

Memo
WFS Groundwater Monitoring
6760 W Marginal Way SW Cardlock Facility



AECOM
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Project name:
Groundwater Monitoring
WFS Cardlock Facility
6760 W Marginal Way SW

Project ref:
606

From:
David Raubvogel
AECOM Senior Geologist

Date:
February 17, 2021

To:
Ms. Taryn Olson
World Fuel Services
Tacoma, WA 988401

Copy:

Memo

Subject: Groundwater Monitoring -WFS Cardlock Facility
6760 W Marginal Way SW; Seattle, WA

Introduction & Background

AECOM has prepared this memorandum on behalf of World Fuel Services (WFS) presenting the results of the groundwater sampling performed at the cardlock facility located at 6760 W Marginal Way SW in Seattle, WA (Figure 1). The approximately 1-acre parcel is leased from the Port of Seattle (POS) and developed with a cardlock fueling facility consisting of a pump island with canopy and Subway restaurant (Figure 2). There are ten onsite monitoring wells as shown on Figure 2. AECOM understands that as part of the lease renewal, POS has requested current groundwater data for this property. The scope of work was performed in accordance with our proposal to WFS dated January 21, 2021. This memorandum documents the groundwater monitoring results including our field sampling observations and laboratory analytical results.

Sampling Procedures and Findings

The monitoring wells requested by the POS which included: EX-1 & 2, MW-23; 24; 25, 26 and 27, were sampled on February 8, 2021. The seven monitoring wells were gauged prior to sampling and purged via low flow sampling. The field parameters were recorded on sampling forms that are provided in Attachment 1. Groundwater samples were collected in appropriate laboratory provided glassware and stored on ice and delivered to the laboratory under proper chain of custody protocol. The groundwater samples were analyzed by Fremont Analytical, a Washington Department of Ecology(Ecology)-accredited laboratory for diesel and oil range petroleum hydrocarbons by Northwest Total Petroleum Hydrocarbons (NWTPH)-Diesel extended (Dx), gasoline range petroleum hydrocarbons by NWTPH-Gasoline extended (Gx) and benzene, toluene, ethylbenzene and xylenes (BTEX) by U.S. EPA Method 8260C.

The groundwater analytical results are summarized in Table 1 along with their respective Ecology Model Toxic Control Act (MTCA) cleanup levels from Ecology's CLARC Database (Ecology 2021). The laboratory analytical report is provided in Attachment 2. An AECOM project chemist reviewed the analytical data and no data usability issues were identified

Memo
WFS Groundwater Monitoring
6760 W Marginal Way SW Cardlock Facility

We trust this memorandum meets your requirement. Please contact us if you have any questions or require additional information.

Sincerely,

A handwritten signature in black ink, appearing to read 'D. Raubvogel', written in a cursive style.

David Raubvogel, LHG
Senior Geologist

Attachments:

Figure 1 – Site Location Map

Figure 2 – Site Plan

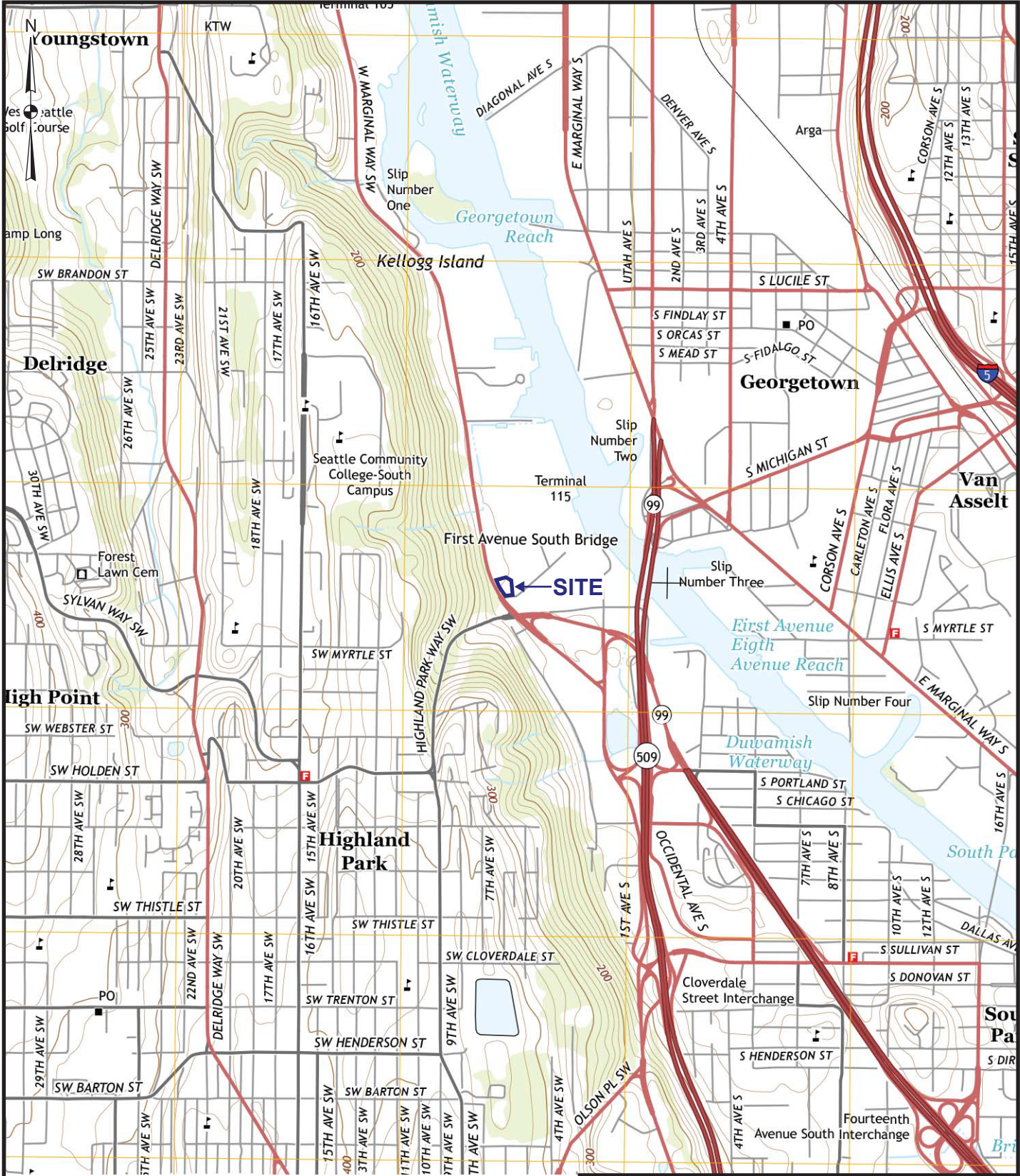
Table 1 – Summary of Groundwater Analytical Results

Attachment 1 – Groundwater Field Sampling Forms

Attachment 2 – Fremont Analytical Laboratory Report

References

Washington State Department of Ecology (Ecology), 2021. CLARC Database. December.



APPROXIMATE SCALE IN FEET

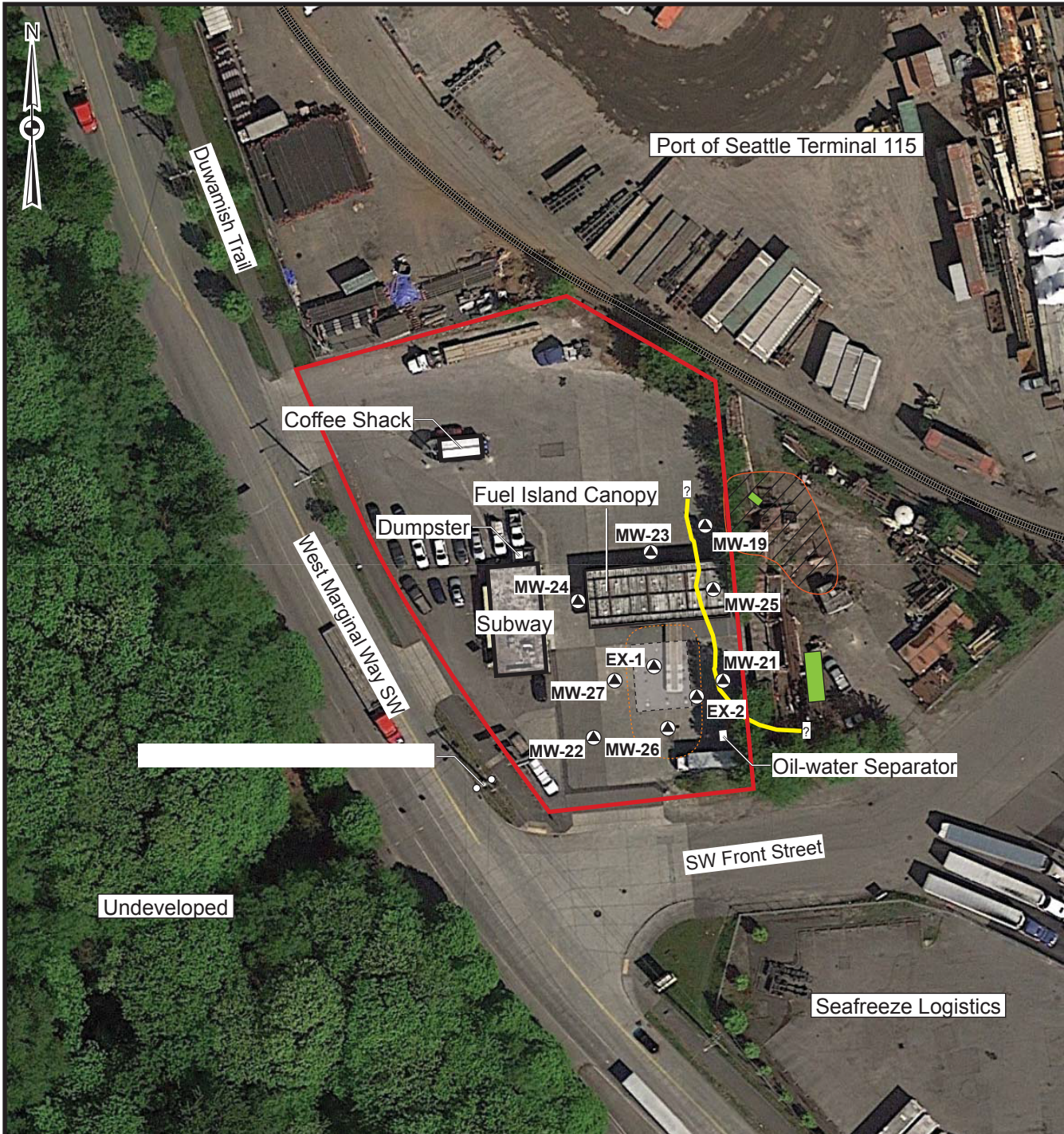


Quadrangle Location

BASE MAP SOURCE: USGS 7½ minute topographic quadrangle map Seattle South, Washington 2014.

FIGURE 1
SITE LOCATION
 #28
 6760 WEST MARGINAL WAY SOUTHWEST
 SEATTLE, WASHINGTON
 JOB NO. 60651450





LEGEND:

- Subject Property
- Railroad Tracks
- USTs/Fill Ports
- Monitoring Well Location (Environmental Associates, Inc., 2014)
- T-115 Southwest Tank Area UST (Environmental Associates, Inc., 2014)
- T-115 Southwest Tank Area - Pre-Card Lock Release (Environmental Associates, Inc., 2014)
- Inferred 2007 Turbine Leak Impact Area (Environmental Associates, Inc., 2014)
- Approximate Area of Diesel Range "Free Product" (Environmental Associates, Inc., 2014)

AERIAL SOURCE: Google Earth



APPROXIMATE SCALE IN FEET

FIGURE 2
SITE PLAN

6760 WEST MARGINAL WAY SOUTHWEST
SEATTLE, WASHINGTON

Table 1
Summary of Groundwater Analytical Results

WFS Cardlock Facility
 6760 West Marginal Way SW
 Seattle, WA

Sample ID	Sample Date	TPH (ug/L)			VOCs (ug/L)			
		Gasoline-Range	Diesel-Range	Heavy Oil-Range	Benzene	Toluene	Ethylbenzene	Total Xylenes
EX-1	2/8/21	50.0 U	5,900	99.2 U	1.00 U	1.00 U	1.00 U	1.00 U
EX-2	2/8/21	198 ^c	6,670	98.7 U	1.00 U	1.00 U	1.00 U	1.00 U
MW-23	2/8/21	50.0 U	99.0 U	620	1.00 U	1.00 U	1.00 U	1.00 U
MW-24	2/8/21	50.0 U	98.8 U	98.8 U	1.00 U	1.00 U	1.00 U	1.00 U
MW-25	2/8/21	50.0 U	305 ^b	676	1.00 U	1.00 U	1.00 U	1.00 U
MW-26	2/8/21	889 ^c	15,400	98.7 U	1.00 U	1.00 U	1.00 U	1.00 U
MW-27	2/8/21	50.0 U	99.0 U	99.0 U	1.00 U	1.00 U	1.00 U	1.00 U
MTCA Method A Groundwater Cleanup Level		800/1,000 ^a	500	500	5	1,000	700	1,000

Notes:

Values in **bold** font indicate that the result reported meets or exceeds the most conservative MTCA Method A cleanup level based on the Ecology website. Model Toxics Control Act (MTCA) Cleanup Regulation, WAC 173-340. MTCA Method A and B values are from Ecology website CLARC tables dated August 2020 (<https://fortress.wa.gov/ecy/clarc/CLARCDATA/CLARCDataTables.aspx>).

TPH - total petroleum hydrocarbon

U - Compound was analyzed for but not detected above the value shown.

ug/L - microgram per liter

VOC - volatile organic compound

^a The MTCA Method A groundwater cleanup level is 1,000 ug/L if benzene is not present and the total of ethylbenzene, toluene, and xylenes is less than 1% of the gasoline mixture. The MTCA Method A cleanup level for all other gasoline mixtures is 800 ug/L.

^b Indicates unresolved compounds in the Diesel range inconsistent with a known petroleum standard.

^c Indicates the presence of unresolved compounds eluting from hexane to dodecane, likely due to overlap with diesel range material.

Memo
WFS Groundwater Monitoring
6760 W Marginal Way SW Cardlock Facility

Attachment 1

GROUNDWATER SAMPLING DATA SHEET

Project Name: <i>WFS 6760 W Marginal Way SW</i>	Sample Number: <i>MW-25</i>	
Project Number: <i>60651450</i>	Well Diameter: <i>2"</i>	
Date: <i>2/8/21</i>	Screen Interval: <i>?</i>	
Weather: <i>Sunny 40's</i>	Measuring Point: <i>TOC</i>	
Sampler(s): <i>NZG</i>	Depth to Water: <i>5.12</i>	
Purge Method: <i>low flow</i>	Depth to Bottom: <i>15.02</i>	
Sample Method: <i>Grab</i>	Depth to NAPL: <i>—</i>	
Tubing Type: <i>LDPE</i>	NAPL Thickness: <i>—</i>	
Pump Intake Depth: <i>1450</i>	Meter Information	
Water disposal: <i>Drummed on-site</i>	<i>Horiba</i>	Model <i>V-52</i>
	Temperature: <i>15.12</i>	Calibration Date

Containers	Bottle type	Number of Primary	Number of MS/MSD	Number of Duplicate	pH:	Calibration Date
Analysis					<i>8.73</i>	<i>02/15/21</i>
<i>DX</i>	<i>1 liter Arabal</i>	<i>1</i>			Conductivity: <i>179</i>	
<i>GX</i>	<i>40mL VOA</i>	<i>3</i>			ORP: <i>-146</i>	
<i>BTEX</i>	<i>40mL VOA</i>				DO: <i>0.29</i>	
					Turbidity: <i>45.7</i>	
					Comments: <i>0955 Skat</i>	

Tide event (based on tide chart): *NA*

Field Parameters	Units	+9 minutes	+9 minutes	+9 minutes	+3 minutes	+3 minutes	+3 minutes	+3 minutes
Temperature	°C	<i>14.32</i>	<i>13.76</i>	<i>13.43</i>	<i>13.33</i>	<i>13.29</i>	<i>13.28</i>	<i>13.28</i>
pH (±0.1)	—	<i>7.22</i>	<i>7.05</i>	<i>7.00</i>	<i>6.98</i>	<i>6.98</i>	<i>6.98</i>	<i>6.97</i>
Conductivity (±3%)	ms/cm	<i>1.81</i>	<i>1.81</i>	<i>1.82</i>	<i>1.82</i>	<i>1.82</i>	<i>1.82</i>	<i>1.82</i>
ORP (±10mV)	mV	<i>-143</i>	<i>-146</i>	<i>-147</i>	<i>-148</i>	<i>-148</i>	<i>-148</i>	<i>-148</i>
DO (±10%)	mg/L	<i>0.00</i>	<i>0.00</i>	<i>0.00</i>	<i>0.00</i>	<i>0.00</i>	<i>0.00</i>	<i>0.00</i>
Turbidity (±10%)	NTU	<i>37.3</i>	<i>44.1</i>	<i>43.6</i>	<i>41.7</i>	<i>41.5</i>	<i>41.4</i>	<i>41.5</i>
Time <i>Skat 0955</i>	—	<i>1008</i>	<i>1013</i>	<i>1022</i>	<i>1025</i>	<i>1028</i>	<i>1031</i>	<i>1034</i>
Water Level	—	<i>6.33</i>	<i>6.41</i>	<i>6.49</i>	<i>6.51</i>	<i>6.52</i>	<i>6.53</i>	<i>6.54</i>
Flow Rate	mL/min	<i>200</i>	<i>100</i>	<i>100</i>	<i>100</i>	<i>100</i>	<i>100</i>	<i>100</i>

Field Parameters	Units	minutes	minutes	minutes	minutes	minutes	minutes	minutes
Temperature	°C							
pH (±0.1)	—							
Conductivity (±3%)	ms/cm							
ORP (±10mV)	mV							
DO (±10%)	mg/L							
Turbidity (±10%)	NTU							
Time	—							
Water Level	—							
Flow Rate	mL/min							

COC Information	Sample ID	Sample Time	Total # of bottles
Primary Sample	<i>MW-25</i>	<i>1035</i>	<i>4</i>
MS/MSD Sample (if collected)	<i>—————</i>	<i>—————</i>	<i>—————</i>
Duplicate Sample (if collected)	<i>—————</i>	<i>—————</i>	<i>—————</i>

GROUNDWATER SAMPLING DATA SHEET

Project Name: <i>WFS 6760 W Marginal Way SW</i>	Sample Number: <i>MW-23</i>
Project Number: <i>60651450</i>	Well Diameter: <i>2"</i>
Date: <i>2/8/21</i>	Screen Interval: <i>7</i>
Weather: <i>overcast 40° breezy</i>	Measuring Point: <i>TOC</i>
Sampler(s): <i>NZG</i>	Depth to Water: <i>5.02</i>
Purge Method: <i>low flow</i>	Depth to Bottom: <i>15.47</i>
Sample Method: <i>Grab</i>	Depth to NAPL: <i>—</i>
Tubing Type: <i>LDPE</i>	NAPL Thickness: <i>—</i>
Pump Intake Depth: <i>~ 15.00</i>	Meter Information
Water disposal: <i>Drummed onsite</i>	<i>Horiba Model U-52</i>
	Temperature: <i>12.58</i>

Calibration Date	
	<i>2/5/21</i>

Containers	Bottle type	Number of Primary	Number of MS/MSD	Number of Duplicate
Analysis				
<i>DX</i>	<i>1 liter Amber</i>	<i>1</i>	<i>/</i>	<i>/</i>
<i>GX</i>	<i>40mL VOA</i>	<i>3</i>	<i>/</i>	<i>/</i>
<i>BTEX</i>	<i>40mL VOA</i>			

pH:	<i>7.51</i>
Conductivity:	<i>1.58</i>
ORP:	<i>-137</i>
DO:	<i>1.81</i>
Turbidity:	<i>43.2</i>
Comments:	<i>(1051) Start</i>

Tide event (based on tide chart): *N/A*

Field Parameters	Units	+9 minutes	+9 minutes	+9 minutes	+3 minutes	+3 minutes	+3 minutes	minutes
Temperature	°C	<i>12.28</i>	<i>12.03</i>	<i>11.94</i>	<i>11.92</i>	<i>11.90</i>	<i>11.89</i>	
pH (±0.1)	—	<i>7.33</i>	<i>7.29</i>	<i>7.29</i>	<i>7.29</i>	<i>7.29</i>	<i>7.29</i>	
Conductivity (±3%)	ms/cm	<i>1.55</i>	<i>1.55</i>	<i>1.55</i>	<i>1.55</i>	<i>1.55</i>	<i>1.55</i>	
ORP (±10mV)	mV	<i>-161</i>	<i>-167</i>	<i>-169</i>	<i>-170</i>	<i>-170</i>	<i>-171</i>	
DO (±10%)	mg/L	<i>0.00</i>	<i>0.00</i>	<i>0.00</i>	<i>0.00</i>	<i>0.00</i>	<i>0.00</i>	
Turbidity (±10%)	NTU	<i>19.0</i>	<i>12.4</i>	<i>9.6</i>	<i>9.4</i>	<i>9.7</i>	<i>9.5</i>	
Time <i>Start 1051</i>	—	<i>1100</i>	<i>1109</i>	<i>1118</i>	<i>1121</i>	<i>1124</i>	<i>1127</i>	
Water Level	—	<i>5.13</i>	<i>5.21</i>	<i>5.30</i>	<i>5.32</i>	<i>5.33</i>	<i>5.35</i>	
Flow Rate	mL/min	<i>100</i>	<i>100</i>	<i>100</i>	<i>100</i>	<i>100</i>	<i>100</i>	

Field Parameters	Units	minutes	minutes	minutes	minutes	minutes	minutes	minutes
Temperature	°C							
pH (±0.1)	—							
Conductivity (±3%)	ms/cm							
ORP (±10mV)	mV							
DO (±10%)	mg/L							
Turbidity (±10%)	NTU							
Time	—							
Water Level	—							
Flow Rate	mL/min							

COC Information	Sample ID	Sample Time	Total # of bottles
Primary Sample	<i>MW-23</i>	<i>1130</i>	<i>4</i>
MS/MSD Sample (if collected)			
Duplicate Sample (if collected)			

GROUNDWATER SAMPLING DATA SHEET

Project Name: <i>WFS 6760 W Mangrove Way SW</i>	Sample Number: <i>MW-24</i>
Project Number: <i>60651450</i>	Well Diameter: <i>2"</i>
Date: <i>2/8/21</i>	Screen Interval: <i>?</i>
Weather: <i>overcast 40's Breezy</i>	Measuring Point: <i>TWC</i>
Sampler(s): <i>NZG</i>	Depth to Water: <i>5.74</i>
Purge Method: <i>low flow</i>	Depth to Bottom: <i>15.68</i>
Sample Method: <i>Grab</i>	Depth to NAPL: <i>—</i>
Tubing Type: <i>LDPE</i>	NAPL Thickness: <i>—</i>
Pump Intake Depth: <i>≈ 15.00</i>	Meter Information
Water disposal: <i>Drummed onsite</i>	<i>Horiba</i> Model <i>V-52</i>
	Temperature: <i>12.77</i>

Calibration Date
<i>NY FEL 2/5/21</i>

Containers	Bottle type	Number of Primary	Number of MS/MSD	Number of Duplicate
Analysis				
<i>DX</i>	<i>1 liter Amber</i>	<i>1</i>	/	/
<i>GX</i>	<i>40ml VOA</i>	<i>3</i>	/	/
<i>BTEX</i>	<i>40ml VOA</i>			

pH: <i>7.40</i>
Conductivity: <i>1.29</i>
ORP: <i>-107</i>
DO: <i>2.01</i>
Turbidity: <i>2.62</i>
Comments: <i>(1145) Start Time</i>
Tide event (based on tide chart): <i>NA</i>

Field Parameters	Units	+9 minutes	+9 minutes	+9 minutes	+3 minutes	+3 minutes	+3 minutes	minutes
Temperature	°C	<i>13.06</i>	<i>12.94</i>	<i>13.00</i>	<i>12.94</i>	<i>12.94</i>	<i>13.00</i>	
pH (±0.1)	—	<i>7.09</i>	<i>7.02</i>	<i>7.00</i>	<i>6.99</i>	<i>6.99</i>	<i>6.99</i>	
Conductivity (±3%)	ms/cm	<i>1.28</i>	<i>1.28</i>	<i>1.28</i>	<i>1.28</i>	<i>1.28</i>	<i>1.28</i>	
ORP (±10mV)	mV	<i>-110</i>	<i>-113</i>	<i>-116</i>	<i>-117</i>	<i>-117</i>	<i>-118</i>	
DO (±10%)	mg/L	<i>1.77</i>	<i>1.54</i>	<i>1.55</i>	<i>1.56</i>	<i>1.57</i>	<i>1.59</i>	
Turbidity (±10%)	NTU	<i>13.3</i>	<i>9.0</i>	<i>4.2</i>	<i>4.3</i>	<i>4.4</i>	<i>4.4</i>	
Time Start <i>1145</i>	—	<i>1154</i>	<i>1203</i>	<i>1212</i>	<i>1215</i>	<i>1218</i>	<i>1221</i>	
Water Level	—	<i>6.28</i>	<i>6.34</i>	<i>6.40</i>	<i>6.42</i>	<i>6.43</i>	<i>6.45</i>	
Flow Rate	mL/min	<i>100</i>	<i>100</i>	<i>100</i>	<i>100</i>	<i>100</i>	<i>100</i>	

Field Parameters	Units	minutes	minutes	minutes	minutes	minutes	minutes	minutes
Temperature	°C							
pH (±0.1)	—							
Conductivity (±3%)	ms/cm							
ORP (±10mV)	mV							
DO (±10%)	mg/L							
Turbidity (±10%)	NTU							
Time Start	—							
Water Level	—							
Flow Rate	mL/min							

COC Information	Sample ID	Sample Time	Total # of bottles
Primary Sample	<i>MW-24</i>	<i>1225</i>	<i>4</i>
MS/MSD Sample (if collected)			
Duplicate Sample (if collected)			

GROUNDWATER SAMPLING DATA SHEET

Project Name: <i>WFS 6760 W Marginal Way SW</i>	Sample Number: <i>EX-1</i>
Project Number: <i>60651450</i>	Well Diameter: <i>2"</i>
Date: <i>2/8/21</i>	Screen Interval: <i>?</i>
Weather: <i>Overcast 40°s Breezy</i>	Measuring Point: <i>TOC</i>
Sampler(s): <i>NZG</i>	Depth to Water: <i>5.77</i>
Purge Method: <i>low flow</i>	Depth to Bottom: <i>10.11</i>
Sample Method: <i>Grab</i>	Depth to NAPL: <i>-</i>
Tubing Type: <i>LDPE</i>	NAPL Thickness: <i>-</i>
Pump Intake Depth: <i>≈ 10.00</i>	Meter Information
Water disposal: <i>Drummed on site</i>	<i>Horiba Model U-52</i>
	Temperature: <i>10.63</i>

Containers	Bottle type	Number of Primary	Number of MS/MSD	Number of Duplicate	pH:	Conductivity:	ORP:	DO:	Turbidity:	Comments:
Analysis					<i>7.06</i>	<i>1.19</i>	<i>-95</i>	<i>13.11</i>	<i>4.57</i>	
<i>DX</i>	<i>1 liter Amber</i>	<i>1</i>	<i>/</i>	<i>/</i>						<i>RY</i>
<i>GX</i>	<i>40mL VOA</i>	<i>3</i>	<i>/</i>	<i>/</i>						<i>FEL</i>
<i>BTEX</i>	<i>40mL VOA</i>		<i>/</i>	<i>/</i>						<i>2/5/21</i>
										<i>1235 Start Time</i>

Tide event (based on tide chart): *N/A*

Field Parameters	Units	+9 minutes	+9 minutes	+9 minutes	+3 minutes	+3 minutes	+3 minutes	+3 minutes
Temperature	°C	<i>10.20</i>	<i>10.41</i>	<i>10.34</i>	<i>10.37</i>	<i>10.41</i>	<i>10.39</i>	<i>10.41</i>
pH (±0.1)	-	<i>7.16</i>	<i>7.16</i>	<i>7.17</i>	<i>7.16</i>	<i>7.16</i>	<i>7.17</i>	<i>7.17</i>
Conductivity (±3%)	ms/cm	<i>1.07</i>	<i>1.05</i>	<i>1.04</i>	<i>1.04</i>	<i>1.04</i>	<i>1.04</i>	<i>1.04</i>
ORP (±10mV)	mV	<i>-64</i>	<i>-55</i>	<i>-50</i>	<i>-47</i>	<i>-47</i>	<i>-46</i>	<i>-45</i>
DO (±10%)	mg/L	<i>11.22</i>	<i>10.42</i>	<i>9.67</i>	<i>9.76</i>	<i>9.35</i>	<i>9.28</i>	<i>9.29</i>
Turbidity (±10%)	NTU	<i>144</i>	<i>83.6</i>	<i>32.4</i>	<i>30.5</i>	<i>20.8</i> <i>27.6</i>	<i>27.1</i>	<i>26.8</i>
Time <i>Start 1235</i>	-	<i>1244</i>	<i>1253</i>	<i>1302</i>	<i>1305</i>	<i>1308</i>	<i>1311</i>	<i>1314</i>
Water Level	-	<i>5.75</i>	<i>5.76</i>	<i>5.76</i>	<i>5.76</i>	<i>5.76</i>	<i>5.76</i>	<i>5.76</i>
Flow Rate	mL/min	<i>120</i>	<i>120</i>	<i>120</i>	<i>120</i>	<i>120</i>	<i>120</i>	<i>120</i>

Field Parameters	Units	minutes	minutes	minutes	minutes	minutes	minutes	minutes
Temperature	°C							
pH (±0.1)	-							
Conductivity (±3%)	ms/cm							
ORP (±10mV)	mV							
DO (±10%)	mg/L							
Turbidity (±10%)	NTU							
Time <i>Start</i>	-							
Water Level	-							
Flow Rate	mL/min							

COC Information	Sample ID	Sample Time	Total # of bottles
Primary Sample	<i>EX-1</i>	<i>1315</i>	<i>4</i>
MS/MSD Sample (if collected)			
Duplicate Sample (if collected)			

GROUNDWATER SAMPLING DATA SHEET

Project Name: <i>WFS 6760 W Marginal Way SW</i>	Sample Number: <i>EX-2</i>
Project Number: <i>60651450</i>	Well Diameter: <i>2"</i>
Date: <i>2/8/21</i>	Screen Interval: <i>?</i>
Weather: <i>Overcast 40°S Breezy</i>	Measuring Point: <i>TC</i>
Sampler(s): <i>NZG</i>	Depth to Water: <i>5.30</i>
Purge Method: <i>low flow</i>	Depth to Bottom: <i>10.32</i>
Sample Method: <i>Grab</i>	Depth to NAPL: <i>—</i>
Tubing Type: <i>LDPE</i>	NAPL Thickness: <i>—</i>
Pump Intake Depth: <i>≈ 10.00</i>	Meter Information
Water disposal: <i>Drummed onsite</i>	<i>Horiba</i> Model <i>U-52</i>
	Temperature: <i>11.74</i>

Containers	Bottle type	Number of Primary	Number of MS/MSD	Number of Duplicate	pH	Calibration Date
Analysis						
<i>DX</i>	<i>1 liter Amber</i>	<i>1</i>	/	/	<i>7.29</i>	<i>4/1</i>
<i>GX</i>	<i>40mL VOA</i>	<i>3</i>	/	/	<i>1.24</i>	<i>FEL</i>
<i>BTEX</i>	<i>40mL VOA</i>		/	/	<i>ORP: -28</i>	<i>2/5/21</i>
					<i>DO: 7.09</i>	
					<i>Turbidity: 61.3</i>	<i>2/8/21</i>
					Comments: <i>(1330) Start Time</i>	
					Tide event (based on tide chart): <i>NA</i>	

Field Parameters	Units	+9 minutes	+9 minutes	+9 minutes	+3 minutes	+3 minutes	+3 minutes	+3 minutes
Temperature	°C	<i>11.72</i>	<i>11.71</i>	<i>11.75</i>	<i>11.74</i>	<i>11.72</i>	<i>11.70</i>	<i>11.69</i>
pH (±0.1)	—	<i>7.14</i>	<i>7.09</i>	<i>7.07</i>	<i>7.07</i>	<i>7.07</i>	<i>7.07</i>	<i>7.06</i>
Conductivity (±3%)	ms/cm	<i>1.23</i>	<i>1.24</i>	<i>1.25</i>	<i>1.24</i>	<i>1.24</i>	<i>1.25</i>	<i>1.24</i>
ORP (±10mV)	mV	<i>-25</i>	<i>-54</i>	<i>-64</i>	<i>-65</i>	<i>-68</i>	<i>-70</i>	<i>-71</i>
DO (±10%)	mg/L	<i>4.05</i>	<i>3.65</i>	<i>3.20</i>	<i>3.19</i>	<i>3.02</i>	<i>2.98</i>	<i>2.97</i>
Turbidity (±10%)	NTU	<i>33.3</i>	<i>6.3</i>	<i>3.2</i>	<i>2.4</i>	<i>1.5</i>	<i>1.8</i>	<i>1.6</i>
Time Start <i>1330</i>	—	<i>1339</i>	<i>1348</i>	<i>1357</i>	<i>1400</i>	<i>1403</i>	<i>1406</i>	<i>1409</i>
Water Level	—	<i>5.30</i>	<i>5.31</i>	<i>5.32</i>	<i>5.32</i>	<i>5.32</i>	<i>5.32</i>	<i>5.32</i>
Flow Rate	mL/min	<i>120</i>	<i>120</i>	<i>120</i>	<i>120</i>	<i>120</i>	<i>120</i>	<i>120</i>

Field Parameters	Units	minutes	minutes	minutes	minutes	minutes	minutes	minutes
Temperature	°C							
pH (±0.1)	—							
Conductivity (±3%)	ms/cm							
ORP (±10mV)	mV							
DO (±10%)	mg/L							
Turbidity (±10%)	NTU							
Time Start	—							
Water Level	—							
Flow Rate	mL/min							

COC Information	Sample ID	Sample Time	Total # of bottles
Primary Sample	<i>EX-2</i>	<i>1410</i>	<i>4</i>
MS/MSD Sample (if collected)			
Duplicate Sample (if collected)			

GROUNDWATER SAMPLING DATA SHEET

Project Name: <i>WFS 6760 W Marginal Way SW</i>	Sample Number: <i>MW-27</i>
Project Number: <i>60651450</i>	Well Diameter: <i>2"</i>
Date: <i>2/8/21</i>	Screen Interval: <i>?</i>
Weather: <i>overcast 40°S breezy</i>	Measuring Point: <i>TOC</i>
Sampler(s): <i>NZG</i>	Depth to Water: <i>5.51</i>
Purge Method: <i>low flow</i>	Depth to Bottom: <i>15.09</i>
Sample Method: <i>Grab</i>	Depth to NAPL: <i>-</i>
Tubing Type: <i>LDPE</i>	NAPL Thickness: <i>-</i>
Pump Intake Depth: <i>≈ 14.50</i>	Meter Information
Water disposal: <i>Drummed onsite</i>	<i>Horiba</i> Model <i>V-52</i>

Containers	Bottle type	Number of Primary	Number of MS/MSD	Number of Duplicate	pH:	Calibration Date
Analysis						
<i>DX</i>	<i>1 liter Amber</i>	<i>1</i>	<i>/</i>	<i>/</i>	<i>7.45</i>	<i>19</i>
<i>GX</i>	<i>40mL VOA</i>	<i>3</i>	<i>/</i>	<i>/</i>	<i>1.18</i>	<i>F E L</i>
<i>BTEX</i>	<i>40mL VOA</i>				<i>ORP: -91</i>	<i>2/5/21</i>
					<i>DO: 0.61</i>	
					<i>Turbidity: 64.5</i>	
					Comments: <i>(1422) Start Time</i>	

Tide event (based on tide chart): *NA*

Field Parameters	Units	+9 minutes	+9 minutes	+9 minutes	+3 minutes	+3 minutes	+3 minutes	minutes
Temperature	°C	<i>12.69</i>	<i>12.63</i>	<i>12.66</i>	<i>12.92</i>	<i>12.92</i>	<i>12.90</i>	
pH (±0.1)	-	<i>7.13</i>	<i>7.02</i>	<i>6.98</i>	<i>6.96</i>	<i>6.96</i>	<i>6.95</i>	
Conductivity (±3%)	ms/cm	<i>1.19</i>	<i>1.18</i>	<i>1.17</i>	<i>1.17</i>	<i>1.18</i>	<i>1.16</i>	
ORP (±10mV)	mV	<i>-99</i>	<i>-104</i>	<i>-108</i>	<i>-110</i>	<i>-110</i>	<i>-111</i>	
DO (±10%)	mg/L	<i>0.00</i>	<i>0.00</i>	<i>0.00</i>	<i>0.00</i>	<i>0.00</i>	<i>0.00</i>	
Turbidity (±10%)	NTU	<i>44.7</i>	<i>29.4</i>	<i>20.953</i>	<i>14.7</i>	<i>14.4</i>	<i>14.2</i>	
Time <i>1422 Start</i>	-	<i>1431</i>	<i>1440</i>	<i>1449</i>	<i>1452</i>	<i>1455</i>	<i>1458</i>	
Water Level	-	<i>5.83</i>	<i>5.88</i>	<i>5.92</i>	<i>5.93</i>	<i>5.95</i>	<i>5.96</i>	
Flow Rate	mL/min	<i>150</i>	<i>150</i>	<i>150</i>	<i>150</i>	<i>150</i>	<i>150</i>	

Field Parameters	Units	minutes	minutes	minutes	minutes	minutes	minutes	minutes
Temperature	°C							
pH (±0.1)	-							
Conductivity (±3%)	ms/cm							
ORP (±10mV)	mV							
DO (±10%)	mg/L							
Turbidity (±10%)	NTU							
Time	-							
Water Level	-							
Flow Rate	mL/min							

COC Information	Sample ID	Sample Time	Total # of bottles
Primary Sample	<i>MW-27</i>	<i>1500</i>	<i>4</i>
MS/MSD Sample (if collected)			
Duplicate Sample (if collected)			

GROUNDWATER SAMPLING DATA SHEET

Project Name: <i>WFS 6760 W Marginal Way SW</i>					Sample Number: <i>MW-26</i>				
Project Number: <i>60651450</i>					Well Diameter: <i>2"</i>				
Date: <i>2/8/21</i>					Screen Interval: <i>?</i>				
Weather: <i>overcast 40°S 13to29</i>					Measuring Point: <i>T0C</i>				
Sampler(s): <i>NZG</i>					Depth to Water: <i>4.49</i>				
Purge Method: <i>low flow</i>					Depth to Bottom: <i>15.04</i>				
Sample Method: <i>Grab</i>					Depth to NAPL: <i>5.00</i>				
Tubing Type: <i>LDPE</i>					NAPL Thickness: <i>Sheen/0.01</i>				
Pump Intake Depth: <i>≈ 1450</i>					Meter Information			Calibration Date	
Water disposal: <i>Drummed on-site</i>					<i>Horiba</i> Model <i>V-52</i>			Date	
					Temperature: <i>11.69</i>			<i>19</i>	
					pH: <i>7.05</i>			<i>FEL</i>	
					Conductivity: <i>1.20</i>			<i>2/5/21</i>	
					ORP: <i>-103</i>				
					DO: <i>1.26</i>				
					Turbidity: <i>12.9</i>				
					Comments: <i>(1515) Start Time</i>				
					Tide event (based on tide chart): <i>NA</i>				

Field Parameters	Units	+9 minutes	+9 minutes	+9 minutes	+3 minutes	+3 minutes	+3 minutes	minutes
Temperature	°C	11.36	11.21	11.22	11.09	11.09	11.08	
pH (±0.1)	-	7.06	7.07	7.06	7.06	7.05	7.04	
Conductivity (±3%)	ms/cm	1.20	1.19	1.21	1.21	1.22	1.23	
ORP (±10mV)	mV	-112	-117	-118	-118	-119	-119	
DO (±10%)	mg/L	0.00	0.00	0.00	0.00	0.00	0.00	
Turbidity (±10%)	NTU	11.3	10.1	8.8	8.3	7.9	8.0	
Time <i>start 1515</i>	-	1524	1533	1542	1545	1548	1551	
Water Level	-	5.36	5.48	5.51	5.51	5.52	5.52	
Flow Rate	mL/min	100	100	100	100	100	100	

Field Parameters	Units	minutes	minutes	minutes	minutes	minutes	minutes	minutes
Temperature	°C							
pH (±0.1)	-							
Conductivity (±3%)	ms/cm							
ORP (±10mV)	mV							
DO (±10%)	mg/L							
Turbidity (±10%)	NTU							
Time	-							
Water Level	-							
Flow Rate	mL/min							

COC Information	Sample ID	Sample Time	Total # of bottles
Primary Sample	<i>MW-26</i>	<i>1555</i>	<i>4</i>
MS/MSD Sample (if collected)			
Duplicate Sample (if collected)			

Memo
WFS Groundwater Monitoring
6760 W Marginal Way SW Cardlock Facility

Attachment 2



AECOM

David Raubvogel
1111 3rd Avenue Suite 1600
Seattle, WA 98101

RE: WFS 6760 W Marginal Way SW
Work Order Number: 2102140

February 15, 2021

Attention David Raubvogel:

Fremont Analytical, Inc. received 8 sample(s) on 2/8/2021 for the analyses presented in the following report.

Diesel and Heavy Oil by NWTPH-Dx/Dx Ext.
Gasoline by NWTPH-Gx
Volatile Organic Compounds by EPA Method 8260D

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,

Brianna Barnes
Project Manager



CLIENT: AECOM
Project: WFS 6760 W Marginal Way SW
Work Order: 2102140

Work Order Sample Summary

Lab Sample ID	Client Sample ID	Date/Time Collected	Date/Time Received
2102140-001	MW-25	02/08/2021 10:35 AM	02/08/2021 5:10 PM
2102140-002	MW-23	02/08/2021 11:30 AM	02/08/2021 5:10 PM
2102140-003	MW-24	02/08/2021 12:25 PM	02/08/2021 5:10 PM
2102140-004	EX-1	02/08/2021 1:15 PM	02/08/2021 5:10 PM
2102140-005	EX-2	02/08/2021 2:10 PM	02/08/2021 5:10 PM
2102140-006	MW-27	02/08/2021 3:00 PM	02/08/2021 5:10 PM
2102140-007	MW-26	02/08/2021 3:55 PM	02/08/2021 5:10 PM
2102140-008	Trip Blank		02/08/2021 5:10 PM

Note: If no "Time Collected" is supplied, a default of 12:00AM is assigned

CLIENT: AECOM
Project: WFS 6760 W Marginal Way SW

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
- DUP - Sample Duplicate
- 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
- REP - Sample Replicate
- RL - Reporting Limit
- RPD - Relative Percent Difference
- SD - Serial Dilution
- SGT - Silica Gel Treatment
- SPK - Spike
- Surr - Surrogate



Client: AECOM

Collection Date: 2/8/2021 10:35:00 AM

Project: WFS 6760 W Marginal Way SW

Lab ID: 2102140-001

Matrix: Groundwater

Client Sample ID: MW-25

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Diesel and Heavy Oil by NWTPH-Dx/Dx Ext.

Batch ID: 31322 Analyst: MM

Diesel (Fuel Oil)	ND	98.7		µg/L	1	2/11/2021 7:02:21 PM
Diesel Range Organics (C12-C24)	305	98.7		µg/L	1	2/11/2021 7:02:21 PM
Heavy Oil	676	98.7		µg/L	1	2/11/2021 7:02:21 PM
Surr: 2-Fluorobiphenyl	93.0	50 - 150		%Rec	1	2/11/2021 7:02:21 PM
Surr: o-Terphenyl	75.0	50 - 150		%Rec	1	2/11/2021 7:02:21 PM

NOTES:

Diesel Range Organics - Indicates unresolved compounds in the Diesel range inconsistent with a known petroleum standard.

Gasoline by NWTPH-Gx

Batch ID: 31319 Analyst: KT

Gasoline	ND	50.0		µg/L	1	2/10/2021 10:27:53 PM
Surr: Toluene-d8	89.1	65 - 135		%Rec	1	2/10/2021 10:27:53 PM
Surr: 4-Bromofluorobenzene	98.6	65 - 135		%Rec	1	2/10/2021 10:27:53 PM

Volatile Organic Compounds by EPA Method 8260D

Batch ID: 31319 Analyst: KT

Benzene	ND	1.00		µg/L	1	2/10/2021 10:27:53 PM
Toluene	ND	1.00		µg/L	1	2/10/2021 10:27:53 PM
Ethylbenzene	ND	1.00		µg/L	1	2/10/2021 10:27:53 PM
m,p-Xylene	ND	1.00		µg/L	1	2/10/2021 10:27:53 PM
o-Xylene	ND	1.00		µg/L	1	2/10/2021 10:27:53 PM
Surr: Dibromofluoromethane	102	87.8 - 114		%Rec	1	2/10/2021 10:27:53 PM
Surr: Toluene-d8	94.3	90.6 - 109		%Rec	1	2/10/2021 10:27:53 PM
Surr: 1-Bromo-4-fluorobenzene	96.3	88.6 - 111		%Rec	1	2/10/2021 10:27:53 PM



Client: AECOM

Collection Date: 2/8/2021 11:30:00 AM

Project: WFS 6760 W Marginal Way SW

Lab ID: 2102140-002

Matrix: Groundwater

Client Sample ID: MW-23

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Diesel and Heavy Oil by NWTPH-Dx/Dx Ext.

Batch ID: 31322 Analyst: MM

Diesel (Fuel Oil)	ND	99.0		µg/L	1	2/11/2021 7:31:41 PM
Heavy Oil	620	99.0		µg/L	1	2/11/2021 7:31:41 PM
Surr: 2-Fluorobiphenyl	85.1	50 - 150		%Rec	1	2/11/2021 7:31:41 PM
Surr: o-Terphenyl	75.8	50 - 150		%Rec	1	2/11/2021 7:31:41 PM

Gasoline by NWTPH-Gx

Batch ID: 31319 Analyst: KT

Gasoline	ND	50.0		µg/L	1	2/10/2021 10:58:05 PM
Surr: Toluene-d8	99.8	65 - 135		%Rec	1	2/10/2021 10:58:05 PM
Surr: 4-Bromofluorobenzene	97.7	65 - 135		%Rec	1	2/10/2021 10:58:05 PM

Volatile Organic Compounds by EPA Method 8260D

Batch ID: 31319 Analyst: KT

Benzene	ND	1.00		µg/L	1	2/10/2021 10:58:05 PM
Toluene	ND	1.00		µg/L	1	2/10/2021 10:58:05 PM
Ethylbenzene	ND	1.00		µg/L	1	2/10/2021 10:58:05 PM
m,p-Xylene	ND	1.00		µg/L	1	2/10/2021 10:58:05 PM
o-Xylene	ND	1.00		µg/L	1	2/10/2021 10:58:05 PM
Surr: Dibromofluoromethane	101	87.8 - 114		%Rec	1	2/10/2021 10:58:05 PM
Surr: Toluene-d8	108	90.6 - 109		%Rec	1	2/10/2021 10:58:05 PM
Surr: 1-Bromo-4-fluorobenzene	95.4	88.6 - 111		%Rec	1	2/10/2021 10:58:05 PM



Client: AECOM

Collection Date: 2/8/2021 12:25:00 PM

Project: WFS 6760 W Marginal Way SW

Lab ID: 2102140-003

Matrix: Groundwater

Client Sample ID: MW-24

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<u>Diesel and Heavy Oil by NWTPH-Dx/Dx Ext.</u>					Batch ID: 31322	Analyst: MM
Diesel (Fuel Oil)	ND	98.8		µg/L	1	2/11/2021 8:01:01 PM
Heavy Oil	ND	98.8		µg/L	1	2/11/2021 8:01:01 PM
Surr: 2-Fluorobiphenyl	96.7	50 - 150		%Rec	1	2/11/2021 8:01:01 PM
Surr: o-Terphenyl	82.0	50 - 150		%Rec	1	2/11/2021 8:01:01 PM
<u>Gasoline by NWTPH-Gx</u>					Batch ID: 31319	Analyst: KT
Gasoline	ND	50.0		µg/L	1	2/10/2021 11:28:21 PM
Surr: Toluene-d8	98.8	65 - 135		%Rec	1	2/10/2021 11:28:21 PM
Surr: 4-Bromofluorobenzene	98.0	65 - 135		%Rec	1	2/10/2021 11:28:21 PM
<u>Volatile Organic Compounds by EPA Method 8260D</u>					Batch ID: 31319	Analyst: KT
Benzene	ND	1.00		µg/L	1	2/10/2021 11:28:21 PM
Toluene	ND	1.00		µg/L	1	2/10/2021 11:28:21 PM
Ethylbenzene	ND	1.00		µg/L	1	2/10/2021 11:28:21 PM
m,p-Xylene	ND	1.00		µg/L	1	2/10/2021 11:28:21 PM
o-Xylene	ND	1.00		µg/L	1	2/10/2021 11:28:21 PM
Surr: Dibromofluoromethane	103	87.8 - 114		%Rec	1	2/10/2021 11:28:21 PM
Surr: Toluene-d8	104	90.6 - 109		%Rec	1	2/10/2021 11:28:21 PM
Surr: 1-Bromo-4-fluorobenzene	95.8	88.6 - 111		%Rec	1	2/10/2021 11:28:21 PM



Client: AECOM

Collection Date: 2/8/2021 1:15:00 PM

Project: WFS 6760 W Marginal Way SW

Lab ID: 2102140-004

Matrix: Groundwater

Client Sample ID: EX-1

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Diesel and Heavy Oil by NWTPH-Dx/Dx Ext.

Batch ID: 31322 Analyst: MM

Diesel (Fuel Oil)	5,900	99.2		µg/L	1	2/11/2021 8:30:21 PM
Heavy Oil	ND	99.2		µg/L	1	2/11/2021 8:30:21 PM
Surr: 2-Fluorobiphenyl	83.3	50 - 150		%Rec	1	2/11/2021 8:30:21 PM
Surr: o-Terphenyl	67.5	50 - 150		%Rec	1	2/11/2021 8:30:21 PM

Gasoline by NWTPH-Gx

Batch ID: 31319 Analyst: KT

Gasoline	ND	50.0		µg/L	1	2/10/2021 11:58:27 PM
Surr: Toluene-d8	98.7	65 - 135		%Rec	1	2/10/2021 11:58:27 PM
Surr: 4-Bromofluorobenzene	97.8	65 - 135		%Rec	1	2/10/2021 11:58:27 PM

Volatile Organic Compounds by EPA Method 8260D

Batch ID: 31319 Analyst: KT

Benzene	ND	1.00		µg/L	1	2/10/2021 11:58:27 PM
Toluene	ND	1.00		µg/L	1	2/10/2021 11:58:27 PM
Ethylbenzene	ND	1.00		µg/L	1	2/10/2021 11:58:27 PM
m,p-Xylene	ND	1.00		µg/L	1	2/10/2021 11:58:27 PM
o-Xylene	ND	1.00		µg/L	1	2/10/2021 11:58:27 PM
Surr: Dibromofluoromethane	101	87.8 - 114		%Rec	1	2/10/2021 11:58:27 PM
Surr: Toluene-d8	108	90.6 - 109		%Rec	1	2/10/2021 11:58:27 PM
Surr: 1-Bromo-4-fluorobenzene	95.6	88.6 - 111		%Rec	1	2/10/2021 11:58:27 PM



Client: AECOM

Collection Date: 2/8/2021 2:10:00 PM

Project: WFS 6760 W Marginal Way SW

Lab ID: 2102140-005

Matrix: Groundwater

Client Sample ID: EX-2

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Diesel and Heavy Oil by NWTPH-Dx/Dx Ext.

Batch ID: 31322 Analyst: MM

Diesel (Fuel Oil)	6,670	98.7		µg/L	1	2/11/2021 8:59:41 PM
Heavy Oil	ND	98.7		µg/L	1	2/11/2021 8:59:41 PM
Surr: 2-Fluorobiphenyl	79.9	50 - 150		%Rec	1	2/11/2021 8:59:41 PM
Surr: o-Terphenyl	66.1	50 - 150		%Rec	1	2/11/2021 8:59:41 PM

Gasoline by NWTPH-Gx

Batch ID: 31319 Analyst: KT

Gasoline	ND	50.0		µg/L	1	2/11/2021 12:28:38 AM
Gasoline Range Organics (C6-C12)	198	50.0		µg/L	1	2/11/2021 12:28:38 AM
Surr: Toluene-d8	98.5	65 - 135		%Rec	1	2/11/2021 12:28:38 AM
Surr: 4-Bromofluorobenzene	103	65 - 135		%Rec	1	2/11/2021 12:28:38 AM

NOTES:

GRO - Indicates the presence of unresolved compounds eluting from hexane to dodecane, likely due to overlap with diesel range material.

Volatile Organic Compounds by EPA Method 8260D

Batch ID: 31319 Analyst: KT

Benzene	ND	1.00		µg/L	1	2/11/2021 12:28:38 AM
Toluene	ND	1.00		µg/L	1	2/11/2021 12:28:38 AM
Ethylbenzene	ND	1.00		µg/L	1	2/11/2021 12:28:38 AM
m,p-Xylene	ND	1.00		µg/L	1	2/11/2021 12:28:38 AM
o-Xylene	ND	1.00		µg/L	1	2/11/2021 12:28:38 AM
Surr: Dibromofluoromethane	99.4	87.8 - 114		%Rec	1	2/11/2021 12:28:38 AM
Surr: Toluene-d8	108	90.6 - 109		%Rec	1	2/11/2021 12:28:38 AM
Surr: 1-Bromo-4-fluorobenzene	99.0	88.6 - 111		%Rec	1	2/11/2021 12:28:38 AM



Client: AECOM

Collection Date: 2/8/2021 3:00:00 PM

Project: WFS 6760 W Marginal Way SW

Lab ID: 2102140-006

Matrix: Groundwater

Client Sample ID: MW-27

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<u>Diesel and Heavy Oil by NWTPH-Dx/Dx Ext.</u>					Batch ID: 31322	Analyst: MM
Diesel (Fuel Oil)	ND	99.0		µg/L	1	2/11/2021 9:58:25 PM
Heavy Oil	ND	99.0		µg/L	1	2/11/2021 9:58:25 PM
Surr: 2-Fluorobiphenyl	82.6	50 - 150		%Rec	1	2/11/2021 9:58:25 PM
Surr: o-Terphenyl	69.0	50 - 150		%Rec	1	2/11/2021 9:58:25 PM
<u>Gasoline by NWTPH-Gx</u>					Batch ID: 31319	Analyst: KT
Gasoline	ND	50.0		µg/L	1	2/11/2021 12:58:39 AM
Surr: Toluene-d8	89.0	65 - 135		%Rec	1	2/11/2021 12:58:39 AM
Surr: 4-Bromofluorobenzene	104	65 - 135		%Rec	1	2/11/2021 12:58:39 AM
<u>Volatile Organic Compounds by EPA Method 8260D</u>					Batch ID: 31319	Analyst: KT
Benzene	ND	1.00		µg/L	1	2/11/2021 12:58:39 AM
Toluene	ND	1.00		µg/L	1	2/11/2021 12:58:39 AM
Ethylbenzene	ND	1.00		µg/L	1	2/11/2021 12:58:39 AM
m,p-Xylene	ND	1.00		µg/L	1	2/11/2021 12:58:39 AM
o-Xylene	ND	1.00		µg/L	1	2/11/2021 12:58:39 AM
Surr: Dibromofluoromethane	101	87.8 - 114		%Rec	1	2/11/2021 12:58:39 AM
Surr: Toluene-d8	94.1	90.6 - 109		%Rec	1	2/11/2021 12:58:39 AM
Surr: 1-Bromo-4-fluorobenzene	100	88.6 - 111		%Rec	1	2/11/2021 12:58:39 AM



Client: AECOM

Collection Date: 2/8/2021 3:55:00 PM

Project: WFS 6760 W Marginal Way SW

Lab ID: 2102140-007

Matrix: Groundwater

Client Sample ID: MW-26

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Diesel and Heavy Oil by NWTPH-Dx/Dx Ext.

Batch ID: 31322 Analyst: MM

Diesel (Fuel Oil)	15,400	98.7		µg/L	1	2/11/2021 10:27:46 PM
Heavy Oil	ND	98.7		µg/L	1	2/11/2021 10:27:46 PM
Surr: 2-Fluorobiphenyl	90.6	50 - 150		%Rec	1	2/11/2021 10:27:46 PM
Surr: o-Terphenyl	77.4	50 - 150		%Rec	1	2/11/2021 10:27:46 PM

Gasoline by NWTPH-Gx

Batch ID: 31319 Analyst: KT

Gasoline	ND	50.0		µg/L	1	2/11/2021 1:28:46 AM
Gasoline Range Organics (C6-C12)	889	50.0		µg/L	1	2/11/2021 1:28:46 AM
Surr: Toluene-d8	98.1	65 - 135		%Rec	1	2/11/2021 1:28:46 AM
Surr: 4-Bromofluorobenzene	104	65 - 135		%Rec	1	2/11/2021 1:28:46 AM

NOTES:

GRO - Indicates the presence of unresolved compounds eluting from hexane to dodecane, likely due to overlap with diesel range material.

Volatile Organic Compounds by EPA Method 8260D

Batch ID: 31319 Analyst: KT

Benzene	ND	1.00		µg/L	1	2/11/2021 1:28:46 AM
Toluene	ND	1.00		µg/L	1	2/11/2021 1:28:46 AM
Ethylbenzene	ND	1.00		µg/L	1	2/11/2021 1:28:46 AM
m,p-Xylene	ND	1.00		µg/L	1	2/11/2021 1:28:46 AM
o-Xylene	ND	1.00		µg/L	1	2/11/2021 1:28:46 AM
Surr: Dibromofluoromethane	101	87.8 - 114		%Rec	1	2/11/2021 1:28:46 AM
Surr: Toluene-d8	103	90.6 - 109		%Rec	1	2/11/2021 1:28:46 AM
Surr: 1-Bromo-4-fluorobenzene	100	88.6 - 111		%Rec	1	2/11/2021 1:28:46 AM



Client: AECOM

Collection Date:

Project: WFS 6760 W Marginal Way SW

Lab ID: 2102140-008

Matrix: Groundwater

Client Sample ID: Trip Blank

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Volatile Organic Compounds by EPA Method 8260D

Batch ID: 31319

Analyst: KT

Benzene	ND	1.00		µg/L	1	2/10/2021 12:53:57 PM
Toluene	ND	1.00		µg/L	1	2/10/2021 12:53:57 PM
Ethylbenzene	ND	1.00		µg/L	1	2/10/2021 12:53:57 PM
m,p-Xylene	ND	1.00		µg/L	1	2/10/2021 12:53:57 PM
o-Xylene	ND	1.00		µg/L	1	2/10/2021 12:53:57 PM
Surr: Dibromofluoromethane	102	87.8 - 114		%Rec	1	2/10/2021 12:53:57 PM
Surr: Toluene-d8	99.6	90.6 - 109		%Rec	1	2/10/2021 12:53:57 PM
Surr: 1-Bromo-4-fluorobenzene	93.8	88.6 - 111		%Rec	1	2/10/2021 12:53:57 PM

Work Order: 2102140
CLIENT: AECOM
Project: WFS 6760 W Marginal Way SW

QC SUMMARY REPORT
Diesel and Heavy Oil by NWTPH-Dx/Dx Ext.

Sample ID: MB-31322	SampType: MBLK	Units: µg/L			Prep Date: 2/10/2021	RunNo: 65295					
Client ID: MBLKW	Batch ID: 31322				Analysis Date: 2/11/2021	SeqNo: 1313080					
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Diesel (Fuel Oil)	ND	99.4									
Diesel Range Organics (C12-C24)	ND	99.4									
Heavy Oil	ND	99.4									
Surr: 2-Fluorobiphenyl	73.8		79.52		92.8	50	150				
Surr: o-Terphenyl	64.0		79.52		80.4	50	150				

Sample ID: LCS-31322	SampType: LCS	Units: µg/L			Prep Date: 2/10/2021	RunNo: 65295					
Client ID: LCSW	Batch ID: 31322				Analysis Date: 2/11/2021	SeqNo: 1313081					
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Diesel (Fuel Oil)	571	100	999.9	0	57.1	48.1	108				
Surr: 2-Fluorobiphenyl	67.5		79.99		84.4	50	150				
Surr: o-Terphenyl	57.9		79.99		72.4	50	150				

Sample ID: 2102133-001BDUP	SampType: DUP	Units: µg/L			Prep Date: 2/10/2021	RunNo: 65295					
Client ID: BATCH	Batch ID: 31322				Analysis Date: 2/11/2021	SeqNo: 1313085					
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Diesel (Fuel Oil)	ND	98.2						0		30	
Heavy Oil	ND	98.2						0		30	
Surr: 2-Fluorobiphenyl	60.2		78.53		76.7	50	150		0		
Surr: o-Terphenyl	45.8		78.53		58.3	50	150		0		

Sample ID: 2102140-005BMS	SampType: MS	Units: µg/L			Prep Date: 2/10/2021	RunNo: 65295					
Client ID: EX-2	Batch ID: 31322				Analysis Date: 2/11/2021	SeqNo: 1313093					
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Diesel (Fuel Oil)	7,840	98.9	989.3	6,675	118	18.7	128				
Surr: 2-Fluorobiphenyl	64.4		79.15		81.4	50	150				

Work Order: 2102140
CLIENT: AECOM
Project: WFS 6760 W Marginal Way SW

QC SUMMARY REPORT
Diesel and Heavy Oil by NWTPH-Dx/Dx Ext.

Sample ID: 2102140-005BMS	SampType: MS	Units: µg/L	Prep Date: 2/10/2021	RunNo: 65295							
Client ID: EX-2	Batch ID: 31322		Analysis Date: 2/11/2021	SeqNo: 1313093							
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Surr: o-Terphenyl	54.7		79.15		69.1	50	150
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Sample ID: 2102151-003BDUP	SampType: DUP	Units: µg/L	Prep Date: 2/10/2021	RunNo: 65295							
Client ID: BATCH	Batch ID: 31322		Analysis Date: 2/12/2021	SeqNo: 1313112							
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Diesel (Fuel Oil)	ND	99.5						0		30
Heavy Oil	115	99.5						107.9	6.24	30
Surr: 2-Fluorobiphenyl	68.2		79.62		85.7	50	150		0	
Surr: o-Terphenyl	55.9		79.62		70.2	50	150		0	

Work Order: 2102140
CLIENT: AECOM
Project: WFS 6760 W Marginal Way SW

QC SUMMARY REPORT
Gasoline by NWTPH-Gx

Sample ID: LCS-31319	SampType: LCS	Units: µg/L			Prep Date: 2/10/2021	RunNo: 65233					
Client ID: LCSW	Batch ID: 31319				Analysis Date: 2/10/2021	SeqNo: 1311851					
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Gasoline	454	50.0	500.0	0	90.8	65	135				
Surr: Toluene-d8	21.0		25.00		84.2	65	135				
Surr: 4-Bromofluorobenzene	26.5		25.00		106	65	135				

Sample ID: MB-31319	SampType: MBLK	Units: µg/L			Prep Date: 2/10/2021	RunNo: 65233					
Client ID: MBLKW	Batch ID: 31319				Analysis Date: 2/10/2021	SeqNo: 1311850					
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Gasoline	ND	50.0									
Surr: Toluene-d8	24.9		25.00		99.5	65	135				
Surr: 4-Bromofluorobenzene	24.1		25.00		96.4	65	135				

Sample ID: 2102136-001ADUP	SampType: DUP	Units: µg/L			Prep Date: 2/10/2021	RunNo: 65233					
Client ID: BATCH	Batch ID: 31319				Analysis Date: 2/10/2021	SeqNo: 1311827					
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Gasoline	ND	50.0						0		30	
Surr: Toluene-d8	24.9		25.00		99.5	65	135		0		
Surr: 4-Bromofluorobenzene	24.0		25.00		96.1	65	135		0		

Sample ID: 2102137-001ADUP	SampType: DUP	Units: µg/L			Prep Date: 2/10/2021	RunNo: 65233					
Client ID: BATCH	Batch ID: 31319				Analysis Date: 2/10/2021	SeqNo: 1311829					
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Gasoline	ND	50.0						0		30	
Surr: Toluene-d8	24.5		25.00		97.8	65	135		0		
Surr: 4-Bromofluorobenzene	24.1		25.00		96.5	65	135		0		

Work Order: 2102140
CLIENT: AECOM
Project: WFS 6760 W Marginal Way SW

QC SUMMARY REPORT
Gasoline by NWTPH-Gx

Sample ID: 2102133-001AMS	SampType: MS	Units: µg/L		Prep Date: 2/10/2021	RunNo: 65233						
Client ID: BATCH	Batch ID: 31319			Analysis Date: 2/10/2021	SeqNo: 1311825						
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Gasoline	471	50.0	500.0	0	94.1	65	135				
Surr: Toluene-d8	24.7		25.00		98.6	65	135				
Surr: 4-Bromofluorobenzene	26.2		25.00		105	65	135				

Work Order: 2102140
 CLIENT: AECOM
 Project: WFS 6760 W Marginal Way SW

QC SUMMARY REPORT
Volatile Organic Compounds by EPA Method 8260D

Sample ID: LCS-31319	SampType: LCS	Units: µg/L				Prep Date: 2/10/2021	RunNo: 65228				
Client ID: LCSW	Batch ID: 31319					Analysis Date: 2/10/2021	SeqNo: 1311745				
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzene	19.0	1.00	20.00	0	95.2	83.4	116				
Toluene	19.9	1.00	20.00	0	99.7	83.6	117				
Ethylbenzene	19.3	1.00	20.00	0	96.7	82.8	117				
m,p-Xylene	39.7	1.00	40.00	0	99.2	81.6	116				
o-Xylene	19.6	1.00	20.00	0	97.9	82.4	115				
Surr: Dibromofluoromethane	26.0		25.00		104	87.8	114				
Surr: Toluene-d8	25.6		25.00		102	90.6	109				
Surr: 1-Bromo-4-fluorobenzene	26.3		25.00		105	88.6	111				

Sample ID: MB-31319	SampType: MBLK	Units: µg/L				Prep Date: 2/10/2021	RunNo: 65228				
Client ID: MBLKW	Batch ID: 31319					Analysis Date: 2/10/2021	SeqNo: 1311744				
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzene	ND	1.00									
Toluene	ND	1.00									
Ethylbenzene	ND	1.00									
m,p-Xylene	ND	1.00									
o-Xylene	ND	1.00									
Surr: Dibromofluoromethane	25.4		25.00		102	87.8	114				
Surr: Toluene-d8	26.5		25.00		106	90.6	109				
Surr: 1-Bromo-4-fluorobenzene	23.6		25.00		94.2	88.6	111				

Sample ID: 2102136-001ADUP	SampType: DUP	Units: µg/L				Prep Date: 2/10/2021	RunNo: 65228				
Client ID: BATCH	Batch ID: 31319					Analysis Date: 2/10/2021	SeqNo: 1311721				
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzene	ND	1.00						0		30	
Toluene	ND	1.00						0		30	
Ethylbenzene	ND	1.00						0		30	

Work Order: 2102140
 CLIENT: AECOM
 Project: WFS 6760 W Marginal Way SW

QC SUMMARY REPORT

Volatile Organic Compounds by EPA Method 8260D

Sample ID: 2102136-001ADUP	SampType: DUP	Units: µg/L	Prep Date: 2/10/2021	RunNo: 65228							
Client ID: BATCH	Batch ID: 31319		Analysis Date: 2/10/2021	SeqNo: 1311721							
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
m,p-Xylene	ND	1.00						0		30	
o-Xylene	ND	1.00						0		30	
Surr: Dibromofluoromethane	24.9		25.00		99.6	87.8	114		0		
Surr: Toluene-d8	27.7		25.00		111	90.6	109		0		S
Surr: 1-Bromo-4-fluorobenzene	23.5		25.00		94.0	88.6	111		0		

NOTES:

S - Outlying surrogate recovery(ies) observed.

Sample ID: 2102137-001ADUP	SampType: DUP	Units: µg/L	Prep Date: 2/10/2021	RunNo: 65228							
Client ID: BATCH	Batch ID: 31319		Analysis Date: 2/10/2021	SeqNo: 1311723							
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzene	ND	1.00						0		30	
Toluene	ND	1.00						0		30	
Ethylbenzene	ND	1.00						0		30	
m,p-Xylene	ND	1.00						0		30	
o-Xylene	ND	1.00						0		30	
Surr: Dibromofluoromethane	25.0		25.00		100	87.8	114		0		
Surr: Toluene-d8	27.2		25.00		109	90.6	109		0		
Surr: 1-Bromo-4-fluorobenzene	23.6		25.00		94.5	88.6	111		0		

Sample ID: 2102133-001AMS	SampType: MS	Units: µg/L	Prep Date: 2/10/2021	RunNo: 65228							
Client ID: BATCH	Batch ID: 31319		Analysis Date: 2/10/2021	SeqNo: 1311719							
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzene	20.2	1.00	20.00	0	101	85.3	129				
Toluene	24.0	1.00	20.00	0	120	87.3	124				
Ethylbenzene	20.8	1.00	20.00	0	104	92.7	120				
m,p-Xylene	42.9	1.00	40.00	0	107	89.7	118				
o-Xylene	21.2	1.00	20.00	0	106	90.3	117				

Work Order: 2102140
CLIENT: AECOM
Project: WFS 6760 W Marginal Way SW

QC SUMMARY REPORT

Volatile Organic Compounds by EPA Method 8260D

Sample ID: 2102133-001AMS	SampType: MS	Units: µg/L	Prep Date: 2/10/2021	RunNo: 65228							
Client ID: BATCH	Batch ID: 31319	Analysis Date: 2/10/2021	SeqNo: 1311719								
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Surr: Dibromofluoromethane	25.4		25.00		102	89.1	116				
Surr: Toluene-d8	28.5		25.00		114	90.5	111				S
Surr: 1-Bromo-4-fluorobenzene	26.4		25.00		106	97.8	110				

NOTES:

S - Outlying surrogate recovery(ies) observed.

Client Name: **URS**

 Work Order Number: **2102140**

 Logged by: **Gabrielle Coeuille**

 Date Received: **2/8/2021 5:10:00 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 Present
6. Was an attempt made to cool the samples? Yes No NA
7. Were all items received at a temperature of >2°C to 6°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:	<input type="text"/>	Date:	<input type="text"/>
By Whom:	<input type="text"/>	Via:	<input type="checkbox"/> eMail <input type="checkbox"/> Phone <input type="checkbox"/> Fax <input type="checkbox"/> In Person
Regarding:	<input type="text"/>		
Client Instructions:	<input type="text"/>		

19. Additional remarks:

Item Information

Item #	Temp °C
Sample 1	0.5

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



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

Chain of Custody Record & Laboratory Services Agreement

Date: 02/08/2021 Page: 1 of 1
Project Name: WFS 6760 w Marginal way SW
Project No: 60651450

Laboratory Project No (Internal): 2102140
Special Remarks:

Client: AECOM
Address: 1111 3rd Ave, Suite 1600
City, State, zip: Seattle, WA 98101
Telephone: 206 438 2700
Fax:

Collected by: NZC
Location: 6067 w Marginal way SW
Report To (PM): David Roubvogel
PM Email: David.Roubvogel@Aecom.com

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

Sample Name	Sample Date	Sample Time	Sample Type (Matrix)*	# of Cont.	Analytes										Comments	
					VOCs (EPA 8260 / 624)	BTEX	Gasoline Range Organics (GX)	Hydrocarbon Identification (HX)	Diesel/Heavy Oil Range Organics (HX)	SVOCs (EPA 8270 / 625)	PAHs (EPA 8270 - SIM)	PCBs (EPA 8092 / 608)	Metals** (EPA 6020 / 200.8)	Total (T) Dissolved (D)		Anions (IC)***
1 MW-25	2/8/21	1035	GW	4	X	X	X	X	X	X	X	X	X	X	X	
2 MW-23	2/8/21	1130	GW	4	X	X	X	X	X	X	X	X	X	X	X	
3 MW-24	2/8/21	1225	GW	4	X	X	X	X	X	X	X	X	X	X	X	
4 EX-1	2/8/21	1315	GW	4	X	X	X	X	X	X	X	X	X	X	X	
5 EX-2	2/8/21	1410	GW	4	X	X	X	X	X	X	X	X	X	X	X	
6 MW-27	2/8/21	1500	GW	4	X	X	X	X	X	X	X	X	X	X	X	
7 MW-26	2/8/21	1555	GW	4	X	X	X	X	X	X	X	X	X	X	X	
8 Trip Blank	2/8/21	1035	GW	1	X											
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 Tl Ti 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, that I have verified Client's agreement to each of the terms on the front and backside of this Agreement.

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

Relinquished (Signature) *Nathan Gagn* Print Name Nathan Gagn Date/Time 2/8/21 1845
 Relinquished (Signature) *Carly Johnson* Print Name Carly Johnson Date/Time 2/8/21 @ 1710