

TECHNICAL MEMORANDUM

Date: May 18, 2023
To: City of Seattle Finance and Administrative Services Department
From: George Iftner, Phil Coughlan; Herrera Environmental Consultants, Inc.
Subject: Waterway #20 Site Characterization and Recommendations

CONTENTS

Introduction.....	3
Methods.....	7
Soil Sampling.....	7
Initial Analyses.....	8
Follow-up Analyses	8
Groundwater Sampling.....	9
Results	9
Soil 13	
Groundwater Conditions.....	15
Recommendations.....	19
Waste Management.....	19
WORKER HEALTH AND SAFETY	20
References.....	22

ATTACHMENTS

- Attachment A Sampling and Analysis Plan
- Attachment B Boring Logs
- Attachment C Photographic Log
- Attachment D Laboratory Data and QA Review Memorandum



TABLES

Table 1.	Summary of Soil Sampling Analytical Results, Waterway #20 Site, Seattle, Washington.....	11
Table 2.	Summary of Groundwater Sampling Analytical Results, Waterway #20 Site, Seattle, Washington.....	17

FIGURES

Figure 1.	Vicinity Map, Waterway #20 Site, Seattle, Washington.....	4
Figure 2.	Site Map and Soil and Groundwater Sampling Locations, Waterway #20 Site, Seattle, Washington.....	5
Figure 3.	Project Site Setting and Gas Works Park Cleanup Site Boundary.....	6
Figure 4.	Soil Contaminants Exceeding Cleanup Levels in 2023 Soil Borings, Waterway #20, Seattle, Washington.....	14

INTRODUCTION

This technical memorandum describes the field investigation methods and results of soil and groundwater sampling conducted by Herrera Environmental Consultants (Herrera) on March 9, 2023, at the Waterway Site #20 (Site). The Site is directly adjacent to, and accessed from 1717 North Northlake Place, adjacent to Lake Union, and immediately west of Gas Works Park in Seattle, Washington (Figure 1).

The Site is owned by the State of Washington, managed by the Department of Natural Resources (DNR) and used by the Seattle Police Department Harbor Patrol (HP). Use of the property by HP must be authorized by DNR pursuant to the terms and conditions of DNR's "Waterway Use Permit #20-89981" (Permit) in accordance with Chapter 79.120 of the Revised Code of Washington (RCW). One of the Permit conditions is for the City of Seattle to provide DNR with soil-sampling data for the filled (upland) portion of Waterway 20. The Site is identified by the King County Tax Assessor as parcel 192504HYDR, and the adjacent property to the east operated by HP and owned by the City of Seattle Department of Parks and Recreation is identified as parcel 4088801930 (King County 2022). The upland portion of the Site that was investigated is approximately 0.24 acres in size (see Figure 2). The Site is also adjacent to the Gas Works Park Cleanup Site (GWPS), which also includes the aquatic portion of the Permit (see Figure 3). A Remedial Investigation/Feasibility Study (RI/FS) is currently on-going for the aquatic portion of the GWPS.

In September 2022, Herrera prepared a Sampling and Analysis Plan (SAP) for the field investigation activities described in this memorandum (Herrera 2022). The SAP included a summary of the results of previous environmental investigations at the Site conducted by Herrera in 2016.

The work was completed to provide additional data on potential contaminants of concern (COCs) in surface and subsurface soils at the Site to support decisions regarding future redevelopment that will allow public access to Waterway 20 and the adjacent upland park area. This work further delineates contamination in soils found in 2016. The conceptual public access features will include an access pathway and beach access (see Figure 2).

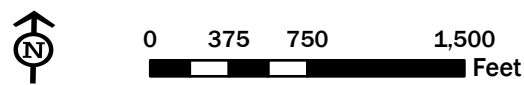


Legend

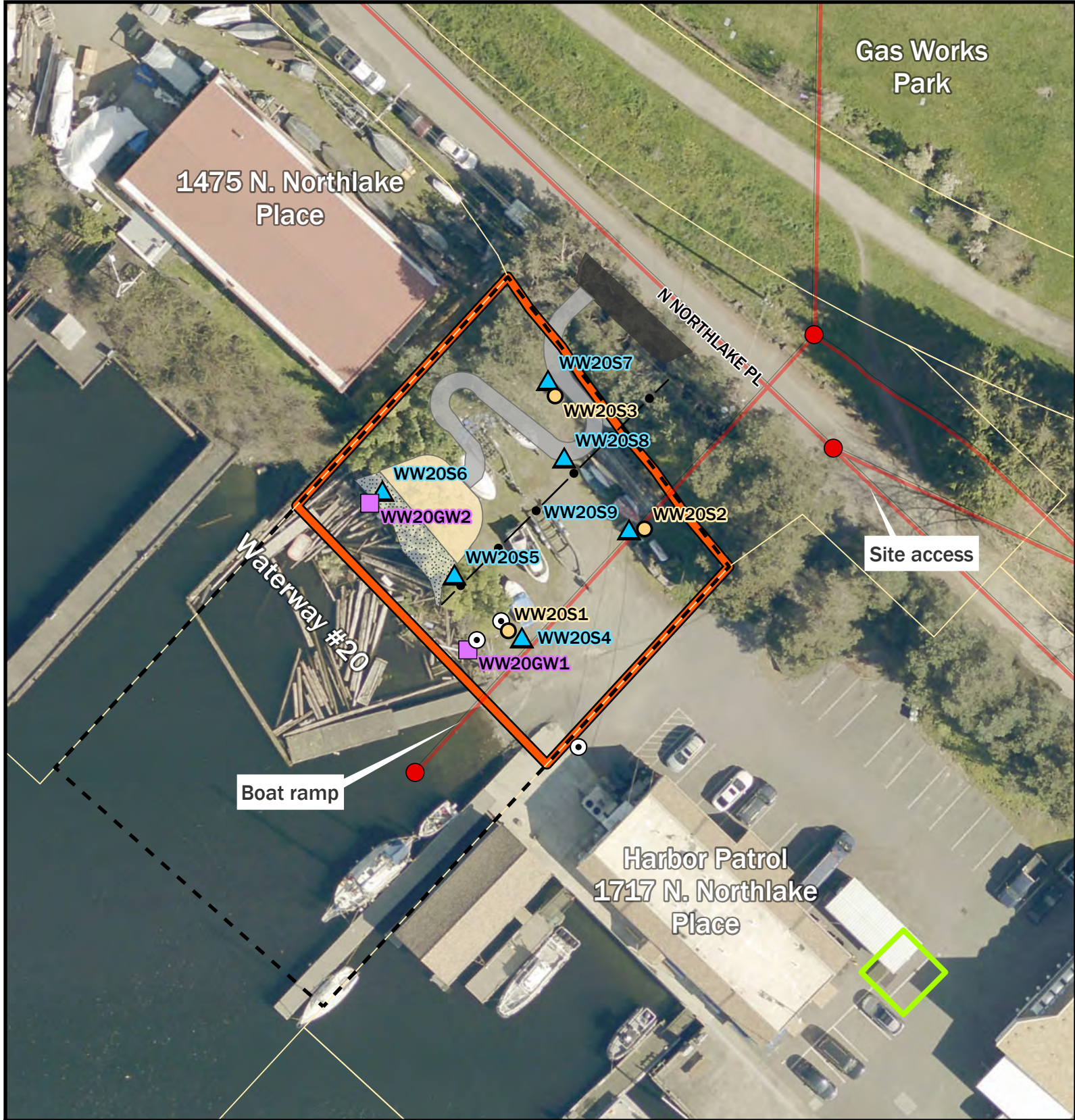
-  Project Site
-  Waterway Use Permit Area
-  Park



Figure 1.
Vicinity Map, Waterway #20 Site, Seattle, Washington.



ESRI (Aerial, 2021)



- Legend**
- 2023 Soil Boring Location
 - 2023 Groundwater Sampling Location
 - 2016 Surface Soil Sample Location
 - Approx. Location of Existing Monitoring Well
 - Other Structure - City of Seattle
 - Project Site
 - Waterway Use Permit Area
 - Approx. Location of Removed UST and Fuel Pump/Pump House
 - Proposed 6-ft Width ADA-Accessible Pathway
 - Proposed Beach Cobble
 - Proposed Beach Sand
 - Proposed Bump Out/Vehicle Drop-off Area
 - Proposed Fence
 - DWW Mainline - City of Seattle
 - Parcel (King County)

Figure 2.
Site Map and Soil and Groundwater Sample Locations, Waterway #20 Site, Seattle, Washington.

0 22.5 45 90 Feet

HERRERA
 King County (Aerial, 2021)

K:\Projects\Y2017\17-06530-022\Project\GISWorking\Pro\Waterway20SAP\Waterway20SAP.aprx



Figure 3.
Project Site Setting and Gas
Works Park Cleanup Site
Boundary.

Legend

- Shoreline (OHWM)
- Gas Works Park Site Area of Investigation
- Waterway Use Permit Area
- Project Site



0 250 500
Feet

ESRI (Aerial, 2021)

METHODS

The following section describes the field investigation methods used to characterize existing soil and groundwater conditions at the Site that may have been affected by historical site uses and placement of fill material. Observations of soils encountered during drilling, laboratory analytical results for soil and groundwater samples are presented in the *Results* section of this memorandum.

Soil Sampling

On March 9, 2023, under the direction of a Herrera Licensed Geologist, Holocene Drilling of Puyallup, Washington completed six soil borings (WWS20S4 through WWS20S9) using a push-probe drill rig. The soil borings were completed to depths of 10 feet below ground surface (bgs) to characterize surface and subsurface soils (Figure 2).

The boring locations were selected to characterize the upland portion of the property and to supplement the previous 2016 drilling locations, areas of planned future public use, and proximity to the aquatic portion of Waterway 20. Refuse was encountered at 2 locations (WW20S5 and WW20S6) within the first 5 feet, so the drill rig was moved 5 feet away and the boring was successfully completed to the full 10-foot depth.

Prior coordination with Harbor Patrol was completed by Herrera at the time of the utility locate to ask if stored items could be moved, if needed.

At a minimum, two soil samples were collected for chemical analyses at each boring location; at borings WW20S4 and WW20S5, a third sample was collected from the 5- to 6-foot bgs depth interval and archived. Sample collection depth intervals varied depending on the field observations of contamination or the presence of refuse and the homogeneity of the subsurface material.

Sample intervals included the following:

- A surface soil sample collected from the 0- to 1-foot depth interval, and
- A subsurface soil sample collected from the 2- to 5-foot or the 5- to 10-foot depth interval based on field observations (e.g., staining, odors, sheen, or presence of fill material), or poor sample recovery in the case of WW20S6.
- Groundwater collected from one push-probe boring (WW20S6) and one existing monitoring well (TSW-1)(see Figure 2). The approximate depths of groundwater encountered in the borings and monitoring well are documented in the soil boring logs in Attachment B. No well log was found for monitoring well TSW-1 that was previously installed at the Site by others.

The drilling and sample collection activities were completed according to the project Sampling and Analysis Plan (SAP) included in Attachment A. The work was overseen by a Herrera Licensed Geologist and soil boring logs are included in Attachment B. A photographic log is provided in Attachment C, laboratory analytical results and a data quality assurance review memorandum are included in Attachment D.

A total of 14 soil samples were collected from the six borings and Herrera hand delivered the samples in iced coolers to OnSite Environmental, Inc. (OnSite) in Redmond, Washington, for laboratory analysis. Two samples were archived for potential analysis, but were not analyzed.

Initial Analyses

A total of 12 samples were initially analyzed for:

1. Gasoline-range total petroleum hydrocarbons (TPH) including BTEX by Ecology Method NWTPH-Gx/8021B.
2. Lube oil- and diesel-range TPH by Ecology Method NWTPH Dx.
3. Total polycyclic aromatic hydrocarbons (PAHs) by US EPA Method 8270D/SIM (Selected Ion Monitoring, low-level).
4. Total Resource Conservation and Recovery Act (RCRA) metals (arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver) according to US EPA Methods 6010C and 7471B.

Follow-up Analyses

Per the SAP, follow-up analysis was also performed on select soil samples and included:

1. PCB analysis by US EPA Method 8082A on 11 samples with detected concentrations of heavy oil-range TPH above the laboratory reporting limit.
5. Based on the laboratory analytical results for RCRA metals, Toxicity Characteristic Leaching Procedure (TCLP) lead testing was also performed by EPA Method 1311/6010D on three samples with elevated concentrations of lead. Elevated concentrations are defined as results greater than 20 times the Dangerous Waste criteria per WAC 173-303. The results are used to determine soil disposal requirements for future excavation and offsite disposal during Site redevelopment activities.

In addition, two samples with detections of total chromium were analyzed for hexavalent chromium by US EPA Method 7196A to determine if that species of chromium is present at concentrations that may require soil to be disposed as Dangerous Waste per WAC 173-303.

Groundwater Sampling

On March 9, 2023, Herrera staff also collected two groundwater samples at the Site. Sample WW20GW1 was collected near the southeast corner of the Site from an existing monitoring well with well tag "TSW-1", and sample WW20GW2 was collected near the northwest corner of the Site from a temporary well point installed at boring WWS20S6. Herrera hand delivered the samples in coolers with ice to OnSite for laboratory analysis of the following:

1. Gasoline-range TPH by Ecology Method NWTPH-Gx.
2. Diesel- and lube oil-range TPH by Ecology Method NWTPH-Dx.
3. Total polycyclic aromatic hydrocarbons (PAHs) by US EPA Method 8270E/SIM.
4. Total and dissolved RCRA metals by EPA Methods 6010D/7471B.
6. PCBs by Method 8082A.
7. Hardness by calculation by US EPA Method 200.7/SM 2340B.

Each well was purged and sampled according to the Sampling and Analysis Plan (SAP) using a peristaltic pump with disposable polyethylene and silicone tubing (Herrera 2022). The wells were purged for approximately 30 minutes using low-flow techniques at a flow rate of approximately 0.4 Liters per minute until turbidity diminished, the water appeared clear, and water quality parameters had stabilized

RESULTS

A data quality review (validation) was performed on the laboratory data following data quality objectives (DQOs) established in the SAP (Herrera 2022). The data validation memorandum is presented in Attachment D. All data were found to be acceptable as reported by the laboratory. Table 1 presents a summary of soil sample results for the laboratory analyses and Figure 4 depicts soil contaminants detected above MTCA Method A or B cleanup levels (CULs).

This page intentionally left blank

Table 1. Summary of Soil Sampling Analytical Results, Waterway #20 Site, Seattle, Washington.														
Analytical Parameter	Soil Results in milligrams per kilogram (mg/kg)												MTCA Method A CUL ^a	Natural Background Concentration ^e
	WW20S4-0	WW20S4-2	WW20S5-0	WW20S5-2	WW20S6-0	WW20S6-5	WW20S7-0	WW20S7-5	WW20S8-0	WW20S8-5	WW20S9-0	WW20S9-2.5		
Total Petroleum Hydrocarbons by NWTPH-Dx and NWTPH-Gx (mg/kg)														
Diesel-Range Organics	ND (28)	ND (270)	ND (160)	ND (150)	ND (170)	ND (28)	ND (53)	ND (160)	ND (140)	ND (28)	ND (34)	ND (29)	2,000	–
Lube Oil	180	5,000	1,600	2,700	2,400	ND (57)	530	1,100	790	180	450	120	2,000	–
Gasoline	ND (6.5)	ND (15)	ND (6.3)	ND (7.1)	ND (5.3)	ND (5.8)	ND (7.3)	ND (8.1)	ND (5.8)	ND (6.8)	ND (6.4)	ND (4.8)	100	–
Polycyclic Aromatic Hydrocarbons (PAHs) by EPA Method 8720E/SIM (mg/kg)														
Naphthalene	ND (0.0073)	0.51	ND (0.036)	0.26	ND (0.035)	ND (0.0076)	0.24	0.33	0.33	0.14	0.58	0.13	5 ^b	–
2-Methylnaphthalene	ND (0.0073)	0.58	ND (0.036)	0.077	ND (0.035)	ND (0.0076)	0.11	0.22	0.14	0.11	0.2	0.096	–	–
1-Methylnaphthalene	ND (0.0073)	0.49	ND (0.036)	0.056	ND (0.035)	ND (0.0076)	0.071	0.18	0.11	0.091	0.089	0.084	–	–
Acenaphthylene	0.0085	0.15	0.038	0.10	ND (0.035)	ND (0.0076)	0.22	0.13	0.85	0.077	2.2	0.048	–	–
Acenaphthene	ND (0.0073)	ND (0.057)	ND (0.036)	0.067	ND (0.035)	ND (0.0076)	ND (0.040)	ND (0.042)	0.12	0.024	0.18	ND (0.0077)	4,800 ^g	–
Fluorene	ND (0.0073)	ND (0.057)	ND (0.036)	0.059	ND (0.035)	ND (0.0076)	ND (0.040)	ND (0.042)	0.13	0.035	0.60	0.0095	3,200 ^g	–
Phenanthrene	0.019	0.63	ND (0.036)	1.2	ND (0.035)	0.0078	0.33	0.30	1.9	0.66	9.3	0.19	–	–
Anthracene	0.0079	0.13	0.040	0.24	0.044	ND (0.0076)	0.15	0.056	0.84	0.14	4.1	0.046	24,000 ^g	–
Fluoranthene	0.031	0.46	0.046	2.3	ND (0.035)	0.0089	0.77	0.32	4.2	0.71	26	0.26	3,200 ^g	–
Pyrene	0.034	0.55	0.082	2.9	0.34	0.011	0.94	0.38	5.1	1.0	27	0.33	2,400 ^g	–
Benzo[a]anthracene	0.017	0.24	0.048	1.0	0.097	ND (0.0076)	0.41	0.16	2.2	0.33	13	0.15	–	–
Chrysene	0.022	0.39	0.091	1.8	0.23	ND (0.0076)	0.57	0.25	2.8	0.62	14	0.24	–	–
Benzo[b]fluoranthene	0.028	0.40	0.088	2.1	0.12	ND (0.0076)	0.78	0.23	3.9	0.63	16	0.30	0.10	–
Benzo[j,k]fluoranthene	0.0089	0.11	ND (0.036)	0.47	ND (0.035)	ND (0.0076)	0.20	0.059	1.0	0.17	6.5	0.090	–	–
Benzo[a]pyrene	0.027	0.32	0.12	1.9	0.26	ND (0.0076)	0.71	0.21	3.7	0.54	16	0.26	7.2 ^g	–
Indeno[1,2,3-c,d]pyrene	0.02	0.28	0.14	1.2	0.16	ND (0.0076)	0.53	0.15	2.6	0.41	8.1	0.22	–	–
Dibenz[a,h]anthracene	ND (0.0073)	ND (0.057)	0.058	0.23	0.085	ND (0.0076)	0.11	ND (0.042)	0.52	0.085	2.4	0.033	–	–
Benzo[g,h,i]perylene	0.026	0.32	0.51	1.7	0.56	ND (0.0076)	0.63	0.16	3.0	0.46	7.6	0.25	–	–
Total cPAHs (TEQ)c	0.035	0.43	0.16	2.4	0.31	ND (0.0057)	0.92	0.27	4.8	0.71	21	0.34	0.10	–
Polychlorinated Biphenyls (PCBs) by EPA Method 8082A (mg/kg)														
Aroclor 1016	ND (0.055)	ND (0.085)	ND (0.054)	ND (0.062)	ND (0.053)	–	ND (0.060)	ND (0.063)	ND (0.055)	ND (0.055)	ND (0.055)	ND (0.057)	5.6 ^g	–
Aroclor 1221	ND (0.055)	ND (0.085)	ND (0.054)	ND (0.062)	ND (0.053)	–	ND (0.060)	ND (0.063)	ND (0.055)	ND (0.055)	ND (0.055)	ND (0.057)	–	–
Aroclor 1232	ND (0.055)	ND (0.085)	ND (0.054)	ND (0.062)	ND (0.053)	–	ND (0.060)	ND (0.063)	ND (0.055)	ND (0.055)	ND (0.055)	ND (0.057)	–	–
Aroclor 1242	ND (0.055)	ND (0.085)	ND (0.054)	ND (0.062)	ND (0.053)	–	ND (0.060)	ND (0.063)	ND (0.055)	ND (0.055)	ND (0.055)	ND (0.057)	–	–
Aroclor 1248	ND (0.055)	ND (0.085)	ND (0.054)	ND (0.062)	ND (0.053)	–	ND (0.060)	ND (0.063)	ND (0.055)	ND (0.055)	ND (0.055)	ND (0.057)	–	–
Aroclor 1254	ND (0.055)	ND (0.085)	ND (0.054)	ND (0.062)	ND (0.053)	–	ND (0.060)	ND (0.063)	ND (0.055)	ND (0.055)	ND (0.055)	ND (0.057)	0.5 ^h	–
Aroclor 1260	ND (0.055)	ND (0.085)	ND (0.054)	ND (0.062)	ND (0.053)	–	ND (0.060)	ND (0.063)	ND (0.055)	ND (0.055)	ND (0.055)	ND (0.057)	0.5 ^h	–
Aroclor 1262	ND (0.055)	ND (0.085)	ND (0.054)	ND (0.062)	ND (0.053)	–	ND (0.060)	ND (0.063)	ND (0.055)	ND (0.055)	ND (0.055)	ND (0.057)	–	–
Aroclor 1268	ND (0.055)	ND (0.085)	ND (0.054)	ND (0.062)	ND (0.053)	–	ND (0.060)	ND (0.063)	ND (0.055)	ND (0.055)	ND (0.055)	ND (0.057)	–	–
Total PCBs	ND (0.055)	ND (0.085)	ND (0.054)	ND (0.062)	ND (0.053)	–	ND (0.060)	ND (0.063)	ND (0.055)	ND (0.055)	ND (0.055)	ND (0.057)	1.0	–

Table 1 (continued). Summary of Soil Sampling Analytical Results, Waterway #20 Site, Seattle, Washington.														
Analytical Parameter	Soil Results in milligrams per kilogram (mg/kg)												MTCA Method A CUL ^a	Natural Background Concentration ^e
	WW20S4-0	WW20S4-2	WW20S5-0	WW20S5-2	WW20S6-0	WW20S6-5	WW20S7-0	WW20S7-5	WW20S8-0	WW20S8-5	WW20S9-0	WW20S9-2.5		
RCRA Metals by EPA Methods 6010D and 7471B (mg/kg)														
Arsenic	ND (11)	ND (17)	ND (11)	ND (12)	ND (11)	ND (11)	ND (12)	ND (13)	ND (11)	ND (11)	ND (11)	ND (11)	20	7.3
Barium	38	270	37	81	38	37	59	300	37	62	35	110	16,000 ^g	NE
Cadmium	ND (0.55)	ND (0.85)	ND (0.54)	ND (0.62)	ND (0.53)	ND (0.57)	ND (0.60)	ND (0.63)	ND (0.55)	1.5	ND (0.55)	ND (0.57)	2.0	0.8
Chromium	24	18	14	19	15	13	26	17	19	15	16	18	2,000 ^d	48
Lead	9.1	1,000	37	130	ND (5.3)	ND (5.7)	48	61	36	280	43	100	250	17
Mercury	ND (0.28)	ND (0.43)	ND (0.27)	ND (0.31)	ND (0.26)	ND (0.28)	ND (0.30)	ND (0.31)	ND (0.28)	ND (0.28)	ND (0.27)	ND (0.29)	2.0	0.1
Selenium	ND (11)	ND (17)	ND (11)	ND (12)	ND (11)	ND (11)	ND (12)	ND (13)	ND (11)	ND (11)	ND (11)	ND (11)	400 ^g	NE
Silver	ND (1.1)	ND (1.7)	ND (1.1)	ND (1.2)	ND (1.1)	ND (1.1)	ND (1.2)	ND (1.3)	ND (1.1)	ND (1.1)	ND (1.1)	ND (1.1)	400 ^g	NE
Toxicity Characteristic Leaching Procedure (TCLP Extraction) by EPA Methods 1311/6010D in milligrams per liter (mg/L)														
Lead	–	ND (0.20)	–	ND (0.20)	–	–	–	–	–	0.55	–	–	5.0 mg/L ^f	–
Soluble Hexavalent Chromium by EPA Method 7196A (mg/kg)														
Hexavalent Chromium	ND (1.1)	–	–	–	–	–	ND (1.2)	–	–	–	–	–	19	–

Bold values were detected above the laboratory practical quantitation limit (PQL).

Shaded and bold values exceeded the applicable MTCA cleanup level.

ND Not Detected at or above the laboratory PQL. The PQL is shown in parentheses.

^a MTCA Method A Soil Cleanup Level for Unrestricted Land Uses per WAC 173-340-900 Table 740-1.

^b Cleanup level is a total value for naphthalene, 1-methylnaphthalene, and 2-methylnaphthalene.

^c Total toxic equivalent concentration (TEQ) is calculated by multiplying individual carcinogenic PAHs (cPAHs) by their respective toxicity equivalency factor (TEF) per WAC 173-340-708. The TEQ was calculated using one-half the reporting limit for compounds that were not detected above the laboratory reporting limit.

^d Cleanup level for chromium (III).

^e Natural background concentration for the Puget Sound Area (Natural Background Soil Metals Concentrations in Washington State, Ecology Publication # 94-115, October, 1994).

^f Maximum Concentration of Contaminants for the Toxicity Characteristic per WAC 173-303-090.

^g MTCA Method B Soil Cleanup Level for Direct Contact Noncancer from Department of Ecology CLARC tables, January 2023.

^h MTCA Method B Soil Cleanup Level for Direct Contact Cancer from Department of Ecology CLARC tables, January 2023.

NE Not established.

– Not analyzed for or not available.

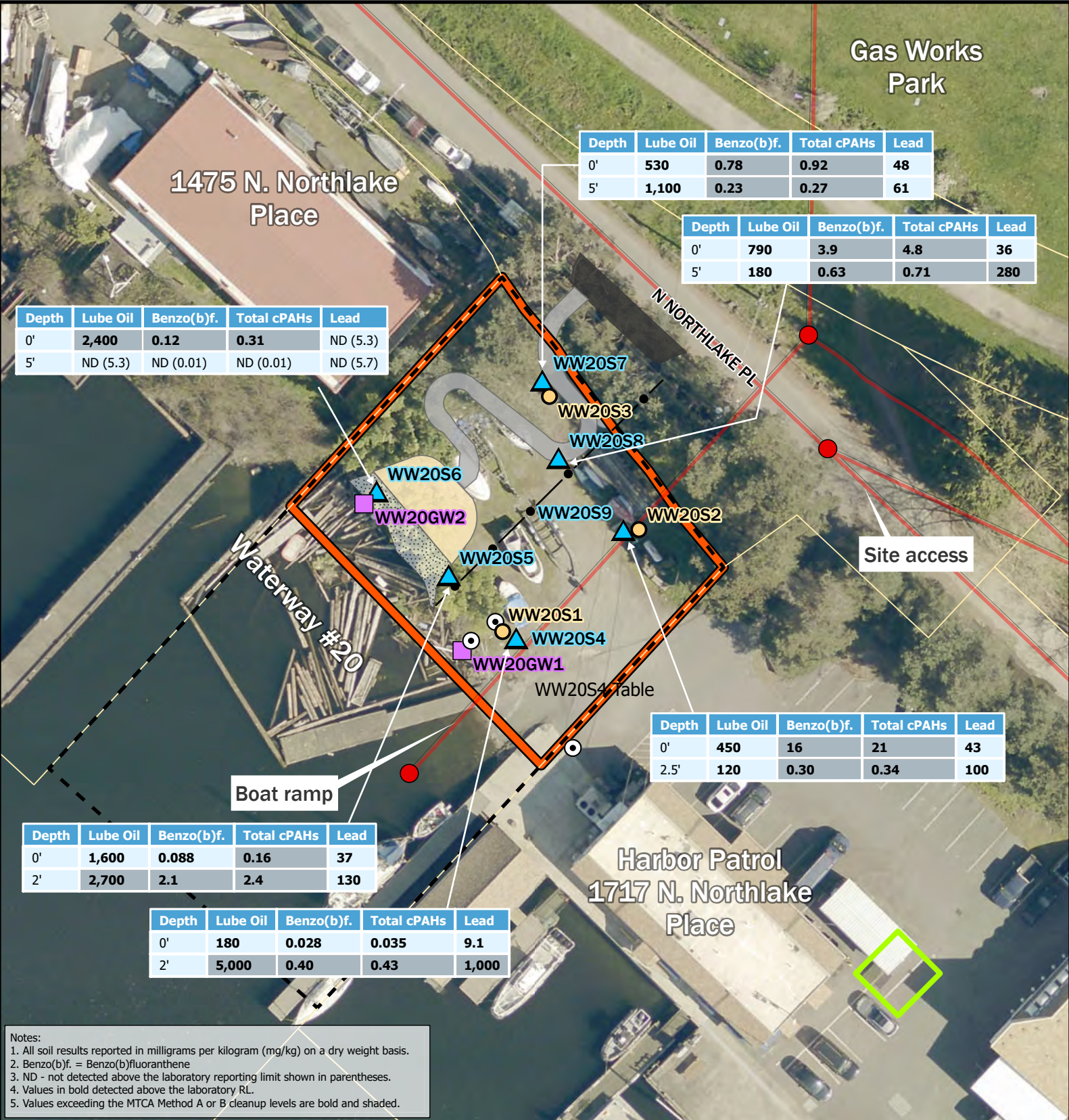
Soil

Fill material was observed in all six borings completed during the field investigation at depths ranging from approximately 2.5 feet bgs in boring WW20S4 to 6 feet bgs in borings WW20S7 and WW20S8 (see Attachment B). The depth of fill material was shallowest near the south end of the Site by the shoreline and thickest to the north. Generalized descriptions of the fill material encountered include the following:

1. WW20S4: sandy gravel trace silt underlain by fine-to-medium sand with silt, trace gravel, and charcoal (slight acrid odor) and wood fibers to approximately 2.5 feet bgs.
8. WW20S5: sandy gravel trace silt with 2-inch-thick charcoal layer at 1.2 feet bgs, underlain by fine sand trace silt, with a 6-inch sandy charcoal layer. Bottom depth of fill estimated at approximately 4 feet bgs due to poor sample recovery.
9. WW20S6: sandy fine-to-medium gravel trace silt, with roots. Bottom depth of fill estimated at approximately 4.5 feet bgs due to poor sample recovery.
10. WW20S7: silty sand, underlain by sandy fine-to-medium gravel trace silt, underlain by sandy silt, and then sand with silt and charcoal to a depth of approximately 6 feet bgs.
11. WW20S8: silty sand underlain by sandy silt, then silty sand, and fine-to-medium sand with silt and charcoal to a depth of approximately 6 feet bgs.
12. WW20S9: sandy gravel trace silt underlain by fine-to-medium sand with charcoal to a depth of approximately 3.5 feet bgs.

No elevated PID readings were detected in any samples from the borings. Given the similar layer of charcoal-stained soils observed in five of the six soil borings, it is likely that there may have been an historic fire at the Site.

At all six boring locations, a sample was analyzed from the 0- to 1-foot bgs depth interval to assess potential surface soil contamination. At borings WW20S4, WW20S5, and WW20S9 a second sample was analyzed from the 2- to 3- foot or 2.5- to 3.5-foot bgs depth interval in soils with charcoal staining. At boring WW20S6 the second sample analyzed was from native soil at the 5- to 6-foot bgs depth interval due to poor recovery in the 0- to 5-foot sample interval and lack of charcoal staining, and at borings WW20S7 and WW20S8, the second sample analyzed was from the 5- to 6-foot bgs depth interval in soils with charcoal staining.



Legend

- ▲ 2023 Soil Boring Location
- 2023 Groundwater Sampling Location
- 2016 Surface Soil Sample Location
- ⊙ Approx. Location of Existing Monitoring Well
- Other Structure - City of Seattle
- Project Site
- Waterway Use Permit Area
- Approx. Location of Removed UST and Fuel Pump/Pump House
- Proposed 6-ft Width ADA-Accessible Pathway
- Proposed Beach Cobble
- Proposed Beach Sand
- Proposed Bump Out/Vehicle Drop-off Area
- Proposed Fence
- DWW Mainline - City of Seattle
- Parcel (King County)

Figure 4.

Soil Contaminants Exceeding Cleanup Levels in 2023 Soil Borings, Waterway #20, Seattle, Washington.



0 22.5 45 90 Feet



K:\Projects\Y2017\17-06530-022\Project\GISWorking\Pro\Waterway20SAP\Waterway20SAP.aprx

No gasoline-range petroleum hydrocarbons were detected in any of the samples analyzed. Lube oil was detected in 11 samples, but concentrations in only three samples, WW20S4-2 (5,000 mg/kg), WW20S5-2 (2,700 mg/kg), and WW20S6-0 (2,400 mg/kg) exceeded the MTCA Method A cleanup level (CUL) of 2,000 mg/kg.

A total of 18 different PAHs were detected in the soil samples analyzed. However, only one particular carcinogenic PAH (benzo[b]fluoranthene) was detected above the respective CUL; nine soil samples had detected concentrations ranging from 0.12 to 16 mg/kg that exceeded the MTCA Method A CUL of 0.1 mg/kg. Total cPAHs were detected in 11 of the 12 samples analyzed at concentrations ranging from 0.035 to 21 mg/kg; the concentrations in 10 of the samples exceeded the MTCA Method A CUL of 0.1 mg/kg. No individual cPAHs or total cPAHs were detected above the respective CULs in sample WW20S6-5 that was collected from soil interpreted to be native in origin.

No PCBs were detected above the laboratory practical quantitation limit (PQL)¹ in any of the soil samples analyzed.

Only three RCRA metals (barium, chromium, and lead) were detected in soils analyzed. Except for lead, the concentrations of barium and chromium, including hexavalent chromium, were below MTCA Method A or B CULs. Lead concentrations in two samples, WW20S4-2 (1,000 mg/kg) and WW20S8-5 (280 mg/kg), exceeded the MTCA Method A CUL.

Follow-up TCLP testing was performed on three samples (WW20S4-2, WW20S5-2, and WW20S8-5) with detected lead concentrations greater than 100 mg/kg that could potentially trigger disposal as Dangerous Waste under WAC 173-303. TCLP lead was detected in only one sample (WW20S8-5) as a concentration of 0.55 mg/L which is below the 5.0 mg/L criterion that would trigger Dangerous Waste classification.

Groundwater Conditions

On March 9, 2023, shallow groundwater was encountered in each of the six soil borings completed, at depths of approximately 4- to 6.5-feet bgs; shallow groundwater was also encountered at 5.3 feet bgs in well TSW-1 during sampling.

Lube oil was detected in one groundwater sample (WW20GW2) at a concentration of 270 µg/L, below the MTCA Method A CUL of 500 µg/L. No gasoline- or diesel-range TPH or PCBs were detected in either sample. Only one PAH was detected in the groundwater samples. The concentration of (benzo[a]anthracene) in sample WW20GW2 (at 0.015 µg/L) was below the MTCA Method A CUL of 0.12 µg/L, and total cPAH concentration in that same sample (0.0093 µg/L) was below the MTCA Method A CUL of 0.012 µg/L. Of the RCRA metals, only barium was

¹ Practical quantitation limit (PQL) is the lowest concentration of a constituent or a chemical that can be reliably measured by a laboratory using a specific analytical method.

detected in sample WW20GW2 (39 µg/L total, and 41 µg/L dissolved), below the MTCA Method A CUL of 3,200 µg/L.

**Table 2. Summary of Groundwater Sampling Analytical Results,
Waterway #20 Site, Seattle, Washington.**

Analytical Parameter	Results (µg/L)		MTCA Method A CUL ^a
	WW20GW2	WW20GW1	
Total Petroleum Hydrocarbons by NWTPH-Dx and NWTPH-Gx			
Diesel-Range Organics	ND (120)	ND (110)	500
Lube Oil	270	ND (220)	500
Gasoline	ND (100)	ND (100)	1,000
Polycyclic Aromatic Hydrocarbons (PAHs) by EPA Method 8720E/SIM			
Naphthalene	ND (0.11)	ND (0.098)	
2-Methylnaphthalene	ND (0.11)	ND (0.098)	160 ^b
1-Methylnaphthalene	ND (0.11)	ND (0.098)	
Acenaphthylene	ND (0.11)	ND (0.098)	–
Acenaphthene	ND (0.11)	ND (0.098)	480 ^c
Fluorene	ND (0.11)	ND (0.098)	320 ^c
Phenanthrene	ND (0.11)	ND (0.098)	–
Anthracene	ND (0.11)	ND (0.098)	2,400 ^c
Fluoranthene	ND (0.11)	ND (0.098)	640 ^c
Pyrene	ND (0.11)	ND (0.098)	240 ^c
Benzo[a]anthracene	0.015	ND (0.0098)	–
Chrysene	ND (0.011)	ND (0.0098)	–
Benzo[b]fluoranthene	ND (0.011)	ND (0.0098)	–
Benzo[j,k]fluoranthene	ND (0.011)	ND (0.0098)	–
Benzo[a]pyrene	ND (0.011)	ND (0.0098)	0.10
Indeno[1,2,3-c,d]pyrene	ND (0.011)	ND (0.0098)	–
Dibenz[a,h]anthracene	ND (0.011)	ND (0.0098)	–
Benzo[g,h,i]perylene	ND (0.011)	ND (0.0098)	–
Total cPAHs (TEQ)	0.0093	ND (0.0074)	0.10
Polychlorinated Biphenyls (PCBs) by EPA Method 8082A			
Aroclor 1016	ND (0.057)	ND (0.049)	0.56 ^c
Aroclor 1221	ND (0.057)	ND (0.049)	–
Aroclor 1232	ND (0.057)	ND (0.049)	–
Aroclor 1242	ND (0.057)	ND (0.049)	–
Aroclor 1248	ND (0.057)	ND (0.049)	–
Aroclor 1254	ND (0.057)	ND (0.049)	0.16 ^c

Table 2 (continued). Summary of Groundwater Sampling Analytical Results, Waterway #20 Site, Seattle, Washington.			
Analytical Parameter	Results (µg/L)		MTCA Method A CULa
	WW20GW2	WW20GW1	
Polychlorinated Biphenyls (PCBs) by EPA Method 8082A (continued)			
Aroclor 1260	ND (0.057)	ND (0.049)	0.022 ^d
Aroclor 1262	ND (0.057)	ND (0.049)	–
Aroclor 1268	ND (0.057)	ND (0.049)	–
Total PCBs	ND (0.057)	ND (0.049)	0.10
RCRA Metals (Total) by EPA Methods 200.8 and 7470A			
Arsenic	ND (3.3)	ND (3.3)	5.0
Barium	39	ND (28)	3,200 ^c
Cadmium	ND (4.4)	ND (4.4)	5.0
Chromium	ND (11)	ND (11)	50
Lead	ND (1.1)	ND (1.1)	15
Mercury	ND (0.50)	ND (0.50)	2.0
Selenium	ND (5.6)	ND (5.6)	80 ^c
Silver	ND (11)	ND (11)	80 ^c
RCRA Metals (Dissolved) by EPA Methods 200.8 and 7470A			
Arsenic	ND (3.0)	ND (3.0)	5.0
Barium	41	ND (25)	3,200 ^c
Cadmium	ND (4.0)	ND (4.0)	5.0
Chromium	ND (10)	ND (10)	50
Lead	ND (1.0)	ND (1.0)	15
Mercury	ND (0.50)	ND (0.50)	2.0
Selenium	ND (5.0)	ND (5.0)	80 ^c
Silver	ND (10)	ND (10)	80 ^c
Hardness (EPA Method 200.7)			
Hardness	200	88	–

Results shown in micrograms per liter (µg/L).

Bold values were detected above the laboratory practical quantitation limit (PQL).

Shaded and bold values exceeded the applicable MTCA cleanup level.

ND = Not Detected at or above the laboratory PQL. The PQL is shown in parentheses.

a = MTCA Method A Cleanup Levels for Groundwater per WAC 173-340-900 Table 720-1.

b = Cleanup level is a total value for naphthalene, 1-methylnaphthalene, and 2-methylnaphthalene.

c = MTCA Method B Groundwater Cleanup Level for Noncancer from Department of Ecology CLARC tables, January 2023.

d = MTCA Method B Groundwater Cleanup Level for Cancer from Department of Ecology CLARC tables, January 2023.

– = Not analyzed for or not available.

RECOMMENDATIONS

The following sections provide general recommendations for waste management and worker health and safety during construction and redevelopment of the Site as a park.

Waste Management

During the soil boring activities, fill material ranging in depth from approximately 2.5 feet bgs to 6 feet bgs was observed in all six borings. The depth of fill material was shallowest near the south end of the Site by the shoreline and thickest to the north as site topography rises up toward North Northlake Place. A distinct charcoal-stained soil layer of sand and silt was observed in five of the six borings. Given the similarity of the layer and similar depths encountered with respect to an imaginary level line drawn from south to north through the site, it is possible that there may have been an historic fire at the Site before additional fill material was placed on top of the burnt layer.

No elevated PID readings or petroleum odors were noted during the investigation and no gasoline- or diesel-range petroleum hydrocarbons, or PCBs were detected in any samples analyzed. Lube oil was detected in three samples at elevated concentrations that exceeded the MTCA Method A cleanup level. The lube oil detected could be associated contaminated fill imported onsite or with leaks or drips from vehicles or equipment staged onsite over the years. Of the PAHs analyzed, concentrations of benzo[b]fluoranthene and total cPAHs exceeded the MTCA Method A CUL in several samples collected from charcoal-stained soils. Lead concentrations in two samples exceeded the MTCA Method A CUL, but TCLP testing of three samples did not indicate lead concentrations would trigger the threshold requiring offsite disposal as Dangerous Waste.

Based on the soil and groundwater sampling results, it appears that contamination at the Site is limited to soils within fill material. Contamination above MTCA cleanup levels was detected in fill soils within the gravel parking area and future footprint of the proposed park. No samples have been obtained of soils on the slope between the gravel parking area and North Northlake Place. However, it is likely that the same charcoal-stained soil layer and possible lube oil and lead contamination could be present in fill materials beneath the slope.

It is notable that no elevated concentrations of any COCs were detected in the soil sample interpreted as native material in boring WW20S6 at a depth of approximately 5 feet bgs. Therefore, it is assumed that some or all the fill material overlying native soils may require offsite disposal at a Subtitle D landfill if excavated, or could be capped in place with proper engineering controls.

During construction, all fill material excavated above the underlying native soils should be stockpiled and tested or directly loaded into trucks for offsite disposal at a licensed facility (e.g., a RCRA Subtitle D landfill).

Standard best management practices (BMPs) should be implemented during construction to prevent the spread of contaminated soils beyond the immediate excavation areas or loading area. Some examples of BMPs include silt fence and straw wattle perimeter protections, turbidity curtains for work along the water's edge, plastic sheeting on pavement to capture soils spilled while loading trucks or containers, street sweeping, and covering temporary stockpiles with plastic.

No contaminants above MTCA Method A or B CULs were detected in the two groundwater samples collected at the Site. If dewatering is necessary during construction, all dewatering water should be temporarily contained within an onsite Baker tank and treated and tested for total settleable solids (TSS) and pH, as well as any other parameters if required under the permit issued for the project prior to discharge to the stormwater drainage system.

BMPs should be employed to prevent stormwater from contacting contaminated soils, and to avoid having to capture, treat, and dispose of contaminated stormwater.

WORKER HEALTH AND SAFETY

This section provides general recommendations for protecting worker health and safety during construction, but preparation of a health and safety plan and implementing the plan would be the responsibility of the contractor selected to complete the park improvements.

Contaminants of concern (COCs) detected in soils at the Site that could pose hazards to workers include lube oil (maximum detected concentration of 5,000 mg/kg), lead (maximum detected concentration of 1,000 mg/kg), benzo(b)fluoranthene (maximum concentration of 16 mg/kg), and total cPAHs (maximum concentration of 21 mg/kg). Preventing potential worker exposures to these COCs should not be difficult if appropriate BMPs are put in place during construction. Based on the COCs and concentrations identified in soils and assuming that dust will be controlled using water spray or other BMPs during construction, the use of respirators during construction activities should not be necessary to prevent worker exposures to COCs.

The following BMPs are recommended to prevent worker exposures to COCs during construction:

- Prepare a written Site-Specific Health and Safety Plan (HASP) that meets the requirements of WAC 296-843-120
- Inform workers who may be potentially exposed to lead of the potential hazards, direct them to review Appendices A and B of OSHA Regulation 1926.62, and provide

Hazardous Waste Operations and Emergency Response (HAZWOPER) training prior to the time of initial job assignment and annually.

- Ensure that all workers have reviewed the HASP and don protective personal protective equipment (PPE) during construction
- Use water spray from a hydrant and hose or water truck to wet down soils as they are being excavated to prevent airborne dust emissions
- Cover temporary soil stockpiles with plastic sheeting and ensure that the trucks hauling contaminated soils and/or containers have closed canopies or covers before they leave the site.
- Field screen soils periodically (e.g., one or two times per hour during each day of active construction) for VOCs using a PID as soils are being excavated. The intent field screening is to capture potential pockets of VOCs not identified via the limited number of three soil borings that were completed to characterize site conditions. If necessary, stop work and adjust BMPs as appropriate if permissible exposure limits (PELs) outlined in the HASP are exceeded.
- Provide a decontamination station and supplies for workers during construction and properly dispose of all waste generated.

REFERENCES

Herrera. 2022. Sampling and Analysis Plan –Phase II Environmental Site Assessment, Waterway #20 Site, Seattle, Washington. Prepared for City of Seattle Finance and Administrative Services Department by Herrera Environmental Consultants, Inc., Seattle, Washington. September 23.

King County. 2022. Tax Parcel Data Reviewed April 20, 2022, on King County Tax Assessor's Parcel Viewer website: <<https://gismaps.kingcounty.gov/parcelviewer2/>>.

ATTACHMENT A

Sampling and Analysis Plan

This page intentionally left blank

FINAL SAMPLING AND ANALYSIS PLAN

PHASE II ENVIRONMENTAL SITE ASSESSMENT WATERWAY #20 SITE SEATTLE, WASHINGTON

**Prepared for
City of Seattle Finance and Administrative Services
Department**

**Prepared by
Herrera Environmental Consultants, Inc.**



Note:

Some pages in this document have been purposely skipped or blank pages inserted so that this document will print correctly when duplexed.

FINAL SAMPLING AND ANALYSIS PLAN

PHASE II ENVIRONMENTAL SITE ASSESSMENT WATERWAY #20 SITE SEATTLE, WASHINGTON

**Prepared for
City of Seattle Finance and Administrative Services Department
P.O. Box 94689
Seattle, WA 98124-4689**

**Prepared by
Herrera Environmental Consultants, Inc.
2200 Sixth Avenue, Suite 1100
Seattle, Washington 98121
Telephone: 206-441-9080**

September 23, 2022

CONTENTS

Introduction.....	1
Objectives.....	1
Site Conditions.....	6
Previous Investigations	6
Physical Setting	7
Geology.....	8
Site Geology.....	8
Hydrogeology.....	9
Organization and Schedule.....	11
Organization and Key Personnel.....	11
Schedule	11
Sampling Design	13
Initial Laboratory Analyses.....	14
Follow-up Laboratory Analyses	14
Field Procedures.....	17
Pre-Drilling Activities	17
Soil Sample Collection.....	17
Groundwater Sample Collection	18
Decontamination Procedures.....	18
Decontamination of Soil Sampling Equipment	18
Sample Handling.....	19
Sample Containers and Labeling	19
Sample Storage.....	21
Sample Shipment and Delivery.....	21
Chain of Custody	21
Sample Documentation.....	21
Disposal of Investigation-Derived Waste.....	22
Disposal of Incidental Trash.....	22
Disposal of Soil Cuttings and Investigation-Derived Water	22
Analytical Procedures	23
Quality Control Objectives and Procedures.....	25

Field Quality Control Procedures	25
Instrument Maintenance and Calibration	26
Field Duplicates.....	27
Laboratory Quality Control Procedures.....	27
Method Blanks	27
Control Standards	27
Matrix Spikes.....	27
Laboratory Duplicates	27
Data Assessment Procedures and Corrective Actions.....	29
Completeness	29
Methods.....	29
Holding Times	30
Detection Limits.....	30
Blanks.....	30
Duplicates	30
Matrix Spikes.....	31
Reporting	33
References.....	35

APPENDICES

Appendix A	2016 Soil Sampling Technical Memorandum
Appendix B	Police Harbor Patrol Closure and Staging Plan
Appendix C	Instrumentation Calibration and Maintenance Documentation

TABLES

Table 1.	Waterway #20 Phase II ESA Personnel and Responsibilities.	11
Table 2.	Waterway #20 Phase II ESA Estimated Schedule.	11
Table 3.	Samples To Be Collected for Waterway #20 Phase II ESA Upland Soil Project.	15
Table 4.	Summary of Data Quality Objectives, Sample Containers, Preservation, and Holding Times for the Waterway #20 Phase II ESA Upland Soil Project.	20
Table 5.	Analytical Methods and Applicable Criteria for Samples Collected for the Waterway #20 Phase II ESA Project.	23
Table 6.	Quality Assurance Requirements and Anticipated Number of Samples.	26

FIGURES

Figure 1.	Vicinity Map, Waterway #20 Site, Seattle, Washington.	3
Figure 2.	Site Map and Soil Sample Locations, Waterway #20, Seattle, Washington.	4
Figure 3.	Project Site Setting and Gas Works Park Cleanup Site Boundary.	5

INTRODUCTION

This sampling and analysis plan (SAP) describes field activities to be performed to complete a Phase II Environmental Site Assessment (ESA) at the Waterway 20 Site (Site). The Site is directly adjacent to, and accessed from 1717 North Northlake Place, adjacent to Lake Union, and immediately west of Gas Works Park in Seattle, Washington (Figure 1).

The Site is owned by the State of Washington, managed by the Department of Natural Resources (DNR), and used by the Seattle Police Department Harbor Patrol (HP). Use of the property by HP must be authorized by DNR pursuant to the terms and conditions of DNR's "Waterway Use Permit #20-89981" (Permit) in accordance with Chapter 79.120 of the Revised Code of Washington (RCW). One of the Permit conditions is for the City of Seattle to provide DNR with soil-sampling data for the filled portion of Waterway 20.

The Site is identified by the King County Tax Assessor as parcel 192504HYDR, and the adjacent property to the east operated by HP and owned by the City of Seattle Department of Parks and Recreation is identified as parcel 4088801930 (King County 2022). The upland portion of the Site that will be investigated according to this SAP is approximately 0.24 acres in size (Google. 2022) (see Figure 2).

The Site is also adjacent to the Gas Works Park Cleanup Site (GWPS), which also includes the aquatic portion of the Permit (see Figure 3). A Remedial Investigation/Feasibility Study (RI/FS) is currently on-going for the aquatic portion of the GWPS and is summarized in the Site Conditions section below.

OBJECTIVES

The work is being completed to provide additional data on potential contaminants of concern (COCs) in surface and subsurface soils at the Site to support decisions regarding future redevelopment that will allow public access to Waterway 20. This work will further delineate contamination in soils found in 2016, which is described in the Previous Investigations section below. The conceptual public access features are shown on Figure 2, which include an access pathway and beach access. The extent of contamination found within the public access portion of the site will factor in a cleanup remedy, if required. Additional characterization may be required based on this investigation to make remediation recommendations at the Site. The specific objectives of the sampling described herein are as follows:

- Characterize surface and subsurface soils at six locations throughout the Site to determine if potential COCs are present and at what concentrations.

- Field screen surface and subsurface soils for volatile organic compounds (VOCs) using a photo-ionization detector (PID), and note visual and olfactory observations that may indicate potential soil contamination.
- Describe surface and subsurface soils encountered using the Unified Soil Classification System (USCS) to a depth of approximately 10 feet bgs and note presence of fill material if present, overlying native soils. Soil observations will also include soil moisture and depth to groundwater, if encountered.
- Characterize groundwater at two locations across the Site to determine if potential COCs are present and at what concentrations.
- Define sufficient physical and chemical information about Site soils to support the following recommendations:
 - Site remediation options if necessary (i.e., potential excavation and offsite disposal, capping in place with asphalt parking lot as an engineering control, etc.),
 - approach for soil management during Site redevelopment for public use, and
 - potential best management practices (BMPs) necessary to protect worker health and safety based on the concentrations of COCs detected in soil samples.
- Providing upland characterization that may be useful to GWPS manager regarding conditions adjacent to the aquatic portion of Waterway 20.

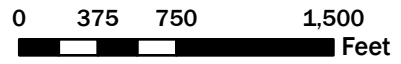


Legend

-  Project Site
-  Waterway Use Permit Area
-  Park



Figure 1.
Vicinity Map, Waterway #20 Site, Seattle, Washington.



ESRI (Aerial, 2021)



- Legend**
- Proposed Soil Boring Location
 - Proposed Groundwater Sampling Location
 - 2016 Surface Soil Sample Location
 - Approx. Location of Existing Monitoring Well
 - Other Structure - City of Seattle
 - Project Site
 - Waterway Use Permit Area
 - Approx. Location of Removed UST and Fuel Pump/Pump House
 - New 6-ft Width ADA-Accessible Pathway
 - Proposed Beach Cobble
 - Proposed Beach Sand
 - Proposed Bump Out/Vehicle Drop-off Area
 - Proposed Fence
 - DWW Mainline - City of Seattle
 - Parcel (King County)

Figure 2.
Site Map and Soil Sample Locations,
Waterway #20, Seattle, Washington.



ESRI (Aerial, 2021)



Figure 3.
Project Site Setting and Gas
Works Park Cleanup Site
Boundary.

Legend

- Shoreline (OHWM)
- Gas Works Park Site Area of Investigation



0 250 500
Feet

ESRI (Aerial, 2021)

SITE CONDITIONS

PREVIOUS INVESTIGATIONS

Surface soil (approximately 6 inches below the ground surface [bgs]) samples were collected from three locations in the upland portion of the property in April 2016 by Herrera personnel (see Figure 2). The sample locations were selected during a site reconnaissance and were approved by DNR prior to sampling. The site is currently used to store concrete moorings and boat trailers, and there were no surficial indications of stained soil or chemical release at the site. Therefore, the three sample locations were selected to provide spatial distribution across the active portion of the property.

A gravelly surface layer was underlain by brown sandy silt at each location, and there were some brick fragments and glass at location WW20S3. Samples were analyzed by Onsite Analytical Laboratory in Redmond, Washington the following parameters:

- Gasoline-range total petroleum hydrocarbons by Ecology's NWTPH Gx Method.
- Benzene, toluene, ethylbenzene, and total xylenes (BTEX) by US EPA Method 8021B.
- Lube oil-range total petroleum hydrocarbons (TPH) and diesel-range TPH by Ecology's NWTPH Dx Method.
- Polycyclic aromatic hydrocarbons (PAHs) by US EPA Method 8270D/SIM (low-level).
- Polychlorinated biphenyls (PCBs) by US EPA Method 8082.
- Total Model Toxics Control Act (MTCA) metals (arsenic, cadmium, chromium, lead, and mercury) by US EPA Methods 6010C and 7471B.

A summary of the analytical results is provided below:

- No gasoline-range TPH, BTEX, diesel-range TPH, PCBs, arsenic, cadmium, or mercury were detected in any of the samples.
- Lube oil-range TPH was detected at all three locations at concentrations ranging from 960 to 1,400 milligrams per kilogram (mg/kg). None of the results exceeded the MTCA Method A cleanup criterion of 2,000 mg/kg for lube oil-range TPH.
- Chromium was detected at all three locations at concentrations ranging from 24 to 37 mg/kg, which were all well below the MTCA method A cleanup criterion of 2,000 mg/kg. Lead was detected at all three locations at concentrations ranging from

29 to 48 mg/kg, which were all well below MTCA method A cleanup criterion for unrestricted land use of 250 mg/kg.

- PAHs were detected at all three locations and total carcinogenic PAHs (cPAHs) concentration ranged from 0.122 to 1.74 mg/kg. All three samples exceeded the MTCA Method A cleanup criterion of 0.1 mg/kg for unrestricted land use, but were less than the cleanup criterion of 2.0 mg/kg for industrial properties.
- Location WW20S2 exhibited a much higher cPAH concentration (1.74 mg/kg) than the other two locations (0.122 and 0.236 mg/kg). The source of the elevated PAH concentrations at location WW20S2 is unknown.

The 2016 Technical memorandum is provided in Appendix A.

PHYSICAL SETTING

The Site is the upland portion of the Waterway 20 Waterway Use Permit on Lake Union. The aquatic portion of the Waterway 20 Waterway Use Permit is included in the GWPS Area of Investigation (AOI), which is currently undergoing RI/FS activities. The Site slopes down rather steeply from N. Northlake Place on the north to Lake Union to the south. Ground surface elevations at the Site range from approximately 30 feet at the north down to 18 feet at Lake Union (1983 HARN).

The Site is listed in the Washington State Department of Ecology (Ecology) Toxics Cleanup Program database under Contaminated Site ID (CSID) #15496 and Facility Site ID (FSID) #97326 for confirmed cPAH contamination in surface soil. The listing is based on previous surface soil sampling completed by Herrera in 2016.

The adjacent property to the east of the Site, operated by Harbor Patrol and owned by the City, is also listed in Ecology's Toxics Cleanup Program database as a leaking underground storage tank (LUST) site with confirmed release of petroleum products to soil and groundwater; the CSID is #11135 and the FSID is #94144461. A Site Characterization Report was submitted to Ecology in 2000, but no site documents were available online. A site map showing the location of the removed underground storage tank (UST) and associated pump and pump house is included as Appendix B.

For the GWPS, a FS is being conducted in accordance with the 2005 Agreed Order, which calls for evaluating the nature and extent of contamination in the Sediment Cleanup Unit (SCU) and evaluating cleanup action alternatives to address this contamination. The 2005 Agreed Order was modified in 2013 to combine the upland area remediated under the 1999 Consent Decree with the sediment area to create a single AOI, which is the focus of the RI/FS. The sediment portion of the AOI (the SCU) was developed to encompass areas of elevated contamination associated with the historical Manufactured Gas Plant, tar refining, or other upland activities. The

SCU cleanup actions are being managed in accordance with the Sediment Management Standards (SMS).

The overall objectives of the FS are to develop and evaluate a range of cleanup action alternatives to remediate sediment in accordance with MTCA and SMS and to identify a preferred alternative. The FS builds on the understanding of existing conditions and contaminant characteristics defined in the RI portion of this RI/FS report. The FS follows the Ecology procedures outlined in MTCA (WAC 173-340-350[8]) and SMS (WAC 173-204-550[7]).

GEOLOGY

The Waterway 20 Site is located within the southwestern portion of the Puget Sound Lowland physiographic region. The Puget Sound Lowland has undergone physiographic and depositional changes due to at least five glacial episodes. The last glaciation that occurred in the region was the Vashon Stade of the Fraser Glaciation, which ended approximately 13,500 years ago. The advance of the Vashon Glacier deepened and widened the north/south-trending valleys situated between the Olympic Mountains and the Cascade Range in western Washington. In the Seattle area, the Vashon Stade is represented by four stratigraphic units (from oldest to youngest): Lawton Clay, Esperance Sand, Vashon Till, and Vashon recessional deposits that make up the Vashon Drive (Galster and Laprade 1991).

As the Vashon glacial lobe advanced south and blocked the northern portion of the Puget Sound basin, a lake was formed; and fine-grained sediments were deposited. This glaciolacustrine deposit, known as the Lawton Clay, is reported to be present in the Seattle area as high as 150 feet above mean sea level. A fine- to medium-grained sand unit was deposited above the Lawton Clay by meltwater streams issuing from the advancing ice sheet as it neared the Seattle area. This sand unit is called the Esperance Sand Member. The Lawton Clay and Esperance Sand are sometimes intermixed and interbedded, and the contact between the two soil types may be gradational. Both these deposits were overridden by an estimated 3,000 feet of ice, which consolidated them into hard or dense layers. A mantle of the Vashon till was deposited on top of the Esperance Sand and Lawton Clay.

In April 2016, shallow soil samples were collected from three locations (see Figure 2) at the Site. At each location, a gravelly surface layer was underlain by brown sandy silt to a depth of approximately 1 foot bgs, and brick fragments and glass were noted at sample location WW20S3.

Site Geology

Based on the Geologic Map of Seattle, the Site and adjacent areas to the east and west along the shoreline of Waterway 20 are mapped as artificial fill (af) of varying thicknesses overlying Vashon subglacial till (Qvt) (Troost et al., 2005). Additional information will be provided in the report generated based on the field work covered under this SAP.

Hydrogeology

Groundwater was not encountered during the 2016 sampling. Based on the site topography, and ground elevations compared to adjacent Lake Union groundwater is expected to be encountered at depths of approximately 4 or 5 feet near the shoreline and 12 to 15 feet bgs near the northwest corner of the Site. Groundwater flow beneath the site is assumed to be from northeast to southwest toward Lake Union.

ORGANIZATION AND SCHEDULE

Key participants are identified and listed below, followed by the schedule for implementation.

ORGANIZATION AND KEY PERSONNEL

Field sampling for the Waterway #20 Phase II ESA project will be performed by Herrera following protocols outlined in the SAP. Key personnel involved in this effort are identified below, and their respective roles and responsibilities are provided in Table 1.

Table 1. Waterway #20 Phase II ESA Personnel and Responsibilities.			
Personnel	Organization	Phone	Duties
Nancy Stachey	City of Seattle – FAS, Property Management	206-684-0690	Client Project Manager
George Iftner	Herrera	206-787-8210	Herrera Project Manager and Field Lead
Phil Coughlan	Herrera	206-787-8242	Herrera Principal-in-charge.
Gina Catarra	Herrera	206-441-9080	Quality Assurance Officer
David Baumeister	OnSite Environmental	425-883-3881	Laboratory Project Manager

SCHEDULE

The overall schedule is provided in Table 2.

Table 2. Waterway #20 Phase II ESA Estimated Schedule.		
Task	Activity	Approximate Scheduled Date/Duration^a
SAP Preparation	Draft SAP	April 20, 2022
	Final SAP	June 30, 2022
Field Sampling	Site Entry Coordination	5 days
	Push Probe/Geotechnical Borings	3 days
Laboratory	Laboratory Reports	14 days after sampling date
Summary Report	Draft Report	45 days after laboratory report
	Final Report	14 days after draft Report comments received
EIM Data Submittal	EIM Data Submittal	14 days after draft report

^a Field sampling task estimated to begin in fourth quarter of 2022; summary report completion estimated to be in first quarter of 2023. Schedule dates may vary based on availability of drillers and consultants.

SAMPLING DESIGN

A total of 6 push-probe borings will be completed to a minimum depth of 10 feet bgs at locations shown in Figure 2. The boring locations have been selected to characterize the upland portion of the property and were based on the previous 2016 locations, areas of planned future public use, and proximity to the aquatic portion of Waterway 20. If refusal is encountered at any location before a depth of 10 feet bgs is reached, the drill rig will be moved 5 or 10 feet away and the boring will be reattempted.

Actual boring locations will be determined based on conditions at the time of field work (i.e., underground utilities, materials stored onsite that may not be moveable, etc.). Prior coordination with Harbor Patrol will be completed by Herrera at the time of the utility locate to ask if stored items can be moved, if needed. The coordinates of each final probe boring location will be recorded using a field GPS unit. In addition, field measurements will be taken from the boring locations to a fixed point (e.g., building corner, fence post, etc.) to improve location identification in the future.

At a minimum, two soil samples will be collected for chemical analyses at each boring location. Sample collection intervals may vary depending on the field observations of contamination or the presence of refuse and the homogeneity of the subsurface material. Sample intervals will include the following:

- A surface soil sample will be collected from the 0- to 1-foot depth interval, and
- A subsurface soil sample will be collected from the 2- to 5-foot or 5- to 10-foot depth interval based on field observations such as staining, odors, sheen, or presence of fill material.
- If the 2- to 5-foot subsurface depth interval is selected for laboratory analysis based on field observations of potential contamination, a sample from the 5- to 10-foot depth interval will be submitted to the laboratory as archive samples. Archive samples may be analyzed for initial laboratory analyses based on results of the 2- to 5-foot sample interval.
- Groundwater will be collected from one push-probe location and one existing monitoring well (see Figure 2). The depth of groundwater, if encountered, will be documented in the field log and included in the report.

Initial Laboratory Analyses

A total of 12 soil samples and 2 groundwater samples will be submitted for chemical analysis. Table 3 provides a summary of sample locations, sample types, sample numbers, and analytical requirements. All soil and groundwater samples will initially be submitted for the following analyses:

1. Lube oil-range TPH and diesel-range TPH by Ecology's NWTPH Dx Method.
2. Gasoline-range petroleum hydrocarbons including BTEX by Method NWTPH-Gx/8021B.
3. PAHs by US EPA Method 8270D/SIM (low-level).
4. Total Resource Conservation and Recovery Act (RCRA) metals (arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver) according to US EPA Methods 6010C and 7471B. Groundwater will be analyzed for both total and dissolved metals.
5. Hardness by calculation by EPA method 3010/ Standard Method 2340B for groundwater samples.
6. PCBs by Method 8082A for groundwater samples.

Archived samples from the 5- to 10-foot interval may also be analyzed for the parameters above, based on the results of the 2- to 5- foot interval samples.

Follow-up Laboratory Analyses

1. Soil samples may also be analyzed for Polychlorinated biphenyls (PCBs) by US EPA Method 8082A as follows (up to 12 total samples):
 - a. Samples with detected concentrations of heavy oil-range TPH above the laboratory reporting limit will be analyzed for PCBs, or
 - b. If no heavy oil-range is detected in any samples, then a minimum of 2 samples from the Site will be analyzed for PCBs. Samples will be selected based on the initial laboratory analysis and/or field observations. Reason for selection for analysis will be documented in the field log and included in the report.
2. Based on the laboratory analytical results for RCRA metals, Toxicity Characteristic Leaching Procedure (TCLP) testing will also be performed by EPA Methods 1311 and 6010C/7470A on up to two (2) select samples with elevated concentrations of heavy metals. Elevated concentrations are defined as results greater than 20 times the Dangerous Waste criteria per WAC 173-303 listed in Table 5. The results will be used to determine soil disposal requirements for future excavation and offsite disposal during Site redevelopment activities. In addition, if more than two samples with elevated

concentrations of heavy metals are present, additional site characterization may be needed to delineate the extent of contamination present.

Table 3. Samples To Be Collected for Waterway #20 Phase II ESA Upland Soil Project.			
Sampling Location	Sample Type	Maximum Number of Samples to be Collected	Analytical Requirements
Six push-probe borings (see Figure 2)	Surface soil	6 One soil sample from each boring, 0- to 1- foot depth interval.	● NWTPHDx, NWTPH-Gx, PAHs, and total RCRA metals (all samples) ● Follow-up PCB analyses if oil-range petroleum hydrocarbons are detected (minimum of 2 samples analyzed for the Site if no TPH is detected) ● Follow-up TCLP analyses (up to 2 samples) if elevated metals concentrations are detected).
	Subsurface soil	6 One soil sample from the 2- to 5-foot or 5- to 10- foot depth interval depending on field observations.	
	Groundwater	1 One boring location	
Monitoring well	Groundwater	1 Existing monitoring well	● NWTPH-Dx, NWTPH-Gx PCBs, PAHs, hardness, and total/dissolved metals RCRA metals

BTEX = Benzene, toluene, ethylbenzene, and total xylenes.

NWTPH-Gx= Northwest total petroleum hydrocarbon gasoline range.

NWTPH-Dx = Northwest total petroleum hydrocarbon diesel range extended (to include heavy oil)

PAHs = Polycyclic aromatic hydrocarbons

PCBs = Polycyclic aromatic hydrocarbons

RCRA metals = Arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver

TCLP = Toxicity Characteristic Leaching Procedure

FIELD PROCEDURES

PRE-DRILLING ACTIVITIES

Prior to commencing drilling activities, Utility Notification Center (UNC) will be notified of the intent to drill the probes. UNC will contact participating agencies or companies with underground utilities in the area. These utility companies will mark the locations of their utility lines and equipment along the property boundary. A private utility locate service will be retained to locate underground utilities at each proposed boring location.

In addition, Herrera will coordinate with Harbor Patrol prior to drilling activities to determine if any materials require removal for drill rig access or access to sample locations.

SOIL SAMPLE COLLECTION

Soil borings will be advanced using a probe-drive sampler attached to driven probe rods. During drilling, discrete soil samples will be collected continuously at 5-foot intervals for soil classification, field screening, and chemical analysis. The probe-drive sampler has a 2-inch outside diameter, and each one is lined with a dedicated clear Lexan® liner. The sampler will be sealed with a piston stop pin while being pushed or driven to the desired sampling depth. The piston stop pin will be retracted into the sampler while the sampler is pushed or driven to obtain a soil sample.

Following retrieval, the soil-filled Lexan® liner will be removed from the sampler and cut open to expose the soil core. Soil encountered during drilling will be visually inspected and classified in accordance with the Unified Soil Classification System (USCS; ASTM International [ASTM] D2488-17). A photoionization detector (PID) instrument (MiniRAE 3000 or similar unit) will be used to screen soil for VOCs. If soils appear to be saturated it will be noted in field log and referenced in the report.

Soil samples will be prepared for chemical analysis by removing soil from the liner and placing it directly into jars provided by the analytical laboratory. Each sample will be uniquely labeled, denoting sample identification number and depth, date and time sampled, and job number. Soil samples will then be placed into a chilled cooler for storage prior to delivery to the analytical laboratory. Pre-weighed sample vials will be filled to comply with the 5035A method for sample collection for NWTPH-Gx/BTEX analyses. These samples will be collected directly from the liner.

Following soil sample collection, each boring will be backfilled from the bottom to ground surface with bentonite chips and capped at the surface with soil or cement to match surrounding surface conditions.

GROUNDWATER SAMPLE COLLECTION

A total of two groundwater samples will be collected from the site: one sample from an existing monitoring well and one sample from a temporary well installed at a push-probe boring location. Procedures for sample collection are described below.

One groundwater sample will be collected from one existing monitoring well depicted as WW20GW1 on Figure 2. Groundwater samples will be collected from monitoring wells using low-flow sampling techniques. Prior to sampling, the static groundwater elevation will be recorded.

One groundwater sample will be collected from a temporary well installed at one push-probe boring (WW20S6) depicted as WW20GW2) on Figure 2. Groundwater samples will be collected from probe borings by driving a stainless-steel screened probe to the desired depth, opening the screen, and drawing water via clean dedicated polyethylene tubing connected to a peristaltic pump at the surface. Initial depth to water will be determined by the field geologist using an electronic water level indicator and based on observations of moisture content and soil texture.

Once the water level has stabilized and after development (approximately 1 to 2 gallons of water purged from each boring), water samples will be collected directly from the tubing into sample containers provided by the laboratory. Samples for dissolved metals analysis will be field filtered using a 0.45 micron high capacity, in line filter. Immediately upon filling, each container will be securely capped, labeled, and stored in a chilled cooler prior to delivery to the laboratory. Following groundwater collection, each probe borehole will be backfilled from the bottom to ground surface with bentonite chips and capped at the surface with soil.

DECONTAMINATION PROCEDURES

Decontamination will be performed on all sampling equipment potentially exposed to contaminated soil between sampling locations. All sampling equipment will be decontaminated prior to entry in the field. Chemical-resistant gloves worn during sample collection will be changed between each location.

Decontamination of Soil Sampling Equipment

The following decontamination procedure will be used for soil sampling equipment:

- Rinse with tap water
- Scrub with water and Liquinox detergent
- Rinse with tap water

- Rinse with deionized water

SAMPLE HANDLING

All samples collected during this investigation will be handled according to the procedures described in this section.

Sample Containers and Labeling

Soil and water samples will be placed into containers supplied by the analytical laboratory and sample container labels will be completed at the time of collection using a permanent waterproof pen or marker. Sample labels will include the following information:

- Project name
- Sample identification
- Date and time of collection
- Initials of sampling personnel
- Analysis to be performed

Sample containers, preservation, and holding times are summarized in Table 4.

Table 4. Summary of Data Quality Objectives, Sample Containers, Preservation, and Holding Times for the Waterway #20 Phase II ESA Upland Soil Project.

Parameter	Units	Detection Limits	Accuracy	Precision	Method Number ^a	Bottle/ Preservative	Maximum Holding Time
Soil							
TPH-Gasoline/BTEX	mg/kg	5.0	NA	30%	NWTPH-Gx/8021B	2 x 40 mL GV/ Cool to 4°C	48 hours to preserve, 14 days to analyze
RCRA Metals ^b	mg/kg	0.25–10	75–125%	20%	6010C/7471B	8 oz. WMG ^c / Cool to 4°C	180 days
TCLP metals	mg/L	0.009–0.50	75–125%	20%	1311 and 6010C/7470		28 days (mercury)
TPH-Diesel and Lube Oil	mg/kg	Diesel – 25 Oil – 50	58–132%	NA	NWTPH-Dx		14 days to extract, 40 days to analyze
PAHs	mg/kg	0.0067	23–143%	34%	8270D/SIM		
PCBs	mg/kg	0.05	26–127%	22%	8082A		
Groundwater							
TPH-Gasoline/BTEX	µg/L	100	72-128%	30%	NWTPH-GX/8021	1 x 40 mL GV/HCl Cool to 4°C	14 days
TPH-Diesel and Lube Oil	mg/L	Diesel – 0.100 Oil – 0.200	56-120%	30%	NWTPH-Dx	2x500mL AG/HCl	14 days to extract, 40 days to analyze
Total and Dissolved RCRA Metals ^b	µg/L	0.125-56	75-125%	20%	6020/7470	500 mL HDPE/HNO ₃ , cool to <6°C	180 days 28 days (mercury)
Hardness	mg/L	0.10	75-125%	20%	2340B	Field filtered with 0.45 micron filter(dissolved metals)	
PAHs	µg/L	0.010-0.10	29-131%	50%	8270E/SIM	1 x 1 L AG/ Cool to <6°C	7 days to extract, 40 days to analyze
PCBs		0.050	80-119%	20%	8082A	1 x 1 L AG/ Cool to <6°C	

^a Method numbers and analytical methods are from USEPA 1986 (6010, 7470, 7471, 8021B, 8082, 8270) and Ecology 1997 (NWTPH-Dx, NWTPH-Gx).

^b RCRA metals include arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver.

^c One 8-oz jar will be collected.

GV = glass vial

Milligrams per kilogram (mg/kg)

Milligrams per liter (mg/L)

PAHs = polycyclic aromatic hydrocarbons

PCBs = polychlorinated biphenyls

TCLP = toxicity characteristic leaching procedure

TPH = total petroleum hydrocarbons

WMG = wide-mouth glass jar

Sample Storage

Immediately following sample collection, sample containers will be placed into a chilled cooler for storage prior to delivery to the analytical laboratory. Care shall be taken to ensure sample holding times are not exceeded during periods of storage. Sample containers may be placed into plastic bags to protect labels from moisture in the cooler, if necessary.

Sample Shipment and Delivery

Samples collected during this investigation will be sent by courier to the analytical laboratory.

Chain of Custody

Following collection, sample information will be recorded on a chain-of-custody form. The purpose of this record is to account for the possession (or custody) of each sample from the time it is collected until laboratory testing and reporting is complete. The signature of each person in possession of the samples must be recorded on the chain-of-custody form. Information to be recorded on the chain-of-custody record will include the following:

- Project name and location
- Project number
- Names of project manager and sampling personnel
- Sample identification
- Date and time of collection
- Analysis requested (for each sample)
- Number of sample containers
- Signature, date, and time (for each person releasing or accepting sample custody)

Sample Documentation

Sampling activities will be documented in a dedicated field notebook. The notebook will be labeled with the project name, project identification number, dates of field activities, and the name and phone number of the field lead/project manager. All relevant activities will be recorded in the field notebook during the sample collection period. Entries into the field notebook will be made in permanent ink. Corrections will be made by placing a single line

through the original entry and the initials of the person entering the correction. At a minimum, information in the field notebook will include:

- Date and atmospheric weather conditions
- Activities to be performed
- Name(s) of sampling personnel
- General condition of sampling area
- Start and stop times of work
- Any unusual events or occurrences
- Description of soil profile

DISPOSAL OF INVESTIGATION-DERIVED WASTE

Disposal of Incidental Trash

Incidental trash generated during this investigation (including discarded nitrile gloves, used Ziploc® bags, paper towels) will be placed in plastic trash bags and disposed of as solid waste.

Disposal of Soil Cuttings and Investigation-Derived Water

Soil cuttings will be placed into a 30-gallon or 55-gallon drum, depending on the volume of soil generated. Purge water will be placed into a separate 55-gallon drum. Decontamination solutions and rinse water will be placed into a separate 55-gallon drum. Drums will be stored onsite at a location designated by Harbor Patrol staff and disposal will be arranged pending the receipt of analytical results. Waste characterization will be based on the investigation sample results; no additional samples will be collected from drums.

ANALYTICAL PROCEDURES

The analytical methods listed in Table 5 will be performed by OnSite Environmental, an accredited Washington State Department of Ecology laboratory.

Table 5. Analytical Methods and Applicable Criteria for Samples Collected for the Waterway #20 Phase II ESA Project.						
Parameter	Method	Reporting Limit		MTCA Method A Criterion ^a		Dangerous Waste Criterion for TCLP Testing ^b
		Soil	Groundwater	Soil	Groundwater	Soil
Total Petroleum Hydrocarbons						
Gasoline-range organics	NWTPH-Gx	5.0 mg/kg	100 µg/L	30/100 mg/kg	800/1,000 µg/L	–
Diesel-range organics	NWTPH-Dx	25 mg/kg	0.100 mg/L	2,000 mg/kg	0.500 mg/L	–
Lube oil-range organics		50 mg/kg	0.200 mg/L		0.500 mg/L	–
Volatile Organic Compounds						
Benzene	EPA8021	1.0 µg/kg	20 ng/L	0.03 mg/kg	5.0 µg/L	–
Toluene		1.0 µg/kg	200 ng/L	7 mg/kg	1,000µg/L	–
Ethylbenzene		1.0 µg/kg	200 ng/L	6 mg/kg	700 µg/L	–
Total Xylenes		2.0 µg/kg	400 ng/L	9 mg/kg	–	–
Total RCRA Metals						
Arsenic	EPA 6010D	10 mg/kg	200 µg/L	20 mg/kg	5.0 µg/L	5.0 mg/L
Barium		2.5 mg/kg	3.0 µg/L	–	–	100 mg/L
Cadmium		0.5 mg/kg	10 µg/L	2.0 mg/kg	5.0 µg/L	1.0 mg/L
Chromium		0.5 mg/kg	5.0 µg/L	2,000 mg/kg	50 µg/L	5.0 mg/L
Lead		5 mg/kg	100 µg/L	250 mg/kg	15 µg/L	5.0 mg/L
Selenium		10 mg/kg	200 µg/L	–	–	1.0 mg/L
Silver		0.5 mg/kg	10 µg/L	–	–	5.0 mg/L
Total Mercury	EPA 7471B	0.25 mg/kg	0.125 µg/L	2.0 mg/kg	2.0 µg/L	0.2 mg/L
Polycyclic Aromatic Hydrocarbons (PAHs)						
Naphthalene	EPA 8270E/SIM	0.0067 mg/kg	0.10 µg/L	5 mg/kg	160 µg/L	–
2-Methylnaphthalene		0.0067 mg/kg	0.10 µg/L	–	–	–
1-Methylnaphthalene		0.0067 mg/kg	0.10 µg/L	–	–	–
Acenaphthylene		0.0067 mg/kg	0.10 µg/L	–	–	–
Acenaphthene		0.0067 mg/kg	0.10 µg/L	--	–	–
Fluorene		0.0067 mg/kg	0.10 µg/L	--	–	–
Phenanthrene		0.0067 mg/kg	0.10 µg/L	–	–	–

Table 5 (continued). Analytical Methods and Applicable Criteria for Samples Collected for the Waterway #20 Phase II ESA Project.

Parameter	Method	Reporting Limit		MTCA Method A Criterion ^a		Dangerous Waste Criterion for TCLP Testing ^b
		Soil	Groundwater	Soil	Groundwater	
Anthracene	EPA 8270E/SIM (continued)	0.0067 mg/kg	0.10 µg/L	–	–	–
Fluoranthene		0.0067 mg/kg	0.10 µg/L	–	–	–
Pyrene		0.0067 mg/kg	0.10 µg/L	–	–	–
Benzo[a]anthracene		0.0067 mg/kg	0.010 µg/L	–	–	–
PAHs (continued)						
Chrysene	EPA 8270E/SIM	0.0067 mg/kg	0.010 µg/L	–	–	–
Benzo[b]fluoranthene		0.0067 mg/kg	0.010 µg/L	–	–	–
Benzo[j,k]fluoranthene		0.0067 mg/kg	0.010 µg/L	–	–	–
Benzo(a)pyrene		0.0067 mg/kg	0.010 µg/L	0.1 mg/kg	0.1 µg/L	–
Indeno(1,2,3-cd)pyrene		0.0067 mg/kg	0.010 µg/L	–	–	–
Dibenz[a,h]anthracene		0.0067 mg/kg	0.010 µg/L	–	–	–
Benzo[g,h,i]perylene		0.0067 mg/kg	0.010 µg/L	–	–	–
Total cPAHs (TEQ)		–	–	0.1 mg/kg	0.1µg/L	–
Polychlorinated Biphenyls (PCBs)						
Total PCBs	EPA 8082	0.050 mg/kg	0.050 µg/L	1 mg/kg	0.1 µg/L	–

^a Washington State Model Toxics Control Act (MTCA, WAC 173-340), Method A soil cleanup level for unrestricted land uses.

^b Follow-up TCLP testing to be performed on samples with detected concentrations that exceed 20 times the Dangerous Waste Criterion, per Washington State Dangerous Waste Regulations (WAC 173-303). Milligrams per kilogram (mg/kg)

Milligrams per liter (mg/L)

Micrograms per kilogram (µg/kg)

Micrograms per liter (µg/L)

Nanograms per liter (ng/L)

QUALITY CONTROL OBJECTIVES AND PROCEDURES

The overall quality assurance objective is to ensure that data of known and acceptable quality are provided. All measurements will be performed to yield consistent results that are representative of the media and conditions measured. Specific objectives and procedures for precision, accuracy, representativeness, completeness, and comparability are identified below and presented above in Table 4:

- **Precision**—Precision will be assessed using laboratory and field duplicates. One laboratory duplicate will be analyzed for each sample batch; one field duplicate will be collected and analyzed for each 10 samples analyzed. Two levels of precision for duplicate analyses will be evaluated. For values that are greater than 5 times the reporting limit, the relative percent difference (RPD) of duplicates will be less than or equal to values specified in Table 4. For values that are less than or equal to 5 times the reporting limit, duplicate values will be within ± 2 times the reporting limit.
- **Accuracy**—Accuracy will be assessed with analyses of laboratory preparation blanks, matrix spikes, laboratory control samples, and surrogates. The values for blanks will not exceed the reporting limit. The percent recovery of spikes will meet criteria specified in Table 4.
- **Representativeness**—Sample representativeness will be ensured by employing consistent and standard sampling procedures.
- **Completeness**—A goal of 100 percent of the samples submitted to the laboratory and analyzed will be judged valid.
- **Comparability**—Data comparability will be ensured through the application of standard sampling procedures, analytical methods, units of measurement, and detection limits. The results will be tabulated in standard spreadsheets for comparison with regulatory standards and historical data.

FIELD QUALITY CONTROL PROCEDURES

Quality control procedures that will be implemented for field activities are described in the following subsections. The frequency and type of quality control samples to be collected in the field are also summarized in Table 6.

Table 6. Quality Assurance Requirements and Anticipated Number of Samples.						
Parameter	Number of Samples	Laboratory Method Blanks^a	Laboratory Control Standard^a	Matrix Spike^a	Lab Duplicates^a	Field Duplicates
Soil Samples						
TPH-Dx	12	1	1	NA	1	2
PAHs	12	1	1	NA	1 ^b	2
RCRA metals	12	1	1	1	1	2
Contingent Analyses						
TPH-Gx/BTEX	5 ^c	1	NA	NA	1	1
PCBs	5 ^d	1	1	1	1 ^b	1
TCLP	2 ^e	1	1	1	1	1
Groundwater Samples						
TPH-GX/BTEX	2	1	1	NA	1	1
TPH-Dx	2	1	1	NA	1	1
PCBs	2	1	1	NA	1	1
PAHs	2	1	1	NA	1	1
Total/dissolved metals	2	1	1	1	1	1
Hardness	2	1	1	1	1	1

^a Laboratory quality assurance samples will be analyzed with each batch of samples submitted to the laboratory for analysis. A laboratory batch will consist of no more than 20 samples.

^b A matrix spike/matrix spike duplicate or laboratory control sample/laboratory control sample duplicate may be analyzed as a laboratory duplicate.

^c Estimated number of samples to be analyzed. TPH-Gx/BTEX will be analyzed if field observations (i.e., PID meter readings) indicate the presence of VOCs.

^d Estimated number of samples to be analyzed. PCBs will be analyzed if oil-range petroleum hydrocarbons are detected above the laboratory reporting limit in a soil sample.

^e Estimated number of samples to be analyzed. TCLP analysis will be performed for specific total RCRA metals if the detected concentration exceeds 20 times the Dangerous Waste criterion listed in Table 5.

BTEX = benzene, toluene, ethylbenzene, total xylenes

Gx = gasoline-range hydrocarbons

Dx = diesel- and lube oil-range hydrocarbons

NA = not applicable

PAHs = polycyclic aromatic hydrocarbons

PCBs = polychlorinated biphenyls

RCRA = Resource Conservation and Recovery Act

TPH = total petroleum hydrocarbons

Instrument Maintenance and Calibration

Portable electronic field instruments will be used to screen soil for VOCs. The instrument manufacturers give direction for the maintenance and calibration of the instruments.

The recommended calibration and maintenance procedures for the PID and sensors can be found in Appendix B of this SAP.

Field Duplicates

One field duplicate will be collected and analyzed for each 10 samples analyzed, for each matrix, as summarized in Table 6.

LABORATORY QUALITY CONTROL PROCEDURES

Quality control procedures that will be implemented in the laboratory are described in the following subsections. The frequency and type of quality control samples to be analyzed by the laboratory are also summarized in Table 6.

Method Blanks

Method blanks consisting of deionized and micro-filtered pure water will be analyzed with every laboratory sample batch. A laboratory sample batch will consist of no more than 20 samples and may include samples from other projects. The total number of method blanks anticipated for this study is shown in Table 6 by parameter. Blank values will be presented in each laboratory report.

Control Standards

Control standards for each parameter will be analyzed by the laboratory with every sample batch. A laboratory sample batch will consist of no more than 20 samples and may include samples from other projects. The total number of control standards anticipated for this study is shown in Table 6 by parameter. Raw values and percent recovery (see formula in the *Data Assessment Procedures and Corrective Actions* section) for the control standards will be presented in each laboratory report.

Matrix Spikes

For applicable parameters, matrix spikes will be analyzed by the laboratory with every sample batch. A laboratory sample batch will consist of no more than 20 samples and may include samples from other projects. The total number of matrix spikes anticipated for this study is shown in Table 6 by parameter. Raw values and percent recovery (see formula in the *Data Assessment Procedures and Corrective Actions* section) for the matrix spikes will be presented in each laboratory report.

Laboratory Duplicates

Laboratory duplicate samples for each parameter will be analyzed for specifically labeled quality assurance samples submitted with every sample batch. This will represent no less than 20 percent of the project submitted samples. The total number of laboratory duplicates

anticipated for this study is shown in Table 6 by parameter. Raw values and relative percent difference (see formula in the *Data Assessment Procedures and Corrective Actions* section) of the duplicate results will be presented in each laboratory report.

DATA ASSESSMENT PROCEDURES AND CORRECTIVE ACTIONS

Quality control problems and corrective actions will be summarized in a quality assurance worksheet. Values associated with minor quality control problems will be considered estimates and flagged with a J. Values associated with major quality control problems will be rejected and flagged with an R. Estimated values may be used for evaluation purposes, while rejected values will not be used. This section describes the data assessment procedures for the following quality control elements:

- Completeness
- Methods
- Holding times
- Detection limits
- Blanks
- Duplicates (laboratory and field)
- Matrix spikes
- Surrogates (organic compounds only)

COMPLETENESS

Completeness will be assessed by comparing valid sample data with this quality assurance plan and the chain-of-custody records. Completeness will be calculated by dividing the number of valid values by the total number of values. Samples may be reanalyzed if completeness is less than 100 percent.

METHODS

Analytical and field methods will be assessed by examination of the field notebook and laboratory reports for deviation from the quality assurance plan. Unacceptable deviations will result in rejected values.

HOLDING TIMES

The dates that analyses are performed will be reported by the laboratory. Holding times will be assessed by comparing analysis dates to sample collection dates. Values that exceed the maximum holding times allowed by the method will be flagged as estimates (J), whereas severe exceedances will result in rejected values (R).

DETECTION LIMITS

Detection limits will be reported in each laboratory report. If detection limits are elevated due to matrix interference, the laboratory will be requested to reanalyze the samples and/or revise the method, if time permits. Detection limits will be less than or equal to criteria listed in Table 5.

BLANKS

Laboratory blanks composed of deionized water prepared as a sample will be prepared and analyzed, and the results reported in each laboratory report. If a laboratory blank value exceeds the detection limit, associated sample values that are less than five times the blank value will be flagged as estimates (J).

DUPLICATES

Precision of laboratory and field duplicate results will be presented in each laboratory report and checked by the project chemist. Precision of laboratory and field duplicate results will be calculated according to the following equation:

$$RPD = \frac{(C_1 - C_2) \times 100\%}{(C_1 + C_2) / 2}$$

Where: RPD = relative percent difference

C₁ = larger of two values

C₂ = smaller of two values

Laboratory or field duplicate results exceeding the objectives will be noted in the quality assurance worksheets and associated values will be flagged as estimates (J). If the objectives are severely exceeded (e.g., more than twice the objective), associated values will be rejected (R).

MATRIX SPIKES

Matrix spike results will be presented in the laboratory reports and checked by the project chemist. The percent recoveries for matrix spikes will be calculated using the following equation:

$$\%R = \frac{(S - U)}{C_{sa}} \times 100\%$$

Where: %R = Percent recovery

S = Measured concentration in spike sample

U = Measured concentration in unspiked sample

C_{sa} = Actual concentration of spike added

If the analyte is not detected in the unspiked sample, then a value of zero will be used in the equation.

REPORTING

Herrera will prepare a report, including sample location map, summary of sampling results compared to appropriate regulatory criteria to meet the investigation objectives, and a quality assurance review of the analytical results.

Any problems and associated corrective actions taken will be reported. Specific quality assurance information that will be noted in the report includes:

- Changes in the SAP
- Significant quality assurance problems and recommended solutions
- Data quality assessment in terms of precision, accuracy, representativeness, completeness, comparability, and detection limits
- Discussion of whether the quality assurance objectives were met and the resulting impact on decision-making
- Limitations on use of the measurement data

The report will also include general recommendations for waste management and worker health and safety during site construction. This would include BMPs that would mitigate for any identified risk.

A draft report will be provided to the City of Seattle and DNR to provide comments for Herrera. A final report that addresses comments will then be provided. All soil and groundwater data collected for this project will be uploaded to Ecology's Environmental Information Management (EIM) database at the time of report completion.

REFERENCES

Ecology. 2013. Model Toxics Control Act Regulation and Statute —Model Toxics Control Act, Chapter 70A.305 RCW; Uniform Environmental Covenants Act, Chapter 64.70 RCW; and MTCA Cleanup Regulation, Chapter 173-340 WAC. Washington State Department of Ecology, Toxics Cleanup Program. Publication Number 94-06.

Galster, Richard W. and William Thomas Laprade. 1991. Geology of Seattle, Washington, United States of America. Environmental and Engineering Geoscience, pp. 235–302.

King County. 2022. Tax Parcel Data Reviewed April 20, 2022, on King County Tax Assessor's Parcel Viewer website: <<https://gismaps.kingcounty.gov/parcelviewer2/>>.

Troost, K.G., D.B. Booth, A.P. Wisher, and S.A. Shimel. 2005. The Geologic Map of Seattle – A Progress Report.

APPENDIX A

2016 Soil Sampling Technical Memorandum

TECHNICAL MEMORANDUM

Date: June 30, 2016

To: Nancy Stachey, City of Seattle – FAS, Property Management

From: Bruce Carpenter, Herrera Environmental Consultants

Subject: Waterway #20 Upland Soil Sampling

CONTENTS

Introduction	1
Methods	2
Results	4

APPENDICES

Appendix A	Photographic Log
Appendix B	Analytical Laboratory Report
Appendix C	Data Quality Assurance Review

TABLES

Table 1. Analytical Results (mg/kg) of Soil Samples Collected at Waterway #20, Seattle, Washington, on April 7, 2016.	5
--	---

FIGURES

Figure 1. Upland Soil Sample Locations at Waterway #20, Seattle, Washington.	3
---	---

Introduction

Waterway #20 (WW20) is located on Lake Union west of Gas Works Park in Seattle, Washington. The property is presently owned by the State of Washington Department of Natural Resources (DNR) and used by Seattle Police Department Harbor Patrol (HP). Use of the property by HP must be authorized by DNR pursuant to the terms and conditions of DNR's "Waterway Use Permit" (Permit) in accordance with Chapter 79.120 of the Revised Code of



Washington (RCW). One of the Permit conditions is for the City of Seattle to provide DNR with sediment-sampling data for the filled portion of WW20.

Herrera Environmental Consultants, Inc. (Herrera) conducted upland sediment (soil) sampling at Waterway #20 (WW20) in Seattle, Washington (Figure 1). The work was conducted for the City of Seattle, Department of Finance and Administrative Services (FAS) under Agreement FAS-2015-060.

Methods

A Herrera representative performed the soil sampling on April 7, 2016. Samples were collected from three locations in the upland portion of the property at a depth of approximately 6 inches below the ground surface (Figure 1). These sample locations were selected during a site reconnaissance and were approved by DNR prior to sampling. The site is currently used to store concrete moorings and boat trailers, and there were no surficial indications of stained soil or chemical release at the site. Therefore, the three sample locations were selected to provide spatial distribution across the active portion of the property.

The soil samples were collected by first removing the top 6 inches of material with a shovel. A stainless steel spoon was then used to partially fill a stainless steel mixing bowl with soil from a depth of 6 inches. All spoons and bowls were decontaminated prior to use. The soil was homogenized and coarse materials larger than 0.25 inch in diameter were removed. The samples were transferred from the bowl directly into jars provided by the analytical laboratory. Pre-weighed sample vials were filled directly from the soil sampling locations and not from the homogenized samples to comply with the method requirements for sampling the following volatile organic compounds: gasoline-range total petroleum hydrocarbons (TPH-Gx) and benzene, toluene, ethylbenzene, and total xylenes (BTEX).

Each sample was uniquely labeled, denoting the sample identification number and depth, and date and time sampled. Samples were then placed into a chilled cooler for storage prior to delivery to the laboratory.

The samples were couriered to Onsite Analytical Laboratory in Redmond, Washington, and analyzed for the following parameters:

- Gasoline-range total petroleum hydrocarbons and BTEX according to Method NWTPH-Gx/BTEX
- Lube oil-range TPH and diesel-range TPH according to Method NWTPH-Dx
- Polycyclic aromatic hydrocarbons (PAHs) according to US EPA Method 8270D/SIM (low-level)
- Polychlorinated biphenyls (PCBs) according to US EPA Method 8082
- Total Model Toxics Control Act (MTCA) metals (arsenic, cadmium, chromium, lead, and mercury) according to US EPA Methods 6010C and 7471B

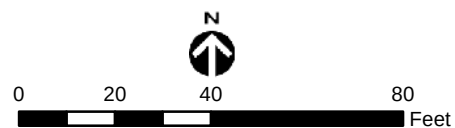


Legend

- Waterway #20 upland soil sample location
- Waterway #20 parcel
- Parcel



Figure 1.
Upland Soil Sample Locations at
Waterway #20, Seattle, Washington.



K:\Projects\Y 2015.15-06211-000\Projectsoil_sample.mxd (5/5/2016)

Results

A gravelly surface layer was underlain by brown sandy silt at each location, and there were some brick fragments and glass at location WW20S3. Photographic documentation of the sampling locations is provided in Appendix A. A summary of analytical results is provided in Table 1 and the analytical laboratory report is provided in Appendix B. A data quality assurance review was conducted and is provided in Appendix C; all of the data were determined to be acceptable for use based on this review.

A summary of the analytical results is provided below:

- No gasoline-range TPH, BTEX, diesel-range TPH, PCBs, arsenic, cadmium, or mercury were detected in any of the samples.
- Lube oil-range TPH was detected at all three locations at concentrations ranging from 960 to 1,400 milligrams per kilogram (mg/kg). None of the results exceeded the MTCA Method A cleanup criterion of 2,000 mg/kg for lube oil-range TPH.
- Chromium was detected at all three locations at concentrations ranging from 24 to 37 mg/kg, which were all well below the MTCA method A cleanup criterion of 2,000 mg/kg. Lead was detected at all three locations at concentrations ranging from 29 to 48 mg/kg, which were all well below MTCA method A cleanup criterion for unrestricted land use of 250 mg/kg.
- PAHs were detected at all three locations and total carcinogenic PAHs (cPAHs) concentration ranged from 0.122 to 1.74 mg/kg. All three samples exceeded the MTCA Method A cleanup criterion of 0.1 mg/kg for unrestricted land use, but were less than the cleanup criterion of 2.0 mg/kg for industrial properties.
- Location WW20S2 exhibited a much higher cPAH concentration (1.74 mg/kg) than the other two locations (0.122 and 0.236 mg/kg). The source of the elevated PAH concentrations at location WW20S2 is unknown.

Table 1. Analytical Results (mg/kg) of Soil Samples Collected at Waterway #20, Seattle, Washington, on April 7, 2016.

Analytical Parameters	Sample Identification			MTCA Cleanup Level
	WW20S1	WW20S2	WW20S3	
Diesel-Range Organics	ND (240)	ND (180)	ND (220)	2,000 ^{a,b}
Lube Oil-Range Organics	1,400	960	1,200	2,000 ^{a,b}
Gasoline-Range Organics	ND (5.6)	ND (5.6)	ND (6.0)	100 ^{a,b}
Benzene	ND (0.020)	ND (0.020)	ND (0.020)	0.030 ^{a,b}
Toluene	ND (0.056)	ND (0.056)	ND (0.060)	7 ^{a,b}
Ethylbenzene	ND (0.056)	ND (0.056)	ND (0.060)	6 ^{a,b}
Total Xylenes	ND (0.056)	ND (0.056)	ND (0.060)	9 ^{a,b}
Polycyclic Aromatic Hydrocarbons				
Naphthalene	0.031	0.088	0.060	5 ^{a,b,d}
2-Methylnaphthalene	0.016	ND (0.073)	0.032	5 ^{a, b,d}
1-Methylnaphthalene	ND (0.014)	0.076	0.023	5 ^{a, b,d}
Acenaphthylene	0.029	0.29	0.068	—
Acenaphthene	ND (0.014)	0.15	ND (0.0073)	4,800 ^c
Fluorene	ND (0.014)	0.31	0.012	3,200 ^c
Phenanthrene	0.087	2.7	0.15	—
Anthracene	0.024	0.78	0.054	24,000 ^c
Fluoranthrene	0.11	3.0	0.22	3,200 ^c
Pyrene	0.15	3.5	0.26	0.1 ^a /2.0 ^b
Benzo[a]anthracene	0.048	1.1	0.092	0.1 ^a /2.0 ^b
Chrysene	0.077	ND (0.020)	ND (0.020)	0.1 ^a /2.0 ^b
Benzo[b]fluoranthene	0.10	1.5	0.23	0.1 ^a /2.0 ^b
Benzo[k]fluoranthene	0.028	0.50	0.057	0.1 ^a /2.0 ^b
Benzo[a]pyrene	0.091	1.3	0.17	0.1 ^a /2.0 ^b
Indeno[1,2,3-c,d]pyrene	0.10	1.0	0.23	—
Dibenz[a,h]anthracene	0.024	0.19	0.036	0.1 ^a /2.0 ^b
Benzo[g,h,i]perylene	0.23	1.2	0.32	—
Total cPAH ^e	0.122	1.74	0.236	0.1 ^a /2.0 ^b
Total PCBs	ND (0.053)	ND (0.055)	ND (0.055)	1 ^{a,f} /10 ^{b,f}
Metals				
Arsenic	ND (11)	ND (11)	ND (11)	20 ^{a,b}
Cadmium	ND (0.53)	ND (0.55)	ND (0.55)	2 ^{a,b}
Chromium	34	24	37	2,000 ^a
Lead	29	45	48	250 ^a /1,000 ^b
Mercury	ND (0.26)	ND (0.27)	ND (0.27)	2 ^{a,b}

^a MTCA method A cleanup criteria (unrestricted land use).

^b MTCA method A cleanup criteria (industrial properties).

^c MTCA method B cleanup criteria (direct contact).

^d Sum of naphthalenes may not exceed 5 milligrams per kilogram (mg/kg).

^e Total cPAH based on toxic equivalency factor (TEF).

^f Sum of all PCBs may not exceed 1 mg/kg (unrestricted land use) and 10 mg/kg (industrial properties).

Values reported in mg/kg dry weight basis.

Values exceeding MTCA method A cleanup criteria (unrestricted land use) are shown in **bold** face type.

ND – Constituent not detected (detection limit).

APPENDIX A

Photographic Log

WATERWAY #20 SOIL SAMPLING PHOTOGRAPH LOG

Photo Number	Photo Description
1	Soil sample location WW20S1 at orange bucket, looking southwest
2	Soil sample location WW20S2 at orange bucket, looking north
3	Soil sample location WW20S3 at orange bucket, looking northwest
4	Looking southwest across site from soil sample location WW2020S3





APPENDIX B

Analytical Laboratory Report



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

April 14, 2016

Bruce Carpenter
Herrera Environmental Consultants, Inc.
2200 6th Avenue, Suite 1100
Seattle, WA 98121

Re: Analytical Data for Project 15-06211-000/001-001
Laboratory Reference No. 1604-072

Dear Bruce:

Enclosed are the analytical results and associated quality control data for samples submitted on April 8, 2016.

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,

A handwritten signature in black ink, appearing to read 'DB', with a long horizontal line extending to the right.

David Baumeister
Project Manager

Enclosures



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

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: April 14, 2016
Samples Submitted: April 8, 2016
Laboratory Reference: 1604-072
Project: 15-06211-000/001-001

Case Narrative

Samples were collected on April 7, 2016 and received by the laboratory on April 8, 2016. 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.

NWTPH Gx/BTEX Analysis

Per EPA Method 5035A, samples were received by the laboratory in pre-weighed 40 mL VOA vials within 48 hours of sample collection. They were stored in a freezer at between -7°C and -20°C until extraction or 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.



Date of Report: April 14, 2016
 Samples Submitted: April 8, 2016
 Laboratory Reference: 1604-072
 Project: 15-06211-000/001-001

NWTPH-Gx/BTEX

Matrix: Soil
 Units: mg/kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	WW20S1					
Laboratory ID:	04-072-01					
Benzene	ND	0.020	EPA 8021B	4-8-16	4-8-16	
Toluene	ND	0.056	EPA 8021B	4-8-16	4-8-16	
Ethyl Benzene	ND	0.056	EPA 8021B	4-8-16	4-8-16	
m,p-Xylene	ND	0.056	EPA 8021B	4-8-16	4-8-16	
o-Xylene	ND	0.056	EPA 8021B	4-8-16	4-8-16	
Gasoline	ND	5.6	NWTPH-Gx	4-8-16	4-8-16	
Surrogate:	Percent Recovery	Control Limits				
Fluorobenzene	88	68-129				
Client ID:	WW20S2					
Laboratory ID:	04-072-02					
Benzene	ND	0.020	EPA 8021B	4-8-16	4-8-16	
Toluene	ND	0.056	EPA 8021B	4-8-16	4-8-16	
Ethyl Benzene	ND	0.056	EPA 8021B	4-8-16	4-8-16	
m,p-Xylene	ND	0.056	EPA 8021B	4-8-16	4-8-16	
o-Xylene	ND	0.056	EPA 8021B	4-8-16	4-8-16	
Gasoline	ND	5.6	NWTPH-Gx	4-8-16	4-8-16	
Surrogate:	Percent Recovery	Control Limits				
Fluorobenzene	93	68-129				
Client ID:	WW20S3					
Laboratory ID:	04-072-03					
Benzene	ND	0.020	EPA 8021B	4-8-16	4-8-16	
Toluene	ND	0.060	EPA 8021B	4-8-16	4-8-16	
Ethyl Benzene	ND	0.060	EPA 8021B	4-8-16	4-8-16	
m,p-Xylene	ND	0.060	EPA 8021B	4-8-16	4-8-16	
o-Xylene	ND	0.060	EPA 8021B	4-8-16	4-8-16	
Gasoline	ND	6.0	NWTPH-Gx	4-8-16	4-8-16	
Surrogate:	Percent Recovery	Control Limits				
Fluorobenzene	93	68-129				



Date of Report: April 14, 2016
 Samples Submitted: April 8, 2016
 Laboratory Reference: 1604-072
 Project: 15-06211-000/001-001

**NWTPH-Gx/BTEX
 QUALITY CONTROL**

Matrix: Soil
 Units: mg/kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0408S2					
Benzene	ND	0.020	EPA 8021B	4-8-16	4-8-16	
Toluene	ND	0.050	EPA 8021B	4-8-16	4-8-16	
Ethyl Benzene	ND	0.050	EPA 8021B	4-8-16	4-8-16	
m,p-Xylene	ND	0.050	EPA 8021B	4-8-16	4-8-16	
o-Xylene	ND	0.050	EPA 8021B	4-8-16	4-8-16	
Gasoline	ND	5.0	NWTPH-Gx	4-8-16	4-8-16	
Surrogate:	Percent Recovery	Control Limits				
Fluorobenzene	83	68-129				

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	04-060-05							
	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	96	68-129		

SPIKE BLANKS

Laboratory ID:	SB0408S1									
	SB	SBD	SB	SBD	SB	SBD				
Benzene	1.02	1.05	1.00	1.00	102	105	76-124	3	17	
Toluene	1.03	1.06	1.00	1.00	103	106	78-124	3	16	
Ethyl Benzene	1.03	1.05	1.00	1.00	103	105	77-123	2	17	
m,p-Xylene	1.03	1.05	1.00	1.00	103	105	78-124	2	17	
o-Xylene	1.03	1.07	1.00	1.00	103	107	76-123	4	18	
Surrogate:										
Fluorobenzene					91	94	68-129			



Date of Report: April 14, 2016
 Samples Submitted: April 8, 2016
 Laboratory Reference: 1604-072
 Project: 15-06211-000/001-001

NWTPH-Dx

Matrix: Soil
 Units: mg/Kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	WW20S1					
Laboratory ID:	04-072-01					
Diesel Range Organics	ND	240	NWTPH-Dx	4-11-16	4-11-16	U1
Lube Oil	1400	260	NWTPH-Dx	4-11-16	4-11-16	
<i>Surrogate:</i>	<i>Percent Recovery</i>	<i>Control Limits</i>				
<i>o-Terphenyl</i>	107	50-150				
Client ID:	WW20S2					
Laboratory ID:	04-072-02					
Diesel Range Organics	ND	180	NWTPH-Dx	4-11-16	4-11-16	U1
Lube Oil Range Organics	960	270	NWTPH-Dx	4-11-16	4-11-16	
<i>Surrogate:</i>	<i>Percent Recovery</i>	<i>Control Limits</i>				
<i>o-Terphenyl</i>	101	50-150				
Client ID:	WW20S3					
Laboratory ID:	04-072-03					
Diesel Range Organics	ND	220	NWTPH-Dx	4-11-16	4-11-16	U1
Lube Oil	1200	270	NWTPH-Dx	4-11-16	4-11-16	
<i>Surrogate:</i>	<i>Percent Recovery</i>	<i>Control Limits</i>				
<i>o-Terphenyl</i>	103	50-150				



Date of Report: April 14, 2016
 Samples Submitted: April 8, 2016
 Laboratory Reference: 1604-072
 Project: 15-06211-000/001-001

**NWTPH-Dx
QUALITY CONTROL**

Matrix: Soil
 Units: mg/Kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0411S1					
Diesel Range Organics	ND	25	NWTPH-Dx	4-11-16	4-11-16	
Lube Oil Range Organics	ND	50	NWTPH-Dx	4-11-16	4-11-16	
Surrogate:	Percent Recovery	Control Limits				
o-Terphenyl	106	50-150				

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	04-072-03							
	ORIG	DUP						
Diesel Range	ND	ND	NA	NA	NA	NA	NA	U1
Lube Oil	1090	819	NA	NA	NA	28	NA	
Surrogate:								
o-Terphenyl				103	107	50-150		



Date of Report: April 14, 2016
 Samples Submitted: April 8, 2016
 Laboratory Reference: 1604-072
 Project: 15-06211-000/001-001

PAHs EPA 8270D/SIM

Matrix: Soil
 Units: mg/Kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	WW20S1					
Laboratory ID:	04-072-01					
Naphthalene	0.031	0.014	EPA 8270D/SIM	4-11-16	4-12-16	
2-Methylnaphthalene	0.016	0.014	EPA 8270D/SIM	4-11-16	4-12-16	
1-Methylnaphthalene	ND	0.014	EPA 8270D/SIM	4-11-16	4-12-16	
Acenaphthylene	0.029	0.014	EPA 8270D/SIM	4-11-16	4-12-16	
Acenaphthene	ND	0.014	EPA 8270D/SIM	4-11-16	4-12-16	
Fluorene	ND	0.014	EPA 8270D/SIM	4-11-16	4-12-16	
Phenanthrene	0.087	0.014	EPA 8270D/SIM	4-11-16	4-12-16	
Anthracene	0.024	0.014	EPA 8270D/SIM	4-11-16	4-12-16	
Fluoranthene	0.11	0.014	EPA 8270D/SIM	4-11-16	4-12-16	
Pyrene	0.15	0.014	EPA 8270D/SIM	4-11-16	4-12-16	
Benzo[a]anthracene	0.048	0.014	EPA 8270D/SIM	4-11-16	4-12-16	
Chrysene	0.077	0.014	EPA 8270D/SIM	4-11-16	4-12-16	
Benzo[b]fluoranthene	0.10	0.014	EPA 8270D/SIM	4-11-16	4-12-16	
Benzo(j,k)fluoranthene	0.028	0.014	EPA 8270D/SIM	4-11-16	4-12-16	
Benzo[a]pyrene	0.091	0.014	EPA 8270D/SIM	4-11-16	4-12-16	
Indeno(1,2,3-c,d)pyrene	0.10	0.014	EPA 8270D/SIM	4-11-16	4-12-16	
Dibenz[a,h]anthracene	0.024	0.014	EPA 8270D/SIM	4-11-16	4-12-16	
Benzo[g,h,i]perylene	0.23	0.014	EPA 8270D/SIM	4-11-16	4-12-16	
Surrogate:	Percent Recovery	Control Limits				
2-Fluorobiphenyl	52	32 - 115				
Pyrene-d10	58	30 - 124				
Terphenyl-d14	64	30 - 117				



Date of Report: April 14, 2016
 Samples Submitted: April 8, 2016
 Laboratory Reference: 1604-072
 Project: 15-06211-000/001-001

PAHs EPA 8270D/SIM

Matrix: Soil
 Units: mg/Kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	WW20S2					
Laboratory ID:	04-072-02					
Naphthalene	0.088	0.073	EPA 8270D/SIM	4-11-16	4-12-16	
2-Methylnaphthalene	ND	0.073	EPA 8270D/SIM	4-11-16	4-12-16	
1-Methylnaphthalene	0.076	0.073	EPA 8270D/SIM	4-11-16	4-12-16	
Acenaphthylene	0.15	0.073	EPA 8270D/SIM	4-11-16	4-12-16	
Acenaphthene	0.29	0.073	EPA 8270D/SIM	4-11-16	4-12-16	
Fluorene	0.31	0.073	EPA 8270D/SIM	4-11-16	4-12-16	
Phenanthrene	2.7	0.073	EPA 8270D/SIM	4-11-16	4-12-16	
Anthracene	0.78	0.073	EPA 8270D/SIM	4-11-16	4-12-16	
Fluoranthene	3.0	0.073	EPA 8270D/SIM	4-11-16	4-12-16	
Pyrene	3.5	0.073	EPA 8270D/SIM	4-11-16	4-12-16	
Benzo[a]anthracene	1.1	0.073	EPA 8270D/SIM	4-11-16	4-12-16	
Chrysene	1.3	0.073	EPA 8270D/SIM	4-11-16	4-12-16	
Benzo[b]fluoranthene	1.5	0.073	EPA 8270D/SIM	4-11-16	4-12-16	
Benzo(j,k)fluoranthene	0.50	0.073	EPA 8270D/SIM	4-11-16	4-12-16	
Benzo[a]pyrene	1.3	0.073	EPA 8270D/SIM	4-11-16	4-12-16	
Indeno(1,2,3-c,d)pyrene	1.0	0.073	EPA 8270D/SIM	4-11-16	4-12-16	
Dibenz[a,h]anthracene	0.19	0.073	EPA 8270D/SIM	4-11-16	4-12-16	
Benzo[g,h,i]perylene	1.2	0.073	EPA 8270D/SIM	4-11-16	4-12-16	
Surrogate:	Percent Recovery	Control Limits				
2-Fluorobiphenyl	58	32 - 115				
Pyrene-d10	75	30 - 124				
Terphenyl-d14	86	30 - 117				



Date of Report: April 14, 2016
 Samples Submitted: April 8, 2016
 Laboratory Reference: 1604-072
 Project: 15-06211-000/001-001

PAHs EPA 8270D/SIM

Matrix: Soil
 Units: mg/Kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	WW20S3					
Laboratory ID:	04-072-03					
Naphthalene	0.060	0.0073	EPA 8270D/SIM	4-11-16	4-12-16	
2-Methylnaphthalene	0.032	0.0073	EPA 8270D/SIM	4-11-16	4-12-16	
1-Methylnaphthalene	0.023	0.0073	EPA 8270D/SIM	4-11-16	4-12-16	
Acenaphthylene	0.068	0.0073	EPA 8270D/SIM	4-11-16	4-12-16	
Acenaphthene	ND	0.0073	EPA 8270D/SIM	4-11-16	4-12-16	
Fluorene	0.012	0.0073	EPA 8270D/SIM	4-11-16	4-12-16	
Phenanthrene	0.15	0.0073	EPA 8270D/SIM	4-11-16	4-12-16	
Anthracene	0.054	0.0073	EPA 8270D/SIM	4-11-16	4-12-16	
Fluoranthene	0.22	0.0073	EPA 8270D/SIM	4-11-16	4-12-16	
Pyrene	0.26	0.0073	EPA 8270D/SIM	4-11-16	4-12-16	
Benzo[a]anthracene	0.092	0.0073	EPA 8270D/SIM	4-11-16	4-12-16	
Chrysene	0.13	0.0073	EPA 8270D/SIM	4-11-16	4-12-16	
Benzo[b]fluoranthene	0.23	0.0073	EPA 8270D/SIM	4-11-16	4-12-16	
Benzo(j,k)fluoranthene	0.057	0.0073	EPA 8270D/SIM	4-11-16	4-12-16	
Benzo[a]pyrene	0.17	0.0073	EPA 8270D/SIM	4-11-16	4-12-16	
Indeno(1,2,3-c,d)pyrene	0.23	0.0073	EPA 8270D/SIM	4-11-16	4-12-16	
Dibenz[a,h]anthracene	0.036	0.0073	EPA 8270D/SIM	4-11-16	4-12-16	
Benzo[g,h,i]perylene	0.32	0.0073	EPA 8270D/SIM	4-11-16	4-12-16	
Surrogate:	Percent Recovery	Control Limits				
2-Fluorobiphenyl	72	32 - 115				
Pyrene-d10	80	30 - 124				
Terphenyl-d14	84	30 - 117				



Date of Report: April 14, 2016
 Samples Submitted: April 8, 2016
 Laboratory Reference: 1604-072
 Project: 15-06211-000/001-001

**PAHs EPA 8270D/SIM
 METHOD BLANK QUALITY CONTROL**

Matrix: Soil
 Units: mg/Kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Laboratory ID: MB0411S2						
Naphthalene	ND	0.0067	EPA 8270D/SIM	4-11-16	4-11-16	
2-Methylnaphthalene	ND	0.0067	EPA 8270D/SIM	4-11-16	4-11-16	
1-Methylnaphthalene	ND	0.0067	EPA 8270D/SIM	4-11-16	4-11-16	
Acenaphthylene	ND	0.0067	EPA 8270D/SIM	4-11-16	4-11-16	
Acenaphthene	ND	0.0067	EPA 8270D/SIM	4-11-16	4-11-16	
Fluorene	ND	0.0067	EPA 8270D/SIM	4-11-16	4-11-16	
Phenanthrene	ND	0.0067	EPA 8270D/SIM	4-11-16	4-11-16	
Anthracene	ND	0.0067	EPA 8270D/SIM	4-11-16	4-11-16	
Fluoranthene	ND	0.0067	EPA 8270D/SIM	4-11-16	4-11-16	
Pyrene	ND	0.0067	EPA 8270D/SIM	4-11-16	4-11-16	
Benzo[a]anthracene	ND	0.0067	EPA 8270D/SIM	4-11-16	4-11-16	
Chrysene	ND	0.0067	EPA 8270D/SIM	4-11-16	4-11-16	
Benzo[b]fluoranthene	ND	0.0067	EPA 8270D/SIM	4-11-16	4-11-16	
Benzo[j,k]fluoranthene	ND	0.0067	EPA 8270D/SIM	4-11-16	4-11-16	
Benzo[a]pyrene	ND	0.0067	EPA 8270D/SIM	4-11-16	4-11-16	
Indeno(1,2,3-c,d)pyrene	ND	0.0067	EPA 8270D/SIM	4-11-16	4-11-16	
Dibenz[a,h]anthracene	ND	0.0067	EPA 8270D/SIM	4-11-16	4-11-16	
Benzo[g,h,i]perylene	ND	0.0067	EPA 8270D/SIM	4-11-16	4-11-16	
<i>Surrogate:</i>	<i>Percent Recovery</i>	<i>Control Limits</i>				
<i>2-Fluorobiphenyl</i>	<i>91</i>	<i>32 - 115</i>				
<i>Pyrene-d10</i>	<i>96</i>	<i>30 - 124</i>				
<i>Terphenyl-d14</i>	<i>97</i>	<i>30 - 117</i>				



Date of Report: April 14, 2016
 Samples Submitted: April 8, 2016
 Laboratory Reference: 1604-072
 Project: 15-06211-000/001-001

**PAHs EPA 8270D/SIM
 SB/SBD QUALITY CONTROL**

Matrix: Soil
 Units: mg/Kg

Analyte	Result		Spike Level		Percent Recovery		Recovery Limits	RPD	Limit	Flags
SPIKE BLANKS										
Laboratory ID:	SB0411S2									
	SB	SBD	SB	SBD	SB	SBD				
Naphthalene	0.0681	0.0629	0.0833	0.0833	82	76	61 - 112	8	15	
Acenaphthylene	0.0854	0.0800	0.0833	0.0833	103	96	65 - 116	7	15	
Acenaphthene	0.0719	0.0667	0.0833	0.0833	86	80	62 - 116	8	13	
Fluorene	0.0779	0.0712	0.0833	0.0833	94	85	60 - 115	9	15	
Phenanthrene	0.0683	0.0638	0.0833	0.0833	82	77	54 - 114	7	15	
Anthracene	0.0970	0.0885	0.0833	0.0833	116	106	70 - 140	9	15	
Fluoranthene	0.0793	0.0723	0.0833	0.0833	95	87	60 - 118	9	15	
Pyrene	0.0775	0.0707	0.0833	0.0833	93	85	65 - 115	9	15	
Benzo[a]anthracene	0.0749	0.0710	0.0833	0.0833	90	85	59 - 129	5	15	
Chrysene	0.0761	0.0715	0.0833	0.0833	91	86	60 - 122	6	15	
Benzo[b]fluoranthene	0.0915	0.0859	0.0833	0.0833	110	103	53 - 124	6	17	
Benzo(j,k)fluoranthene	0.0872	0.0804	0.0833	0.0833	105	97	58 - 124	8	16	
Benzo[a]pyrene	0.0843	0.0783	0.0833	0.0833	101	94	62 - 127	7	15	
Indeno(1,2,3-c,d)pyrene	0.0810	0.0750	0.0833	0.0833	97	90	60 - 120	8	15	
Dibenz[a,h]anthracene	0.0919	0.0858	0.0833	0.0833	110	103	60 - 117	7	15	
Benzo(g,h,i)perylene	0.0847	0.0786	0.0833	0.0833	102	94	63 - 117	7	15	
Surrogate:										
2-Fluorobiphenyl					88	81	32 - 115			
Pyrene-d10					94	86	30 - 124			
Terphenyl-d14					94	87	30 - 117			



Date of Report: April 14, 2016
 Samples Submitted: April 8, 2016
 Laboratory Reference: 1604-072
 Project: 15-06211-000/001-001

**PCBs
 EPA 8082A**

Matrix: Soil
 Units: mg/Kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID: WW20S1						
Laboratory ID:	04-072-01					
Aroclor 1016	ND	0.053	EPA 8082A	4-11-16	4-11-16	
Aroclor 1221	ND	0.053	EPA 8082A	4-11-16	4-11-16	
Aroclor 1232	ND	0.053	EPA 8082A	4-11-16	4-11-16	
Aroclor 1242	ND	0.053	EPA 8082A	4-11-16	4-11-16	
Aroclor 1248	ND	0.053	EPA 8082A	4-11-16	4-11-16	
Aroclor 1254	ND	0.053	EPA 8082A	4-11-16	4-11-16	
Aroclor 1260	ND	0.053	EPA 8082A	4-11-16	4-11-16	
Surrogate:	Percent Recovery	Control Limits				
DCB	70	50-139				
Client ID: WW20S2						
Laboratory ID:	04-072-02					
Aroclor 1016	ND	0.055	EPA 8082A	4-11-16	4-11-16	
Aroclor 1221	ND	0.055	EPA 8082A	4-11-16	4-11-16	
Aroclor 1232	ND	0.055	EPA 8082A	4-11-16	4-11-16	
Aroclor 1242	ND	0.055	EPA 8082A	4-11-16	4-11-16	
Aroclor 1248	ND	0.055	EPA 8082A	4-11-16	4-11-16	
Aroclor 1254	ND	0.055	EPA 8082A	4-11-16	4-11-16	
Aroclor 1260	ND	0.055	EPA 8082A	4-11-16	4-11-16	
Surrogate:	Percent Recovery	Control Limits				
DCB	78	50-139				
Client ID: WW20S3						
Laboratory ID:	04-072-03					
Aroclor 1016	ND	0.055	EPA 8082A	4-11-16	4-11-16	
Aroclor 1221	ND	0.055	EPA 8082A	4-11-16	4-11-16	
Aroclor 1232	ND	0.055	EPA 8082A	4-11-16	4-11-16	
Aroclor 1242	ND	0.055	EPA 8082A	4-11-16	4-11-16	
Aroclor 1248	ND	0.055	EPA 8082A	4-11-16	4-11-16	
Aroclor 1254	ND	0.055	EPA 8082A	4-11-16	4-11-16	
Aroclor 1260	ND	0.055	EPA 8082A	4-11-16	4-11-16	
Surrogate:	Percent Recovery	Control Limits				
DCB	70	50-139				



Date of Report: April 14, 2016
 Samples Submitted: April 8, 2016
 Laboratory Reference: 1604-072
 Project: 15-06211-000/001-001

**PCBs EPA 8082A
 QUALITY CONTROL**

Matrix: Soil
 Units: mg/Kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0411S2					
Aroclor 1016	ND	0.050	EPA 8082A	4-11-16	4-11-16	
Aroclor 1221	ND	0.050	EPA 8082A	4-11-16	4-11-16	
Aroclor 1232	ND	0.050	EPA 8082A	4-11-16	4-11-16	
Aroclor 1242	ND	0.050	EPA 8082A	4-11-16	4-11-16	
Aroclor 1248	ND	0.050	EPA 8082A	4-11-16	4-11-16	
Aroclor 1254	ND	0.050	EPA 8082A	4-11-16	4-11-16	
Aroclor 1260	ND	0.050	EPA 8082A	4-11-16	4-11-16	
Surrogate:	Percent Recovery	Control Limits				
DCB	94	50-139				

Analyte	Result				Spike Level	Source	Percent	Recovery	RPD		
						Result	Recovery	Limits			
MATRIX SPIKES											
Laboratory ID:	04-072-01										
	MS	MSD	MS	MSD		MS	MSD				
Aroclor 1260	0.383	0.394	0.500	0.500	ND	77	79	49-133	3	17	
Surrogate:											
DCB						74	78	50-139			



Date of Report: April 14, 2016
 Samples Submitted: April 8, 2016
 Laboratory Reference: 1604-072
 Project: 15-06211-000/001-001

**TOTAL METALS
 EPA 6010C/7471B**

Matrix: Soil
 Units: mg/kg (ppm)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	04-072-01					
Client ID:	WW20S1					
Arsenic	ND	11	6010C	4-13-16	4-13-16	
Cadmium	ND	0.53	6010C	4-13-16	4-13-16	
Chromium	34	0.53	6010C	4-13-16	4-13-16	
Lead	29	5.3	6010C	4-13-16	4-13-16	
Mercury	ND	0.26	7471B	4-13-16	4-13-16	
Lab ID:	04-072-02					
Client ID:	WW20S2					
Arsenic	ND	11	6010C	4-13-16	4-13-16	
Cadmium	ND	0.55	6010C	4-13-16	4-13-16	
Chromium	24	0.55	6010C	4-13-16	4-13-16	
Lead	45	5.5	6010C	4-13-16	4-13-16	
Mercury	ND	0.27	7471B	4-13-16	4-13-16	
Lab ID:	04-072-03					
Client ID:	WW20S3					
Arsenic	ND	11	6010C	4-13-16	4-13-16	
Cadmium	ND	0.55	6010C	4-13-16	4-13-16	
Chromium	37	0.55	6010C	4-13-16	4-13-16	
Lead	48	5.5	6010C	4-13-16	4-13-16	
Mercury	ND	0.27	7471B	4-13-16	4-13-16	



Date of Report: April 14, 2016
Samples Submitted: April 8, 2016
Laboratory Reference: 1604-072
Project: 15-06211-000/001-001

**TOTAL METALS
EPA 6010C
METHOD BLANK QUALITY CONTROL**

Date Extracted: 4-13-16
Date Analyzed: 4-13-16

Matrix: Soil
Units: mg/kg (ppm)

Lab ID: MB0413SM1

Analyte	Method	Result	PQL
Arsenic	6010C	ND	10
Cadmium	6010C	ND	0.50
Chromium	6010C	ND	0.50
Lead	6010C	ND	5.0



Date of Report: April 14, 2016
Samples Submitted: April 8, 2016
Laboratory Reference: 1604-072
Project: 15-06211-000/001-001

**TOTAL MERCURY
EPA 7471B
METHOD BLANK QUALITY CONTROL**

Date Extracted: 4-13-16
Date Analyzed: 4-13-16

Matrix: Soil
Units: mg/kg (ppm)

Lab ID: MB0413S1

Analyte	Method	Result	PQL
Mercury	7471B	ND	0.25



Date of Report: April 14, 2016
 Samples Submitted: April 8, 2016
 Laboratory Reference: 1604-072
 Project: 15-06211-000/001-001

**TOTAL METALS
 EPA 6010C
 DUPLICATE QUALITY CONTROL**

Date Extracted: 4-13-16
 Date Analyzed: 4-13-16

 Matrix: Soil
 Units: mg/kg (ppm)

 Lab ID: 04-090-01

Analyte	Sample Result	Duplicate Result	RPD	PQL	Flags
Arsenic	ND	ND	NA	10	
Cadmium	ND	ND	NA	0.50	
Chromium	29.0	32.3	11	0.50	
Lead	13.3	7.05	61	5.0	C



Date of Report: April 14, 2016
Samples Submitted: April 8, 2016
Laboratory Reference: 1604-072
Project: 15-06211-000/001-001

**TOTAL MERCURY
EPA 7471B
DUPLICATE QUALITY CONTROL**

Date Extracted: 4-13-16
Date Analyzed: 4-13-16

Matrix: Soil
Units: mg/kg (ppm)

Lab ID: 04-072-03

Analyte	Sample Result	Duplicate Result	RPD	PQL	Flags
Mercury	ND	ND	NA	0.25	



Date of Report: April 14, 2016
 Samples Submitted: April 8, 2016
 Laboratory Reference: 1604-072
 Project: 15-06211-000/001-001

**TOTAL METALS
 EPA 6010C
 MS/MSD QUALITY CONTROL**

Date Extracted: 4-13-16

Date Analyzed: 4-13-16

Matrix: Soil

Units: mg/kg (ppm)

Lab ID: 04-090-01

Analyte	Spike Level	MS	Percent Recovery	MSD	Percent Recovery	RPD	Flags
Arsenic	100	92.4	92	92.0	92	0	
Cadmium	50.0	47.7	95	47.9	96	0	
Chromium	100	121	92	121	92	0	
Lead	250	235	89	233	88	1	



Date of Report: April 14, 2016
Samples Submitted: April 8, 2016
Laboratory Reference: 1604-072
Project: 15-06211-000/001-001

**TOTAL MERCURY
EPA 7471B
MS/MSD QUALITY CONTROL**

Date Extracted: 4-13-16

Date Analyzed: 4-13-16

Matrix: Soil

Units: mg/kg (ppm)

Lab ID: 04-072-03

Analyte	Spike Level	MS	Percent Recovery	MSD	Percent Recovery	RPD	Flags
Mercury	0.500	0.537	107	0.515	103	4	



Date of Report: April 14, 2016
Samples Submitted: April 8, 2016
Laboratory Reference: 1604-072
Project: 15-06211-000/001-001

% MOISTURE

Date Analyzed: 4-11-16

Client ID	Lab ID	% Moisture
WW20S1	04-072-01	5
WW20S2	04-072-02	9
WW20S3	04-072-03	9





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-naphthalene) 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





14648 NE 95th Street • Redmond, WA 98052
Phone: (425) 883-3881 • www.onsite-env.com

Page 1 of 1

Company:	Herrera Environmental
Project Number:	15-06211-000/001-001
Project Name:	WW#20
Project Manager:	Bruce Carpenter
Sampled by:	Bruce Carpenter

[illegible]

APPENDIX C

Data Quality Assurance Review

Herrera Environmental Consultants, Inc.

Memorandum

To Project File 15-06211-000
From Gina Catarra, Herrera Environmental Consultants
Date May 6, 2016
Subject Data Quality Assurance Review of the Waterway 20 Upland Soil Data

This memorandum presents a review of data quality for 3 soil samples collected for the Waterway 20 upland soil site on April 7th, 2016. OnSite Environmental, Inc., of Redmond, Washington analyzed the samples for:

- Total petroleum hydrocarbons by NWTPH-Gx and NWTPH-Dx methods
- Benzene, ethylbenzene, toluene, and xylenes (BTEX) by EPA method 8021B
- Polycyclic aromatic hydrocarbons (PAHs) by EPA method 8270D/SIM
- Polychlorinated biphenyls (PCBs) by EPA method 8082A
- Total metals (arsenic, cadmium, chromium, lead, and mercury) by EPA methods 6010C and 7471B.

Results for the following samples were validated.

Sample ID	Date Collected	Matrix	Analyses
WW20S1	4/7/2016	Soil	NWTPH-Gx/BTEX, NWTPH-Dx, PAHs, PCBs, metals
WW20S2	4/7/2016	Soil	NWTPH-Gx/BTEX, NWTPH-Dx, PAHs, PCBs, metals
WW20S3	4/7/2016	Soil	NWTPH-Gx/BTEX, NWTPH-Dx, PAHs, PCBs, metals

The laboratory's performance was reviewed in accordance with quality control (QC) criteria established by the laboratory and in the specified methods.

Quality control data summaries submitted by the laboratories were reviewed; raw data were not submitted by the laboratories. Data qualifiers (flags) were added to the sample results in the laboratory reports. Data validation results are summarized below, followed by definitions of data qualifiers.

Custody, Preservation, Holding Times, and Completeness—Acceptable

The samples were properly preserved and sample custody was maintained from sample collection to receipt at the laboratories. All samples were analyzed within the required method holding times. The laboratory report was complete and contained results for all samples and tests requested on the chain-of-custody (COC) forms.

Laboratory Reporting Limits—Acceptable with Discussion

The laboratory reporting limits were reasonable for the methods, with the exception noted below. No data were qualified based on laboratory reporting limits.

The reporting limits for diesel range organics (DRO) were elevated due to matrix interferences.

Method Blank Analysis—Acceptable

Method blanks were analyzed at the required frequency. Method blanks did not contain levels of target analytes above the laboratory reporting limits.

Laboratory Control Sample Analysis—Acceptable

Blank spike/blank spike duplicate (BS/BSD) samples were analyzed with project samples for NWTPH-Gx/BTEX and PAH analyses at the required frequency. The percent recovery values for all compounds met the criteria established by the laboratory or method, as applicable.

Surrogate Analysis—Acceptable

Surrogate compounds were added to all samples for NWTPH-Gx/BTEX (fluorobenzene), NWTPH-Dx (o-terphenyl), and PAHs (2-fluorobiphenyl, pyrene-d10, and terphenyl-d14), and PCB (DCB) analyses. The percent recovery values for all surrogate compounds met the criteria established by the laboratory or method, as applicable.

Matrix Spike Analysis—Acceptable

Matrix spike/matrix spike duplicate (MS/MSD) samples were analyzed for PCBs (sample WW20S1) and total metals (batch and WW20S3). The percent recovery values for PCBs (77 and 79 percent) and total metals (ranging from 88 to 107 percent) met the control limits (49 to 133 percent for PCBs, and 75 to 125 percent for total metals) established by the laboratory.

Laboratory Duplicate Analysis—Acceptable

Laboratory duplicates were analyzed for NWTPH-Gx/BTEX (batch sample), NWTPH-Dx (sample WW20S3), and total metals (batch sample and WW20S3); matrix spike duplicates were analyzed for PCBs (WW20S1) and for total metals (batch sample and WW20S3). The relative

percent difference (RPD) was calculated for each analyte where both duplicate values were greater than five times the reporting limit (RL). The difference between duplicate values was calculated if the detected compound concentration was less than five times the RL in either the sample or the field duplicate. The relative percent difference (RPD) values or difference values met the control limits established by the laboratory.

Definition of Data Qualifiers

The following data qualifier definitions are taken from *USEPA National Functional Guidelines for Inorganic Superfund Data Review* (USEPA 2014).

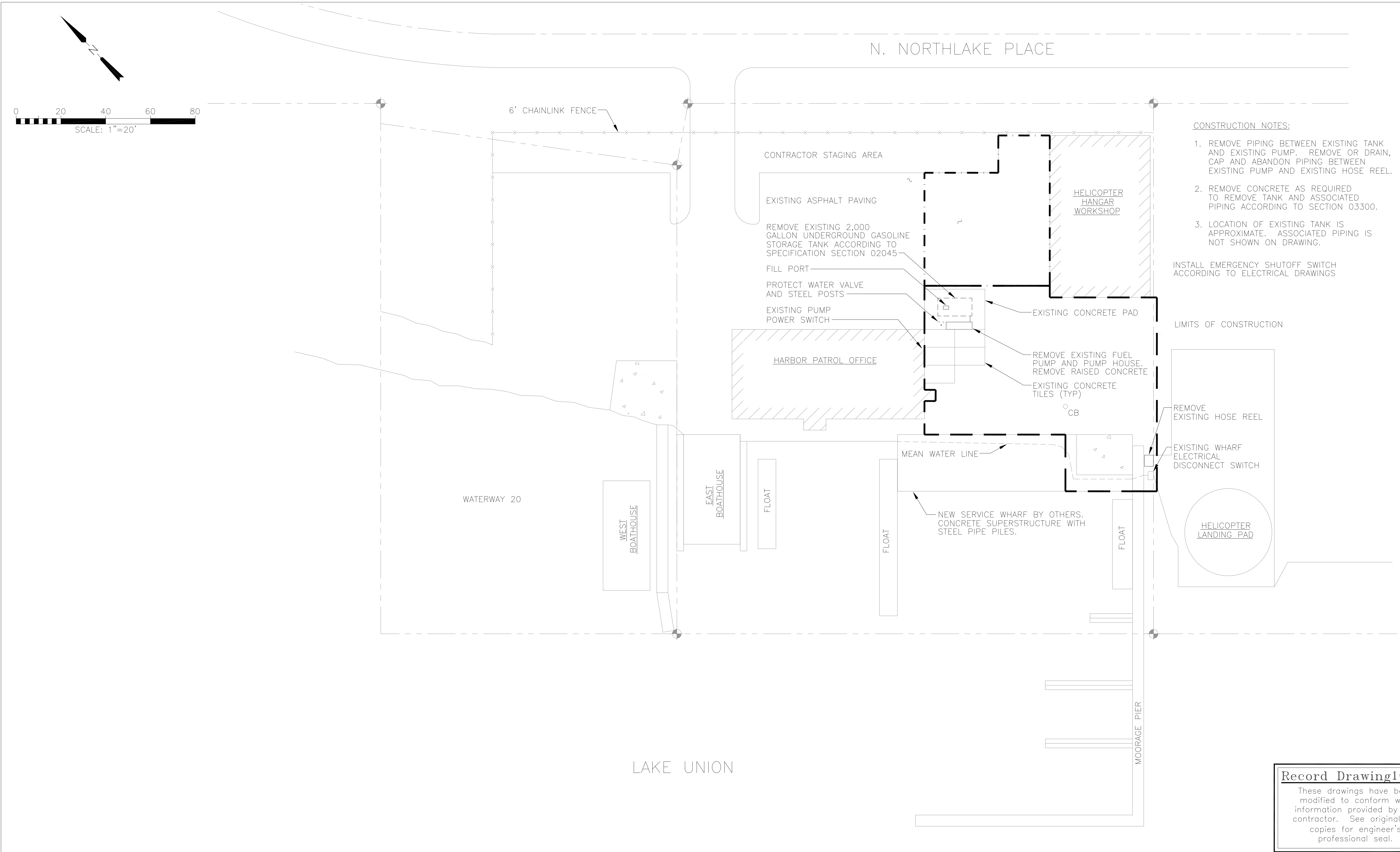
- U** The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.
- J** The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.
- UJ** The material was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.
- R** The data are unusable. (Note: analyte may or may not be present.)

References

USEPA. 2014. National functional guidelines for inorganic superfund data review. US Environmental Protection Agency, Office of Superfund Remediation and Technology Innovation (OSRTI), Washington, D.C. (EPA-540-R-013-001).

APPENDIX B

Police Harbor Patrol Closure and Staging Plan



- CONSTRUCTION NOTES:
1. REMOVE PIPING BETWEEN EXISTING TANK AND EXISTING PUMP. REMOVE OR DRAIN, CAP AND ABANDON PIPING BETWEEN EXISTING PUMP AND EXISTING HOSE REEL.
 2. REMOVE CONCRETE AS REQUIRED TO REMOVE TANK AND ASSOCIATED PIPING ACCORDING TO SECTION 03300.
 3. LOCATION OF EXISTING TANK IS APPROXIMATE. ASSOCIATED PIPING IS NOT SHOWN ON DRAWING.

INSTALL EMERGENCY SHUTOFF SWITCH ACCORDING TO ELECTRICAL DRAWINGS

LIMITS OF CONSTRUCTION

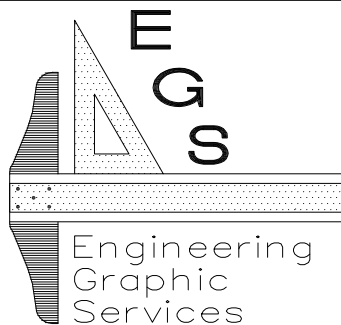
REMOVE EXISTING HOSE REEL

EXISTING WHARF ELECTRICAL DISCONNECT SWITCH

HELICOPTER LANDING PAD

Record Drawing10/00

These drawings have been modified to conform with information provided by the contractor. See original file copies for engineer's professional seal.



1	1-00	REVISED PER RECORD DRAWING MARKUPS	MKW	DSGN	KJD/SAB
				DRWN	EGS
				CHKD	VMS
				APRD	
				DATE	
Δ	12/1/98	EDIT - CLOSE TANK IN-PLACE			
REV	DATE	DESCRIPTION	BY	APRD	DATE
DRAWING REVISION RECORD					

ONE INCH ON ORIGINAL DRAWING

IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY

CITY OF SEATTLE
EXECUTIVE SERVICES DEPARTMENT
UNDERGROUND TANK
REMOVAL AND REPLACEMENT
CENTRAL GROUP

REMOVAL AND REPLACEMENT OF
UNDERGROUND STORAGE TANK SYSTEMS
POLICE HARBOR PATROL
CLOSURE AND STAGING PLAN

PROJ NO 95-044
DWG NO 25
SHEET 25 OF 49

APPENDIX C

Instrumentation Calibration and Maintenance Documentation

Air Monitoring Equipment Calibration/Check Log

Project

Name:

Project

Number:

[illegible]

Air Monitoring Log*

Project Name: _____

Project Number: _____

Date	Time	Location	Source Area/ Breathing Zone	Instrument	Concentrations/ Units	Sampled By	Comments

***Notify the Site Health and Safety Officer immediately if a PEL, TLV, or other limit is exceeded.**

ATTACHMENT B

Boring Logs

This page intentionally left blank



GROUNDWATER SAMPLING LOG

Project No.: 15-06211-000 Site: WW #20 Well No.: GW2 Date: 3/9/23
Well Depth: 9.5' Screen Length: 5' Well Diameter: 3/4" Casing Type: PVC
Sampling Device: Peristaltic Tubing Type: Polyethylene Water Level: 5.3'
Measuring Point: — Other Info: —

Temp Well: _____ Screen 4.5' - 9.5'
Sampling Personnel: _____ George Ifthar, Yashvi Patel

[illegible]

Type of Samples Collected for Laboratory Analysis:

Well Casing Volumes:

Gal/Ft 1¼" = 0.077 1½" = 0.10 2" = 0.16 2½" = 0.24 3" = 0.37 3½" = 0.50 4" = 0.65 6" = 1.46



HERRERA

SOIL BORING AND MONITORING WELL CONSTRUCTION RECORD

Boring No.: WW20S4

Total depth: 10 feet

Sheet 1 of 1

Project Name: Waterway #20

Project Number: 15-06211-000

Client: City of Seattle

Location: Upland adjacent to waterway

HEC Rep.: George Iftner

Start/End Date: 3/9/2023

Notes: _____

Drilling Contractor: Holocene Drilling

Drilling Method: Geoprobe

Sampling Method: 5-foot sampler

Ground Elevation: NA

Air Monitoring (y/n): Yes

Instrument(s): MiniRAE PID

PID Reading (ppm)	Sample Type, Interval	% Recovery	Depth (feet, BGS)	Water Level (feet)	Soil Group	Soil Description	Sample/Time
					GP	Gray-brown sandy GRAVEL, trace silt (damp). FILL	WW20S4-0 8:40
			1		SP-SM	Dark brown fine-to-medium SAND with silt, trace gravel, charcoal, and wood fibers (damp). FILL	
0.0		60%	2				WW20S4-2 8:50
			3			Brown fine-to-medium SAND with silt (moist-to-wet). Native.	
			4	▼			
			5				
			6			Similar fine-to-medium SAND with silt (wet).	WW20S4-5 9:00
0.0			7				
		95%	8				
			9			- 2" lens of fine sand - gravelly - transition to yellowish-brown	
			10				



HERRERA

SOIL BORING AND MONITORING WELL CONSTRUCTION RECORD

Boring No.: WW20S5

Total depth: 10 feet

Sheet 1 of 1

Project Name: Waterway #20

Project Number: 15-06211-000

Client: City of Seattle

Location: Upland adjacent to waterway

HEC Rep.: George Iftner

Start/End Date: 3/9/2023

Notes: _____

Drilling Contractor: Holocene Drilling

Drilling Method: Geoprobe

Sampling Method: 5-foot sampler

Ground Elevation: NA

Air Monitoring (y/n): Yes

Instrument(s): MiniRAE PID

PID Reading (ppm)	Sample Type, Interval	% Recovery	Depth (feet, BGS)	Water Level (feet)	Soil Group	Soil Description	Sample/Time
					GP	Red-brown sandy GRAVEL, trace silt (damp). FILL	WW20S5-0 9:25
			1			-2" burnt charcoal layer at 1.2 feet	
0.0		60%	2		SP	Gray-brown fine SAND, trace silt (moist). FILL	WW20S5-2 9:35
			3			6" dark brown-black fine-medium sandy charcoal.	
			4				
			5				
			6	▼	SP	Brown fine-to-medium SAND, trace silt and gravel (moist-to-wet). Native.	WW20S5-5 9:40
0.0			7		SP-SM	Gray fine-to-medium SAND with silt (moist-to-wet).	
		80%	8				
			9				
			10			-grades to coarse sand with silt (wet).	



HERRERA

SOIL BORING AND MONITORING WELL CONSTRUCTION RECORD

Boring No.: WW20S6

Total depth: 10 feet

Sheet 1 of 1

Project Name: Waterway #20

Project Number: 15-06211-000

Client: City of Seattle

Location: Upland adjacent to waterway

HEC Rep.: George Iftner

Start/End Date: 3/9/2023

Notes: _____

Drilling Contractor: Holocene Drilling

Drilling Method: Geoprobe

Sampling Method: 5-foot sampler

Ground Elevation: NA

Air Monitoring (y/n): Yes

Instrument(s): MiniRAE PID

PID Reading (ppm)	Sample Type, Interval	% Recovery	Depth (feet, BGS)	Water Level (feet)	Soil Group	Soil Description	Sample/Time
					GP	Brown sandy fine-to-medium GRAVEL trace silt and roots, (damp). Fill.	WW20S6-0 10:10
			1				
			2				
0.0		40%	3		SP-SM	Gray-brown fine-to-medium SAND with silt (moist-to-wet). Native.	WW20S6-5 10:20
			4				
			5				
			6	▼			
0.0		80%	7				
			8				
			9				
			10				



HERRERA

SOIL BORING AND MONITORING WELL CONSTRUCTION RECORD

Boring No.: WW20S7

Total depth: 10 feet

Sheet 1 of 1

Project Name: Waterway #20

Project Number: 15-06211-000

Client: City of Seattle

Location: Upland adjacent to waterway

HEC Rep.: George Iftner

Start/End Date: 3/9/2023

Notes: _____

Drilling Contractor: Holocene Drilling

Drilling Method: Geoprobe

Sampling Method: 5-foot sampler

Ground Elevation: NA

Air Monitoring (y/n): Yes

Instrument(s): MiniRAE PID

PID Reading (ppm)	Sample Type, Interval	% Recovery	Depth (feet, BGS)	Water Level (feet)	Soil Group	Soil Description	Sample/Time
					SM	Dark brown silty SAND (damp). FILL.	WW20S7-0 12:10
			1		GP	Brown sandy f-m GRAVEL trace silt (damp). FILL.	
					ML	Gray-brown sandy SILT (damp). FILL.	
1.5		60%	2				
			3			-charcoal in tip of sampler	
			4				
			5				
			6		SP-SM	Black fine-to-medium SAND with silt and charcoal (moist). FILL.	WW20S7-5 12:20
0.0		50%	7	▼		-transitions to brown fine-to-medium SAND with silt (wet). Native.	
			8				
			9				
			10				



HERRERA

SOIL BORING AND MONITORING WELL CONSTRUCTION RECORD

Boring No.: WW20S8

Total depth: 10 feet

Sheet 1 of 1

Project Name: Waterway #20

Project Number: 15-06211-000

Client: City of Seattle

Location: Upland adjacent to waterway

HEC Rep.: George Iftner

Start/End Date: 3/9/2023

Notes: _____

Drilling Contractor: Holocene Drilling

Drilling Method: Geoprobe

Sampling Method: 5-foot sampler

Ground Elevation: NA

Air Monitoring (y/n): Yes

Instrument(s): MiniRAE PID

PID Reading (ppm)	Sample Type, Interval	% Recovery	Depth (feet, BGS)	Water Level (feet)	Soil Group	Soil Description	Sample/Time
					GP	Dark brown silty SAND with gravel (damp). FILL.	WW20S8-0 12:35
			1				
0.0		80%	2		ML	Gray sandy SILT (moist). FILL.	
			3		SM	Gray-to-brown silty SAND (moist). FILL.	
			4				
			5				WW20S8-5 12:45
			6	▼	SP-SM	Brown-black f-m SAND with silt and charcoal (moist-to-wet). FILL.	
0.0		60%	7			Gray f-m SAND with silt, occasional gravel (wet). Native.	
			8				
			9				
			10				



HERRERA

SOIL BORING AND MONITORING WELL CONSTRUCTION RECORD

Boring No.: WW20S9

Total depth: 10 feet

Sheet 1 of 1

Project Name: Waterway #20

Project Number: 15-06211-000

Client: City of Seattle

Location: Upland adjacent to waterway

HEC Rep.: George Iftner

Start/End Date: 3/9/2023

Notes: _____

Drilling Contractor: Holocene Drilling

Drilling Method: Geoprobe

Sampling Method: 5-foot sampler

Ground Elevation: NA

Air Monitoring (y/n): Yes

Instrument(s): MiniRAE PID

PID Reading (ppm)	Sample Type, Interval	% Recovery	Depth (feet, BGS)	Water Level (feet)	Soil Group	Soil Description	Sample/Time
					GP	Brown-gray sandy GRAVEL, trace silt (damp). FILL.	WW20S9-0 12:55
			1				
			2				
0.0		80%	3		SP	Dark brown-black f-m SAND, with charcoal, trace silt (moist). FILL.	WW20S9-2.5 13:05
			4		SP-SM	Brown-gray fine-to-medium SAND with silt (moist-to-wet). Native.	
			5				
				▼	GP	Gray-brown sandy GRAVEL, trace silt (wet).	
			6				
0.0		60%	7				
			8				
			9				
			10				

ATTACHMENT C

Photographic Log

This page intentionally left blank

WATERWAY #20 SITE CHARACTERIZATION: PHOTOGRAPHIC LOG

Photo Number	Photo Description
1	Waterway #20 Site, facing northwest.
2	Waterway #20 Site shoreline, facing west-northwest.
3	Waterway #20 Site and site entrance, facing northeast.
4	Boring WW20S4: soils from the 0–5' bgs depth interval, with black charcoal-stained layer.
5	Boring WW20S4: soils from the 5–10' bgs depth interval.
6	Boring WW20S5: soils from the 0–5' bgs depth interval, with black charcoal-stained layer.
7	Boring WW20S5: soils from 0–5' bgs (bottom of photo) and 5–10' bgs (top).
8	Boring WW20S6: soils from the 0–5' bgs depth interval; black charcoal-stained layer near bottom.
9	Boring WW20S6: soils from 0–5' bgs (bottom of photo) and 5–10' bgs (top).
10	Boring WW20S7: soils from 0–5' bgs (bottom of photo) and 5–10' bgs with charcoal-stained layer (top).
11	Boring WW20S8: soils from 0–5' bgs (top of photo) and 5–10' bgs with charcoal-stained layer (bottom).
12	Boring WW20S9: soils from 0–5' bgs with charcoal-stained layer (bottom of photo), and 5–10' bgs (top).
13	WW20GW1 groundwater sample location at existing well "TSW-1."
14	WW20GW2 groundwater sample location at soil boring WW20S6.









13.



14.

ATTACHMENT D

Laboratory Data and QA Review Memorandum

This page intentionally left blank



**OnSite
Environmental Inc.**

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

March 20, 2023

George Iftner
Herrera Environmental Consultants, Inc.
2200 6th Avenue, Suite 1100
Seattle, WA 98121

Re: Analytical Data for Project 15-06211-000
Laboratory Reference No. 2303-107

Dear George:

Enclosed are the analytical results and associated quality control data for samples submitted on March 9, 2023.

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



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

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: March 20, 2023
Samples Submitted: March 9, 2023
Laboratory Reference: 2303-107
Project: 15-06211-000

Case Narrative

Samples were collected on March 9, 2023 and received by the laboratory on March 9, 2023. 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.



Date of Report: March 20, 2023
 Samples Submitted: March 9, 2023
 Laboratory Reference: 2303-107
 Project: 15-06211-000

GASOLINE RANGE ORGANICS
NWTPH-Gx

Matrix: Soil
 Units: mg/kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	WW20S4-0					
Laboratory ID:	03-107-01					
Gasoline	ND	6.5	NWTPH-Gx	3-10-23	3-10-23	
Surrogate:	Percent Recovery	Control Limits				
Fluorobenzene	90	69-130				
Client ID:	WW20S4-2					
Laboratory ID:	03-107-02					
Gasoline	ND	15	NWTPH-Gx	3-10-23	3-10-23	
Surrogate:	Percent Recovery	Control Limits				
Fluorobenzene	90	69-130				
Client ID:	WW20S5-0					
Laboratory ID:	03-107-04					
Gasoline	ND	6.3	NWTPH-Gx	3-10-23	3-10-23	
Surrogate:	Percent Recovery	Control Limits				
Fluorobenzene	91	69-130				
Client ID:	WW20S5-2					
Laboratory ID:	03-107-05					
Gasoline	ND	7.1	NWTPH-Gx	3-10-23	3-10-23	
Surrogate:	Percent Recovery	Control Limits				
Fluorobenzene	80	69-130				
Client ID:	WW20S6-0					
Laboratory ID:	03-107-07					
Gasoline	ND	5.3	NWTPH-Gx	3-10-23	3-10-23	
Surrogate:	Percent Recovery	Control Limits				
Fluorobenzene	91	69-130				
Client ID:	WW20S6-5					
Laboratory ID:	03-107-08					
Gasoline	ND	5.8	NWTPH-Gx	3-10-23	3-10-23	
Surrogate:	Percent Recovery	Control Limits				
Fluorobenzene	86	69-130				
Client ID:	WW20SDUP1-0					
Laboratory ID:	03-107-09					
Gasoline	ND	6.1	NWTPH-Gx	3-10-23	3-10-23	
Surrogate:	Percent Recovery	Control Limits				
Fluorobenzene	90	69-130				



Date of Report: March 20, 2023
 Samples Submitted: March 9, 2023
 Laboratory Reference: 2303-107
 Project: 15-06211-000

**GASOLINE RANGE ORGANICS
 NWTPH-Gx**

Matrix: Soil
 Units: mg/kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	WW20S7-0					
Laboratory ID:	03-107-11					
Gasoline	ND	7.3	NWTPH-Gx	3-10-23	3-10-23	
Surrogate:	Percent Recovery	Control Limits				
Fluorobenzene	92	69-130				
Client ID:	WW20S7-5					
Laboratory ID:	03-107-12					
Gasoline	ND	8.1	NWTPH-Gx	3-10-23	3-10-23	
Surrogate:	Percent Recovery	Control Limits				
Fluorobenzene	88	69-130				
Client ID:	WW20S8-0					
Laboratory ID:	03-107-13					
Gasoline	ND	5.8	NWTPH-Gx	3-10-23	3-10-23	
Surrogate:	Percent Recovery	Control Limits				
Fluorobenzene	92	69-130				
Client ID:	WW20S8-5					
Laboratory ID:	03-107-14					
Gasoline	ND	6.8	NWTPH-Gx	3-10-23	3-10-23	
Surrogate:	Percent Recovery	Control Limits				
Fluorobenzene	88	69-130				
Client ID:	WW20S9-0					
Laboratory ID:	03-107-15					
Gasoline	ND	6.4	NWTPH-Gx	3-10-23	3-10-23	
Surrogate:	Percent Recovery	Control Limits				
Fluorobenzene	88	69-130				
Client ID:	WW20S9-2.5					
Laboratory ID:	03-107-16					
Gasoline	ND	4.8	NWTPH-Gx	3-10-23	3-10-23	
Surrogate:	Percent Recovery	Control Limits				
Fluorobenzene	95	69-130				
Client ID:	WW20SDUP2-2.5					
Laboratory ID:	03-107-17					
Gasoline	ND	8.8	NWTPH-Gx	3-10-23	3-10-23	
Surrogate:	Percent Recovery	Control Limits				
Fluorobenzene	88	69-130				



Date of Report: March 20, 2023
 Samples Submitted: March 9, 2023
 Laboratory Reference: 2303-107
 Project: 15-06211-000

**GASOLINE RANGE ORGANICS
 NWTPH-Gx
 QUALITY CONTROL**

Matrix: Soil
 Units: mg/kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0310S1					
Gasoline	ND	5.0	NWTPH-Gx	3-10-23	3-10-23	
Surrogate:	Percent Recovery	Control Limits				
Fluorobenzene	86	69-130				
Laboratory ID:	MB0310S2					
Gasoline	ND	5.0	NWTPH-Gx	3-10-23	3-10-23	
Surrogate:	Percent Recovery	Control Limits				
Fluorobenzene	88	69-130				

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	03-107-01							
	ORIG	DUP						
Gasoline	ND	ND	NA	NA	NA	NA	NA	30
Surrogate:								
Fluorobenzene				90	88	69-130		
Laboratory ID:	03-117-01							
	ORIG	DUP						
Gasoline	ND	ND	NA	NA	NA	NA	NA	30
Surrogate:								
Fluorobenzene				81	95	69-130		



Date of Report: March 20, 2023
 Samples Submitted: March 9, 2023
 Laboratory Reference: 2303-107
 Project: 15-06211-000

GASOLINE RANGE ORGANICS
NWTPH-Gx

Matrix: Water
 Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	WW20GW2					
Laboratory ID:	03-107-10					
Gasoline	ND	100	NWTPH-Gx	3-15-23	3-15-23	
<i>Surrogate:</i>	<i>Percent Recovery</i>	<i>Control Limits</i>				
<i>Fluorobenzene</i>	92	65-122				
Client ID:	WW20GW1					
Laboratory ID:	03-107-18					
Gasoline	ND	100	NWTPH-Gx	3-15-23	3-15-23	
<i>Surrogate:</i>	<i>Percent Recovery</i>	<i>Control Limits</i>				
<i>Fluorobenzene</i>	95	65-122				
Client ID:	WW20GWDUP					
Laboratory ID:	03-107-19					
Gasoline	ND	100	NWTPH-Gx	3-15-23	3-15-23	
<i>Surrogate:</i>	<i>Percent Recovery</i>	<i>Control Limits</i>				
<i>Fluorobenzene</i>	96	65-122				



Date of Report: March 20, 2023
 Samples Submitted: March 9, 2023
 Laboratory Reference: 2303-107
 Project: 15-06211-000

**GASOLINE RANGE ORGANICS
 NWTPH-Gx
 QUALITY CONTROL**

Matrix: Water
 Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0315W1					
Gasoline	ND	100	NWTPH-Gx	3-15-23	3-15-23	
<i>Surrogate:</i>	<i>Percent Recovery</i>	<i>Control Limits</i>				
<i>Fluorobenzene</i>	93	65-122				

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	03-107-10							
	ORIG	DUP						
Gasoline	ND	ND	NA	NA	NA	NA	30	
<i>Surrogate:</i>								
<i>Fluorobenzene</i>				92	98	65-122		



Date of Report: March 20, 2023
 Samples Submitted: March 9, 2023
 Laboratory Reference: 2303-107
 Project: 15-06211-000

DIESEL AND HEAVY OIL RANGE ORGANICS
NWTPH-Dx

Matrix: Soil
 Units: mg/Kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	WW20S4-0					
Laboratory ID:	03-107-01					
Diesel Range Organics	ND	28	NWTPH-Dx	3-14-23	3-14-23	
Lube Oil	180	55	NWTPH-Dx	3-14-23	3-14-23	
<i>Surrogate:</i>	<i>Percent Recovery</i>	<i>Control Limits</i>				
<i>o-Terphenyl</i>	93	50-150				

Client ID:	WW20S4-2					
Laboratory ID:	03-107-02					
Diesel Range Organics	ND	270	NWTPH-Dx	3-14-23	3-17-23	U1
Lube Oil	5000	430	NWTPH-Dx	3-14-23	3-17-23	
<i>Surrogate:</i>	<i>Percent Recovery</i>	<i>Control Limits</i>				
<i>o-Terphenyl</i>	64	50-150				

Client ID:	WW20S5-0					
Laboratory ID:	03-107-04					
Diesel Range Organics	ND	160	NWTPH-Dx	3-14-23	3-16-23	U1
Lube Oil	1600	270	NWTPH-Dx	3-14-23	3-16-23	
<i>Surrogate:</i>	<i>Percent Recovery</i>	<i>Control Limits</i>				
<i>o-Terphenyl</i>	79	50-150				

Client ID:	WW20S5-2					
Laboratory ID:	03-107-05					
Diesel Range Organics	ND	150	NWTPH-Dx	3-14-23	3-17-23	
Lube Oil	2700	310	NWTPH-Dx	3-14-23	3-17-23	
<i>Surrogate:</i>	<i>Percent Recovery</i>	<i>Control Limits</i>				
<i>o-Terphenyl</i>	79	50-150				

Client ID:	WW20S6-0					
Laboratory ID:	03-107-07					
Diesel Range Organics	ND	170	NWTPH-Dx	3-14-23	3-16-23	U1
Lube Oil	2400	260	NWTPH-Dx	3-14-23	3-16-23	
<i>Surrogate:</i>	<i>Percent Recovery</i>	<i>Control Limits</i>				
<i>o-Terphenyl</i>	83	50-150				

Client ID:	WW20S6-5					
Laboratory ID:	03-107-08					
Diesel Range Organics	ND	28	NWTPH-Dx	3-14-23	3-14-23	
Lube Oil Range Organics	ND	57	NWTPH-Dx	3-14-23	3-14-23	
<i>Surrogate:</i>	<i>Percent Recovery</i>	<i>Control Limits</i>				
<i>o-Terphenyl</i>	87	50-150				



Date of Report: March 20, 2023
 Samples Submitted: March 9, 2023
 Laboratory Reference: 2303-107
 Project: 15-06211-000

**DIESEL AND HEAVY OIL RANGE ORGANICS
 NWTPH-Dx**

Matrix: Soil
 Units: mg/Kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	WW20SDUP1-0					
Laboratory ID:	03-107-09					
Diesel Range Organics	ND	130	NWTPH-Dx	3-14-23	3-16-23	
Lube Oil	930	270	NWTPH-Dx	3-14-23	3-16-23	
<i>Surrogate:</i>	<i>Percent Recovery</i>	<i>Control Limits</i>				
<i>o-Terphenyl</i>	79	50-150				

Client ID:	WW20S7-0					
Laboratory ID:	03-107-11					
Diesel Range Organics	ND	53	NWTPH-Dx	3-14-23	3-16-23	U1
Lube Oil	530	60	NWTPH-Dx	3-14-23	3-16-23	
<i>Surrogate:</i>	<i>Percent Recovery</i>	<i>Control Limits</i>				
<i>o-Terphenyl</i>	77	50-150				

Client ID:	WW20S7-5					
Laboratory ID:	03-107-12					
Diesel Range Organics	ND	160	NWTPH-Dx	3-14-23	3-15-23	
Lube Oil	1100	320	NWTPH-Dx	3-14-23	3-15-23	
<i>Surrogate:</i>	<i>Percent Recovery</i>	<i>Control Limits</i>				
<i>o-Terphenyl</i>	77	50-150				

Client ID:	WW20S8-0					
Laboratory ID:	03-107-13					
Diesel Range Organics	ND	140	NWTPH-Dx	3-20-23	3-20-23	
Lube Oil	790	280	NWTPH-Dx	3-20-23	3-20-23	
<i>Surrogate:</i>	<i>Percent Recovery</i>	<i>Control Limits</i>				
<i>o-Terphenyl</i>	81	50-150				

Client ID:	WW20S8-5					
Laboratory ID:	03-107-14					
Diesel Range Organics	ND	28	NWTPH-Dx	3-14-23	3-15-23	
Lube Oil	180	55	NWTPH-Dx	3-14-23	3-15-23	
<i>Surrogate:</i>	<i>Percent Recovery</i>	<i>Control Limits</i>				
<i>o-Terphenyl</i>	76	50-150				

Client ID:	WW20S9-0					
Laboratory ID:	03-107-15					
Diesel Range Organics	ND	34	NWTPH-Dx	3-14-23	3-16-23	U1
Lube Oil	450	55	NWTPH-Dx	3-14-23	3-16-23	
<i>Surrogate:</i>	<i>Percent Recovery</i>	<i>Control Limits</i>				
<i>o-Terphenyl</i>	78	50-150				



Date of Report: March 20, 2023
 Samples Submitted: March 9, 2023
 Laboratory Reference: 2303-107
 Project: 15-06211-000

DIESEL AND HEAVY OIL RANGE ORGANICS
NWTPH-Dx

Matrix: Soil
 Units: mg/Kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	WW20S9-2.5					
Laboratory ID:	03-107-16					
Diesel Range Organics	ND	29	NWTPH-Dx	3-14-23	3-14-23	
Lube Oil	120	57	NWTPH-Dx	3-14-23	3-14-23	
<i>Surrogate:</i>	<i>Percent Recovery</i>	<i>Control Limits</i>				
<i>o-Terphenyl</i>	75	50-150				
Client ID:	WW20SDUP2-2.5					
Laboratory ID:	03-107-17					
Diesel Range Organics	ND	39	NWTPH-Dx	3-14-23	3-15-23	U1
Lube Oil	200	61	NWTPH-Dx	3-14-23	3-15-23	
<i>Surrogate:</i>	<i>Percent Recovery</i>	<i>Control Limits</i>				
<i>o-Terphenyl</i>	76	50-150				



Date of Report: March 20, 2023
 Samples Submitted: March 9, 2023
 Laboratory Reference: 2303-107
 Project: 15-06211-000

**DIESEL AND HEAVY OIL RANGE ORGANICS
 NWTPH-Dx
 QUALITY CONTROL**

Matrix: Soil
 Units: mg/Kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0314S1					
Diesel Range Organics	ND	25	NWTPH-Dx	3-14-23	3-14-23	
Lube Oil Range Organics	ND	50	NWTPH-Dx	3-14-23	3-14-23	
Surrogate:	Percent Recovery	Control Limits				
<i>o</i> -Terphenyl	88	50-150				
Laboratory ID:	MB0320S1					
Diesel Range Organics	ND	25	NWTPH-Dx	3-20-23	3-20-23	
Lube Oil Range Organics	ND	50	NWTPH-Dx	3-20-23	3-20-23	
Surrogate:	Percent Recovery	Control Limits				
<i>o</i> -Terphenyl	88	50-150				

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	03-088-01							
	ORIG	DUP						
Diesel Range	ND	ND	NA	NA	NA	NA	NA	
Lube Oil Range	ND	ND	NA	NA	NA	NA	NA	
Surrogate:								
<i>o</i> -Terphenyl				77	77	50-150		
Laboratory ID:	03-107-01							
	ORIG	DUP						
Diesel Range	ND	ND	NA	NA	NA	NA	NA	
Lube Oil	160	156	NA	NA	NA	3	NA	
Surrogate:								
<i>o</i> -Terphenyl				93	81	50-150		
Laboratory ID:	03-193-03							
	ORIG	DUP						
Diesel Range	ND	ND	NA	NA	NA	NA	NA	
Lube Oil Range	ND	ND	NA	NA	NA	NA	NA	
Surrogate:								
<i>o</i> -Terphenyl				83	86	50-150		



Date of Report: March 20, 2023
 Samples Submitted: March 9, 2023
 Laboratory Reference: 2303-107
 Project: 15-06211-000

**DIESEL AND HEAVY OIL RANGE ORGANICS
 NWTPH-Dx**

Matrix: Water
 Units: mg/L (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	WW20GW2					
Laboratory ID:	03-107-10					
Diesel Range Organics	ND	0.12	NWTPH-Dx	3-14-23	3-14-23	
Lube Oil Range Organics	0.27	0.24	NWTPH-Dx	3-14-23	3-14-23	
<i>Surrogate:</i>	<i>Percent Recovery</i>	<i>Control Limits</i>				
<i>o-Terphenyl</i>	103	50-150				

Client ID:	WW20GW1					
Laboratory ID:	03-107-18					
Diesel Range Organics	ND	0.11	NWTPH-Dx	3-14-23	3-15-23	
Lube Oil Range Organics	ND	0.22	NWTPH-Dx	3-14-23	3-15-23	
<i>Surrogate:</i>	<i>Percent Recovery</i>	<i>Control Limits</i>				
<i>o-Terphenyl</i>	100	50-150				

Client ID:	WW20GWDUP					
Laboratory ID:	03-107-19					
Diesel Range Organics	ND	0.11	NWTPH-Dx	3-14-23	3-15-23	
Lube Oil Range Organics	ND	0.22	NWTPH-Dx	3-14-23	3-15-23	
<i>Surrogate:</i>	<i>Percent Recovery</i>	<i>Control Limits</i>				
<i>o-Terphenyl</i>	112	50-150				



Date of Report: March 20, 2023
 Samples Submitted: March 9, 2023
 Laboratory Reference: 2303-107
 Project: 15-06211-000

**DIESEL AND HEAVY OIL RANGE ORGANICS
 NWTPH-Dx
 QUALITY CONTROL**

Matrix: Water
 Units: mg/L (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0314W1					
Diesel Range Organics	ND	0.10	NWTPH-Dx	3-14-23	3-14-23	
Lube Oil Range Organics	ND	0.16	NWTPH-Dx	3-14-23	3-14-23	
<i>Surrogate:</i>	<i>Percent Recovery</i>	<i>Control Limits</i>				
<i>o-Terphenyl</i>	<i>101</i>	<i>50-150</i>				

Analyte	Result		Spike Level		Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE										
Laboratory ID:	03-125-01									
	ORIG	DUP								
Diesel Range	ND	ND	NA	NA		NA	NA	NA	NA	
Lube Oil Range Organics	0.195	0.167	NA	NA		NA	NA	15	NA	
Surrogate:										
o-Terphenyl						103	99	50-150		



Date of Report: March 20, 2023
 Samples Submitted: March 9, 2023
 Laboratory Reference: 2303-107
 Project: 15-06211-000

PAHs EPA 8270E/SIM

Matrix: Soil
 Units: mg/Kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	WW20S4-0					
Laboratory ID:	03-107-01					
Naphthalene	ND	0.0073	EPA 8270E/SIM	3-15-23	3-15-23	
2-Methylnaphthalene	ND	0.0073	EPA 8270E/SIM	3-15-23	3-15-23	
1-Methylnaphthalene	ND	0.0073	EPA 8270E/SIM	3-15-23	3-15-23	
Acenaphthylene	0.0085	0.0073	EPA 8270E/SIM	3-15-23	3-15-23	
Acenaphthene	ND	0.0073	EPA 8270E/SIM	3-15-23	3-15-23	
Fluorene	ND	0.0073	EPA 8270E/SIM	3-15-23	3-15-23	
Phenanthrene	0.019	0.0073	EPA 8270E/SIM	3-15-23	3-15-23	
Anthracene	0.0079	0.0073	EPA 8270E/SIM	3-15-23	3-15-23	
Fluoranthene	0.031	0.0073	EPA 8270E/SIM	3-15-23	3-15-23	
Pyrene	0.034	0.0073	EPA 8270E/SIM	3-15-23	3-15-23	
Benzo[a]anthracene	0.017	0.0073	EPA 8270E/SIM	3-15-23	3-15-23	
Chrysene	0.022	0.0073	EPA 8270E/SIM	3-15-23	3-15-23	
Benzo[b]fluoranthene	0.028	0.0073	EPA 8270E/SIM	3-15-23	3-15-23	
Benzo(j,k)fluoranthene	0.0089	0.0073	EPA 8270E/SIM	3-15-23	3-15-23	
Benzo[a]pyrene	0.027	0.0073	EPA 8270E/SIM	3-15-23	3-15-23	
Indeno(1,2,3-c,d)pyrene	0.020	0.0073	EPA 8270E/SIM	3-15-23	3-15-23	
Dibenz[a,h]anthracene	ND	0.0073	EPA 8270E/SIM	3-15-23	3-15-23	
Benzo[g,h,i]perylene	0.026	0.0073	EPA 8270E/SIM	3-15-23	3-15-23	
<i>Surrogate:</i>	<i>Percent Recovery</i>	<i>Control Limits</i>				
2-Fluorobiphenyl	99	42 - 116				
Pyrene-d10	101	41 - 116				
Terphenyl-d14	116	49 - 130				



Date of Report: March 20, 2023
 Samples Submitted: March 9, 2023
 Laboratory Reference: 2303-107
 Project: 15-06211-000

PAHs EPA 8270E/SIM

Matrix: Soil
 Units: mg/Kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	WW20S4-2					
Laboratory ID:	03-107-02					
Naphthalene	0.51	0.057	EPA 8270E/SIM	3-15-23	3-15-23	
2-Methylnaphthalene	0.58	0.057	EPA 8270E/SIM	3-15-23	3-15-23	
1-Methylnaphthalene	0.49	0.057	EPA 8270E/SIM	3-15-23	3-15-23	
Acenaphthylene	0.15	0.057	EPA 8270E/SIM	3-15-23	3-15-23	
Acenaphthene	ND	0.057	EPA 8270E/SIM	3-15-23	3-15-23	
Fluorene	ND	0.057	EPA 8270E/SIM	3-15-23	3-15-23	
Phenanthrene	0.63	0.057	EPA 8270E/SIM	3-15-23	3-15-23	
Anthracene	0.13	0.057	EPA 8270E/SIM	3-15-23	3-15-23	
Fluoranthene	0.46	0.057	EPA 8270E/SIM	3-15-23	3-15-23	
Pyrene	0.55	0.057	EPA 8270E/SIM	3-15-23	3-15-23	
Benzo[a]anthracene	0.24	0.057	EPA 8270E/SIM	3-15-23	3-15-23	
Chrysene	0.39	0.057	EPA 8270E/SIM	3-15-23	3-15-23	
Benzo[b]fluoranthene	0.40	0.057	EPA 8270E/SIM	3-15-23	3-15-23	
Benzo(j,k)fluoranthene	0.11	0.057	EPA 8270E/SIM	3-15-23	3-15-23	
Benzo[a]pyrene	0.32	0.057	EPA 8270E/SIM	3-15-23	3-15-23	
Indeno(1,2,3-c,d)pyrene	0.28	0.057	EPA 8270E/SIM	3-15-23	3-15-23	
Dibenz[a,h]anthracene	ND	0.057	EPA 8270E/SIM	3-15-23	3-15-23	
Benzo[g,h,i]perylene	0.32	0.057	EPA 8270E/SIM	3-15-23	3-15-23	
<i>Surrogate:</i>	<i>Percent Recovery</i>	<i>Control Limits</i>				
<i>2-Fluorobiphenyl</i>	<i>83</i>	<i>42 - 116</i>				
<i>Pyrene-d10</i>	<i>84</i>	<i>41 - 116</i>				
<i>Terphenyl-d14</i>	<i>105</i>	<i>49 - 130</i>				



Date of Report: March 20, 2023
 Samples Submitted: March 9, 2023
 Laboratory Reference: 2303-107
 Project: 15-06211-000

PAHs EPA 8270E/SIM

Matrix: Soil
 Units: mg/Kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:		WW20S5-0				
Laboratory ID:		03-107-04				
Naphthalene	ND	0.036	EPA 8270E/SIM	3-15-23	3-16-23	
2-Methylnaphthalene	ND	0.036	EPA 8270E/SIM	3-15-23	3-16-23	
1-Methylnaphthalene	ND	0.036	EPA 8270E/SIM	3-15-23	3-16-23	
Acenaphthylene	0.038	0.036	EPA 8270E/SIM	3-15-23	3-16-23	
Acenaphthene	ND	0.036	EPA 8270E/SIM	3-15-23	3-16-23	
Fluorene	ND	0.036	EPA 8270E/SIM	3-15-23	3-16-23	
Phenanthrene	ND	0.036	EPA 8270E/SIM	3-15-23	3-16-23	
Anthracene	0.040	0.036	EPA 8270E/SIM	3-15-23	3-16-23	
Fluoranthene	0.046	0.036	EPA 8270E/SIM	3-15-23	3-16-23	
Pyrene	0.082	0.036	EPA 8270E/SIM	3-15-23	3-16-23	
Benzo[a]anthracene	0.048	0.036	EPA 8270E/SIM	3-15-23	3-16-23	
Chrysene	0.091	0.036	EPA 8270E/SIM	3-15-23	3-16-23	
Benzo[b]fluoranthene	0.088	0.036	EPA 8270E/SIM	3-15-23	3-16-23	
Benzo(j,k)fluoranthene	ND	0.036	EPA 8270E/SIM	3-15-23	3-16-23	
Benzo[a]pyrene	0.12	0.036	EPA 8270E/SIM	3-15-23	3-16-23	
Indeno(1,2,3-c,d)pyrene	0.14	0.036	EPA 8270E/SIM	3-15-23	3-16-23	
Dibenz[a,h]anthracene	0.058	0.036	EPA 8270E/SIM	3-15-23	3-16-23	
Benzo[g,h,i]perylene	0.51	0.036	EPA 8270E/SIM	3-15-23	3-16-23	
<i>Surrogate: Percent Recovery Control Limits</i>						
2-Fluorobiphenyl	82	42 - 116				
Pyrene-d10	89	41 - 116				
Terphenyl-d14	106	49 - 130				



Date of Report: March 20, 2023
 Samples Submitted: March 9, 2023
 Laboratory Reference: 2303-107
 Project: 15-06211-000

PAHs EPA 8270E/SIM

Matrix: Soil
 Units: mg/Kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:		WW20S5-2				
Laboratory ID:		03-107-05				
Naphthalene	0.26	0.041	EPA 8270E/SIM	3-15-23	3-16-23	
2-Methylnaphthalene	0.077	0.041	EPA 8270E/SIM	3-15-23	3-16-23	
1-Methylnaphthalene	0.056	0.041	EPA 8270E/SIM	3-15-23	3-16-23	
Acenaphthylene	0.10	0.041	EPA 8270E/SIM	3-15-23	3-16-23	
Acenaphthene	0.067	0.041	EPA 8270E/SIM	3-15-23	3-16-23	
Fluorene	0.059	0.041	EPA 8270E/SIM	3-15-23	3-16-23	
Phenanthrene	1.2	0.041	EPA 8270E/SIM	3-15-23	3-16-23	
Anthracene	0.24	0.041	EPA 8270E/SIM	3-15-23	3-16-23	
Fluoranthene	2.3	0.041	EPA 8270E/SIM	3-15-23	3-16-23	
Pyrene	2.9	0.041	EPA 8270E/SIM	3-15-23	3-16-23	
Benzo[a]anthracene	1.0	0.041	EPA 8270E/SIM	3-15-23	3-16-23	
Chrysene	1.8	0.041	EPA 8270E/SIM	3-15-23	3-16-23	
Benzo[b]fluoranthene	2.1	0.041	EPA 8270E/SIM	3-15-23	3-16-23	
Benzo(j,k)fluoranthene	0.47	0.041	EPA 8270E/SIM	3-15-23	3-16-23	
Benzo[a]pyrene	1.9	0.041	EPA 8270E/SIM	3-15-23	3-16-23	
Indeno(1,2,3-c,d)pyrene	1.2	0.041	EPA 8270E/SIM	3-15-23	3-16-23	
Dibenz[a,h]anthracene	0.23	0.041	EPA 8270E/SIM	3-15-23	3-16-23	
Benzo[g,h,i]perylene	1.7	0.041	EPA 8270E/SIM	3-15-23	3-16-23	
<i>Surrogate:</i>	<i>Percent Recovery</i>	<i>Control Limits</i>				
2-Fluorobiphenyl	79	42 - 116				
Pyrene-d10	88	41 - 116				
Terphenyl-d14	111	49 - 130				



Date of Report: March 20, 2023
 Samples Submitted: March 9, 2023
 Laboratory Reference: 2303-107
 Project: 15-06211-000

PAHs EPA 8270E/SIM

Matrix: Soil
 Units: mg/Kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:		WW20S6-0				
Laboratory ID:		03-107-07				
Naphthalene	ND	0.035	EPA 8270E/SIM	3-15-23	3-16-23	
2-Methylnaphthalene	ND	0.035	EPA 8270E/SIM	3-15-23	3-16-23	
1-Methylnaphthalene	ND	0.035	EPA 8270E/SIM	3-15-23	3-16-23	
Acenaphthylene	ND	0.035	EPA 8270E/SIM	3-15-23	3-16-23	
Acenaphthene	ND	0.035	EPA 8270E/SIM	3-15-23	3-16-23	
Fluorene	ND	0.035	EPA 8270E/SIM	3-15-23	3-16-23	
Phenanthrene	ND	0.035	EPA 8270E/SIM	3-15-23	3-16-23	
Anthracene	0.044	0.035	EPA 8270E/SIM	3-15-23	3-16-23	
Fluoranthene	ND	0.035	EPA 8270E/SIM	3-15-23	3-16-23	
Pyrene	0.34	0.035	EPA 8270E/SIM	3-15-23	3-16-23	
Benzo[a]anthracene	0.097	0.035	EPA 8270E/SIM	3-15-23	3-16-23	
Chrysene	0.23	0.035	EPA 8270E/SIM	3-15-23	3-16-23	
Benzo[b]fluoranthene	0.12	0.035	EPA 8270E/SIM	3-15-23	3-16-23	
Benzo(j,k)fluoranthene	ND	0.035	EPA 8270E/SIM	3-15-23	3-16-23	
Benzo[a]pyrene	0.26	0.035	EPA 8270E/SIM	3-15-23	3-16-23	
Indeno(1,2,3-c,d)pyrene	0.16	0.035	EPA 8270E/SIM	3-15-23	3-16-23	
Dibenz[a,h]anthracene	0.085	0.035	EPA 8270E/SIM	3-15-23	3-16-23	
Benzo[g,h,i]perylene	0.56	0.035	EPA 8270E/SIM	3-15-23	3-16-23	
<i>Surrogate: Percent Recovery Control Limits</i>						
2-Fluorobiphenyl	84	42 - 116				
Pyrene-d10	97	41 - 116				
Terphenyl-d14	117	49 - 130				



Date of Report: March 20, 2023
 Samples Submitted: March 9, 2023
 Laboratory Reference: 2303-107
 Project: 15-06211-000

PAHs EPA 8270E/SIM

Matrix: Soil
 Units: mg/Kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	WW20S6-5					
Laboratory ID:	03-107-08					
Naphthalene	ND	0.0076	EPA 8270E/SIM	3-15-23	3-16-23	
2-Methylnaphthalene	ND	0.0076	EPA 8270E/SIM	3-15-23	3-16-23	
1-Methylnaphthalene	ND	0.0076	EPA 8270E/SIM	3-15-23	3-16-23	
Acenaphthylene	ND	0.0076	EPA 8270E/SIM	3-15-23	3-16-23	
Acenaphthene	ND	0.0076	EPA 8270E/SIM	3-15-23	3-16-23	
Fluorene	ND	0.0076	EPA 8270E/SIM	3-15-23	3-16-23	
Phenanthrene	0.0078	0.0076	EPA 8270E/SIM	3-15-23	3-16-23	
Anthracene	ND	0.0076	EPA 8270E/SIM	3-15-23	3-16-23	
Fluoranthene	0.0089	0.0076	EPA 8270E/SIM	3-15-23	3-16-23	
Pyrene	0.011	0.0076	EPA 8270E/SIM	3-15-23	3-16-23	
Benzo[a]anthracene	ND	0.0076	EPA 8270E/SIM	3-15-23	3-16-23	
Chrysene	ND	0.0076	EPA 8270E/SIM	3-15-23	3-16-23	
Benzo[b]fluoranthene	ND	0.0076	EPA 8270E/SIM	3-15-23	3-16-23	
Benzo(j,k)fluoranthene	ND	0.0076	EPA 8270E/SIM	3-15-23	3-16-23	
Benzo[a]pyrene	ND	0.0076	EPA 8270E/SIM	3-15-23	3-16-23	
Indeno(1,2,3-c,d)pyrene	ND	0.0076	EPA 8270E/SIM	3-15-23	3-16-23	
Dibenz[a,h]anthracene	ND	0.0076	EPA 8270E/SIM	3-15-23	3-16-23	
Benzo[g,h,i]perylene	ND	0.0076	EPA 8270E/SIM	3-15-23	3-16-23	
<i>Surrogate:</i>	<i>Percent Recovery</i>	<i>Control Limits</i>				
2-Fluorobiphenyl	82	42 - 116				
Pyrene-d10	93	41 - 116				
Terphenyl-d14	104	49 - 130				



Date of Report: March 20, 2023
 Samples Submitted: March 9, 2023
 Laboratory Reference: 2303-107
 Project: 15-06211-000

PAHs EPA 8270E/SIM

Matrix: Soil
 Units: mg/Kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID: WW20SDUP1-0						
Laboratory ID: 03-107-09						
Naphthalene	ND	0.035	EPA 8270E/SIM	3-15-23	3-16-23	
2-Methylnaphthalene	ND	0.035	EPA 8270E/SIM	3-15-23	3-16-23	
1-Methylnaphthalene	ND	0.035	EPA 8270E/SIM	3-15-23	3-16-23	
Acenaphthylene	ND	0.035	EPA 8270E/SIM	3-15-23	3-16-23	
Acenaphthene	ND	0.035	EPA 8270E/SIM	3-15-23	3-16-23	
Fluorene	ND	0.035	EPA 8270E/SIM	3-15-23	3-16-23	
Phenanthrene	ND	0.035	EPA 8270E/SIM	3-15-23	3-16-23	
Anthracene	ND	0.035	EPA 8270E/SIM	3-15-23	3-16-23	
Fluoranthene	ND	0.035	EPA 8270E/SIM	3-15-23	3-16-23	
Pyrene	0.043	0.035	EPA 8270E/SIM	3-15-23	3-16-23	
Benzo[a]anthracene	ND	0.035	EPA 8270E/SIM	3-15-23	3-16-23	
Chrysene	0.042	0.035	EPA 8270E/SIM	3-15-23	3-16-23	
Benzo[b]fluoranthene	0.041	0.035	EPA 8270E/SIM	3-15-23	3-16-23	
Benzo(j,k)fluoranthene	ND	0.035	EPA 8270E/SIM	3-15-23	3-16-23	
Benzo[a]pyrene	0.054	0.035	EPA 8270E/SIM	3-15-23	3-16-23	
Indeno(1,2,3-c,d)pyrene	0.047	0.035	EPA 8270E/SIM	3-15-23	3-16-23	
Dibenz[a,h]anthracene	ND	0.035	EPA 8270E/SIM	3-15-23	3-16-23	
Benzo[g,h,i]perylene	0.11	0.035	EPA 8270E/SIM	3-15-23	3-16-23	
<i>Surrogate: Percent Recovery Control Limits</i>						
2-Fluorobiphenyl	86	42 - 116				
Pyrene-d10	96	41 - 116				
Terphenyl-d14	112	49 - 130				



Date of Report: March 20, 2023
 Samples Submitted: March 9, 2023
 Laboratory Reference: 2303-107
 Project: 15-06211-000

PAHs EPA 8270E/SIM

Matrix: Soil
 Units: mg/Kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:		WW20S7-0				
Laboratory ID:		03-107-11				
Naphthalene	0.24	0.040	EPA 8270E/SIM	3-15-23	3-16-23	
2-Methylnaphthalene	0.11	0.040	EPA 8270E/SIM	3-15-23	3-16-23	
1-Methylnaphthalene	0.071	0.040	EPA 8270E/SIM	3-15-23	3-16-23	
Acenaphthylene	0.22	0.040	EPA 8270E/SIM	3-15-23	3-16-23	
Acenaphthene	ND	0.040	EPA 8270E/SIM	3-15-23	3-16-23	
Fluorene	ND	0.040	EPA 8270E/SIM	3-15-23	3-16-23	
Phenanthrene	0.33	0.040	EPA 8270E/SIM	3-15-23	3-16-23	
Anthracene	0.15	0.040	EPA 8270E/SIM	3-15-23	3-16-23	
Fluoranthene	0.77	0.040	EPA 8270E/SIM	3-15-23	3-16-23	
Pyrene	0.94	0.040	EPA 8270E/SIM	3-15-23	3-16-23	
Benzo[a]anthracene	0.41	0.040	EPA 8270E/SIM	3-15-23	3-16-23	
Chrysene	0.57	0.040	EPA 8270E/SIM	3-15-23	3-16-23	
Benzo[b]fluoranthene	0.78	0.040	EPA 8270E/SIM	3-15-23	3-16-23	
Benzo(j,k)fluoranthene	0.20	0.040	EPA 8270E/SIM	3-15-23	3-16-23	
Benzo[a]pyrene	0.71	0.040	EPA 8270E/SIM	3-15-23	3-16-23	
Indeno(1,2,3-c,d)pyrene	0.53	0.040	EPA 8270E/SIM	3-15-23	3-16-23	
Dibenz[a,h]anthracene	0.11	0.040	EPA 8270E/SIM	3-15-23	3-16-23	
Benzo[g,h,i]perylene	0.63	0.040	EPA 8270E/SIM	3-15-23	3-16-23	
<i>Surrogate:</i>	<i>Percent Recovery</i>	<i>Control Limits</i>				
2-Fluorobiphenyl	84	42 - 116				
Pyrene-d10	93	41 - 116				
Terphenyl-d14	112	49 - 130				



Date of Report: March 20, 2023
 Samples Submitted: March 9, 2023
 Laboratory Reference: 2303-107
 Project: 15-06211-000

PAHs EPA 8270E/SIM

Matrix: Soil
 Units: mg/Kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	WW20S7-5					
Laboratory ID:	03-107-12					
Naphthalene	0.33	0.042	EPA 8270E/SIM	3-15-23	3-16-23	
2-Methylnaphthalene	0.22	0.042	EPA 8270E/SIM	3-15-23	3-16-23	
1-Methylnaphthalene	0.18	0.042	EPA 8270E/SIM	3-15-23	3-16-23	
Acenaphthylene	0.13	0.042	EPA 8270E/SIM	3-15-23	3-16-23	
Acenaphthene	ND	0.042	EPA 8270E/SIM	3-15-23	3-16-23	
Fluorene	ND	0.042	EPA 8270E/SIM	3-15-23	3-16-23	
Phenanthrene	0.30	0.042	EPA 8270E/SIM	3-15-23	3-16-23	
Anthracene	0.056	0.042	EPA 8270E/SIM	3-15-23	3-16-23	
Fluoranthene	0.32	0.042	EPA 8270E/SIM	3-15-23	3-16-23	
Pyrene	0.38	0.042	EPA 8270E/SIM	3-15-23	3-16-23	
Benzo[a]anthracene	0.16	0.042	EPA 8270E/SIM	3-15-23	3-16-23	
Chrysene	0.25	0.042	EPA 8270E/SIM	3-15-23	3-16-23	
Benzo[b]fluoranthene	0.23	0.042	EPA 8270E/SIM	3-15-23	3-16-23	
Benzo(j,k)fluoranthene	0.059	0.042	EPA 8270E/SIM	3-15-23	3-16-23	
Benzo[a]pyrene	0.21	0.042	EPA 8270E/SIM	3-15-23	3-16-23	
Indeno(1,2,3-c,d)pyrene	0.15	0.042	EPA 8270E/SIM	3-15-23	3-16-23	
Dibenz[a,h]anthracene	ND	0.042	EPA 8270E/SIM	3-15-23	3-16-23	
Benzo[g,h,i]perylene	0.16	0.042	EPA 8270E/SIM	3-15-23	3-16-23	
<i>Surrogate:</i>	<i>Percent Recovery</i>	<i>Control Limits</i>				
<i>2-Fluorobiphenyl</i>	<i>88</i>	<i>42 - 116</i>				
<i>Pyrene-d10</i>	<i>86</i>	<i>41 - 116</i>				
<i>Terphenyl-d14</i>	<i>115</i>	<i>49 - 130</i>				



Date of Report: March 20, 2023
 Samples Submitted: March 9, 2023
 Laboratory Reference: 2303-107
 Project: 15-06211-000

PAHs EPA 8270E/SIM

Matrix: Soil
 Units: mg/Kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	WW20S8-0					
Laboratory ID:	03-107-13					
Naphthalene	0.33	0.037	EPA 8270E/SIM	3-15-23	3-16-23	
2-Methylnaphthalene	0.14	0.037	EPA 8270E/SIM	3-15-23	3-16-23	
1-Methylnaphthalene	0.11	0.037	EPA 8270E/SIM	3-15-23	3-16-23	
Acenaphthylene	0.85	0.037	EPA 8270E/SIM	3-15-23	3-16-23	
Acenaphthene	0.12	0.037	EPA 8270E/SIM	3-15-23	3-16-23	
Fluorene	0.13	0.037	EPA 8270E/SIM	3-15-23	3-16-23	
Phenanthrene	1.9	0.037	EPA 8270E/SIM	3-15-23	3-16-23	
Anthracene	0.84	0.037	EPA 8270E/SIM	3-15-23	3-16-23	
Fluoranthene	4.2	0.037	EPA 8270E/SIM	3-15-23	3-16-23	
Pyrene	5.1	0.15	EPA 8270E/SIM	3-15-23	3-16-23	
Benzo[a]anthracene	2.2	0.037	EPA 8270E/SIM	3-15-23	3-16-23	
Chrysene	2.8	0.037	EPA 8270E/SIM	3-15-23	3-16-23	
Benzo[b]fluoranthene	3.9	0.037	EPA 8270E/SIM	3-15-23	3-16-23	
Benzo(j,k)fluoranthene	1.0	0.037	EPA 8270E/SIM	3-15-23	3-16-23	
Benzo[a]pyrene	3.7	0.037	EPA 8270E/SIM	3-15-23	3-16-23	
Indeno(1,2,3-c,d)pyrene	2.6	0.037	EPA 8270E/SIM	3-15-23	3-16-23	
Dibenz[a,h]anthracene	0.52	0.037	EPA 8270E/SIM	3-15-23	3-16-23	
Benzo[g,h,i]perylene	3.0	0.037	EPA 8270E/SIM	3-15-23	3-16-23	
<i>Surrogate:</i>	<i>Percent Recovery</i>	<i>Control Limits</i>				
<i>2-Fluorobiphenyl</i>	<i>85</i>	<i>42 - 116</i>				
<i>Pyrene-d10</i>	<i>91</i>	<i>41 - 116</i>				
<i>Terphenyl-d14</i>	<i>114</i>	<i>49 - 130</i>				



Date of Report: March 20, 2023
 Samples Submitted: March 9, 2023
 Laboratory Reference: 2303-107
 Project: 15-06211-000

PAHs EPA 8270E/SIM

Matrix: Soil
 Units: mg/Kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	WW20S8-5					
Laboratory ID:	03-107-14					
Naphthalene	0.14	0.0074	EPA 8270E/SIM	3-15-23	3-16-23	
2-Methylnaphthalene	0.11	0.0074	EPA 8270E/SIM	3-15-23	3-16-23	
1-Methylnaphthalene	0.091	0.0074	EPA 8270E/SIM	3-15-23	3-16-23	
Acenaphthylene	0.077	0.0074	EPA 8270E/SIM	3-15-23	3-16-23	
Acenaphthene	0.024	0.0074	EPA 8270E/SIM	3-15-23	3-16-23	
Fluorene	0.035	0.0074	EPA 8270E/SIM	3-15-23	3-16-23	
Phenanthrene	0.66	0.0074	EPA 8270E/SIM	3-15-23	3-16-23	
Anthracene	0.14	0.0074	EPA 8270E/SIM	3-15-23	3-16-23	
Fluoranthene	0.71	0.0074	EPA 8270E/SIM	3-15-23	3-16-23	
Pyrene	1.0	0.15	EPA 8270E/SIM	3-15-23	3-16-23	
Benzo[a]anthracene	0.33	0.0074	EPA 8270E/SIM	3-15-23	3-16-23	
Chrysene	0.62	0.0074	EPA 8270E/SIM	3-15-23	3-16-23	
Benzo[b]fluoranthene	0.63	0.0074	EPA 8270E/SIM	3-15-23	3-16-23	
Benzo(j,k)fluoranthene	0.17	0.0074	EPA 8270E/SIM	3-15-23	3-16-23	
Benzo[a]pyrene	0.54	0.0074	EPA 8270E/SIM	3-15-23	3-16-23	
Indeno(1,2,3-c,d)pyrene	0.41	0.0074	EPA 8270E/SIM	3-15-23	3-16-23	
Dibenz[a,h]anthracene	0.085	0.0074	EPA 8270E/SIM	3-15-23	3-16-23	
Benzo[g,h,i]perylene	0.46	0.0074	EPA 8270E/SIM	3-15-23	3-16-23	
<i>Surrogate:</i>	<i>Percent Recovery</i>	<i>Control Limits</i>				
<i>2-Fluorobiphenyl</i>	<i>83</i>	<i>42 - 116</i>				
<i>Pyrene-d10</i>	<i>95</i>	<i>41 - 116</i>				
<i>Terphenyl-d14</i>	<i>113</i>	<i>49 - 130</i>				



Date of Report: March 20, 2023
 Samples Submitted: March 9, 2023
 Laboratory Reference: 2303-107
 Project: 15-06211-000

PAHs EPA 8270E/SIM

Matrix: Soil
 Units: mg/Kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:		WW20S9-0				
Laboratory ID:		03-107-15				
Naphthalene	0.58	0.037	EPA 8270E/SIM	3-15-23	3-16-23	
2-Methylnaphthalene	0.20	0.037	EPA 8270E/SIM	3-15-23	3-16-23	
1-Methylnaphthalene	0.089	0.037	EPA 8270E/SIM	3-15-23	3-16-23	
Acenaphthylene	2.2	0.037	EPA 8270E/SIM	3-15-23	3-16-23	
Acenaphthene	0.18	0.037	EPA 8270E/SIM	3-15-23	3-16-23	
Fluorene	0.60	0.037	EPA 8270E/SIM	3-15-23	3-16-23	
Phenanthrene	9.3	0.37	EPA 8270E/SIM	3-15-23	3-16-23	
Anthracene	4.1	0.037	EPA 8270E/SIM	3-15-23	3-16-23	
Fluoranthene	26	0.37	EPA 8270E/SIM	3-15-23	3-16-23	
Pyrene	27	0.37	EPA 8270E/SIM	3-15-23	3-16-23	
Benzo[a]anthracene	13	0.37	EPA 8270E/SIM	3-15-23	3-16-23	
Chrysene	14	0.37	EPA 8270E/SIM	3-15-23	3-16-23	
Benzo[b]fluoranthene	16	0.37	EPA 8270E/SIM	3-15-23	3-16-23	
Benzo(j,k)fluoranthene	6.5	0.37	EPA 8270E/SIM	3-15-23	3-16-23	
Benzo[a]pyrene	16	0.37	EPA 8270E/SIM	3-15-23	3-16-23	
Indeno(1,2,3-c,d)pyrene	8.1	0.37	EPA 8270E/SIM	3-15-23	3-16-23	
Dibenz[a,h]anthracene	2.4	0.037	EPA 8270E/SIM	3-15-23	3-16-23	
Benzo[g,h,i]perylene	7.6	0.37	EPA 8270E/SIM	3-15-23	3-16-23	
<i>Surrogate:</i>	<i>Percent Recovery</i>	<i>Control Limits</i>				
<i>2-Fluorobiphenyl</i>	<i>85</i>	<i>42 - 116</i>				
<i>Pyrene-d10</i>	<i>98</i>	<i>41 - 116</i>				
<i>Terphenyl-d14</i>	<i>129</i>	<i>49 - 130</i>				



Date of Report: March 20, 2023
 Samples Submitted: March 9, 2023
 Laboratory Reference: 2303-107
 Project: 15-06211-000

PAHs EPA 8270E/SIM

Matrix: Soil
 Units: mg/Kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:		WW20S9-2.5				
Laboratory ID:		03-107-16				
Naphthalene	0.13	0.0077	EPA 8270E/SIM	3-15-23	3-16-23	
2-Methylnaphthalene	0.096	0.0077	EPA 8270E/SIM	3-15-23	3-16-23	
1-Methylnaphthalene	0.084	0.0077	EPA 8270E/SIM	3-15-23	3-16-23	
Acenaphthylene	0.048	0.0077	EPA 8270E/SIM	3-15-23	3-16-23	
Acenaphthene	ND	0.0077	EPA 8270E/SIM	3-15-23	3-16-23	
Fluorene	0.0095	0.0077	EPA 8270E/SIM	3-15-23	3-16-23	
Phenanthrene	0.19	0.0077	EPA 8270E/SIM	3-15-23	3-16-23	
Anthracene	0.046	0.0077	EPA 8270E/SIM	3-15-23	3-16-23	
Fluoranthene	0.26	0.0077	EPA 8270E/SIM	3-15-23	3-16-23	
Pyrene	0.33	0.0077	EPA 8270E/SIM	3-15-23	3-16-23	
Benzo[a]anthracene	0.15	0.0077	EPA 8270E/SIM	3-15-23	3-16-23	
Chrysene	0.24	0.0077	EPA 8270E/SIM	3-15-23	3-16-23	
Benzo[b]fluoranthene	0.30	0.0077	EPA 8270E/SIM	3-15-23	3-16-23	
Benzo(j,k)fluoranthene	0.090	0.0077	EPA 8270E/SIM	3-15-23	3-16-23	
Benzo[a]pyrene	0.26	0.0077	EPA 8270E/SIM	3-15-23	3-16-23	
Indeno(1,2,3-c,d)pyrene	0.22	0.0077	EPA 8270E/SIM	3-15-23	3-16-23	
Dibenz[a,h]anthracene	0.033	0.0077	EPA 8270E/SIM	3-15-23	3-16-23	
Benzo[g,h,i]perylene	0.25	0.0077	EPA 8270E/SIM	3-15-23	3-16-23	
<i>Surrogate:</i>	<i>Percent Recovery</i>	<i>Control Limits</i>				
<i>2-Fluorobiphenyl</i>	<i>80</i>	<i>42 - 116</i>				
<i>Pyrene-d10</i>	<i>88</i>	<i>41 - 116</i>				
<i>Terphenyl-d14</i>	<i>106</i>	<i>49 - 130</i>				



Date of Report: March 20, 2023
 Samples Submitted: March 9, 2023
 Laboratory Reference: 2303-107
 Project: 15-06211-000

PAHs EPA 8270E/SIM

Matrix: Soil
 Units: mg/Kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID: WW20SDUP2-2.5						
Laboratory ID: 03-107-17						
Naphthalene	0.23	0.0082	EPA 8270E/SIM	3-15-23	3-16-23	
2-Methylnaphthalene	0.19	0.0082	EPA 8270E/SIM	3-15-23	3-16-23	
1-Methylnaphthalene	0.17	0.0082	EPA 8270E/SIM	3-15-23	3-16-23	
Acenaphthylene	0.069	0.0082	EPA 8270E/SIM	3-15-23	3-16-23	
Acenaphthene	0.0086	0.0082	EPA 8270E/SIM	3-15-23	3-16-23	
Fluorene	0.019	0.0082	EPA 8270E/SIM	3-15-23	3-16-23	
Phenanthrene	0.33	0.0082	EPA 8270E/SIM	3-15-23	3-16-23	
Anthracene	0.065	0.0082	EPA 8270E/SIM	3-15-23	3-16-23	
Fluoranthene	0.39	0.0082	EPA 8270E/SIM	3-15-23	3-16-23	
Pyrene	0.46	0.0082	EPA 8270E/SIM	3-15-23	3-16-23	
Benzo[a]anthracene	0.21	0.0082	EPA 8270E/SIM	3-15-23	3-16-23	
Chrysene	0.34	0.0082	EPA 8270E/SIM	3-15-23	3-16-23	
Benzo[b]fluoranthene	0.45	0.0082	EPA 8270E/SIM	3-15-23	3-16-23	
Benzo[j,k]fluoranthene	0.13	0.0082	EPA 8270E/SIM	3-15-23	3-16-23	
Benzo[a]pyrene	0.36	0.0082	EPA 8270E/SIM	3-15-23	3-16-23	
Indeno(1,2,3-c,d)pyrene	0.31	0.0082	EPA 8270E/SIM	3-15-23	3-16-23	
Dibenz[a,h]anthracene	0.069	0.0082	EPA 8270E/SIM	3-15-23	3-16-23	
Benzo[g,h,i]perylene	0.37	0.0082	EPA 8270E/SIM	3-15-23	3-16-23	
<i>Surrogate: Percent Recovery Control Limits</i>						
2-Fluorobiphenyl	79	42 - 116				
Pyrene-d10	84	41 - 116				
Terphenyl-d14	103	49 - 130				



Date of Report: March 20, 2023
 Samples Submitted: March 9, 2023
 Laboratory Reference: 2303-107
 Project: 15-06211-000

**PAHs EPA 8270E/SIM
 QUALITY CONTROL**

Matrix: Soil
 Units: mg/Kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0315S1					
Naphthalene	ND	0.0067	EPA 8270E/SIM	3-15-23	3-15-23	
2-Methylnaphthalene	ND	0.0067	EPA 8270E/SIM	3-15-23	3-15-23	
1-Methylnaphthalene	ND	0.0067	EPA 8270E/SIM	3-15-23	3-15-23	
Acenaphthylene	ND	0.0067	EPA 8270E/SIM	3-15-23	3-15-23	
Acenaphthene	ND	0.0067	EPA 8270E/SIM	3-15-23	3-15-23	
Fluorene	ND	0.0067	EPA 8270E/SIM	3-15-23	3-15-23	
Phenanthrene	ND	0.0067	EPA 8270E/SIM	3-15-23	3-15-23	
Anthracene	ND	0.0067	EPA 8270E/SIM	3-15-23	3-15-23	
Fluoranthene	ND	0.0067	EPA 8270E/SIM	3-15-23	3-15-23	
Pyrene	ND	0.0067	EPA 8270E/SIM	3-15-23	3-15-23	
Benzo[a]anthracene	ND	0.0067	EPA 8270E/SIM	3-15-23	3-15-23	
Chrysene	ND	0.0067	EPA 8270E/SIM	3-15-23	3-15-23	
Benzo[b]fluoranthene	ND	0.0067	EPA 8270E/SIM	3-15-23	3-15-23	
Benzo(j,k)fluoranthene	ND	0.0067	EPA 8270E/SIM	3-15-23	3-15-23	
Benzo[a]pyrene	ND	0.0067	EPA 8270E/SIM	3-15-23	3-15-23	
Indeno(1,2,3-c,d)pyrene	ND	0.0067	EPA 8270E/SIM	3-15-23	3-15-23	
Dibenz[a,h]anthracene	ND	0.0067	EPA 8270E/SIM	3-15-23	3-15-23	
Benzo[g,h,i]perylene	ND	0.0067	EPA 8270E/SIM	3-15-23	3-15-23	
<i>Surrogate:</i>	<i>Percent Recovery</i>	<i>Control Limits</i>				
2-Fluorobiphenyl	92	42 - 116				
Pyrene-d10	96	41 - 116				
Terphenyl-d14	110	49 - 130				



Date of Report: March 20, 2023
 Samples Submitted: March 9, 2023
 Laboratory Reference: 2303-107
 Project: 15-06211-000

**PAHs EPA 8270E/SIM
 QUALITY CONTROL**

Matrix: Soil
 Units: mg/Kg

Analyte	Result		Spike Level		Source Result	Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
MATRIX SPIKES											
Laboratory ID:	03-107-08										
	MS	MSD	MS	MSD		MS	MSD				
Naphthalene	0.0700	0.0731	0.0833	0.0833	ND	84	88	43 - 118	4	28	
Acenaphthylene	0.0686	0.0804	0.0833	0.0833	ND	82	97	51 - 127	16	29	
Acenaphthene	0.0697	0.0834	0.0833	0.0833	ND	84	100	46 - 128	18	28	
Fluorene	0.0724	0.0853	0.0833	0.0833	ND	87	102	49 - 128	16	24	
Phenanthrene	0.0799	0.0789	0.0833	0.0833	0.00686	88	86	44 - 135	1	32	
Anthracene	0.0875	0.0934	0.0833	0.0833	ND	105	112	49 - 135	7	26	
Fluoranthene	0.0957	0.0932	0.0833	0.0833	0.00783	105	102	48 - 139	3	32	
Pyrene	0.0967	0.0930	0.0833	0.0833	0.0101	104	100	46 - 143	4	32	
Benzo[a]anthracene	0.0773	0.0765	0.0833	0.0833	ND	93	92	49 - 137	1	33	
Chrysene	0.0913	0.0944	0.0833	0.0833	ND	110	113	48 - 136	3	30	
Benzo[b]fluoranthene	0.0853	0.0877	0.0833	0.0833	ND	102	105	48 - 141	3	32	
Benzo(j,k)fluoranthene	0.0908	0.0865	0.0833	0.0833	ND	109	104	48 - 141	5	32	
Benzo[a]pyrene	0.0884	0.0882	0.0833	0.0833	ND	106	106	48 - 140	0	32	
Indeno(1,2,3-c,d)pyrene	0.0808	0.0828	0.0833	0.0833	ND	97	99	47 - 139	2	28	
Dibenz[a,h]anthracene	0.0765	0.0834	0.0833	0.0833	ND	92	100	51 - 133	9	24	
Benzo[g,h,i]perylene	0.0854	0.0871	0.0833	0.0833	ND	103	105	47 - 136	2	29	
Surrogate:											
2-Fluorobiphenyl						75	93	42 - 116			
Pyrene-d10						94	100	41 - 116			
Terphenyl-d14						107	116	49 - 130			



Date of Report: March 20, 2023
 Samples Submitted: March 9, 2023
 Laboratory Reference: 2303-107
 Project: 15-06211-000

PAHs EPA 8270E/SIM

Matrix: Water
 Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:		WW20GW2				
Laboratory ID:		03-107-10				
Naphthalene	ND	0.11	EPA 8270E/SIM	3-13-23	3-13-23	
2-Methylnaphthalene	ND	0.11	EPA 8270E/SIM	3-13-23	3-13-23	
1-Methylnaphthalene	ND	0.11	EPA 8270E/SIM	3-13-23	3-13-23	
Acenaphthylene	ND	0.11	EPA 8270E/SIM	3-13-23	3-13-23	
Acenaphthene	ND	0.11	EPA 8270E/SIM	3-13-23	3-13-23	
Fluorene	ND	0.11	EPA 8270E/SIM	3-13-23	3-13-23	
Phenanthrene	ND	0.11	EPA 8270E/SIM	3-13-23	3-13-23	
Anthracene	ND	0.11	EPA 8270E/SIM	3-13-23	3-13-23	
Fluoranthene	ND	0.11	EPA 8270E/SIM	3-13-23	3-13-23	
Pyrene	ND	0.11	EPA 8270E/SIM	3-13-23	3-13-23	
Benzo[a]anthracene	0.015	0.011	EPA 8270E/SIM	3-13-23	3-13-23	
Chrysene	ND	0.011	EPA 8270E/SIM	3-13-23	3-13-23	
Benzo[b]fluoranthene	ND	0.011	EPA 8270E/SIM	3-13-23	3-13-23	
Benzo(j,k)fluoranthene	ND	0.011	EPA 8270E/SIM	3-13-23	3-13-23	
Benzo[a]pyrene	ND	0.011	EPA 8270E/SIM	3-13-23	3-13-23	
Indeno(1,2,3-c,d)pyrene	ND	0.011	EPA 8270E/SIM	3-13-23	3-13-23	
Dibenz[a,h]anthracene	ND	0.011	EPA 8270E/SIM	3-13-23	3-13-23	
Benzo[g,h,i]perylene	ND	0.011	EPA 8270E/SIM	3-13-23	3-13-23	
<i>Surrogate:</i>	<i>Percent Recovery</i>	<i>Control Limits</i>				
2-Fluorobiphenyl	73	20 - 106				
Pyrene-d10	77	19 - 104				
Terphenyl-d14	99	41 - 127				



Date of Report: March 20, 2023
 Samples Submitted: March 9, 2023
 Laboratory Reference: 2303-107
 Project: 15-06211-000

PAHs EPA 8270E/SIM

Matrix: Water
 Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:		WW20GW1				
Laboratory ID:		03-107-18				
Naphthalene	ND	0.098	EPA 8270E/SIM	3-13-23	3-13-23	
2-Methylnaphthalene	ND	0.098	EPA 8270E/SIM	3-13-23	3-13-23	
1-Methylnaphthalene	ND	0.098	EPA 8270E/SIM	3-13-23	3-13-23	
Acenaphthylene	ND	0.098	EPA 8270E/SIM	3-13-23	3-13-23	
Acenaphthene	ND	0.098	EPA 8270E/SIM	3-13-23	3-13-23	
Fluorene	ND	0.098	EPA 8270E/SIM	3-13-23	3-13-23	
Phenanthrene	ND	0.098	EPA 8270E/SIM	3-13-23	3-13-23	
Anthracene	ND	0.098	EPA 8270E/SIM	3-13-23	3-13-23	
Fluoranthene	ND	0.098	EPA 8270E/SIM	3-13-23	3-13-23	
Pyrene	ND	0.098	EPA 8270E/SIM	3-13-23	3-13-23	
Benzo[a]anthracene	ND	0.0098	EPA 8270E/SIM	3-13-23	3-13-23	
Chrysene	ND	0.0098	EPA 8270E/SIM	3-13-23	3-13-23	
Benzo[b]fluoranthene	ND	0.0098	EPA 8270E/SIM	3-13-23	3-13-23	
Benzo(j,k)fluoranthene	ND	0.0098	EPA 8270E/SIM	3-13-23	3-13-23	
Benzo[a]pyrene	ND	0.0098	EPA 8270E/SIM	3-13-23	3-13-23	
Indeno(1,2,3-c,d)pyrene	ND	0.0098	EPA 8270E/SIM	3-13-23	3-13-23	
Dibenz[a,h]anthracene	ND	0.0098	EPA 8270E/SIM	3-13-23	3-13-23	
Benzo[g,h,i]perylene	ND	0.0098	EPA 8270E/SIM	3-13-23	3-13-23	
<i>Surrogate:</i>	<i>Percent Recovery</i>	<i>Control Limits</i>				
2-Fluorobiphenyl	76	20 - 106				
Pyrene-d10	86	19 - 104				
Terphenyl-d14	99	41 - 127				



Date of Report: March 20, 2023
 Samples Submitted: March 9, 2023
 Laboratory Reference: 2303-107
 Project: 15-06211-000

PAHs EPA 8270E/SIM

Matrix: Water
 Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:		WW20GWDUP				
Laboratory ID:		03-107-19				
Naphthalene	ND	0.11	EPA 8270E/SIM	3-13-23	3-13-23	
2-Methylnaphthalene	ND	0.11	EPA 8270E/SIM	3-13-23	3-13-23	
1-Methylnaphthalene	ND	0.11	EPA 8270E/SIM	3-13-23	3-13-23	
Acenaphthylene	ND	0.11	EPA 8270E/SIM	3-13-23	3-13-23	
Acenaphthene	ND	0.11	EPA 8270E/SIM	3-13-23	3-13-23	
Fluorene	ND	0.11	EPA 8270E/SIM	3-13-23	3-13-23	
Phenanthrene	ND	0.11	EPA 8270E/SIM	3-13-23	3-13-23	
Anthracene	ND	0.11	EPA 8270E/SIM	3-13-23	3-13-23	
Fluoranthene	ND	0.11	EPA 8270E/SIM	3-13-23	3-13-23	
Pyrene	ND	0.11	EPA 8270E/SIM	3-13-23	3-13-23	
Benzo[a]anthracene	0.012	0.011	EPA 8270E/SIM	3-13-23	3-13-23	
Chrysene	ND	0.011	EPA 8270E/SIM	3-13-23	3-13-23	
Benzo[b]fluoranthene	ND	0.011	EPA 8270E/SIM	3-13-23	3-13-23	
Benzo(j,k)fluoranthene	ND	0.011	EPA 8270E/SIM	3-13-23	3-13-23	
Benzo[a]pyrene	ND	0.011	EPA 8270E/SIM	3-13-23	3-13-23	
Indeno(1,2,3-c,d)pyrene	ND	0.011	EPA 8270E/SIM	3-13-23	3-13-23	
Dibenz[a,h]anthracene	ND	0.011	EPA 8270E/SIM	3-13-23	3-13-23	
Benzo[g,h,i]perylene	ND	0.011	EPA 8270E/SIM	3-13-23	3-13-23	
<i>Surrogate:</i>	<i>Percent Recovery</i>	<i>Control Limits</i>				
2-Fluorobiphenyl	65	20 - 106				
Pyrene-d10	76	19 - 104				
Terphenyl-d14	89	41 - 127				



Date of Report: March 20, 2023
 Samples Submitted: March 9, 2023
 Laboratory Reference: 2303-107
 Project: 15-06211-000

**PAHs EPA 8270E/SIM
 QUALITY CONTROL**

Matrix: Water

Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0313W1					
Naphthalene	ND	0.10	EPA 8270E/SIM	3-13-23	3-13-23	
2-Methylnaphthalene	ND	0.10	EPA 8270E/SIM	3-13-23	3-13-23	
1-Methylnaphthalene	ND	0.10	EPA 8270E/SIM	3-13-23	3-13-23	
Acenaphthylene	ND	0.10	EPA 8270E/SIM	3-13-23	3-13-23	
Acenaphthene	ND	0.10	EPA 8270E/SIM	3-13-23	3-13-23	
Fluorene	ND	0.10	EPA 8270E/SIM	3-13-23	3-13-23	
Phenanthrene	ND	0.10	EPA 8270E/SIM	3-13-23	3-13-23	
Anthracene	ND	0.10	EPA 8270E/SIM	3-13-23	3-13-23	
Fluoranthene	ND	0.10	EPA 8270E/SIM	3-13-23	3-13-23	
Pyrene	ND	0.10	EPA 8270E/SIM	3-13-23	3-13-23	
Benzo[a]anthracene	ND	0.010	EPA 8270E/SIM	3-13-23	3-13-23	
Chrysene	ND	0.010	EPA 8270E/SIM	3-13-23	3-13-23	
Benzo[b]fluoranthene	ND	0.010	EPA 8270E/SIM	3-13-23	3-13-23	
Benzo(j,k)fluoranthene	ND	0.010	EPA 8270E/SIM	3-13-23	3-13-23	
Benzo[a]pyrene	ND	0.010	EPA 8270E/SIM	3-13-23	3-13-23	
Indeno(1,2,3-c,d)pyrene	ND	0.010	EPA 8270E/SIM	3-13-23	3-13-23	
Dibenz[a,h]anthracene	ND	0.010	EPA 8270E/SIM	3-13-23	3-13-23	
Benzo[g,h,i]perylene	ND	0.010	EPA 8270E/SIM	3-13-23	3-13-23	
<i>Surrogate:</i>	<i>Percent Recovery</i>	<i>Control Limits</i>				
2-Fluorobiphenyl	72	20 - 106				
Pyrene-d10	87	19 - 104				
Terphenyl-d14	97	41 - 127				



Date of Report: March 20, 2023
 Samples Submitted: March 9, 2023
 Laboratory Reference: 2303-107
 Project: 15-06211-000

**PAHs EPA 8270E/SIM
 QUALITY CONTROL**

Matrix: Water
 Units: ug/L

Analyte	Result		Spike Level		Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
SPIKE BLANKS										
Laboratory ID:	SB0313W1									
	SB	SBD	SB	SBD	SB	SBD				
Naphthalene	0.347	0.364	0.500	0.500	69	73	25 - 82	5	39	
Acenaphthylene	0.374	0.378	0.500	0.500	75	76	35 - 107	1	26	
Acenaphthene	0.367	0.373	0.500	0.500	73	75	33 - 99	2	26	
Fluorene	0.388	0.392	0.500	0.500	78	78	43 - 95	1	24	
Phenanthrene	0.403	0.399	0.500	0.500	81	80	49 - 100	1	20	
Anthracene	0.392	0.383	0.500	0.500	78	77	47 - 101	2	21	
Fluoranthene	0.434	0.416	0.500	0.500	87	83	51 - 115	4	23	
Pyrene	0.420	0.405	0.500	0.500	84	81	53 - 117	4	24	
Benzo[a]anthracene	0.387	0.362	0.500	0.500	77	72	57 - 114	7	21	
Chrysene	0.432	0.408	0.500	0.500	86	82	55 - 119	6	21	
Benzo[b]fluoranthene	0.429	0.391	0.500	0.500	86	78	56 - 125	9	26	
Benzo(j,k)fluoranthene	0.458	0.429	0.500	0.500	92	86	53 - 124	7	22	
Benzo[a]pyrene	0.415	0.400	0.500	0.500	83	80	54 - 119	4	22	
Indeno(1,2,3-c,d)pyrene	0.448	0.405	0.500	0.500	90	81	55 - 118	10	23	
Dibenz[a,h]anthracene	0.430	0.419	0.500	0.500	86	84	56 - 118	3	23	
Benzo[g,h,i]perylene	0.432	0.399	0.500	0.500	86	80	55 - 117	8	22	
Surrogate:										
2-Fluorobiphenyl					59	63	20 - 106			
Pyrene-d10					75	79	19 - 104			
Terphenyl-d14					87	87	41 - 127			



Date of Report: March 20, 2023
 Samples Submitted: March 9, 2023
 Laboratory Reference: 2303-107
 Project: 15-06211-000

PCBs EPA 8082A

Matrix: Water
 Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	WW20GW2					
Laboratory ID:	03-107-10					
Aroclor 1016	ND	0.057	EPA 8082A	3-15-23	3-15-23	
Aroclor 1221	ND	0.057	EPA 8082A	3-15-23	3-15-23	
Aroclor 1232	ND	0.057	EPA 8082A	3-15-23	3-15-23	
Aroclor 1242	ND	0.057	EPA 8082A	3-15-23	3-15-23	
Aroclor 1248	ND	0.057	EPA 8082A	3-15-23	3-15-23	
Aroclor 1254	ND	0.057	EPA 8082A	3-15-23	3-15-23	
Aroclor 1260	ND	0.057	EPA 8082A	3-15-23	3-15-23	
Aroclor 1262	ND	0.057	EPA 8082A	3-15-23	3-15-23	
Aroclor 1268	ND	0.057	EPA 8082A	3-15-23	3-15-23	
Surrogate:	Percent Recovery	Control Limits				
DCB	112	49-133				
Client ID:	WW20GW1					
Laboratory ID:	03-107-18					
Aroclor 1016	ND	0.049	EPA 8082A	3-15-23	3-15-23	
Aroclor 1221	ND	0.049	EPA 8082A	3-15-23	3-15-23	
Aroclor 1232	ND	0.049	EPA 8082A	3-15-23	3-15-23	
Aroclor 1242	ND	0.049	EPA 8082A	3-15-23	3-15-23	
Aroclor 1248	ND	0.049	EPA 8082A	3-15-23	3-15-23	
Aroclor 1254	ND	0.049	EPA 8082A	3-15-23	3-15-23	
Aroclor 1260	ND	0.049	EPA 8082A	3-15-23	3-15-23	
Aroclor 1262	ND	0.049	EPA 8082A	3-15-23	3-15-23	
Aroclor 1268	ND	0.049	EPA 8082A	3-15-23	3-15-23	
Surrogate:	Percent Recovery	Control Limits				
DCB	131	49-133				
Client ID:	WW20GWDUP					
Laboratory ID:	03-107-19					
Aroclor 1016	ND	0.051	EPA 8082A	3-15-23	3-15-23	
Aroclor 1221	ND	0.051	EPA 8082A	3-15-23	3-15-23	
Aroclor 1232	ND	0.051	EPA 8082A	3-15-23	3-15-23	
Aroclor 1242	ND	0.051	EPA 8082A	3-15-23	3-15-23	
Aroclor 1248	ND	0.051	EPA 8082A	3-15-23	3-15-23	
Aroclor 1254	ND	0.051	EPA 8082A	3-15-23	3-15-23	
Aroclor 1260	ND	0.051	EPA 8082A	3-15-23	3-15-23	
Aroclor 1262	ND	0.051	EPA 8082A	3-15-23	3-15-23	
Aroclor 1268	ND	0.051	EPA 8082A	3-15-23	3-15-23	
Surrogate:	Percent Recovery	Control Limits				
DCB	130	49-133				



Date of Report: March 20, 2023
 Samples Submitted: March 9, 2023
 Laboratory Reference: 2303-107
 Project: 15-06211-000

**PCBs EPA 8082A
 QUALITY CONTROL**

Matrix: Water
 Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0315W1					
Aroclor 1016	ND	0.050	EPA 8082A	3-15-23	3-15-23	
Aroclor 1221	ND	0.050	EPA 8082A	3-15-23	3-15-23	
Aroclor 1232	ND	0.050	EPA 8082A	3-15-23	3-15-23	
Aroclor 1242	ND	0.050	EPA 8082A	3-15-23	3-15-23	
Aroclor 1248	ND	0.050	EPA 8082A	3-15-23	3-15-23	
Aroclor 1254	ND	0.050	EPA 8082A	3-15-23	3-15-23	
Aroclor 1260	ND	0.050	EPA 8082A	3-15-23	3-15-23	
Aroclor 1262	ND	0.050	EPA 8082A	3-15-23	3-15-23	
Aroclor 1268	ND	0.050	EPA 8082A	3-15-23	3-15-23	
Surrogate:	Percent Recovery	Control Limits				
DCB	119	49-133				

Analyte	Result		Spike Level		Source Result	Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
SPIKE BLANKS											
Laboratory ID:	SB0315W1										
	SB	SBD	SB	SBD		SB	SBD				
Aroclor 1260	0.524	0.496	0.500	0.500	N/A	105	99	67-120	5	15	
Surrogate:											
DCB						124	114	49-133			



Date of Report: March 20, 2023
 Samples Submitted: March 9, 2023
 Laboratory Reference: 2303-107
 Project: 15-06211-000

TOTAL METALS
EPA 6010D/7471B

Matrix: Soil
 Units: mg/Kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID: WW20S4-0						
Laboratory ID: 03-107-01						
Arsenic	ND	11	EPA 6010D	3-16-23	3-16-23	
Barium	38	2.8	EPA 6010D	3-16-23	3-16-23	
Cadmium	ND	0.55	EPA 6010D	3-16-23	3-16-23	
Chromium	24	0.55	EPA 6010D	3-16-23	3-16-23	
Lead	9.1	5.5	EPA 6010D	3-16-23	3-16-23	
Mercury	ND	0.28	EPA 7471B	3-16-23	3-16-23	
Selenium	ND	11	EPA 6010D	3-16-23	3-16-23	
Silver	ND	1.1	EPA 6010D	3-16-23	3-16-23	

Client ID: WW20S4-2						
Laboratory ID: 03-107-02						
Arsenic	ND	17	EPA 6010D	3-16-23	3-16-23	
Barium	270	4.3	EPA 6010D	3-16-23	3-16-23	
Cadmium	ND	0.85	EPA 6010D	3-16-23	3-16-23	
Chromium	18	0.85	EPA 6010D	3-16-23	3-16-23	
Lead	1000	8.5	EPA 6010D	3-16-23	3-16-23	
Mercury	ND	0.43	EPA 7471B	3-16-23	3-16-23	
Selenium	ND	17	EPA 6010D	3-16-23	3-16-23	
Silver	ND	1.7	EPA 6010D	3-16-23	3-16-23	

Client ID: WW20S5-0						
Laboratory ID: 03-107-04						
Arsenic	ND	11	EPA 6010D	3-16-23	3-16-23	
Barium	37	2.7	EPA 6010D	3-16-23	3-16-23	
Cadmium	ND	0.54	EPA 6010D	3-16-23	3-16-23	
Chromium	14	0.54	EPA 6010D	3-16-23	3-16-23	
Lead	37	5.4	EPA 6010D	3-16-23	3-16-23	
Mercury	ND	0.27	EPA 7471B	3-16-23	3-16-23	
Selenium	ND	11	EPA 6010D	3-16-23	3-16-23	
Silver	ND	1.1	EPA 6010D	3-16-23	3-16-23	



Date of Report: March 20, 2023
 Samples Submitted: March 9, 2023
 Laboratory Reference: 2303-107
 Project: 15-06211-000

TOTAL METALS
EPA 6010D/7471B

Matrix: Soil
 Units: mg/Kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:		WW20S5-2				
Laboratory ID:		03-107-05				
Arsenic	ND	12	EPA 6010D	3-16-23	3-16-23	
Barium	81	3.1	EPA 6010D	3-16-23	3-16-23	
Cadmium	ND	0.62	EPA 6010D	3-16-23	3-16-23	
Chromium	19	0.62	EPA 6010D	3-16-23	3-16-23	
Lead	130	6.2	EPA 6010D	3-16-23	3-16-23	
Mercury	ND	0.31	EPA 7471B	3-16-23	3-16-23	
Selenium	ND	12	EPA 6010D	3-16-23	3-16-23	
Silver	ND	1.2	EPA 6010D	3-16-23	3-16-23	

Client ID:		WW20S6-0				
Laboratory ID:		03-107-07				
Arsenic	ND	11	EPA 6010D	3-16-23	3-16-23	
Barium	38	2.6	EPA 6010D	3-16-23	3-16-23	
Cadmium	ND	0.53	EPA 6010D	3-16-23	3-16-23	
Chromium	15	0.53	EPA 6010D	3-16-23	3-16-23	
Lead	ND	5.3	EPA 6010D	3-16-23	3-16-23	
Mercury	ND	0.26	EPA 7471B	3-16-23	3-16-23	
Selenium	ND	11	EPA 6010D	3-16-23	3-16-23	
Silver	ND	1.1	EPA 6010D	3-16-23	3-16-23	

Client ID:		WW20S6-5				
Laboratory ID:		03-107-08				
Arsenic	ND	11	EPA 6010D	3-16-23	3-16-23	
Barium	37	2.8	EPA 6010D	3-16-23	3-16-23	
Cadmium	ND	0.57	EPA 6010D	3-16-23	3-16-23	
Chromium	13	0.57	EPA 6010D	3-16-23	3-16-23	
Lead	ND	5.7	EPA 6010D	3-16-23	3-16-23	
Mercury	ND	0.28	EPA 7471B	3-16-23	3-16-23	
Selenium	ND	11	EPA 6010D	3-16-23	3-16-23	
Silver	ND	1.1	EPA 6010D	3-16-23	3-16-23	



Date of Report: March 20, 2023
 Samples Submitted: March 9, 2023
 Laboratory Reference: 2303-107
 Project: 15-06211-000

TOTAL METALS
EPA 6010D/7471B

Matrix: Soil
 Units: mg/Kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID: WW20SDUP1-0						
Laboratory ID: 03-107-09						
Arsenic	ND	11	EPA 6010D	3-16-23	3-16-23	
Barium	43	2.7	EPA 6010D	3-16-23	3-16-23	
Cadmium	ND	0.53	EPA 6010D	3-16-23	3-16-23	
Chromium	18	0.53	EPA 6010D	3-16-23	3-16-23	
Lead	82	5.3	EPA 6010D	3-16-23	3-16-23	
Mercury	ND	0.27	EPA 7471B	3-16-23	3-16-23	
Selenium	ND	11	EPA 6010D	3-16-23	3-16-23	
Silver	ND	1.1	EPA 6010D	3-16-23	3-16-23	

Client ID: WW20S7-0						
Laboratory ID: 03-107-11						
Arsenic	ND	12	EPA 6010D	3-16-23	3-16-23	
Barium	59	3.0	EPA 6010D	3-16-23	3-16-23	
Cadmium	ND	0.60	EPA 6010D	3-16-23	3-16-23	
Chromium	26	0.60	EPA 6010D	3-16-23	3-16-23	
Lead	48	6.0	EPA 6010D	3-16-23	3-16-23	
Mercury	ND	0.30	EPA 7471B	3-16-23	3-16-23	
Selenium	ND	12	EPA 6010D	3-16-23	3-16-23	
Silver	ND	1.2	EPA 6010D	3-16-23	3-16-23	

Client ID: WW20S7-5						
Laboratory ID: 03-107-12						
Arsenic	ND	13	EPA 6010D	3-16-23	3-16-23	
Barium	300	3.1	EPA 6010D	3-16-23	3-16-23	
Cadmium	ND	0.63	EPA 6010D	3-16-23	3-16-23	
Chromium	17	0.63	EPA 6010D	3-16-23	3-16-23	
Lead	61	6.3	EPA 6010D	3-16-23	3-16-23	
Mercury	ND	0.31	EPA 7471B	3-16-23	3-16-23	
Selenium	ND	13	EPA 6010D	3-16-23	3-16-23	
Silver	ND	1.3	EPA 6010D	3-16-23	3-16-23	



Date of Report: March 20, 2023
 Samples Submitted: March 9, 2023
 Laboratory Reference: 2303-107
 Project: 15-06211-000

TOTAL METALS
EPA 6010D/7471B

Matrix: Soil
 Units: mg/Kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:		WW20S8-0				
Laboratory ID:		03-107-13				
Arsenic	ND	11	EPA 6010D	3-16-23	3-16-23	
Barium	37	2.8	EPA 6010D	3-16-23	3-16-23	
Cadmium	ND	0.55	EPA 6010D	3-16-23	3-16-23	
Chromium	19	0.55	EPA 6010D	3-16-23	3-16-23	
Lead	36	5.5	EPA 6010D	3-16-23	3-16-23	
Mercury	ND	0.28	EPA 7471B	3-16-23	3-16-23	
Selenium	ND	11	EPA 6010D	3-16-23	3-16-23	
Silver	ND	1.1	EPA 6010D	3-16-23	3-16-23	

Client ID:		WW20S8-5				
Laboratory ID:		03-107-14				
Arsenic	ND	11	EPA 6010D	3-16-23	3-16-23	
Barium	62	2.8	EPA 6010D	3-16-23	3-16-23	
Cadmium	1.5	0.55	EPA 6010D	3-16-23	3-16-23	
Chromium	15	0.55	EPA 6010D	3-16-23	3-16-23	
Lead	280	5.5	EPA 6010D	3-16-23	3-16-23	
Mercury	ND	0.28	EPA 7471B	3-16-23	3-16-23	
Selenium	ND	11	EPA 6010D	3-16-23	3-16-23	
Silver	ND	1.1	EPA 6010D	3-16-23	3-16-23	

Client ID:		WW20S9-0				
Laboratory ID:		03-107-15				
Arsenic	ND	11	EPA 6010D	3-16-23	3-16-23	
Barium	35	2.7	EPA 6010D	3-16-23	3-16-23	
Cadmium	ND	0.55	EPA 6010D	3-16-23	3-16-23	
Chromium	16	0.55	EPA 6010D	3-16-23	3-16-23	
Lead	43	5.5	EPA 6010D	3-16-23	3-16-23	
Mercury	ND	0.27	EPA 7471B	3-16-23	3-16-23	
Selenium	ND	11	EPA 6010D	3-16-23	3-16-23	
Silver	ND	1.1	EPA 6010D	3-16-23	3-16-23	



Date of Report: March 20, 2023
 Samples Submitted: March 9, 2023
 Laboratory Reference: 2303-107
 Project: 15-06211-000

TOTAL METALS
EPA 6010D/7471B

Matrix: Soil
 Units: mg/Kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID: WW20S9-2.5						
Laboratory ID: 03-107-16						
Arsenic	ND	11	EPA 6010D	3-16-23	3-16-23	
Barium	110	2.9	EPA 6010D	3-16-23	3-16-23	
Cadmium	ND	0.57	EPA 6010D	3-16-23	3-16-23	
Chromium	18	0.57	EPA 6010D	3-16-23	3-16-23	
Lead	100	5.7	EPA 6010D	3-16-23	3-16-23	
Mercury	ND	0.29	EPA 7471B	3-16-23	3-16-23	
Selenium	ND	11	EPA 6010D	3-16-23	3-16-23	
Silver	ND	1.1	EPA 6010D	3-16-23	3-16-23	

Client ID: WW20SDUP2-2.5						
Laboratory ID: 03-107-17						
Arsenic	ND	12	EPA 6010D	3-16-23	3-16-23	
Barium	170	3.1	EPA 6010D	3-16-23	3-16-23	
Cadmium	ND	0.61	EPA 6010D	3-16-23	3-16-23	
Chromium	24	0.61	EPA 6010D	3-16-23	3-16-23	
Lead	160	6.1	EPA 6010D	3-16-23	3-16-23	
Mercury	ND	0.31	EPA 7471B	3-16-23	3-16-23	
Selenium	ND	12	EPA 6010D	3-16-23	3-16-23	
Silver	ND	1.2	EPA 6010D	3-16-23	3-16-23	



Date of Report: March 20, 2023
 Samples Submitted: March 9, 2023
 Laboratory Reference: 2303-107
 Project: 15-06211-000

**TOTAL METALS
 EPA 6010D/7471B
 QUALITY CONTROL**

Matrix: Soil
 Units: mg/Kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0316SM2					
Arsenic	ND	10	EPA 6010D	3-16-23	3-16-23	
Barium	ND	2.5	EPA 6010D	3-16-23	3-16-23	
Cadmium	ND	0.50	EPA 6010D	3-16-23	3-16-23	
Chromium	ND	0.50	EPA 6010D	3-16-23	3-16-23	
Lead	ND	5.0	EPA 6010D	3-16-23	3-16-23	
Selenium	ND	10	EPA 6010D	3-16-23	3-16-23	
Silver	ND	1.0	EPA 6010D	3-16-23	3-16-23	

Laboratory ID:	MB0316S1					
Mercury	ND	0.25	EPA 7471B	3-16-23	3-16-23	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	03-107-01							
	ORIG	DUP						
Arsenic	ND	ND	NA	NA	NA	NA	20	
Barium	35.0	32.4	NA	NA	NA	8	20	
Cadmium	ND	ND	NA	NA	NA	NA	20	
Chromium	21.9	20.4	NA	NA	NA	7	20	
Lead	8.30	7.10	NA	NA	NA	16	20	
Selenium	ND	ND	NA	NA	NA	NA	20	
Silver	ND	ND	NA	NA	NA	NA	20	

Laboratory ID:	03-107-01							
Mercury	ND	ND	NA	NA	NA	NA	20	

MATRIX SPIKES

Laboratory ID:	03-107-01									
	MS	MSD	MS	MSD		MS	MSD			
Arsenic	91.5	89.2	100	100	ND	92	89	75-125	3	20
Barium	122	119	100	100	35.0	87	84	75-125	3	20
Cadmium	45.3	44.2	50.0	50.0	ND	91	88	75-125	2	20
Chromium	110	112	100	100	21.9	89	90	75-125	1	20
Lead	228	225	250	250	8.30	88	87	75-125	2	20
Selenium	89.5	86.9	100	100	ND	90	87	75-125	3	20
Silver	20.4	19.4	25.0	25.0	ND	82	78	75-125	5	20

Laboratory ID:	03-107-01									
Mercury	0.514	0.508	0.500	0.500	0.0164	100	98	80-120	1	20



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

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: March 20, 2023
 Samples Submitted: March 9, 2023
 Laboratory Reference: 2303-107
 Project: 15-06211-000

TOTAL METALS
EPA 200.8/7470A

Matrix: Water
 Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID: WW20GW2						
Laboratory ID: 03-107-10						
Arsenic	ND	3.3	EPA 200.8	3-15-23	3-15-23	
Barium	39	28	EPA 200.8	3-15-23	3-15-23	
Cadmium	ND	4.4	EPA 200.8	3-15-23	3-15-23	
Chromium	ND	11	EPA 200.8	3-15-23	3-15-23	
Lead	ND	1.1	EPA 200.8	3-15-23	3-15-23	
Mercury	ND	0.50	EPA 7470A	3-14-23	3-14-23	
Selenium	ND	5.6	EPA 200.8	3-15-23	3-15-23	
Silver	ND	11	EPA 200.8	3-15-23	3-15-23	

Client ID: WW20GW1						
Laboratory ID: 03-107-18						
Arsenic	ND	3.3	EPA 200.8	3-15-23	3-15-23	
Barium	ND	28	EPA 200.8	3-15-23	3-15-23	
Cadmium	ND	4.4	EPA 200.8	3-15-23	3-15-23	
Chromium	ND	11	EPA 200.8	3-15-23	3-15-23	
Lead	ND	1.1	EPA 200.8	3-15-23	3-15-23	
Mercury	ND	0.50	EPA 7470A	3-14-23	3-14-23	
Selenium	ND	5.6	EPA 200.8	3-15-23	3-15-23	
Silver	ND	11	EPA 200.8	3-15-23	3-15-23	

Client ID: WW20GWDUP						
Laboratory ID: 03-107-19						
Arsenic	ND	3.3	EPA 200.8	3-15-23	3-15-23	
Barium	ND	28	EPA 200.8	3-15-23	3-15-23	
Cadmium	ND	4.4	EPA 200.8	3-15-23	3-15-23	
Chromium	ND	11	EPA 200.8	3-15-23	3-15-23	
Lead	ND	1.1	EPA 200.8	3-15-23	3-15-23	
Mercury	ND	0.50	EPA 7470A	3-14-23	3-14-23	
Selenium	ND	5.6	EPA 200.8	3-15-23	3-15-23	
Silver	ND	11	EPA 200.8	3-15-23	3-15-23	



Date of Report: March 20, 2023
 Samples Submitted: March 9, 2023
 Laboratory Reference: 2303-107
 Project: 15-06211-000

**TOTAL METALS
 EPA 200.8/7470A
 QUALITY CONTROL**

Matrix: Water
 Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0315WM1					
Arsenic	ND	3.3	EPA 200.8	3-15-23	3-15-23	
Barium	ND	28	EPA 200.8	3-15-23	3-15-23	
Cadmium	ND	4.4	EPA 200.8	3-15-23	3-15-23	
Chromium	ND	11	EPA 200.8	3-15-23	3-15-23	
Lead	ND	1.1	EPA 200.8	3-15-23	3-15-23	
Selenium	ND	5.6	EPA 200.8	3-15-23	3-15-23	
Silver	ND	11	EPA 200.8	3-15-23	3-15-23	

Laboratory ID:	MB0314W1					
Mercury	ND	0.50	EPA 7470A	3-14-23	3-14-23	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	03-020-08							
	ORIG	DUP						
Arsenic	ND	ND	NA	NA	NA	NA	NA	20
Barium	ND	ND	NA	NA	NA	NA	NA	20
Cadmium	ND	ND	NA	NA	NA	NA	NA	20
Chromium	ND	ND	NA	NA	NA	NA	NA	20
Lead	ND	ND	NA	NA	NA	NA	NA	20
Selenium	ND	ND	NA	NA	NA	NA	NA	20
Silver	ND	ND	NA	NA	NA	NA	NA	20

Laboratory ID:	03-107-10							
Mercury	ND	ND	NA	NA	NA	NA	NA	20

MATRIX SPIKES

Laboratory ID:	03-020-08									
	MS	MSD	MS	MSD		MS	MSD			
Arsenic	102	109	111	111	ND	92	98	75-125	6	20
Barium	119	125	111	111	15.9	93	99	75-125	5	20
Cadmium	102	105	111	111	ND	92	95	75-125	3	20
Chromium	101	106	111	111	ND	91	96	75-125	5	20
Lead	102	108	111	111	ND	92	97	75-125	6	20
Selenium	105	108	111	111	ND	94	98	75-125	4	20
Silver	93.8	104	111	111	ND	85	94	75-125	11	20

Laboratory ID:	03-107-10									
Mercury	11.9	12.0	12.5	12.5	ND	95	96	75-125	1	20



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

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: March 20, 2023
 Samples Submitted: March 9, 2023
 Laboratory Reference: 2303-107
 Project: 15-06211-000

DISSOLVED METALS
EPA 200.8/7470A

Matrix: Water
 Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:		WW20GW2				
Laboratory ID:		03-107-10				
Arsenic	ND	3.0	EPA 200.8		3-15-23	
Barium	41	25	EPA 200.8		3-15-23	
Cadmium	ND	4.0	EPA 200.8		3-15-23	
Chromium	ND	10	EPA 200.8		3-15-23	
Lead	ND	1.0	EPA 200.8		3-15-23	
Mercury	ND	0.50	EPA 7470A		3-14-23	
Selenium	ND	5.0	EPA 200.8		3-15-23	
Silver	ND	10	EPA 200.8		3-15-23	

Client ID:		WW20GW1				
Laboratory ID:		03-107-18				
Arsenic	ND	3.0	EPA 200.8		3-15-23	
Barium	ND	25	EPA 200.8		3-15-23	
Cadmium	ND	4.0	EPA 200.8		3-15-23	
Chromium	ND	10	EPA 200.8		3-15-23	
Lead	ND	1.0	EPA 200.8		3-15-23	
Mercury	ND	0.50	EPA 7470A		3-14-23	
Selenium	ND	5.0	EPA 200.8		3-15-23	
Silver	ND	10	EPA 200.8		3-15-23	

Client ID:		WW20GWDUP				
Laboratory ID:		03-107-19				
Arsenic	ND	3.0	EPA 200.8		3-15-23	
Barium	ND	25	EPA 200.8		3-15-23	
Cadmium	ND	4.0	EPA 200.8		3-15-23	
Chromium	ND	10	EPA 200.8		3-15-23	
Lead	ND	1.0	EPA 200.8		3-15-23	
Mercury	ND	0.50	EPA 7470A		3-14-23	
Selenium	ND	5.0	EPA 200.8		3-15-23	
Silver	ND	10	EPA 200.8		3-15-23	



Date of Report: March 20, 2023
 Samples Submitted: March 9, 2023
 Laboratory Reference: 2303-107
 Project: 15-06211-000

**DISSOLVED METALS
 EPA 200.8/7470A
 QUALITY CONTROL**

Matrix: Water
 Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0313F1					
Arsenic	ND	3.0	EPA 200.8	3-13-23	3-15-23	
Barium	ND	25	EPA 200.8	3-13-23	3-15-23	
Cadmium	ND	4.0	EPA 200.8	3-13-23	3-15-23	
Chromium	ND	10	EPA 200.8	3-13-23	3-15-23	
Lead	ND	1.0	EPA 200.8	3-13-23	3-15-23	
Selenium	ND	5.0	EPA 200.8	3-13-23	3-15-23	
Silver	ND	10	EPA 200.8	3-13-23	3-15-23	

Laboratory ID:	MB0313F1					
Mercury	ND	0.50	EPA 7470A	3-13-23	3-14-23	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	03-131-01							
	ORIG	DUP						
Arsenic	ND	ND	NA	NA	NA	NA	20	
Barium	ND	ND	NA	NA	NA	NA	20	
Cadmium	ND	ND	NA	NA	NA	NA	20	
Chromium	ND	ND	NA	NA	NA	NA	20	
Lead	ND	ND	NA	NA	NA	NA	20	
Selenium	ND	ND	NA	NA	NA	NA	20	
Silver	ND	ND	NA	NA	NA	NA	20	

Laboratory ID:	03-073-01							
Mercury	ND	ND	NA	NA	NA	NA	20	

MATRIX SPIKES

Laboratory ID:	03-131-01									
	MS	MSD	MS	MSD		MS	MSD			
Arsenic	79.0	80.6	80.0	80.0	ND	99	101	75-125	2	20
Barium	91.2	89.8	80.0	80.0	ND	114	112	75-125	2	20
Cadmium	76.0	76.4	80.0	80.0	ND	95	96	75-125	1	20
Chromium	78.2	76.8	80.0	80.0	ND	98	96	75-125	2	20
Lead	82.2	80.4	80.0	80.0	ND	103	101	75-125	2	20
Selenium	83.6	82.6	80.0	80.0	ND	105	103	75-125	1	20
Silver	85.2	86.0	80.0	80.0	ND	107	108	75-125	1	20

Laboratory ID:	03-073-01									
Mercury	11.9	11.8	12.5	12.5	ND	95	94	75-125	1	20



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

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: March 20, 2023
 Samples Submitted: March 9, 2023
 Laboratory Reference: 2303-107
 Project: 15-06211-000

HARDNESS
EPA 200.7/SM 2340B

Matrix: Water
 Units: mg eqt. CaCO₃/L (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	WW20GW2					
Laboratory ID:	03-107-10					
Hardness	200	1.0	EPA 200.7/SM 2340B	3-14-23	3-14-23	

Client ID:	WW20GW1					
Laboratory ID:	03-107-18					
Hardness	88	1.0	EPA 200.7/SM 2340B	3-14-23	3-14-23	

Client ID:	WW20GWDUP					
Laboratory ID:	03-107-19					
Hardness	88	1.0	EPA 200.7/SM 2340B	3-14-23	3-14-23	



Date of Report: March 20, 2023
 Samples Submitted: March 9, 2023
 Laboratory Reference: 2303-107
 Project: 15-06211-000

HARDNESS
EPA 200.7/SM 2340B
QUALITY CONTROL

Matrix: Water
 Units: mg eqt. CaCO₃/L (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0314WH1					
Hardness	ND	1.0	EPA 200.7/SM 2340B	3-14-23	3-14-23	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	03-116-01							
	ORIG	DUP						
Hardness	24.7	22.6	NA	NA	NA	NA	9	20

MATRIX SPIKES

Laboratory ID:	03-116-01									
	MS	MSD	MS	MSD		MS	MSD			
Hardness	152	154	132	132	24.7	96	98	75-125	1	20

SPIKE BLANK

Laboratory ID:	SB0314WH1									
	SB		SB			SB				
Hardness	129		132		NA	98		85-115	NA	NA



Date of Report: March 20, 2023
 Samples Submitted: March 9, 2023
 Laboratory Reference: 2303-107
 Project: 15-06211-000

% MOISTURE

Client ID	Lab ID	% Moisture	Date Analyzed
WW20S4-0	03-107-01	9	3-13-23
WW20S4-2	03-107-02	41	3-13-23
WW20S5-0	03-107-04	8	3-13-23
WW20S5-2	03-107-05	19	3-13-23
WW20S6-0	03-107-07	5	3-13-23
WW20S6-5	03-107-08	12	3-13-23
WW20SDUP1-0	03-107-09	6	3-13-23
WW20S7-0	03-107-11	17	3-13-23
WW20S7-5	03-107-12	21	3-13-23
WW20S8-0	03-107-13	10	3-13-23
WW20S8-5	03-107-14	10	3-13-23
WW20S9-0	03-107-15	9	3-13-23
WW20S9-2.5	03-107-16	13	3-13-23
WW20SDUP2-2.5	03-107-17	18	3-13-23





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-naphthalene) 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.
- X2 - Sample extract treated with a silica gel cleanup procedure.
- Y - The calibration verification for this analyte exceeded the 20% drift specified in methods 8260 & 8270, 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.
- Y1 - Negative effects of the matrix from this sample on the instrument caused values for this analyte in the bracketing continuing calibration verification standard (CCVs) to be outside of 20% acceptance criteria. Because of this, quantitation limits and sample concentrations should be considered estimates.
- Z -
- ND - Not Detected at PQL
- PQL - Practical Quantitation Limit
- RPD - Relative Percent Difference





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

Chain of Custody

Page 1 of 2

Company: <u>Hererra</u>		☐ Same Day ☐ 1 Day		Turnaround Request (in working days)		Laboratory Number: 03-107																		
Project Number: <u>15-06211-000</u>		☐ 2 Days ☐ 3 Days																						
Project Name: <u>WW #20</u>		☒ Standard (7 Days)																						
Project Manager: <u>George Ifthner</u>		☐ (other)																						
Sampled by: <u>George Ifthner</u>																								
Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	Number of Containers																			
1	WW20S4-0	3/9/23	8:40	Soil	2	NWTPH-HCID	NWTPH-Gx/BTEX (8021 ☐ 8260 ☐)	NWTPH-Gx	NWTPH-Dx (Acid / SG Clean-up ☐)	Volatiles 8260	Halogenated Volatiles 8260	EDB EPA 8011 (Waters Only)	Semivolatiles 8270/SIM (with low-level PAHs)	PAHs 8270/SIM (low-level)	PCBs 8082	Organochlorine Pesticides 8081	Organophosphorus Pesticides 8270/SIM	Chlorinated Acid Herbicides 8151	Total RCRA Metals	Total MFGA Metals <u>Diss. RCRA Metals</u>	TCLP Metals	HEM (oil and grease) 1664	<u>Hardness</u>	% Moisture
2	WW20S4-2		8:50		2			✓	✓					✓					✓					
3	WW20S4-5		9:00		2			✓	✓					✓					✓					
4	WW20S5-0		9:25		2			✓	✓					✓					✓					
5	WW20S5-2		9:35		2			✓	✓					✓					✓					
6	WW20S5-5		9:40		2			✓	✓					✓					✓					
7	WW20S6-0		10:10		2			✓	✓					✓					✓					
8	WW20S6-5		10:20		2			✓	✓					✓					✓					
9	WW20SDUP1-0		10:30		2			✓	✓					✓					✓					
10	WW20G W2	✓	10:55	Water	11			✓	✓					✓					✓					
Signature		Company	Date	Time	Comments/Special Instructions																			
<u>[Signature]</u>		<u>Hererra</u>	<u>3/9/23</u>	<u>18:00</u>	<u>6W - Dissolved metals were field filtered & soils hold for PCBs, TCLP</u>																			
Relinquished																								
Received																								
Relinquished																								
Received																								
Relinquished																								
Received																								
Relinquished																								
Reviewed/Date		Reviewed/Date		Data Package: Standard ☒ Level III ☐ Level IV ☐		Chromatograms with final report ☐ Electronic Data Deliverables (EDDs) ☒																		



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

Chain of Custody

Page 2 of 2

Company: <u>Herrera</u>			Turnaround Request (in working days)			Laboratory Number: 03-107																		
Project Number: <u>15-06211-000</u>			☐ Same Day ☐ 1 Day																					
Project Name: <u>WW #20</u>			☐ 2 Days ☐ 3 Days																					
Project Manager: <u>George Ithen</u>			☒ Standard (7 Days)																					
Sampled by: <u>George Ithen</u>			☐ (other)																					
Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	Number of Containers																			
11	WW20S7-0	3/9/23	12:10	Soil	2																			
12	WW20S7-5		12:20		2																			
13	WW20S8-0		12:35		2																			
14	WW20S8-5		12:45		2																			
15	WW20S9-0		12:55		2																			
16	WW20S9-2.5		13:05		2																			
17	WW20SDOP2-2.5		13:15		2																			
18	WW20GW1		14:20	Water	1																			
19	WW20GW DWP		14:00	Water	1																			
					NWTPH-HCID																			
					NWTPH-Gx/BTEX (8021 ☐ 8260 ☐)																			
					NWTPH-Gx																			
					NWTPH-Dx (Acid / SG Clean-up ☐)																			
					Volatiles 8260																			
					Halogenated Volatiles 8260																			
					EDB EPA 8011 (Waters Only)																			
					Semivolatiles 8270/SIM (with low-level PAHs)																			
					PAHs 8270/SIM (low-level)																			
					PCBs 8082																			
					Organochlorine Pesticides 8081																			
					Organophosphorus Pesticides 8270/SIM																			
					Chlorinated Acid Herbicides 8151																			
					Total RCRA Metals																			
					Total MTCA Metals <u>Diss RCRA Metals</u> TCLP Metals																			
					HEM (oil and grease) 1664																			
					<u>Hardness</u>																			
					% Moisture																			
Relinquished			Signature: <u>[Signature]</u>			Company: <u>Herrera</u>			Date: <u>3/9/23</u>			Time: <u>18:00</u>			Comments/Special Instructions: <u>GW - Discolored metals were field filtered</u> <u>Soils hold for PCBs, TCLP</u>									
Received															Data Package: Standard ☒ Level III ☐ Level IV ☐									
Relinquished															Chromatograms with final report ☐ Electronic Data Deliverables (EDDs) ☒									
Reviewed/Date																								



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

March 30, 2023

George Iftner
Herrera Environmental Consultants, Inc.
2200 6th Avenue, Suite 1100
Seattle, WA 98121

Re: Analytical Data for Project 15-06211-000
Laboratory Reference No. 2303-107B

Dear George:

Enclosed are the analytical results and associated quality control data for samples submitted on March 9, 2023.

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,

A handwritten signature in black ink, appearing to read 'DB', followed by a long horizontal flourish.

David Baumeister
Project Manager

Enclosures



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

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: March 30, 2023
Samples Submitted: March 9, 2023
Laboratory Reference: 2303-107B
Project: 15-06211-000

Case Narrative

Samples were collected on March 9, 2023 and received by the laboratory on March 9, 2023. 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.

TCLP Lead EPA 1311/6010D Analysis

Due to a limited amount of sample, less than the required 100g was tumbled for TCLP analysis. The amount of sample used was: (75 g) for WW20S4-2(03-107-02).

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.



Date of Report: March 30, 2023
 Samples Submitted: March 9, 2023
 Laboratory Reference: 2303-107B
 Project: 15-06211-000

PCBs EPA 8082A

Matrix: Soil
 Units: mg/Kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	WW20S4-0					
Laboratory ID:	03-107-01					
Aroclor 1016	ND	0.055	EPA 8082A	3-22-23	3-22-23	
Aroclor 1221	ND	0.055	EPA 8082A	3-22-23	3-22-23	
Aroclor 1232	ND	0.055	EPA 8082A	3-22-23	3-22-23	
Aroclor 1242	ND	0.055	EPA 8082A	3-22-23	3-22-23	
Aroclor 1248	ND	0.055	EPA 8082A	3-22-23	3-22-23	
Aroclor 1254	ND	0.055	EPA 8082A	3-22-23	3-22-23	
Aroclor 1260	ND	0.055	EPA 8082A	3-22-23	3-22-23	
Aroclor 1262	ND	0.055	EPA 8082A	3-22-23	3-22-23	
Aroclor 1268	ND	0.055	EPA 8082A	3-22-23	3-22-23	
Surrogate:	Percent Recovery	Control Limits				
DCB	99	53-127				
Client ID:	WW20S4-2					
Laboratory ID:	03-107-02					
Aroclor 1016	ND	0.085	EPA 8082A	3-22-23	3-22-23	
Aroclor 1221	ND	0.085	EPA 8082A	3-22-23	3-22-23	
Aroclor 1232	ND	0.085	EPA 8082A	3-22-23	3-22-23	
Aroclor 1242	ND	0.085	EPA 8082A	3-22-23	3-22-23	
Aroclor 1248	ND	0.085	EPA 8082A	3-22-23	3-22-23	
Aroclor 1254	ND	0.085	EPA 8082A	3-22-23	3-22-23	
Aroclor 1260	ND	0.085	EPA 8082A	3-22-23	3-22-23	
Aroclor 1262	ND	0.085	EPA 8082A	3-22-23	3-22-23	
Aroclor 1268	ND	0.085	EPA 8082A	3-22-23	3-22-23	
Surrogate:	Percent Recovery	Control Limits				
DCB	82	53-127				
Client ID:	WW20S5-0					
Laboratory ID:	03-107-04					
Aroclor 1016	ND	0.054	EPA 8082A	3-22-23	3-22-23	
Aroclor 1221	ND	0.054	EPA 8082A	3-22-23	3-22-23	
Aroclor 1232	ND	0.054	EPA 8082A	3-22-23	3-22-23	
Aroclor 1242	ND	0.054	EPA 8082A	3-22-23	3-22-23	
Aroclor 1248	ND	0.054	EPA 8082A	3-22-23	3-22-23	
Aroclor 1254	ND	0.054	EPA 8082A	3-22-23	3-22-23	
Aroclor 1260	ND	0.054	EPA 8082A	3-22-23	3-22-23	
Aroclor 1262	ND	0.054	EPA 8082A	3-22-23	3-22-23	
Aroclor 1268	ND	0.054	EPA 8082A	3-22-23	3-22-23	
Surrogate:	Percent Recovery	Control Limits				
DCB	71	53-127				



Date of Report: March 30, 2023
 Samples Submitted: March 9, 2023
 Laboratory Reference: 2303-107B
 Project: 15-06211-000

PCBs EPA 8082A

Matrix: Soil
 Units: mg/Kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	WW20S5-2					
Laboratory ID:	03-107-05					
Aroclor 1016	ND	0.062	EPA 8082A	3-22-23	3-22-23	
Aroclor 1221	ND	0.062	EPA 8082A	3-22-23	3-22-23	
Aroclor 1232	ND	0.062	EPA 8082A	3-22-23	3-22-23	
Aroclor 1242	ND	0.062	EPA 8082A	3-22-23	3-22-23	
Aroclor 1248	ND	0.062	EPA 8082A	3-22-23	3-22-23	
Aroclor 1254	ND	0.062	EPA 8082A	3-22-23	3-22-23	
Aroclor 1260	ND	0.062	EPA 8082A	3-22-23	3-22-23	
Aroclor 1262	ND	0.062	EPA 8082A	3-22-23	3-22-23	
Aroclor 1268	ND	0.062	EPA 8082A	3-22-23	3-22-23	
Surrogate:	Percent Recovery	Control Limits				
DCB	75	53-127				
Client ID:	WW20S6-0					
Laboratory ID:	03-107-07					
Aroclor 1016	ND	0.053	EPA 8082A	3-22-23	3-22-23	
Aroclor 1221	ND	0.053	EPA 8082A	3-22-23	3-22-23	
Aroclor 1232	ND	0.053	EPA 8082A	3-22-23	3-22-23	
Aroclor 1242	ND	0.053	EPA 8082A	3-22-23	3-22-23	
Aroclor 1248	ND	0.053	EPA 8082A	3-22-23	3-22-23	
Aroclor 1254	ND	0.053	EPA 8082A	3-22-23	3-22-23	
Aroclor 1260	ND	0.053	EPA 8082A	3-22-23	3-22-23	
Aroclor 1262	ND	0.053	EPA 8082A	3-22-23	3-22-23	
Aroclor 1268	ND	0.053	EPA 8082A	3-22-23	3-22-23	
Surrogate:	Percent Recovery	Control Limits				
DCB	77	53-127				
Client ID:	WW20S7-0					
Laboratory ID:	03-107-11					
Aroclor 1016	ND	0.060	EPA 8082A	3-22-23	3-22-23	
Aroclor 1221	ND	0.060	EPA 8082A	3-22-23	3-22-23	
Aroclor 1232	ND	0.060	EPA 8082A	3-22-23	3-22-23	
Aroclor 1242	ND	0.060	EPA 8082A	3-22-23	3-22-23	
Aroclor 1248	ND	0.060	EPA 8082A	3-22-23	3-22-23	
Aroclor 1254	ND	0.060	EPA 8082A	3-22-23	3-22-23	
Aroclor 1260	ND	0.060	EPA 8082A	3-22-23	3-22-23	
Aroclor 1262	ND	0.060	EPA 8082A	3-22-23	3-22-23	
Aroclor 1268	ND	0.060	EPA 8082A	3-22-23	3-22-23	
Surrogate:	Percent Recovery	Control Limits				
DCB	91	53-127				



Date of Report: March 30, 2023
 Samples Submitted: March 9, 2023
 Laboratory Reference: 2303-107B
 Project: 15-06211-000

PCBs EPA 8082A

Matrix: Soil
 Units: mg/Kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	WW20S7-5					
Laboratory ID:	03-107-12					
Aroclor 1016	ND	0.063	EPA 8082A	3-22-23	3-22-23	
Aroclor 1221	ND	0.063	EPA 8082A	3-22-23	3-22-23	
Aroclor 1232	ND	0.063	EPA 8082A	3-22-23	3-22-23	
Aroclor 1242	ND	0.063	EPA 8082A	3-22-23	3-22-23	
Aroclor 1248	ND	0.063	EPA 8082A	3-22-23	3-22-23	
Aroclor 1254	ND	0.063	EPA 8082A	3-22-23	3-22-23	
Aroclor 1260	ND	0.063	EPA 8082A	3-22-23	3-22-23	
Aroclor 1262	ND	0.063	EPA 8082A	3-22-23	3-22-23	
Aroclor 1268	ND	0.063	EPA 8082A	3-22-23	3-22-23	
Surrogate:	Percent Recovery	Control Limits				
DCB	63	53-127				
Client ID:	WW20S8-0					
Laboratory ID:	03-107-13					
Aroclor 1016	ND	0.055	EPA 8082A	3-22-23	3-22-23	
Aroclor 1221	ND	0.055	EPA 8082A	3-22-23	3-22-23	
Aroclor 1232	ND	0.055	EPA 8082A	3-22-23	3-22-23	
Aroclor 1242	ND	0.055	EPA 8082A	3-22-23	3-22-23	
Aroclor 1248	ND	0.055	EPA 8082A	3-22-23	3-22-23	
Aroclor 1254	ND	0.055	EPA 8082A	3-22-23	3-22-23	
Aroclor 1260	ND	0.055	EPA 8082A	3-22-23	3-22-23	
Aroclor 1262	ND	0.055	EPA 8082A	3-22-23	3-22-23	
Aroclor 1268	ND	0.055	EPA 8082A	3-22-23	3-22-23	
Surrogate:	Percent Recovery	Control Limits				
DCB	90	53-127				
Client ID:	WW20S8-5					
Laboratory ID:	03-107-14					
Aroclor 1016	ND	0.055	EPA 8082A	3-22-23	3-22-23	
Aroclor 1221	ND	0.055	EPA 8082A	3-22-23	3-22-23	
Aroclor 1232	ND	0.055	EPA 8082A	3-22-23	3-22-23	
Aroclor 1242	ND	0.055	EPA 8082A	3-22-23	3-22-23	
Aroclor 1248	ND	0.055	EPA 8082A	3-22-23	3-22-23	
Aroclor 1254	ND	0.055	EPA 8082A	3-22-23	3-22-23	
Aroclor 1260	ND	0.055	EPA 8082A	3-22-23	3-22-23	
Aroclor 1262	ND	0.055	EPA 8082A	3-22-23	3-22-23	
Aroclor 1268	ND	0.055	EPA 8082A	3-22-23	3-22-23	
Surrogate:	Percent Recovery	Control Limits				
DCB	92	53-127				



Date of Report: March 30, 2023
 Samples Submitted: March 9, 2023
 Laboratory Reference: 2303-107B
 Project: 15-06211-000

PCBs EPA 8082A

Matrix: Soil
 Units: mg/Kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	WW20S9-0					
Laboratory ID:	03-107-15					
Aroclor 1016	ND	0.055	EPA 8082A	3-22-23	3-22-23	
Aroclor 1221	ND	0.055	EPA 8082A	3-22-23	3-22-23	
Aroclor 1232	ND	0.055	EPA 8082A	3-22-23	3-22-23	
Aroclor 1242	ND	0.055	EPA 8082A	3-22-23	3-22-23	
Aroclor 1248	ND	0.055	EPA 8082A	3-22-23	3-22-23	
Aroclor 1254	ND	0.055	EPA 8082A	3-22-23	3-22-23	
Aroclor 1260	ND	0.055	EPA 8082A	3-22-23	3-22-23	
Aroclor 1262	ND	0.055	EPA 8082A	3-22-23	3-22-23	
Aroclor 1268	ND	0.055	EPA 8082A	3-22-23	3-22-23	
Surrogate:	Percent Recovery	Control Limits				
DCB	83	53-127				
Client ID:	WW20S9-2.5					
Laboratory ID:	03-107-16					
Aroclor 1016	ND	0.057	EPA 8082A	3-22-23	3-22-23	
Aroclor 1221	ND	0.057	EPA 8082A	3-22-23	3-22-23	
Aroclor 1232	ND	0.057	EPA 8082A	3-22-23	3-22-23	
Aroclor 1242	ND	0.057	EPA 8082A	3-22-23	3-22-23	
Aroclor 1248	ND	0.057	EPA 8082A	3-22-23	3-22-23	
Aroclor 1254	ND	0.057	EPA 8082A	3-22-23	3-22-23	
Aroclor 1260	ND	0.057	EPA 8082A	3-22-23	3-22-23	
Aroclor 1262	ND	0.057	EPA 8082A	3-22-23	3-22-23	
Aroclor 1268	ND	0.057	EPA 8082A	3-22-23	3-22-23	
Surrogate:	Percent Recovery	Control Limits				
DCB	77	53-127				



Date of Report: March 30, 2023
 Samples Submitted: March 9, 2023
 Laboratory Reference: 2303-107B
 Project: 15-06211-000

**PCBs EPA 8082A
 QUALITY CONTROL**

Matrix: Soil
 Units: mg/Kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0322S1					
Aroclor 1016	ND	0.050	EPA 8082A	3-22-23	3-22-23	
Aroclor 1221	ND	0.050	EPA 8082A	3-22-23	3-22-23	
Aroclor 1232	ND	0.050	EPA 8082A	3-22-23	3-22-23	
Aroclor 1242	ND	0.050	EPA 8082A	3-22-23	3-22-23	
Aroclor 1248	ND	0.050	EPA 8082A	3-22-23	3-22-23	
Aroclor 1254	ND	0.050	EPA 8082A	3-22-23	3-22-23	
Aroclor 1260	ND	0.050	EPA 8082A	3-22-23	3-22-23	
Aroclor 1262	ND	0.050	EPA 8082A	3-22-23	3-22-23	
Aroclor 1268	ND	0.050	EPA 8082A	3-22-23	3-22-23	
Surrogate:	Percent Recovery	Control Limits				
DCB	105	53-127				

Analyte	Result		Spike Level		Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
MATRIX SPIKES										
Laboratory ID:	03-107-01									
	MS	MSD	MS	MSD		MS	MSD			
Aroclor 1260	0.378	0.421	0.500	0.500	ND	76	84	47-121	11	17
Surrogate:										
DCB						87	100	53-127		



Date of Report: March 30, 2023
 Samples Submitted: March 9, 2023
 Laboratory Reference: 2303-107B
 Project: 15-06211-000

TCLP LEAD
EPA 1311/6010D

Matrix: TCLP Extract
 Units: mg/L (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	WW20S4-2					
Laboratory ID:	03-107-02					
Lead	ND	0.20	EPA 6010D	3-28-23	3-28-23	

Client ID:	WW20S5-2					
Laboratory ID:	03-107-05					
Lead	ND	0.20	EPA 6010D	3-28-23	3-28-23	

Client ID:	WW20S8-5					
Laboratory ID:	03-107-14					
Lead	0.55	0.20	EPA 6010D	3-28-23	3-28-23	



Date of Report: March 30, 2023
 Samples Submitted: March 9, 2023
 Laboratory Reference: 2303-107B
 Project: 15-06211-000

**TCLP LEAD
 EPA 1311/6010D
 QUALITY CONTROL**

Matrix: TCLP Extract
 Units: mg/L (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0328TM1					
Lead	ND	0.20	EPA 6010D	3-28-23	3-28-23	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	03-107-14							
	ORIG	DUP						
Lead	0.550	0.560	NA	NA	NA	NA	2	20

MATRIX SPIKES

Laboratory ID:	03-107-14									
	MS	MSD	MS	MSD		MS	MSD			
Lead	10.2	10.2	10.0	10.0	0.550	97	97	75-125	0	20



Date of Report: March 30, 2023
 Samples Submitted: March 9, 2023
 Laboratory Reference: 2303-107B
 Project: 15-06211-000

**SOLUBLE HEXAVALENT CHROMIUM
 WATER EXTRACTION
 EPA 7196A**

Matrix: Soil
 Units: mg/Kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	WW20S4-0					
Laboratory ID:	03-107-01					
Hexavalent Chromium	ND	1.1	EPA 7196A mod.	3-29-23	3-29-23	
Client ID:	WW20S7-0					
Laboratory ID:	03-107-11					
Hexavalent Chromium	ND	1.2	EPA 7196A mod.	3-29-23	3-29-23	



Date of Report: March 30, 2023
 Samples Submitted: March 9, 2023
 Laboratory Reference: 2303-107B
 Project: 15-06211-000

**SOLUBLE HEXAVALENT CHROMIUM
 WATER EXTRACTION
 EPA 7196A
 QUALITY CONTROL**

Matrix: Soil
 Units: mg/Kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0329S1					
Hexavalent Chromium	ND	1.0	EPA 7196A mod.	3-29-23	3-29-23	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	03-107-01							
	ORIG	DUP						
Hexavalent Chromium	ND	ND	NA	NA	NA	NA	20	

MATRIX SPIKES

Laboratory ID:	03-107-01									
	MS	MSD	MS	MSD		MS	MSD			
Hexavalent Chromium	4.69	4.66	5.00	5.00	ND	94	93	75-125	1	20

SPIKE BLANK

Laboratory ID:	SB0329S1									
	SB		SB			SB				
Hexavalent Chromium	4.93		5.00		NA	99		75-125	NA	NA



Date of Report: March 30, 2023
 Samples Submitted: March 9, 2023
 Laboratory Reference: 2303-107B
 Project: 15-06211-000

% MOISTURE

Client ID	Lab ID	% Moisture	Date Analyzed
WW20S4-0	03-107-01	9	3-13-23
WW20S4-2	03-107-02	41	3-13-23
WW20S5-0	03-107-04	8	3-13-23
WW20S5-2	03-107-05	19	3-13-23
WW20S6-0	03-107-07	5	3-13-23
WW20S7-0	03-107-11	17	3-13-23
WW20S7-5	03-107-12	21	3-13-23
WW20S8-0	03-107-13	10	3-13-23
WW20S8-5	03-107-14	10	3-13-23
WW20S9-0	03-107-15	9	3-13-23
WW20S9-2.5	03-107-16	13	3-13-23





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-naphthalene) 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.
- X2 - Sample extract treated with a silica gel cleanup procedure.
- Y - The calibration verification for this analyte exceeded the 20% drift specified in methods 8260 & 8270, 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.
- Y1 - Negative effects of the matrix from this sample on the instrument caused values for this analyte in the bracketing continuing calibration verification standard (CCVs) to be outside of 20% acceptance criteria. Because of this, quantitation limits and sample concentrations should be considered estimates.
- Z -
- ND - Not Detected at PQL
- PQL - Practical Quantitation Limit
- RPD - Relative Percent Difference





Chain of Custody

Page 1 of 2

Analytical Laboratory Testing Services 14648 NE 95th Street • Redmond, WA 98052 Phone: (425) 883-3881 • www.onsite-env.com																													
Company: <u>Hererra</u>																													
Project Number: <u>15-06211-000</u>																													
Project Name: <u>WW #20</u>																													
Project Manager: <u>George Ifthner</u>																													
Sampled by: <u>George Ifthner</u>																													
☐ Same Day ☐ 1 Day ☐ 2 Days ☐ 3 Days ☒ Standard (7 Days) ☐ _____ (other)																													
Turnaround Request (in working days)																													
Laboratory Number: 03-107																													
Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	Number of Containers																								
1	WW20S4-0	3/9/23	8:40	Soil	2	NWTPH-HCID	NWTPH-Gx/BTEX (8021 ☐ 8260 ☐)	NWTPH-Gx	NWTPH-Dx (Acid / SG Clean-up ☐)	Volatiles 8260	Halogenated Volatiles 8260	EDB EPA 8011 (Waters Only)	Semivolatiles 8270/SIM (with low-level PAHs)	PAHs 8270/SIM (low-level)	PCBs 8082	Organochlorine Pesticides 8081	Organophosphorus Pesticides 8270/SIM	Chlorinated Acid Herbicides 8151	Total RCRA Metals	Total MTCA Metals	Diss. RCRA Metals	TCLP Metals	HEM (oil and grease) 1664	Hardness	Hex chromium	% Moisture			
2	WW20S4-2		8:50		2			✓	✓					✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
3	WW20S4-5		9:00		2			✓	✓					✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
4	WW20S5-0		9:25		2			✓	✓					✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
5	WW20S5-2		9:35		2			✓	✓					✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
6	WW20S5-5		9:40		2																								
7	WW20S6-0		10:10		2			✓	✓					✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
8	WW20S6-5		10:20		2			✓	✓					✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
9	WW20SDUP1-0		10:30		2			✓	✓					✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
10	WW20G W2	✓	10:55	Water	11			✓	✓					✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Signature		Company		Date	Time	Comments/Special Instructions																							
<u>[Signature]</u>		<u>Hererra</u>		<u>3/9/23</u>	<u>18:00</u>	<u>GW - Dissolved metals were field filtered ✓</u> <u>soils hold for PCBs, TCLP</u> <u>(X) Added 3/21/23. DB (STA)</u>																							
Relinquished		Relinquished																											
Received		Received																											
Relinquished		Relinquished																											
Received		Received																											
Relinquished		Relinquished																											
Received		Received																											
Relinquished		Relinquished																											
Reviewed/Date		Reviewed/Date																											



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

Chain of Custody

Company: <u>Herrera</u> Project Number: <u>15-06211-006</u> Project Name: <u>WW #20</u> Project Manager: <u>George Ithier</u> Sampled by: <u>George Ithier</u>			Turnaround Request (in working days) ☐ Same Day ☐ 1 Day ☐ 2 Days ☐ 3 Days ☒ Standard (7 Days) ☐ (other) _____			Laboratory Number: 03-107																						
Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	Number of Containers																							
11	WW20S7-0	3/9/23	12:10	soil	2	NWTPH-HCID	NWTPH-Gx/BTEX (8021 ☐ 8260 ☐)	NWTPH-Gx	NWTPH-Dx (Acid / SG Clean-up ☐)	Volatiles 8260	Halogenated Volatiles 8260	EDB EPA 8011 (Waters Only)	Semivolatiles 8270/SIM (with low-level PAHs)	PAHs 8270/SIM (low-level)	PCBs 8082	Organochlorine Pesticides 8081	Organophosphorus Pesticides 8270/SIM	Chlorinated Acid Herbicides 8151	Total RCRA Metals	Total MTCA Metals	Diss RCRA metals	TCLP Metals	HEM (oil and grease) 1664	Hardness	Hex chromium	% Moisture		
12	WW20S7-5		12:20		2			✓	✓					✓	✓	✓	✓	✓	✓									
13	WW20S8-0		12:35		2			✓	✓					✓	✓	✓	✓	✓	✓									
14	WW20S8-5		12:45		2			✓	✓					✓	✓	✓	✓	✓	✓									
15	WW20S9-0		12:55		2			✓	✓					✓	✓	✓	✓	✓	✓									
16	WW20S9-2.5		13:05		2			✓	✓					✓	✓	✓	✓	✓	✓									
17	WW20S DOP2-2.5		13:15		2			✓	✓					✓	✓	✓	✓	✓	✓									
18	WW20GW1		14:20	water	1			✓	✓					✓	✓	✓	✓	✓	✓									
19	WW20GW DHP		14:00	water	1			✓	✓					✓	✓	✓	✓	✓	✓									
Signature		Company		Date	Time	Comments/Special Instructions																						
<u>[Signature]</u>		<u>Herrera</u>		<u>3/9/23</u>	<u>18:00</u>	GW - Dissolved metals were field filtered soils hold for PCBs, TCLP																						
Relinquished		Received		Reviewed/Date		Data Package: Standard ☒ Level III ☐ Level IV ☐ Chromatograms with final report ☐ Electronic Data Deliverables (EDDs) ☒																						

Herrera Environmental Consultants, Inc.

Internal Memorandum

Date: May 2, 2023
To: Project File 15-06211-000
From: Shannon McKernan
Subject: Data Quality Assurance Review of the Waterway 20 Phase II Sampling Data

This memorandum presents a review of data quality for 12 soil samples and two groundwater samples collected for the Waterway 20 project site (WW20) in Seattle, Washington on March 9, 2023. OnSite Environmental, Inc. (OnSite), of Redmond, Washington, analyzed the samples for:

- Gasoline-range petroleum hydrocarbons (Gx) by Ecology Method NWTPH-Gx
- Diesel- and lube oil-range petroleum hydrocarbons (Dx) by Ecology Method NWTPH-Dx
- Polyaromatic hydrocarbons (PAHs) by EPA Method 8270E/SIM
- Polychlorinated biphenyls (PCBs) by EPA Method 8082A
- Resource Conservation and Recovery Act (RCRA) metals (arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver) by EPA Methods 6010D and 7471B.
- Dissolved RCRA metals by EPA Methods 200.8 and 7470A
- Toxicity characteristic leaching procedure (TCLP) for lead (Pb) by EPA Methods 1311 and 6010D
- Hardness by EPA Methods 200.7 and SM2340B
- Hexavalent chromium (Cr VI) by EPA Method 7196A modified.

Results for the following samples were validated.

Sample ID	Lab SDG	Date Collected	Matrix	Analyses
WW20S4-0	2303-107/ 2303-107B	3/9/2023	Soil	Gx, Dx, PAHs, PCBs, RCRA Metals, Cr (VI)
WW20S4-2	2303-107/ 2303-107B	3/9/2023	Soil	Gx, Dx, PAHs, PCBs, RCRA Metals, TCLP Pb
WW20S5-0	2303-107/ 2303-107B	3/9/2023	Soil	Gx, Dx, PAHs, PCBs, RCRA Metals
WW20S5-2	2303-107/ 2303-107B	3/9/2023	Soil	Gx, Dx, PAHs, PCBs, RCRA Metals, TCLP Pb
WW20S6-0	2303-107/ 2303-107B	3/9/2023	Soil	Gx, Dx, PAHs, PCBs, RCRA Metals
WW20S6-5	2303-107	3/9/2023	Soil	Gx, Dx, PAHs, RCRA Metals
WW20SDUP1-0 (field duplicate of WW20S6-0)	2303-107	3/9/2023	Soil	Gx, Dx, PAHs, RCRA Metals
WW20SW2	2303-107/ 2303-107B	3/9/2023	Groundwater	Gx, Dx, PAHs, PCBs, RCRA Metals (total and dissolved), Hardness
WW20S7-0	2303-107/ 2303-107B	3/9/2023	Soil	Gx, Dx, PAHs, PCBs, RCRA Metals, Cr (VI)
WW20S7-5	2303-107/ 2303-107B	3/9/2023	Soil	Gx, Dx, PAHs, PCBs, RCRA Metals
WW20S8-0	2303-107/ 2303-107B	3/9/2023	Soil	Gx, Dx, PAHs, PCBs, RCRA Metals
WW20S8-5	2303-107/ 2303-107B	3/9/2023	Soil	Gx, Dx, PAHs, PCBs, RCRA Metals, TCLP Pb
WW20S9-0	2303-107/ 2303-107B	3/9/2023	Soil	Gx, Dx, PAHs, PCBs, RCRA Metals
WW20S9-2.5	2303-107/ 2303-107B	3/9/2023	Soil	Gx, Dx, PAHs, PCBs, RCRA Metals
WW20SDUP2-2.5 (field duplicate of WW20S9-2.5)	2303-107	3/9/2023	Soil	Gx, Dx, RCRA Metals
WW20GW1	2303-107	3/9/2023	Groundwater	Gx, Dx, PAHs, PCBs, RCRA Metals (total and dissolved), Hardness
WW20GWDUP (field duplicate of WW20GW)	2303-107	3/9/2023	Groundwater	Gx, Dx, PAHs, PCBs, RCRA Metals (total and dissolved), Hardness

The laboratory's performance was reviewed in accordance with quality control (QC) criteria established in the *Waterway #20 Sampling and Analysis Plan* (SAP) (Herrera 2022), by the laboratory, and in the specified methods.

Quality control data summaries submitted by the laboratories were reviewed; raw data were not submitted by the laboratories. Data qualifiers (flags) were added to the sample results in the laboratory reports. Data validation results are summarized below, followed by definitions of data qualifiers.

Custody, Preservation, Holding Times, and Completeness—Acceptable

The samples were properly preserved, and sample custody was maintained from sample collection to receipt at the laboratories. Nineteen samples were submitted to OnSite with seventeen samples indicated for select analysis on March 9, 2023 (results associated with lab work order 2303-107). Additional sample analysis was requested and indicated on the chain-of-custody (COC) forms on March 21, 2023 (results associated with lab work order 2303-107B). Two samples were submitted on hold and were not run for analysis. Samples were analyzed within the required method holding times. The laboratory reports were complete and contained results for all samples and tests requested on the COC.

Laboratory Assigned Data Qualifiers—Acceptable with Discussion

The laboratory assigned data qualifier U1 was assigned by the lab to work order 2303-107 to sample results for diesel range organics by NWTPH-Dx for soil samples WW20S4-2, WW20S5-0, WWW20S6-0, WW20S7-0, WW20S9-0, and WW20SDUP2-2.5. Per laboratory notes, the U1 qualifier indicates: "The practical quantitation limit is elevated due to interferences present in the sample." All results for these samples are reported as non-detect. No action is taken other than to note this.

Laboratory Reporting Limits—Acceptable with Discussion

The laboratory reporting limits met or were below the limits established in the SAP with the exceptions of gasoline-range organics, diesel-range organics, lube oil-range organics, RCRA metals, and/or PAHs in soil and/or groundwater. All reporting limits, however, were below the MTCA Method A criteria (WAC 173-340-900) listed in the SAP, where applicable. No data were qualified based on laboratory reporting limits.

Method Blank Analysis—Acceptable

Method blanks were analyzed at the required frequency. Method blanks did not contain levels of target analytes above the laboratory reporting limits.

Laboratory Control Sample Analysis—Acceptable

Laboratory control samples including blank spikes and blank spike duplicates (BS/BSD) were analyzed for water for PAHs, PCBs, and hardness and for soil for hexavalent chromium at the required frequency. The percent recovery (%R) values met the criteria established by the laboratory and SAP.

Surrogate Compound Analysis—Acceptable with Discussion

Surrogate compounds were added to all soil and groundwater samples analyzed for by methods NWTPH-Gx (fluorobenzene), NWTPH-Dx (o-terphenyl), PAHs, (2-fluorobiphenyl, pyrene-d10, and terphenyl-d14), and PCBs (DCB. The percent recovery (%R) values for all surrogate compounds met the criteria established by the laboratory or specified method.

The laboratory %R value criteria for DCB as a surrogate for PCBs in groundwater analyzed by EPA Method 8082A is 49 to 133%. Per the 2022 SAP, the %R criteria for PCBs in groundwater samples is 80 to 119%. All groundwater client samples analyzed by EPA Method 8082A met DCB %R values established by the SAP with the exception of duplicate pair WW20GW1 and WW20GWDUP (%R values of 131% and 130%, respectively) and laboratory batch spike blank sample SB0315W1 (124%). PCB results for all groundwater results in the associated lab batch (including client samples WW20GW1 and WW20GWDUP) are all non-detect. No action is taken other than to note this.

Matrix Spike Analysis—Acceptable

Matrix spike (MS) or matrix spike/matrix spike duplicate (MS/MSD) samples were analyzed for PAHs (client soil sample WW20S6-5), PCBs (client soil sample WW20S4-0), metals (client soil sample WW20S4-0, client water sample WW20GW2, and batch samples), TCLP lead (client soil sample WW20S8-5), hardness (batch water sample), and hexavalent chromium (client soil sample WW20S4-0) at the required frequency. The percent recovery values met the criteria established in the SAP and by the laboratory.

Laboratory Duplicate Analysis—Acceptable

Laboratory duplicate samples (or MS/MSD samples) were analyzed for TPH-Gx, TPH-Dx, PAHs, PCBs, metals hardness, TCLP lead, hexavalent chromium, and hardness. The relative percent difference (RPD) values met the control limits established in the SAP or by the laboratory.

Field Duplicate Analysis—Acceptable with Discussion

Field duplicates pairs for the sampling event included:

- WW20SDUP1-0 is a field duplicate of soil sample WW20S6-0
- WW20SDUP2-2.5 is a field duplicate of soil sample WW20S9-2.5
- WW20GWDUP is a field duplicate of groundwater sample WW20GW1

The relative percent difference (RPD) values met the control limits established in the SAP with the following exceptions:

- For soil duplicate pair WW20SDUP1-0 and WW20S6-0: RPD values for lead by EPA Method 6010D is greater than 20% and results are qualified as estimated (UJ/J). RPD values for pyrene, benzo(a)anthracene, chrysene, benzo(b)fluoranthene, benzo(a)pyrene, ideno(1,2,3-c,d)pyrene, dibenz(a,h)anthracene, benzo(g,h,i)perylene by EPA Method 8270E/SIM are greater than 34% and results are qualified as estimated (UJ/J).
- For soil duplicate pair WW20SDUP2-2.5 and WW20S9-2.5: RPD values for barium, chromium, and lead by EPA Methods 6010D are greater than 20% and results are qualified as estimated (UJ/J). RPD values for naphthalene, acenaphthylene, 2-methylnaphthalene, 1-methylnaphthalene, fluorene, phenanthrene, anthracene, fluoranthene, chrysene, benzo(b)fluoranthene, benzo(j,k)fluoranthene, ideno(1,2,3-c,d)pyrene, dibenz(a,h)anthracene, and benzo(g,h,i)perylene by EPA Method 8270E/SIM are greater than 34% and results are qualified as estimated (UJ/J).

RPD values for groundwater duplicate pair WW20GWDUP and WW20GW1 met the control limits for groundwater established in the SAP for gasoline analyzed by NWTPH-Gx and diesel range organics and lube oil analyzed by NWTPH-Dx (50%), PAHs analyzed by EPA Method 8270E/SIM (34%), total and dissolved metals analyzed by EPA Methods 200.8 and 7470A (20%), hardness by EPA Method 200.7/SM 2340B (20%), and PCBs analyzed by EPA Method 8082A (22%).

Definition of Data Qualifiers

The following data qualifier definitions are taken from the USEPA National Functional Guidelines for Inorganic Superfund Data Review (USEPA 2020).

- U** The analyte was analyzed for, but was not detected above the level of the adjusted detection limit of quantitation limit, as appropriate.
- J** The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.
- UJ** The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

References

Herrera. 2022. Final Sampling and Analysis Plan for Phase II Environmental Site Assessment, Waterway #20 Site. Prepared for City of Seattle Finance and Administrative Services Department, Seattle, Washington, by Herrera Environmental Consultants, Inc., Seattle, Washington.

USEPA. 2020. National Functional Guidelines for Inorganic Superfund Data Review. U.S. Environmental Protection Agency, Office of Superfund Remediation and Technology Innovation (OSRTI), Washington, D.C. (EPA-542-R-20-006).