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January 8, 2004

Mr. Barney M. Chan – Hazardous Materials Specialist
Alameda County Health Care Services Agency
Environmental Health Services – Environmental Protection
Local Oversight Program
1131 Harbor Bay Parkway
Alameda, California 94502-6577

Alameda County
Environmental Health
JAN 13 2004

Subject: Workplan for Groundwater Characterization
Russ Elliott, Inc. Facility – 2526 Wood Street, Oakland, California
Alameda County Health Fuel Leak Case No. RO000040

Dear Mr. Chan:

INTRODUCTION AND BACKGROUND

On behalf of the property owner (Elliott Family Trust), Stellar Environmental Solutions, Inc. (SES) is submitting to the Alameda County Environmental Health Department (ACEH) this workplan for a groundwater characterization program (well installation and monitoring) at the referenced site. This workplan follows:

- Removal of one 550-gallon diesel UFST in 1995
- Removal of one 10,000-gallon gasoline UFST in 2002
- SES's August 2003 report discussing the above two UFST removals (SES, 2003a)
- Technical workplan for a Preliminary Site Assessment (PSA) (SES, 2003b), approved by ACEH (ACEH, 2003)
- Implementation of the PSA in October 2003 (PSA documentation report submitted concurrently with this workplan) (SES, 2003c)

Figure 1 shows the site location. Figure 2 shows the former UFST locations, excavation layouts, sampling locations, and 1995/96 and 2002 analytical results. Figure 3 shows the recent October 2003 grab-groundwater analytical results. Figure 3 also shows the location of

proposed wells. Tables 1 through 4 summarize historical analytical results. All tables and figures are attached at the end of this workplan.

Salient findings discussed in our PSA report upon which the proposed work is based include:

- Eight exploratory boreholes were advanced to a maximum depth of 25 feet below grade, on all four sides of the former UFSTs, including two through the center of the former excavations and one immediately adjacent to the former UFST dispenser. A total of 16 soil samples were collected for laboratory analysis, from depths just above an inferred perched water zone, and from just above a more laterally-extensive upper water-bearing zone. One “grab” groundwater sample was collected from each borehole. The boreholes were geologically logged from continuous soil cores, and PID readings were collected as an indicator of potential contamination.
- Site lithology ranges from low-permeability silts and clays to higher-permeability (and water-bearing) sands and gravels. Groundwater was first encountered (as evidenced by saturated soil cuttings and measurable water in the borehole) in an inferred perched zone at depths of approximately 8 to 10 feet. A more laterally-extensive lower water-bearing zone occurs at depths of approximately 16 to 18 feet. The lower water-bearing zone is underlain by a low-permeability, non-water-bearing zone.
- The only soil contaminant detected above regulatory agency screening-level criteria is MTBE; that contamination is confined to the immediate vicinity of the former gasoline UFST.
- Groundwater contaminants above screening-level criteria include diesel, gasoline, benzene, MTBE, and TBA. Based on concentrations and distribution, gasoline and MTBE appear to be a greater concern than the other detected contaminants.
- Elevated levels of groundwater contamination appears to be beneath the area of the UFSTs and to the south, with no or minor contamination in other directions. The geometry of groundwater contamination appears to indicate a westerly groundwater flow direction, with a shallow or flat hydraulic gradient.
- Based on the available data, it would be appropriate to install three groundwater monitoring wells: one through the center of each of the former excavations, and one to the south of the UFSTs (near BH-05 and BH-02) as the groundwater contaminant plume appears to extend in that direction. Triangulating the wells as shown on Figure 3 will also allow groundwater flow direction to be calculated. Three groundwater wells is the minimum that the regulators will accept to determine local groundwater

flow direction. One or more additional wells may be needed if the initial wells do not adequately define the extent of contamination. The wells should be monitored and sampled on a quarterly basis for at least 1 year.

- The property owner will be pursuing cost reimbursement costs from the State of California Underground Storage Tank Cleanup Fund (Fund), and to maximize the potential for reimbursement, proposed work will not be conducted until ACEH written approval is obtained.

TECHNICAL OBJECTIVES AND PROPOSED SCOPE OF WORK

The objective of the proposed work is to satisfy one of the generally-required regulatory criteria for site closure: characterization of the groundwater contaminant plume. This requires “permanent” groundwater monitoring wells monitored on a quarterly basis, to evaluate groundwater flow direction, contaminant extent and magnitude, and plume stability.

The proposed scope of work includes the following four tasks: 1) Pre-Field Work Planning; 2) Well Installation; 3) Quarterly Groundwater Monitoring; 4) Laboratory Analyses; and 5) Report Preparation.

Task 1: Pre-Field Work Planning

SES will revise the site-specific Health and Safety Plan to include the new work activities. We will apply for the requisite borehole drilling permit from Alameda County Public Works Agency, and we will notify Underground Service Alert of proposed drilling for its notification to utilities to mark any potential underground utilities.

Task 2: Well Installation

We propose to initially install three groundwater monitoring wells, as shown on Figure 3: one through the center of each of the former UFST excavations, and one to the south, near BH-02 and BH-05, where the groundwater contamination appears to extend. These three wells will allow for an initial evaluation of local groundwater flow direction, and plume geometry. An additional well(s) may be needed, and will be determined following review of the first two quarters of monitoring.

Monitoring wells will be constructed in accordance with California Environmental Protection Agency (Cal/EPA) guidelines for sampling dissolved petroleum products in groundwater. There is no anticipated use of the wells for groundwater extraction; therefore the wells will be

2-inch diameter. We anticipate that well depths will be approximately 20 feet (at least two feet into the low-permeability aquitard below the upper water-bearing zone. Well depths and screened intervals will be evaluated and modified in the field based on geologic logging conducting during borehole drilling. Well construction will include the following:

- Ten feet of 2-inch diameter PVC factory-slotted well screen (0.010 inch slots) at the base of the well; (10-20' ?) (5-20')
- Annular sand pack from total well depth to 2 feet above the top of the well screen, overlain by 2 feet of hydrated bentonite pellets, overlain by neat Portland cement grout slurry;
- 2-inch diameter PVC blank casing from top of well screen to surface with locking well caps; and
- Surface completion will be either flush-mounted, Christy-type, traffic-rated well boxes or above-ground "stovepipe" type boxes with protective traffic bollards.

Boreholes will be drilled with approximately 8-inch diameter truck-mounted hollow stem augers. Continuous soil cores will be collected and geologically logged in accordance with the visual method of the Unified Soils Classification System, and borehole geologic logs will be prepared and certified by a California Registered Geologist. One soil sample will be collected for laboratory analysis from the capillary fringe from each borehole, or from the depth exhibiting field evidence of maximum contamination.

No sooner than 48 hours following installation, the wells will be developed by surging and bailing or pumping to set the annular sand pack and reduce the potential for fine-grained native materials to infiltrate the sand pack. In accordance with California GeoTracker requirements, the horizontal coordinates and vertical elevations of the well casing tops will be surveyed by a licensed California land surveyor.

Well development water will be temporarily containerized in labeled, steel 55-gallon drums. That water will be properly disposed of at a permitted non-hazardous liquids treatment facility.

Task 3: Quarterly Monitoring

The wells will be monitored and sampled on a quarterly basis, for a period of at least one year. Groundwater sampling will be conducted in accordance with Cal/EPA guidelines for

sampling dissolved petroleum products in groundwater. In brief, water levels will be measured with an electric water level meter prior to sampling. Each well will be purged by pumping or bailing of 3 to 5 wetted well volumes. Aquifer stabilization indicators (temperature, pH, electrical conductivity) will be measured between each well volume purged, and purging will continue until stabilized formation water is entering the well. Water samples will be collected with a new disposable bailer and transferred to sampling containers appropriate for each analytical method. Samples will be preserved and managed in accordance with USEPA protocols. To evaluate site conditions as regards the potential for natural attenuation, groundwater samples will also be analyzed for indicators of natural attenuation, which might include ferrous iron, dissolved oxygen, redox potential (ORP), sulfate and/or nitrogen.

Waste soil from the well boreholes will be temporarily containerized onsite in labeled, 55-gallon drums. This soil will be appropriately profiled and disposed of at a permitted landfill.

Task 4: Laboratory Analyses

A California-certified (ELAP) analytical laboratory will complete the laboratory analyses. The analytical results will be performed at a standard turnaround (2 weeks). All soil and groundwater samples will be analyzed for the following:

- Total volatile hydrocarbons – gasoline range (TVHg), by modified EPA Method 8015;
- Total extractable hydrocarbons – diesel range (TEHd) by modified EPA Method 8015; and
- BTEX and MTBE, by EPA Method 8260.
- Fuel oxygenates (TAME, ETBE, DIPE and TBA) by EPA Method 8260
- Lead scavengers EDB and EDC by EPA Method 8260

Task 5: Report Preparation

One technical documentation report will be prepared and submitted to ACEH following each quarterly event. In accordance with direction from Mr. Chan of ACEH, no submittals of technical documents by SES to the RWQCB are needed at this time. All reports will contain the following elements:

- Investigation scope and objectives;
- Summary of previous investigation activities and findings;

- Sampling and analytical protocols used;
- Hydrochemical data from the sample analyses;
- Site maps delineating historical sampling and well locations;
- Groundwater elevation map;
- Conclusions and, where appropriate, recommendations; and
- Technical appendices.

The report following the first sampling event will include the following additional elements:

- Well installation, development and surveying protocols;
- Fate of waste materials
- Site lithologic conditions including borehole geologic logs;

The report following the fourth sampling event will include the following additional elements:

- Discussion of the fate and transport mechanisms of the constituents of concern in the groundwater, and their potential migrational pathways; and
- An evaluation of the stability of the groundwater plume.

The project will be overseen, and all reports will be signed, by a California Registered Geologist.

In accordance with California GeoTracker requirements, all analytical data and a site plan will be uploaded in electronic data format (EDF) to the GeoTracker database.

ESTIMATED SCHEDULE

We estimate that the drilling will be conducted within 2 weeks following ACEH approval of this workplan. Analytical laboratory results will be completed on normal turnaround (10 working days). Documentation reports will be submitted in the first month of the quarter following the quarter in which work was conducted.


TEAM QUALIFICATIONS

Stellar Environmental Solutions, Inc. has completed dozens of similar projects, including several under the jurisdiction of ACEH. Our team will consist of the following:

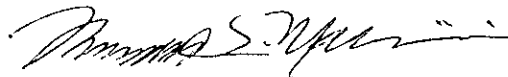
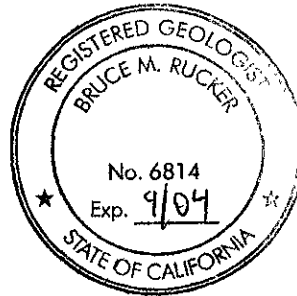
- Stellar Environmental Solutions, Inc. (owner's consultant responsible for overall project coordination, geologic evaluation, sampling, data evaluation, and report certification by a California Registered Geologist);
- Well installation driller with a current C-57 license;
- California-licensed land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

We trust that this submittal meets your agency's needs. We request that ACEH provide to SES and the property owner written approval of this workplan. Please contact the undersigned directly if you have any questions.

Sincerely,



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



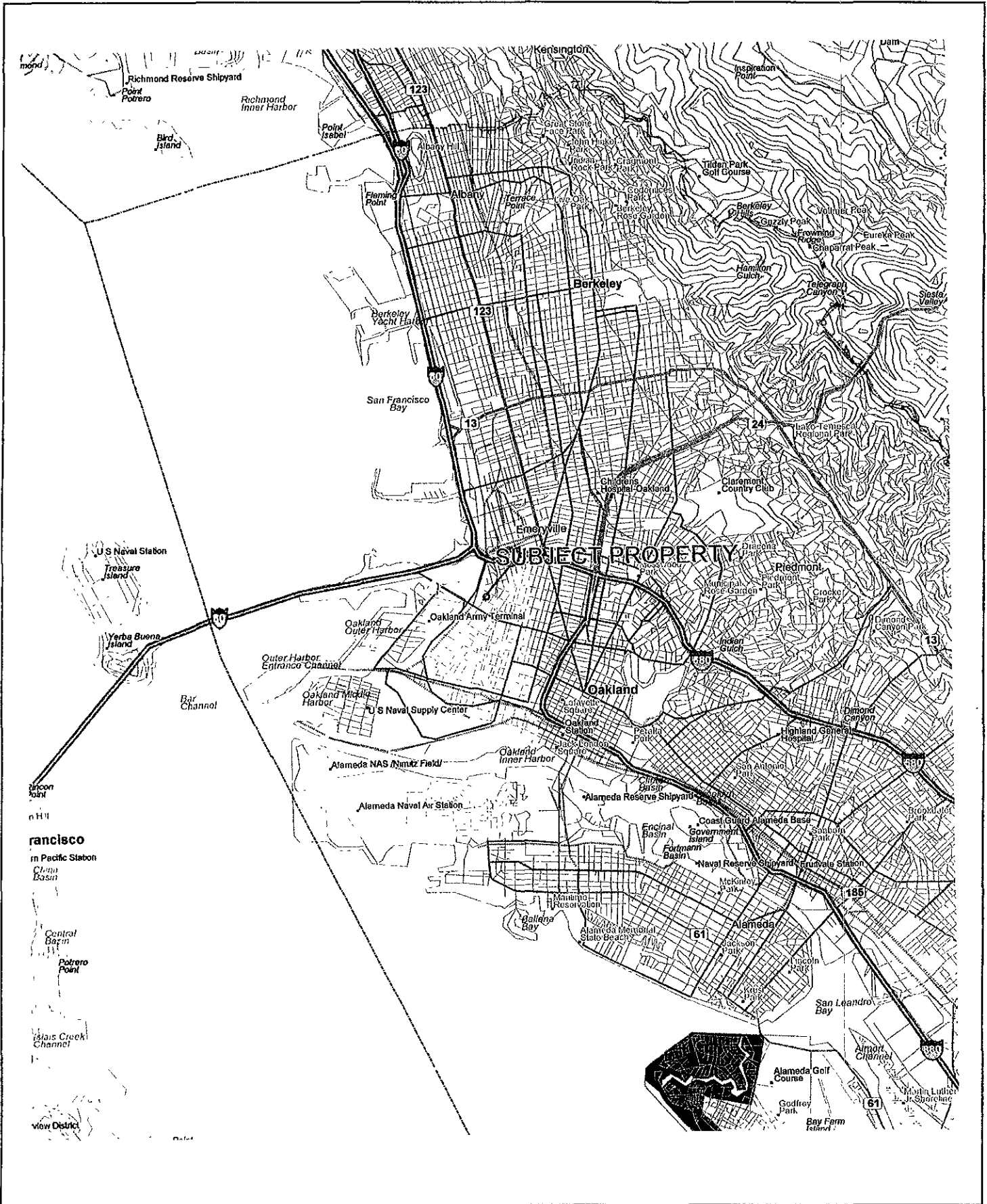
Richard S. Makdisi, R.G., R.E.A.
Principal

Attachments: Figures 1, 2 and 3
Tables 1 through 4 (Historical Analytical Results)

cc: Ms. Jeanette Elliott – Elliott Family Trust

REFERENCES

- Alameda County Health Care Services, 2003. Letter approving Stellar Environmental Solutions' August 20, 2003 technical workplan for 2526 Wood Street, Oakland, California. September 29.
- Stellar Environmental Solutions, Inc. (SES), 2003a. Underground Fuel Storage Tanks Closure Documentation and Assessment Report, Russ Elliott, Inc. – 2526 Wood Street, Oakland, California. August 15.
- SES, 2003b. Workplan for Preliminary Site Assessment – Russ Elliott, Inc. Facility, 2526 Wood Street, Oakland, California. August 20.
- SES, 2003c. Preliminary Site Assessment Report– Russ Elliott, Inc. Facility, 2526 Wood Street, Oakland, California. November 19.



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

2526 Wood Street
Oakland, CA

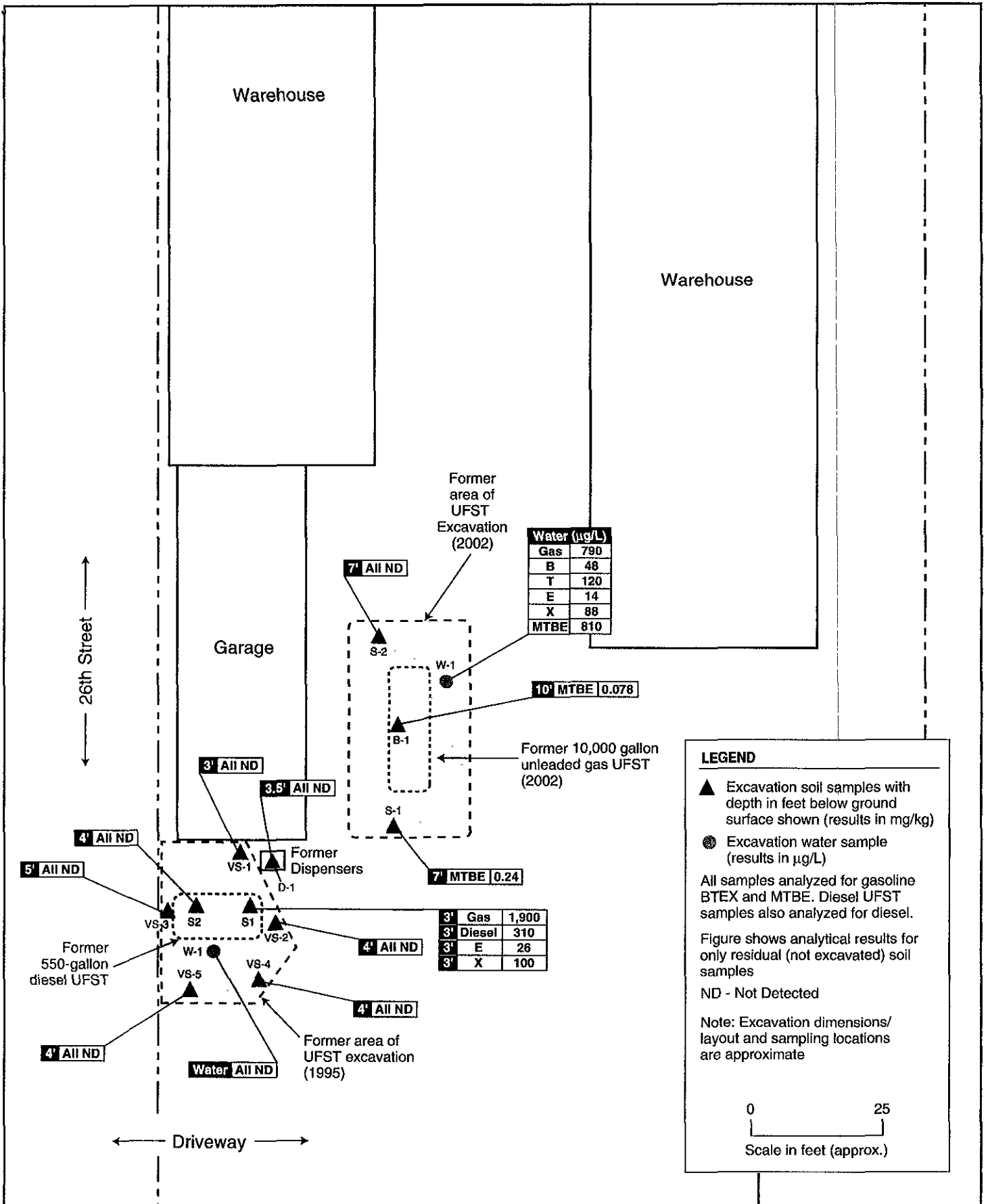
By: MJC

JULY 2003

Figure 1



2003-36-01



DETAIL OF FORMER UFSTs SHOWING SAMPLING LOCATIONS AND 1995/1996 & 2002 ANALYTICAL RESULTS

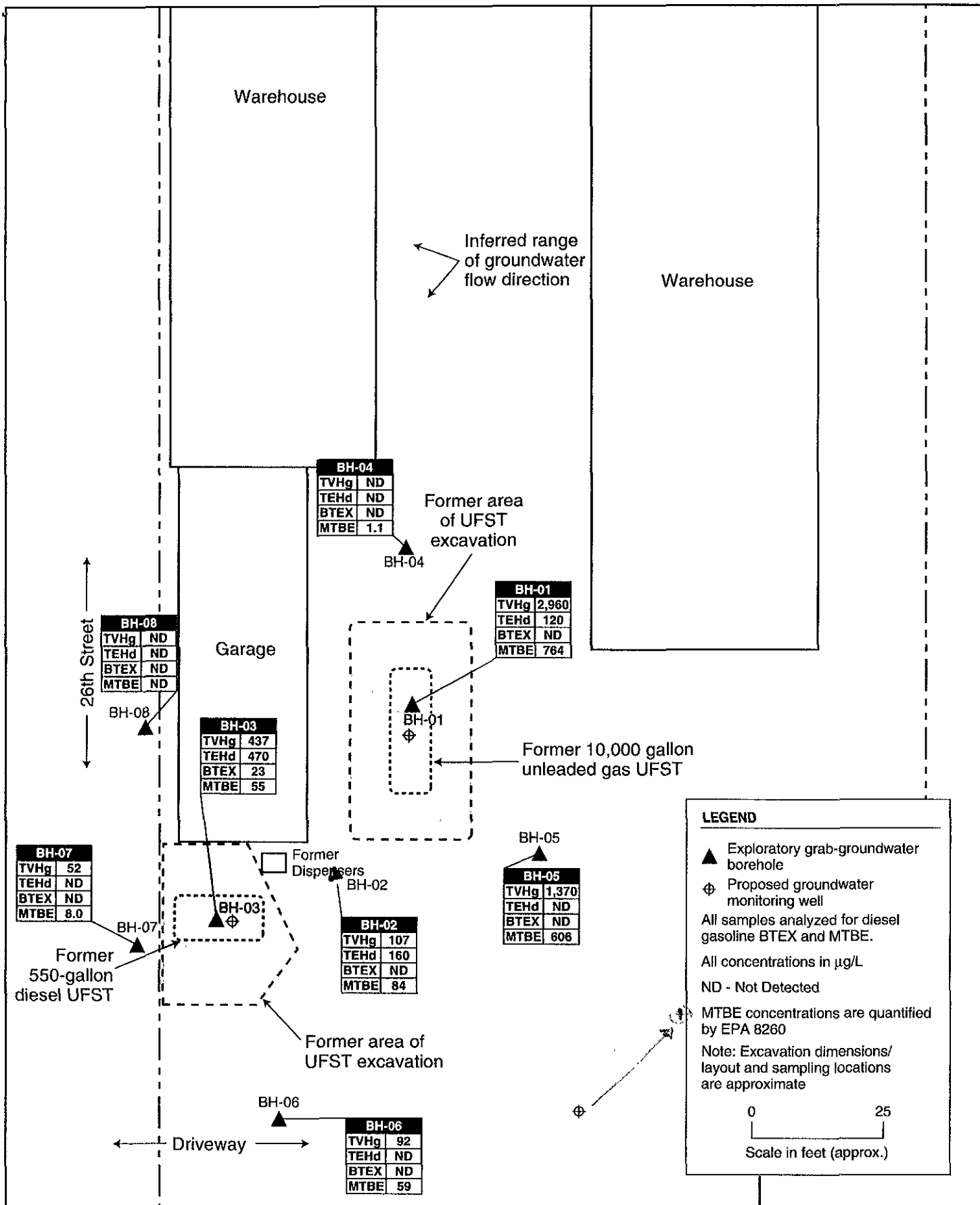
2526 Wood Street
Oakland, CA

By: MJC

JANUARY 2004

Figure 2

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OCTOBER 2003 GROUNDWATER ANALYTICAL RESULTS AND PROPOSED WELL LOCATIONS

2526 Wood Street
Oakland, CA

By: MJC

JANUARY 2004

Figure 3

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2003-41-15

Table 1
1995-1996 Diesel UFST Removal Sampling Analytical Results
2526 Wood Street, Oakland, California

Sample I.D.	Sample Depth (feet)	TEHd	TVHg	Benzene	Toluene	Ethyl benzene	Total Xylenes	MTBE	Total Lead
July 1995 Excavation Confirmation Samples (concentrations in mg/kg) (sample locations subsequently overexcavated)									
S-1 (south sidewall)	3	310	1,900	2.6	<1.4	26	100	NA	NA
S-2 (north sidewall)	4	< 1	< 0.5	<0.005	<0.005	<0.005	0.0054	NA	NA
June 1996 Excavation Confirmation Soil Samples (concentrations in mg/kg)									
VS-1	3	<1	<1	<0.005	<0.005	<0.005	<0.005	<0.05	NA
VS-2	4	<1	<1	<0.005	<0.005	<0.005	<0.005	<0.05	NA
VS-3	5	<1	<1	<0.005	<0.005	<0.005	<0.005	<0.05	NA
VS-4	4	<1	<1	<0.005	<0.005	<0.005	<0.005	<0.05	NA
VS-5	4	<1	<1	<0.005	<0.005	<0.005	<0.005	<0.05	NA
Soil ESLs		100 / 500	100 / 400	0.044 / 0.38	2.9 / 9.3	3.3 / 4.7	1.5 / 1.5	0.023 / 5.6	750 / 750
July 1995 Stockpiled Soil Sample (concentrations in mg/kg)									
SP1 (A-D) ^(a)	—	340	960	<0.005	<0.005	<0.005	<0.015	NA	NA
June 1996 Stockpiled Soil Sample (concentrations in mg/kg)									
STK (A-D)	—	< 25	340	0.80	1.2	0.71	<0.005	<0.05	NA
October 1995 Pit Water Sample (concentration in µg/L)									
W-1	4.5	<50	<50	<0.5	<0.5	<0.5	<0.5	NA	NA
Groundwater ESLs		100 / 640	100 / 500	1.0 / 46	40 / 130	30 / 290	13 / 13	5.0 / 18,000	2.5 / 2.5

Notes:

^(a) 4-point composite sample.

TEHd = total extractable hydrocarbons- diesel range; TVHg = total volatile hydrocarbons gasoline range, NA = sample not analyzed for this constituent

ESLs = Regional Water Quality Control Board, San Francisco Bay Region "Environmental Screening Levels" for commercial/industrial sites. First value is for sites where groundwater is a potential or current drinking water source. Second value is for sites where groundwater is not a potential or current drinking water source.

Table 2
April 2002 Gasoline UFST Removal Sampling Analytical Results
2526 Wood Street, Oakland, California

Sample I.D.	Sample Depth (feet)	TEHd	TVHg	Benzene	Toluene	Ethyl benzene	Total Xylenes	MTBE	Total Lead
Excavation Confirmation Soil Samples (concentrations in mg/kg)									
S-1 (west sidewall)	7'	NA	<1.0	<0.005	<0.005	<0.005	<0.005	0.24	8.5
S-2 (east sidewall)	7'	NA	<1.0	<0.005	<0.005	<0.005	<0.005	<0.05	<3.0
B-1 (UFST base)	10'	NA	<1.0	<0.005	<0.005	<0.005	<0.005	0.078	3.1
D-1 (below dispenser)	3.5'	NA	<1.0	<0.005	<0.005	<0.005	<0.005	<0.05	11
Soil ESLs		100 / 500	100 / 400	0.044 / 0.38	2.9 / 9.3	3.3 / 4.7	1.5 / 1.5	0.023 / 5.6	750 / 750
Stockpiled Soil Sample (concentrations in mg/kg)									
STK 1A-1D	—	NA	<1.0	<0.005	<0.005	<0.005	<0.005	0.15	9.9
Pit Water Sample (concentration in µg/L)									
W-1	7'	790	NA	48	120	14	88	810	ND ^(a)
Groundwater ESLs		100 / 640	100 / 500	1.0 / 46	40 / 130	30 / 290	13 / 13	5.0 / 18,000	2.5 / 2.5

Notes:

^(a) Not Detected— method reporting limit not specified in lab report

TEHd = total extractable hydrocarbons- diesel range; TVHg = total volatile hydrocarbons gasoline range; NA = sample not analyzed for this constituent.

ESLs = Regional Water Quality Control Board, San Francisco Bay Region "Environmental Screening Levels" for commercial/industrial sites. First value is for sites where groundwater is a potential or current drinking water source. Second value is for sites where groundwater is not a potential or current drinking water source

Table 3
October 2003 Borehole Soil Analytical Results
2526 Wood Street, Oakland, California

Sample I.D.	Sample Depth (feet)	TEHd	TVHg	Benzene	Toluene	Ethylbenzene	Total Xylenes	MTBE ^(a)	Fuel Oxygenates ^(b)
BH-01-4'	4	< 10.0	< 3.0	< 0.005	< 0.005	< 0.005	< 0.015	< 0.035 / 0.0017	ND
BH-02-6.5'	6.5	< 1.0	< 3.0	< 0.005	< 0.005	< 0.005	< 0.015	0.095 / 0.135	TBA = 0.061
BH-02-16'	16	< 1.0	< 3.0	< 0.005	< 0.005	< 0.005	< 0.015	<0.035 / < 0.005	ND
BH-03-4.5'	4.5	< 1.0	< 3.0	< 0.005	< 0.005	< 0.005	< 0.015	<0.035 / < 0.005	ND
BH-03-15'	15	< 1.0	< 3.0	< 0.005	< 0.005	< 0.005	< 0.015	<0.035 / < 0.005	ND
BH-04-7'	7	< 1.0	< 3.0	< 0.005	< 0.005	< 0.005	< 0.015	<0.035	NA
BH-04-18'	18	2.0	< 3.0	< 0.005	< 0.005	< 0.005	< 0.015	<0.035	NA
BH-05-6'	6	2.0	< 3.0	< 0.005	< 0.005	< 0.005	< 0.015	0.094 / 0.026	NA
BH-05-15.5'	15.5	< 1.0	< 3.0	< 0.005	< 0.005	< 0.005	< 0.015	0.046 / 0.0025	NA
BH-06-8.5'	8.5	1.3	< 3.0	< 0.005	< 0.005	< 0.005	< 0.015	<0.035	NA
BH-06-15.5'	15.5	< 1.0	< 3.0	< 0.005	< 0.005	< 0.005	< 0.015	<0.035	NA
BH-06-19.5'	19.5	< 1.0	< 3.0	< 0.005	< 0.005	< 0.005	< 0.015	<0.035	NA
BH-07-6'	6	2.2	< 3.0	< 0.005	< 0.005	< 0.005	< 0.015	<0.035	NA
BH-07-15.5'	15.5	< 1.0	< 3.0	< 0.005	< 0.005	< 0.005	< 0.015	<0.035	NA
BH-08-10'	10	< 1.0	< 3.0	< 0.005	< 0.005	< 0.005	< 0.015	<0.035	NA
BH-08-19.5'	19.5	2.0	< 3.0	< 0.005	< 0.005	< 0.005	< 0.015	<0.035	NA
	Soil ESLs	100 / 500	100 / 400	0.044 / 0.38	2.9 / 9.3	3.3 / 13	1.5 / 1.5	0.023 / 5.6	TBA = 0.073 / 110

Notes

^(a) First value is quantification by EPA Method 8021b, second value is confirmation quantification by EPA Method 8260B.

^(b) Table reports only detected fuel oxygenates. Full list of analytes is included in Appendix D.

TEHd = total extractable hydrocarbons- diesel range, TVHg = total volatile hydrocarbons gasoline range; TBA = tertiary butyl alcohol; ND = not selected above method reporting limits; NA = not analyzed for these constituents.

All concentrations are in mg/kg

Table 4
October 2003 Borehole Groundwater Analytical Results
2526 Wood Street, Oakland

Sample I.D.	TEHd	TVHg	Benzene	Toluene	Ethylbenzene	Total Xylenes	MTBE ^(a)	Fuel Oxygenates ^(b)
BH-01-GW	120	2,960	< 0.30	< 0.30	< 0.30	< 0.60	1,020 / 764	TAME = 4.7 TBA = 93
BH-02-GW	160	107	< 0.30	< 0.30	< 0.30	< 0.60	103 / 84	ND
BH-03-GW	470	437	1.0	1.9	16	4.1	69 / 55	TBA = 10
BH-04-GW	< 100	< 50	< 0.30	< 0.30	< 0.30	< 0.60	5.0 / 1.1	NA
BH-05-GW	< 100	1,370	< 0.30	< 0.30	< 0.30	< 0.60	737 / 606	NA
BH-06-GW	< 100	92	< 0.30	< 0.30	< 0.30	< 0.60	70 / 59	NA
BH-07-GW	< 100	52	< 0.30	< 0.30	< 0.30	< 0.60	12 / 8.0	NA
BH-08-GW	< 100	< 50	< 0.30	< 0.30	< 0.30	< 0.60	< 50	NA
Groundwater ESLs	100 / 640	100 / 500	1.0 / 46	40 / 130	30 / 290	13 / 13	5.0 / 18,000	TAME = NLP TBA = 12 / 18,000

Notes.

^(a) First value is quantified by EPA Method 8021b, second value is quantified by EPA Method 8260B

^(b) Table reports only detected fuel oxygenates. Full list of analytes is included in Appendix D.

TEHd = total extractable hydrocarbons- diesel range; TVHg = total volatile hydrocarbons gasoline range; TAME = tertiaryamylmethyl ether; TBA = tertiary butyl alcohol, ND = not selected above method reporting limits; NA = not analyzed for these constituents, NLP = no level published

All concentrations are in mg/L.