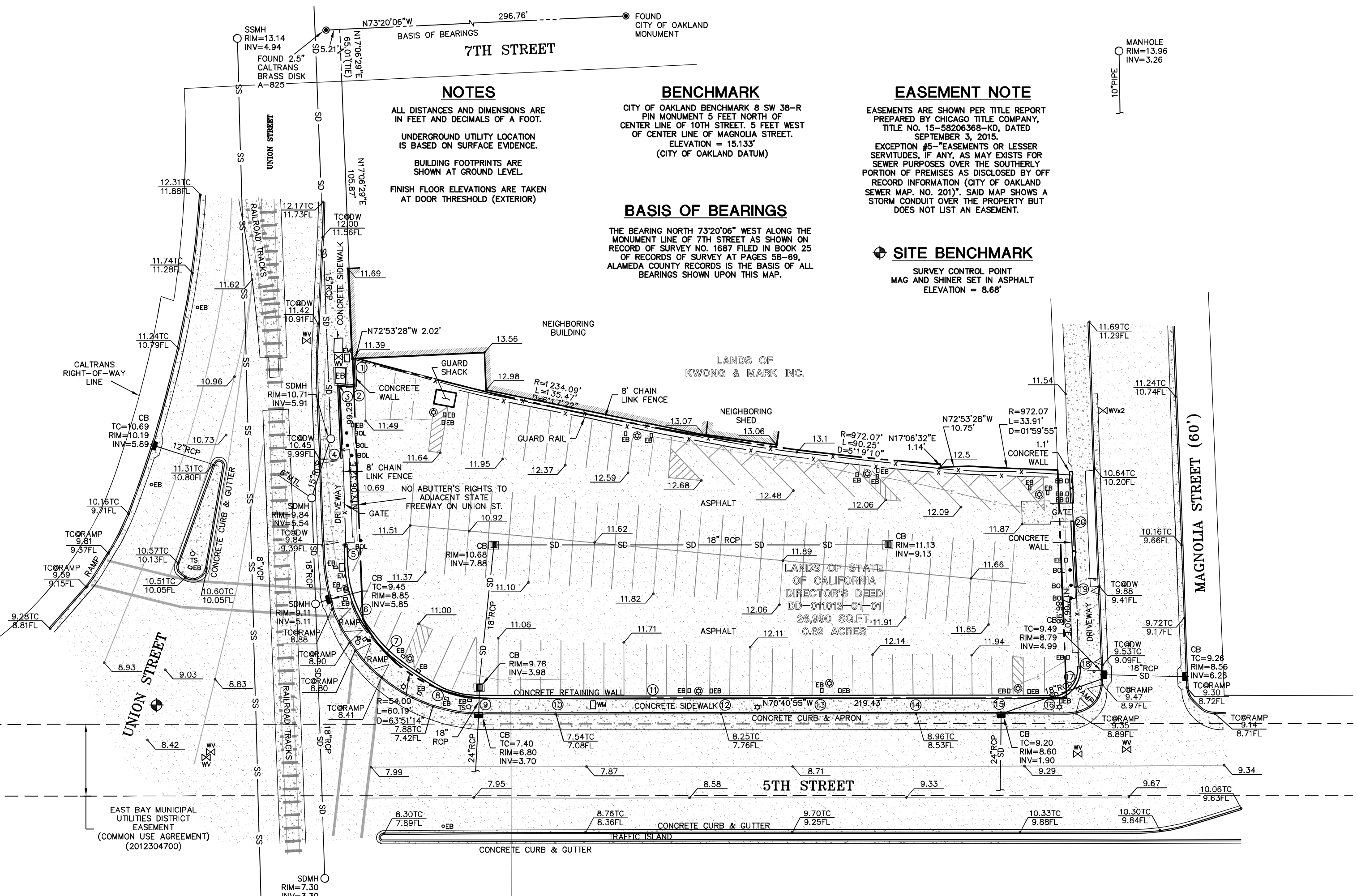

VICINITY MAP
NO SCALE

LEGEND AND NOTES

— —	BOUNDARY LINE
— E —	ELECTRICAL LINE (PER PAINT MARKINGS)
— x —	FENCE LINE
— SS —	SANITARY SEWER LINE
— SD —	STORM DRAIN LINE
BW	BOTTOM OF WALL
DW	DRIVEWAY
FL	FLOW LINE
INV	INVERT
RCP	REINFORCED CONCRETE PIPE
TC	TOP OF CURB
TW	TOP OF WALL
VCP	VITRIFIED CLAY PIPE
• BOL	BOLLARD
CB	CATCH BASIN
EB	ELECTRICAL BOX
EM	ELECTRICAL METER
SSMH	SANITARY SEWER MANHOLE
	SIGN
SDMH	STORM DRAIN MANHOLE
	STREET LIGHT
	STREET LIGHT w/ BASE
TS	TRAFFIC SIGNAL
WM	WATER METER
WV	WATER VALVE
	BENCHMARK
XXX.XX	SPOTGRADE
	ASPHALT
	CONCRETE

NOTES

ALL DISTANCES AND DIMENSIONS ARE IN FEET AND DECIMALS OF A FOOT.

UNDERGROUND UTILITY LOCATION IS BASED ON SURFACE EVIDENCE.

BUILDING FOOTPRINTS ARE SHOWN AT GROUND LEVEL.

FINISH FLOOR ELEVATIONS ARE TAKEN AT DOOR THRESHOLD (EXTERIOR)

BENCHMARK

CITY OF OAKLAND BENCHMARK 8 SW 38-R PIN MONUMENT 5 FEET NORTH OF CENTER LINE OF 10TH STREET. 5 FEET WEST OF CENTER LINE OF MAGNOLIA STREET.
ELEVATION = 15.133'
(CITY OF OAKLAND DATUM)

BASIS OF BEARINGS

THE BEARING NORTH 73°20'06" WEST ALONG THE MONUMENT LINE OF 7TH STREET AS SHOWN ON RECORD OF SURVEY NO. 1687 FILED IN BOOK 25 OF RECORDS OF SURVEY AT PAGES 58-69, ALAMEDA COUNTY RECORDS IS THE BASIS OF ALL BEARINGS SHOWN UPON THIS MAP.

EASEMENT NOTE

EASEMENTS ARE SHOWN PER TITLE REPORT PREPARED BY CHICAGO TITLE COMPANY, TITLE NO. 15-58206368-KD, DATED SEPTEMBER 3, 2015.
EXCEPTION #5-"EASEMENTS OR LESSER SERVITUDES, IF ANY, AS MAY EXISTS FOR SEWER PURPOSES OVER THE SOUTHERLY PORTION OF PREMISES AS DISCLOSED BY OFF RECORD INFORMATION (CITY OF OAKLAND SEWER MAP. NO. 201)". SAID MAP SHOWS A STORM CONDUIT OVER THE PROPERTY BUT DOES NOT LIST AN EASEMENT.

SITE BENCHMARK

SURVEY CONTROL POINT
MAG AND SHINER SET IN ASPHALT
ELEVATION = 8.68'

SURVEYOR'S STATEMENT

THIS MAP CORRECTLY REPRESENTS A SURVEY MADE BY ME OR UNDER MY DIRECTION AT THE REQUEST OF KEVIN BROWN IN SEPTEMBER 2015.

I HEREBY STATE THAT ALL EXISTING GRADES UPON THIS PLAT ARE BASED UPON CITY OF OAKLAND DATUM.

I HEREBY FURTHER STATE THAT TO THE BEST OF MY KNOWLEDGE ALL PROVISIONS OF APPLICABLE STATE LAWS AND LOCAL ORDINANCES HAVE BEEN COMPLIED WITH.

GREGORY F. BRAZE, PLS 7623 DATE

RETAINING WALL SPOTGRADES

	TW	BW		TW	BW
1	12.08	11.38	11	11.91	8.01
2	11.98	11.28	12	12.07	8.37
3	11.88	11.18	13	12.31	8.81
4	11.32	10.62	14	12.26	9.06
5	10.39	10.09	15	12.27	9.27
6	10.41	9.31	16	12.36	9.36
7	10.37	8.67	17	12.34	9.64
8	11.37	7.97	18	9.92	9.92
9	11.49	7.48	19	10.66	10.16
10	11.78	7.68	20	12.04	10.54

SCALE: 1" = 20'
0 10 20 40

REVISIONS	BY
JOB NO.	2151068
DATE:	10-14-15
SCALE:	1" = 20'
DRAWN BY:	JN
SHEET NO.	SU1

1 OF 1 SHEETS

STREET LEVEL PLANTING SCHEDULE

SYMBOL	ABBREV.	SCIENTIFIC NAME	COMMON NAME	SIZE	SPACING	WATER	NOTES
TREES							
	ACE PAL	ACER PALMATUM	JAPANESE MAPLE	36" BOX		MEDIUM	
	ACE 'SAN'	ACER PALMATUM 'SANGO KAKU'	JAPANESE MAPLE	24" BOX		MEDIUM	
	ACE RUB	ACER RUBRUM 'ARMSTRONG'	UPRIGHT RED MAPLE	36" BOX		MEDIUM	
	BRU CAN	BRUGMANSIA X CANDIDA	ANGEL'S TRUMPET			MEDIUM	
	COR AUS	CORDYLINE AUSTRALIS 'RED STAR'	RED STAR CORDYLINE			LOW	
	MAY BOR	MAYTENUS BOARIA	MAYTEN			MEDIUM	
	MUS BAS	MUSA BASJOO	JAPANESE FIBER BANANA			HIGH	
	WAS ROB	WASHINGTONIA ROBUSTA	MEXICAN FAN PALM			LOW	
SHRUBS, PERENNIALS AND VINES							
	ACE 'ORE'	ACER PALMATUM 'ORANGEOLA'	JAPANESE MAPLE			MEDIUM	
	ANE HYB	ANEMONE X HYBRIDA	JAPANESE ANEMONE			MEDIUM	
	ANI FLA	ANIGOZANTHUS FLAVIDUS	KANGAROO PAW			LOW	
	BAM MUL	BAMBUSA MULTIPLEX 'ALPHONSE KARR'	ALPHONSE KARR BAMBOO			LOW	
	DOD VIS	DODONAEA VISCOSA 'PURPUREA'	PURPLE HOPSEED BUSH			LOW	
	FIC PUM	FICUS PUMILA	CREEPING FIG			MEDIUM	
	HEU SAN	HEUCHERA SANGUINEA 'SPLENDENS'	CORAL BELLS			MEDIUM	
	HEU PAL	HEUCHERA 'PALACE PURPLE'	PALACE PURPLE CORAL BELLS			MEDIUM	

STREET LEVEL PLANTING SCHEDULE, CONTINUED

SYMBOL	ABBREV.	SCIENTIFIC NAME	COMMON NAME	SIZE	SPACING	WATER	NOTES
SHRUBS, PERENNIALS AND VINES, CONT.							
	LIR MUS	LIRIOPE MUSCARI	CREEPING LILY TURF			MEDIUM	
	MUH CAP	MUHLENBERGIA CAPILLARIS	PINK MUHLY			LOW	
	NEP COR	NEPHROLEPIS CORDIFOLIA	SOUTHERN SWORDFERN			MEDIUM	
	LOT BER	LOTUS BERTHELOTII	TRAILING LOTUS			LOW	
	OLE 'MON'	OLEA EUROPEA 'MONTRA'	LITTLE OLLIE DWARF OLIVE			VERY LOW	
	POL MUN	POLYSTICHUM MUNITUM	WESTERN SWORDFERN			MEDIUM	
	SAL MIC	SALVIA MICROPHYLLA 'HOT LIPS'	HOT LIPS SAGE			LOW	
	SED MOR	SEDUM MORGANIANUM	BURRO TAIL			LOW	
	THY 'ARG'	THYMUS VULGARIS 'ARGENTIUM'	VARIEGATED SILVER THYME			LOW	
	TRA JAS	TRACHELOSPERMUM JASMINOIDES	STAR JASMINE			MEDIUM	
	WOO FIM	WOODWARDIA FIMBRIATA	GIANT CHAIN FERN			MEDIUM	

2ND LEVEL PLANTING SCHEDULE

SYMBOL	ABBREV.	SCIENTIFIC NAME	COMMON NAME	SIZE	SPACING	WATER	NOTES
SHRUBS, PERENNIALS AND VINES							
	COR GLA	CORREA GLABRA 'COLIBAN RIVER'	COLIBAN RIVER ROCK FUCHSIA			LOW	
	SED SAR	SEDUM SARMENTOSUM	CREEPING STONE CROP			LOW	
	TRA JAS	TRACHELOSPERMUM JASMINOIDES	STAR JASMINE			MODERATE	

PLANTING NOTES

1. All trees shall be of uniform height and form for the species and container size.
2. Final placement of plants shall be reviewed at the site by the Landscape Architect.
3. Install all planting after irrigation system is completed, fully operational, and has been reviewed by the Landscape Architect.
4. Mulch all newly planted areas with 3" of specified mulch.
5. Remove nursery stakes and tags from trees and shrubs at time of planting.
6. The contractor is responsible for taking soil samples of the topsoil to be used as planting medium for the project. This includes site soil and imported topsoils. Lab test results and recommendations to be approved by Landscape Architect prior to soil delivery to site. The Landscape Architect may request re-testing of delivered import topsoil to verify its conformance to the approved sample. Refer to specifications for soil testing methodology.
7. Plant schedule is subject to change based on plant availability and existing soil conditions.
8. Listed water requirements are based on water use classification of landscape species as per WUCOLS III, August 2000, and EBMUD - Plants and Landscapes for summer-dry climates of the San Francisco Bay Region, 2004)
11. CONTRACTOR TO PLACE A MARKER GEOTEXTILE FABRIC BENEATH THE LANDSCAPE AREAS FOLLOWING OVER-EXCAVATION AND PRIOR TO IMPORT BACKFILL PLACEMENT. THIS WILL PROVIDE A BARRIER FOR FUTURE MAINTENANCE WORKERS TO INDICATE THAT SOIL BELOW THE FABRIC, IF REMOVED, SHOULD BE MANAGED PER THE SITE MANAGEMENT PLAN.

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dbarchitect.com
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415 896 6700 fax 415 896 6103

HOLLIDAY DEVELOPMENT

MILLER COMPANY
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1585 FOLSOM ST.
SAN FRANCISCO, CA 94103
415.252.7288
www.millercomp.com

REGISTERED LANDSCAPE ARCHITECT
JEFFREY EZRA MILLER
NO. 2031
8/24/2016
STATE OF CALIFORNIA

LICENSE STAMP

THE UNION

532 Union Street
Oakland CA 94607

DRAWING RELEASE STATUS	DATE
BUILDING PERMIT	08.24.2016
OFF-SITE DRAWING	12.01.2016
PRICING SET	02.21.2017

ADDENDA

No.	Description	Date

SHEET TITLE

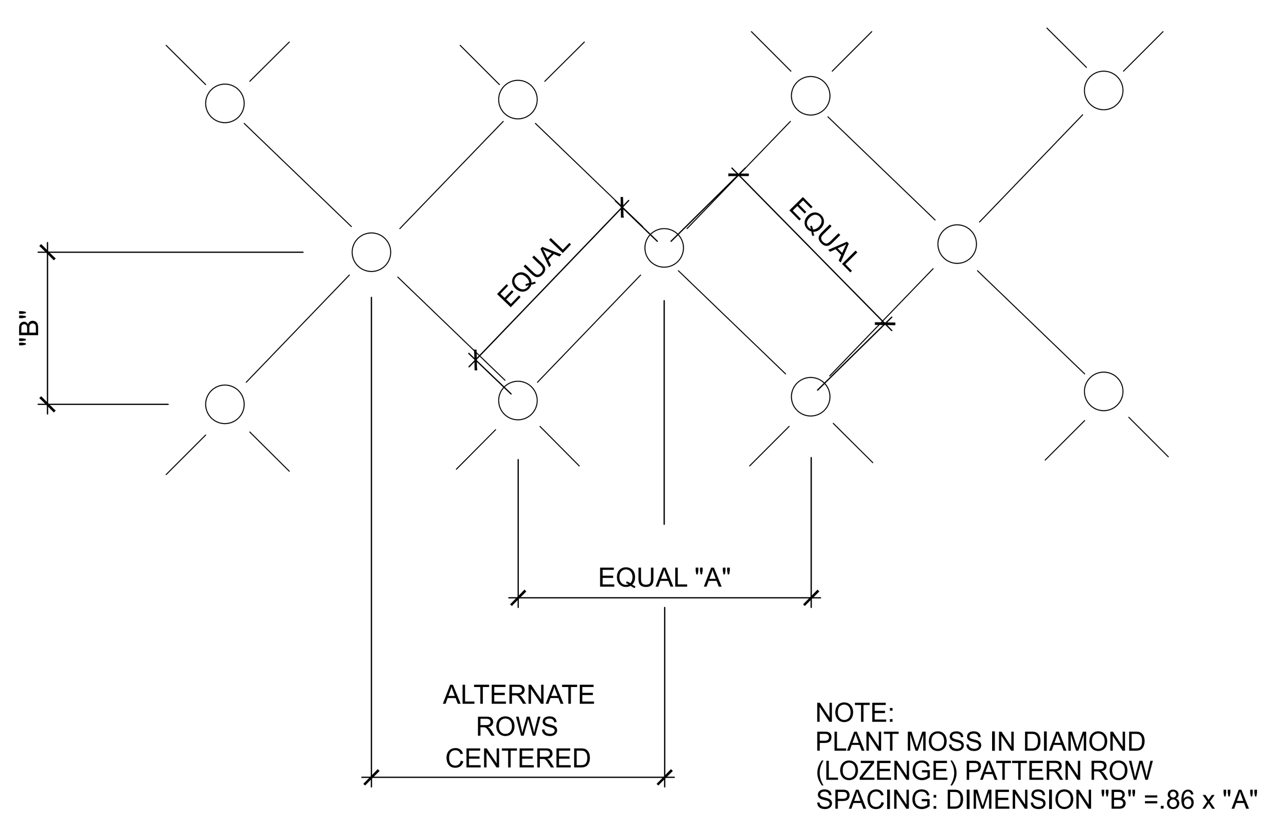
PLANTING SCHEDULE

SCALE

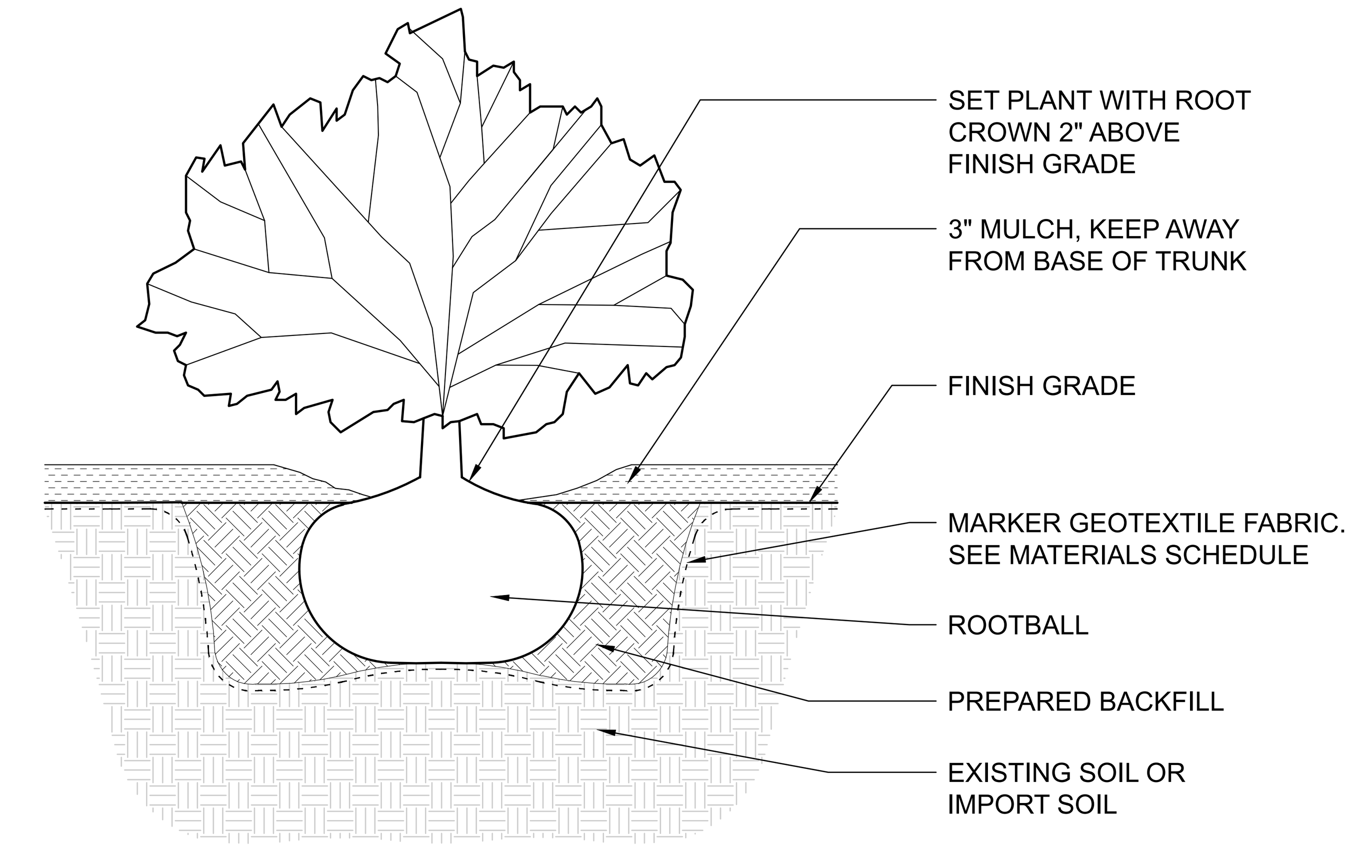
APN NUMBER 004-0049-004-00	RELEASE DATE AUGUST 24, 2016
DRAWN BY GEL	CHECKED BY JM

L3.00

OF ___ SHEETS

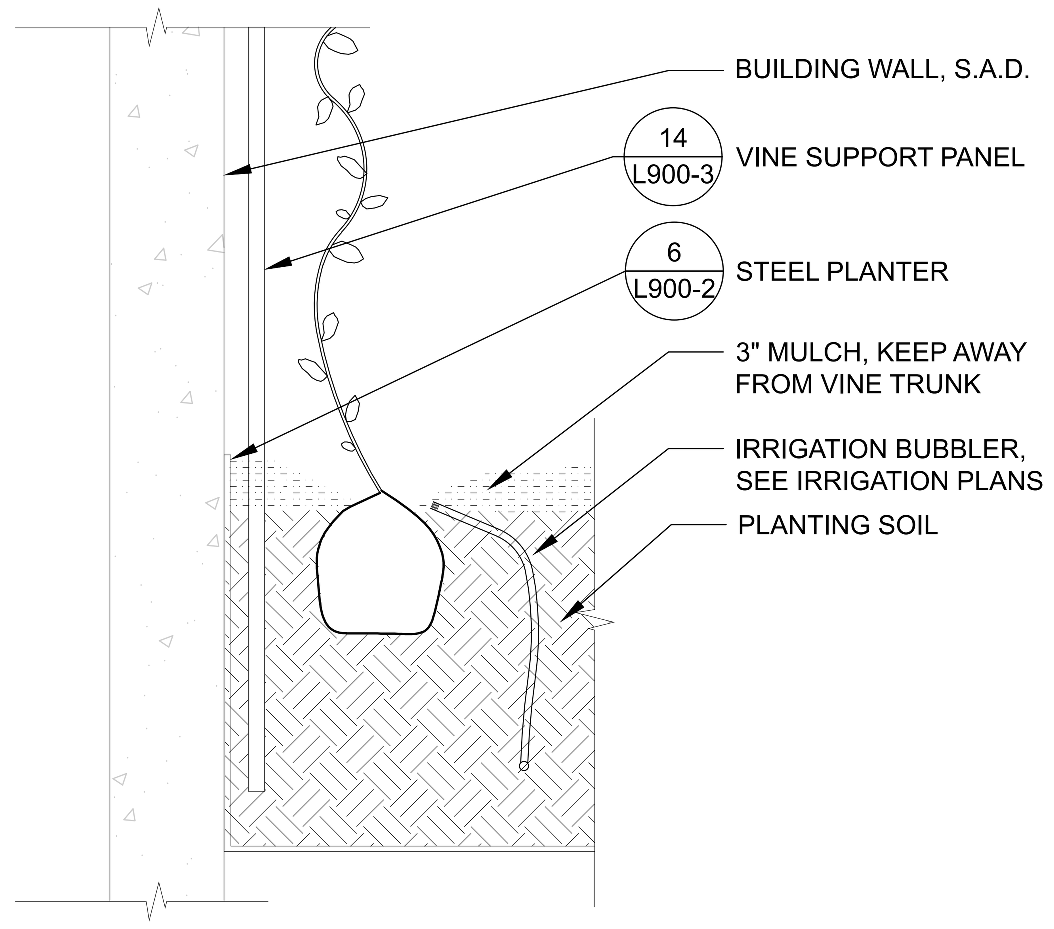


7 GROUND COVER PLANTING
SCALE: N.T.S.

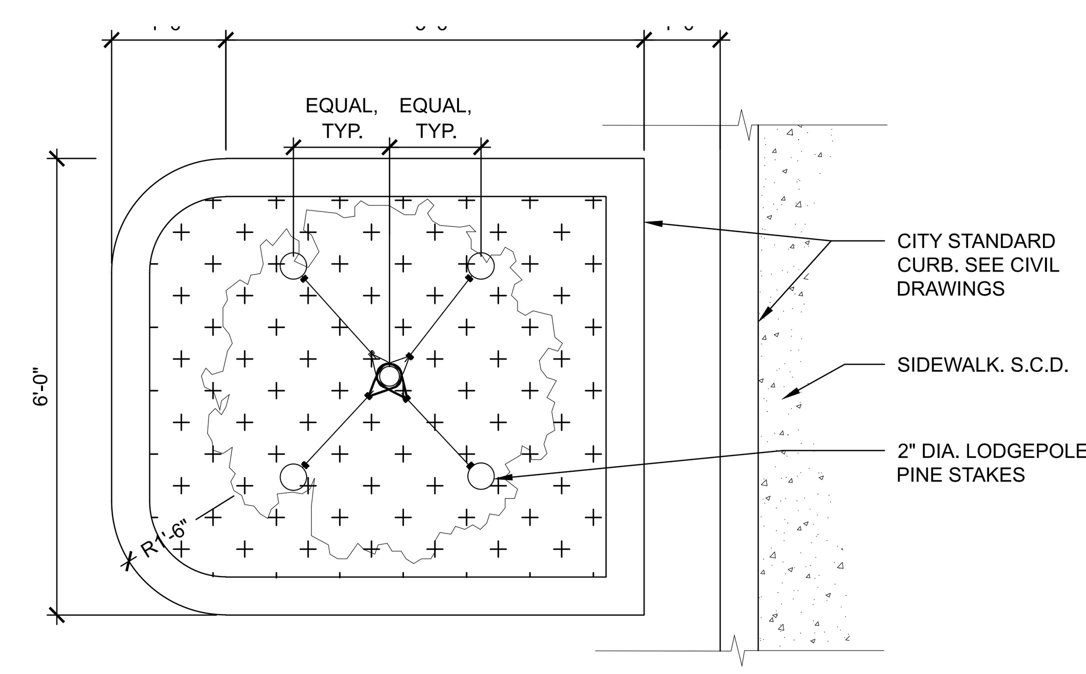


4 SHRUB / PERENNIAL PLANTING
SCALE: N.T.S.

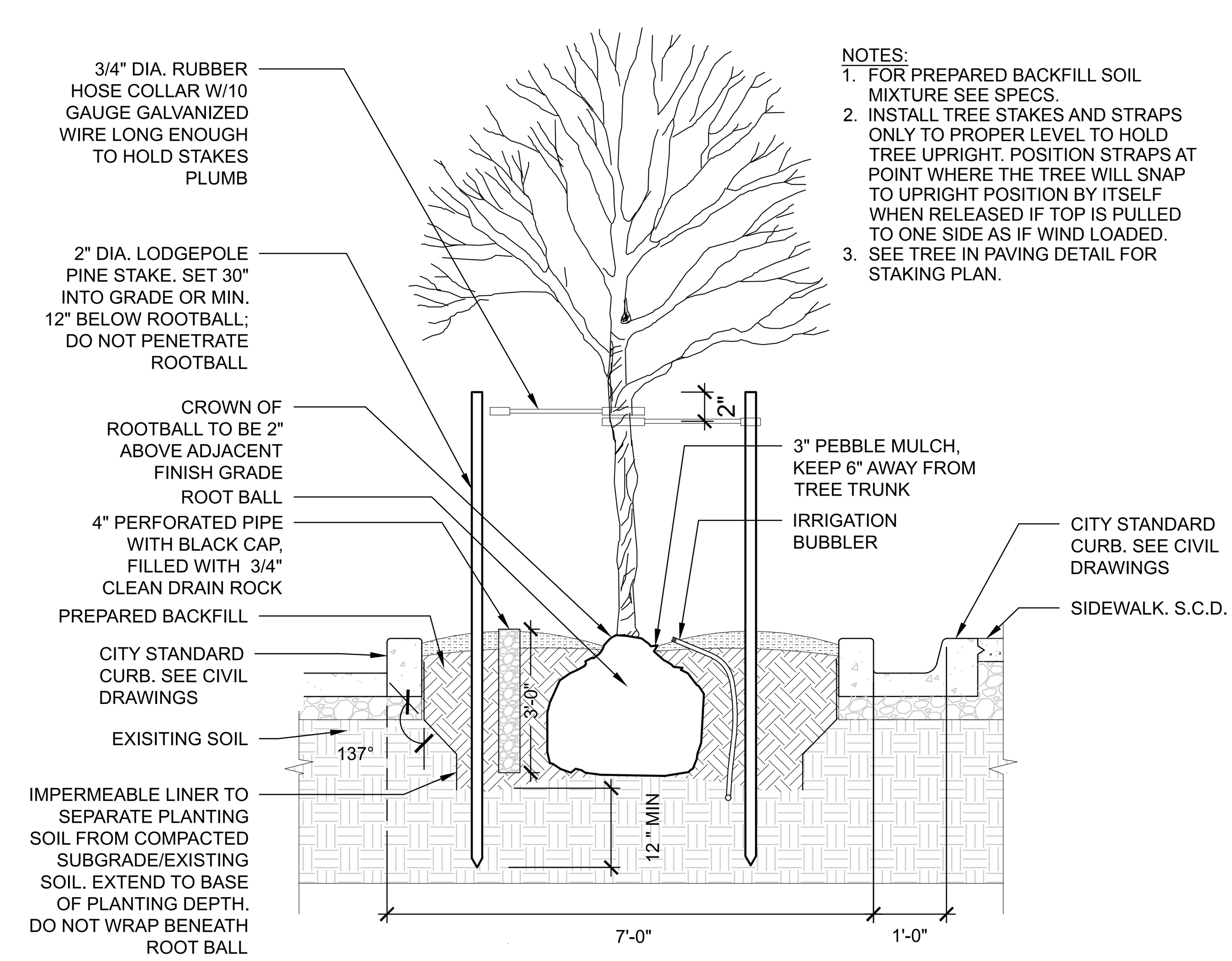
1 NOT USED
SCALE: N.T.S.



8 VINE PLANTING
SCALE: N.T.S.

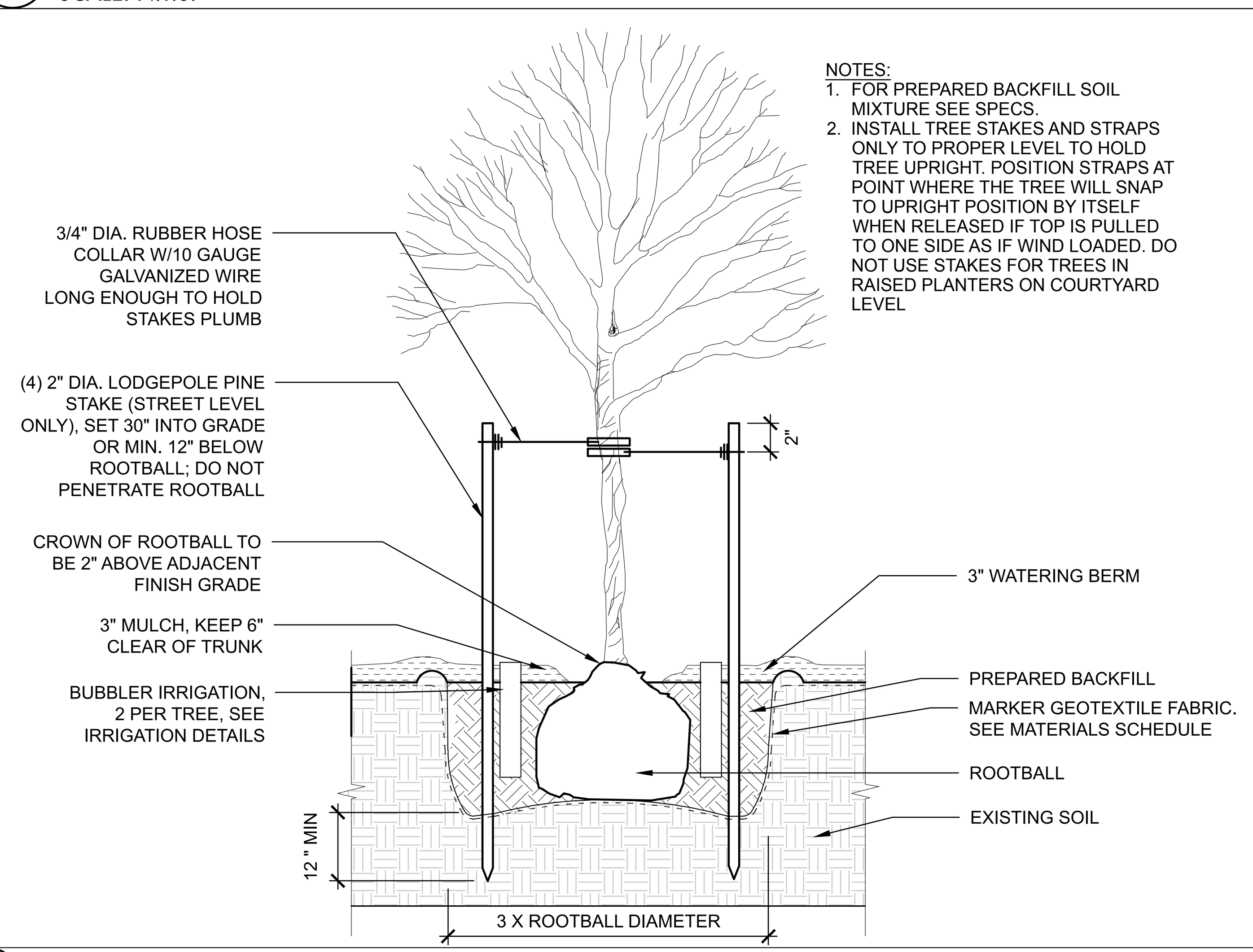


PLAN



SECTION

6 RAISED TREE WELL WITH CONCRETE CURB
SCALE: 1/2" = 1'-0"



9 TREE PLANTING
SCALE: N.T.S.

3 NOT USED
SCALE: 1/2" = 1'-0"

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BUILDING PERMIT	08.24.2016
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PRICING SET	02.21.2017

ADDENDA

No.	Description	Date

SHEET TITLE

PLANTING DETAILS

SCALE
AS SHOWN

APN NUMBER	RELEASE DATE
004-0049-004-00	AUGUST 22, 2016
DRAWN BY	CHECKED BY
GEL	JM

L6.00

OF ___ SHEETS

APPENDIX B

CALCULATIONS

TABLE B-1
WORKER AND COMMUNITY PROTECTION ACTION LEVELS
5th and Magnolia Streets
Oakland, California

Chemicals of Concern	Soil RME	Threshold Limits			Action Level	MiniRam Real Time Air Measurements	
		Cal OSHA PEL	NAAQS[a]	CAAQS[b]		Dust Threshold	Dust Action Level
	(mg/kg)	(mg/m^3)	(mg/m^3)	(mg/m^3)	(mg/m^3)	(mg/m^3)	(mg/m^3)
Lead (Max Concentration)	2,180	0.05	--	--	0.03	23	11.5
Respirable Dust (Worker)	--	5	--	--	2.5	5.0	2.5
Respirable Dust (Perimeter)	--	--	0.15	0.05	0.05	0.05	0.05

Notes:

mg/kg: milligrams per kilogram

mg/m^3: milligrams per cubic meter

OSHA: Occupational Safety and Health Administration

PEL: Permissible Exposure Limit

TWA: Time weighted average for an 8-hour work shift, 40-hour work week

a: National Ambient Air Quality Standards (NAAQS) is 0.15 mg/m^3 for a 24-hour period; and 0.05 mg/m^3 for an annual arithmetic mean

b: California Ambient Air Quality Standards (CAAQS) is 0.05 mg/m^3 for a 24-hour period and 0.02 mg/m^3 for an annual arithmetic mean.

APPENDIX C

SPECIFICATIONS

TenCate
Mirafi®

SEPARATION DRAINAGE

Mirafi® Orange Delineation Nonwoven Geotextile

for Visual Barrier, Soil Separation and Drainage

TenCate™ develops and produces materials that function to increase performance, reduce costs and deliver measurable results by working with our customers to provide advanced solutions.

The Difference Mirafi® Orange Nonwoven Geotextiles Make:

- Utility Alert. Mirafi® delineation geotextiles are a visual dig barrier designed to be placed above underground utilities.
- Contaminated Soils. Mirafi® delineation geotextiles separate contaminated soils from clean soils.
- Archeological Sites. Mirafi® delineation geotextiles assist in the long-term protection of historical sites.

APPLICATIONS

Mirafi® nonwoven geotextiles are used in a wide variety of applications in the environmental and general civil markets. These include separation, filtration and protection applications.

Mirafi® delineation geotextiles are is used in many critical subsurface systems. The use of this orange delineation fabric allows for safe excavations where utilities or other sensitive structures may be buried. The highly visible orange nonwoven geotextile serves as a warning to construction workers when the excavation reaches a buried structure.

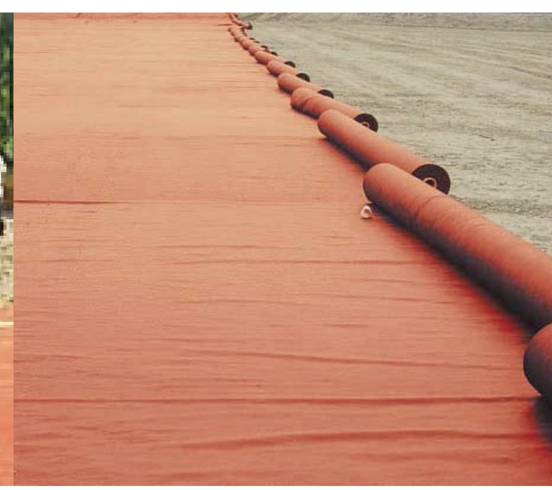
Excavation near all utilities, (gas, electric, water, Cable TV and telephone) is always a sensitive operation. The use of Mirafi® delineation geotextile is a low cost-effective method of protection. In addition, lining trench's with a geotextile keeps the selected and costly backfill material separated from the native subgrade.

Construction in areas where contaminated soils exist poses risks when trenches or deep footings need to be excavated. These risks are minimized when the Mirafi® delineation geotextile is placed on the contaminated soils before the capping of these areas occurs. The geotextile limits particle movement between the clean new soil and the contaminated substrate. The Mirafi® delineation geotextile offers a visual barrier to future excavations of the contaminated hazard below.

Mirafi® Orange Delineation Geotextiles

Federal and State laws require that archeological sites must be protected from adverse impacts caused by engineering projects. Many archeological sites throughout the world are left in place to protect them. In some cases, after discovery, they are buried. Sites can be protected through burial below an engineered cover, if the engineering project does not require excavation. The installation of Mirafi® delineation geotextile before the new soil is placed will aide in the long term protection of these archeological sites.

* These guidelines serve as a general basis for installation. Detailed instructions are available from your TenCate™ representative.



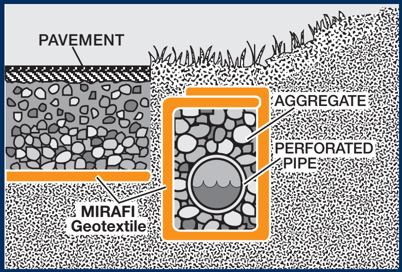
Mirafi® Orange Delineation Nonwoven Geotextiles

for Visual Barrier, Soil Separation and Drainage

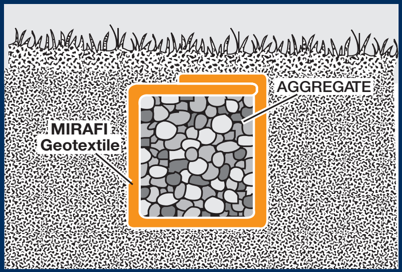
Property / Test Method	Units	140NL	160N	180N
MECHANICAL PROPERTIES				
Grab Tensile Strength				
ASTM D4632				
Strength @ Ultimate	lbs (N)	100 (445)	175 (779)	240 (1068)
Elongation @ Ultimate	%	75	75	70
Trapezoidal Tear Strength	lbs	50	85	90
ASTM D4533	(N)	(223)	(378)	(400)
CBR Puncture Strength	lbs	310	480	630
ASTM D6241	(N)	(1380)	(2136)	(2802)
UV Resistance after 500 hrs.	% strength	70	80	80
ASTM D4355				
HYDRAULIC PROPERTIES				
Apparent Opening Size (AOS)	US Sieve	70	100	100
ASTM D4751	mm	0.212	0.15	0.15
Permittivity	sec^{-1}	2.4	1.5	1.5
ASTM D4491				
Flow Rate	$gal/min/ft^2$	175	105	95
ASTM D4491	$(l/min/m^2)$	(7130)	(4278)	(3870)
Packaging				
Roll Width	ft (m)	15.0 (4.5)	15.0 (4.5)	15.0 (4.5)
Roll Length	ft (m)	360 (110)	300 (91)	300 (91)
Est. Gross Weight	lbs (kg)	143 (165)	215 (97)	265 (120)
Area	yd^2 (m^2)	600 (502)	500 (418)	500 (418)

*NOTE: Mechanical Properties and Hydraulic Properties shown are Typical Value. Apparent Opening Size (AOS) properties shown are Maximum Average Roll Values.
(Values and methods could change without notice)

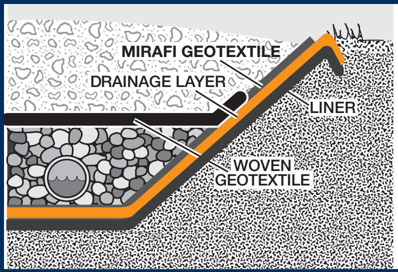
Mirafi® Orange Delineation Geotextiles



Cut-off/Inceptor Drain Along a Roadway Or Another Critical Struction



French Drain Without Pipe



Liner Protection Within a Landfill

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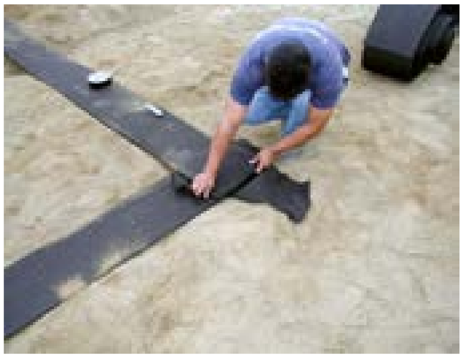
ISO 9001
FM 61026

materials that make a difference

GEOVENT™

ACTIVE/PASSIVE GAS VENTING SYSTEM



GEOVENT™ allows for ease of installation directly on the subgrade, eliminating the need for costly and labor-intensive trenching.

GEOVENT™ allows for ease of installation directly on the subgrade, eliminating the need for costly and labor-intensive trenching.

DESCRIPTION

GEOVENT™ consists of a three-dimensional vent core that is wrapped in a non-woven, needle-punched filter fabric.

GEOVENT End Outlets are available for use in conjunction with GEOVENT active/passive gas venting systems.

APPLICATION

GEOVENT™ is designed for use in the following application:

- An active or passive venting when used with CETCO vapor intrusion mitigation systems.

BENEFITS

- Installed directly on subgrade eliminating trenching and potential interference or damage to existing underground utilities
- Placed in closer proximity to the vapor intrusion barrier allowing for more effective venting of any accumulated gas
- Greater opening area per lineal foot of pipe and integral filter fabric allows for higher ventilation efficiency

TESTING DATA

PHYSICAL PROPERTIES		
CORE PROPERTY	TEST METHOD	RESULT
Compressive Strength	ASTM D 1621	8,500 - 11,000 psf (407 - 527 kN/m²)
Thickness	ASTM D 1777	1.0 in. (2.54 cm)
Flow Rate (Hydraulic gradient = .1)	ASTM D 4716	30 gpm/ft width (372 lpm/m)

FABRIC PROPERTY	TEST METHOD	RESULT
A.O.S.	ASTM D 4751	70 US Sieve (0.212 mm)
Grab Tensile Strength	ASTM D 4632	100 lbs. (0.45 kN)
CBR Puncture Strength	ASTM D 6241	250 lbs. (1.11 kN)
Flow Rate	ASTM D 4491	140 gpm/ft² (5,704 lpm/m²)

PACKAGING

GEOVENT™ is available in the following packaging option:

- 1 ft. x 165 ft. (0.3 m x 50 m) Rolls

North America: 847.851.1800 | 800.527.9948 | www.CETCO.com

UPDATED: FEBRUARY 2014

TDS_GEOVENT_AM_EN_201403_v1

CETCO®

OUR STANDARDS. YOUR PEACE OF MIND.

A Minerals Technologies Company