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March 31, 2011

Mr. Jerry Wickham, PG
Alameda County
Department of Environmental Health Services
1131 Harbor Bay Parkway, Suite 250
Alameda, California 94502-6577

Subject: **Fuel Leak Case#RO0002996**
Site Address: 316 38th Street, Oakland, CA

Dear Mr. Wickham:

SOMA's "Workplan for Additional Soil and Groundwater Investigation" for the subject property has been uploaded to the State's GeoTracker database and Alameda County's FTP site for your review.

Thank you for your time in reviewing our report. If you have any questions or comments, please call me at (925) 734-6400.

Sincerely,

Mansour Sepehr, Ph.D., PE
Principal Hydrogeologist

REGISTERED PROFESSIONAL ENGINEER
MANSOUR SEPEHR
No. C042928
Exp. 3-31-12
CIVIL
STATE OF CALIFORNIA

Enclosure

cc: Mr. John Kortum, Esq., Archer Norris
Mr. Peter McGaw, Esq., Archer Norris
Mr. Albert Cohen, Esq., Loeb & Loeb, LLC

Workplan for Additional Soil and Groundwater Investigation

316 38th Street
Oakland, California
Case RO0002996

March 31, 2011

Project 2720

Prepared for
Mr. Earl Thompson, Jr.
Executor for the Estate of Earl Thompson, Sr.

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PERJURY STATEMENT

Site Location: 316 38th Street, Oakland, California

"I declare under penalty of perjury, that the information and/or recommendations contained in the attached document or report is true and correct to the best of my knowledge".

for Earl Thompson, Jr.
75 Court Street
Quincy, CA 95971-9444
Owner

CERTIFICATION

SOMA Environmental Engineering, Inc. has prepared this report on behalf of Mr. Earl Thompson, Jr., Executor for the Estate of Earl Thompson, Sr., property owner of 316 38th Street, Oakland, California (Thompson Property) in accordance with Alameda County Environmental Health Services correspondence dated December 2, 2010.

Mansour Sepehr, PhD, PE
Principal Hydrogeologist

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1. INTRODUCTION

SOMA Environmental Engineering, Inc. (SOMA) has prepared this workplan on behalf of Mr. Earl Thompson, Jr., Executor for the Estate of Earl Thompson, Sr., property owner of 316 38th Street in Oakland, California (Thompson Property). This workplan was prepared at the request of Alameda County Environmental Health Services (ACEHS) made in correspondence dated December 2, 2010.

Based on results of the August 2010 soil and groundwater sampling, the following data gaps in site characterization data were identified (October 18, 2010 report):

1. Upgradient (northern) extent of contamination was not defined.
2. Vertical extent of contamination in the vicinity of borings LDP-1 and LDP-2 was not defined.

ACEHS concurred with identification of these data gaps and requested preparation of this workplan for additional site investigation to address them.

ACEHS also requested inclusion in the workplan of a proposal for installing additional monitoring wells for the site, because of the concern that existing groundwater monitoring wells (GW-5, GW-6A, and LFR-4) do not effectively establish the groundwater flow gradient at the site. However, based on SOMA's conversation with ACEHS, no additional wells are being proposed at this time because the extent of contamination has not been defined fully. Instead, results of this proposed investigation will be utilized to better determine the locations of any future monitoring wells.

1.1 Site Vicinity

The site is located in an area of primarily commercial and residential property uses (Figure 1). Figure 2 shows locations of decommissioned underground storage tanks (USTs), historical and new boreholes, and wells in the vicinity. Properties in the vicinity of the Thompson Property are primarily commercial and residential. Reportedly, six USTs were previously located at or near the nearby Glovatorium site located upgradient from the subject site at 3820 Manila Avenue (Glovatorium Property). The Glovatorium Property location is shown in Figures 1 and 2. Two USTs associated with the Glovatorium Property were located under the sidewalk near 316 38^{th} Street and four USTs were located inside the Glovatorium building. Capacities of the six Glovatorium USTs have been reported as ranging from 800 to 5,000 gallons. They reportedly contained Stoddard solvent (TPH-ss), fuel oil, and possibly waste oil. It was reported that in about the late 1970s a significant release of TPH-ss occurred when a new piping system was installed. In August 1997. Volatile Organic Compounds (VOCs), principally perchlorethelyne (PCE), was reportedly used at the Glovatorium Property but not at the Thompson Property.

In June 1997, HK2 obtained City of Oakland Fire Prevention Bureau permit No. 52-97 to decommission the USTs. USTs inside the building were interconnected through a series of pipes and valves. The six Glovatorium USTs were abandoned in place by backfilling with either cement-sand slurry or pea gravel. Groundwater monitoring wells associated with the Glovatorium Property are currently monitored semi-annually. Past groundwater monitoring events have indicated the presence of VOCs and petroleum hydrocarbons (PHCs) in groundwater beneath the Glovatorium Property and adjacent properties.

Surrounding properties are primarily commercial and residential. TOSCO Marketing Company (TOSCO) is located north and upgradient of the site, at 40th Street and Broadway (3943 Broadway). This site is an active service station, which contains a number of groundwater monitoring wells. Station facilities include two 12,000-gallon double-wall gasoline underground storage tanks (USTs) in a common pit, one 520-gallon double-wall waste oil UST, two dispenser islands, one station building, and a car wash building. Historically, during the ongoing groundwater monitoring at TOSCO site, free product has been observed beneath that site. During the June 2010 groundwater monitoring event, free product was detected in one of the TOSCO wells at a thickness of 0.5 feet; the thickness of free product had increased to 1.49 feet during the December 2010 event. Due to the presence of free product upgradient of the Thompson Property, one of the objectives of this proposed investigation will be to evaluate the potential for contaminant migration from existing upgradient sources.

1.2 Site Geology/Hydrogeology

The Thompson Property (the subject site) is located on the alluvial plain between the San Francisco Bay shoreline and the Oakland hills. Surface sediments in the site vicinity consist of Holocene alluvial deposits that are representative of an alluvial fan depositional environment (Temescal Formation), which typically consists of lenses of clayey gravel, sandy silty clay, and sand-clay-silt mixtures. The pattern of stream channel deposition results in a three-dimensional network of coarse-grained sediments interspersed with finer grained silts and clays. The individual units tend to be discontinuous lenses aligned parallel to the axis of the former stream flow direction.

The sediments are predominantly fine-grained, consisting of clay, silty clay, sandy clay, gravelly clay and clayey silt. Discontinuous layers of coarse-grained sediments (clayey sand, silty sand, and clayey gravel) generally also contain relatively high percentages of silt and clay, which tend to reduce their permeability. Beneath the clay zone is a coarse-grained zone (ranging from approximately 15 to 25 feet below ground surface [bgs]), which extends throughout most of the site. This coarse grained zone is most likely the main water-bearing and contaminant transport zone.

Based on current and previous groundwater monitoring reports for wells in the vicinity of the subject site, groundwater flows from the northeast to the southwest with an approximate groundwater flow gradient ranging between 0.019 ft/ft and 0.035 ft/ft. Slug test results indicated that hydraulic conductivity of saturated sediments ranges between 1.2×10^{-4} and 6.9×10^{-4} cm/sec, which is equivalent to 0.34 ft/day to 1.95 ft/day. Using the average groundwater flow gradient of 0.027 and aquifer porosity of 0.32, the groundwater flow velocity ranges between 10.5 and 60.1 ft/year.

Based on confirmation soil borings advanced during USTs closure, the subject site is underlain with unconfined sediments as follows: primarily sand up to approximately 8 to 12 feet bgs (possibly fill material) and inorganic clays with sand to approximately 17 feet bgs around Tank #1; inorganic clays with sand to the total depth of the borings around Tank #2; and interbedded sand, clay, silt layers with gravel up to the total depth of the borings around Tank #3. During tank decommissioning, depth to water around Tank #1 was noted at approximately 12 feet bgs, Tank #2 at approximately 7 feet bgs, and Tank #3 at 7 feet bgs.

During the August 2010 investigation (drilling of borings DP-1 through DP-8), SOMA encountered refusal at 27 feet in boring DP-5, at 27 feet in boring DP-7, and at 27 feet in boring DP-8; the rest of the borings were advanced to the depth of 30 feet bgs. SOMA also encountered refusal at 21 feet (within silt) during advancement of LDP-1, at 23 feet (within well graded sand) during advancement of LDP-2, and at 22 feet (within well graded sand) during advancement of LDP-3.

2. SCOPE OF WORK

During the August 2010 site investigation (results of which are documented in the October 18, 2010 report), SOMA advanced 10 soil borings to delineate horizontal extent of the contaminant plume upgradient and downgradient of decommissioned USTs, located beneath the sidewalk adjacent to the subject site, and sampled existing groundwater monitoring wells in the vicinity of the decommissioned USTs.

As mentioned earlier, SOMA's report dated October 18, 2010 identified the following data gaps:

1. Upgradient (northern) extent of contamination was not defined.
2. Vertical extent of contamination in the vicinity of borings LDP-1 and LDP-2 was not defined.

The following scope of work was designed to address these data gaps:

Task 1: Permit acquisition, Health and Safety Plan (HASP) preparation, and subsurface utility clearance

- Task 2: Advancement of soil borings to delineate upgradient extent of contamination
- Task 3: Advancement of soil borings to delineate and verify extent of contamination near LDP-1 and LDP-2
- Task 4: Data review and report preparation

These tasks are described below.

3. FIELD ACTIVITIES

3.1 Pre-Investigation Activities

Upon approval of this workplan, and prior to initiating field activities, all appropriate permits will be obtained from Alameda County and the City of Oakland.

SOMA will prepare a site-specific Health and Safety Plan (HASP). The HASP will be prepared according to the Occupational Safety and Health Administration (OSHA), “Hazardous Waste Operation and Emergency Response” guidelines (29 CFR 1910.120) and the California Occupational Safety and Health Administration (Cal/OSHA) “Hazardous Waste Operation and Emergency Response” guidelines (CCR Title 8, section 5192). The HASP is designed to address safety provisions during field activities and protect the field crew from physical and chemical hazards resulting from drilling and sampling. The HASP establishes personnel responsibilities, general safe work practices, field procedures, personal protective equipment standards, decontamination procedures, and emergency action plans. The HASP will be reviewed and signed by field staff and contractors prior to beginning field operations.

SOMA will contact Underground Service Alert (USA) to ensure that drilling areas are clear of underground utilities. Following USA clearance, SOMA will retain a private utility locator to survey proposed drilling areas and locate any additional subsurface conduits.

3.2 Borings to Delineate Upgradient Extent of Contamination

During a site visit on February 7, 2011, SOMA identified two possible upgradient areas where borings could be advanced. The first was in the northernmost portion of the site; the second was immediately north of the site on the Glovatorium property, located at 3820 Manila Avenue. Due to access restrictions, the second location, though physically much easier to access, was designated an alternate; it will be utilized only if authorized by a site access agreement between the two property owners before implementation of this investigation begins. Figure 3 shows drilling areas evaluated during preparation of this workplan.

Due to access limitations inside the Thompson building, proposed upgradient borings will be advanced using Ram-Set hand portable (limited access) equipment that utilizes direct push technology (DPT). General field procedures are documented in Appendix A. Proposed borings LDP-4 through LDP-6 are positioned inside the building upgradient of boring LDP-3. SOMA proposes utilizing a Ram-Set unit designed for extremely tight space conditions. The unit requires only 5 feet of vertical clearance and has a footprint of only 2 square feet; the depth limitation of this rig in normally consolidated soil ranges between 25 and 80 feet bgs. Upon site inspection, several locations were found suitable for limited access borehole advancement, the proposed locations are shown in Figure 3. If for any reason Ram-Set cannot be utilized, with concurrence from ACEHS, hand-augered boreholes will be advanced where feasible instead, for collection of proposed soil and groundwater samples.

Each DP boring will be advanced to approximately 30 feet bgs. SOMA will employ photoionization detector (PID) and field observations of odor and staining to determine the ultimate sampling depth and final depth of each boring. If no staining is observed, at minimum, soil samples will be collected at soil/groundwater interface where varying lithologies are encountered, and in areas where contamination was encountered in the past. One groundwater sample will be collected from each encountered groundwater-bearing zone. Samples will be collected according to applicable protocol, and analyzed as described later in this document.

3.3 Borings to Delineate Extent of Contamination near LDP-1 and LDP-2

Due to access limitations inside the site building near LDP boring locations, SOMA proposes utilizing a Geoprobe rig with greater torque than that utilized during advancement of LDP-1 and LDP-2. This larger rig will be utilized to penetrate through refusal that might be encountered at greater depths and aid in delineating the extent of contamination. Proposed boring locations are shown in Figure 3. To overcome refusal conditions, SOMA will utilize a larger Geoprobe drilling rig (e.g., Rhino Track); to advance proposed angled soil borings to beneath the site building.

During advancement of previous borings, the detected contaminants of concern (COCs) reported in boring LDP-2 were higher than in LDP-1, therefore, the proposed investigation will be focused in the vicinity of boring LDP-2.

In addition, a relatively high TPH-g detection in groundwater has been reported in boring LDP-2 at 380,000 ug/L as compared to TPH-ss detection in the same sample at 24,000 ug/L. TPH-g (TPH-ss) were detected in borings LDP-1 and LDP-3 at 1,800 ug/L (1,200 ug/L) and 410 ug/L (260 ug/L), respectively. Since it appears that distribution of TPH-g and TPH-d is disproportionate in LDP-2 as compared to the other samples, Curtis and Tompkins (C&T; the laboratory that analyzed these samples) was contacted with an inquiry as to the accuracy of these results. According to John Goyette of C&T, it is unlikely that the aforementioned TPH-g result was correct as reported. According to C&T, the sample was initially run undiluted; the TPH-g result was 36,000 ug/L, which was over the calibration range, and TPH-ss was 24,000 ug/L, which was within range and reported. The sample was then diluted to bring it within the reporting range of the equipment being used by the lab; however, it appears that an incorrect dilution of 100 (instead of 10) was reported, increasing the reported concentration by an order of magnitude. Therefore, the borings proposed to be advanced in the vicinity of LDP-2 will be also used to evaluate the validity of the previously reported analytical results for TPH-g.

Two proposed soil borings will be advanced to beneath the storage area and the area of former piping. One proposed boring (DP-9) will be advanced immediately north of borings TB2-2 and TB1-3 and angled (at a 30 degree angle from vertical) northward (N 25^o E). and one boring, DP-10, will be advanced in a northwesterly direction (N 65^o W) toward LDP-2, also at a 30 degree angle from vertical. Due to differing analytical protocols by different labs (Test America and Curtis & Tompkins), principally use of different laboratory standards for the various categories of TPH, a third boring (DP-11) will be advanced vertically immediately downgradient of the location of TB2-2 to verify prior analytical reports.

Subsurface soil and groundwater sample collection from each boring will utilize the methodology described elsewhere in this workplan. Based on the proposed angle of advancement, each boring will be advanced to approximately 30 feet bgs so that that the length of each boring will be approximately 35 linear feet. Constructed boring logs will be corrected for the drilling angles.

3.4 Soil Sampling

DPT is an efficient method of collecting continuous soil cores while preventing cross-contamination, involving hydraulically hammering a set of steel rods into the subsurface with the lead section consisting of a polyethylene-lined sampler. After pushing the drilling rods to the desired depth, the soil-filled liner will be retrieved. SOMA's field geologist will log continuous soil cores from each boring location, characterizing the content of each soil-filled tube using the Unified Soil Classification System.

Encountered subsurface lithologies from all advanced borings will be recorded on geological borehole logs. At each interval of depth-discrete soil sampling, the DP drilling rig will obtain a 4-foot soil core sample. The contents of each sediment-filled tube will be screened using PID. Vapors from the soil core sample(s) will be screened for volatile compounds and will be documented on geological borehole logs. SOMA proposes that soil samples be collected at depths where PID readings or visual observations indicate presence of significant soil contamination. In addition, one soil sample will be collected from the vadose zone at the soil-groundwater interface. SOMA's field geologist will select and cut sections of the soil-filled tubes into 6-inch-long sections and cap ends of each sample with a Teflon liner and polyethylene end caps. Samples will be labeled and immediately placed into a chilled ice chest for transportation to a California state-certified environmental laboratory for analysis.

3.5 Groundwater Sampling

To collect groundwater samples at field-identified depth intervals, a hydropunch type groundwater sampler will be used. This device is designed to take discrete groundwater sampling without cross-contaminating water-bearing zones (WBZs) at different depth intervals. The dual-walled sampler involves hydraulically driving or hammering a cased set of rods into the ground with the lead rod section consisting of a hollow acetate-lined sampler. After cased rods are pushed to the desired depth, the drilling rods are withdrawn from within the 1.25-inch-diameter outer casing for insertion of the screened sampler. The field crew will use a Watera sampler to collect groundwater samples from all advanced boreholes (regular and limited access); the low-flow sampling technique will be utilized to minimize turbidity of groundwater samples and allow for collection of groundwater samples that are representative of subsurface conditions.

3.6 Boring Decommissioning

Following soil and groundwater sampling, borings will be abandoned and sealed with a bentonite grout mixture and completed at the surface with materials to match existing grade.

Soil and waste-water generated during boring activities will be temporarily stored on-site in separate DOT-rated 55-gallon steel drums, pending characterization, profiling and transport to an approved disposal/recycling facility.

3.7 Laboratory Analyses

Collected grab groundwater samples and soil samples will be submitted to a California state-certified environmental laboratory under appropriate chain-of-custody protocol for analysis of the following:

- TPH as gasoline (TPH-g), TPH as diesel (TPH-d), TPH as kerosene (TPH-k) and TPH as Stoddard Solvent (TPH-ss) by EPA Method 8015
- Benzene, toluene, ethylbenzene, total xylenes (BTEX) by EPA Method 8260
- Volatile organic compounds (VOCs) such as perchloroethylene (PCE), trichloroethene (TCE), vinyl chloride (VC), and naphthalene; and gasoline oxygenates such as methyl tertiary-butyl ether (MtBE) and tertiary-butyl alcohol (TBA). EPA Method 8260B

- Total lead. EPA Method 6010

SOMA proposes utilizing a silica gel clean up for all samples.

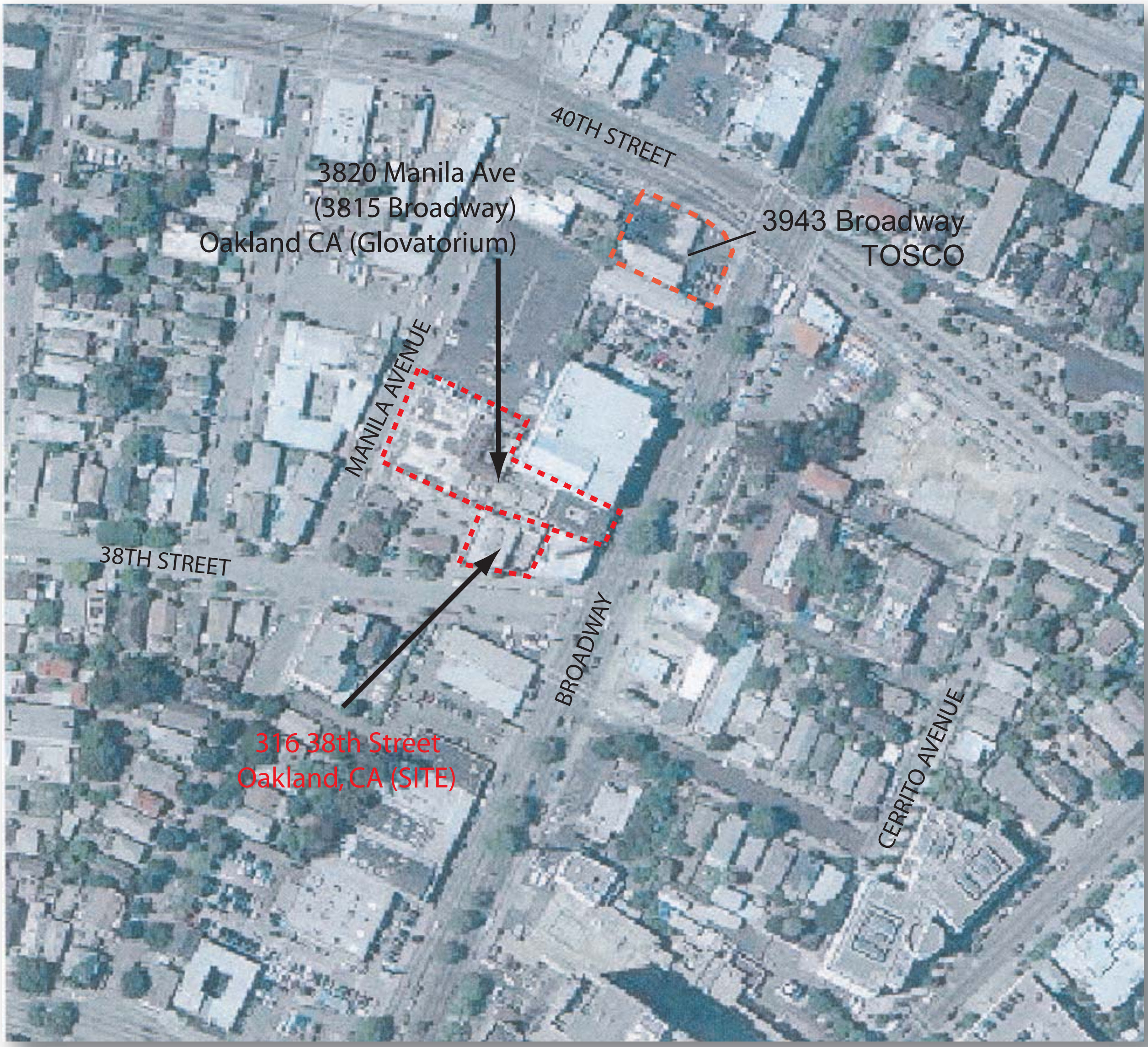
3.8 Data Review and Report Preparation

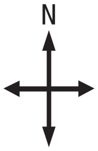
Soil and groundwater data collected during this investigation will be utilized to determine whether identified data gaps have been addressed. Investigation results will be made available to the regulatory agency.

A report will be submitted that will include, at minimum, the following:

- Detailed description of completed investigation
- Detailed description of all field activities
- Tabulation of historical and current sample analytical data
- Maps showing locations of advanced borings and contaminant distribution
- Waste disposal manifests

Figures





approximate scale in feet

0 250 500

Figure 1: Site vicinity map.

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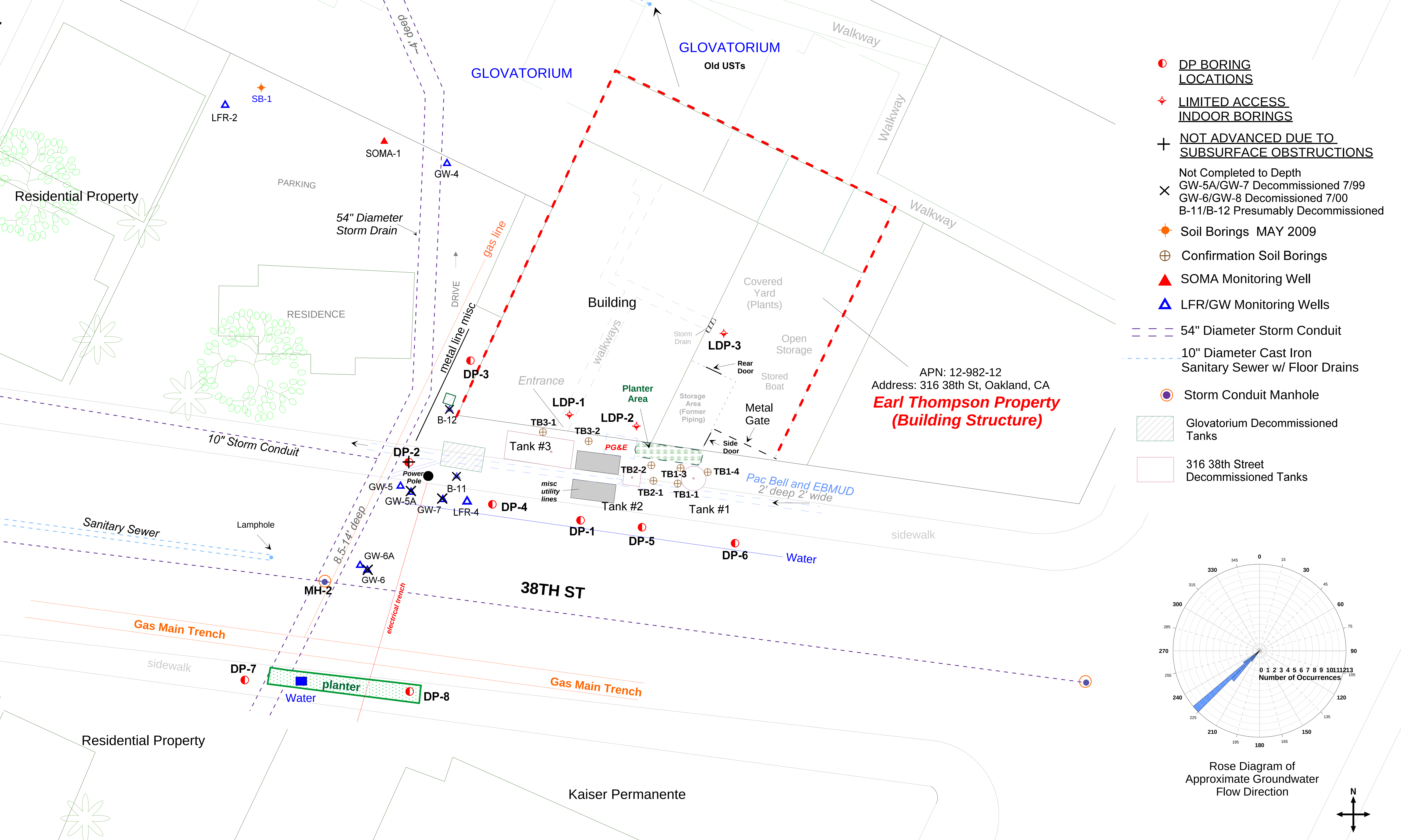

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0 20 40

Figure 2 Site Vicinity Map Showing the Locations of USTs, Advanced Sampling Boreholes and Wells

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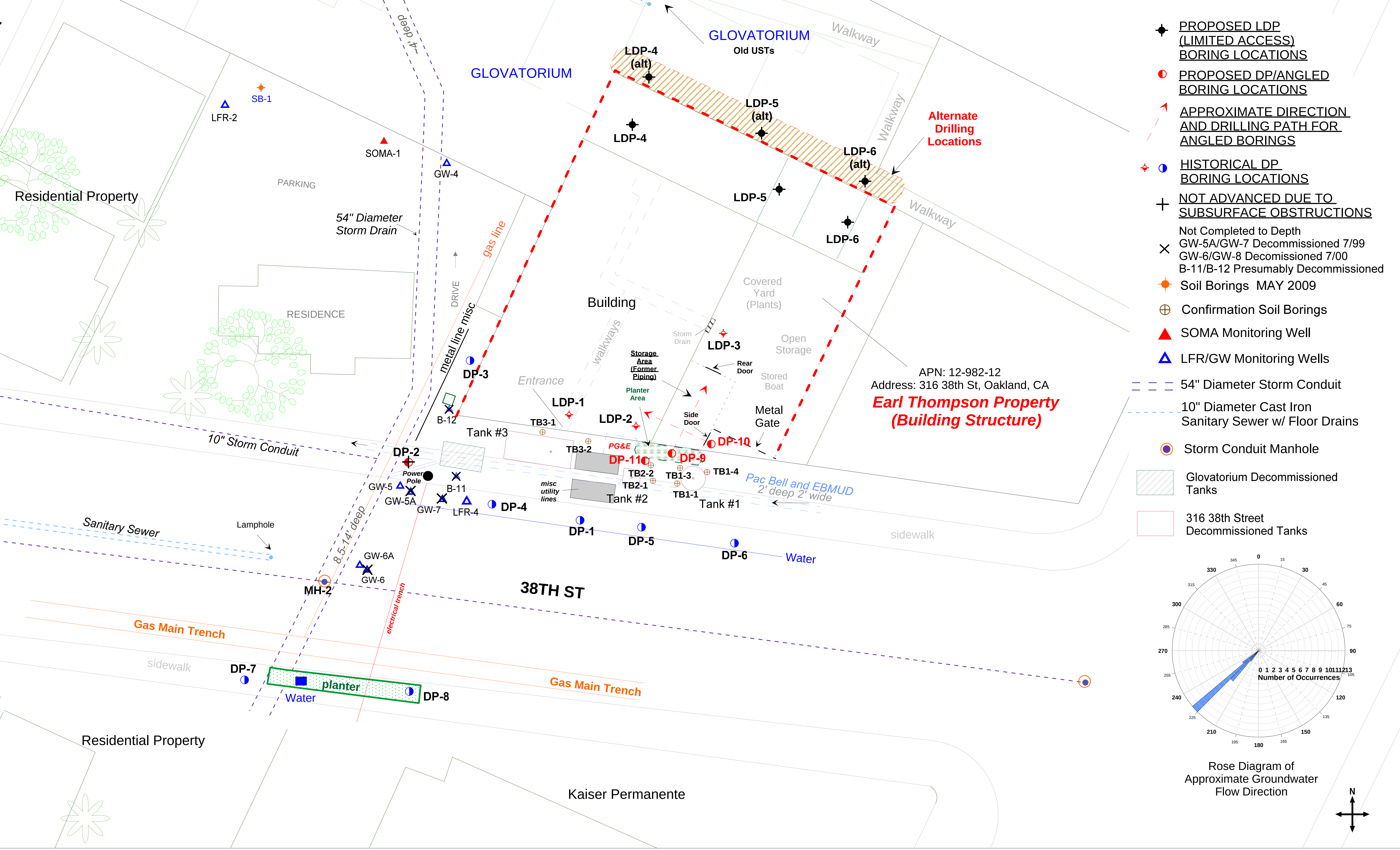

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0 20 40

Figure 3 Map Showing the Proposed Drilling Locations

Appendix A
General Field Procedures

GENERAL FIELD PROCEDURES

Hydraulic Push (GEOPROBE) Drilling

Utility Locating

Prior to drilling, boring locations are marked with white paint or other discernible marking and cleared for underground utilities through Underground Service Alert (USA). In addition, the first five feet of each borehole are air-knifed, or carefully advanced with a hand auger if shallow soil samples are necessary, to help evaluate the borehole location for underground structures or utilities.

Borehole Advancement

Pre-cleaned push rods (typically one to two inches in diameter) are advanced using a hydraulic push type rig for the purpose of collecting samples and evaluating subsurface conditions. The drill rod serves as a soil sampler, and an acetate liner is inserted into the annulus of the drill rod prior to advancement. Once the sample is collected, the rods and sampler are retracted and the sample tubes are removed from the sampler head. The sampler head is then cleaned, filled with clean sample tubes, inserted into the borehole and advanced to the next sampling point where the sample collection process is repeated.

Soil Sample Collection

The undisturbed soil samples intended for laboratory analysis are cut away from the acetate sample liner using a hacksaw, or equivalent tool, in sections approximately 6 inches in length. The 6-inch samples are lined at each end with Teflon® sheets and capped with plastic caps. Labels documenting job number, borehole identification, collection date, and depth are affixed to each sample. The samples are then placed into an ice-filled cooler for delivery under chain-of-custody to a laboratory certified by the State of California to perform the specified tests. The remaining collected soil that has not been selected for laboratory analysis is logged using the United Soil Classification System (USCS) under the direction of a State Registered Professional Geologist, and is field screened for organic vapors using a photo-ionization detector (PID), or an equivalent tool. Soil cuttings generated are stored in Department of Transportation (DOT) approved 55-gallon steel drums, or an equivalent storage container.

Groundwater Sample Collection

Once the desired groundwater sampling depth has been reached, a Hydropunch tip is affixed to the head of the sampling rods. The Hydropunch tip is advanced between approximately 6 inches to one foot within the desired groundwater sampling zone (effort is made to emplace the Hydropunch screen across the center and lower portion of the water table), and retracted to expose the Hydropunch screen.

Grab groundwater samples are collected by lowering a pre-cleaned, single-sample polypropylene, disposable bailer down the annulus of the sampler rod. The groundwater sample is discharged from the bailer to the sample container through a bottom emptying flow control valve to minimize volatilization.

Because the sampling section of the non-discrete groundwater sampler is not protected or sealed, this sampler should only be used where cross contamination from overlying materials is not a concern. Discrete groundwater samplers are driven to the sample interval, and then o-rings, a protective tube/sheath, and an expendable point provide a watertight seal.

Collected water samples are discharged directly into laboratory-provided, pre-cleaned vials or containers and sealed with Teflon-lined septum, screw-on lids. Labels documenting sample number, well identification, collection date, and type of preservative (if applicable, e.g., HCl for TPPH, BTEX, and fuel oxygenates) are affixed to each sample. The samples are then placed into an ice-filled cooler for delivery under chain-of-custody to a laboratory certified by the State of California to perform the specified tests.

Borehole Completion

Upon completion of drilling and sampling, the rods are retracted. Neat cement grout, mixed at a ratio of 6 gallons of water per 94 pounds of Portland cement, is introduced, *via* a tremmie pipe, and pumped to displace standing water in the borehole. Displaced groundwater is collected at the surface into DOT approved 55-gallon steel drums, or an equivalent storage container. In areas where the borehole penetrates asphalt or concrete, the borehole is capped with an equivalent thickness of asphalt or concrete patch to match finished grade.

Organic Vapor Procedures

Soil samples are collected for analysis in the field for ionizable organic compounds using a PID with a 10.2 eV lamp. The test procedure *involves* measuring approximately 30 grams from an undisturbed soil sample, placing this subsample in a Ziploc--type bag or in a clean glass jar, and sealing the jar with aluminum foil secured under a ring-type threaded lid. The container is warmed for approximately 20 minutes (in the sun); then the headspace within the container is tested for total organic *vapor,* measured in parts per million as benzene (ppm; volume/volume). The instrument is calibrated prior to drilling. The results of the field-testing are noted on the boring logs. PID readings are useful for indicating relative levels of contamination, but cannot be used to evaluate petroleum hydrocarbon levels with the confidence of laboratory analyses.

Equipment Decontamination

Equipment that could potentially contact subsurface media and compromise the integrity of the samples is carefully decontaminated prior to drilling and sampling. Drill augers and other large pieces of equipment are decontaminated using high-pressure hot water spray. Samplers, groundwater pumps, liners and other equipment are decontaminated in an Alconox scrub solution and double rinsed in clean tap water rinse followed by a final distilled water rinse.

The rinsate and other wastewater are contained in 55-gallon DOT-approved drums, labeled (to identify the contents, generation date and project) and stored on-site pending waste profiling and disposal.

Soil Cuttings and Rinsate/Purge Water

Soil cuttings and rinsate/purge water generated during drilling and sampling are stored onsite in DOT-approved 55-gallon steel drums pending characterization. A label is affixed to the drums indicating the contents of the drum, suspected contaminants, date of generation, and the boring number from which the waste is generated. The drums are removed from the site by a licensed waste disposal contractor under manifest to an appropriate facility for treatment/recycling.