GROUNDWATER MONITORING REPORT
FEBRUARY 2004
AIRPORT WAY FACILITY
SEATTLE, WASHINGTON

Prepared for

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Prepared by

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March 2004

TETRA TECH EM INC.

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1.0 INTRODUCTION

Under Environmental Services Agreement No. USW-000215, Task Order MVT-EHS-025, Qwest Communications International Inc. (Qwest), tasked Tetra Tech EM Inc. (Tetra Tech) to install and develop monitoring wells at the Qwest Airport Way facility, to conduct groundwater sampling, and to report on the results of the sampling.

Tetra Tech prepared this report to document fieldwork conducted at the Qwest Airport Way facility during January and February 2004, to summarize analytical data obtained during the course of the fieldwork, and to provide recommendations regarding further action at the site. The objectives of the fieldwork at the Airport Way facility were to characterize soil and groundwater contaminant concentrations, geochemical conditions, and groundwater flow directions at the site.

Section 2.0 of this report provides background information on the Airport Way facility and an account of previous soil and groundwater investigations conducted at the site. Section 3.0 includes a summary of the field activities conducted by Tetra Tech at the Airport Way facility. Section 4.0 presents the results of the field activities and the groundwater analytical data. Section 5.0 presents a discussion of the results and recommendations for future action at the site. Tables and figures follow the reference section at the end of this report. Appendix A contains the groundwater well survey results; Appendix B contains the field sampling forms; Appendix C contains the complete laboratory reports; Appendix D contains the lithologic logs and well construction diagrams.

2.0 BACKGROUND

The Airport Way facility is located at 1709 Airport Way South, Seattle, Washington (see Figure 1). The property is in a largely industrial and commercial area of Seattle. The METRO Atlantic base is immediately north of the property and the Northwest EnviroService, Inc. (NWES) chemical processing facility (currently Emerald Petroleum) is located to the northeast across Airport Way South.

Topography in the vicinity of the site is generally flat (see Figure 1). Beacon Hill is located about 0.25-mile east of the site. Groundwater flow is expected to be toward the Duwamish River, which is located about one mile to the west of the site.

The subject property formerly contained two heating and motor oil underground storage tanks (UST), a

4,000-gallon gasoline UST, and a 4,000-gallon diesel UST (see Figure 2). During 1993, two of the USTs were removed -- the 1,760-gallon heating oil tank (tank 1) and the 300-gallon motor oil tank (tank 2). Six cubic yards of petroleum contaminated soil and eight cubic yards of sand that had been placed in tank 1 were removed from the site (Boateng & Associates, Inc. [Boateng] 1993a, 1993b). Confirmation soil samples from the tank excavations were below the Model Toxics Control Act (MTCA) Method A cleanup levels.

During 1998, two 4,000-gallon gasoline and diesel USTs and associated fuel dispenser piping were removed from the site (AGRA Earth and Environmental, Inc. [AGRA] 1998). About 305 tons of petroleum contaminated soil were excavated and removed. Groundwater was encountered at about 8 feet below ground surface (bgs). Soil samples collected from the sidewalls at about 11 feet bgs contained gasoline; diesel; and benzene, toluene, ethylbenzene, and total xylenes (BTEX) constituents above the MTCA Method A cleanup levels. The 1998 report states that "access to the bottom of the excavation was severely restricted due to sidewall instability" (AGRA 1998).

A geoprobe investigation was performed during 2003 (Tetra Tech 2003). Sampling locations that exceeded the MTCA Method A groundwater cleanup levels were within and adjacent to the areas of the previous tank excavations for the 4,000-gallon gasoline and diesel USTs (see Figures 2 and 3). Concentrations of benzene (maximum of 880 micrograms per liter [µg/L]), total xylenes (maximum of 1,700 µg/L), total petroleum hydrocarbons (TPH) as diesel (TPH-d) (maximum of 5,900 µg/L), and TPH as gasoline (TPH-g) (maximum of 6,100 µg/L) exceeded the MTCA Method A cleanup levels established for these compounds.

Currently, the property is listed on the Washington State Department of Ecology (Ecology) Leaking Underground Storage Tank (LUST) database as site identification number 10006 and release identification numbers 459234 and 5061. Ecology's LUST database www.ecy.wa.gov/programs/tcp/ust-lust/tanks.html was most recently updated on January 14, 2004.

3.0 FIELD ACTIVITIES

The following sections summarize the monitoring well installation, soil sampling, well development, and groundwater sampling activities conducted by Tetra Tech during January and February 2004.

3.1 WELL INSTALLATION AND SOIL SAMPLING

Four monitoring wells were installed at the Qwest facility on January 27, 2004, using a hollow-stem auger drilling rig operated by Geotech Explorations, Inc. Lithologic logs and well construction diagrams are provided in Appendix D. The locations of the wells are shown on Figure 4.

The flush-mount wells were installed at about 17.0 feet deep with a 10-foot 0.01-inch screen from about 7.0 to 17.0 feet bgs. Silica sand (size 10/20) was installed as sand pack from the base of the boring to about 2 feet above the top of the well screen. The remainder of the annulus of each well was filled with 3/8-inch bentonite chips up to a depth of about 2.0 feet bgs.

A soil sample was collected from each boring and analyzed for BTEX, TPH-d, and TPH-g by North Creek Analytical, Inc. in Bothell, Washington.

3.2 WELL DEVELOPMENT

The monitoring wells were developed on January 29, 2004, and February 2, 2004, using disposable bailers. About 30 to 40 gallons of water were bailed from each well. Well development water was contained in 55-gallon drums on site.

3.3 GROUNDWATER SAMPLING

On February 9, 2004, Tetra Tech field personnel collected groundwater level measurements at each well. The depth to groundwater was measured using an electronic water-level indicator that was lowered into each well. Depth-to-water measurements were made to the nearest hundredth of a foot.

After taking groundwater level measurements, the field personnel purged and sampled the wells using a peristaltic pump using low-flow sampling techniques. A flow-through cell and Horiba U-22 water meter were used to measure field parameters during purging (see Appendix B). At least three casing volumes of water were purged from each well. Purged groundwater was containerized in DOT-approved 55-gallon drums staged on site. Once the field parameters stabilized, groundwater samples were collected using dedicated low-density polyethylene tubing and a low-flow peristaltic pump. A duplicate groundwater sample was collected from monitoring well MW-4 (see Appendix C).

Groundwater samples were labeled and immediately placed in a cooler on ice. Chain-of-custody documentation was recorded on forms once samples were collected and the sample names, descriptions, and times of collection were recorded.

Groundwater samples were transported to North Creek Analytical, Inc. Samples were delivered following proper chain-of-custody protocol. North Creek Analytical, Inc., analyzed the samples for BTEX by Method 8021B (U.S. Environmental Protection Agency [EPA] 1996), TPH-g (Ecology 1997), and TPH-d (Ecology 1997). Groundwater samples were also analyzed for geochemical parameters, including dissolved oxygen, iron II, total iron, nitrate, sulfate, methane, and bicarbonate alkalinity.

The measuring point elevations of the wells and some site features were surveyed by Hammond Collier Wade Livingstone Professional Surveyors on February 9, 2004. A bolt of a streetlight north of the wells was used as a temporary benchmark and assigned an arbitrary elevation of 100.00 feet.

4.0 RESULTS

This section summarizes the results of the soil and groundwater investigation.

4.1 SOIL

Concentrations of diesel (41.7 mg/kg) and motor oil (117 mg/kg) were detected in the soil collected from the monitoring well MW-1 boring at a depth of about 6.5 feet bgs (see Table 1). However, the concentration of TPH-d is below the MTCA Method A cleanup level (2,000 mg/kg) for unrestricted land use.

4.2 GROUNDWATER

This section summarizes the results of the groundwater investigation including site geology, groundwater flow direction and gradient, and groundwater analytical results. Groundwater was encountered at around 7.0 feet bgs during drilling.

4.2.1 SITE GEOLOGY

The lithology of the site consisted primarily of sands including silty sand, clayey sand, and well graded sand with gravel. Some interbeds of clay and silt (up to 2 feet thick) were also found. Thin lenses of peat (less than 2-inches thick) were also present.

4.2.2 GROUNDWATER FLOW DIRECTION AND GRADIENT

Based on water level measurement data presented in Table 2, groundwater flow is to the west. The horizontal groundwater gradient at the Airport Way facility is about 0.019 ft/ft. Based on the small amount of drawdown observed during well development and sampling and the observed lithology, the shallow water-bearing zone appears to be characterized by moderate hydraulic conductivity (probably about 10^{-4} to 10^{-3} centimeters per second).

4.2.3 GROUNDWATER ANALYTICAL RESULTS

Groundwater samples were collected from the groundwater monitoring wells at the Airport Way facility on February 9, 2004. Groundwater samples were analyzed for BTEX constituents, TPH-g, TPH-d, and geochemical parameters (used to indicate natural attenuation).

Petroleum constituents were detected at levels below MTCA Method A groundwater cleanup levels in the monitoring wells located down gradient of the tank excavation (monitoring wells MW-1 and MW-3). As shown on Figure 3 and in Table 3, benzene (maximum of 2.40 µg/L in MW-3) and gasoline (maximum of 70.1 µg/L in MW-1) were detected at concentrations below the MTCA Method A groundwater cleanup levels. Diesel (maximum of 360 µg/L in well MW-3) also was detected below the MTCA Method A groundwater cleanup level.

The concentrations of petroleum constituents for the February 2004 groundwater well data are generally lower than the concentrations obtained by Tetra Tech during the July 2003 subsurface investigation (Tetra Tech 2003). During the July 2003 sampling, the concentrations of benzene (maximum of 880 µg/L), TPH-g (maximum of 5,900 µg/L), and TPH-d (maximum 6,200 µg/L) exceeded the MTCA Method A groundwater cleanup levels (Tetra Tech 2003) and are one to two orders of magnitude higher than results of this investigation as shown on Figure 3. The differences in results are most likely because of the monitoring well and direct push drilling locations, the screen interval, and the sampling techniques used. The direct-push borings (Tetra Tech 2003) characterized by moderate to high TPH and BTEX

concentrations were located within or immediately adjacent to the tank excavation. The 2003 direct push data and 2004 monitoring well data show that (1) the portion of the groundwater contaminant plume above the MTCA Method A cleanup levels is limited to the immediate area of the tank excavation, (2) the groundwater contaminant plume is small (less than about 40 feet long), and (3) the plume has not migrated off site.

Also it should be noted that groundwater protection standards are probably not applicable to the site. Nearby hazardous waste sites undergoing cleanup including the NWES Airport Way property (NWES 2003) and the Philip Services Corporation (PCS) Georgetown property (PSC 2003) have made demonstrations under the Washington Administrative Code (WAC) 173-340-720(2) that there is no current or future groundwater beneficial use in the site vicinities, and therefore groundwater protection standards based on drinking water use are not applicable. For PSC Georgetown site, Ecology has tentatively approved a non-beneficial use demonstration for the shallow and intermediate aquifer zones subject to future public comment (Ecology 2004).

The presence of petroleum hydrocarbons in groundwater alter groundwater geochemistry primarily through reactions driven by microbial degradation processes. Bacteria metabolize hydrocarbons through oxidation by using a variety of electron receptors present in an aquifer. Metabolic processes that are energetically favorable occur before energetically less favorable reactions and a predictable geochemical pattern of metabolite depletion and product enrichment is expected to occur around a hydrocarbon plume (Wiedemeier and others 1995). Listed from most to least energetically favorable, the following major degradation processes are documented to occur: aerobic respiration (generally measured as dissolved oxygen depletion), denitrification (generally measured as nitrate depletion), iron III depletion (generally measured as iron II enrichment), sulfate reduction (generally measured as sulfate depletion), and methanogenesis (generally measured as methane enrichment). The aerobic and anaerobic degradation processes also tend to create an increase in bicarbonate alkalinity within and downgradient of the petroleum plume (Wiedemeier and others 1995).

The geochemical data show that anaerobic conditions exist throughout the site as shown on Table 4. Concentrations of dissolved oxygen are low (less than 1 milligram per liter [mg/L]) and the oxidation-reduction potential is strongly negative (less than -88 millivolts). Bicarbonate alkalinity, ferrous iron (Fe II), and methane concentrations all increase on the downgradient (west) side of the main tank excavation. These geochemistry data are consistent with anaerobic biodegradation of fuel constituents. However, it

is not possible to accurately document the decline of concentrations of petroleum constituents in groundwater because of insufficient historical groundwater data.

5.0 CONCLUSIONS AND RECOMMENDATIONS

The February 2004 monitoring well sampling results and July 2003 direct-push groundwater sampling results (Tetra Tech 2003) show that no further action is necessary for groundwater at the Qwest Airport Way facility, specifically:

- Soil contamination at the site appears to be limited to the former tank excavation in areas below the water table. Further excavation from these areas is not practicable because of excavation stability issues and the need for dewatering.
- The major sources of contamination (that is the USTs) and accessible petroleum contaminated soil have been removed.
- Chemical concentrations in the monitoring well network 40 feet down gradient (west) of the main tank excavation are currently below the MTCA Method A groundwater cleanup levels. The 2003 direct-push groundwater data show that groundwater contamination above the MTCA Method A groundwater cleanup levels for petroleum hydrocarbons is present in the immediate vicinity of the tank excavation (Tetra Tech 2003). Although MTCA Method A groundwater cleanup levels were used for screening purposes in this report, it appears that they may not be applicable based on groundwater beneficial use demonstrations made at nearby hazardous waste sites (NWES 2003; PSC 2003; Ecology 2004).
- Based on the newly documented westerly groundwater flow direction and the monitoring well results, the groundwater contaminant plume has not migrated off site. The groundwater-to-surface water transport pathway does not appear to be of concern at the down gradient (western) property boundary. The downgradient property boundary represents a potential conditional point of compliance as defined under WAC 173-340-720(8).
- Geochemical conditions at the site suggest that anaerobic biodegradation of fuel constituents is occurring.

Therefore, in accordance with WAC 173-340-450, Tetra Tech recommends that Qwest submit to Ecology a letter along with this report and previous reports that requests a determination of no further action for the Airport Way facility. Tetra Tech recommends decommissioning the monitoring wells after a no further action determination is obtained from Ecology.

REFERENCES

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Wiedemeier, Todd, J.T. Wilson, D.H. Kampbell, R.N. Miller, and J.E. Hansen. 1995. "Technical Protocol for Implementing Intrinsic Remediation with Long-Term Monitoring for Natural Attenuation of Fuel Contamination Dissolved in Groundwater." Prepared for Air Force Center for Environmental Excellence, Technology Transfer Division. November 11.

TABLES

TABLE 1

SOIL ANALYTICAL RESULTS (mg/kg)
QWEST AIRPORT WAY FACILITY
JANUARY 2004

Location	Benzene	Toluene	Ethylbenzene	Xylenes (total)	TPH-g	TPH-d
MW1-SB-6.5	0.0300 U	0.0500 U	0.0500 U	0.100 U	5.00 U	10.0 U
MW2-SB-6.5	0.0300 U	0.0500 U	0.0500 U	0.100 U	5.00 U	10.0 U
MW3-SB-6.5	0.0300 U	0.0500 U	0.0500 U	0.100 U	5.00 U	41.7, 117 (a)
MW4-SB-11.5	0.0300 U	0.0500 U	0.0500 U	0.100 U	5.00 U	10.0 U
MTCA Cleanup Level	0.03	7	6	9	100	2,000

Notes:

U Analyte was analyzed for, but was not detected; the associated value represents the laboratory reporting limit.
(a) First concentration represents diesel range hydrocarbons; second concentration represents lube oil range hydrocarbons.
mg/kg Milligram per kilogram
MTCA Model Toxics Control Act Method A
TPH-d Total petroleum hydrocarbon as diesel
TPH-g Total petroleum hydrocarbon as gasoline

TABLE 2

GROUNDWATER ELEVATIONS
QWEST AIRPORT WAY FACILITY
FEBRUARY 2004

Location	Surveyed Top of Casing (ft, elevation relative to assumed datum)	Depth to Water (ft)	Groundwater Elevation (ft)
MW-1	98.45	5.99	92.46
MW-2	99.59	5.61	93.98
MW-3	98.63	6.15	92.48
MW-4	97.71	5.28	92.43

Note:

ft Feet

TABLE 3

GROUNDWATER ANALYTICAL RESULTS (µg/L)
QWEST AIRPORT WAY FACILITY
FEBRUARY 2004

Location	Benzene	Toluene	Ethylbenzene	Xylenes (total)	TPH-g	TPH-d
MW-1	2.40	0.500 U	0.500 U	1.00 U	50.0 U	250 U
MW-2	0.500 U	0.500 U	0.500 U	1.00 U	50.0 U	250 U
MW-3	0.500 U	0.500 U	0.500 U	1.00 U	70.5	360
MW-4	0.500 U	0.500 U	0.500 U	1.00 U	50.0 U	250 U
MW-40 (duplicate of MW-4)	0.500 U	0.500 U	0.500 U	1.00 U	50.0 U	291
MTCA Cleanup Level	5	1,000	700	1,000	800	500

Notes:

U Analyte was analyzed for, but was not detected; the associated number is the laboratory reporting limit.
µg/L Microgram per liter
MTCA Model Toxics Control Act
TPH-d Total petroleum hydrocarbon as diesel
TPH-g Total petroleum hydrocarbon as gasoline

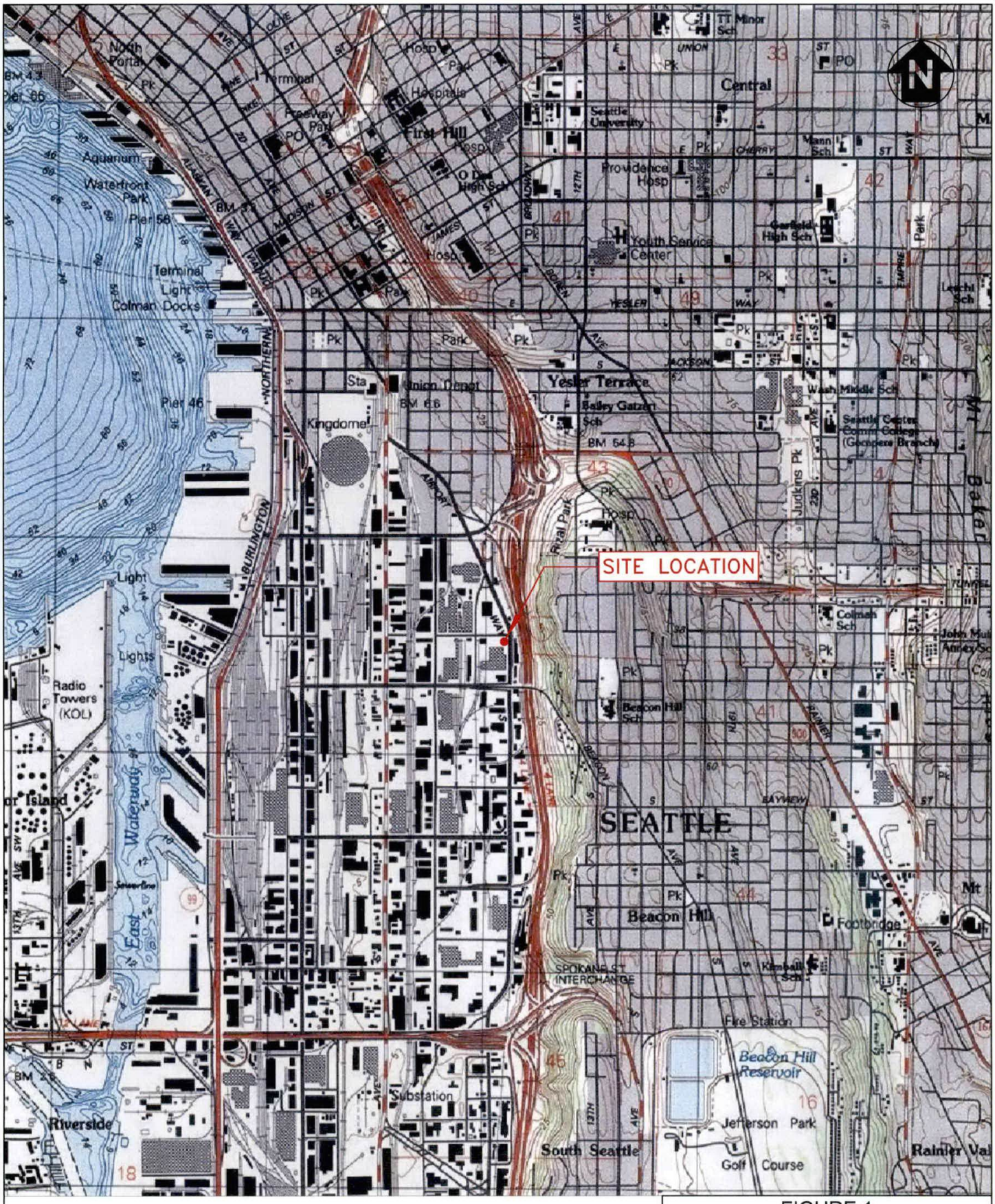
TABLE 4

GROUNDWATER GEOCHEMICAL ANALYTICAL RESULTS
QWEST AIRPORT WAY FACILITY
FEBRUARY 2004

Location	Dissolved Oxygen (mg/L)	Oxidation-Reduction Potential (millivolts)	Bicarbonate Alkalinity (mg/L)	Total Iron/Ferrous Iron (mg/L)	Nitrate (mg/L)	Sulfate (mg/L)	Methane (mg/L)
MW-1	0.28	-123	444	11.7/5.6	0.200 U	0.400 U	11,300
MW-2	0	-88	317	4.03/3.0	0.200 U	0.400 U	5,880
MW-3	0.42	-100	505	8.42/3.6	0.200 U	0.724	11,300
MW-4	0	-90	612	15.2/3.2	0.200 U	0.400 U	10,700

Note:
mg/L Milligram per liter

FIGURES



Source: USGS 7.5–Minute Quadrangle Map. Seattle South E, WA. 1978.

FIGURE 1

SITE LOCATION MAP
QWEST
1709 AIRPORT WAY SOUTH
SEATTLE, WASHINGTON

TETRA TECH EM INC.

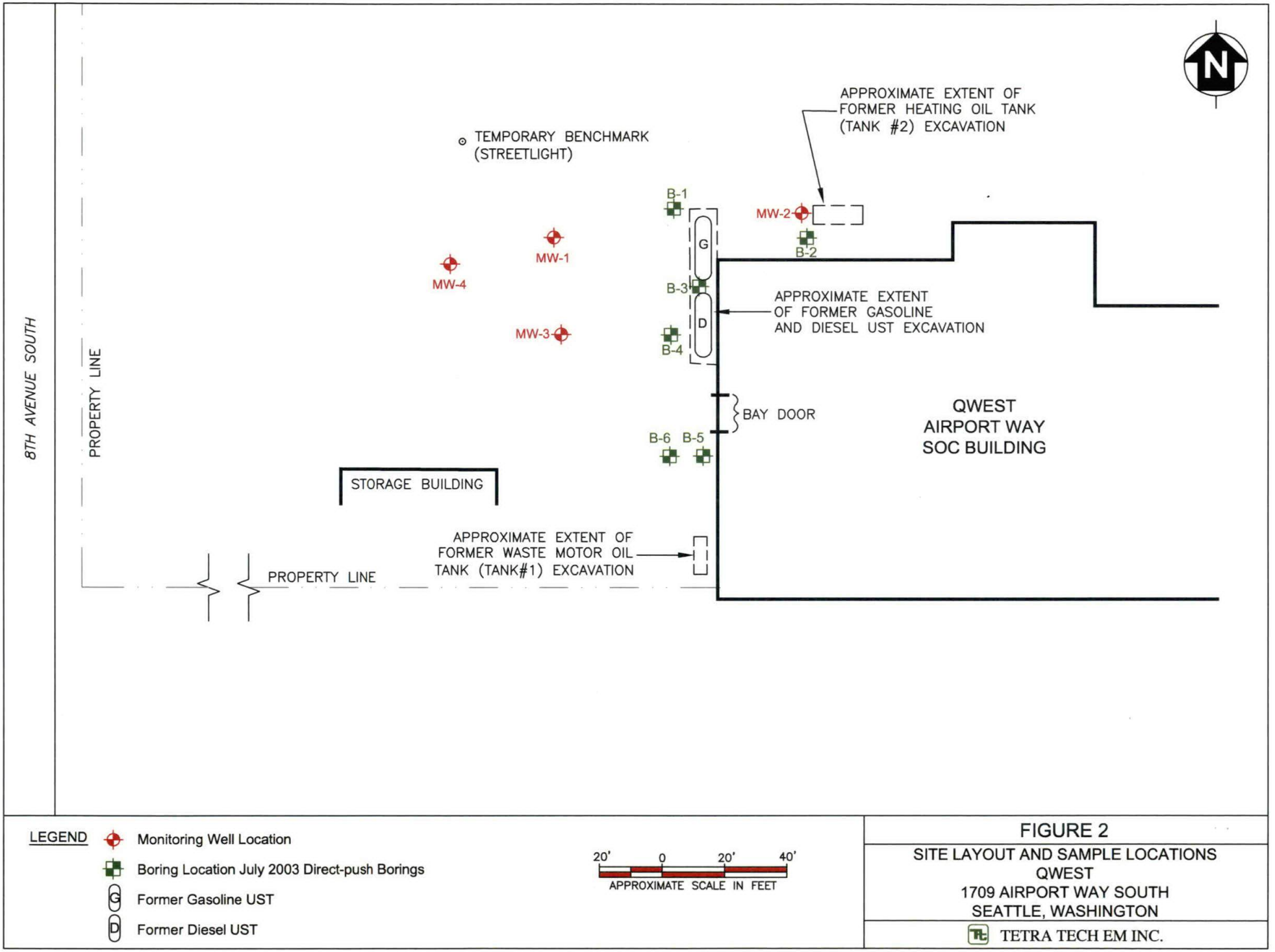


FIGURE 2

SITE LAYOUT AND SAMPLE LOCATIONS
QWEST
1709 AIRPORT WAY SOUTH
SEATTLE, WASHINGTON

TETRA TECH EM INC.

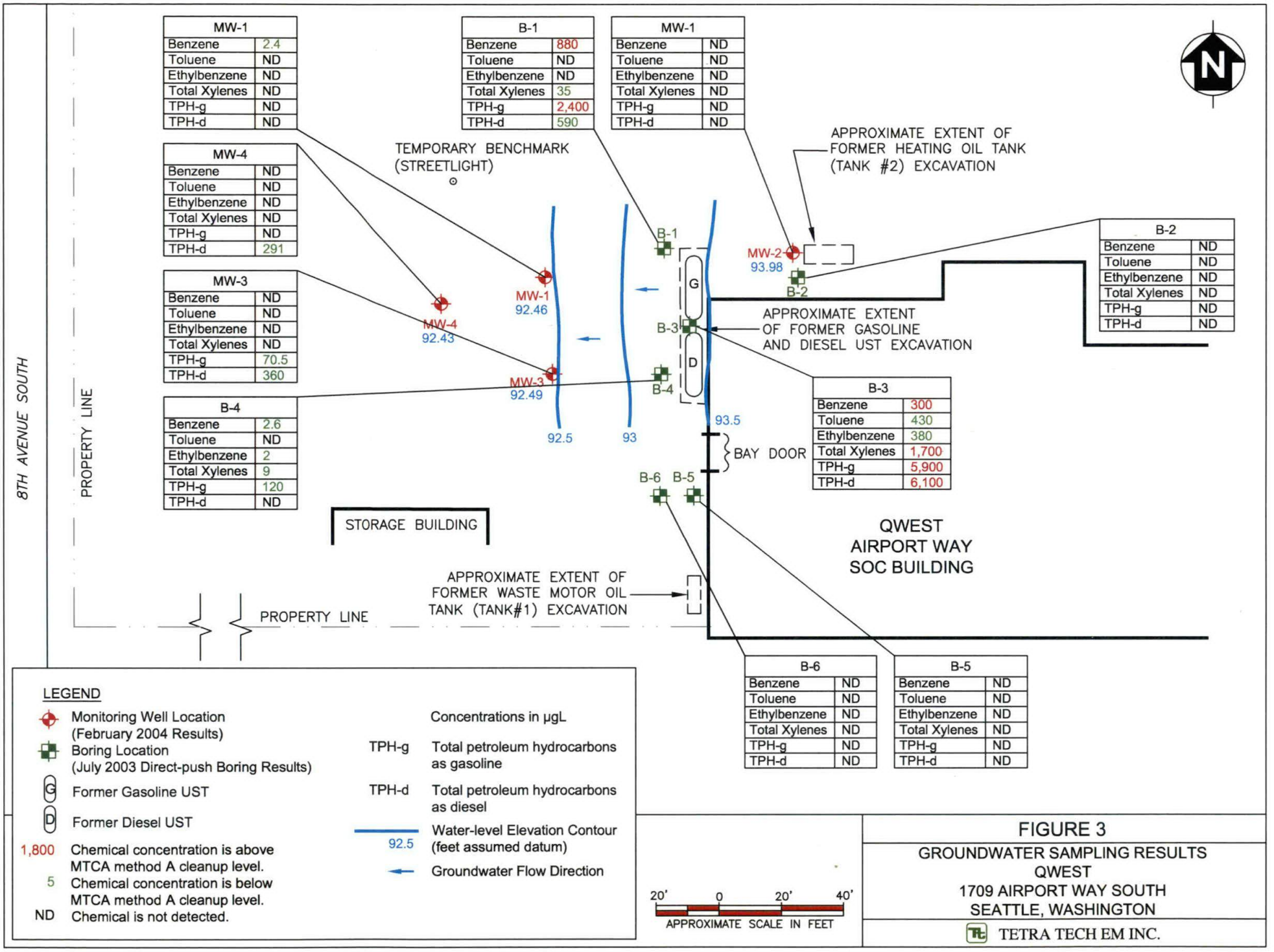


FIGURE 3

GROUNDWATER SAMPLING RESULTS
QWEST
1709 AIRPORT WAY SOUTH
SEATTLE, WASHINGTON

TETRA TECH EM INC.

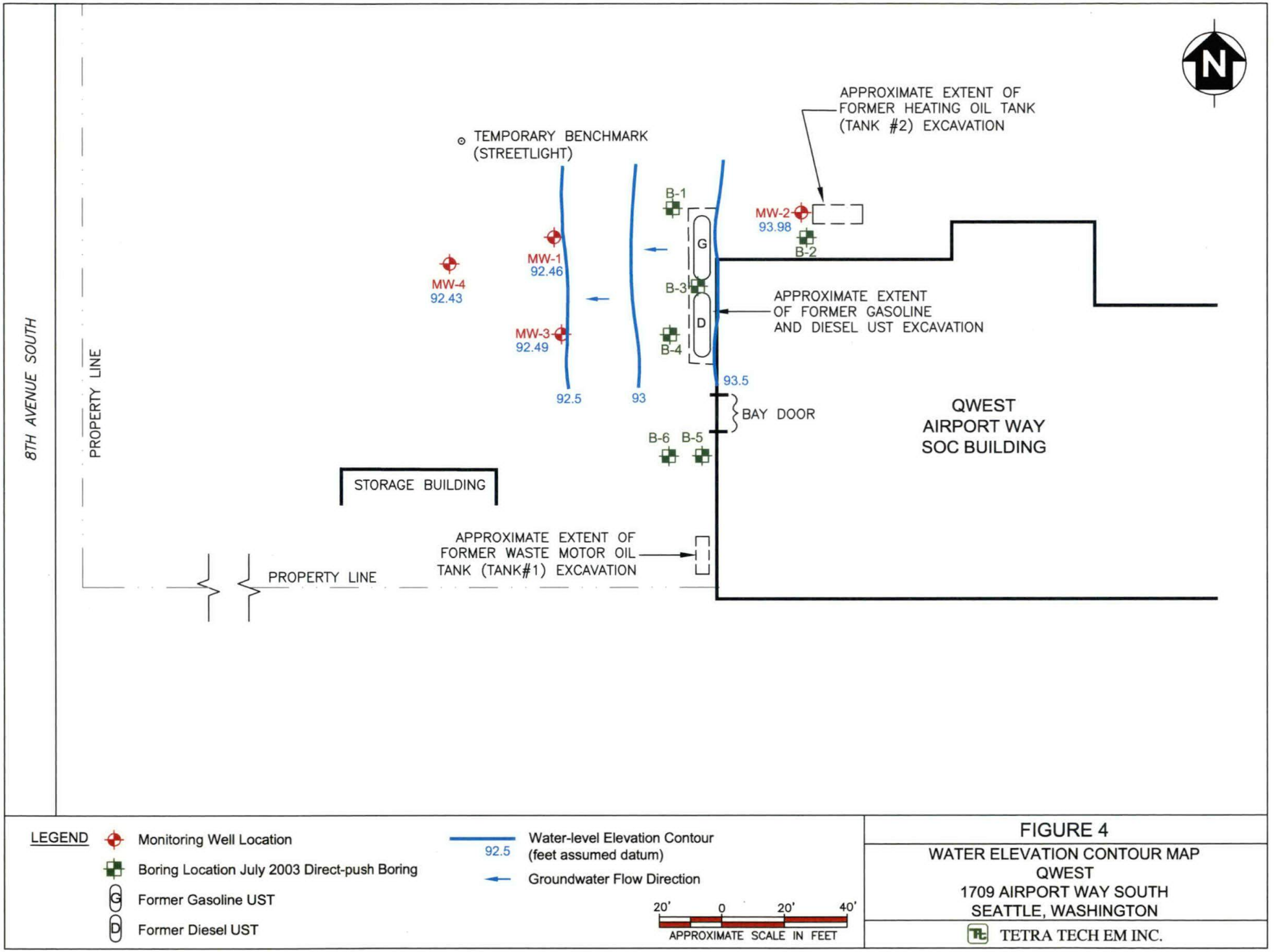


FIGURE 4

WATER ELEVATION CONTOUR MAP
QWEST
1709 AIRPORT WAY SOUTH
SEATTLE, WASHINGTON

TETRA TECH EM INC.

APPENDIX A

WELL SURVEY RESULTS
QWEST AIRPORT WAY FACILITY
SEATTLE, WASHINGTON

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Seattle, Washington 98103-8090
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PLEASE DELIVER TO:

Name: **Ben Farrell**

Firm: **TetraTech EM Inc**

Location:

Telefax No.: **425 673-9119**

SENT FROM: Name: **Dave Fujiki**

TOTAL PAGES:	3
HCWL Job No.:	04-50-001

If you do not receive all of these pages, please call as soon as possible. Thank you.

Comments

Ben,

Please find attached a map of the Qwest Airport Service Center at 1709 Airport Way S. as well as a list of points and their northing, easting, elevation and description. Please note that at each monitoring well two shots were taken: 1) top of cover (at center) 2) top of pvc casing (at north edge). Also a benchmark was set on the streetlight pole north of MW-1 and MW-4. The benchmark elevation is set at 100.00 and is at the top of the southwestern bolt. There are four bolts for the streetlight. The approximate location of the old tank was also located and are field marked with white paint per Lee.

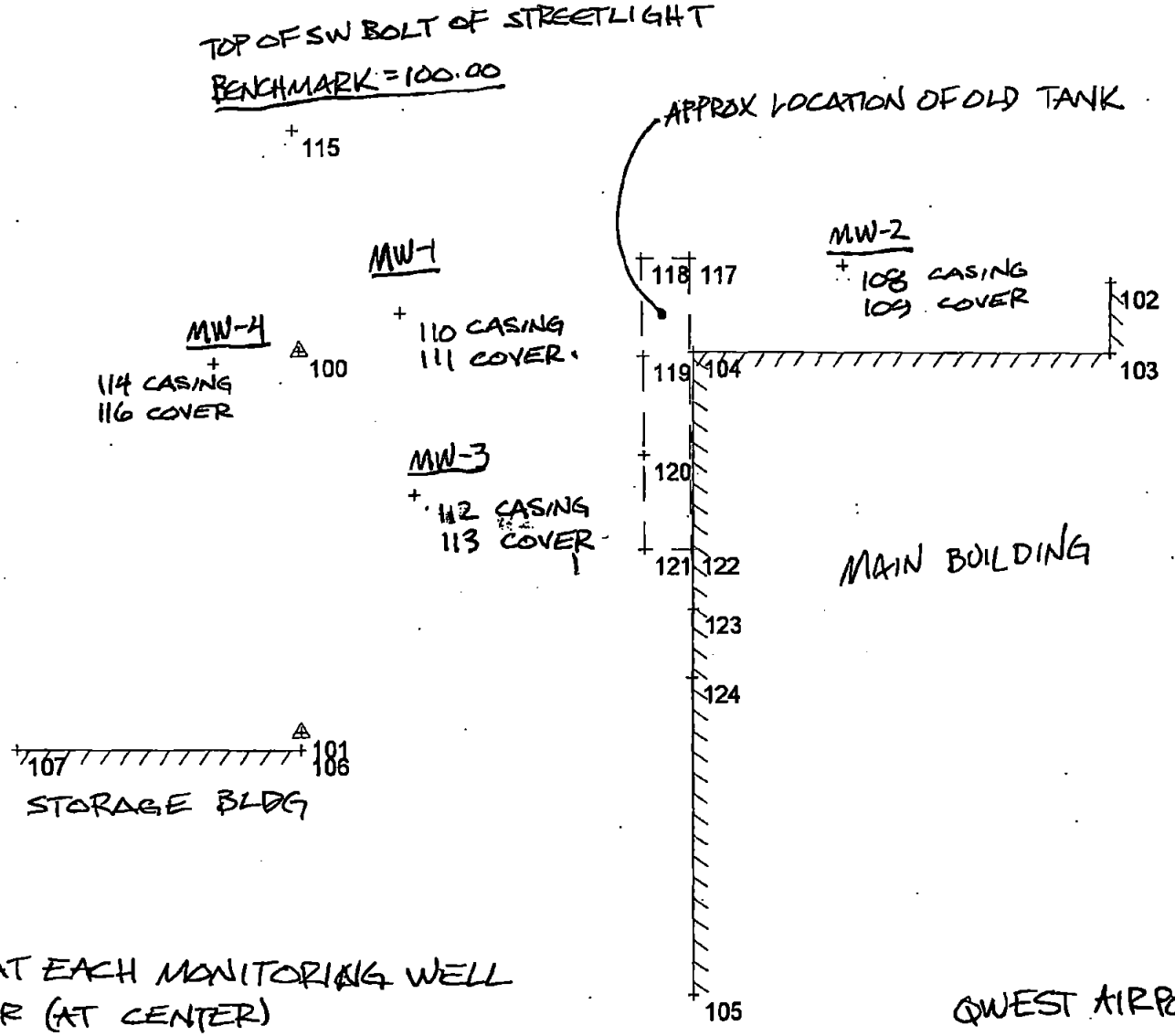
If you have any questions, please feel free to call Scott Edwards or myself.

Thank you,

David S. Fujiki

☐ Original will be mailed.
☑ Original will not be mailed.

Date Transmitted: 02/09/04



NO SHOTS TAKEN AT EACH MONITORING WELL
- TOP OF COVER (AT CENTER)
- TOP OF CASING (AT NORTH EDGE)

QWEST AIRPORT WAY SERVICE CENTER

1709 AIRPORT WAY S.

LISCAD Report: Point Report
Monday, February 09, 2004 11:43

File: 0450001
Projection: Plane grid
File Date: Monday, February 09, 2004
Survey Date: 02/09/04
Field Party: DSF, HA
Client: Tetra Tech EM
Street: 1709 Airport Way (Qwest)
Suburb: Seattle
Description: Location of monitoring wells

Distance Units: US Survey Feet

Point ID	North	East	Elevation	Code	Group	Description
100	5000.000	5000.000	98.496	103	CONTROL	PK NAIL
101	4934.735	5000.000	98.581	103	CONTROL	PK NAIL
102	5011.337	5145.634	98.923	601	BLDG	MAIN BLDG. COR
103	4999.319	5145.462	98.931	601	BLDG	MAIN BLDG. COR
104	4999.773	5070.588	98.882	601	BLDG	MAIN BLDG. NW COR
105	4890.033	5069.678	100.015	601	BLDG	MAIN BLDG. SW COR
106	4931.648	4999.840	98.733	601	BLDG	STORAGE BLDG. NE COR
107	4931.914	4949.714	98.312	601	BLDG	STORAGE BLDG. NW COR
108	5014.476	5097.539	99.586	322	WATER	TOP OF CASING - NORTH MW-2
109	5014.299	5097.590	100.024	318	WATER	TOP OF COVER MW-2
110	5006.563	5018.148	98.451	322	WATER	TOP OF CASING - NORTH MW-1
111	5006.448	5018.203	98.966	318	WATER	TOP OF COVER MW-1
112	4975.374	5020.613	98.626	322	WATER	TOP OF CASING - NORTH MW-3
113	4975.262	5020.565	99.075	318	WATER	TOP OF COVER MW-3
114	4997.923	4984.948	97.713	322	WATER	TOP OF CASING - NORTH MW-4
115	5037.351	4998.947	100.000	120	CONTROL	BENCH MARK-TOP OF SW BOLT
116	4997.859	4984.898	98.108	318	WATER	TOP OF COVER MW-4
117	5015.714	5070.008	98.457	425	ROAD	APPROX OLD TANK LOCATION
118	5015.755	5061.394	98.542	425	ROAD	APPROX OLD TANK LOCATION
119	4999.057	5061.568	98.850	425	ROAD	APPROX OLD TANK LOCATION
120	4982.078	5061.633	99.357	425	ROAD	APPROX OLD TANK LOCATION
121	4966.055	5061.672	100.007	425	ROAD	APPROX OLD TANK LOCATION
122	4965.977	5070.013	100.215	425	ROAD	APPROX OLD TANK LOCATION
123	4955.803	5070.334	100.378	610	BLDG	NORTH SIDE WAREHOUSE ENTRY
124	4943.893	5070.013	100.365	610	BLDG	NORTH SIDE WAREHOUSE ENTRY

Listed 25 of 26 points.

APPENDIX B

FIELD SAMPLING FORMS
QWEST AIRPORT WAY FACILITY
SEATTLE, WASHINGTON

Tetra Tech EM Inc.

MICROPURGING GROUNDWATER SAMPLING DATA SHEET

Page 1 of 1

Date 2/9/04

Well Name MW-1
Project Direct Airport Way SOC
Project No. P1747018301
Well Location
Sample Date 2/9/04
Sampling Personnel Li Ma
Sample ID MW-1
Duplicate ID /

Screen Interval
Station Elevation ____ GND ____ TOC ____
Static Water Level (from TOC) 5.99
Well Stick Up
Static Elevation
Well Depth 13.2 MEAS ____ RPTD ____
Feet of Water
Gallons/Foot
Casing Volume

Immiscible Phases Present ☐ Yes ☒ No
Type
Measured with
PID Readings (background)
PID Reading (TOC)
Wells Installed by
Installation Date
Development Date(s)

FIELD CHEMISTRY CALIBRATIONS

Date/Time ____ Spec. Conductance: Standard ____ µmhos/cm at 25 C Reading ____ µmhos/cm at ____ C
pH: pH 4.00 - ____ at ____ C pH 7.00 - ____ at ____ C pH 10.00 - ____ at ____ C Slope ____
Dissolved Oxygen: D.O. Meter ____ mg/L at ____ C PID: Calibration Gas ____ PPM ____ Span ____ Reading ____

PURGING

Time	Discharge Rate (mL/min)	Dissolved Oxygen (mg/L)	pH	Eh/ORP (mV)	Temp. (C)	Specific Conduct. ~~(µmhos/cm~~ mS/m at C)	Turbidity (NTU)	Cumulative Volume of Water Removed (Purged) Gallons	Cumulative Volume of Water Removed (Purged) Casing Vol.	PID/OVA Reading Location	PID/OVA Reading Value	Depth to Water (ft)	Comments
1230	300	1.41	6.99	-59	13.5	91.9	78.2					5.99	
1235	"	1.36	6.92	-94	14.0	91.8	21.8	2				6.50	
1241	"	0.48	7.11	-119	14.2	92.3	13.9	4				7.05	
1250	"	0.28	7.11	+23	14.3	92.1	19.1	5				7.06	
					Sampled @ 1300								

SAMPLE PARAMETERS

Condition of well:
Remarks: Sampled @ 1300; Fe^{++} = 5.6 mg/L

FIELD EQUIPMENT

pH Meter ____ Serial Number ____
Spec. Cond. Meter ____ Serial Number ____
Pump ____ Serial Number ____
Water Level Meter ____ Serial Number ____
D.O. Meter ____ Serial Number ____
Filter Apparatus ____ Filters ____
Temperature Measure ____
Interface Probe ____ Serial Number ____
PID/OVA ____ Serial Number ____

Field Chemistry Calibrations

Fractions ____
Number of Bottles ____
Sample Depth ____
Field Notebook ____
Sample Method ____
Discharge Water Containerized ☐ Yes ☐ No

Tetra Tech EM Inc.

MICROPURGING GROUNDWATER SAMPLING DATA SHEET

Page 1 of 1
Date 2/9/04

Well Name MW-2
Project Nwest Airport Way soc
Project No. P1747018301
Well Location
Sample Date 2/9/04
Sampling Personnel Li Ma
Sample ID MW-2
Duplicate ID /

Screen Interval
Station Elevation ____ GND ____ TOC ____
Static Water Level (from TOC) 5.61'
Well Stick Up
Static Elevation
Well Depth 17 MEAS ____ RPTD ____
Feet of Water
Gallons/Foot
Casing Volume

Immiscible Phases Present ☐ Yes ☒ No
Type
Measured with
PID Readings (background)
PID Reading (TOC)
Wells Installed by
Installation Date
Development Date(s)

FIELD CHEMISTRY CALIBRATIONS

Date/Time ____ Spec. Conductance: Standard ____ µmhos/cm at 25 C Reading ____ µmhos/cm at ____ C
pH: pH 4.00 - ____ at ____ C pH 7.00 - ____ at ____ C pH 10.00 - ____ at ____ C Slope ____
Dissolved Oxygen: D.O. Meter ____ mg/L at ____ C PID: Calibration Gas ____ PPM ____ Span ____ Reading ____

PURGING

Time	Discharge Rate (mL/min)	Dissolved Oxygen (mg/L)	pH	Eh/ORP (mV)	Temp. (C)	Specific Conduct. ~~(µmhos/cm~~ ms/m at C)	Turbidity (NTU)	Cumulative Volume of Water Removed (Purged)		PID/OVA Reading		Depth to Water (ft)	Comments
								Gallons	Casing Vol.	Location	Value		
1310	300	1.64	7.12	-12	12.5	63.8	120					5.99	
1320	"	0.46	7.02	-19	12.7	63.8	60.5	1				5.99	
1325	"	0	7.17	-60	13.0	64.8	68.0	2				5.99	
1330	"	0	7.35	-78	13.0	65.0	46.7	3.5				5.99	
1335	"	0	7.39	-88	12.9	65.6	35.2	4.5				6.02	
					Sampled @ 1340								

SAMPLE PARAMETERS

Condition of well:
Remarks: Fe# = 3.0 mg/L

FIELD EQUIPMENT

pH Meter ____ Serial Number ____
Spec. Cond. Meter ____ Serial Number ____
Pump ____ Serial Number ____
Water Level Meter ____ Serial Number ____
D.O. Meter ____ Serial Number ____
Filter Apparatus ____ Filters ____
Temperature Measure ____
Interface Probe ____ Serial Number ____
PID/OVA ____ Serial Number ____

Field Chemistry Calibrations

Fractions ____
Number of Bottles ____
Sample Depth ____
Field Notebook ____
Sample Method ____
Discharge Water Containerized ☐ Yes ☐ No

Tetra Tech EM Inc.

MICROPURGING GROUNDWATER SAMPLING DATA SHEET

Page 1 of 1
Date 2/9/04

Well Name MW-3
Project Quest Airport Imaging SOC
Project No. P1747018301
Well Location
Sample Date 2/9/04
Sampling Personnel Li Ma
Sample ID MW-3
Duplicate ID /

Screen Interval
Station Elevation ____ GND ____ TOC ____
Static Water Level (from TOC) 6.15
Well Stick Up
Static Elevation
Well Depth 12.7 MEAS ____ RPTD ____
Feet of Water
Gallons/Foot
Casing Volume

Immiscible Phases Present ☐ Yes ☒ No
Type
Measured with
PID Readings (background)
PID Reading (TOC)
Wells Installed by
Installation Date
Development Date(s)

FIELD CHEMISTRY CALIBRATIONS

Date/Time ____ Spec. Conductance: Standard ____ µmhos/cm at 25 C Reading ____ µmhos/cm at ____ C
pH: pH 4.00 - ____ at ____ C pH 7.00 - ____ at ____ C pH 10.00 - ____ at ____ C Slope ____
Dissolved Oxygen: D.O. Meter ____ mg/L at ____ C PID: Calibration Gas ____ PPM ____ Span ____ Reading ____

PURGING

mS/m

Time	Discharge Rate (mL/min)	Dissolved Oxygen (mg/L)	pH	Eh/ORP (mV)	Temp. (C)	Specific Conduct. ~~(µmhos/cm~~ at C)	Turbidity (NTU)	Cumulative Volume of Water Removed (Purged)		PID/OVA Reading		Depth to Water (ft)	Comments
								Gallons	Casing Vol.	Location	Value		
1148	300	2.88	7.04	-69	13.3	0.113	94.1					6.15	
1152	300	1.29	7.12	-92	13.4	0.106	4.6	1				6.40	
1157	300	0.44	7.14	-98	13.3	0.102	1.5	3				6.60	
1205	:	0.42	7.14	-100	13.3	0.104	1.5	5				6.60	
				Sampled @ 1215									

SAMPLE PARAMETERS

Condition of well:
Remarks: Fe 4+ = 3.6 mg/L

FIELD EQUIPMENT

pH Meter ____ Serial Number ____
Spec. Cond. Meter ____ Serial Number ____
Pump ____ Serial Number ____
Water Level Meter ____ Serial Number ____
D.O. Meter ____ Serial Number ____
Filter Apparatus ____ Filters ____
Temperature Measure ____
Interface Probe ____ Serial Number ____
PID/OVA ____ Serial Number ____

Field Chemistry Calibrations

Fractions ____
Number of Bottles ____
Sample Depth ____
Field Notebook ____
Sample Method ____
Discharge Water Containerized ☐ Yes ☐ No

Tetra Tech EM Inc.

MICROPURGING GROUNDWATER SAMPLING DATA SHEET

Page 1 of 1

Date 2/9/04

Well Name MW-4
Project Qwest Airport Way SOC
Project No. P1747018301
Well Location
Sample Date 2/9/04
Sampling Personnel Li Ma

Sample ID MW-4
Duplicate ID MW-40

Screen Interval
Station Elevation ____ GND ____ TOC ____
Static Water Level (from TOC) 5.28'
Well Stick Up
Static Elevation
Well Depth 16.4' MEAS ____ RPTD ____
Feet of Water
Gallons/Foot
Casing Volume

Immiscible Phases Present ☐ Yes ☒ No
Type
Measured with
PID Readings (background)
PID Reading (TOC)
Wells Installed by
Installation Date
Development Date(s)

FIELD CHEMISTRY CALIBRATIONS

Date/Time ____ Spec. Conductance: Standard ____ µmhos/cm at 25 C Reading ____ µmhos/cm at ____ C
pH: pH 4.00 - ____ at ____ C pH 7.00 - ____ at ____ C pH 10.00 - ____ at ____ C Slope ____
Dissolved Oxygen: D.O. Meter ____ mg/L at ____ C PID: Calibration Gas ____ PPM ____ Span ____ Reading ____

PURGING

Time	Discharge Rate (mL/min)	Dissolved Oxygen (mg/L)	pH	Eh/ORP (mV)	Temp. (C)	Specific Conduct. (~~µmhos/cm~~ mS/m at C)	Turbidity (NTU)	Cumulative Volume of Water Removed (Purged) Gallons	Cumulative Volume of Water Removed (Purged) Casing Vol.	PID/OVA Reading Location	PID/OVA Reading Value	Depth to Water (ft)	Comments
1000	300	2.14	6.77	-69	14.3	0.159	62					5.28	
1005	300	0.85	6.99	-80	14.4	0.158	24.5	1				5.30	
1015	300	0.75	7.09	-89	14.5	0.143	23.1	3				5.45	
1022	300	0	7.08	-90	14.5	0.142	18.4	5				5.55	
				Sampled @				1130					

SAMPLE PARAMETERS

Condition of well:
Remarks: $Fe^{+} = 3.2$ mg/L Take Dup from this well MW-40 @ 11:40

FIELD EQUIPMENT

pH Meter ____ Serial Number ____
Spec. Cond. Meter ____ Serial Number ____
Pump ____ Serial Number ____
Water Level Meter ____ Serial Number ____
D.O. Meter ____ Serial Number ____
Filter Apparatus ____ Filters ____
Temperature Measure ____
Interface Probe ____ Serial Number ____
PID/OVA ____ Serial Number ____

Field Chemistry Calibrations

Fractions ____
Number of Bottles ____
Sample Depth ____
Field Notebook ____
Sample Method ____
Discharge Water Containerized ☐ Yes ☐ No

APPENDIX C

LABORATORY ANALYTICAL REPORT
QWEST AIRPORT WAY FACILITY
SEATTLE, WASHINGTON

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02 February 2004

Ben Farrell
Tetra Tech, EM, Inc.
6100 219th Street SW, Ste 550
Mountlake Terrace, WA/USA 98043

RE: Qwest Airport Way SOC

Enclosed are the results of analyses for samples received by the laboratory on 01/24/04 10:15. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Jeanne Garthwaite

Jeanne Garthwaite
Project Manager

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3209 Denali St, Anchorage, AK 99503-4030 907-334-9200 FAX 334-9210

CHAIN OF CUSTODY REPORT

Work Order #: B4A0593

CLIENT: Tetra Tech EM Inc

REPORT TO: Ben Farrell
ADDRESS: 6100 219th Street SW, Suite 550
Mountlake Terrace WA 98043
PHONE: (425) 673-3678 FAX: (425) 673-9191

INVOICE TO: Ben Farrell
6100 219th Street SW, Suite 550
Mountlake Terrace, WA 98043

P.O. NUMBER: P1747018301

PROJECT NAME: Quest Airport Way SOC
PROJECT NUMBER: P1747018301
SAMPLED BY: Ben Farrell

TURNAROUND REQUEST
in Business Days *
Organic & Inorganic Analyses: 10 | 7 | 5 | STD. | 4 | 3 | 2 | 1 | <1
Petroleum Hydrocarbon Analyses: ~~5~~ STD. | 4 | 3 | 2 | 1 | <1
OTHER Specify:
* Turnaround Requests less than standard may incur Rush Charges.

	CLIENT SAMPLE IDENTIFICATION	SAMPLING DATE/TIME	PRESERVATIVE: Ice	Ice	REQUESTED ANALYSES: NWTPH-Gx/BTEX	NWTPH-Dx	MATRIX (W, S, O)	# OF CONT.	LOCATION / COMMENTS	NCA WO ID
1	MW1-SB-6.5	1/22/04 / 14:22	X	X	X	X	S	2		01
2	MW2-SB-6.5	1/23/04 / 12:15	X	X	X	X	S	2		02
3	MW3-SB-6.5	1/23/04 / 14:08	X	X	X	X	S	2		03
4	MW4-SB-11.5	1/23/04 / 16:00	X	X	X	X	S	2		04
5										05
6										
7										
8										
9										
10										

RELEASED BY: PRINT NAME: Benjamin R. Farrell FIRM: Tetra Tech EM Inc DATE: 1/24/04 TIME: 10:15
RECEIVED BY: PRINT NAME: Dena Hardmeyer FIRM: NCA DATE: 1.24.04 TIME: 10:15
RELEASED BY: PRINT NAME: FIRM: DATE: TIME:
RECEIVED BY: PRINT NAME: FIRM: DATE: TIME:

ADDITIONAL REMARKS: W/O
TEMP: 5-1
PAGE OF

COC REV 1/03

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Tetra Tech, EM, Inc.	Project: Qwest Airport Way SOC	
6100 219th Street SW, Ste 550	Project Number: P1747018301	**Reported:**
Mountlake Terrace, WA/USA 98043	Project Manager: Ben Farrell	02/02/04 13:45

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
MW1-SB-6.5	B4A0593-01	Soil	01/22/04 14:22	01/24/04 10:15
MW2-SB-6.5	B4A0593-02	Soil	01/23/04 12:15	01/24/04 10:15
MW3-SB-6.5	B4A0593-03	Soil	01/23/04 14:08	01/24/04 10:15
MW4-SB-11.5	B4A0593-04	Soil	01/23/04 16:00	01/24/04 10:15

North Creek Analytical - Bothell

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Jeanne Garthwaite

Jeanne Garthwaite, Project Manager

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Tetra Tech, EM, Inc.	Project: Qwest Airport Way SOC	
6100 219th Street SW, Ste 550	Project Number: P1747018301	**Reported:**
Mountlake Terrace, WA/USA 98043	Project Manager: Ben Farrell	02/02/04 13:45

Gasoline Hydrocarbons (Benzene to Naphthalene) and BTEX by NWTPH-G and EPA 8021B

North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
MW1-SB-6.5 (B4A0593-01) Soil Sampled: 01/22/04 14:22 Received: 01/24/04 10:15									
Gasoline Range Hydrocarbons	ND	5.00	mg/kg dry	1	4A29004	01/29/04	01/29/04	NWTPH-Gx/8021B	
Benzene	ND	0.0300	"	"	"	"	"	"	
Toluene	ND	0.0500	"	"	"	"	"	"	
Ethylbenzene	ND	0.0500	"	"	"	"	"	"	
Xylenes (total)	ND	0.100	"	"	"	"	"	"	
Surrogate: 4-BFB (FID)	*85.4 %*	*52-123*			"	"	"	"	
Surrogate: 4-BFB (PID)	*97.4 %*	*60-127*			"	"	"	"	
MW2-SB-6.5 (B4A0593-02) Soil Sampled: 01/23/04 12:15 Received: 01/24/04 10:15									
Gasoline Range Hydrocarbons	ND	5.00	mg/kg dry	1	4A29004	01/29/04	01/29/04	NWTPH-Gx/8021B	
Benzene	ND	0.0300	"	"	"	"	"	"	
Toluene	ND	0.0500	"	"	"	"	"	"	
Ethylbenzene	ND	0.0500	"	"	"	"	"	"	
Xylenes (total)	ND	0.100	"	"	"	"	"	"	
Surrogate: 4-BFB (FID)	*79.2 %*	*52-123*			"	"	"	"	
Surrogate: 4-BFB (PID)	*97.4 %*	*60-127*			"	"	"	"	
MW3-SB-6.5 (B4A0593-03) Soil Sampled: 01/23/04 14:08 Received: 01/24/04 10:15									
Gasoline Range Hydrocarbons	ND	5.00	mg/kg dry	1	4A29004	01/29/04	01/29/04	NWTPH-Gx/8021B	
Benzene	ND	0.0300	"	"	"	"	"	"	
Toluene	ND	0.0500	"	"	"	"	"	"	
Ethylbenzene	ND	0.0500	"	"	"	"	"	"	
Xylenes (total)	ND	0.100	"	"	"	"	"	"	
Surrogate: 4-BFB (FID)	*82.7 %*	*52-123*			"	"	"	"	
Surrogate: 4-BFB (PID)	*91.7 %*	*60-127*			"	"	"	"	

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Tetra Tech, EM, Inc.	Project: Qwest Airport Way SOC	
6100 219th Street SW, Ste 550	Project Number: P1747018301	**Reported:**
Mountlake Terrace, WA/USA 98043	Project Manager: Ben Farrell	02/02/04 13:45

Gasoline Hydrocarbons (Benzene to Naphthalene) and BTEX by NWTPH-G and EPA 8021B

North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
MW4-SB-11.5 (B4A0593-04) Soil Sampled: 01/23/04 16:00 Received: 01/24/04 10:15									
Gasoline Range Hydrocarbons	ND	5.00	mg/kg dry	1	4A29004	01/29/04	01/29/04	NWTPH-Gx/8021B	
Benzene	ND	0.0300	"	"	"	"	"	"	
Toluene	ND	0.0500	"	"	"	"	"	"	
Ethylbenzene	ND	0.0500	"	"	"	"	"	"	
Xylenes (total)	ND	0.100	"	"	"	"	"	"	
Surrogate: 4-BFB (FID)	*79.4 %*	*52-123*			"	"	"	"	
Surrogate: 4-BFB (PID)	*91.6 %*	*60-127*			"	"	"	"	

North Creek Analytical - Bothell

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Jeanne Garthwaite, Project Manager

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Tetra Tech, EM, Inc.	Project: Qwest Airport Way SOC	
6100 219th Street SW, Ste 550	Project Number: P1747018301	**Reported:**
Mountlake Terrace, WA/USA 98043	Project Manager: Ben Farrell	02/02/04 13:45

Semivolatile Petroleum Products by NWTPH-Dx (w/o Acid/Silica Gel Clean-up)

North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
MW1-SB-6.5 (B4A0593-01) Soil Sampled: 01/22/04 14:22 Received: 01/24/04 10:15									
Diesel Range Hydrocarbons	ND	10.0	mg/kg dry	1	4A28030	01/28/04	01/28/04	NWTPH-Dx	
Lube Oil Range Hydrocarbons	ND	25.0	"	"	"	"	"	"	
Surrogate: 2-FBP	*78.8 %*	*50-150*			"	"	"	"	
Surrogate: Octacosane	*98.9 %*	*57-120*			"	"	"	"	
MW2-SB-6.5 (B4A0593-02) Soil Sampled: 01/23/04 12:15 Received: 01/24/04 10:15									
Diesel Range Hydrocarbons	ND	10.0	mg/kg dry	1	4A28030	01/28/04	01/28/04	NWTPH-Dx	
Lube Oil Range Hydrocarbons	ND	25.0	"	"	"	"	"	"	
Surrogate: 2-FBP	*83.7 %*	*50-150*			"	"	"	"	
Surrogate: Octacosane	*105 %*	*57-120*			"	"	"	"	
MW3-SB-6.5 (B4A0593-03) Soil Sampled: 01/23/04 14:08 Received: 01/24/04 10:15									
Diesel Range Hydrocarbons	**41.7**	10.0	mg/kg dry	1	4A28030	01/28/04	01/28/04	NWTPH-Dx	D-09
Lube Oil Range Hydrocarbons	**117**	25.0	"	"	"	"	"	"	
Surrogate: 2-FBP	*97.4 %*	*50-150*			"	"	"	"	
Surrogate: Octacosane	*114 %*	*57-120*			"	"	"	"	
MW4-SB-11.5 (B4A0593-04) Soil Sampled: 01/23/04 16:00 Received: 01/24/04 10:15									
Diesel Range Hydrocarbons	ND	10.0	mg/kg dry	1	4A28030	01/28/04	01/28/04	NWTPH-Dx	
Lube Oil Range Hydrocarbons	ND	25.0	"	"	"	"	"	"	
Surrogate: 2-FBP	*82.7 %*	*50-150*			"	"	"	"	
Surrogate: Octacosane	*107 %*	*57-120*			"	"	"	"	

North Creek Analytical - Bothell

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Jeanne Garthwaite, Project Manager

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907.563.9200 fax 907.563.9210

Tetra Tech, EM, Inc.	Project: Qwest Airport Way SOC	
6100 219th Street SW, Ste 550	Project Number: P1747018301	**Reported:**
Mountlake Terrace, WA/USA 98043	Project Manager: Ben Farrell	02/02/04 13:45

Physical Parameters by APHA/ASTM/EPA Methods
North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
MW1-SB-6.5 (B4A0593-01) Soil Sampled: 01/22/04 14:22 Received: 01/24/04 10:15									
Dry Weight	**94.2**	1.00	%	1	4A28036	01/28/04	01/29/04	BSOPSPL003R08	
MW2-SB-6.5 (B4A0593-02) Soil Sampled: 01/23/04 12:15 Received: 01/24/04 10:15									
Dry Weight	**88.2**	1.00	%	1	4A28036	01/28/04	01/29/04	BSOPSPL003R08	
MW3-SB-6.5 (B4A0593-03) Soil Sampled: 01/23/04 14:08 Received: 01/24/04 10:15									
Dry Weight	**92.4**	1.00	%	1	4A28036	01/28/04	01/29/04	BSOPSPL003R08	
MW4-SB-11.5 (B4A0593-04) Soil Sampled: 01/23/04 16:00 Received: 01/24/04 10:15									
Dry Weight	**81.5**	1.00	%	1	4A28036	01/28/04	01/29/04	BSOPSPL003R08	

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Tetra Tech, EM, Inc.	Project: Qwest Airport Way SOC	
6100 219th Street SW, Ste 550	Project Number: P1747018301	**Reported:**
Mountlake Terrace, WA/USA 98043	Project Manager: Ben Farrell	02/02/04 13:45

Gasoline Hydrocarbons (Benzene to Naphthalene) and BTEX by NWTPH-G and EPA 8021B - Quality Control

North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 4A29004: Prepared 01/29/04 Using EPA 5030B (MeOH)										
Blank (4A29004-BLK1)										
Gasoline Range Hydrocarbons	ND	5.00	mg/kg							
Benzene	ND	0.0300	"							
Toluene	ND	0.0500	"							
Ethylbenzene	ND	0.0500	"							
Xylenes (total)	ND	0.100	"							
Surrogate: 4-BFB (FID)	*3.74*		"	*4.00*		*93.5*	*52-123*			
Surrogate: 4-BFB (PID)	*4.11*		"	*4.00*		*103*	*60-127*			
LCS (4A29004-BS1)										
Gasoline Range Hydrocarbons	24.1	5.00	mg/kg	27.5		87.6	80-120			
Benzene	0.349	0.0300	"	0.405		86.2	80-120			
Toluene	1.74	0.0500	"	1.91		91.1	80-120			
Ethylbenzene	0.454	0.0500	"	0.450		101	80-120			
Xylenes (total)	2.15	0.100	"	2.18		98.6	80-120			
Surrogate: 4-BFB (FID)	*3.61*		"	*4.00*		*90.2*	*52-123*			
Surrogate: 4-BFB (PID)	*3.57*		"	*4.00*		*89.2*	*60-127*			
LCS Dup (4A29004-BSD1)										
Gasoline Range Hydrocarbons	23.9	5.00	mg/kg	27.5		86.9	80-120	0.833	40	
Benzene	0.359	0.0300	"	0.405		88.6	80-120	2.82	40	
Toluene	1.78	0.0500	"	1.91		93.2	80-120	2.27	40	
Ethylbenzene	0.465	0.0500	"	0.450		103	80-120	2.39	40	
Xylenes (total)	2.20	0.100	"	2.18		101	80-120	2.30	40	
Surrogate: 4-BFB (FID)	*3.58*		"	*4.00*		*89.5*	*52-123*			
Surrogate: 4-BFB (PID)	*3.68*		"	*4.00*		*92.0*	*60-127*			
Matrix Spike (4A29004-MS1)					**Source: B4A0661-07**					
Gasoline Range Hydrocarbons	23.9	5.00	mg/kg dry	34.7	0.644	67.0	54-120			
Benzene	0.363	0.0300	"	0.511	ND	71.0	50-119			
Toluene	1.84	0.0500	"	2.41	0.0106	75.9	54-114			
Ethylbenzene	0.481	0.0500	"	0.568	0.00511	83.8	60-130			
Xylenes (total)	2.29	0.100	"	2.75	0.0162	82.7	63-124			
Surrogate: 4-BFB (FID)	*4.18*		"	*5.05*		*82.8*	*52-123*			
Surrogate: 4-BFB (PID)	*4.43*		"	*5.05*		*87.7*	*60-127*			

North Creek Analytical - Bothell

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Jeanne Garthwaite, Project Manager

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Tetra Tech, EM, Inc.	Project: Qwest Airport Way SOC	
6100 219th Street SW, Ste 550	Project Number: P1747018301	**Reported:**
Mountlake Terrace, WA/USA 98043	Project Manager: Ben Farrell	02/02/04 13:45

Gasoline Hydrocarbons (Benzene to Naphthalene) and BTEX by NWTPH-G and EPA 8021B - Quality Control

North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 4A29004: Prepared 01/29/04 Using EPA 5030B (MeOH)										
Matrix Spike Dup (4A29004-MSD1)					**Source: B4A0661-07**					
Gasoline Range Hydrocarbons	20.3	5.00	mg/kg dry	34.7	0.644	56.6	54-120	16.3	40	
Benzene	0.297	0.0300	"	0.511	ND	58.1	50-119	20.0	40	
Toluene	1.53	0.0500	"	2.41	0.0106	63.0	54-114	18.4	40	
Ethylbenzene	0.409	0.0500	"	0.568	0.00511	71.1	60-130	16.2	40	
Xylenes (total)	1.97	0.100	"	2.75	0.0162	71.0	63-124	15.0	40	
Surrogate: 4-BFB (FID)	*3.91*		"	*5.05*		*77.4*	*52-123*			
Surrogate: 4-BFB (PID)	*4.17*		"	*5.05*		*82.6*	*60-127*			

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Tetra Tech, EM, Inc.	Project: Qwest Airport Way SOC	
6100 219th Street SW, Ste 550	Project Number: P1747018301	**Reported:**
Mountlake Terrace, WA/USA 98043	Project Manager: Ben Farrell	02/02/04 13:45

Semivolatile Petroleum Products by NWTPH-Dx (w/o Acid/Silica Gel Clean-up) - Quality Control
North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 4A28030: Prepared 01/28/04 Using EPA 3550B										
Blank (4A28030-BLK1)										
Diesel Range Hydrocarbons	ND	10.0	mg/kg							
Lube Oil Range Hydrocarbons	ND	25.0	"							
Surrogate: 2-FBP	*9.70*		"	*10.7*		*90.7*	*50-150*			
Surrogate: Octacosane	*5.82*		"	*5.33*		*109*	*57-120*			
LCS (4A28030-BS1)										
Diesel Range Hydrocarbons	54.0	10.0	mg/kg	66.7		81.0	70-130			
Surrogate: 2-FBP	*8.80*		"	*10.7*		*82.2*	*50-150*			
LCS Dup (4A28030-BSD1)										
Diesel Range Hydrocarbons	57.0	10.0	mg/kg	66.7		85.5	70-130	5.41	40	
Surrogate: 2-FBP	*9.79*		"	*10.7*		*91.5*	*50-150*			
Duplicate (4A28030-DUP1)					**Source: B4A0593-01**					
Diesel Range Hydrocarbons	ND	10.0	mg/kg dry		ND			NA	40	
Lube Oil Range Hydrocarbons	ND	25.0	"		ND			NA	40	
Surrogate: 2-FBP	*11.2*		"	*11.5*		*97.4*	*50-150*			
Surrogate: Octacosane	*6.37*		"	*5.76*		*111*	*57-120*			

Jeanne Garthwaite, Project Manager

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Tetra Tech, EM, Inc.	Project: Qwest Airport Way SOC	
6100 219th Street SW, Ste 550	Project Number: P1747018301	**Reported:**
Mountlake Terrace, WA/USA 98043	Project Manager: Ben Farrell	02/02/04 13:45

Physical Parameters by APHA/ASTM/EPA Methods - Quality Control
North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 4A28036: Prepared 01/28/04 Using Dry Weight										
Blank (4A28036-BLK1)										
Dry Weight	100	1.00	%							

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Tetra Tech, EM, Inc.	Project: Qwest Airport Way SOC	
6100 219th Street SW, Ste 550	Project Number: P1747018301	**Reported:**
Mountlake Terrace, WA/USA 98043	Project Manager: Ben Farrell	02/02/04 13:45

Notes and Definitions

D-09	Results in the diesel organics range are primarily due to overlap from a heavy oil range product.
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference

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23 February 2004

Ben Farrell
Tetra Tech, EM, Inc.
3100 219th Street SW, Ste 550
Mountlake Terrace, WA/USA 98043

RE: Qwest Airport Way SOC

Enclosed are the results of analyses for samples received by the laboratory on 02/09/04 14:40. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Jeanne Garthwaite

Jeanne Garthwaite
Project Manager

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CHAIN OF CUSTODY REPORT

Work Order #: B4B0239

CLIENT: Tetra Tech EM Inc

REPORT TO: Ben Farrell
ADDRESS: Tetra Tech EM Inc.
6100 219Th Street SW, Suite550
PHONE: (425) 673-3675 FAX: (425) 673-9119

INVOICE TO: Ben Farrell
Tetra Tech EM Inc
6100 219Th Street SW, Suite550
Mountlake Terrace, WA 98043

P.O. NUMBER: P174701830)

PROJECT NAME: Quest Airport Way SOC
PROJECT NUMBER: P174701930)
SAMPLED BY:

TURNAROUND REQUEST in Business Days *

Organic & Inorganic Analyses: ~~10~~ STD. | 7 | 5 | 4 | 3 | 2 | 1 | <1

Petroleum Hydrocarbon Analyses: ~~5~~ STD. | 4 | 3 | 2 | 1 | <1

OTHER Specify:

* Turnaround Requests less than standard may incur Rush Charges.

	CLIENT SAMPLE IDENTIFICATION	SAMPLING DATE/TIME	PRESERVATIVE: HCL	HCL	HCL	HNO3	Ice	REQUESTED ANALYSES: NWTPH-Gx BTEX	NWTPH-Dx	Methane	Total Iron	Geochemistry	MATRIX (W, S, O)	# OF CONT.	LOCATION / COMMENTS	NCA WO ID
1	MW-4	2/9/04 1130						X	X	X	X	X	Water	10	Cooler	-01
2	MW-40	2/9/04 1140						X	X					5		-02
3	MW-3	2/9/04 1215						X	X	X	X	X		10		-03
4	MW-1	2/9/04 1300						X	X	X	X	X		10		-04
5	MW-2	2/9/04 1340						X	X	X	X	X		10		-05
6																
7																
8																
9																
10																

RELEASED BY: Li Ma FIRM: Tetra Tech DATE: 2/9/04 TIME: 1446
PRINT NAME:

RECEIVED BY: Tom Blankinship FIRM: NCA DATE: 2/9/04 TIME: 1446
PRINT NAME:

RELEASED BY: DATE:
PRINT NAME: FIRM: TIME:

RECEIVED BY: DATE:
PRINT NAME: FIRM: TIME:

ADDITIONAL REMARKS: Geochemistry = nitrate, sulfate, alkalinity

TEMP: 12.2 w/o

PAGE OF

COC REV 1/03

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Tetra Tech, EM, Inc.	Project: Qwest Airport Way SOC	
6100 219th Street SW, Ste 550	Project Number: P1747018301	**Reported:**
Mountlake Terrace, WA/USA 98043	Project Manager: Ben Farrell	02/23/04 11:20

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
MW-4	B4B0239-01	Water	02/09/04 11:30	02/09/04 14:40
MW-40	B4B0239-02	Water	02/09/04 11:40	02/09/04 14:40
MW-3	B4B0239-03	Water	02/09/04 12:15	02/09/04 14:40
MW-1	B4B0239-04	Water	02/09/04 13:00	02/09/04 14:40
MW-2	B4B0239-05	Water	02/09/04 13:40	02/09/04 14:40

North Creek Analytical - Bothell

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Jeanne Garthwaite

Jeanne Garthwaite, Project Manager

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Tetra Tech, EM, Inc.	Project: Qwest Airport Way SOC	
6100 219th Street SW, Ste 550	Project Number: P1747018301	**Reported:**
Mountlake Terrace, WA/USA 98043	Project Manager: Ben Farrell	02/23/04 11:20

Gasoline Hydrocarbons (Benzene to Naphthalene) and BTEX by NWTPH-G and EPA 8021B
North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
MW-4 (B4B0239-01) Water Sampled: 02/09/04 11:30 Received: 02/09/04 14:40									
Gasoline Range Hydrocarbons	ND	50.0	ug/l	1	4B12011	02/12/04	02/12/04	NWTPH-Gx/8021B	
Benzene	ND	0.500	"	"	"	"	"	"	
Toluene	ND	0.500	"	"	"	"	"	"	
Ethylbenzene	ND	0.500	"	"	"	"	"	"	
Xylenes (total)	ND	1.00	"	"	"	"	"	"	
Surrogate: 4-BFB (FID)	*99.4 %*	*62-127*			"	"	"	"	
Surrogate: 4-BFB (PID)	*88.8 %*	*72-127*			"	"	"	"	
MW-40 (B4B0239-02) Water Sampled: 02/09/04 11:40 Received: 02/09/04 14:40									
Gasoline Range Hydrocarbons	ND	50.0	ug/l	1	4B12011	02/12/04	02/12/04	NWTPH-Gx/8021B	
Benzene	ND	0.500	"	"	"	"	"	"	
Toluene	ND	0.500	"	"	"	"	"	"	
Ethylbenzene	ND	0.500	"	"	"	"	"	"	
Xylenes (total)	ND	1.00	"	"	"	"	"	"	
Surrogate: 4-BFB (FID)	*100 %*	*62-127*			"	"	"	"	
Surrogate: 4-BFB (PID)	*90.4 %*	*72-127*			"	"	"	"	
MW-3 (B4B0239-03) Water Sampled: 02/09/04 12:15 Received: 02/09/04 14:40									
Gasoline Range Hydrocarbons	**70.5**	50.0	ug/l	1	4B12011	02/12/04	02/12/04	NWTPH-Gx/8021B	
Benzene	ND	0.500	"	"	"	"	"	"	
Toluene	ND	0.500	"	"	"	"	"	"	
Ethylbenzene	ND	0.500	"	"	"	"	"	"	
Xylenes (total)	ND	1.00	"	"	"	"	"	"	
Surrogate: 4-BFB (FID)	*103 %*	*62-127*			"	"	"	"	
Surrogate: 4-BFB (PID)	*92.5 %*	*72-127*			"	"	"	"	

North Creek Analytical - Bothell

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Jeanne Garthwaite, Project Manager

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Tetra Tech, EM, Inc.	Project: Qwest Airport Way SOC	
6100 219th Street SW, Ste 550	Project Number: P1747018301	**Reported:**
Mountlake Terrace, WA/USA 98043	Project Manager: Ben Farrell	02/23/04 11:20

Gasoline Hydrocarbons (Benzene to Naphthalene) and BTEX by NWTPH-G and EPA 8021B

North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
MW-1 (B4B0239-04) Water Sampled: 02/09/04 13:00 Received: 02/09/04 14:40									
Gasoline Range Hydrocarbons	ND	50.0	ug/l	1	4B12011	02/12/04	02/12/04	NWTPH-Gx/8021B	
Benzene	**2.40**	0.500	"	"	"	"	"	"	
Toluene	ND	0.500	"	"	"	"	"	"	
Ethylbenzene	ND	0.500	"	"	"	"	"	"	
Xylenes (total)	ND	1.00	"	"	"	"	"	"	
Surrogate: 4-BFB (FID)	*99.6 %*	*62-127*			"	"	"	"	
Surrogate: 4-BFB (PID)	*90.4 %*	*72-127*			"	"	"	"	
MW-2 (B4B0239-05) Water Sampled: 02/09/04 13:40 Received: 02/09/04 14:40									
Gasoline Range Hydrocarbons	ND	50.0	ug/l	1	4B12011	02/12/04	02/12/04	NWTPH-Gx/8021B	
Benzene	ND	0.500	"	"	"	"	"	"	
Toluene	ND	0.500	"	"	"	"	"	"	
Ethylbenzene	ND	0.500	"	"	"	"	"	"	
Xylenes (total)	ND	1.00	"	"	"	"	"	"	
Surrogate: 4-BFB (FID)	*99.4 %*	*62-127*			"	"	"	"	
Surrogate: 4-BFB (PID)	*90.4 %*	*72-127*			"	"	"	"	

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Tetra Tech, EM, Inc.	Project: Qwest Airport Way SOC	
6100 219th Street SW, Ste 550	Project Number: P1747018301	**Reported:**
Mountlake Terrace, WA/USA 98043	Project Manager: Ben Farrell	02/23/04 11:20

Semivolatile Petroleum Products by NWTPH-Dx (w/o Acid/Silica Gel Clean-up)
North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
MW-4 (B4B0239-01) Water Sampled: 02/09/04 11:30 Received: 02/09/04 14:40									
Diesel Range Hydrocarbons	ND	0.250	mg/l	1	4B10009	02/10/04	02/11/04	NWTPH-Dx	
Lube Oil Range Hydrocarbons	ND	0.500	"	"	"	"	"	"	
Surrogate: 2-FBP	*83.9 %*	*50-150*			"	"	"	"	
Surrogate: Octacosane	*87.0 %*	*50-150*			"	"	"	"	
MW-40 (B4B0239-02) Water Sampled: 02/09/04 11:40 Received: 02/09/04 14:40									
Diesel Range Hydrocarbons	**0.291**	0.250	mg/l	1	4B10009	02/10/04	02/11/04	NWTPH-Dx	D-06
Lube Oil Range Hydrocarbons	ND	0.500	"	"	"	"	"	"	
Surrogate: 2-FBP	*88.8 %*	*50-150*			"	"	"	"	
Surrogate: Octacosane	*92.4 %*	*50-150*			"	"	"	"	
MW-3 (B4B0239-03) Water Sampled: 02/09/04 12:15 Received: 02/09/04 14:40									
Diesel Range Hydrocarbons	**0.360**	0.250	mg/l	1	4B10009	02/10/04	02/11/04	NWTPH-Dx	D-06
Lube Oil Range Hydrocarbons	ND	0.500	"	"	"	"	"	"	
Surrogate: 2-FBP	*93.3 %*	*50-150*			"	"	"	"	
Surrogate: Octacosane	*101 %*	*50-150*			"	"	"	"	
MW-1 (B4B0239-04) Water Sampled: 02/09/04 13:00 Received: 02/09/04 14:40									
Diesel Range Hydrocarbons	ND	0.250	mg/l	1	4B10009	02/10/04	02/11/04	NWTPH-Dx	
Lube Oil Range Hydrocarbons	ND	0.500	"	"	"	"	"	"	
Surrogate: 2-FBP	*89.6 %*	*50-150*			"	"	"	"	
Surrogate: Octacosane	*94.5 %*	*50-150*			"	"	"	"	
MW-2 (B4B0239-05) Water Sampled: 02/09/04 13:40 Received: 02/09/04 14:40									
Diesel Range Hydrocarbons	ND	0.250	mg/l	1	4B10009	02/10/04	02/11/04	NWTPH-Dx	
Lube Oil Range Hydrocarbons	ND	0.500	"	"	"	"	"	"	
Surrogate: 2-FBP	*95.5 %*	*50-150*			"	"	"	"	
Surrogate: Octacosane	*102 %*	*50-150*			"	"	"	"	

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Tetra Tech, EM, Inc.	Project: Qwest Airport Way SOC	
6100 219th Street SW, Ste 550	Project Number: P1747018301	**Reported:**
Mountlake Terrace, WA/USA 98043	Project Manager: Ben Farrell	02/23/04 11:20

Total Metals by EPA 6000/7000 Series Methods
North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
MW-4 (B4B0239-01) Water Sampled: 02/09/04 11:30 Received: 02/09/04 14:40									
Iron	15.2	0.150	mg/l	1	4B11017	02/11/04	02/12/04	EPA 6010B	
MW-3 (B4B0239-03) Water Sampled: 02/09/04 12:15 Received: 02/09/04 14:40									
Iron	8.42	0.150	mg/l	1	4B11017	02/11/04	02/12/04	EPA 6010B	
MW-1 (B4B0239-04) Water Sampled: 02/09/04 13:00 Received: 02/09/04 14:40									
Iron	11.7	0.150	mg/l	1	4B11017	02/11/04	02/12/04	EPA 6010B	
MW-2 (B4B0239-05) Water Sampled: 02/09/04 13:40 Received: 02/09/04 14:40									
Iron	4.03	0.150	mg/l	1	4B11017	02/11/04	02/12/04	EPA 6010B	

North Creek Analytical - Bothell

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Jeanne Garthwaite

Jeanne Garthwaite, Project Manager

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Tetra Tech, EM, Inc.	Project: Qwest Airport Way SOC	
6100 219th Street SW, Ste 550	Project Number: P1747018301	**Reported:**
Mountlake Terrace, WA/USA 98043	Project Manager: Ben Farrell	02/23/04 11:20

Conventional Chemistry Parameters by APHA/EPA Methods
North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
MW-4 (B4B0239-01) Water Sampled: 02/09/04 11:30 Received: 02/09/04 14:40									
Bicarbonate Alkalinity	**612**	5.00	mg/L as CaCO3	1	4B17046	02/17/04	02/17/04	SM 2320B	
Carbonate Alkalinity	ND	5.00	"	"	"	"	"	"	
Hydroxide Alkalinity	ND	5.00	"	"	"	"	"	"	
Total Alkalinity	**612**	5.00	"	"	"	"	"	"	
MW-3 (B4B0239-03) Water Sampled: 02/09/04 12:15 Received: 02/09/04 14:40									
Bicarbonate Alkalinity	**505**	5.00	mg/L as CaCO3	1	4B17046	02/17/04	02/17/04	SM 2320B	
Carbonate Alkalinity	ND	5.00	"	"	"	"	"	"	
Hydroxide Alkalinity	ND	5.00	"	"	"	"	"	"	
Total Alkalinity	**505**	5.00	"	"	"	"	"	"	
MW-1 (B4B0239-04) Water Sampled: 02/09/04 13:00 Received: 02/09/04 14:40									
Bicarbonate Alkalinity	**444**	5.00	mg/L as CaCO3	1	4B17046	02/17/04	02/17/04	SM 2320B	
Carbonate Alkalinity	ND	5.00	"	"	"	"	"	"	
Hydroxide Alkalinity	ND	5.00	"	"	"	"	"	"	
Total Alkalinity	**444**	5.00	"	"	"	"	"	"	
MW-2 (B4B0239-05) Water Sampled: 02/09/04 13:40 Received: 02/09/04 14:40									
Bicarbonate Alkalinity	**317**	5.00	mg/L as CaCO3	1	4B17046	02/17/04	02/17/04	SM 2320B	
Carbonate Alkalinity	ND	5.00	"	"	"	"	"	"	
Hydroxide Alkalinity	ND	5.00	"	"	"	"	"	"	
Total Alkalinity	**317**	5.00	"	"	"	"	"	"	

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Tetra Tech, EM, Inc.	Project: Qwest Airport Way SOC	
6100 219th Street SW, Ste 550	Project Number: P1747018301	**Reported:**
Mountlake Terrace, WA/USA 98043	Project Manager: Ben Farrell	02/23/04 11:20

Anions by EPA Method 300.0

North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
MW-4 (B4B0239-01) Water Sampled: 02/09/04 11:30 Received: 02/09/04 14:40									
Nitrate-Nitrogen	ND	0.200	mg/l as N	1	4B11002	02/10/04	02/10/04	EPA 300.0	
Sulfate	ND	0.400	mg/l	"	"	"	"	"	
MW-3 (B4B0239-03) Water Sampled: 02/09/04 12:15 Received: 02/09/04 14:40									
Nitrate-Nitrogen	ND	0.200	mg/l as N	1	4B11002	02/10/04	02/10/04	EPA 300.0	
Sulfate	**0.724**	0.400	mg/l	"	"	"	"	"	
MW-1 (B4B0239-04) Water Sampled: 02/09/04 13:00 Received: 02/09/04 14:40									
Nitrate-Nitrogen	ND	0.200	mg/l as N	1	4B11002	02/10/04	02/11/04	EPA 300.0	
Sulfate	ND	0.400	mg/l	"	"	"	02/10/04	"	
MW-2 (B4B0239-05) Water Sampled: 02/09/04 13:40 Received: 02/09/04 14:40									
Nitrate-Nitrogen	ND	0.200	mg/l as N	1	4B11002	02/10/04	02/10/04	EPA 300.0	
Sulfate	ND	0.400	mg/l	"	"	"	"	"	

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Tetra Tech, EM, Inc.	Project: Qwest Airport Way SOC	
6100 219th Street SW, Ste 550	Project Number: P1747018301	**Reported:**
Mountlake Terrace, WA/USA 98043	Project Manager: Ben Farrell	02/23/04 11:20

Hydrocarbons by GC/FID Headspace
North Creek Analytical - Bend

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
MW-4 (B4B0239-01) Water Sampled: 02/09/04 11:30 Received: 02/09/04 14:40									**R-08**
Methane	**10700**	51.9	ug/l	1	0402040	02/13/04	02/13/04	RSK 175	
MW-3 (B4B0239-03) Water Sampled: 02/09/04 12:15 Received: 02/09/04 14:40									**R-08**
Methane	**12100**	51.9	ug/l	1	0402040	02/13/04	02/13/04	RSK 175	
MW-1 (B4B0239-04) Water Sampled: 02/09/04 13:00 Received: 02/09/04 14:40									**R-08**
Methane	**11300**	51.9	ug/l	1	0402040	02/13/04	02/13/04	RSK 175	
MW-2 (B4B0239-05) Water Sampled: 02/09/04 13:40 Received: 02/09/04 14:40									**R-08**
Methane	**5880**	51.9	ug/l	1	0402040	02/13/04	02/13/04	RSK 175	

North Creek Analytical - Bothell

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Jeanne Garthwaite

Jeanne Garthwaite, Project Manager

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Tetra Tech, EM, Inc.	Project: Qwest Airport Way SOC	
6100 219th Street SW, Ste 550	Project Number: P1747018301	**Reported:**
Mountlake Terrace, WA/USA 98043	Project Manager: Ben Farrell	02/23/04 11:20

Gasoline Hydrocarbons (Benzene to Naphthalene) and BTEX by NWTPH-G and EPA 8021B - Quality Control

North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 4B12011: Prepared 02/12/04 Using EPA 5030B (P/T)										
Blank (4B12011-BLK1)										
Gasoline Range Hydrocarbons	ND	50.0	ug/l							
Benzene	ND	0.500	"							
Toluene	ND	0.500	"							
Ethylbenzene	ND	0.500	"							
Xylenes (total)	ND	1.00	"							
Surrogate: 4-BFB (FID)	*47.1*		"	*48.0*		*98.1*	*62-127*			
Surrogate: 4-BFB (PID)	*42.6*		"	*48.0*		*88.8*	*72-127*			
LCS (4B12011-BS1)										
Gasoline Range Hydrocarbons	486	50.0	ug/l	502		96.8	80-120			
Surrogate: 4-BFB (FID)	*51.1*		"	*48.0*		*106*	*62-127*			
LCS (4B12011-BS2)										
Benzene	8.41	0.500	ug/l	10.0		84.1	80-120			
Toluene	8.27	0.500	"	10.0		82.7	80-120			
Ethylbenzene	8.31	0.500	"	9.80		84.8	80-120			
Xylenes (total)	25.4	1.00	"	30.0		84.7	80-120			
Surrogate: 4-BFB (PID)	*43.0*		"	*48.0*		*89.6*	*72-127*			
LCS Dup (4B12011-BSD1)										
Gasoline Range Hydrocarbons	510	50.0	ug/l	502		102	80-120	4.82	25	
Surrogate: 4-BFB (FID)	*52.3*		"	*48.0*		*109*	*62-127*			
LCS Dup (4B12011-BSD2)										
Benzene	8.42	0.500	ug/l	10.0		84.2	80-120	0.119	40	
Toluene	8.30	0.500	"	10.0		83.0	80-120	0.362	40	
Ethylbenzene	8.32	0.500	"	9.80		84.9	80-120	0.120	40	
Xylenes (total)	25.5	1.00	"	30.0		85.0	80-120	0.393	40	
Surrogate: 4-BFB (PID)	*43.1*		"	*48.0*		*89.8*	*72-127*			

North Creek Analytical - Bothell

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Tetra Tech, EM, Inc.	Project: Qwest Airport Way SOC	
6100 219th Street SW, Ste 550	Project Number: P1747018301	**Reported:**
Mountlake Terrace, WA/USA 98043	Project Manager: Ben Farrell	02/23/04 11:20

Gasoline Hydrocarbons (Benzene to Naphthalene) and BTEX by NWTPH-G and EPA 8021B - Quality Control

North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 4B12011: Prepared 02/12/04 Using EPA 5030B (P/T)										
Matrix Spike (4B12011-MS1)					**Source: B4B0239-01**					
Gasoline Range Hydrocarbons	480	50.0	ug/l	502	16.2	92.4	72-119			
Surrogate: 4-BFB (FID)	*51.5*		"	*48.0*		*107*	*62-127*			
Matrix Spike (4B12011-MS2)					**Source: B4B0239-02**					
Benzene	8.72	0.500	ug/l	10.0	ND	87.2	70-129			
Toluene	8.65	0.500	"	10.0	ND	86.5	73-114			
Ethylbenzene	8.61	0.500	"	9.80	0.112	86.7	82-120			
Xylenes (total)	26.2	1.00	"	30.0	ND	87.3	74-118			
Surrogate: 4-BFB (PID)	*42.7*		"	*48.0*		*89.0*	*72-127*			
Matrix Spike Dup (4B12011-MSD1)					**Source: B4B0239-01**					
Gasoline Range Hydrocarbons	480	50.0	ug/l	502	16.2	92.4	72-119	0.00	25	
Surrogate: 4-BFB (FID)	*51.9*		"	*48.0*		*108*	*62-127*			
Matrix Spike Dup (4B12011-MSD2)					**Source: B4B0239-02**					
Benzene	8.62	0.500	ug/l	10.0	ND	86.2	70-129	1.15	40	
Toluene	8.53	0.500	"	10.0	ND	85.3	73-114	1.40	40	
Ethylbenzene	8.50	0.500	"	9.80	0.112	85.6	82-120	1.29	40	
Xylenes (total)	26.0	1.00	"	30.0	ND	86.7	74-118	0.766	40	
Surrogate: 4-BFB (PID)	*42.8*		"	*48.0*		*89.2*	*72-127*			

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Tetra Tech, EM, Inc.	Project: Qwest Airport Way SOC	
6100 219th Street SW, Ste 550	Project Number: P1747018301	**Reported:**
Mountlake Terrace, WA/USA 98043	Project Manager: Ben Farrell	02/23/04 11:20

Semivolatile Petroleum Products by NWTPH-Dx (w/o Acid/Silica Gel Clean-up) - Quality Control
North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 4B10009: Prepared 02/10/04 Using EPA 3520C										
Blank (4B10009-BLK1)										
Diesel Range Hydrocarbons	ND	0.250	mg/l							
Lube Oil Range Hydrocarbons	ND	0.500	"							
Surrogate: 2-FBP	*0.270*		"	*0.320*		*84.4*	*50-150*			
Surrogate: Octacosane	*0.142*		"	*0.160*		*88.8*	*50-150*			
LCS (4B10009-BS1)										
Diesel Range Hydrocarbons	1.60	0.250	mg/l	2.00		80.0	58-125			
Surrogate: 2-FBP	*0.318*		"	*0.320*		*99.4*	*50-150*			
LCS Dup (4B10009-BSD1)										
Diesel Range Hydrocarbons	1.64	0.250	mg/l	2.00		82.0	58-125	2.47	40	
Surrogate: 2-FBP	*0.314*		"	*0.320*		*98.1*	*50-150*			

North Creek Analytical - Bothell

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Tetra Tech, EM, Inc.	Project: Qwest Airport Way SOC	
6100 219th Street SW, Ste 550	Project Number: P1747018301	**Reported:**
Mountlake Terrace, WA/USA 98043	Project Manager: Ben Farrell	02/23/04 11:20

Total Metals by EPA 6000/7000 Series Methods - Quality Control
North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 4B11017: Prepared 02/11/04 Using EPA 3010A										
Blank (4B11017-BLK1)										
Iron	ND	0.150	mg/l							
LCS (4B11017-BS1)										
Iron	4.97	0.150	mg/l	5.00		99.4	80-120			
LCS Dup (4B11017-BSD1)										
Iron	4.98	0.150	mg/l	5.00		99.6	80-120	0.201	20	
Matrix Spike (4B11017-MS1)					**Source: B4B0239-01**					
Iron	19.9	0.150	mg/l	5.00	15.2	94.0	75-125			
Matrix Spike Dup (4B11017-MSD1)					**Source: B4B0239-01**					
Iron	19.3	0.150	mg/l	5.00	15.2	82.0	75-125	3.06	20	
Post Spike (4B11017-PS1)					**Source: B4B0239-01**					
Iron	18.9	0.150	mg/l	5.00	15.2	74.0	75-125			Q-01

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6100 219th Street SW, Ste 550	Project Number: P1747018301	**Reported:**
Mountlake Terrace, WA/USA 98043	Project Manager: Ben Farrell	02/23/04 11:20

Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control
North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 4B17046: Prepared 02/17/04 Using General Preparation										
Blank (4B17046-BLK1)										
Bicarbonate Alkalinity	ND	5.00	mg/L as CaCO3							
Carbonate Alkalinity	ND	5.00	"							
Hydroxide Alkalinity	ND	5.00	"							
Total Alkalinity	ND	5.00	"							
LCS (4B17046-BS1)										
Total Alkalinity	52.4	5.00	mg/L as CaCO3	50.0		105	90-110			
LCS Dup (4B17046-BSD1)										
Total Alkalinity	52.3	5.00	mg/L as CaCO3	50.0		105	90-110	0.191	20	
Duplicate (4B17046-DUP1)					**Source: B4B0243-05**					
Bicarbonate Alkalinity	247	5.00	mg/L as CaCO3		247			0.00	6	
Carbonate Alkalinity	ND	5.00	"		ND			NA	6	
Hydroxide Alkalinity	ND	5.00	"		ND			NA	6	
Total Alkalinity	247	5.00	"		247			0.00	6	

North Creek Analytical - Bothell

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Jeanne Garthwaite, Project Manager

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Bend 20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711
541.383.9310 fax 541.382.7588
Anchorage 2000 W. International Airport Road, Suite A10, Anchorage, AK 99502-1119
907.563.9200 fax 907.563.9210

Tetra Tech, EM, Inc.	Project: Qwest Airport Way SOC	
6100 219th Street SW, Ste 550	Project Number: P1747018301	**Reported:**
Mountlake Terrace, WA/USA 98043	Project Manager: Ben Farrell	02/23/04 11:20

Anions by EPA Method 300.0 - Quality Control
North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 4B11002: Prepared 02/10/04 Using General Preparation										
Blank (4B11002-BLK1)										
Nitrate-Nitrogen	ND	0.200	mg/l as N							
Sulfate	ND	0.400	mg/l							
LCS (4B11002-BS1)										
Nitrate-Nitrogen	1.02	0.200	mg/l as N	1.00		102	90-110			
Sulfate	6.04	0.400	mg/l	6.00		101	90-110			
LCS Dup (4B11002-BSD1)										
Nitrate-Nitrogen	1.01	0.200	mg/l as N	1.00		101	90-110	0.985	20	
Sulfate	6.10	0.400	mg/l	6.00		102	90-110	0.988	20	
Duplicate (4B11002-DUP1)					**Source: B4B0132-01**					
Sulfate	30.8	2.00	mg/l		30.8			0.00	25	
Duplicate (4B11002-DUP2)					**Source: B4B0239-04**					
Nitrate-Nitrogen	ND	0.200	mg/l as N		0.159			12.0	25	
Sulfate	ND	0.400	mg/l		0.327			1.23	25	
Duplicate (4B11002-DUP3)					**Source: B4B0243-05**					
Nitrate-Nitrogen	ND	0.200	mg/l as N		ND			NA	25	
Sulfate	ND	0.400	mg/l		ND			NA	25	
Matrix Spike (4B11002-MS1)					**Source: B4B0132-01**					
Sulfate	36.4	2.00	mg/l	6.00	30.8	93.3	58-135			
Matrix Spike (4B11002-MS2)					**Source: B4B0239-04**					
Nitrate-Nitrogen	1.11	0.200	mg/l as N	1.00	0.159	95.1	54-124			
Sulfate	6.53	0.400	mg/l	6.00	0.327	103	58-135			

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Tetra Tech, EM, Inc.	Project: Qwest Airport Way SOC	
6100 219th Street SW, Ste 550	Project Number: P1747018301	**Reported:**
Mountlake Terrace, WA/USA 98043	Project Manager: Ben Farrell	02/23/04 11:20

Anions by EPA Method 300.0 - Quality Control
North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 4B11002: Prepared 02/10/04 Using General Preparation										
Matrix Spike (4B11002-MS3)					**Source: B4B0243-05**					
Nitrate-Nitrogen	1.05	0.200	mg/l as N	1.00	ND	105	54-124			
Sulfate	6.39	0.400	mg/l	6.00	ND	106	58-135			

North Creek Analytical - Bothell

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Jeanne Garthwaite

Jeanne Garthwaite, Project Manager

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Anchorage 2000 W. International Airport Road, Suite A10, Anchorage, AK 99502-1119
907.563.9200 fax 907.563.9210

Tetra Tech, EM, Inc.	Project: Qwest Airport Way SOC	
6100 219th Street SW, Ste 550	Project Number: P1747018301	**Reported:**
Mountlake Terrace, WA/USA 98043	Project Manager: Ben Farrell	02/23/04 11:20

Hydrocarbons by GC/FID Headspace - Quality Control
North Creek Analytical - Bend

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 0402040: Prepared 02/13/04 Using GC Headspace										
Blank (0402040-BLK1)										
Methane	ND	1.20	ug/l							
LCS (0402040-BS1)										
Methane	52.2	1.20	ug/l	60.2		86.7	70-130			
LCS Dup (0402040-BSD1)										
Methane	51.9	1.20	ug/l	60.2		86.2	70-130	0.576	25	
Duplicate (0402040-DUP1)					**Source: C402040-05**					
Methane	24700	51.9	ug/l		23800			3.71	35	R-08

Jeanne Garthwaite, Project Manager

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Tetra Tech, EM, Inc.	Project: Qwest Airport Way SOC	
6100 219th Street SW, Ste 550	Project Number: P1747018301	**Reported:**
Mountlake Terrace, WA/USA 98043	Project Manager: Ben Farrell	02/23/04 11:20

Notes and Definitions

D-06	The sample chromatographic pattern does not resemble the fuel standard used for quantitation.
Q-01	The spike recovery for this QC sample is outside of established control limits. Review of associated batch QC indicates the recovery for this analyte does not represent an out-of-control condition for the batch.
R-08	Original analyte was over calibration, results from diluted analysis.
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference

APPENDIX D

LITHOLOGIC LOGS AND WELL CONSTRUCTION DIAGRAMS
QWEST AIRPORT WAY FACILITY
SEATTLE, WASHINGTON

Tetra Tech EM Inc. **BOREHOLE LOG** Sheet 1 of 1

Location Map ~~NW SW~~ ← N	Job Number: P1747018301	Borehole ID: MW-1
tank excavation	Client: Qwest	Depth to water During drilling: 7.0'
X MW-1	Site: Airport Way SOC	Logged By: Ben Farrell
	Subsite:	Drilling Dates: 1/22/04
	Drilling Co: Geotech Explorations, Inc	Drilling Method: hollow-stem auger
	Personnel: Travis	Sampling Method: split-spoon

Sample Interval: Sample Top	Sample Bottom	Recovered	Blows/ 6in. Sample	Time	PID Reading	Lab Analysis	Depth in Feet	USCS Soil Type	Soil Description
							1		
							2		
							3		
							4		
		18"	11	14:22	0.0		5	CL	Gravelly lean Clay. Brown lean clay with about 10 to 20% gravel up to 1-inch in diameter; 5 to 10 percent silt; moist; no odor
			30		15.3		6	SW	Well graded Sand with Gravel. Brown, medium to coarse well graded sand with about 10 to 20 percent gravel up to 1.5-inches in diameter; 5 to 10 percent silt; moist; no odor ▽
			30				7		
							8		
							9	---	?
		14"	5	14:32	0.0		0	CL	Gravelly lean Clay. Brown clay with gravel and sand, wet, 2-inches thick
			3		2.1		1	SM	silty sand. Gray, medium, subangular sand with 10 to 20 percent silt; wet, no odor
			11					CL	Lean Clay with sand. Gray clay with fine sand and trace gravel; wet
							2	OL	2-inch thick peat layer.
							3		
							4	---	?
			4				5	SP	Poorly Graded Sand. Gray medium sand with 5 to 10% fines; wet; no odor
		16"	10	14:46	0.0		6		
			11		0.0				
							7		Total depth = 16.5 feet bgs
							8		
							9		
							0		

Atlantic Water Supply G9011L01000817

Tetra Tech EM Inc.

BOREHOLE LOG

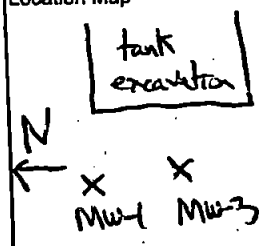
Sheet 1 of 1

Location Map	NA	Job Number: P1747018301	Borehole ID: MW-2
		Client: Quest	Depth to water During drilling: 7.0'
MW-2 X tank excavation		Site: Airport Way SC	Logged By: Ben Farrell
		Subsite:	Drilling Dates: 1/23/04
Gatliday corner		Drilling Co: Geotech Explorations, Inc.	Drilling Method: hollow-stem auger
		Personnel: TAWB	Sampling Method: split-spoon

Sample Interval: Sample Top	Sample Bottom	Recovered	Blows/ 6in. Sample	Time	PID Reading	Lab Analysis	Depth in Feet	USCS Soil Type	Soil Description
							1		
							2		
							3		
							4		
			3	1215	0.0		5	CL	~~Gray Sandy~~ Sandy lean clay. Gray sandy clay; moist; no odor
			11		0.0		6	SW	Well graded sand. Gray fine to coarse sand with about 5 to 10 percent clay and trace gravel (up to 1/4"); moist to wet; no odor ▽
			17				7		
							8		
							9		
			3	1230	0.0		0	SC	Clayey sand. Gray sand with about 15 to 20 percent clay; 5 to 10 percent gravel (1/4-inch); wet; no odor
			4		0.0		1		
			7				2		
							3		
							4		
			5	1235	0.0		5	SW-SC	Well Graded Sand with Clay. Gray, well graded sand with about 15 to 20 percent gravel (up to 1/2-inch); wet; no odor
			9		0.0		6		
			6				7		Total depth = 16.5 feet bgs
							8		
							9		
							0		

Tetra Tech EM Inc. **BOREHOLE LOG** Sheet 1 of 1

Location Map

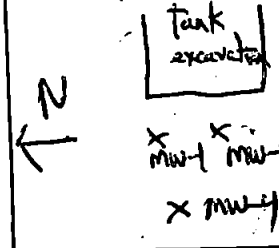


Job Number: P1747018301	Borehole ID: MW-3
Client: Qwest	Depth to water During drilling: 7.0'
Site: Airport Way SOC	Logged By: Ben Farrell
Subsite:	Drilling Dates: 1/23/04
Drilling Co: Geotech Explorations Inc	Drilling Method: hollow-stem
Personnel: Travis	Sampling Method: split-spoon

Sample Interval: Sample Top	Sample Bottom	Recovered	Blows/6in. Sample	Time	PID Reading	Lab Analysis	Depth in Feet	USCS Soil Type	Soil Description
							1		
							2		
							3		
							4		
			15	1405			5	ML	Silt with sand. Gray to dark brown silt with about 20 to 30 percent fine to coarse sand and 10 to 15 percent gravel (to 1-inch); moist; no odor ▽
			21				6		
			32				7		
							8		?
							9		
							0		
			2	1417			1	SW	Well graded sand. Gray, well graded sand with trace silt and gravel (1-inch); wet; no odor
			5					CL	3-inch lense of sandy clay
			3				2		
							3		
							4		
			4	1430			5	SW	& Well graded sand. Gray, well graded sand with about 5 to 10 percent clay; wet; no odor
			5				6	CL	Sandy clay; wet, no odor
			7				7		Total depth = 16.5 feet bgs.
							8		
							9		
							0		

Tetra Tech EM Inc. **BOREHOLE LOG** Sheet 1 of 1

Location Map



Job Number: P1747018301	Borehole ID: MW-4
Client: Quest	Depth to water During drilling: 7.0' bgs
Site: Airport Way SOC	Logged By: Ben Farrell
Subsite:	Drilling Dates: 1/23/04
Drilling Co: Geotech Explorations	Drilling Method: hollow-stem auger
Personnel: Travis	Sampling Method: split spoon

Sample Interval: Sample Top	Sample Bottom	Recovered	Blows/ 6in. Sample	Time	PID Reading	Lab Analysis	Depth in Feet	USCS Soil Type	Soil Description
							1		
							2		
							3		
							4		
			17	1590			5	SW	Well Graded Sand, Dark brown well graded fine to coarse sand with trace gravel; moist; no odor
			50				6		
			6				7		
							8		
							9		
			11	1600			0	SW-SC	Well Graded Sand With Clay, Brown well graded fine to coarse sand with trace gravel; moist; odor; shell fragments present
			17				1	OL	2-inch thick peat layer @ tip.
			21				2		
							3		
							4		
			4	1607			5	SC	Clayey Sand, Gray; fine to coarse sand with about 20 to 30% clay and silt and trace gravel; wet no odor
			4				6		
			4				7		Total depth = 16.5 feet bgs
							8		
							9		
							0		

Atlantic Water Supply G9011L01000817

TETRATECH EM INC

MONITORING WELL COMPLETION RECORD

DRILLING INFORMATION

DRILLING BEGAN:
DATE 1/22/04 TIME 1420
WELL INSTALLATION BEGAN:
DATE 1/22/04 TIME 1450
WELL COMPLETION FINISHED:
DATE 1/22/04 TIME 1520
DRILLING CO. Geotech Explorations
DRILLER Travis
LICENSE
DRILL RIG B-59
DRILLING METHOD:
☒ HOLLOW STEM AUGER
☐ AIR ROTARY
☐
DIAMETER OF AUGERS:
ID 9 1/4" OD

BENTONITE SEAL

AMOUNT CALCULATED
AMOUNT USED
☒ PELLETS, SIZE 3/8-Inch
☐ CHIPS, SIZE
☐
PRODUCT Hole Plug
MFG. BY
METHOD INSTALLED:
☒ POURED ☐ TREMIE
AMOUNT OF WATER USED 0

FILTER PACK

AMOUNT CALCULATED
AMOUNT USED
☒ SAND, SIZE 10-20 silica sand
☐ FORMATION COLLAPSE:
FROM TO
PRODUCT Silica Sand
MFG. BY
METHOD INSTALLED:
☒ POURED ☐ TREMIE

SURVEY INFORMATION

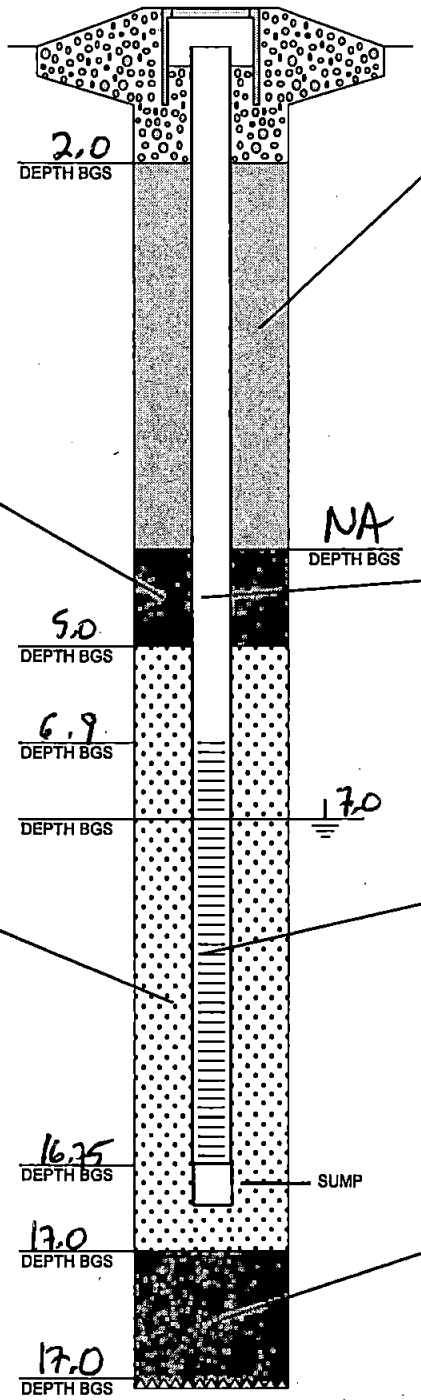
TOC ELEVATION (See report appendix)
GROUND ELEVATION
NORTHING CORD.
EASTING CORD.
DATE SURVEYED
SURVEY CO.

CENTRALIZERS USED?

☐ YES ☒ NO;
CENTRALIZER DEPTHS: _____, _____

SURFACE COMPLETION

☒ FLUSH MOUNT
☐ ABOVE GROUND W/BUMPER POST
☒ CONCRETE ☐ ASPHALT



MONITORING WELL

MONITORING WELL NO. MW-1
PROJECT P1747019301
SITE Quonset Airport Way 50c
BOREHOLE NO. MW-1
WELL PERMIT NO.
TOC TO BOTTOM OF WELL

ANNULAR SEAL

AMOUNT CALCULATED NA
AMOUNT USED (See seal desc.)
☐ GROUT FORMULA
PORTLAND CEMENT
BENTONITE
WATER
☐ PREPARED MIX
PRODUCT
MFG. BY
METHOD INSTALLED:
☐ POURED ☐ TREMIE

CASING

☒ SCHEDULE 40 PVC
☐
PRODUCT
MFG. BY
CASING DIAMETER:
ID OD 2-Inch
LENGTH OF CASING

WELL SCREEN

☒ SCHEDULE 40 PVC
☐
PRODUCT
MFG. BY
CASING DIAMETER:
ID OD 2inch
SLOT SIZE 10 slot - .01-Inch
LENGTH OF SCREEN 10-feet

BOREHOLE BACKFILL

AMOUNT CALCULATED NA
AMOUNT USED
☐ BENTONITE CHIPS, SIZE
☐ BENTONITE PELLETS, SIZE
☐ SLURRY
☐ FORMATION COLLAPSE
PRODUCT
MFG. BY
METHOD INSTALLED:
☐ POURED ☐ TREMIE

TETRATECH EM INC

MONITORING WELL COMPLETION RECORD

DRILLING INFORMATION

DRILLING BEGAN:
DATE 1/23/04 TIME 1215
WELL INSTALLATION BEGAN:
DATE 1/23/04 TIME ~~13~~ 12:45
WELL COMPLETION FINISHED:
DATE 1/23/04 TIME ~~1315~~ 1330
DRILLING CO. Gratch Exploration, Inc
DRILLER TrWB
LICENSE
DRILL RIG B-59
DRILLING METHOD:
☒ HOLLOW STEM AUGER
☐ AIR ROTARY
☐
DIAMETER OF AUGERS:
ID 9 1/4" OD

BENTONITE SEAL

AMOUNT CALCULATED
AMOUNT USED
☐ PELLETS, SIZE
☒ CHIPS, SIZE 3-8 inch hole plug
☐
PRODUCT Hole plug
MFG. BY
METHOD INSTALLED:
☒ POURED ☐ TREMIE
AMOUNT OF WATER USED 0

FILTER PACK

AMOUNT CALCULATED
AMOUNT USED
☒ SAND, SIZE 10-20
☐ FORMATION COLLAPSE:
FROM TO
PRODUCT Silica sand
MFG. BY
METHOD INSTALLED:
☒ POURED ☐ TREMIE

SURVEY INFORMATION

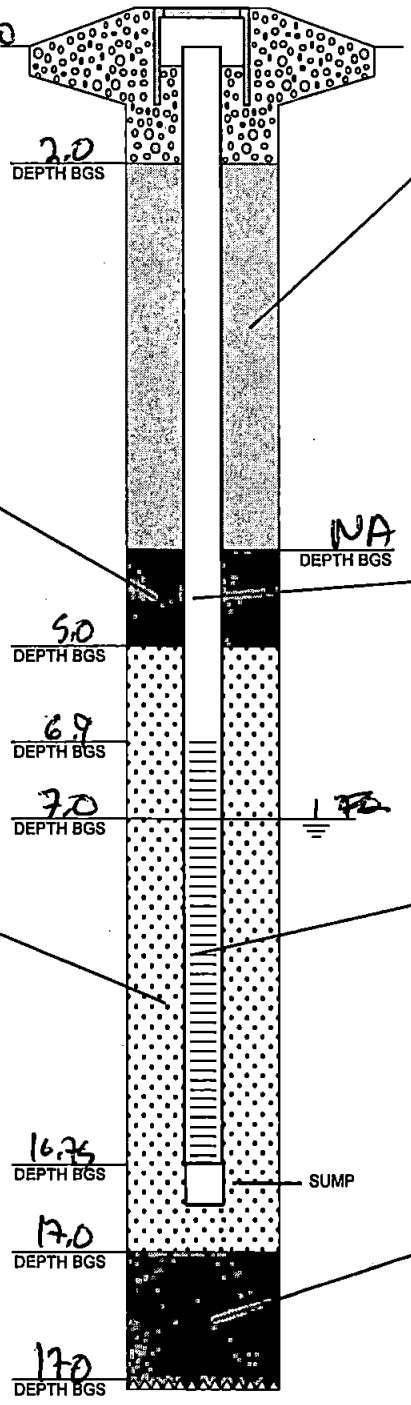
TOC ELEVATION (See report appendix)
GROUND ELEVATION
NORTHING CORD.
EASTING CORD.
DATE SURVEYED
SURVEY CO.

CENTRALIZERS USED?

☐ YES ☒ NO;
CENTRALIZER DEPTHS: _____, _____

SURFACE COMPLETION

☒ FLUSH MOUNT
☐ ABOVE GROUND W/BUMPER POST
☒ CONCRETE ☐ ASPHALT



MONITORING WELL

MONITORING WELL NO. MW-2
PROJECT P1747 01830
SITE Qwest Airport Way So
BOREHOLE NO. MW-2
WELL PERMIT NO.
TOC TO BOTTOM OF WELL

ANNULAR SEAL

AMOUNT CALCULATED NA
AMOUNT USED (See seal description)
☐ GROUT FORMULA
PORTLAND CEMENT
BENTONITE
WATER
☐ PREPARED MIX
PRODUCT
MFG. BY
METHOD INSTALLED:
☐ POURED ☐ TREMIE

CASING

☒ SCHEDULE 40 PVC
☐
PRODUCT
MFG. BY
CASING DIAMETER:
ID OD 2-Inch
LENGTH OF CASING

WELL SCREEN

☒ SCHEDULE 40 PVC
☐
PRODUCT
MFG. BY
CASING DIAMETER:
ID OD 2 Inch
SLOT SIZE 10 slot - .01-inch
LENGTH OF SCREEN 10-Feet

BOREHOLE BACKFILL

AMOUNT CALCULATED NA
AMOUNT USED
☐ BENTONITE CHIPS, SIZE
☐ BENTONITE PELLETS, SIZE
☐ SLURRY
☐ FORMATION COLLAPSE
PRODUCT
MFG. BY
METHOD INSTALLED:
☐ POURED ☐ TREMIE

TETRATECH EM INC

MONITORING WELL COMPLETION R

DRILLING INFORMATION

DRILLING BEGAN:
DATE 1/22/04 TIME 1400
WELL INSTALLATION BEGAN:
DATE 1/23/04 TIME 1430
WELL COMPLETION FINISHED:
DATE 1/23/04 TIME 1530
DRILLING CO. Geotech Explorations
DRILLER Travis
LICENSE
DRILL RIG Mobile B59
DRILLING METHOD:
☒ HOLLOW STEM AUGER
☐ AIR ROTARY
☐
DIAMETER OF AUGERS:
ID 9 1/4" OD

SURFACE COMPLETION

☒ FLUSH MOUNT
☐ ABOVE GROUND W/BUMPER POST
☒ CONCRETE ☐ ASPHALT

MONITORING WELL

MONITORING WELL NO. MW-3
PROJECT P1747 01.6301
SITE Qwest Airport Way 50
BOREHOLE NO. MW-3
WELL PERMIT NO.
TOC TO BOTTOM OF WELL

ANNULAR SEAL

AMOUNT CALCULATED NA
AMOUNT USED (see seal description)
☐ GROUT FORMULA
PORTLAND CEMENT
BENTONITE
WATER
☐ PREPARED MIX
PRODUCT
MFG. BY
METHOD INSTALLED:
☐ POURED ☐ TREMIE

BENTONITE SEAL

AMOUNT CALCULATED
AMOUNT USED
☐ PELLETS, SIZE
☒ CHIPS, SIZE 3-8 inch
☐
PRODUCT
MFG. BY
METHOD INSTALLED:
☒ POURED ☐ TREMIE
AMOUNT OF WATER USED 9

CASING

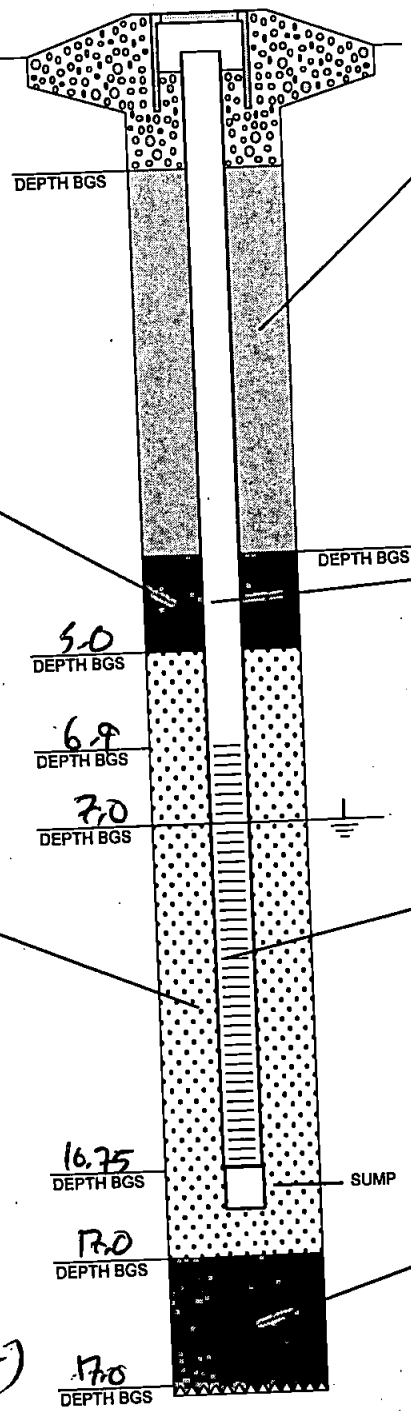
☒ SCHEDULE 40 PVC
☐
PRODUCT
MFG. BY
CASING DIAMETER:
ID OD 2 inch
LENGTH OF CASING

FILTER PACK

AMOUNT CALCULATED
AMOUNT USED
☒ SAND, SIZE 10-20
☐ FORMATION COLLAPSE:
FROM TO
PRODUCT Gilroa sand
MFG. BY
METHOD INSTALLED:
☒ POURED ☐ TREMIE

WELL SCREEN

☒ SCHEDULE 40 PVC
☐
PRODUCT
MFG. BY
CASING DIAMETER:
ID OD 2 inch
SLOT SIZE 10 slot - 0.01-inch
LENGTH OF SCREEN 10-feet



SURVEY INFORMATION

TOC ELEVATION (see report appendix)
GROUND ELEVATION
NORTHING CORD.
EASTING CORD.
DATE SURVEYED
SURVEY CO.

CENTRALIZERS USED?

☐ YES ☒ NO;
CENTRALIZER DEPTHS: ____, ____

BOREHOLE BACKFILL

AMOUNT CALCULATED NA
AMOUNT USED
☐ BENTONITE CHIPS, SIZE
☐ BENTONITE PELLETS, SIZE
☐ SLURRY
☐ FORMATION COLLAPSE
PRODUCT
MFG. BY
METHOD INSTALLED:
☐ POURED ☐ TREMIE

TETRATECH EM INC

MONITORING WELL COMPLETION RECOR

DRILLING INFORMATION

DRILLING BEGAN:
DATE 1/23/04 TIME 1540
WELL INSTALLATION BEGAN:
DATE 1/23/04 TIME 1607
WELL COMPLETION FINISHED:
DATE 1/23/04 TIME 1645
DRILLING CO. Geotek Explorations
DRILLER Travis
LICENSE
DRILL RIG B-59
DRILLING METHOD:
☒ HOLLOW STEM AUGER
☐ AIR ROTARY
☐
DIAMETER OF AUGERS:
ID ____ OD ____

SURFACE COMPLETION

☒ FLUSH MOUNT
☐ ABOVE GROUND W/BUMPER POST
☒ CONCRETE ☐ ASPHALT

MONITORING WELL

MONITORING WELL NO. MW-4
PROJECT P1747.09.01
SITE Quest Arpt Way, OR
BOREHOLE NO. MW-4
WELL PERMIT NO.
TOC TO BOTTOM OF WELL

ANNULAR SEAL

AMOUNT CALCULATED NA
AMOUNT USED
☐ GROUT FORMULA
PORTLAND CEMENT
BENTONITE
WATER
☐ PREPARED MIX
PRODUCT
MFG. BY
METHOD INSTALLED:
☐ POURED ☐ TREMIE

BENTONITE SEAL

AMOUNT CALCULATED
AMOUNT USED
☐ PELLETS, SIZE
☒ CHIPS, SIZE 3/8-Inch
☐
PRODUCT
MFG. BY
METHOD INSTALLED:
☒ POURED ☐ TREMIE
AMOUNT OF WATER USED 0

CASING

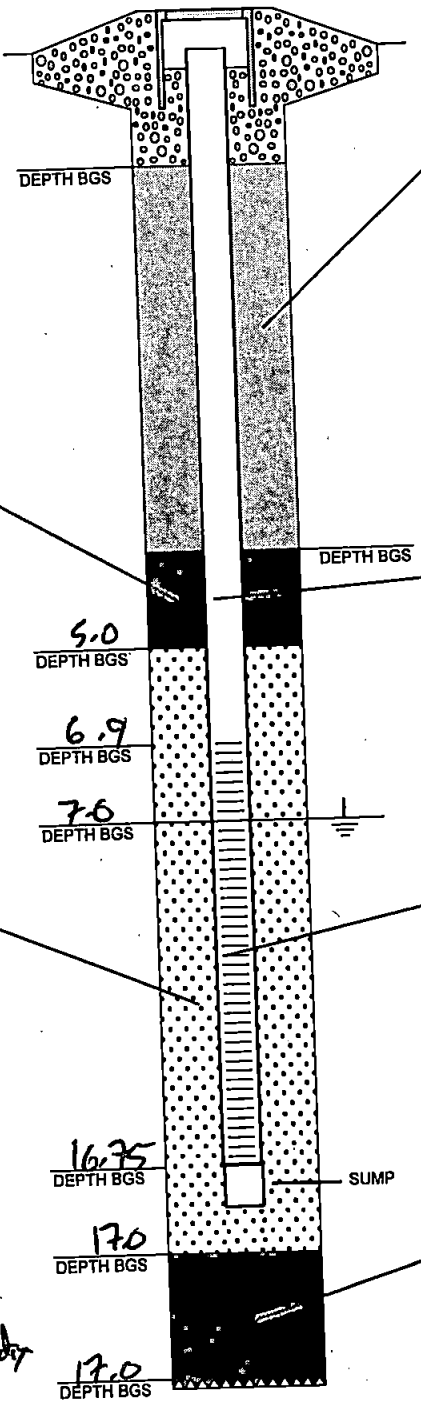
☒ SCHEDULE 40 PVC
☐
PRODUCT
MFG. BY
CASING DIAMETER:
ID ____ OD 2-Inch
LENGTH OF CASING

FILTER PACK

AMOUNT CALCULATED
AMOUNT USED
☒ SAND, SIZE 10-20
☐ FORMATION COLLAPSE:
FROM TO
PRODUCT 10-20 Silica Sand
MFG. BY
METHOD INSTALLED:
☒ POURED ☐ TREMIE

WELL SCREEN

☒ SCHEDULE 40 PVC
☐
PRODUCT
MFG. BY
CASING DIAMETER:
ID ____ OD 2-Inch
SLOT SIZE 10 slot - 0.01-Inch
LENGTH OF SCREEN 10-Foot



SURVEY INFORMATION

TOC ELEVATION See report appendix
GROUND ELEVATION
NORTHING CORD.
EASTING CORD.
DATE SURVEYED
SURVEY CO.

CENTRALIZERS USED?

☐ YES ☒ NO;
CENTRALIZER DEPTHS: ____, ____

BOREHOLE BACKFILL

AMOUNT CALCULATED
AMOUNT USED
☐ BENTONITE CHIPS, SIZE
☐ BENTONITE PELLETS, SIZE
☐ SLURRY
☐ FORMATION COLLAPSE
PRODUCT
MFG. BY
METHOD INSTALLED:
☐ POURED ☐ TREMIE