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TRANSMITTAL

TO	Mr. Ned Dunn	DATE	9/8/17
COMPANY	Seattle Center Redevelopment	PHONE	206-684-7212
ADDRESS	305 Harrison Street, Suite 109 Seattle, WA 98103	FAX	206-386-9019
		JOB NO.	21-1-12176-046
PROJECT	**SEATTLE CENTER LOT NO. 2 FINAL QUARTER TWENTY-SIX GROUNDWATER MONITORING REPORT**		

THE FOLLOWING ITEMS ARE TRANSMITTED:

DATE	NO. COPIES	DESCRIPTION
SEPTEMBER 2017	1	Final Quarter Twenty-Six Groundwater Monitoring Report for the Seattle Center Lot No. 2.

☐ Per your request ☐ For your approval ☐ For your information ☒ For your files
☐ For your review ☐ For your action ☐ Return with comments ☐ Other

Comments:

Hello Ned,

Enclosed with this transmittal letter is the final Twenty-Sixth Quarter Groundwater Monitoring Report for Seattle Center Lot No. 2 for your review. Your comments, as discussed during our phone conversation that occurred August 30, 2017 have been incorporated.

If you have any questions or require anything further, please don't hesitate to contact me at 206-695-6704.

Regards,

-Ed

By: Edwin V. Ptak c: Scott Gaulke, PE

Title: Environmental Scientist Vice President

February to May 2017 (26th Quarter)
Phase II Groundwater Monitoring Report
Seattle Center Lot Number 2
Seattle, Washington

September 8, 2017

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Seattle Center Redevelopment
Attn: Mr. Ned Dunn
305 Harrison Street, Suite 109
Seattle, Washington 98109

By:
Shannon & Wilson, Inc.
400 N 34th Street, Suite 100
Seattle, Washington 98103

21-1-12176-046

SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

September 8, 2017

Seattle Center Redevelopment
305 Harrison Street, Suite 109
Seattle, WA 98109

Attn: Mr. Ned Dunn

RE: FEBRUARY TO MAY 2017 (26TH QUARTER) PHASE II GROUNDWATER MONITORING, SEATTLE CENTER LOT NUMBER 2, SEATTLE, WASHINGTON

This letter report summarizes the status of Phase II groundwater monitoring activities at the Seattle Center Lot Number 2 property (Site). Remediation of gasoline-contaminated groundwater at the Site through the use of an active in situ treatment system was conducted by the City of Seattle in conjunction with redevelopment of the property by IRIS Holdings, LLC, a wholly owned entity of the Bill & Melinda Gates Foundation. The goal of the remediation was to remove gasoline-range total petroleum hydrocarbons (TPH-G) in groundwater and meet cleanup levels in groundwater at a conditional point of compliance. Monitoring activities consisted of quarterly groundwater sampling. The groundwater remediation system was turned off in March 2016 in accordance with our discussion during our March 14, 2016, meeting. The system was turned off to determine if remediation of the source areas was completed or if rebound would occur, and to evaluate if monitored natural attenuation (MNA) of the remaining contamination was sufficient to be the final groundwater treatment method. This letter report presents groundwater monitoring results from May 2017, the 26th quarter of Phase II operation and the 5th monitoring event to be conducted during the rebound test and MNA evaluation.

BACKGROUND

Previous environmental studies have identified gasoline- and benzene-impacted groundwater that originates primarily from two hot spot areas: a former fueling area in the north-central portion of

400 NORTH 34TH STREET, SUITE 100
P.O. BOX 300303
SEATTLE, WASHINGTON 98103
206-632-8020 FAX 206-695-6777
TDD 1-800-833-6388
www.shannonwilson.com

the property and a former gasoline underground storage tank location in the central portion of the Site. In general, groundwater flow direction is to the south-southwest (Figure 3).

To facilitate cleanup of gasoline- and benzene-contaminated groundwater at the Site, a two-phase remediation plan was developed.[1] Each phase consisted of a system of soil vapor extraction (SVE) and air sparging (AS) wells (Figure 1). Phase I was installed in 2006 to 2007 and operated from June 2007 to June 2008. Phase I was discontinued when redevelopment activities required removal of the equipment. Phase I operated for approximately 8,870 hours.

Phase II of the remediation included reinstalling the AS/SVE system after the current property was completed. The reinstalled system commenced operation in November 2010. Phase II was completed in March 2016 following an analysis of groundwater data that indicated decreasing trends in concentrations of contaminants in source area wells and an absence of contaminants in point-of-compliance wells. Based on an evaluation of the groundwater data, the remediation system was shut off on March 15, 2016, to conduct a rebound test. Additional analyses were added to the monitoring program to assist with the evaluation of the feasibility of MNA as a final treatment method. Groundwater monitoring procedures and methods are discussed in the Post-Construction Groundwater Monitoring Plan[2] and results of the groundwater monitoring for the rebound test and the evaluation of the feasibility of MNA as a final treatment method are discussed below.

GROUNDWATER MONITORING

In accordance with our discussion during our March 14, 2016, meeting, the SVE/AS system was shut off to initiate a rebound test. Groundwater monitoring for the 26th round of quarterly sampling was conducted to analyze for the contaminants of concern, evaluate the effects (if any) of the rebound test, and evaluate the feasibility of MNA as a final groundwater treatment method.

[1] Shannon & Wilson, Inc., 2009, Groundwater remediation plan, Phase II remediation design, Seattle Center lot no. 2, Seattle, Washington: Report prepared by Shannon & Wilson, Inc., Seattle, Wash., and Aspect Consulting LLC, Seattle, Wash., 21-1-12176-018, for Seattle Center Redevelopment, Seattle, Wash., June 11.

[2] Shannon & Wilson Inc., 2017, Post-construction groundwater monitoring plan Seattle Center lot number 2 (Iris Holding LLC 500 5th Ave North) Seattle, Washington: Report prepared by Shannon & Wilson, Inc., Seattle, Wash., 21-1-12176-046, for Seattle Center Redevelopment, Seattle, Wash, June 9.

Groundwater sampling was conducted on May 24, 25, and 26, 2017. Sampled wells included compliance wells SW-25, SW-26, and SW-27, and wells SVE-13, SVE-16, SVE-17, SVE-19, SVE-20, SVE-23, SVE-24, SVE-25, and SVE-26. During the February monitoring event, SW-25 was not sampled due to a change in Site conditions. Since then, the Bill & Melinda Gates Foundation installed a door in the security fence to allow safe access to SW-25. SW-25 was sampled during the 26th monitoring event.

Prior to sampling, approximately 1 to 2.5 gallons of groundwater were purged from each well until water quality parameters stabilized. Each monitoring well was sampled using low-flow techniques, except SVE-13 and SW-25. Groundwater sampling from wells SVE-13 and SW-25 were conducted using a disposable high-density polyethylene bailer due to a malfunction of the dedicated submersible pump. Consequently, water quality parameters could not be collected for these locations. Groundwater samples were collected from the well once three well volumes had been removed.

The collected samples were transported under chain-of-custody protocols to OnSite Environmental, Inc. in Redmond, Washington, to analyze for Northwest TPH-G and benzene, toluene, ethylbenzene, and xylenes by U.S. Environmental Protection Agency (EPA) Method 8021. Additional parameters were added to the monitoring program as recommended in the Guidance for Petroleum Contaminated Ground Water by Natural Attenuation.[3] MNA indicator parameters include: nitrate and sulfate by EPA Method 300.0, manganese by EPA Method 200.8, ferrous iron by SM3500-Fe B, and alkalinity by SM 4500 NH3 E. Depth to groundwater measurements were recorded for the wells sampled during each monitoring event using an electronic water level indicator. The calculated groundwater elevations based on field measurements are presented in Table 3.

[3] Washington State Department of Ecology, 2005, Guidance on remediation of petroleum-contaminated ground water by natural attenuation (v. 1.0): Olympia, Wash., Washington State Dept. of Ecology, publication no. 05-09-091, 139 p.

Investigation-Derived Waste Disposal

Groundwater purged from wells during sampling was contained on site in the 500-gallon treatment system water collection tank. The treatment system water collection tank will continue to be used to store purge water from future sampling events and will be disposed of periodically.

Groundwater Results

In the southern plume, TPH-G was detected above the Model Toxics Control Act (MTCA) cleanup criteria at SVE-23 and below the cleanup criteria at SVE-20 (Table 1). Benzene was not detected in the southern plume monitoring wells. SVE-23 has historically exceeded the cleanup criteria for TPH-G since the implementation of the Phase II remediation, with the exception of the 9th, 10th, and 20th quarters (Table 2). Prior to being detected in the 26th quarter, TPH-G has not been detected at SVE-20 since the 22nd quarter and has not exceeded the cleanup criteria since the 15th quarter.

In the middle plume during the 26th quarter, TPH-G was detected below the cleanup criteria at SVE-19. Benzene was not detected above laboratory reporting limits in the middle plume wells. With the exception of the detection of TPH-G at SVE-19 during the 26th quarterly event, TPH-G and benzene have not been detected at SVE-17 and SVE-19 since November 2015 and May 2016, respectively.

TPH-G and benzene were not detected during the 26th quarter in the northern plume. They were also not detected during the previous 25th quarter event. TPH-G was detected at SVE-13 during the 22nd and 23rd quarters at levels below cleanup criteria. Benzene has not been detected at SVE-13 since the 6th quarter sampling event completed in May 2012.

A summary of the analytical groundwater results is presented in Figure 2 and Table 1. Figures 4 and 5 are time series plots that show historical concentrations of TPH-G and benzene, respectively, for each SVE well. The analytical laboratory report from this quarter's groundwater sampling is contained in Appendix A.

Natural Attenuation Evaluation

Based on soil source removal activities conducted during the construction of the existing building, the decreasing trend in concentrations of TPH-G and benzene in source area wells, and the absence of these contaminants in the downgradient point-of-compliance wells, MNA is being evaluated as a final groundwater treatment method. MNA, under favorable conditions, reduces the mass and concentrations of contaminants in the environment through physical, chemical, and biological processes. To evaluate the feasibility of MNA, an analysis of the status of the plumes and a review of the geochemical parameters were conducted. Plume status evaluation was completed using Mann-Kendall statistical analysis for benzene and TPH-G concentrations. The results are presented in Appendix B. The north, middle, and south TPH-G and benzene plumes are either stable or decreasing. Two wells, SVE-13 and SVE-24, yielded "no trend," which is likely an artifact of the Mann-Kendall statistical analysis that requires the use of half the laboratory detection limits in place of zero values for non-detects; this masks any trends in these wells. SVE-23 also yielded "no trend" for the 26th quarterly event, which is likely due to the 26th quarter TPH-G concentration being outside the data group the Mann-Kendall statistical analysis used to conclude a "stable" plume status during the 25th quarter event. Additional data points from future monitoring events will be required for the Mann-Kendall statistical analysis to conclude a concentration trend for SVE-23.

In general, according to the guidance provided by the Washington State Department of Ecology,[4] the analysis of the primary and secondary geochemical parameters show that conditions for MNA through biodegradation continue to be favorable (Table 1). In accordance with the Post-Construction Groundwater Monitoring Plan, the groundwater monitoring analytical suite will continue to include the MNA geochemical parameters through the February 2018 (29th quarter) event to evaluate the feasibility of MNA as a long-term groundwater treatment method. For future monitoring events, groundwater will also be analyzed for TPH-G and benzene to continue to evaluate plume status. A description of the long-term groundwater monitoring plan beyond the 29th quarterly event is contained in the Post-Construction Groundwater Monitoring Plan.

[4] Ibid.

CONCLUSIONS

In general, TPH-G and benzene are consistent with historical declining trends in concentrations (see Figures 4 and 5). No rebound concentrations of TPH-G and benzene have been observed in source area wells and there have not been detections of contaminants in the downgradient point-of-compliance wells during the May 2016, August 2016, November 2016, February 2017, and May 2017 sampling events, which suggests that the current groundwater conditions are likely representative of natural conditions uninfluenced by the AS/SVE treatment system. Results of the last five quarterly groundwater monitoring events indicate that conditions for monitored natural attenuation are favorable. The AS/SVE system will remain off and post-treatment groundwater conditions will continue to be evaluated.

A Mann-Kendall statistical analysis of the status of the plumes reveals that the north, middle, and south plumes are either stable or decreasing, which indicates that the conditions for natural attenuation are favorable. Conditions in wells SVE-13, SVE-23, and SVE-24 have yielded "no trend" with Mann-Kendall but are likely not indicative of conditions of concern. Monitoring wells SVE-13 and SVE-24 yielded "no trend," likely due to the Mann-Kendall statistical analysis requirement to use half of the laboratory detection limits in place of zero values for non-detects. SVE-23 also yielded "no trend," which is due to the TPH-G concentration being anomalously high during the 26th quarter. Similar concentrations of TPH-G have been observed in historic data and we anticipate this condition will improve as recent trends suggest. The Mann-Kendall statistical analysis for SVE-23 concluded a "stable" plume during the 25th quarter event. These results have been consistent throughout the shut-off period and likely do not suggest any conflict with the overall results of the Mann-Kendall analyses that the plumes are either shrinking or stable. TPH-G and benzene will be analyzed during upcoming groundwater monitoring events to continue to evaluate the status of the plumes. MNA geochemical parameters will be analyzed through the February (29th quarter) event to evaluate whether MNA is feasible as a long-term groundwater treatment method. A description of the long-term groundwater monitoring plan beyond the 29th quarterly event is contained in the Post-Construction Groundwater Monitoring Plan.

Benzene was detected during the 23rd and 24th monitoring events (August and November 2016) at SVE-24 in excess of the MTCA Method A cleanup criteria. Prior to the 23rd event, benzene

was not detected at SVE-24 for six consecutive events. During the 25th event, benzene returned to a concentration below the cleanup criteria and was not detected during the 26th event. A similar trend was observed at SVE-24 during the 8th, 9th, and 10th quarterly events, which were completed in August 2012, November 2012, and February 2013. Both occurrences can be seen in Figure 5 and are characterized by peak benzene concentrations measured during the November sampling event and may be associated with high seasonal groundwater elevations.

Source area sampling point SVE-25 has historically exceeded the cleanup criteria since the implementation of the Phase II remediation. Beginning in November 2015, TPH-G and benzene concentrations have been below the cleanup criteria. Based on the review of the results of other source area wells and the evaluation of the plume status, it is likely that the recent absence of TPH-G and benzene and previous detections below the cleanup criteria at SVE-25 are a reflection of the occurrence of biodegradation through natural attenuation. The benzene detection above cleanup criteria in February 2017 is inconsistent with recent trends. Further monitoring data will be required to evaluate whether benzene will continue to be present at SVE-25.

LIMITATIONS

The data presented in this letter report are based on sampling at the Site and should be considered representative of our observations at the time. We also note that the facts and conditions referenced in this letter report may change over time, and that those set forth here are applicable to the facts and conditions as described only at the time this letter report was written. We believe that the conclusions stated here are factual, but no guarantee is made or implied.

This letter report was prepared for the exclusive use of Seattle Center Redevelopment and its representatives and in no way guarantees that any agency or its staff will reach the same conclusions as Shannon & Wilson, Inc. Shannon & Wilson, Inc. has prepared the enclosed Appendix C, “Important Information About Your Geotechnical/Environmental Report,” to help you and others in understanding our reports.

SHANNON & WILSON, INC.

If you have any questions regarding the findings presented herein, please call me at (206) 632-8020.

Sincerely,

SHANNON & WILSON, INC.

Edwin V. Ptak
Environmental Scientist

State of Washington
Hydrogeologist
263
Licensed Geologist
SCOTT W. GAULKE
9/8/2017

Scott W. Gaulke, PE, LHG
Vice President

EVP:SWG/evp

Enc: Table 1 – Groundwater Analytical Results for May 2017
Table 2 – Historical Groundwater Analytical Results (5 pages)
Table 3 – Groundwater Elevations (6 pages)
Figure 1 – Site Plan
Figure 2 – TPH-G and Benzene Concentrations in Groundwater
Figure 3 – Groundwater Contour Map
Figure 4 – Historical TPH-G Concentrations in SVE Wells
Figure 5 – Historical Benzene Concentrations in SVE Wells
Appendix A – Groundwater Analytical Laboratory Report
Appendix B – Plume Status Evaluation
Appendix C – Important Information About Your Geotechnical/Environmental Report

TABLE 1
GROUNDWATER ANALYTICAL RESULTS FOR MAY 2017

Well Number	Sample ID	Quarter	Date Collected	BTEX (µg/L)				TPH - Gasoline (µg/L)	Secondary Geochemical Indicators					Primary Geochemical Indicators				
				Benzene	Toluene	Ethylbenzene	Xylenes		Manganese (µg/L)	Alkalinity (mg/L)	Nitrate (mg/L)	Sulfate (mg/L)	Ferrous Iron (mg/L)	ORP	DO (mg/L)	pH	Specific Conductivity (µmhos/cm)	Temperature (°C)
Soil Vapor Extraction Wells																		
SVE-13	SVE-13	Q26	5/30/2017	< 4.0	< 4.0	< 4.0	< 4.0	< 400	**3,400**	**810**	< 0.050	**42**	**14.2**	*	*	*	*	*
SVE-16	SVE-16	Q26	5/26/2017	< 4.0	< 4.0	< 4.0	< 4.0	< 400	**1,600**	**350**	**0.082**	**71**	**36.6**	-68.3	0.17	6.42	0.85	14.7
SVE-17	SVE-17	Q26	5/25/2017	< 4.0	< 4.0	< 4.0	< 4.0	< 400	**1,900**	**480**	< 0.050	**45**	**42.3**	-38.3	0.12	7.39	0.69	15.7
SVE-19	SVE-19	Q26	5/25/2017	< 4.0	< 1.0	< 1.0	< 4.0	**290**	**8,900**	**300**	**0.088**	**710**	**62.3**	-101.4	0.11	7.35	1.83	15.2
SVE-20	SVE-20	Q26	5/25/2017	< 4.0	< 4.0	**5.7**	< 4.0	**510**	**3,400**	**720**	**0.10**	**210**	**29.3**	-117.8	0.10	7.26	1.54	14.8
SVE-23	SVE-23	Q26	5/25/2017	< 4.0	**12**	**110**	**216**	**4,100**	**1,300**	**260**	**0.072**	**5.0**	**19.2**	-92.4	0.10	7.42	0.54	14.7
SVE-24	SVE-24	Q26	5/24/2017	< 1.0	< 1.0	< 1.0	< 1.0	< 100	**11,000**	**250**	**0.070**	**1,700**	**37.3**	223.6	0.18	6.81	2.80	14.6
SVE-25	SVE-25	Q26	5/25/2017	< 4.0	< 4.0	< 4.0	< 1.0	< 400	**1,800**	**78**	**0.064**	**200**	**9.85**	43.8	0.28	7.06	0.65	14.5
SVE-26	SVE-26	Q26	5/24/2017	< 1.0	< 1.0	< 1.0	< 1.0	< 100	**1,200**	**110**	**0.34**	**310**	**65.6**	302.3	1.41	5.99	0.71	14.3
Compliance Wells																		
SW-25	SW-25	Q26	5/26/2017	< 1.0	< 1.0	< 1.0	< 1.0	< 100	**1200**	**48**	**0.092**	**150**	**19.2**	*	*	*	*	*
SW-26	SW-26	Q26	5/24/2017	< 1.0	< 1.0	< 1.0	< 1.0	< 100	**3300**	**200**	**0.050**	**110**	**0.784**	231.4	0.42	6.19	0.60	14.4
SW-27	SW-27	Q26	5/24/2017	< 1.0	< 1.0	< 1.0	< 1.0	< 100	**410**	**92**	**0.060**	**67**	**18.1**	309.4	0.31	6.4	0.42	15.7
MTCA Method A Cleanup Levels				5	1,000	700	1,000	800/1,000[1]	--	--	--	--	--	NA	NA	NA	NA	NA

Notes:

[1] Cleanup level for gasoline is 800 micrograms per liter (µg/L) if benzene is present; 1,000 µg/L if no detectable benzene in groundwater.

* = Geochemical indicators could not be collected due to pump malfunction; three well volumes were purged and a bailer was used to collect samples.

-- = Model Toxics Control Act (MTCA) Method A cleanup criteria not established for this parameter.

< = less than reporting limit indicated

Bolded text indicates analyte detected.

Shaded text indicates concentration exceeds state cleanup criterion.

°C = degrees Celsius

BTEX = benzene, toluene, ethylbenzene, and xylenes

DO = dissolved oxygen in milligrams per liter (mg/L)

ID = identification

µmhos/cm = micromhos per centimeter

NA = not applicable

ORP = oxygen reduction potential in millivolts

SVE = soil vapor extraction

TPH = total petroleum hydrocarbons

TABLE 2
HISTORICAL GROUNDWATER ANALYTICAL RESULTS

Well Number	Sample ID	Quarter	Date Collected	BTEX				TPH - Gasoline	Units	Field Measurements	
				Benzene	Toluene	Ethylbenzene	Xylenes			ORP	DO
SVE-13	SVE-13	Q26	5/30/2017	< 4.0	< 4.0	< 4.0	< 4.0	< 400	µg/L	*	*
	SVE-13	Q25	2/24/2017	< 4.0	< 4.0	< 4.0	**6.3**	< 400	µg/L	*	*
	SVE-13	Q24	11/18/2016	< 4.0	< 4.0	< 4.0	**4.0**	< 400	µg/L	*	*
	SVE-13	Q23	8/29/2016	< 4.0	< 4.0	< 4.0	**19.0**	**520**	µg/L	*	*
	SVE-13	Q22	5/26/2016	< 1.0	< 1.0	< 1.0	**9.2**	**780**	µg/L	*	*
	SVE-13	Q21	2/26/2016	< 1.0	< 1.0	< 1.0	< 1.0	< 100	µg/L	*	*
	SVE-13	Q20	11/20/2015	< 1.0	< 1.0	< 1.0	< 1.0	< 100	µg/L	*	*
	SVE-13	Q19	8/28/2015	< 1.0	< 1.0	**2.9**	**32**	**1,000**	µg/L	*	*
	SVE-13	Q18	5/29/2015	< 4.0	< 4.0	< 4.0	**18**	**680**	µg/L	*	*
	SVE-13	Q17	2/27/2015	< 1.0	< 1.0	**2.1**	**15**	**720**	µg/L	*	*
	SVE-13	Q16	11/21/2014	< 1.0	< 1.0	**3.6**	**13**	**640**	µg/L	*	*
	SVE-13	Q15	8/29/2014	< 1.0	**1.9**	**8.4**	**40**	**1,800**	µg/L	*	*
	SVE-13	Q14	5/28/2014	< 1.0	< 1.0	**1.1**	**2.6**	**220**	µg/L	44.8	1.08
	SVE-13	Q13	2/25/2014	< 1.0	**1.3**	**4.0**	**15**	**720**	µg/L	*	*
	SVE-13	Q12	11/26/2013	< 1.0	**4.4**	**10**	**66**	**1,400**	µg/L	-74.5	0.44
	SVE-13	Q11	8/30/2013	--	--	--	--	--	--	--	--
	SVE-13	Q10	5/30/2013	< 1.0	< 1.0	**1.2**	**5.3**	**270**	µg/L	45.3	0.27
	SVE-13	Q9	2/27/2013	< 1.0	< 1.0	< 1.0	**1.1**	**270**	µg/L	-1.1	0.23
	SVE-13	Q8	11/26/2012	< 1.0	< 1.0	< 1.0	< 2.0	< 100	µg/L	33.9	0.11
	SVE-13-083012	Q7	8/30/2012	< 1.0	**1.6**	**3.8**	**33**	**900**	µg/L	-21.8	0.04
	SVE-13-053012	Q6	5/30/2012	**1.8**	< 1.0	**24**	**21**	**1,100**	µg/L	-219.5	0.30
	SVE-13-022912	Q5	2/29/2012	< 1.0	**1.5**	**3.3**	**16**	**1,500**	µg/L		
	SVE-13-112911	Q4	11/29/2011	< 1.0	< 1.0	< 1.0	< 2.0	< 100	µg/L	-10.5	0.40
	SVE-13-083011	Q3	8/30/2011	< 4.0	**5.0**	**5.7**	**20**	**4,900**	µg/L	-96.9	0.99
	SVE-13	Q2	5/27/2011	< 4.0	< 4.0	< 4.0	**8.2**	**2,400**	µg/L	-56.9	0.09
	SVE-13-022411	Q1	2/24/2011	< 1.0	< 5.0	**4.2**	**25**	**5,100**	µg/L	-73	0.35
	SVE-13-052010	Interim	5/20/2010	**8.1**	< 4.0	**33**	**69**	**13,000**	µg/L	-344.7	0.53
SVE-16	SVE-16	Q26	5/26/2017	< 4.0	< 4.0	< 4.0	< 4.0	< 400	µg/L	-68.3	0.17
	SVE-16	Q25	2/24/2017	< 4.0	< 4.0	**< 4.0**	< 4.0	< 400	µg/L	-20.5	0.13
	SVE-16	Q24	11/18/2016	**2.0**	< 1.0	**3.0**	< 1.0	**260**	µg/L	-101.7	0.43
	SVE-16	Q23	8/29/2016	< 4.0	< 4.0	< 4.0	< 4.0	< 400	µg/L	210.4	0.31
	SVE-16	Q22	5/25/2016	**1.4**	**3.4**	**6.2**	**7.2**	**420**	µg/L	-42.9	0.17
	SVE-16	Q21	2/26/2016	< 1.0	< 1.0	< 1.0	< 2.0	< 100	µg/L	39.2	0.21
	SVE-16	Q20	11/19/2015	**5.7**	**1.9**	**14**	**4.0**	**950**	µg/L	48.9	0.77
	SVE-16	Q19	8/28/2015	**4.8**	**1.3**	**15**	**2.0**	**950**	µg/L	-63.3	0.67
	SVE-16	Q18	5/28/2015	**5.0**	< 1.0	**19**	< 2.0	**830**	µg/L	-30.4	0.35
	SVE-16	Q17	2/27/2015	**1.4**	< 1.0	**4.5**	**3.3**	**570**	µg/L	-41.4	3.19
	SVE-16	Q16	11/21/2014	**2.6**	< 1.0	< 1.0	< 2.0	**400**	µg/L	79.1	0.12
	SVE-16	Q15	8/29/2014	**3.3**	< 1.0	**17**	< 2.0	**970**	µg/L	-54.3	0.08
	SVE-16	Q14	5/28/2014	**5.1**	< 1.0	**24**	**2.2**	**900**	µg/L	-39.5	0.17
	SVE-16	Q13	2/25/2014	**3.6**	< 1.0	**17**	**1.5**	**580**	µg/L	-0.7	0.23
	SVE-16	Q12	11/25/2013	**6.5**	< 1.0	**36**	**2.2**	**790**	µg/L	-99.2	0.22
	SVE-16	Q11	8/30/2013	**5.2**	**1.4**	**29**	**15**	**850**	µg/L	-58.7	0.14
	SVE-16	Q10	5/30/2013	< 4.0	< 4.0	**7.2**	< 8.0	< 400	µg/L	-17.1	0.31
	SVE-16	Q9	2/27/2013	< 1.0	< 1.0	**2.9**	**< 2.0**	**220**	µg/L	-34.4	0.17
	SVE-16	Q8	11/27/2012	**7.9**	**2.7**	**46**	**51**	**1,900**	µg/L	-89.5	0.14
	SVE-16-083012	Q7	8/30/2012	**9.0**	**1.3**	**48**	**21**	**1,200**	µg/L	-36.4	0.06
	SVE-16-053112	Q6	5/31/2012	**2.5**	< 1.0	**11**	**2.1**	**370**	µg/L	-300.4	0.43
	SVE-16-022912	Q5	2/29/2012	**3.1**	< 1.0	**10**	**1.8**	**440**	µg/L	-25	0.94
	SVE-16-112911	Q4	11/29/2011	**10**	< 1.0	**37**	**12**	**1,100**	µg/L	-62.2	0.89
	SVE-16-083011	Q3	8/30/2011	**9.7**	< 1.0	**30**	**11**	**1,100**	µg/L	-59.4	6.02
	SVE-16	Q2	5/27/2011	**8.5**	< 1.0	**5.6**	**1.7**	**480**	µg/L	-13	0.48
	SVE-16-022411	Q1	2/24/2011	**16**	< 1.0	**13**	**20**	**1,300**	µg/L	-15.8	1.27
	SVE-16-052010	Interim	5/20/2010	**17**	< 1.0	**33**	**3.5**	**820**	µg/L	89.9	0.51
SVE-17	SVE-17	Q26	5/25/2017	< 4.0	< 4.0	< 4.0	< 4.0	< 400	µg/L	-38.3	0.12
	SVE-17	Q25	2/24/2017	< 4.0	< 4.0	< 4.0	< 4.0	< 400	µg/L	-110.3	0.09
	SVE-17	Q24	11/18/2016	< 1.0	< 1.0	< 1.0	< 1.0	< 100	µg/L	-46.4	0.19
	SVE-17	Q23	8/26/2016	< 1.0	< 1.0	< 1.0	< 1.0	< 100	µg/L	315.8	0.19
	SVE-17	Q22	5/25/2016	< 1.0	**3.2**	< 1.0	< 2.0	< 100	µg/L	-4.0	0.15
	SVE-17	Q21	2/26/2016	< 1.0	< 1.0	< 1.0	< 1.0	< 100	µg/L	-47.2	0.31
	SVE-17	Q20	11/19/2015	**4.0**	**1.2**	**8.4**	**2.7**	**630**	µg/L	-32.4	4.80
	SVE-17	Q19	8/26/2015	< 1.0	< 1.0	< 1.0	< 1.0	< 100	µg/L	5.5	2.76
	SVE-17	Q18	5/28/2015	< 1.0	< 1.0	< 1.0	< 2.0	< 100	µg/L	10.4	0.41
	SVE-17	Q17	2/27/2015	< 1.0	< 1.0	< 1.0	< 2.0	< 100	µg/L	47.8	3.41
	SVE-17	Q16	11/21/2014	< 1.0	< 1.0	< 1.0	< 2.0	< 100	µg/L	66.3	0.23
	SVE-17	Q15	8/28/2014	< 1.0	< 1.0	< 1.0	< 2.0	< 100	µg/L	-5.0	0.21
	SVE-17	Q14	5/28/2014	< 1.0	< 1.0	< 1.0	< 2.0	< 100	µg/L	-9.9	2.04
	SVE-17	Q13	2/25/2014	< 1.0	< 1.0	< 1.0	< 2.0	< 100	µg/L	-5.4	1.68
	SVE-17	Q12	11/25/2013	< 1.0	< 1.0	< 1.0	< 2.0	< 100	µg/L	9.1	3.44
	SVE-17	Q11	8/30/2013	< 1.0	< 1.0	< 1.0	< 2.0	**120**	µg/L	-26.0	0.15
	SVE-17	Q10	5/30/2013	< 1.0	< 1.0	< 1.0	< 2.0	< 100	µg/L	35.7	0.21
	SVE-17	Q9	2/27/2013	< 1.0	< 1.0	< 1.0	**1.9**	**400**	µg/L	7.1	0.27
	SVE-17	Q8	11/26/2012	< 1.0	< 1.0	< 1.0	**1.4**	**180**	µg/L	-17.7	0.17
	SVE-17-083012	Q7	8/30/2012	< 1.0	< 1.0	< 1.0	< 2.0	**170**	µg/L	28.5	0.09
	SVE-17-053112	Q6	5/31/2012	< 1.0	< 1.0	< 1.0	**2**	**300**	µg/L	-245.0	0.59
	SVE-17-022912	Q5	2/29/2012	< 1.0	< 1.0	< 1.0	**12**	**720**	µg/L	65.5	0.78
	SVE-17-112911	Q4	11/29/2011	**1.2**	< 1.0	< 1.0	**12**	**620**	µg/L	-19.0	0.40
	SVE-17-083011	Q3	8/30/2011	**1.2**	< 1.0	**2.3**	**22**	**880**	µg/L	58.5	4.97
	SVE-17	Q2	5/27/2011	**3.2**	< 1.0	**4.1**	**34**	**1,200**	µg/L	32.4	0.37
	SVE-17-022411	Q1	2/24/2011	**2.6**	**1.1**	**6.4**	**49**	**1,900**	µg/L	85.3	1.29
	SVE-17-052010	Interim	5/20/2010	**2.9**	< 1.0	**8.1**	**6.0**	**590**	µg/L	28.5	0.38

TABLE 2
HISTORICAL GROUNDWATER ANALYTICAL RESULTS

Well Number	Sample ID	Quarter	Date Collected	BTEX				TPH - Gasoline	Units	Field Measurements	
				Benzene	Toluene	Ethylbenzene	Xylenes			ORP	DO
SVE-19	SVE-19	Q26	5/25/2017	< 4.0	< 1.0	< 1.0	< 4.0	**290**	µg/L	-101.4	0.11
	SVE-19	Q25	2/24/2017	< 4.0	< 4.0	< 4.0	< 4.0	< 400	µg/L	-121.4	0.10
	SVE-19	Q24	11/17/2016	< 4.0	< 4.0	< 4.0	< 4.0	< 400	µg/L	-67.1	0.10
	SVE-19	Q23	8/26/2016	< 4.0	< 4.0	< 4.0	< 4.0	< 400	µg/L	276.4	0.15
	SVE-19	Q22	5/25/2016	< 1.0	< 1.0	< 1.0	< 2.0	**160**	µg/L	-18.2	0.16
	SVE-19	Q21	2/25/2016	< 1.0	< 1.0	< 1.0	< 2.0	**240**	µg/L	-59.4	0.08
	SVE-19	Q20	11/19/2015	< 1.0	< 1.0	**4**	**2.4**	**400**	µg/L	33	1.53
	SVE-19	Q19	8/26/2015	< 1.0	< 1.0	< 1.0	< 1.0	**200**	µg/L	39.7	0.30
	SVE-19	Q18	5/28/2015	< 1.0	< 1.0	< 1.0	< 2.0	**180**	µg/L	52.1	0.39
	SVE-19	Q17	2/26/2015	< 1.0	< 1.0	< 1.0	< 2.0	< 100	µg/L	20.1	0.16
	SVE-19	Q16	11/19/2014	< 1.0	< 1.0	**1.3**	< 2.0	**210**	µg/L	14.6	0.11
	SVE-19	Q15	8/28/2014	< 1.0	< 1.0	< 1.0	< 2.0	**170**	µg/L	-14.1	0.18
	SVE-19	Q14	5/27/2014	< 1.0	< 1.0	**4.7**	< 2.0	**510**	µg/L	-39.2	1.11
	SVE-19	Q13	2/25/2014	< 1.0	< 1.0	**4.8**	< 2.0	**560**	µg/L	-51.3	0.27
	SVE-19	Q12	11/25/2013	< 1.0	< 1.0	**3.6**	< 2.0	**400**	µg/L	-28.9	0.19
	SVE-19	Q11	8/30/2013	< 1.0	< 1.0	**5.8**	< 2.0	**780**	µg/L	-23.1	0.19
	SVE-19	Q10	5/30/2013	< 4.0	< 4.0	**44**	< 8.0	**960**	µg/L	-2.1	0.31
	SVE-19	Q9	2/26/2013	< 1.0	< 1.0	**12**	< 2.0	**670**	µg/L	-17.5	0.26
	SVE-19	Q8	11/26/2012	**1.1**	< 1.0	**22**	**4.5**	**1,300**	µg/L	-34.7	0.13
	SVE-19-083012	Q7	8/30/2012	< 1.0	< 1.0	**2.9**	**3.2**	**360**	µg/L	36.3	0.12
	SVE-19-053112	Q6	5/31/2012	**2.0**	< 1.0	**52**	**4.9**	**1,500**	µg/L	-290	0.42
	SVE-19-022912	Q5	2/29/2012	**1.5**	< 1.0	**34**	**8.8**	**1,300**	µg/L	73.4	0.84
	SVE-19-112911	Q4	11/29/2011	**3.2**	< 1.0	**46**	**15**	**1,900**	µg/L	43.3	0.36
	SVE-19-083011	Q3	8/30/2011	**3.4**	< 1.0	**62**	**35**	**2,000**	µg/L	83	5.24
	SVE-19	Q2	5/27/2011	**2.6**	**1.8**	**36**	**70**	**1,400**	µg/L	89.2	0.26
	SVE-19-022411	Q1	2/24/2011	**4.5**	**6.1**	**52**	**168**	**2,400**	µg/L	120.1	0.45
	SVE-19-052010	Interim	5/20/2010	**14**	**3.4**	**94**	**122**	**3,100**	µg/L	-14.3	0.31
SVE-20	SVE-20	Q26	5/25/2017	< 4.0	< 4.0	**5.7**	< 4.0	**510**	µg/L	-117.8	0.10
	SVE-20	Q25	2/23/2017	< 4.0	< 4.0	**6.1**	< 4.0	< 400	µg/L	-136.1	0.11
	SVE-20	Q24	11/17/2016	< 4.0	< 4.0	**4.9**	< 4.0	< 400	µg/L	-110.8	0.12
	SVE-20	Q23	8/26/2016	< 4.0	< 4.0	**6.3**	< 4.0	< 400	µg/L	85.3	0.18
	SVE-20	Q22	5/25/2016	**1.0**	**3.0**	**5.4**	**3.6**	**340**	µg/L	-104.3	0.17
	SVE-20	Q21	2/25/2016	< 1.0	< 1.0	< 1.0	< 2.0	<400	µg/L	-151.3	0.09
	SVE-20	Q20	11/19/2015	< 1.0	< 1.0	**4.8**	**4**	**500**	µg/L	107.5	14.58
	SVE-20	Q19	8/26/2015	< 1.0	< 1.0	**1.9**	< 2.0	**260**	µg/L	-88.4	0.39
	SVE-20	Q18	5/28/2015	< 1.0	< 1.0	**2.1**	< 2.0	**330**	µg/L	-17.4	0.37
	SVE-20	Q17	2/26/2015	< 1.0	< 1.0	**5.0**	< 2.0	**390**	µg/L	-81.2	3.31
	SVE-20	Q16	11/19/2014	**1.2**	< 1.0	**5.1**	**11**	**770**	µg/L	-83.4	0.10
	SVE-20	Q15	8/28/2014	**1.1**	< 1.0	**4.1**	**6.1**	**810**	µg/L	-111.3	0.11
	SVE-20	Q14	5/27/2014	**1.5**	**1.4**	**11**	**15**	**870**	µg/L	-94.2	1.08
	SVE-20	Q13	2/24/2014	**2.0**	**1.7**	**11**	**17**	**840**	µg/L	-89.4	0.45
	SVE-20	Q12	11/25/2013	**1.9**	**1.7**	**13**	**17**	**790**	µg/L	-109.2	0.46
	SVE-20	Q11	8/30/2013	**2.8**	**4.0**	**66**	**63**	**3,000**	µg/L	-95.4	0.38
	SVE-20	Q10	5/29/2013	< 4.0	< 4.0	**22**	**22**	**790**	µg/L	-40.2	0.21
	SVE-20	Q9	2/26/2013	**1.4**	**1.3**	**28**	**23**	**1,100**	µg/L	-63.8	0.28
	SVE-20	Q8	11/26/2012	**2.2**	**2.5**	**50**	**42**	**2,300**	µg/L	-91.2	0.09
	SVE-20-083012	Q7	8/30/2012	< 1.0	< 1.0	**20**	**4**	**690**	µg/L	-26.4	0.11
	SVE-20-053012	Q6	5/30/2012	< 1.0	**1.1**	**2.7**	**12**	**1,300**	µg/L	-232.3	0.44
	SVE-20-022912	Q5	2/29/2012	**3.3**	**1.9**	**51**	**54**	**1,800**	µg/L	-19.1	0.4
	SVE-20-112911	Q4	11/29/2011	**4.1**	**1.1**	**25**	**26**	**1,300**	µg/L	-33.2	0.34
	SVE-20-083011	Q3	8/30/2011	**5.1**	< 4.0	**61**	**40**	**2,200**	µg/L	-67	5.15
	SVE-20	Q2	5/27/2011	**4.7**	< 4.0	**58**	**43**	**3,100**	µg/L	-46.1	0.36
	SVE-20-022411	Q1	2/24/2011	**8.8**	**1.7**	**47**	**50**	**3,000**	µg/L	-73.9	0.53
	SVE-20-052010	Interim	5/20/2010	**13**	< 4.0	**81**	**146**	**4,600**	µg/L	-96.8	0.10
SVE-23	SVE-23	Q26	5/25/2017	< 4.0	**12**	**110**	**216**	**4,100**	µg/L	-92.4	0.10
	SVE-23	Q25	2/23/2017	< 4.0	**10**	**86**	**177**	**2,700**	µg/L	-99.7	0.08
	SVE-23	Q24	11/17/2016	< 4.0	**11.0**	**89**	**218**	**3,100**	µg/L	-110.8	0.12
	SVE-23	Q23	8/26/2016	< 4.0	**12.0**	**86**	**218**	**3,100**	µg/L	248.3	0.21
	SVE-23	Q22	5/25/2016	**3.2**	**11.0**	**78**	**185**	**3,700**	µg/L	-74.3	0.02
	SVE-23	Q21	2/25/2016	< 1.0	**8.8**	**69**	**175**	**2,800**	µg/L	-113.7	0.08
	SVE-23	Q20	11/19/2015	< 1.0	< 1.0	< 1.0	< 1.0	< 100	µg/L	-44.6	0.54
	SVE-23	Q19	8/26/2015	**2.1**	**7.2**	**49**	**87**	**2,200**	µg/L	-47.5	0.67
	SVE-23	Q18	5/28/2015	**1.8**	< 1.0	**45**	**3.8**	**2,200**	µg/L	-12.4	0.68
	SVE-23	Q17	2/26/2015	**2.7**	**8.2**	**62.0**	**143**	**2,800**	µg/L	-75.9	4.93
	SVE-23	Q16	11/19/2014	< 4.0	**8.8**	**85.0**	**210**	**3,500**	µg/L	-31.4	0.16
	SVE-23	Q15	8/28/2014	< 4.0	**6.8**	**81**	**185**	**3,500**	µg/L	-64.2	0.14
	SVE-23	Q14	5/27/2014	**2.9**	**9.8**	**74**	**125**	**2,800**	µg/L	-56.1	1.03
	SVE-23	Q13	2/24/2014	**2.0**	**4.2**	**44**	**43**	**1,400**	µg/L	-40.3	0.46
	SVE-23	Q12	11/25/2013	**4.4**	**11**	**67**	**125**	**2,500**	µg/L	-92.3	0.37
	SVE-23	Q11	8/29/2013	**5.3**	**12**	**67**	**135**	**3,100**	µg/L	-51.3	0.14
	SVE-23	Q10	5/29/2013	**1.1**	**1.5**	**9.8**	**15.1**	**460**	µg/L	43.1	0.26
	SVE-23	Q9	2/26/2013	< 1.0	< 1.0	**3.3**	**5.6**	**230**	µg/L	82.4	0.30
	SVE-23	Q8	11/26/2012	**5.0**	**8.0**	**56**	**89**	**2,400**	µg/L	-55.5	0.05
	SVE-23-083012	Q7	8/30/2012	**8.2**	**11**	**75**	**126**	**3,300**	µg/L	-27.4	0.23
	SVE-23-053112	Q6	5/31/2012	**3.9**	**3.1**	**27**	**30**	**1,200**	µg/L	-232.1	0.54
	SVE-23-022912	Q5	2/29/2012	**3.3**	**2.5**	**27**	**24**	**880**	µg/L	57.4	0.58
	SVE-23-112911	Q4	11/29/2011	**6.9**	**6.5**	**53**	**47**	**1,600**	µg/L	-42.5	0.47
	SVE-23-083011	Q3	8/30/2011	**13**	**8**	**78**	**73**	**2,600**	µg/L	-39.5	5.11
	SVE-23	Q2	5/27/2011	**21**	**10**	**100**	**176**	**4,200**	µg/L	-48.7	0.42
	SVE-23-022411	Q1	2/24/2011	**27**	**7.4**	**130**	**197**	**6,000**	µg/L	-68.9	0.85
	SVE-23-052010	Interim	5/20/2010	**47**	**19**	**250**	**820**	**7,700**	µg/L	-44.1	0.25

TABLE 2
HISTORICAL GROUNDWATER ANALYTICAL RESULTS

Well Number	Sample ID	Quarter	Date Collected	BTEX				TPH - Gasoline	Units	Field Measurements	
				Benzene	Toluene	Ethylbenzene	Xylenes			ORP	DO
SVE-24	SVE-24	Q26	5/24/2017	< 1.0	< 1.0	< 1.0	< 1.0	< 100	µg/L	223.6	0.18
	SVE-24	Q25	2/22/2017	**2.9**	< 1.0	**2.3**	< 1.0	**160**	µg/L	18.9	0.20
	SVE-24	Q24	11/17/2016	**38**	4.5	**18**	20.5	**680**	µg/L	-80.4	0.20
	SVE-24	Q23	8/25/2016	**13**	< 4.0	**6.3**	< 4.0	**440**	µg/L	48.3	0.16
	SVE-24	Q22	5/24/2016	< 1.0	**1.0**	< 1.0	< 1.0	< 100	µg/L	-35.4	0.18
	SVE-24	Q21	2/25/2016	< 1.0	< 1.0	< 1.0	< 1.0	< 100	µg/L	-4.9	0.24
	SVE-24	Q20	11/19/2015	< 1.0	< 1.0	< 1.0	< 1.0	< 100	µg/L	150.0	16.80
	SVE-24	Q19	8/26/2015	< 1.0	< 1.0	< 1.0	< 1.0	< 100	µg/L	-1.6	0.38
	SVE-24	Q18	5/28/2015	< 1.0	< 1.0	< 1.0	< 2.0	< 100	µg/L	-28.1	0.34
	SVE-24	Q17	2/26/2015	< 1.0	< 1.0	< 1.0	< 2.0	**150**	µg/L	-96.8	1.41
	SVE-24	Q16	11/19/2014	**2.0**	< 1.0	**3.7**	< 2.0	**330**	µg/L	-21.4	0.13
	SVE-24	Q15	8/28/2014	< 1.0	< 1.0	< 1.0	< 2.0	**190**	µg/L	-70.1	0.12
	SVE-24	Q14	5/27/2014	< 1.0	< 1.0	< 1.0	< 2.0	< 100	µg/L	-33.2	1.01
	SVE-24	Q13	2/24/2014	< 1.0	< 1.0	< 1.0	< 2.0	**110**	µg/L	-39.8	0.77
	SVE-24	Q12	11/25/2013	< 1.0	< 1.0	< 1.0	< 2.0	< 100	µg/L	-34.0	0.35
	SVE-24	Q11	8/29/2013	< 1.0	< 1.0	**2.5**	< 2.0	**210**	µg/L	-34.2	0.21
	SVE-24	Q10	5/29/2013	< 1.0	< 1.0	**2.4**	< 2.0	**180**	µg/L	-48.1	0.28
	SVE-24	Q9	2/26/2013	**14**	< 1.0	**6.8**	< 2.0	**310**	µg/L	-38.8	0.33
	SVE-24	Q8	11/26/2012	**31**	**1.4**	**9.5**	**3.4**	**500**	µg/L	-71.1	0.15
	SVE-24-082912	Q7	8/29/2012	**3.1**	< 1.0	**2.8**	< 2.0	**260**	µg/L	-15.7	0.27
	SVE-24-053012	Q6	5/30/2012	< 1.0	< 1.0	< 1.0	< 2.0	< 100	µg/L	-250.0	0.30
	SVE-24-022912	Q5	2/29/2012	**1.1**	< 1.0	< 1.0	**1.8**	**140**	µg/L	-33.3	3.65
	SVE-24-112911	Q4	11/29/2011	< 1.0	< 1.0	< 1.0	< 2.0	< 100	µg/L	-71.0	0.70
	SVE-24-083011	Q3	8/30/2011	< 1.0	< 1.0	< 1.0	< 2.0	< 100	µg/L	-11.9	0.15
	SVE-24	Q2	5/31/2011	< 4.0	< 4.0	< 4.0	< 4.0	< 400	µg/L	-11.4	0.19
	SVE-24-022411	Q1	2/24/2011	< 1.0	< 1.0	< 1.0	< 2.0	< 100	µg/L	-42.6	0.68
	SVE-24-052010	Interim	5/20/2010	< 1.0	< 1.0	< 1.0	< 2.0	< 100	µg/L	-273.6	0.63
SVE-25	SVE-25	Q26	5/25/2017	< 4.0	< 4.0	< 4.0	< 1.0	< 400	µg/L	43.8	0.28
	SVE-25	Q25	2/23/2017	**10**	< 4.0	**7.8**	**8.1**	< 400	µg/L	-48.4	0.14
	SVE-25	Q24	11/17/2016	< 1.0	< 1.0	**1.4**	< 1.0	< 100	µg/L	38.4	0.18
	SVE-25	Q23	8/25/2016	< 1.0	< 1.0	**1.9**	< 1.0	< 100	µg/L	343.9	0.18
	SVE-25	Q22	5/24/2016	**4**	**1.2**	**14**	**1.6**	**270**	µg/L	-11.9	0.14
	SVE-25	Q21	2/25/2016	< 1.0	< 1.0	**9.5**	< 2.0	< 100	µg/L	-62.4	0.14
	SVE-25	Q20	11/20/2015	< 1.0	< 1.0	< 1.0	< 2.0	< 100	µg/L	-39.5	0.59
	SVE-25	Q19	8/26/2015	**43**	**8.5**	**130**	**47**	**2,000**	µg/L	-56.0	0.23
	SVE-25	Q18	5/28/2015	**68**	< 4.0	**160**	**12**	**3,000**	µg/L	-4.1	0.29
	SVE-25	Q17	2/26/2015	**120**	**13**	**190**	**106**	**2,900**	µg/L	-137.1	4.39
	SVE-25	Q16	11/19/2014	**250**	**40**	**300**	**140**	**3,800**	µg/L	-57.5	0.07
	SVE-25	Q15	8/28/2014	**170**	**85**	**220**	**281**	**4,400**	µg/L	-98.4	0.16
	SVE-25	Q14	5/27/2014	**91**	**19**	**200**	**158**	**3,500**	µg/L	-68.8	1.04
	SVE-25	Q13	2/24/2014	**120**	**52**	**260**	**257**	**4,800**	µg/L	-53.1	0.77
	SVE-25	Q12	11/25/2013	**100**	**28**	**200**	**113**	**3,200**	µg/L	-90.3	0.26
	SVE-25	Q11	8/29/2013	**93**	**7.5**	**130**	**71**	**2,200**	µg/L	-53.2	0.21
	SVE-25	Q10	5/29/2013	**68**	**4.6**	**82**	**40**	**1,300**	µg/L	-56.9	0.28
	SVE-25	Q9	2/27/2013	**190**	**29**	**150**	**180**	**3,200**	µg/L	-68.1	0.20
	SVE-25	Q8	11/26/2012	**380**	**160**	**270**	**580**	**7,200**	µg/L	-107.6	0.01
	SVE-25-082912	Q7	8/29/2012	**200**	**160**	**180**	**377**	**5,300**	µg/L	-21.3	0.39
	SVE-25-053012	Q6	5/30/2012	**79**	**20**	**63**	**160**	**1,600**	µg/L	-218.5	0.25
	SVE-25-022912	Q5	2/29/2012	**400**	**230**	**330**	**498**	**6,600**	µg/L	-83.2	1.11
	SVE-25-112911	Q4	11/29/2011	**290**	**230**	**240**	**480**	**5,800**	µg/L	-114	0.60
	SVE-25-083011	Q3	8/30/2011	**430**	**220**	**250**	**591**	**6,700**	µg/L	-74.5	0.08
	SVE-25	Q2	5/31/2011	**390**	**330**	**200**	**490**	**6,100**	µg/L	-46.8	0.17
	SVE-25-022411	Q1	2/24/2011	**400**	**370**	**200**	**440**	**6,900**	µg/L	-82.5	0.34
	SVE-25-052010	Interim	5/20/2010	**360**	**130**	**150**	**109**	**2,800**	µg/L	-177.9	0.91
SVE-26	SVE-26	Q26	5/24/2017	< 1.0	< 1.0	< 1.0	< 1.0	< 100	µg/L	302.3	1.41
	SVE-26	Q25	2/23/2017	< 1.0	< 1.0	< 1.0	< 1.0	< 100	µg/L	171.4	0.29
	SVE-26	Q24	11/16/2016	< 1.0	< 1.0	< 1.0	< 1.0	< 100	µg/L	-52.4	0.21
	SVE-26	Q23	8/25/2016	< 1.0	< 1.0	< 1.0	< 1.0	< 100	µg/L	101.4	0.20
	SVE-26	Q22	5/24/2016	< 1.0	< 1.0	< 1.0	< 1.0	< 100	µg/L	36.2	4.41
	SVE-26	Q21	2/25/2016	< 1.0	< 1.0	< 1.0	< 1.0	< 100	µg/L	59.6	5.79
	SVE-26	Q20	11/19/2015	< 1.0	< 1.0	< 1.0	< 1.0	< 100	µg/L	-44.1	17.93
	SVE-26	Q19	8/26/2015	< 1.0	< 1.0	< 1.0	< 1.0	< 100	µg/L	-42.5	0.19
	SVE-26	Q18	5/28/2015	< 1.0	< 1.0	< 1.0	< 2.0	< 100	µg/L	-9.4	1.1
	SVE-26	Q17	2/26/2015	< 1.0	< 1.0	< 1.0	< 2.0	< 100	µg/L	-51.9	6.01
	SVE-26	Q16	11/19/2014	< 1.0	< 1.0	< 1.0	< 2.0	< 100	µg/L	-15.1	0.11
	SVE-26	Q15	8/28/2014	< 1.0	< 1.0	< 1.0	< 2.0	< 100	µg/L	-48	0.21
	SVE-26	Q14	5/27/2014	< 1.0	< 1.0	< 1.0	< 2.0	< 100	µg/L	-111	1.02
	SVE-26	Q13	2/24/2014	< 1.0	< 1.0	< 1.0	< 2.0	**130**	µg/L	-66.4	0.59
	SVE-26	Q12	11/25/2013	**1.4**	< 1.0	< 1.0	< 2.0	**170**	µg/L	-104.3	0.35
	SVE-26	Q11	8/29/2013	**2.7**	< 1.0	< 1.0	< 1.0	**180**	µg/L	0.6	0.29
	SVE-26	Q10	5/29/2013	**1.4**	< 1.0	< 1.0	< 2.0	**130**	µg/L	-31.2	0.26
	SVE-26	Q9	2/27/2013	< 1.0	< 1.0	**1.6**	< 2.0	**170**	µg/L	-30	0.87
	SVE-26	Q8	11/26/2012	< 1.0	< 1.0	**4.8**	**4.8**	**270**	µg/L	-64.5	0.03
	SVE-26-082912	Q7	8/29/2012	**7.6**	< 1.0	**20**	**26**	**520**	µg/L	-24.4	0.32
	SVE-26-053012	Q6	5/30/2012	**250**	**54**	**260**	**161**	**3,700**	µg/L	-225.6	0.28
	SVE-26-022912	Q5	2/29/2012	**99**	**21**	**84**	**91**	**1,400**	µg/L	-60.4	1.17
	SVE-26-112911	Q4	11/29/2011	**180**	**86**	**91**	**200**	**2,600**	µg/L	-116	0.70
	SVE-26-083011	Q3	8/30/2011	**170**	**100**	**81**	**180**	**2,200**	µg/L	-54	0.21
	SVE-26	Q2	5/31/2011	**150**	**96**	**28**	**61**	**990**	µg/L	-25.7	0.49
	SVE-26-022411	Q1	2/24/2011	**11**	**2.3**	**1.1**	**11**	**270**	µg/L	-84	0.21
	SVE-26-052010	Interim	5/20/2010	< 4.0	< 4.0	< 4.0	< 4.0	< 400	µg/L	-149.9	1.90

TABLE 2
HISTORICAL GROUNDWATER ANALYTICAL RESULTS

Well Number	Sample ID	Quarter	Date Collected	BTEX				TPH - Gasoline	Units	Field Measurements	
				Benzene	Toluene	Ethylbenzene	Xylenes			ORP	DO
SW-25	SW-25	Q26	5/26/2017	< 1.0	< 1.0	< 1.0	< 1.0	< 100	µg/L	*	*
	**	Q25	**	**	**	**	**	**	**	**	**
	SW-25	Q24	11/18/2016	< 1.0	< 1.0	< 1.0	< 1.0	< 100	µg/L	*	*
	SW-25	Q23	8/29/2016	< 4.0	< 4.0	< 4.0	< 4.0	< 400	µg/L	*	*
	SW-25	Q22	5/26/2016	< 1.0	**2.9**	< 1.0	< 1.0	< 100	µg/L	*	*
	SW-25	Q21	2/26/2016	< 1.0	< 1.0	< 1.0	< 1.0	< 100	µg/L	*	*
	SW-25	Q20	11/19/2015	< 1.0	< 1.0	< 1.0	< 1.0	< 100	µg/L	*	*
	SW-25	Q19	8/28/2015	< 1.0	< 1.0	< 1.0	< 1.0	< 100	µg/L	*	*
	SW-25	Q18	5/29/2015	< 1.0	< 1.0	< 1.0	< 2.0	< 100	µg/L	104.8	3.41
	SW-25	Q17	3/3/2015	< 1.0	< 1.0	< 1.0	< 2.0	< 100	µg/L	108.4	9.41
	SW-25	Q16	11/21/2014	< 1.0	< 1.0	< 1.0	< 2.0	< 100	µg/L	102.1	1.39
	SW-25	Q15	8/29/2014	< 1.0	< 1.0	< 1.0	< 2.0	< 100	µg/L	61.2	2.11
	SW-25	Q14	5/28/2014	< 1.0	< 1.0	< 1.0	< 2.0	< 100	µg/L	71.8	1.02
	SW-25	Q13	2/25/2014	< 1.0	< 1.0	< 1.0	< 2.0	< 100	µg/L	86.4	0.88
	SW-25	Q12	11/26/2013	< 1.0	< 1.0	< 1.0	< 2.0	< 100	µg/L	118.2	2.01
	SW-25	Q11	8/30/2013	< 1.0	< 1.0	< 1.0	< 2.0	< 100	µg/L	37.2	1.1
	SW-25	Q10	5/30/2013	< 1.0	< 1.0	< 1.0	< 2.0	< 100	µg/L	110.6	5.61
	SW-25	Q9	2/27/2013	< 1.0	< 1.0	< 1.0	< 2.0	< 100	µg/L	60.5	2.04
	SW-25	Q8	11/26/2012	< 1.0	< 1.0	< 1.0	< 2.0	< 100	µg/L	78.9	4.03
	SW-25-083012	Q7	8/30/2012	< 1.0	< 1.0	< 1.0	< 2.0	< 100	µg/L	10.7	2.76
	SW-25-053112	Q6	5/31/2012	< 1.0	< 1.0	< 1.0	< 2.0	< 100	µg/L	-138.6	3.07
	SW-25-022912	Q5	2/29/2012	< 1.0	< 1.0	< 1.0	< 2.0	< 100	µg/L	66.2	8.51
	SW-25-120911	Q4	12/9/2011	< 1.0	< 1.0	< 1.0	< 2.0	< 100	µg/L	81.7	3.14
	SW-25-083011	Q3	8/30/2011	< 1.0	< 1.0	< 1.0	< 2.0	< 100	µg/L	0.8	3.41
	SW-25	Q2	5/31/2011	< 1.0	< 1.0	< 1.0	< 2.0	< 100	µg/L	31.7	4.84
	SW-25-022411	Q1	2/24/2011	< 1.0	< 1.0	< 1.0	< 2.0	< 100	µg/L	-10.9	5.46
	SW-25-110510	Interim	11/5/2010	< 1.0	< 1.0	< 1.0	< 2.0	< 100	µg/L	-14	3.58
	SW-25-043010	Interim	4/30/2010	< 1.0	< 1.0	< 1.0	< 2.0	< 100	µg/L	-85.3	2.17
SW-26	SW-26	Q26	5/24/2017	< 1.0	< 1.0	< 1.0	< 1.0	< 100	µg/L	231.4	0.42
	SW-26	Q25	2/22/2017	< 1.0	< 1.0	< 1.0	< 1.0	< 100	µg/L	55.2	0.15
	SW-26	Q24	11/16/2016	< 1.0	< 1.0	< 1.0	< 1.0	< 100	µg/L	-38.7	0.38
	SW-26	Q23	8/25/2016	< 1.0	< 1.0	< 1.0	< 1.0	< 100	µg/L	479.4	0.68
	SW-26	Q22	5/24/2016	< 1.0	**2.9**	< 1.0	< 1.0	< 100	µg/L	-3.4	0.24
	SW-26	Q21	2/25/2016	< 1.0	< 1.0	< 1.0	< 1.0	< 100	µg/L	-21.7	0.19
	SW-26	Q20	11/19/2015	< 1.0	< 1.0	< 1.0	< 1.0	< 100	µg/L	-31.0	3.35
	SW-26	Q19	8/26/2015	< 1.0	< 1.0	< 1.0	< 1.0	< 100	µg/L	-30.0	0.66
	SW-26	Q18	5/28/2015	< 1.0	< 1.0	< 1.0	< 2.0	< 100	µg/L	26.4	0.68
	SW-26	Q17	2/26/2015	< 1.0	< 1.0	< 1.0	< 2.0	< 100	µg/L	-51.9	6.01
	SW-26	Q16	11/19/2014	< 1.0	< 1.0	< 1.0	< 2.0	< 100	µg/L	-4.8	0.20
	SW-26	Q15	8/28/2014	< 1.0	< 1.0	< 1.0	< 2.0	< 100	µg/L	-57.8	0.17
	SW-26	Q14	5/27/2014	< 1.0	< 1.0	< 1.0	< 2.0	< 100	µg/L	-50.1	1.03
	SW-26	Q13	2/25/2014	< 1.0	< 1.0	< 1.0	< 2.0	< 100	µg/L	-50.2	0.75
	SW-26	Q12	11/25/2013	< 1.0	< 1.0	< 1.0	< 2.0	< 100	µg/L	-52.0	5.71
	SW-26	Q11	8/29/2013	< 1.0	< 1.0	< 1.0	< 2.0	< 100	µg/L	-18.1	5.51
	SW-26	Q10	5/29/2013	< 1.0	< 1.0	< 1.0	< 2.0	< 100	µg/L	-48.2	5.63
	SW-26	Q9	2/27/2013	< 1.0	< 1.0	< 1.0	< 2.0	< 100	µg/L	-70.2	1.32
	SW-26	Q8	11/26/2012	< 1.0	< 1.0	< 1.0	< 2.0	< 100	µg/L	-37.6	5.18
	SW-26-082912	Q7	8/29/2012	< 1.0	< 1.0	< 1.0	< 2.0	< 100	µg/L	21.0	5.15
	SW-26-053012	Q6	5/30/2012	**3.1**	< 1.0	**2.2**	**1.1**	**230**	µg/L	-206.7	2.86
	SW-26-022912	Q5	2/29/2012	< 1.0	< 1.0	< 1.0	< 2.0	< 100	µg/L	-69.6	1.15
	SW-26-112911	Q4	11/29/2011	< 1.0	< 1.0	< 1.0	< 2.0	< 100	µg/L	-93.0	0.70
	SW-26-083011	Q3	8/30/2011	< 1.0	< 1.0	< 1.0	< 2.0	< 100	µg/L	-11.5	4.08
	SW-26	Q2	5/31/2011	< 1.0	< 1.0	< 1.0	< 2.0	< 100	µg/L	20.8	0.8
	SW-26-022411	Q1	2/24/2011	< 1.0	< 1.0	< 1.0	< 2.0	< 100	µg/L	-66.3	2.22
	SW-26-110510	Interim	11/5/2010	**5.5**	< 1.0	**1.0**	< 2.0	< 100	µg/L	-103	1.09
	SW-26-043010	Interim	4/30/2010	**5.5**	< 4.0	< 4.0	< 8.0	< 400	µg/L	-152	0.85
SW-27	SW-27	Q26	5/24/2017	< 1.0	< 1.0	< 1.0	< 1.0	< 100	µg/L	309.4	0.31
	SW-27	Q25	2/22/2017	< 1.0	< 1.0	< 1.0	< 1.0	< 100	µg/L	-5.7	0.30
	SW-27	Q24	11/17/2016	< 4.0	< 4.0	< 4.0	< 4.0	< 400	µg/L	8.3	2.14
	SW-27	Q23	8/25/2016	< 4.0	< 4.0	< 4.0	< 4.0	< 400	µg/L	*	*
	SW-27	Q22	5/24/2016	< 1.0	< 1.0	< 1.0	< 1.0	< 100	µg/L	*	*
	SW-27	Q21	2/25/2016	< 1.0	< 1.0	< 1.0	< 1.0	< 100	µg/L	*	*
	SW-27	Q20	11/19/2015	< 1.0	< 1.0	< 1.0	< 1.0	< 100	µg/L	*	*
	SW-27	Q19	8/26/2015	< 1.0	< 1.0	< 1.0	< 1.0	< 100	µg/L	*	*
	SW-27	Q18	5/28/2015	< 1.0	< 1.0	< 1.0	< 2.0	< 100	µg/L	*	*
	SW-27	Q17	2/26/2015	< 1.0	< 1.0	< 1.0	< 2.0	< 100	µg/L	*	*
	SW-27	Q16	11/19/2014	< 1.0	< 1.0	< 1.0	< 2.0	< 100	µg/L	*	*
	SW-27	Q15	8/28/2014	< 4.0	< 4.0	< 4.0	< 8.0	< 400	µg/L	*	*
	SW-27	Q14	5/27/2014	< 1.0	< 1.0	< 1.0	< 2.0	< 100	µg/L	*	*
	SW-27	Q13	2/24/2014	< 1.0	< 1.0	< 1.0	< 2.0	< 100	µg/L	*	*
	SW-27	Q12	11/25/2013	< 1.0	< 1.0	< 1.0	< 2.0	< 100	µg/L	*	*
	SW-27	Q11	8/29/2013	< 1.0	< 1.0	< 1.0	< 2.0	< 100	µg/L	*	*
	SW-27	Q10	5/29/2013	< 1.0	< 1.0	< 1.0	< 2.0	< 100	µg/L	79.1	8.72
	SW-27	Q9	2/27/2013	< 1.0	< 1.0	< 1.0	< 2.0	< 100	µg/L	22.4	4.56
	SW-27	Q8	11/27/2012	< 1.0	< 1.0	< 1.0	< 2.0	< 100	µg/L	15.4	0.41
	SW-27-082912	Q7	8/29/2012	< 1.0	< 1.0	< 1.0	< 2.0	< 100	µg/L	19.3	3.38
	SW-27-053112	Q6	5/31/2012	< 1.0	< 1.0	< 1.0	< 2.0	< 100	µg/L	-165.8	2.3

TABLE 2
HISTORICAL GROUNDWATER ANALYTICAL RESULTS

Well Number	Sample ID	Quarter	Date Collected	BTEX				TPH - Gasoline	Units	Field Measurements	
				Benzene	Toluene	Ethylbenzene	Xylenes			ORP	DO
SW-27	SW-27-022912	Q5	2/29/2012	< 1.0	< 1.0	< 1.0	< 2.0	< 100	µg/L	24.2	1.93
	SW-27-112911	Q4	11/29/2011	< 1.0	< 1.0	< 1.0	< 2.0	< 100	µg/L	-1.0	6.2
	SW-27-083011	Q3	8/30/2011	< 1.0	< 1.0	< 1.0	< 2.0	< 100	µg/L	39.9	4.41
	SW-27	Q2	5/31/2011	**1.5**	< 1.0	< 1.0	< 2.0	< 100	µg/L	32.7	0.6
	SW-27-022411	Q1	2/24/2011	**2.1**	< 1.0	< 1.0	< 2.0	< 100	µg/L	-26.4	0.33
	SW-27-110510	Interim	11/5/2010	**8.0**	< 1.0	< 1.0	< 2.0	< 100	µg/L	-157	0
	SW-27-043010	Interim	4/30/2010	**4.5**	< 1.0	< 1.0	< 2.0	< 100	µg/L	-99.2	0.67
MTCA Method A Cleanup Levels				5	1,000	700	1,000	800/1,000 [1]	µg/L	NA	NA

Notes:

[1] Cleanup level for gasoline is 800 micrograms per liter (µg/L) if benzene is present; 1,000 µg/L if no detectable benzene in groundwater.

* = Parameters could not be collected due to pump modification; bailer used to collect samples.

** = Well not monitored/sampled due to change in site conditions preventing safe access to the well.

< = less than reporting limit indicated

Bolded text indicates analyte detected.

Shaded text indicates concentration exceeds state cleanup criterion.

BTEX = benzene, toluene, ethylbenzene, and xylenes

DO = dissolved oxygen in milligrams per liter

ID = identification

MTCA = Model Toxics Control Act

NA = not applicable

ORP = oxygen reduction potential in millivolts

SVE = soil vapor extraction

TPH = total petroleum hydrocarbons

TABLE 3
GROUNDWATER ELEVATIONS

Well Number	Date	TOC Elevation	DTW	Groundwater Elevation
SVE-13	5/30/2017	79.67	27.25	52.42
	2/24/2017	79.67	26.83	52.84
	11/18/2016	79.67	27.32	52.35
	8/29/2016	79.67	29.62	50.05
	5/26/2016	79.67	29.28	50.39
	2/26/2016	79.67	27.42	52.25
	11/20/2015	79.67	28.20	51.47
	8/28/2015	79.67	29.19	50.48
	5/29/2015	79.67	28.78	50.89
	2/27/2015	79.67	27.95	51.72
	11/21/2014	79.67	28.55	51.12
	8/29/2014	79.67	29.98	49.69
	5/28/2014	79.67	28.73	50.94
	2/25/2014	79.67	27.25	52.42
	11/26/2013	79.67	28.30	51.37
	8/30/2013	79.67	*	*
	5/30/2013	79.67	25.43	54.24
	2/27/2013	79.67	26.21	53.46
	11/26/2012	79.67	26.66	53.01
	8/30/2012	79.67	28.22	51.45
	5/30/2012	79.67	26.90	52.77
	2/29/2012	79.67	26.28	53.39
	11/29/2011	79.67	26.66	53.01
	8/30/2011	79.67	26.89	52.78
	5/27/2011	79.67	25.40	54.27
	2/24/2011	79.67	24.79	54.88
	5/20/2010	79.67	28.17	51.50
SVE-16	5/26/2017	51.67	6.01	45.66
	2/24/2017	51.67	5.62	46.05
	11/18/2016	51.67	6.03	45.64
	8/29/2016	51.67	7.52	44.15
	5/25/2016	51.67	8.00	43.67
	2/26/2016	51.67	6.21	45.46
	11/19/2015	51.67	8.63	43.04
	8/28/2015	51.67	8.63	43.04
	5/28/2015	51.67	8.63	43.04
	2/27/2015	51.67	8.52	43.15
	11/21/2014	51.67	7.60	44.07
	8/29/2014	51.67	8.55	43.12
	5/28/2014	51.67	8.31	43.36
	2/25/2014	51.67	8.13	43.54
	11/25/2013	51.67	9.25	42.42
	8/30/2013	51.67	8.80	42.87
	5/30/2013	51.67	8.00	43.67
	2/27/2013	51.67	7.44	44.23
	11/27/2012	51.67	6.94	44.73
	8/30/2012	51.67	8.64	43.03
	5/31/2012	51.67	7.91	43.76
	2/29/2012	51.67	7.53	44.14
	11/29/2011	51.67	7.88	43.79
	8/30/2011	51.67	7.55	44.12
	5/27/2011	51.67	6.03	45.64
	2/24/2011	51.67	6.73	44.94
	5/20/2010	51.67	7.02	44.65

TABLE 3
GROUNDWATER ELEVATIONS

Well Number	Date	TOC Elevation	DTW	Groundwater Elevation
SVE-17	5/25/2017	51.67	8.21	43.46
	2/24/2017	51.67	7.81	43.86
	11/18/2016	51.67	8.62	43.05
	8/26/2016	51.67	9.91	41.76
	5/25/2016	51.67	10.22	41.45
	2/26/2016	51.67	8.67	43.00
	11/19/2015	51.67	9.30	42.37
	8/26/2015	51.67	10.20	41.47
	5/28/2015	51.67	10.78	40.89
	2/27/2015	51.67	10.98	40.69
	11/21/2014	51.67	10.25	41.42
	8/28/2014	51.67	11.48	40.19
	5/28/2014	51.67	**	**
	2/25/2014	51.67	11.25	40.42
	11/25/2013	51.67	11.68	39.99
	8/30/2013	51.67	11.05	40.62
	5/30/2013	51.67	10.03	41.64
	2/27/2013	51.67	9.68	41.99
	11/26/2012	51.67	10.22	41.45
	8/30/2012	51.67	10.98	40.69
	5/31/2012	51.67	10.73	40.94
	2/29/2012	51.67	10.53	41.14
	11/29/2011	51.67	10.94	40.73
	8/30/2011	51.67	10.27	41.40
	5/27/2011	51.67	9.40	42.27
	2/24/2011	51.67	9.41	42.26
	5/20/2010	51.67	9.54	42.13
SVE-19	5/25/2017	51.67	11.34	40.33
	2/24/2017	51.67	11.15	40.52
	11/17/2016	51.67	12.17	39.50
	8/26/2016	51.67	12.98	38.69
	5/25/2016	51.67	13.00	38.67
	2/25/2016	51.67	11.68	39.99
	11/19/2015	51.67	12.13	39.54
	8/26/2015	51.67	14.13	37.54
	5/28/2015	51.67	14.20	37.47
	2/26/2015	51.67	15.12	36.55
	11/19/2014	51.67	14.02	37.65
	8/28/2014	51.67	15.05	36.62
	5/27/2014	51.67	14.40	37.27
	2/25/2014	51.67	14.63	37.04
	11/25/2013	51.67	14.76	36.91
	8/30/2013	51.67	13.93	37.74
	5/30/2013	51.67	13.02	38.65
	2/26/2013	51.67	12.48	39.19
	11/26/2012	51.67	13.01	38.66
	8/30/2012	51.67	13.58	38.09
	5/31/2012	51.67	13.24	38.43
	2/29/2012	51.67	13.42	38.25
	11/29/2011	51.67	13.70	37.97
	8/30/2011	51.67	13.04	38.63
	5/27/2011	51.67	12.38	39.29
	2/24/2011	51.67	12.41	39.26
	5/20/2010	51.67	12.94	38.73

TABLE 3
GROUNDWATER ELEVATIONS

Well Number	Date	TOC Elevation	DTW	Groundwater Elevation
SVE-20	5/25/2017	51.67	12.28	39.39
	2/23/2017	51.67	12.65	39.02
	11/17/2016	51.67	13.27	38.40
	8/26/2016	51.67	13.61	38.06
	5/25/2016	51.67	14.12	37.55
	2/25/2016	51.67	12.71	38.96
	11/19/2015	51.67	14.30	37.37
	8/26/2015	51.67	15.92	35.75
	5/28/2015	51.67	15.95	35.72
	2/26/2015	51.67	17.05	34.62
	11/19/2014	51.67	15.28	36.39
	8/28/2014	51.67	15.99	35.68
	5/27/2014	51.67	15.65	36.02
	2/24/2014	51.67	16.31	35.36
	11/25/2013	51.67	16.28	35.39
	8/30/2013	51.67	15.10	36.57
	5/29/2013	51.67	14.50	37.17
	2/26/2013	51.67	14.05	37.62
	11/26/2012	51.67	14.17	37.50
	8/30/2012	51.67	14.72	36.95
	5/30/2012	51.67	14.93	36.74
	2/29/2012	51.67	14.85	36.82
	11/29/2011	51.67	15.33	36.34
	8/30/2011	51.67	14.61	37.06
	5/27/2011	51.67	14.01	37.66
	2/24/2011	51.67	12.14	39.53
	5/20/2010	51.67	14.58	37.09
SVE-23	5/25/2017	51.67	13.45	38.22
	2/23/2017	51.67	13.66	38.01
	11/17/2016	51.67	14.50	37.17
	8/26/2016	51.67	14.68	36.99
	5/25/2016	51.67	15.51	36.16
	2/25/2016	51.67	13.97	37.70
	11/19/2015	51.67	14.70	36.97
	8/26/2015	51.67	15.99	35.68
	5/28/2015	51.67	16.97	34.70
	2/26/2015	51.67	16.25	35.42
	11/19/2014	51.67	16.30	35.37
	8/28/2014	51.67	16.98	34.69
	5/27/2014	51.67	17.12	34.55
	2/24/2014	51.67	17.58	34.09
	11/25/2013	51.67	17.50	34.17
	8/29/2013	51.67	16.51	35.16
	5/29/2013	51.67	15.77	35.90
	2/26/2013	51.67	15.74	35.93
	11/26/2012	51.67	15.68	35.99
	8/30/2012	51.67	16.00	35.67
	5/31/2012	51.67	15.71	35.96
	2/29/2012	51.67	15.90	35.77
	11/29/2011	51.67	16.05	35.62
	8/30/2011	51.67	15.22	36.45
	5/27/2011	51.67	15.05	36.62
	2/24/2011	51.67	14.82	36.85
	5/20/2010	51.67	15.41	36.26

TABLE 3
GROUNDWATER ELEVATIONS

Well Number	Date	TOC Elevation	DTW	Groundwater Elevation
SVE-24	5/24/2017	51.67	14.10	37.57
	2/22/2017	51.67	14.23	37.44
	11/17/2016	51.67	15.24	36.43
	8/25/2016	51.67	15.34	36.33
	5/24/2016	51.67	15.77	35.90
	2/25/2016	51.67	13.80	37.87
	11/19/2015	51.67	15.01	36.66
	8/26/2015	51.67	16.01	35.66
	5/28/2015	51.67	17.13	34.54
	2/26/2015	51.67	15.92	35.75
	11/19/2014	51.67	16.94	34.73
	8/28/2014	51.67	17.90	33.77
	5/27/2014	51.67	18.20	33.47
	2/24/2014	51.67	18.60	33.07
	11/25/2013	51.67	18.44	33.23
	8/29/2013	51.67	17.17	34.50
	5/29/2013	51.67	16.00	35.67
	2/26/2013	51.67	15.57	36.10
	11/26/2012	51.67	16.43	35.24
	8/29/2012	51.67	17.52	34.15
	5/30/2012	51.67	16.58	35.09
	2/29/2012	51.67	16.51	35.16
	11/29/2011	51.67	17.23	34.44
	8/30/2011	51.67	16.29	35.38
	5/31/2011	51.67	16.31	35.36
	2/24/2011	51.67	16.16	35.51
	5/20/2010	51.67	17.59	34.08
SVE-25	5/25/2017	51.67	13.82	37.85
	2/23/2017	51.67	13.51	38.16
	11/17/2016	51.67	14.35	37.32
	8/25/2016	51.67	13.98	37.69
	5/24/2016	51.67	15.10	36.57
	2/25/2016	51.67	12.82	38.85
	11/19/2015	51.67	13.40	38.27
	8/26/2015	51.67	16.62	35.05
	5/28/2015	51.67	16.62	35.05
	2/26/2015	51.67	15.02	36.65
	11/19/2014	51.67	15.85	35.82
	8/28/2014	51.67	16.20	35.47
	5/27/2014	51.67	17.23	34.44
	2/24/2014	51.67	17.34	34.33
	11/25/2013	51.67	17.65	34.02
	8/29/2013	51.67	16.17	35.50
	5/29/2013	51.67	13.00	38.67
	2/27/2013	51.67	14.44	37.23
	11/26/2012	51.67	14.56	37.11
	8/29/2012	51.67	16.08	35.59
	5/30/2012	51.67	15.16	36.51
	2/29/2012	51.67	14.93	36.74
	11/29/2011	51.67	15.61	36.06
	8/30/2011	51.67	14.53	37.14
	5/31/2011	51.67	14.95	36.72
	2/24/2011	51.67	14.78	36.89
	5/20/2010	51.67	16.00	35.67

TABLE 3
GROUNDWATER ELEVATIONS

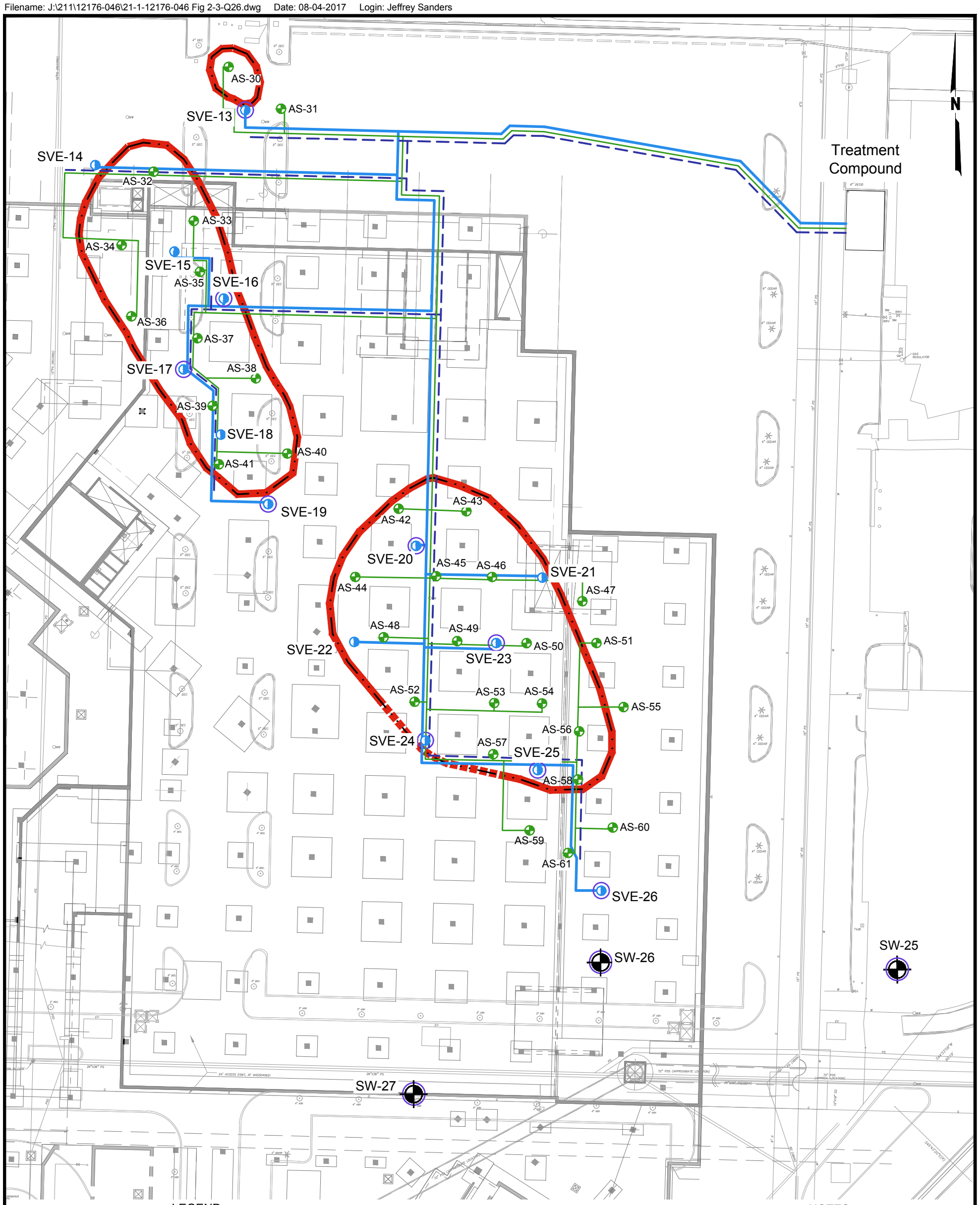
Well Number	Date	TOC Elevation	DTW	Groundwater Elevation
SVE-26	5/24/2017	46.67	10.41	36.26
	2/23/2017	46.67	8.41	38.26
	11/16/2016	46.67	6.20	40.47
	8/25/2016	46.67	8.56	38.11
	5/24/2016	46.67	10.25	36.42
	2/25/2016	46.67	7.21	39.46
	11/19/2015	46.67	9.30	37.37
	8/26/2015	46.67	10.33	36.34
	5/28/2015	46.67	13.53	33.14
	2/26/2015	46.67	11.10	35.57
	11/19/2014	46.67	11.40	35.27
	8/28/2014	46.67	9.65	37.02
	5/27/2014	46.67	13.80	32.87
	2/24/2014	46.67	12.32	34.35
	11/25/2013	46.67	13.73	32.94
	8/29/2013	46.67	14.18	32.49
	5/29/2013	46.67	10.91	35.76
	2/27/2013	46.67	10.92	35.75
	11/26/2012	46.67	8.77	37.90
	8/29/2012	46.67	11.41	35.26
	5/30/2012	46.67	10.20	36.47
	2/29/2012	46.67	10.32	36.35
	11/29/2011	46.67	10.40	36.27
	8/30/2011	46.67	9.58	37.09
	5/31/2011	46.67	10.66	36.01
	2/24/2011	46.67	10.99	35.68
	5/20/2010	46.67	12.83	33.84
SW-25	5/26/2017	80.25	63.46	16.79
	2/24/2017	*	*	*
	11/18/2016	80.25	63.05	17.20
	8/29/2016	80.25	64.70	15.55
	5/26/2016	80.25	66.50	13.75
	2/26/2016	80.25	67.21	13.04
	11/20/2015	80.25	63.37	16.88
	8/28/2015	80.25	65.37	14.88
	5/29/2015	80.25	65.45	14.80
	3/3/2015	80.25	63.08	17.17
	11/21/2014	80.25	64.95	15.30
	8/29/2014	80.25	67.35	12.90
	5/28/2014	80.25	70.80	9.45
	2/25/2014	80.25	69.90	10.35
	11/26/2013	80.25	63.40	16.85
	8/30/2013	80.25	63.10	17.15
	5/30/2013	80.25	63.45	16.80
	2/27/2013	80.25	61.34	18.91
	11/26/2012	80.25	61.60	18.65
	8/30/2012	80.25	61.67	18.58
	5/31/2012	80.25	60.81	19.44
	2/29/2012	80.25	59.92	20.33
	12/9/2011	80.25	56.89	23.36
	8/30/2011	80.25	61.97	18.28
	5/31/2011	80.25	59.20	21.05
	2/24/2011	80.25	58.23	22.02
	11/2/2010	80.25	58.04	22.21
	4/30/2010	80.25	56.04	24.21

TABLE 3
GROUNDWATER ELEVATIONS

Well Number	Date	TOC Elevation	DTW	Groundwater Elevation
SW-26	5/24/2017	46.60	16.92	29.68
	2/22/2017	46.60	14.41	32.19
	11/16/2016	46.60	14.58	32.02
	8/25/2016	46.60	14.60	32.00
	5/24/2016	46.60	16.12	30.48
	2/25/2016	46.60	14.90	31.70
	11/19/2015	46.60	14.50	32.10
	8/26/2015	46.60	16.51	30.09
	5/28/2015	46.60	20.38	26.22
	2/26/2015	46.60	17.75	28.85
	11/19/2014	46.60	18.10	28.50
	8/28/2014	46.60	16.05	30.55
	5/27/2014	46.60	20.61	25.99
	2/25/2014	46.60	18.57	28.03
	11/25/2013	46.60	19.41	27.19
	8/29/2013	46.60	19.31	27.29
	5/29/2013	46.60	17.65	28.95
	2/27/2013	46.60	17.83	28.77
	11/26/2012	46.60	13.84	32.76
	8/29/2012	46.60	18.02	28.58
	5/30/2012	46.60	19.25	27.35
	2/29/2012	46.60	19.23	27.37
	11/29/2011	46.60	19.29	27.31
	8/30/2011	46.60	20.09	26.51
	5/31/2011	46.60	20.52	26.08
	2/24/2011	46.60	20.02	26.58
	11/2/2010	46.60	13.67	32.93
	4/30/2010	46.60	22.07	24.53
SW-27	5/24/2017	51.65	25.51	26.14
	2/22/2017	51.65	23.57	28.08
	11/17/2016	51.65	24.61	27.04
	8/25/2016	51.65	23.50	28.15
	5/24/2016	51.65	25.91	25.74
	2/25/2016	51.65	25.80	25.85
	11/19/2015	51.65	23.20	28.45
	8/26/2015	51.65	24.60	27.05
	5/28/2015	51.65	28.10	23.55
	2/26/2015	51.65	25.23	26.42
	11/19/2014	51.65	27.16	24.49
	8/28/2014	51.65	25.95	25.70
	5/27/2014	51.65	25.05	26.60
	2/24/2014	51.65	25.57	26.08
	11/25/2013	51.65	26.30	25.35
	8/29/2013	51.65	28.20	23.45
	5/29/2013	51.65	22.50	29.15
	2/27/2013	51.65	22.82	28.83
	11/26/2012	51.65	22.25	29.40
	8/29/2012	51.65	23.85	27.80
	5/31/2012	51.65	24.20	27.45
	2/29/2012	51.65	23.68	27.97
	11/29/2011	51.65	23.21	28.44
	8/30/2011	51.65	22.36	29.29
	5/31/2011	51.65	23.12	28.53
	2/24/2011	51.65	23.57	28.08
	11/2/2010	51.65	23.64	28.01
	4/30/2010	51.65	23.39	28.26

Notes:
* = Not sampled due to Mercer Street construction activities.
** = Data missing due to malfunction.
Elevations are in feet (North America Vertical Datum [NAVD] 88)
DTW = depth to water
SVE = soil vapor extraction
TOC = top of well casing

Filename: J:\211\12176-046\21-1-12176-046 Fig 2-3-Q26.dwg Date: 08-04-2017 Login: Jeffrey Sanders



LEGEND

- SVE (Soil Vapor Extraction) Well
- AS (Air Sparging) Well
- Well Selected for Groundwater Monitoring
- Compliance Monitoring Well
- Estimated Baseline Extent of Benzene in Soil >0.3 mg/kg (January-March 2008)
- SVE Piping (Multiple Pipes)
- AS Piping (Multiple Pipes)
- Fugitive Vapor Collection Piping

0 40 80

Scale in Feet

NOTES

1. Well locations and piping are adapted from as-built drawing provided by Sellen Construction, received 5-18-2011.
2. Figure adapted from electronic files provided by Aspect Consulting and KPFF, dated March 2008 and March 2011.
3. Well AS-30 was decommissioned in May 2013.

Phase 2 Remediation Monitoring - 26th Quarter
Seattle Center Lot No. 2
Seattle, Washington

SITE PLAN

September 2017 21-1-12176-046

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FIG. 1

FIG. 1

Filename: J:\211\12176-046\21-1-12176-046 Fig 2-3-Q26.dwg Date: 08-04-2017 Login: Jeffrey Sanders

SVE-13	02-24-17	05-30-17
TPH-G	ND	ND
B	ND	ND

SVE-16	02-24-17	05-26-17
TPH-G	ND	ND
B	ND	ND

SVE-17	02-24-17	05-25-17
TPH-G	ND	ND
B	ND	ND

SVE-19	02-24-17	05-25-17
TPH-G	ND	290
B	ND	ND

SVE-20	02-23-17	05-25-17
TPH-G	ND	510
B	ND	ND

SVE-23	02-23-17	05-25-17
TPH-G	2700	4100
B	ND	ND

SVE-24	02-22-17	05-24-17
TPH-G	160	ND
B	2.9	ND

SVE-25	02-23-17	05-25-17
TPH-G	ND	ND
B	10	ND

SVE-26	02-23-17	05-24-17
TPH-G	ND	ND
B	ND	ND

SW-26	02-22-17	05-24-17
TPH-G	ND	ND
B	ND	ND

SW-25	*	05-26-17
TPH-G	*	ND
B	*	ND

SW-27	02-22-17	05-24-17
TPH-G	ND	ND
B	ND	ND

Treatment Compound

N

LEGEND

- SVE (Soil Vapor Extraction) Well
- AS (Air Sparging) Well
- Well Selected for Groundwater Monitoring
- Compliance Monitoring Well
- Estimated Baseline Extent of Benzene in Soil >0.3 mg/kg (January-March 2008)
- SVE Piping (Multiple Pipes)
- AS Piping (Multiple Pipes)
- Fugitive Vapor Collection Piping

CONCENTRATIONS LEGEND

TPH-G	Gasoline-Range Hydrocarbons
B	Benzene
µg/L	Micrograms per Liter
ND	Not Detected
*	Not Sampled in February 2017

0 40 80

Scale in Feet

NOTES

1. Well locations and piping are adapted from as-built drawing provided by Sellen Construction, received 5-18-2011.
2. Figure adapted from electronic files provided by Aspect Consulting and KPFF, dated March 2008 and March 2011.
3. Well AS-30 was decommissioned in May 2013.

Phase 2 Remediation Monitoring - 26th Quarter
Seattle Center Lot No. 2
Seattle, Washington

TPH-G AND BENZENE CONCENTRATIONS IN GROUNDWATER

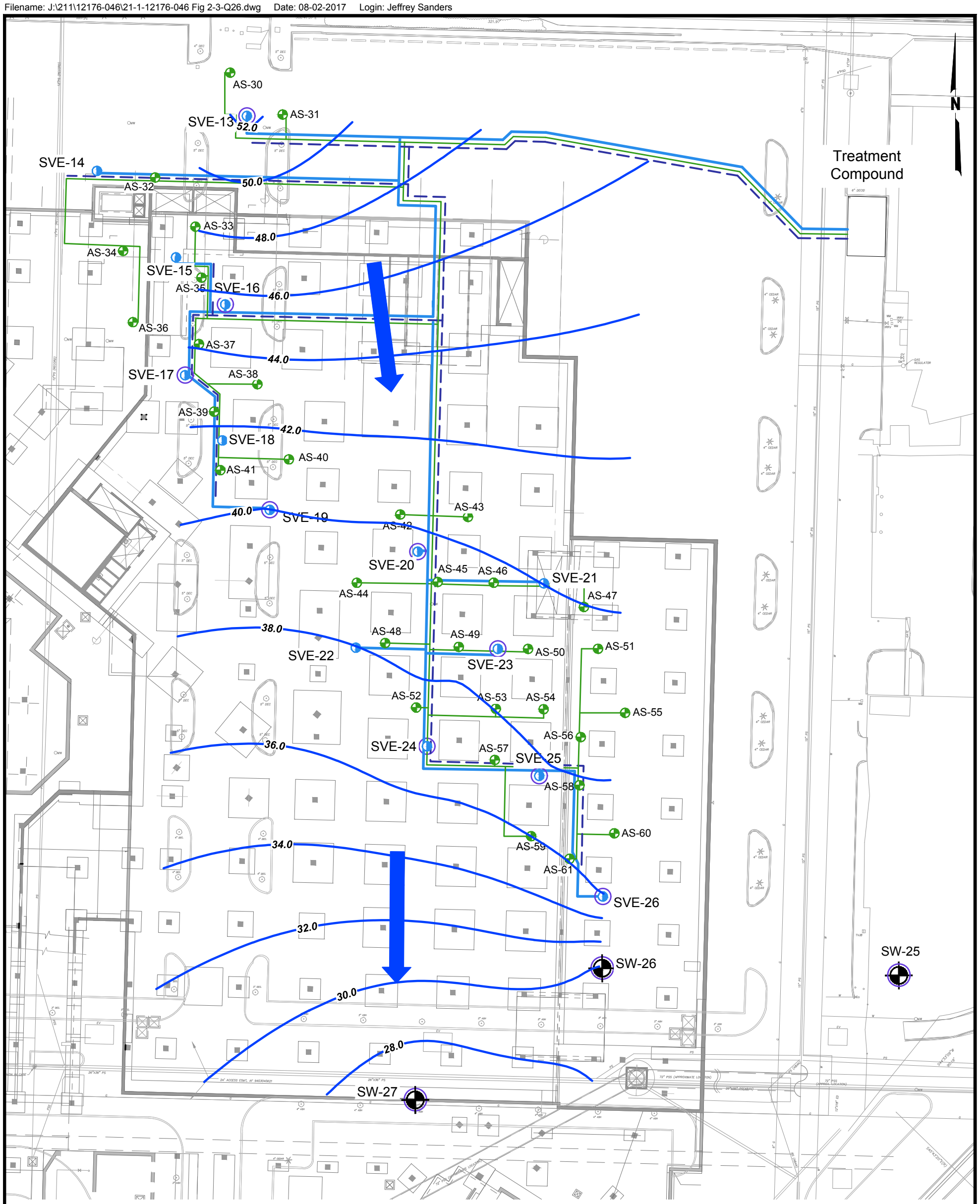
September 2017 21-1-12176-046

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FIG. 2

FIG. 2

Filename: J:\211\12176-046\21-1-12176-046 Fig 2-3-Q26.dwg Date: 08-02-2017 Login: Jeffrey Sanders



LEGEND

- SVE (Soil Vapor Extraction) Well
- AS (Air Sparging) Well
- Well Selected for Groundwater Monitoring
- Compliance Monitoring Well
- 48.0 — Approximate Groundwater Elevation (in feet) (Dashed where inferred)
- Approximate Groundwater Flow Direction

0 40 80

Scale in Feet

NOTES

1. Well locations and piping are adapted from as-built drawing provided by Sellen Construction, received 5-18-2011.
2. Figure adapted from electronic files provided by Aspect Consulting and KPFF, dated March 2008 and March 2011.
3. Well AS-30 was decommissioned in May 2013.

Phase 2 Remediation Monitoring - 26th Quarter
Seattle Center Lot No. 2
Seattle, Washington

GROUNDWATER CONTOUR MAP

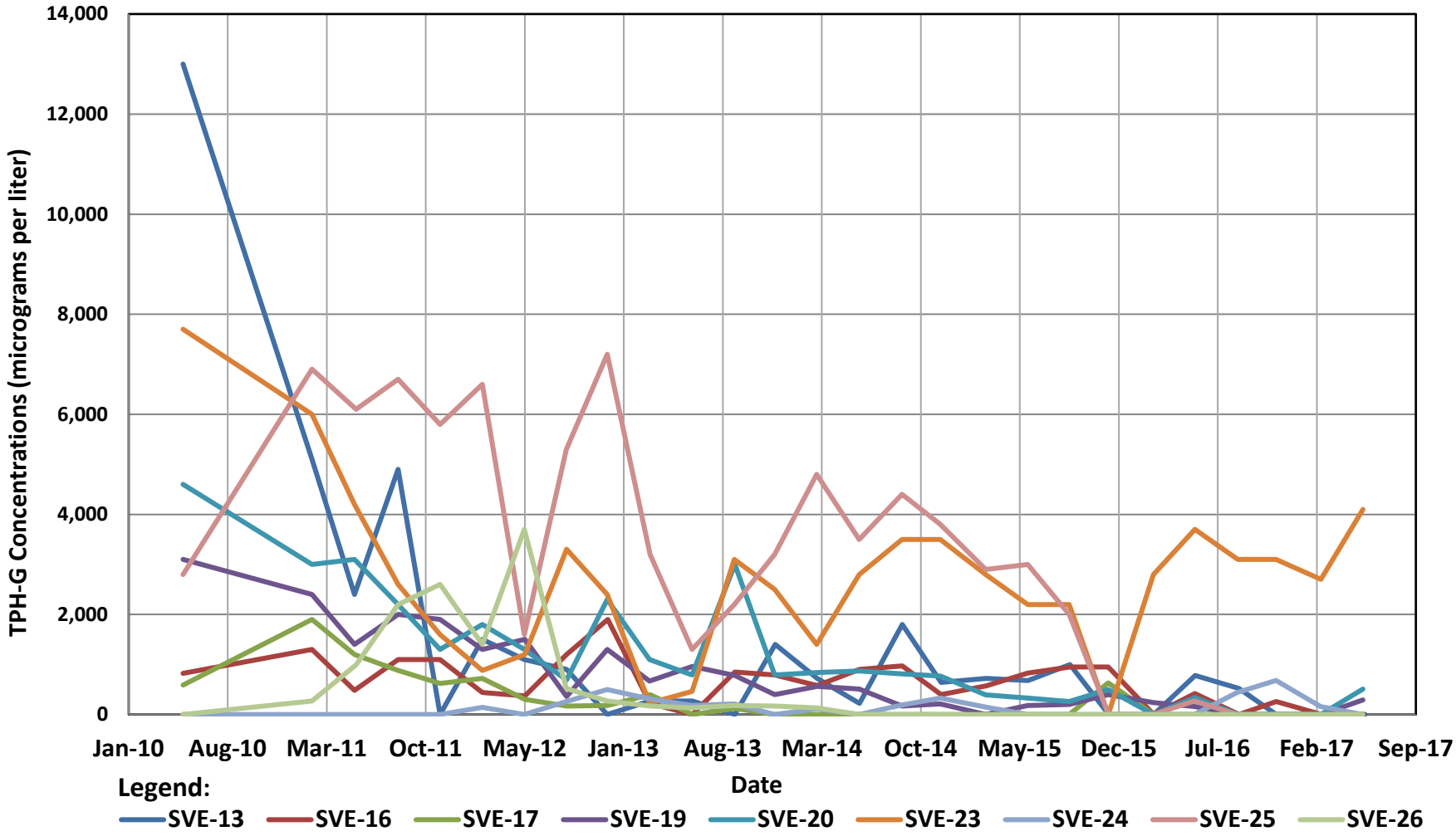
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FIG. 3

FIG. 3

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Non-Detects plotted as zero.

Cleanup Level = 800 micrograms per liter

Phase 2 Remediation Monitoring - 25th Quarter
Seattle Center Lot No. 2 Seattle, Washington

HISTORICAL TPH-G CONCENTRATIONS IN SVE WELLS

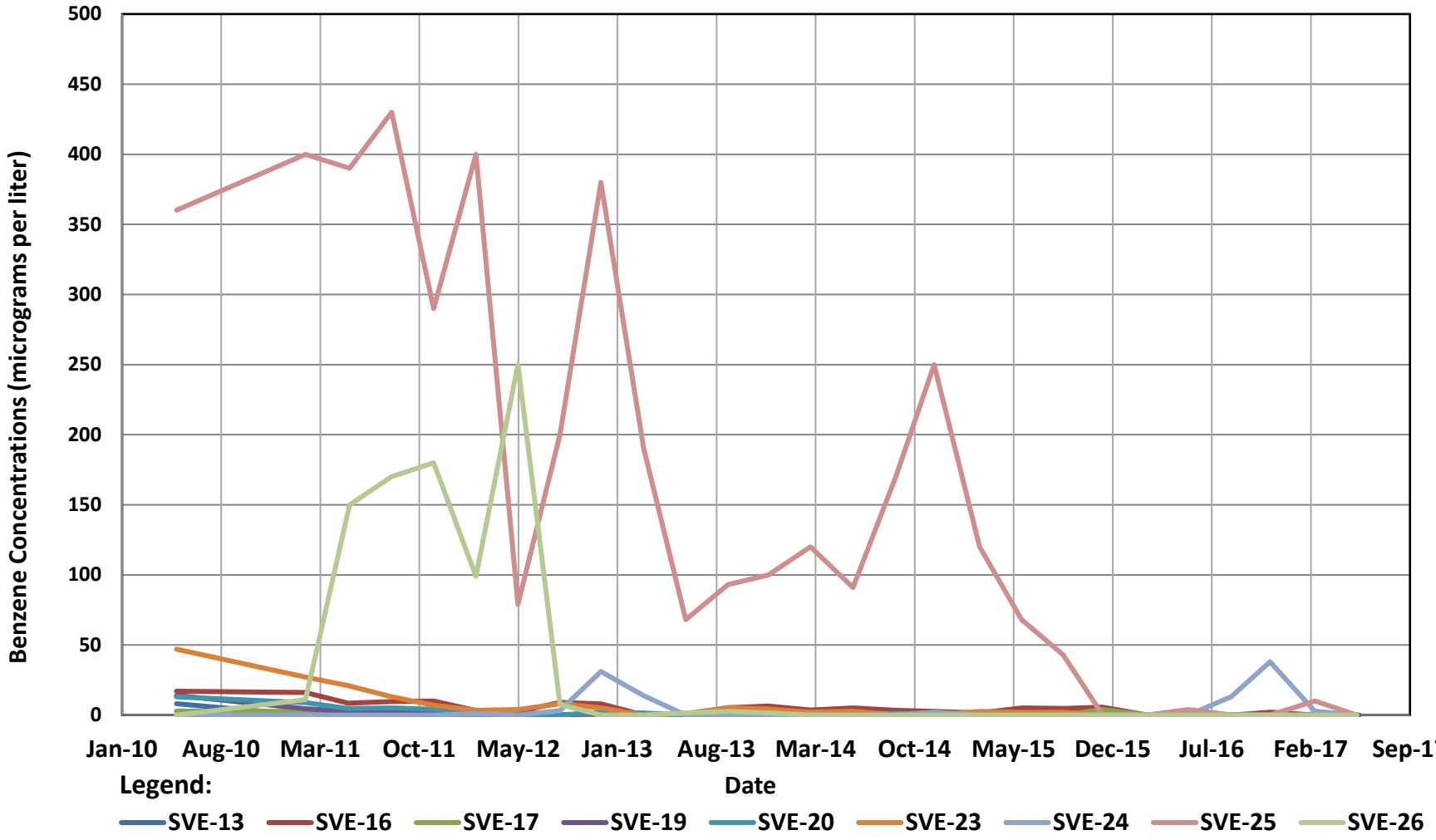
September 2017 21-1-12176-046

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

FIG. 4

FIG. 4

C:\Users\evp\Desktop\stuff\Copy of 21-1-12176-046-Q26-L1f-T1-T2-T3.xlsx



Non-Detects plotted as zero.

Cleanup Level = 5 micrograms per liter

Phase 2 Remediation Monitoring - 25th Quarter
Seattle Center Lot No. 2 Seattle, Washington

HISTORICAL BENZENE CONCENTRATIONS IN SVE WELLS

September 2017 21-1-12176-046

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

FIG. 5

FIG. 5

APPENDIX A

GROUNDWATER ANALYTICAL LABORATORY REPORT

OnSite Environmental Inc.
14648 NE 95th Street, Redmond, WA 98052 • (425) 883-3881

June 6, 2017

Edwin Ptak
Shannon & Wilson, Inc.
400 N 34th Street, Suite 100
Seattle, WA 98103

Re: Analytical Data for Project 21-1-12176-044
Laboratory Reference No. 1705-310

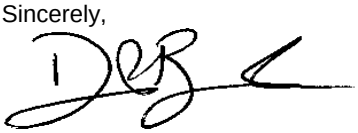
Dear Edwin:

Enclosed are the analytical results and associated quality control data for samples submitted on May 25, 2017.

The standard policy of OnSite Environmental, Inc. is to store your samples for 30 days from the date of receipt. If you require longer storage, please contact the laboratory.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning the data, or need additional information, please feel free to call me.

Sincerely,



David Baumeister
Project Manager

Enclosures

This report pertains to the samples analyzed in accordance with the chain of custody, and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: June 6, 2017
Samples Submitted: May 25, 2017
Laboratory Reference: 1705-310
Project: 21-1-12176-044

Case Narrative

Samples were collected on May 24, 2017 and received by the laboratory on May 25, 2017. They were maintained at the laboratory at a temperature of 2°C to 6°C.

Please note that any and all soil sample results are reported on a dry-weight basis, unless otherwise noted below.

General QA/QC issues associated with the analytical data enclosed in this laboratory report will be indicated with a reference to a comment or explanation on the Data Qualifier page. More complex and involved QA/QC issues will be discussed in detail below.

Nitrate EPA 353.3 Analysis

The reported Nitrate results are a calculated value based on the subtraction of Nitrite from the Nitrate plus Nitrite result. The Nitrite analysis, which has a 48-hour holding time, was performed within the holding time. Immediately after this analysis, an aliquot of the samples was preserved with concentrated sulfuric acid and stored at 4 degrees C. The preserved samples were then analyzed within the maximum 28-day holding time for the Nitrate plus Nitrite analysis

Any other QA/QC issues associated with this extraction and analysis will be indicated with a footnote reference and discussed in detail on the Data Qualifier page.

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Date of Report: June 6, 2017
Samples Submitted: May 25, 2017
Laboratory Reference: 1705-310
Project: 21-1-12176-044

NWTPH-Gx/BTEX

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**SW-27**					
Laboratory ID:	05-310-01					
Benzene	**ND**	1.0	EPA 8021B	5-30-17	5-30-17	
Toluene	**ND**	1.0	EPA 8021B	5-30-17	5-30-17	
Ethyl Benzene	**ND**	1.0	EPA 8021B	5-30-17	5-30-17	
m,p-Xylene	**ND**	1.0	EPA 8021B	5-30-17	5-30-17	
o-Xylene	**ND**	1.0	EPA 8021B	5-30-17	5-30-17	
Gasoline	**ND**	100	NWTPH-Gx	5-30-17	5-30-17	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*111*	*61-118*				
Client ID:	**SVE-26**					
Laboratory ID:	05-310-02					
Benzene	**ND**	1.0	EPA 8021B	5-30-17	5-30-17	
Toluene	**ND**	1.0	EPA 8021B	5-30-17	5-30-17	
Ethyl Benzene	**ND**	1.0	EPA 8021B	5-30-17	5-30-17	
m,p-Xylene	**ND**	1.0	EPA 8021B	5-30-17	5-30-17	
o-Xylene	**ND**	1.0	EPA 8021B	5-30-17	5-30-17	
Gasoline	**ND**	100	NWTPH-Gx	5-30-17	5-30-17	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*96*	*61-118*				
Client ID:	**SW-26**					
Laboratory ID:	05-310-03					
Benzene	**ND**	1.0	EPA 8021B	5-30-17	5-30-17	
Toluene	**ND**	1.0	EPA 8021B	5-30-17	5-30-17	
Ethyl Benzene	**ND**	1.0	EPA 8021B	5-30-17	5-30-17	
m,p-Xylene	**ND**	1.0	EPA 8021B	5-30-17	5-30-17	
o-Xylene	**ND**	1.0	EPA 8021B	5-30-17	5-30-17	
Gasoline	**ND**	100	NWTPH-Gx	5-30-17	5-30-17	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*101*	*61-118*				

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Date of Report: June 6, 2017
Samples Submitted: May 25, 2017
Laboratory Reference: 1705-310
Project: 21-1-12176-044

NWTPH-Gx/BTEX

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**SVE-24**					
Laboratory ID:	05-310-04					
Benzene	**ND**	1.0	EPA 8021B	5-30-17	5-30-17	
Toluene	**ND**	1.0	EPA 8021B	5-30-17	5-30-17	
Ethyl Benzene	**ND**	1.0	EPA 8021B	5-30-17	5-30-17	
m,p-Xylene	**ND**	1.0	EPA 8021B	5-30-17	5-30-17	
o-Xylene	**ND**	1.0	EPA 8021B	5-30-17	5-30-17	
Gasoline	**ND**	100	NWTPH-Gx	5-30-17	5-30-17	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*103*	*61-118*				

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Date of Report: June 6, 2017
Samples Submitted: May 25, 2017
Laboratory Reference: 1705-310
Project: 21-1-12176-044

NWTPH-Gx/BTEX
QUALITY CONTROL

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0530W1					
Benzene	**ND**	1.0	EPA 8021B	5-30-17	5-30-17	
Toluene	**ND**	1.0	EPA 8021B	5-30-17	5-30-17	
Ethyl Benzene	**ND**	1.0	EPA 8021B	5-30-17	5-30-17	
m,p-Xylene	**ND**	1.0	EPA 8021B	5-30-17	5-30-17	
o-Xylene	**ND**	1.0	EPA 8021B	5-30-17	5-30-17	
Gasoline	**ND**	100	NWTPH-Gx	5-30-17	5-30-17	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*107*	*61-118*				

Analyte	Result		Spike Level		Source Result	Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE											
Laboratory ID:	05-310-01										
	ORIG	DUP									
Benzene	**ND**	**ND**	NA	NA		NA		NA	NA	30	
Toluene	**ND**	**ND**	NA	NA		NA		NA	NA	30	
Ethyl Benzene	**ND**	**ND**	NA	NA		NA		NA	NA	30	
m,p-Xylene	**ND**	**ND**	NA	NA		NA		NA	NA	30	
o-Xylene	**ND**	**ND**	NA	NA		NA		NA	NA	30	
Gasoline	**ND**	**ND**	NA	NA		NA		NA	NA	30	
Surrogate:											
Fluorobenzene						*111*	*106*	*61-118*			
SPIKE BLANKS											
Laboratory ID:	SB0530W1										
	SB	SBD	SB	SBD		SB	SBD				
Benzene	**53.0**	**54.6**	50.0	50.0		**106**	**109**	79-120	3	11	
Toluene	**53.5**	**54.9**	50.0	50.0		**107**	**110**	79-118	3	12	
Ethyl Benzene	**52.5**	**53.8**	50.0	50.0		**105**	**108**	80-117	2	12	
m,p-Xylene	**52.2**	**53.4**	50.0	50.0		**104**	**107**	80-117	2	12	
o-Xylene	**52.4**	**53.5**	50.0	50.0		**105**	**107**	80-116	2	11	
Surrogate:											
Fluorobenzene						*87*	*109*	*61-118*			

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Date of Report: June 6, 2017
Samples Submitted: May 25, 2017
Laboratory Reference: 1705-310
Project: 21-1-12176-044

TOTAL MANGANESE
EPA 6010C

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	05-310-01					
Client ID:	**SW-27**					
Manganese	**450**	10	6010C	5-26-17	5-30-17	
Lab ID:	05-310-02					
Client ID:	**SVE-26**					
Manganese	**950**	10	6010C	5-26-17	5-30-17	
Lab ID:	05-310-03					
Client ID:	**SW-26**					
Manganese	**340**	10	6010C	5-26-17	5-30-17	
Lab ID:	05-310-04					
Client ID:	**SVE-24**					
Manganese	**10000**	50	6010C	5-26-17	5-31-17	

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Date of Report: June 6, 2017
Samples Submitted: May 25, 2017
Laboratory Reference: 1705-310
Project: 21-1-12176-044

TOTAL MANGANESE
EPA 6010C
METHOD BLANK QUALITY CONTROL

Date Extracted:	5-26-17
Date Analyzed:	5-30-17
Matrix:	Water
Units:	ug/L (ppb)
Lab ID:	MB0526WH1

Analyte	Method	Result	PQL
Manganese	6010C	**ND**	10

This report pertains to the samples analyzed in accordance with the chain of custody,
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Date of Report: June 6, 2017
Samples Submitted: May 25, 2017
Laboratory Reference: 1705-310
Project: 21-1-12176-044

TOTAL MANGANESE
EPA 6010C
DUPLICATE QUALITY CONTROL

Date Extracted: 5-26-17
Date Analyzed: 5-30-17

Matrix: Water
Units: ug/L (ppb)

Lab ID: 05-310-01

Analyte	Sample Result	Duplicate Result	RPD	PQL	Flags
Manganese	**447**	**419**	7	10	

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Date of Report: June 6, 2017
Samples Submitted: May 25, 2017
Laboratory Reference: 1705-310
Project: 21-1-12176-044

TOTAL MANGANESE
EPA 6010C
MS/MSD QUALITY CONTROL

Date Extracted: 5-26-17
Date Analyzed: 5-30-17

Matrix: Water
Units: ug/L (ppb)

Lab ID: 05-310-01

Analyte	Spike Level	MS	Percent Recovery	MSD	Percent Recovery	RPD	Flags
Manganese	500	**901**	91	**905**	92	0	

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Date of Report: June 6, 2017
Samples Submitted: May 25, 2017
Laboratory Reference: 1705-310
Project: 21-1-12176-044

DISSOLVED MANGANESE
EPA 6010C

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	05-310-01					
Client ID:	**SW-27**					
Manganese	**410**	11	6010C		6-1-17	
Lab ID:	05-310-02					
Client ID:	**SVE-26**					
Manganese	**1200**	11	6010C		6-1-17	
Lab ID:	05-310-03					
Client ID:	**SW-26**					
Manganese	**330**	11	6010C		6-1-17	
Lab ID:	05-310-04					
Client ID:	**SVE-24**					
Manganese	**11000**	50	6010C		6-2-17	

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Date of Report: June 6, 2017
Samples Submitted: May 25, 2017
Laboratory Reference: 1705-310
Project: 21-1-12176-044

DISSOLVED MANGANESE
EPA 6010C
METHOD BLANK QUALITY CONTROL

Date Analyzed: 6-1-17

Matrix: Water
Units: ug/L (ppb)

Lab ID: MB0526F1

Analyte	Method	Result	PQL
Manganese	6010C	**ND**	11

This report pertains to the samples analyzed in accordance with the chain of custody,
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Date of Report: June 6, 2017
Samples Submitted: May 25, 2017
Laboratory Reference: 1705-310
Project: 21-1-12176-044

DISSOLVED MANGANESE
EPA 6010C
DUPLICATE QUALITY CONTROL

Date Analyzed: 6-1-17

Matrix: Water
Units: ug/L (ppb)

Lab ID: 05-324-01

Analyte	Sample Result	Duplicate Result	RPD	PQL	Flags
Manganese	**1610**	**1610**	0	11	

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Date of Report: June 6, 2017
Samples Submitted: May 25, 2017
Laboratory Reference: 1705-310
Project: 21-1-12176-044

DISSOLVED MANGANESE
EPA 6010C
MS/MSD QUALITY CONTROL

Date Analyzed: 6-1-17

Matrix: Water
Units: ug/L (ppb)

Lab ID: 05-324-01

Analyte	Spike Level	MS	Percent Recovery	MSD	Percent Recovery	RPD	Flags
Manganese	555	**2260**	118	**2270**	119	0	

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and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: June 6, 2017
Samples Submitted: May 25, 2017
Laboratory Reference: 1705-310
Project: 21-1-12176-044

TOTAL ALKALINITY
SM 2320B

Matrix: Water
Units: mg CaCO3/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**SW-27**					
Laboratory ID:	05-310-01					
Total Alkalinity	**92**	2.0	SM 2320B	6-2-17	6-2-17	
Client ID:	**SVE-26**					
Laboratory ID:	05-310-02					
Total Alkalinity	**110**	2.0	SM 2320B	6-2-17	6-2-17	
Client ID:	**SW-26**					
Laboratory ID:	05-310-03					
Total Alkalinity	**200**	2.0	SM 2320B	6-2-17	6-2-17	
Client ID:	**SVE-24**					
Laboratory ID:	05-310-04					
Total Alkalinity	**250**	2.0	SM 2320B	6-2-17	6-2-17	

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Project: 21-1-12176-044

TOTAL ALKALINITY
SM 2320B
QUALITY CONTROL

Matrix: Water
Units: mg CaCO3/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0602W1					
Total Alkalinity	**ND**	2.0	SM 2320B	6-2-17	6-2-17	

Analyte	Result		Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE									
Laboratory ID:	05-310-01								
	ORIG	DUP							
Total Alkalinity	**92.0**	**90.0**	NA	NA	NA	NA	2	10	
SPIKE BLANK									
Laboratory ID:	SB0602W1								
	SB		SB		SB				
Total Alkalinity	**96.0**		100	NA	96	86-117	NA	NA	

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Project: 21-1-12176-044

NITRATE (as Nitrogen)
EPA 353.2

Matrix: Water
Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**SW-27**					
Laboratory ID:	05-310-01					
Nitrate	**0.060**	0.050	EPA 353.2	5-30-17	5-30-17	
Client ID:	**SVE-26**					
Laboratory ID:	05-310-02					
Nitrate	**0.34**	0.050	EPA 353.2	5-30-17	5-30-17	
Client ID:	**SW-26**					
Laboratory ID:	05-310-03					
Nitrate	**0.053**	0.050	EPA 353.2	5-30-17	5-30-17	
Client ID:	**SVE-24**					
Laboratory ID:	05-310-04					
Nitrate	**0.070**	0.050	EPA 353.2	5-30-17	5-30-17	

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Laboratory Reference: 1705-310
Project: 21-1-12176-044

NITRATE (as Nitrogen)
EPA 353.2
QUALITY CONTROL

Matrix: Water
Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0530W1					
Nitrate	**ND**	0.050	EPA 353.2	5-30-17	5-30-17	

Analyte	Result		Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE									
Laboratory ID:	05-310-01								
	ORIG	DUP							
Nitrate	**0.0597**	**0.0622**	NA	NA	NA	NA	4	9	
MATRIX SPIKE									
Laboratory ID:	05-310-01								
	MS		MS		MS				
Nitrate	**2.26**		2.00	0.0597	110	93-126	NA	NA	
SPIKE BLANK									
Laboratory ID:	SB0530W1								
	SB		SB		SB				
Nitrate	**2.11**		2.00	NA	106	96-122	NA	NA	

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Project: 21-1-12176-044

SULFATE
ASTM D516-07

Matrix: Water
Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**SW-27**					
Laboratory ID:	05-310-01					
Sulfate	**67**	25	ASTM D516-07	5-26-17	5-26-17	
Client ID:	**SVE-26**					
Laboratory ID:	05-310-02					
Sulfate	**310**	100	ASTM D516-07	5-26-17	5-26-17	
Client ID:	**SW-26**					
Laboratory ID:	05-310-03					
Sulfate	**110**	25	ASTM D516-07	5-26-17	5-26-17	
Client ID:	**SVE-24**					
Laboratory ID:	05-310-04					
Sulfate	**1700**	500	ASTM D516-07	5-26-17	5-26-17	

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Laboratory Reference: 1705-310
Project: 21-1-12176-044

SULFATE
ASTM D516-07
QUALITY CONTROL

Matrix: Water
Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0526W1					
Sulfate	**ND**	5.0	ASTM D516-07	5-26-17	5-26-17	

Analyte	Result		Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE									
Laboratory ID:	05-310-01								
	ORIG	DUP							
Sulfate	**66.8**	**63.1**	NA	NA	NA	NA	6	10	
MATRIX SPIKE									
Laboratory ID:	05-310-01								
	MS		MS		MS				
Sulfate	**119**		50.0	66.8	104	77-129	NA	NA	
SPIKE BLANK									
Laboratory ID:	SB0526W1								
	SB		SB		SB				
Sulfate	**9.59**		10.0	NA	96	91-113	NA	NA	

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OnSite Environmental Inc.

Data Qualifiers and Abbreviations

A - Due to a high sample concentration, the amount spiked is insufficient for meaningful MS/MSD recovery data.

B - The analyte indicated was also found in the blank sample.

C - The duplicate RPD is outside control limits due to high result variability when analyte concentrations are within five times the quantitation limit.

E - The value reported exceeds the quantitation range and is an estimate.

F - Surrogate recovery data is not available due to the high concentration of coeluting target compounds.

H - The analyte indicated is a common laboratory solvent and may have been introduced during sample preparation, and be impacting the sample result.

I - Compound recovery is outside of the control limits.

J - The value reported was below the practical quantitation limit. The value is an estimate.

K - Sample duplicate RPD is outside control limits due to sample inhomogeneity. The sample was re-extracted and re-analyzed with similar results.

L - The RPD is outside of the control limits.

M - Hydrocarbons in the gasoline range are impacting the diesel range result.

M1 - Hydrocarbons in the gasoline range (toluene-napthalene) are present in the sample.

N - Hydrocarbons in the lube oil range are impacting the diesel range result.

N1 - Hydrocarbons in diesel range are impacting lube oil range results.

O - Hydrocarbons indicative of heavier fuels are present in the sample and are impacting the gasoline result.

P - The RPD of the detected concentrations between the two columns is greater than 40.

Q - Surrogate recovery is outside of the control limits.

S - Surrogate recovery data is not available due to the necessary dilution of the sample.

T - The sample chromatogram is not similar to a typical _____.

U - The analyte was analyzed for, but was not detected above the reported sample quantitation limit.

U1 - The practical quantitation limit is elevated due to interferences present in the sample.

V - Matrix Spike/Matrix Spike Duplicate recoveries are outside control limits due to matrix effects.

W - Matrix Spike/Matrix Spike Duplicate RPD are outside control limits due to matrix effects.

X - Sample extract treated with a mercury cleanup procedure.

X1- Sample extract treated with a Sulfuric acid/Silica gel cleanup procedure.

Y - The calibration verification for this analyte exceeded the 20% drift specified in method 8260C, and therefore the reported result should be considered an estimate. The overall performance of the calibration verification standard met the acceptance criteria of the method.

Z -

ND - Not Detected at PQL
PQL - Practical Quantitation Limit
RPD - Relative Percent Difference

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3600 Fremont Ave. N.
Seattle, WA 98103
T: (206) 352-3790
F: (206) 352-7178
info@fremontanalytical.com

OnSite Environmental Inc
David Baumeister
14648 NE 95th Street
Redmond, WA 98052

RE: Seattle Center
Work Order Number: 1705297

May 26, 2017

Attention David Baumeister:

Fremont Analytical, Inc. received 4 sample(s) on 5/24/2017 for the analyses presented in the following report.

Ferrous Iron by SM3500-Fe B

This report consists of the following:

- Case Narrative
- Analytical Results
- Applicable Quality Control Summary Reports
- Chain of Custody

All analyses were performed consistent with the Quality Assurance program of Fremont Analytical, Inc. Please contact the laboratory if you should have any questions about the results.

Thank you for using Fremont Analytical.

Sincerely,

Chelsea Ward
Project Manager

Date: *05/26/2017*

CLIENT: OnSite Environmental Inc
Project: Seattle Center
Work Order: 1705297

Work Order Sample Summary

Lab Sample ID	Client Sample ID	Date/Time Collected	Date/Time Received
1705297-001	SW-27	05/24/2017 10:55 AM	05/24/2017 3:44 PM
1705297-002	SVE-26	05/24/2017 12:15 PM	05/24/2017 3:44 PM
1705297-003	SW-26	05/24/2017 1:20 PM	05/24/2017 3:44 PM
1705297-004	SVE-24	05/24/2017 2:55 PM	05/24/2017 3:44 PM

Case Narrative

WO#: **1705297**
Date: **5/26/2017**

CLIENT: OnSite Environmental Inc
Project: Seattle Center

I. SAMPLE RECEIPT:
Samples receipt information is recorded on the attached Sample Receipt Checklist.

II. GENERAL REPORTING COMMENTS:
Results are reported on a wet weight basis unless dry-weight correction is denoted in the units field on the analytical report ("mg/kg-dry" or "ug/kg-dry").

Matrix Spike (MS) and MS Duplicate (MSD) samples are tested from an analytical batch of "like" matrix to check for possible matrix effect. The MS and MSD will provide site specific matrix data only for those samples which are spiked by the laboratory. The sample chosen for spike purposes may or may not have been a sample submitted in this sample delivery group. The validity of the analytical procedures for which data is reported in this analytical report is determined by the Laboratory Control Sample (LCS) and the Method Blank (MB). The LCS and the MB are processed with the samples and the MS/MSD to ensure method criteria are achieved throughout the entire analytical process.

III. ANALYSES AND EXCEPTIONS:
Exceptions associated with this report will be footnoted in the analytical results page(s) or the quality control summary page(s) and/or noted below.

Qualifiers:

* - Flagged value is not within established control limits
B - Analyte detected in the associated Method Blank
D - Dilution was required
E - Value above quantitation range
H - Holding times for preparation or analysis exceeded
I - Analyte with an internal standard that does not meet established acceptance criteria
J - Analyte detected below Reporting Limit
N - Tentatively Identified Compound (TIC)
Q - Analyte with an initial or continuing calibration that does not meet established acceptance criteria (<20%RSD, <20% Drift or minimum RRF)
S - Spike recovery outside accepted recovery limits
ND - Not detected at the Reporting Limit
R - High relative percent difference observed

Acronyms:

%Rec - Percent Recovery
CCB - Continued Calibration Blank
CCV - Continued Calibration Verification
DF - Dilution Factor
HEM - Hexane Extractable Material
ICV - Initial Calibration Verification
LCS/LCSD - Laboratory Control Sample / Laboratory Control Sample Duplicate
MB or MBLANK - Method Blank
MDL - Method Detection Limit
MS/MSD - Matrix Spike / Matrix Spike Duplicate
PDS - Post Digestion Spike
Ref Val - Reference Value
RL - Reporting Limit
RPD - Relative Percent Difference
SD - Serial Dilution
SGT - Silica Gel Treatment
SPK - Spike
Surr - Surrogate

Analytical Report

Work Order: **1705297**
Date Reported: **5/26/2017**

CLIENT: OnSite Environmental Inc
Project: Seattle Center

Lab ID: 1705297-001 **Collection Date:** 5/24/2017 10:55:00 AM
Client Sample ID: **SW-27** **Matrix:** Groundwater

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Ferrous Iron by SM3500-Fe B				Batch ID: R36406		Analyst: KT
Ferrous Iron	18.1	1.00	D	mg/L	20	5/25/2017 10:52:00 AM

Lab ID: 1705297-002 **Collection Date:** 5/24/2017 12:15:00 PM
Client Sample ID: **SVE-26** **Matrix:** Groundwater

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Ferrous Iron by SM3500-Fe B				Batch ID: R36406		Analyst: KT
Ferrous Iron	65.6	2.50	D	mg/L	50	5/25/2017 10:53:00 AM

Lab ID: 1705297-003 **Collection Date:** 5/24/2017 1:20:00 PM
Client Sample ID: **SW-26** **Matrix:** Groundwater

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Ferrous Iron by SM3500-Fe B				Batch ID: R36406		Analyst: KT
Ferrous Iron	0.784	0.0500		mg/L	1	5/25/2017 10:50:00 AM

Analytical Report

Work Order: **1705297**
Date Reported: **5/26/2017**

CLIENT: OnSite Environmental Inc
Project: Seattle Center

Lab ID: 1705297-004 **Collection Date:** 5/24/2017 2:55:00 PM
Client Sample ID: **SVE-24** **Matrix:** Groundwater

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Ferrous Iron by SM3500-Fe B				Batch ID: R36406		Analyst: KT
Ferrous Iron	37.3	1.00	D	mg/L	20	5/25/2017 10:54:00 AM

Work Order: 1705297
CLIENT: OnSite Environmental Inc
Project: Seattle Center

QC SUMMARY REPORT

Ferrous Iron by SM3500-Fe B

Sample ID	**MB-R36406**	SampType: **MBLK**			Units: **mg/L**		Prep Date: **5/25/2017**		RunNo: **36406**		
Client ID:	**MBLKW**	Batch ID: **R36406**					Analysis Date: **5/25/2017**		SeqNo: **698275**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Ferrous Iron	ND	0.0500									

Sample ID	**LCS-R36406**	SampType: **LCS**			Units: **mg/L**		Prep Date: **5/25/2017**		RunNo: **36406**		
Client ID:	**LCSW**	Batch ID: **R36406**					Analysis Date: **5/25/2017**		SeqNo: **698276**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Ferrous Iron	0.997	0.0500	1.000	0	99.7	90	110				

Sample ID	**1705297-003ADUP**	SampType: **DUP**			Units: **mg/L**		Prep Date: **5/25/2017**		RunNo: **36406**		
Client ID:	**SW-26**	Batch ID: **R36406**					Analysis Date: **5/25/2017**		SeqNo: **698284**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Ferrous Iron	0.802	0.0500						0.7836	2.37	20	

Sample ID	**1705297-003AMS**	SampType: **MS**			Units: **mg/L**		Prep Date: **5/25/2017**		RunNo: **36406**		
Client ID:	**SW-26**	Batch ID: **R36406**					Analysis Date: **5/25/2017**		SeqNo: **698285**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Ferrous Iron	1.80	0.0500	1.000	0.7836	101	85	115				

Sample ID	**1705297-003AMSD**	SampType: **MSD**			Units: **mg/L**		Prep Date: **5/25/2017**		RunNo: **36406**		
Client ID:	**SW-26**	Batch ID: **R36406**					Analysis Date: **5/25/2017**		SeqNo: **698286**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Ferrous Iron	1.79	0.0500	1.000	0.7836	100	85	115	1.797	0.655	20	

Sample Log-In Check List

Client Name:	**ONSITE**	Work Order Number:	**1705297**
Logged by:	**Clare Griggs**	Date Received:	**5/24/2017 3:44:00 PM**

Chain of Custody

1.	Is Chain of Custody complete?	Yes	☑	No ☐	Not Present	☐
2.	How was the sample delivered?	Client				

Log In

3.	Coolers are present?	Yes	☑	No ☐	NA	☐
4.	Shipping container/cooler in good condition?	Yes	☑	No ☐		
5.	Custody Seals present on shipping container/cooler? (Refer to comments for Custody Seals not intact)	Yes	☐	No ☐	Not Required	☑
6.	Was an attempt made to cool the samples?	Yes	☑	No ☐	NA	☐
7.	Were all items received at a temperature of >0°C to 10.0°C*	Yes	☑	No ☐	NA	☐
8.	Sample(s) in proper container(s)?	Yes	☑	No ☐		
9.	Sufficient sample volume for indicated test(s)?	Yes	☑	No ☐		
10.	Are samples properly preserved?	Yes	☑	No ☐		
11.	Was preservative added to bottles?	Yes	☐	No ☑	NA	☐
12.	Is there headspace in the VOA vials?	Yes	☐	No ☐	NA	☑
13.	Did all samples containers arrive in good condition(unbroken)?	Yes	☑	No ☐		
14.	Does paperwork match bottle labels?	Yes	☑	No ☐		
15.	Are matrices correctly identified on Chain of Custody?	Yes	☑	No ☐		
16.	Is it clear what analyses were requested?	Yes	☑	No ☐		
17.	Were all holding times able to be met?	Yes	☑	No ☐		

Special Handling (if applicable)

18.	Was client notified of all discrepancies with this order?	Yes	☐	No ☐	NA	☑

Person Notified: _____ Date _____

By Whom: _____ Via: ☐ eMail ☐ Phone ☐ Fax ☐ In Person

Regarding: _____

Client Instructions: _____

19. Additional remarks:

Item Information

Item #	Temp ºC
Cooler	2.4
Sample	6.6

* Note: DoD/ELAP and TNI require items to be received at 4°C +/- 2°C

Fremont Analytical
3600 Fremont Ave N.
Seattle, WA 98103
Tel: 206-352-3790
Fax: 206-352-7178

Chain of Custody Record & Laboratory Services Agreement

Date: 5/24/17 Page: 1 of: 1
Laboratory Project No (internal): 1705297
Special Remarks:

Project Name: Seattle Center
Project No: 21-1-12176-044
Collected by: EVP
Location: Seattle Center
Report To (PM): David Baumeister
PM Email: dbaumeister@onsite-env.com

Client: Onsite Environmental Inc.
Address: 14648 NE 95th St.
City, State, Zip: Redmond, WA 98052
Telephone: 425-883-3881
Fax:

Sample Disposal: ☐ Return to client ☐ Disposal by lab (after 30 days)

	Sample Name	Sample Date	Sample Time	Sample Type (Matrix)*	VOCs (EPA 8260 / 624)	GX/BTEX	BTEX	Gasoline Range Organics (GX)	Hydrocarbon Identification (HCID)	Diesel/Heavy Oil Range Organics (DX)	SVOCs (EPA 8270 / 625)	PAHs (EPA 8270 - SIM)	PCBs (EPA 8082 / 608)	Metals** (EPA 6020 / 200.8)	Total (T) | Dissolved (D)	Anions (IC)***	EDB (8011)	Ferrous Fe			Comments
1	SW-27	5/24/17	1055	GW													X				
2	SVE-26	"	1215	"													X				
3	SW-26	"	1320	"													X				
4	SVE-24	"	1455	"													X				
5																					
6																					
7																					
8																					
9																					
10																					

*Matrix: A = Air, AQ = Aqueous, B = Bulk, O = Other, P = Product, S = Soil, SD = Sediment, SL = Solid, W = Water, DW = Drinking Water, GW = Ground Water, SW = Storm Water, WW = Waste Water

**Metals (Circle): MTCA-5 RCRA-8 Priority Pollutants TAL *Individual:* Ag Al As B Ba Be Ca Cd Co Cr Cu Fe Hg K Mg Mn Mo Na Ni Pb Sb Se Sr Sn Ti Tl U V Zn

***Anions (Circle): Nitrate Nitrite Chloride Sulfate Bromide O-Phosphate Fluoride Nitrate+Nitrite

I represent that I am authorized to enter into this Agreement with Fremont Analytical on behalf of the Client named above and that I have verified Client's agreement to each of the terms on the front and backside of this Agreement.

Relinquished	Date/Time	Received	Date/Time
x [signature]	5/24/17 1350	x [signature]	5/24/2017 ~~1350~~ 1544
Relinquished	Date/Time	Received	Date/Time
x		x	

Turn-around Time:
- [X] Standard
- [ ] 3 Day
- [ ] 2 Day
- [ ] Next Day
- Same Day ____ (specify)

Chain of Custody

Page 1 of 1

OnSite Environmental Inc.
Analytical Laboratory Testing Services
14648 NE 95th Street • Redmond, WA 98052
Phone: (425) 883-3881 • www.onsite-env.com

Company: Shannon & Wilson Inc.
Project Number: 21-1-12176-044
Project Name: Seattle Center
Project Manager: EVP
Sampled by: EVP

Turnaround Request (in working days)
(Check One)
☐ Same Day ☐ 1 Day
☐ 2 Days ☐ 3 Days
☒ Standard (7 Days) (TPH analysis 5 Days)
☐ _____ (other)

Laboratory Number: 05-310

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	Number of Containers	NWTPH-HCID	NWTPH-Gx/BTEX	NWTPH-Gx	NWTPH-Dx (☐ Acid / SG Clean-up)	Volatiles 8260C	Halogenated Volatiles 8260C	EDB EPA 8011 (Waters Only)	Semivolatiles 8270D/SIM (with low-level PAHs)	PAHs 8270D/SIM (low-level)	PCBs 8082A	Organochlorine Pesticides 8081B	Organophosphorus Pesticides 8270D/SIM	Chlorinated Acid Herbicides 8151A	Total RCRA Metals	Total MTCA Metals	TCLP Metals	HEM (oil and grease) 1664A	total & diss manganese	alkalinity	nitrate	sulfate	% Moisture ferrous iron
1	SW-27	5/24/17	1055	GW	7		X																X	X	X	X	X
2	SVE-26	"	1215	"	7		X																X	X	X	X	X
3	SW-26	"	1320	"	7		X																X	X	X	X	X
4	SVE-24	"	1455	"	7		X																X	X	X	X	X

	Signature	Company	Date	Time
Relinquished		S&W	5/25/17	0800
Received		SPECD-1	5/25/17	1030
Relinquished		SPECD-1	5/25/17	1220
Received		ORG	5/25/17	1220
Relinquished				
Received				
Reviewed/Date		Reviewed/Date		

Comments/Special Instructions

Data Package: Standard ☐ Level III ☐ Level IV ☐

Chromatograms with final report ☐ Electronic Data Deliverables (EDDs) ☒

OnSite Environmental Inc.
14648 NE 95th Street, Redmond, WA 98052 • (425) 883-3881

June 7, 2017

Edwin Ptak
Shannon & Wilson, Inc.
400 N 34th Street, Suite 100
Seattle, WA 98103

Re: Analytical Data for Project 21-1-12176-044
Laboratory Reference No. 1705-318

Dear Edwin:

Enclosed are the analytical results and associated quality control data for samples submitted on May 26, 2017.

The standard policy of OnSite Environmental, Inc. is to store your samples for 30 days from the date of receipt. If you require longer storage, please contact the laboratory.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning the data, or need additional information, please feel free to call me.

Sincerely,

David Baumeister
Project Manager

Enclosures

This report pertains to the samples analyzed in accordance with the chain of custody, and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: June 7, 2017
Samples Submitted: May 26, 2017
Laboratory Reference: 1705-318
Project: 21-1-12176-044

Case Narrative

Samples were collected on May 25, 2017 and received by the laboratory on May 26, 2017. They were maintained at the laboratory at a temperature of 2°C to 6°C.

Please note that any and all soil sample results are reported on a dry-weight basis, unless otherwise noted below.

General QA/QC issues associated with the analytical data enclosed in this laboratory report will be indicated with a reference to a comment or explanation on the Data Qualifier page. More complex and involved QA/QC issues will be discussed in detail below.

Nitrate EPA 353.2 Analysis

The reported Nitrate results are a calculated value based on the subtraction of Nitrite from the Nitrate plus Nitrite result. The Nitrite analysis, which has a 48-hour holding time, was performed within the holding time. Immediately after this analysis, an aliquot of the samples was preserved with concentrated sulfuric acid and stored at 4 degrees C. The preserved samples were then analyzed within the maximum 28-day holding time for the Nitrate plus Nitrite analysis

Any other QA/QC issues associated with this extraction and analysis will be indicated with a footnote reference and discussed in detail on the Data Qualifier page.

This report pertains to the samples analyzed in accordance with the chain of custody,
and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: June 7, 2017
Samples Submitted: May 26, 2017
Laboratory Reference: 1705-318
Project: 21-1-12176-044

NWTPH-Gx/BTEX

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**SVE-25**					
Laboratory ID:	05-318-01					
Benzene	**ND**	4.0	EPA 8021B	5-31-17	5-31-17	
Toluene	**ND**	4.0	EPA 8021B	5-31-17	5-31-17	
Ethyl Benzene	**ND**	4.0	EPA 8021B	5-31-17	5-31-17	
m,p-Xylene	**ND**	4.0	EPA 8021B	5-31-17	5-31-17	
o-Xylene	**ND**	4.0	EPA 8021B	5-31-17	5-31-17	
Gasoline	**ND**	400	NWTPH-Gx	5-31-17	5-31-17	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*89*	*61-118*				
Client ID:	**SVE-23**					
Laboratory ID:	05-318-02					
Benzene	**ND**	4.0	EPA 8021B	5-31-17	5-31-17	
Toluene	**12**	4.0	EPA 8021B	5-31-17	5-31-17	
Ethyl Benzene	**110**	4.0	EPA 8021B	5-31-17	5-31-17	
m,p-Xylene	**210**	4.0	EPA 8021B	5-31-17	5-31-17	
o-Xylene	**5.8**	4.0	EPA 8021B	5-31-17	5-31-17	
Gasoline	**4100**	400	NWTPH-Gx	5-31-17	5-31-17	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*108*	*61-118*				
Client ID:	**SVE-20**					
Laboratory ID:	05-318-03					
Benzene	**ND**	4.0	EPA 8021B	5-31-17	5-31-17	
Toluene	**ND**	4.0	EPA 8021B	5-31-17	5-31-17	
Ethyl Benzene	**5.7**	4.0	EPA 8021B	5-31-17	5-31-17	
m,p-Xylene	**ND**	4.0	EPA 8021B	5-31-17	5-31-17	
o-Xylene	**ND**	4.0	EPA 8021B	5-31-17	5-31-17	
Gasoline	**510**	400	NWTPH-Gx	5-31-17	5-31-17	O
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*107*	*61-118*				

This report pertains to the samples analyzed in accordance with the chain of custody, and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: June 7, 2017
Samples Submitted: May 26, 2017
Laboratory Reference: 1705-318
Project: 21-1-12176-044

NWTPH-Gx/BTEX

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**SVE-19**					
Laboratory ID:	05-318-04					
Benzene	**ND**	1.0	EPA 8021B	5-31-17	5-31-17	
Toluene	**ND**	1.0	EPA 8021B	5-31-17	5-31-17	
Ethyl Benzene	**ND**	1.0	EPA 8021B	5-31-17	5-31-17	
m,p-Xylene	**ND**	1.0	EPA 8021B	5-31-17	5-31-17	
o-Xylene	**ND**	1.0	EPA 8021B	5-31-17	5-31-17	
Gasoline	**290**	100	NWTPH-Gx	5-31-17	5-31-17	O
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*91*	*61-118*				
Client ID:	**SVE-17**					
Laboratory ID:	05-318-05					
Benzene	**ND**	4.0	EPA 8021B	5-31-17	5-31-17	
Toluene	**ND**	4.0	EPA 8021B	5-31-17	5-31-17	
Ethyl Benzene	**ND**	4.0	EPA 8021B	5-31-17	5-31-17	
m,p-Xylene	**ND**	4.0	EPA 8021B	5-31-17	5-31-17	
o-Xylene	**ND**	4.0	EPA 8021B	5-31-17	5-31-17	
Gasoline	**ND**	400	NWTPH-Gx	5-31-17	5-31-17	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*109*	*61-118*				

This report pertains to the samples analyzed in accordance with the chain of custody, and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: June 7, 2017
Samples Submitted: May 26, 2017
Laboratory Reference: 1705-318
Project: 21-1-12176-044

NWTPH-Gx/BTEX
QUALITY CONTROL

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0531W1					
Benzene	**ND**	1.0	EPA 8021B	5-31-17	5-31-17	
Toluene	**ND**	1.0	EPA 8021B	5-31-17	5-31-17	
Ethyl Benzene	**ND**	1.0	EPA 8021B	5-31-17	5-31-17	
m,p-Xylene	**ND**	1.0	EPA 8021B	5-31-17	5-31-17	
o-Xylene	**ND**	1.0	EPA 8021B	5-31-17	5-31-17	
Gasoline	**ND**	100	NWTPH-Gx	5-31-17	5-31-17	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*93*	*61-118*				

Analyte	Result		Spike Level		Source Result	Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE											
Laboratory ID:	05-324-02										
	ORIG	DUP									
Benzene	**ND**	**ND**	NA	NA		NA		NA	NA	30	
Toluene	**ND**	**ND**	NA	NA		NA		NA	NA	30	
Ethyl Benzene	**ND**	**ND**	NA	NA		NA		NA	NA	30	
m,p-Xylene	**ND**	**ND**	NA	NA		NA		NA	NA	30	
o-Xylene	**ND**	**ND**	NA	NA		NA		NA	NA	30	
Gasoline	**ND**	**ND**	NA	NA		NA		NA	NA	30	
Surrogate:											
Fluorobenzene						*94*	*91*	*61-118*			
MATRIX SPIKES											
Laboratory ID:	05-324-02										
	MS	MSD	MS	MSD		MS	MSD				
Benzene	**52.4**	**54.8**	50.0	50.0	ND	**105**	**110**	80-120	4	13	
Toluene	**53.0**	**55.4**	50.0	50.0	ND	**106**	**111**	81-115	4	14	
Ethyl Benzene	**53.8**	**56.2**	50.0	50.0	ND	**108**	**112**	81-114	4	12	
m,p-Xylene	**53.6**	**55.9**	50.0	50.0	ND	**107**	**112**	81-114	4	13	
o-Xylene	**53.6**	**55.9**	50.0	50.0	ND	**107**	**112**	81-113	4	11	
Surrogate:											
Fluorobenzene						*109*	*111*	*61-118*			

This report pertains to the samples analyzed in accordance with the chain of custody, and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: June 7, 2017
Samples Submitted: May 26, 2017
Laboratory Reference: 1705-318
Project: 21-1-12176-044

TOTAL MANGANESE
EPA 6010C

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	05-318-01					
Client ID:	**SVE-25**					
Manganese	**1700**	10	6010C	5-26-17	5-30-17	
Lab ID:	05-318-02					
Client ID:	**SVE-23**					
Manganese	**1200**	10	6010C	5-26-17	5-30-17	
Lab ID:	05-318-03					
Client ID:	**SVE-20**					
Manganese	**3400**	50	6010C	5-26-17	5-31-17	
Lab ID:	05-318-04					
Client ID:	**SVE-19**					
Manganese	**7800**	50	6010C	5-26-17	5-31-17	
Lab ID:	05-318-05					
Client ID:	**SVE-17**					
Manganese	**1700**	10	6010C	5-26-17	5-30-17	

This report pertains to the samples analyzed in accordance with the chain of custody,
and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: June 7, 2017
Samples Submitted: May 26, 2017
Laboratory Reference: 1705-318
Project: 21-1-12176-044

TOTAL MANGANESE
EPA 6010C
METHOD BLANK QUALITY CONTROL

Date Extracted:	5-26-17
Date Analyzed:	5-30-17
Matrix:	Water
Units:	ug/L (ppb)
Lab ID:	MB0526WH1

Analyte	Method	Result	PQL
Manganese	6010C	**ND**	10

This report pertains to the samples analyzed in accordance with the chain of custody,
and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: June 7, 2017
Samples Submitted: May 26, 2017
Laboratory Reference: 1705-318
Project: 21-1-12176-044

TOTAL MANGANESE
EPA 6010C
DUPLICATE QUALITY CONTROL

Date Extracted: 5-26-17
Date Analyzed: 5-30-17

Matrix: Water
Units: ug/L (ppb)

Lab ID: 05-310-01

Analyte	Sample Result	Duplicate Result	RPD	PQL	Flags
Manganese	**447**	**419**	7	10	

This report pertains to the samples analyzed in accordance with the chain of custody,
and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: June 7, 2017
Samples Submitted: May 26, 2017
Laboratory Reference: 1705-318
Project: 21-1-12176-044

TOTAL MANGANESE
EPA 6010C
MS/MSD QUALITY CONTROL

Date Extracted: 5-26-17
Date Analyzed: 5-30-17

Matrix: Water
Units: ug/L (ppb)

Lab ID: 05-310-01

Analyte	Spike Level	MS	Percent Recovery	MSD	Percent Recovery	RPD	Flags
Manganese	500	**901**	91	**905**	92	0	

This report pertains to the samples analyzed in accordance with the chain of custody, and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: June 7, 2017
Samples Submitted: May 26, 2017
Laboratory Reference: 1705-318
Project: 21-1-12176-044

DISSOLVED MANGANESE
EPA 6010C

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	05-318-01					
Client ID:	**SVE-25**					
Manganese	**1800**	11	6010C		6-1-17	
Lab ID:	05-318-02					
Client ID:	**SVE-23**					
Manganese	**1300**	11	6010C		6-1-17	
Lab ID:	05-318-03					
Client ID:	**SVE-20**					
Manganese	**3400**	50	6010C		6-1-17	
Lab ID:	05-318-04					
Client ID:	**SVE-19**					
Manganese	**8900**	50	6010C		6-1-17	
Lab ID:	05-318-05					
Client ID:	**SVE-17**					
Manganese	**1900**	11	6010C		6-1-17	

This report pertains to the samples analyzed in accordance with the chain of custody,
and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: June 7, 2017
Samples Submitted: May 26, 2017
Laboratory Reference: 1705-318
Project: 21-1-12176-044

DISSOLVED MANGANESE
EPA 6010C
METHOD BLANK QUALITY CONTROL

Date Analyzed: 6-1-17

Matrix: Water
Units: ug/L (ppb)

Lab ID: MB0526F1

Analyte	Method	Result	PQL
Manganese	6010C	**ND**	11

This report pertains to the samples analyzed in accordance with the chain of custody,
and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: June 7, 2017
Samples Submitted: May 26, 2017
Laboratory Reference: 1705-318
Project: 21-1-12176-044

DISSOLVED MANGANESE
EPA 6010C
DUPLICATE QUALITY CONTROL

Date Analyzed: 6-1-17

Matrix: Water
Units: ug/L (ppb)

Lab ID: 05-324-01

Analyte	Sample Result	Duplicate Result	RPD	PQL	Flags
Manganese	**1610**	**1610**	0	11	

This report pertains to the samples analyzed in accordance with the chain of custody,
and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: June 7, 2017
Samples Submitted: May 26, 2017
Laboratory Reference: 1705-318
Project: 21-1-12176-044

DISSOLVED MANGANESE
EPA 6010C
MS/MSD QUALITY CONTROL

Date Analyzed: 6-1-17

Matrix: Water
Units: ug/L (ppb)

Lab ID: 05-324-01

Analyte	Spike Level	MS	Percent Recovery	MSD	Percent Recovery	RPD	Flags
Manganese	555	**2260**	118	**2270**	119	0	

This report pertains to the samples analyzed in accordance with the chain of custody,
and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: June 7, 2017
Samples Submitted: May 26, 2017
Laboratory Reference: 1705-318
Project: 21-1-12176-044

TOTAL ALKALINITY
SM 2320B

Matrix: Water
Units: mg CaCO3/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**SVE-25**					
Laboratory ID:	05-318-01					
Total Alkalinity	**78**	2.0	SM 2320B	6-2-17	6-2-17	
Client ID:	**SVE-23**					
Laboratory ID:	05-318-02					
Total Alkalinity	**260**	2.0	SM 2320B	6-2-17	6-2-17	
Client ID:	**SVE-20**					
Laboratory ID:	05-318-03					
Total Alkalinity	**720**	2.0	SM 2320B	6-2-17	6-2-17	
Client ID:	**SVE-19**					
Laboratory ID:	05-318-04					
Total Alkalinity	**300**	2.0	SM 2320B	6-2-17	6-2-17	
Client ID:	**SVE-17**					
Laboratory ID:	05-318-05					
Total Alkalinity	**480**	2.0	SM 2320B	6-2-17	6-2-17	

This report pertains to the samples analyzed in accordance with the chain of custody,
and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: June 7, 2017
Samples Submitted: May 26, 2017
Laboratory Reference: 1705-318
Project: 21-1-12176-044

TOTAL ALKALINITY
SM 2320B
QUALITY CONTROL

Matrix: Water
Units: mg CaCO3/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0602W1					
Total Alkalinity	**ND**	2.0	SM 2320B	6-2-17	6-2-17	

Analyte	Result		Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE									
Laboratory ID:	05-310-01								
	ORIG	DUP							
Total Alkalinity	**92.0**	**90.0**	NA	NA	NA	NA	2	10	
SPIKE BLANK									
Laboratory ID:	SB0602W1								
	SB		SB		SB				
Total Alkalinity	**96.0**		100	NA	96	86-117	NA	NA	

This report pertains to the samples analyzed in accordance with the chain of custody, and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: June 7, 2017
Samples Submitted: May 26, 2017
Laboratory Reference: 1705-318
Project: 21-1-12176-044

SULFATE
ASTM D516-07

Matrix: Water
Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**SVE-25**					
Laboratory ID:	05-318-01					
Sulfate	**200**	100	ASTM D516-07	6-2-17	6-5-17	
Client ID:	**SVE-23**					
Laboratory ID:	05-318-02					
Sulfate	**ND**	5.0	ASTM D516-07	6-2-17	6-5-17	
Client ID:	**SVE-20**					
Laboratory ID:	05-318-03					
Sulfate	**210**	50	ASTM D516-07	6-2-17	6-5-17	
Client ID:	**SVE-19**					
Laboratory ID:	05-318-04					
Sulfate	**710**	250	ASTM D516-07	6-2-17	6-5-17	
Client ID:	**SVE-17**					
Laboratory ID:	05-318-05					
Sulfate	**45**	25	ASTM D516-07	6-2-17	6-5-17	

This report pertains to the samples analyzed in accordance with the chain of custody,
and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: June 7, 2017
Samples Submitted: May 26, 2017
Laboratory Reference: 1705-318
Project: 21-1-12176-044

SULFATE
ASTM D516-07
QUALITY CONTROL

Matrix: Water
Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0602F1					
Sulfate	**ND**	5.0	ASTM D516-07	6-2-17	6-5-17	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	05-318-01							
	ORIG DUP							
Sulfate	**204** **200**	NA	NA	NA	NA	2	10	
MATRIX SPIKE								
Laboratory ID:	05-318-01							
	MS	MS		MS				
Sulfate	**406**	200	204	101	77-129	NA	NA	
SPIKE BLANK								
Laboratory ID:	SB0602F1							
	SB	SB		SB				
Sulfate	**9.50**	10.0	NA	95	91-113	NA	NA	

This report pertains to the samples analyzed in accordance with the chain of custody, and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: June 7, 2017
Samples Submitted: May 26, 2017
Laboratory Reference: 1705-318
Project: 21-1-12176-044

NITRATE (as Nitrogen)
EPA 353.2

Matrix: Water
Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**SVE-25**					
Laboratory ID:	05-318-01					
Nitrate	**0.064**	0.050	EPA 353.2	5-30-17	5-30-17	
Client ID:	**SVE-23**					
Laboratory ID:	05-318-02					
Nitrate	**0.072**	0.050	EPA 353.2	5-30-17	5-30-17	
Client ID:	**SVE-20**					
Laboratory ID:	05-318-03					
Nitrate	**0.096**	0.050	EPA 353.2	5-30-17	5-30-17	
Client ID:	**SVE-19**					
Laboratory ID:	05-318-04					
Nitrate	**0.088**	0.050	EPA 353.2	5-30-17	5-30-17	
Client ID:	**SVE-17**					
Laboratory ID:	05-318-05					
Nitrate	**ND**	0.050	EPA 353.2	5-30-17	5-30-17	

This report pertains to the samples analyzed in accordance with the chain of custody,
and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: June 7, 2017
Samples Submitted: May 26, 2017
Laboratory Reference: 1705-318
Project: 21-1-12176-044

NITRATE (as Nitrogen)
EPA 353.2
QUALITY CONTROL

Matrix: Water
Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0530W1					
Nitrate	**ND**	0.050	EPA 353.2	5-30-17	5-30-17	

Analyte	Result		Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE									
Laboratory ID:	05-310-01								
	ORIG	DUP							
Nitrate	**0.0597**	**0.0622**	NA	NA	NA	NA	4	9	
MATRIX SPIKE									
Laboratory ID:	05-310-01								
	MS		MS		MS				
Nitrate	**2.26**		2.00	0.0597	110	93-126	NA	NA	
SPIKE BLANK									
Laboratory ID:	SB0530W1								
	SB		SB		SB				
Nitrate	**2.11**		2.00	NA	106	96-122	NA	NA	

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OnSite Environmental Inc.

Data Qualifiers and Abbreviations

A - Due to a high sample concentration, the amount spiked is insufficient for meaningful MS/MSD recovery data.

B - The analyte indicated was also found in the blank sample.

C - The duplicate RPD is outside control limits due to high result variability when analyte concentrations are within five times the quantitation limit.

E - The value reported exceeds the quantitation range and is an estimate.

F - Surrogate recovery data is not available due to the high concentration of coeluting target compounds.

H - The analyte indicated is a common laboratory solvent and may have been introduced during sample preparation, and be impacting the sample result.

I - Compound recovery is outside of the control limits.

J - The value reported was below the practical quantitation limit. The value is an estimate.

K - Sample duplicate RPD is outside control limits due to sample inhomogeneity. The sample was re-extracted and re-analyzed with similar results.

L - The RPD is outside of the control limits.

M - Hydrocarbons in the gasoline range are impacting the diesel range result.

M1 - Hydrocarbons in the gasoline range (toluene-napthalene) are present in the sample.

N - Hydrocarbons in the lube oil range are impacting the diesel range result.

N1 - Hydrocarbons in diesel range are impacting lube oil range results.

O - Hydrocarbons indicative of heavier fuels are present in the sample and are impacting the gasoline result.

P - The RPD of the detected concentrations between the two columns is greater than 40.

Q - Surrogate recovery is outside of the control limits.

S - Surrogate recovery data is not available due to the necessary dilution of the sample.

T - The sample chromatogram is not similar to a typical _____.

U - The analyte was analyzed for, but was not detected above the reported sample quantitation limit.

U1 - The practical quantitation limit is elevated due to interferences present in the sample.

V - Matrix Spike/Matrix Spike Duplicate recoveries are outside control limits due to matrix effects.

W - Matrix Spike/Matrix Spike Duplicate RPD are outside control limits due to matrix effects.

X - Sample extract treated with a mercury cleanup procedure.

X1- Sample extract treated with a Sulfuric acid/Silica gel cleanup procedure.

Y - The calibration verification for this analyte exceeded the 20% drift specified in method 8260C, and therefore the reported result should be considered an estimate. The overall performance of the calibration verification standard met the acceptance criteria of the method.

Z -

ND - Not Detected at PQL
PQL - Practical Quantitation Limit
RPD - Relative Percent Difference

This report pertains to the samples analyzed in accordance with the chain of custody, and is intended only for the use of the individual or company to whom it is addressed.

3600 Fremont Ave. N.
Seattle, WA 98103
T: (206) 352-3790
F: (206) 352-7178
info@fremontanalytical.com

OnSite Environmental Inc
David Baumeister
14648 NE 95th Street
Redmond, WA 98052

RE: Seattle Center
Work Order Number: 1705305

May 31, 2017

Attention David Baumeister:

Fremont Analytical, Inc. received 5 sample(s) on 5/25/2017 for the analyses presented in the following report.

Ferrous Iron by SM3500-Fe B

This report consists of the following:

- Case Narrative
- Analytical Results
- Applicable Quality Control Summary Reports
- Chain of Custody

All analyses were performed consistent with the Quality Assurance program of Fremont Analytical, Inc. Please contact the laboratory if you should have any questions about the results.

Thank you for using Fremont Analytical.

Sincerely,

Chelsea Ward
Project Manager

Date: *05/31/2017*

CLIENT: OnSite Environmental Inc
Project: Seattle Center
Work Order: 1705305

Work Order Sample Summary

Lab Sample ID	Client Sample ID	Date/Time Collected	Date/Time Received
1705305-001	SVE-25	05/25/2017 11:15 AM	05/25/2017 4:22 PM
1705305-002	SVE-23	05/25/2017 12:25 PM	05/25/2017 4:22 PM
1705305-003	SVE-20	05/25/2017 1:25 PM	05/25/2017 4:22 PM
1705305-004	SVE-19	05/25/2017 2:30 PM	05/25/2017 4:22 PM
1705305-005	SVE-17	05/25/2017 3:35 PM	05/25/2017 4:22 PM

Case Narrative

WO#: **1705305**
Date: **5/31/2017**

CLIENT: OnSite Environmental Inc
Project: Seattle Center

I. SAMPLE RECEIPT:
Samples receipt information is recorded on the attached Sample Receipt Checklist.

II. GENERAL REPORTING COMMENTS:
Results are reported on a wet weight basis unless dry-weight correction is denoted in the units field on the analytical report ("mg/kg-dry" or "ug/kg-dry").

Matrix Spike (MS) and MS Duplicate (MSD) samples are tested from an analytical batch of "like" matrix to check for possible matrix effect. The MS and MSD will provide site specific matrix data only for those samples which are spiked by the laboratory. The sample chosen for spike purposes may or may not have been a sample submitted in this sample delivery group. The validity of the analytical procedures for which data is reported in this analytical report is determined by the Laboratory Control Sample (LCS) and the Method Blank (MB). The LCS and the MB are processed with the samples and the MS/MSD to ensure method criteria are achieved throughout the entire analytical process.

III. ANALYSES AND EXCEPTIONS:
Exceptions associated with this report will be footnoted in the analytical results page(s) or the quality control summary page(s) and/or noted below.

Qualifiers:

* - Flagged value is not within established control limits
B - Analyte detected in the associated Method Blank
D - Dilution was required
E - Value above quantitation range
H - Holding times for preparation or analysis exceeded
I - Analyte with an internal standard that does not meet established acceptance criteria
J - Analyte detected below Reporting Limit
N - Tentatively Identified Compound (TIC)
Q - Analyte with an initial or continuing calibration that does not meet established acceptance criteria (<20%RSD, <20% Drift or minimum RRF)
S - Spike recovery outside accepted recovery limits
ND - Not detected at the Reporting Limit
R - High relative percent difference observed

Acronyms:

%Rec - Percent Recovery
CCB - Continued Calibration Blank
CCV - Continued Calibration Verification
DF - Dilution Factor
HEM - Hexane Extractable Material
ICV - Initial Calibration Verification
LCS/LCSD - Laboratory Control Sample / Laboratory Control Sample Duplicate
MB or MBLANK - Method Blank
MDL - Method Detection Limit
MS/MSD - Matrix Spike / Matrix Spike Duplicate
PDS - Post Digestion Spike
Ref Val - Reference Value
RL - Reporting Limit
RPD - Relative Percent Difference
SD - Serial Dilution
SGT - Silica Gel Treatment
SPK - Spike
Surr - Surrogate

Analytical Report

Work Order: **1705305**
Date Reported: **5/31/2017**

CLIENT: OnSite Environmental Inc
Project: Seattle Center

Lab ID: 1705305-001 **Collection Date:** 5/25/2017 11:15:00 AM
Client Sample ID: **SVE-25** **Matrix:** Groundwater

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Ferrous Iron by SM3500-Fe B				Batch ID: R36447		Analyst: KT
Ferrous Iron	9.85	1.00	D	mg/L	20	5/26/2017 9:46:00 AM

Lab ID: 1705305-002 **Collection Date:** 5/25/2017 12:25:00 PM
Client Sample ID: **SVE-23** **Matrix:** Groundwater

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Ferrous Iron by SM3500-Fe B				Batch ID: R36447		Analyst: KT
Ferrous Iron	19.2	5.00	D	mg/L	100	5/26/2017 9:38:00 AM

Lab ID: 1705305-003 **Collection Date:** 5/25/2017 1:25:00 PM
Client Sample ID: **SVE-20** **Matrix:** Groundwater

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Ferrous Iron by SM3500-Fe B				Batch ID: R36447		Analyst: KT
Ferrous Iron	29.3	2.50	D	mg/L	50	5/26/2017 9:40:00 AM

CLIENT: OnSite Environmental Inc
Project: Seattle Center

Lab ID: 1705305-004 **Collection Date:** 5/25/2017 2:30:00 PM
Client Sample ID: **SVE-19** **Matrix:** Groundwater

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Ferrous Iron by SM3500-Fe B				Batch ID: R36447		Analyst: KT
Ferrous Iron	62.3	2.50	D	mg/L	50	5/26/2017 9:42:00 AM

Lab ID: 1705305-005 **Collection Date:** 5/25/2017 3:35:00 PM
Client Sample ID: **SVE-17** **Matrix:** Groundwater

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Ferrous Iron by SM3500-Fe B				Batch ID: R36447		Analyst: KT
Ferrous Iron	42.3	2.50	D	mg/L	50	5/26/2017 9:44:00 AM

Fremont Analytical

Date: *5/31/2017*

Work Order: 1705305
CLIENT: OnSite Environmental Inc
Project: Seattle Center

QC SUMMARY REPORT

Ferrous Iron by SM3500-Fe B

Sample ID	**MB-R36447**	SampType: **MBLK**			Units: **mg/L**		Prep Date: **5/26/2017**		RunNo: **36447**		
Client ID:	**MBLKW**	Batch ID: **R36447**					Analysis Date: **5/26/2017**		SeqNo: **699182**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Ferrous Iron	ND	0.0500									

Sample ID	**LCS-R36447**	SampType: **LCS**			Units: **mg/L**		Prep Date: **5/26/2017**		RunNo: **36447**		
Client ID:	**LCSW**	Batch ID: **R36447**					Analysis Date: **5/26/2017**		SeqNo: **699183**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Ferrous Iron	0.908	0.0500	1.000	0	90.8	90	110				

Sample ID	**1705305-001ADUP**	SampType: **DUP**			Units: **mg/L**		Prep Date: **5/26/2017**		RunNo: **36447**		
Client ID:	**SVE-25**	Batch ID: **R36447**					Analysis Date: **5/26/2017**		SeqNo: **699190**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Ferrous Iron	10.4	1.00						8.911	15.1	20	D

Sample ID	**1705305-001AMS**	SampType: **MS**			Units: **mg/L**		Prep Date: **5/26/2017**		RunNo: **36447**		
Client ID:	**SVE-25**	Batch ID: **R36447**					Analysis Date: **5/26/2017**		SeqNo: **699191**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Ferrous Iron	31.3	1.00	20.00	8.911	112	85	115				D

Sample ID	**1705305-001AMSD**	SampType: **MSD**			Units: **mg/L**		Prep Date: **5/26/2017**		RunNo: **36447**		
Client ID:	**SVE-25**	Batch ID: **R36447**					Analysis Date: **5/26/2017**		SeqNo: **699192**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Ferrous Iron	31.1	1.00	20.00	8.911	111	85	115	31.35	0.751	20	D

Sample Log-In Check List

Client Name:	**ONSITE**	Work Order Number:	**1705305**
Logged by:	**Clare Griggs**	Date Received:	**5/25/2017 4:22:00 PM**

Chain of Custody

1.	Is Chain of Custody complete?	Yes ☑	No ☐	Not Present ☐
2.	How was the sample delivered?	Client		

Log In

3.	Coolers are present?	Yes ☑	No ☐	NA ☐
4.	Shipping container/cooler in good condition?	Yes ☑	No ☐	
5.	Custody Seals present on shipping container/cooler? (Refer to comments for Custody Seals not intact)	Yes ☐	No ☐	Not Required ☑
6.	Was an attempt made to cool the samples?	Yes ☑	No ☐	NA ☐
7.	Were all items received at a temperature of >0°C to 10.0°C*	Yes ☑	No ☐	NA ☐
8.	Sample(s) in proper container(s)?	Yes ☑	No ☐	
9.	Sufficient sample volume for indicated test(s)?	Yes ☑	No ☐	
10.	Are samples properly preserved?	Yes ☑	No ☐	
11.	Was preservative added to bottles?	Yes ☐	No ☑	NA ☐
12.	Is there headspace in the VOA vials?	Yes ☐	No ☐	NA ☑
13.	Did all samples containers arrive in good condition(unbroken)?	Yes ☑	No ☐	
14.	Does paperwork match bottle labels?	Yes ☑	No ☐	
15.	Are matrices correctly identified on Chain of Custody?	Yes ☑	No ☐	
16.	Is it clear what analyses were requested?	Yes ☑	No ☐	
17.	Were all holding times able to be met?	Yes ☑	No ☐	

Special Handling (if applicable)

18.	Was client notified of all discrepancies with this order?	Yes ☐	No ☐	NA ☑

Person Notified: _____ Date _____

By Whom: _____ Via: ☐ eMail ☐ Phone ☐ Fax ☐ In Person

Regarding: _____

Client Instructions: _____

19. Additional remarks:

Item Information

Item #	Temp ºC
Cooler	3.5
Sample	5.1

* Note: DoD/ELAP and TNI require items to be received at 4°C +/- 2°C

Chain of Custody Record & Laboratory Services Agreement

Fremont Analytical
3600 Fremont Ave N.
Seattle, WA 98103
Tel: 206-352-3790
Fax: 206-352-7178

Date: 5/25/17 Page: 1 of: 1

Laboratory Project No (internal): 1705305

Project Name: Seattle Center

Special Remarks:

Client: Onsite ~~Environmental~~ Environmental

Project No: 21-1-12176-044

Address: 14648 NE 95th St.

Collected by: EVP

City, State, Zip: Redmond, WA 98052

Location: Seattle Center

Telephone: 425-883-3881

Report To (PM): David Baumeister

Sample Disposal: ☐ Return to client ☐ Disposal by lab (after 30 days)

Fax:

PM Email: dbaumeister@onsite-env.com

	Sample Name	Sample Date	Sample Time	Sample Type (Matrix)*	VOCs (EPA 8260 / 624)	GX/BTEX	BTEX	Gasoline Range Organics (GX)	Hydrocarbon Identification (HCID)	Diesel/Heavy Oil Range Organics (DX)	SVOCs (EPA 8270 / 625)	PAHs (EPA 8270 - SIM)	PCBs (EPA 8082 / 608)	Metals** (EPA 6020 / 200.8) Total (T) | Dissolved (D)	Anions (IC)***	EDB (8011)	Ferrous Fe			Comments
1	SVE-25	5/25/17	1115	GW												X				
2	SVE-23		1225													X				
3	SVE-20		1325													X				
4	SVE-19		1430													X				
5	SVE-17		1535													X				
6																				
7																				
8																				
9																				
10																				

*Matrix: A = Air, AQ = Aqueous, B = Bulk, O = Other, P = Product, S = Soil, SD = Sediment, SL = Solid, W = Water, DW = Drinking Water, GW = Ground Water, SW = Storm Water, WW = Waste Water

**Metals (Circle): MTCA-5 RCRA-8 Priority Pollutants TAL *Individual:* Ag Al As B Ba Be Ca Cd Co Cr Cu Fe Hg K Mg Mn Mo Na Ni Pb Sb Se Sr Sn Ti Tl U V Zn

***Anions (Circle): Nitrate Nitrite Chloride Sulfate Bromide O-Phosphate Fluoride Nitrate+Nitrite

I represent that I am authorized to enter into this Agreement with Fremont Analytical on behalf of the Client named above and that I have verified Client's agreement to each of the terms on the front and backside of this Agreement.

Relinquished	Date/Time	Received	Date/Time
x [signature]	5/25/17 1622	x [signature]	5/25/2017 1622
Relinquished	Date/Time	Received	Date/Time
x		x	

Turn-around Time:

- ☒ Standard
- ☐ 3 Day
- ☐ 2 Day
- ☐ Next Day
- Same Day _____ (specify)

Chain of Custody

Page 1 of 1

OnSite Environmental Inc.
Analytical Laboratory Testing Services
14648 NE 95th Street • Redmond, WA 98052
Phone: (425) 883-3881 • www.onsite-env.com

Laboratory Number: 05-318

Company: Shannon & Wilson Inc.
Project Number: 21-1-12176-044
Project Name: Seattle Center
Project Manager: EVP
Sampled by: EVP

Turnaround Request (in working days)
(Check One)
☐ Same Day ☐ 1 Day
☐ 2 Days ☐ 3 Days
☒ Standard (7 Days) (TPH analysis 5 Days)
☐ _____ (other)

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	Number of Containers	NWTPH-HCID	NWTPH-Gx/BTEX	NWTPH-Gx	NWTPH-Dx (☐ Acid / SG Clean-up)	Volatiles 8260C	Halogenated Volatiles 8260C	EDB EPA 8011 (Waters Only)	Semivolatiles 8270D/SIM (with low-level PAHs)	PAHs 8270D/SIM (low-level)	PCBs 8082A	Organochlorine Pesticides 8081B	Organophosphorus Pesticides 8270D/SIM	Chlorinated Acid Herbicides 8151A	Total RCRA Metals	Total MTCA Metals	TCLP Metals	HEM (oil and grease) 1664A	total & dissolved manganese	alkalinity	sulfate	nitrate	%~~Moisture~~ ferrous iron
1	SVE-25	5/25/17	1115	GW	7		X																X	X	X	X	X
2	SVE-23		1225		7		X																X	X	X	X	X
3	SVE-20		1325		7		X																X	X	X	X	X
4	SVE-19		1430		7		X																X	X	X	X	X
5	SVE-17		1535		7		X																X	X	X	X	X

	Signature	Company	Date	Time
Relinquished		S&W	5/26/17	0800
Received		GP ecology	5/26/17	850
Relinquished		GP ecology	5/26/17	1045
Received		ORE	5/26/17	1045
Relinquished				
Received				
Reviewed/Date		Reviewed/Date		

Comments/Special Instructions
dissolved - metals are field filtered

Data Package: Standard ☐ Level III ☐ Level IV ☐

Chromatograms with final report ☐ Electronic Data Deliverables (EDDs) ☒

OnSite Environmental Inc.
14648 NE 95th Street, Redmond, WA 98052 • (425) 883-3881

June 9, 2017

Edwin Ptak
Shannon & Wilson, Inc.
400 N 34th Street, Suite 100
Seattle, WA 98103

Re: Analytical Data for Project 21-1-12176-044
Laboratory Reference No. 1705-324

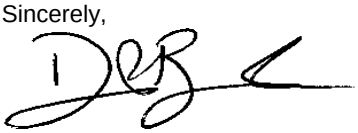
Dear Edwin:

Enclosed are the analytical results and associated quality control data for samples submitted on May 26, 2017.

The standard policy of OnSite Environmental, Inc. is to store your samples for 30 days from the date of receipt. If you require longer storage, please contact the laboratory.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning the data, or need additional information, please feel free to call me.

Sincerely,



David Baumeister
Project Manager

Enclosures

This report pertains to the samples analyzed in accordance with the chain of custody, and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: June 9, 2017
Samples Submitted: May 26, 2017
Laboratory Reference: 1705-324
Project: 21-1-12176-044

Case Narrative

Samples were collected on May 26, 2017 and received by the laboratory on May 26, 2017. They were maintained at the laboratory at a temperature of 2°C to 6°C.

Please note that any and all soil sample results are reported on a dry-weight basis, unless otherwise noted below.

General QA/QC issues associated with the analytical data enclosed in this laboratory report will be indicated with a reference to a comment or explanation on the Data Qualifier page. More complex and involved QA/QC issues will be discussed in detail below.

Nitrate EPA 353.2 Analysis

The reported Nitrate results are a calculated value based on the subtraction of Nitrite from the Nitrate plus Nitrite result. The Nitrite analysis, which has a 48-hour holding time, was performed within the holding time. Immediately after this analysis, an aliquot of the samples was preserved with concentrated sulfuric acid and stored at 4 degrees C. The preserved samples were then analyzed within the maximum 28-day holding time for the Nitrate plus Nitrite analysis

Any other QA/QC issues associated with this extraction and analysis will be indicated with a footnote reference and discussed in detail on the Data Qualifier page.

This report pertains to the samples analyzed in accordance with the chain of custody, and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: June 9, 2017
Samples Submitted: May 26, 2017
Laboratory Reference: 1705-324
Project: 21-1-12176-044

NWTPH-Gx/BTEX

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**SVE-16**					
Laboratory ID:	05-324-01					
Benzene	**ND**	4.0	EPA 8021B	5-31-17	5-31-17	
Toluene	**ND**	4.0	EPA 8021B	5-31-17	5-31-17	
Ethyl Benzene	**ND**	4.0	EPA 8021B	5-31-17	5-31-17	
m,p-Xylene	**ND**	4.0	EPA 8021B	5-31-17	5-31-17	
o-Xylene	**ND**	4.0	EPA 8021B	5-31-17	5-31-17	
Gasoline	**ND**	400	NWTPH-Gx	5-31-17	5-31-17	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*105*	*61-118*				
Client ID:	**SW-25**					
Laboratory ID:	05-324-02					
Benzene	**ND**	1.0	EPA 8021B	5-31-17	5-31-17	
Toluene	**ND**	1.0	EPA 8021B	5-31-17	5-31-17	
Ethyl Benzene	**ND**	1.0	EPA 8021B	5-31-17	5-31-17	
m,p-Xylene	**ND**	1.0	EPA 8021B	5-31-17	5-31-17	
o-Xylene	**ND**	1.0	EPA 8021B	5-31-17	5-31-17	
Gasoline	**ND**	100	NWTPH-Gx	5-31-17	5-31-17	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*94*	*61-118*				

This report pertains to the samples analyzed in accordance with the chain of custody, and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: June 9, 2017
Samples Submitted: May 26, 2017
Laboratory Reference: 1705-324
Project: 21-1-12176-044

NWTPH-Gx/BTEX
QUALITY CONTROL

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0531W1					
Benzene	**ND**	1.0	EPA 8021B	5-31-17	5-31-17	
Toluene	**ND**	1.0	EPA 8021B	5-31-17	5-31-17	
Ethyl Benzene	**ND**	1.0	EPA 8021B	5-31-17	5-31-17	
m,p-Xylene	**ND**	1.0	EPA 8021B	5-31-17	5-31-17	
o-Xylene	**ND**	1.0	EPA 8021B	5-31-17	5-31-17	
Gasoline	**ND**	100	NWTPH-Gx	5-31-17	5-31-17	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*93*	*61-118*				

Analyte	Result		Spike Level		Source Result	Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE											
Laboratory ID:	05-324-02										
	ORIG	DUP									
Benzene	**ND**	**ND**	NA	NA		NA		NA	NA	30	
Toluene	**ND**	**ND**	NA	NA		NA		NA	NA	30	
Ethyl Benzene	**ND**	**ND**	NA	NA		NA		NA	NA	30	
m,p-Xylene	**ND**	**ND**	NA	NA		NA		NA	NA	30	
o-Xylene	**ND**	**ND**	NA	NA		NA		NA	NA	30	
Gasoline	**ND**	**ND**	NA	NA		NA		NA	NA	30	
Surrogate:											
Fluorobenzene						*94*	*91*	*61-118*			
MATRIX SPIKES											
Laboratory ID:	05-324-02										
	MS	MSD	MS	MSD		MS	MSD				
Benzene	**52.4**	**54.8**	50.0	50.0	ND	**105**	**110**	80-120	4	13	
Toluene	**53.0**	**55.4**	50.0	50.0	ND	**106**	**111**	81-115	4	14	
Ethyl Benzene	**53.8**	**56.2**	50.0	50.0	ND	**108**	**112**	81-114	4	12	
m,p-Xylene	**53.6**	**55.9**	50.0	50.0	ND	**107**	**112**	81-114	4	13	
o-Xylene	**53.6**	**55.9**	50.0	50.0	ND	**107**	**112**	81-113	4	11	
Surrogate:											
Fluorobenzene						*109*	*111*	*61-118*			

This report pertains to the samples analyzed in accordance with the chain of custody, and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: June 9, 2017
Samples Submitted: May 26, 2017
Laboratory Reference: 1705-324
Project: 21-1-12176-044

TOTAL MANGANESE
EPA 6010C

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	05-324-01					
Client ID:	**SVE-16**					
Manganese	**1700**	10	6010C	6-2-17	6-2-17	
Lab ID:	05-324-02					
Client ID:	**SW-25**					
Manganese	**1600**	10	6010C	6-2-17	6-2-17	

This report pertains to the samples analyzed in accordance with the chain of custody,
and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: June 9, 2017
Samples Submitted: May 26, 2017
Laboratory Reference: 1705-324
Project: 21-1-12176-044

TOTAL MANGANESE
EPA 6010C
METHOD BLANK QUALITY CONTROL

Date Extracted:	6-2-17
Date Analyzed:	6-2-17
Matrix:	Water
Units:	ug/L (ppb)
Lab ID:	MB0602WH1

Analyte	Method	Result	PQL
Manganese	6010C	**ND**	10

This report pertains to the samples analyzed in accordance with the chain of custody,
and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: June 9, 2017
Samples Submitted: May 26, 2017
Laboratory Reference: 1705-324
Project: 21-1-12176-044

TOTAL MANGANESE
EPA 6010C
DUPLICATE QUALITY CONTROL

Date Extracted: 6-2-17
Date Analyzed: 6-2-17

Matrix: Water
Units: ug/L (ppb)

Lab ID: 06-016-02

Analyte	Sample Result	Duplicate Result	RPD	PQL	Flags
Manganese	**140**	**149**	6	10	

This report pertains to the samples analyzed in accordance with the chain of custody,
and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: June 9, 2017
Samples Submitted: May 26, 2017
Laboratory Reference: 1705-324
Project: 21-1-12176-044

TOTAL MANGANESE
EPA 6010C
MS/MSD QUALITY CONTROL

Date Extracted: 6-2-17
Date Analyzed: 6-2-17

Matrix: Water
Units: ug/L (ppb)

Lab ID: 06-016-02

Analyte	Spike Level	MS	Percent Recovery	MSD	Percent Recovery	RPD	Flags
Manganese	500	**565**	85	**545**	81	4	

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Date of Report: June 9, 2017
Samples Submitted: May 26, 2017
Laboratory Reference: 1705-324
Project: 21-1-12176-044

DISSOLVED MANGANESE
EPA 6010C

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	05-324-01					
Client ID:	**SVE-16**					
Manganese	**1600**	11	6010C		6-1-17	
Lab ID:	05-324-02					
Client ID:	**SW-25**					
Manganese	**1200**	11	6010C	5-26-17	6-1-17	

This report pertains to the samples analyzed in accordance with the chain of custody,
and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: June 9, 2017
Samples Submitted: May 26, 2017
Laboratory Reference: 1705-324
Project: 21-1-12176-044

DISSOLVED MANGANESE
EPA 6010C
METHOD BLANK QUALITY CONTROL

Date Analyzed: 6-1-17

Matrix: Water
Units: ug/L (ppb)

Lab ID: MB0526F1

Analyte	Method	Result	PQL
Manganese	6010C	**ND**	11

This report pertains to the samples analyzed in accordance with the chain of custody,
and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: June 9, 2017
Samples Submitted: May 26, 2017
Laboratory Reference: 1705-324
Project: 21-1-12176-044

DISSOLVED MANGANESE
EPA 6010C
DUPLICATE QUALITY CONTROL

Date Analyzed: 6-1-17

Matrix: Water
Units: ug/L (ppb)

Lab ID: 05-324-01

Analyte	Sample Result	Duplicate Result	RPD	PQL	Flags
Manganese	**1610**	**1610**	0	11	

This report pertains to the samples analyzed in accordance with the chain of custody,
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Date of Report: June 9, 2017
Samples Submitted: May 26, 2017
Laboratory Reference: 1705-324
Project: 21-1-12176-044

DISSOLVED MANGANESE
EPA 6010C
MS/MSD QUALITY CONTROL

Date Analyzed: 6-1-17

Matrix: Water
Units: ug/L (ppb)

Lab ID: 05-324-01

Analyte	Spike Level	MS	Percent Recovery	MSD	Percent Recovery	RPD	Flags
Manganese	555	**2260**	118	**2270**	119	0	

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and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: June 9, 2017
Samples Submitted: May 26, 2017
Laboratory Reference: 1705-324
Project: 21-1-12176-044

TOTAL ALKALINITY
SM 2320B

Matrix: Water
Units: mg CaCO3/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**SVE-16**					
Laboratory ID:	05-324-01					
Total Alkalinity	**350**	2.0	SM 2320B	6-2-17	6-2-17	
Client ID:	**SW-25**					
Laboratory ID:	05-324-02					
Total Alkalinity	**48**	2.0	SM 2320B	6-2-17	6-2-17	

This report pertains to the samples analyzed in accordance with the chain of custody,
and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: June 9, 2017
Samples Submitted: May 26, 2017
Laboratory Reference: 1705-324
Project: 21-1-12176-044

TOTAL ALKALINITY
SM 2320B
QUALITY CONTROL

Matrix: Water
Units: mg CaCO3/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0602W1					
Total Alkalinity	**ND**	2.0	SM 2320B	6-2-17	6-2-17	

Analyte	Result		Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE									
Laboratory ID:	05-310-01								
	ORIG	DUP							
Total Alkalinity	**92.0**	**90.0**	NA	NA	NA	NA	2	10	
SPIKE BLANK									
Laboratory ID:	SB0602W1								
	SB		SB		SB				
Total Alkalinity	**96.0**		100	NA	96	86-117	NA	NA	

This report pertains to the samples analyzed in accordance with the chain of custody,
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Date of Report: June 9, 2017
Samples Submitted: May 26, 2017
Laboratory Reference: 1705-324
Project: 21-1-12176-044

SULFATE
ASTM D516-07

Matrix: Water
Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**SVE-16**					
Laboratory ID:	05-324-01					
Sulfate	**71**	25	ASTM D516-07	6-2-17	6-5-17	
Client ID:	**SW-25**					
Laboratory ID:	05-324-02					
Sulfate	**150**	50	ASTM D516-07	6-2-17	6-5-17	

This report pertains to the samples analyzed in accordance with the chain of custody,
and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: June 9, 2017
Samples Submitted: May 26, 2017
Laboratory Reference: 1705-324
Project: 21-1-12176-044

SULFATE
ASTM D516-07
QUALITY CONTROL

Matrix: Water
Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0602F1					
Sulfate	**ND**	5.0	ASTM D516-07	6-2-17	6-5-17	

Analyte	Result		Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE									
Laboratory ID:	05-318-01								
	ORIG	DUP							
Sulfate	**204**	**200**	NA	NA	NA	NA	2	10	
MATRIX SPIKE									
Laboratory ID:	05-318-01								
	MS		MS		MS				
Sulfate	**406**		200	204	101	77-129	NA	NA	
SPIKE BLANK									
Laboratory ID:	SB0602F1								
	SB		SB		SB				
Sulfate	**9.50**		10.0	NA	95	91-113	NA	NA	

This report pertains to the samples analyzed in accordance with the chain of custody,
and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: June 9, 2017
Samples Submitted: May 26, 2017
Laboratory Reference: 1705-324
Project: 21-1-12176-044

NITRATE (as Nitrogen)
EPA 353.2

Matrix: Water
Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**SVE-16**					
Laboratory ID:	05-324-01					
Nitrate	**0.082**	0.050	EPA 353.2	5-30-17	5-30-17	
Client ID:	**SW-25**					
Laboratory ID:	05-324-02					
Nitrate	**0.092**	0.050	EPA 353.2	5-30-17	5-30-17	

This report pertains to the samples analyzed in accordance with the chain of custody,
and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: June 9, 2017
Samples Submitted: May 26, 2017
Laboratory Reference: 1705-324
Project: 21-1-12176-044

NITRATE (as Nitrogen)
EPA 353.2
QUALITY CONTROL

Matrix: Water
Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0530W1					
Nitrate	**ND**	0.050	EPA 353.2	5-30-17	5-30-17	

Analyte	Result		Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE									
Laboratory ID:	05-310-01								
	ORIG	DUP							
Nitrate	**0.0597**	**0.0622**	NA	NA	NA	NA	4	9	
MATRIX SPIKE									
Laboratory ID:	05-310-01								
	MS		MS		MS				
Nitrate	**2.26**		2.00	0.0597	110	93-126	NA	NA	
SPIKE BLANK									
Laboratory ID:	SB0530W1								
	SB		SB		SB				
Nitrate	**2.11**		2.00	NA	106	96-122	NA	NA	

This report pertains to the samples analyzed in accordance with the chain of custody,
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OnSite Environmental Inc.

Data Qualifiers and Abbreviations

A - Due to a high sample concentration, the amount spiked is insufficient for meaningful MS/MSD recovery data.

B - The analyte indicated was also found in the blank sample.

C - The duplicate RPD is outside control limits due to high result variability when analyte concentrations are within five times the quantitation limit.

E - The value reported exceeds the quantitation range and is an estimate.

F - Surrogate recovery data is not available due to the high concentration of coeluting target compounds.

H - The analyte indicated is a common laboratory solvent and may have been introduced during sample preparation, and be impacting the sample result.

I - Compound recovery is outside of the control limits.

J - The value reported was below the practical quantitation limit. The value is an estimate.

K - Sample duplicate RPD is outside control limits due to sample inhomogeneity. The sample was re-extracted and re-analyzed with similar results.

L - The RPD is outside of the control limits.

M - Hydrocarbons in the gasoline range are impacting the diesel range result.

M1 - Hydrocarbons in the gasoline range (toluene-napthalene) are present in the sample.

N - Hydrocarbons in the lube oil range are impacting the diesel range result.

N1 - Hydrocarbons in diesel range are impacting lube oil range results.

O - Hydrocarbons indicative of heavier fuels are present in the sample and are impacting the gasoline result.

P - The RPD of the detected concentrations between the two columns is greater than 40.

Q - Surrogate recovery is outside of the control limits.

S - Surrogate recovery data is not available due to the necessary dilution of the sample.

T - The sample chromatogram is not similar to a typical _____.

U - The analyte was analyzed for, but was not detected above the reported sample quantitation limit.

U1 - The practical quantitation limit is elevated due to interferences present in the sample.

V - Matrix Spike/Matrix Spike Duplicate recoveries are outside control limits due to matrix effects.

W - Matrix Spike/Matrix Spike Duplicate RPD are outside control limits due to matrix effects.

X - Sample extract treated with a mercury cleanup procedure.

X1- Sample extract treated with a Sulfuric acid/Silica gel cleanup procedure.

Y - The calibration verification for this analyte exceeded the 20% drift specified in method 8260C, and therefore the reported result should be considered an estimate. The overall performance of the calibration verification standard met the acceptance criteria of the method.

Z -

ND - Not Detected at PQL
PQL - Practical Quantitation Limit
RPD - Relative Percent Difference

This report pertains to the samples analyzed in accordance with the chain of custody, and is intended only for the use of the individual or company to whom it is addressed.

3600 Fremont Ave. N.
Seattle, WA 98103
T: (206) 352-3790
F: (206) 352-7178
info@fremontanalytical.com

OnSite Environmental Inc
David Baumeister
14648 NE 95th Street
Redmond, WA 98052

RE: Seattle Center
Work Order Number: 1705311

May 31, 2017

Attention David Baumeister:

Fremont Analytical, Inc. received 2 sample(s) on 5/26/2017 for the analyses presented in the following report.

Ferrous Iron by SM3500-Fe B

This report consists of the following:

- Case Narrative
- Analytical Results
- Applicable Quality Control Summary Reports
- Chain of Custody

All analyses were performed consistent with the Quality Assurance program of Fremont Analytical, Inc. Please contact the laboratory if you should have any questions about the results.

Thank you for using Fremont Analytical.

Sincerely,

Mike Ridgeway
Laboratory Director

Date: *05/31/2017*

CLIENT: OnSite Environmental Inc
Project: Seattle Center
Work Order: 1705311

Work Order Sample Summary

Lab Sample ID	Client Sample ID	Date/Time Collected	Date/Time Received
1705311-001	SVE-16	05/26/2017 9:55 AM	05/26/2017 11:10 AM
1705311-002	SW-25	05/26/2017 10:40 AM	05/26/2017 11:10 AM

Case Narrative

WO#: **1705311**
Date: **5/31/2017**

CLIENT: OnSite Environmental Inc
Project: Seattle Center

I. SAMPLE RECEIPT:
Samples receipt information is recorded on the attached Sample Receipt Checklist.

II. GENERAL REPORTING COMMENTS:
Results are reported on a wet weight basis unless dry-weight correction is denoted in the units field on the analytical report ("mg/kg-dry" or "ug/kg-dry").

Matrix Spike (MS) and MS Duplicate (MSD) samples are tested from an analytical batch of "like" matrix to check for possible matrix effect. The MS and MSD will provide site specific matrix data only for those samples which are spiked by the laboratory. The sample chosen for spike purposes may or may not have been a sample submitted in this sample delivery group. The validity of the analytical procedures for which data is reported in this analytical report is determined by the Laboratory Control Sample (LCS) and the Method Blank (MB). The LCS and the MB are processed with the samples and the MS/MSD to ensure method criteria are achieved throughout the entire analytical process.

III. ANALYSES AND EXCEPTIONS:
Exceptions associated with this report will be footnoted in the analytical results page(s) or the quality control summary page(s) and/or noted below.

Qualifiers:

* - Flagged value is not within established control limits
B - Analyte detected in the associated Method Blank
D - Dilution was required
E - Value above quantitation range
H - Holding times for preparation or analysis exceeded
I - Analyte with an internal standard that does not meet established acceptance criteria
J - Analyte detected below Reporting Limit
N - Tentatively Identified Compound (TIC)
Q - Analyte with an initial or continuing calibration that does not meet established acceptance criteria (<20%RSD, <20% Drift or minimum RRF)
S - Spike recovery outside accepted recovery limits
ND - Not detected at the Reporting Limit
R - High relative percent difference observed

Acronyms:

%Rec - Percent Recovery
CCB - Continued Calibration Blank
CCV - Continued Calibration Verification
DF - Dilution Factor
HEM - Hexane Extractable Material
ICV - Initial Calibration Verification
LCS/LCSD - Laboratory Control Sample / Laboratory Control Sample Duplicate
MB or MBLANK - Method Blank
MDL - Method Detection Limit
MS/MSD - Matrix Spike / Matrix Spike Duplicate
PDS - Post Digestion Spike
Ref Val - Reference Value
RL - Reporting Limit
RPD - Relative Percent Difference
SD - Serial Dilution
SGT - Silica Gel Treatment
SPK - Spike
Surr - Surrogate

Analytical Report

Work Order: **1705311**
Date Reported: **5/31/2017**

CLIENT: OnSite Environmental Inc
Project: Seattle Center

Lab ID: 1705311-001 **Collection Date:** 5/26/2017 9:55:00 AM
Client Sample ID: **SVE-16** **Matrix:** Groundwater

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Ferrous Iron by SM3500-Fe B				Batch ID: R36447		Analyst: KT
Ferrous Iron	36.6	2.50	D	mg/L	50	5/26/2017 11:35:00 AM

Lab ID: 1705311-002 **Collection Date:** 5/26/2017 10:40:00 AM
Client Sample ID: **SW-25** **Matrix:** Groundwater

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Ferrous Iron by SM3500-Fe B				Batch ID: R36447		Analyst: KT
Ferrous Iron	19.2	2.50	D	mg/L	50	5/26/2017 11:37:00 AM

Fremont Analytical

Date: *5/31/2017*

Work Order: 1705311
CLIENT: OnSite Environmental Inc
Project: Seattle Center

QC SUMMARY REPORT

Ferrous Iron by SM3500-Fe B

Sample ID	MB-R36447	SampType:	MBLK			Units:	mg/L	Prep Date:	5/26/2017		RunNo:	36447	
Client ID:	MBLKW	Batch ID:	R36447					Analysis Date:	5/26/2017		SeqNo:	699182	
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual		
Ferrous Iron	ND	0.0500											

Sample ID	LCS-R36447	SampType:	LCS			Units:	mg/L	Prep Date:	5/26/2017		RunNo:	36447	
Client ID:	LCSW	Batch ID:	R36447					Analysis Date:	5/26/2017		SeqNo:	699183	
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual		
Ferrous Iron	0.908	0.0500	1.000	0	90.8	90	110						

Sample ID	1705305-001ADUP	SampType:	DUP			Units:	mg/L	Prep Date:	5/26/2017		RunNo:	36447	
Client ID:	BATCH	Batch ID:	R36447					Analysis Date:	5/26/2017		SeqNo:	699190	
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual		
Ferrous Iron	10.4	1.00						8.911	15.1	20	D		

Sample ID	1705305-001AMS	SampType:	MS			Units:	mg/L	Prep Date:	5/26/2017		RunNo:	36447	
Client ID:	BATCH	Batch ID:	R36447					Analysis Date:	5/26/2017		SeqNo:	699191	
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual		
Ferrous Iron	31.3	1.00	20.00	8.911	112	85	115				D		

Sample ID	1705305-001AMSD	SampType:	MSD			Units:	mg/L	Prep Date:	5/26/2017		RunNo:	36447	
Client ID:	BATCH	Batch ID:	R36447					Analysis Date:	5/26/2017		SeqNo:	699192	
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual		
Ferrous Iron	31.1	1.00	20.00	8.911	111	85	115	31.35	0.751	20	D		

Sample Log-In Check List

Client Name:	**ONSITE**	Work Order Number:	**1705311**
Logged by:	**Clare Griggs**	Date Received:	**5/26/2017 11:10:00 AM**

Chain of Custody

1.	Is Chain of Custody complete?	Yes ☑	No ☐	Not Present ☐
2.	How was the sample delivered?	Client		

Log In

3.	Coolers are present?	Yes ☑	No ☐	NA ☐
4.	Shipping container/cooler in good condition?	Yes ☑	No ☐	
5.	Custody Seals present on shipping container/cooler? (Refer to comments for Custody Seals not intact)	Yes ☐	No ☐	Not Required ☑
6.	Was an attempt made to cool the samples?	Yes ☑	No ☐	NA ☐
7.	Were all items received at a temperature of >0°C to 10.0°C*	Yes ☐	No ☑	NA ☐
	Samples received straight from field.			
8.	Sample(s) in proper container(s)?	Yes ☑	No ☐	
9.	Sufficient sample volume for indicated test(s)?	Yes ☑	No ☐	
10.	Are samples properly preserved?	Yes ☑	No ☐	
11.	Was preservative added to bottles?	Yes ☐	No ☑	NA ☐
12.	Is there headspace in the VOA vials?	Yes ☐	No ☐	NA ☑
13.	Did all samples containers arrive in good condition(unbroken)?	Yes ☑	No ☐	
14.	Does paperwork match bottle labels?	Yes ☑	No ☐	
15.	Are matrices correctly identified on Chain of Custody?	Yes ☑	No ☐	
16.	Is it clear what analyses were requested?	Yes ☑	No ☐	
17.	Were all holding times able to be met?	Yes ☑	No ☐	

Special Handling (if applicable)

18.	Was client notified of all discrepancies with this order?	Yes ☐	No ☐	NA ☑

Person Notified: _____ Date _____

By Whom: _____ Via: ☐ eMail ☐ Phone ☐ Fax ☐ In Person

Regarding: _____

Client Instructions: _____

19. Additional remarks:

Item Information

Item #	Temp ºC
Cooler	13.9
Sample	14.9

* Note: DoD/ELAP and TNI require items to be received at 4°C +/- 2°C

Chain of Custody Record & Laboratory Services Agreement

Fremont Analytical
3600 Fremont Ave N.
Seattle, WA 98103
Tel: 206-352-3790
Fax: 206-352-7178

Date: 5/26/17 Page: 1 of: 1

Laboratory Project No (internal): 705311

Project Name: Seattle Center

Special Remarks: -Send lab reports to David Baumeister

Project No: 21-1-12176-044

Collected by: EVP

Client: Onsite Environmental

Address: 14648 NE 95th St.

City, State, Zip: Redmond, WA 98052

Telephone: 425-883-3881

Location: Seattle Center

Report To (PM): David Baumeister

PM Email: dbaumeister@onsite-env.com

Sample Disposal: ☐ Return to client ☐ Disposal by lab (after 30 days)

	Sample Name	Sample Date	Sample Time	Sample Type (Matrix)*	VOCs (EPA 8260 / 624) GX/BTEX	BTEX	Gasoline Range Organics (GX)	Hydrocarbon Identification (HCID)	Diesel/Heavy Oil Range Organics (DX)	SVOCs (EPA 8270 / 625)	PAHs (EPA 8270 - SIM)	PCBs (EPA 8082 / 608)	Metals** (EPA 6020 / 200.8) Total (T) | Dissolved (D)	Anions (IC)***	EDB (8011)	Ferrous Fe			Comments
1	SVE-16	5/26/17	0955	GW	X										X				
2	SW-25	5/26/17	1040	GW	X										X				
3																			
4																			
5																			
6																			
7																			
8																			
9																			
10																			

*Matrix: A = Air, AQ = Aqueous, B = Bulk, O = Other, P = Product, S = Soil, SD = Sediment, SL = Solid, W = Water, DW = Drinking Water, GW = Ground Water, SW = Storm Water, WW = Waste Water

**Metals (Circle): MTCA-5 RCRA-8 Priority Pollutants TAL *Individual:* Ag Al As B Ba Be Ca Cd Co Cr Cu Fe Hg K Mg Mn Mo Na Ni Pb Sb Se Sr Sn Ti Tl U V Zn

***Anions (Circle): Nitrate Nitrite Chloride Sulfate Bromide O-Phosphate Fluoride Nitrate+Nitrite

I represent that I am authorized to enter into this Agreement with Fremont Analytical on behalf of the Client named above and that I have verified Client's agreement to each of the terms on the front and backside of this Agreement.

Relinquished	Date/Time	Received	Date/Time
x	5/26/17 1110	x	5/26/17 1110
Relinquished	Date/Time	Received	Date/Time
x		x	

Turn-around Time:
- ☒ Standard
- ☐ 3 Day
- ☐ 2 Day
- ☐ Next Day
- Same Day _____ (specify)

Chain of Custody

Page 1 of 1

OnSite Environmental Inc.
Analytical Laboratory Testing Services
14648 NE 95th Street • Redmond, WA 98052
Phone: (425) 883-3881 • www.onsite-env.com

Company: Shannon & Wilson Inc.
Project Number: 21-1-12176-044
Project Name: Seattle Center
Project Manager: EVP
Sampled by: EVP

Turnaround Request (in working days)

(Check One)

- ☐ Same Day ☐ 1 Day
- ☐ 2 Days ☐ 3 Days
- ☒ Standard (7 Days) (TPH analysis 5 Days)
- ☐ _____ (other)

Laboratory Number: 05-324

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	Number of Containers
1	SVE-16	5/26/17	0950	GW	7
2	SW-25	5/26/17	1040	GW	7

Lab ID	NWTPH-HCID	NWTPH-Gx/BTEX	NWTPH-Gx	NWTPH-Dx (☐ Acid / SG Clean-up)	Volatiles 8260C	Halogenated Volatiles 8260C	EDB EPA 8011 (Waters Only)	Semivolatiles 8270D/SIM (with low-level PAHs)	PAHs 8270D/SIM (low-level)	PCBs 8082A	Organochlorine Pesticides 8081B	Organophosphorus Pesticides 8270D/SIM	Chlorinated Acid Herbicides 8151A	Total RCRA Metals	Total MTCA Metals	TCLP Metals	HEM (oil and grease) 1664A	total & diss manganese	alkalinity	sulfate	nitrate	% Moisture	Ferrous Iron
1		X																X	X	X	X		X
2		X																X	X	X	X		X

	Signature	Company	Date	Time
Relinquished		SAW	5/26/17	1200
Received		ALPHA	5/26/17	12:00
Relinquished		ALPHA	5/26/17	14:12
Received		ALPHA	5/26/17	1412
Relinquished				
Received				
Reviewed/Date		Reviewed/Date		

Comments/Special Instructions

- SVE-16 is field filtered for diss. manganese
- SW-25 is not field filtered for diss. manganese

Data Package: Standard ☐ Level III ☐ Level IV ☐

Chromatograms with final report ☐ Electronic Data Deliverables (EDDs) ☒

OnSite Environmental Inc.
14648 NE 95th Street, Redmond, WA 98052 • (425) 883-3881

June 8, 2017

Edwin Ptak
Shannon & Wilson, Inc.
400 N 34th Street, Suite 100
Seattle, WA 98103

Re: Analytical Data for Project 21-1-12176-044
Laboratory Reference No. 1705-345

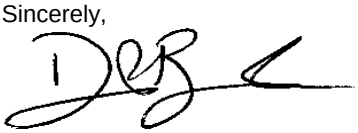
Dear Edwin:

Enclosed are the analytical results and associated quality control data for samples submitted on May 31, 2017.

The standard policy of OnSite Environmental, Inc. is to store your samples for 30 days from the date of receipt. If you require longer storage, please contact the laboratory.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning the data, or need additional information, please feel free to call me.

Sincerely,



David Baumeister
Project Manager

Enclosures

This report pertains to the samples analyzed in accordance with the chain of custody, and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: June 8, 2017
Samples Submitted: May 31, 2017
Laboratory Reference: 1705-345
Project: 21-1-12176-044

Case Narrative

Samples were collected on May 30, 2017 and received by the laboratory on May 31, 2017. They were maintained at the laboratory at a temperature of 2°C to 6°C.

Please note that any and all soil sample results are reported on a dry-weight basis, unless otherwise noted below.

General QA/QC issues associated with the analytical data enclosed in this laboratory report will be indicated with a reference to a comment or explanation on the Data Qualifier page. More complex and involved QA/QC issues will be discussed in detail below.

Nitrate EPA 353.2 Analysis

The reported Nitrate results are a calculated value based on the subtraction of Nitrite from the Nitrate plus Nitrite result. The Nitrite analysis, which has a 48-hour holding time, was performed within the holding time. Immediately after this analysis, an aliquot of the samples was preserved with concentrated sulfuric acid and stored at 4 degrees C. The preserved samples were then analyzed within the maximum 28-day holding time for the Nitrate plus Nitrite analysis

Any other QA/QC issues associated with this extraction and analysis will be indicated with a footnote reference and discussed in detail on the Data Qualifier page.

This report pertains to the samples analyzed in accordance with the chain of custody, and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: June 8, 2017
Samples Submitted: May 31, 2017
Laboratory Reference: 1705-345
Project: 21-1-12176-044

NWTPH-Gx/BTEX

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**SVE-13**					
Laboratory ID:	05-345-01					
Benzene	**ND**	4.0	EPA 8021B	6-1-17	6-1-17	
Toluene	**ND**	4.0	EPA 8021B	6-1-17	6-1-17	
Ethyl Benzene	**ND**	4.0	EPA 8021B	6-1-17	6-1-17	
m,p-Xylene	**ND**	4.0	EPA 8021B	6-1-17	6-1-17	
o-Xylene	**ND**	4.0	EPA 8021B	6-1-17	6-1-17	
Gasoline	**ND**	400	NWTPH-Gx	6-1-17	6-1-17	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*90*	*61-118*				

This report pertains to the samples analyzed in accordance with the chain of custody, and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: June 8, 2017
Samples Submitted: May 31, 2017
Laboratory Reference: 1705-345
Project: 21-1-12176-044

NWTPH-Gx/BTEX
QUALITY CONTROL

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0601W1					
Benzene	**ND**	1.0	EPA 8021B	6-1-17	6-1-17	
Toluene	**ND**	1.0	EPA 8021B	6-1-17	6-1-17	
Ethyl Benzene	**ND**	1.0	EPA 8021B	6-1-17	6-1-17	
m,p-Xylene	**ND**	1.0	EPA 8021B	6-1-17	6-1-17	
o-Xylene	**ND**	1.0	EPA 8021B	6-1-17	6-1-17	
Gasoline	**ND**	100	NWTPH-Gx	6-1-17	6-1-17	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*92*	*61-118*				

Analyte	Result		Spike Level		Source Result	Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE											
Laboratory ID:	05-344-01										
	ORIG	DUP									
Benzene	**ND**	**ND**	NA	NA		NA		NA	NA	30	
Toluene	**ND**	**ND**	NA	NA		NA		NA	NA	30	
Ethyl Benzene	**ND**	**ND**	NA	NA		NA		NA	NA	30	
m,p-Xylene	**ND**	**ND**	NA	NA		NA		NA	NA	30	
o-Xylene	**ND**	**ND**	NA	NA		NA		NA	NA	30	
Gasoline	**ND**	**ND**	NA	NA		NA		NA	NA	30	
Surrogate:											
Fluorobenzene						*95*	*101*	*61-118*			
MATRIX SPIKES											
Laboratory ID:	05-344-01										
	MS	MSD	MS	MSD		MS	MSD				
Benzene	**51.4**	**52.9**	50.0	50.0	ND	**103**	**106**	80-120	3	13	
Toluene	**52.6**	**53.7**	50.0	50.0	ND	**105**	**107**	81-115	2	14	
Ethyl Benzene	**53.2**	**54.3**	50.0	50.0	ND	**106**	**109**	81-114	2	12	
m,p-Xylene	**53.4**	**54.2**	50.0	50.0	ND	**107**	**108**	81-114	1	13	
o-Xylene	**53.3**	**54.2**	50.0	50.0	ND	**107**	**108**	81-113	2	11	
Surrogate:											
Fluorobenzene						*107*	*111*	*61-118*			

This report pertains to the samples analyzed in accordance with the chain of custody, and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: June 8, 2017
Samples Submitted: May 31, 2017
Laboratory Reference: 1705-345
Project: 21-1-12176-044

TOTAL ALKALINITY
SM 2320B

Matrix: Water
Units: mg CaCO3/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**SVE-13**					
Laboratory ID:	05-345-01					
Total Alkalinity	**810**	2.0	SM 2320B	6-2-17	6-2-17	

This report pertains to the samples analyzed in accordance with the chain of custody,
and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: June 8, 2017
Samples Submitted: May 31, 2017
Laboratory Reference: 1705-345
Project: 21-1-12176-044

TOTAL ALKALINITY
SM 2320B
QUALITY CONTROL

Matrix: Water
Units: mg CaCO3/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0602W1					
Total Alkalinity	**ND**	2.0	SM 2320B	6-2-17	6-2-17	

Analyte	Result		Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE									
Laboratory ID:	05-310-01								
	ORIG	DUP							
Total Alkalinity	**92.0**	**90.0**	NA	NA	NA	NA	2	10	
SPIKE BLANK									
Laboratory ID:	SB0602W1								
	SB		SB		SB				
Total Alkalinity	**96.0**		100	NA	96	86-117	NA	NA	

This report pertains to the samples analyzed in accordance with the chain of custody, and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: June 8, 2017
Samples Submitted: May 31, 2017
Laboratory Reference: 1705-345
Project: 21-1-12176-044

TOTAL MANGANESE
EPA 6010C

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	05-345-01					
Client ID:	**SVE-13**					
Manganese	**4700**	50	6010C	6-2-17	6-7-17	

This report pertains to the samples analyzed in accordance with the chain of custody,
and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: June 8, 2017
Samples Submitted: May 31, 2017
Laboratory Reference: 1705-345
Project: 21-1-12176-044

TOTAL MANGANESE
EPA 6010C
METHOD BLANK QUALITY CONTROL

Date Extracted:	6-2-17
Date Analyzed:	6-2-17
Matrix:	Water
Units:	ug/L (ppb)
Lab ID:	MB0602WH1

Analyte	Method	Result	PQL
Manganese	6010C	**ND**	10

This report pertains to the samples analyzed in accordance with the chain of custody,
and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: June 8, 2017
Samples Submitted: May 31, 2017
Laboratory Reference: 1705-345
Project: 21-1-12176-044

TOTAL MANGANESE
EPA 6010C
DUPLICATE QUALITY CONTROL

Date Extracted: 6-2-17
Date Analyzed: 6-2-17

Matrix: Water
Units: ug/L (ppb)

Lab ID: 06-016-02

Analyte	Sample Result	Duplicate Result	RPD	PQL	Flags
Manganese	**140**	**149**	6	10	

This report pertains to the samples analyzed in accordance with the chain of custody, and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: June 8, 2017
Samples Submitted: May 31, 2017
Laboratory Reference: 1705-345
Project: 21-1-12176-044

TOTAL MANGANESE
EPA 6010C
MS/MSD QUALITY CONTROL

Date Extracted: 6-2-17
Date Analyzed: 6-2-17

Matrix: Water
Units: ug/L (ppb)

Lab ID: 06-016-02

Analyte	Spike Level	MS	Percent Recovery	MSD	Percent Recovery	RPD	Flags
Manganese	500	**565**	85	**545**	81	4	

This report pertains to the samples analyzed in accordance with the chain of custody,
and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: June 8, 2017
Samples Submitted: May 31, 2017
Laboratory Reference: 1705-345
Project: 21-1-12176-044

DISSOLVED MANGANESE
EPA 6010C

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	05-345-01					
Client ID:	**SVE-13**					
Manganese	**3400**	50	6010C	5-31-17	6-2-17	

This report pertains to the samples analyzed in accordance with the chain of custody,
and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: June 8, 2017
Samples Submitted: May 31, 2017
Laboratory Reference: 1705-345
Project: 21-1-12176-044

DISSOLVED MANGANESE
EPA 6010C
METHOD BLANK QUALITY CONTROL

Date Filtered:	5-31-17
Date Analyzed:	6-1-17
Matrix:	Water
Units:	ug/L (ppb)
Lab ID:	MB0531F1

Analyte	Method	Result	PQL
Manganese	6010C	**ND**	11

This report pertains to the samples analyzed in accordance with the chain of custody,
and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: June 8, 2017
Samples Submitted: May 31, 2017
Laboratory Reference: 1705-345
Project: 21-1-12176-044

DISSOLVED MANGANESE
EPA 6010C
DUPLICATE QUALITY CONTROL

Date Filtered:
Date Analyzed: 6-1-17

Matrix: Water
Units: ug/L (ppb)

Lab ID: 05-324-01

Analyte	Sample Result	Duplicate Result	RPD	PQL	Flags
Manganese	**1610**	**1610**	0	11	

This report pertains to the samples analyzed in accordance with the chain of custody,
and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: June 8, 2017
Samples Submitted: May 31, 2017
Laboratory Reference: 1705-345
Project: 21-1-12176-044

DISSOLVED MANGANESE
EPA 6010C
MS/MSD QUALITY CONTROL

Date Filtered:
Date Analyzed: 6-2-17

Matrix: Water
Units: ug/L (ppb)

Lab ID: 05-324-01

Analyte	Spike Level	MS	Percent Recovery	MSD	Percent Recovery	RPD	Flags
Manganese	555	**2260**	118	**2270**	119	0	

This report pertains to the samples analyzed in accordance with the chain of custody,
and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: June 8, 2017
Samples Submitted: May 31, 2017
Laboratory Reference: 1705-345
Project: 21-1-12176-044

SULFATE
ASTM D516-07

Matrix: Water
Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**SVE-13**					
Laboratory ID:	05-345-01					
Sulfate	**42**	10	ASTM D516-07	6-2-17	6-5-17	

This report pertains to the samples analyzed in accordance with the chain of custody,
and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: June 8, 2017
Samples Submitted: May 31, 2017
Laboratory Reference: 1705-345
Project: 21-1-12176-044

SULFATE
ASTM D516-07
QUALITY CONTROL

Matrix: Water
Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0602F1					
Sulfate	**ND**	5.0	ASTM D516-07	6-2-17	6-5-17	

Analyte	Result		Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE									
Laboratory ID:	05-318-01								
	ORIG	DUP							
Sulfate	**204**	**200**	NA	NA	NA	NA	2	10	
MATRIX SPIKE									
Laboratory ID:	05-318-01								
	MS		MS		MS				
Sulfate	**406**		200	204	101	77-129	NA	NA	
SPIKE BLANK									
Laboratory ID:	SB0602F1								
	SB		SB		SB				
Sulfate	**9.50**		10.0	NA	95	91-113	NA	NA	

This report pertains to the samples analyzed in accordance with the chain of custody,
and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: June 8, 2017
Samples Submitted: May 31, 2017
Laboratory Reference: 1705-345
Project: 21-1-12176-044

NITRATE (as Nitrogen)
EPA 353.2

Matrix: Water
Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**SVE-13**					
Laboratory ID:	05-345-01					
Nitrate	**ND**	0.050	EPA 353.2	6-6-17	6-6-17	

This report pertains to the samples analyzed in accordance with the chain of custody,
and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: June 8, 2017
Samples Submitted: May 31, 2017
Laboratory Reference: 1705-345
Project: 21-1-12176-044

NITRATE (as Nitrogen)
EPA 353.2
QUALITY CONTROL

Matrix: Water
Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0606W1					
Nitrate	**ND**	0.050	EPA 353.2	6-6-17	6-6-17	

Analyte	Result		Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE									
Laboratory ID:	05-345-01								
	ORIG	DUP							
Nitrate	**ND**	**ND**	NA	NA	NA	NA	NA	9	
MATRIX SPIKE									
Laboratory ID:	05-345-01								
	MS		MS		MS				
Nitrate	**2.33**		2.00	ND	117	93-126	NA	NA	
SPIKE BLANK									
Laboratory ID:	SB0606W1								
	SB		SB		SB				
Nitrate	**2.30**		2.00	NA	115	96-122	NA	NA	

This report pertains to the samples analyzed in accordance with the chain of custody,
and is intended only for the use of the individual or company to whom it is addressed.

OnSite Environmental Inc.

Data Qualifiers and Abbreviations

A - Due to a high sample concentration, the amount spiked is insufficient for meaningful MS/MSD recovery data.

B - The analyte indicated was also found in the blank sample.

C - The duplicate RPD is outside control limits due to high result variability when analyte concentrations are within five times the quantitation limit.

E - The value reported exceeds the quantitation range and is an estimate.

F - Surrogate recovery data is not available due to the high concentration of coeluting target compounds.

H - The analyte indicated is a common laboratory solvent and may have been introduced during sample preparation, and be impacting the sample result.

I - Compound recovery is outside of the control limits.

J - The value reported was below the practical quantitation limit. The value is an estimate.

K - Sample duplicate RPD is outside control limits due to sample inhomogeneity. The sample was re-extracted and re-analyzed with similar results.

L - The RPD is outside of the control limits.

M - Hydrocarbons in the gasoline range are impacting the diesel range result.

M1 - Hydrocarbons in the gasoline range (toluene-napthalene) are present in the sample.

N - Hydrocarbons in the lube oil range are impacting the diesel range result.

N1 - Hydrocarbons in diesel range are impacting lube oil range results.

O - Hydrocarbons indicative of heavier fuels are present in the sample and are impacting the gasoline result.

P - The RPD of the detected concentrations between the two columns is greater than 40.

Q - Surrogate recovery is outside of the control limits.

S - Surrogate recovery data is not available due to the necessary dilution of the sample.

T - The sample chromatogram is not similar to a typical _____.

U - The analyte was analyzed for, but was not detected above the reported sample quantitation limit.

U1 - The practical quantitation limit is elevated due to interferences present in the sample.

V - Matrix Spike/Matrix Spike Duplicate recoveries are outside control limits due to matrix effects.

W - Matrix Spike/Matrix Spike Duplicate RPD are outside control limits due to matrix effects.

X - Sample extract treated with a mercury cleanup procedure.

X1- Sample extract treated with a Sulfuric acid/Silica gel cleanup procedure.

Y - The calibration verification for this analyte exceeded the 20% drift specified in method 8260C, and therefore the reported result should be considered an estimate. The overall performance of the calibration verification standard met the acceptance criteria of the method.

Z -

ND - Not Detected at PQL
PQL - Practical Quantitation Limit
RPD - Relative Percent Difference

This report pertains to the samples analyzed in accordance with the chain of custody, and is intended only for the use of the individual or company to whom it is addressed.

3600 Fremont Ave. N.
Seattle, WA 98103
T: (206) 352-3790
F: (206) 352-7178
info@fremontanalytical.com

OnSite Environmental Inc
David Baumeister
14648 NE 95th Street
Redmond, WA 98052

RE: Seattle Center
Work Order Number: 1705341

June 02, 2017

Attention David Baumeister:

Fremont Analytical, Inc. received 1 sample(s) on 5/30/2017 for the analyses presented in the following report.

Ferrous Iron by SM3500-Fe B

This report consists of the following:

- Case Narrative
- Analytical Results
- Applicable Quality Control Summary Reports
- Chain of Custody

All analyses were performed consistent with the Quality Assurance program of Fremont Analytical, Inc. Please contact the laboratory if you should have any questions about the results.

Thank you for using Fremont Analytical.

Sincerely,

Mike Ridgeway
Laboratory Director

Date: *06/02/2017*

CLIENT: OnSite Environmental Inc
Project: Seattle Center
Work Order: 1705341

Work Order Sample Summary

Lab Sample ID	Client Sample ID	Date/Time Collected	Date/Time Received
1705341-001	SVE-13	05/30/2017 2:30 PM	05/30/2017 2:40 PM

Case Narrative

WO#: **1705341**
Date: **6/2/2017**

CLIENT: OnSite Environmental Inc
Project: Seattle Center

I. SAMPLE RECEIPT:
Samples receipt information is recorded on the attached Sample Receipt Checklist.

II. GENERAL REPORTING COMMENTS:
Results are reported on a wet weight basis unless dry-weight correction is denoted in the units field on the analytical report ("mg/kg-dry" or "ug/kg-dry").

Matrix Spike (MS) and MS Duplicate (MSD) samples are tested from an analytical batch of "like" matrix to check for possible matrix effect. The MS and MSD will provide site specific matrix data only for those samples which are spiked by the laboratory. The sample chosen for spike purposes may or may not have been a sample submitted in this sample delivery group. The validity of the analytical procedures for which data is reported in this analytical report is determined by the Laboratory Control Sample (LCS) and the Method Blank (MB). The LCS and the MB are processed with the samples and the MS/MSD to ensure method criteria are achieved throughout the entire analytical process.

III. ANALYSES AND EXCEPTIONS:
Exceptions associated with this report will be footnoted in the analytical results page(s) or the quality control summary page(s) and/or noted below.

Qualifiers:

* - Flagged value is not within established control limits
B - Analyte detected in the associated Method Blank
D - Dilution was required
E - Value above quantitation range
H - Holding times for preparation or analysis exceeded
I - Analyte with an internal standard that does not meet established acceptance criteria
J - Analyte detected below Reporting Limit
N - Tentatively Identified Compound (TIC)
Q - Analyte with an initial or continuing calibration that does not meet established acceptance criteria (<20%RSD, <20% Drift or minimum RRF)
S - Spike recovery outside accepted recovery limits
ND - Not detected at the Reporting Limit
R - High relative percent difference observed

Acronyms:

%Rec - Percent Recovery
CCB - Continued Calibration Blank
CCV - Continued Calibration Verification
DF - Dilution Factor
HEM - Hexane Extractable Material
ICV - Initial Calibration Verification
LCS/LCSD - Laboratory Control Sample / Laboratory Control Sample Duplicate
MB or MBLANK - Method Blank
MDL - Method Detection Limit
MS/MSD - Matrix Spike / Matrix Spike Duplicate
PDS - Post Digestion Spike
Ref Val - Reference Value
RL - Reporting Limit
RPD - Relative Percent Difference
SD - Serial Dilution
SGT - Silica Gel Treatment
SPK - Spike
Surr - Surrogate

Analytical Report

Work Order: **1705341**
Date Reported: **6/2/2017**

Client: OnSite Environmental Inc
Collection Date: 5/30/2017 2:30:00 PM
Project: Seattle Center
Lab ID: 1705341-001
Matrix: Groundwater
Client Sample ID: **SVE-13**

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Ferrous Iron by SM3500-Fe B				Batch ID: R36506		Analyst: KT
Ferrous Iron	14.2	2.50	D	mg/L	50	5/31/2017 12:51:00 PM

Fremont Analytical

Date: *6/2/2017*

Work Order: 1705341
CLIENT: OnSite Environmental Inc
Project: Seattle Center

QC SUMMARY REPORT

Ferrous Iron by SM3500-Fe B

Sample ID	**MB-R36506**	SampType: **MBLK**			Units: **mg/L**		Prep Date: **5/31/2017**		RunNo: **36506**		
Client ID:	**MBLKW**	Batch ID: **R36506**					Analysis Date: **5/31/2017**		SeqNo: **700387**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Ferrous Iron	ND	0.0500									

Sample ID	**LCS-R36506**	SampType: **LCS**			Units: **mg/L**		Prep Date: **5/31/2017**		RunNo: **36506**		
Client ID:	**LCSW**	Batch ID: **R36506**					Analysis Date: **5/31/2017**		SeqNo: **700388**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Ferrous Iron	1.03	0.0500	1.000	0	103	90	110				

Sample ID	**1705341-001ADUP**	SampType: **DUP**			Units: **mg/L**		Prep Date: **5/31/2017**		RunNo: **36506**		
Client ID:	**SVE-13**	Batch ID: **R36506**					Analysis Date: **5/31/2017**		SeqNo: **700390**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Ferrous Iron	12.4	2.50						14.18	13.2	20	D

Sample ID	**1705341-001AMS**	SampType: **MS**			Units: **mg/L**		Prep Date: **5/31/2017**		RunNo: **36506**		
Client ID:	**SVE-13**	Batch ID: **R36506**					Analysis Date: **5/31/2017**		SeqNo: **700391**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Ferrous Iron	65.3	2.50	50.00	14.18	102	85	115				D

Sample ID	**1705341-001AMSD**	SampType: **MSD**			Units: **mg/L**		Prep Date: **5/31/2017**		RunNo: **36506**		
Client ID:	**SVE-13**	Batch ID: **R36506**					Analysis Date: **5/31/2017**		SeqNo: **700392**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Ferrous Iron	64.9	2.50	50.00	14.18	101	85	115	65.35	0.721	20	D

Sample Log-In Check List

Client Name:	**ONSITE**	Work Order Number:	**1705341**
Logged by:	**Clare Griggs**	Date Received:	**5/30/2017 2:40:00 PM**

Chain of Custody

1.	Is Chain of Custody complete?	Yes ☑	No ☐	Not Present ☐
2.	How was the sample delivered?	Client		

Log In

3.	Coolers are present?	Yes ☑	No ☐	NA ☐
4.	Shipping container/cooler in good condition?	Yes ☑	No ☐	
5.	Custody Seals present on shipping container/cooler? (Refer to comments for Custody Seals not intact)	Yes ☐	No ☐	Not Required ☑
6.	Was an attempt made to cool the samples?	Yes ☑	No ☐	NA ☐
7.	Were all items received at a temperature of >0°C to 10.0°C*	Yes ☐	No ☑	NA ☐
	Sample received straight from field.			
8.	Sample(s) in proper container(s)?	Yes ☑	No ☐	
9.	Sufficient sample volume for indicated test(s)?	Yes ☑	No ☐	
10.	Are samples properly preserved?	Yes ☑	No ☐	
11.	Was preservative added to bottles?	Yes ☐	No ☑	NA ☐
12.	Is there headspace in the VOA vials?	Yes ☐	No ☐	NA ☑
13.	Did all samples containers arrive in good condition(unbroken)?	Yes ☑	No ☐	
14.	Does paperwork match bottle labels?	Yes ☑	No ☐	
15.	Are matrices correctly identified on Chain of Custody?	Yes ☑	No ☐	
16.	Is it clear what analyses were requested?	Yes ☑	No ☐	
17.	Were all holding times able to be met?	Yes ☑	No ☐	

Special Handling (if applicable)

18.	Was client notified of all discrepancies with this order?	Yes ☐	No ☐	NA ☑

Person Notified: _____ Date _____

By Whom: _____ Via: ☐ eMail ☐ Phone ☐ Fax ☐ In Person

Regarding: _____

Client Instructions: _____

19. Additional remarks:

Item Information

Item #	Temp ºC
Cooler	4.5
Sample	10.4

* Note: DoD/ELAP and TNI require items to be received at 4°C +/- 2°C

Fremont Analytical
3600 Fremont Ave N.
Seattle, WA 98103
Tel: 206-352-3790
Fax: 206-352-7178

Chain of Custody Record & Laboratory Services Agreement

Date: 5/30/17 Page: 1 of: 1

Laboratory Project No (internal): 1705341

Project Name: Seattle Center

Special Remarks:

Client: Onsite Environmental

Project No: 21-1-13176-044

Address: 14648 NE 95th St.

Collected by: EVP

City, State, Zip: Redmond WA 98052

Location: Seattle Cntr

Telephone: 425-883-3881

Report To (PM): Dave Baumeister

Sample Disposal: ☐ Return to client ☐ Disposal by lab (after 30 days)

Fax:

PM Email: dbaumeister@onsite-env.com

	Sample Name	Sample Date	Sample Time	Sample Type (Matrix)*	VOCs (EPA 8260 / 624)	GX/BTEX	BTEX	Gasoline Range Organics (GX)	Hydrocarbon Identification (HCID)	Diesel/Heavy Oil Range Organics (DX)	SVOCs (EPA 8270 / 625)	PAHs (EPA 8270 - SIM)	PCBs (EPA 8082 / 608)	Metals** (EPA 6020 / 200.8)	Total (T) | Dissolved (D)	Anions (IC)***	EDB (8011)	Ferrous Fe				Comments
1	SVE-13	5/30/17	1430	GW													X					
2																						
3																						
4																						
5																						
6																						
7																						
8																						
9																						
10																						

*Matrix: A = Air, AQ = Aqueous, B = Bulk, O = Other, P = Product, S = Soil, SD = Sediment, SL = Solid, W = Water, DW = Drinking Water, GW = Ground Water, SW = Storm Water, WW = Waste Water

**Metals (Circle): MTCA-5 RCRA-8 Priority Pollutants TAL *Individual:* Ag Al As B Ba Be Ca Cd Co Cr Cu Fe Hg K Mg Mn Mo Na Ni Pb Sb Se Sr Sn Ti Tl U V Zn

***Anions (Circle): Nitrate Nitrite Chloride Sulfate Bromide O-Phosphate Fluoride Nitrate+Nitrite

I represent that I am authorized to enter into this Agreement with Fremont Analytical on behalf of the Client named above and that I have verified Client's agreement to each of the terms on the front and backside of this Agreement.

Relinquished	Date/Time	Received	Date/Time
x	5/30/17 1440	x	5/30/2017 1440
Relinquished	Date/Time	Received	Date/Time
x		x	

Turn-around Time:

- ☒ Standard
- ☐ 3 Day
- ☐ 2 Day
- ☐ Next Day
- Same Day _____ (specify)

Chain of Custody

OnSite Environmental Inc.
Analytical Laboratory Testing Services
14648 NE 95th Street • Redmond, WA 98052
Phone: (425) 883-3881 • www.onsite-env.com

Company: Shannon & Wilson
Project Number: 21-1-12176-044
Project Name: Seattle Center
Project Manager: EVP
Sampled by: EVP

Turnaround Request (in working days)
(Check One)
☐ Same Day ☐ 1 Day
☐ 2 Days ☐ 3 Days
☒ Standard (7 Days) (TPH analysis 5 Days)
☐ _____ (other)

Laboratory Number: 05-345

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	Number of Containers	NWTPH-HCID	NWTPH-Gx/BTEX	NWTPH-Gx	NWTPH-Dx (☐ Acid / SG Clean-up)	Volatiles 8260C	Halogenated Volatiles 8260C	EDB EPA 8011 (Waters Only)	Semivolatiles 8270D/SIM (with low-level PAHs)	PAHs 8270D/SIM (low-level)	PCBs 8082A	Organochlorine Pesticides 8081B	Organophosphorus Pesticides 8270D/SIM	Chlorinated Acid Herbicides 8151A	Total RCRA Metals	Total MTCA Metals	TCLP Metals	HEM (oil and grease) 1664A	alkalinity	total & diss manganese	sulfate	nitrate	%Moisture	Ferrous Iron
1	SVE-13	5/30/17	1430	GW	7		X																X	X	XX	X	X

	Signature	Company	Date	Time
Relinquished		SdW	5/31/17	0800
Received		GRedD7	5/31/17	837
Relinquished		GRedD7	5/7/17	1207
Received		Circle Ec	5/31/17	1707
Relinquished				
Received				
Reviewed/Date		Reviewed/Date		

Comments/Special Instructions
*dissolved metals are not field filtered

Data Package: Standard ☐ Level III ☐ Level IV ☐

Chromatograms with final report ☐ Electronic Data Deliverables (EDDs) ☒

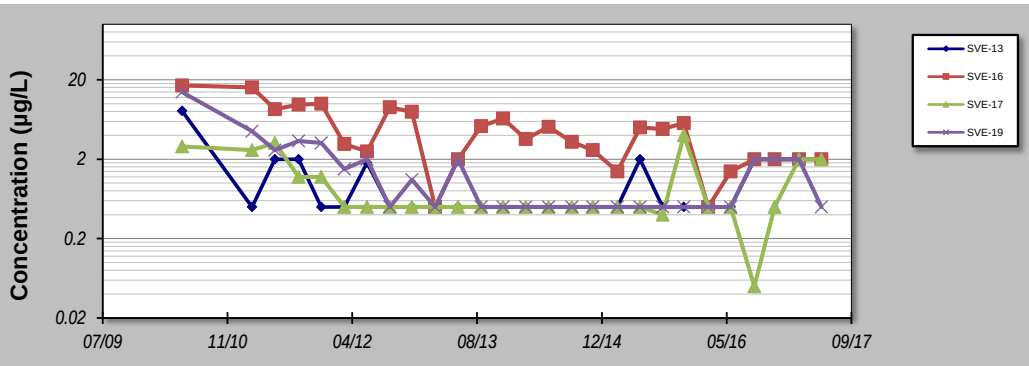
APPENDIX B

PLUME STATUS EVALUATION

GSI MANN-KENDALL TOOLKIT
for Constituent Trend Analysis

Evaluation Date: 1-Aug-17
Facility Name: Seattle Center
Conducted By: EVP
Job ID: 21-1-12176-046
Constituent: benzene
Concentration Units: µg/L

Sampling Point ID:	SVE-13	SVE-16	SVE-17	SVE-19			
Sampling Event	Sampling Date	BENZENE CONCENTRATION (µg/L)						
1	5/20/2010	8.1	17	2.9	14			
2	2/24/2011	0.5	16	2.6	4.5			
3	5/27/2011	2	8.5	3.2	2.6			
4	8/30/2011	2	9.7	1.2	3.4			
5	11/29/2011	0.5	10	1.2	3.2			
6	2/29/2012	0.5	3.1	0.5	1.5			
7	5/30/2012	1.8	2.5	0.5	2			
8	8/30/2012	0.5	9	0.5	0.5			
9	11/26/2012	0.5	7.9	0.5	1.1			
10	2/27/2013	0.5	0.5	0.5	0.5			
11	5/30/2013	0.5	2	0.5	2			
12	8/30/2013		5.2	0.5	0.5			
13	11/26/2013	0.5	6.5	0.5	0.5			
14	2/25/2014	0.5	3.6	0.5	0.5			
15	5/28/2014	0.5	5.1	0.5	0.5			
16	8/29/2014	0.5	3.3	0.5	0.5			
17	11/21/2014	0.5	2.6	0.5	0.5			
18	2/27/2015	0.5	1.4	0.5	0.5			
19	5/29/2015	2	5	0.5	0.5			
20	8/28/2015	0.5	4.8	0.4	0.5			
21	11/20/2015	0.5	5.7	4	0.5			
22	2/26/2016	0.5	0.5	0.5	0.5			
23	5/26/2016	0.5	1.4	0.5	0.5			
24	8/29/2016	2	2	0.05	2			
25	11/18/2016	2	2	0.5	2			
26	2/24/2017	2	2	2	2			
27	5/25/2017	2	2	2	0.5			
28								
29								
30								
Coefficient of Variation:		1.25	0.84	0.99	1.52			
Mann-Kendall Statistic (S):		14	-177	-77	-124			
Confidence Factor:		61.2%	>99.9%	94.3%	99.6%			
Concentration Trend:		No Trend	Decreasing	Prob. Decreasing	Decreasing			



Notes:

1. At least four independent sampling events per well are required for calculating the trend. *Methodology is valid for 4 to 40 samples.*
2. Confidence in Trend = Confidence (in percent) that constituent concentration is increasing (S>0) or decreasing (S<0): >95% = Increasing or Decreasing; ≥ 90% = Probably Increasing or Probably Decreasing; < 90% and S>0 = No Trend; < 90%, S≤0, and COV ≥ 1 = No Trend; < 90% and COV < 1 = Stable.
3. Methodology based on "MAROS: A Decision Support System for Optimizing Monitoring Plans", J.J. Aziz, M. Ling, H.S. Rifai, C.J. Newell, and J.R. Gonzales, *Ground Water* , 41(3):355-367, 2003.

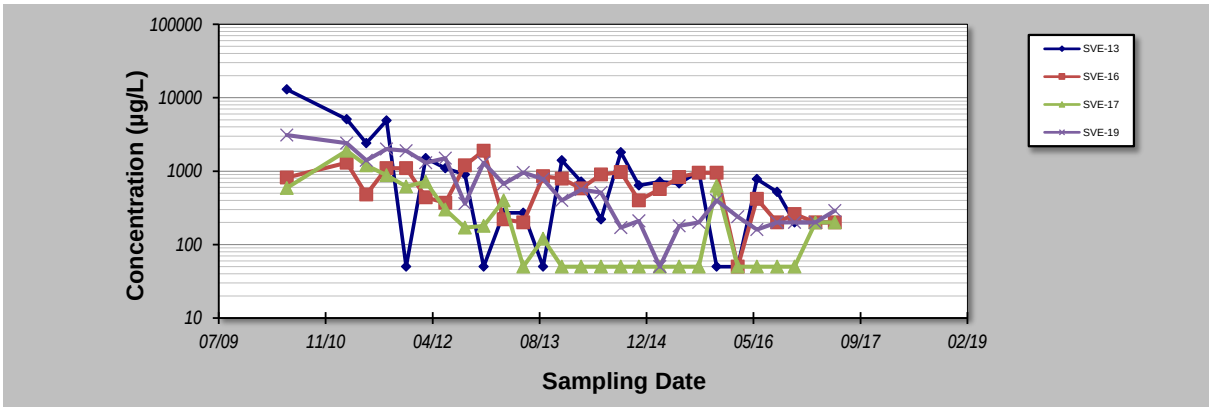
DISCLAIMER: The GSI Mann-Kendall Toolkit is available "as is". Considerable care has been exercised in preparing this software product; however, no party, including without limitation GSI Environmental Inc., makes any representation or warranty regarding the accuracy, correctness, or completeness of the information contained herein, and no such party shall be liable for any direct, indirect, consequential, incidental or other damages resulting from the use of this product or the information contained herein. Information in this publication is subject to change without notice. GSI Environmental Inc., disclaims any responsibility or obligation to update the information contained herein.

GSI MANN-KENDALL TOOLKIT
for Constituent Trend Analysis

Evaluation Date: 1-Aug-17
Facility Name: Seattle Center
Conducted By: EVP

Job ID: 21-1-12176-046
Constituent: TPH-gas
Concentration Units: µg/L

Sampling Point ID:	SVE-13	SVE-16	SVE-17	SVE-19			
Sampling Event	Sampling Date	TPH-GAS CONCENTRATION (µg/L)						
1	5/20/2010	13000	820	590	3100			
2	2/24/2011	5100	1300	1900	2400			
3	5/27/2011	2400	480	1200	1400			
4	8/30/2011	4900	1100	880	2000			
5	11/29/2011	50	1100	620	1900			
6	2/29/2012	1500	440	720	1300			
7	5/30/2012	1100	370	300	1500			
8	8/30/2012	900	1200	170	360			
9	11/26/2012	50	1900	180	1300			
10	2/27/2013	270	220	400	670			
11	5/30/2013	270	200	50	960			
12	8/30/2013	50	850	120	780			
13	11/26/2013	1400	790	50	400			
14	2/25/2014	720	580	50	560			
15	5/28/2014	220	900	50	510			
16	8/29/2014	1800	970	50	170			
17	11/21/2014	640	400	50	210			
18	2/27/2015	720	570	50	50			
19	5/29/2015	680	830	50	180			
20	8/28/2015	1000	950	50	200			
21	11/20/2015	50	950	630	400			
22	2/26/2016	50	50	50	240			
23	5/26/2016	780	420	50	160			
24	8/29/2016	520	200	50	200			
25	11/18/2016	200	260	50	200			
26	2/24/2017	200	200	200	200			
27	5/25/2017	200	200	200	290			
28								
29								
30								
Coefficient of Variation:		1.85	0.64	1.36	1.00			
Mann-Kendall Statistic (S):		-136	-121	-154	-233			
Confidence Factor:		99.8%	99.4%	100.0%	>99.9%			
Concentration Trend:		Decreasing	Decreasing	Decreasing	Decreasing			



Notes:

1. At least four independent sampling events per well are required for calculating the trend. *Methodology is valid for 4 to 40 samples.*
2. Confidence in Trend = Confidence (in percent) that constituent concentration is increasing (S>0) or decreasing (S<0): >95% = Increasing or Decreasing; ≥ 90% = Probably Increasing or Probably Decreasing; < 90% and S>0 = No Trend; < 90%, S≤0, and COV ≥ 1 = No Trend; < 90% and COV < 1 = Stable.
3. Methodology based on "MAROS: A Decision Support System for Optimizing Monitoring Plans", J.J. Aziz, M. Ling, H.S. Rifai, C.J. Newell, and J.R. Gonzales, *Ground Water* , 41(3):355-367, 2003.

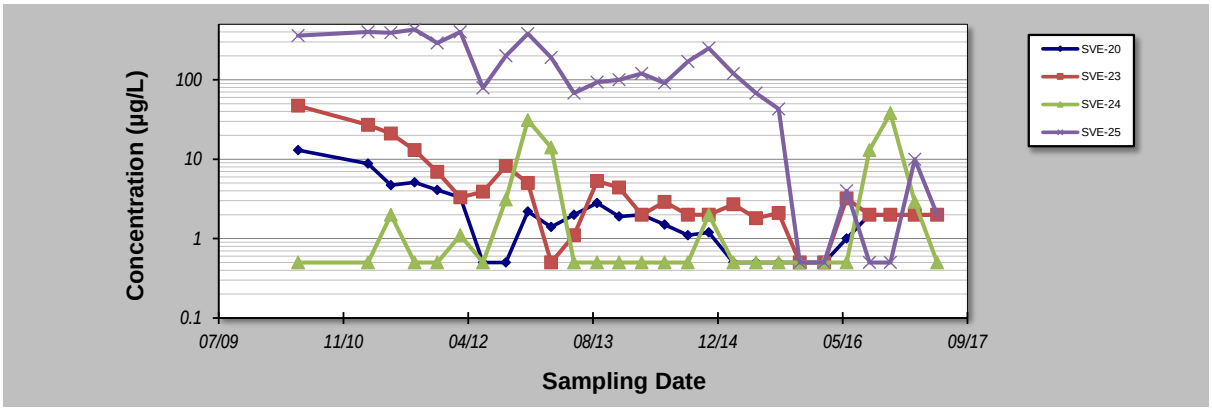
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GSI MANN-KENDALL TOOLKIT
for Constituent Trend Analysis

Evaluation Date: 1-Aug-17
Facility Name: Seattle Center
Conducted By: EVP

Job ID: 21-1-12176-046
Constituent: benzene
Concentration Units: µg/L

Sampling Point ID:	SVE-20	SVE-23	SVE-24	SVE-25			
Sampling Event	Sampling Date	BENZENE CONCENTRATION (µg/L)						
1	5/20/2010	13	47	0.5	360			
2	2/24/2011	8.8	27	0.5	400			
3	5/27/2011	4.7	21	2	390			
4	8/30/2011	5.1	13	0.5	430			
5	11/29/2011	4.1	6.9	0.5	290			
6	2/29/2012	3.3	3.3	1.1	400			
7	5/30/2012	0.5	3.9	0.5	79			
8	8/30/2012	0.5	8.2	3.1	200			
9	11/26/2012	2.2	5	31	380			
10	2/27/2013	1.4	0.5	14	190			
11	5/30/2013	2	1.1	0.5	68			
12	8/30/2013	2.8	5.3	0.5	93			
13	11/26/2013	1.9	4.4	0.5	100			
14	2/25/2014	2	2	0.5	120			
15	5/28/2014	1.5	2.9	0.5	91			
16	8/29/2014	1.1	2	0.5	170			
17	11/21/2014	1.2	2	2	250			
18	2/27/2015	0.5	2.7	0.5	120			
19	5/29/2015	0.5	1.8	0.5	68			
20	8/28/2015	0.5	2.1	0.5	43			
21	11/20/2015	0.5	0.5	0.5	0.5			
22	2/26/2016	0.5	0.5	0.5	0.5			
23	5/26/2016	1	3.2	0.5	4			
24	8/26/2016	2	2	13	0.5			
25	11/17/2016	2	2	38	0.5			
26	2/23/2017	2	2	2.9	10			
27	5/24/2017	2	2	0.5	2			
28								
29								
30								
Coefficient of Variation:		1.12	1.58	2.19	0.95			
Mann-Kendall Statistic (S):		-141	-189	15	-230			
Confidence Factor:		99.9%	>99.9%	61.4%	>99.9%			
Concentration Trend:		Decreasing	Decreasing	No Trend	Decreasing			



Notes:

1. At least four independent sampling events per well are required for calculating the trend. *Methodology is valid for 4 to 40 samples.*
2. Confidence in Trend = Confidence (in percent) that constituent concentration is increasing (S>0) or decreasing (S<0): >95% = Increasing or Decreasing; ≥ 90% = Probably Increasing or Probably Decreasing; < 90% and S>0 = No Trend; < 90%, S≤0, and COV ≥ 1 = No Trend; < 90% and COV < 1 = Stable.
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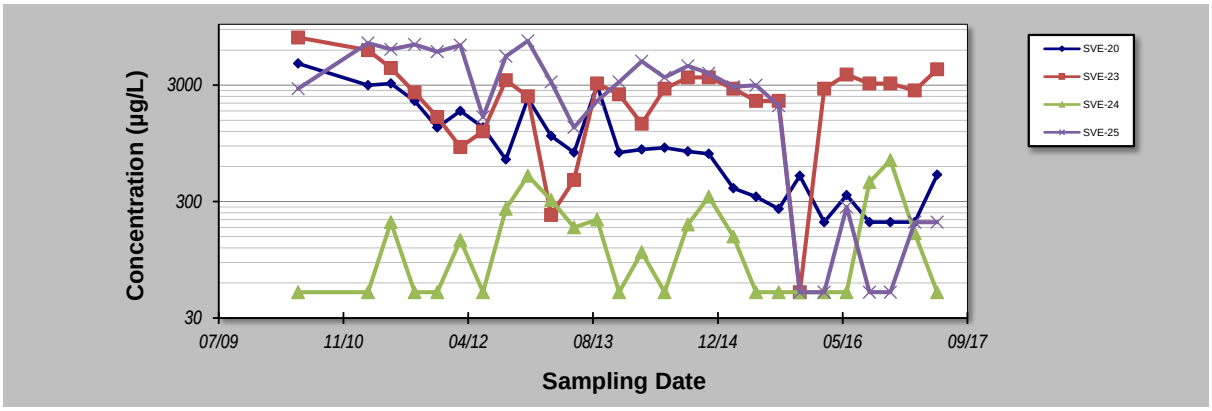
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GSI MANN-KENDALL TOOLKIT
for Constituent Trend Analysis

Evaluation Date: 1-Aug-17
Facility Name: Seattle Center
Conducted By: EVP

Job ID: 21-1-12176-046
Constituent: TPH-gas
Concentration Units: µg/L

Sampling Point ID:	SVE-20	SVE-23	SVE-24	SVE-25			
Sampling Event	Sampling Date	TPH-GAS CONCENTRATION (µg/L)						
1	5/20/2010	4600	7700	50	2800			
2	2/24/2011	3000	6000	50	6900			
3	5/27/2011	3100	4200	200	6100			
4	8/30/2011	2200	2600	50	6700			
5	11/29/2011	1300	1600	50	5800			
6	2/29/2012	1800	880	140	6600			
7	5/30/2012	1300	1200	50	1600			
8	8/30/2012	690	3300	260	5300			
9	11/26/2012	2300	2400	500	7200			
10	2/27/2013	1100	230	310	3200			
11	5/30/2013	790	460	180	1300			
12	8/30/2013	3000	3100	210	2200			
13	11/26/2013	790	2500	50	3200			
14	2/25/2014	840	1400	110	4800			
15	5/28/2014	870	2800	50	3500			
16	8/29/2014	810	3500	190	4400			
17	11/21/2014	770	3500	330	3800			
18	2/27/2015	390	2800	150	2900			
19	5/29/2015	330	2200	50	3000			
20	8/28/2015	260	2200	50	2000			
21	11/20/2015	500	50	50	50			
22	2/26/2016	200	2800	50	50			
23	5/26/2016	340	3700	50	270			
24	8/26/2016	200	3100	440	50			
25	11/17/2016	200	3100	680	50			
26	2/23/2017	200	2700	160	200			
27	5/24/2017	510	4100	50	200			
28								
29								
30								
Coefficient of Variation:		0.95	0.60	0.98	0.78			
Mann-Kendall Statistic (S):		-254	9	15	-197			
Confidence Factor:		>99.9%	56.6%	61.4%	>99.9%			
Concentration Trend:		Decreasing	No Trend	No Trend	Decreasing			



Notes:

1. At least four independent sampling events per well are required for calculating the trend. *Methodology is valid for 4 to 40 samples.*
2. Confidence in Trend = Confidence (in percent) that constituent concentration is increasing (S>0) or decreasing (S<0): >95% = Increasing or Decreasing; ≥ 90% = Probably Increasing or Probably Decreasing; < 90% and S>0 = No Trend; < 90%, S≤0, and COV ≥ 1 = No Trend; < 90% and COV < 1 = Stable.
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APPENDIX C

IMPORTANT INFORMATION ABOUT YOUR GEOTECHNICAL/ENVIRONMENTAL REPORT

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

Attachment to and part of Report 21-1-12176-046

Date: September 8, 2017
To: Seattle Center Redevelopment
Attn: Mr. Ned Dunn

IMPORTANT INFORMATION ABOUT YOUR GEOTECHNICAL/ENVIRONMENTAL REPORT

CONSULTING SERVICES ARE PERFORMED FOR SPECIFIC PURPOSES AND FOR SPECIFIC CLIENTS.

Consultants prepare reports to meet the specific needs of specific individuals. A report prepared for a civil engineer may not be adequate for a construction contractor or even another civil engineer. Unless indicated otherwise, your consultant prepared your report expressly for you and expressly for the purposes you indicated. No one other than you should apply this report for its intended purpose without first conferring with the consultant. No party should apply this report for any purpose other than that originally contemplated without first conferring with the consultant.

THE CONSULTANT'S REPORT IS BASED ON PROJECT-SPECIFIC FACTORS.

A geotechnical/environmental report is based on a subsurface exploration plan designed to consider a unique set of project-specific factors. Depending on the project, these may include: the general nature of the structure and property involved; its size and configuration; its historical use and practice; the location of the structure on the site and its orientation; other improvements such as access roads, parking lots, and underground utilities; and the additional risk created by scope-of-service limitations imposed by the client. To help avoid costly problems, ask the consultant to evaluate how any factors that change subsequent to the date of the report may affect the recommendations. Unless your consultant indicates otherwise, your report should not be used: (1) when the nature of the proposed project is changed (for example, if an office building will be erected instead of a parking garage, or if a refrigerated warehouse will be built instead of an unrefrigerated one, or chemicals are discovered on or near the site); (2) when the size, elevation, or configuration of the proposed project is altered; (3) when the location or orientation of the proposed project is modified; (4) when there is a change of ownership; or (5) for application to an adjacent site. Consultants cannot accept responsibility for problems that may occur if they are not consulted after factors which were considered in the development of the report have changed.

SUBSURFACE CONDITIONS CAN CHANGE.

Subsurface conditions may be affected as a result of natural processes or human activity. Because a geotechnical/environmental report is based on conditions that existed at the time of subsurface exploration, construction decisions should not be based on a report whose adequacy may have been affected by time. Ask the consultant to advise if additional tests are desirable before construction starts; for example, groundwater conditions commonly vary seasonally.

Construction operations at or adjacent to the site and natural events such as floods, earthquakes, or groundwater fluctuations may also affect subsurface conditions and, thus, the continuing adequacy of a geotechnical/environmental report. The consultant should be kept apprised of any such events, and should be consulted to determine if additional tests are necessary.

MOST RECOMMENDATIONS ARE PROFESSIONAL JUDGMENTS.

Site exploration and testing identifies actual surface and subsurface conditions only at those points where samples are taken. The data were extrapolated by your consultant, who then applied judgment to render an opinion about overall subsurface conditions. The actual interface between materials may be far more gradual or abrupt than your report indicates. Actual conditions in areas not sampled may differ from those predicted in your report. While nothing can be done to prevent such situations, you and your consultant can work together to help reduce their impacts. Retaining your consultant to observe subsurface construction operations can be particularly beneficial in this respect.

A REPORT'S CONCLUSIONS ARE PRELIMINARY.

The conclusions contained in your consultant's report are preliminary because they must be based on the assumption that conditions revealed through selective exploratory sampling are indicative of actual conditions throughout a site. Actual subsurface conditions can be discerned only during earthwork; therefore, you should retain your consultant to observe actual conditions and to provide conclusions. Only the consultant who prepared the report is fully familiar with the background information needed to determine whether or not the report's recommendations based on those conclusions are valid and whether or not the contractor is abiding by applicable recommendations. The consultant who developed your report cannot assume responsibility or liability for the adequacy of the report's recommendations if another party is retained to observe construction.

THE CONSULTANT'S REPORT IS SUBJECT TO MISINTERPRETATION.

Costly problems can occur when other design professionals develop their plans based on misinterpretation of a geotechnical/environmental report. To help avoid these problems, the consultant should be retained to work with other project design professionals to explain relevant geotechnical, geological, hydrogeological, and environmental findings, and to review the adequacy of their plans and specifications relative to these issues.

BORING LOGS AND/OR MONITORING WELL DATA SHOULD NOT BE SEPARATED FROM THE REPORT.

Final boring logs developed by the consultant are based upon interpretation of field logs (assembled by site personnel), field test results, and laboratory and/or office evaluation of field samples and data. Only final boring logs and data are customarily included in geotechnical/environmental reports. These final logs should not, under any circumstances, be redrawn for inclusion in architectural or other design drawings, because drafters may commit errors or omissions in the transfer process.

To reduce the likelihood of boring log or monitoring well misinterpretation, contractors should be given ready access to the complete geotechnical engineering/environmental report prepared or authorized for their use. If access is provided only to the report prepared for you, you should advise contractors of the report's limitations, assuming that a contractor was not one of the specific persons for whom the report was prepared, and that developing construction cost estimates was not one of the specific purposes for which it was prepared. While a contractor may gain important knowledge from a report prepared for another party, the contractor should discuss the report with your consultant and perform the additional or alternative work believed necessary to obtain the data specifically appropriate for construction cost estimating purposes. Some clients hold the mistaken impression that simply disclaiming responsibility for the accuracy of subsurface information always insulates them from attendant liability. Providing the best available information to contractors helps prevent costly construction problems and the adversarial attitudes that aggravate them to a disproportionate scale.

READ RESPONSIBILITY CLAUSES CLOSELY.

Because geotechnical/environmental engineering is based extensively on judgment and opinion, it is far less exact than other design disciplines. This situation has resulted in wholly unwarranted claims being lodged against consultants. To help prevent this problem, consultants have developed a number of clauses for use in their contracts, reports, and other documents. These responsibility clauses are not exculpatory clauses designed to transfer the consultant's liabilities to other parties; rather, they are definitive clauses that identify where the consultant's responsibilities begin and end. Their use helps all parties involved recognize their individual responsibilities and take appropriate action. Some of these definitive clauses are likely to appear in your report, and you are encouraged to read them closely. Your consultant will be pleased to give full and frank answers to your questions.

The preceding paragraphs are based on information provided by the
ASFE/Association of Engineering Firms Practicing in the Geosciences, Silver Spring, Maryland