STELLAR ENVIRONMENTAL SOLUTIONS, INC.
2198 Sixth Street, Suite 201 · Berkeley, CA 94710
Tel: (510)644-3123 · Fax: (510)644-3859
Geoscience & Engineering Consulting

RECEIVED
By lopprojectop at 7:59 am, May 04, 2006

May 3, 2006

Mr. Barney Chan
Hazardous Materials Specialist
Alameda County Health Care Services Agency
Department of Environmental Health, Local Oversight Program
1131 Harbor Bay Parkway, Suite 250
Alameda, California 94502

Subject: Workplan for Groundwater Characterization and Interim Corrective Actions
2836 Union Street, Oakland, California
Alameda County Environmental Health Case No. RO0002901

Dear Mr. Chan:

INTRODUCTION AND BACKGROUND

On behalf of the property owner (Mr. Larry Wadler), Stellar Environmental Solutions, Inc. (SES) is providing to Alameda County Health Care Services Agency, Department of Environmental Health (Alameda County Environmental Health) this workplan for groundwater characterization (well installation and monitoring) and interim corrective actions. The site history and data and findings from environmental site investigations that form the rationale for this corrective action workplan are included in the Corrective Action Investigation Report (attached).

The Responsible Party has submitted an application for eligibility determination to the California Underground Storage Tank Cleanup Fund (Fund). The proposed work will be conducted at the direction of and under oversight by Alameda County Environmental Health to ensure maximum potential for reimbursement by the Fund.

Attachment A contains tabular summaries of previous analytical results, and figures showing the former UST, UST removal-related sampling locations, and borehole soil and groundwater results and contaminant distribution.

TECHNICAL OBJECTIVES AND PROPOSED SCOPE OF WORK

The general objective of the proposed work is to address two of the generally required regulatory criteria for site closure: 1) removing the contaminant source (in this case, residual contaminated soil that will act as a continued impact to groundwater); and 2) characterizing groundwater contamination.

Groundwater Characterization Program

Pre-Field Work Planning and Permits

SES will conduct the following pre-fieldwork planning and permitting elements for the proposed borehole program:

- Obtain workplan concurrence from Alameda County Environmental Health, or proceed with the proposed investigation if Alameda County Environmental Health does not respond within the 60-day lead agency review period stipulated by California Code of Regulations, Title 23, Division 3, Chapter 16, Underground Tank Regulations.
- Obtain a borehole drilling permit from Alameda County Public Works Agency.
- Obtain from the City of Oakland Encroachment an Excavation Permit, which is required for the proposed wells drilled in Union Street.
- Make a site visit to mark drilling locations, then notify Underground Service Alert.

Technical Rationale Well Location and Construction Specifications

As discussed in detail in our April 2006 technical report, we have potentially identified a shallow perched water-bearing zone (at approximately 8 to 12 feet). This zone is clearly in some contact with the deeper common water table at approximately 20 feet below ground surface (bgs) given the hydrocarbon impacts to the lower zone, but the hydraulic regimes at the two depths may be different. To close this data gap, SES will conduct detailed lithologic logging during well installation activities, and will install two "nested" wells, with two screened intervals at each nested well location, one in each water-bearing zone. One of the nested wells will be placed in the area of the observed "perched" water, and one will be placed in the offsite area outside the perched zone. The other two wells will be screened only within the deeper water-bearing zone. All wells will be used to collect (quarterly) water elevations to evaluate groundwater flow direction and gradient, and to collect groundwater samples for laboratory analysis.

Because the lower water bearing zone is relatively thin (approximately 2 to 3 feet), we propose to use 2-foot-long well screens for those wells. We are proposing to utilize 5-foot-long screened intervals in the two wells monitoring the upper water-bearing zone. The longer screens are needed because: 1) we hope to utilize the source-area shallow well screen as a potential vapor monitoring point (to support evaluating future corrective actions); and 2) at the offsite location, there is no known water-bearing zone identified, and the longer screen therefore would have a greater potential to intercept water above the lower water-bearing zone. .

We propose to install groundwater monitoring wells at the following four locations:

- MW-1: In the area of maximum groundwater contamination (near BH-02) to evaluate conditions near the contaminant source (nested well monitoring the 10- and 20-foot zones).
- MW-2: Within the former eastern half of the UFST excavation (near BH-4) as an upgradient monitoring point (monitoring the 20-foot zone).
- MW-3: In the front yard of the adjoining (to the north) residence to monitor the downgradient portion of the plume (nested well monitoring the 10- and 20-foot zones).
- MW-4: In Union Street (near BH-12) to monitor the downgradient portion of the plume (monitoring the 20-foot zone).

As discussed later in this workplan, we will install a temporary dewatering point, assuming that water is encountered, in the backfill of the proposed soil corrective action (at the former dispenser area) to allow for groundwater pumping as an interim corrective action. While samples may be collected for analysis (to evaluate pre- and post-pumping contaminant concentrations), this dewatering point will not be constructed as a well, nor will it be included in the proposed groundwater characterization program.

Figure 1 is a site location map; Figure 2 shows the proposed well locations.

Borehole Drilling and Sampling

The drilling, sampling, and well installations will be completed using a licensed drilling subcontractor under the direction of SES. The boreholes will be advanced with a Geoprobe™ (direct-push) rig that advances approximately 2-inch-diameter sampling rods into undisturbed soil and collects continuous core samples.

All four of the groundwater monitoring wells will be located within several feet of existing recent boreholes from which soil analytical data were obtained. Proposed borehole soil samples will be collected for laboratory analysis only at depths not previously characterized (i.e., to address data gaps on lithology and contaminant concentrations), as follows.

MW-1 (at the BH-02 location) and MW-2 (at the BH-04 location). These boreholes will be advanced beyond the 12- to 14-foot previous borehole depths, to lithologically log the bore and intercept the lower water-bearing zone. One soil sample will be collected from each borehole from the approximate middle of the clay zone that separates the two water-bearing zones (or at a depth of approximately 15 feet if a lower water-bearing zone is not encountered).

3-D TopoQuads Copyright © 1999 DeLorme Yarmouth, ME 04096

1000 ft Scale: 1 : 43,750 Detail: 12-2 Datum: WGS84

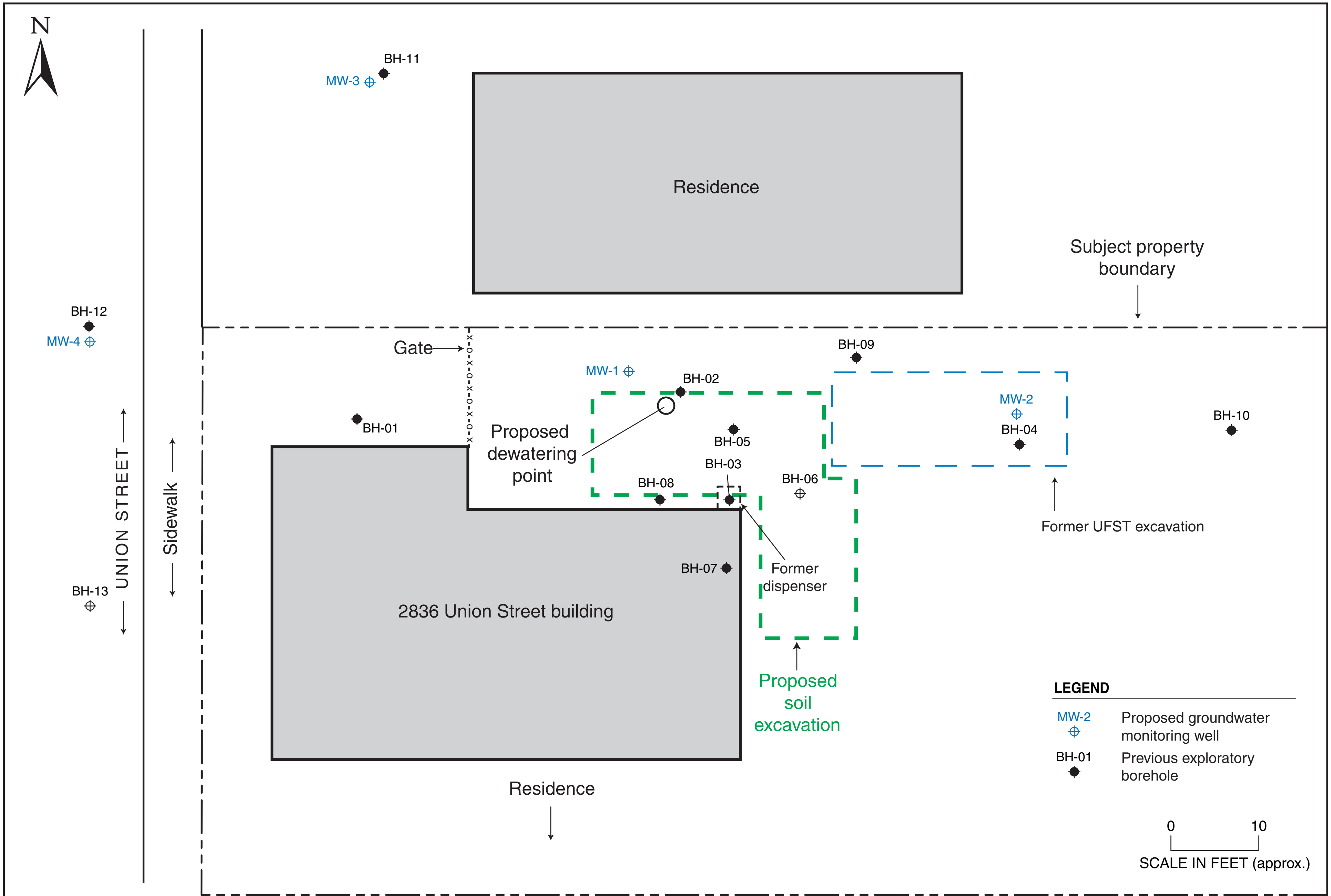
N

SITE LOCATION ON U.S.G.S. TOPOGRAPHIC MAP

2836 Union Street Oakland, CA	By: MJC	NOVEMBER 2005
	Figure 1	

STELLAR ENVIRONMENTAL SOLUTIONS, INC
GEOSCIENCE & ENGINEERING CONSULTING

2005-65-01



STELLAR ENVIRONMENTAL SOLUTIONS, INC
GEOSCIENCE & ENGINEERING CONSULTING

PROPOSED WELLS AND CORRECTIVE ACTION AREA

2836 Union Street, Oakland, CA

Figure 2

by: MJC	**APRIL 2006**

2005-65-36

MW-3 (at the BH-11 location) and MW-4 (at the BH-12 location). The boreholes will be advanced beyond the 22-foot previous borehole depths, to evaluate the thickness of the lower-water bearing zone. One soil sample will be collected from each borehole from the inferred non-water-bearing aquitard beneath the lower water-bearing zone.

Well Completion

Two "nested" wells will be installed at the proposed MW-1 and MW-3 locations, each with a 7-foot screened interval (approximately 7 to 13 feet deep) in the shallow target water-bearing zones, and a 2-foot screened interval (approximately 20 to 22 feet). We propose to utilize narrow-diameter "pre-packed" groundwater monitoring wells, which are commonly utilized for groundwater monitoring and sampling at fuel release sites.

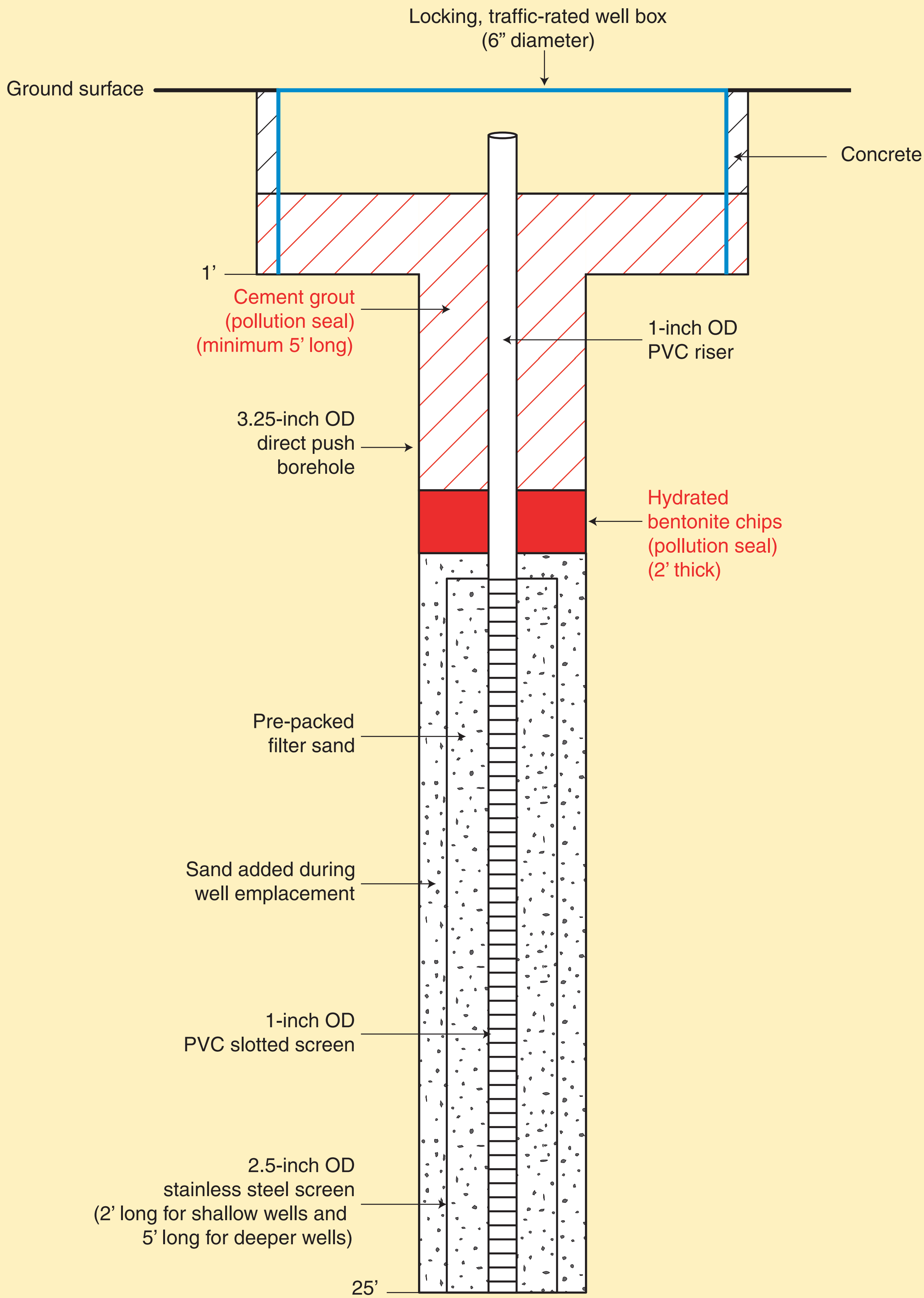
The well emplacement procedure will be as follows:

- 2-inch continuous core sampling rods are withdrawn after soil sampling run is completed.
- 3¼-inch OD "blind" (closed with sacrificial tip) drive rods are driven over the 2-inch borehole, to well completion depth, and the sacrificial tip is dropped.
- The pre-packed well is emplaced inside the drive rods, and supplemental sand is added to fill the annular space around the pre-packed screens, and to cover the top of the well screens approximately 0.5 foot, and the sand is wetted.
- Bentonite chips are added on top of the sand and hydrated.
- Portland cement grout slurry is brought to near ground surface, and the well box is installed.

Figure 3 shows the proposed well construction schematic.

The following are key construction specifications:

- Well screen and filter pack ("pre-packed"): 2- or 5-foot-long 2½-inch outside diameter (OD) stainless steel mesh, enclosing ¾-inch-thick #20/40 sand, around 1-inch inside diameter (ID) (0.010-inch slotted) Schedule 40 PVC screen.
- Well riser: 1-inch ID Schedule 40 PVC.
- Pollution seal: 2-foot-thick bentonite chips (hydrated) overlain by Portland cement grout slurry to near ground surface).
- Surface completion: Christy-type flush-mount box and locking well casing cap (separate well completions for each of the two "nested" wells at each location).



SCHEMATIC OF PROPOSED PRE-PACKED GROUNDWATER MONITORING WELL

2836 Union Street **Oakland, CA**	**By: MJC**	**APRIL 2006**	STELLAR Environmental Solutions, Inc Geoscience & Engineering Consulting
	FIGURE 3		

2005-65-37

This type of well completion has been previously approved by the Alameda County Public Works Agency on a similar fuel leak release site conducted in Oakland.

Well Development

No later than 2 to 3 days following well installations, each well will be developed by purging standing water in the well casings. Ten wetted casing volumes will be purged, and aquifer stability parameters (temperature, pH, and electrical conductivity) will be measured between each purged volume.

Monitoring Well Surveying

Following well installations, the horizontal coordinates and vertical elevations of the wells will be surveyed by a licensed land surveyor, in accordance with State of California GeoTracker requirements. The elevation precision will be to 0.01 feet relative to an established benchmark datum.

Monitoring Well Quarterly Sampling

We propose to begin a program of consecutive quarterly groundwater monitoring events. The first sampling event likely will be conducted immediately following well development. Each sampling event will consist of:

- Measuring equilibrated water levels in wells using an electric water level meter, and checking for free-product petroleum with an oil-water interface probe.
- Purging each well (with a peristaltic pump) of a minimum of 3 casing volumes and a maximum of 5 casing volumes, and measuring aquifer stability parameters (pH, temperature, and electrical conductivity) before purging and after each purged volume.
- Collecting post-purge groundwater samples for laboratory analysis.
- Delivering the samples to the analytical laboratory.

Groundwater monitoring and sampling will be conducted by an SES subcontractor under supervision of SES personnel.

Management of Investigation-Derived Waste

Soil. Waste soil from the drilling will be containerized in labeled 55-gallon steel drums that will be temporarily stored onsite (and combined with the previous investigation drill cuttings). As a cost-savings measure, we propose to add the soil to that excavated in the proposed soil corrective action, which we anticipate will be sent to a local non-hazardous (Class II) landfill.

Water. Well development water, monitoring event purge water, and equipment decontamination rinseate will be containerized onsite in labeled, 55-gallon drum(s). This non-hazardous water will be added to the water to be pumped during the groundwater interim corrective action (see below), which will be properly sampled, profiled, and disposed of at a permitted wastewater treatment facility.

<u>Laboratory Analyses</u>

Soil and groundwater samples will be analyzed by a State of California-certified analytical laboratory. All samples will be analyzed for the following site chemicals of concern:

- Total volatile hydrocarbons, gasoline range—by EPA Method 8015M;
- Benzene, toluene, ethylbenzene, and xylenes; and methyl tertiary-butyl ether—by EPA Method 8260; and
- Two lead scavengers (EDB and EDC) and five fuel oxygenates (TAME, ETBE, DIPE, TBA, and ethanol)—by EPA Method 8260.

If the initial groundwater sampling event does not detect lead scavengers or fuel oxygenates, SES will petition Alameda County Environmental Health to delete these analytes from future groundwater monitoring.

Interim Corrective Actions

The Responsible Party proposes to implement interim corrective actions to remove contaminant mass and reduce the overall long-term impact to groundwater. The corrective actions will consist of two general activities: 1) removal (by excavation) of accessible contaminated soils; and 2) short-term groundwater pumping.

<u>Contaminated Soil Removal</u>

As discussed in our April 2006 Corrective Action Investigation Report, elevated levels of contaminated soil are present in the immediate vicinity of the former dispenser. We estimate that contaminated soils extend over an approximately 400- to 500-square foot area (centered around the former dispenser). The top of soil contamination is as shallow as 2.5 feet deep (at the dispenser) and at approximately 5 feet deep (away from the dispenser). Approximately one-quarter of the contaminated soil is not accessible for excavation because of an overlying building. We estimate that the volume of accessible contaminated soil is approximately 100 cubic yards, and will result in the removal of an estimated 165 pounds of gasoline (along with commensurate mass of related site contaminants). Figure 2 shows the inferred layout of the excavation (the final size and shape will be dictated by field conditions such as contaminant extent and access constraints).

An additional estimated 70 to 100 cubic yards of non-contaminated to lightly contaminated soil will be removed when the highly contaminated soil is exposed. We will attempt to segregate the inferred non-contaminated soil from the contaminated soil, so that stockpile sampling and analysis might allow for reuse of some of the excavated soil as excavation backfill.

Soil will be removed with a backhoe (or equivalent) and temporarily stockpiled on plastic sheeting. A photoionization detector (PID) will be used to field-screen excavated soil to help determine when we have reached the limits of soil contamination. We anticipate reaching a depth of approximately 10 feet, at which time infiltrating groundwater likely will make further soil removal infeasible. We propose to collect four to six excavation confirmation sidewall soil samples, in the unsaturated zone, to document residual (post-excavation) soil contaminant concentrations.

SES will be prepared to pump infiltrating groundwater from the excavation, which will: 1) result in contaminant mass removal; and 2) allow for easier excavation backfilling. That water will be pumped to an onsite temporary holding tank.

Following excavation and sampling, we will emplace a backfill dewatering well in the excavation, likely at the northwest corner where maximum groundwater contamination has been detected. The well be either 2- or 4-inch PVC pipe screened over the lower portion of the well. If necessary, the excavation will be deepened at the dewatering well location to ensure that the screened interval corresponds with the water-bearing zone interval. To minimize sediment entry into the well (potentially clogging the well screen), the screened interval will be wrapped with a commercially-available “seamless polyester filter sock” designed for this application.

Base rock (gravel) will be emplaced at the bottom of the excavation (sufficient to bridge infiltrating groundwater, likely 2 to 3 feet thick) to allow for sufficient compaction. The gravel layer will be overlain by a relatively permeable material (sand) up to approximately 3 feet bgs. The sand layer will be useful as an air-permeable unit if later corrective actions such as soil vapor extraction (SVE) or bioventing are considered. The upper 3 feet of the excavation will be backfilled with a low-permeability (high silt/clay unit) material, designed to act as a cap to prevent air “short-circuiting” from the surface if SVE or bioventing is implemented.

Stockpiled soil will be sampled, analyzed, profiled, and transported to a local non-hazardous landfill.

Contaminated Groundwater Removal

As discussed in our April 2006 Corrective Action Investigation Report, groundwater contamination near solubility limits (and potentially LNAPL) appears to be laterally restricted to a shallow water-bearing zone. It appears that significant contaminant mass removal can be achieved by dewatering this water-bearing zone. The primary means for dewatering will be pumping from the backfill dewatering well. Pumping may also be conducted from the open excavation, but only as necessary to keep the excavation dry.

Pre-pumping and post-pumping grab-groundwater samples will be collected to evaluate the effectiveness of the corrective action. We estimate that up to 3,000 gallons of groundwater will be initially pumped, depending on groundwater infiltration. We estimate that 1 to 2 pounds of gasoline would be removed. Future additional groundwater pumping (and/or removal of LNAPL) might be appropriate if site conditions warrant.

Technical Reports

We will prepare the following technical documentation reports.

Well Installation and Corrective Action Documentation Report

- Summary of historical UFST removal and sampling activities, and initial site characterization results.
- Technical objectives of the program.
- Discussion of borehole drilling, well installation, and sampling protocols/methods.
- Tabular summary of analytical results, including the first groundwater monitoring event and the corrective action results.
- Figure(s) showing site layout, well locations, and corrective action features.
- Evaluation of site hydrogeologic conditions, including borehole geologic logs for boreholes that are advanced to depths not previously characterized, a map showing local groundwater flow direction, and an evaluation of the hydrogeologic relationship between the two water-bearing zones.
- Discussion of analytical results in the context of estimated contaminant mass removed and residual contaminant concentrations.
- Technical appendices (e.g. lab reports, well elevation data, borehole logs, permits, waste transport documentation, photodocumentation, etc.).

Second and Third Quarterly Groundwater Sampling Reports

These two reports will focus specifically on the activities and findings of the second and third quarterly sampling events.

Fourth Quarterly Sampling and Annual Summary Report

This report will be prepared following the fourth quarterly sampling event. In addition to a discussion of the sampling activities and findings for the fourth event, the report will evaluate hydrochemical and groundwater flow direction trends. The report will also evaluate the potential for site closure, and the need to conduct any additional site characterization activities to close data gaps (if appropriate).

In accordance with requirements by the State Water Resources Control Board and Alameda County Environmental Health, the reports will be uploaded (as electronic files) to the State GeoTracker and Alameda County Environmental Health ftp systems.

Electronic Data Reporting

All required electronic data for previous investigations has been uploaded to the GeoTracker system. The following GeoTracker electronic uploads will be made for proposed work data:

- "Field Point IDs" – well and corrective action sample names
- "GeoMap" – site plan showing sampling and corrective action locations
- "GeoBore" – borehole geologic logs
- "GeoWell" (water level data for quarterly groundwater sampling events
- Well survey data
- "Geo Report" – electronic format reports
- Electronic Data Deliverable (EDD) – analytical laboratory reports for proposed samples

ESTIMATED SCHEDULE

The property owner will proceed with the work as soon as practical following receipt of Alameda County Environmental Health's concurrence with this workplan. We anticipate completing the work in the following sequence:

- Soil excavation and emplacement of backfill dewatering point
- Dewatering
- Well installations and first quarterly event

- Technical documentation report
- Subsequent quarterly groundwater monitoring and reporting events
- Annual summary report (following the fourth quarterly event)

SES anticipates that the first technical report (discussing corrective actions and first well monitoring event) will be submitted within 10 to 12 weeks following Alameda County Environmental Health's directive. Groundwater monitoring reports will be submitted to Alameda County Environmental Health within 2 to 4 weeks following each event.

TEAM QUALIFICATIONS

Stellar Environmental Solutions, Inc. has completed dozens of similar projects, including numerous projects under oversight of Alameda County Environmental Health. Our team will consist of:

- Stellar Environmental Solutions, Inc. (owner's consultant responsible for overall project coordination, geologic evaluation, sampling, data evaluation, and report certification by a California Registered Geologist);
- Borehole driller with a current C-57 license;
- California-licensed well surveyor; and
- Analytical laboratory with a current California ELAP certification.

We trust that this submittal meets your agency's needs. We will contact you in the near future to confirm your receipt of this workplan. In the interim, please contact the undersigned directly if you have any questions.

We 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 our knowledge.

Sincerely,

Bruce M. Rucker, R.G., R.E.A.
Project Manager

Richard S. Makdisi, R.G, R.E.A.
Principal

cc: Mr. Larry Wadler (Property Owner and Responsible Party)

Attachments: Figures showing UST layout and previous borehole sampling locations and results
Tables of previous analytical results

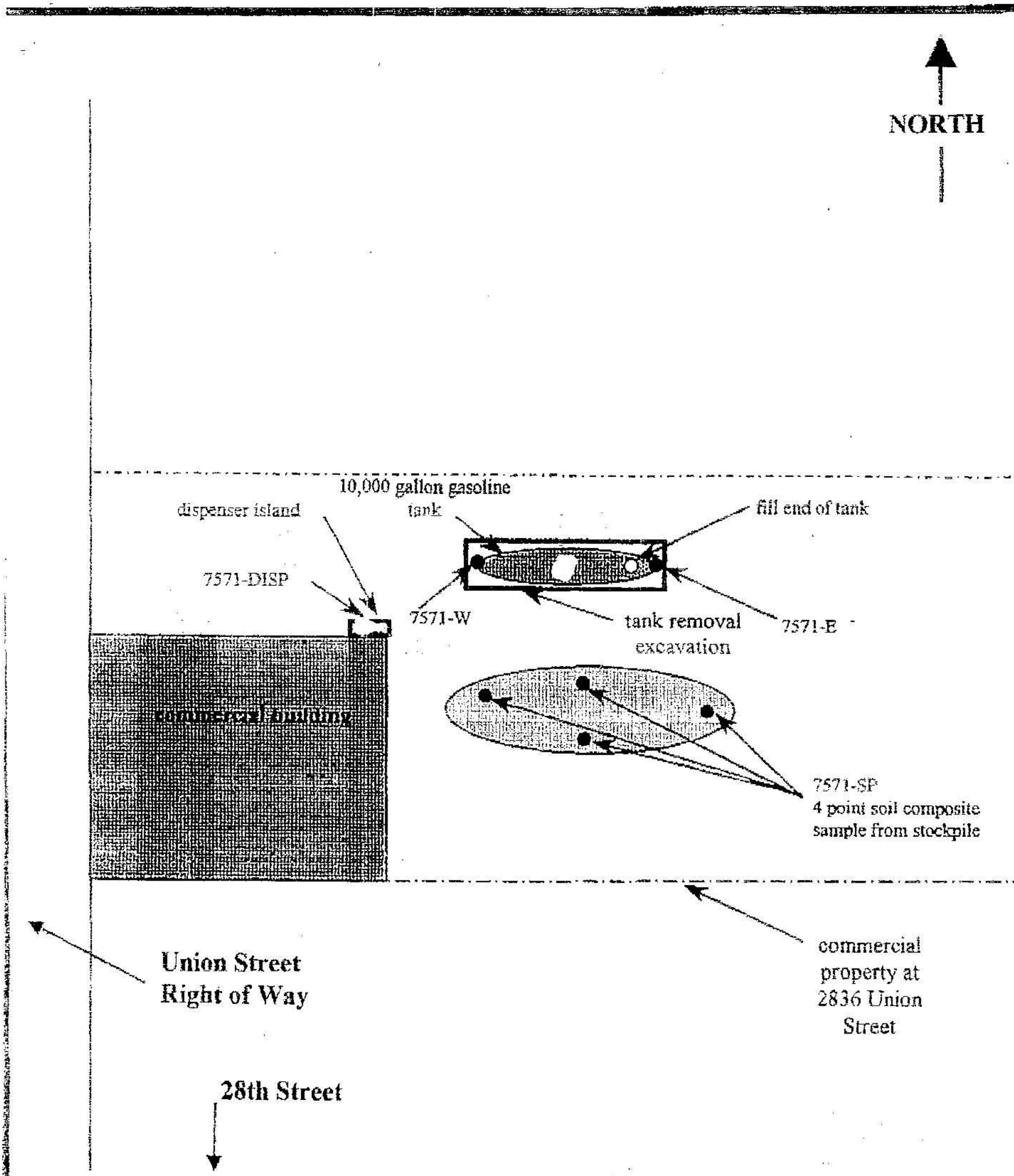
ATTACHMENT A

Figures

(former UST and borehole sampling locations & results)

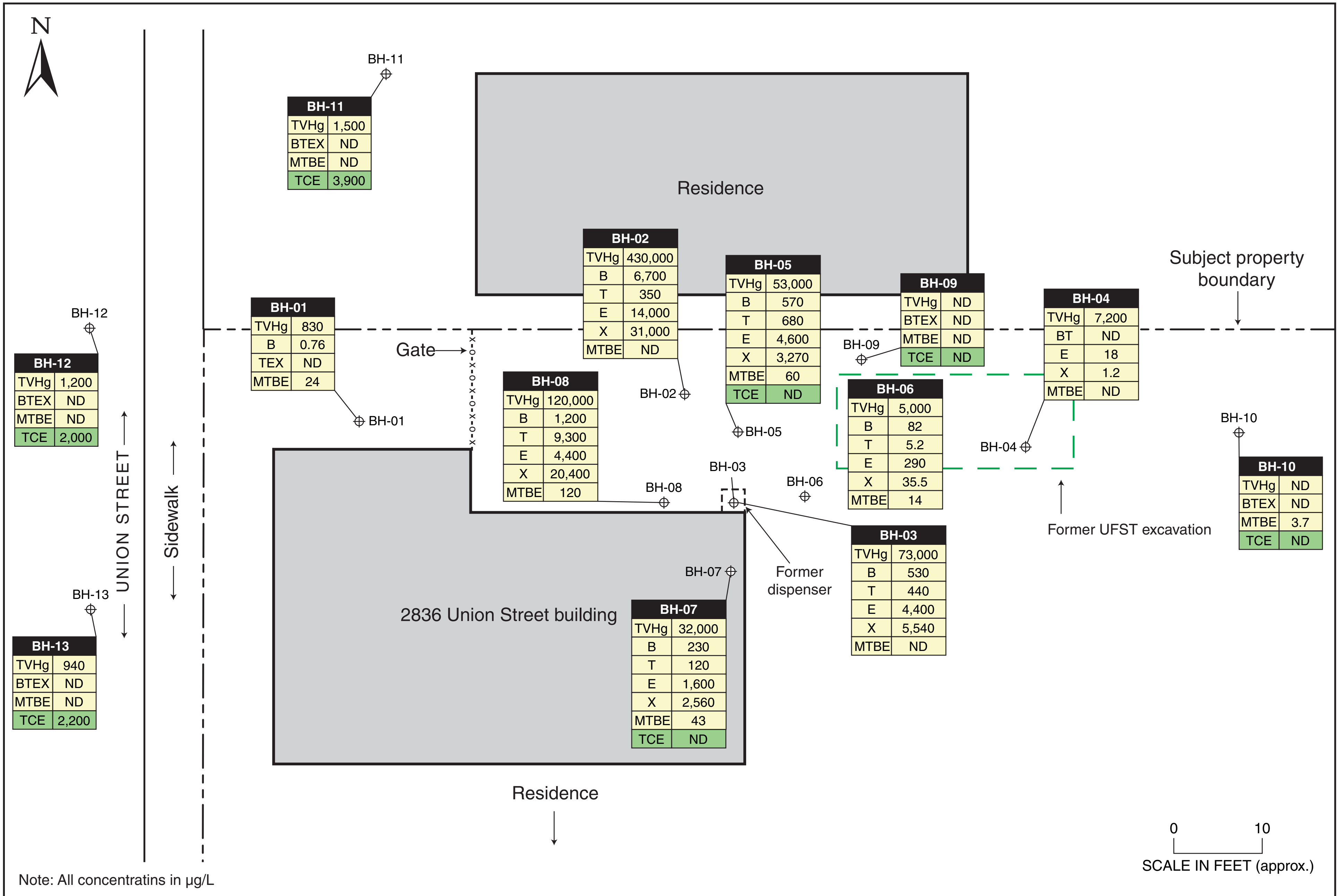
Tables

(previous analytical results)



GOLDEN GATE TANK REMOVAL 255 Shipley Street San Francisco, California 94107 Telephone (415) 512 1555 Fax (415) 512 0964	**SITE PLAN** 2836 Union Street Oakland, California

Project Number 7571	July, 1998	By: jnc	Not to scale	



BH-01	
TVHg	830
B	0.76
TEX	ND
MTBE	24

BH-02	
TVHg	430,000
B	6,700
T	350
E	14,000
X	31,000
MTBE	ND

BH-03	
TVHg	73,000
B	530
T	440
E	4,400
X	5,540
MTBE	ND

BH-04	
TVHg	7,200
BT	ND
E	18
X	1.2
MTBE	ND

BH-05	
TVHg	53,000
B	570
T	680
E	4,600
X	3,270
MTBE	60
TCE	ND

BH-06	
TVHg	5,000
B	82
T	5.2
E	290
X	35.5
MTBE	14

BH-07	
TVHg	32,000
B	230
T	120
E	1,600
X	2,560
MTBE	43
TCE	ND

BH-08	
TVHg	120,000
B	1,200
T	9,300
E	4,400
X	20,400
MTBE	120

BH-09	
TVHg	ND
BTEX	ND
MTBE	ND
TCE	ND

BH-10	
TVHg	ND
BTEX	ND
MTBE	3.7
TCE	ND

BH-11	
TVHg	1,500
BTEX	ND
MTBE	ND
TCE	3,900

BH-12	
TVHg	1,200
BTEX	ND
MTBE	ND
TCE	2,000

BH-13	
TVHg	940
BTEX	ND
MTBE	ND
TCE	2,200

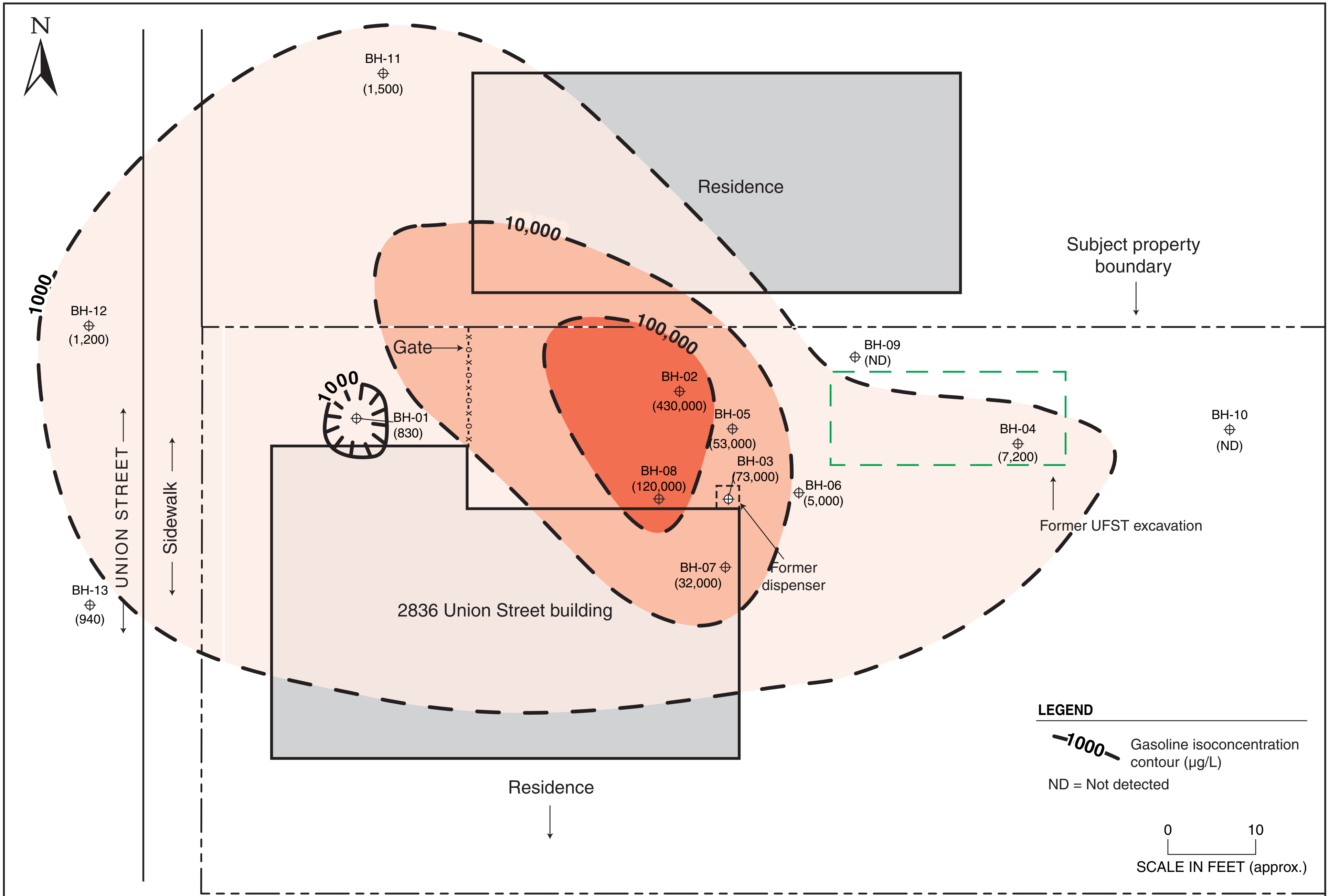
2005-65-32

STELLAR Environmental Solutions, Inc
Geoscience & Engineering Consulting

GROUNDWATER ANALYTICAL RESULTS
DECEMBER 2005 AND APRIL 2006 INVESTIGATION
2836 Union Street, Oakland, California

Figure 5

by: MJC | **APRIL 2006**



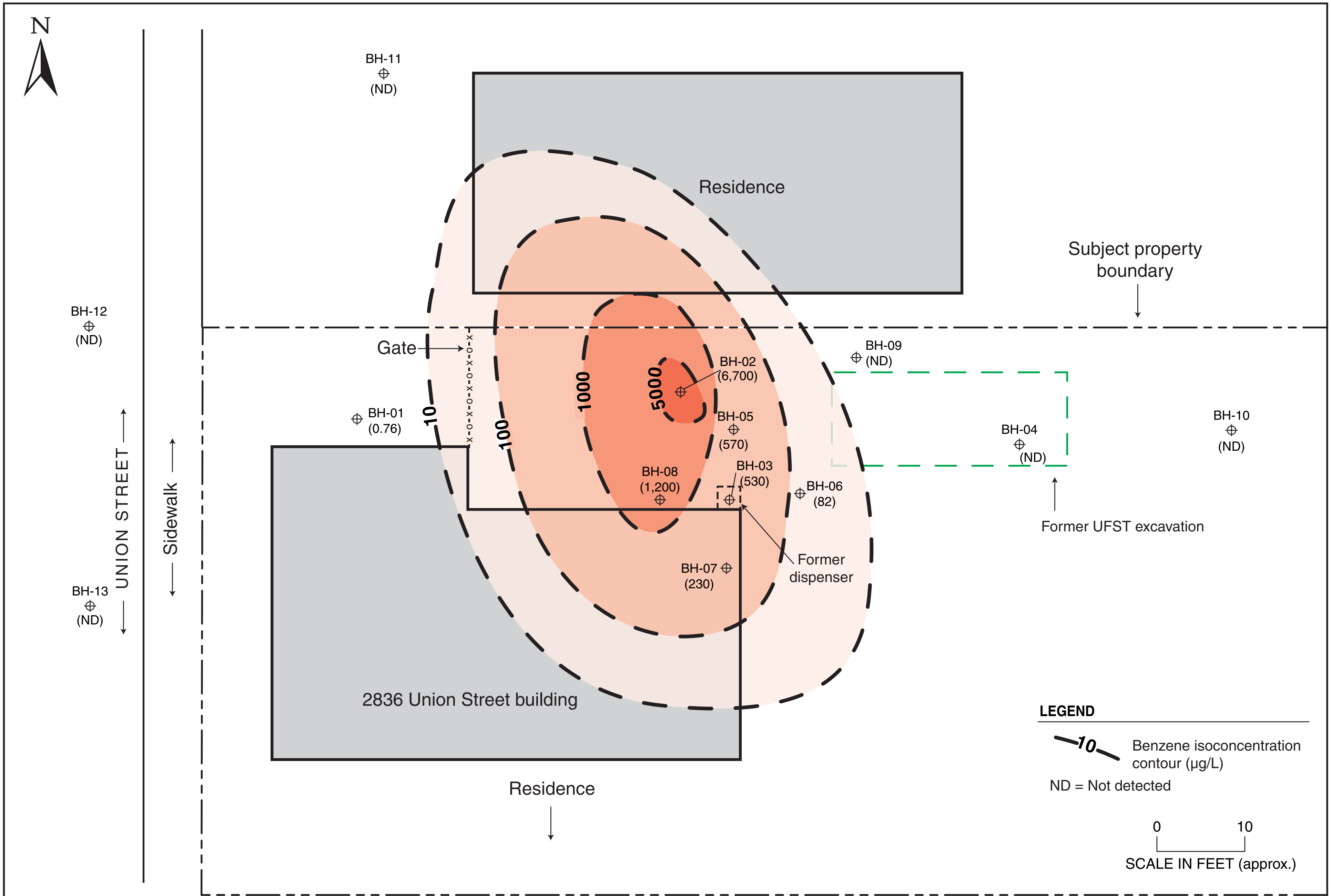
2005-65-33

STELLAR
ENVIRONMENTAL SOLUTIONS, INC
GEOSCIENCE & ENGINEERING CONSULTING

DISSOLVED GASOLINE PLUME CONTOURS
NOVEMBER 2005 AND APRIL 2006 BOREHOLES
2836 Union Street, Oakland, CA

Figure 6

by: MJC | APRIL 2006



2005-65-34

STELLAR ENVIRONMENTAL SOLUTIONS, INC
GEOSCIENCE & ENGINEERING CONSULTING

DISSOLVED BENZENE PLUME CONTOURS
NOVEMBER 2005-APRIL 2006 BOREHOLES
2836 Union Street, Oakland, CA

Figure 7

by: MJC

APRIL 2006

Table 1
Soil Analytical Results – Petroleum and Aromatic Hydrocarbons
2836 Union Street, Oakland, California

Sample ID	Sample Location	Sample Depth (feet)	TVHg	Benzene	Toluene	Ethylbenzene	Total Xylenes	MTBE
July 1998 UFST Removal Excavation Soil Samples								
7751-E	CF - excavation sidewall	8.5	*< 0.5*	*< 0.005*	*< 0.005*	*< 0.005*	*< 0.01*	*< 0.005*
7751-W	CF - excavation sidewall	8.5	**7.2**	*< 0.005*	0.012	0.065	0.021	*< 0.005*
7751-DISP	beneath dispenser, unsaturated zone	2.0	**2,100**	**2.8**	**16**	**15**	**93**	**5.1**
November 2005 Borehole Soil Samples								
BH-01-8’	CF: upper water-bearing zone	8	*< 1.0*	*< 0.005*	*< 0.005*	*< 0.005*	*< 0.01*	*< 0.021*
BH-01-17’	clay aquitard	17	*< 1.0*	*< 0.005*	*< 0.005*	*< 0.005*	*< 0.01*	*< 0.021*
BH-02-8.5’	CF: upper water-bearing zone	8.5	31	**0.093**	*< 0.005*	0.75	0.55	*< 0.022*
BH-02-13.5’	clay aquitard	13.5	3.0	0.012	*< 0.005*	0.057	0.134	**0.024**
BH-03-2.5’	unsaturated zone	2.5	**220**	**0.47**	**6.7**	**3.10**	**17.9**	*< 0.26*
BH-03-7’	unsaturated zone	7	**920**	**1.8**	**19**	**16**	**81**	*< 0.66*
BH-03-14.5’	clay aquitard	14.5	*< 1.0*	*< 0.005*	*< 0.005*	0.019	0.021	*< 0.02*
BH-04-10.5’	saturated zone -UFST excav. backfill	10.5	*< 0.93*	*< 0.005*	*< 0.005*	*< 0.005*	0.007	*< 0.019*
BH-04-14.5’	clay aquitard	14.5	*< 1.0*	*< 0.005*	*< 0.005*	*< 0.005*	*< 0.01*	*< 0.02*
April 2006 Borehole Soil Samples								
BH-05-5’	unsaturated zone	5	**310**	**0.32**	*< 0.25*	**3.8**	**7.9**	*< 0.25*
BH-05-7.5’	CF: upper water-bearing zone	7.5	**2,600**	*< 3.1*	**37**	**35**	**161**	*< 3.1*
BH-05-10’	saturated zone (upper)	10	**2,800**	*< 5.0*	*< 5.0*	**85**	**150**	*< 5.0*
BH-05-11.5’	clay aquitard	11.5	83	*< 0.2*	*< 0.2*	2.7	0.83	*< 0.2*
BH-06-5’	unsaturated zone	5	8.6	**0.170**	*< 0.017*	0.22	*< 0.017*	*< 0.017*
BH-06-7.5’	CF: upper water-bearing zone	7.5	**1,300**	0.025	*< 0.025*	0.38	0.034	*< 0.025*
BH-06-10’	saturated zone (upper)	10	9.2	*< 0.0048*	*< 0.0048*	*< 0.0048*	*< 0.0048*	*< 0.0048*
BH-07-5’	unsaturated zone	5	330	**0.34**	**2.20**	2.40	**11.9**	*< 0.25*

Table 1 (continued)

Sample ID	Sample Location	Sample Depth (feet)	TVHg	Benzene	Toluene	Ethylbenzene	Total Xylenes	MTBE
April 2006 Borehole Soil Samples — continued								
BH-07-7.5’	CF: upper water-bearing zone	7.5	**2,800**	*< 4.2*	**10**	**43**	**196**	*< 4.2*
BH-07-10’	clay aquitard	10	**640**	*< 0.17*	*< 0.17*	2.30	1.20	*< 0.17*
BH-07-11.5’	clay aquitard	11.5	25	*< 0.005*	*< 0.005*	0.012	0.0243	0.0057
BH-08-5’	unsaturated zone	5	30	**0.21**	*< 0.13*	1.1	1.36	**0.22**
BH-08-7.5’	CF: upper water-bearing zone	7.5	**5,300**	*< 6.3*	**88**	**79**	**380**	*< 6.3*
BH-08-10’	saturated zone (upper)	10	**1,100**	*< 2.0*	**11**	**18**	**86**	*< 2.0*
BH-08-11.5’	clay aquitard	11.5	2.3	**0.67**	0.096	0.26	0.54	**0.0098**
BH-09-11.5’	unsaturated zone	11.5	*< 0.97*	*< 0.0048*	*< 0.0048*	*< 0.0048*	*< 0.0048*	*< 0.0048*
BH-09-19.5’	CF: lower water-bearing zone	19.5	*< 0.92*	*< 0.0048*	*< 0.0048*	*< 0.0048*	*< 0.0048*	*< 0.0048*
BH-10-7.5’	CF: upper water-bearing zone	7.5	*< 0.99*	*< 0.0045*	*< 0.0045*	*< 0.0045*	*< 0.0045*	*< 0.0045*
BH-11-22’	CF: lower water-bearing zone	22	*< 1.1*	*< 0.0049*	*< 0.0049*	*< 0.0049*	*< 0.0049*	*< 0.0049*
BH-12-20.5’	CF: lower water-bearing zone	20.5	*< 1.0*	*< 0.0046*	*< 0.0046*	*< 0.0046*	*< 0.0046*	*< 0.0046*
BH-13-20.5’	CF: lower water-bearing zone	20.5	*< 1.0*	*< 0.0048*	*< 0.0048*	*< 0.0048*	*< 0.0048*	*< 0.0048*
ESLs [a]			*100*	*0.04*	*2.0*	*3.0*	*1.5*	*0.023*

Notes:

[a] ESLs = Water Board Environmental Screening Levels for residential or commercial/industrial sites where groundwater is a potential drinking water resource.

CF = capillary fringe
TVHg = total volatile hydrocarbons as gasoline
MTBE = methyl tertiary-butyl ether

All concentrations are in milligrams per kilogram (mg/kg). Samples in **bold-face type** exceed the ESL criterion.

Table 2
April 2005 Borehole Soil Analytical Results – Volatile Organic Compounds
2836 Union Street, Oakland, California

(all concentrations are in μg/kg)

Sample ID	**BH-05-7.5'**	**BH-06-7.5'**	**BH-07-7.5'**	**BH-08-7.5'**	**ESLs [a]**
VOCs Not Associated With Gasoline					
Acetone	*< 13,000*	*< 100*	*< 17,000*	*<25,000*	240
cis-1,2-dichloroethene	*< 3,100*	*< 25*	*< 4,200*	*< 6,300*	190
Trichloroethene	*< 3,100*	*< 25*	*< 4,200*	*< 6,300*	260
Gasoline Constituent VOCs					
Isopropylbenzene	4,100	320	5,400	9,300	NLP
Propylbenzene	16,000	> 1,100 [b]	22,000	36,000	NLP
1,3,5-Trimethylbenzene	28,000	42	41,000	63,000	NLP
2-Chlorotoluene	*< 3,100*	*< 25*	*< 4,200*	*< 6,300*	NLP
1,2,4-Trimethylbenzene	> 93,000 [b]	*< 25*	> 140,000 [b]	190,000	NLP
sec-Butylbenzene	*< 3,100*	320	*< 4,200*	*< 6,300*	NLP
Para-Isopropyl Toluene	*< 3,100*	*< 25*	*< 4,200*	*< 6,300*	NLP
n-Butylbenzene	7,800	> 950 [b]	8,800	18,000	NLP
Naphthalene	**11,000**	> 530 [b]	**19,000**	**27,000**	4,200

Notes:

[a] ESLs = Water Board Environmental Screening Levels for residential or commercial/industrial sites where groundwater is a potential drinking water resource.

[b] chromatograph response exceeds instrument's linear range – actual concentration is undefined amount greater than reported.

Samples in **bold-face type** exceed the ESL criterion. NLP = No Level Published
Table lists those compounds detected in the soil samples, as well as those compounds detected in site groundwater samples. See Appendix D for full list of analytes.

Table 3
Groundwater Analytical Results – Petroleum and Aromatic Hydrocarbons
2836 Union Street, Oakland, California

Sample ID	TVHg	Benzene	Toluene	Ethyl-Benzene	Total Xylenes	MTBE
July 1998 UFST Removal Excavation Grab-Groundwater Sample						
7561-GW [(a)]	**4,200**	**15**	4.0	**140**	**170**	**150**
November 2005 Borehole Groundwater Samples						
BH-01-GW	**830**	0.76	*< 0.50*	*< 0.50*	*< 0.50*	**24**
BH-02-GW	**430,000**	**6,700**	**350**	**14,000**	**31,000**	*< 200*
BH-03-GW	**73,000**	**530**	**440**	**4,400**	**5,540**	*< 200*
BH-04-GW	**7,200**	*< 0.5*	*< 0.5*	18	1.2	*< 2.0*
April 2006 Borehole Groundwater Samples						
BH-05-GW	**53,000**	**570**	**680**	**4,600**	**3,270**	**60**
BH-06-GW	**5,000**	**82**	5.2	**290**	**35.5**	**14**
BH-07-GW	**32,000**	**230**	**120**	**1,600**	**2,560**	**43**
BH-08-GW	**120,000**	**1,200**	**9,300**	**4,400**	**20,400**	**120**
BH-09-GW	*< 50*	*< 0.5*	*< 0.5*	*< 0.5*	*< 0.5*	*< 0.5*
BH-10-GW	*< 50*	*< 0.5*	*< 0.5*	*< 0.5*	*< 0.5*	3.7
BH-11-GW	**1,500**	*< 8.3*	*< 8.3*	*< 8.3*	*< 8.3*	*< 8.3*
BH-12-GW	**1,200**	*< 2.0*	*< 2.0*	*< 2.0*	*< 2.0*	*< 2.0*
BH-13-GW	**940**	*< 4.2*	*< 4.2*	*< 4.2*	*< 4.2*	*< 4.2*
ESLs [(b)]	100	1.0	40	30	13	5.0
MCLs	no level published	1.0	40	30	20	5.0

Notes:

(a) This sample had no detectable lead (< 0.05 mg/L).

(b) ESLs = Water Board Environmental Screening Levels for residential or commercial/industrial sites where groundwater is a potential drinking water resource.

MCLs = California Maximum Contaminant Levels.
TVHg = total volatile hydrocarbons as gasoline.
MTBE = methyl tertiary-butyl ether

All concentrations are in micrograms per liter (µg/L). Samples in **bold-face type** exceed the ESL or MCL criterion.

Table 4
April 2005 Borehole Groundwater Analytical Results – Volatile Organic Compounds
2836 Union Street, Oakland, California

Sample ID	BH-05-GW	BH-07-GW	BH-09-GW	BH-10-GW	BH-11-GW	BH-12-GW	BH-13-GW	ESLs [a]	MCLs
VOCs Not Associated With Gasoline									
Acetone	*< 830*	*< 200*	*< 10*	**31**	*< 170*	*< 40*	*< 83*	700	NLP
cis-1,2-dichloroethene	*< 42*	*< 10*	*< 0.5*	*< 0.5*	**71**	**53**	**41**	6.0	70
Trichloroethene	*< 42*	*< 10*	*< 0.5*	*< 0.5*	**3,900**	**2,000**	**2,200**	5.0	5.0
Gasoline Constituent VOCs									
Isopropylbenzene	**290**	**300**	*< 0.5*	*< 0.5*	*< 8.3*	*< 2.0*	*< 4.2*	NLP	NLP
Propylbenzene	**860**	**1,000**	*< 0.5*	*< 0.5*	*< 8.3*	*< 2.0*	*< 4.2*	NLP	NLP
1,3,5-Trimethylbenzene	**700**	**1,000**	*< 0.5*	*< 0.5*	*< 8.3*	*< 2.0*	*< 4.2*	NLP	NLP
2-Chlorotoluene	**66**	*< 10*	*< 0.5*	*< 0.5*	*< 8.3*	*< 2.0*	*< 4.2*	NLP	NLP
1,2,4-Trimethylbenzene	**2,300**	**2,500**	*< 0.5*	*< 0.5*	*< 8.3*	*< 2.0*	*< 4.2*	NLP	NLP
sec-Butylbenzene	**69**	**78**	*< 0.5*	*< 0.5*	*< 8.3*	*< 2.0*	*< 4.2*	NLP	NLP
Para-Isopropyl Toluene	**50**	**39**	*< 0.5*	*< 0.5*	*< 8.3*	*< 2.0*	*< 4.2*	NLP	NLP
Naphthalene	**960**	**630**	*< 2.0*	*< 2.0*	*< 33*	*< 8.0*	*< 17*	**21**	NLP

Notes:

[a] ESLs = Water Board Environmental Screening Levels for residential or commercial/industrial sites where groundwater is a potential drinking water resource.

MCLs = California Maximum Contaminant Levels
TVHg = total volatile hydrocarbons as gasoline
MTBE = methyl tertiary-butyl ether

NLP = no level published

All concentrations are in micrograms per liter (μg/L). Samples in **bold-face type** exceed the ESL or MCL criterion.

Table lists only detected VOCs. See laboratory report appendix for full list of target compounds.