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11:02 am, Aug 29, 2012

Alameda County
Environmental Health

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

Re: B&C Gas Mini Mart, 2008 First Street, Livermore, California
(ACEHD Case No. RO0000278)

Dear Mr. Wickham:

Stratus Environmental, Inc. (Stratus) has recently prepared a document titled *Work Plan for Supplemental Remediation* on my behalf. The report was prepared in regards to Alameda County Fuel Leak Case No. RO0000278, located at 2008 First Street, Livermore, California.

I have reviewed a copy of this report, sent to me by representatives of Stratus, and "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."

Sincerely,

Balaji Angle
B&C Gas Mini Mart

STRATUS
ENVIRONMENTAL, INC.

3330 Cameron Park Drive, Ste 550
Cameron Park, California 95682
(530) 676-6004 ~ Fax: (530) 676-6005

August 28, 2012
Project No. 2146-2008-01

Mr. Jerry Wickham
Alameda County Environmental Health Department
1131 Harbor Bay Parkway, Suite 250
Alameda, California 94502

Re: Work Plan for Supplemental Remediation
B&C Gas Mini Mart
2008 First Street
Livermore, California

Dear Mr. Wickham:

On behalf of Mr. Balaji Angle, Stratus Environmental, Inc. (Stratus) has prepared this *Work Plan for Supplemental Remediation* for the B&C Gas Mini Mart, located at 2008 First Street, Livermore, California (see Figures 1 and 2). Petroleum hydrocarbon impact to the soil and groundwater has previously been documented at the subject property. Beginning in late 2007, a previous consultant representing the site (Golder Associates) began injecting ozone into the subsurface within the limits of the service station in order to begin mitigating near-source groundwater contaminants. In January 2009, Golder Associates prepared a Corrective Action Plan (CAP) for the site which recommended testing the feasibility of using soil vapor extraction (SVE) at the site to supplement ozone injection (OI) remedial work. After reviewing the CAP, Alameda County Environmental Health Department (ACEHD) issued a letter, dated May 10, 2010, which approved the recommendations presented in the CAP. To date, a detailed plan to test/implement SVE at the site has not been submitted, in part due to increases in groundwater levels beneath the site in late 2010 and 2011, which would likely have decreased the effectiveness of SVE.

After reviewing a report that documented the findings of a recent groundwater monitoring event, which was performed during the first quarter 2012, and the current status of OI remedial efforts, ACEHD requested, in a letter dated June 28, 2012, that the SVE remedial option for the site be re-evaluated. In addition, ACEHD requested that a damaged groundwater monitoring well (MW-6) be properly destroyed and replaced, and that a plan to expand the OI system to allow for treatment of groundwater contaminants across a larger area be developed for agency review.

This *Work Plan* proposes to implement SVE onsite within areas of previously documented petroleum hydrocarbon impact to the subsurface. SVE work will be completed intermittently at times of 'relatively low water table levels', when we believe the remedial technology will be most effective. Based on our understanding of the site geological conditions, and the extent of petroleum hydrocarbon impact to the subsurface, we believe that SVE will be an aggressive and effective method of remediating fuel contaminants located in close proximity to the site, and should be the most cost-effective method of managing the site's environmental case towards closure. A proposal to install three vapor extraction wells, one of which will be completed within the MW-6 well boring after overdrilling of this damaged well, for use in onsite SVE remediation, is included in this *Work Plan*. Data collected during this remediation event will also be used to assist in evaluating whether SVE should also be completed offsite.

Given the possible necessity of performing offsite SVE, based on historically available site assessment data, Stratus is recommending that expansion of the OI system offsite be postponed. If offsite SVE appears likely to be viable, based on the results of the onsite SVE work, it would be much more efficient and cost effective to install subsurface conveyances necessary for both OI and SVE during the same offsite construction project, than if the work were completed in separate phases.

SITE DESCRIPTION

The site is located at the northeast corner of the intersection of First Street and South L Street in Livermore. Mixed residential and commercial property use surrounds the subject property. The facility remains operational as an active service station. The configuration of the service station, including the locations of fuel dispensers and underground storage tanks (USTs), is provided on Figure 2.

An environmental case was formerly managed at a property located west-northwest of the site, at 57/59 L Street (Former Groth Brothers Oldsmobile). Fuel contamination attributed to the B&C Gas Mini Mart site appears to have migrated beneath a portion of the Groth Brothers Oldsmobile site where volatile organic compounds (VOCs) were historically detected.

BACKGROUND

Stratus has attached select data collected during historical project work to this report. Appendix A contains a tabulated summary of well construction information for the network of wells at the site. Appendix B contains a tabulated summary of soil analytical data identified by Stratus during a review of historical site documents, and select maps illustrating sample locations. Appendix C contains maps (in plan and sectional view) that illustrate the approximate extent of petroleum hydrocarbon impact to soil (within the 'source area'), and the approximate extent of petroleum hydrocarbon impact to groundwater. A summary description of historical site investigation work performed at the site, geologic and hydrogeologic conditions, the extent of petroleum hydrocarbon impact to the subsurface, and historical remedial efforts, are provided in the following subsections of this document.

Summary of Historical Site Investigation Work

Petroleum hydrocarbon impact to the subsurface was discovered at the site in 1988. Since that time, numerous phases of investigation have been completed in order to characterize the subsurface conditions and distribution of contaminants in soil and groundwater beneath the site. The following section of this document provides an overview of data collected on behalf of Mr. Angle that are available from reports submitted to ACEHD and to Geotracker. Figures 2 and/or 3 illustrate the approximate locations of soil borings, monitoring wells, and remediation wells completed at the site.

A preliminary subsurface assessment was performed in September 1988. During this work, three exploratory soil borings were advanced, and one of the borings was converted to groundwater monitoring well MW-1. Intermittent groundwater monitoring and sampling (approximately once per year) was performed between 1988 and 1993. Mr. Angle acquired the facility from Desert Petroleum in January 1994. In March 1994, a waste oil UST (280-gallon) was removed from the property. Approximately 25 cubic yards of soil were also excavated and removed from the site. In June 1994, three additional groundwater monitoring wells (MW-2 through MW-4) were installed and a quarterly groundwater monitoring and sampling program was inititated. In October 1995, onsite well MW-6 and offsite well MW-5 were installed.

The fuel storage system at the site failed an integrity test in September 1995. In 1996, the USTs at the site were replaced, and two hydraulic lifts were removed. At this time, approximately 700 cubic yards of impacted soil were excavated and removed from the property. A 1,000-gallon gasoline UST discovered during the excavation work was closed in-place with approval from ACEHD and the City of Livermore Fire Department.

Approximately ½ mile northwest of the site, at 1493 Olivina Avenue, California Water Service Company (CWSC) maintains a water supply well (#8). Historical calculation of groundwater flow direction, from monitoring well gauging data, generally shows that groundwater flow in the site vicinity is towards the northwest and the CWSC well. In order to assess subsurface conditions between the site and the CWSC well, an extensive network of single completion (MW-7 through MW-13, D-1, and D-2) and multi-depth chambered wells (CMT-1 through CMT-4) were installed in 1999 and 2003, respectively (see Figure 3 for location). Onsite well MW-1 was destroyed in November 2007.

An additioonal subsurface investigation was completed in 2006, which consisted of advancing 17 membrane interface probe (MIP) soil borings, followed by seven confirmation borings to allow for sample collection. One of the borings (MIP-8) appears to have also been converted to an offsite vapor extraction well.

In August 2007, six sparging well clusters (SP-1A/B through SP-6A/B, SP-5C, and SP-6C) and one vapor extraction well (SVE-1) were installed at the site. The vapor extraction well was intended to be in relative close proximity to the southern end of a former UST, where high levels of total petroleum hydrocarbons as gasoline/gasoline range organics (TPHG/GRO) were detected in a compliance soil sample (at 8,500 milligrams per kilogram [mg/Kg]). Due to risks associated with the presence of existing USTs/fuel product lines, the vapor extraction well was situated approximately 17 feet west of the compliance soil sample location. Well SVE-1 was screened from approximately 15 to 25 feet below ground surface (bgs).

Site Geology and Hydrogeology

Coarser grained soils have typically been encountered between surface grade and 15 feet bgs. Finer grained soils (silt/clay mixtures) have generally been noted from 15 feet bgs to about 35 to 40 feet bgs, although sandy strata are interbedded within these finer grained soils. Sandy strata (with interbedded fine grained strata) have predominately been observed from 35 to 40 feet bgs to approximately 60 to 75 feet bgs. Laterally extensive clayey strata are present beneath the site at depths ranging between approximately 75 and 110 feet bgs. These clayey strata appear to be approximately 8 to 10 feet in thickness at a minimum. The cross-sectional depiction included in Appendix C provides a general illustration of subsurface conditions in the site vicinity.

Groundwater levels beneath the site have fluctuated significantly during the 24-year groundwater monitoring period ranging (onsite) between approximately 69 feet bgs (1992) and 18 feet bgs (2007). At the time that this report was prepared, groundwater was at a level of approximately 42 feet bgs, and during the past 2 years groundwater levels have ranged between 30 and 42 feet bgs onsite. Saturated soils above approximately 75 feet bgs and the laterally continuous clay interval represent the uppermost water bearing interval, and contain the plume of fuel contaminants originating from the site. Groundwater flow is consistently towards the northwest, at an average hydraulic gradient of approximately 0.015 ft/ft. Groundwater velocity in the site vicinity has been estimated at approximately two to four feet per day. A groundwater elevation contour map for the first quarter 2012 is presented as Figure 4.

Overview of Extent of Impact to the Subsurface

The contaminants of concern (COCs) at the site are TPHG/GRO, benzene, toluene, ethylbenzene, and total xylenes (BTEX compounds), and the fuel oxygenate methyl tertiary butyl ether (MTBE). After performing the MIP borings, and reviewing the results of previous work, Golder Associates concluded (stated in several reports) that most of the petroleum hydrocarbon impact (also referred to as the 'source zone') is present between approximately 35 and 50 feet bgs. The plan view map presented in Appendix C illustrates the generalized extent of petroleum hydrocarbon impact to soil ('source zone' only depicted). The 'source zone' encompasses a relatively large lateral area, extending across L Street to the northwest of the site.

The plan view map presented in Appendix C depicts a groundwater plume that extends a relatively large distance northwest of the site (about 2,000 feet). Concentrations of fuel contaminants decline significantly beyond well MW-5 and the former Groth Brothers Oldsmobile property (beyond the area where the 'source area' contaminants are present in soil). At the time of the most recent well sampling event, performed during the first quarter 2012, GRO, benzene, and MTBE were reported at maximum concentrations of 600 micrograms per liter (μg/L), 19 μg/L, and 13 μg/L, respectively (impacted well MW-5 was, however, dry at the time of sampling).

Remedial Efforts

Approximately 725 cubic yards of soil have been excavated and removed from the site; about 25 cubic yards were removed from beneath a former waste oil UST, and the remaining soil was excavated during removal and replacement of the sites fuel storage USTs. Manual bailing of free phase liquid hydrocarbons (free product) was also briefly performed at wells MW-2 and MW-5 during the mid 1990's.

Ozone injection has been performed at the site intermittently between late 2007 and the present time using a Calcon HiPro^{TM} 2500 remediation system. Initially, OI began as a pilot test, and then continued as a long-term remedial project. The equipment is configured to allow for injection of ozone into the subsurface through wells SP-1A/B, SP-2A/B, and SP-4A/B. In general, the A/B injection well clusters were installed to depths that will allow for sparging of ozone into the 'source zone' strata (which are periodically above the water table given groundwater fluctuation ranges at the site). Subgrade conveyance piping has not been installed to offsite wells SP-5A/B/C and SP-6A/B/C.

In the June 28, 2012 letter, ACEHD noted that general monitoring and reporting of data associated with operation of the OI system has been limited in scope and frequency since performance of the OI pilot test. ACEHD has requested that additional data regarding oxidant injection concentrations, volumes, flow rates, and radius of influence (ROI) be provided. Stratus will begin collecting additional data pertaining to the OI system and reporting this data for ACEHD review. It may be difficult, however, to provide accurate ROI information for the OI system. Since injection of ozone is being performed at wells SP-1, SP-2, and SP-4, which are located in close proximity to L Street, in our opinion there are not sufficient monitoring wells to estimate the ROI of the OI system, because only one downgradient well (MW-5) is located in relative close proximity to the site. In addition, well MW-5 is only 40 feet in depth and typically does not extend a significant distance into the saturated zone, except at times of high groundwater levels.

PROJECT APPROACH

At times of lower groundwater levels at the site, we concur with ACEHD and Golder Associates' conclusions that SVE is likely to be a viable remedial alternative for removing 'source zone' petroleum hydrocarbon mass from the subsurface (as stated earlier, the 'source zone' extends from approximately 35 to 50 feet bgs; see Figures in Appendix C). By removing petroleum hydrocarbon mass from the 'source zone' at times of low groundwater levels, we believe that groundwater quality beneath the site will be improved, and the fuel contaminant mass that can dissolve in groundwater and represent an ongoing source for groundwater impact into the future will be reduced.

In order to perform the SVE work, Stratus is proposing to install three vapor extraction wells along the western edge of the service station property boundary or immediately northwest of the site. Installation of the vapor extraction wells will allow for physical removal and abatement of fuel contaminants from the subsurface, rather than mitigating contaminants in close proximity to the sparging wells in-situ. Two of the vapor extraction wells SVE-3A/B and SVE-4A/B will be constructed as nested wells that will allow for both removal of contaminants in the vapor phase (at times of low water levels), and monitoring of groundwater concentrations at times of higher groundwater levels. The other vapor extraction well (SVE-2) will be installed in close proximity and screened from approximately 30 to 50 feet bgs, across the 'source zone' depth of contaminants and deeper than well SVE-1. Well SVE-3A/B will be constructed within the MW-6 borehole after overdrilling and deepening. The new wells will be constructed using schedule 80 PVC well casing, instead of schedule 40 PVC, as we suspect that well MW-6 may have been damaged by the oxidizing effects of ozone injected from well SP-2, which is situated approximately 4 feet away from well MW-6.

Once the vapor extraction wells have been installed, subgrade conveyance piping will be connected to wells SVE-1, SVE-2, SVE-3A/B, and SVE-4A/B. The piping will extend from the wellheads to a designated area of the property that will be used to park a trailer-mounted vapor extraction system. We anticipate situating the vapor extraction system in close proximity to the OI remediation system, given the layout of the service station facility; however, the exact location may need to be modified at a later date in order to facilitate implementation of the project work. The vapor extraction system will be rented, instead of purchased, due to the anticipated intermittent use of SVE at times of seasonally low groundwater levels.

In order to power the vapor extraction system, Stratus anticipates installing a 3-phase temporary power connection to the site. Although it will require a period of time to obtain an electrical connection from the local power grid, using this type of electrical service, instead of a generator, should allow for more cost effective and reliable operation of the SVE system. Propane will be used as a fuel for combustion of contaminants (thermal oxidation). Before operating the vapor extraction system, the appropriate permit will be obtained from the Bay Area Air Quality Management District (BAAQMD).

Upon startup of the vapor extraction system, Stratus will monitor performance of the remedial work on an ongoing basis. In particular, Stratus will assess contaminant mass extraction rates, and attempt to determine ROI around each vapor extraction well. We are hopeful that, given the relatively coarse grained soils beneath the site within the 'source zone', a large ROI will be observed, and thus SVE will remove contaminants across a relatively wide area of the subsurface, including areas with difficult surface access (i.e. beneath roadways, existing USTs, etc.). At times of higher water levels, when vapor extraction is not being performed, the newly installed wells will be useful in assessing the effectiveness of remediation, and can be used for observation of groundwater parameters (such as dissolved oxygen, pH, oxidation/reduction potential, etc.).

The performance of the SVE work from onsite (and SVE-4 A/B) will be used, in part, to evaluate whether or not offsite SVE work should be implemented in the future. In the event that this appears warranted, additional vapor extraction wells situated offsite (across L Street) would be necessary. Implementation of offsite vapor extraction would also require the installation of subsurface conveyance piping to the offsite vapor extraction wells. Given the possible necessity of performing offsite SVE, Stratus is proposing to postpone our previous recommendation for connecting wells SP-5 A/B/C and SP-6 A/B/C to the OI system. If connection of the (possible) offsite vapor extraction wells and sparging wells were completed at the same time, subsurface conveyance piping could be installed within the same trench excavation, which would require only one offsite construction project (instead of two) and thus be more efficient and cost effective. This scenario would also likely be more desirable to the City of Livermore, because the L Street right-of-way would only need to be disturbed during one construction project instead of two separate projects.

By proposing to perform SVE remediation at the site, our project goal would be to remove sufficient petroleum hydrocarbon mass, largely from the 'source zone' area of the subsurface, to position the site's environmental case for closure in as economically feasible manner as possible. By implementing SVE on an intermittent (seasonal) basis, we are hopeful that substantial remedial progress at the site can be obtained, while operating within the current annual budgeting parameters, and total project budget allocations, imposed upon Mr. Angle by California's Underground Storage Tank Cleanup Fund (USTCF). Upon eventual implementation of SVE, Stratus would evaluate remedial progress on an ongoing basis in order to assess the effectiveness and applicability of SVE technology at the site relative to highly variable water level fluctuations experienced at the site. Parameters would then be established to operate the SVE system once groundwater levels are below a specific depth interval within the subsurface.

SCOPE OF WORK

The proposed scope of work has been subdivided into five tasks, as outlined below. All work will be conducted under the direct supervision of a State of California Professional Geologist or Professional Engineer, and will be conducted in accordance with standards established by the *Tri-Regional Board Staff Recommendations of Preliminary Investigation and Evaluation of Underground Tank Sites* (RWQCB, April 2004), ACEHD, and Zone 7 Water Agency guidelines. A generalized description of field practices and procedures that will be used by Stratus during drilling work is provided in Appendix D.

Task 1 – Soil Boring and Well Installation Activities

<u>Pre-field Activities</u>

Following approval of this scope of work by ACEHD, the following activities will be completed:

- Secure an encroachment permit from the City of Livermore,
- Obtain well installation/destruction permits from Zone 7 Water Agency,
- Retain and schedule a licensed C-57 drilling contactor,
- Update the health and safety plan for the site,
- Mark drilling locations and contact Underground Service Alert (USA) to locate underground utilities in the vicinity of the work site, and
- Notify the City of Livermore, Zone 7 Water Agency, ACEHD, Mr. Angle, and USA of the scheduled field activities.

Field Activities

Task 1A - Soil Borings and Overdrilling of Well MW-6

A licensed well driller will advance the well borings using a truck mounted or limited access drill rig equipped with 8-inch or 10-inch diameter hollow stem augers. The borings will be converted to vapor extraction wells, as described below. The initial 5 feet of borings SVE-2 and SVE-4A/B will be advanced with a hand auger and/or posthole digger to reduce the possibility of damaging underground utilities. During advancement of well borings SVE-2 and SVE-4A/B, soil samples will be collected at select intervals using a California-type, split-spoon sampler equipped with three pre-cleaned brass tubes. The ends of the bottom-most, intact tube from each sample interval will be lined with Teflon™ sheets, capped, and sealed. Each sample will then be labeled, placed in a resealable plastic bag, and stored in an ice-chilled cooler. Strict chain-of-custody procedures will be followed from the time the samples are collected until the time the samples are relinquished to the laboratory. Soil contained in the remaining brass tubes will be screened for VOCs using a photoionization detector (PID). Stratus will record PID readings, soil types, and other pertinent geologic data on a borehole log. We anticipate submitting three to four samples from borings SVE-2 and SVE-4A/B for analytical testing; the exact number of samples submitted for testing will be determined at the time of the investigation and based on findings observed during sample collection.

During the overdrilling of well MW-6, steel drilling rods will be placed within the borehole in order to 'track' the original borehole during advancement of the hollow stem augers. Upon reaching the total depth of well MW-6 (approximately 40 feet bgs), appropriate tooling will be used to remove the PVC well materials from the borehole. Once the PVC has been extracted, the borehole will be extended to 58 feet bgs to allow for construction of well SVE-3A/B.

Task 1B –Vapor Extraction Well Installation

Well SVE-2 will be constructed through 8-inch diameter hollow stem augers and wells SVE-3A/B and SVE-4A/B will be constructed through 10-inch diameter hollow stem augers. The well casing will consist of 2-inch diameter schedule 80 PVC and 15 to 20 feet of 0.02-inch diameter factory slotted well screen. Well SVE-2 will be screened from approximately 30 to 50 feet bgs and wells SVE-3A/B and SVE-4A/B will be screened from approximately 25 to 40 feet bgs and 43 to 58 feet bgs. For well SVE-2, a filter pack of #3 sand will be placed in the annular space around the well casing from the bottom of the well screen to approximately two feet above the top of the well screen (28 to 50 feet bgs). For wells SVE-3A/B and SVE-4A/B, filter pack sand will be placed from approximately 42 to 58 feet bgs and 23 to 40.5 feet bgs. Bentonite will be placed from approximately 40.5 to 42 feet bgs in well borings SVE-3A/B and

SVE-4A/B. After placing the filter pack(s) around each well, approximately two to three feet of bentonite chips will be placed on top of the filter pack and hydrated with clean water to provide a transition seal for the wells. Neat cement will be used to backfill the remaining annular space around each well casing. A watertight locking cap will be placed over the top of each well casing, and a traffic rated vault box will be installed around the top of each well. The actual well construction may be modified in the field based on conditions encountered at the time of the investigation. Well completion and destruction forms will be filed with the Department of Water Resources (DWR) upon completion of drilling work.

Task 1C - Waste Management

All drill cuttings and wastewater generated during the field activities will be contained in U.S. Department of Transportation-approved 55-gallon steel drums. The drums will be appropriately labeled and stored at the site pending proper disposal. A licensed contractor will transport the soil and wastewater to an appropriate facility for disposal.

Task 1D - Surveying

A California licensed land surveyor will be retained to update the monitoring well survey for the site. Due to the necessity of installing subgrade piping to the wells, which will require modification of the vapor extraction wellheads following drilling, surveying work will likely not occur immediately following well drilling in order to avoid mobilizing a surveying contractor to the site twice to obtain correct well elevations. In addition to surveying the newly installed wells, we anticipate that well MW-5 will need to be re-surveyed, as the upper portion of this well casing has been damaged and should be repaired during the third quarter 2012. Elevations of the top-of-casing of the newly completed wells will be surveyed to a 0.01-foot vertical accuracy. The elevations will be established relative to a known benchmark in feet mean sea level (MSL). These data will be submitted to the Regional Water Quality Control Board (RWQCB) as required by AB2886 (GeoTracker).

Task 2 – Laboratory Analysis

Soil samples will be forwarded to a state-certified laboratory for chemical analysis under proper chain-of-custody. The samples will be analyzed for GRO using USEPA Method 8015, and for BTEX compounds and MTBE using USEPA Method 8260.

Task 3 – Well Installation and Destruction Report Preparation

A report will be prepared to document the well installation activities. The report will include, at a minimum, a scaled site plan, documentation regarding the well installation procedures, and documentation regarding uploading of appropriate data to Geotracker.

Task 4 – Seasonal Soil Vapor Extraction

Stratus will mobilize a 250 cubic feet per minute (cfm) thermal oxidizer, or a system with similar capabilities, to complete SVE remediation. The system will be installed within a temporary fencing enclosure to prevent public access while the equipment is in operation. Subgrade piping will extend from wells SVE-1, SVE-2, SVE-3A/B, and SVE-4A/B to the pre-determined area that will contain the SVE system fenced enclosure. Tasks associated with implementation of the proposed seasonal SVE remediation project are described in the following subsections of this report.

Task 4A - Design Drawings and Permitting

Stratus will prepare and submit design drawings to procure permits from appropriate governmental agencies, as appropriate. The design drawings will include, but will not be limited to, the following:

- Details illustrating the system layout.
- Details for construction of the process piping manifold and instrumentation.
- Construction details for an electrical service panel and connection.
- A construction specifications document to support the design drawings.

Stratus will utilize the design drawings to obtain the following permits, as needed:

- An air discharge permit from the BAAQMD.
- A building permit from the City of Livermore.

Task 4B - Construction and System Installation

A Stratus field construction supervisor will oversee field activities and ensure conformity with the construction requirements set forth in the plans and specifications. Stratus will supervise trenching, sub-grade and aboveground pipe installation, backfill, compaction, and resurfacing where necessary. All construction work will be performed by appropriately licensed contractors, as required by the building permits.

Task 4C - Start-Up and Operation

The start-up and source testing programs for the SVE system will be conducted during the first 2 days of system operation, or as specified by the BAAQMD. The following parameters will be monitored and recorded on field data sheets during the system start up:

- Vapor extraction rate.
- Applied vacuum at each vapor extraction well, and in wells located in the vicinity of the extraction wells.
- Influent flow into the system.
- PID measurements for organic vapors from each extraction well and effluent air.

During source testing, one set of influent and effluent air samples will be collected and forwarded to a state certified laboratory. The air samples will be analyzed on a 24-hour turnaround basis for GRO, BTEX, and MTBE. Based on our experience with BAAQMD permit requirements, an additional set of influent and effluent air samples will be required to be collected within one week of continuous operation of the SVE system. These analytical results will be used to evaluate system destruction efficiency and will be reported to the BAAQMD. Based on results observed during start-up and source testing, an optimum vacuum and flow rate for continuous SVE operation from multiple extraction wells (SVE-1, SVE-2, SVE-3A/B, and SVE-4A/B) will be selected.

Task 4D - Operation and Maintenance

After the system start-up and system optimization for multiple well SVE, a Stratus technician will visit the site twice each month to monitor system operation and to perform maintenance on the SVE equipment. O&M site visits will be completed in conjunction with visits to maintain the OI system. Data collection will include measurement of flow rate and applied vacuum at each vapor extraction well and influent to the SVE system, measurement of induced vacuum at select observation wells, and field monitoring of organic vapors. Influent and effluent air samples will be collected at least once per month.

Task 5 – Data Reporting

Stratus will prepare a report of the SVE source testing for submittal to the BAAQMD. This report will include, but not be limited to, soil vapor extractions rates, applied vacuum, calculated mass extraction and emission rates of petroleum hydrocarbons, and the destruction efficiency of the SVE system. The report will be submitted within approximately 4 weeks of completing the source testing work.

Data regarding operation of the SVE equipment will be included in quarterly remediation status reports already being prepared for the site due to the use of the OI system. These reports will be distributed to the BAAQMD to document air discharge permit compliance, and to ACEHD for regulatory compliance and documentation.

LIMITATIONS

This *Work Plan* was prepared in general accordance with accepted standards of care that existed at the time this work was performed. No other warranty, expressed or implied, is made. Conclusions and recommendations are based on field observations and data obtained from this work and previous investigations. It should be recognized that definition and evaluation of geologic conditions is a difficult and somewhat inexact science. Judgments leading to conclusions and recommendations are generally made with an incomplete knowledge of the subsurface conditions present. More extensive studies may be performed to reduce uncertainties. This *Work Plan* is solely for the use and information of our client unless otherwise noted.

If you have any questions or comments concerning this *Work Plan*, please contact Scott Bittinger at (530) 676-2062 or Gowri Kowtha at (530) 676-6001.

Sincerely,

STRATUS ENVIRONMENTAL, INC.

PROFESSIONAL GEOLOGIST
Scott G. Bittinger
No. 7477
STATE OF CALIFORNIA

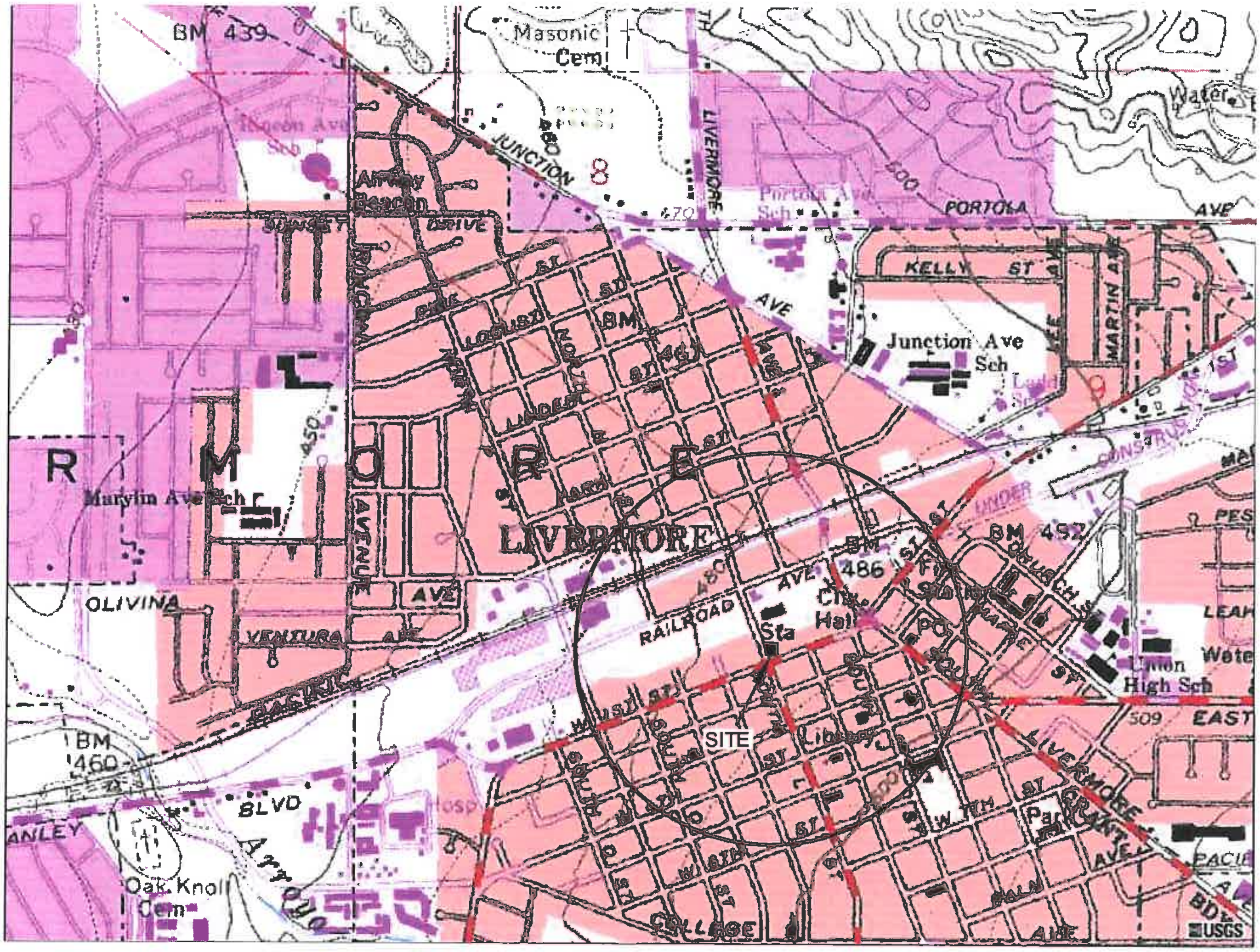
Scott G. Bittinger, P.G.
Project Manager

Gowri S. Kowtha, P.E.
Principal Engineer

Attachments:

Figure 1	Site Location Map
Figure 2	Site Plan
Figure 3	Site Vicinity Map
Figure 4	Groundwater Elevation Contour Map, First Quarter 2012
Appendix A	Well Construction Detail Summary Tables
Appendix B	Available Soil Analytical Data and Select Sample Location Maps
Appendix C	Figures Illustrating the Approximate Extent of Petroleum Hydrocarbon Impact to Soil and Groundwater
Appendix D	Field Practices and Procedures

cc: Mr. Balaji Angle, B&C Gas Mini Mart



GENERAL NOTES:
BASE MAP FROM U.S.G.S.
LIVERMORE, CA.
7.5 MINUTE TOPOGRAPHIC
PHOTOREVISED 1999

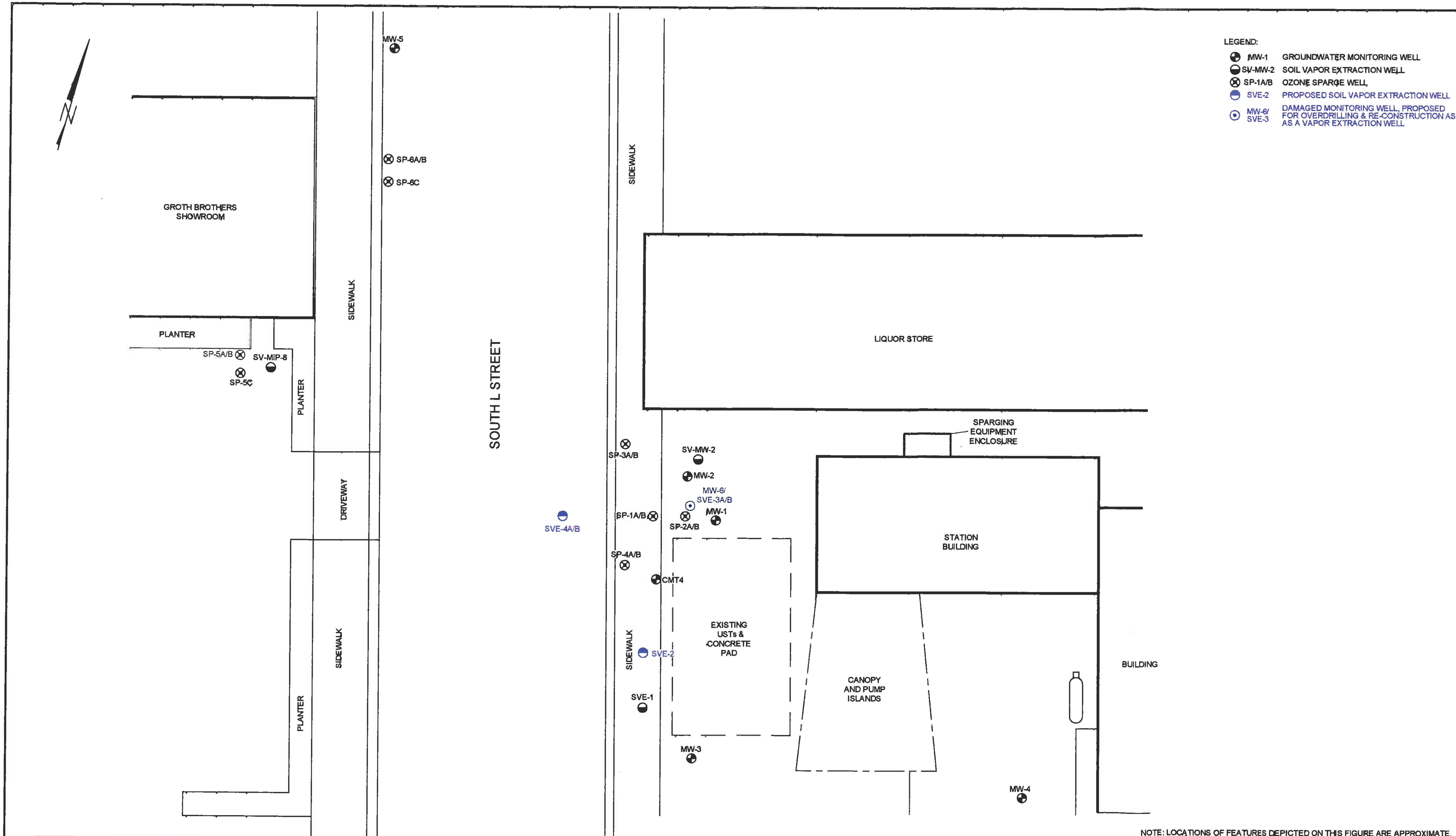
N

QUADRANGLE LOCATION

0 1800 FT

APPROXIMATE SCALE

STRATUS ENVIRONMENTAL, INC.	B & C GAS MINI MART 2008 FIRST STREET LIVERMORE, CALIFORNIA SITE LOCATION MAP	FIGURE 1 PROJECT NO. 2146-2008-01



STRATUS ENVIRONMENTAL, INC.

0 20 FT

APPROXIMATE SCALE

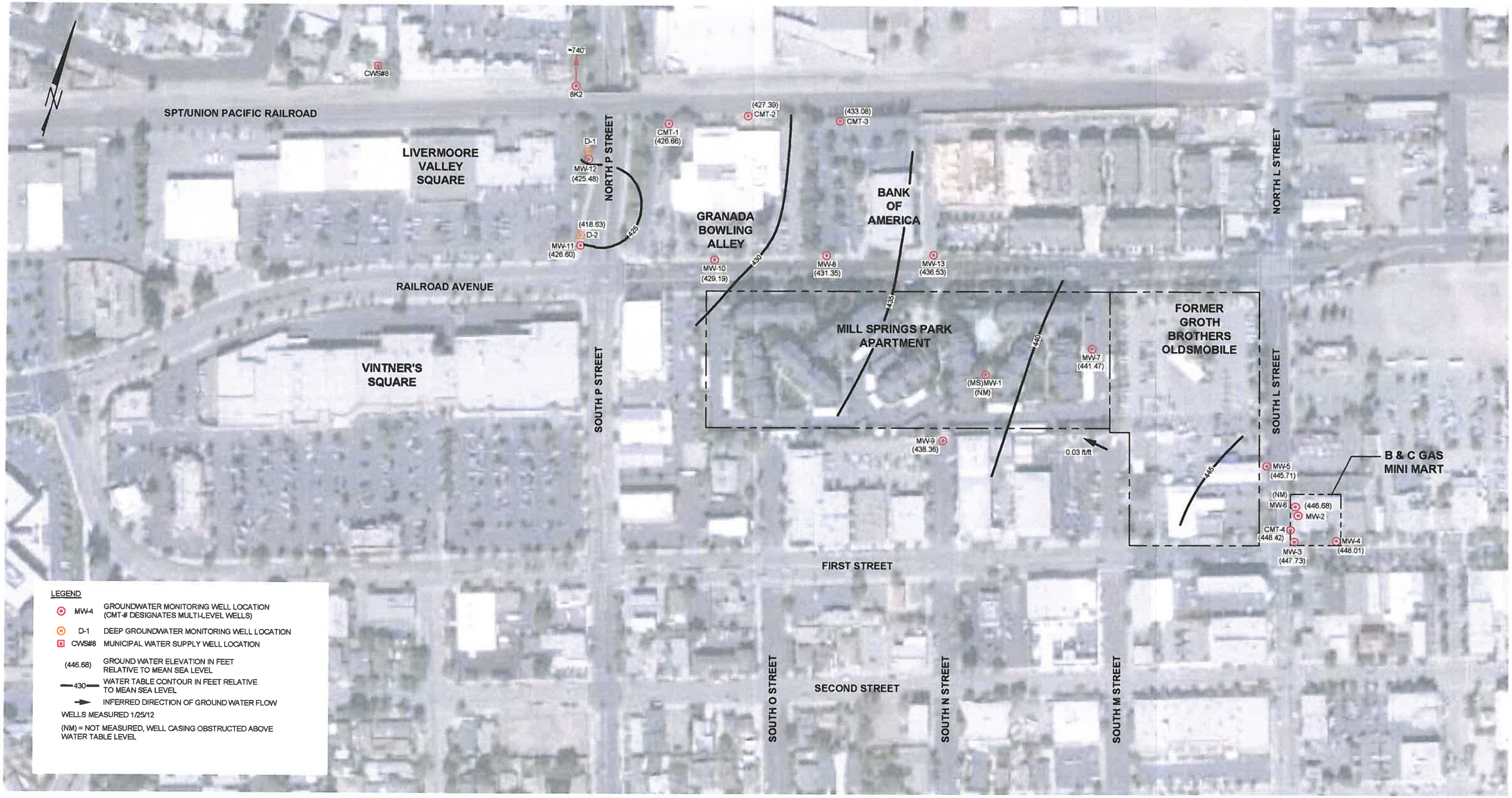
B & C GAS MINI MART
2008 FIRST STREET
LIVERMORE, CALIFORNIA

SITE PLAN

FIGURE
2

PROJECT NO.
2146-2008-01

STRATUS ENVIRONMENTAL, INC.	0 — 200 FT APPROXIMATE SCALE	B & C GAS MINI MART 2008 1st STREET LIVERMORE, CALIFORNIA SITE VICINITY MAP	FIGURE 3 PROJECT NO. 2146-2008-01



STRATUS ENVIRONMENTAL, INC.	0 — 200 FT APPROXIMATE SCALE	B & C GAS MINI MART 2008 1st STREET LIVERMORE, CALIFORNIA GROUNDWATER ELEVATION CONTOUR MAP 1st QUARTER 2012	FIGURE 4 PROJECT NO. 2146-2008-01

APPENDIX A

WELL CONSTRUCTION DETAIL SUMMARY TABLES

Table 3a
Single-Screen Monitoring Well Construction Details
Corrective Action Plan
B&C Gas Station
Livermore, California

Well No.	Drilling Method	Date Installed	T.D. Boring (ft.-bgs)	T.D. Well (ft.-bgs)	Borehole Diameter (inches)	Casing Material (PVC)	Casing Diameter (inches)	Screen Size (inches)	Sand Pack Material	Screened Interval (ft.-bgs)	Sand Pack Interval (ft.-bgs)
MW-1	HSA	Destroyed Nov-07	77	77	8	PVC	2	0.020	#3 sand	27 - 77	25 - 77
MW-2	HSA	Jun-94	60	60	10	PVC	4	0.020	#2/20 sand	30 - 60	27 - 60
MW-3	HSA	Jun-94	60	60	10	PVC	4	0.020	#2/20 sand	30 - 60	27 - 60
MW-4	HSA	Jun-94	60	60	10	PVC	4	0.020	#2/20 sand	30 - 60	27 - 60
MW-5	HSA	Oct-95	42	40	10	PVC	4	0.020	#2 sand	15 - 40	12 - 40
MW-6	HSA	Oct-95	42	40	10	PVC	4	0.020	#2 sand	15 - 40	12 - 40
MW-7	HSA	Jun-99	62	49	8	PVC	2	0.020	#3 sand	29-49	27-51
MW-8	HSA	Jun-99	62	54	8	PVC	2	0.020	#3 sand	34-54	32-54
MW-9	HSA	Jun-99	45	45	8	PVC	2	0.020	#3 sand	25-45	23-45
MW-10	HSA	Jun-99	55	53.5	8	PVC	2	0.020	#3 sand	33.5-53.5	23-55
MW-11	HSA	Jun-99	50	49	8	PVC	2	0.020	#3 sand	29-49	27-49
MW-12	HSA	Jun-99	45	43.5	8	PVC	2	0.020	#3 sand	23.5-43.5	21-45
MW-13	HSA	Jul-99	55	55	8	PVC	2	0.020	#3 sand	35-55	32-55
D-1	HSA	Jun-99	125	125	8	PVC	2	0.020	#3 sand	110-125	104-125
D-2	HSA	Jun-99	115	114	8	PVC	2	0.020	#3 sand	99-114	94-114
(MS)MW-1	HSA	Apr-89	62	60	NA	PVC	2	NA	NA	30-60	NA

Notes:
HAS = Hollow-Stem Auger
T.D. = total depth
ft.-bgs = feet below ground surface
NA = not available
Well construction information for wells MW-2 through MW-6 collected from Remediation Service Int'l boring logs.

Table 3b
Multi-Level Monitoring Well Construction Details
Corrective Action Plan
B&C Gas Station
Livermore, California

Well No.	Zone No.	Drilling Method	Date Installed	T.D. Boring (ft.-bgs)	T.D. CMT (ft.-bgs)	Borehole Diameter (inches)	Casing Material	Casing Diameter (inches)	Sand Pack Material	Port Depth (ft.-bgs)	Sand Pack Interval (ft.-bgs)
CMT-1	Z1	Sonic	7-Aug-03	147	146	6.0	CMT	1.7	#2/12	46	43 - 48.8
	Z2								#2/12	61	59 - 62
	Z3								#2/12	69	66.8 - 70.7
	Z4								#2/12	91	89 - 93.3
	Z5								#2/12	106	104 - 108.4
	Z6								#2/12	123	120.5 - 125.5
	Z7								#2/12	145	142 - 147
CMT-2	Z1	Sonic	11-Aug-03	147	144	6.0	CMT	1.7	#2/12	49	46 - 50.5
	Z2								#2/12	59	57.1 - 60.5
	Z3								#2/12	68	66 - 70
	Z4								#2/12	88	86 - 89.9
	Z5								#2/12	106	104 - 107.5
	Z6								#2/12	125	123 - 126.5
	Z7								#2/12	144	142 - 147
CMT-3	Z1	Sonic	13-Aug-03	187	155	6.0	CMT	1.7	#2/16	44	41 - 46
	Z2								#2/16	55	53 - 58
	Z3								#2/16	65	61.5 - 67.5
	Z4								#2/16	88	86 - 90
	Z5								#2/16	108	104.5 - 110
	Z6								#2/16	132	128.5 - 134
	Z7								#2/16	155	152.5 - 157
CMT-4	Z1	Sonic	14-Aug-03	137	136	6.0	CMT	1.7	#2/16	26	24 - 28.5
	Z2								#2/16	38	35.5 - 40
	Z3								#2/16	52	48.6 - 55
	Z4								#2/16	62	60 - 65
	Z5								#2/16	72	69.6 - 73.5
	Z6								#2/16	107	104 - 110
	Z7								#2/16	136	132.5 - 137

Notes:
T.D. = total depth
ft.-bgs = feet below ground surface
CMT = continuous multi-channel tubing (7 discrete internal channels in a "honeycomb" pattern within the larger tubing)
faint line indicates approximate location of aquiclude in each well

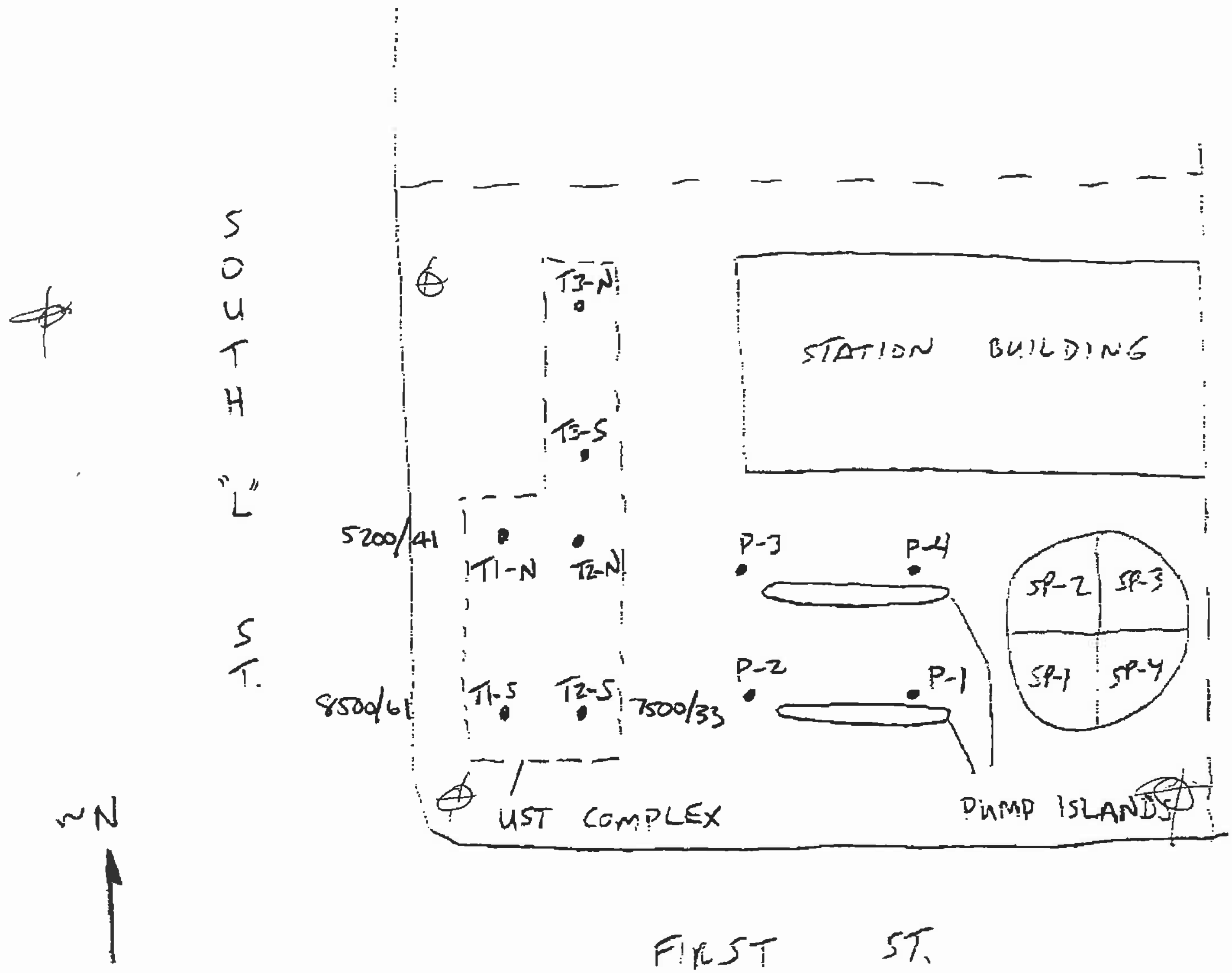
Table 5
Sparge Well Construction Details
Corrective Action Plan
B&C Gas Station
Livermore, California

Well No.	Drilling Method	Date Completed	T.D. Boring (ft.-bgs)	T.D. Well (ft.-bgs)	Borehole Diameter (inches)	Casing Material (PVC)	Casing Diameter (inches)	Screen Size and Type	Sand Pack Material	Seal Material	Seal Interval (ft-bgs)	Screened Interval (ft.-bgs)	Sand Pack Interval (ft.-bgs)
SP-1A	HSA	8/22/2007	48.5	42.0	8.25	SCH 80	1	1.5 in.x 18 in., 25 micron porous PVDF	#0/30	Bentonite Chips	36.5-39.5	40.5-42.0	39.5-42.0
SP-1B	HSA	8/22/2007	48.5	48.5	8.25	SCH 80	1	1.5 in.x 18 in., 25 micron porous PVDF	#0/30	Bentonite Chips	42.0-45.5	47-48.5	45.5-48.5
SP-2A	HSA	8/21/2007	48.5	42.5	8.25	SCH 80	1	1.5 in.x 18 in., 25 micron porous PVDF	#0/30	Bentonite Chips	37.0-40.0	41.0 - 42.5	40.0-42.5
SP-2B	HSA	8/21/2007	48.5	48.5	8.25	SCH 80	1	1.5 in.x 18 in., 25 micron porous PVDF	#0/30	Bentonite Chips	42.5-46.0	47.0-48.5	46.0-48.5
SP-3A	HSA	8/24/2007	49.0	42.0	8.25	SCH 80	1	1.5 in.x 18 in., 25 micron porous PVDF	#0/30	Bentonite Chips	36.5 - 39.5	40.5-42.0	39.5-42.0
SP-3B	HSA	8/24/2007	49.0	48.0	8.25	SCH 80	1	1.5 in.x 18 in., 25 micron porous PVDF	#0/30	Bentonite Chips	42.0-45.5	46.5-48.0	45.5-48.0
SP-4A	HSA	8/22/2007	49.0	42.0	8.25	SCH 80	1	1.5 in.x 18 in., 25 micron porous PVDF	#0/30	Bentonite Chips	36.5-39.5	40.5-42.0	39.5-42.0
SP-4B	HSA	8/22/2007	49.0	49.0	8.25	SCH 80	1	1.5 in.x 18 in., 25 micron porous PVDF	#0/30	Bentonite Chips	42.0-45.5	47.5-49.0	45.5-49.0
SP-5A	HSA	8/21/2007	51.0	41.0	8.25	SCH 80	1	1.5 in.x 18 in., 25 micron porous PVDF	#0/30	Bentonite Chips	35.5-38.5	39.5-41.0	38.5-41.0
SP-5B	HSA	8/21/2007	51.0	48.0	8.25	SCH 80	1	1.5 in.x 18 in., 25 micron porous PVDF	#0/30	Bentonite Chips	41.0-45.5	46.5-48.0	45.5-48.0
SP-5C	HSA	8/21/2007	54.0	54.0	8.25	SCH 80	1	1.5 in.x 18 in., 25 micron porous PVDF	#0/30	Bentonite Chips	48.5-51.5	52.5-54.0	51.5-54.0
SP-6A	HSA	8/23/2007	54.0	42.0	8.25	SCH 80	1	1.5 in.x 18 in., 25 micron porous PVDF	#0/30	Bentonite Chips	36.5-39.5	40.5-42.0	39.5-42.0
SP-6B	HSA	8/23/2007	54.0	49.0	8.25	SCH 80	1	1.5 in.x 18 in., 25 micron porous PVDF	#0/30	Bentonite Chips	42.0-44.0	47.5-49.0	44.0-49.0
SP-6C	HSA	8/24/2007	56.0	54.0	8.25	SCH 80	1	1.5 in.x 18 in., 25 micron porous PVDF	#0/30	Bentonite Chips	48.5-51.5	52.5-54.0	51.5-54.0

Notes:
HAS = Hollow-Stem Auger
T.D. = total depth
ft.-bgs = feet below ground surface
PVDF = polyvinylidene fluoride (Kynar)

APPENDIX B

AVAILABLE SOIL ANALYTICAL DATA AND SELECT SAMPLE LOCATION MAPS



Soil analysis
ppm TPHg / benzene @ 14' bg

B + C GAS MINI MART
2008 FIRST ST.
LIVERMORE, CA.

TABLE A

Gasoline UST and Product Piping Sampling Summary

B&C Gas Mini Mart

2008 1st Street, Livermore, California

Results in mg/Kg - parts per million (ppm)

Gasoline UST and Product Piping Sampling Results

Sample ID	Depth (ft.)	Laboratory	Date	TPH-Gasoline	Benzene	Toluene	Ethylbenzene	Xylenes	MTBE	Total Lead
T1-S-14.0	14	Analytical Science	18-Jul-96	8500	61	250	75	380	80	
T1-N-14.0	14	Analytical Science	18-Jul-96	5200	41	92	46	260	46	
T2-S-14.0	14	Analytical Science	18-Jul-96	7500	33	250	100	400	96	
T2-N-14.0	14	Analytical Science	18-Jul-96	270	0.27	0.43	0.39	2.2	6.6	
T3-S-13.5	13.5	Analytical Science	18-Jul-96	ND	ND	ND	ND	ND	0.24	
T3-N-13.5	13.5	Analytical Science	18-Jul-96	52	1.9	1.5	ND	2.8	36	
P-1-3.0	3	Analytical Science	18-Jul-96	ND	ND	0.013	ND	0.017	0.012	
P-2-3.5	3.5	Analytical Science	18-Jul-96	ND	ND	ND	ND	ND	0.17	
P-3-3.5	3.5	Analytical Science	18-Jul-96	ND	ND	ND	ND	ND	0.015	
P-4-3.0	3	Analytical Science	18-Jul-96	ND	ND	ND	ND	ND	ND	

TPH-Gasoline = Total Petroleum Hydrocarbons calculated as Gasoline.

MTBE = Methyl t-Butyl Ether.

ND = Not detected at or above laboratory detection limits.

TABLE B

Soil Stockpile Sampling Summary
B&C Gas Mini Mart
2008 1st Street, Livermore, California

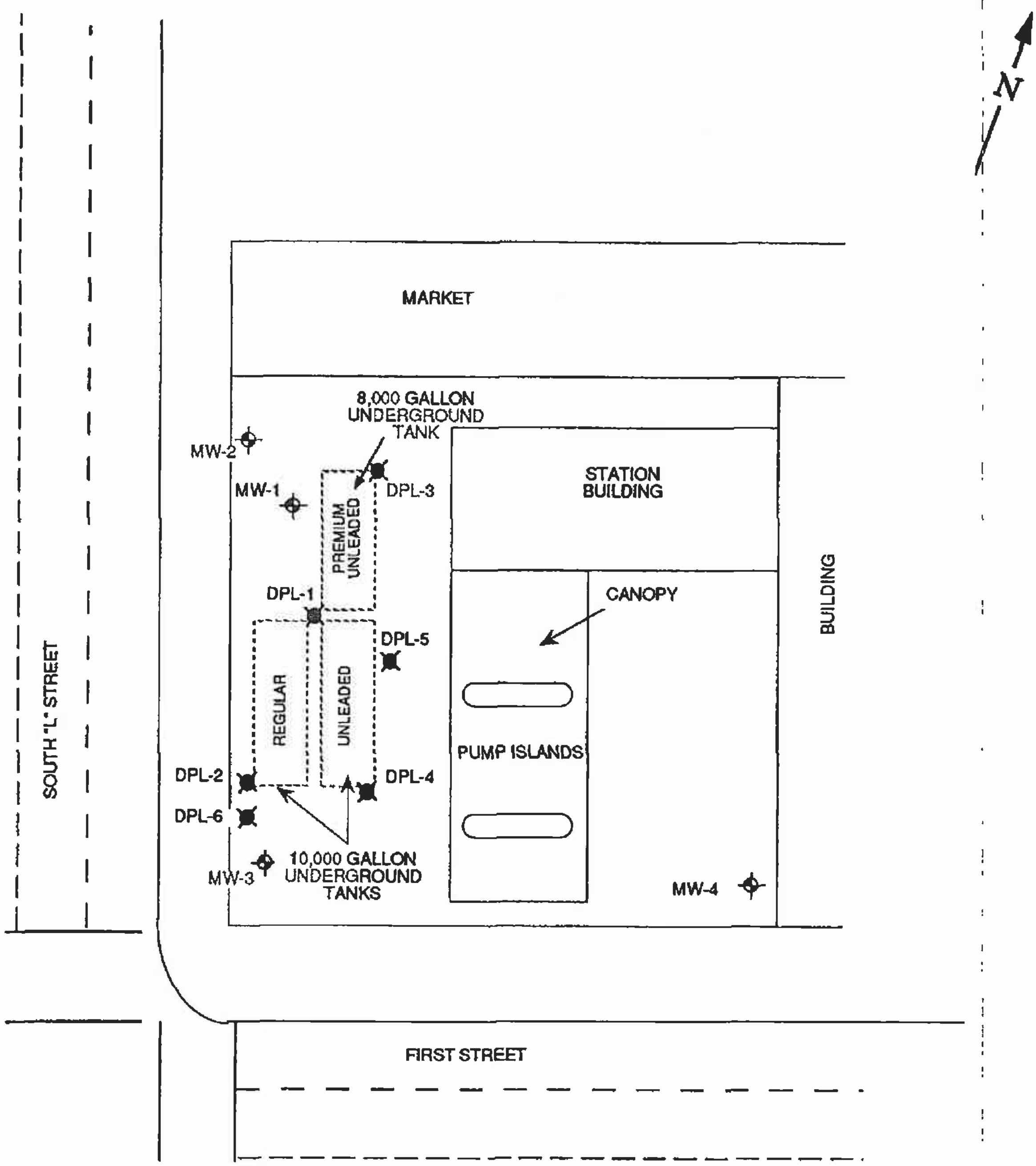
Results in mg/Kg - parts per million (ppm)

UST Excavation and Product Piping Soil Stockpile Sampling Results

Sample ID	Laboratory	Date	TPH-Gasoline	Benzene	Toluene	Ethylbenzene	Xylenes	Total Lead
SP-1(A-D)	Analytical Science	18-Jul-96	320	ND	ND	1.5	3.3	
SP-2(A-D)	Analytical Science	18-Jul-96	300	ND	ND	ND	6.9	
SP-3(A-D)	Analytical Science	18-Jul-96	130	ND	ND	ND	1.2	
SP-4(A-D)	Analytical Science	18-Jul-96	130	ND	ND	ND	0.90	

TPH-Gasoline = Total Petroleum Hydrocarbons calculated as Gasoline.

ND = Not detected at or above laboratory detection limits.



MAP NOT TO SCALE.
SURVEYED DISTANCE BETWEEN WELLS, 1" = 25'.

LEGEND

- GROUNDWATER MONITORING WELL LOCATION
- GEONOMICS AND ON-SITE TECHNOLOGIES BOREHOLE LOCATIONS

2008 FIRST STREET,
LIVERMORE, CA 94550

FIGURE 4: PLOT PLAN WITH HISTORIC BOREHOLE LOCATIONS

RSI REMEDIATION SERVICE, INT'L

TABLE 1

HISTORIC SUMMARY OF SOIL SAMPLE ANALYTICAL RESULTS

2008 FIRST STREET
LIVERMORE, CA

TPH & BTEX Concentrations are in mg/Kg

SAMPLE DATE	SAMPLE ID	SAMPLE LOCATION	TPH	BENZENE	TOLUENE	ETHYL-BENZENE	TOTAL XYLENES	TOTAL LEAD
2/24/88	DPL288-1	DPL-1 @ 14.5'	400	7.5	9.5	NA	27	NA
2/24/88	DPL288-3	DPL-3 @ 15'	ND	ND	ND	NA	ND	NA
2/24/88	DPL288-4	DPL -4 @ 16.5'	ND	ND	ND	NA	ND	NA
9/22/88	GX136-1	MW-1 @ 16'	ND	ND	ND	ND	ND	NA
9/22/88	GX136-2A	MW-1 @ 23.5'	ND	ND	ND	ND	ND	NA
9/22/88	GX136-3	MW-1 @ 28.5'	ND	ND	ND	ND	ND	NA
9/22/88	GX136-4	MW-1 @ 33.5'	31	0.14	0.87	0.74	4.7	NA
9/22/88	GX136-5	MW-1 @ 38.5'	72	ND	ND	ND	4	NA
9/22/88	GX136-6	MW-1 @ 43.5'	10	0.14	0.13	0.18	0.72	NA
9/22/88	GX136-7	MW-1 @ 48.5'	0.51	ND	ND	ND	ND	NA
9/22/88	GX136-8	MW-1 @ 53.5'	1.7	0.12	0.11	0.049	0.29	NA
9/22/88	GX136-9	MW-1 @ 58.5	54	ND	ND	ND	4.4	NA
9/23/88	DPL5-1	DPL-5 @ 16'	ND	ND	ND	ND	ND	NA
9/23/88	DPL5-2	DPL-5 @ 21'	ND	ND	ND	ND	ND	NA
9/23/88	DPL5-3	DPL-5 @ 26'	ND	ND	ND	ND	ND	NA
9/23/88	DPL5-4	DPL-5 @ 31'	33	0.71	1.7	0.77	6.2	NA
9/23/88	DPL5-5	DPL-5 @ 36'	8.5	0.054	1.1	0.23	2	NA
9/23/88	DPL5-6	DPL-5 @ 41'	0.8	0.097	0.1	ND	0.13	NA
9/23/88	DPL5-7	DPL-5 @ 46'	ND	ND	ND	ND	ND	NA
9/23/88	DPL6-1A	DPL-6 @ 17.5'	ND	ND	ND	ND	ND	NA
9/23/88	DPL6-2	DPL-6 @ 21'	ND	ND	ND	ND	ND	NA
9/23/88	DPL6-3	DPL-6 @ 26'	2.5	ND	ND	ND	ND	NA
9/23/88	DPL6-4	DPL-6 @ 31'	12	0.14	0.083	0.31	1.4	NA
9/23/88	DPL6-5	DPL-6 @ 36'	1,600	ND	3.7	5.3	32	NA
9/23/88	DPL6-6	DPL-6 @ 41'	11	0.035	ND	ND	ND	NA
9/23/88	DPL6-7	DPL-6 @ 46'	100	ND	ND	ND	4.8	NA
6/16/94	MW-4 @ 40'	MW-4 @ 40'	ND	0.009	17	0.006	0.02	12
6/17/94	MW-3 @ 10'	MW-3 @ 10'	390	0.4	2.2	2.2	11	150
6/17/94	MW-3 @ 15'	MW-3 @ 15'	390	0.3	1.9	2.2	11	190
6/17/94	MW-3 @ 20'	MW-3 @ 20'	ND	0.17	0.012	0.006	0.081	12
6/17/94	MW-3 @ 30'	MW-3 @ 30'	300	ND	1.6	1.7	8.3	14
6/17/94	MW-3 @ 35'	MW-3 @ 35'	130	1.1	3.6	1.1	4.9	12
6/17/94	MW-3 @ 45'	MW-3 @ 45'	230	0.62	3.8	2.5	10	28
6/17/94	MW-3 @ 50'	MW-3 @ 50'	100	0.35	0.82	0.56	2	7
6/17/94	MW-3 @ 55'	MW-3 @ 55'	270	0.47	3	1.9	6.7	24
6/17/94	MW-2 @ 40'	MW-2 @ 40'	77	0.36	2.5	1.1	7	10
6/18/94	MW-2 @ 45'	MW-2 @ 45'	28	0.3	0.16	0.4	0.97	8
6/18/94	MW-2 @ 50'	MW-2 @ 50'	6	0.04	0.08	0.07	0.3	9
6/18/94	MW-2 @ 60'	MW-2 @ 60'	2	0.045	0.18	0.041	0.23	14

2/88 Sampling results from Geonomics Inc. report
9/88 Sampling results from On-Site Technologies Inc. report
6/94 Sampling results from RSI report
TPH = Total petroleum hydrocarbons as gasoline
NA = Not analyzed for this constituent

REMEDIATION SERVICE, INT'L

TABLE 3

HYDROPUNCH SOIL & GROUNDWATER ANALYTICAL RESULTS

2008 FIRST STREET
LIVERMORE, CA

Soil sample analytical results are in mg/Kg
Groundwater sample analytical results are in ug/L

SOIL ppm

SAMPLE DATE	SAMPLE DESCRIPTION	TPH	BENZENE	TOLUENE	ETHYL-BENZENE	TOTAL XYLENES
3/8/95	H-1 @ 20'	ND	0.019	0.043	0.014	0.061
3/8/95	H-1 @ 25'	ND	ND	ND	ND	ND
3/8/95	H-1 @ 30'	380	4.8	16	7.4	34
3/8/95	H-2 @ 20'	ND	ND	ND	ND	ND
3/8/95	H-2 @ 25'	ND	0.024	0.008	0.013	0.04
3/8/95	H-2 @ 30'	6,100	35	180	120	540
3/8/95	H-3 @ 20'	ND	ND	ND	ND	ND
3/8/95	H-3 @ 25'	ND	ND	ND	ND	ND
3/8/95	H-3 @ 30'	980	9.1	45	20	98
3/8/95	H-4 @ 20'	ND	ND	ND	ND	ND
3/8/95	H-4 @ 25'	ND	ND	ND	ND	ND
3/8/95	H-4 @ 30'	ND	ND	ND	ND	ND
3/8/95	H-4 @ 20'	ND	ND	ND	ND	ND
3/8/95	H-4 @ 25'	ND	ND	ND	ND	ND
3/8/95	H-4 @ 30'	ND	ND	ND	ND	ND

GROUNDWATER ppb

SAMPLE DATE	SAMPLE DESCRIPTION	TPH	BENZENE	TOLUENE	ETHYL-BENZENE	TOTAL XYLENES
3/8/95	H-4	1,500	57	33	9.4	42
3/8/95	H-5	620	22	24	8	42

TPH = Total petroleum hydrocarbons as gasoline
NA = Not analyzed for this constituent

Table 1
2006 & 2007 Soil Analytical Results
B & C Gas Station
Livermore, California

Sample ID	Depth (feet)	Date Sampled	TPH-Gas (mg/kg)	Benzene (mg/kg)	Toluene (mg/kg)	Ethyl benzene (mg/kg)	Xylenes (mg/kg)	MTBE (mg/kg)	DIPE (mg/kg)	ETBE (mg/kg)	TAME (mg/kg)	Tert-Butanol (mg/kg)	Methanol (mg/kg)	Ethanol (mg/kg)
Ceiling Value			5000	870	650	400	420	500						
Residential Direct Exposure			4200	11	650	400	420	2600						
Vapor Intrusion			soil gas	soil gas	soil gas	soil gas	soil gas	soil gas						
Drinking Water Source			83	0.044	2.9	3.3	2.3	0.023						
Tier 1 Soil ESL			83	0.044	2.9	3.3	2.3	0.023	NE	NE	NE	NE	NE	NE
CB-2 40-40.5	40 - 40.5	3/28/2006	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	0.02	<0.0050	<0.0050	<0.0050	0.0066	<0.20	<0.010
CB-3 46.5-47	46.5 - 47	3/29/2006	<1.0	<0.0050	<0.0050	0.014	0.0088	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.2	<0.010
CB-8 46.5-47	46.5 - 47	3/29/2006	13	0.0081	<0.0050	0.066	0.11	0.018	<0.0050	<0.0050	<0.0050	<0.015	<0.25	<0.025
CB-10 45-45.5	45 - 45.5	3/29/2006	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	0.0057	<0.0050	<0.0050	<0.0050	<0.0050	<0.2	<0.010
CB-11 41.5-42	41.5 - 42	3/28/2006	<1.0	<0.0050	<0.0050	0.0051	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.2	<0.010
CB-12 47.5-48	47.5 - 48	3/28/2006	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.20	<0.010
CB-13 42-42.5	42 - 42.5	3/29/2006	**460**	**0.081**	0.058	2.1	0.36	<0.025	<0.025	<0.025	<0.025	<0.15	<5.0	<0.50
SP-1	40	8/22/2007	**260**	<0.050	0.056	**4.7**	**18**	NA	NA	NA	NA	NA	NA	NA
SP-2	43	8/20/2007	71	<0.025	<0.025	0.72	2.0	NA	NA	NA	NA	NA	NA	NA
SP-3	35	8/24/2007	4.4	<0.0050	<0.0050	0.019	<0.0050	NA	NA	NA	NA	NA	NA	NA
SP-5	45	8/20/2007	**290**	**0.070**	0.059	**4.5**	**3.5**	NA	NA	NA	NA	NA	NA	NA
SP-6	35	8/20/2007	2.8	0.058	<0.0050	0.070	0.015	NA	NA	NA	NA	NA	NA	NA
SVE-1	10	8/24/2007	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	NA	NA	NA	NA	NA	NA	NA
SVE-1	15	8/24/2007	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	NA	NA	NA	NA	NA	NA	NA
SVE-1	20	8/24/2007	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	NA	NA	NA	NA	NA	NA	NA
SVE-1	25	8/24/2007	6.6	<0.0050	<0.0050	0.16	1.6	NA	NA	NA	NA	NA	NA	NA

Notes:

mg/kg = milligram per kilogram
TPH = Total petroleum hydrocarbons
MTBE = Methyl tert-butyl ether
DIPE = Di-isopropyl ether
ETBE = Ethyl tert-butyl ether
TAME = tert-Amyl methyl ether
Bold = exceedance of Tier 1 ESL
NA = not analyzed
NE = not established

TABLE 3

TABULATED SOIL AND GROUNDWATER ANALYTICAL RESULTS

2008 FIRST ST.
LIVERMORE, CA
Groundwater Concentrations are in ug/L
Soil Concentrations are in mg/Kg

SAMPLE DATE	GROUNWATER SAMPLE LOCATION	TPH	BENZENE	TOLUENE	ETHYL-BENZENE	TOTAL XYLENES	MTBE
10/11/95	G-1	380	61	0.8	ND	1.5	80
10/11/95	G-2	140	2.5	ND	ND	ND	9.4
10/11/95	G-3	92,000	11,000	18,000	2,200	11,000	18000
10/11/95	G-4	8000	46	24	8	28	150

SAMPLE DATE	SOIL SAMPLE LOCATION	TPH	BENZENE	TOLUENE	ETHYL-BENZENE	TOTAL XYLENES	MTBE
10/10/95	MW-5 @ 10'	ND	ND	ND	ND	ND	ND
10/10/95	MW-5 @ 15'	ND	ND	ND	ND	ND	ND
10/10/95	MW-5 @ 20'	ND	ND	ND	ND	ND	ND
10/10/95	MW-5 @ 25'	ND	0.009	ND	ND	ND	0.026
10/10/95	MW-5 @ 30'	790	13	41	13	66	20
10/10/95	MW-5 @ 35'	2.5	0.43	0.15	0.039	0.1	5
10/10/95	MW-5 @ 40'	250	3.1	8	3.1	14	3.2

G= Groundwater Hydropunch
TPH= Total petroleum hydrocarbons as gasoline

REMEDIATION SERVICE, INT'L.

Table 2
Summary of Petroleum Hydrocarbons in Soil
2008 1st Street, Livermore, California

Units: micrograms per liter (mg/kg)

Sample ID	Sample Depth (ft bgs)	Sample Date	USEPA Method 8260B					
			TPH Gasoline	Benzene	Toluene	Ethyl-benzene	Xylenes	MTBE
SP-1	40	8/22/2007	260	<0.050	0.056	4.7	18	<0.050
SP-2	43	8/20/2007	71	<0.025	<0.025	0.72	2.0	<0.025
SP-3	35	8/24/2007	4.4	<0.0050	<0.0050	0.019	<0.0050	<0.0050
SP-5	45	8/20/2007	290	0.070	0.059	4.5	3.5	<0.040
SP-6	35	8/24/2007	2.8	0.058	<0.0050	0.070	0.015	0.052
SVE-1	10	8/24/2007	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	0.0083
SVE-1	15	8/24/2007	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
SVE-1	20	8/24/2007	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
SVE-1	25	8/24/2007	6.6	0.028	<0.0050	0.16	0.099	1.6

NOTES:

Laboratory analyses performed according to USEPA method 8260B

TPH - Total Petroleum Hydrocarbons

MTBE - Methyl *tertiary*-butyl ether

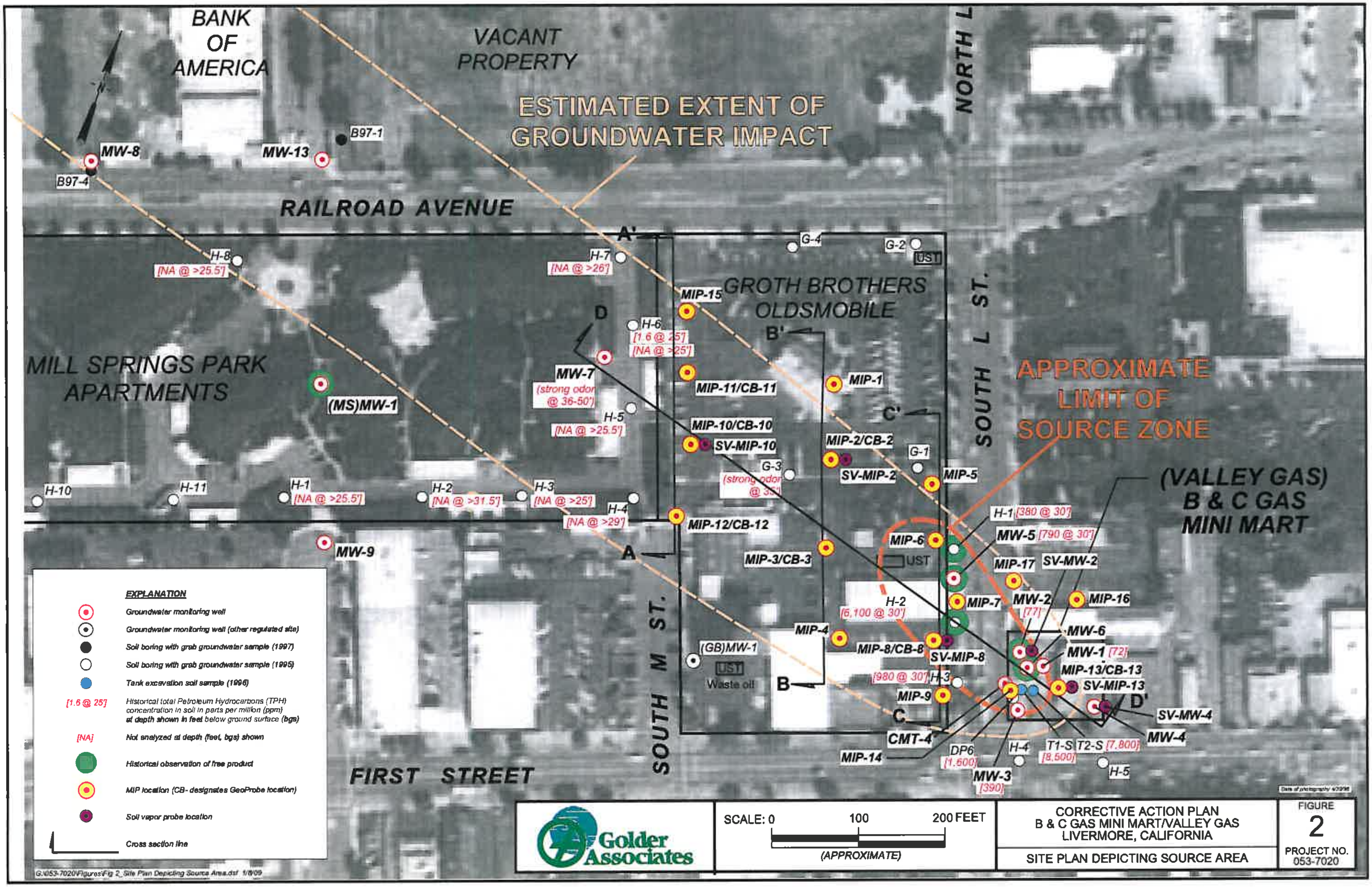
NA - Not Analyzed

ND - Not detected at specified detection limits; for raised detection limits, higher value is given in table.

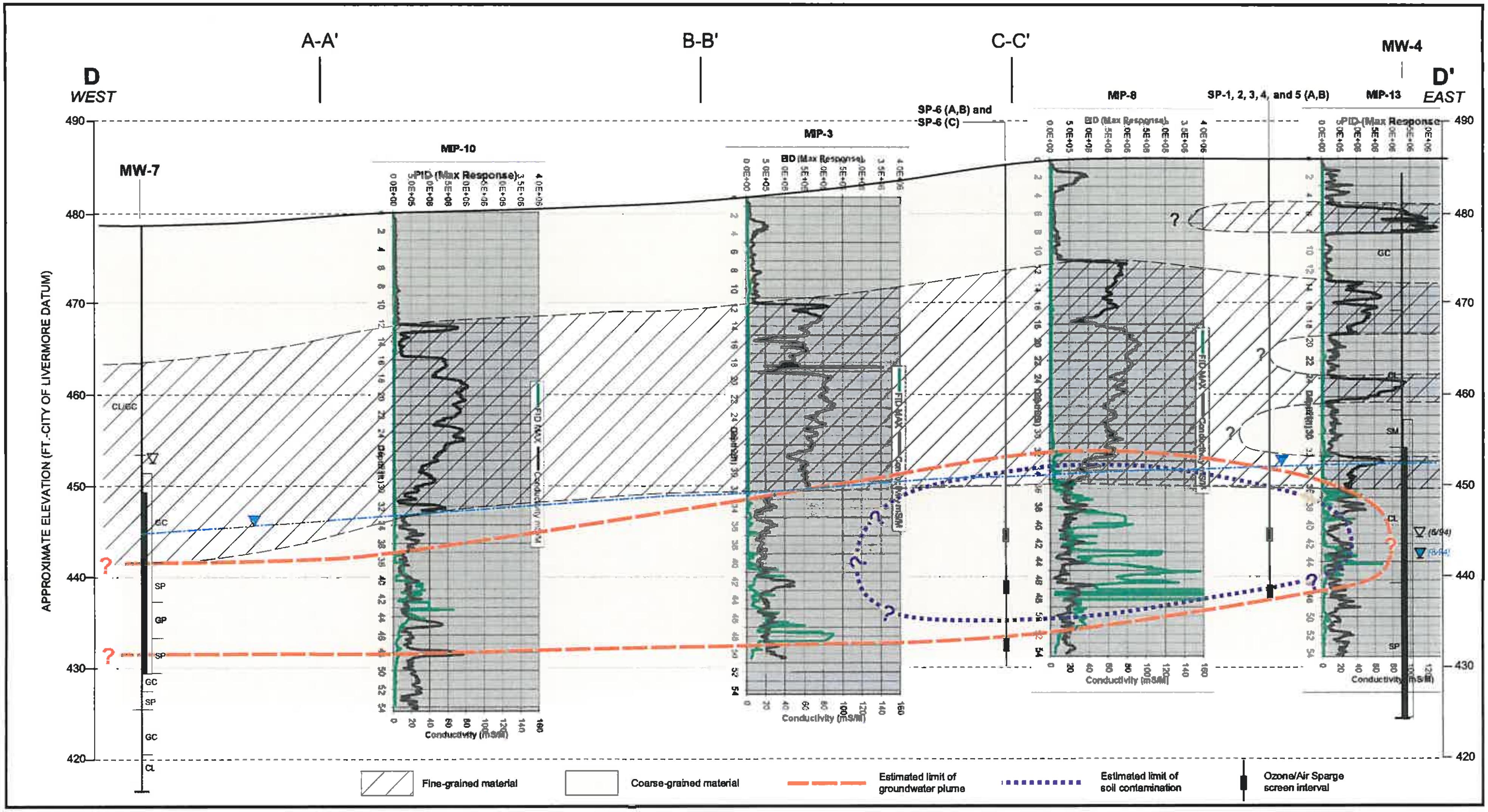
ft bgs - Feet below ground surface

APPENDIX C

FIGURES ILLUSTRATING THE APPROXIMATE EXTENT OF PETROLEUM HYDROCARBON IMPACT TO SOIL AND GROUNDWATER



BANK OF AMERICA
VACANT PROPERTY
ESTIMATED EXTENT OF GROUNDWATER IMPACT
NORTH L
RAILROAD AVENUE
MW-8
B97-4
MW-13
B97-1
MILL SPRINGS PARK APARTMENTS
(MS)MW-1
GROTH BROTHERS OLDSMOBILE
SOUTH L ST.
SOUTH M ST.
FIRST STREET
APPROXIMATE LIMIT OF SOURCE ZONE
(VALLEY GAS) B & C GAS MINI MART
H-8 [NA @ >25.5']
H-7 [NA @ >26']
H-6 [1.6 @ 25'] [NA @ >25']
MW-7 (strong odor @ 36-50')
H-5 [NA @ >25.5']
H-10
H-11
H-1 [NA @ >25.5']
H-2 [NA @ >31.5']
H-3 [NA @ >25']
H-4 [NA @ >29']
MW-9
MIP-15
MIP-11/CB-11
MIP-10/CB-10
SV-MIP-10
MIP-12/CB-12
MIP-3/CB-3
MIP-1
MIP-2/CB-2
SV-MIP-2
G-1
G-2
G-3 (strong odor @ 35')
G-4
UST
MIP-5
MIP-4
(GB)MW-1
UST
Waste oil
H-2 [6,100 @ 30']
MIP-6
UST
H-1 [380 @ 30']
MW-5 [790 @ 30']
MIP-17
SV-MW-2
MIP-7
MW-2 [77']
MIP-16
MW-6
MW-1 [72]
MIP-13/CB-13
SV-MIP-13
MIP-8/CB-8
SV-MIP-8
[980 @ 30'] H-3
MIP-9
CMT-4
MIP-14
DP6 [1,600]
H-4
MW-3 [390]
T1-S [8,500]
T2-S [7,800]
SV-MW-4
MW-4
H-5
A
A'
B
B'
C
C'
D
D'
EXPLANATION
Groundwater monitoring well
Groundwater monitoring well (other regulated site)
Soil boring with grab groundwater sample (1997)
Soil boring with grab groundwater sample (1995)
Tank excavation soil sample (1996)
[1.6 @ 25'] Historical total Petroleum Hydrocarbons (TPH) concentration in soil in parts per million (ppm) at depth shown in feet below ground surface (bgs)
[NA] Not analyzed at depth (feet, bgs) shown
Historical observation of free product
MIP location (CB- designates GeoProbe location)
Soil vapor probe location
Cross section line
G:\053-7020\Figures\Fig 2_Site Plan Depicting Source Area.dsf 1/8/09
Golder Associates
SCALE: 0 100 200 FEET
(APPROXIMATE)
CORRECTIVE ACTION PLAN
B & C GAS MINI MART/VALLEY GAS
LIVERMORE, CALIFORNIA
SITE PLAN DEPICTING SOURCE AREA
FIGURE 2
PROJECT NO. 053-7020



Golder Associates

SCALE: 0 50 100 150 FEET

(V.E.= 5X)

CORRECTIVE ACTION PLAN
B & C GAS MINI MART/VALLEY GAS
LIVERMORE, CALIFORNIA

GEOLOGIC CROSS SECTION D-D'

FIGURE 3

PROJECT NO. 053-7020

G:\053-7020\FIGURES\Fig 3_XSEC DD_CAP.DSF 1/8/09

APPENDIX D

FIELD PRACTICES AND PROCEDURES

FIELD PRACTICES AND PROCEDURES

General procedures used by Stratus in site assessments for drilling exploratory borings, collecting samples, and installing monitoring wells are described herein. These general procedures are used to provide consistent and reproducible results; however, some procedure may be modified based on site conditions. A California state-registered geologist supervises the following procedures.

PRE-FIELD WORK ACTIVITIES

Health and Safety Plan

Field work performed by Stratus at the site is conducted according to guidelines established in a Site Health and Safety Plan (SHSP). The SHSP is a document which describes the hazards that may be encountered in the field and specifies protective equipment, work procedures, and emergency information. A copy of the SHSP is at the site and available for reference by appropriate parties during work at the site.

Locating Underground Utilities

Prior to commencement of any work that is to be below surface grade, the location of the excavation, boring, etc., is marked with white paint as required by law. An underground locating service such as Underground Service Alert (USA) is contacted. The locating company contacts the owners of the various utilities in the vicinity of the site to mark the locations of their underground utilities. Any invasive work is preceded by hand augering to a minimum depth of five feet below surface grade to avoid contact with underground utilities.

FIELD METHODS AND PROCEDURES

Exploratory Soil Borings

Soil borings will be drilled using a truck-mounted, hollow stem auger drill rig. Soil samples for logging will be obtained from auger-return materials and by advancing a modified California split-spoon sampler equipped with brass or stainless steel liners into undisturbed soil beyond the tip of the auger. Soils will be logged by a geologist according to the Unified Soil Classification System and standard geological techniques. Drill cuttings well be screened using a portable photoionization detector (PID) or a flame ionization detector (FID). Exploratory soil borings not used for monitoring well installation will be backfilled to the surface with a bentonite-cement slurry pumped into the boring through a tremie pipe.

Soil sampling equipment will be cleaned with a detergent water solution, rinsed with clean water, and equipped with clean liners between sampling intervals. Augers and samplers will be steam cleaned between each boring to reduce the possibility of cross contamination. Steam cleaning effluent will be contained in 55-gallon drums and temporarily stored on site. The disposal of the effluent will be the responsibility of the client.

Drill cuttings generated during the drilling procedure will be stockpiled on site. Stockpiled drill cuttings will be placed on and covered with plastic sheeting. The stockpiled soil is typically characterized by collecting and analyzing composite samples from the stockpile. Stratus Environmental will recommend an appropriate method for disposition of the cuttings based on the analytical results. The client will be responsible for disposal of the drill cuttings.

Soil Sample Collection

During drilling, soil samples will be collected in cleaned brass, two by six inch tubes. The tubes will be set in an 18-inch-long split-barrel sampler. The sampler will be conveyed to bottom of the borehole attached to a wire-line hammer device on the drill rig. When possible, the split-barrel sampler will be driven its entire length, either hydraulically or by repeated pounding a 140-pound hammer using a 30-inch drop. The number of drops (blows) used to drive the sampler will be recorded on the boring log. The sampler will be extracted from the borehole, and the tubes containing the soil samples will be removed. Upon removal, the ends of the lowermost tube will be sealed with Teflon sheets and plastic caps. Soil samples for chemical analysis will be labeled, placed on ice, and delivered to a state-certified analytical laboratory, along with the appropriate chain-of-custody documentation.

Soil Classification

As the samples are obtained in the field, they will be classified by the field geologist in accordance with the Unified Soil Classification System. Representative portions of the samples will be retained for further examination and for verification of the field classification. Logs of the borings indicating the depth and identification of the various strata and pertinent information regarding the method of maintaining and advancing the borehole will be prepared.

Soil Sample Screening

Soil samples selected for chemical analysis will be determined from a head-space analysis using a PID or an FID. The soil will be placed in a Ziploc® bag, sealed, and allowed to reach ambient temperature, at which time the PID probe will be inserted into the Ziploc® bag. The total volatile hydrocarbons present are detected by the PID and reported in parts per million by volume (ppmv). The PID will be calibrated to an isobutylene standard.

Generally two soil samples from each soil boring will be submitted for chemical analysis unless otherwise specified in the scope of work. Soil samples selected for analysis typically represent the highest PID reading recorded for each soil boring and the sample just above first-encountered groundwater.

Stockpiled Drill Cuttings and Soil Sampling

Soil generated during drilling operations will be stockpiled on-site. The stockpile will be set on and covered by plastic sheeting in a manner to prevent rain water from coming in contact with the soil. Prior to collecting soil samples, Stratus personnel will calculate the approximate volume of soil in the stockpile. The stockpile will then divided into sections, if warranted, containing the predetermined volume sampling interval. Soil samples will be collected at 0.5 to 2 feet below the surface of the stockpile. Four soil samples will be collected from the stockpile and composited into one sample by the laboratory prior to analysis. The soil samples will be collected in cleaned brass, two by six inch tubes using a hand driven sampling device. To reduce the potential for cross-contanlination between samples, the sampler will be cleaned between each sampling event. Upon recovery, the sample container will be sealed at each end with Teflon sheeting and plastic caps to minimize the potential of volatilization and cross-contanlination prior to chemical analysis. The soil sample will be labeled, placed on ice, and delivered to a state-certified analytical laboratory, along with the appropriate chain-of-custody documentation.

Direct Push Technology, Soil Sampling

GeoProbe™ is a drilling method of advancing small diameter borings without generating soil cuttings. The GeoProbe™ system consists of a 2-inch diameter, 5-feet long, stainless steel soil sampling tool that is hydraulically advanced into subsurface soils by a small, truck-mounted rig. The sampling tool is designed similar to a California-modified split-spoon sampler, and lined with a 5-foot long, clear acrylic sample tube that enables continuous core sampling.

To collect soil samples, the sampler is advanced to the desired sampling depth. The mouth of the sampling tool is plugged to prevent soil from entering the sampler. Upon reaching the desired sampling depth, the plug at the mouth of the sample tool is disengaged and retracted, the sampler is advanced, and the sampler is filled with soil. The sample tool is then retrieved from the boring, and the acrylic sample tube removed. The sample tool is then cleaned, a new acrylic tube is placed inside and the sampling equipment is advanced back down the borehole to the next sample interval.

The Stratus geologist describes the entire interval of soil visible in the acrylic tube. The bottom-most 6-inch long section is cut off and retained for possible chemical analysis. The ends of the chemical sample are lined with Teflon™ sheets, capped, labeled, and placed in an ice-chilled cooler for transport to California Department of Health Services-certified analytical laboratory under chain-of-custody.

Direct Push Technology, Water Sampling

A well known example of direct push technology for water sampling is the Hydropunch®. For the purpose of this field method the term hydropunch will be used instead of direct push technology for water sampling.

The hydropunch is typically used with a drill rig. A boring is drilled with hollow stem-augers to just above the sampling zone. In some soil conditions the drill rig can push directly from the surface to the sampling interval. The hydropunch is conveyed to the bottom of the boring using drill rods. Once on bottom the hydropunch is driven a maximum of five feet. The tool is then opened by lifting up the drill rod no more than four feet. Once the tool is opened, water enters and a sample can be collected with a bailer or tubing utilizing a peristaltic pump. Soil particles larger than silt are prevented from entering the tool by a screen within the tool. The water sample is collected, labeled, and handled according to the Quality Assurance Plan.

Monitoring Well Installation

Monitoring wells will be completed by installing 2 to 6 inch-diameter Schedule 40 polyvinyl chloride (PVC) casing. The borehole diameter for a monitoring well will be a minimum of four inches larger than the outside diameter of the casing. The 2-inch-diameter flush-threaded casing is generally used for wells dedicated for groundwater monitoring purposes.

A monitoring well is typically cased with threaded, factory-perforated and blank Schedule 40 PVC. The perforated interval consists of slotted casing, generally with 0.01 or 0.02 inch-wide by 1.5-inch-long slots, with 42 slots per foot. The screened sections of casing are factory machine slotted and will be installed approximately 5 feet above and 10 feet below first-encountered water level. The screened interval will allow for seasonal fluctuation in water level and for monitoring floating product. A threaded or slip PVC cap is secured to the bottom of the casing. The slip cap can be secured with stainless steel screws or friction; no solvents or cements are used. Centering devices may be fastened to the casing to ensure even distribution of filter material and grout within the borehole annulus. The well casing is thoroughly washed and/or steam cleaned, or may be purchased as pre-cleaned, prior to completion.

A filter pack of graded sand will be placed in the annular space between the PVC casing and the borehole wall. Sand will be added to the borehole through the hollow stem of the augers to provide a uniform filter pack around the casing and to stabilize the borehole. The sand pack will be placed to a maximum of 2 feet above the screens, followed by a minimum 1-foot seal consisting of bentonite pellets.

Cement grout containing 5 percent bentonite or concrete will be placed above the bentonite seal to the ground surface. A concrete traffic-rated vault box will be installed over the monitoring well(s). A watertight locking cap will be installed over the top of the well casing. Reference elevations for each monitoring well will be surveyed when more than two wells will be located on site. Monitoring well elevations will be surveyed by a California licensed surveyor to the nearest 0.01-foot relative to mean sea level (MSL). Horizontal coordinates of the wells will be measured at the same time.

Exploratory boring logs and well construction details will be prepared for the final written report.