CITY OF OAKLAND

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April 24, 2014

Mark Detterman
Alameda County Environmental Health
1131 Harbor Bay Parkway
Alameda , CA 94502-6540

Subject: Conceptual Site Model & Request for Case Closure, City of Oakland Corporation Yard, 5921 Shepherd Canyon Road, Oakland, California- Case File No. RO141

Dear Mr. Detterman:

Enclosed is the Conceptual Site Model and Request for Case Closure for the City of Oakland Corporation yard, 5921 Shepherd Canyon Road, Oakland, California, Case File No RO141 ("the Site").

I certify under penalty of law that this document and all attachments are prepared by Fugro Consultants under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who managed the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

If you have any questions or comments, please call Ms. Jeriann Alexander at (510) 267-4401 or me at (510) 238-6361.

Sincerely,

Gopal Nair

Enclosure

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April 22, 2014
Project No. 04.72140008

Alameda County Environmental Health
1131 Harbor Bay Parkway
Alameda, California 94502

Attention: Mr. Mark Detterman

Subject: Conceptual Site Model and Request for Case Closure, City of Oakland Corporation Yard No. 4, 5921 Shepherd Canyon Road, Oakland, California, Case File No. RO141

Dear Mr. Detterman:

On behalf of the City of Oakland (City), Fugro Consultants, Inc. (Fugro) presents this letter containing additional information and assessment for the City's Corporation Yard No. 4, located at 5921 Shepherd Canyon Road in Oakland, California (Site, Plates 1 and 2). Currently, the Site is considered an "open case" by the Alameda County Environmental Health Department (ACEH; Case #RO141) and the Regional Water Quality Control Board (RWQCB; Case #01-0515). Based on the Low-Threat UST Closure Policy (LTCP) Checklist posted on GeoTracker for the Site, additional general and media-specific information, including the submittal of a CSM, is required to satisfy the LTCP criteria. The purpose of this document is to provide the requested CSM, evaluate the general and media-specific criteria listed in the LTCP, and to formally request case closure for the subject site.

CONCEPTUAL SITE MODEL

The CSM presented herein summarizes and assesses available Site information regarding the nature, extent and mobility of the hydrocarbon release which occurred at the Site. The CSM is documented in a tabular format with five (5) sections describing the Source, Site Characteristics including hydrogeology and preferential pathways, Remediation Status, a Well and Sensitive Receptor Survey, and Risk Assessment. Supporting documentation is attached to assist with a review of this information including Site vicinity maps, Site analytical data summary tables (Table 1 and 2), Logs of Borings (Appendix A), a Site Plot Plan (Appendix B), a Conceptual Exposure Model (Appendix C), and Department of Water Resources (DWR) and Alameda County Public Works Agency's (ACPWA) Well Survey Reports (Appendix D, presented as hardcopy only).

Item	CSM Criteria	Evaluation
1	**Source**	
1.1	Source and Volume	Source is overfilling and a pipe leak resulting in a release of petroleum hydrocarbons to soil. In May 1990, one 2,000-gallon gasoline underground storage tank (UST) and one 550-gallon diesel UST were removed from the Site under observation by the City of Oakland. According to information obtained from the State Water Resources Control Board's (SWRCB) GeoTracker website *"The UST Unauthorized Release form in the file indicates the source of the release was from tank overfilling and a pipe leak at the dispenser however there is no additional information in the case files."* The UST removal report is not available at ACEH or RWQCB for review. As a result, the volume of fuel released is unknown, and the volume of impacted soil is unknown. Reportedly, no groundwater was encountered in the excavation during removal of the two USTs at the Site. Subsequent studies suggest that only localized residual soil and groundwater impacts remain.
1.2	Steps Taken to Stop Release	The two USTs and associated vent pipes were removed from the Site in 1990.
2	**Site Characterization**	
2.1	Current Site Use/Status	The Site is paved and is currently used as an active corporation yard by the City of Oakland. The Site has a street address of 5921 Shepherd Canyon Road, Oakland, CA 94611. Adjacent properties include the City of Oakland Fire Station No. 24, which is located to the south, across Shepherd Canyon Road. The location of the Site is illustrated on Plate 1 – Vicinity Map and Plate 2 – Site Plan.
2.2	Soil Definition Status	In May 1990, the two USTs and two vent pipes were removed from the Site. Two confirmation soil samples (IA1 and IA2) were collected beneath the 2,000-gallon gasoline UST at a depth of 11 feet below ground surface (bgs), and one confirmation sample (IA3) was obtained below the 550-gallon diesel UST at a depth of 8.0 feet bgs. Additionally, one confirmation sample was obtained beneath each vent pipe (IA4 and IA5) at a depth of 3.0 feet bgs. Analytical results for soil samples collected from the Site are summarized in Table 1. For the soil samples obtained from beneath the gasoline UST and vent pipe (IA1, IA2, and IA3) analyses detected total petroleum hydrocarbons as gasoline (TPHg) at concentrations up to 790 milligrams per kilogram (mg/kg). Analyses also detected benzene [up to 27 micrograms per kilogram (µg/kg)], toluene (up to 86 µg/kg), ethylbenzene (up to 16 µg/kg), and xylenes (up to 150 µg/kg). With the exception of 790 mg/kg of TPHg, all detected concentrations were below respective Tier 1 Environmental Screening Level (ESL) criteria and ESLs for a commercial/industrial land use.

Item	CSM Criteria	Evaluation
		Analyses detected no TPHg or BTEX is the sample obtained below the vent pipe. At that time, no analyses for MTBE were performed. For samples obtained from beneath the diesel UST and vent pipe (IA3 and IA4), analyses detected total petroleum hydrocarbons as diesel (TPHd) at concentrations of 63 mg/kg and 190 mg/kg, respectively. Analyses detected total petroleum hydrocarbons as motor oil (TPHmo) in the confirmation sample obtained from beneath the vent pipe at 24 mg/kg. With the exception of 190 mg/kg of TPHd detected beneath the vent pipe, detected TPHd and TPHmo were below respective Tier 1 ESL and ESLs for a commercial/industrial land use. In March 1999, Subsurface Consultants Inc. (SCI, a wholly owned subsidiary of Fugro) advanced one boring within the former gasoline UST excavation area to a depth of 25 feet bgs. Analyses detected no TPHg, benzene, or methyl tertiary butyl ether (MTBE) concentrations in the samples analyzed from depths of 13.5 and 19 bgs. Analyses detected 21 mg/kg of TPHd and up to 15 mg/kg of TPHmo in the two samples analyzed. Detected TPHd and TPHmo concentrations were well below respective Tier 1 ESLs and ESLs for a commercial/industrial land use. In their letter dated October 14, 2010, ACEH indicated that the Site was not adequately characterized and requested an additional investigation to evaluate the lateral and vertical extent of petroleum hydrocarbons near the former USTs. On January 27, 2011 Fugro drilled Borings B-1 and B-2 to maximum depths of 25 and 38 feet bgs, respectively. Boring B-1 was completed approximately 20 feet downgradient of the former UST locations. Boring B-2 was completed 60 feet southeast, and downgradient of the former USTs, on the south side of Shepherd Canyon Road and within the paved parking area of Fire Station No. 24. No odors were detected in soil samples during drilling. The highest Organic Vapor Meter (OVM) reading was 2.5 parts per million (ppm) for B-1@9.5 feet. Fugro detected no OVM readings in soil samples from B-2. Based on field observations, soil samples B-1@9.5' and B-2@24' were selected for chemical analyses. Analyses detected no TPHg, TPHmo, BTEX, or MTBE in Samples B-1@9.5' or B-2@24'. Analyses detected 4.2 mg/kg of TPHd in B-1@9.5', which is well below respective Tier 1 ESL and the ESL for a commercial/industrial land use. Analyses detected no TPHd in B-2@24'.
2.3	Groundwater Definition Status	No groundwater was encountered in the excavations following removal of the 2,000-gallon gasoline and 550-gallon diesel USTs in 1990. Analytical results for groundwater samples collected from the Site are summarized in Table 2.

Item	CSM Criteria	Evaluation
		In March 1999, a grab groundwater sample was obtained from Boring SCI-1, completed within the former UST area. Analytical results detected 140 micrograms per liter (µg/L) of TPHg, 150 µg/L of TPHd, and 12 µg/L of benzene in the grab groundwater sample tested. In June 1999, SCI installed a 2-inch diameter monitoring well (MW-1) approximately 10 feet downgradient of the former UST locations. Well MW-1 was completed to a depth of 25 feet bgs. Following well development activities, groundwater samples were obtained in June 1999 and then again in September 1999. For the June 1999 monitoring event, analyses detected 8,000 µg/L of TPHg, 1,100 µg/L of TPHg, 1,300 µg/L of benzene, 2,000 µg/L of toluene, 240 µg/L of ethylbenzene, and 1,350 µg/L of xylenes. For the September 1999 monitoring event, analyses detected significantly lower contaminant concentrations. Analyses detected 210 µg/L of TPHg, 360 µg/L of TPHd, 110 µg/L of benzene, 8.8 µg/L of toluene, 32 µg/L of ethylbenzene, and 5.8 µg/L of xylenes. No TPHmo or MTBE was detected in the groundwater samples analyzed from June or September 1999. Fugro completed an additional investigation at the Site on January 27, 2011 which included the completion of Borings B-1 (20 feet downgradient) and B-2 (60 feet downgradient) to initial depths of 25 and 30 feet bgs, respectively. No groundwater was encountered during drilling in either location. Both borings were secured overnight to allow for recharge. Fugro returned the next day, encountered groundwater in B-1 at a depth of 22.88 feet bgs, and collected a grab groundwater sample. No groundwater was encountered in Boring B-2. Boring B-2 was secured over the weekend to allow for recharge. On February 1, 2011 Fugro returned and encountered no groundwater. Boring B-2 was then drilled an additional 8 feet, to a maximum depth of 38 feet bgs, secured, and allowed to recharge for several days. Fugro returned on February 4, 2011 to encounter no groundwater. Fugro then proceeded to grout using neat cement. In addition to the grab groundwater sample obtained from B-1, Fugro also obtained a sample from monitoring well MW-1. Except for 0.66 µg/L of benzene in MW-1, analyses detected no TPHg, TPHd, TPHmo, BTEX, MTBE, naphthalene, or lead scavengers (1,2-dichloroethane or 1,2-dibromoethane) in groundwater samples collected from MW-1 or B-1. Detected benzene in groundwater is below the Tier 1 ESL criteria and the ESL for a commercial/industrial land use. Based on these findings, groundwater impacts at the source area have significantly attenuated between June 1999 and

Item	CSM Criteria	Evaluation
		January 2011 and have significantly attenuated within 10 feet of the former UST area. Residual benzene impacts to groundwater identified in the monitoring well located 10 feet downgradient of the UST area are below Tier 1 ESL criteria (drinking water) and are decreasing. Analyses detected no toluene, ethylbenzene, or xylenes during the last monitoring event.
2.4	Plume Stability and Concentration Trends	The primary source of hydrocarbons has been removed. Residual impacts to groundwater extend less than 10 feet from the source area. No TPHg, TPHd, TPHmo, naphthalene, or MTBE were detected in groundwater samples obtained from MW-1 or B-1 in January 2011. Additionally, residual benzene impacts to groundwater identified in well MW-1 are below Tier 1 ESL criteria (drinking water). The lateral extent of groundwater impact from those USTs appears to be stable, has significantly attenuated since 1999, and is localized to less than 10 feet from the source area.
2.5	Groundwater Flow Direction, Depth Trends, and Gradient Trends	In January 2011, groundwater was encountered during drilling of Boring B-1 at a depth of 22.88 feet bgs. No groundwater was encountered in boring B-2, located 60 feet downgradient of the UST area, which was completed to a depth of 38 feet bgs. Groundwater was measured in MW-1 at a depth of 14.37 feet bgs on January 27, 2011. No other monitoring wells are located at the Site. However, local gradient information was obtained from the 2011 Annual Groundwater Monitoring Report prepared by Conestoga-Rovers & Associates, Inc. for a Chevron Service Station (#9-1740) located about 2,000 feet northwest of the Site. According to this report, the groundwater gradient at that facility is 0.03 ft/ft toward the south-southeast.
2.6	Site Setting and Hydrogeology	The Site is situated at approximately 675 feet above mean sea level. Topography at the Site slopes toward the south-southeast. The Site and immediate area is completely hardscaped. The impacted area is capped with 2-inches of asphalt underlain by 10-inches of concrete. Paved surfaces across the Site are underlain with brown gravelly silt, which is underlain by fractured siltstone to the maximum depth explored. Logs of Borings SCI-1, MW-1, B-1, and B-2 are presented in Appendix A. In January 2011, groundwater was measured at a depth of 14.37 feet bgs in well MW-1. Shallow groundwater likely mimics surface topography which slopes south-southeast.
2.7	Regional Stratigraphy and Hydrogeology	The Site is underlain by Holocene Surficial Sediments (QA), which consists of alluvial gravel, sand and clay and the

Item	CSM Criteria	Evaluation
		Cretaceous Joaquin Miller Shale (Kp-jm), which consists of claystone but includes many thin layers of arkosic sandstone. Based on our review of the DWR and ACPWA's Well Survey Reports, the nearest deep wells (>100 feet bgs) are cathodic protection wells located between 1,500 and 1,800 feet from the Site. Stratigraphy of these deep-screened wells consist of shallow soil underlain by bedrock (shale) encountered at depths between 8 and 28 feet bgs. The Hayward Fault is located approximately 0.25 miles southwest of the Site. Based on our review of the San Francisco Bay Basin (Region 2) Water Quality Control Plan (Basin Plan), prepared by the San Francisco Bay RWQCB, dated December 31, 2011, the Site is located within the Santa Clara Valley Basin, East Bay Plain Subbasin. The East Bay Plain Subbasin is a northwest trending alluvial plain bounded on the north by San Pablo Bay, on the east by contact with the Franciscan Basement complex, and on the south by the Niles Cone Groundwater Basin. The East Bay Plain Subbasin extends to the west beneath San Francisco Bay. Fugro observed no water supply wells at the Site, or within or immediately adjacent to the plume area. One groundwater monitoring well (MW-1) is currently present at the Site, approximately 10 feet downgradient of the source area. According to the Well Survey Reports, no municipal or domestic water supply wells are located within 2,000 feet of the Site.
2.8	Preferential Pathways Analysis	No preferential pathways have been identified at the Site. Results of a utility survey completed prior to drilling in 2011 indicated a shallow electrical line that is situated about 15 feet downgradient of the former UST area. Additionally, the City of Oakland provided a plot plan for the Site which shows a 4-inch diameter sewer lateral emanating from the southeast side of the building, taking a 45-degree turn to the south, and then connecting to the sewer main, located approximately 40 feet away. The depth of the sewer lateral or the sewer main is not shown on the plan. Typically, utilities are installed to depths of less than 10 feet bgs. Residual low concentrations of benzene (0.66 µg/L) were identified in MW-1 during the investigation in 2011 at a depth of 14.37 feet bgs. Therefore, the shallow electrical utility trench, sewer lateral, and other utilities, if present, will not intercept static groundwater and will therefore not be a preferential pathway for residual impacted groundwater. No other maps documenting existing utilities at the Site or along Shepherd Canyon were provided by the City. A copy of the City provided plot plan is presented is Appendix B.

Item	CSM Criteria	Evaluation
2.9	Other Pertinent Issues	East Bay Municipal Utilities District (EBMUD) provides potable water to the City of Oakland. The EBMUD's water supply comes from the Mokelumne River watershed in the Sierra Nevada. As such, it is not expected that water below the site would be considered for use as a potable supply. Fugro conducted a reconnaissance of the Site and surrounding properties. The nearest schools, Joaquin Miller Elementary School and the Montera Middle School, are located at 5525 Ascot Drive and 5555 Ascot Drive, respectively, about 1,100 feet south of the Site. Although the two schools are located downgradient, they are separated from the Site by Shepherd Canyon and Shepherd Creek, which are situated approximately 270 feet south of the Site. No hospitals or other sensitive receptors have been identified within a 2,000 foot radius of the Site.
3	**Remediation Status**	
3.1	Remedial Actions Taken – Soil	Based on our review of available information, no significant soil remedial action has been required or implemented at this Site. The USTs were removed from the Site in 1990. Records do not indicate whether any impacted soil was over-excavated or removed from the Site at that time.
3.2	Remedial Actions Taken - Groundwater	Based on our review of available information, no groundwater remedial action has been required or implemented at this Site.
3.3	Remediation Effectiveness	Actions have removed the primary source of hydrocarbon release(s) at the Site; the USTs, dispensers and piping systems have been removed. Fugro's investigation in January 2011, detected no TPHg, TPHmo, BTEX, or MTBE in samples analyzed. Analyses only detected 4.2 mg/kg of TPHd in B-1@9.5', which is well below respective Tier 1 ESL and the ESL for a commercial/industrial land use. Except for 0.66 µg/L of benzene in MW-1, analyses detected no TPHg, TPHd, TPHmo, BTEX, MTBE, naphthalene, or lead scavengers (1,2-dichloroethane or 1,2-dibromoethane) in groundwater samples collected from MW-1 or B-1 in 2011. Detected benzene in groundwater is below the Tier 1 ESL criteria and the ESL for a commercial/industrial land use. Primary source removal, coupled with natural attenuation, has effectively limited residual groundwater impacts to less than 10 feet downgradient of the source area.
3.4	Attenuation Predictions	Based on the results of groundwater monitoring at MW-1, located 10 feet downgradient of the source area, residual TPHg, TPHd, and BTEX constituents have significantly attenuated between June 1999 and January 2011 as summarized below:

Item	CSM Criteria	Evaluation
		• TPHg from 8,000 µg/L to Not Detected (ND) <50 µg/L • TPHd from 1,100 µg/L to ND <50 µg/L • Benzene from 1,300 µg/L to 0.66 µg/L • Toluene from 2,000 µg/L to ND <0.5 µg/L • Ethylbenzene from 240 µg/L to ND <0.5 µg/L • Total Xylenes from 1,350 µg/L to ND <1.0 µg/L Natural attenuation of residual benzene concentrations through adsorption, dispersion, dilution, volatilization, and biological degradation is likely occurring as evidenced by the relatively small lateral extent (less than 10 feet) of groundwater impact at the Site.
4	**Well and Sensitive Receptor Survey**	
4.1	Well Survey Results	In February 2014, a well survey of active and inactive wells within a 2,000-ft radius of the Site was obtained through DWR and ACPWA. Results indicated no municipal or domestic water supply wells within a 2,000-ft radius of the Site. Offsite Well Logs are presented in Appendix D (hardcopy only). The approximate locations of known or registered wells are presented on Plate 3.
4.2	Shallow Water Wells	According to the Well Survey Reports, nine shallow wells were identified within a 2,000 ft radius of the Site. Eight out of the nine wells were used for groundwater monitoring purposes as discussed below: Chevron Service Station (#9-1740) Four wells located at 6550 Moraga Avenue, about 2,000 feet northwest of the Site. According to GeoTracker, these wells were destroyed in November 2011. Unocal Service Station (#5269) Four wells located at 2240 Mountain Blvd, about 1,250 feet west-southwest of the Site. According to GeoTracker, this Site was closed in April 1993. It is assumed that these four wells were destroyed at that time. One additional shallow well was identified approximately 2,000 feet cross-gradient from the Site. According to ACPWA's Well Survey Report, the use of this well is unknown. It is also unknown if this well is still present at this location, however, given that this well is 2,000 feet cross-gradient, groundwater in this well will not be impacted by residual groundwater contamination at the Site. No shallow water supply wells were identified within a 2,000 ft radius of the Site. EBMUD provides potable water to the City of Oakland. Shallow groundwater is not utilized as a water supply, at or in the near vicinity of the Site.
4.3	Deep Water Wells	According to the Well Survey Report, two deep wells (>100 feet) have been identified within a 2,000 ft radius of the Site.

Item	CSM Criteria	Evaluation
		Two of these wells are cathodic protection wells located between 1,500 and 1,800 feet from the Site. It is unknown if these two cathodic protection wells are still present. EBMUD provides potable water to the City of Oakland. Deep groundwater is not utilized as a water supply, at or in the near vicinity of the Site.
4.4	Evaluation of Potential Impact to Water Wells	No sensitive receptors or water supply wells are present at the Site or within the localized (less than 10-ft) area impacted by residual concentrations of benzene.
4.5	Evaluation of Potential Impact to Surface Water	Shepherd Creek is located approximately 270 feet downgradient of the Site, however based on the findings of the investigation in 2011, residual benzene impacts to groundwater extend less than 10 feet downgradient of the source area. Based on this information, surface water will not be impacted by residual groundwater contamination at the Site.
5	**Risk Assessment**	
5.1	Conceptual Exposure Model	The Site is currently occupied by a City of Oakland Corporation Yard and will likely remain in this use for the foreseeable future. Additionally, the Site is completely hardscaped and the former source area is capped with a paved parking lot. Based on the Conceptual Exposure Model attached in Appendix C, and given the results of the soil and groundwater investigation completed at the Site in 2011, there are no complete exposure pathways of significant concern at the Site.
5.2	Potential Human Exposures	The Site is currently hardscaped and the source area is capped with a paved parking lot. Residual TPHd concentrations in soil (4.2 mg/kg) and benzene concentrations in groundwater (0.66 µg/L) are well below respective Tier 1 ESLs. Accordingly, any exposure via inhalation or the vapor intrusion pathway is considered to not be significant.
5.3	Potential Ecological Exposures	Because the Site and impacted area are fully hardscaped, no exposure pathways to ecological receptors were identified.
5.4	Risk Assessment Status	No risk assessment is planned at this time because no exposure is present based on the current land use of the Site; no water supply wells are impacted; and t the chemicals of concern do not exceed respective Tier 1 ESL criteria. No other sensitive receptors (schools, pre-schools, hospitals, etc.) were identified within 1,000 feet of the Site.

ASSESSMENT OF LOW-THREAT CLOSURE POLICY CRITERIA

In 2012, the State Water Resources Control Board adopted the LTCP (Resolution No. 2012-0062) which outlines eight general criteria and three categories of media-specific criteria a Site must satisfy to be a candidate for closure under the policy. The following assessment strongly suggests that Site conditions currently satisfy the LTCP criteria.

General Criteria

Criteria a - The unauthorized release is located within the service area of a public water system.

As discussed in Section 2.9 of the CSM, the Site is located within the service area of the EBMUD. The EBMUD's water supply comes from the Mokelumne River watershed in the Sierra Nevada. Based on our review of the Well Survey Reports, no known municipal or domestic water supply wells are located at, or within 2,000 feet of the Site. The affected groundwater is not currently being used as a source of drinking water and is not likely to be used as a drinking water source in the foreseeable future.

Criteria b - The unauthorized release consists only of petroleum.

Impacts to soil and groundwater reportedly originated from a release from UST overfilling and a pipe leak at a dispenser. A 2,000-gallon gasoline UST and a 550-gallon diesel UST were removed from the Site in May 1990. Results of confirmation sampling identified concentrations of TPHg, TPHd, and BTEX in soil samples obtained beneath the former USTs and vent pipes (Section 2.2). Additional investigation completed by Fugro at the Site in 1999, identified the presence of localized, low level TPHg, TPHd, and BTEX in both soil and groundwater samples obtained from the Site (refer to Sections 2.2 and 2.3 for further information). There have been no known non-petroleum impacts or releases documented at the Site.

Criteria c - The unauthorized ("primary") release from the UST system has been stopped.

According to the SWRCB's GeoTracker website, *"The UST Unauthorized Release form in the file indicates the source of the release was from tank overfilling and a pipe leak at the dispenser however there is no additional information in the case files."* The removal of the USTs in 1990 effectively stopped the release of petroleum hydrocarbons.

Criteria d - Free product has been removed to the maximum extent practicable.

No free product was identified during the removal of the USTs in 1990. Additionally, concentrations of chemicals of concern detected in soil samples collected beneath the USTs or in soil and groundwater samples obtained from the Site in 1999 and 2011 were not indicative of the presence of free product (refer to Sections 2.2 and 2.3 for further information).

Criteria e - A Conceptual Site Model that assesses the nature, extent, and mobility of the release has been developed.

A CSM that includes a discussion of site assessment, regional and Site-specific geology and hydrogeology, a review of the soil and groundwater conditions at the Site, and an evaluation of potential exposure pathways is presented in this letter. The CSM provides sufficient information which allows an assessment of the nature, extent and mobility of the former release.

Criteria f - Secondary source has been removed to the extent practicable.

The USTs were removed from the Site in 1990. It is unknown if any impacted soil was over-excavated at that time. To Fugro's knowledge no soil or groundwater remedial action has been required or implemented at this Site.

Fugro's investigation in January 2011, detected no TPHg, TPHmo, BTEX, or MTBE in the soil samples analyzed. Analyses only detected 4.2 mg/kg of TPHd in B-1@9.5', which is well below respective Tier 1 ESL and the ESL for a commercial/industrial land use. Except for 0.66 µg/L of benzene in MW-1, analyses detected no TPHg, TPHd, TPHmo, BTEX, MTBE, naphthalene, or lead scavengers (1,2-dichloroethane or 1,2-dibromoethane) in groundwater samples collected from MW-1 or B-1. Detected benzene in groundwater is below the Tier 1 ESL criteria and the ESL for a commercial/industrial land use (refer to Sections 2.2 and 2.3 for further information).

Primary source removal, coupled with natural attenuation, has effectively reduced soil and groundwater concentrations at the Site, and limited residual groundwater impacts to less than 10 feet downgradient of the source area (refer to Section 3.4 for further information). Natural attenuation of residual benzene concentrations through adsorption, dispersion, dilution, volatilization, and biological degradation is likely occurring as evidenced by the relatively small lateral extent of groundwater impact at the Site. There does not appear to be any significant secondary source material at the Site.

Criteria g - Soil and Groundwater has been tested for MTBE and the results reported in accordance with Heath and Safety Code Section 25296.15.

MTBE was analyzed in soil and groundwater samples obtained from the Site in 1999 and 2011. Analyses detected no MTBE above the laboratory detection limit in any of the samples tested (refer to Sections 2.2 and 2.3 for further information).

Criteria h - Does a nuisance exist as defined by Water Code Section 13050.

No nuisance exists at the Site, as defined by Water Code Section 13050. Site conditions are not injurious to health, are not indecent or offensive to the senses, and do not obstruct free use of property or interfere with the comfortable enjoyment of life or property. Site conditions do not affect an entire community or neighborhood, or any considerable number of persons. Residual impacts to groundwater are restricted to the subsurface, and are present in a

limited or localized area (less than 10 feet) that does not adversely affect the community at large.

Media-Specific Criteria

Groundwater

Residual concentrations at the Site do not currently pose a risk to existing or anticipated future beneficial uses of groundwater, and as such the groundwater-specific criteria as outlined by the LTCP have been met. The LTCP states that "the contaminant plume that exceeds water quality objectives (WQO's) must be stable or decreasing in areal extent, and meet all of the additional characteristics of one of the five classes of sites." This Site fulfills Class 1 criteria as described below:

1a). The contaminant plume that exceeds WQOs is less than 100 feet in length.

Monitoring well MW-1 is situated approximately 10 feet downgradient of the UST source area. In 2011, benzene was detected in groundwater obtained from MW-1 at a concentration of 0.66 µg/L, which is below the drinking water WQO of 1.0 µg/L. No other chemicals of concern were identified in groundwater samples obtained from MW-1 during the 2011 investigation.

1b). There is no free product.

As discussed in the General Criteria d section, no free product has been identified at the Site.

1c). The nearest existing water supply well or surface water body is greater than 250 feet from the defined plume boundary.

Based on our review of the Well Survey Report, no known municipal or domestic water supply wells are located at, or within 2,000 feet of the Site.

Shepherd Creek is the nearest surface water body and is located approximately 270 feet downgradient of the source area. Based on the findings of the investigation in 2011, residual benzene impacts to groundwater extend less than 10 feet downgradient of the source area. Accordingly, this criteria is met.

Petroleum Vapor Intrusion to Indoor Air

According to the SWRCB's GeoTracker website, the Site is considered low-threat for the vapor-intrusion-to-air pathway if Site-specific conditions satisfy items 2a, 2b, or 2c.

This Site satisfies condition 2a – Scenario 3 (a bioattenuation zone without oxygen measurement or oxygen <4% and the bioattenuation zone is a continuous zone that provides a separation of at least 5 feet vertically between the dissolved phase benzene and the foundation of existing or potential buildings; and contain total TPH <100 mg/kg through the entire depth of

the bioattenuation zone; and dissolved phase benzene concentrations are less than 100 µg/L) as summarized below:

- Residual dissolved phase benzene in groundwater samples obtained from MW-1 in 2011 was 0.66 µg/L, well below the scenario criteria of 100 µg/L.
- Depth to water measured at MW-1 in 2011 measured 14.37 feet bgs, providing a separation of more than 5 feet vertically between the dissolved phase benzene and the foundation of existing or potential buildings.
- Fugro's investigation in January 2011, detected no TPHg, TPHmo, BTEX, or MTBE in soil samples analyzed. Analyses only detected 4.2 mg/kg of TPHd in B-1@9.5'. As a result, total TPH concentrations are below the scenario criteria of 100 mg/kg.

Direct Contact and Outdoor Air Exposure

The Media-Specific Criteria for direct contact with contaminated soil or inhalation of contaminants potentially volatilized to outdoor air have been met:

1. The maximum concentrations of chemicals of concern in soil are less than or equal to those listed in Table 1 of the LTCP.
2. A site-specific risk assessment shows that chemicals of concern present in soil will not adversely affect human health.
3. Exposure to chemicals of concern is mitigated through engineering controls.

Soil samples collected from the Site have not been analyzed for naphthalene and polycyclic aromatic hydrocarbons (PAHs). According to the LTCP, testing for PAHs is only necessary where soil is affected by either waste oil or Bunker C fuel. No waste oil UST or the use of Bunker C fuel has ever been identified on the Site. As a result, testing for PAHs is not applicable.

For naphthalene testing, relative concentrations of naphthalene in soil can be conservatively estimated using published relative concentrations of naphthalene and benzene in gasoline. Taken from the SWRCB Leaking Underground Fuel Tank Guidance Manual[1], gasoline mixtures contain approximately 2% benzene and 0.25% naphthalene. Therefore, benzene concentrations can be directly substituted for naphthalene concentrations with a safety factor of eight. Given that analyses detected no benzene in soil samples analyzed during the 2011 investigation, it can be assumed that naphthalene would also not be present in soil at the Site. Further, analyses of groundwater samples obtained from MW-1 (10 feet downgradient of the source area) and B-1 (20 feet downgradient) did not detect the presence of naphthalene above the laboratory detection limit. As a result, concentrations of chemicals of concern in soil are less than those listed in Table 1 of the LTCP.

[1] Leaking Underground Fuel Tank Guidance Manual, California SWRCB, September 2012.

As discussed previously, Fugro's investigation in January 2011, detected no TPHg, TPHmo, BTEX, or MTBE in samples analyzed. Analyses only detected 4.2 mg/kg of TPHd in B-1@9.5', which is well below respective Tier 1 ESL (100 mg/kg), the ESL for a commercial/industrial land use (110 mg/kg) and the ESL for direct exposure by a construction/utility worker (900 mg/kg). No risk assessment is planned at this time based on the current land use of the Site; that no water supply wells are impacted; and that the chemicals of concern do not exceed respective Tier 1 ESL criteria.

Because the Site is completely hardscaped, there is little to no potential for direct human contact with Site soil or for offsite wind dispersion of soil. Therefore, direct contact exposure pathways (i.e., ingestion, dermal contact, and inhalation of particulates) with soil are considered incomplete or insignificant and are expected to remain the same for the foreseeable future.

CLOSING STATEMENT

This report provides a CSM that assesses the nature and extent of petroleum hydrocarbons impacts at this former UST site. In Fugro's professional opinion, the Site has been adequately characterized and we recommend no further investigation or remedial action for the Site at this time. The primary source of hydrocarbon contamination have been removed. Residual concentrations of TPHd in soil and benzene in groundwater are below respective Tier 1 ESL criteria, and therefore do not pose a significant threat to human health or the environment.

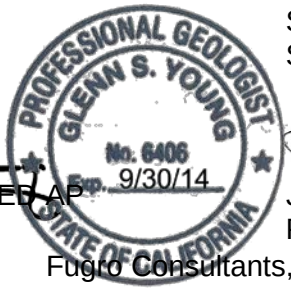
We believe the findings presented herein satisfy the General and Media-Specific Criteria listed in the Low-Threat Closure Policy adopted by the State Water Resources Control Board (Resolution No. 2012-0062). Therefore, on behalf of City of Oakland, Fugro respectfully requests case closure for the City's Corporation Yard No. 4, located at 5921 Shepherd Canyon Road, in Oakland, California.

On behalf of the City of Oakland, Fugro requests ACEH review and concurrence with these findings. Please contact Mr. Gopal Nair at (510) 238-6361 or the undersigned at (510) 268-0461 if you have any questions.

Sincerely,

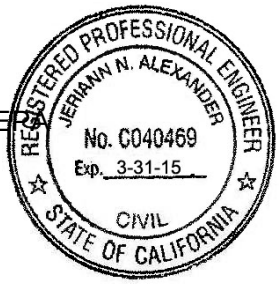
FUGRO CONSULTANTS, INC.

Karen A. Emery, P.G.
Senior Geologist
SCA Environmental, Inc.



Glenn S. Young, P.G., LEED AP
Principal Geologist
SCA Environmental, Inc.

Jeriann Alexander, P.E., REA
Principal Engineer
Fugro Consultants, Inc.



KAE/GSY/JNA:

Attachments:

Table 1 – Summary of Analytical Results - Soil
Table 2 – Summary of Analytical Results - Grab Groundwater
Plate 1 – Vicinity Map
Plate 2 – Site Plan
Plate 3 – Summary of Known or Registered Wells
Appendix A – Logs of Borings
Appendix B – City Plot Plan
Appendix C – Conceptual Exposure Model
Appendix D – DWR & ACPWA Well Survey Reports (Hardcopy Only)

TABLES

Table 1
Summary of Analytical Results - Soil
City of Oakland Corporation Yard #4
5921 Shepherd Canyon Road
Oakland, California

		Sample ID									**Regulatory Screening Criteria**	
Analyte	Units	IA1	IA2	IA5	IA3	IA4	SCI-1@13.5'	SCI-1@19'	B-1 @ 9.5'	B-2 @ 24'	Tier 1	Commercial/Industrial Land Use
Sample Depth	feet	11	11	3.0	8.0	3.0	13.5	19	9.5	24		
Sample Date		5/3/1990	5/3/1990	5/3/1990	5/3/1990	5/3/1990	3/5/1999	3/5/1999	1/27/2011	2/4/2011	(Unrestricted)	(Groundwater is a Current of Potential Drinking Water Resource)
Sample Location		Below Gasoline UST	Below Gasoline UST	Below Gasoline Piping	Below Diesel UST	Below Diesel Piping	UST Excavation Area		20' DG of UST Area	70' DG of UST Area		
Hydrocarbons												
TPHg	mg/kg	**60**	**790**	ND	--	--	<1.0	<1.0	<1.1	<1.1	100	500
TPHd	mg/kg	--	--	--	**62**	**190**	**21**	**21**	**4.2** Y	<0.99	100	110
TPHmo	mg/kg	--	--	--	ND	**24**	**14**	**15**	<5.0	<5.0	100	500
Volatile Organic Compounds												
MTBE	µg/kg	--	--	--	--	--	<20	<20	<22	<21	23	23
Benzene	µg/kg	**6.0**	**27**	ND	--	--	<5.0	<5.0	<5.4	<5.3	44	44
Toluene	µg/kg	**11**	**86**	ND	--	--	<5.0	<5.0	<5.4	<5.3	2,900	2,900
Ethylbenzene	µg/kg	**2.4**	**16**	ND	--	--	<5.0	<5.0	<5.4	<5.3	3,300	3,300
Total Xylenes	µg/kg	**12**	**150**	ND	--	--	<5.0	<5.0	<5.4	<5.3	2,300	2,300

Notes:
TPHg = Total Petroleum Hydrocarbons as gasoline
TPHd = Total Petroleum Hydrocarbons as diesel
TPHmo = Total Petroleum Hydrocarbons as motor oil
DG = Downgradient
mg/kg = Milograms per kilogram
µg/kg = Micrograms per kilogram
Detected Concetrations shown in **Bold**
< = Not detected above laboratory detection limit
ND = Not Detected
-- = Not Analyzed
Y = Sample exhibits chromatographic pattern which does not resemble standard
ESL = Environmental Screening Level, San Francisco Bay Regional Water Quality Control Board. User's Guide: Derivation and Application of Environmental Screening Levels, Interim Final December 2013
User's Guide: Derivation and Application of Environmental Screening Levels, Interim Final December 2013

Exceeds Tier 1 ESL

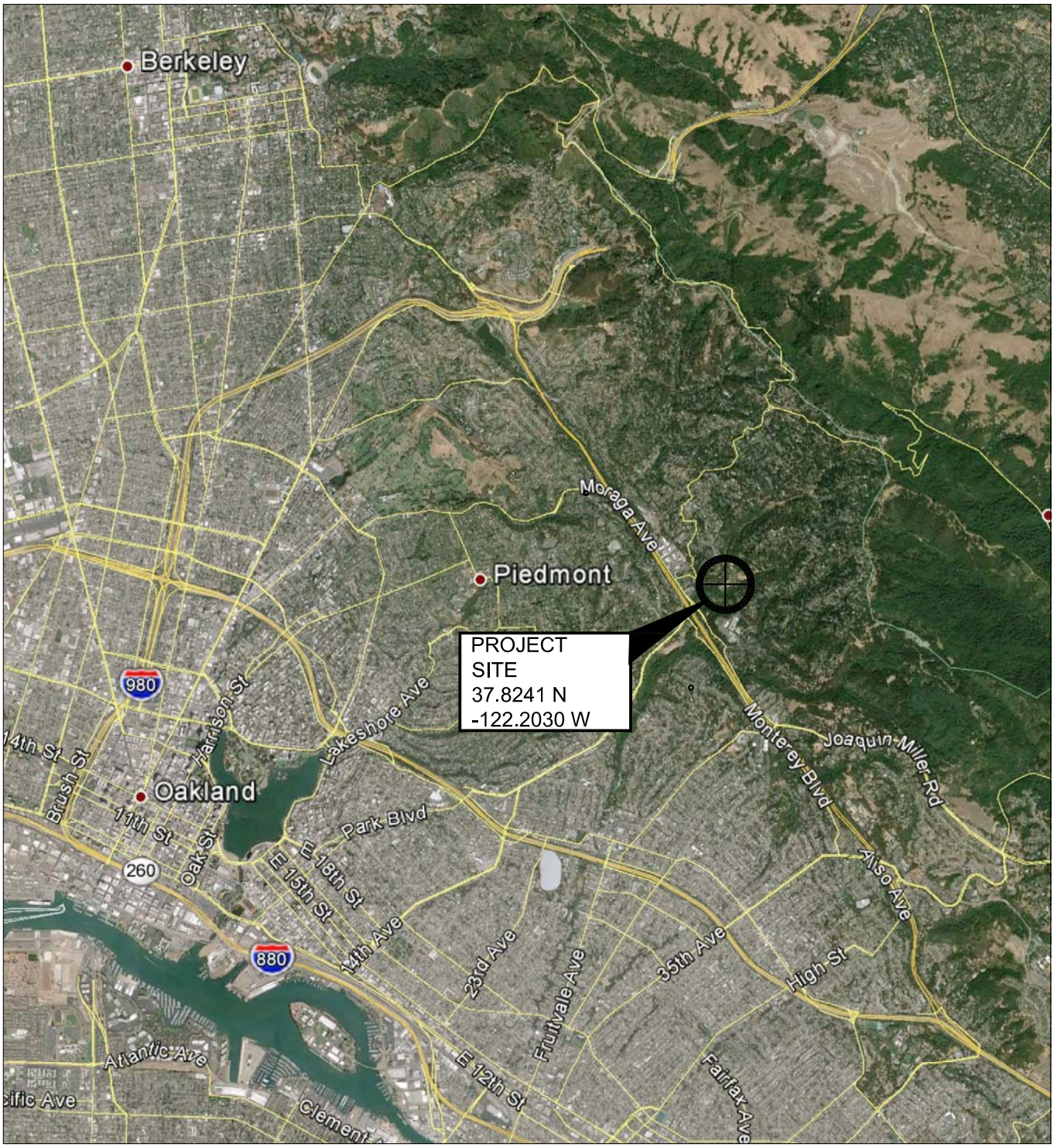
Table 2
Summary of Analytical Results - Groundwater
City of Oakland Corporation Yard #4
5921 Shepherd Canyon Road
Oakland, California

		Sample ID					Screening Criteria	
Analyte	**Units**	**SCI-1**	**MW-1**	**MW-1**	**MW-1**	**B-1**	**Tier 1**	**Commercial/Industrial Land Use**
Date		3/5/1999	6/10/1999	9/10/1999	1/27/2011	1/27/2011	(Unrestricted)	(Evaluation of Potential Vapor Intrusion)
Sample Type		Grab	Well	Well	Well	Grab		
Sample Location		UST Excavation Area	10' DG of UST Area	10' DG of UST Area	10' DG of UST Area	20' DG of UST Area		
Petroleum Hydrocarbons								
TPHg	µg/L	**140**	**8,000**	**210**	<50	<50	100	NE
TPHd	µg/L	**150**	**1,100**	**360**	<50	<50	100	NE
TPHmo	µg/L	<310	<300	<280	<300	<300	100	NE
Volatile Organic Compounds								
MTBE	µg/L	<2.0	<40	<0.5	<0.5	<0.5	5.0	100,000
Benzene	µg/L	**12**	**1,300**	**110**	**0.66**	<0.5	1.0	270
Toluene	µg/L	**1.8**	**2,000**	**8.8**	<0.5	<0.5	40	NE
Ethylbenzene	µg/L	**4.0**	**240**	**32**	<0.5	<0.5	30	3,100
Total Xylenes	µg/L	**6.9**	**1,350**	**5.8**	<1.0	<1.0	20	NE
Naphthalene	µg/L	--	--	--	<2.0	<2.0	6.1	1,600
Lead Scavengers								
1,2-Dichloroethane	µg/L	--	--	--	<0.5	<0.5	0.5	1,000
1,2-Dibromoethane	µg/L	--	--	--	<0.5	<0.5	0.05	770

Notes:
TPHg = Total Petroleum Hydrocarbons as gasoline
TPHd = Total Petroleum Hydrocarbons as diesel
TPHmo = Total Petroleum Hydrocarbons as motor oil
MTBE = Methyl tert Butyl Ether
DG = Downgradient
µg/L = micrograms per liter
Detected Concentrations shown in **Bold**
< = Not detected above laboratory detection limit
ND = Not Detected
-- = Not Analyzed
NE= Not established
ESL = Environmental Screening Level, San Francisco Bay Regional Water Quality Control Board
User's Guide: Derivation and Application of Environmental Screening Levels, Interim Final December 2013

Exceeds Tier 1 ESL

PLATES



BASE MAP SOURCE: Google Earth Pro (2014), Aerial photgraph.

NORTH
0 5000
FEET

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VICINITY MAP

5921 Shepherd Canyon Road
Oakland, California

PLATE 1

BASE MAP SOURCE: Aerial photograph from Google Earth Pro 2010.

LEGEND

MW-1 Location of Monitoring Well

B-2 Location of Boring

NORTH

0 60

FEET

SITE PLAN

5921 Shepherd Canyon Road
Oakland, California

PLATE 2

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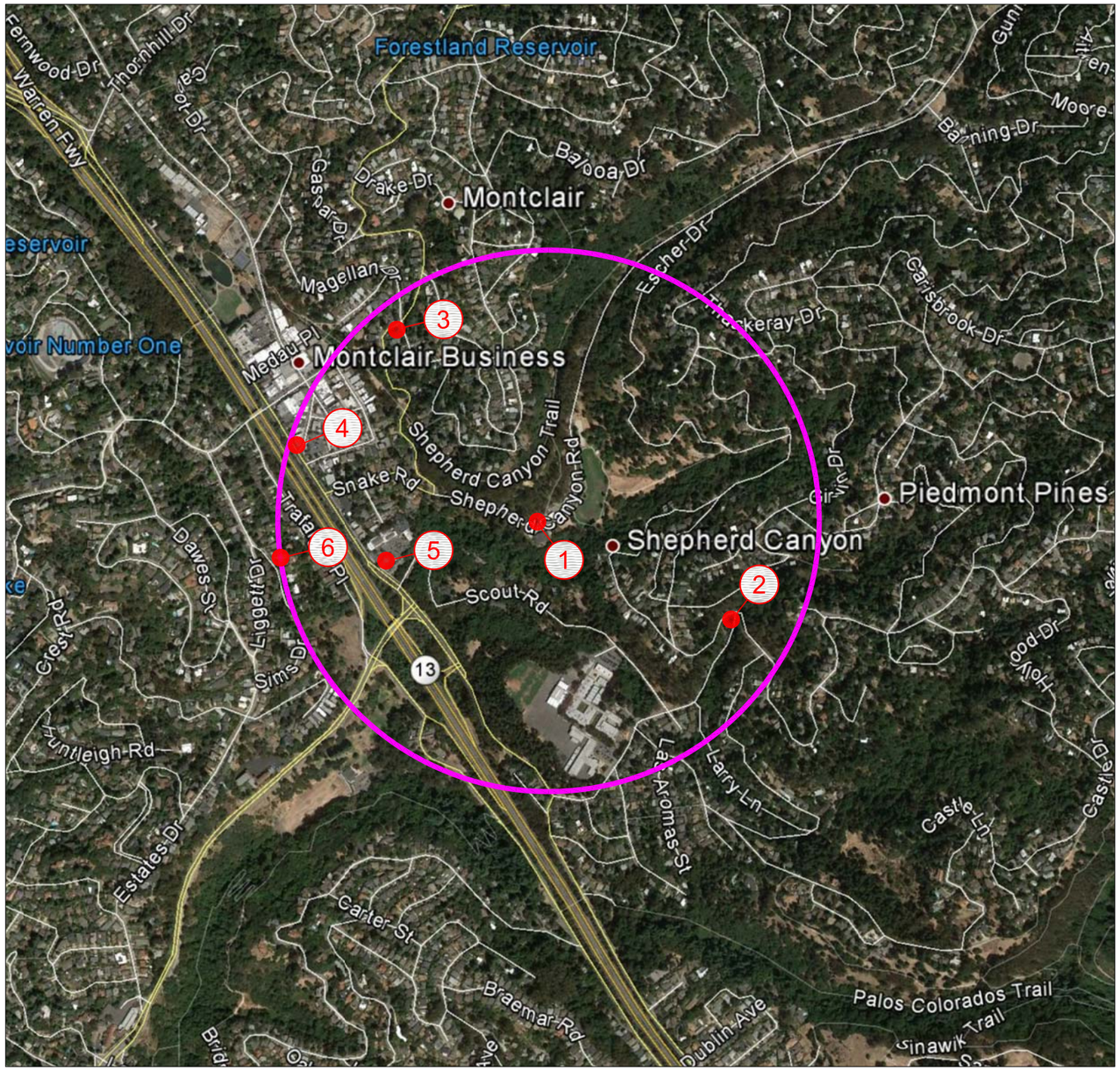


BASE MAP SOURCE: Google Earth Pro (2013), Aerial photograph.

Table 1
Summary of Registered Wells and Uses
City of Oakland Corporation Yard No. 4
Oakland, California

Key ID	Address	No. of Wells	Reported Use	Depth, Screen Interval	Comments
1	5921 Shepherd Canyon Rd., Oakland	1	Monitoring	25 ft, screened between 15-25ft	Site
2	*	1	Cathodic Protection	120 ft, screened between 95-120ft	1,563 ft SE, Downgradient
3	*	1	Cathodic Protection	120 ft, screened between 95-120ft	1770 ft NW, Upgradient
4	*	4	Monitoring	Varies, screened between 5-25ft & 5-30ft	Site Closed, Wells Destroyed
5	*	4	Monitoring	Varies, screened between 11-31ft & 30-50ft	Site Closed, Wells Destroyed
6	*	1	Unknown	32 ft, unknown screen interval	1,950 ft W, Cross-gradient

LEGEND

- Approximate Well Location
- 1 — Key ID
- 2000 ft radius
- * — Confidential Information

NORTH
0 1000 2000
FEET

SUMMARY OF WELL SURVEY
5921 Shepherd Canyon Road
Oakland, California

PLATE 3

APPENDIX A
LOGS OF BORINGS

Project Name & Location: Oakland Corporation Yard No. 4, Oakland, California	Ground Surface Elevation: --
	Elevation Datum: --
Drilling Coordinates: --	Start: Date 3/5/99 Time 0930 / Finish: Date 3/5/99 Time 1130
Drilling Company & Driller: BAE / Tom	Drilling Fluid: N/A / Hole Diameter: 6 Inches
Rig Type & Drilling Method: C57 - 6" HSA	
Sampler Type(s): A) 18" California Drive Sampler w/Stainless Steel Tubes B) C)	Logged By: John Rasmussen
Sampling Method(s): A) 140# Downhole Sampler B) C)	Backfill Method: Tremmie Grout / Date: 3/5/99

Elevation (feet) / Depth (feet)	Sample Depth/No.	Sampler Type	Blows/6 inches of Pressure	OVM (ppm)	Sample Interval	Graphic Log	SOIL DESCRIPTIONS GROUP NAME (GROUP SYMBOL) color, consistency/density, moisture condition, other descriptions (Local Name or Material Type)	LABORATORY DATA Moisture Content (%)	Dry Density (pcf)	Other
0							**ASPHALTIC CONCRETE (2" thick)** **CEMENT CONCRETE (10" thick)**			
							WELL GRADED GRAVEL WITH SAND (GW) beige-tan and gray, loose to medium dense, moist (fill)			
	3.5	A	4	0						
5										
							SILTSTONE light brown, intensely fractured, low hardness, friable, deeply weathered			
	9.0	A	50/4"	0						
10							becomes less fractured and less weathered with depth			
	13.5	A	50/5"	0						
15							▽ groundwater encountered at 18.0 feet bgs			
	19.0	A	50/4"	0						
20							becomes gray, more shale-like			
	23.5	A	50/5"	NA			Temporary casing installed in borehole to obtain groundwater sample.			
25							Casing removed prior to tremmie grounting.			
30										

LOG OF BORING No. SCI-1

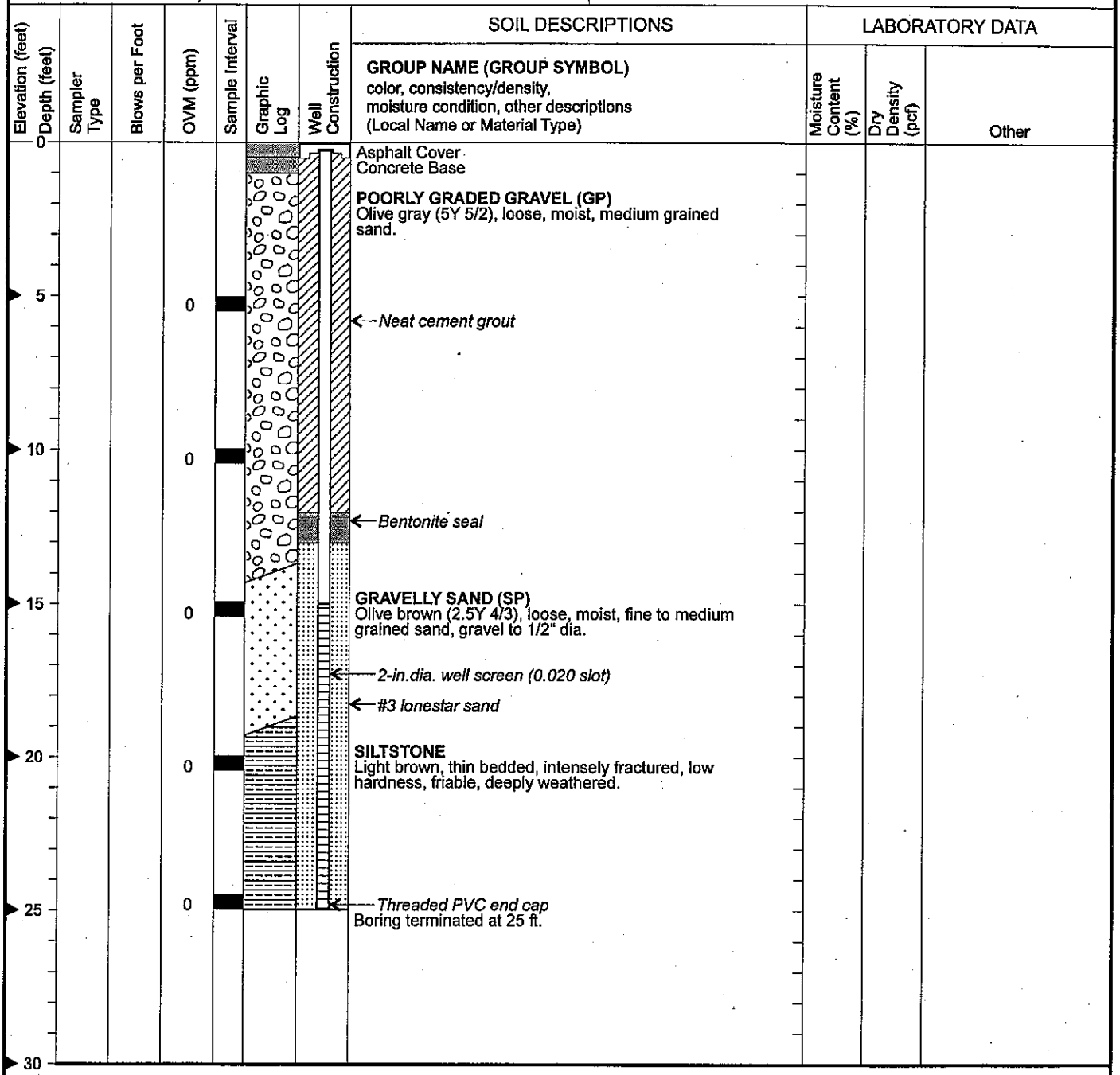
Subsurface Consultants, Inc.
Geotechnical & Environmental Engineers

OAKLAND CORPORATION YARD NO. 4
5921 SHEPHERD CANYON ROAD
OAKLAND, CALIFORNIA

JOB NUMBER	DATE	APPROVED	PLATE
272.037	03/28/99		3

BORING.CDR

Project Name & Location: OAKLAND CORPORATION YARD No.4 5921 SHEPHERD CANYON ROAD OAKLAND, CALIFORNIA	Ground Surface Elevation:
	Elevation Datum:
Drilling Coordinates:	Start: Date 6/.3/99 Time 1245 — Finish: Date 6/3/99 Time 1500
Drilling Company & Driller: BAEI / Eric Santellen	
Rig Type & Drilling Method: CME-75 Hollow Stem Auger	Drilling Fluid: N/A — Hole Diameter: 8 inches
Sampler Type(s): A) B) C)	Logged By: John Wolfe
Sampling Method(s): A) B) C)	Backfill Method: Monitoring Well — Date: 6/3/99



LOG OF BORING No. MW-1

SCI Subsurface Consultants, Inc. Geotechnical & Environmental Engineers	OAKLAND CORPORATION YARD No.4 5921 SHEPHERD CANYON ROAD OAKLAND, CALIFORNIA		PLATE 3
	JOB NUMBER 272.037	DATE 11/99	APPROVED GN

MW-1.CDR

City of Oakland
Project No. 04.74100012

DEPTH, ft	MATERIAL SYMBOL	SAMPLE NO.	SAMPLER TYPE	SAMPLER BLOW COUNT/ PRESSURE	OVM/PID (ppm)	LOCATION: SURFACE EL: ft +/- (rel. datum) MATERIAL DESCRIPTION	OTHER TESTS
						12 inch Asphalt / Concrete Pavement	
1		1			1.5	SILT with gravel (ML): brown, moist, medium sub-rounded to angular gravel, no odor or staining	
2							
3							
4							
5		5			1.5		
6						SILTSTONE: light brown, dry, hard, fractured, no odor or staining	
7							
8							
9							
10		9.5			2.5		
11							
12							
13						- color change to gray	
14		13.5			1		

Continued

BORING DEPTH: 25.0 ft
DEPTH TO WATER: 23.0 ft
BACKFILL: Grout
COMPLETION DATE: January 27, 2011
NOTES: 1. Terms and symbols defined on Plate A-1.

DRILLING METHOD: 2-in. dia. Direct Push
HAMMER TYPE: Direct Push
RIG TYPE: Geo Probe 7822DT
DRILLED BY: VTS
LOGGED BY: M D'Anna

LOG OF B-1
Oakland Corporation Yard 4
Oakland, California

DEPTH, ft	MATERIAL SYMBOL	SAMPLE NO.	SAMPLER TYPE	SAMPLER BLOW COUNT/ PRESSURE	OVM/PID (ppm)	LOCATION: SURFACE EL: ft +/- (rel. datum) MATERIAL DESCRIPTION	OTHER TESTS
16		15.5			0.5		
17							
18							
19						- color change to gray brown	
20		19.5			0.5		
21							
22							
23						▼	
24		24			1.5		
25						- Bottom of Boring at 25 feet	
26							
27							
28							
29							

BORING DEPTH: 25.0 ft
DEPTH TO WATER: 23.0 ft
BACKFILL: Grout
COMPLETION DATE: January 27, 2011
NOTES: 1. Terms and symbols defined on Plate A-1.

DRILLING METHOD: 2-in. dia. Direct Push
HAMMER TYPE: Direct Push
RIG TYPE: Geo Probe 7822DT
DRILLED BY: VTS
LOGGED BY: M D'Anna

LOG OF B-1
Oakland Corporation Yard 4
Oakland, California

DEPTH, ft	MATERIAL SYMBOL	SAMPLE NO.	SAMPLER TYPE	SAMPLER BLOW COUNT/ PRESSURE	OVM/PID (ppm)	LOCATION: SURFACE EL: ft +/- (rel. datum) MATERIAL DESCRIPTION	OTHER TESTS
		0.5			0	8 inch Asphalt / Concrete Pavement	
						SILT with gravel (ML): brown, dry, medium to coarse, sub-rounded to sub-angular gravel, no odor or staining	
5		5			0		
						SILTSTONE: brown, dry, weathered, no odor or staining	
10		10			0		
		13.5			0		
15		15			0		
		16.5			0		
		18			0		
		19.5			0		

Continued

BORING DEPTH: 38.0 ft
DEPTH TO WATER: Not Encountered
BACKFILL: Grout
COMPLETION DATE: February 4, 2011
NOTES: 1. Terms and symbols defined on Plate A-1.

DRILLING METHOD: 2-in. dia. Direct Push
HAMMER TYPE: Direct Push
RIG TYPE: Geo Probe 7822DT
DRILLED BY: VTS
LOGGED BY: M D'Anna

LOG OF B-2
Oakland Corporation Yard 4
Oakland, California

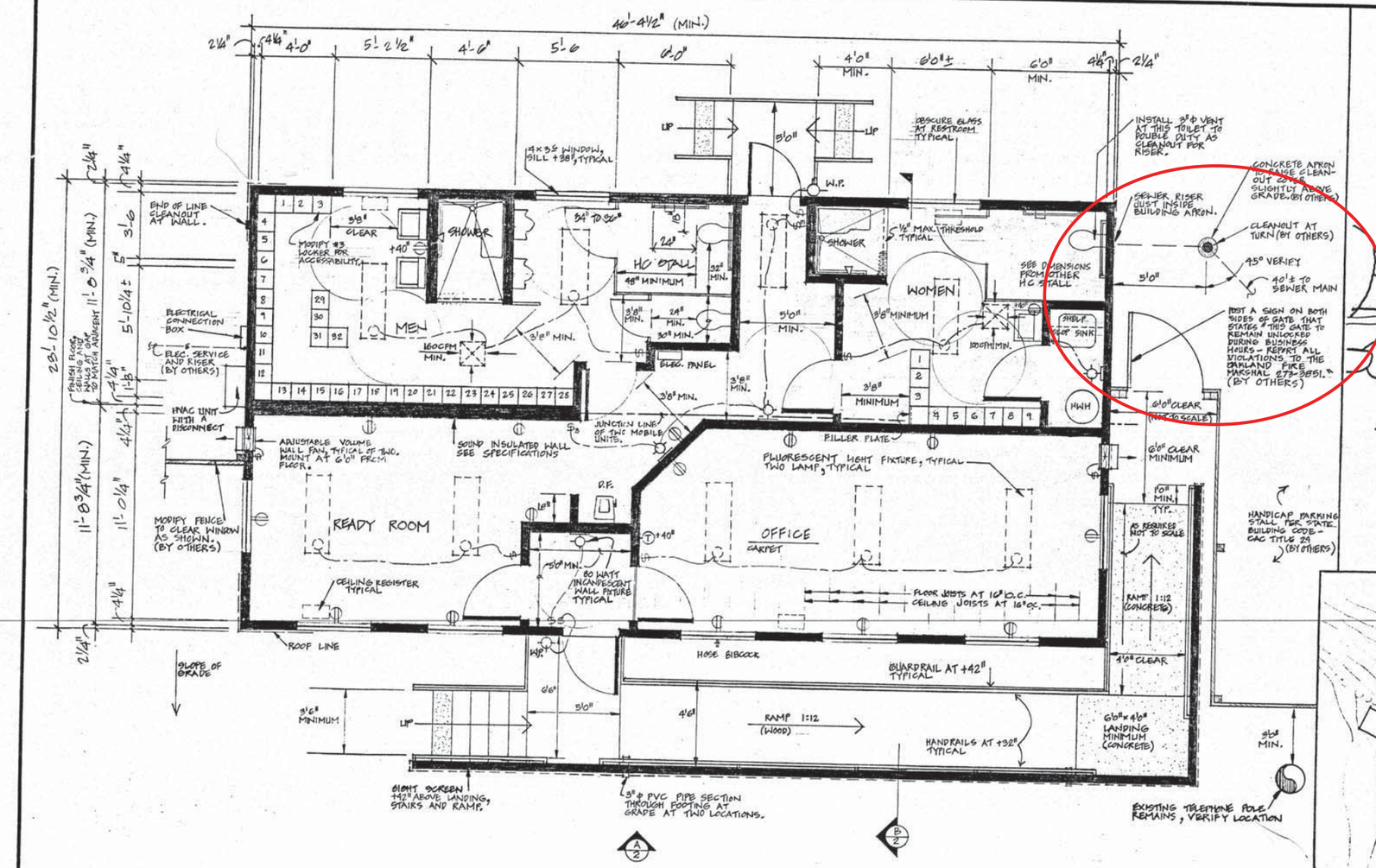
DEPTH, ft	MATERIAL SYMBOL	SAMPLE NO.	SAMPLER TYPE	SAMPLER BLOW COUNT/ PRESSURE	OVM/PID (ppm)	LOCATION: SURFACE EL: ft +/- (rel. datum) MATERIAL DESCRIPTION	OTHER TESTS
						- color change to dark brown	
		24			0	- color change to dark brown to gray brown, some iron oxide staining	
		24.5			0		
25						- color change to gray brown	
		27			0		
		28			0		
30						- no iron oxide staining	
35						- Bottom of Boring at 38 feet bgs	

BORING DEPTH: 38.0 ft
DEPTH TO WATER: Not Encountered
BACKFILL: Grout
COMPLETION DATE: February 4, 2011
NOTES: 1. Terms and symbols defined on Plate A-1.

DRILLING METHOD: 2-in. dia. Direct Push
HAMMER TYPE: Direct Push
RIG TYPE: Geo Probe 7822DT
DRILLED BY: VTS
LOGGED BY: M D'Anna

LOG OF B-2
Oakland Corporation Yard 4
Oakland, California

APPENDIX B
CITY PLOT PLAN

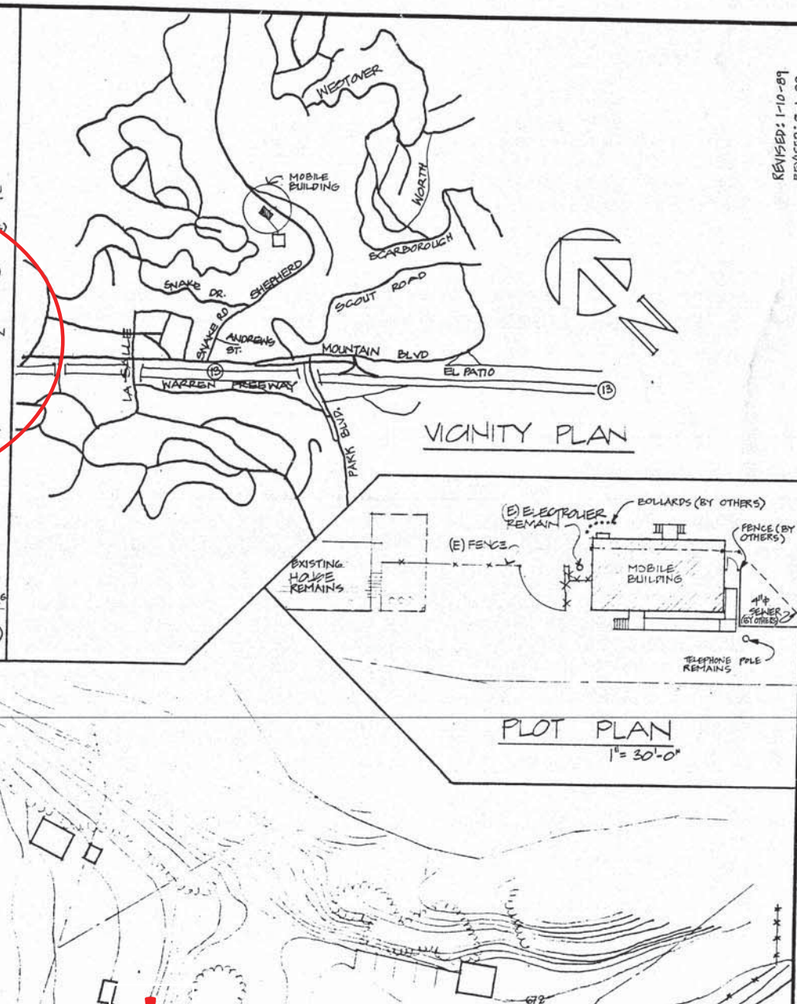


FLOOR PLAN 1/4" = 1'-0"

DEDUCTIVE BIDS:

ON THE BID PROPOSAL FORM STATE THE DEDUCTIONS FROM THE BASE BID FOR THE FOLLOWING:

- ELIMINATION OF HANDICAP ACCESS CONSTRUCTION & FURNISHING
- NO AIR CONDITIONING, JUST HEATING



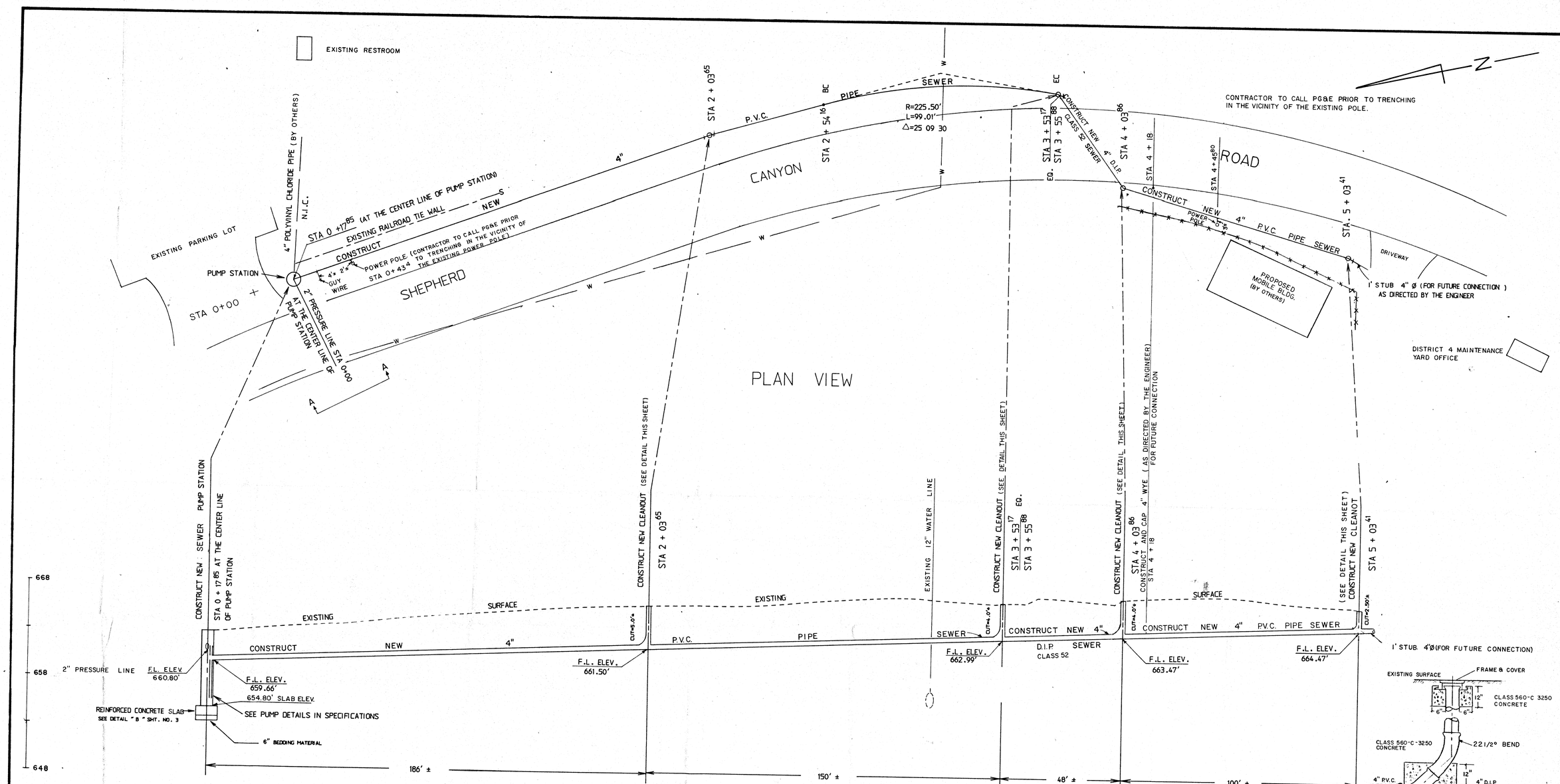
Approximate UST Location

REVISED: 1-10-89
REVISED: 8-1-88

DATE: 7-25-86
DRAWN BY: CPT & TIM
CHECKED BY:
DRAWING NO. 2B4P22
COST CENTER NO.
PROJECT NO. 2B4P22
SHEET NO. OF 3

OPW-CORP. YARD #4
MOBILE BUILDING INSTALLATION
8721 SHEPHERD CANYON ROAD, OAKLAND, CA

CITY OF OAKLAND
OFFICE OF GENERAL SERVICES



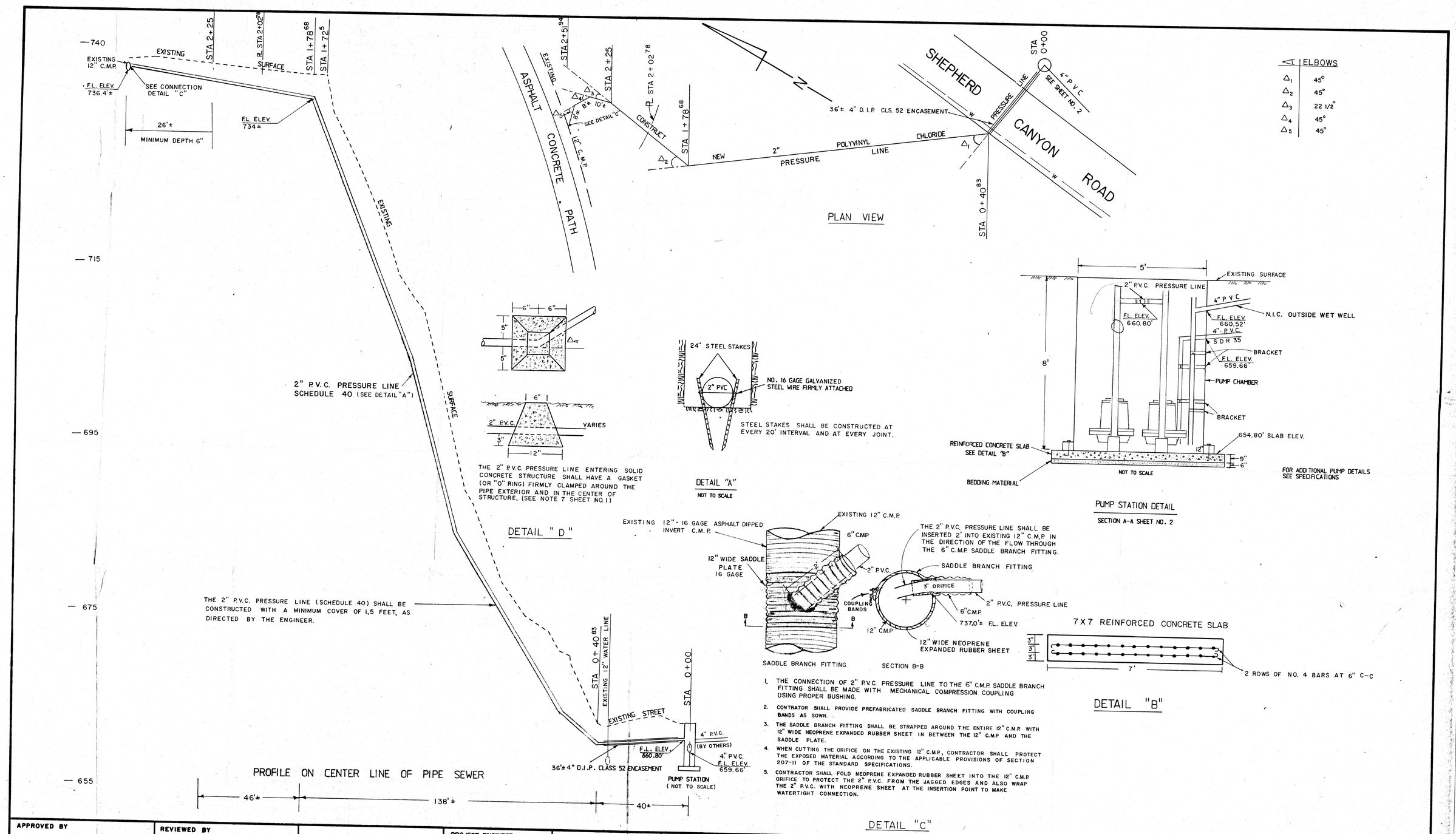
APPROVED BY	REVIEWED BY		PROJECT ENGINEER	DESIGNED KG	REVISION	DATE	BY	REFERENCE
DEPUTY DIRECTOR OF PUBLIC WORKS	CONSTRUCTION ENGINEER							
RECOMMENDED BY	REVIEWED BY		DESIGN ENGINEER	DRAWN KK				
PLANNING AND DESIGN ENGINEER				CHECKED				

CITY OF OAKLAND
ENGINEERING AND DESIGN SERVICES DEPARTMENT
CITY PROJECT NO. G53910

PLANS FOR THE CONSTRUCTION OF SANITARY SEWER, SEWER PUMP AND PRESSURE LINE IN THE VICINITY OF SHEPHERD CANYON PARK AND DISTRICT 4 MAINTENANCE YARD.

SCALE:
HOR: 1" = 20'
VERT: 1" = 5'
DATE:

SHEET NO. 2 OF 4



APPROVED BY	REVIEWED BY		PROJECT ENGINEER	DESIGNED K.G.	REVISION	DATE	BY	REFERENCE
DEPUTY DIRECTOR OF PUBLIC WORKS	CONSTRUCTION ENGINEER							
RECOMMENDED BY	REVIEWED BY		DESIGN ENGINEER	DRAWN K.G.				
PLANNING AND DESIGN ENGINEER				CHECKED ALFREDO R. POHL				

CITY OF OAKLAND
ENGINEERING AND DESIGN SERVICES DEPARTMENT
CITY PROJECT NO. G53910

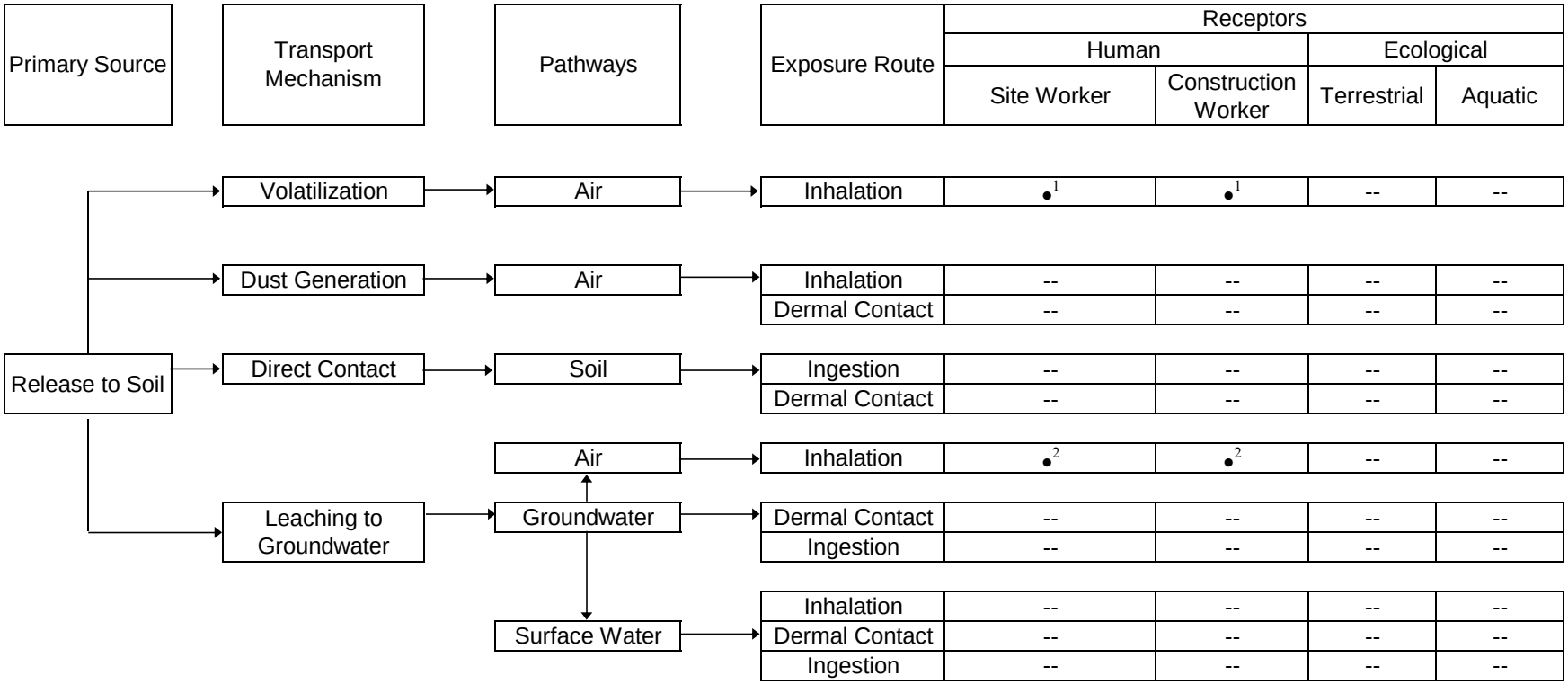
PLANS FOR THE CONSTRUCTION OF SANITARY SEWER, SEWER PUMP AND PRESSURE LINE IN THE VICINITY OF SHEPHERD CANYON PARK AND DISTRICT 4 MAINTENANCE YARD

SCALE: HOR: 1"= 20' VERT: 1= 5' DATE:

SHEET NO. 3 OF 4

APPENDIX C
CONCEPTUAL EXPOSURE MODEL

Conceptual Exposure Model for Human Health and Ecological Receptors
City of Oakland Corporation Yard #4
5921 Shepherd Canyon Road, Oakland, California



Primary Source	Transport Mechanism	Pathways	Exposure Route	Receptors			
				Human		Ecological	
				Site Worker	Construction Worker	Terrestrial	Aquatic
Release to Soil	Volatilization	Air	Inhalation	•[1]	•[1]	--	--
	Dust Generation	Air	Inhalation	--	--	--	--
			Dermal Contact	--	--	--	--
	Direct Contact	Soil	Ingestion	--	--	--	--
			Dermal Contact	--	--	--	--
	Leaching to Groundwater	Air	Inhalation	•[2]	•[2]	--	--
		Groundwater	Dermal Contact	--	--	--	--
			Ingestion	--	--	--	--
		Surface Water	Inhalation	--	--	--	--
			Dermal Contact	--	--	--	--
			Ingestion	--	--	--	--

LEGEND

- • Pathway potentially complete.
- -- Pathway is not complete.

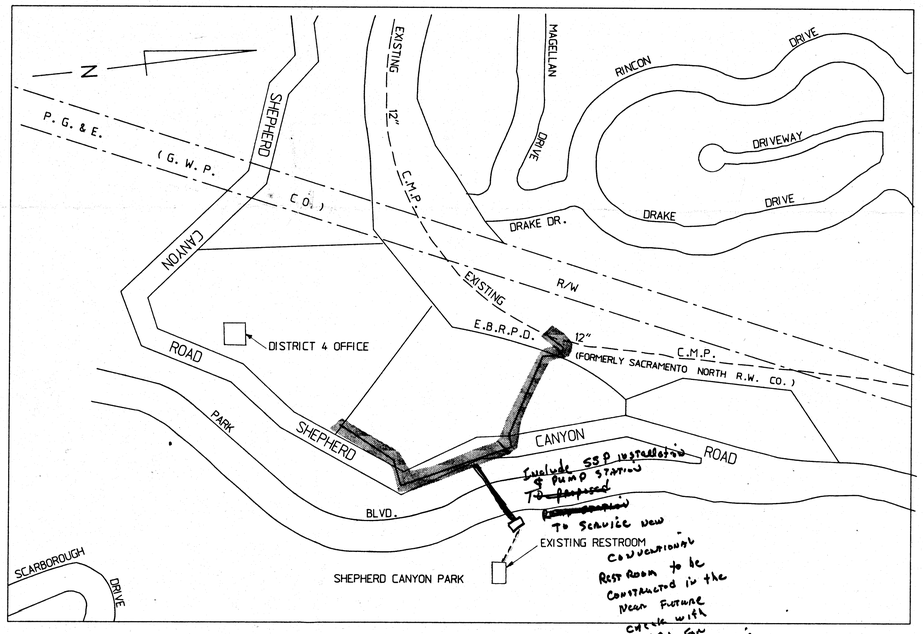
[1] Primary Source has been removed. Based on the results of recent site investigations, groundwater impacts are stable and decreasing, and are localized to 10 ft downgradient of the source area, which is covered by a paved parking lot.

[2] Benzene concentrations are below Tier 1 ESL criteria (44 µg/L) and ESL for Potential Vapor Intrusion Concern for both residential and commercial land uses (27 µg/L).

PLANS FOR THE CONSTRUCTION OF SANITARY SEWER, SEWER PUMP AND PRESSURE LINE IN THE VICINITY OF SHEPHERD CANYON PARK AND DISTRICT 4 MAINTENANCE YARD

GENERAL NOTES:

1. THE LOCATION AND SIZES OF MAJOR UNDERGROUND FACILITIES AND UTILITIES SHOWN HEREON ARE SCHEMATIC IN NATURE USING INFORMATION FURNISHED BY THE RESPECTIVE AGENCIES. THE CONTRACTOR IS RESPONSIBLE FOR VERIFYING ALL DATA WITH RESPECTIVE AGENCIES AND TAKING PROPER PRECAUTIONS TO PROTECT AND AVOID THE EXISTING FACILITIES AND UTILITIES.
2. THE METHOD OF EXCAVATION, SHORING, AND DEWATERING FOR THE SEWER PUMP STATION SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR, SUBJECT TO THE REVIEW OF THE ENGINEER.
3. THE CONTRACTOR SHALL EXERCISE PRECAUTION WHILE WORKING ON THE SITE. ANY DAMAGE TO THE EXISTING FACILITIES (RETAINING WALL ETC.) SHALL BE REPAIRED AT THE CONTRACTOR'S EXPENCE.
4. THE EXCESS EXCAVATED MATERIAL SHALL BE THE PROPERTY OF THE CONTRACTOR AND SHALL BE DISPOSED OFF THE SITE OF WORK AT CONTRACTOR'S EXPENCE.
5. THE 4" P.V.C. SHALL BE SDR 35 OF 20' LENGTHS WITH GASKET JOINTS AND THE 2" P.V.C. PRESSURE LINE SHALL BE SCHEDULE 40 OF 20' LENGTHS WITH SOLVENT WELD JOINTS. THE P.V.C. PLASTIC PIPE SHALL CONFORM TO THE REQUIREMENTS OF SECTION 207-17 OF THE SPECIFICATIONS. THE P.V.C. PLASTIC PIPE SHALL USE CLASS I BEDDING IN ACCORDANCE WITH ASTM D-2321.
6. THE 2" P.V.C. PRESSURE LINE SHALL BE ANCHORED AT EVERY 20' INTERVAL, AND AT EVERY JOINT AS PER DETAIL "A" SHEET NO. 3. THE COST OF CONSTRUCTION OF ANCHORS SHALL BE INCLUDED IN THE PRICE OF 2" P.V.C. AND NO ADDITIONAL PAYMENT SHALL BE MADE THEREFORE.
7. THE 2" P.V.C. PRESSURE LINE SHALL BE CONCRETE ANCHORED AT EVERY HORIZONTAL ANGLE POINT AS PER DETAIL "D" SHEET NO. 3. THE COST OF CONSTRUCTION OF ANCHORS SHALL BE INCLUDED IN THE PRICE OF 2"P.V.C. AND NO ADDITIONAL PAYMENT SHALL BE MADE THEREFORE.
8. THE STEEL WET WELL BASIN SHALL BE ANCHORED TO THE CONCRETE SLAB AS RECOMMENDED BY THE MANUFACTURER.
9. THE CONNECTION OF THE 2" P.V.C. PRESSURE LINE TO THE EXISTING 12" C.M.P. SEWER SHALL BE INCLUDED IN THE PRICE OF THE 2" P.V.C. PIPE AND NO ADDITONAL PAYMENT SHALL BE MADE THEREFORE.
10. THE CONSTRUCTION OF 7'X7' REINFORCED CONCRETE SLAB AND 6" BEDDING MATERIAL UNDER THE SLAB SHALL BE INCLUDED IN THE PRICE OF SEWER PUMP STATION AND NO ADDITIONAL PAYMENT SHALL BE MADE THEREFORE.



LOCATION PLAN
NOT TO SCALE

LEGEND:

—— W ——	EXISTING WATER LINE
- - - - - - - -	EXISTING SURFACE
————	PROPOSE SANITARY SEWER PIPE
◯	PROPOSED SEWER PUMP STATION
○	PROPOSED MANHOLE
○	PROPOSED CLEANOUT
P.V.C.	POLYVINYL CHLORIDE PIPE
D.I.P.	DUCTILE IRON PIPE
N.I.C.	NOT IN CONTRACT
C.M.P.	CORRUGATED METAL PIPE

TERRY E. ROBERTS
DIRECTOR OF PUBLIC WORKS

APPROVED BY: DEPUTY DIRECTOR OF PUBLIC WORKS	REVIEWED BY: CONSTRUCTION ENGINEER		PROJECT ENGINEER: A.H. POHL C17641	DESIGNED: KALPANA GANDHI	REVISION	DATE	BY	REFERENCE
RECOMMENDED BY: PLANNING AND DESIGN ENGINEER	REVIEWED BY:		DESIGN ENGINEER: Ken Wong C23514	DRAWN: KALPANA GANDHI				
				CHECKED: A.H. POHL				

CITY OF OAKLAND
ENGINEERING AND DESIGN SERVICES DEPARTMENT
CITY PROJECT NO. G53910

TITLE SHEET

APPENDIX D
DWR & ACPWA WELL SURVEY REPORTS
(HARDCOPY ONLY)